



सत्यमेव जयते

**INVESTIGATION REPORT ON SERIOUS INCIDENT OF  
AIRPROX BETWEEN M/s JET AIRWAYS ,JAI426 (B737-800  
AIRCRAFT VT-JBE )AND M/s AIR INDIA Ltd, AIC696 (A321  
AIRCRAFT VT-PPL) AT CSI AIRPORT, MUMBAI, ON 21/08/2017**

**KUNJ LATA**  
**INVESTIGATOR-IN-CHARGE**

**DINESH KUMAR**  
**INVESTIGATOR**

## ABBREVIATION

|         |   |
|---------|---|
| AAIB    | Aircraft Accident Incident Bureau                         |
| ACC     | Area Control  |
| ADC     | Aerodrome control   |
| APP     | Approach Control  |
| ATC     | Air Traffic Controller                                    |
| ASR     | Approach Control Surveillance Approach Radar- ASR         |
| ATPL    | Airline Transport Pilot Licence                           |
| CCW     | Current Conflict Warning                                  |
| CPDLC   | Controller Pilot Data Link Communication                  |
| CPL     | Commercial Pilot License                                  |
| DFDR    | Digital Flight Data Recorder                              |
| DME     | Distance Measuring Equipment                              |
| ICAO    | International Civil Aviation Organization                 |
| IFR     | Instrument Flight Rule                                    |
| NM      | Nautical Miles  |
| OCC     | Oceanic Control   |
| PCW     | Predicted Conflict Warning                                |
| SMGCS   | Surface Movement Guidance and Control System              |
| STAR    | Standard Terminal Arrival Route                           |
| TCAS RA | Traffic Collision Avoidance System- Resolution Advisories |
| TCAS TA | Traffic Collision Avoidance System- Traffic Advisories    |
| UTC     | Co-ordinated Universal Time                               |
| VHF     | Very High Frequency                                       |
| VOR     | VHF Omnidirectional Range                                 |

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**INVESTIGATION REPORT ON SERIOUS INCIDENT OF AIRPROX**  
**BETWEEN M/s JET AIRWAYS JAI426 (B737-800 AIRCRAFT,**  
**REGISTRATION- VT-JBE) AND M/s AIR INDIA AIC696 (A321 AIRCRAFT**  
**REGISTRATION- VT-PPL) AT CSI AIRPORT, MUMBAI, ON 21/08/2017**

|     |   |                                |                                |
|-----|---|--------------------------------|--------------------------------|
| 1.  | Aircraft Type                           | A321                           | B737-800                       |
| 2.  | Nationality                             | INDIAN                         | INDIAN                         |
| 3.  | Registration                            | VT-PPL                         | VT-JBE                         |
| 4.  | Owner                                   | AIR INDIA                      | JET AIRWAYS                    |
| 5.  | Operator                                | AIR INDIA                      | JET AIRWAYS                    |
| 6.  | Pilot – in –Command                     | ATPL HOLDER                    | ATPL HOLDER                    |
|     | Extent of Injuries                      | NIL                            | NIL                            |
| 7.  | Co-Pilot                                | CPL HOLDER                     | CPL HOLDER                     |
|     | Extent of Injuries                      | NIL                            | NIL                            |
| 8.  | Place of Accident                       | MUMBAI APPROACH                | MUMBAI APPROACH                |
| 9.  | Co-ordinates of accident Site(Location) | VICINITY OF MB394 POINT        | VICINITY OF MB394 POINT        |
| 10. | Last point of Departure                 | CALICUT                        | VARANASI                       |
| 11. | Intended place of Landing               | MUMBAI                         | MUMBAI                         |
| 12. | Date & Time of Accident                 | 21.08.17 at time 1008 UTC      | 21.08.17 at time 1008 UTC      |
| 13. | Passengers on Board                     | 95                             | 163                            |
| 14. | Extent of Injuries                      | NONE                           | NONE                           |
| 15. | Crew on Board                           | 07                             | 08                             |
| 16. | Extent of Injuries                      | NONE                           | NONE                           |
| 17. | Phase of Operation                      | APPROACHING MUMBAI FOR LANDING | APPROACHING MUMBAI FOR LANDING |
| 18. | Type of Incident:                       | AIRPROX                        | AIRPROX                        |

(ALL TIMINGS IN THE REPORT ARE IN UTC)

