STANDARD OPERATING PROCEDURE (SOP)
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SUBJECT: Hong Kong Airspace Introductory Guide

EFFECTIVE DATE: 28 NOV 2024

SCOPE: Discussion of the structure and classification of the Hong Kong Flight Information Region (FIR) airspace for the understanding of controllers who are new to the airspace.

1. PURPOSE

1.1. This Standard Operating Procedure (SOP) discusses in detail the airspace structure, airways and airspace classification of the airspace in Hong Kong FIR in the context of VATSIM online controlling.

2. ROLES AND RESPONSIBILITIES

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

3. DISTRIBUTION

3.1. This SOP is intended for controllers staffing ATC positions within Hong Kong FIR, particularly those who are unfamiliar with the airspace structure of the FIR.

4. BACKGROUND

4.1. Over time, it has been observed that a written guide is helpful to the new controllers at Hong Kong vACC to understand the complex structure of the airspace. Due to operational differences between this online environment on VATSIM and that in the real world, it is also necessary to define procedures that are specific to the online environment.

5. LOCATION AND COVERAGE

5.1. Location of Hong Kong FIR

5.1.1. Hong Kong Flight Information Region (VHHK FIR) is situated in Southeast Asia, sharing its border with five neighbouring Flight Information Regions: Taipei FIR (RCAA), Guangzhou FIR (ZGZU), Shanghai FIR (ZSHA), Sanya FIR (ZJSA) and Manila FIR (RPHI).

5.2. Controlled Airfields

5.2.1. On VATSIM, Hong Kong vACC provides ATC service to the following 3 airfields:

- Hong Kong International Airport (VHHH)
- Macau International Airport (VMMC)
- Kai Tak International Airport (formerly Hong Kong International Airport) (VHHX)
  (Note: Kai Tak International Airport (VHHX) was closed permanently in 1998. However, because of popularity and historical importance, ATC service is provided to that airport on VATSIM)

5.2.2. In addition to the aerodromes mentioned in 5.2.1, there are various uncontrolled aerodromes and helipads across Hong Kong FIR, including but not limited to:

- Shek Kong Airfield (formerly RAF Shek Kong) (VHSK)
- Sky Shuttle Heliport (VHSS) (refer to AD 3 of AIP Hong Kong for details)
- Macau Heliport (VMMH) (refer to AD 3 of AIP Macau for details)

6. AIRSPACE CLASSIFICATION

6.1. In brief, the navigable airspace is divided into various classes by the definition specified by the International Civil Aviation Organisation (ICAO). Generally, the navigable airspace can be divided into either **Controlled Airspace** or **Uncontrolled Airspace**, under each of which the airspace is further divided into different classes. Each of these classes of airspace correspond to the types of flight rules permitted and the extent of ATC service provided. The following table lists each type of airspace and their characteristics:

CONTROLLED AIRSPACE

Class A	**IFR flights only** are permitted; all flights are provided with air traffic control service and are separated from each other.
Class B	**IFR and VFR flights** are permitted; all flights are provided with air traffic control service and are separated from each other.
Class C	**IFR and VFR flights** are permitted, all flights are provided with air traffic control service and IFR flights are separated from other IFR flights and from VFR flights. VFR flights are separated from IFR flights and receive traffic information in respect of other VFR flights.
Class D	**IFR and VFR flights** are permitted, all flights are provided with air traffic control service, IFR flights are separated from other IFR flights and receive traffic information in respect of VFR flights, VFR flights receive traffic information in respect of all other flights.
Class E	**IFR and VFR flights** are permitted; IFR flights are provided with air traffic control service and are separated from other IFR flights. All flights receive traffic information as far as is practical. Class E shall not be used for control zones.

