STANDARD OPERATING PROCEDURES (SOP)
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SUBJECT: Hong Kong En-route Control Standard Operating Procedures

EFFECTIVE DATE: 5 AUG 2018

SCOPE: Outlines standard techniques for VATSIM online ATC service for controller staffing Hong Kong Radar positions within Hong Kong FIR

Contents

1. PURPOSE

1.1. This Standard Operating Procedure (SOP) sets forth the procedures for all controllers providing terminal airspace air traffic control service in the Hong Kong Terminal Airspace (TMA) to improve communication, techniques, and to distinguish procedures that are specific to the online environment.

2. ROLES AND RESPONSIBILITIES

2.1. The Office of Primary Responsibility (OPR) for this SOP is the team under the supervision of Manager (Standards and Publications). This SOP shall be maintained, revised, updated or cancelled by the Manager (Standards and Publications). Any suggestions for modification / amendment to this SOP should be sent to the Manager (Standards and Publications) for review.

3. DISTRIBUTION

3.1. This SOP is intended for controllers staffing ATC positions in the Hong Kong Area Radar sectors, as well as other controllers who interface with Hong Kong Area Radar controllers.

4. BACKGROUND

4.1. Over time, it has been observed that a written standard procedure is helpful to Hong Kong Area Radar controllers due to the vast knowledge required to control within this complex airspace. Due to operational differences between this online environment on VATSIM and that in the real world, it is also necessary to defines procedures that are specific to the online environment.

