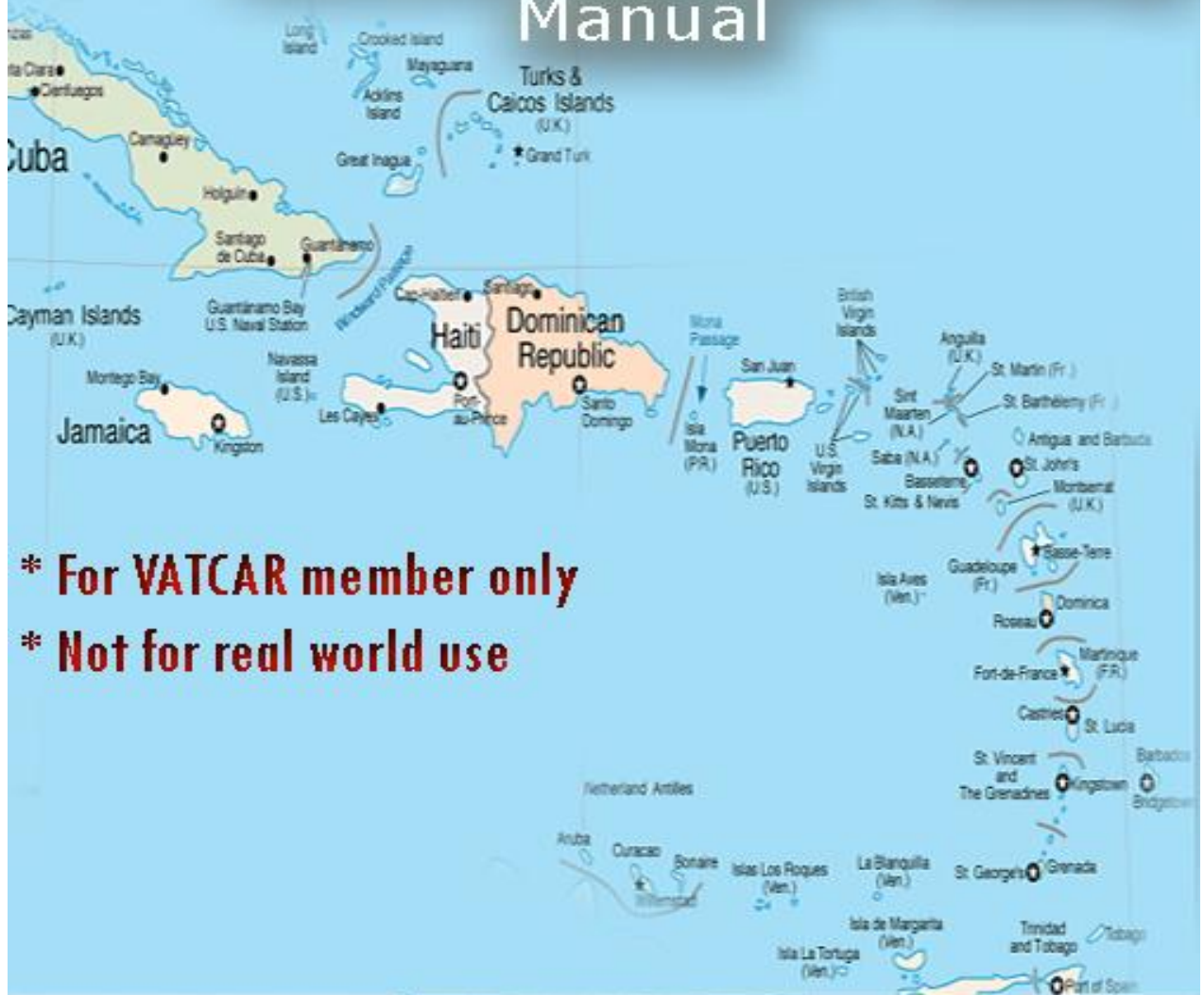




# VATCAR Approach Training Manual



- \* For VATCAR member only
- \* Not for real world use



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# TABLE OF CONTENTS

CHAPTER		PAGE
CHAPTER 1	DEFINITIONS .....	4
	<i>Aerodrome Control Service – Visual Approach</i>	4
CHAPTER 2	PURPOSE OF THE APPROACH CONTROLLER.....	5
CHAPTER 3	INFORMATION TO AIRCRAFT.....	5
CHAPTER 4	INFORMATION TO BE PASSED FROM APP TO TWR.....	5
CHAPTER 5	ATIS.....	5
CHAPTER 6	APPROACH SEQUENCE.....	5
CHAPTER 7	HEADING.....	6
CHAPTER 8	LEVELS.....	6
CHAPTER 9	SPEED CONTROL.....	6
CHAPTER 10	HOW TO IDENTIFY AIRCRAFT [SSR].....	7
CHAPTER 11	HOW TO IDENTIFY AIRCRAFT [NON SSR].....	7
CHAPTER 12	PHRASEOLOGY.....	8
	<i>INITIAL CALL TO RADAR</i>	8
	<i>ENROUTE</i>	8
	<i>AVOIDING ACTION</i> .....	8
	<i>Laterally</i>	8
	<i>Vertically</i>	8
CHAPTER 13	APPROACH AND LANDING.....	9
	<i>CONTINUE APPROACH</i>	9
	<i>HOLDING CLEARANCE</i>	9
	<i>RATE OF CLIMB/DESCENT RESTRICTIONS</i> .....	9
	<i>Arriving Aircraft</i>	9
	<i>Departing Aircraft</i>	10
CHAPTER 14	VECTORING.....	11
	<i>THREE TYPES/WAYS TO VECTOR</i>	11
	<i>ADVISING AIRCRAFT OF REASON(S) FOR VECTORING</i>	11
	<i>VECTORING FOR FINAL APPROACH</i> .....	11
	<i>Distance</i>	11
	<i>Lateral Entry</i>	11
CHAPTER 15	CONTROL OF AIRCRAFT.....	12
	<i>CONTROL OF VFR FLIGHTS</i>	12
	<i>SEQUENCING VFR AND SPECIAL VFR FLIGHTS</i>	12
CHAPTER 16	CONTROL OF AIRCRAFT.....	13
	<i>AIRSPACE CLASSIFICATION</i>	13
CHAPTER 17	APPROACHES.....	14
	<i>PICTURE OF AN APPROACH CHART</i>	14
	<i>PRECISION APPROACHES AND SYSTEMS</i>	15
	<i>NON PRECISION APPROACHES AND SYSTEMS</i>	15
	<i>DME ARC APPROACH</i>	15
	<i>VISUAL APPROACH</i>	15
	<i>RNAV APPROACH</i>	15
	<i>MISSED APPROACH</i>	16
	<i>When Instructed</i>	16
	<i>When Advised</i>	16
CHAPTER 18	DECISION HEIGHT OR ALTITUDE.....	16
CHAPTER 19	OVERSHOOT PROCEDURE.....	16
CHAPTER 20	SID AND STAR.....	17
	<i>STANDARD INSTRUMENT DEPARTURE</i> .....	17
	<i>PILOT NAVIGATION</i>	17
	<i>RADAR VECTOR</i>	17
	<i>Hybrid</i>	17
	<i>RNAV</i>	17

CHAPTER 21	STANDARD TERMINAL ARRIVAL ROUTE.....	18
CHAPTER 22	NOISE ABATEMENT PROCEDURES.....	18
CHAPTER 23	HOLDING.....	19
	<i>HOLDING PATTERN</i> .....	19
CHAPTER 24	NON RADAR SEPARATION.....	20
	EXPLANATION OF TERMS	20
	SEPARATION BASED ON VOR/DME/TACAN INFORMATION	20
	HORIZONTAL SEPARATION	20
CHAPTER 25	NAVIGATION.....	21
	NAVIGATION TERMS	21
	FORMULAE	21
CHAPTER 26	LATERAL SEPARATION.....	22
CHAPTER 27	GEOGRAPHICAL SEPARATION.....	22
CHAPTER 28	LONGTITUDINAL SEPERATION – TIME AND DISTANCE.....	23
CHAPTER 29	LONGTITUDINAL SEPERATION MINIMA BASED ON TIME.....	24
	AIRCRAFT MAINTAINING SAME LEVEL.....	24
	Aircraft flying on the same track	24
	Aircraft flying on crossing tracks	25
	AIRCRAFT CLIMBING OR DESCENDING.....	25
	Aircraft flying on the same track	25
	Aircraft flying on crossing tracks	27
	Aircraft flying on reciprocal tracks	28
CHAPTER 30	LONGTITUDINAL BASED ON DISTANCE USING DME AND/OR GNSS.....	28
	AIRCRAFT AT THE SAME CRUISING LEVEL.....	28
	Aircraft flying on the same track	28
	Aircraft flying on crossing tracks	29
	AIRCRAFT CLIMBING OR DESCENDING.....	30
	Aircraft flying on the same track	30
	Aircraft flying on reciprocal tracks	30
CHAPTER 31	EMERGENCIES.....	31
	CONTROLLERS RESPONSIBILITY.....	31
	RECOGNISING AN EMERGENCY SITUATION.....	31
	DISTRESS AND URGENCY MESSAGES.....	31
	RETAINING CONTROL.....	32
	INDICATIONS ON THE RADAR DISPLAY.....	32
	EMERGENCY TRIANGLE PROCEDURE.....	32
	STRAYED AND UNIDENTIFIED AIRCRAFT.....	32
	Strayed	33
	Unidentified	33

## DEFINITIONS

**Approach control service.** Air traffic control service for arriving or departing controlled flights.

**Estimated elapsed time.** The estimated time required to proceed from one significant point to another.

**Estimated time of arrival.** For IFR flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome. For VFR flights, the time at which it is estimated that the aircraft will arrive over the aerodrome.

**Expected approach time.** The time at which ATC expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing.

**Flight information region (FIR).** An airspace of defined dimensions within which flight information service and alerting service are provided.

**Flow control.** Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome, so as to ensure the most effective utilization of the airspace.

**Glide path.** A descent profile determined for vertical guidance during a final approach.

**Holding fix.** A geographical location that serves as a reference for a holding procedure.

**Holding procedure.** A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

**Instrument approach procedure (IAP).** A series of predetermined maneuvers by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply.

**Instrument meteorological conditions (IMC).** Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

*Note 1.— In a control zone, a VFR flight may proceed under instrument meteorological conditions if and as authorized by air traffic control.*

**Procedure turn.** A maneuver in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

*Note 1.— Procedure turns are designated “left” or “right” according to the direction of the initial turn.*

*Note 2.— Procedure turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure.*

**Radar approach.** An approach in which the final approach phase is executed under the direction of a controller using radar.

**Radar contact.** The situation which exists when the radar position of a particular aircraft is seen and identified on a situation display.

**Radar separation.** The separation used when aircraft position information is derived from radar sources.

**Reporting point.** A specified geographical location in relation to which the position of an aircraft can be reported.

**Transition altitude.** The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.

**Transition layer.** The airspace between the transition altitude and the transition level.

**Transition level.** The lowest usable flight level available above the transition altitude.

**Vectoring.** Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an ATS surveillance system.

**Visual approach.** An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

## **THE PURPOSE OF THE APPROACH CONTROLLER IS TO**

1. To provide Radar surveillance to aircraft Departing, Arriving, and Transiting in order to prevent collisions between:
  - a. Aircraft arriving;
  - b. Aircraft arriving and aircraft transiting;
  - c. Aircraft departing;
  - d. Aircraft departing and aircraft transiting; and
  - e. Aircraft arriving and departing.
2. To vector aircraft to a position on final approach where a landing can be made safely, and if not, to a position where further instructions can be received.