UNCONTROLLED AIRSPACE

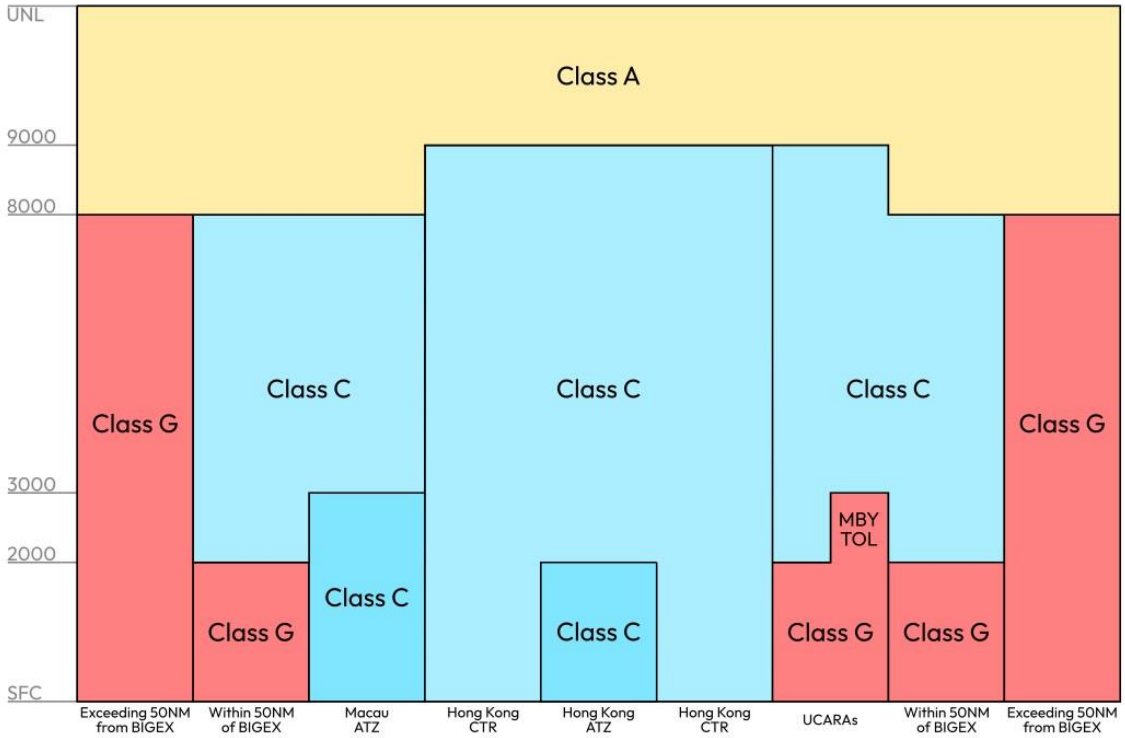
Class F	**IFR and VFR flights** are permitted, all participating IFR flights receive an air traffic advisory service and all flights receive flight information service if requested.
Class G	**IFR and VFR flights** are permitted and receive flight information service is requested.

6.2. Within Hong Kong FIR, there are 3 classes of airspace present: **Class A, Class C**, and **Class G**. These classifications are particularly important to the control of traffic flying under Visual Flight Rules (VFR) and Special Visual Flight Rules (SVFR) (Note: Controllers shall refer to SOP006 for the differences between VFR and SVFR).

6.3. According to ENR 1.4 of AIP Hong Kong, the following is the airspace classification of Hong Kong FIR.

Airspace	Levels	Classification
Within 50 NM of BIGEX (excluding airspace within and above Hong Kong CTR and UCARAs)	Between 8000ft and UNL Between 2000ft and 8000ft Between SFC and 2000ft	A C G (note 1)
Exceeding 50 NM from BIGEX but within Hong Kong TMA	Between 8000ft and UNL Between SFC and 8000ft	A G (note 1)
Above Hong Kong CTR	Between 9000ft and UNL	A
Hong Kong CTR	Between SFC and 9000ft	C
Above UCARAs	Between 9000ft and UNL Between upper limits of UCARA and 9000ft	A C
UCARAs	Between SFC and upper limits of UCARA	G (note 1)
Airspace south of Hong Kong TMA	Between 8000ft and UNL Between SFC and 8000ft	A G (note 2)

1. Two-way communications required.
2. Two-way communications not required south of Hong Kong TMA.



6.4. According to ENR 1.2 of AIP Hong Kong, flights under VFR and SVFR may take place within Class C airspace and Class G airspace of Hong Kong FIR, subject to ATC clearance.

