

**FINAL REPORT ON SERIOUS INCIDENT BETWEEN JAI792  
and LLR626 in NAGPUR ACC on 02.12.2016.**

1. Aircraft  
Type : B737-800/ATR-72  
Nationality : INDIAN  
Registration : VT-JFP (Jet Airways)/ VT-AIV (Alliance Air)
2. Owner/ Operator : M/s Jet Airways / M/s Alliance Air
3. Pilot – in –Command : ATPL Holder for both Jet Airways and Alliance Air  
Extent of injuries : Nil
4. First Officer : CPL Holder for both Jet Airways and Alliance Air  
Extent of injuries : Nil
5. Place of Incident : Nagpur ACC
6. Date & Time of Incident : 02<sup>nd</sup> December 2016; 10:07 UTC
7. Last point of Departure : Gwalior for Alliance Air and Indore for Jet Airways
8. Point of intended landing : Mumbai for Alliance Air and Delhi for Jet Airways
9. Type of operation : Schedule Operation for Jet Airways & Alliance Air
10. Crew on Board : 02+05 Crew for Jet Airways and 02+02 for Alliance Air  
Extent of injuries : Nil
11. Passengers on Board : 129 (Jet Airways) and 60 (Alliance Air)  
Extent of injuries : Nil
12. Phase of operation : Level Cruise for Alliance Air & Climbing for Jet Airways
13. Type of Occurrence : Air Proximity

(ALL TIMINGS IN THE REPORT ARE IN UTC)

**SYNOPSIS:**

“On 02.12.2016, JAI792, Jet airways, B738 departed from Indore to Delhi was assigned FL160 by the planning Controller. LLR628, Alliance Air ATR, opposite direction traffic was flying at FL180 from Gwalior to Mumbai. JAI792 climbed up to FL178 and minimum distance was around 4NM. LLR628 reported traffic on TCAS but no RA reported by both aircraft. Controller took action to resolve the traffic but it was too late by the time incident was happened. As per Controller’s statement, intention was to climb JAI792 FL160 and maintain but unknowingly uttered FL180.”<sup>1</sup>

JAI792 aircraft B737-800, registration VT-JFP from Indore to Delhi operating on ATS route G590-BPL-Q24 was given climb to F180 and traffic information in respect of 12’ O Clock traffic (LLR 628) was also passed. JAI 792 in a routine manner acknowledged the Climb by saying “Roger Climb and maintain flight level FL180.” After sometime, JAI792 came in close proximity with Alliance Air LLR 628, ATR-72, registration VT-VIV from Bhopal to Mumbai, maintaining FL180. The Lateral separation which should be 10 NM was reduced to 4.02 Nm whereas the vertical separation which should be 1000 feet was reduced to 200 feet simultaneously at time 10:07:05. The Radar Controller and Crew of JAI792 instead of resolving the traffic started having argument on the Channel/RT. The Controller thereafter gave a left heading of 360 degrees, (northerly heading), which was just less than 30 degrees (As the aircraft JAI 792 was flying heading 027, NNE at the time of airprox and just before it). This northerly heading of 360 degrees seems to be insufficient for resolving the conflict. The aircraft on its own flew more divergent heading to 330 degrees i.e. NNW. LLR 628, ATR-72 reported having JAI792 on TCAS and the traffic (JAI792) passed right wing and was 3’O Clock 04 miles (NM). Thereafter both the aircrafts were clear of traffic. JAI792 was given climb to FL280 and direct routing to waypoint BUKLO. LLR628 continued to its destination maintaining flight level FL180. Thereafter the flights were uneventful. The replay of RSR Frequency, replay of radar data, ATC tape transcripts, the statement of controller, flight Crew and the ATC Log Books reveals that:

1. LLR 628, ATR-72, VT-VIV, from Bhopal to Mumbai was maintaining Flight Level FL180 and was in two way communication with Route Surveillance Radar (RSR)

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<sup>1</sup> Message from OPS Control room vide email dated 02/12/2016 at time 14:54 UTC



Controller, Nagpur on frequency 123.9 MHz

2. At time 10:03 UTC, JAI792 came in contact with RSR Controller Nagpur and was passing FL 103 for FL160. JAI792 was identified by RSR Controller. Subsequently JAI792 which was release by Indore was passing FL122 for FL160.
3. At time 10:04:11, RSR Controller instructed JAI792 to Climb and maintain Flight Level FL180 and also passed on the Essential traffic "Traffic 12' O Clock, 30 miles (NM) opposite direction ATR Flight Level FL180."
4. At time 10:04:20, JAI792 acknowledged RSR Controller's instruction- "Roger Climb and maintain Flight Level FL180."
5. At time 10:06:34, JAI792 asked the RSR Controller "Confirm Maintain Flight Level 180 ." to this the RSR Controller replied maintain FL160 at time 10:06:42.
6. From time 10:06:42 there was argument between JAI792 and RSR Controller on the channel.
7. At time 10:06:57, RSR controller gave first avoiding action "Turn left heading 360 due traffic." And the pilot of JAI792 replied "We are turning 330. "
8. At time 10:07:05, LLR628, ATR-72 confirmed that "they have traffic on TCAS.
9. From time 10:07:08, RSR Controller gave LLR628 Climb to FL190 to which LLR628 replied "We Climb 190, but traffic passed just right wing, Traffic 3' O Clock 4 miles. Traffic has already passed we can maintain FL180."
10. At time 10:08, JAI792 was clear of traffic LLR628. JAI 728 was given climb to FL280 and direct routing to waypoint BUKLO."
11. There was again argument between the RSR Controller and JAI792.
12. The Visibility was 2400 M at the time of airprox.
13. The lateral & vertical separation was reduced to 4.02 NM & 200 feet respectively.

There was no injury to person on board both the aircraft and there was no fire.

Ministry of Civil Aviation constituted<sup>2</sup> a committee of inquiry to investigate the cause of the Serious Incident under Rule 11 (1) of Aircraft (Investigation of Accidents and Incidents), Rules 2012 comprising of Dr. Jitender Loura, Assistant Director, AAIB as Chairman, Shri Raje Bhatnagar, Assistant Director, AAIB as member.

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<sup>2</sup>Ministry of Civil Aviation Notification Vide No AV-15013/13/2016-DG dated 29<sup>th</sup> December 2016.

## 1. FACTUAL INFORMATION

### 1.1 History of the flight

On 02.12.2016, JAI792 aircraft B737-800, registration VT-JFP operating schedule flight from Indore to Delhi on ATS route G590-BPL-Q24 was given climb to F180 and traffic information in respect of essential/12' O Clock traffic was also passed (LLR 628). LLR 628, ATR 72, registration VT-AIV, also operating as schedule flight from Indore to Mumbai was at cruise level FL180. JAI 792, B737-800 came in close proximity with Alliance Air LLR 628, ATR-72. The Lateral separation was reduced to 4.02 Nm whereas the vertical separation was reduced to 200 feet simultaneously as against the standard Lateral and Vertical separation of 10 NM and 1000 feet respectively.. The Radar Controller after having an argument with JAI792 gave a left heading of 360 degrees, north, which was just less than 30 degrees (As the aircraft JAI 792 was flying heading 027, NNE at the time of airprox and just before it). The aircraft on its own flew more divergent heading to 330 degrees i.e. NNW. LLR 628, ATR-72 reported having JAI792 on TCAS and the traffic (JAI792) passed right wing and was 3'O Clock 04 miles (NM). Both the aircraft were clear of conflict at time 10:08 and thereafter LLR 628 proceeded to Mumbai maintaining flight level FL180 and JAI792 was given direct routing to waypoint "BUKLO" and climb to flight level FL280. Thereafter the flights were uneventful.

