



**FINAL INVESTIGATION REPORT ON NEAR GROUND COLLISION**  
**BETWEEN M/s INDIGO A 320 AIRCRAFT VT-IEM AND M/s JET AIRWAYS**  
**B737-800 AIRCRAFT VT-JFY AT DELHI**  
**ON 1<sup>st</sup> FEBRUARY 2017**

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**DIRECTORATE GENERAL OF CIVIL AVIATION**

OPPOSITE SAFDARJUNG AIRPORT, AUROBINDO MARG, NEW DELHI-110003

## **Foreword**

*In accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO) and Rule 03 of Aircraft (Investigation of Accidents and Incidents), Rules 2012, the sole objective of the investigation of an accident/incident shall be the prevention of accidents/incidents and not apportion blame or liability.*

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

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**FINAL REPORT ON NEAR GROUND COLLISION**  
**BETWEEN M/s INDIGO A320 AIRCRAFT VT-IEM AND M/s JET AIRWAYS**  
**B737-800 AIRCRAFT VT-JFYAT DELHI ON 1<sup>st</sup> FEBRUARY 2017**

1. Aircraft	
Type	: 1. A320 (M/s Indigo) 2. B737-800 (M/s Jet Airways)
Nationality	: INDIAN
Registration	: 1. VT-IEM (M/s Indigo) 2. VT-JFY (M/s Jet Airways)
2. Owner	: 1. GY Aviation Lease 101 Co. Ltd (M/s Indigo) 2. Fhada Aviation Ltd. (M/s Jet Airways)
3. Operator	: 1. M/s Indigo 2. M/s Jet Airways
4. Pilot – in –Command	: 1. Indigo - ALTP holder 2. Jet Airways –ATPL holder
Extent of injuries	: Nil
5. First Officer	: 1. Indigo – ALTP holder 2. Jet Airways - CPLholder
Extent of injuries	: Nil
6. Place of Occurrence	: IGI Airport, New Delhi
7. Date & Time of Incident	: 1 <sup>st</sup> February 2017; 00:26:01 UTC (Approx.)
8. Last point of Departure	: Delhi
9. Point of intended landing	: 1. Indigo - Vishakhapatnam 2. Jet Airways - Abu Dhabi
10. Type of operation	: Schedule Operation
11. Crew on Board	: 1. M/s Indigo (2 cockpit crew + 4 cabin crew)
Extent of injuries	: 2. M/s Jet Airways (2 cockpit crew + 5 cabin crew) : Nil
12. Passengers on Board	: 1. M/s Indigo-83 2. M/s Jet Airways-142
Extent of injuries	: Nil
13. Phase of operation	: During taxi
14. Type of incident	: Near Ground collision

(ALL TIMINGS IN THE REPORT ARE IN UTC)

## **SYNOPSIS:**

On 1<sup>st</sup> February, 2017, M/s Indigo Airbus A320 aircraft VT-IEM was scheduled to operate flight Delhi-Vishakhapatnam and Jet Airways Boeing B737-800 aircraft VT-JFY was scheduled to operate flight Delhi-Abu Dhabi.

The visibility was low during that time and accordingly Low Visibility Procedure (LVP) operations were in place at IGI Airport. At 00:24:34 UTC, M/s Indigo aircraft VT-IEM was given instruction to line-up Runway 28 and at 00:25:41 UTC, it was cleared for take-off Runway 28 by the Tower controller. However VT-IEM, instead of making a right turn for line up on Runway 28, crossed the runway and moved straight ahead towards taxiway 'W' where M/s Jet Airways aircraft VT-JFY was holding at holding point for Runway 28 on taxiway 'W'. The tower controller noticed the same on Advanced Surface Movement Guidance & Control System (ASMGCS) and instructed Indigo aircraft to stop immediately and hold position. The pilot immediately stopped the aircraft as advised by ATC. Subsequently VT-IEM was pushed back by tow truck and with the help of "Follow Me" vehicle of DIAL made to line-up on Runway 28. Indigo aircraft VT-IEM thereafter departed at 01:19:21UTC for Vishakhapatnam. During this time, the Jet Airways aircraft VT-JFY did not move from its assigned position. Runway 28 was closed for operations for approximately 53 minutes. There was no injury to any of the occupant on board the aircraft and there was no fire.

Director General of Civil Aviation ordered an enquiry under Rule 13(1) of the Aircraft (Investigation of Accidents and Incidents) Rule 2012 and appointed an Inquiry Officer to investigate into the cause of the incident.

## **1. FACTUAL INFORMATION**

### **1.1 History of the flight**

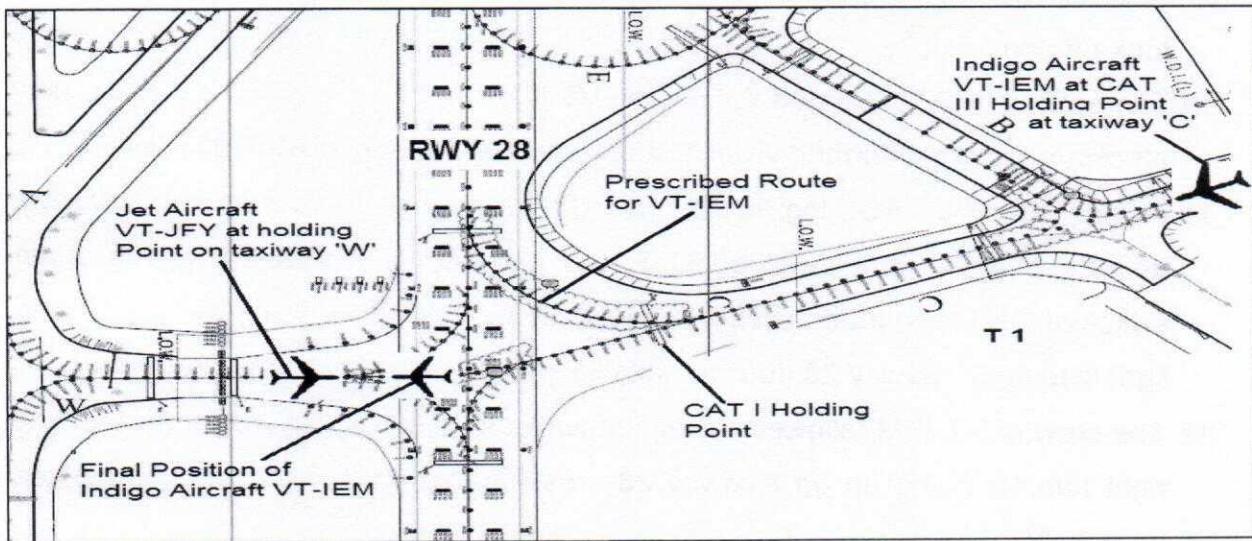
On 1<sup>st</sup> February, 2017, M/s Indigo Airbus A320 aircraft VT-IEM was scheduled to operate flight 6E719 sector Delhi-Vishakhapatnam under the command of a pilot an ATPL holder on type with a co-pilot also an ATPL holder on type. There were 89 persons on board the aircraft including 06 crew members.

M/s Jet Airways Boeing B737-800 aircraft VT-JFY was scheduled to operate flight 9W582 sector Delhi-Abu Dhabi under the command of a pilot an ATPL holder on type with a co-pilot a CPL holder on type. There were 149 persons on board the aircraft including 07 crew members.