6.5. Within the Class C airspace designated as Hong Kong Control Zones (Hong Kong CTR), all VFR and SVFR traffic are to maintain communication with ATC and report entering each individual CTR zone. A detailed discussion of such procedure can be found in the SOP006 document.

7. AIRWAYS

7.1. Airways connect one waypoint to another within a specific airspace. Analogous to highways and freeways in driving, airways many times have requirements regarding altitude, aircraft type, navigational equipment on board etc.

7.2. Airway Designators

7.2.1. According to Appendix 1 of ICAO Annex 11, an Air Traffic Service (ATS) route designator usually has a maximum of FIVE (5) alphanumerical characters. The designator provides information such as high/low altitude, navigational performance and aircraft type, and identifies an airway in an unambiguous manner. The designator usually begins with a letter, followed by a number from 1 to 999.

7.2.2. The first letter of the designator is selected based on the following requirement: (source: Appendix 1 of ICAO Annex 11)

FIRST LETTER	PURPOSE
A, B, G, R	For routes which form part of the regional network of ATS routes and are not area navigation routes (RNAV).
L, M, N, P	For area navigation routes (RNAV) which form part of the regional networks of ATS routes.
H, J, V, W	For routes which do not form part of the regional network of the ATS routes and are not area navigation routes (RNAV).
Q, T, Y, Z	For area navigation routes which do not form part of the regional network of ATS routes (RNAV).

