



सत्यमेव जयते

**FINAL REPORT ON SERIOUS INCIDENT INVOLVING
AIRPROX BETWEEN M/S JET AIRWAYS' B777 AIRCRAFT
VT-JLJ AND AIR INDIA'S A319 AIRCRAFT VT-SCP IN
MUMBAI AIRSPACE ON 07.11.2018.**

**Jasbir Singh Larhga
Investigator-in-Charge
Deputy Director, AAIB**

**Kunj Lata
Investigator
Assistant Director, AAIB**

Foreword

In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 3 of Aircraft (Investigation of Accidents and Incidents), Rules 2017, the sole objective of the investigation of an accident shall be the prevention of accidents and incidents and not apportion blame or liability. The investigation conducted in accordance with the provisions of above said rules shall be separate from any judicial or administrative proceedings to apportion blame or liability.

This document has been prepared based upon the evidences collected during the investigation and opinion obtained from the experts. Consequently, the use of this report for any purpose other than for the prevention of future accidents or incidents could lead to erroneous interpretations.

TABLE OF CONTENT

| Para | Content | Page |
|----------|--|------|
| | SYNOPSIS | 2 |
| 1 | FACTUAL INFORMATION | 3 |
| 1.1 | History of Flight | 3 |
| 1.2 | Injuries to Person | 4 |
| 1.3 | Damage to Aircraft | 4 |
| 1.4 | Other Damage | 4 |
| 1.5 | Personal Information | 4 |
| 1.5.1 | Air Traffic Controller | 4 |
| 1.5.2 | Flight Crew | 5 |
| 1.6 | Aircraft Information | 5 |
| 1.7 | Meteorology Information | 5 |
| 1.8 | Aids to Navigation | 5 |
| 1.9 | Communication | 5 |
| 1.10 | Aerodrome Information | 7 |
| 1.11 | Flight Recorders | 7 |
| 1.12 | Wreckage and Impact Information | 7 |
| 1.13 | Medical and Pathological Information | 7 |
| 1.14 | Fire | 7 |
| 1.15 | Survival Aspect | 7 |
| 1.16 | Test and Research | 8 |
| 1.17 | Organizational and Management Information | 8 |
| 1.17.1 | Airports Authority of India | 8 |
| 1.17.2 | Jet Airways | 9 |
| 1.17.3 | Air India Ltd. | 9 |
| 1.18 | Additional Information | 9 |
| 1.18.1 | Radar Snapshots | 9 |
| 1.19 | Useful or Effective Investigation Techniques | 13 |
| 2 | ANALYSIS | 13 |
| 3 | CONCLUSION | 15 |
| 3.1 | Findings | 15 |
| 3.2 | Probable Cause of the Incident | 16 |
| 4 | SAFETY RECOMMENDATIONS | 16 |

FINAL REPORT ON SERIOUS INCIDENT INVOLVING AIRPROX BETWEEN M/S JET AIRWAYS' B777 AIRCRAFT VT-JLJ AND AIR INDIA'S A319 AIRCRAFT VT-SCP IN MUMBAI AIRSPACE ON 07.11.2018.

| | | | |
|--|--|--------------------------|---------------|
| 1. | Aircraft Type | Boeing 777 | Airbus 319 |
| 2. | Nationality | INDIAN | INDIAN |
| 3. | Registration | VT-JLJ | VT-SCP |
| 4. | Owner | JET AIRWAYS Ltd | AIR INDIA Ltd |
| 5. | Operator | JET AIRWAYS Ltd | AIR INDIA Ltd |
| 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 AIRSPACE | |
| 9. | Co-ordinates of accident Site (Location) | WAY POINT GIVEK | |
| 10. | Last point of Departure | MUMBAI | BHOPAL |
| 11. | Intended place of Landing | BANGKOK | MUMBAI |
| 12. | Date & Time of Accident | 07.11.2018, 03:12:11 UTC | |
| 13. | Extent of Injuries (Crew) | NIL | NIL |
| 14. | Extent of Injuries (Passenger) | NIL | NIL |
| 15. | Phase of Operation | CLIMBING | CRUISE |
| 16. | Type of Incident: | AIRPROX | |
| (ALL TIMINGS IN THE REPORT ARE IN UTC) | | | |

SYNOPSIS

On 07.11.2018, Jet Airways' B-777 aircraft VT-JLJ, operating flight JAI70 from Mumbai to Bangkok and Air India's A-319 aircraft VT-SCP, operating flight AIC634 from Bhopal to Mumbai; were involved in an airprox incident in Mumbai airspace at 031211 UTC.

The incident happened at approximately 164 NM from Mumbai VOR (BBB) on radial 066 near waypoint GIVEK, while JAI70 was climbing passing FL338 for FL350 on Route Q19 and AIC634 was cruising at FL340 on Route W146.

The standard lateral and vertical separation of 10NM and 1000 feet respectively between the reciprocal aircraft was breached and reduced to 3NM and 200 feet respectively. The conflict was resolved on the Situation Data Display (SDD) at 031559 UTC.

The incident was classified as Serious Incident by Aircraft Accident Investigation Bureau (AAIB) and Mr Jasbir Singh Larhga, Deputy Director, AAIB was appointed as Investigator-in-Charge along with Ms Kunj Lata, Assistant Director, AAIB as Investigator by Director General, AAIB vide Corrigendum dated 28.05.2019 issued in partial modification of Order No INV-12011/9/2018 dated 08.11.2018.

Initial Notification of the incident was sent to ICAO as well as the State of Manufacture in accordance with ICAO Annex 13, however, no Accredited Representatives were appointed by any State of Manufacture.

1 FACTUAL INFORMATION.

1.1 History of the flight.

On 07.11.2018, Jet Airways' B-777 aircraft VT-JLJ was operating flight JAI70 from Mumbai to Bangkok. Flight JAI70 departed from Mumbai at 0247 UTC. After departure, the aircraft was issued clearance to climb to FL140 by the APP Control. The aircraft was later cleared up to FL240 by the Lower Area Control and handed over to Mumbai Control / Radar (ACC / RSR(N)). Aircraft contacted RSR(N) at 025708 UTC and requested FL310. The aircraft was cleared to FL310 and subsequently to FL350 at 025809 UTC. The aircraft was flying on Route Q19.