### 1.2 Injuries to persons.

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil
MINOR/NONE	(02+05) Jet airways (02 +02) Alliance Air	129 Jet Airways 60 Alliance Air	Nil

### 1.3 Damage to aircraft: NIL

### 1.4 Other damage: NIL



**1.5 Personnel information:****1.5.1 JAI792 (Registration: VT-JFP)****Pilot in command<sup>3</sup>**

AGE	40 Years
License	ATPL-5541
Date of License Issue and Valid up to	24-09-2013/23-09-2020
Category	AEROPLANE
Class	MULTI ENGINE
Endorsements as PIC	----
Date of Joining Company	01/03/2016
Date of Endorsement as PIC on type	24/09/2013
Instrument Rating	23/04/2016
Date of RTR Issue and Valid up to	13/05/2016 TO 12/05/2036
Date of FRTOL issue & validity	02/09/2003 TO 01/09/2018
Date of Med. Exam & validity	11/02/2016 TO 04/01/2017
Date of Route Check	09/07/2016
Date of Last Proficiency Check	19/10/2016
Date of English language Proficiency & Valid up to	valid up to 22-04-2020
Date of last CRM	16/03/2016
Date of last Monsoon training	20/05/2016
Date of Dangerous Goods Awareness Training	08/03/2016
Date of last Refresher/Simulator	16/03/2016
Simulator Training for Critical Emergencies	19/10/2016
Familiarity with Route/ Airport flown for last 12 months and since joining the company.	1 <sup>st</sup> time on the date of serious incident i.e. 02/12/2016
Total flying experience	12355:20 HRS
Total Experience on type	7649:00 HRS
Total Experience as PIC on type	6051:00 HRS

<sup>3</sup> Information provided by CoFS, Jet Airways

Last flown on type	01/12/2016
Total flying experience during last 01 Year	573:05 HRS
Total flying experience during last 180 days	354:10 HRS
Total flying experience during last 90 days	219:39 HRS
Total flying experience during last 30 days	63:24 HRS
Total flying experience during last 07 Days	19:14 HRS
Total flying experience during last 24 Hours	04:50 HRS
Rest period before the flight	13:15 HRS

**Note: All the above information is required as of date of occurrence.**

### **Co-pilot**

AGE	41YRS
License	CPL 7912
Date of License Issue and Valid up to	16/04/2009 To 15/04/2019
Category	AEROPLANE
Class	MULTI ENGINE
Endorsements as PIC	N/A
Date of Joining Company	12/08/2013
Date of Endorsement as PIC on type	----
Instrument Rating	21/10/2016
Date of RTR Issue and Valid up to	22/08/2013 To 01/08/2018
Date of FRTOL issue & validity	16/04/2009 To 15/04/2019
Date of Med. Exam & validity	04/07/2016 To 05/07/2017
Date of Route Check	29/12/2015
Date of Last Proficiency Check	08/05/2016
Date of English language Proficiency & Valid up to	----- VALID TILL 22/05/2018
Date of last CRM	17/06/2016
Date of last Monsoon training	26/11/2015
Date of Dangerous Goods Awareness Training	24/07/2015
Date of last Refresher/Simulator	17/06/2016



Simulator Training for Critical Emergencies	21/10/2016
Familiarity with Route/ Airport flown for last 12 months and since joining the company.	02/12/2016
Total flying experience	2050 HRS
Total Experience on type	1850 HRS
Total Experience as PIC on type	N/A
Last flown on type	23/11/2016
Total flying experience during last 01 Year	677:09 HRS
Total flying experience during last 180 days	338:01 HRS
Total flying experience during last 90 days	169:15 HRS
Total flying experience during last 30 days	57:25 HRS
Total flying experience during last 07 Days	06:26 HRS
Total flying experience during last 24 Hours	06:26 HRS
Rest period before the flight	15:00 HRS

Note: All the above information is required as of date of occurrence.

### 1.5.2 LLR628, VT-AIV

#### Pilot- in-Command<sup>4</sup>:

AGE	16.12.1958
License	AT.FCL.20099
Date of License Issue and Valid up to	26.04.2007 VALID 28.03.2018
Category	ATPL
Class	AEROPLANE
Endorsements as PIC	15.04.2014
Date of Joining Company	15.04.2016
Date of Endorsement as PIC on type	30.03.2014
Instrument Rating	02.02.2017
Date of RTR Issue and Valid up to	26.04.2007 VALID 28.03.2018

<sup>4</sup>Information provided by CoFS, Alliance Air

Date of FRTOL issue & validity	26.04.2007 VALID 28.03.2018
Date of Med. Exam & validity	04.07.2017 VALID 03.07.2018
Date of Route Check	26.05.2017
Date of Last Proficiency Check	29.07.2017
Date of English language Proficiency & Valid up to	26/05.2017 LEVEL-5 25.02.2018
Date of last CRM	04.04.2017
Date of last Monsoon training	22.11.2016
Date of Dangerous Goods Awareness Training	02.04.2016
Date of last Refresher/Simulator	21.11.2016
Simulator Training for Critical Emergencies	
Familiarity with Route/ Airport flown for last 12 months and since joining the company.	
Total flying experience	3900 HRS
Total Experience on type	1800 HRS
Total Experience as PIC on type	823.03 HRS
Last flown on type	02.10.2017
Total flying experience during last 01 Year	667 HRS
Total flying experience during last 180 days	429 HRS
Total flying experience during last 90 days	172.48 HRS
Total flying experience during last 30 days	56 HRS
Total flying experience during last 07 Days	26 HRS
Total flying experience during last 24 Hours	5 HRS
Rest period before the flight	

Note: All the above information is required as of date of occurrence.

**Co-pilot:**

AGE	17.12.1989
License	9623
Date of License Issue and Valid up to	31.03.2010 VALID 30.03.2020
Category	AIRPLANE



Class	CPL
Endorsements as PIC	NA
Date of Joining Company	05.11.2015
Date of Endorsement as PIC on type	NA
Instrument Rating	16.10.2016
Date of RTR Issue and Valid up to	15.11.2011 VALID 14.11.2031
Date of FRTOL issue & validity	31.03.2010 VALID 30.03.2020
Date of Med. Exam & validity	07.12.2016 VALID 06.12.2017
Date of Route Check	11.03.2017
Date of Last Proficiency Check	07.04.2017
Date of English language Proficiency & Valid up to	11.09.2014 LEVEL-5 VALID 10.09.2020
Date of last CRM	08.11.2016
Date of last Monsoon training	27.09.2017
Date of Dangerous Goods Awareness Training	09.12.2017
Date of last Refresher/Simulator	26.09.2017
Simulator Training for Critical Emergencies	
Familiarity with Route/ Airport flown for last 12 months and since joining the company.	
Total flying experience	1102 HRS
Total Experience on type	1102 HRS
Total Experience as PIC on type	NA
Last flown on type	26.09.2017
Total flying experience during last 01 Year	697 HRS
Total flying experience during last 180 days	314 HRS
Total flying experience during last 90 days	150 HRS
Total flying experience during last 30 days	42.14 HRS
Total flying experience during last 07 Days	5.43 HRS
Total flying experience during last 24 Hours	0
Rest period before the flight	

Note: All the above information is required as of date of occurrence.

**1.5.3 Radar (RSR) Controller<sup>5</sup>**

STATION	ATC UNIT	Date of RATING	Remarks <sup>6</sup>
Nagpur Airport	ADC/APP	13 <sup>th</sup> November' 2013	The Controller was found to lack in the following areas: 1. RT Technique 2. Use of Standard Phraseology. 3. Clarity in instructions passed to aircraft. 4. Voice was observed to be under confident.
	ACC	10 <sup>th</sup> January 2011	
	RSR	02 <sup>nd</sup> March 2013 - FAIL 30 <sup>th</sup> April 2013 - PASS	

**1.6 Aircraft information:****1.6.1 M/s Jet Airways: B737-800**

The B737-800 is a subsonic, medium-range, civil transport aircraft. The aircraft has two high bypass turbofan engines manufactured by M/S CFM General. The aircraft is designed and registered for operation with minimum two crew necessarily.

The aircraft is certified in Normal (Passenger) category, for day and night operation under VFR & IFR. The maximum operating altitude is 41000<sup>7</sup> feet and the maximum Laden weight (MTOW) is 70533 kg. The Aircraft length, wingspan and height as per AMM are 39.47 meter, 35.79 meter and 12.08 meter respectively. The distance between main wheels is 5.71 meter. The distance between engines is 9.652 meter and engine ground clearance is 0.48 meter (18.9 inches). Boeing 737-800 aircraft, registration VT-JFP (MSN 39068) had been manufactured in year 2013. The aircraft is registered under Category 'A' and the Certificate of registration No. 4466. The Certificate of Airworthiness Number 6575 under "NORMAL category" sub division Passenger / Mail / Goods was issued by DGCA.