## **SYNOPSIS**

The Serious Incident of breach of separation between M/s Jet Airways, JAI426, (B737-800 aircraft, registration: VT-JBE) from Calicut to Mumbai on Q12 route and M/s Air India, AIC696,( A321 aircraft, registration: VT-PPL) from Varanasi to Mumbai on G450 route took place in Mumbai Approach Control. An incident occurred when JAI426 which was orbiting to its right and maintaining flight level FL120 was given “Descend to FL100” while AIC696 was maintain flight level FL110. The minimum lateral separation between both aircraft was reduced to 2.3 NM and minimum vertical separation was 400 feet. JAI426 reported TCAS RA while AIC696 reported Traffic Advisory (TCAS TA) only.

The occurrence was classified as a “Serious Incident” in accordance with the Aircraft (Investigation of Accidents and Incidents) Rules, 2017. DG, AAIB ordered an investigation into their occurrence vide order no: 01/2017-Serious Incident dated 23/10/2017. A corrigendum was issued vide AAIB Order dated 28/05/2019 appointing Ms. Kunj Lata, Assistant Director as Investigator-in-Charge and Mr. Dinesh Kumar, Air Safety Officer as an Investigator to investigate the cause of the incident.

In accordance with the provisions of Annex 13, Initial notification of the occurrence was sent to ICAO on 30/08/17.

## **1.0 FACTUAL INFORMATION**

### **1.1 HISTORY OF FLIGHT**

On 21.08.2017, AIC696 was scheduled for sector Varanasi to Mumbai, and it came in contact with Mumbai Approach radar controller at FL150. AIC696 was following “STAR EMRAK 1A RWY27” and expected touchdown time given was 1030 UTC. At time 09:57:58 UTC, AIC696 was given “descend to FL130” via Approach Radar Controller.

The other aircraft JAI426, was scheduled from Calicut to Mumbai and maintaining FL150. JAI426 was following “STAR KETOR 1A ARRIVAL RWY27” and expected touchdown time given was 1025 UTC.

At time 10:00:11 UTC, the Approach Radar Controller instructed AIC696 “Descend to FL120” and assigned a heading H270 for arrival sequence at 10:01:03 UTC.

At time 10:04:28 UTC, Approach Radar Controller instructed JAI426 to “Descend to FL120” .At time 10:05:56 UTC, Approach Radar Controller instructed JAI426 to make one orbit to its right at its present position.

At time 10:06:06 UTC, JAI426 was given further “Descend to FL100” while it was orbiting . While descending, JAI426 received TCAS RA and AIC696 received TCAS TA and both aircraft followed the advisory actions. The minimum lateral separation was reduced to 2.3 NM and vertical separation was 400 feet. The incident occurred near waypoint MB394 which is around 40NM from Mumbai Airport.

### **1.2 INJURIES TO PERSONS**

| INJURIES    | CREW | PASSENGERS | OTHERS |
|-------------|------|------------|--------|
| FATAL       | NIL  | NIL        | NIL    |
| SERIOUS     | NIL  | NIL        | NIL    |
| MINOR/ NONE | NIL  | NIL        | NIL    |

### **1.3 DAMAGE TO THE AIRCRAFT**

NIL

### **1.4 OTHER DAMAGES**

NIL

### **1.5 PERSONAL INFORMATION**

#### **1.5.1. Pilot-in-Command (FOR AIC696 AND JAI426)**

Both PIC held valid ATPL licenses and held required ratings to fly.

#### **1.5.2. Co-Pilot (FOR AIC696 AND JAI426)**

Both operating crew held valid licenses.

#### **1.5.3 ATC Controller**

i. The controller was rated for the following ATC units at CSI

Airport:-

- a. Tower Control- ADC/AAP/SMGCS
- b. Oceanic Control- OCC & CPDLC
- c. Area Control- ACC
- d. Approach Control Surveillance Approach Radar- ASR