On the same day, Air India's A-319 aircraft VT-SCP was operating flight AIC634 from Bhopal to Mumbai. The aircraft had departed from Bhopal at 0240 UTC and was cruising at FL340 on route W146. The Route W146 intersects Route Q19, that was being used by JAI70, between waypoints GIVEK and POSIN. The description of the routes and waypoints is given in the Figure 1 below: -

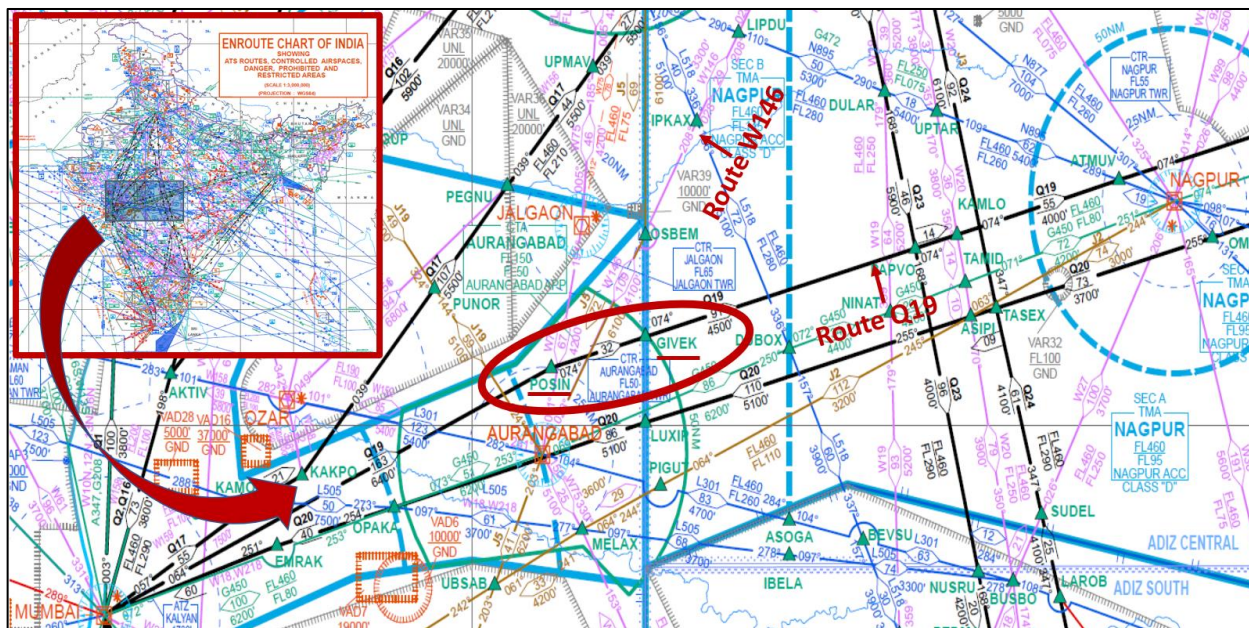


Figure 1: Enroute Chart showing waypoints POSIN, GIVEK and Route Q19 and W146

While JAI70 was climbing, the Mode C information from the aircraft became unavailable to the Radar on two occasions and the aircraft altitude was not getting displayed on the Radar Screen. The Mode C information from the Radar Screen disappeared at 030700 UTC and reappeared at 030749 UTC. Again, at 030857 UTC the Mode C information was lost but it reappeared again at 031214 UTC.

As per the airprox report given by Airport Authority of India (AAI), Short Term Conflict Alert (STCA) got triggered at 025830 UTC between AIC634 and JAI70, while JAI70 was

passing FL338 for FL350; and AIC634 was cruising at FL340. Radar controller RSR(N) neglected the STCA and JAI70 was released to Nagpur Radar (ARSR) by RSR(N) at 030936 UTC after JAI70 had passed waypoint POSIN. Mode C information for JAI70 was not available on Radar Screen at that time. Thereafter, flight data block turned red on the Situation Data Display (SDD) at 030946 UTC, indicating violation status of STCA. JAI70 tried contacting Nagpur Radar after handover, but did not get any response.

AIC634 which was cruising at FL340 tried contacting Mumbai ATC at 030747 UTC and 030947 UTC, however, it got no response. At 031211 UTC, Confirmed Conflict Warning (CCW) also appeared along with the STCA on SDD. Meanwhile Resolution Advisory (RA) also got triggered in both aircraft. Both aircraft followed the RA with JAI70 descending and AIC634 climbing.

The standard lateral and vertical separation of 10NM and 1000 feet respectively between the reciprocal aircraft was breached and reduced to 3NM and 200 feet respectively. Incident took place on Radial 066, 164 NM from Mumbai VOR/DME (BBB).

1.2 Injuries to persons.

NIL

1.3 Damage to Aircraft.

NIL

1.4 Other damage.

NIL

1.5 Personnel information.

1.5.1 Air Traffic Controller.

The Air Traffic Controller manning Mumbai Radar (RSR(N)) at the time of incident was rated for the following ATC units at CSI Airport, Mumbai:

- (i) Tower Control - ADC/SMC/ASMGCS
- (ii) Area Control - RSR/CPDLC/ ADS
- (iii) Oceanic Control – OCC

The controller was not involved in any incident in past. Last proficiency check was done in Area Control (Surveillance) was on 29.10.2018. His medical was valid, and he was not fatigued.

1.5.2 Flight Crew.

Flight crew of both aircraft held valid licenses and were qualified to operate their respective flights.

1.6 Aircraft Information.

Not Available

1.7 Meteorological Information.

Not Available

1.8 Aids to Navigation.

All Automation Systems, VHF channel and ATS surveillance system at Mumbai Airport were reported to be working normal. RSR(N) was working on frequency 132.7 Mhz. Mumbai airport has DVOR/DME (BBB) with frequency of 113.7 Mhz.

1.9 Communications.

JAI070 and AIC634 were in contact with Mumbai Radar and the details of the same from Aeronautical Information Publication (AIP) is as below: -

| Service designation | Call sign | Frequency | Remarks |
|---------------------|---------------------------|------------------------|-------------------------|
| ACC / RSR (N) | Mumbai Control / Radar | 120.5 MHZ 132.7 MHZ | SDBY Frequency ----- |

As per the transcript of recording obtained from Mumbai Radar, JAI70 was in contact with Mumbai Radar (RSR(N)) from 025708 UTC to 030942 UTC. AIC634 had tried to contact RSR(N) at 030747 UTC and 030947 UTC, however, it got no response. Later, AIC634 remained in contact with RSR(N) from 031241 UTC to 031349 UTC.

After the Radar service was terminated by RSR(N), JAI70 was advised to contact Nagpur Radar (ARSR).

Details of Nagpur Radar as per AIP is as below: -

| Service designation | Call sign | Frequency | Remarks |
|---------------------|--------------|------------------------|---------------|
| ARSR | Nagpur Radar | 123.9 MHZ 133.65MHZ | SBY Frequency |

JAI70 was not able to make any contact with Nagpur ARSR, immediately after transfer of control, however, was able to contact after conflict was resolved and same was reported to Nagpur ARSR. At 031302 UTC, JAI70 also tried to inform Mumbai RSR(N) that it was clear of conflict. The call was, however, not acknowledged.

