



सत्यमेव जयते

**INVESTIGATION REPORT ON SERIOUS INCIDENT BETWEEN VISTARA,
VTI997 AND AIR INDIA, AIC631 AT CSI AIRPORT, MUMBAI, ON
07/02/2018**

KUNJ LATA
INVESTIGATOR-IN-CHARGE

DINESH KUMAR
INVESTIGATOR

ABBREVIATIONS

AAIB	Aircraft Accident Investigation Bureau
ACC	Area Control
ADC	Aerodrome Control
APP	Approach Control
ATC	Air Traffic Controller
ASR	Approach Control Surveillance Approach Radar
ATPL	Airline Transport Pilot License
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 Arrival Routes
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

TABLE OF CONTENT

Sl. No.	<u>Subject</u>	<u>Page</u>
	SYNOPSIS	4
1.0	FACTUAL INFORMATION	5
1.1	HISTORY OF FLIGHT	5
1.2	INJURIES TO PERSON	5
1.3	DAMAGE TO AIRCRAFT	5
1.4	OTHER DAMAGE	5
1.5	PERSONAL INFORMATION	5
1.5.1	Pilot-in-Command- Vistara	6
1.5.2	Co-Pilot- Vistara	6
1.5.3	Pilot-in-Command- Air India Ltd	6
1.5.4	Co-Pilot- Air India Ltd	6
1.5.5	ATC CONTROLLER	7
1.6	AIRCRAFT INFORMATION	7
1.7	METEOROLOGY INFORMATION	8
1.8	AIDS TO NAVIGATION	8
1.9	COMMUNICATION	8
1.10	AERODROME INFORMATION	8
1.11	FLIGHT RECORDERS	9
1.12	WRECKAGE AND IMPACT INFORMATION	9
1.13	MEDICAL AND PATHOLOGICAL INFORMATION	9
1.14	FIRE	9
1.15	SURVIVAL ASPECT	9
1.16	TEST AND RESEARCH	10
1.17	ORGANIZATIONAL AND MANAGEMENT INFORMATION	10
1.18	ADDITIONAL INFORMATION	11
1.19	USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES	13
2.0	ANALYSIS	13
2.1	CAUSE LEADING TO INCIDENT	15
3.0	CONCLUSION	16
4.0	RECOMMENDATIONS	16

**INVESTIGATION REPORT ON SERIOUS INCIDENT BETWEEN VISTARA,
VTI997 AND AIR INDIA, AIC631 AT CSI AIRPORT, MUMBAI, ON
07/02/2018**

1.	Aircraft Type	A320	A319
2.	Nationality	INDIAN	INDIAN
3.	Registration	VT-TNE	VT-SCV
4.	Owner	M/s ARCU AIRCRAFT LEASING LTD	M/ s AIR INDIA LTD
5.	Operator	TATA SINGAPORE AIRLINES 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 AREA NORTH	MUMBAI AREA NORTH
9.	Co-ordinates of accident Site(Location)	BETWEEN WAYPOINT SEKVI AND KAKPO	BETWEEN WAYPOINT SEKVI AND KAKPO
10.	Last point of Departure	NEW DELHI	MUMBAI
11.	Intended place of Landing	PUNE	BHOPAL
12.	Date & Time of Accident	07/02/2018 at time 1500 UTC	07/02/2018 at time 1500 UTC
13.	Passengers on Board	152	109
14.	Extent of Injuries	NONE	NONE
15.	Crew on Board	07	06
16.	Extent of Injuries	NONE	NONE
17.	Phase of Operation	DESCENDING	CLIMBING
18.	Type of Incident:	AIRPROX	AIRPROX
(ALL TIMINGS IN THE REPORT ARE IN UTC)			

SYNOPSIS

On 07/02/2018, Vistara VTI997,(Registration: VT-TNE, Type: A320) was scheduled for New Delhi to Pune and Air India AIC631,(Registration: VT-SCV, Type: A319) was scheduled for Mumbai to Bhopal.

At 1500 UTC , AIC631 met with RA incident at FL270 with VTI997 in Mumbai Area- North.

VTI997 was overflying Mumbai FIR from New Delhi to Pune and AIC631 was departing from Mumbai. VTI997 was instructed by Area Radar Controller “Descend from FL360 to FL290” and AIC631 was instructed “Climb to FL270”. After some time, PCW generated between AIC631 and VTI997. It was observed that VTI997 had descended below its assigned level i.e. FL290. AIC631 was in climbing phase and at the time of PCW, it was at FL254.