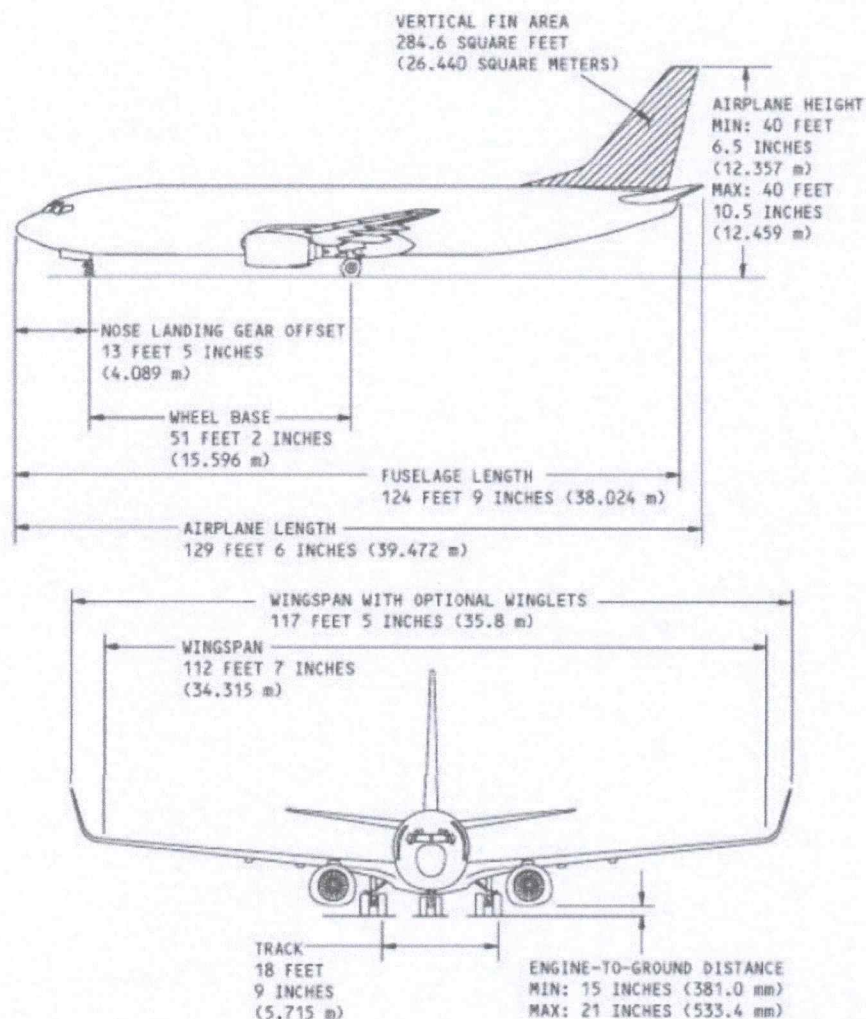
<sup>5</sup> AAI Nagpur Training In-Charge's letter dated 08.12.2016.

<sup>6</sup> AAI CHQ Proficiency Check vide letter No AAI/ATM/SQMS/31-03(Part-2)/2015 dated 07<sup>th</sup> October 2015.

<sup>7</sup> Aircraft Manufacture Manual (AMM) of Boeing Company.



The specified minimum operating crew is two and the maximum all up weight is 70533 Kgs. At the time of incident the Certificate of Airworthiness was current.



**Figure 1.1: A Boeing 737-800 aircraft**

The Aircraft was holding a valid Aero Mobile License No. A-006/090/WRLO-2014 at the time of serious incident. This Aircraft was operated under Scheduled Operator's Permit No S.6A. As on 02.12.2016 the aircraft's left and right engine's serial number are:

1. LH Engine: Serial Number 658405 and TSN 10490 and CSN 7486.

2. RH Engine: Serial number 658417 and TSN 10490 and CSN 7486.

The Boeing 737-800 aircraft and its engines are being maintained as per the maintenance programme consisting of calendar period/ flying Hours or Cycles based maintenance as per maintenance programme approved by Regional Airworthiness office.

Accordingly, the last major inspection, "C" check was carried out on 25/07/2015. Subsequently all lower inspections (Preflight checks, Service Checks, Weekly Checks) were carried out as and when due before the incident. The aircraft was last weighed on 12/11/2013 and the weight schedule was prepared and duly approved by the office of Director of Airworthiness, DGCA. Prior to the incident flight the weight and balance of the aircraft was well within the operating limits.

All the concerned Airworthiness Directive, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine has been complied with as on date of event.

#### **1.6.2 Alliance Air ATR-72-212A:**

ATR 72-212A is a subsonic, medium-range, civil transport aircraft. The aircraft is installed with two turboprop engines manufactured by Pratt & Whitney, Canada. The aircraft is designed for operation with two pilots and has passenger seating capacity of 72. The aircraft is certified in Normal (Passenger) category, for day and night operation under VFR & IFR. The maximum operating altitude is 25000 feet. The length, wingspan and height of the aircraft is 27.166 meter, 27.050 meter and 7.72 meter respectively.

The distance between main wheels is 4.1 meter. The distance between engines is 8.1 meter and engine ground clearance is 1.21 meter. ATR-72 aircraft, registration VT-AIV (MSN 1252) had been manufactured in year 2015. The aircraft's Certificate of registration number 4590 and the Certificate of Airworthiness number 6700 issued by DGCA were current on the day of serious incident. The specified minimum operating crew is two and the maximum all up weight is 23000 Kgs. At the time of serious incident, the aircraft was holding a valid Aero Mobile License No. A-024/026-RLO (NR). This Aircraft was operated under Scheduled Operator's Permit No S.8 which was valid up to 30.04.2018. As on 02.12.2016 the aircraft's left and right engine's serial Number are:

1. LH Engine: Serial Number ED1038.

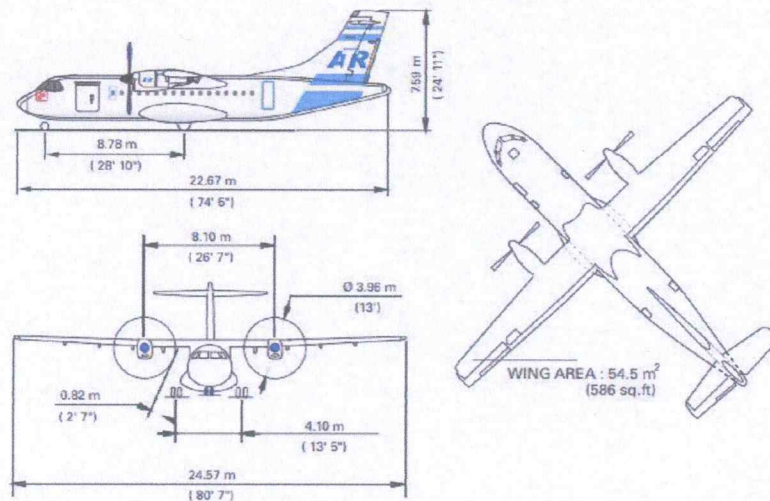


2. RH Engine: Serial number ED1039.

The ATR-72 aircraft and its engines are being maintained as per the maintenance programme consisting of calendar period/ flying Hours or Cycles based maintenance as per maintenance programme approved by Regional Airworthiness office.

Accordingly, the last major inspection, “5A” check was carried out on 26/09/2016. Subsequently all lower inspections (Preflight checks, Service Checks, Weekly Checks) were carried out as and when due before the incident. The aircraft was last weighed on 10/06/2015 and the weight schedule was prepared and duly approved by the office of Director of Airworthiness, DGCA. Prior to the incident flight the weight and balance of the aircraft was well within the operating limits.

All the concerned Airworthiness Directive, mandatory Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine has been complied with as on date of event.



**Figure 1.2: An ATR aircraft**

**1.7 Meteorological information:**

MET Report Nagpur Aerodrome

Information: F

Time of Observation: 10:00

UTC Date: 02<sup>nd</sup> December, 2016

Wind: CALM

Visibility: 2400 meters

Weather: HZ (Haze)

Cloud: FEW 2000 FT (0600 MTS)

BKN 10000 FT (3000 MTS)

Temperature: 20 degrees

Dew Point: 15 degrees

QNH: 1011 hPa

QFE: 1011hPa

Trend: NOSIG

**1.8 Aids to navigation:**

All the aids to navigation including Radar frequency 123.9 MHz were reported working normal.

**1.9 Communications:**

During the period of occurrence, the aircrafts, JAI792, B737-800 and LLR628, ATR-72 were in contact with ATC on RSR frequency 123.9 MHz. There was always two way communications between the ATC and both the aircrafts.

**1.10 Aerodrome information:**

Dr. Babasaheb Ambedkar International Airport (IATA: NAG, ICAO: VANP) is an international airport serving the city of Nagpur, Maharashtra, India. The airport handles around 4,000 passengers per day and caters to four domestic airlines and two international airlines connecting Nagpur to Sharjah, Doha and 12 domestic destinations. The air traffic



services at Nagpur airport are provided by AAI which includes Aerodrome Control service (ADC/SMC), Approach Control service (APP), Area Control Service (ACC), Route Surveillance Radar Service (RSR) and ADS-B Surveillance.