The transcript of significant communication between RSR(N) and both flights is given below: -

| TIME(UTC) | FROM | COMMUNICATION |
|---|--------|--|
| 025708 | JAI070 | RADAR GOOD MORNING JAI70 PASSING LEVEL 186 FOR 240 |
| 025712 | RSRN | JAI70 CLIMB FL310 |
| 025714 | JAI070 | CLIMB LEVEL 310, JAI70 |
| 025802 | JAI070 | RADAR JAI70 REQUESTING FINAL LEVEL 350 |
| 025806 | RSRN | JAI70 ROGER, CLIMB FL350 |
| 025809 | JAI70 | CLIMB TO LEVEL 350, JAI70 |
| STCA WAS GENERATED ON SDD FROM 025830 UTC TO 030945 UTC | | |
| 030747 | AIC634 | MUMBAI, AIC634, GOOD MORNING NO REPLY GIVEN BY CONTROLLER |
| 030936 | RSRN | JAI70, RADAR SERVICE TERMINATED, CONTACT NAGPUR CONTROL 13365 |
| 030942 | JAI070 | NAGPUR 13365, GOOD DAY, JAI70 |
| STATUS OF STCA CHANGED TO VIOLATION AND FLIGHT BLOCK TURNED RED ON SDD FROM 030946 UTC TO 031559 UTC | | |
| 030947 | AIC634 | MUMBAI, AIC634 NO REPLY BY RADAR CONTROLLER |
| CCW WAS GENERATED ALONGWITH STCA ON SDD AT 031219 UTC | | |
| 031241 | AIC634 | MUMBAI, AIC634 |
| 031244 | RSRN | AIC634, MUMBAI |
| 031247 | AIC634 | ...GARBLED....., FL340 TO FL344, COMING CLEAR OF CONFLICT, COMING BACK TO LEVEL 340 NOW |
| 031257 | RSRN | CALLSIGN |
| 031258 | AIC634 | AIC634, WE ARE 30 MILES AAU |
| 031302 | JAI070 | MUMBAI JAI70 CLEAR OF CONFLICT NOW, CLIMBING LEVEL 350 NO REPLY GIVEN BY RADAR CONTROLLER |
| 031335 | RSRN | AIC634 RADAR |
| 031339 | AIC634 | AIC634 GO AHEAD |
| 031340 | RSRN | WHAT LEVEL YOU ARE MAINTAINING BEFORE SIR |
| 031341 | AIC634 | MAINTAINING 340 |
| 031343 | RSRN | YOU ARE MAINTAINING 340, ROGER |
| 031349 | AIC634 | AIC634 WE ARE 348 NOW, CONFIRM YOU WANT US TO DESCEND NOW TO 340? WE GOT TCAS RA AT 340 |
| 031400 | JAI070 | MUMBAI JAI70 |
| 031408 | JAI070 | MUMBAI CONTROL JAI70 NO REPLY GIVEN BY RADAR CONTROLLER |

1.10 Aerodrome information.

Not Available

1.11 Flight Recorders.

Flight data recorders were installed on both aircraft. DFDR data was obtained from both aircraft and was analyzed.

The details of relevant events from DFDR data of JAI70 (VT-JLJ) are as below :-

| Sr. | Time (UTC) | Event |
|------------|-------------------|---|
| 1. | 031206 | Resolution Advisory (RA) was activated, while JAI70 was at 33834 feet altitude and Aircraft started getting DESCEND advisory on TCAS. |
| 2. | 031225 | Aircraft started getting DO NOT CLIMB advisory on TCAS, while at 33348 feet altitude |
| 3. | 031247 | Conflict was resolved on TCAS |

The details of relevant events from DFDR data of AIC634 (VT-SCP) are as below :-

| Sr. | Time (UTC) | Event |
|------------|-------------------|--|
| 1. | 031211 | RA was activated, while AIC634 was at 34008 feet altitude and Aircraft started getting CLIMB advisory on TCAS. |
| 2. | 031225 | Aircraft started getting DO NOT DESCEND advisory on TCAS, while at 34208 feet altitude |
| 3. | 031338 | Conflict was resolved on TCAS |

1.12 Wreckage and Impact Information.

NIL

1.13 Medical and Pathological Information.

NIL

1.14 Fire.

NIL

1.15 Survival Aspects.

NIL

1.16 Tests and Research.

NIL

1.17 Organizational and Management Information.

1.17.1 Airports Authority of India.

Airports Authority of India (AAI) is a statutory body working under the Ministry of Civil Aviation, Government of India. It provides Communication Navigation Surveillance / Air Traffic Management (CNS/ATM) services over Indian airspace and adjoining oceanic areas. AAI has issued Manual of Air Traffic Services (MATS) for standardization and quality assurance in every sub-system of Air Traffic System, while maintaining harmony with the ICAO Standards and Recommended Practices.

Para 8.3.7 of MATS deal with the operation of SSR Transponders. As per Para 8.3.7.4, *"Whenever it is observed on the situation display that the aircraft identification transmitted by a Mode S-equipped aircraft is different from that expected from the aircraft, the pilot shall be requested to confirm and, if necessary, re-enter the correct aircraft identification."*

Procedures for coordination and transfer of control of a flight between successive ATC units and control sectors are given in Chapter 10 of MATS Part-1. As per Para 10.1.1.2, *"ATC units should, to the extent possible, establish and apply standardized procedures for the coordination and transfer of control of flights, in order, inter alia, to reduce the need for verbal coordination. Such coordination procedures shall conform to the procedures contained in the following provisions and be specified in letters of agreement and instructions contained in MATS 2 of the concerned airport, as applicable."*

As per Para 12.2 of the Coordination Procedures laid down in the Letter of Agreement Mumbai ACC is required to coordinate the time, level or any relevant instructions like change of flight rules, flight plan etc at which the aircraft will reach the boundary point of two control airspace and; obtain Level Clearance for East bound flights on Route Q19. Such coordination requires Mode C information to be available on the Radar Screen.

Procedures to deal with ATC contingencies are laid down in Chapter 15 of the MATS Part-1. Para 15.7.2.2 of MATS Part-1 states that *"In the event an STCA is generated in respect of controlled flights, the controller shall without delay take action to ensure that the applicable separation minimum will not be infringed."*

1.17.2 Jet Airways.

M/s Jet Airways held a scheduled operator permit and 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 at the time of incident. The airline stopped operations in April 2019 owing to financial issues.

1.17.3 Air India Ltd.

Air India Ltd., is a scheduled airline with an Airbus and Boeing fleet operating flights on domestic and international sectors. The Airlines Head Quarter is located at New Delhi. The Company is headed by Chairman & Managing Director assisted by a team of professionals in various departments.