7.3. ATS routes within Hong Kong FIR

7.3.1. For a detailed list of all waypoints within an ATS route, controllers shall refer to ENR 3.1 of AIP Hong Kong.

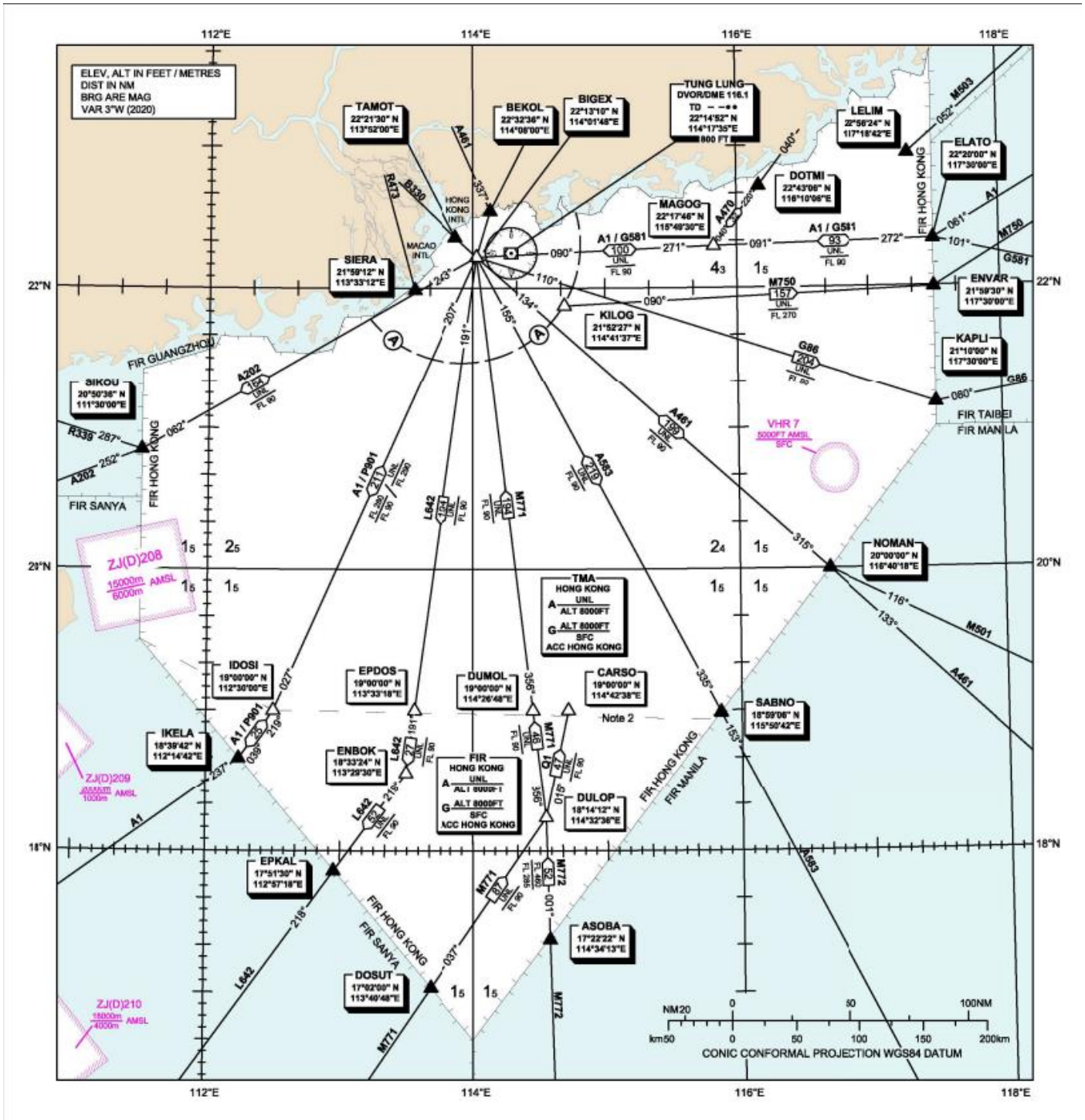


Figure 7.1: Hong Kong FIR Enroute Chart (AIP ENR 6-1)

7.3.2. Controllers shall instruct transit traffic to follow ATS routes as shown below. For more information, please refer to AIP **ENR 6-2**.