The visibility reported during that time was 50 meters and low visibility procedure was in operations. The Indigo aircraft VT-IEM was parked on bay no. 27 and its scheduled departure time was 23:50:00 UTC. Due to low visibility, the ATC informed crew of VT-IEM to expect some delay and departure was revised to 00:20:00 UTC. Later taxi instructions were given to VT-IEM as "taxi via 'C' holding point runway 28". Two other Indigo aircraft with registration VT-IDX and VT-IDS were ahead of VT-IEM in sequence for take-off runway 28. Aircraft VT-IDS was holding at CAT-III holding point on taxiway 'C' and VT-IDX which was ahead of VT-IDS had taxied to taxiway 'B' from taxiway 'C' instead of lining up runway 28 via taxiway 'C' for take-off. Subsequently VT-IDX was made to line up on runway 28 via taxiway 'B' with the help of "Follow Me" vehicle of DIAL. After VT-IDX got airborne, ATC gave instructions to VT-IDS which was holding at CAT-III to line up runway 28 via taxiway 'C' and it got airborne uneventfully from runway 28.

At 00:22:43 UTC crew of VT-IEM requested ATC for CAT-III holding lights and the same was switched ON by ATC. At 00:22:49 UTC, ATC asked VT-IEM to confirm ready for departure to which VT-IEM replied AFFIRM. At 00:22:53 UTC, ATC instructed VT-IEM to move forward to CAT-I holding point to which crew of VT-IEM asked ATC to disregard the CAT-III stop bar lights. AT 00:23:36 UTC, ATC informed that stop bar light is OFF from their side and asked VT-IEM to confirm if it is still glowing to which VT-IEM replied that it is still glowing. At 00:23:43 UTC, crew of VT-IEM informed ATC that stop bar lights has gone OFF now. At 00:24:34 UTC, ATC asked VT-IEM to line up runway 28 and at 00:25:41UTC, ATC cleared VT-IEM for take-off runway 28. ATC informed visibility as 50

meters with winds 210°/03 knots and asked VT-IEM to report rolling. Thereafter, Tower Controller observed on Advanced Surface Movement Guidance & Control System (ASMGCS) that VT-IEM instead of making a right turn for line up-on Runway 28 crossed the runway and was moving towards taxiway 'W'. The Tower Controller immediately instructed VT-IEM to stop and hold position immediately. Thereafter, ATC informed VT-IEM that Jet Airways aircraft VT-JFY is ahead and again instructed VT-IEM to hold position to which VT-IEM confirmed holding position. Crew of VT-IEM asked ATC to confirm their position and they were informed that they are on taxiway 'W'. Crew of VT-IEM requested ATC to make a right turn which was denied by ATC and informed that they cannot move as Jet Airways aircraft VT-JFY is ahead. VT-IEM requested ATC for "Follow Me" vehicle of DIAL to guide them, to which ATC informed VT-IEM, that they require tow truck also. The ATC confirmed with VT-IEM, if they are able to see Jet Airways aircraft VT-JFY to which crew of VT-IEM said yes. The ATC then requested crew of VT-IEM if they will be able to tell their distance from Jet Airways aircraft VT-JFY to which VT-IEM replied that it should be atleast around 100 meters. At 00:54:10 UTC, follow me reached on taxiway 'W' holding point and VT-IEM was asked to switch off the engines. Thereafter VT-IEM was pushed back on runway 28 to line up facing west with the help of tow truck. At 01:19:16 UTC, ATC cleared VT-IEM for take-off and at 01:21:10 VT-JFY was cleared for take-off. Runway 28 remained blocked from 00:26:01 UTC to 01:19:21 UTC i.e. around 53 minutes. There was no injury to any of the occupant on board the aircraft and there was no fire.



Route followed by Indigo Aircraft VT-IEM

**1.2 Injuries to persons:**

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	Nil	Nil	Nil
SERIOUS	Nil	Nil	Nil
MINOR/NONE	02+04 (Indigo) 02+05 (Jet Airways)	83 (Indigo) 142 (Jet Airways)	Nil

**1.3 Damage to aircraft:** Nil

**1.4 Other damage:** Nil

**1.5 Personnel information:**

**1.5.1 Pilot – in – Command**

AGE : 39 years 04 months 26 days  
License : ATPL Holder  
Category : Aeroplane  
Class : Multi Engine  
Endorsements as PIC : Cessna-172, King Air C-90, Airbus A-320  
Date of Med. Exam. : 18/11/2016  
Med. Exam valid upto : 17/11/2017  
FRTO License valid upto : 23/02/2018  
Total flying experience : 6888:21 HRS  
Experience on type : 3986:25 HRS  
Experience as PIC on type : 1548:36 HRS  
Total flying experience during last 365 days : 678:55 HRS  
Total flying experience during last 180 days : 325:38 HRS  
Total flying experience during last 90 days : 174:34 HRS  
Total flying experience during last 30 days : 54:56 HRS  
Total flying experience during last 07 Days : 07:19 HRS  
Total flying experience during last 24 Hours : Nil

### **1.5.2 Co-Pilot**

AGE	:	29 years 10 months and 19 days
License	:	ATPL Holder
Category	:	Aeroplane
Class	:	Single engine and Multi engine
Endorsements as PIC	:	Cessna 172, Duchess 76
Date of Med. Exam	:	07/07/2016
Med. Exam valid upto	:	06/07/2017
FRTD License valid upto	:	27/12/2017
Total flying experience	:	2656:48
Experience on type	:	2253:11
Experience as PIC on type	:	Nil
Total flying experience during last 365 days	:	610:45 Hrs
Total flying experience during last 180 days	:	325:22 Hrs
Total flying experience during last 90 days	:	188:59 Hrs
Total flying experience during last 30 days	:	50:39 Hrs
Total flying experience during last 07 Days	:	15:28 Hrs
Total flying experience during last 24 Hours	:	Nil

The operating crew were not involved in any serious incident/ accident in past. The operating crew were current in all training and had adequate rest prior to roster for the incident flight.

### **1.5.3 ATC Controller: Tower Controller**

Following are the qualifications and training details :

#### **1. Tower Controller**

AGE: 41 years 11 months and 10 days

a) Double Banking start :

- i) ADC/SMC/ASMGCS: 30.01.2007
- ii) ACC: 01.01.2007
- iii) ADS/CPDLC : 04.07.2010
- iv) ARSR : 05.03.2017