1.18 Additional Information.

1.18.1 Radar Snapshots.

Radar snapshots of the incident were obtained from Mumbai Radar. As per the Airprox Report by AAI, STCA predicting conflict between JAI70 and AIC634 was triggered at 025830 UTC causing the Flight Block on Situation Data Display to turn Yellow. The snapshot taken for time 025841 UTC given in the Figure 2 below, shows JAI70 cleared for FL350 and climbing through FL209 on Route Q19, while AIC634 is cleared for FL340 and climbing at FL332 on Route W146.

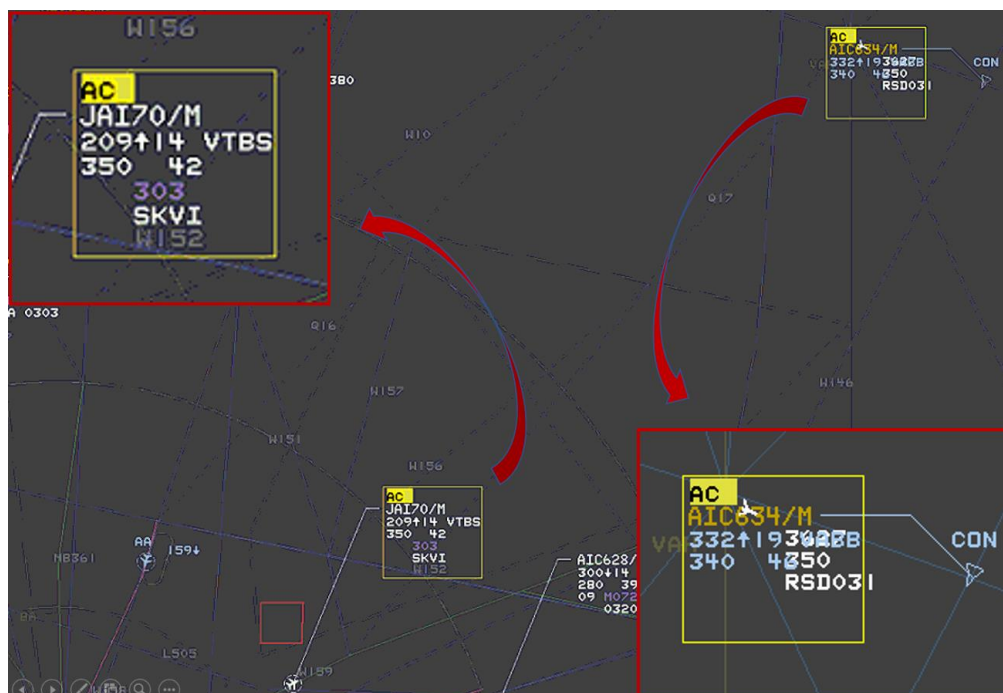


Figure 2: Radar Snapshot at 025841 UTC, with Flight Blocks zoomed-in

The snapshot for time 030700 UTC shown in Figure 3 below, shows that JAI70 was not displaying Mode C information, and current altitude of aircraft was not being displayed.

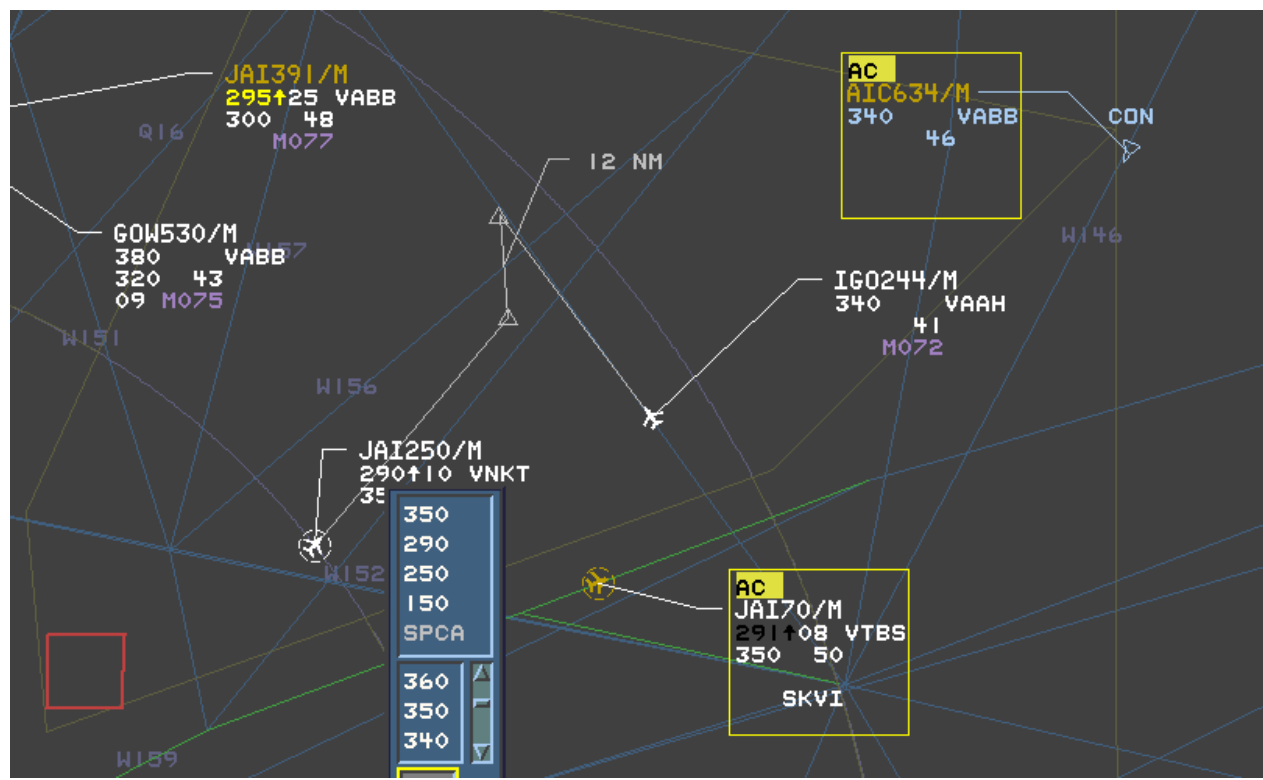


Figure 3: Radar Snapshot at 030700 UTC

The Mode C information was not available till time 030749 UTC, and Figure 4 below shows JAI70 at FL300 when Mode C information became available again.