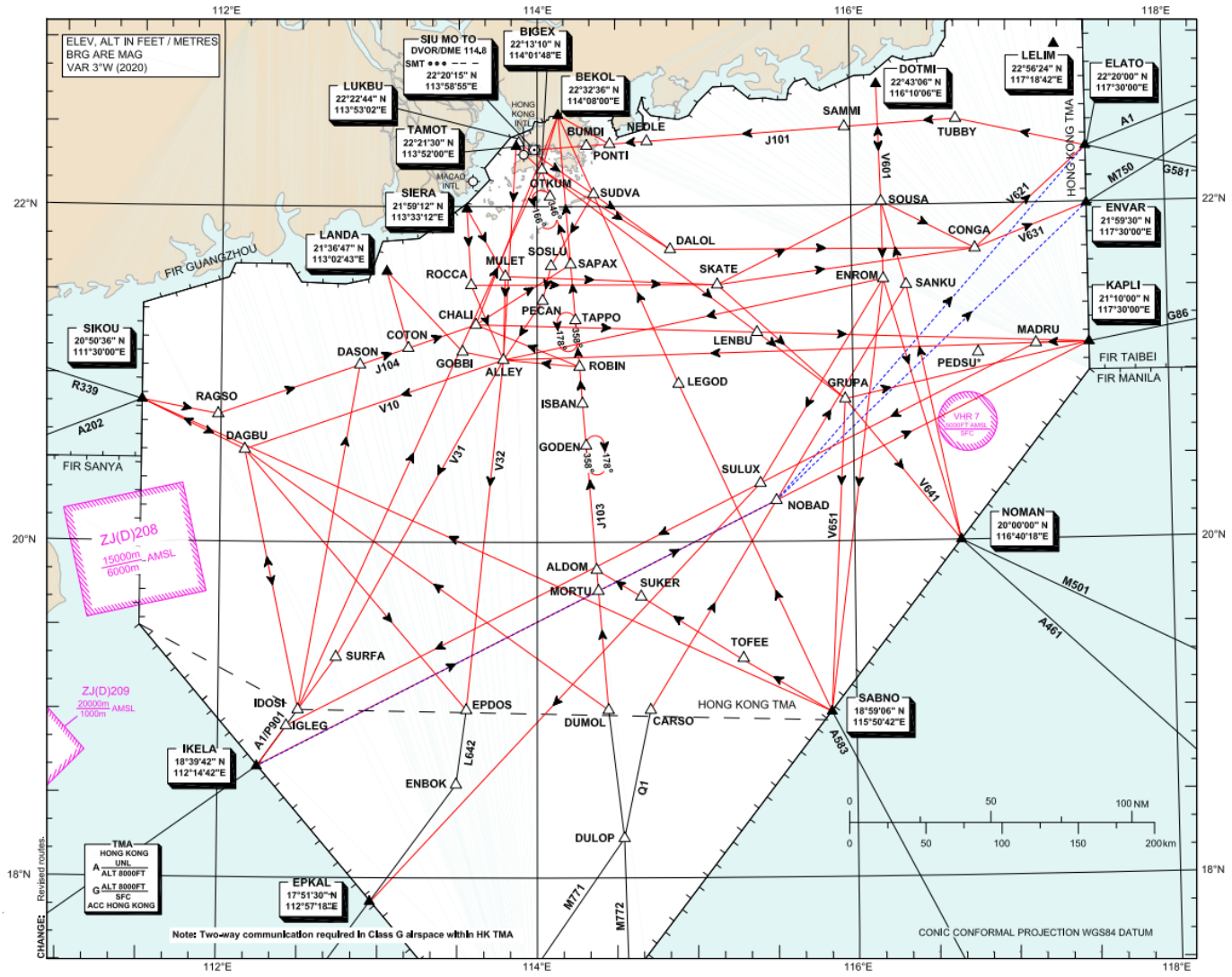


Figure 7.2: Hong Kong FIR ATS Routes (AIP ENR 6-2)

7.3.3. Restrictions

(source: Section 1, ENR 3.1, AIP Hong Kong)

AIRWAY	RESTRICTION
A1	Min ALT: 8000ft Between IKELA and BIGEX: ALT 8000ft to FL285 EASTBOUND at ELATO: FL270 or below
A202	Min ALT: 8000ft Traffic overflying Bangkok not permitted on this route
A461	Between NOMAN and BIGEX: 8000ft to UNL (Class A); both directions Between BIGEX and BEKOL: 4500ft to 8000ft (Class C), 8000ft to UNL (Class A); Northbound only.
A470	Min ALT: 8000ft
A583	Min ALT: 8000ft
B330	Between TAMOT and BIGEX: 6000ft to 8000ft (Class C), 8000ft to UNL (Class A) One-way route normally for southbound traffic only. Northbound for traffic transiting Hong Kong FIR and landing Guangzhou (ZGGG).
G86	Min ALT: 8000ft

7.3.4. Handoff Procedures

7.3.4.1. Controllers shall consult the respective Letter of Agreement (LoA) for methods and altitudes of handoff at Transfer of Control Points (TCP) along the boundary of Hong Kong FIR. There is normally no need for transfer between En-route positions and Terminal airspace positions on traffic flying on ATS routes.

8. TERMINAL TRANSITION ROUTES

8.1. There are two primary functions of **Terminal Transition Routes (TTR)** within Hong Kong FIR:

8.1.1. Connecting the terminating point of a Standard Instrument Departure (SID) to a waypoint on the boundary of Hong Kong FIR, and;

8.1.2. Connecting a waypoint on the boundary of Hong Kong FIR to the initial point of a Standard Terminal Arrival Route (STAR).

8.2. Within Hong Kong FIR, each TTR serves either Hong Kong International Airport (VHHH) or Macau International Airport (VMMC), or both in some cases. Additionally, some routes are also used by transit traffic. TTRs that begin with a "V" designator indicate that it serves VHHH or both VHHH and VMMC, while TTRs that begin with a "J" designator indicate that it serves VMMC only. Further, for TTRs with a "V" designator, if there are one or two numeric digits (or a number starting with 600 following the designator) that follow the designator (e.g. V601, V12, V31 etc.), such implies the TTR is a departure TTR, while if there exists a number starting with 500 following the designator (e.g. V512, V571 etc.), such indicates that the TTR is an arrival TTR.

8.3. For a list of all waypoints and their corresponding coordinates on each TTR within Hong Kong FIR, controllers should consult Section 2 of **ENR 3.1** of AIP Hong Kong.