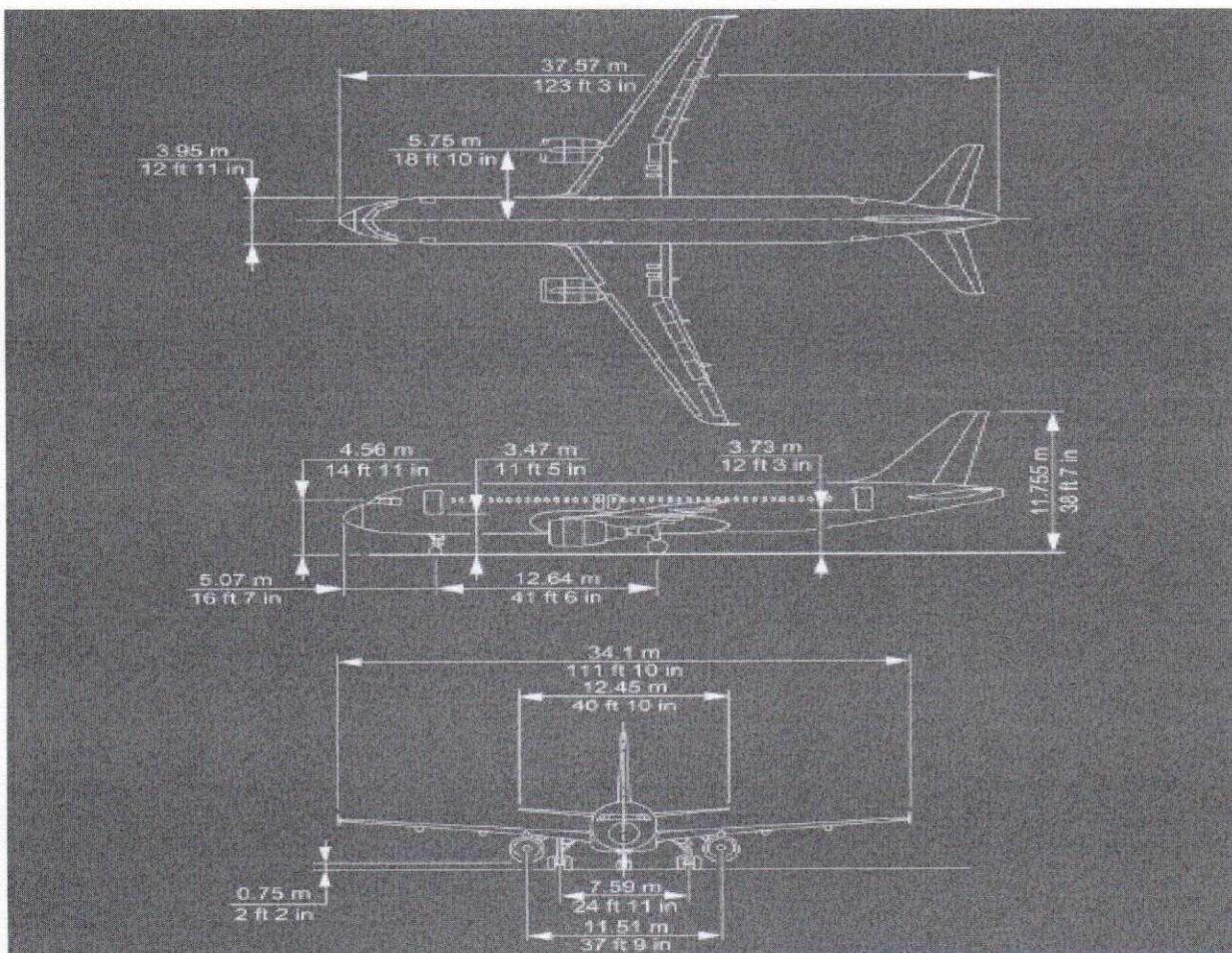
b) Date of Rating :

- i) ADC/SMC/ASMGCS : 23.01.2008
- ii) ACC : 30.12.2010
- iii) ADS/CPDLC : 29.07.2011

**1.6 Aircraft information:**

**1.16.1 Indigo Aircraft VT-IEM, Airbus A320**

The A320 is a subsonic, medium-range, civil transport aircraft. The aircraft has two high bypass turbofan engines manufactured by M/S International Aero Engines. The aircraft is designed for operation with two pilots and has passenger seating capacity of 180.



**Three Directional view diagram of A320**

The subject Airbus A320 aircraft VT-IEM (MSN 4947) had been manufactured in year 2012. The aircraft was registered with DGCA under the ownership of M/S GY AVIATION LEASE 101 COLIMITED, IRELAND. The aircraft is registered under Category 'A' and the Certificate of registration No. 4269.

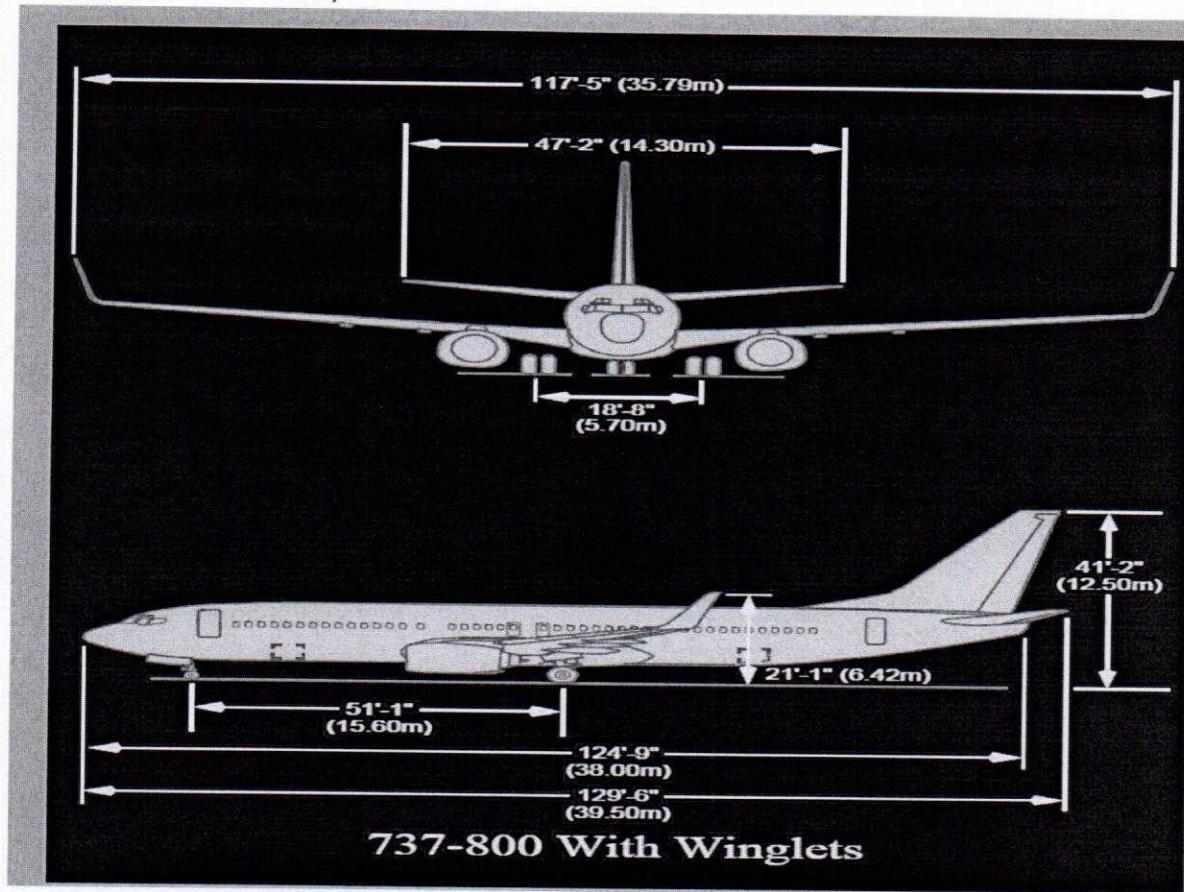
The Certificate of Airworthiness Number 6378 under "Normal category" subdivision Passenger was issued by DGCA on 07.02.2011. The specified minimum operating crew is two and the maximum all up weight is 77000 Kg. At the time of incident the Certificate of Airworthiness was valid. (C of A has lifetime validity and airworthiness review certificate was valid till 04.12.17).