Both aircraft got RA and followed the RA maneuvering. AIC631 reported followed RA but was conflicting with Area Radar Controller’s instruction. AIC631 also reported that the traffic, VTI997 was 10’o Clock and separation was approx. 5NM and +/- 100 Feet.

The minimum lateral separation reported by ATC between the two aircraft was less than 2NM while no vertical separation existed.

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: 03/2018-AAIB dated 09/02/2018. 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.

1.0 FACTUAL INFORMATION

1.1 History of Flight

Area Control- North was operating with additional airspace of OZAR above FL210. It was working on 132.7 Mhz Frequency.

VTI997 was scheduled from Delhi to Pune. It came in contact with Mumbai Area North at 14:39:09 UTC at FL360. After identifying VTI997, Area Radar Controller gave instructions to proceed direct to Pune via OZAR Airspace.

Area North Radar Controller gave “Descend to FL290” which was duly acknowledged by VTI997 as “Descend to FL290, VTI997 in positive contact with Pune”. Thereafter, Area North Radar Controller asked him to standby due traffic.

AIC631, was scheduled from Mumbai to Bhopal and came in contact with Mumbai Area North at 14:54:45 UTC. After identifying AIC631, it was given “Climb to FL270”.

VTI997 descended below assigned FL290 and descended to FL270 which was the level assigned to AIC631. AIC631 was climbing to FL270 and VTI997 was descending to FL270. Thus, PCW system alert was generated at time 1500 UTC. It was not acknowledged in time and the PCW alert got converted to CCW alert.

Both aircraft reported got RA and RA maneuvers were executed. Both aircraft reported “clear of conflict” at 15:01:26 UTC.

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 Vistara

Age	29 yrs
License Type	ATPL
Date of Issue	06/11/2013
Validity of license	05/11/2020
Date of joining Vistara	01/12/2014
Total flying experience	5400 hrs
Total flying experience as PI on type	1378.26 hrs

1.5.2. Co-Pilot for Vistara

Age	31 yrs
License Type	CPL
Date of Issue	12/06/2015
Validity of license	11/06/2020
Date of joining Vistara	03/10/2017
Total flying experience	1200 hrs
Total flying experience as P2 on type	1000 hrs

1.5.3 Pilot-in-Command for Air India Ltd.

Age	51 yrs
License Type	ATPL
Date of Issue	25/02/1995
Validity of license	26/07/2021
Date of joining Air India Ltd	19/05/1989
Total flying experience	19267 hrs
Total flying experience as PI on type	14847 hrs

1.5.4 Co-Pilot for Air India Ltd.

Age	32 yrs
-----	--------

License Type	CPL
Date of Issue	16/10/2010
Validity of license	15/09/2020
Date of joining Air India Ltd	17/11/2016
Total flying experience	885.29 hrs
Total flying experience as P2 on type	640.43 hrs

1.5.5 ATC Controller

(a) The Controller was rated for the following ATC units at CSI

Airport:

- (i) Tower Control- ADC/SMC
- (ii) Oceanic Control- OCC
- (iii) Area Control- ACC
- (iv) Approach Control Surveillance Radar- ASR
- (v) Area Route Surveillance Radar- ARSR
- (vi) ADS/CPDLC

(b) Whether involved in any Incident in Past:

The controller was involved in an airprox occurred between SVA748 and DLH8418 near NOBAT in Mumbai FIR on 05/12/2004 as OCC(N) Controller and was found lacking in the identification of traffic.

(c) Proficiency Checks:

Last check was done in 14.12.2017 (at the time of incident) on ARSR.

(d) English Language Proficiency Aptitude: Level 6

1.6 Aircraft Information

The Airbus A320 family consists of short- to medium-range, narrow-body,

commercial passenger twin-engine jet airliners by Airbus. The family includes the A318, A319, A320 and A321, as well as the ACJ business jet. The A320s are also named A320ceo (current engine option) following the introduction of the A320neo (new engine option). The aircraft family can accommodate up to 236 passengers and has a range of 3,100 to 12,000 km (1,700 to 6,500 nm), depending on model.

1.7 Meteorological Information

No weather deviation or turbulence was reported. Weather was not the contributory factor.