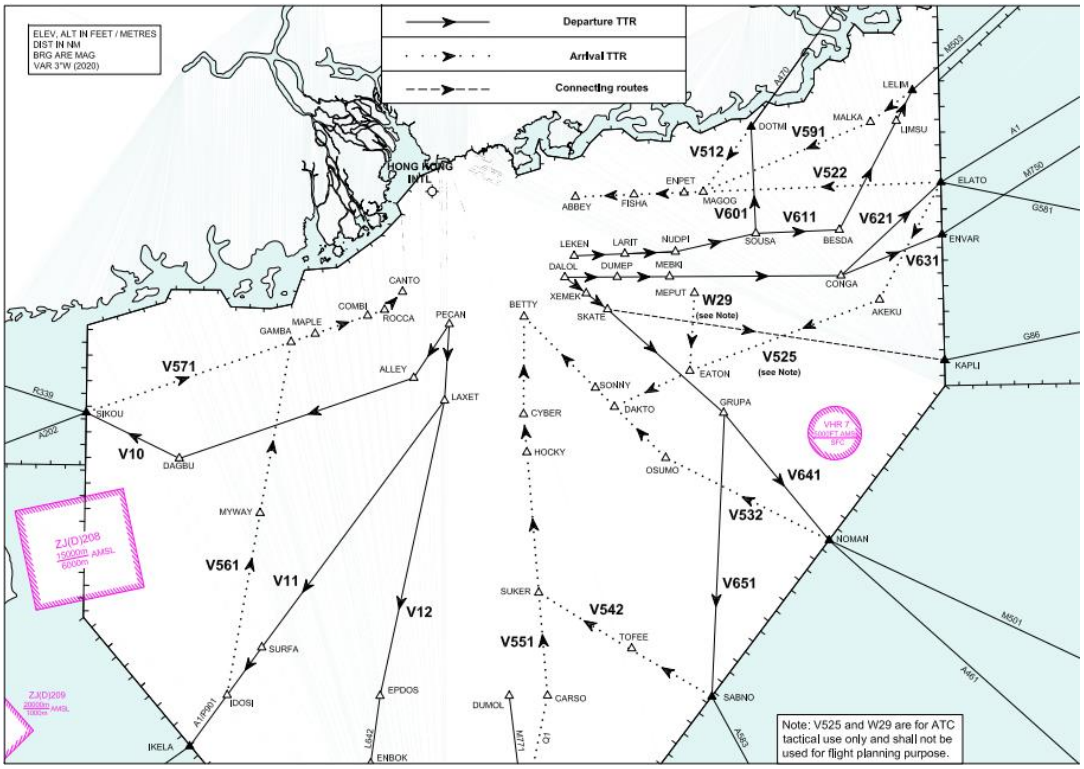


Figure 8.1: TTR routes for VHHH within Hong Kong FIR. (AIP Hong Kong, ENR 6-5)