ii. Whether Controllers were involved in any incident or accident in past:-

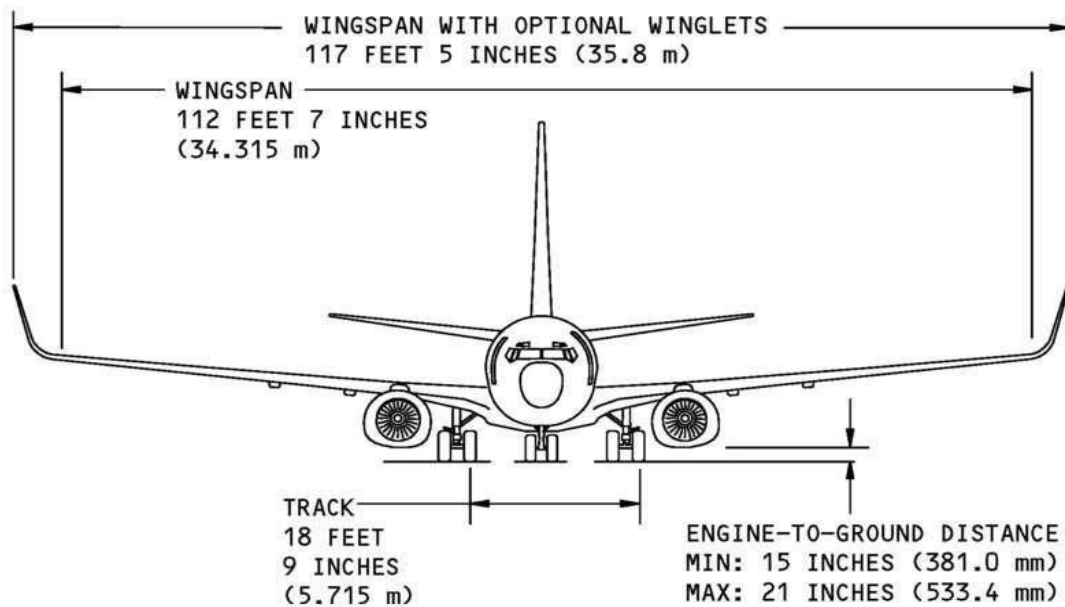
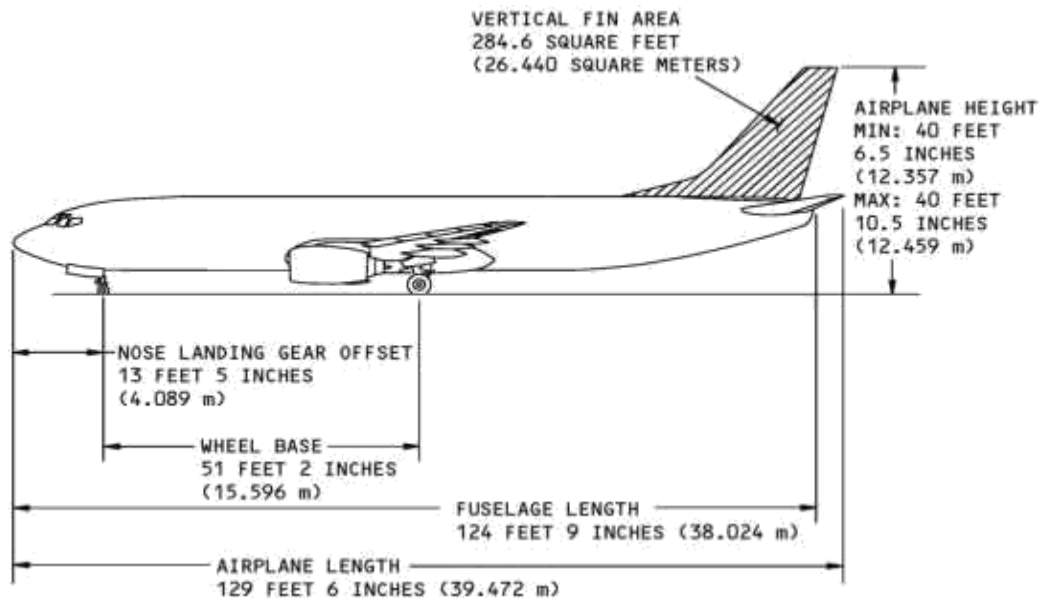
The controller was involved in an Airprox occurred on 22.05.2014 at Mumbai OCC Area between ETD413 and ETD685.

### **1.6 AIRCRAFT INFORMATION**

#### **B737-800 Aircraft: -**

They are short- to medium-range, narrow-body jet airliners powered by two engines. This aircraft is certified in Normal category, for day and night operation under VFR & IFR. The maximum

operating altitude is 41000 feet and maximum takeoff weight is 79,015 Kgs. Aircraft length is 39.472meters, wingspan is 35.8 meters and height of this aircraft is 12.459 meters. This airplane is certificated in the Transport Category, FAR Part 25 and Part 36.