The last major inspection 750 FH / 120 DAYS INSPECTION check carried out at 10516 cycles on 30<sup>th</sup> January 2017. Subsequently all lower inspections (Prefight checks, Service Checks, Weekly Checks) were carried out as and when due before the incident.

Prior to the incident flight the weight and balance of the aircraft was well within the operating limits. There was no defect reported on the aircraft on the previous flight.

### **1.16.2 Jet Airways Aircraft VT-JFY, Boeing B737-700**

The Boeing B737-800 is a short- medium range civil transport aircraft which is equipped with two dual-rotor, axial flow turbofan model CFM56-7B26 engines manufactured by CFM (CFM International).



Two Directional View diagram of B737 800

B787-8 aircraft, VT-JFY, S/No. 42804 was manufactured in 2014. The aircraft is owned by FHADA Aviation Ltd and operated by Jet Airways (India) Ltd. Certificate of Registration No.4250, under 'A' Category with sub categories Passenger/Goods/Mail issued in the name of owner FHADA Aviation Ltd and operated by Jet Airways (India) Ltd. on 15.09.2014. The Certificate of Airworthiness Number 6630 under "Normal" category subdivision "Passenger/Goods/Mail" for day and night operation under VFR & IFR was issued by DGCA on 10.09.2014. At the time of incident the Certificate of Airworthiness was valid. (C of A has lifetime validity. The airworthiness review certificate was valid till 15.09.2017).

#### **1.7 Meteorological information:**

Time (UTC)	Visibility (m)	RVR-RWY 28 (m)	Wind	Temp. (°C)
00:00:00	50	150/125/125	Calm	11
00:30:00	50	175/150/150	Calm	11
01:00:00	Below 50	150/150/150	190/05	11

#### **1.8 Aids to navigation:**

At IGI airport, the VOR/DME, ILS landing facility and PAPI are available on either side of all the three runways.

#### **1.9 Communications:**

There was always two way communications between the ATC and both aircraft. The communication between tower control and aircraft was carried out on 118.1 MHZ.

#### **The ATC tape transcript of frequency 118.1 MHz from 00:20:53 UTC to 00:30:13**

TIME (UTC) HHMMSS	UNIT	TRANSMISSION
002053	JAI582	TOWER JAI582 HOLDING POINT W FOR RUNWAY 28
002113	JAI582	SIR JAI582 HOLDING AT HOLDING POINT W FOR RUNWAY 28
002119	TOWER	JAI582 ROGER
002243	IGO719	TOWER IGO719 CAN YOU GIVE US CAT-III HOLDING LIGHTS OKAY THANK YOU SIR
002249	TOWER	IGO719 CONFIRM READY FOR DEPARTURE
002252	IGO719	AFFIRM SIR
002253	TOWER	ROGER YOU CAN MOVE FORWARD TO CAT-I HOLDING POINT
002257	IGO719	MOVE FORWARD TO CAT-I HOLDING POINT IGO719

002329	IGO719	CONFIRM DISREGARD THE CAT-III STOP BAR LIGHTS IGO719
002336	TOWER	IGO719 STOP BAR IS OFF FROM TOWER SIDE CONFIRM STILL GLOWING
002340	IGO719	IT'S STILL ON SIR IGO719
002342	TOWER	ROGER
002343	IGO719	NOW IT'S OFF
002434	TOWER	IGO719 TOWER LINE-UP RUNWAY 28
002437	IGO719	LINE-UP RUNWAY 28 IGO719
002541	TOWER	IGO719 TOWER RUNWAY 28 CLEARED FOR TAKE OFF WIND 210°/03 KNOTS REPORT ROLLING
002548	IGO719	CLEARED FOR TAKE OFF RUNWAY 28 WILL CALL YOU ROLLING
002601	TOWER	IGO719 HOLD POSITION
002604	IGO719	HOLD POSITION IGO719
002606	TOWER	JAI582 AIRCRAFT IS AHEAD OF YOU IS A320 HOLD POSITION
002611	JAI582	ROGER THAT WE ARE HOLDING POSITION JAI582
002614	TOWER	IGO719
002615	IGO719	GO AHEAD SIR
002617	TOWER	HOLD AT PRESENT POSITION JET AIRWAYS B738 IS AHEAD OF YOU
002623	IGO719	COPIED SIR IGO719 HOLDING POSITION
002732	IGO719	AND CONFIRM OUR POSITION AS OF NOW SIR IGO719
002736	TOWER	IGO719 YOU ARE ON TAXIWAY W
002740	IGO719	ROGER THAT SIR
002744	IGO719	CAN WE MAKE A RIGHT TURN
002746	TOWER	UNABLE YOU CANNOT TAKE A RIGHT TURN
002755	TOWER	IGO719 EVEN YOU CAN NOT MOVE A LITTLE BIT AHEAD DUE AIRCRAFT JET AIRWAYS B738 IS HOLDING
002803	IGO719	ROGER SIR WE ARE JUST HOLDING POSITION
003005	IGO719	TOWER CONFIRM FOLLOW ME CAN GUIDE US. IS IT ON THE WAY?
003010	TOWER	NEGATIVE TOW TRUCK ALSO REQUIRED.
003013	IGO719	ROGER SIR

### **1.10 Aerodrome information:**

The following are the relevant details of the IGI airport New Delhi

Co-ordinates

ARP: N 28° 34' 07"

E 077° 06' 44"

Elevation: 778' Ft.

Indira Gandhi International Airport (IATA code: DEL, ICAO code: VIDP) is operated by Delhi International Airport Private Limited (DIAL). The ATC is controlled by Airports Authority of India (AAI).

Delhi Airport has three runways. The details are as follows:

Runway	Dimension (in meters)	Landing Category (ILS)
11/29	4430 X 60	ILS CAT III B (both side)
10/28	3810X 45	RWY 28-ILS CAT III B RWY 10-ILS CAT I
09/27	2813 X 45	ILS CAT I (both side)

The fire fighting services available is CAT – 10. The meteorological services are available round the clock. Trend forecast and briefing is available. Flight documentation is provided in Chart and Tabular form in English language.

#### **1.11 Flight recorders:**

The relevant portion of Cockpit Voice Recorder (CVR) data was not available and the Digital Flight Data Recorder (DFDR) data was downloaded for investigation.

**CVR:** Make: HONEYWELL INTERNATIONAL INC, Part No. 980-6022-001, S/N: CVR-120-15744

**DFDR:** Make: HONEYWELL INTERNATIONAL INC, Part No. 980-4700-042, S/N: SSFDR-18967

Relevant DFDR data was analysed and there were no abnormalities observed. The maximum taxiing speed of VT-IEM was 9 kts.

#### **1.12 Wreckage and impact information:**

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

#### **1.13 Medical and pathological Information:**

Both the cockpit crew and all cabin crew of M/s Indigo had undergone Breath analyser check during the pre-flight medical check prior to the flight at Delhi and were not found under the influence of alcohol.

#### **1.14 Fire:**

There was no fire.

### **1.15 Survival aspects:**

The incident was survivable.