## **INFORMATION TO AIRCRAFT**

After an arriving aircraft has placed itself under the control of Approach Control, the following information shall be passed as soon as practicable:

- a) Runway in use;
- b) Current meteorological information together with the time of observation:
  - i) Surface wind direction (in degrees magnetic) and speed.
  - ii) Visibility;
  - iii) Present weather;
  - iv) Significant cloud amount and height of base;
  - v) The appropriate barometric pressure;
  - vi) Relevant information reported by pilots of other aircraft, e.g. vertical wind shear, severe turbulence etc.;
  - vii) Significant meteorological information, e.g. thunderstorms, water spouts;
  - viii) Any other relevant information
- c) Current runway surface conditions when appropriate.

## **INFORMATION TO BE PASSED FROM APPROACH CONTROL TO TOWER/AERODROME CONTROL**

Approach Control shall supply the following information to Aerodrome Control:

- a) Estimates received on arriving aircraft;
- b) The anticipated order in which control of aircraft is to be transferred;
- c) The anticipated delay to departing IFR flights together with the reason for the delay.

Prior to handing an aircraft over to the unit providing Tower/Aerodrome Control, Approach Control shall inform that unit of the position and type of approach being made by that aircraft, and at which point, level or condition the aircraft will be their control. At any rate a position report shall be made no later than 8 nautical miles from the final approach path. This will allow the Tower/Aerodrome Controller enough time to integrate Circuit traffic, with in bound traffic.

## **ATIS**

The ATIS message is intended to provide a pilot with a range of information to enable him to make a definite decision about his approach and landing or take-off. The ATIS message is transmitted on a published VHF broadcast frequency or selected VORs therefore reducing RTF loading. The message should, whenever practicable, not exceed 30 seconds.

## **APPROACH SEQUENCE**

The approach sequence shall be established in a manner which will facilitate arrival of the maximum number of aircraft with the least delay. However, priority in the approach sequence is to be given to certain aircraft

1. Ambulance aircraft where safety of life is involved;
2. Aircraft known to be on an Emergency.
3. Royal or Presidential Flights when so advised by the appropriate ATS authority.

## **HEADINGS**

Pilots may operate under their own navigation or a controller may provide headings for the purpose of positioning, sequencing or as navigational assistance. When operating under their own navigation, pilots may alter course as required; however, unless safety is likely to be compromised, pilots shall not change their general route or maneuvering area without first advising and obtaining a response from the controller.

If an ATC heading is unacceptable to the pilot he shall advise the controller immediately.

## **LEVELS**

Pilots may select their own operating levels or may be provided with level allocations by the controller for the positioning and/or sequencing of traffic or for navigational assistance. If a level is unacceptable to the pilot he shall advise the controller immediately.

Unless safety is likely to be compromised, a pilot shall not change level or level band without first advising and obtaining a response from the controller.

## **SPEED CONTROL**

Controllers may request pilots to increase or decrease speed in order to facilitate a safe and orderly flow of traffic. Speed adjustments should be limited to those necessary to establish and/or maintain a desired separation minima or spacing. Pilots shall be advised when a speed control restriction is no longer required.

Speed control should not be applied in the following circumstances:

- a) In holding patterns, other than where published on approach charts;
- b) In areas of thunderstorms or known turbulence.

The application of speed control should be appropriate for the phase of flight, as its application over a long period of time may affect aircraft fuel reserves, and can affect the pilot's planned operating profile. Instructions involving frequent changes of speed should be avoided.

Pilots will adhere to the speed (IAS or Mach Number) approved or assigned by ATC and will request ATC approval before making any changes thereto. Pilots of aircraft unable to maintain the approved or assigned speed (e.g. for aircraft performance reasons) will inform ATC as soon as possible. In such circumstances, controllers shall apply an alternative method to establish or maintain the desired separation or spacing between the aircraft concerned.

Aircraft should not be instructed to operate at a high speed by one controller and, on transfer to the next sector, be instructed to reduce speed significantly.

## RADAR IDENTIFICATION

### WHAT TO USE THE RADAR INFORMATION FOR

The information presented on a radar display may be used to provide identified aircraft with:

1. Traffic information on any aircraft that looks like on a conflicting path and suggestions or advice regarding avoiding action;
2. Information to assist the aircraft in its navigation.

### HOW TO RADAR IDENTIFY AIRCRAFT

#### *SSR (SECONDARY SURVEILLANCE RADAR) EQUIPMENT AVAILABLE*

If the aircraft has SSR equipment (a squawk machine) than:

1. Confirm the aircraft is squawking the assigned SSR code In VRC: Look in the flight plan strip;
2. Ask the aircraft to squawk "**IDENT**" and make sure there is only one aircraft squawking IDENT at that moment at the expected position;
3. Ask the pilot to squawk stand-by, wait and see the result and ask to squawk Charlie again and wait and see the result.

#### *SSR NOT AVAILABLE*

If the aircraft has no SSR equipment, or as an additional identification method to be used:

- a. By verifying the expected radar position of the aircraft while it reports its position over, or as bearing and distance from a point displayed on the radar map (e.g. a VOR), and by verifying that the track of that particular radar position is consistent with the aircraft path or reported heading;
- b. By verifying an observed radar position of that aircraft which is known to have just departed, provided that the identification is established within 2 km (1 NM) from the end of the runway used. Particular care should be taken to avoid confusion with aircraft holding over or overflying the aerodrome, or with aircraft departing from or making a missed approach over adjacent runways;
- c. By transfer of radar identification from one controller to another;
- d. By observing the aircraft heading, if circumstances require, and following a period of track observation:
  - a. Instructing the pilot to execute one or more changes of heading of 30 degrees or more and correlating the movements of one particular radar position of that aircraft's acknowledged execution of the instructions given; or
  - b. Correlating the movements of a particular radar position of that aircraft with maneuvers currently executed by an aircraft having so reported.

When using these methods, the radar controller shall:

1. Verify that the movements of not more than one radar position indication correspond with those of the aircraft; and
2. Ensure that the maneuver(s) will not carry the aircraft outside the coverage of the radar display.

## PHRASEOLOGY

Studies show that an initial call which does not contain all the required information can lead to a loss of separation. On first contact after departure include:

1. **Call-sign,**
2. **SID [If applicable],**
3. **Current or passing level plus cleared level.**

The information in the initial call is essential for the safety of the aircraft by ensuring mutual understanding between the crew and the controller of the intention for the aircraft.

Omissions will require an additional call for clarification which may lead to frequency congestion.

On first contact with subsequent frequencies include **call-sign** and:

1. **Level** , including passing and cleared level if not maintaining the cleared level
2. **Cleared level** (if different from **current level**)
3. **Speed** (if assigned by ATC), and
4. **Other ATC** clearances assigned.

### INITIAL CALL TO RADAR

*Metro Radar, Big Jet 345, passing 1500 feet climbing to FL120, squawking 1745*

Big Jet 345, Metro Radar roger, radar identified

### EN-ROUTE

Big Jet 345, fly heading 260 (degrees), climb to FL 100,

*Fly heading 260 (degrees), climb to FL 100, Big Jet 345*

Big Jet 345, fly direct BONNY, climb to FL 360

*Direct BONNY, climb to FL 360, Big Jet 345*

Big Jet 345, contact Northern Control, 132.6

*Contact Northern Control, 132.6, Big Jet 345*

*Northern Control, Big Jet 345, passing FL240 climbing to FL 360, direct BONNY*

Big Jet 345, Northern Control, fly direct CLYDE

*Direct CLYDE, Big Jet 345*

### AVOIDING ACTION

#### LATERAL AVOIDING ACTION

Big Jet 345, turn left (or right) immediately heading 270 (or 30 degrees)! to avoid traffic at 2 o'clock, 5 miles crossing right to left, 500 feet below

#### VERTICAL AVOIDING ACTION

Big Jet 345, climb (or descend) immediately to FL 160, traffic at 12 o'clock 3 miles opposite direction, same level

***Note. An urgent tone shall be used.***

### SIMULTANEOUS OR CONTINUOUS TRANSMISSIONS

Direct controller – pilot communication can be adversely affected by simultaneous or continuous transmissions. There are times when the controller is not aware of a blocked transmission, but a pilot is. On hearing a simultaneous transmission it can be helpful if a pilot informs ATC that the transmission was BLOCKED.

*Transmission blocked, Big Jet 345*

## APPROACH AND LANDING

The phrase ‘**cleared ILS approach runway xx**’ has, in the past, introduced some ambiguity whereby pilots have taken this to mean they are cleared to the altitude/height depicted on the approach chart immediately prior to the final approach fix. This should not be assumed; normally clearances to descend at this point will be given distinctly.

Other phrases that are commonly in use include:

Big Jet 345, turn right heading 110, descend to 3000 feet, report established localiser runway 14

*Right heading 110, descend to 3000 feet, report established localiser runway 14* Right, Big Jet 345

*Big Jet 345, established localiser*

Big Jet 345, cleared ILS approach runway 14

*Cleared ILS approach runway 14, Big Jet 345*

**Or**

Big Jet 345, turn right heading 110 degrees, cleared ILS approach runway 14, maintain 3000ft, until glide-path interception

*Turning right heading 110, cleared ILS approach runway 14, maintain 3000ft until glide-path runway 14*

## CONTINUE APPROACH

If the runway is obstructed when the aircraft reports ‘**final**’, but it is expected to be available in good time for the aircraft to make a safe landing, the controller will delay landing clearance by issuing an instruction to ‘continue approach’. The controller may explain why the landing clearance has been delayed. An instruction to ‘**continue**’ is **NOT** a clearance to land.

*Metro Tower, Big Jet 345, final runway 27 Right*

Big Jet 345, continue approach

*Continue approach, Big Jet 345*

Big Jet 345, cleared to land, runway 27 Right, wind 270 degrees ten knots

*Cleared to land runway 27 Right, Big Jet 345*

## HOLDING CLEARANCE

At times on request from a pilot, or because of traffic congestion, an aircraft may be cleared to a hold or fix. On clearance to a hold or a fix, the pilot shall fly the inbound route/radial to the hold or fix, and follow the published procedure for that hold or fix.

*Metro Tower, Big Jet 345, with you descending out of FL260 for FL240*

Big Jet 345, Adams Approach roger, cleared to the Adams VOR BGI, descend to FL130

*Cleared to Adams VOR BGI, FL130, Big Jet 345*

## RATE OF CLIMB/DESCENT RESTRICTIONS

When two or more aircraft are proceeding along the same route [Either Arriving, or Departing], and are in close proximity to each other, a rate of climb or rate of descent restriction may be appropriately used.

*Note. The rate of climb/descent restriction can only be brought into effect after vertical separation exists.*

## ARRIVING AIRCRAFT

After vertical separation has been established, the aircraft at the lower level shall be asked his proposed rate of descent. This aircraft shall then be cleared to a suitable level in descent, and to maintain a rate of descent of **no less than** that specified by the Approach Controller [This takes into account the pilot’s reported proposed rate of descent], and asked to report leaving his present level.

*Metro Tower, Big Jet 345, with you at FL240, requesting descent*

*Metro Tower, Jet Blue 123 descending out of FL280 for FL260 looking for lower*

Jet Blue 123, Adams Approach, standby for lower

Big Jet 345, Adams Approach roger, what is your proposed rate of descent?

*Proposed rate of descent is 1500ft/min, Big Jet 345*

Big Jet 345 descend to FL080, rate of descent 1000ft/min **minimum**, report leaving FL240

*Roger, descend to FL080, rate of descent 1000ft/min **minimum**, leaving FL240 now, Big Jet 345*

After the lower aircraft has reported leaving his present flight level the second and higher aircraft shall be issued a clearance to a suitable level above that level the first aircraft was cleared to, and asked to maintain a rate of descent restriction of **no more than** that given to the previous and lower aircraft.