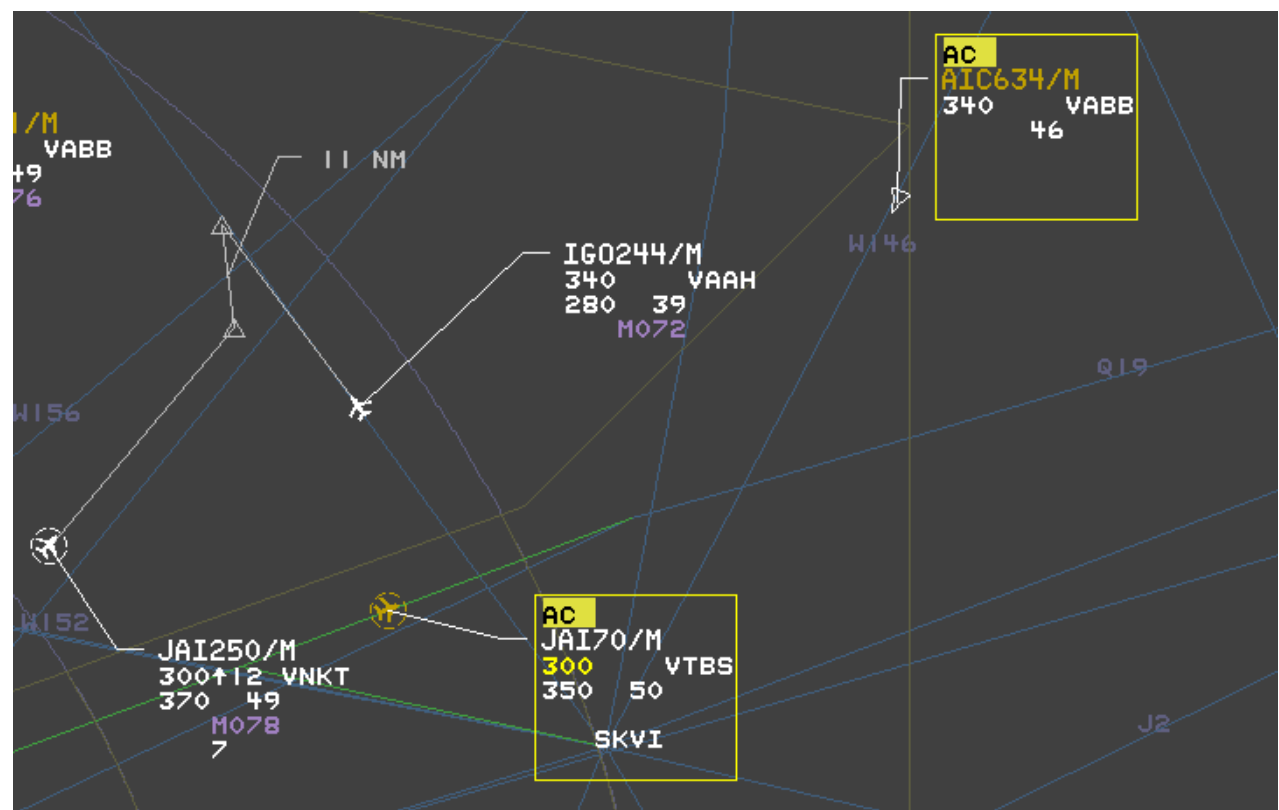


Figure 4: Radar Snapshot at 030749 UTC

Mode C information from the aircraft was lost again at 030857 UTC and the same is shown in the Figure 5 below.

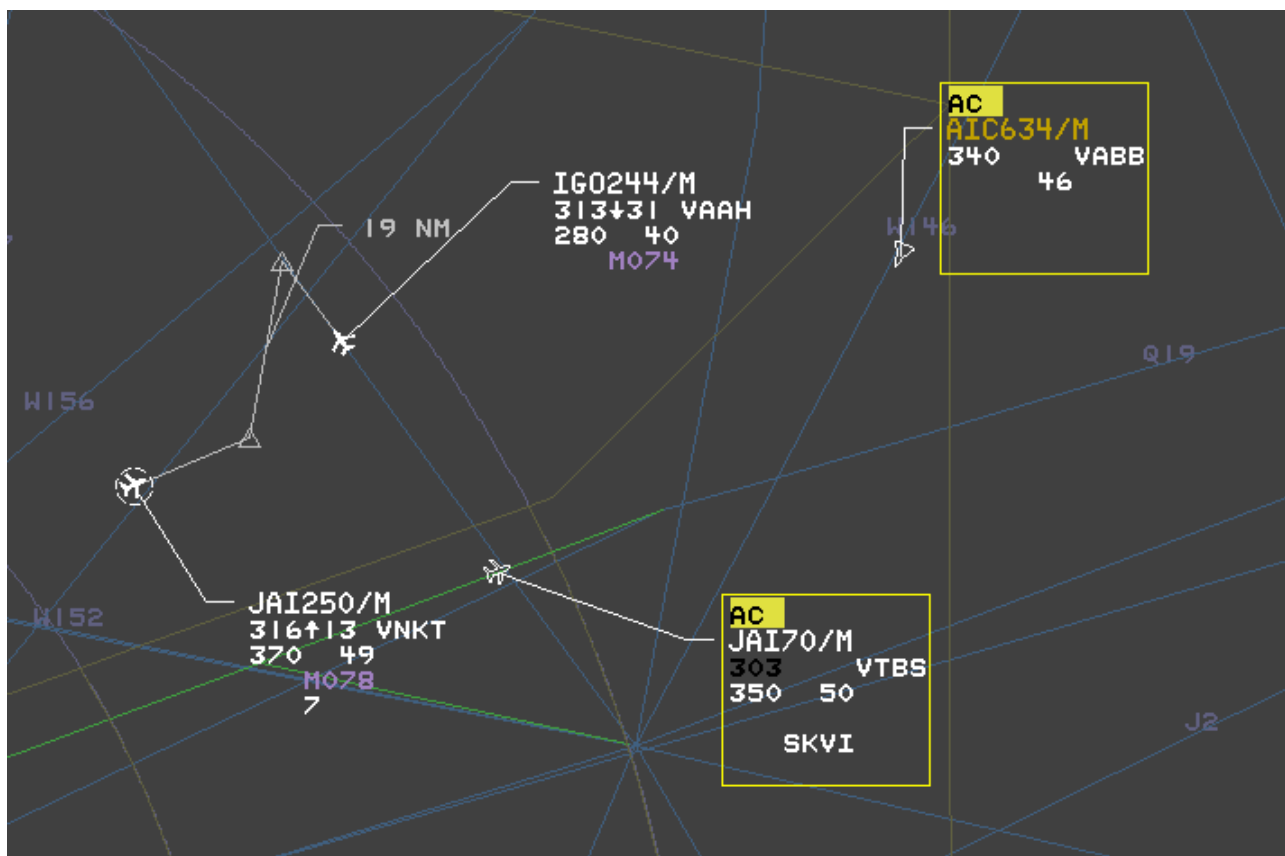


Figure 5: Radar Snapshot at 030857 UTC

While the Mode C information was still not available when the Flight Block for JAI70 turned red indicating violation status of STCA at 030947 UTC as shown in the Figure 6 below.