### **1.16 Tests and research:** Nil

### **1.17 Organizational and management information:**

#### **1.17.1 Indigo**

M/s Indigo is a Scheduled Airline having DGCA SOP No. S-19 in category passenger & cargo and the subject aircraft was endorsed on the permit. The operator has got a fleet of 65 Airbus A-320 aircraft (as on date of incident). It operates flights on domestic and international sectors. The operator main base is located at Delhi.

The Company is headed by CEO assisted by a team of professionals heading each department. The flight operation is headed by V.P. Flight Ops who holds current license on Airbus A-320. The Flight Safety Department is headed by the Chief of Flight Safety who is a pilot with a current license of Airbus A-320. The Chief of flight Safety reports directly to CEO.

The operator has a training centre, where all ground training is conducted by DGCA approved ground instructors. It also utilizes the CAE Simulator facilities at Bengaluru, Dubai, Madrid and FSTC at Gurgaon. The Chief Pilot (Standards and QA) functions under the authority of the Director (Flight Operations). The chief Pilot is responsible for Flight Crew Standards and Quality Assurance of Flight Crew Training. The operator has their own in-house maintenance facility and the maintenance is carried out under CAR 145 issued by DGCA.

#### **1.17.2 Jet Airways**

M/s Jet Airways (India) Ltd. is a Scheduled Airline having DGCA SOP No. S-6A in Category Passenger and Cargo. The Airline main base is located at Mumbai. The Air operator permit of the Airline is valid till 12/02/2018. The airline commenced its operations on 5th May 1993.

The Company is headed by CEO assisted by a leadership 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 a Senior Vice President in the company who reports directly to the Chairman.

The airlines operates a fleet of aircraft, which includes 04 Boeing 777-300 ER aircraft, 08 Airbus A330-200 aircraft, 68 next generation Boeing 737-700/800/900 aircraft and 18 ATR 72-212A turboprop aircraft. M/s Jet Airways operates 68 destinations (47 Domestic + 21 international).

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

#### **1.17.3 Airports Authority of India (AAI)**

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 Delhi Aerodrome are provided by AAI which includes Aerodrome Control Tower.

#### **1.17.4 Delhi International Airport Ltd.**

Delhi International Airport (P) Limited (DIAL) is a joint venture, formed as a consortium between GMR Group, Airports Authority of India, Fraport AG and Eraman Malaysia. GMR is the lead member of the consortium, Fraport AG is the airport operator and Eraman Malaysia is the retail advisor.

The concession to operate, manage and develop the IGI Airport was awarded to the consortium in January 2006, following an International competitive bidding process. DIAL entered into Operations, Management and Development Agreement (OMDA) on April 4, 2006 with the AAI. The initial term of the concession is for 30 years extendable for another 30 years.

## **1.18 Additional information:**

### **1.18.1 Low Visibility Procedure (LVP)**

Low Visibility Procedures (LVP) are the actions to ensure the safe and efficient operations of aircraft and vehicles during period of reduced visibility. LVP shall only be implemented when Safeguarding Procedures (SP) has been completed for low visibility operations.

SP includes inspection of aeronautical ground lighting system, termination of all work in progress and removal of all equipment/material from localizer and glide path sensitive area and the manoeuvring area, restrictions on movement of vehicles on the manoeuvring area and aprons.

SP shall be initiated when the RVR is less than 1200 m or visibility is forecast to deteriorate to 800 m or less. LVP procedure shall be implemented when RVR is less than 800 m or less and appropriate CAT operations to be selected as given below:

- CAT II Operations: Runway visual range (RVR) not less than 300m.
- CAT IIIA Operations: Runway visual range (RVR) not less than 175m.
- CAT IIIB Operations: Runway visual range (RVR) less than 175m but not less than 50m.

As per AAI AIP supplement 43/2012 dated 19/11/2012, during low visibility the taxing aircraft should be routed in accordance with the prescribed Low Visibility Routes to ensure a simple one-way traffic flow is maintained, however it may be necessary for operational reason to sometimes route aircraft via alternative taxiways. Aircraft shall not be permitted to enter the runway at any point other than taxiway 'C' and 'P' for departure from runway 28.

As per AAI AIP supplement 43/2012 dated 19/11/2012, it is the responsibility of tower supervisor to check lighting is correctly selected and operating properly on the commencement of LVP.

As per Aerodrome Manual, the appropriate aeronautical ground lights must have been inspected during the hour preceding implementation of LVP, and thereafter every subsequent two hour period. These lighting inspections should be accorded priority and, if necessary, aircraft operations may have to be delayed.

### **1.18.2 Aerodrome Ground Lighting (AGL) System at IGI Airport**

IGI Airport is equipped with AGL system. Taxiway C, B and W is equipped with the following AGL facility:

1. Taxiway centre line lights.
2. CAT-III Stop bar lights at taxiway C installed at 315 meters from runway 28 centreline.
3. Stop bar lights at taxiway W installed at 107.5 meters from runway 28 centreline.
4. There is a specific soft button in controller screen for operating stop bar lights.
5. Runway crossing lights between taxiway C & W.
6. There is a specific soft button in controller screen for operating runway crossing light between taxiway C & W.
7. Taxiway edge lights on curve.
8. Runway guard light.

Taxiway centre lights are green in colour and runway crossing lights as well as curve lights leading from taxiway to the runway centre line are alternate green and yellow.

There is a separate control available in tower screen for controlling runway crossing lights. Whenever runway crossing lights are switched ON, the curve lights for lining on runway for departure is automatically switched OFF through available interlock.

#### ***Switching of lightings Systems during transition between different categories***

- **Runway Lighting System**

After changing the category (CAT I/II/III) the runway lighting systems will go in to their default status. Then the ATC controller can adjust status (on/off) and intensities as required.

- **Runway Stop bar lights**

All runway stop bars will remain switch on irrespective of any weather conditions. It is the responsibility of ATC controller to control stop bars as required. The intensity can be

adjusted by ATC controller. The stop bars can be operated by pressing on each button individually to turn ON and turn OFF. Once stop bars will be turned OFF, after 90 seconds, stop bars will turn ON automatically. When stop bars lights are switched ON, Lead-On light will get automatically OFF and vice-versa.

- **Taxiway centre line lights**

To switch all taxiway centrelines including runway crossing lights on or off in common, two buttons "All on" and "All Off" are provided.

- **Taxiway C-B Right Crossing**

Taxiway 'B' right and taxiway 'C' straight crossing are interlocked with each other. When 'B' right curve is ON, 'C' straight crossing shall be turned off and vice-versa.

- **Taxiway C-W Crossing**

Taxiway 'C' & taxiway 'W' crossing are interlocked with each other. If any crossing is switch ON or OFF, other crossing shall be switch ON or OFF automatically. Separate control is available in tower screen for controlling runway crossing lights. Whenever runway crossing lights are switched ON, curve lights for lining up on runway for departure is automatically switched OFF through available interlock.

- **Intensity Selection**

The intensity selection "+" and "-" are available in the controller panel and can be used to adjust the intensity level of each system individually. It is possible to switch off a system by pressing the "-" button until a "0" appears.