**1.11 Flight recorders:**

The ATC tape transcripts of frequency 123.9 MHz and Radar Snap Shots along with DFDR data are placed in the evidence folder.

**1.12 Wreckage and impact information.**

There was no damage to either of the aircraft or to any ground facilities.

**1.13 Medical and pathological Information:**

The cockpit crew of both M/s Jet Airways and M/s Alliance Air had undergone pre-flight medical check prior to the flight and the same was found to be negative.

**1.14 Fire:**

There was no fire after the incident.

**1.15 Survival aspects:**

The incident was survivable.

**1.16 Tests and research: Nil**

**1.17 Organizational and management information:**

M/s Jet Airways is an Indian registered Schedule airline under the regulatory control of Director General of Civil Aviation. It operates scheduled flights to both domestic and international sectors. 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.

M/s Alliance Air, a subsidiary of M/s Air India Ltd. is a scheduled Air Operator under the regulatory control of Directorate General of Civil Aviation.

Airports authority of India (AAI) is a public sector undertaking under the Ministry of Civil Aviation. It was formed by an Act of Parliament and came into existence on 1<sup>st</sup> April 1995. AAI provides Air Navigation Services in air space measuring 2.8 million square nautical miles which cover entire Indian air space. The Air Traffic Services at Nagpur airport are provided by AAI which includes Route radar Surveillance, ADS-B Surveillance, Area control Service, Approach Control Service and Aerodrome Control Tower.

**1.18 Additional information:** NIL

**1.19 Useful and Effective Techniques:** NIL

**2. ANALYSIS**

Before analysis, the following hypothesis were presumed:

1. The Controller gave Climb to JAI792 to flight level 160 as claimed by him in his statement.
2. The Crew of JAI792 listened (not heard) to the ATC instructions carefully and followed the instructions non-mechanically.
3. The Crew of JAI 792 were not aware of any traffic information and were given normal climb to FL160 by Indore ATC.
4. There were no arguments between the Controller and Crew of JAI792 on the Channel and they didn't jeopardize the safety of aircraft and its occupants.

The analysis of Radar Snap Shots (sequence of event as displayed over RADAR in front of RSR Controller where in the details of JAI 792 & LLR628 are clearly visible), ATC tape transcript, DFDR data reveals that :

1. JAI792 came in contact with Nagpur Radar after being released by Indore ATC. After radar identification, Radar Controller at time 10:04:11, instructed JAI792 "Roger Climb and maintain flight Level 180. Traffic 12 O'clock, 30 miles (NM) opposite direction ATR flight level 180." And the crew of JAI792 read-back mechanically at time 10:04:20 "Roger Climb and maintain flight level 180, JAI792." (Figure 2.1)





Figure 2.1: After Radar Identification of JAI792, at this time Controller passed wrong ATC instruction to JAI792 which was acknowledged by JAI792.

2. At time 10:05:45, the aircraft (JAI792) reached flight level 160 and Radar data block of JAI792 as displayed on the radar Controller's Screen (Situation Data

Display-SDD) showed 160 <sup>↑</sup> 160 This could have strike the mind of radar controller that the aircraft is passing flight level 160 and the cleared flight level shown is also 160. Had there been a slip of tongue, if we presume then, at least at this point of time, the controller should have reacted. This clearly shows lack of Surveillance. (Figure 2.2)

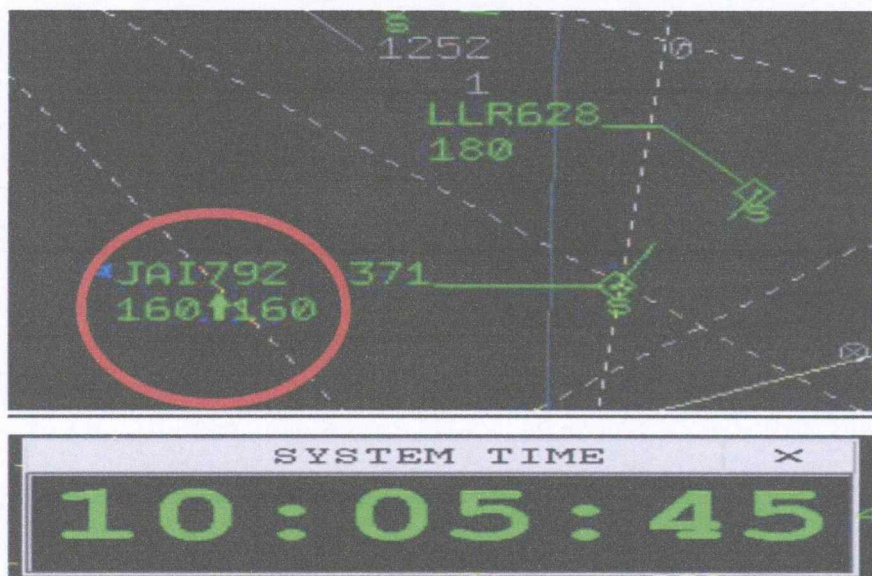


Figure 2.2: At time 10:05:45, JAI792 seen passing FL160 with a Climb arrow and CFL as FL160, the Controller should have reacted to the situation: Lack of Surveillance.



3. At time 10:05:49, the aircraft (JAI792) was passing flight level 162, a clear burst of level from flight level 160. Had the controller being vigilant and maintained surveillance over the aircrafts under his jurisdiction, the controller could have reacted to the situation at this time. (Figure 2.3)

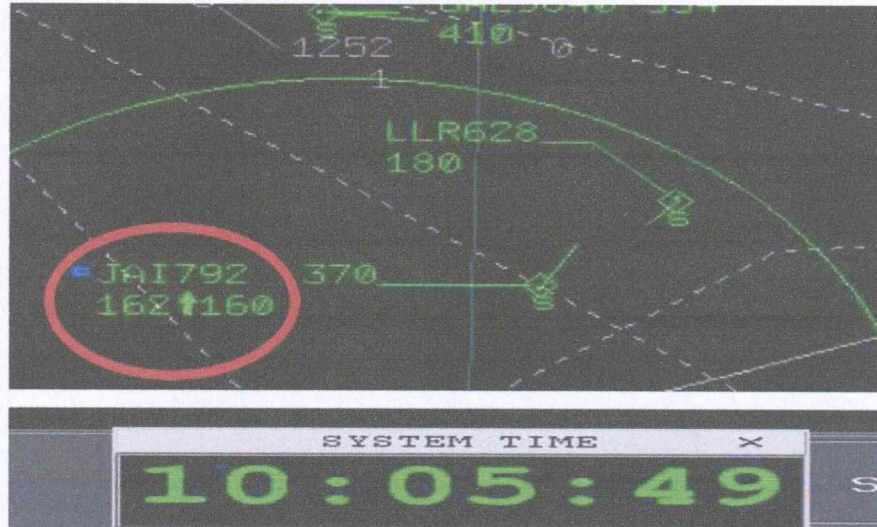


Figure 2.3: At time 10:05:49, JAI792 seen passing FL162 with a Climb arrow and CFL as FL160, the Controller should have reacted to the situation: Poor Surveillance.

4. At time 10:06:03, the radar Scope of the controller showed level passed by the aircraft and Level cleared ~~170~~ ~~160~~. Still there was no reaction from the controller. (Figure 2.4)

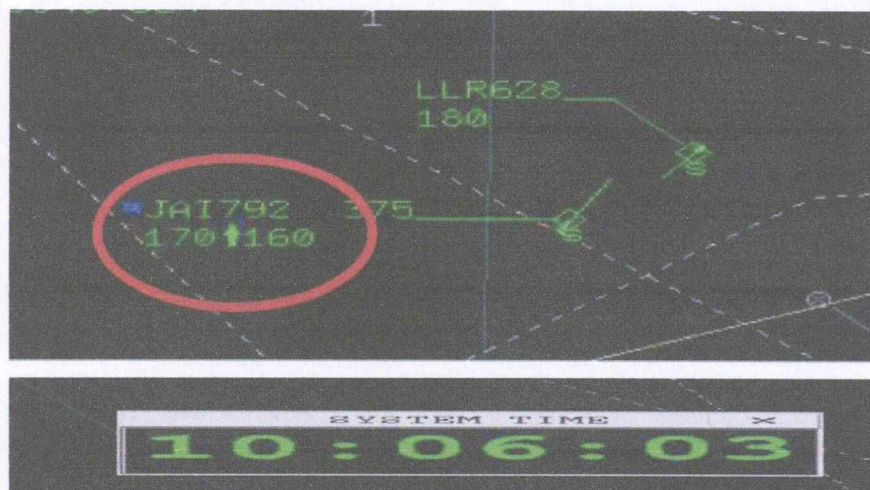


Figure 2.4: At time 10:06:03, JAI792 seen passing FL170 with a Climb arrow and CFL as FL160, No reaction from the Controller: Lack of Surveillance.