1.8 Aids to Navigation

All Automation Systems, VHF channel and ATS surveillance system at Mumbai Airport 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

A positive two way communication was always maintained between ATC unit and involved 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 data recorders were installed on both aircraft and were operative.

However, M/s Vistara failed to provide CVR to the investigation team.

1.11.1 As per CAR section 5 Series C Part 1, Para 9.1 states that:-

‘In case of the accident/serious incidents, CVR shall be removed from the aircraft at the earliest opportunity’.

1.11.2 As per CAR Section 5 Series C Part 1, Para 9.2 CVR shall be removed when:

“The separation between the aircraft was less than prescribed for the situation”.

1.11.3 As per CAR Section 1 Series B Part II:

“Compliance with CARs is not optional. Occasionally, however, there may be situations where it may not be possible to comply with the directions given in the CARs because of exceptional circumstances, physical constraints, non-availability of specified equipment etc. which may warrant exemptions from the CARs. However such deviation would be an exception and not the norm.”

1.11.4 As per CAR Section 1 Series B Part II, Para 3, Grant of Exemption under Rule 133A:

*“The DGCA after examining the application(s) for exemption(s) May exempt, **in writing**, the applicant from complying with specific provisions of the CAR and may impose conditions for such exemptions to ensure the safety and regularity of aircraft operation.”*

While investigating it was found that the verbal approval was taken from DGCA for not removing the CVR. M/s Vistara was not able to produce any evidence of exemption from CAR.

1.12 Wreckage and Impact Information

Nil

1.13 Medical and Pathological Information

Not applicable

1.14 Fire

Nil

1.15 Survival Aspects

Yes, no injuries.

1.16 Tests and Research

Nil

1.17 Organizational and management information

Airports Authority of India

Airports Authority of India (AAI) is a statutory body working under the Ministry of Civil Aviation, Government of India. AAI is responsible for creating, upgrading, maintaining and managing civil aviation infrastructure in India. It provides Communication Navigation Surveillance / Air Traffic Management (CNS/ATM) services over Indian airspace and adjoining oceanic areas.

Auto Track System has two modes in which recording can be replayed, they are Interactive and Non-Interactive mode. In Interactive mode certain specific jobs can be performed on recordings such as, information of bearing, estimated crossing time, distance between the aircraft etc. In this case the recordings could not be played in interactive mode due to system limitation. Thus, exact separation between the concerned aircraft could not be ascertained.

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 pilots. The training facility for the Airbus pilots is set up at Hyderabad while for the Boeing pilots is in Mumbai. Both training facilities are headed by the Executive Director. The Engineering training facility is established at Delhi and Mumbai.

Tata Singapore (Vistara)

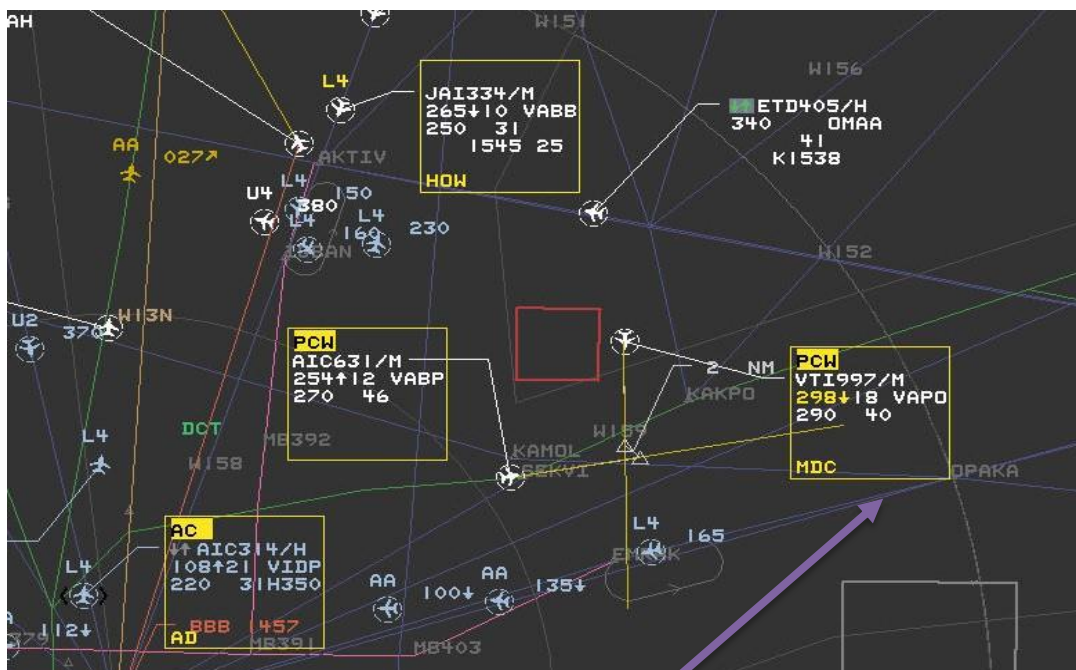
Tata SIA Airlines Limited, operating as Vistara, is an Indian scheduled operator. The carrier, a joint venture between Tata Sons and Singapore Airlines. They serves at several destinations with a fleet of Airbus A320 and Boeing 737-800NG aircraft.