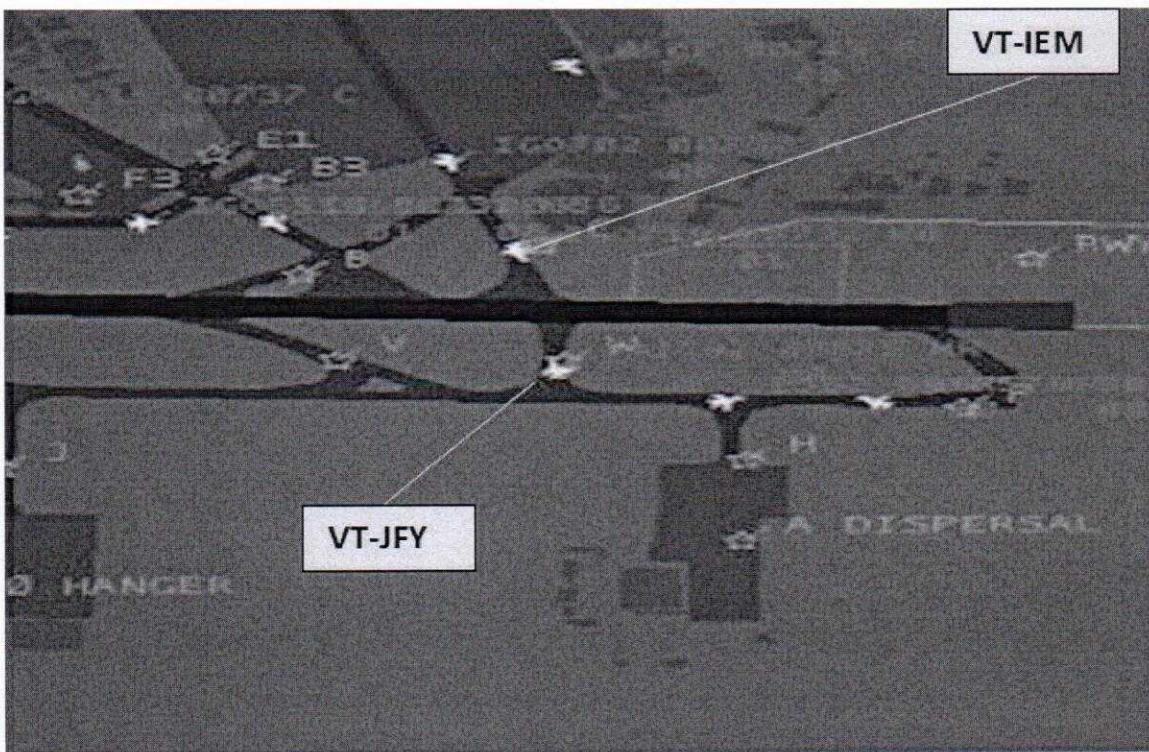
### **1.18.3 DGCA Inspection report for operations CAT II/III aeronautical ground lights**

On 08/02/2017, an inspection to review the CAT II/III operations and associated infrastructure at IGI Airport, New Delhi was carried out by Aerodrome Standard Directorate, O/o DGCA. Some salient observations relevant to this incident are mentioned below:

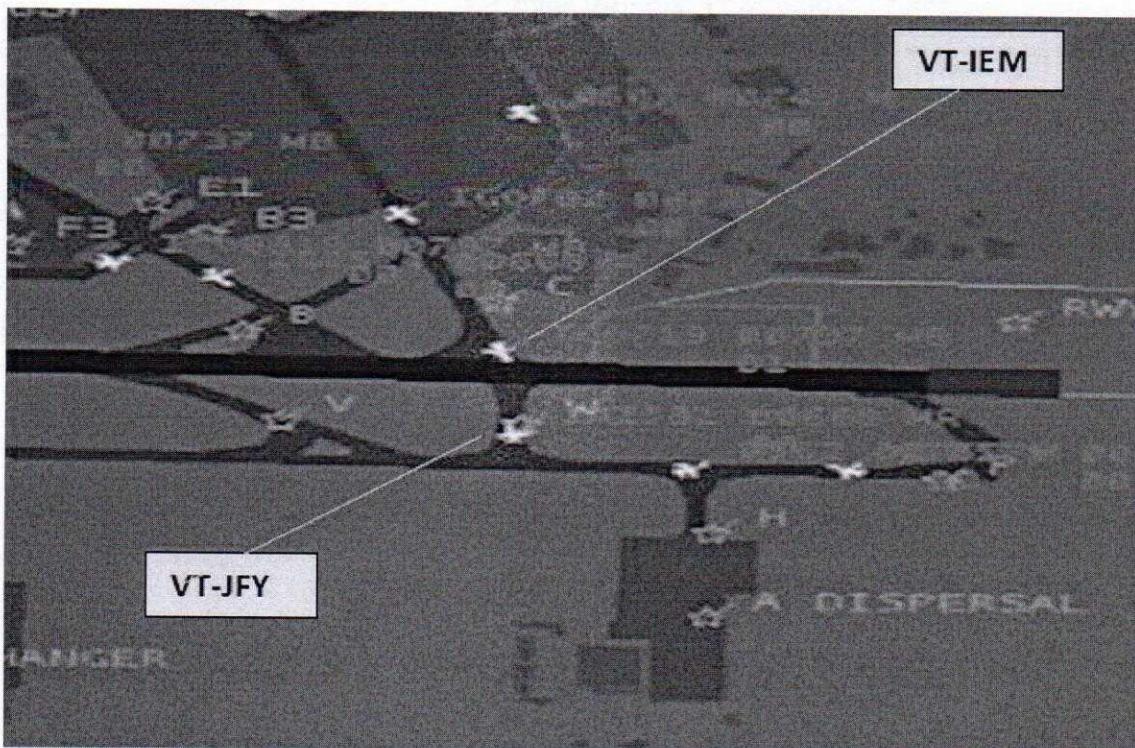
- As per ATC log dated 28/01/2017, while LVP was in force, the stop bars were not working in CAT-III mode selection and same was informed to AOCC, DIAL. Honeywell representative advised ATC to select CAT-I mode to operate stop bars. Therefore AGL system continued to operate in CAT-I mode even in LVP conditions till 01/02/2017.
- As per Aerodrome Manual, the lights should be inspected before initiation of LVP and there after every 2 hours; even at the cost of delaying the aircraft; however M/s DIAL is not carrying out such inspection during LVP, inspections are carried out only after termination of LVP.
- Few lights of C-W crossing runway 28 circuit found to be glowing even when they were switched OFF.

