# Approach Controller Training Materials

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ATC OPERATION DEPARTMENT

Author: Dennis Lam
Mickey Ma

# Role Clarity

## TMA Overview

A 'TMA', or Terminal Maneuvering Area, is an area of airspace that surrounds a major aerodrome, such as Melbourne or Sydney (wherever a radar tower exists). TMA controllers are responsible for all aircraft operating in this airspace. Exact dimensions vary and these will be discussed in the 'Airspace awareness' competency.

TMA controllers use radar to process a variety of aircraft movements, which typically include:

- Arrivals and departures to and from the aerodrome in the control area.
- IFR training flights conducting practice instrument approaches ( Not common in Hong Kong )
- VFR flight following ( Not Available in Hong Kong )

Online, most of your work as a TMA controller will be focused on arrivals & departures to and from the major aerodrome. Key duties include:

- providing descent instructions to arriving aircraft and positioning them for an approach to land
- using radar vectors (turns) and intermediate climb/descent levels to positively separate aircraft
- using speed control and vectors to adjust the arrival sequence
- transferring arrivals to TWR once established on approach
- providing climb instructions to departing aircraft and establishing them on their planned route
- transferring departures to Enroute (CTR) sectors once established on route

## Operating a TMA position

The default position for TMA control is Approach (APP) and this position should be opened in preference to Departures (DEP). A single TMA controller will log on as APP and handle arrivals and departures. During busy periods, TMA airspace may be divided into two or more parts, with APP managing one part and DEP managing the other. Typically the airspace is divided by a line perpendicular to the duty runway; APP handling what is nominally called the "arrival" airspace and DEP handling the "departure" airspace.

A common misconception is that when both APP & DEP are operating, APP only handles arriving aircraft and DEP only handles departing aircraft. This is

**not** correct; the two positions are not allocated aircraft on this basis. Instead, both positions are assigned a portion of TMA airspace and manage all traffic (whether arriving or departing) that flies through that portion.

## Providing aerodrome services in the absence of TWR

Online, you will experience times where you are operating an APP position without a TWR at the major aerodrome within your airspace. You may, subject to workload, extend your coverage to provide aerodrome control services to aircraft on the ground. At a minimum, we recommend providing an airways clearance and takeoff instruction to ensure an orderly flow of traffic entering your airspace.

## Know your airspace

Although there are only two classes of airspace in Hong Kong, it is still really important to know the vertical and horizontal boundaries of the different classes of airspace within the TMA. Aircraft will often transition from one class to another, and you must be able to provide the correct service for the class of airspace in which the aircraft is operating.

The horizontal boundaries of control area steps are shown in the controller client sector files, however vertical boundaries are not depicted. These can be sourced from various chart source offline and online but are proprietary and cannot be reproduced here.