5. At time 10:06:22 when JAI792 was passing flight level 174 and the cleared flight level as shown in radar was 160 i.e. 174 160, the controller did not react to the situation. Neither there was any reaction from the Crew of JAI792, This situation was after 02 minutes and 11 seconds of issuing wrong climb instruction to JAI792 to FL180 by the controller and duly acknowledging of the wrong climb instruction by Crew of JAI792 despite being provided with essential traffic/opposite direction traffic (LLR628-ATR72)(figure 2.5). Furthermore, the climb of JAI792 was restricted to flight level 160 by Indore ATC due to traffic. "Indore ATC has cleared us to FL160 and told us that further climb would be with Nagpur as they had traffic with them. Then on contacting Nagpur, Nagpur had cleared us to FL180 (as per what we heard) and we read back the same, which was not corrected (in case we read back the wrong flight level). But Nagpur had not intimated us about any traffic<sup>8</sup>." This situation can be at the most said to be after 37 seconds of level burst by JAI792 as depicted in figure 2.2.

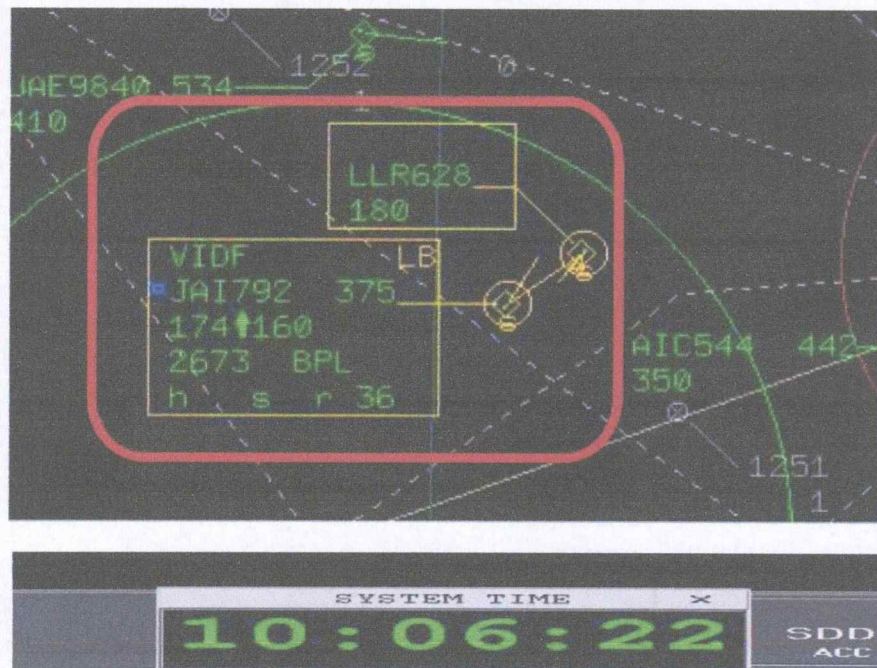


Figure 2.5: At time 10:06:22, JAI792 seen passing FL174 with a Climb arrow and CFL as FL160, Neither controller reacted nor Crew of JAI792 who were aware of traffic before being released by Indore ATC.

<sup>8</sup>Statement of Pilot monitoring (PM) & Captain of the Flight.



6. The very first reaction came from the controller at time 10:06:34 i.e. after 143 seconds of issuing wrong instruction (When his audio sensory organs were playing the main role- he issued the wrong instruction and heard back the reply from crew of JAI792)) and after 49 seconds of the level burst (When both audio and visual sensory organs were playing role). This reaction was in the form of an ATC instruction “Confirm maintaining flight level 180”. At this time, the lateral and vertical separation between two almost opposite direction traffic (JAI792 on heading 028 and LLR628 on heading 222) was reduced to 8.165NM and 500feet respectively (Figure 2.6).

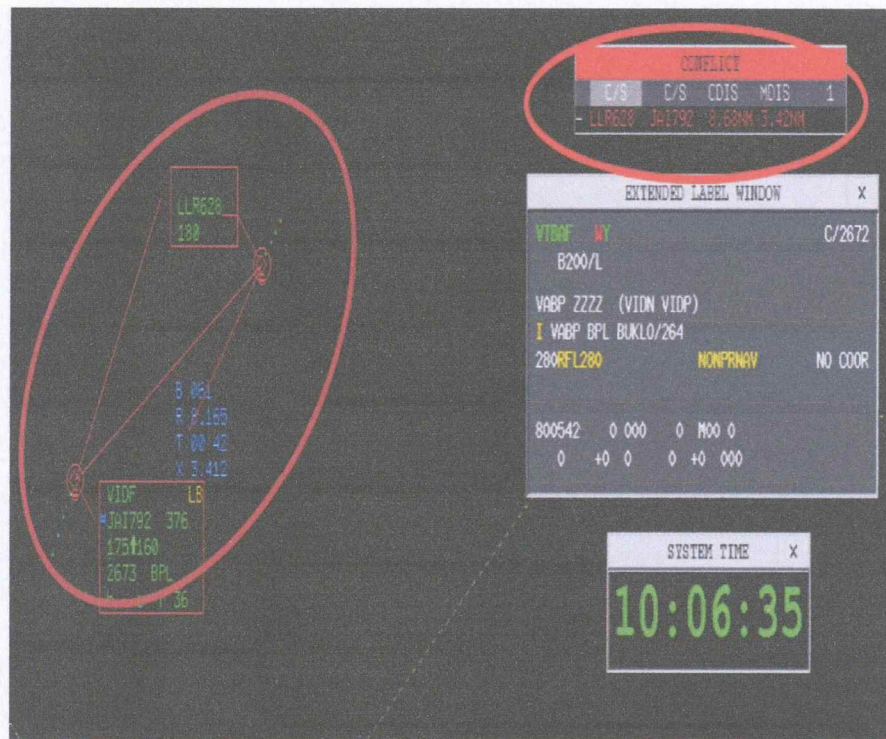
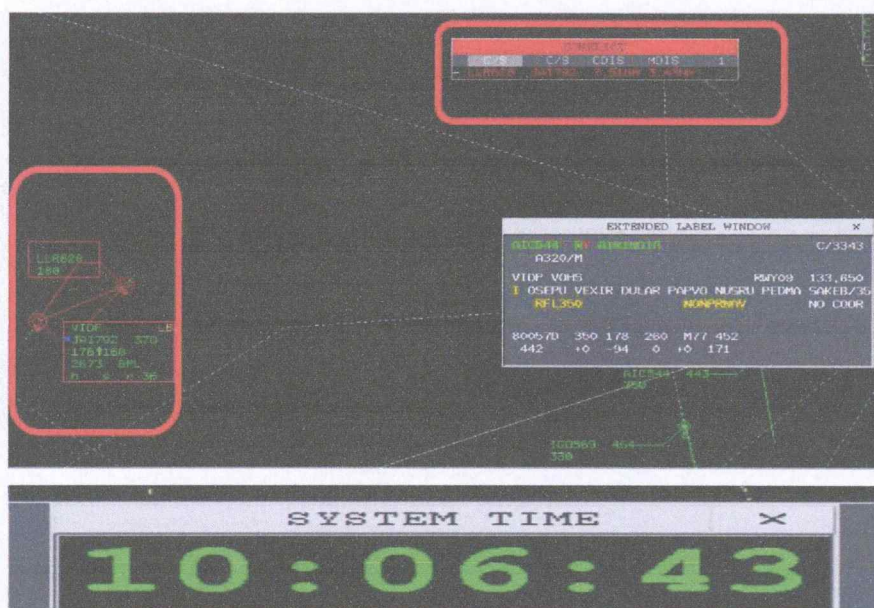


Figure 2.6: At time 10:06:35, JAI792 seen passing FL175 with a Climb arrow and CFL as FL160, and the Controller is asking crew of JAI792 “Confirm Maintain FL180”



7. At time 10:06:42, the controller again asked JAI792 to “Maintain flight Level 160” when JAI792 was passing FL176. The lateral and vertical separation between almost reciprocal traffic was reduced to 6.9NM and 400 feet respectively. The controller by asking an aircraft, who is passing climbing FL176 to maintain FL160 has shown extremely poor skills to handle conflicting situation. The Controller failed to give an avoiding heading to the conflicting traffic. Four seconds after this, at time 10:06:47, the Crew get into the arguing mode with the Controller “Sir we have told, Confirm again 180”. The Controller and pilot are in arguing mode without giving any consideration to resolving the conflict thereby jeopardizing the safety of the aircraft and its occupants. The Controller at time 10:06:51 arguing “160 Sir I told you to maintain.....” But was also trying to give an avoiding heading which was stepped up as the crew of JAI792 seems still in the arguing and defensive mode. Crew at time 10:06:53 was trying to put his arguments forth by saying “I repeated back 180 also.” (Figure 2.7 & 2.8).



