



**DIRECTORATE OF AIR TRAFFIC MANAGEMENT**  
**RAJIV GANDHI BHAWAN, NEW DELHI-110003**  
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# ATMC

## **AIR TRAFFIC MANAGEMENT CIRCULAR NO. 4 of 2011**

### **Handling of Traffic on Reciprocal Track**

#### **1. Introduction**

It has been observed that in recent past there has been a significant increase in the number of Airprox incidents in en-route phase. Analysis of these incidents revealed that as high as 30% of the Airprox incidents in Indian FIRs fall under this category. Though many of these aircraft were well within radar coverage, the controllers overlooked the reciprocal traffic and permitted the opposite direction aircraft to climb/descent through its level. Since knowledge of factors attributable to such incidents can enhance flight safety, these are enumerated in this circular along with guidance material on handling of aircraft on reciprocal track in en-route phase of the flight.

#### **2. Purpose**

2.1 Purpose of this ATMC is to enumerate some of the factors which attribute to incidents on reciprocal track along with guidance to controllers for handling of such aircraft on reciprocal track when level change of one aircraft is effected through the level of other aircraft.

#### **3. Scope**

3.1 This ATMC is applicable to all air traffic controllers working at ATC centres/ATC units of Airports Authority of India.

#### **4. Applicable provisions of separation between aircraft on reciprocal track**

##### **4.1 Time based separation**

4.1.1 When Aircraft climbing or descending on reciprocal tracks and 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. Provided it has been determined that the aircraft have passed each other, this minimum need not apply (Ref: Para 5.6.2.2.3.3 of Manual of Air Traffic Services – Part1).

## 4.2 Distance based separation

4.2.1 Aircraft utilizing on-track DME and/or collocated waypoint or same 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.

4.2.2 There is no distance based longitudinal separation minima prior to determination that the aircraft concerned have crossed each other.

## 4.3 Radar separation

4.3.1 The horizontal separation minima based on radar shall be 5 NM within 60 NM from the radar head and 10 NM beyond 60 NM from the radar head except at the airport(s) where radar separation of 3 NM is specifically permitted.

4.3.2 Radar separation shall be applied so that distance between the centres of the RPS representing the position of the aircraft concerned, is never less than prescribed minima.

## 5. Factors for incidents on reciprocal track

5.1 There may be lack of conceptual clarity on the issues of providing radar separation to aircraft on reciprocal tracks, human error in detecting conflict and appreciation of closure speed and rate of climb/descent limitations at higher levels in en-route phase of flights. Due to very high rate of closure of aircraft on reciprocal track, the clear airspace between aircraft diminishes very fast and availability of radar lull controller in false sense of security. Thus many controllers are getting trapped by such type of separation plan that has no alerting check points and no escape route.

5.2 Inattention or lack of vigilance is contributory factors in approximately 50 percent of all Airprox incidents. Such human errors often happen during periods of light, non-complex traffic, particularly when controllers have to handle a small workload after peak traffic. They develop complacency and boredom which contribute to the frequency of such attention-related incidents. When there is stressful situation, it may also trigger tunnel vision in controllers who then overlook traffic relevant to their sector. When a controller becomes pre-occupied with a problem, therefore occupying all the available surveillance resources, this may lead to overlooking an aircraft, even if in the central area or in front of the aircraft which is given climb or descent. Short Term Conflict Alert (STCA) if provided, may occur too late to be effective in conflict avoidance in the vertical dimension and thus leading to a reliance on TCAS.



## 6. Generic Guidance

- 6.1 Radar controller must ensure correct brightness settings of situation display and not to obscure aircraft not under his/her control.
- 6.2 Radar controllers should avoid transferring aircraft to the next sector very early, especially when climb and descent is effected.
- 6.3 After peak periods, controllers may be relieved from the position or exchange positions on the sector in order to refocus and maintain a high concentration level.
- 6.4 Controllers shall avoid hasty decisions while considering request of level change. They may advise the pilot to stand-by while evaluating his/her request.
- 6.5 A Controller must ensure that aircraft is clear of conflicts before handing over to adjacent sector/centre, so that no unexpected manoeuvre will affect his/her traffic.