Jet Blue 123, descend to FL090, rate of descent 1000ft/min **maximum**

*Roger, descend to FL90, rate of descent 1000ft/min **maximum**, Jet Blue 123*

**Note. In this situation it may be advisable traffic permitting, to advise both aircraft of each other.**

#### DEPARTING AIRCRAFT

This procedure which may be used for two or more aircraft departing is based on the first aircraft being allowed to take off and the minimum vertical separation of 1000ft established prior to the second aircraft being given take-off clearance. It is also conducted under the premise that the following aircraft has been issued a level in clearance below that of the first departing aircraft.

Prior to take-off, the first aircraft in the departure sequence shall be asked his proposed rate of climb. This aircraft, having been cleared to a flight level, shall be instructed to maintain a rate of climb of no less than that specified by the Approach Controller [**This takes into account the pilot's reported proposed rate of climb**].

*Metro Tower, Big Jet 345, with you at Exit2, ready for take-off*

Big Jet 345, Adams Departure roger, line up and wait

*Line up and wait, Big Jet 345*

Big Jet 345, what will be your proposed rate of climb?

*Proposed rate of climb will be 1800ft/min, Big Jet 345*

Big Jet 345, copy departure restriction

*Ready to copy departure restriction, Big Jet 345*

Big Jet 345, rate of climb 1200ft/min **minimum**

*Roger, rate of climb 1200ft/min **minimum**, Big Jet 345*

Big Jet 345, departure restrictions correct, cleared for take-off left turn, wind 09008 knots, report out of 1000ft

*Cleared for take-off, we copy the winds, and will report out of 1000ft, Big Jet 345*

*Metro Tower, Jet Blue 123 ready in sequence for take-off*

Jet Blue 123, Adams Departure, roger, line up and copy departure restrictions

*Lining up and ready to copy departure restriction, Jet Blue 123*

Jet Blue 123, rate of climb 1200ft/min **maximum**

*Roger, rate of climb 1200ft/min **maximum***

Jet Blue 123, departure restrictions correct, standby for take-off

*Roger, standing by, Jet Blue 123*

*Metro Tower, Big Jet 345, out of 1000ft*

Big Jet 345, Adams Departure roger

Jet Blue 123, cleared for take-off left turn, wind 10011 knots

*Cleared for take-off, we copy the winds, Jet Blue 123*

## VECTORING

On initiation of contact with an arriving aircraft, the unit providing Approach Control shall establish identification of the aircraft prior to vectoring that aircraft.

### THREE TYPES/WAYS TO VECTOR

There are three main ways to vector aircraft:

- a. Issue the direction to turn and heading, e.g. **"TURN LEFT HEADING 360."**  
If you say "FLY HEADING" the pilot will turn in the shortest direction. The term "TURN HEADING" is incorrect and should not be used.
- b. Issue a direction and number of degrees to turn, e.g. **"TURN THIRTY DEGREES RIGHT."**
- c. Issue a NO-GYRO turn. Tell the aircraft **"THIS WILL BE A NO-GYRO VECTOR"** when to **"TURN LEFT/RIGHT"** and when to **"STOP TURN."** The pilot will make standard rate turns (3 degrees/second).

### ADVISING AIRCRAFT OF REASONS FOR VECTORS

An aircraft being vectored shall be informed the reason for such vectors.

Big Jet 345, for vectors to the localizer course turn right heading 190

*Roger, right turn heading 190 for the localiser, Big Jet 345*

Or

Big Jet 345, for vectors for the Visual Approach turn left heading 030 degrees, report the field in site

*Roger, left turn heading 030, will call the field in sight for the Visual, Big Jet 345*

### VECTORING FOR FINAL APPROACH [DISTANCE]

Unless otherwise prescribed by the appropriate VATSIM authority, aircraft shall be vectored so as to be established on the final approach track at a distance of not less than 5 miles from touchdown. If it becomes necessary to vector an aircraft through the final approach track before subsequently joining the approach from the opposite side, the controller shall advise the pilot prior to the aircraft passing through the final approach track.

Big Jet 345, turn right heading 190 degrees, you will be vectored through the localizer course;

*Roger, right turn heading 190, through the localiser, Big Jet 345*

### VECTORING FOR FINAL APPROACH [LATERAL ENTRY]

Controllers shall vector aircraft onto the final approach track, or onto a heading to close the final approach track at an angle not greater than 30° offset from the final approach track. Whenever practicable, the aircraft is to be established on the final approach track before the Final Approach Fix or inner marker to enable it to cross the Final Approach Fix at the altitude/height specified in the notified procedure.

Big Jet 345, turn right heading 050 degrees, cleared for the straight in ILS Approach runway 08;

*Roger, right turn heading 050, cleared for the ILS approach runway 8, Big Jet 345*

Or

Big Jet 345, turn left heading 110 degrees, cleared for the straight in ILS Approach runway 08

*Roger, left turn heading 110, cleared for the ILS approach runway 8, Big Jet 345*

The final vector to the final approach path puts the aircraft in a position where the pilot on his own navigation shall be able to accomplish a landing. It is therefore important that on issuing a final vector, the pilot of that aircraft be informed of his position in relation to the final approach course and distance from touch-down. Once an approach has commenced, the aircraft should be allowed to self-position for the approach. Vectors should not then be given unless safety is at risk.

Big Jet 345, turn left heading 110 degrees, cleared for the straight in ILS Approach runway 08, position 3 miles North of the localizer, and 12 miles from touchdown

*Roger, left turn heading 110, cleared for the ILS approach, we copy position, Big Jet 345*

## **CONTROL OF AIRCRAFT**

Control of an arriving aircraft shall be transferred from the unit providing approach control service to the unit providing aerodrome control service when the aircraft:

- 1) Is in the vicinity of the aerodrome, and it is considered that approach and landing will be completed in visual reference to the ground,
- 2) Is at a prescribed point or level, or
- 3) Has landed.

### **CONTROL OF VFR FLIGHTS**

ATC has a responsibility to prevent collisions between known flights whether IFR, SVFR, or VFR, and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other.

Instructions issued to VFR flights in Class D airspace are mandatory. These may comprise routing instructions, visual holding instructions, level restrictions, and information on collision hazards, in order to establish a safe, orderly and expeditious flow of traffic and to provide for the effective management of overall ATC workload.

Routing instructions may be issued which will reduce or eliminate points of conflict with other flights, such as final approach tracks and circuit areas, with a consequent reduction in the workload associated with passing extensive traffic information. VRPs may be established to assist in the definition of frequently utilized routes and the avoidance of instrument approach and departure tracks. Where controllers require VFR aircraft to hold at a specific point pending further clearance, this is to be explicitly stated to the pilot.

When issuing instructions to VFR flights, controllers should be aware of the over-riding requirements for the pilot to remain in VMC, to avoid obstacles and to remain within the privileges of his license. This may result in the pilot requesting an alternative clearance, particularly in marginal weather conditions.

Approach radar controllers in particular should exercise extreme caution in vectoring VFR flights – a geographical routing instruction is preferable. Prior to vectoring, the controller must establish with the pilot the need to report if headings issued are not acceptable due to the requirements to remain in VMC, avoid obstacles, and comply with the low flying rules. Controllers should be aware that pilots of some VFR flights may not be sufficiently experienced to comply accurately with vectors, or to recover to visual navigation after vectoring.

### **SEQUENCING VFR AND SPECIAL VFR FLIGHTS**

Where sequencing of IFR flights is in operation, controllers shall provide sufficient information to pilots of VFR or Special VFR flights to enable them to integrate safely into the landing sequence. If it is necessary for a VFR flight to be given a vector, or specific routing instructions, the pilot shall be instructed to advise the controller if the routing or vector will prevent the pilot from remaining in VMC. If it is necessary for a Special VFR flight to be given vectors to establish it in the landing sequence, controllers shall ensure that vectors given do not preclude the responsibility for the pilot to remain clear of cloud, with the surface in sight and keep clear of obstacles by visual reference to the surface.

## CLASSIFICATION OF AIRSPACE

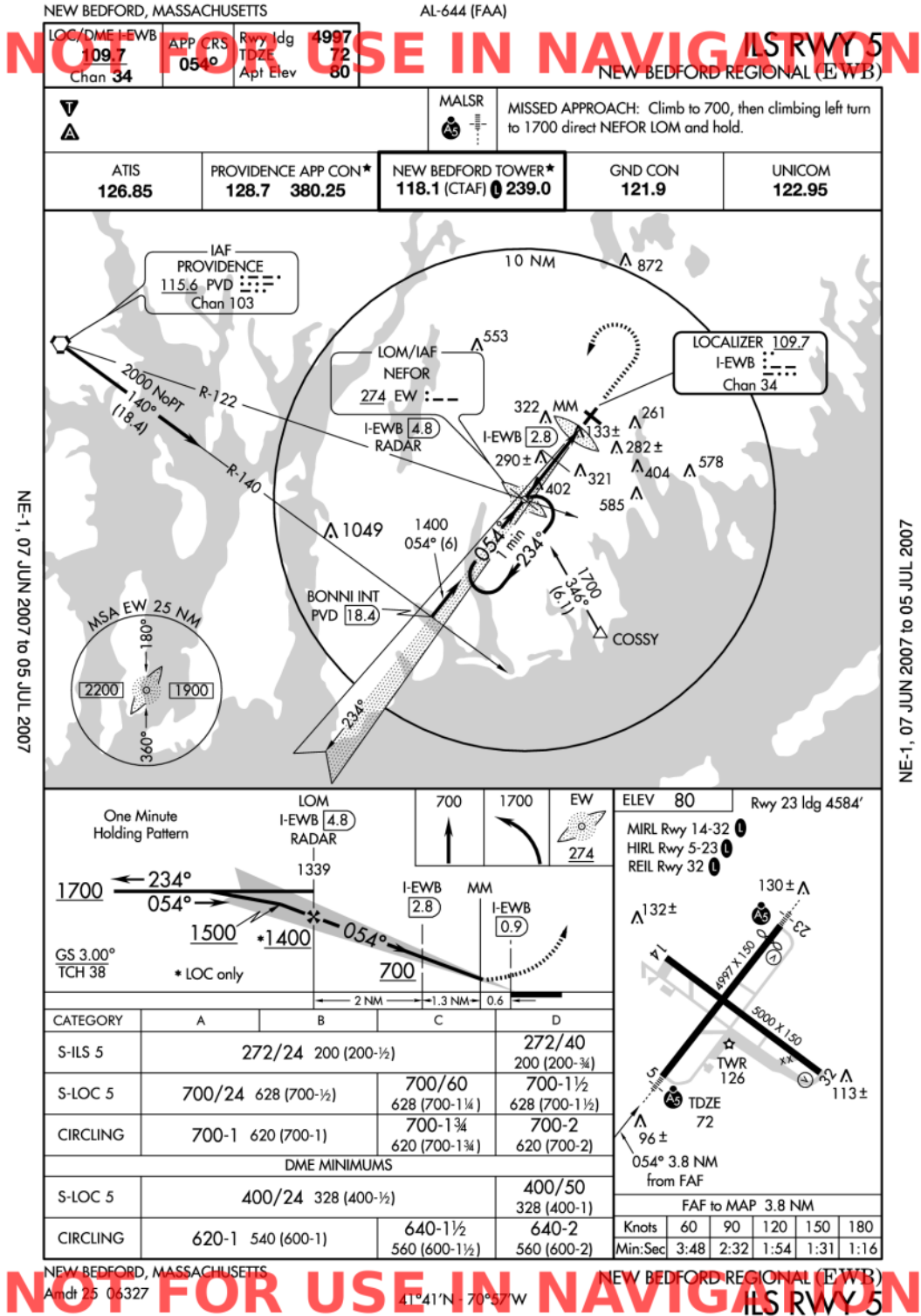
The classification of the airspace which determines the Flight Rules which apply and the minimum services that shall be provided. The classification is as follows: -