### **Statistics of B737-800**

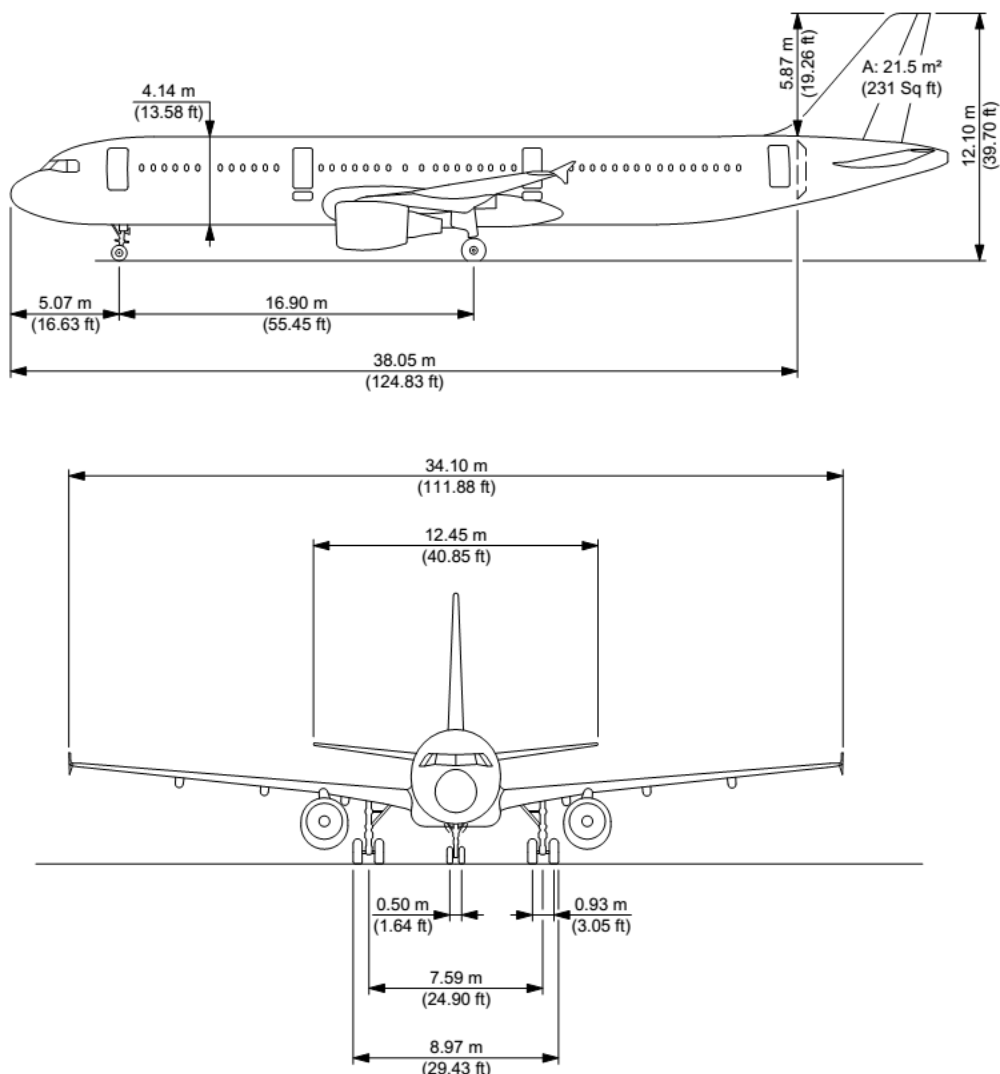
|                         |          |
|-------------------------|----------|
| Current Fleet size      | 12       |
| Maximum Take-off Weight | 79 tons  |
| Wing Span               | 35.8 m   |
| Overall Length          | 39.472 m |



|                            |                 |
|----------------------------|-----------------|
| Overall Height             | 12.459 m        |
| Cabin Width                | 3.7 m (approx.) |
| Wing Area                  | 124.6 Sq. m     |
| Average Cruise Speed       | 0.78 Mach       |
| Maximum Operating Altitude | 41000 ft        |
| Maximum Fuel Capacity      | 20000 ltrs      |
| Maximum Thrust             | 2 x(27000lbs)   |
| No of Engines              | 2               |
| Model                      | CFM56 – 7B      |

### **A321 Aircraft: -**

The Airbus A321 is a member of the Airbus A320 family of short-to medium-range, narrow-body, commercial passenger twin-engine jet airliners. The first derivative of the baseline A320, it has a stretched fuselage. It is a low-wing cantilever monoplane with a conventional tail unit having a single vertical stabilizer and rudder.