5. AIRSPACE

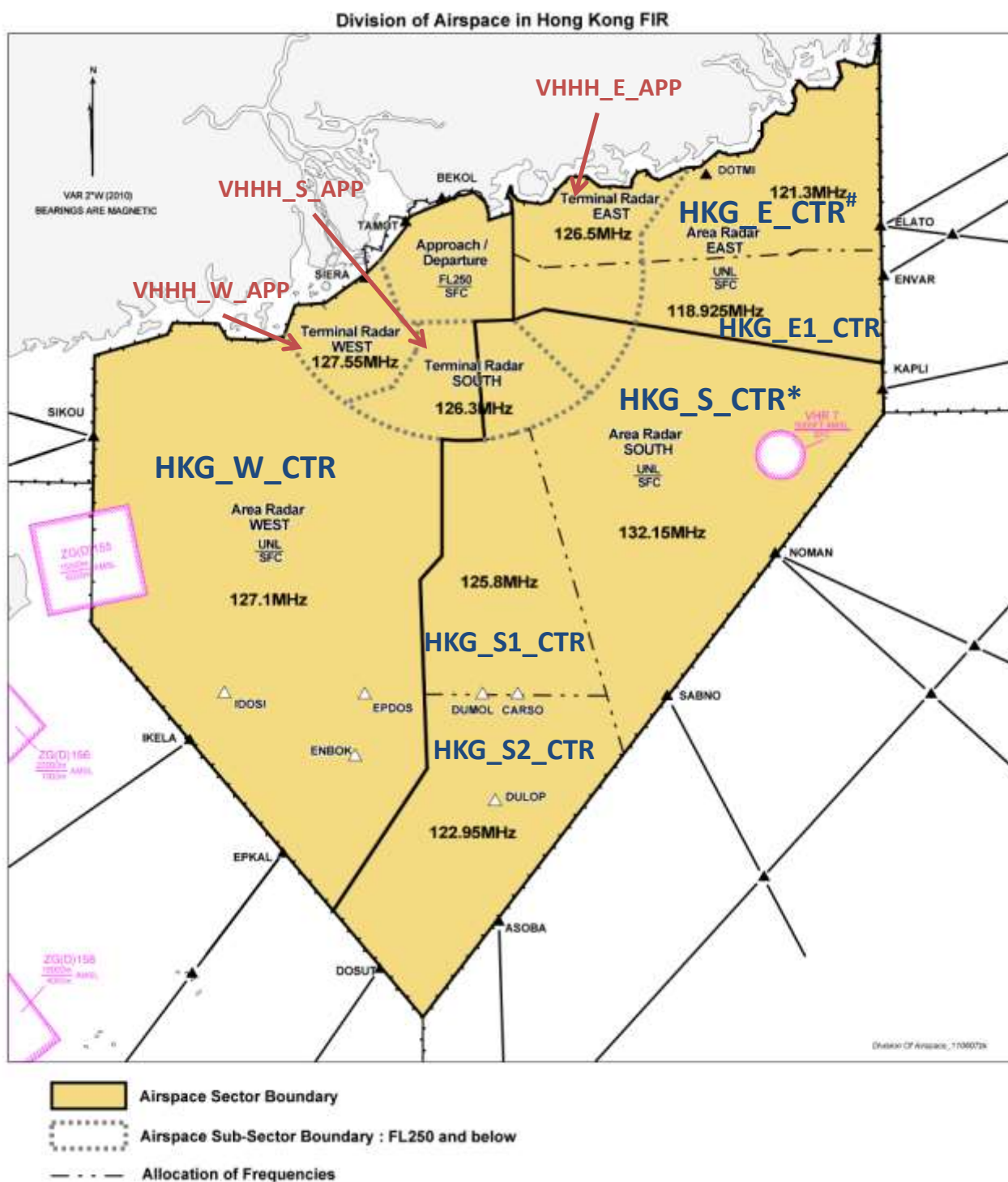### 5.1. Sectors of Hong Kong Radar

Figure 5.1: Division of airspace in Hong Kong FIR. (Source: Hong Kong AIP ENR3.1-15)

 # When HKG_E_CTR is the only Area Radar East sector online, it covers both sectors of Area Radar East.

* When HKG_S_CTR is the only Area Radar South sector online, it covers all three (3) sectors of Area Radar South.

5.2. FREQUENCIES

5.2.1. The following frequencies, text call sign and voice call sign shall be used at all times. Frequencies other than listed may not be used. *(Refer to AIP ENR 3.1)*

POSITION	TEXT CALL SIGN	VOICE CALL SIGN	FREQUENCY
Area Radar East	HKG_E_CTR	"Hong Kong Radar"	121.300
Area Radar East	HKG_E1_CTR	"Hong Kong Radar"	118.925
Area Radar South	HKG_S_CTR	"Hong Kong Radar"	132.150
Area Radar South	HKG_S1_CTR	"Hong Kong Radar"	125.800
Area Radar South	HKG_S2_CTR	"Hong Kong Radar"	122.950
Area Radar West	HKG_W_CTR	"Hong Kong Radar"	127.100

Text in red colour indicates primary frequency for the sector

**Terminal Radar positions are listed within the Terminal Airspace SOP (SOP004) document.*

5.1.1. When only one Area Radar controller is online, such controller shall use the **HKG_E_CTR** and frequency **121.300** to log in. Coverage will be the entire Area Radar airspace.

5.2. VERTICAL LIMITS

5.2.1. For areas above Terminal Radar sectors, the vertical limit for Area Radar sectors is above **FL250-Unlimited**. For other areas, the vertical limit is **SFC-Unlimited**. *(HKAIP ENR3.1 Section 4.2)*

5.2.2. When an Area Radar controller is providing coverage for Terminal Radar and/or Approach/Departure positions as per Section 5.5 of this SOP, the lower vertical limit may be extended below FL250. Controllers shall refer to SOP004 document for the vertical limits of Terminal Radar and Approach/Departure positions.

5.3. SECTORISATION

5.3.1. When two controllers covering the Area Radar airspace are online, depending on the current and upcoming traffic flow, the two controllers shall coordinate and decide on the sectorisation of the airspace. It is possible that one controller controls more than one sector at the same time.

5.3.2. Other sectorisation methods are possible and shall be arranged through prior coordination.

5.4. TOP-DOWN COVERAGE

5.4.1. If there is no controller online for terminal airspace, then Area Radar controller shall provide coverage to terminal airspace and, if applicable, aerodrome control service.