**Figure 2.7: At time 10:06:42, the Controller and Crew of JAI792 in arguing mode without any regard to the safety of aircraft and its occupants.**



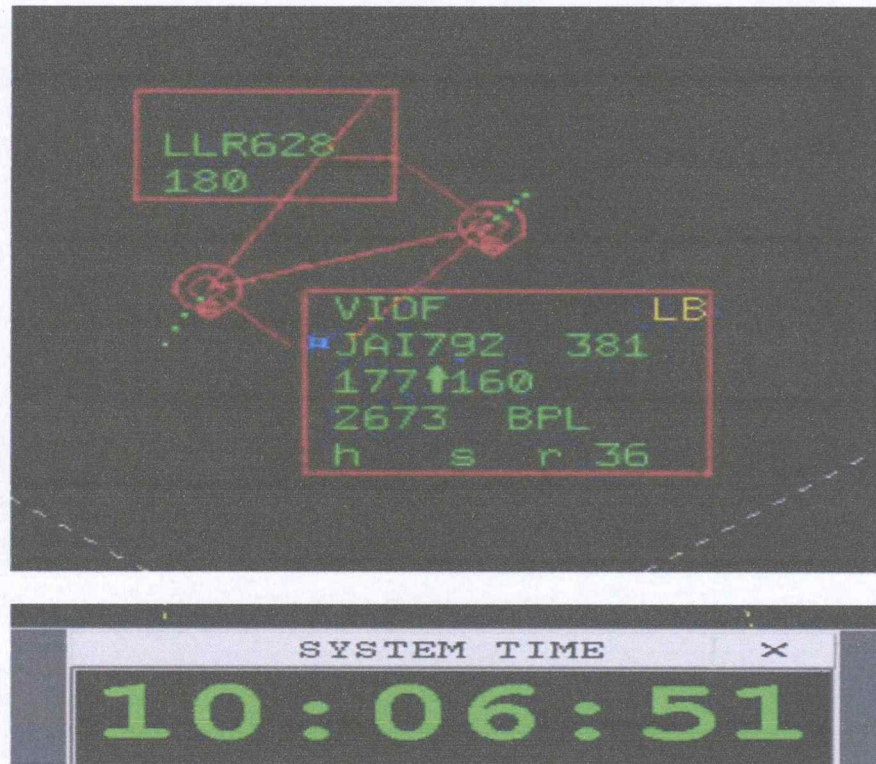


Figure 2.8: The Controller and Crew of JAI792 still in arguing mode. At this time, 10:06:51, Radar Controller is arguing with JAI792 “160 Sir, I told you to maintain. 160”. Pilot of JAI792 is still in arguing mode and replies back at time 10:06:53, “I repeated back, 180 also”.

8. The controller at time 10:06:57 i.e. after 186 seconds of issuing wrong instruction at time 10:04:11 (Figure 2.1) and after 72 seconds of first indication of level burst at time 10:05:45 (Figure 2.2) passed the very first instruction for avoiding the reciprocal traffic by asking JAI792 to “turn left heading 360”. Does this heading of just 27 degrees was a sufficient heading to avoid the Conflict. The controller failed to appreciate which heading will clear the aircraft from conflict. The Controller lacks the basics of Radar techniques, separation, headings. The Crew at this stage, initiated on his own a further left heading of 330 (NNW) to avoid the conflicting traffic. At this time the lateral and vertical separation was reduced to 5.22 NM and 200 feet respectively. The Crew at time 10:06:59 replied “We are turning 330.”(Figure 2.9).



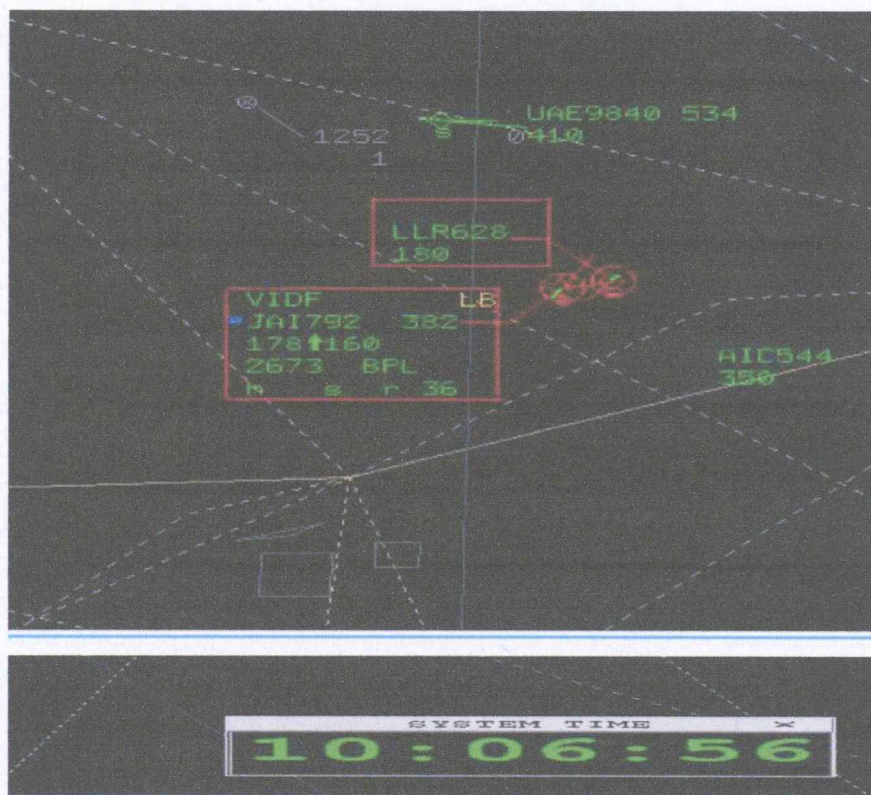


Figure 2.9: At this time, first instruction in the form of issuing insignificant avoiding heading by the Controller came and the Crew of JAI792 own its own turned further left heading 330.

9. From time 10:07:05 to 10:07:08, the lateral and vertical separation between JAI792 and LLR628 was 4.02 NM and 200 feet respectively. (Figure 2.10).

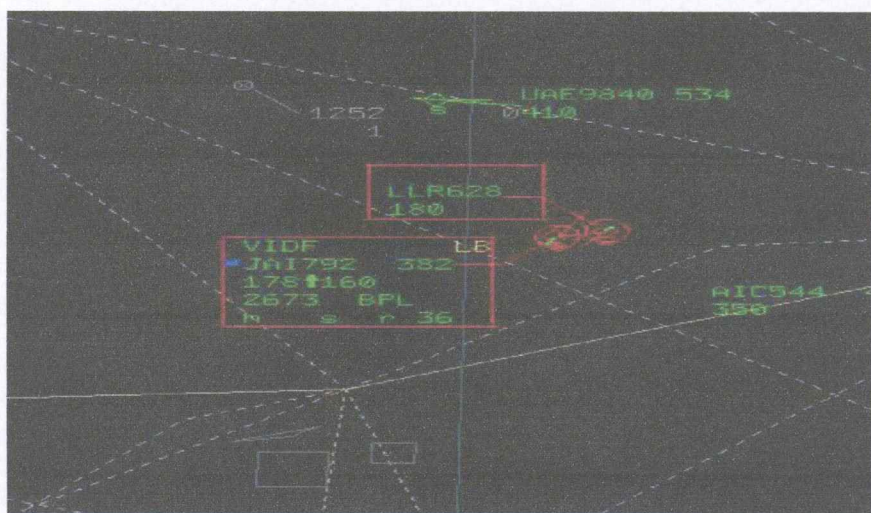


Figure 2.10 Minimum Lateral and vertical separation of 4.02 NM and 200 feet.



10. At time 10:07:14, LLR628 confirmed “Traffic passed just right wing” and the lateral and vertical separation was 4.12 NM and 500 feet respectively. At time 10:07:23, LLR628 confirmed “Traffic 3 O’ Clock 4 NM”. Thereafter JAI792 was seen descending on Radar. The minimum lateral and vertical separation was 4.7 NM and 500 feet (figure 2.11 and figure 2.12).