### **Statistics of A321**

|                            |                 |
|----------------------------|-----------------|
| Current Fleet size         | 20              |
| Maximum Take-off Weight    | 89 tons         |
| Wing Span                  | 34.1 m          |
| Overall Length             | 44.5 m          |
| Overall Height             | 12.1 m          |
| Cabin Width                | 3.7 m           |
| Wing Area                  | 122.4 Sq. m     |
| Average Cruise Speed       | 0.78 Mach       |
| Maximum Operating Altitude | 39800 ft        |
| Maximum Fuel Capacity      | 23700 lt        |
| Maximum Thrust             | 2 x (33000 lbs) |
| No of Engines              | 2               |
| Model                      | CFM56 - 5B3 / P |

#### **1.7 METEOROLOGICAL INFORMATION**

Visibility reported at the time of incident was 2500 meters.

Weather was not a contributory factor to this incident.

#### **1.8 AIDS TO NAVIGATION**

All automation systems, VHF channel and ATS surveillance system were reported to be working normal.

Mumbai VOR/DME, nomenclature BBB is operational for H24 on the coordinates of 190510.21N 0725228.93E and has a frequency of 116.6 MHz.

#### **1.9 COMMUNICATION**

There was two-way positive communication between ATC and aircraft.

#### **1.10 AERODROME INFORMATION**

Mumbai airport is known as Chhatrapati Shivaji International Airport and its ICAO Code is VABB. IATA nomenclature of the airport is BOM. The co-ordinates of ARP are 190530N, 0725158E. The Elevation of airport is 37 feet.

Runway Orientation and Dimension are as below:

Runway 09/27      Dimension-3448 x 60 meters

Runway 14/32      Dimension-2871 x 45 meters

**1.11      FLIGHT RECORDERS**

Flight Recorders were installed on both aircraft and were in operational condition.

**1.12      WRECKAGE AND IMPACT INFORMATION**

Nil

**1.13      MEDICAL AND PATHOLOGICAL INFORMATION**

Not applicable.

**1.14      FIRE**

Nil

**1.15      SURVIVAL ASPECT**

Yes, no injuries.

**1.16      TESTS AND RESEARCH**

Nil

**1.17      ORGANIZATIONAL AND MANAGEMENT INFORMATION**

**Air India Ltd :-**

Air India Ltd. is a scheduled airline with an Airbus and Boeing fleet operating flights on Domestic and International sectors. It is a public sector undertaking under the Ministry of Civil Aviation. The Airlines Head Quarter is

located at New Delhi. The Company is headed by Chairman & Managing Director assisted by a team of professional of various departments. The Flight Safety Department is headed by Chief of Flight Safety approved by DGCA. The Chief of Safety is an Executive Director who reports directly to the Chairman.

M/s Air India has a full established Operations training facility for the pilots. The training facility for the Airbus pilots is set up at Hyderabad and for the Boeing pilots it is in Mumbai. Both training facilities are headed by an officer of the rank of Executive Director. The Engineering training facility is established at Delhi and Mumbai.

### **Jet Airways:-**

M/s Jet Airways was operating as a scheduled airline having scheduled operator permit No. S-6A in a category of passenger and cargo. The airline commenced its operation on 5<sup>th</sup> May 1993. The Jet Airways Group was operating a fleet of 119 aircraft, comprising Boeing 777-300 ERs, Airbus A330-200/300, Next Generation Boeing 737s and ATR 72-500/600s. The Flight Safety Department is headed by Chief of Flight Safety approved by DGCA.

M/s Jet Airways has a full established Operations training facility for the pilots. The training facility for the Airbus pilots is set up at Bangalore and for the Boeing pilots in Mumbai. Both training facilities are headed by the Vice President Training who reports to CEO directly. The Engineering training facility for the maintenance of the aircraft is established at Mumbai and Delhi.