5.4.2. Pursuant to 5.4.1, if there is no aerodrome ATC available either at airfields within Hong Kong FIR, the Area Radar controller shall also provide aerodrome ATC service to all airfields, except Shek Kong Airfield (VHSK).

6. GENERAL INFORMATION

6.1. PRIOR TO CONNECTION

6.1.1. Prior to each connection, Area Radar controllers shall check the weather information at each aerodrome and, if coverage for aerodrome positions is necessary, determine the runway(s)-in-use at the relevant aerodromes.

6.1.2. Hong Kong Area Radar controllers shall make use of the Hong Kong VACC Discord channel to coordinate with aerodrome controller(s) and Terminal Airspace controller(s) if they are also online. When other Area Radar controllers are also online, the controller shall also make use of the Discord channel to arrange sectorisation of the positions. In addition, Area Radar controllers shall also check if other Area Radar controllers are already online. If so, arrangement of sectorisation shall be made prior to connection.

6.1.3. To coordinate with Area Radar controllers in neighbouring FIRs, Area Radar controllers at Hong Kong FIR may either use VATSEA Discord, intercom or private text message. The VATSEA Discord is encouraged for coordination with Manila Control controller(s) if that controller is also online on the VATSEA Discord server.

6.1.4. Area Radar controllers shall be familiar with all SIDs, STARs and IAPs into the three major aerodromes (VHHH, VMMC and VHHX) prior to connection. In particular, it is often the responsibility of the Area Radar controller to initial descent for aircraft at cruising altitude. If needed, they should have all the SID/STAR guides ready prior to connection.

6.1.5. Area Radar controllers shall also be familiar with **all handoff procedures** specified within all published Letters of Agreement (LOA) with neighbouring Flight Information Regions (FIR).

6.2. UNDERSTANDING SEPARATION

6.2.1. Area Radar controllers shall maintain a safe and sound separation between aircraft at all times. They shall understand that the airspace is three-dimensional (3D), hence in many cases both vertical and lateral separation shall be fully used. Area Radar controllers shall provide separation between all flights in Class A and Class C airspace (ICAO Doc. 4444 Section 5.2.1.1).

6.2.2. VERTICAL SEPARATION

6.2.2.1. RVSM vertical separation scheme shall be used within Hong Kong FIR:
- 1000 feet vertical separation at or below FL410, and;
- 2000 feet vertical separation above FL410, and;

6.2.2.2. According to Section 5.3.3.6 of ICAO Doc 4444, *"cruising levels of aircraft flying to the same destination shall be assigned in a manner that will be correct for an approach sequence at destination."*

6.2.2.3. According to Section 5.3.4.1 of ICAO Doc 4444, *"An aircraft may be cleared to a level previously occupied by another aircraft after the latter has reported vacating it, except*

when:

   a) severe turbulence is known to exist;

   b) the higher aircraft is effecting a cruise climb; or

   c) the difference in aircraft performance is such that less than the applicable separation minimum may result;
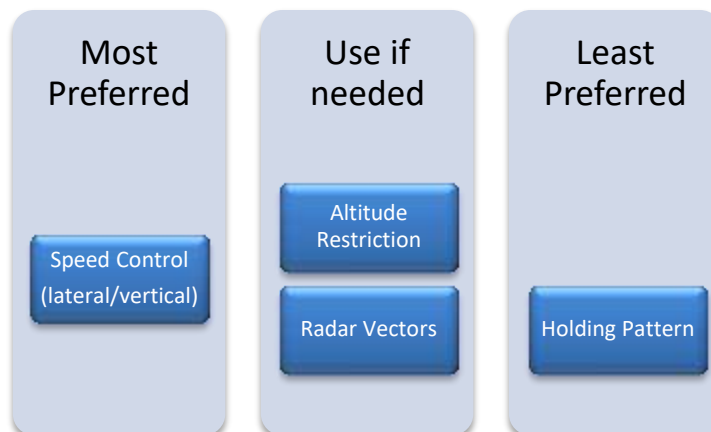
in which case such clearance shall be withheld until the aircraft vacating the level has reported at or passing another level separated by the required minimum."