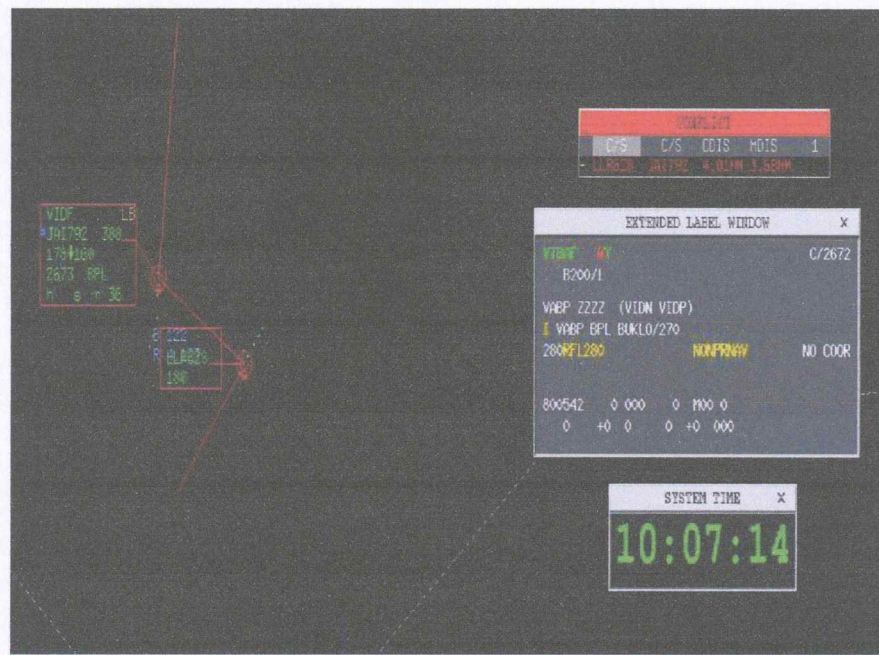


Figure 2.11: LLR628 Confirming “Traffic passed just right wing”

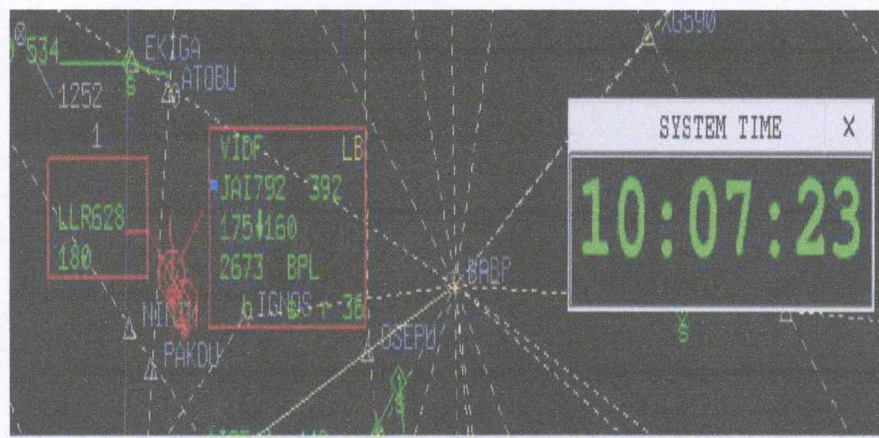


Figure 2.12: LLR628 confirming “Traffic 3’O Clock 4 mimes (NM)”



11. At time 10:07:51 JAI792, who was given climb to FL280 was seen passing FL174 for FL280 in climb mode. (Figure 2.13)



Figure 2.13: At time 10:07:51 JAI792 seen climbing passing FL174 for FL280

12. At time 10:08:12 both the aircrafts, who passed each other, were clear of conflict and JAI792 was given direct routing to waypoint "BUKLO" JAI792 was seen passing FL179 for FL280 on Radar.(Figure 2.14)



Figure 2.14: At time 10:08:12 JAI792 seen passing FL179 for FL280 and direct to "BUKLO"

Further analysis of Log books of Tower, Approach and Area, Duty rosters of ATCOs from January 2016 to January 2017 and Proficiency Check report of AAI reveals that:

1. The RSR Controller, who is rated for RSR, Tower, Approach and Area ratings of Nagpur airport failed to perform any duty in Tower and approach during the above mentioned period of over one year. His procedural rating of Tower (ADC/SMC) and Approach (APP) had expired/lapsed/VOID well before the date of serious incident i.e. 02/12/2016.
2. The RSR controller performed only one duty in AREA North (ACC-N) on 23/04/2016 from 16:30 to 17:30 UTC i.e. for one hour in over one year. His ACC rating was lapsed / Void as on the date of serious incident i.e. 02/12/2016.
3. The analysis of proficiency check report of the RSR Controller in August 2017 reveals that the controller lacks in the following areas:

- RT techniques
- Use of standard Phraseology
- Clarity in the instructions passed to the aircraft.
- Voice was observed to be under confident.

and corrective training as mentioned below was suggested for the RSR controller:

- Two days class room training covering all the areas of improvement as mentioned above.
  - On the job skill improvement program for one week, under an instructor.
  - After completion of above mentioned classroom training and skill improvement programme, the controller may be assessed for his proficiency by Joint GM (SQMS).
4. There were 19 radar Controllers at Nagpur airport as on the date of serious incident<sup>9</sup> that the controllers who were rated as per records in RSR, Tower, Approach and Area Units and on ADS B Surveillance.

A further analysis of ATC log books for the above said period reveals that:

- Out of 19 Radar Controllers at Nagpur airport as on date of serious incident i.e. 02/12/2017, none of the 19 radar controller have performed duty in Tower

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<sup>9</sup> Email from ATS-in-Charge, AAI Nagpur dated 24/07/2017



for over six months and thus all the 19 Radar Controllers have their Tower rating lapsed/expired /VOID. They include the ATC training-in-charge, SQMS-in-charge, Watch Supervisory Officer (WSO), Deputy General Managers, Assistant General Managers, Senior Managers and other air traffic controllers. Out of 19 radar controllers, 13 didn't perform even a single duty during the period of analysis i.e. from January 2016 to January 2017. The remaining six radar controllers performed duty after an elapse of a period of six months i.e. they performed duty in Tower after the lapse/expiry of their Tower rating. Which is an unauthorized taking over of ATC Channel. These six radar controllers, who performed duties in Tower without authorization, performed duty varying from just 40 minutes to an hour to a maximum of 20:04 hours in a period of analysis i.e. from January 2016 to January 2017. Further, these six Radar Controllers include ATC training-in-charge of Nagpur ATC, Assistant General Managers and Senior Managers.

- In respect of Approach rating, 16 of the 19 radar Controllers have their Approach rating Lapsed/Void. The three remaining Radar Controllers performed duty in segregated approach for the duration varying **from 01:40 hrs to 03:00 hrs to 08:12 hrs in total. They have performed duty as minimum as 05 minutes and 15 minutes as one duty.**
- Seven of the 19 Radar Controllers have their Area (ACC) rating expired/VOID.
- There were six radar Controllers who had all of their Procedural ratings i.e. Tower, Approach and Area expired/Lapsed/Void during the period of analysis i.e. January 2016 to January 2017.
- With respect of PRD, the provisions are "If a radar controller performs a PRD in a radar Unit (RSR/TAR), the procedural ratings of the said unit are deemed to be current/valid. But it does not cover the Tower rating. Does it imply that the Tower rating of the radar controllers, who are performing PRD has expired/Void? In the case of Nagpur ATC, the Tower and Approach rating of PRD Controllers seems to be lapsed/Void since the day they are performing PRD at Nagpur.

5. The analysis of duty roster from period of January 2016 to January 2017 reveals that:

- The ATS-in-Charge/ ATS-in-Charge<sup>10</sup> (for January 2017 duty roster), who prepared duty roster for the ATCOs, failed to mark the duty of the Radar Controllers in various procedural units for keeping their Tower/APP/ACC ratings current/Valid.
- The ATC duty roster<sup>11</sup> provides “to meet operational requirement, WSO may assign controllers from one stream to another.” But it doesn’t allow individual controller to keep his/her ratings current/valid.
- The ATC duty roster<sup>12</sup> provides in Note that “**All ATC rated officers deployed in general duty must perform minimum three independent duties in a month ...**” This instruction, for drawing of the rating allowance, seems to be inadequate and needs to be expanded and be clearer in light of multi ratings and duration. It has been observed that ATC Controllers have performed duty for a duration as less as 05 minutes, 15 minutes. It should clearly specify the number of duties as well as number of hours per ATC rating held by the controller.