Class	Flight Rules	Aircraft Requirements	Minimum Services by ATC Unit
A	IFR only	ATC clearance before entry. Comply with ATC instructions.	Separate all aircraft from each other.
B	IFR and VFR	ATC clearance before entry. Comply with ATC instructions.	Separate all aircraft from each other.
C	IFR and VFR	ATC clearance before entry. Comply with ATC instructions.	(a) Separate IFR flights from other IFR and VFR flights; (b) Separate VFR flights from IFR flights; (c) Pass traffic information to VFR flights on other VFR flights and give traffic avoidance advice if requested.
D	IFR and VFR	ATC clearance before entry. Comply with ATC instructions.	(a) Separate IFR flights from other IFR flights; (b) Pass traffic information to IFR flights on VFR flights and give traffic avoidance advice if requested; (c) Pass traffic information to VFR flights on IFR flights and other VFR flights.
E	IFR and VFR	IFR flights to obtain ATC clearance before entry and comply with ATC instructions.  VFR flights do not require clearance.	(a) Separate IFR flights from other IFR flights; (b) Pass traffic information, as far as practicable, to IFR flights on VFR flights; (c) VFR flights in contact are to be given traffic information as far as practicable.
F	IFR and VFR	Participating IFR flights are expected to comply with ATC instructions.	Separation provided, as far as possible, between aircraft that have flight planned to operate IFR on ADRs.
G	IFR and VFR	None.	None.

# APPROACHES

In aviation, an instrument approach or instrument approach procedure (IAP) is a type of air navigation that allows pilots to land an aircraft in reduced visibility (known as instrument meteorological conditions or IMC), or to reach visual conditions permitting a visual landing.

Approaches are classified as either precision or nonprecision, depending on the accuracy and capabilities of the navigational aids (*navaids*) used. Precision approaches utilize both lateral (localizer) and vertical (glideslope) information. Nonprecision approaches provide lateral course information only.



## **PRECISION APPROACHES AND SYSTEMS**

1. ILS - Instrument Landing System
2. MLS - Microwave Landing System
3. PAR - Precision Approach Radar (Military)
4. GPS (with vertical navigation *via* WAAS or EGNOS) - Global Positioning System
5. LAAS - Ground Based Augmentation System (GBAS) for Global Satellite Navigation Systems (GNSS)
6. JPALS - Joint Precision Approach and Landing System
7. GCA - Ground-Controlled Approach (mostly military)

## **NON PRECISION APPROACHES AND SYSTEMS**

1. Localizer
2. VOR
3. Non-Directional Beacon or NDB with complementary Automatic Direction Finder (ADF) installed on board
4. Localizer Type Directional Aid or LDA
5. Simplified Directional Facility or SDF
6. GPS - Global Positioning System
7. TACAN
8. SRA - Surveillance Radar Approach (known in some countries as an ASR approach)
9. ASR - Airport Surveillance Radar (Military designation for SRA)

## **INSTRUMENT APPROACH**

An Instrument Approach is an approach based on a set of predetermined maneuvers with reference to navigational aids which places a pilot flying in IMC at a point where a landing can be completed, and if not, to a position of holding where further clearance can be obtained.

## **DME ARC APPROACH**

A DME ARC Approach is an approach established, requiring a pilot to fly under Instrument Meteorological Conditions [IMC] at a specified distance from a navigational aid e.g. VOR, and within a designated area, to enable the pilot to make a transition from en-route flight inbound, to a position where an approach can be made without flying overhead the airport based navigational aid.

## **VISUAL APPROACH**

A Visual Approach is an approach by an IFR flight when either all or part of an instrument approach procedure is not completed and the approach is made with visual reference to the terrain [Ground].

To expedite traffic at any time, IFR flights may be authorized to execute visual approaches if the pilot reports that he can maintain visual reference to the surface and:

- a) The pilot in sequence behind another aircraft reports the leading traffic in sight and is able to maintain own separation; or
- b) The pilot reports at any time after commencing the approach procedure that the visibility will permit a visual approach and landing, and a reasonable assurance exists that this can be accomplished.

## **RNAV APPROACH**

RNAV stands for **a**Rea **N**AVigation and encompasses a variety of aircraft equipment. For RNAV-equipped aircraft, it is easy for a pilot to navigate directly to a VOR, NDB, intersection, or approach waypoint.

RNAV can be defined as a method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability, or a combination thereof.

## **MISSED APPROACH**

A Missed Approach is a predefined navigational sequence to be followed by an aircraft on an Instrument Approach when visual reference to continue the approach does not exist, and requires the pilot to initiate the procedure. The navigational sequence following a Missed Approach will put the aircraft at a location where another IFR Approach can be commenced, which will usually be followed by the pilot attempting another approach.

### *WHEN INSTRUCTED*

An aircraft shall be instructed to carry out a missed approach in any of the following circumstances:

- a) On instructions from Approach Control or Tower/Aerodrome Control;
- b) When no landing clearance is received before 2 miles from touchdown (or such other range as agreed with Aerodrome Control);
- c) When it appears to be dangerously positioned on final approach.

### *WHEN ADVISED*

An aircraft is to be advised to carry out a missed approach in any of the following circumstances:

- a) If it reaches a position from which it appears that a successful approach cannot be completed;
- b) If it is not visible on the Radar display for any significant interval during the last two miles of the approach;
- c) If the position or identification of the aircraft is in doubt during any portion of the final approach.

Missed approach instructions shall include the level to which the aircraft is to climb and, if necessary, heading instructions to keep the aircraft within the missed approach area. The aircraft shall be instructed to contact Approach Control or, by arrangement, to remain with the Tower/Aerodrome Controller.

**NB. This procedure should not be confused with the OVERSHOOT PROCEDURE.**

## **DECISION HEIGHT OR ALTITUDE**

A decision height (DH) or decision altitude (DA) is a specified height or altitude in the precision approach at which a missed approach must be initiated if the required visual reference to continue the approach has not been acquired. This allows the pilot sufficient time to safely re-configure the aircraft to climb and execute the missed approach procedures while avoiding terrain and obstacles.

## **OVERSHOOT PROCEDURE**

An Overshoot is a landing that is aborted due to reasons other than lack of visual reference e.g. Vehicle, Aircraft, or Object on the runway, Landing gear not properly extended, or some other unsafe condition. When an Overshoot Procedure is initiated, the aircraft is usually accepted into a position in the Aerodrome Traffic Circuit where further instructions are given.

# SID AND STAR

## STANDARD INSTRUMENT DEPARTURE

A Standard Instrument Departure Procedure (SID) is a procedure designed to organize and expedite the flow of traffic from an airport into the en-route environment. They consist of a set of instructions defining how to get from the terminal environment into the en-route structure, thereby reducing communication with ATC because they do not have to read those instructions to every aircraft. Each departure is given its own unique name. They are compiled into charts, which include a visual and text description of the departure.

There are three main types of departures, differing primarily in the way you get from the terminal to en-route environment. The three main types of departures are as follows:

### PILOT NAVIGATION

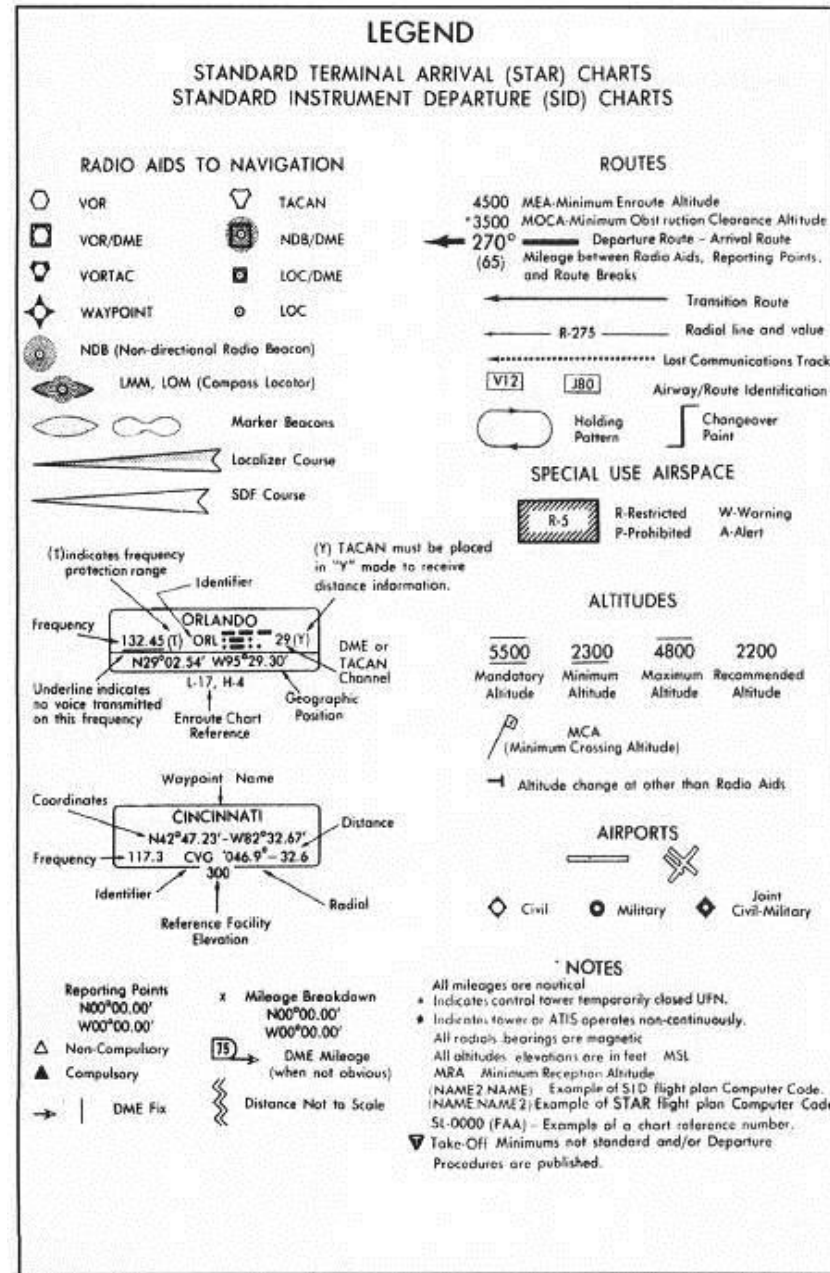
As the name suggests, pilot navigation departures diagram to the pilot the route to take, and generally do not require any intervention from ATC to make the transition to the en-route structure.

### RADAR VECTOR

Radar Vector departures, contrary to pilot navigation departures, primarily use radar vectors from ATC to get the pilot into the en-route structure. However, these departures will frequently contain a set of instructions to follow very close to the airport (Such as fly a heading on departure, or a set of turns) to depart the immediate terminal area, and then ATC provides vectors to continue on to the en-route structure.

### HYBRID

Although not an entirely different type of departure, hybrid departures are a mix of Pilot Navigation and Radar Vector departures. Primarily these departures are pilot navigation departures, in which the pilot is ultimately going to follow the chart to get to the en-route environment, but ATC provides a vector along the way. An example of this would be ATC



provides a heading off the runway, and then a heading to join a radial, and then the pilot continues on the procedure from that point.