1.18 Additional Information

1.18.1 INDRA System

The Indra Advance Air Control Automation System offers one of the most advanced automated air traffic control systems which meets International Civil Aviation Organization (ICAO) standards and recommended practices in air traffic management.

It has an inbuilt feature of change in color of level indicator if there is a mismatch of level assigned and the level updated by the crew in the system of aircraft. Whenever there is a mismatch of level selected by the pilot, then after passing 300 feet it will change its color from white (normal) to yellow color. It is the first indication to resolve the traffic conflict which appears on the radar screen.



Level mismatch shown by the system(it shall be white instead of yellow)

1.18.2 Training imparted to Controller

After the incident, an investigation team reached the site and after

preliminary investigation a preliminary report was issued on the basis of which DGCA suggested training syllabus to Airports Authority of India (AAI). AAI imparted all trainings and submitted the Action Taken Report to DGCA.

List of training imparted to Controller

- (a) One day classroom training on Radar Separation and its application, surveillance, identification of conflict, R/T techniques etc.
- (b) Five days training on simulator giving emphasis on Radar Separation and its application, surveillance, identification of conflict, R/T techniques etc.
- (c) Fifteen day On-job-training followed by assessment by rating board.

After completion of training the Controller was rostered back to resume his duties.

1.18.3 Training imparted to Pilot and Co-Pilot

A safety recommendation was issued to M/s Tata Singapore Airlines Ltd to impart training to the Pilot and Co-Pilot as per DGCA syllabus.

List of training imparted to Pilot and Co-Pilot

- (a) CRM Training for both Pilots
 - (i) Pilots to be given 1 day CRM consisting of pilot responsibilities.
 - (ii) Importance of CM1 remaining in the cockpit during critical phase of flight, especially when descent was already commenced.
 - (iii) TCAS management by manual flying and flying on autopilot.
 - (iv) Various non normal procedures involving TCAS and autopilot management.
- (b) Simulator Training (For Both Pilots) (2Hrs PF & 2Hrs PM)
 - (i) 4 hours training on the simulator involving TCAS and auto flight system
 - (ii) Cross-checking of cleared altitude by both the pilots
 - (iii) TCAS management by manual flying and flying on autopilot

(iv) Various non normal procedures involving TCAS and autopilot management.

(c) Route Checks (For Both Pilots)

SLF sectors and 2 Line checks by TRI.

DGCA also limited upgradation of PIC (for trainer status) for next 3 years.

After completion, Pilot and Co-Pilot were rostered back to Flight Duties.

Thus, the corrective training has been imparted to Controller and both Flight Crew from M/s Vistara as per the guidelines of DGCA on recommendations of preliminary report by AAIB.

1.18 **Useful or Effective Investigation Techniques:**

Nil

2.0 ANALYSIS

The Radar controller took over watch in Area Control Controller-North at 1430 UTC.

At time 14:39:09 UTC, VTI997 came in contact with Area Radar Controller and it was identified in north of SG reporting point at a flight level of FL360. VTI997 was instructed to proceed direct to PUNE via OZAR Airspace.

At time 14:54:45 UTC, AIC631 came in contact of Area Radar Controller. AIC631 was instructed to “Climb to FL270 via SEKVI-Q17 route to Bhopal”.