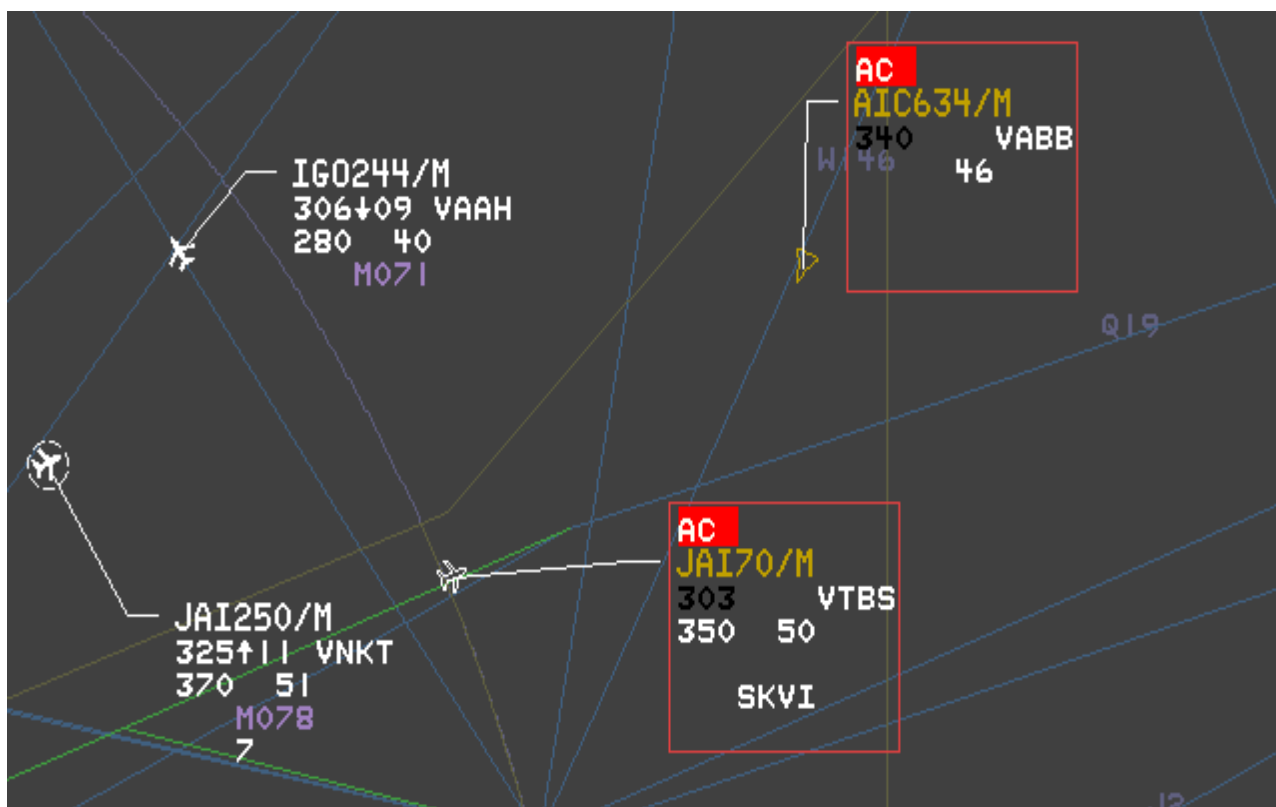


Figure 6: Radar Snapshot at 030947 UTC

This STCA continued to be displayed in red till 031131 UTC and the same can be seen in the Figure 7 below.

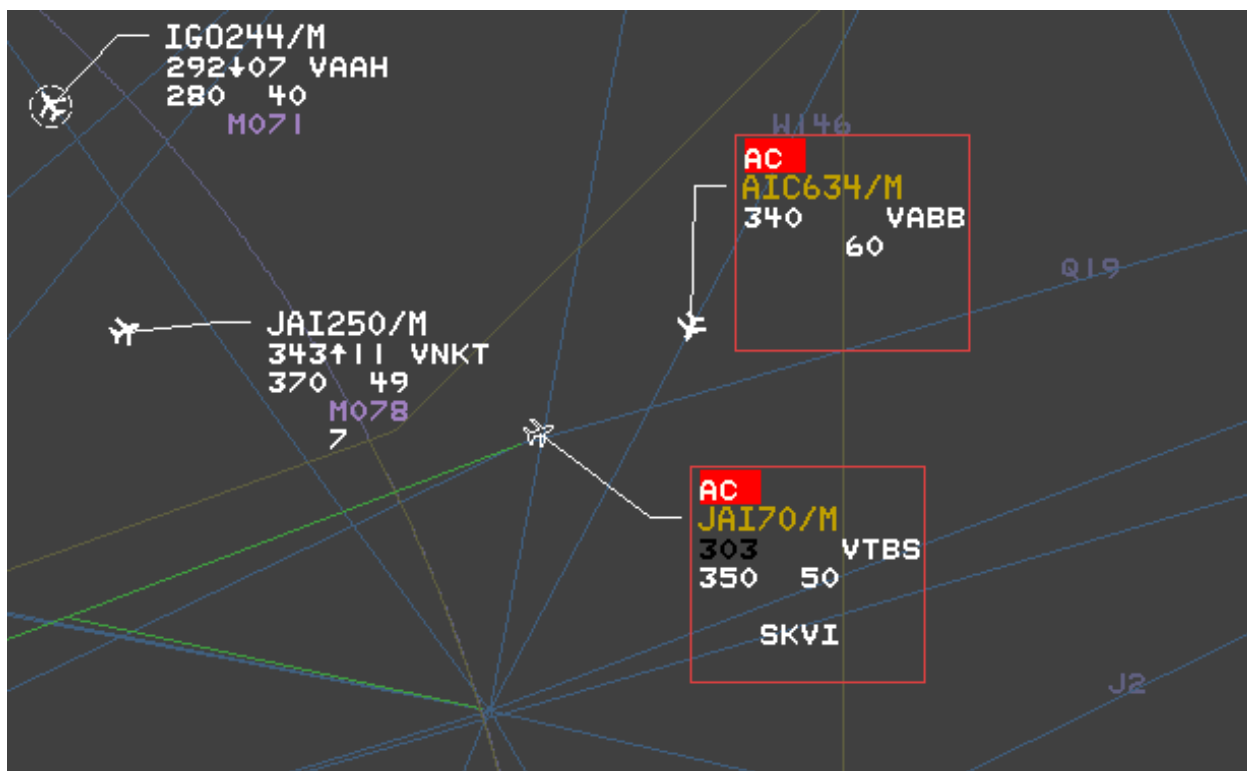


Figure 7: Radar Snapshot at 031131 UTC

At 031211 UTC, CCW was also triggered along with STCA and the Mode C information was still not available for JAI70. The same is shown in the Figure 8 below.