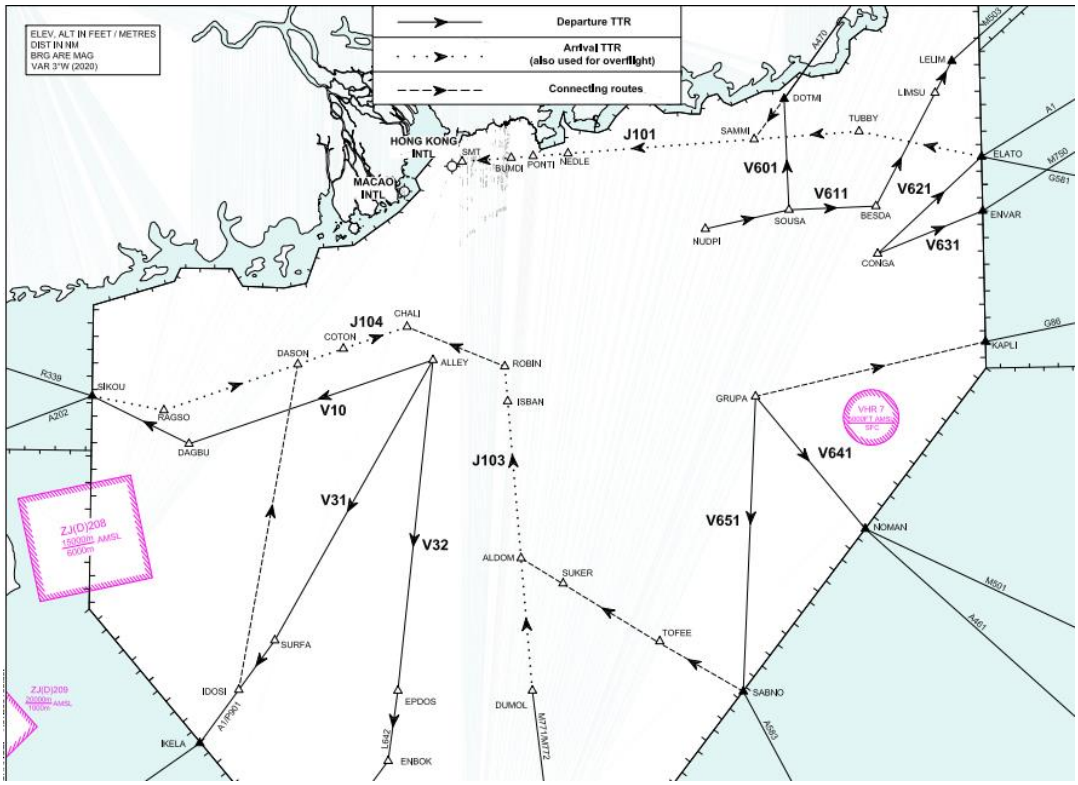


Figure 8.2: TTR routes for VMMC within Hong Kong FIR. (AIP Hong Kong, ENR 6-6)

9. RADAR SEPARATION

9.1. UNDERSTANDING SEPARATION

9.1.1. Controllers using radar control 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. Such controllers shall provide separation between all flights in Class A and Class C airspace (ICAO Doc 4444 Section 5.2.1.1).

9.1.2. Section 8.8 of the Controller Training Manual (HKVACC-TM-GEN-001) provides a detailed discussion of the various separation methods available to controllers using radar control. Controllers shall use such manual for reference concerning separation methods. However, in this document, important concepts are highlighted.

General Rule of Thumb for Radar Separation:
(Excerpt from Section 8.8 of the Controller Training Manual HKVACC-TM-GEN-001)

1. Have a clear strategy what you want the pilot to do. Order and contrary orders lead to confusion and frustration.
2. Consider what implications your instructions have. It's not a good idea to give a pilot clearance to land if you at the moment before gave another pilot instruction to line up on the same runway.
3. Talk clearly and not too fast. It may sound "cool" talking fast but it often leads to misunderstanding which makes it slower.
4. Use standard phraseology. This reduces the risk of misunderstanding and confusion.
5. Listen to the readback carefully as it was the first time the instruction was given. Mistakes happen easily.
6. Act immediately if a conflict can occur. Don't wait until the conflict is developing. An aircraft doesn't turn immediately when given the instruction, the pilot needs to hear the instruction, act on it and then the aircraft starts turning.
7. Don't take on more than you can manage. Take a position which you feel you manage and ask for help if you need it and there is someone available. That was the "software" which always is the most important.

9.1.3. VERTICAL SEPARATION

9.1.3.1. 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;

9.1.3.2. 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 the destination."

9.1.3.3. 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."

9.1.4. LONGITUDINAL SEPARATION

9.1.4.1. 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.