## 7. Specific Guidance for facilitating climb & descent on reciprocal track

- 7.1 Radar controllers, before effecting a level change, shall scan the area around the aircraft concerned to assess for any potential conflict. They should not be in a hurry to give climb and descent, which was the case in many of the incidents. Controllers should Re-scan the situation immediately after giving climb/descent. When ATC automation system permits, RBT/RBL/Min Sep tool may be used between conflicting traffic as a reminder of possible conflict. This will help in reducing human error in detection of conflict before authorizing climb/descent to the aircraft concerned. Radar controllers shall maintain a close coordination with procedural (Planning) controllers before effecting level change in en-route phase of the flight.
- 7.2 Procedural (Planning) controllers, before effecting a level change, shall scan the flight progress board for any potential conflict, particularly reciprocal traffic in bi-directional routes.
- 7.3 In view of para 4.1.1, there is no longitudinal separation if estimated time of crossing of reciprocal traffic is less than 10 minutes when the radar controller is intending to give climb/descent to an aircraft through the level of reciprocal aircraft. In such cases, either of the following may be followed:
  - 7.3.1 Radar derived information indicate that both aircraft have passed each other and after passing each other, applicable radar separation is existing, or
  - 7.3.2 One of the aircraft may be instructed to make parallel offset to route by at least the minimum distance of applicable radar separation and when established parallel offset track, level change may be effected. When vertical separation is achieved, offset can be cancelled and may be instructed to rejoin cleared flight route or direct next reporting point, or



7.7.3 One of the aircraft may be assigned tracks / headings which will facilitate applicable lateral radar separation minima until vertical separation minima are established. General guidelines for assigning heading/track are as appended below:

- *As a thumb of rule, vectoring angle to achieve lateral separation of X NM is*  
 $X = [60/\text{Distance}] * X \text{ degrees}$
- *To achieve 1 NM separation at 60 NM, vectoring angle =  $60/60 * 1 = 1^\circ$ .  
Thus when an aircraft is given heading/track which is different by 1 degree, it will achieve lateral separation of 1NM at a distance of 60 NM.*
- *Considering speed of 480 knots (i.e. 8 NM/min) of jet aircraft, distance between two aircraft on reciprocal track (relative speed 16 NM per min) in nil wind condition (10 minutes before traffic crossing each other)*  
 $= 10 * 16 = 160\text{NM}$ .
- *Degree of turn required to achieve 10NM separation (e.g. 10 NM radar separation minima) at crossing point at 80NM*  
 $= 60/80 * 10 = 7.5^\circ$ .
- *Thus to be more realistic and on a safer side, a turn of  $10^\circ$  will be enough to give more than 10 NM lateral separation, if aircraft are 160 NM apart and strong cross wind component is not there.*
- *Heading adjustment may be required depending upon reaction of pilot in executing ATC instruction, wind direction, aircraft speed etc.*

7.4 There may be a situation in which aircraft on laterally separated tracks are given clearances to climb or descend though the level of other aircraft, and there is likelihood of infringement of lateral separation minima due weather deviations, direct routings or any other reason. In such cases, action should be taken to level-off the aircraft concerned by applying vertical separation minimum and give further climb/descent only when appropriate separation minimum has been established.

7.5 While making offset or assigning heading from route/track, controller shall take care of traffic on adjacent routes/tracks.

7.6 Vigilance shall be maintained by the radar controller so that in all circumstances at least one of the standard separations is maintained



## 8. Queries

8.1 Any queries or further guidance required on the contents of this ATMC should be addressed to:

Executive Director [ATM]  
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Safdarjung Airport  
New Delhi-110003  
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## 9. Validity

9.1 This ATMC will remain in force until further notice.

9.2 AAI CHQ letter No. AAI/21-12/2004-AR1 dated October 18, 2004 is hereby cancelled.

  
[JYOTI PRASAD] 26/5/11

**EXECUTIVE DIRECTOR [ATM]  
AIRPORTS AUTHORITY OF INDIA  
Dated: 26-05-2011**