6. The involved Radar Controller was not maintaining personal log book of the duty performed by him in ATC units.

### 3. CONCLUSIONS:

#### 3.1 Findings

1. Both the Indian registered aircraft (JAI792, B737-800 and LLR628, ATR-72) were on scheduled flights from Indore to Delhi and Gwalior to Mumbai respectively under the command of an appropriately licensed ATPL holder and FO being CPL holders.
2. The medical of both the cockpit crew members was valid. Both have undergone pre-flight medical checks including BA test which was negative.
3. Traffic density with Nagpur Approach Radar was moderate.

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<sup>10</sup>Duty roster for the month of January 2017.

<sup>11</sup>ATC Duty roster from January to August 2016.

<sup>12</sup>ATC Duty Roster for January 2017, December, October, September, August 2016 etc.



4. The RSR controller issued wrong ATC Clearance to JAI792 to Climb to FL180 but he provided the essential traffic information along with it. The Pilot monitoring (PM) who happens to be the Captain/P1 of the aircraft, failed to appreciate the instruction despite being aware well in advance that Nagpur has traffic and owing to which the climb of JAI792 was restricted to FL160.
5. If we presume, as per our first hypothesis , that the controller had inadvertently gave FL180 to JAI792, even then the controller's failure to detect the conflict from the time he gave wrong instruction ( 10:04:11), his failure to maintain surveillance over the aircrafts under his jurisdiction, his failure to correct the wrong instructions despite ample opportunity/time available at his disposal, his giving precedence to the arguments on RT over safety of aircrafts and its occupants and his extremely poor handling of conflicts and his poor performance as evaluate by AAI in his proficiency check of 2015 cannot be overlooked. His intervention for resolving the traffic conflict came **at time 10:06:57 i.e. after 186 seconds of issuing wrong instruction at time 10:04:11 (Figure 2.1) and after 72 seconds of first indication of level burst at time 10:05:45 (Figure 2.2) and this instruction of turning left heading 360 (by 27 degree) too didn't seem to resolve the traffic conflict and the Crew at this stage, initiated on his own a further left heading of 330 (NNW) to avoid the conflicting traffic.** The controller failed to appreciate which heading will clear the aircraft from conflict. The Controller lacks the basics of Radar techniques, separation, headings and needs to be trained exhaustively in theory, simulation of traffic conflicts and on OJT. His performance need to be regularly monitored.
6. The RSR Controller fails to perform duty in Tower, Approach and Area for over an year i.e. from January 2016 to January 2017 and thus has lost the privilege of performing independent duty in Nagpur Tower/ Approach and Area. Thus his procedural ratings are VOID/Elapsed.
7. The Crew of JAI792 i.e. Captain/Pilot monitoring (PM) was well aware of the traffic with Nagpur ATC as the aircraft's climb to FL160 was restricted by Indore ATC and he heard the wrong instructions along with the essential traffic information and **in fact didn't listen to it.** He responded very casually and mechanically to the wrong or inadvertently wrong ATC instruction and without applying his mind. **(Roger**

**Climb and maintain FL180 JAI792, a reply to wrong ATC instruction – “Roger climb and maintain FL180. Traffic 12 O’ clock, 30 miles opposite direction ATR FL180”).**

8. The Crew failed to listen and interpret the wrong ATC instruction coupled with right essential traffic information and read back casually and mechanically.
9. The CVR/CVR data was not made available to committee as it was told by Jet airways that since it was not an RA incident, the CVR could not be preserved the data was over ridden.
10. 19 Radar Controllers including the ATC training-in-charge, SQMS-in-charge, Watch Supervisory Officer (WSO) have Tower rating lapsed/expired /VOID.,
11. The six radar controllers performed duty after an elapse of a period of six months i.e. they performed duty in Tower after the lapse/expiry of their Tower rating.
12. These six radar controllers, who performed duties in Tower without authorization, include ATC training-in-charge of Nagpur ATC, Assistant General Managers and Senior Managers and they performed duty varying from just 40 minutes to an hour to a maximum of 20:04 hours in a period of analysis i.e. from January 2016 to January 2017.
13. 16 of the 19 radar Controllers have their Approach rating Lapsed/Void. The three remaining Radar Controllers performed duty in segregated approach for the duration varying from 01:40 hrs to 03:00 hrs to 08:12 hrs in total. They have performed duty as minimum as 05 minutes and 15 minutes as one duty.
14. Seven of the 19 Radar Controllers have their Area (ACC) rating expired/VOID.
15. There were six radar Controllers who had **all of their Procedural ratings i.e. Tower, Approach and Area expired/Lapsed/Void during the period of analysis i.e. January 2016 to January 2017.**
16. The Tower and Approach rating of PRD Controllers seems to be lapsed/Void since the day they are performing PRD at Nagpur.
17. The ATS- in-charge, the training in charge and WSOs at Nagpur airport failed to mark/reassign the duties of ATC Controllers/Radar Controllers in all the units for which these controllers were holding the ratings and thereby failed to give the



controllers an opportunity to do an independent duty in the units to keep their ratings current/Valid.

18. The handing over taking over of watch was not followed properly in various log books. At many places the handing over and taking over Controllers have not even signed the log books when where is the question of briefing. A clear violation of provisions of MATS1 was being practiced by controllers at Nagpur ATC.

19. The individual Controllers are not maintaining records of duty performed by them in ATC units.

### **3.2 Probable cause of the Serious Incident:**

**Human error, laxity towards Safety on part of both Controller and Crew of JAI792 along with Proficiency of Controller are the main probable cause which are expanded as below:**

- 1) Inadvertent use of incorrect climb instruction by the Radar Controller though with essential traffic information.
- 2) Failure of Controller and Crew to hear back the transmissions made to each other.
- 3) Inability of Crew of JAI792 to identify the wrong climb instruction in the light of correct essential information as well as a previous knowledge of the traffic.
- 4) Controllers' failure to maintain proper surveillance over the aircrafts under control.
- 5) Slow reflection and poor conflict resolving ability of the Controller.
- 6) Judgmental failure of Controller to give correct avoiding heading.

### **3.3 Contributory Factors:**

**Argumentative behaviour on part of both the Controller and the Crew of JAI792:**

Failure of the Radar Controller and Crew of JAI792 to maintain RT discipline as both were having arguments over RT till the separation reached the serious level.

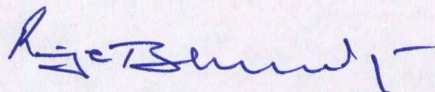


**SAFETY RECOMMENDATIONS:**

1. The RSR Controller shall be given exhaustive training in class room, on simulators and on OJT on conflict resolution, radar techniques, separation standards, techniques Surveillance hearing back and RT discipline.
2. The RSR Controller, having history of poor proficiency in ATC shall be regularly monitored by senior controllers and SQMS team.
3. AAI shall initiate corrective action for the lapsed procedural ratings of the Radar Controller as per MATS1.
4. AAI shall initiate corrective action about the lapsed procedural ratings of the other Radar Controllers at Nagpur airport as well as for lapsed Tower and Approach ratings of PRD Controllers in accordance with the provisions of MATS1.
5. AAI shall make certain procedural changes in the interest of safety:
  - To reduce the number of ratings held by Controllers.
  - To make clear provisions for the currency of ratings in terms of minimum hours of duty to be performed per rating/unit by prescribing minimum norms of at least 20 to 30 hours per unit per month and also defining minimum amount of duration of one duty irrespective of whether the controller is doing active/regular ATC duty or general duty or PRD. As performing just 05 minutes of duty in a year/six months/one month or even at one time, seems to be highly justified.
  - AAI shall make clear provisions in the duty roster in such a manner that the Controllers are marked in all the units every month for which they are rated. The non- marking of a Controller's duty for over one month/six months or a year cannot be justified in any manner.
  - AAI shall introduce Controller's duty log book system in a standard format wherein the controllers shall enter the duties performed by him/her in every ATC unit and the log book shall be duly verified by WSO/ATS in-Charge.
6. The crew of JAI792 may be counselled/imparted corrective training on proper hear back, maintain RT discipline and CRM training.

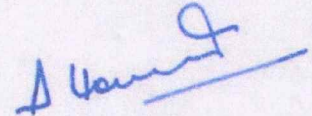


7. The availability of CVR data in the case would have been quite helpful. DGCA is requested to advise the operator to provide CVR data in future irrespective of RA.



**(Raje Bhatnagar)**

Assistant Director of Airworthiness, AAIB  
Member, CoI to VT-JFP



**(Dr. Jitender Loura)**

Assistant Director of Operations, AAIB  
Chairman, CoI to VT-JFP

Place: New Delhi

Date: 31/10/2017