### RNAV

RNAV departures are pilot navigation departures, but instead of being able to be flown simply using VORs and tracking, they make use of GPS waypoints.



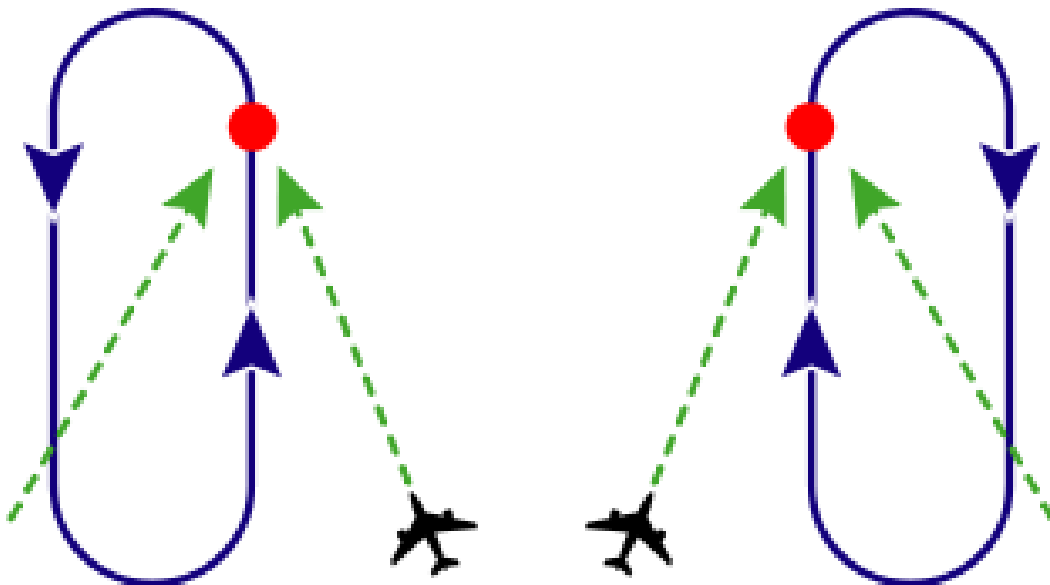
## HOLDING

In aviation, **holding** (or **flying a hold**) is a maneuver designed to delay aircraft that have arrived at their destination but cannot land yet because of traffic congestion, poor weather, or runway unavailability (for instance, during snow removal), while keeping it within a specified airspace. Several aircraft may fly the same holding pattern at the same time, separated vertically by 1,000 feet or more. This is generally described as a **stack** or **holding stack**. As a rule, new arrivals will be added at the top. The aircraft at the bottom of the stack will be taken out and allowed to make an approach first, after which all aircraft in the stack move down one level, and so on.

A holding pattern for IFR aircraft is usually a racetrack pattern based on a *holding fix*. This *fix* can be a radio beacon such as an NDB or VOR. The fix is the start of the first turn of the racetrack pattern. Aircraft will fly towards the fix, and once there will enter a predefined racetrack pattern. A standard holding pattern uses right-hand turns and takes approximately 4 minutes to complete (one minute for each 180 degree turn, and two one-minute straight ahead sections). Deviations from this pattern can happen if long delays are expected; longer legs (usually two or three minutes) may be used, or aircraft with DME may be assigned patterns with legs defined in nautical miles rather than minutes. Less frequent turns are more comfortable for passengers and crew. Additionally, left-hand turns may be assigned to some holding patterns if there are airspace restrictions nearby.

In the absence of a radio beacon, the *holding fix* can be any fixed point in the air, and can be created using two crossing VOR radials (a so called intersection), or it can be at a specific distance from a VOR using a coupled DME. When DME is used, the inbound turn of the racetrack may be permanently defined by distance limits rather than in minutes. Furthermore, in appropriately equipped aircraft, GPS waypoints may be used to define the holding pattern, eliminating the need for ground-based navigational aids entirely.

## HOLDING PATTERN



## **NON RADAR SEPARATION**

### **EXPLANATION OF TERMS**

'Level change' means that portion of the climb and descent during which the vertical separation in relation to the level of another aircraft is less than the prescribed minima.

An 'exact reporting point' is a position established by a navigational facility which is:

- Overhead a VOR;
- Overhead an NDB;
- A position notified as a reporting point and which is established by the intersection of VOR radials, or of a VOR radial and a bearing from an NDB;
- A position established by a VOR radial combined with a range from a co-located or associated DME.

### **SEPARATION BASED ON VOR/DME/TACAN INFORMATION**

Where measured distance values are used, each aircraft must be using the same 'on track' VOR/DME/TACAN facility i.e. the aircraft must be flying towards or away from the same facility.

Communication must be maintained with the aircraft concerned throughout the period that measured distance values are being used to achieve separation. Separation is to be checked by obtaining simultaneous DME readings from aircraft at intervals of not more than 10 minutes.

VOR/DME separation criteria are based on the condition that a VOR and its associated DME/TACAN station are within 5 miles of each other. Where this distance is exceeded, special separation criteria will be published in MATS Part 2.

### **HORIZONTAL SEPARATION**

The three types of horizontal separation are:

Lateral separation;

Longitudinal separation;

Separation based on ATS surveillance system information.

## NAVIGATION

Non Radar separation requires a basic understanding of navigation. This section will provide an introduction to navigation problems encountered by the Air Traffic Controller.

Navigation is based on the principle that the earth is covered with a grid of lines traveling North and South and East and West. The lines traveling North to South are called **Meridians of longitude** and expressed as 180 degrees East or West of the **prime meridian**. The prime meridian passes through Greenwich England. The meridian opposite the prime meridian is called the international date line. Longitude is measured in degrees, minutes and seconds. The lines traveling East to West and parallel are called **Parallels of Latitude** and measured as zero to ninety degrees North or South of the **equator**. Latitude is measured in degrees, minutes and seconds.

The equator being a great circle contains 360 degrees and since the earth makes one revolution each 24 hours, therefore, 15 degrees of longitude represent one hour in time. In Air Traffic Control accuracy is very important, therefore, a standard method of reporting time has been developed called Coordinated Universal Time (UTC). An atomic clock in Paris, France monitors the accuracy of time.

*Note: "One-in-sixty" Rule - "An error in the track of one degree will cause an error in position of about one mile in a distance of 60 miles".*

## NAVIGATION TERMS

- (a) **Indicated Airspeed** - The speed as indicated by the airspeed indicator.
- (b) **True Airspeed** - The speed corrected for density and temperature.
- (c) **Ground Speed** - The actual speed of the aircraft over the ground.
- (d) **Heading** -The angle between the longitudinal axis of the airplane at any moment and a meridian. Headings may be true, magnetic or compass.
- (e) **Track Made Good** - The actual path of the aircraft over the ground. This track may be expressed as true, magnetic or compass.
- (f) **Drift**-The angle between the heading being flown and the track made good. Drift is expressed in degrees and may be left or right.

## FORMULAE

DISTANCE = SPEED X TIME

SPEED =  $\frac{\text{DISTANCE}}{\text{TIME}}$

TIME =  $\frac{\text{DISTANCE}}{\text{SPEED}}$

The controller should be capable of using the circular slide rule to solve basic navigation problems. Included with this study guide is a very basic slide rule that may be constructed at home and will provide for some training. The three problems common to many control decisions are **distance**, **elapsed time** and **ground speed**. With any two known the third may be calculated.

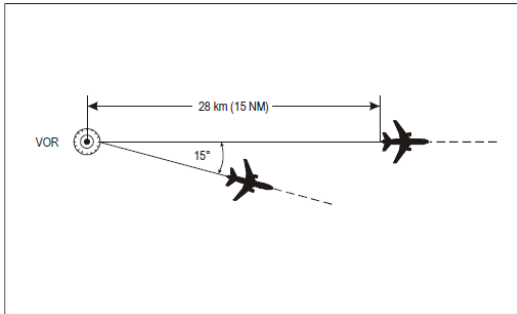
- (a) **To find distance** -when ground speed is 240kts, and time is 30 minutes, set 240 on the outer scale opposite 60(black arrow) on the inner scale. Read the distance on the outer scale opposite 30 on the inner scale. Ans. 120nm.
- (b) **To find elapsed time** - when ground speed is 300kts and distance is 100nm, set 300 on the outer scale opposite 60(black arrow) on the inner scale. Read the time on the inner scale opposite 100 on the outer scale. Ans. 20 minutes.
- (c) **To find Ground Speed** -when distance is 150nm and the time is 30 minutes. Set 150 on the outer scale opposite 30 on the inner scale. Read ground speed opposite 60(black arrow) on the inner scale. **Ans. 300kts.**

## LATERAL SEPARATION

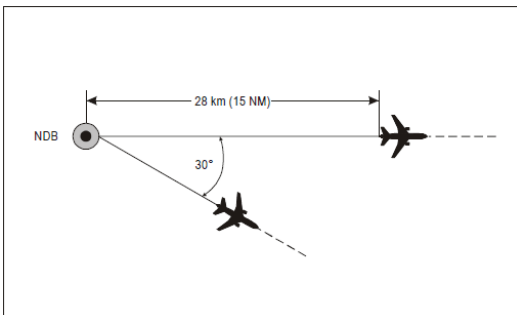
Lateral separation shall be applied so that the distance between aircraft is never less than a specified amount. It is achieved by requiring aircraft to fly on different tracks or in different geographical locations as determined by visual observations or by use of navigational aids.

Lateral separation between two aircraft exists when:

- a) *VOR*: both aircraft are established on radials diverging by at least 15 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the facility (see Figure *BELOW*);



- b) *NDB*: both aircraft are established on tracks to or from the NDB which are diverging by at least 30 degrees and at least one aircraft at a distance of 28 km (15 NM) or more from the facility (see Figure *BELOW*); or



- c) *RNAV operations*: both aircraft are established on tracks which diverge by at least 15 degrees and the protected airspace associated with the track of one aircraft does not overlap with the protected airspace associated with the track of the other aircraft. This is determined by applying the angular difference between two tracks and the appropriate protected airspace value. The derived value is expressed as a distance from the intersection of the two tracks at which lateral separation exists.

## GEOGRAPHICAL SEPARATION

Geographical separation must be:

- a) Indicated by position reports over different geographical locations that have been specified; and
- b) Constant or increasing.

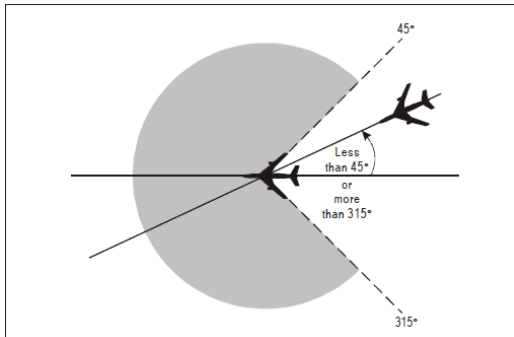
## LONGITUDINAL SEPARATION – TIME AND DISTANCE

Longitudinal separation based on either time or distance shall be applied so that the spacing between the estimated positions of the aircraft being separated is never less than a prescribed minima. It is achieved by requiring aircraft to:

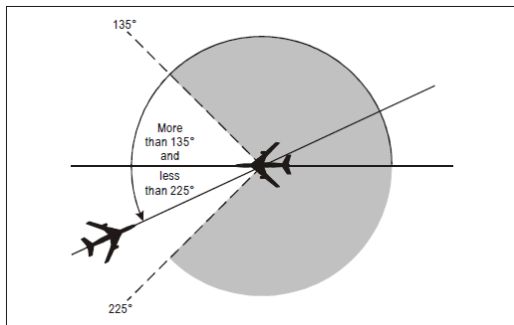
- Depart at a specified time;
- Lose or gain time to arrive at a geographical location at a specified time; or
- Hold over a geographical location until a specified time.