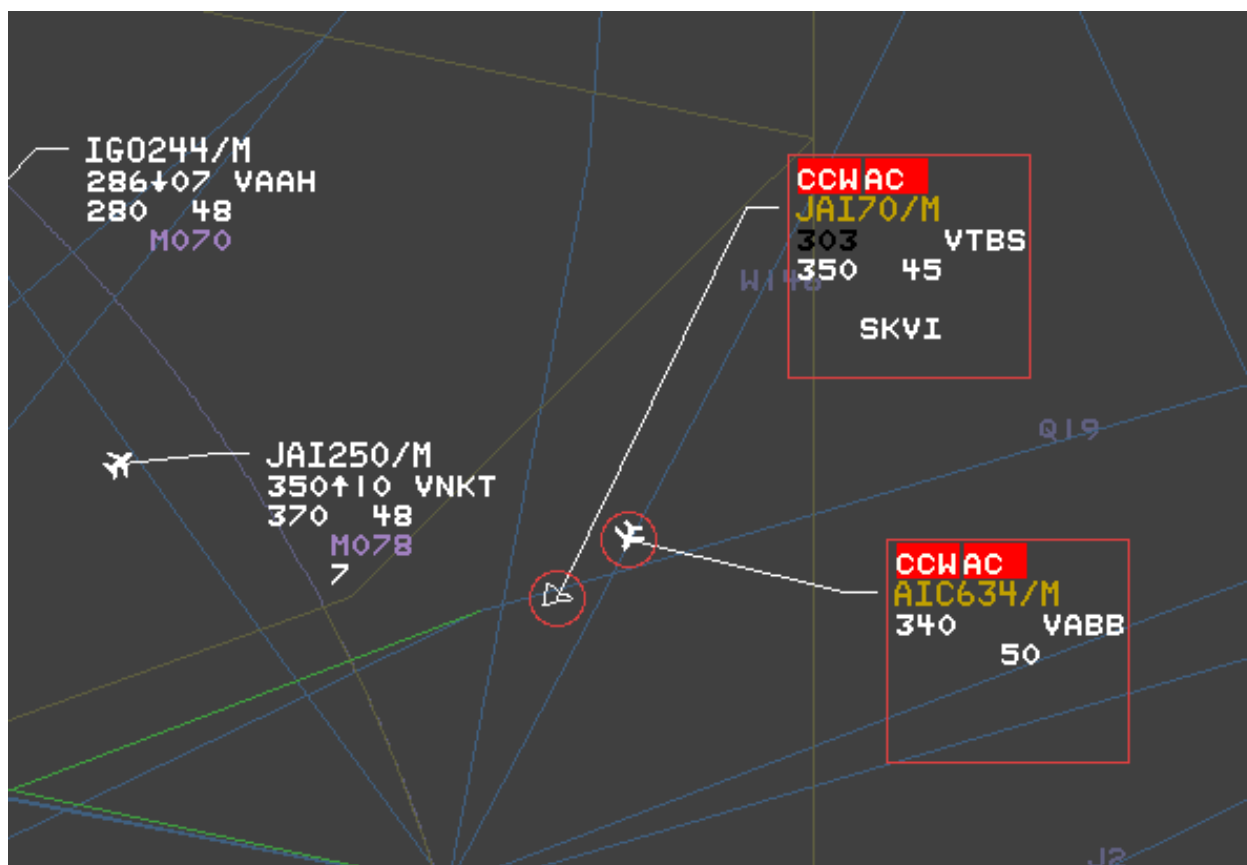


Figure 8: Radar Snapshot at 031211 UTC

The Mode C information was regained at 031214 UTC and it can be seen in the Figure 9 that vertical separation between JAI70 and AIC634 was reduced to 200 feet.