9.1.4.2. The following excerpt from the Controller Training Manual provides a guideline for lateral separation:

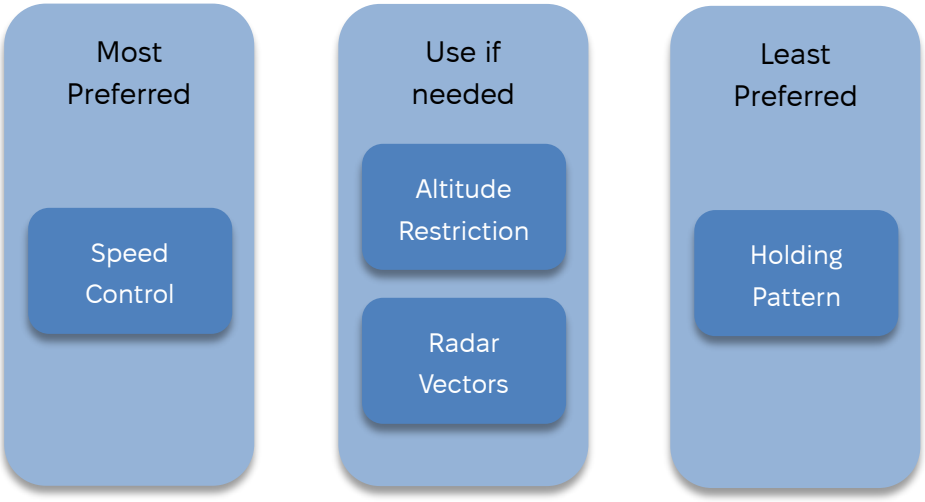
Lateral Separation Minima:
(Excerpt from Section 8.8.2 of the Controller Training Manual HKVACC-TM-GEN-001)
The basic rule is that there should be at least **5 nm horizontal separation** in all directions. You can therefore imagine a circle around all aircraft with 2.5 nm radius to reach the 5 nm requirement.

There are situations when the 5 nm separation can be overruled. One situation is when two aircraft are on final for landing. In this case **3 nm separation** is sufficient. (not regarding wake turbulence separation) Other rules may apply.

It is however not recommended to use this small separation even in this situation.

9.1.4.3. As a reference for Area Radar controllers, for aircraft on the same cruising level and on the same track, **20 nm minimum longitudinal separation** 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 longitudinal separation** may be applied. (Section 5.4.2.3 of ICAO Doc 4444)

9.1.5. Controllers shall attempt to use **speed control** for separation before deciding to use radar vectors or holding patterns. The priority shall be set as follows:



9.2. UNDERSTANDING SPEED CONTROL

(Excerpt from Section 8.8.6 of the Controller Training Manual HKVACC-TM-GEN-001)
An aircraft needs to maintain a certain speed to not fall to the ground. The minimum speed is mainly **dependent on the weight of the aircraft**. There are also other factors, so it is not always possible for a pilot to slow down or speed up to the instructed speed. It is the pilot's responsibility to inform you of this.

In that case, you must separate him from other aircraft by other means. In aircraft performance tables, there are several speed restrictions given, but only two are of interest for the controller. The first is "**minimum clean**" which is the lowest speed an aircraft can maintain without using flaps or spoilers.

The second is "**minimum approach speed**" which is the lowest speed an aircraft can maintain using both flaps and spoilers.

Avoid a giving pilot who is flying using his flaps a speed instruction which forces him to again retract his flaps.

Apart from the specific aircraft's speed restrictions, there are speed restrictions common for all aircraft. By following these, you need not study the specific aircraft's specifications:

Aircraft at FL280 – FL100:
Do not give a speed restriction below 250 knots or corresponding Mach.

Aircraft below FL100:
Turbo jet: Not slower than 210 knots, except when within 20 nm from runway, in that case not slower than 170 knots.
Turbo prop: Not slower than 200 knots, except when within 20 nm from runway, in that case not slower than 150 knots.

Departing traffic (if speed restrictions really are necessary):
Turbo jet: Not slower than 230 knots.
Turbo prop: Not slower than 150 knots.
Helicopter: Not slower than 60 knots.

RECORD OF REVISION

DATE	REV.	REVISION CONTENT	APPROVAL
03 AUG 2018	1	Added visual chart for Hong Kong Airspace Section 6.3	B. BROWN
24 JUN 2020	2	Added section 7.3.2 Added figure 7.2	J. CHENG
01 DEC 2021	3	Updated figure 7.2	J. CHENG
03 APR 2024	4	Updated figures and diagrams Updated section 8.2	T. SIU
28 NOV 2024	5	Updated TTR Diagrams	T. SIU