For the purpose of application of longitudinal separation, the terms below shall have the following meanings:

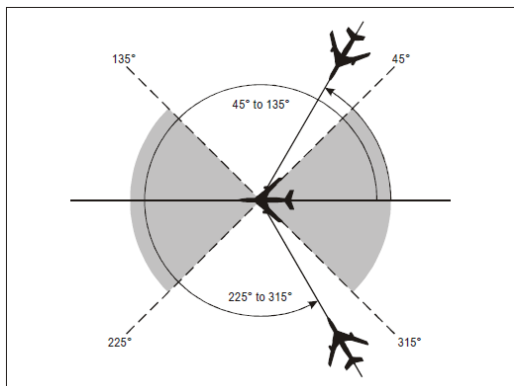
- Same Track:** same direction tracks and intersecting tracks or portions thereof, the angular difference of which is less than 45 degrees or more than 315 degrees, and whose protected airspaces overlap.



- Reciprocal Tracks:** opposite tracks and intersecting tracks or portions thereof, the angular difference of which is more than 135 degrees, but less than 225 degrees, and whose protected airspaces overlap.



- Crossing Tracks:** intersecting tracks or portions thereof other than those specified in a) and b) above.

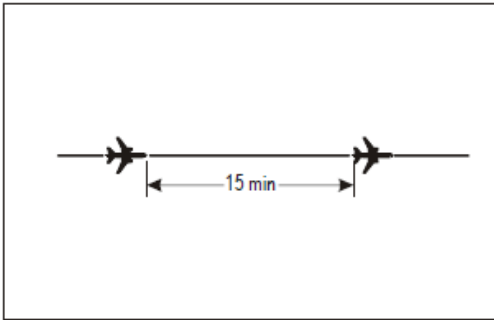


## LONGITUDINAL SEPARATION MINIMA BASED ON TIME

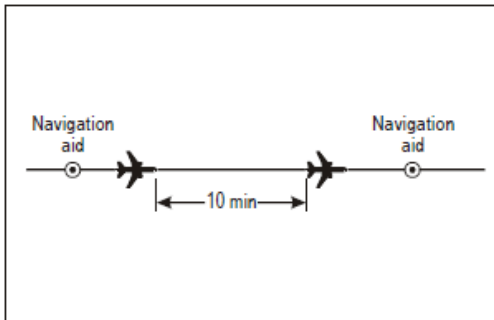
### AIRCRAFT MAINTAINING THE SAME LEVEL

Aircraft flying on the same track

- a) 15 minutes (see Figure *BELOW*); or

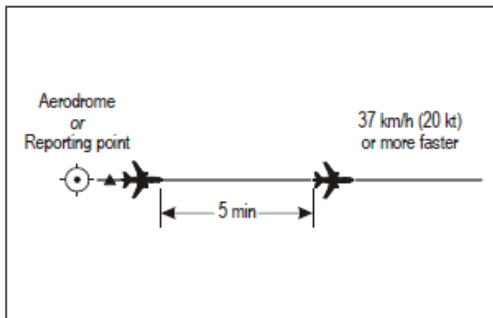


- b) 10 minutes, if navigation aids permit frequent determination of position and speed (see Figure *BELOW*); or

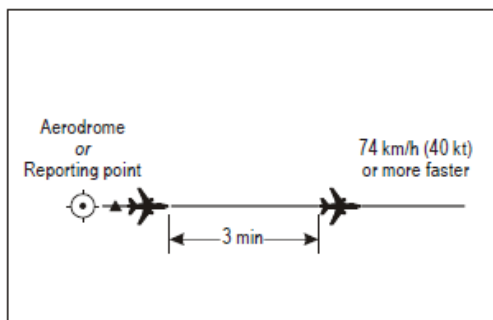


- c) 5 minutes in the following cases, provided that in each case the preceding aircraft is maintaining a true airspeed of 37 km/h (20 kt) or more faster than the succeeding aircraft (see Figure *BELOW*):

- 1) Between aircraft that have departed from the same aerodrome;
- 2) Between en-route aircraft that have reported over the same exact significant point;
- 3) Between departing and en-route aircraft after the en-route aircraft has reported over a fix that is so located in relation to the departure point as to ensure that five-minute separation can be established at the point the departing aircraft will join the air route; or

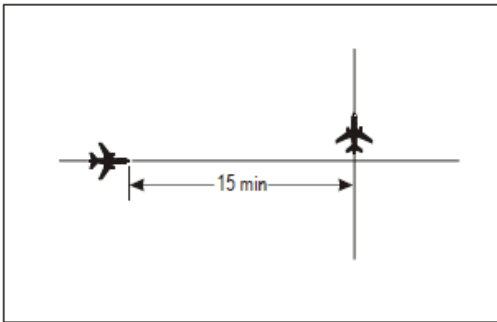


- d) 3 minutes in the cases listed under c) provided that in each case the preceding aircraft is maintaining a true airspeed of 74 km/h (40 kt) or more faster than the succeeding aircraft (see Figure *BELOW*).

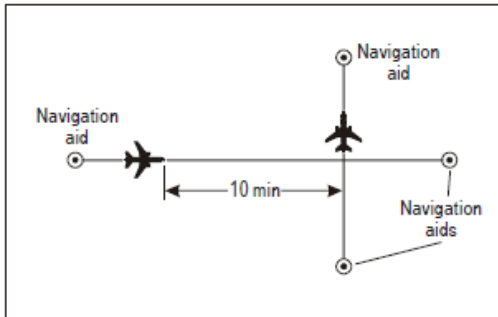


*Aircraft flying on crossing tracks*

- a) 15 minutes at the point of intersection of the tracks (see Figure **BELOW**); or



- b) 10 minutes if navigation aids permit frequent determination of position and speed (see Figure **BELOW**).

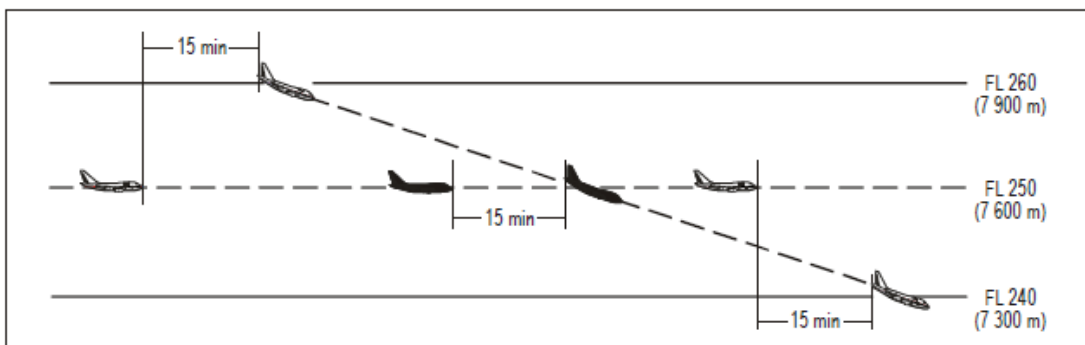
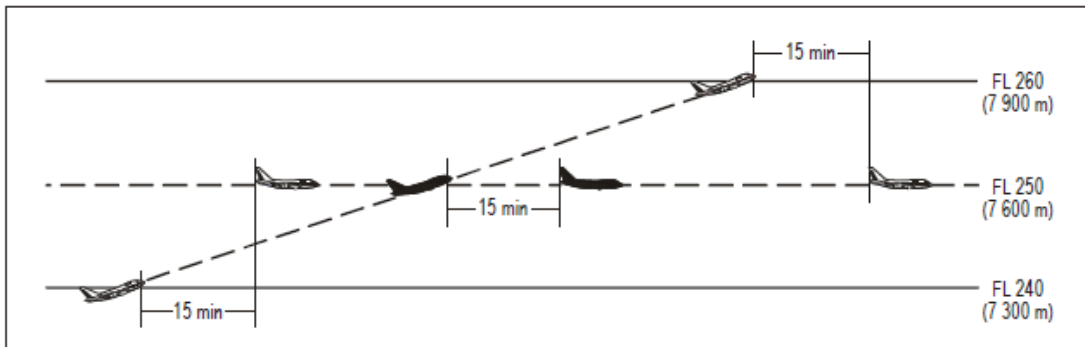


**AIRCRAFT CLIMBING OR DESCENDING**

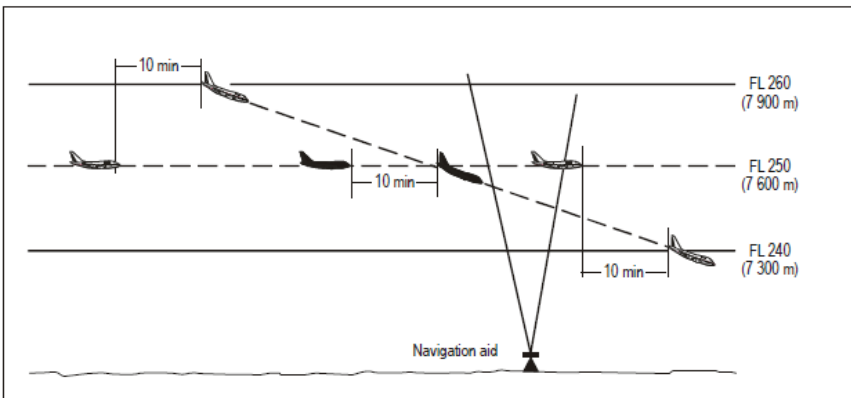
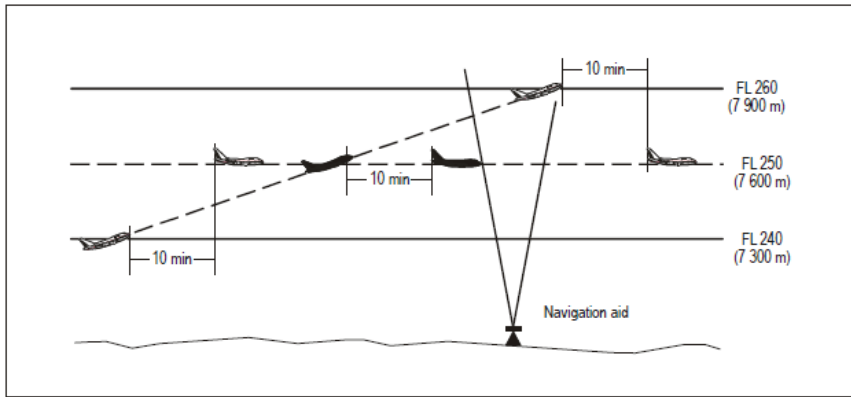
*Aircraft flying on the same track*

When an aircraft will pass through the level of another aircraft on the same track, the following minimum longitudinal separation shall be provided:

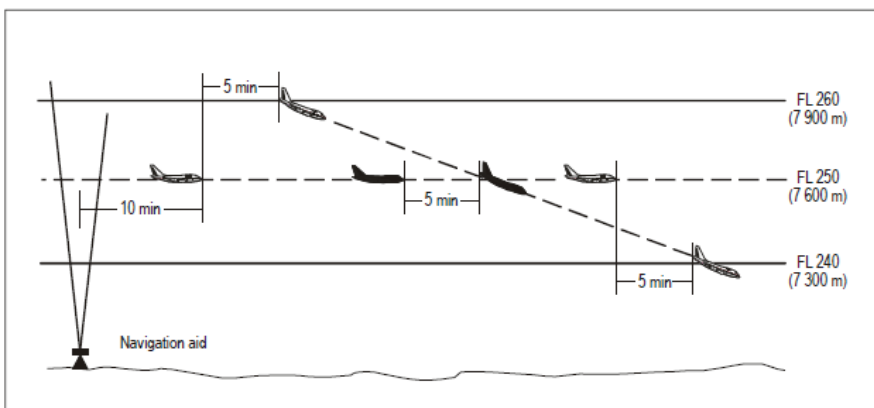
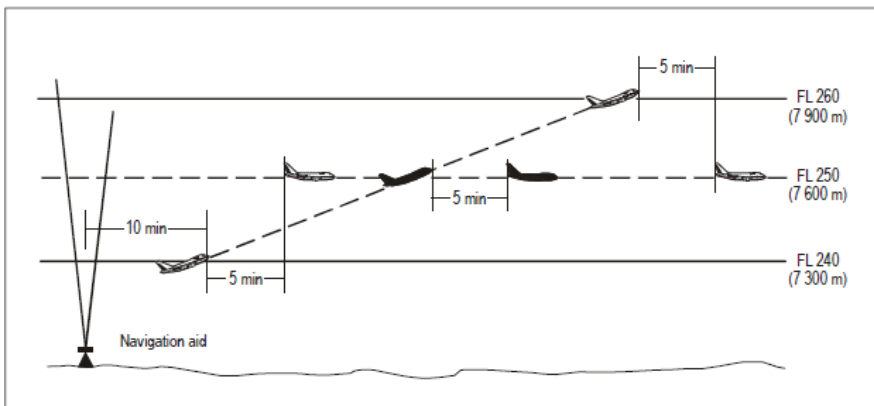
- a) 15 minutes while vertical separation does not exist (see Figures **BELOW**); or



b) 10 minutes while vertical separation does not exist, provided that such separation is authorized only where navigation aids permit frequent determination of position and speed (see Figures *BELOW*); or



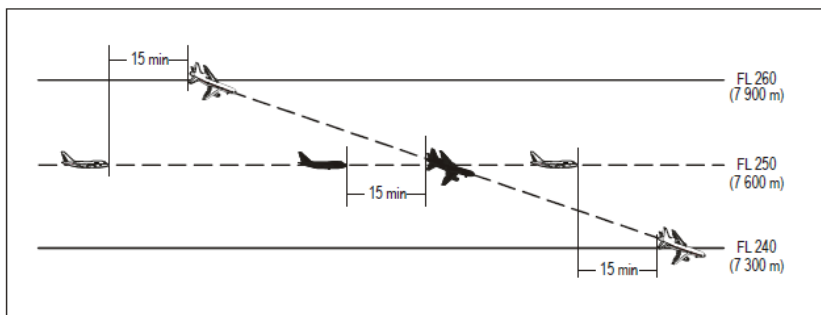
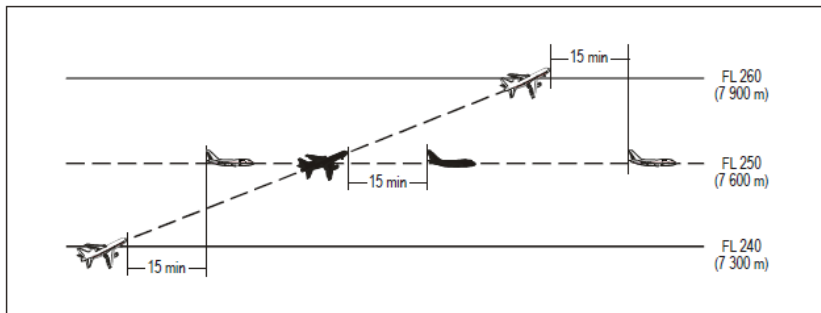
c) 5 minutes while vertical separation does not exist, provided that the level change is commenced within 10 minutes of the time the second aircraft has reported over an exact reporting point (see Figures *BELOW*).



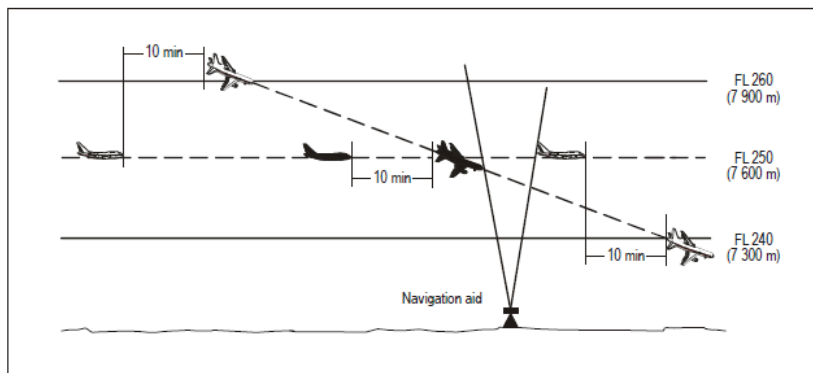
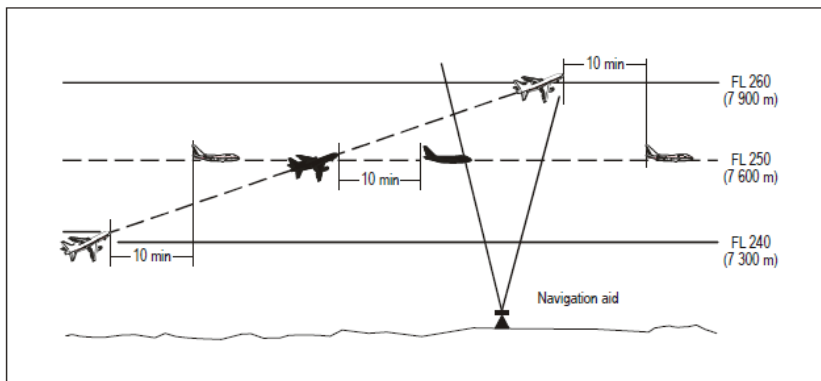
**Note.**— To facilitate application of the procedure where a considerable change of level is involved, a descending aircraft may be cleared to some convenient level above the lower aircraft, or a climbing aircraft to some convenient level below the higher aircraft, to permit a further check on the separation that will be obtained while vertical separation does not exist.

*Aircraft flying on crossing tracks*

a) 15 minutes while vertical separation does not exist (see Figures **BELOW**); or

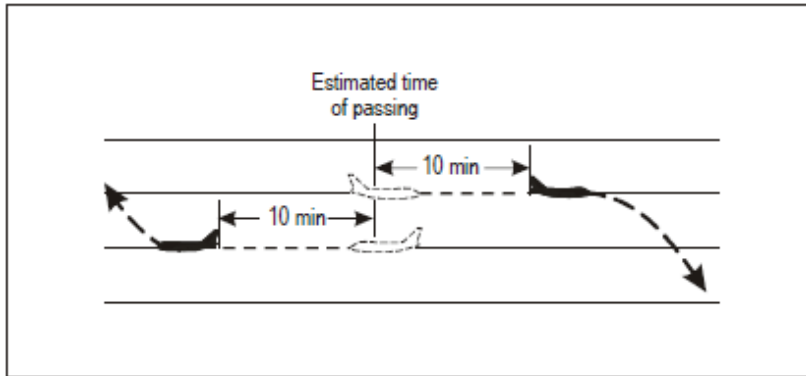


b) 10 minutes while vertical separation does not exist if navigation aids permit frequent determination of position and speed (see Figures **BELOW**).



### *Aircraft flying on reciprocal tracks*

Where lateral separation is not provided, vertical separation shall be provided for at least ten minutes prior to and after the time the aircraft are estimated to pass, or are estimated to have passed (see Figure *BELOW*). Provided it has been determined that the aircraft have passed each other, this minimum need not apply.



## **LONGITUDINAL SEPARATION MINIMA BASED ON DISTANCE USING DME AND/OR GNSS**

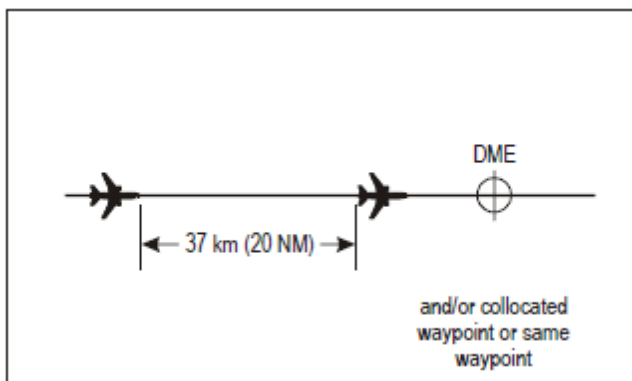
*Note.— Where the term “on track” is used in the provisions relating to the application of longitudinal separation minima using DME and/or GNSS, it means that the aircraft is flying either directly inbound to or directly outbound from the station/waypoint.*

Separation shall be established by maintaining not less than specified distance(s) between aircraft positions as reported by reference to DME in conjunction with other appropriate navigation aids and/or GNSS. This type of separation shall be applied between two aircraft using DME, or two aircraft using GNSS, or one aircraft using DME and one aircraft using GNSS. Direct controller-pilot VHF voice communication shall be maintained while such separation is used.

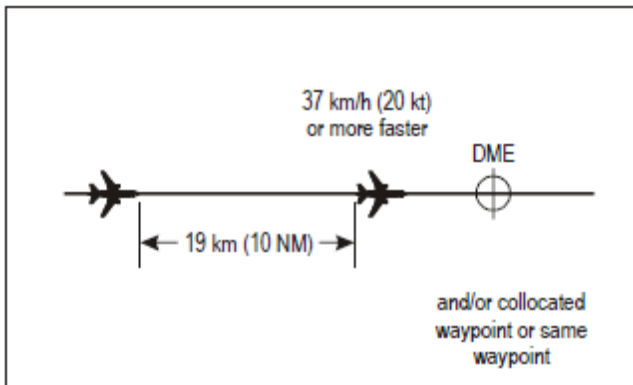
### ***AIRCRAFT AT THE SAME CRUISING LEVEL***

*Aircraft flying on the same track:*

- a) 37 km (20 NM), provided:
  - 1) Each aircraft utilizes:
    - i) The same “on-track” DME station when both aircraft are utilizing DME; or
    - ii) An “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
    - iii) The same waypoint when both aircraft are utilizing GNSS; and
  - 2) separation is checked by obtaining simultaneous DME and/or GNSS readings from the aircraft at frequent intervals to ensure that the minimum will not be infringed (see Figure *BELOW*);

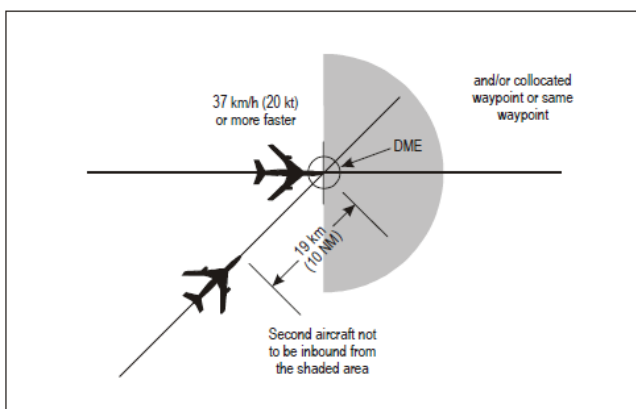
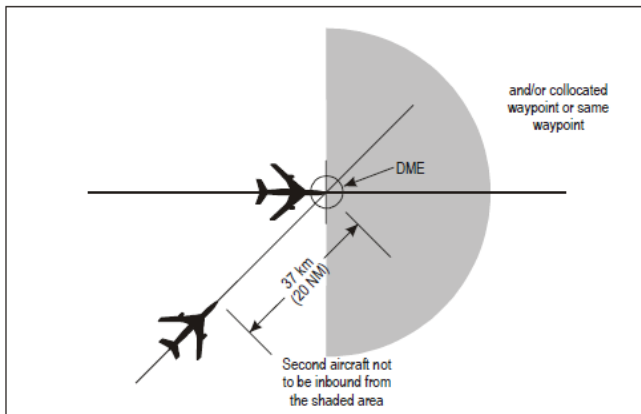


- b) 19 km (10 NM), provided:
- 1) The leading aircraft maintains a true airspeed of 37 km/h (20 kt) or more faster than the succeeding aircraft;
  - 2) Each aircraft utilizes:
    - i) The same “on-track” DME station when both aircraft are utilizing DME; or
    - ii) An “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
    - iii) The same waypoint when both aircraft are utilizing GNSS; and
  - 3) Separation is checked by obtaining simultaneous DME and/or GNSS readings from the aircraft at such intervals as are necessary to ensure that the minimum is established and will not be infringed (see Figure **BELOW**).