At 14:54:45 UTC, VTI997 requested for a descent. The Radar Controller gave “Descend to FL290” . The instruction was readback by VTI997. VTI997 reported the she is in positive contact with PUNE but the Radar Controller advised VTI997 to “Standby to Change over Due Traffic”. **This instruction was not acknowledged by VTI997.**

At 14:59, PCW was generated when VTI997 was passing FL298 in descending phase and AIC631 was passing FL254 in climbing phase. **Radar controller did not respond in time, when the PCW was generated.** Indication of wrong flight level feed in aircraft system was being indicated as the colour of the level entered in VTI997 was yellow in colour. Colour change from white to

yellow is a safety feature of the Automation System. This indication was neglected by the Radar Controller. As per the controller's statement, this feature was not taught to him or he doesn't remember. Later CCW alert came on Radar.



System showing Current conflict warning (CCW)

At 15:00:22 UTC, Radar controller instructed VTI997 as “ VTI997 stop descend and climb to level 280”. **This instruction was not read back by VTI997.** Again at 15:00:28 UTC, controller called VTI997 and this time VTI997 replied as “Go ahead Sir”. Controller asked him to “Climb to level 280”. At 15:00:34 UTC, Radar controller instructed AIC631 to “Stop climb”, this instruction was readback by AIC631.

At time 15:00:39 UTC, CCW was generated by Automation System. Both aircraft got TCAS RA and followed RA maneuvers . TCAS RA for VTI997 was active for 36 second with an instruction of “Descend” and then “Don't climb” instruction. TCAS RA for AIC631 was active for 34 sec with an instruction of “Climb” and then “Don't Climb” instruction. VTI997 and AIC631 reported clear of conflict at time 15:01:26 UTC.

The minimum lateral separation reported between the two aircraft was

approx. 2 NM while there was no vertical separation existed.

After clear of traffic, controller asked “VTI997 you have been given descend to FL290 only” but VTI997 replied as “Negative Sir you have given descend till FL280 Sir”. After that Radar controller gave instruction as “climb to FL280 now”, this was readback by the aircraft.

The crew of Vistara, VTI997 descended from FL290 to FL 270 without the authorization given by Radar Controller. Both crew had stated that they heard “Descend to FL270 and acknowledged FL270” in their statements. As per DFDR data, crew selected FL270 at first instance when descent was given.

As per the statements given by the Flight crew, at the time of serious incident the control and Communication were with P2 (PF and PM) and P1 was out of the cockpit. P1 handed over the controls to P2 who was pilot monitoring (PM), however, he was present in cockpit when the descent clearance was given and acknowledged by VTI997. This information is as per statements given by Flight crew. As per Vistara, the CVR was not downloaded and a verbal dispensation was sought for the same from DGCA and hence AAIB is not in a position to cross-check the statement with CVR.

It was observed that the flight crew failed to set the Navigation Display (ND) for the descent profile (which could have shown the traffic 1000 feet below VTI997) and continued to fly cruise profile (which shows traffic 2000 feet below and above VTI997).

It was observed in DFDR, that the vertical rate of descent of VTI997 was 1020/990/900 feet per minute till FL310 and thereafter 2070 feet per minute till FL300. Till FL290, it was 2750 feet per minute and 3300 feet per minute at FL285. Subsequently it reduced to 1200 feet at FL270.

2.1 Cause Leading to Incident

- (a) The controller took over the navigation of the aircraft by issuing direct routing.
- (b) Controller failed to identify the mismatch of the level assigned and level entered by the crew.

(c) Flight crew entered the wrong level and descended below the cleared level i.e. FL270, which was pre-assumed by the crew.

3.0 CONCLUSIONS

- (a) Controller failed to identify the traffic.
- (b) Controller failed to maintain proper surveillance of the conflicts in his jurisdiction.
- (c) Controller failed to acknowledge the PCW and CCW alerts in time.
- (d) Flight crew entered pre assumed level i.e. FL270.
- (e) Flight crew failed to monitor instructions communicated by controller.

4.0 RECOMMENDATIONS

- (a) Nil recommendations for Flight crew and Radar Controller, as the corrective training has already been imparted and the action taken report submitted to DGCA by their respective organisations.**
- (b) DGCA may not issue any verbal dispensation from Civil Aviation Requirement for the cases of Serious Incident or Accident.**
- (c) M/s Vistara may follow the CAR requirements and take approvals of dispensation from AAIB for serious Incident and Accident.**



KUNJ LATA
INVESTIGATOR-IN-CHARGE



DINESH KUMAR
INVESTIGATOR