#### **1.18.4 Zoomed Radar picture of Indigo Aircraft VT-IEM and Jet Airways Aircraft VT-JFY as displayed in front of controller**

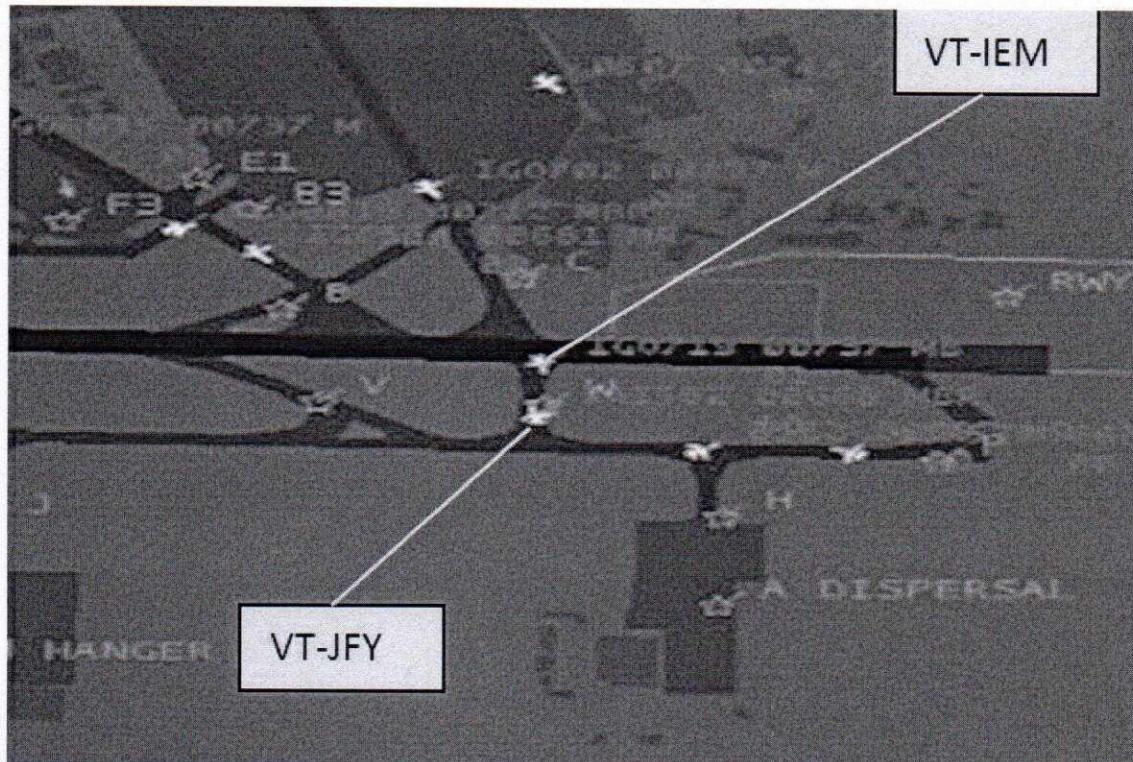
- At Time 00:25:17 UTC, Indigo Aircraft VT-IEM approaching runway 28 via taxiway 'C' and Jet Airways Aircraft VT-JFY holding at taxiway 'W' holding point.



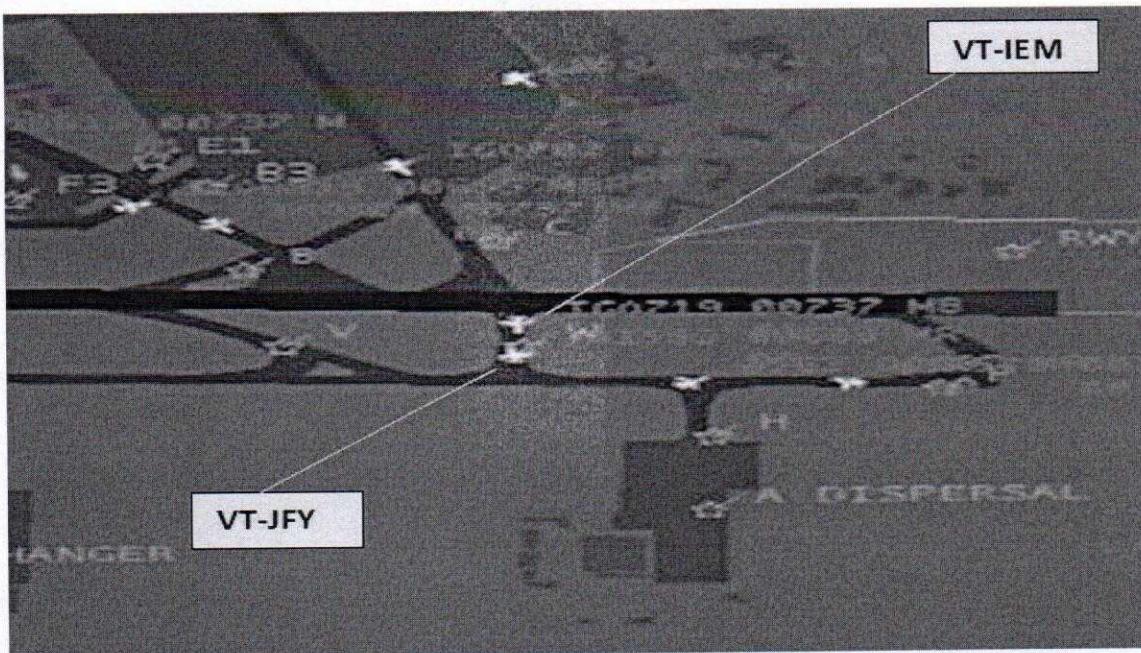
- At Time 00:25:39 UTC, Indigo Aircraft VT-IEM entering runway 28 via taxiway 'C' and Jet Airways Aircraft VT-JFY holding at taxiway 'W' holding point.



- At Time 00:25:56 UTC, Indigo Aircraft VT-IEM crossing runway 28 and Jet Airways Aircraft VT-JFY holding at taxiway 'W' holding point.



- At Time 00:26:09 UTC, final position of Indigo Aircraft VT-IEM and Jet Airways Aircraft VT-JFY holding at taxiway 'W' holding point.



#### **1.19 Useful and Effective Techniques:** Nil

## **2. ANALYSIS**

### **2.1 Serviceability of Aircraft**

At the time of incident the Certificate of Airworthiness was valid.

The aircraft and its Engines are being maintained as per the maintenance program consisting of calendar period/ flying Hours or Cycles based maintenance as per maintenance program approved by Regional Airworthiness office, Delhi. Accordingly, lower inspections (Pre-flight checks, Service Checks, Weekly Checks) were carried out as and when due before the incident.

There was no defect on the aircraft prior to the flight. There was no defect recorded on the steering and movability of the aircraft.

In view of the above, it is inferred that the serviceability of the aircraft is not a factor to the incident.

## **2.2 Weather**

At IGI Airport, New Delhi; the LVP were in force and the scheduled departure time of the Indigo aircraft VT-IEM was revised from 23:50:00 UTC to 00:20:00 UTC due low visibility. At time 00:00:00 UTC, visibility was 50m with RVR RWY 28 as 150m/125m/125m. At time of Incident, the visibility was 50m with RVR RWY 28 as 175m/150m/150m and winds calm. The weather was deteriorating further. In the prevailing weather condition the movement of the aircraft was entirely dependent upon the lead in lights available on the taxiways as no external visual references were available to the crew. In the absence of external references, crew followed the incorrect lights which lead to the incident.

Therefore, weather is a contributory factor to the incident.

## **2.3 Operational Factors**

### **2.3.1 Pilot Factor**

Both the Indigo pilots have operated from RWY 28 earlier and were authorized for low visibility operations. Pilots were cautious as they were aware that another Indigo aircraft VT-IDX operating flight 6E765 which was ahead of them in sequence for take-off RWY 28 had inadvertently taxied towards taxiway 'B' instead of lining up Runway 28 via 'C'. When taxing instructions were given to the crew of VT-IEM to line up on runway 28 via taxiway 'C', they asked ATC to disregard CAT-III holding point stop bar lights. In absence of external visual reference due to low visibility, pilots were following the lead in lights on taxiway 'C' and did not realise that they have actually crossed the runway 28 and heading towards taxiway 'W' where the Jet Airways aircraft VT-JFY was holding at holding point. They stopped the aircraft only after getting instructions from ATC. During this period no attempt was made by the pilots to confirm their position or ask for follow me assistance till the time ATC asked them to stop and hold position. The taxing speed of VT-IEM was within the prescribed limit of 10 kts (for low visibility operations).