*Aircraft flying on crossing tracks*

The longitudinal separation prescribed in 5.4.2.3.3.1 shall also apply provided each aircraft reports distance from the DME station and/or collocated waypoint or same waypoint located at the crossing point of the tracks and that the relative angle between the tracks is less than 90 degrees (see Figures **BELOW**).

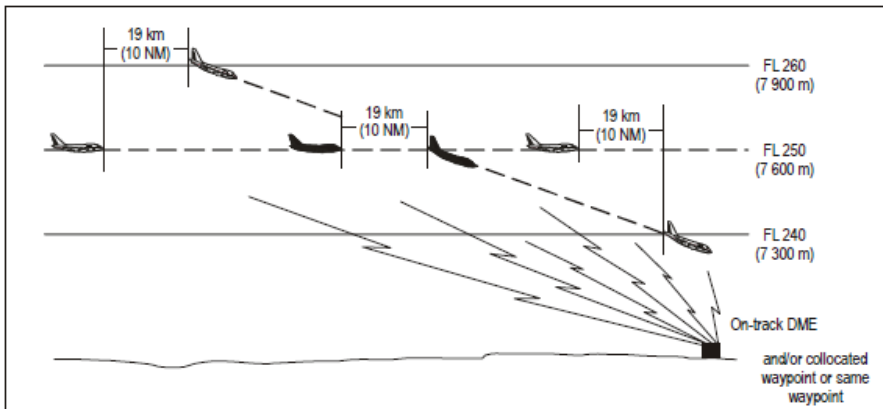
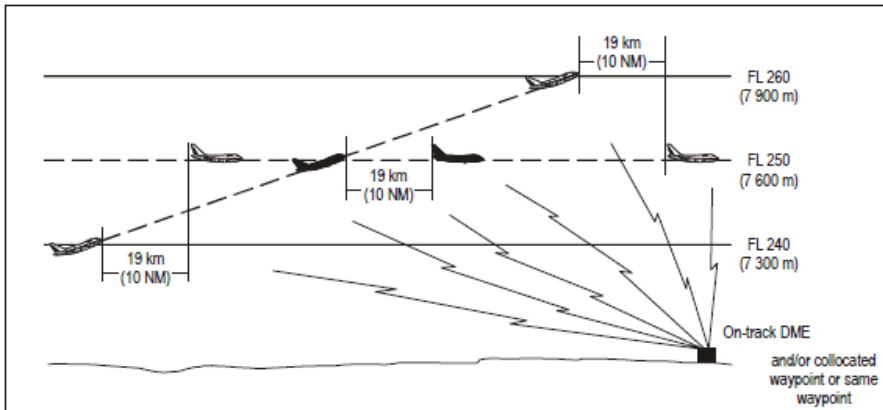


## **AIRCRAFT CLIMBING AND DESCENDING**

### *Aircraft flying on the same track*

19 km (10 NM) while vertical separation does not exist, provided:

- a) Each aircraft utilizes:
  - i) The same “on-track” DME station when both aircraft are utilizing DME; or
  - ii) An “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
  - iii) The same waypoint when both aircraft are utilizing GNSS; and
- b) One aircraft maintains a level while vertical separation does not exist; and
- c) Separation is established by obtaining simultaneous DME and/or GNSS readings from the aircraft (see Figures **BELOW**).



**Note.**— *To facilitate application of the procedure where a considerable change of level is involved, a descending aircraft may be cleared to some convenient level above the lower aircraft, or a climbing aircraft to some convenient level below the higher aircraft, to permit a further check on the separation that will be obtained while vertical separation does not exist.*

### *Aircraft flying on reciprocal tracks*

Aircraft utilizing on-track DME and/or collocated waypoint may be cleared to climb or descend through the levels occupied by other aircraft utilizing on-track DME and/or collocated waypoint or same waypoint, provided that it has been positively established that the aircraft have passed each other and are at least 10 NM apart, or such other value as prescribed by the appropriate ATS authority.

## EMERGENCIES

The circumstances of each aircraft emergency can vary to such an extent that detailed instructions cannot be given for every situation. The procedures outlined in this section are intended as a general guide and controllers must use their own judgement when handling a particular emergency.

**DISTRESS: A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.**

**URGENCY: A condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.**

The procedures described in the preceding sections and the appropriate standard phraseology may also be varied to meet an emergency situation but any reduction in separation, necessary to cope with the emergency, should be restored as soon as possible.

### CONTROLLERS RESPONSIBILITY

Controllers must always be alert to the possibility of an aircraft emergency. Speed may be necessary in certain circumstances but calm co-ordinated actions are essential in all situations.

Controllers shall offer as much assistance as possible to any aircraft that is considered to be in an emergency situation. Assistance to the aircraft can include the provision of information on the availability of aerodromes and their associated approach aids, vectoring, weather information and details of terrain clearance. An emergency may require alerting action to be taken immediately or it may develop to that point later.

If the ACC is involved the ACC Controller should take charge of the operation. Controllers must be ready to give all possible assistance to the ACC and other ATC units. If more than one ACC is involved then the supervisors should agree between them which one takes charge.

The appropriate Search & Rescue Agencies should be advised of any aircraft emergency.

### RECOGNISING AN EMERGENCY SITUATION

A controller may suspect that an aircraft is in an emergency situation when:

- a) Radio contact is not established at the time it is expected to be established;
- b) Radio contact is lost;
- c) A pilot makes a report about the malfunctioning of his aircraft or the unusual behavior of persons on-board;
- d) The erratic behavior of an aircraft or position symbol is observed;
- e) It is overdue at an aerodrome; or
- f) The pilot reports that the aircraft is short of fuel.

If the controller is in radio contact with the aircraft he should ask the pilot if he wishes to declare an emergency and, if not specified by the pilot, the class of emergency being declared.

### DISTRESS AND URGENCY MESSAGES

Pilots have been advised that, in the event of an emergency situation, an ATS unit can only provide the necessary priority and handling if the controller is made aware of the emergency by the crew's formal declaration on the RTF. Pilots have also been advised that the extent to which an ATS unit will be able to offer assistance will depend on the amount of information provided and on its being transmitted at the earliest opportunity. Furthermore, it is preferable that if pilots believe that they are facing an emergency situation, to declare it as early as possible and cancel it later if they decide that the situation allows.

There are two classes of emergency message:

**MAYDAY**

and;

**PAN**

The emergency message will contain as many as possible of the following items:

**MAYDAY, MAYDAY, MAYDAY** (for distress messages)

or

**PAN PAN, PAN PAN, PAN PAN** (for urgency messages)

and

- a. Name of the station addressed (time and circumstances permitting)
- b. Identification of the aircraft
- c. Nature of the emergency
- d. Intention of the person in command
- e. Present position, level and heading

When a pilot has given certain items of information normally associated with an emergency message but has not prefixed the transmission with 'MAYDAY' or 'PAN', the controller is to ask the pilot if he wishes to declare an emergency. If the pilot declines to do so, the controller may, if he thinks it appropriate, carry out the necessary actions as if the pilot had declared an emergency. Controllers are not required to give priority to aircraft with a reported shortage of fuel unless an emergency is declared.

**RETAINING CONTROL**

If a controller considers that another ATS unit may be able to give more assistance and, in the circumstances, it is reasonable to do so, the pilot should be asked to change frequency.

If the controller can offer immediate assistance the aircraft should normally be retained on the frequency. If necessary, impose a radio silence on other aircraft or transfer them to another frequency.

Alternatively it may be more expedient to transfer the emergency aircraft to a discrete frequency, particularly if a radio silence would endanger other traffic.

The aircraft should be retained on the original frequency if it is unreasonable to ask the pilot, or if he is not prepared, to change frequency. The controller may be able to relay instructions and information from other units to the pilot.

**INDICATIONS ON THE RADAR DISPLAY**

Pilots may select the following SSR transponder codes to indicate the emergency situation:

**Code 77 (7700)** – Aircraft Emergency

**Code 76 (7600)** – Radio Failure

**Code 75 (7500)** – Hijack or Other Act of Violence.

If an aircraft in communication with an ATS unit experiences Radio Failure **Code 76 (7600)**, then the pilot in command of that aircraft shall use the **Text Feature** on VRC to inform that unit of the failure, and continue using the text feature as the means of communication. The aircraft shall **NOT** be treated as an emergency under this circumstance.

To indicate an emergency condition pilots are encouraged to select Code 7700 as soon as is practicable after declaring an emergency situation, having due regard for the overriding importance of controlling aircraft and containing the emergency. However, if the aircraft is already transmitting a discrete code and receiving an air traffic service, that code may be retained at the discretion of either the pilot or the controller.

## **EMERGENCY TRIANGLE PROCEDURE**

Pilots lost or uncertain of position and experiencing either transmitter or complete radio failure are advised, as a last resort, to carry out special procedures to indicate to controllers that they require assistance.

## **STRAYED AND UNIDENTIFIED AIRCRAFT**

For the purposes of this chapter, the terms strayed and unidentified aircraft have the following meaning:

### **STRAYED AIRCRAFT**

Is an aircraft which has deviated significantly from its intended track, or which reports that it is lost.

When a controller becomes aware of an aircraft which has deviated significantly from its intended track but has not reported as being lost, the following actions should be followed in so far as is necessary:

- a) Attempt to establish two-way communication, unless such communication already exists, and inform the pilot of his position;
- b) Inform other ATS units into whose area the aircraft has strayed or may stray.

### **UNIDENTIFIED AIRCRAFT**

Is an aircraft which has been observed or reported to be operating in a given area but whose identify has not been established.

When a controller becomes aware of an unidentified aircraft within airspace for which they are the controlling authority and an ATC clearance is required, or when required by appropriate military authorities, he should follow, in so far as is necessary, the following actions:

- a) Attempt to establish the identity of the aircraft;
- b) Attempt to establish two-way communication;
- c) If possible, attempt to obtain information from other aircraft in the area;
- d) As required, notify those units consulted in the tracing of the unidentified aircraft that the aircraft's position has been ascertained.

**\*Controllers are reminded, an unattended connection as ATC can result in a suspension from VATSIM. While logged on as ATC, NEVER leave VRC unattended. If you are leaving the pc, it is advised you disconnect from VATSIM\***

**\*Also controllers are asked to ALWAYS be polite, respectful, courteous and cooperative to all pilots. It goes a very long way in helping not only your FIR but VATCAR as well \***