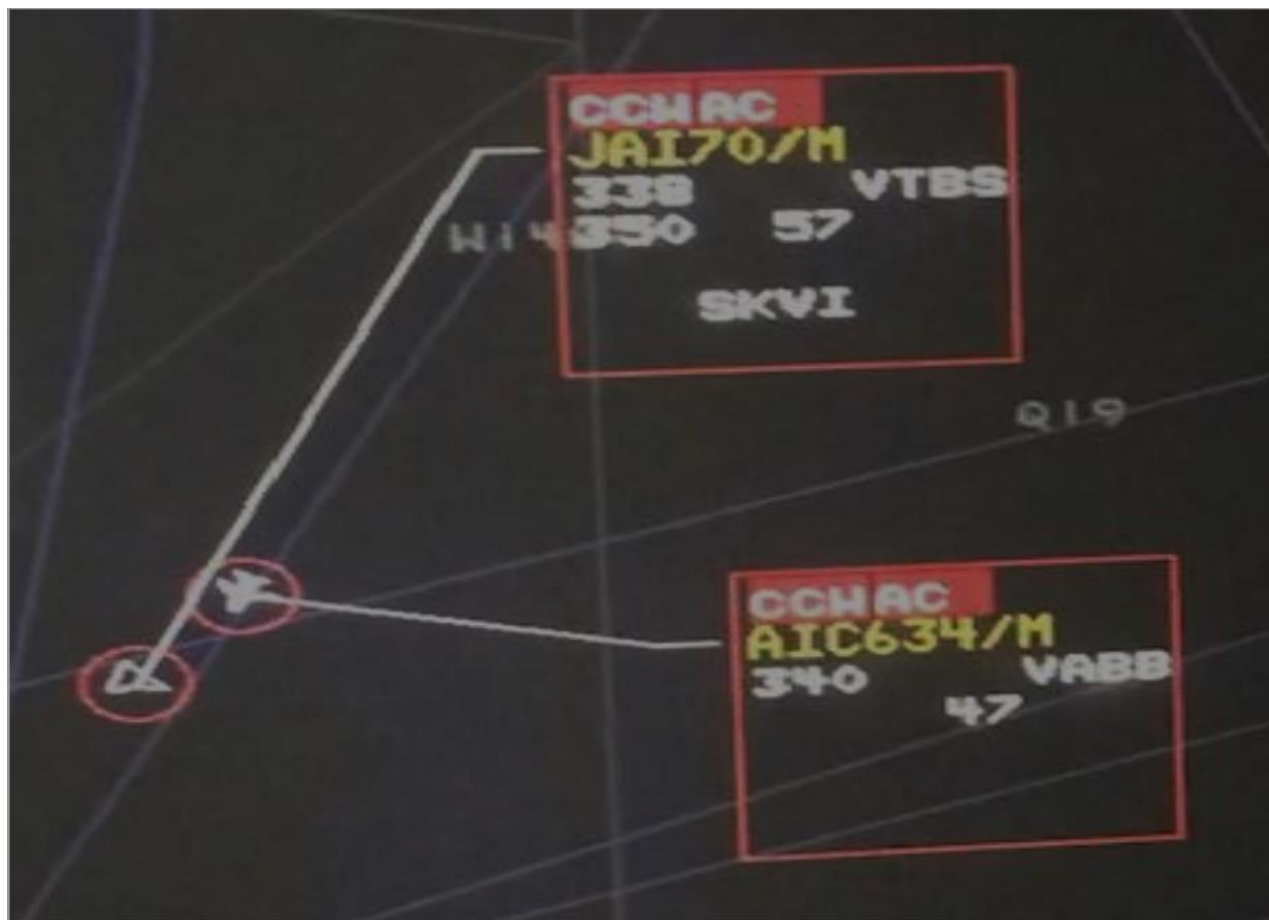


Figure 9: Radar Snapshot at 031214 UTC

1.19 Useful or Effective Investigation Techniques.

NIL

2. ANALYSIS.

JAI70 came in contact of RSR(N) at 025708 UTC and was cleared for FL350. At 025830 UTC conflict warning between JAI70 and AIC634 was triggered. Thereafter, Mode C information was also lost on Radar Screen from 030700 UTC to 030744 UTC, however, Radar Controller neither took any action on the Conflict Warning, nor on the loss of Mode C information.

The conflict warning continued for 11:15 minutes, with no corrective action by the Radar Controller. While the alert was still active, Radar Controller terminated the Radar Service and transferred the control of aircraft to Nagpur Radar without resolving the conflict. The action was not in accordance with the MATS Para 15.7.2.2.

The sequence of events and details of loss of Mode C information and Alerts on SDD are given in the Table below: -

| TIME | EVENT | MODE C | STCA | | |
|--------|---|---------------|---------|---------|---------|
| | | | YELLOW | RED | |
| 025708 | JAI70 contacts Mumbai Radar. | Available | No STCA | No STCA | |
| 025806 | JAI70 cleared for FL350. | | | | |
| 025830 | Flight Block turns yellow due to STCA predicting conflict. | | | | |
| 030700 | MODE C information disappears from Radar Screen. | Not Available | STCA | | |
| 030747 | AIC634 calls Mumbai Radar, gets no response. | | | | |
| 030749 | MODE C information becomes available. | Available | | | |
| 030857 | MODE C information is lost again. | Not Available | | | No STCA |
| 030936 | Radar Service Terminated by Mumbai Radar. | | | | |
| 030945 | Flight Block turns Red due to STCA, indicating confirmed violation. | | | | |
| 030947 | AIC 634 calls Mumbai Radar, but gets no response | | | | |
| 031206 | RA gets activated on JAI70 TCAS. Crew gets DESCEND advisory | | | | |
| 031211 | CCW along with STCA is displayed on SDD RA gets activated on AIC634 TCAS. Crew gets CLIMB advisory | | | | |
| 031214 | MODE C information becomes available and vertical separation had reduced to 200 feet. | | | | |
| 031225 | JAI70 Crew gets DO NOT CLIMB advisory on TCAS AIC634 Crew gets DO NOT DESCEND advisory on TCAS | | | | |
| 031241 | AIC634 informs Mumbai Radar, that it is clear of conflict. | | | | |
| 031247 | RA stops on JAI70 TCAS | | No STCA | STCA | |
| 031302 | JAI70 contacts Mumbai Radar and informs that it is clear of conflict. | | | | |
| 031337 | RA stops on AIC634 TCAS | | | | |
| 031559 | STCA stops on SDD. | | | | |

As seen in the above table that at the time of termination of Radar Service and transfer of control to Nagpur Radar, the Mode C information for JAI70 was also not available and CCW had been triggered. The Controller did not ask the crew of JAI70 to confirm flight level, as required by Para 8.3.7.4 of MATS Part 1.

Even after the Radar Service was terminated by Mumbai Radar, Nagpur Radar had not accepted transfer of control of JAI70 in its jurisdiction. The conflict warnings had continued on Mumbai Radar controller's screen and CCW was triggered at 030946 UTC without any corrective action by the Mumbai Radar Controller.

Both aircraft were not in contact of either Mumbai or Nagpur at the time of Airprox. The Airprox resulted in a Resolution Advisory being triggered in the aircraft TCAS, with JAI70 getting DESCEND advisory and AIC634 getting CLIMB advisory. The conflict was resolved on SDD at 031559 UTC. Radar Controller by ignoring STCA for such a longer duration coupled with failure to monitor the parameters (Mode C) of Radar Data Block and by ignoring CCW during termination of Radar Service and transfer of Control to Nagpur ARSR created a situation where neither of the two aircraft were under his control/VHF Communication and were heading towards an air miss/airprox.

3. CONCLUSIONS.

3.1 Findings.

3.1.1 Both scheduled flights were under the command of an appropriately licensed ATPL holders with Co-Pilot being CPL holders.

3.1.2 The medical of all cockpit crew members as well as Controller was valid.

3.1.3 All communication facilities like VOR, RSR frequency were reported to be working normal.

3.1.4 STCA (Yellow) was ignored for a period of over 11 minutes and 15 seconds.

3.1.5 STCA (Red) including display of CCW was ignored for a period of over of 06 minutes and 14 seconds.

3.1.6 Radar Controller failed to monitor the parameters/elements in the Radar Data Block and terminated the Radar Service without verifying the level from the aircraft i.e. JAI70.

3.1.7 When Radar Controller was terminating the Radar Service and transferring the Aircraft (JAI70) to Nagpur, Current Conflict warning appeared on his Radar Scope, the Controller failed to act in an appropriate manner and transferred the aircraft to Nagpur.

3.1.8 Radar Controller failed to comply with Para 8.3.7.4 and Para 15.7.2.2 of MATS-Part1.

3.1.9 Radar Controller failed to "ensure that aircraft are separated within ATS Surveillance coverage."

3.1.10 At the time of serious incident/airprox, the two aircraft (JAI70 & AI644) were not in two-way contact either with Mumbai ATC or with Nagpur ATC.

3.1.11 AIC634 tried to contact Mumbai Radar on two occasions before the airprox and JAI70 tried to contact Mumbai Radar thrice after the airprox but no two-way communication was established.


3.2 Probable cause of the Incident.

The incident was caused due to disregard of procedure laid down in Para 8.3.7.4 and Para 15.7.2.2 of MATS-Part1 and poor surveillance of aircraft on SDD.

4. Safety Recommendations.

4.1 Radar Controller shall be given appropriate corrective training in Surveillance techniques, STCA procedures, Radar Service Termination procedures etc. and handling of aircrafts in exigencies.

4.2 AAI shall take necessary steps to augment the reliable VHF Coverage up to the Transfer of Control point on all the routes, preferably with some overlapping.



**(Jasbir Singh Larhga)
Investigator-in-Charge
Deputy Director, AAIB**



**(Kunj Lata)
Investigator
Assistant Director, AAIB**

Date: 20.01.2020