## **1.18 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES**

Nil

## **2.0 ANALYSIS**

The controller took over the watch at 0930 UTC on Approach Radar in a high density traffic situation. There were 12 aircraft on the Approach Departure and 6 aircraft in Approach Arrival. In between, he was changing over and accepting many aircraft from other ATC units.

Incident took place while sequencing the arrivals. The estimated touch down time of JAI426 was 1025 UTC which was following KETOR 1A and for AIC696 was 1030 UTC which was following EMRAK 1A. Thus, JAI426 was number one in approach for landing on Runway 27 and AIC696 was number two in the arrival sequence.

The Approach Radar Controller instructed AIC696 to “turn left heading H180” at 09:55:41 UTC and again to heading “H210” at 09:56:20 UTC. AIC696 was given “Descend to FL 130” at time 09:57:09 UTC.

JAI426 was also given “Descend to FL130” at 09:57:11 UTC. AIC696 which was number two aircraft in arrival sequence was given “Descend to FL120” at time 10:00:11 UTC and further “Descend to FL110” at time 10:03:12 UTC.

JAI426 which was number one aircraft in arrival sequence was given “Descend to FL 120” and asked to make an orbit to the right at the present position at time 10:09:29 UTC. At time 10:06:06 UTC, JAI426 was given “Descend to FL110” while aircraft was orbiting.

While descending a PCW (Predicted Conflict Warning) was generated. During the warning, Approach Radar Controller didn't initiate corrective action in time. Later, AIC696 flying on heading H090 was given an avoidance heading to turn left H360 and JAI426 was instructed to turn right heading H090 by Approach Radar Controller. JAI426 was also asked to expedite descent. The Approach Radar Controller tried to combine descent clearance with orbiting instruction. At 10:08:22 UTC, PCW converted to CCW (Current Conflict Warning).



**FIGURE: RADAR SNAPSHOT SHOWING CCW WARNING**

JAI426 received TCAS RA at 10:08:22 UTC while passing FL107 (10707 feet) with “DESCEND” advisory followed by “Don’t Climb Advisory”. AIC696 reported TCAS Advisory. The minimum lateral separation was reduced to 2.3 NM and vertical separation was 400 feet.

While studying the Tape Transcript and Radar Replay, it was observed that the Approach Radar Controller made call sign mistakes and gave instruction which was not acknowledged by AIC696. He was calling Air India as Indigo and giving instructions thus AIC696 did not comply.

It was observed during radar reply that the Approach Radar Controller was lacking in Radar Label Management. He was moving cursor very often and it was also observed that he was readjusting the Radar data Block line.

## 2.1 CAUSE LEADING TO INCIDENT

1. The controller tried to combine a descent instruction with orbiting instruction in high traffic environment which resulted in breach of separation.
2. The controller lost the situational awareness while issuing descent to JAI426 which was orbiting. Concentration of the controller

seems to be only in sequencing the arrivals. The controller was lacking in Radar Label Management as he was readjusting the data block very often. This may be because of the fact that the controller had been performing general duties and had done very limited duties on active channel.

3. AIC696 and JAI426 was almost on opposite direction. After PCW generation, there was a delay in detecting the conflict. There was no transmission between controller and the concerned aircraft till it was converted to CCW.

### **3.0 CONCLUSION**

The incident happened in the proximity of way point MB394 which is within 40 NM of the MUMBAI and was in Class-C airspace. The density of traffic was high.

Incident happened due to momentarily loss of situational awareness while issuing a descent instruction to JAI426 which was orbiting. There was a delay in detecting the conflict.

The controller lacked situational awareness and basic radar vectoring techniques. It was seen during radar reply that the controller was lacking in Radar Label Management. The controller was more involved in arrival sequencing though AIC696 and JAI426 were almost in opposite direction when the incident occurred.

### **4.0 RECOMMENDATIONS**

1. Approach Radar Controller may be given appropriate Simulator Training of 30 hrs (Max 2 hrs per day) on identifying the traffic and vectoring techniques.
2. In addition the involved Approach Radar Controller may be given 30 hrs (Max 2 hrs per day) of corrective training covering surveillance technique, management of radar labels and situational awareness be

added to his required training in En-route surveillance (ASSR) unit.

3. Training section may sensitize all controllers to be vigilant while PCW system alerts and take the corrective action on time.



KUNJ LATA

INVESTIGATOR-IN-CHARGE



DINESH KUMAR

INVESTIGATOR