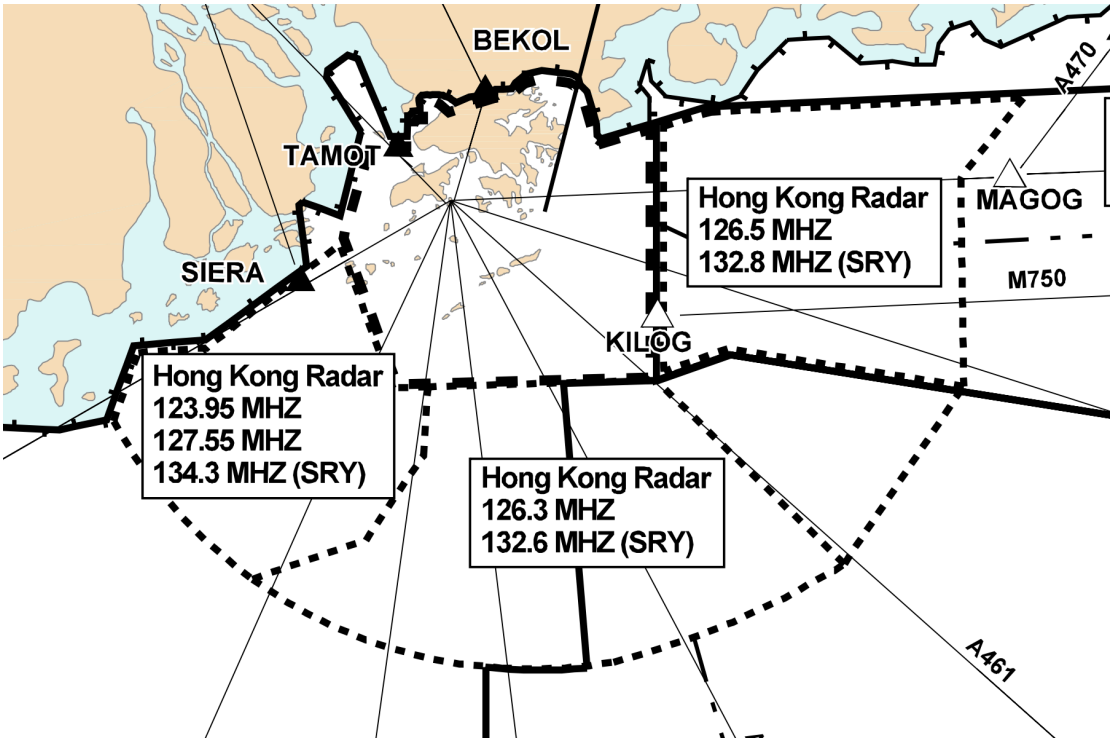


Fig 1. The TMA ( including Terminal Radar Controlled Region ) in Hong Kong.

## Application advanced altimetry concepts

**Altimetry refresher**

This competency builds on the information you covered as part of the Tower rating. Here is a diagram to refresh your memory of local & area QNH, altitudes and flight levels, and the transition layer:

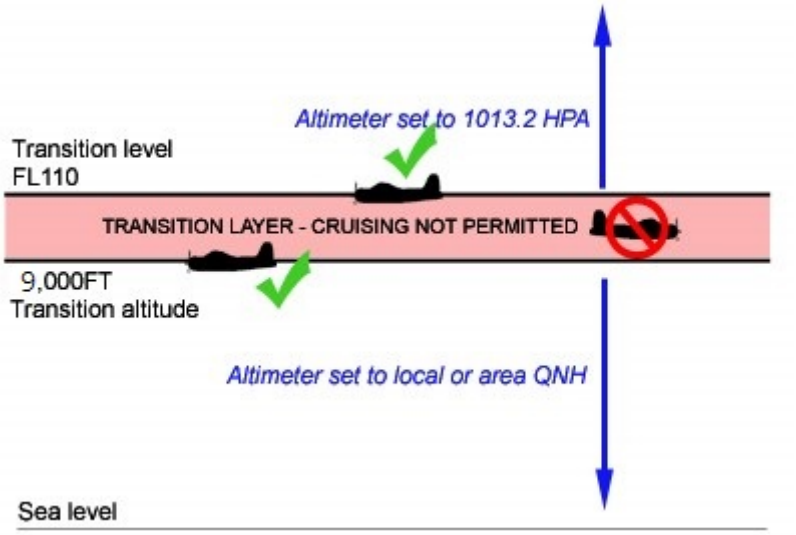


Fig 2. ( Source: Internet )

Recall also that **Local QNH** is specific to a controlled aerodrome and is found in the aerodrome METAR. It is used by ATC and quoted in the ATIS. By contrast, **Area QNH** is issued as part of an Area Forecast, which provides meteorological information for a defined area of operation (often hundreds of square miles). It is an average QNH over the area covered. Area QNHs are not available online with IVAO, and is therefore necessary to use the nearest local QNH as a reference point for issuing an Area QNH.