6.2.3. LATERAL SEPARATION

6.2.3.1. The method of longitudinal separation based on distance using Distance Measuring Equipment (DME) and/or GNSS shall be used in Hong Kong FIR whenever possible as distances between aircraft are always readily available on the screen.

6.2.3.2. For aircraft on the same cruising level and on the same track, **20 nm minimum vertical separations** shall be provided. Except when the preceding aircraft maintains a true airspeed of **20 knots or more** faster than the succeeding aircraft, then **10 nm minimum vertical separations** may be applied. (Section 5.4.2.3 of ICAO Doc 4444)

6.2.4. Area Radar controllers shall attempt to use **speed control (lateral and horizontal)** for separation before deciding to use radar vectors or holding pattern. The priority shall be set as follows:

Most Preferred	Use if needed	Least Preferred
Speed Control (lateral/vertical)	Altitude Restriction	Holding Pattern
	Radar Vectors	

6.3. GENERAL KNOWLEDGE FOR HANDOFF

6.3.1. As per Section 5.3.3.1 of ICAO Doc 4444, Area Radar controllers may only assign one cruising level for an aircraft beyond the control area. No climbs or descend shall take place during a handoff unless agreement has been established prior to the handoff. The aircraft may request further climb or descend after contacting the accepting controller.

6.3.2. Area Radar shall not clear an aircraft to a waypoint beyond its control airspace. If deviation from flight plan route is necessary during a handoff, the controller shall notify the accepting controller prior to initiating the handoff.

6.3.3. Unless prior coordination is made with the en-route controller(s) of the neighbouring FIR, handoff procedures outlined with the respective LOAs shall always be observed.

7. DEPARTURE PROCEDURES

7.1. Area Radar controllers shall expect to receive handoffs from Terminal Radar controllers (or the APP controller acting as Terminal Radar Controller if only APP is available) as the departure aircraft approaches the ceiling of the terminal airspace or the boundary of the airspace, whichever the sooner. The Area Radar controller shall **clear the aircraft to the requested cruising altitude** within the flight plan as soon as possible in a safe and sound manner. If assigning an intermediate altitude is required due to traffic or weather, the Area Control shall explain the reason to the pilot.

7.2. Occasionally, the cruising altitude requested within the flight plan can be incorrect due to errors by previous controllers. In that case, the Area Radar controller shall confirm with the pilot the closest correct altitude can be accepted before assigning a new altitude.

7.3. As the majority of the departure flights from aerodromes within Hong Kong FIR will cross the boundary of Hong Kong FIR, Area Radar controllers shall ensure that a **proper cruising altitude** is assigned to the aircraft when it crosses the Transfer of Control Point (TCP) between Hong Kong FIR and a neighbouring FIR. These altitudes are listed in the respective Letters of Agreement (LOA).

8. ARRIVAL PROCEDURES

8.1. INITIATING DESCENT FOR ARRIVAL AIRCRAFT

8.1.1. There are two ways the calculate the top of descent (TOC) distance from the arrival aerodrome:

8.1.1.1. The explicit way:

(Source: http://www.flightsimaviation.com/rule-of-thumb/14_Top_of_Descent_Distance_Calculation.html)

Step 1: *Time to descend can be calculated by dividing the difference between cruise altitude and descent altitude (the altitude the aircraft needs to reach) by the rate of descent.*

Step 2: *Multiple the time to descend by the ground speed in cruise. Then, divide the result by 60. (dividing by 60 converts the unit of time from minutes to hours)*

Example:

Cruise altitude – FL380

Needs to reach FL130 by MUSEL

Average rate of descent – 1500 ft/min

Ground speed at cruise – 490 kts

$$\frac{38000ft - 13000ft}{1500ft/min} = \textit{16.7 min}$$

$$\frac{16.7\,min * 490nm/hour}{60\,\frac{min}{hour}} = \textit{136nm}$$

Therefore, <u>the descent should start about 136nm from MUSEL</u>. Controller shall note that this assumes does not slow down from the speed in cruise. The distance needed should be less if speed reduction is taken into consideration.