### Issuing QNH to aircraft

Follow the following rules when issuing QNH to an aircraft:
1. Issue QNH to aircraft above the transition layer when you assign descent to a level below the transition layer.
2. Issue **local** QNH to aircraft inbound to a **controlled** aerodrome.
3. Issue **area** QNH to aircraft inbound to an **uncontrolled** aerodrome, or aircraft departing to cruise at a level below the transition layer.

### Cruising in the transition layer - ATC responsibility

You will remember from the Tower module that cruising in the transition layer is not permitted. As a controller, you are required to alert pilots if they attempt to cruise within the transition layer (for example: a VFR aircraft at 10,500FT).

This seems simple enough, except that the transition layer changes when the Area QNH drops below 1013. When Area QNH is 1013hpa or greater, there is a 1000FT buffer between the transition level (FL110) and the transition altitude (9000FT). However, when the Area QNH drops below 1013, the buffer shrinks. To preserve a minimum of 2000FT separation between the transition level and transition altitude, certain flight levels become unavailable for cruising.

## Identification and Verification of Aircraft

### What is Mode C?

Mode C (or Mode Charlie) is a setting on an aircraft's transponder that allows radar to interrogate and calculate the aircraft's level. Online, pilots have two transponder settings: Standby (where only position information is available and a level is not displayed on the radar screen) and Normal (aka Mode C).

### Identifying aircraft

Identification is the process of matching aircraft details (or identity) with a radar return. It is essentially a way of checking that the radar return you see on screen is who you think it is. If an aircraft is squawking its assigned code, the controller client will automatically display the datatag (callsign & other specific information).

For online use it is generally sufficient to identify aircraft through the use of squawk codes. If necessary you can also use the SQUAWK IDENT instruction, which changes the color (or shape, depending on controller client) of the radar return for a brief period. Alternatively, you can match an aircraft's reported position with a radar return in the same position (but be careful if there are a number of aircraft in the same area).

Advise an aircraft of positive identification using the word RADAR IDENTIFIED.

### Verifying levels

When an aircraft is first identified, controllers must check that the Mode C level (which is displayed on their screen) is within 200FT of the pilot-reported level (which is displayed on the aircraft's altimeter).

Aircraft departing from a radar tower will automatically report their level when they first call the TMA unit. However, in other circumstances (including if aircraft do not report their level as expected) use the phrase VERIFY LEVEL.

Pilots should then report their level to the nearest 100FT.

### Issuing squawk codes

Aircraft departing from a towered aerodrome will be issued a squawk code by TWR. However, aircraft departing from a non-towered aerodrome won't have one, so ensure you issue a squawk code to these aircraft.

# Separation Minimums of Aircrafts

## Separation Standards

As you will see in the next few competencies, the requirement to apply a prescribed separation standard depends on the category of flight (IFR or VFR) and the class of airspace in which the aircraft are operating.

The two basic standards used in the TMA are:

- 3NM lateral/horizontal
- 1000FT vertical*

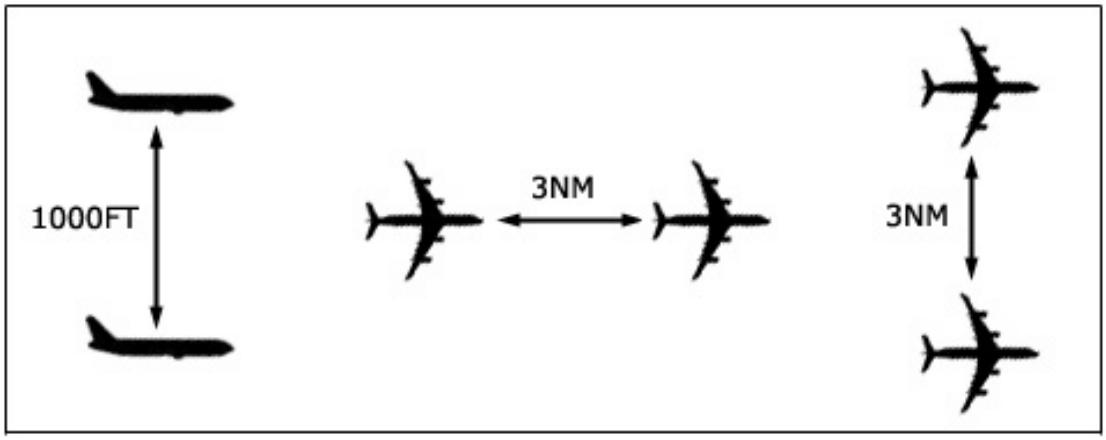


Fig 3 Source: Internet

**Important:** The 3NM standard is an absolute minimum. In some cases you will have to apply a larger standard for wake turbulence separation.

## Wake turbulence separation - arriving aircraft

Wake turbulence concepts were covered in the TWR module. While TWR is responsible for applying wake turbulence between departures, APP is responsible for maintaining wake turbulence for arrivals (and all other aircraft movements). Here is the wake turbulence table summarizing the distance required between aircraft.

| Lead aircraft | Following aircraft | Distance (NM) |
|---|---|---|

| | | |
|---|---|---|
| SUPER<br>(A380) | SUPER<br>HEAVY<br>MEDIUM<br>LIGHT | -<br>6<br>7<br>8 |
| HEAVY | HEAVY<br>MEDIUM<br>LIGHT | 4<br>5<br>6 |
| MEDIUM | HEAVY<br>MEDIUM<br>LIGHT | -<br>-<br>5 |

## Issue climb & descent instructions

**Climb and descent**

When issuing climb or descent instructions to aircraft, use the phrase CLIMB/DESCEND TO (level). Remember that levels below the transition layer are referred to in FEET and levels above the transition layer are referred to as FLIGHT LEVELS. You may omit FEET when assigning an altitude, but cannot omit FLIGHT LEVEL when assigning one.

Important: aircraft in controlled airspace must be provided with instructions that provide keep the aircraft within controlled airspace. Only in situations of last resort should aircraft that have planned to operate in controlled airspace be allowed or forced OCTA.

When assigning either climb or descent, ensure you issue instructions with plenty of time to allow continuous climb or descent, unless traffic or other circumstances require an aircraft to maintain an intermediate level.

When there are changes of situations and you need to stop an aircraft's climb or descend, you SHOULD use the phrase "Maintain [Alt] FT / FL [Alt] on Reaching ".

## TMA Ceiling and highest assignable levels

By now you should be familiar with the various TMA Supplements. These supplements detail the dimensions of TMA airspace, including the highest level you can assign for departing aircraft. This is known as the TMA Ceiling, which is FL250 in Hong Kong.

## Issuing QNH

QNH must be advised to aircraft when:

- assigning descent to a level below the transition layer;

- The aircraft is operating at altitudes; and

- On request from the pilot.

For example, if an aircraft is at FL130 and you issue descent to A090, you should provide the Area QNH at the same time.

If an aircraft is inbound to a controlled aerodrome, such as Macau, you must issue the local QNH for VMMC. Which you will say: Macau QNH 1000 hPa (example).

# ATIS

As you now know from your experience as a TWR controller, the aerodrome ATIS is an important method of communicating weather & operational

information to pilots prior to their arrival or departure.

As an APP controller, it is your responsibility to ensure that aircraft inbound to a controlled aerodrome are in receipt of the current information, as indicated by the ATIS code.

Once you have first contact with traffic inbound into the TMA, you should say the current information and the RWY to expect.

Example:

OHK301: Oasis 301 with you descending FL130 by MUSEL.
HK APP: Oasis 301, Information Alpha, RWY 25R.

As an APP controller, it is also your responsibility to ensure that aircraft are aware of any significant changes to the ATIS information.

## Transfer aircraft to next ATC unit (CTR/TMR)

You should first coordinate with next ATC unit if available via ATC channel. After the confirmation, you can right click the aircraft to be transferred and click TRANSFER. The transfer message will be sent automatically by IVAC after the confirmation of next ATC unit.