8.1.1.2. The simplified way: (derived from the above formula)

(Source: VATUSA Training http://www.vatusa.net/training/tiki-index.php?page=C1+Training)

Step 1: Determine the vertical distance needed to travel by subtracting the desired altitude from the aircraft current altitude.

Step 2: Dropping the thousands in the altitude

Step 3: Multiply the result by a number between 4 and 5. (4 is a bit more ambitious; 4.5 moderate; 5 gives a longer descent distance)

Example:

Cruise altitude – FL380

Needs to reach FL130 by MUSEL

$$\frac{38000ft - 13000ft}{1000} = \textit{25}$$

25 X 4 = 100nm (multiplying by 4)

25 X 5 = 125nm (multiplying by 5)

Therefore, the aircraft will have to start descending <u>between 100nm and 125nm</u> from MUSEL. Controller shall note that these numbers are less than the result of Example 1. The multiplying factor has taken speed reduction into consideration.

8.1.2. When assigning descent altitude, controllers shall **only assign an altitude within their**

sectors. When traffic permits, Area Radar controllers may assign a lower altitude within the sector of Terminal Radar or Approach. In such case, the Area Radar controller shall be responsible for confirming with the controller responsible for the lower altitude prior to altitude assignment.

8.2. PHRASEOLOGIES FOR INITIATING DECENT

Phraseology:

Initiating descent:

When assigning an lower altitude with a waypoint reference,

Area Radar Controller: *(Callsign)* **DESCEND TO REACH** *(altitude/flight level)* **BY** *(waypoint), or;*

        (Callsign) **DESCEND TO** *(altitude/flight level),* **REACH BY** *(waypoint).*

When assigning an lower altitude without a waypoint reference,

Area Radar Controller: *(Callsign)* **DESCEND TO** *(altitude/flight level)*.

Examples:

HKG_E_CTR: CATHAY 420, DESCEND TO REACH FL130 BY MUSEL.

HKG_E_CTR: CATHAY 420, DESCEND TO FL300.

8.3. HANDING OFF TO TERMINAL RADAR CONTROLLERS

8.3.1. Area Radar controller shall begin the handoff process as an aircraft approaches the airspace of Terminal Radar. Controllers shall be aware of the vertical and lateral limits of the airspace.

Example: An aircraft that is flying at a level above FL250 above the Terminal Radar airspace is not in the Terminal Radar airspace, even though it may appear to have crossed the boundary of the Terminal Radar sector.

9. TRANSIT PROCEDURES

9.1.   Many aircraft transit through the airspace of Hong Kong FIR without landing or departing from any of the aerodrome of Hong Kong FIR. This is considered **Transit Traffic**. Transit aircraft on VATSIM shall comply with all airway restrictions as published in the Hong Kong AIP, all LOA documents and all SOP documents.

9.2.   Pursuant to Section 9.1, transit aircraft accepted from VATPRC ATC shall thus be flying at appropriate levels once entering Hong Kong FIR. If the aircraft has not already been assigned an acceptable level and is still flying at metric levels, Area Radar controller shall assign the nearest acceptable level when traffic permits.

9.3.   Area Radar controllers shall be reminded that transit aircraft landing at an aerodrome near the boundary of Hong Kong FIR after exiting Hong Kong FIR may be required to cross the Transfer of Control Point below the level of cruise of the aircraft. These altitudes are usually listed in the respective Letter of Agreement (LOA). Examples of these aerodromes including: ZGOW, ZSAM, ZGGG, ZGSZ, ZGSD, ZJSY and ZJHK.

RECORD OF REVISION

DATE	REV.	REVISION CONTENT	APPROVAL
31 Jul 2018	**1**	• **Changes in Content**	**B.BROWN**