Further, the other pilots who operated from runway 28 via taxiway 'C' just before the incident did not inform about the misleading lighting configuration to ATC. A feedback from those pilots may have alerted the controller and incident could have been averted by taking corrective measures.

### **2.3.2 ATC**

At the time of incident the visibility was 50 meters and low visibility procedures were in force. AGL system was on CAT-I mode since 28/01/2017 till the time of incident however LVP were enforced 4 to 5 times between this period but during all these occasions AGL system was not selected to CAT-III mode by the ATC. As per ATC log dated 28/01/2017, while LVP was in force, the tower controller was not able to control the stop bars in CAT-III AGL selection RWY 28 and same was informed to AOCC, DIAL. Honeywell representative advised ATC to select CAT-I mode to operate stop bars. Therefore AGL was selected in CAT-I mode and manually all the CAT-III lights were turned ON. LVP was initiated at 18:48:00 UTC on 01/02/2018. At that time; all lights including taxiway 'C' to 'W' runway crossing light were ON. As per Honeywell AGL log; at 23:21:27 UTC, the runway crossing light between taxiway C & W were switched OFF and just after two seconds it was again switched ON which automatically resulted in switching OFF the taxiway 'C' curve light leading to runway 28 due to available interlock between these lights. At 00:25:41 UTC, VT-IEM was cleared for take-off Runway 28 by the Tower controller. Tower controller observed on ASMGCS that Indigo aircraft VT-IEM is crossing the runway and moving towards taxiway 'W', immediately instructed Indigo aircraft to stop and hold position. Runway crossing light between 'C' and 'W' was switched OFF at 11:53:42 UTC.

Neither ATCO nor tower supervisor/watch supervisor could notice that taxiway 'C' to 'W' runway crossing light was ON for a longer period.

As per AAI AIP supplement 43/2012 dated 19/11/2012, it is the responsibility of tower supervisor to check lighting is correctly selected and operating properly on the commencement of LVP. However it appears that tower supervisor did not notice that taxiway 'C' to 'W' crossing light was ON at that time.

In view of the above, it appears that there was lack of training of AGL system to the ATCO and tower supervisor.

As per AAI AIP supplement 43/2012 dated 19/11/2012,during LVP the aircraft shall not be permitted to enter the runway at any point other than taxiway 'C' and 'P' for departure from runway 28. However VT-JFY was given taxi instruction from taxiway 'W' to line up runway 28 by the ATC.

### **2.3.3 DIAL**

As per ATC log dated 28/01/2017, while LVP was in force, the tower controller was not able to control the stop bars in CAT-III AGL selection RWY 28 and same was informed to AOCC, DIAL. Honeywell representative advised ATC to select CAT-I mode to operate stop bars. Therefore AGL was selected in CAT-I mode and manually all the CAT-III lights were turned ON.

As per AAI AIP supplement 43/2012 dated 19/11/2012, the lights should be inspected before initiation of LVP and there after every 2 hours; even at the cost of delaying the aircraft; however on the day of incident M/s DIAL did not carry out any follow up inspection after the initiation of LVP.

During the inspection conducted by DGCA after the incident, few lights of C-W crossing runway 28 circuit found to be glowing even when they were switched off.

AGL CMS monitoring team failed to notice that the taxiway 'C' to 'W' runway crossing light was ON for a longer period.

### **2.4 Circumstances leading to the incident**

Take-off clearance was given to VT-IEM from Runway 28, during that time LVP operations were in force and the visibility was 50m with RVR RWY 28 as 175m/150m/150m. In the prevailing weather condition the movement of the aircraft was entirely dependent upon the available lead in lights as no external visual references were available. The runway crossing lights between taxiway 'C' and 'W' were switched ON inadvertently by the tower controller which automatically turned OFF the taxiway 'C' curve light leading to runway 28 centre line due to available interlock between these lights. The crew followed the lights available to them which led to the incident.

## **3 CONCLUSIONS:**

### **3.1 Findings**

1. The Aircraft had valid Certificate of Airworthiness and Certificate of flight release at the time of incident.

2. The pilots were having valid license and were qualified on type.
3. On the day of incident, during that time LVP was in operation at IGI Airport. (LVP was initiated at 18:48:00 UTC). Visibility at that time was 50 meters and RVR RWY 28 was 175m/150m/150m.
4. Due to low visibility, departure of VT-IEM was delayed by 30 minutes by ATC. The revised departure time was 00:20:00 UTC.
5. Jet Airways aircraft VT-JFY was holding at holding point on taxiway 'W' for runway 28.
6. The ATC gave instructions to aircraft VT-IEM to "taxi via 'C' holding point runway 28".
7. Two other Indigo aircraft with registration VT-IDX and VT-IDS were ahead of VT-IEM in sequence for take-off runway 28 via taxiway 'C'.
8. The aircraft VT-IDX which was ahead of VT-IDS had inadvertently taxied to taxiway 'B' from taxiway 'C' instead of lining up runway 28 via taxiway 'C' for take-off. Subsequently VT-IDX was made to line up on runway 28 via taxiway 'B' with the help of "Follow Me" vehicle of DIAL.
9. After VT-IDX took-off, the aircraft VT-IDS lined up runway 28 via taxiway 'C' and took-off uneventfully.
10. Thereafter, the ATC cleared the aircraft VT-IEM for line up runway 28, gave take-off clearance and informed visibility as 50 meters with winds 210° /03 knots.
11. As per Honeywell AGL log; at 23:21:27 UTC, the runway crossing light between taxiway C & W were switched OFF and just after two seconds it was again switched ON which automatically resulted in switching OFF the taxiway 'C' curve light leading to runway 28 due to available interlock between these lights.
12. The crew of VT-IEM followed the lights available to them and instead of taking a right turn for lining up on Runway 28 crossed the runway and moved towards taxiway 'W'.
13. The Tower Controller observed this on ASMGCS and immediately instructed VT-IEM to stop and hold position immediately to which the crew of VT-IEM complied.
14. During this time, the Jet Airways aircraft VT-JFY did not move from its assigned position.
15. The aircraft VT-IEM was then pushed back by tow truck and with the help of "Follow Me" made to line-up on Runway 28. Thereafter the aircraft took-off.

16. The runway 28 remained blocked from 0026 UTC to 0119 UTC i.e. for around 53 minutes.
17. Neither ATCO nor tower supervisor/watch supervisor could notice that the C-W runway crossing light was ON for a longer period.
18. AGL CMS monitoring team failed to notice that the taxiway 'C' to 'W' runway crossing light was ON for a longer period.
19. Runway crossing light between C and W was switched OFF at 11:53:42 UTC on 01/02/2017.
20. AGL system was on CAT-I mode since 28/01/2017 till the time of incident however LVP were enforced 4 to 5 times between this period, but during all these occasions AGL system was not selected to CAT-III mode by the ATC.
21. As per ATC log dated 28/01/2017, while LVP was in force, the tower controller was not able to control the stop bars in CAT-III AGL selection RWY 28. Honeywell representative advised ATC to select CAT-I mode to operate stop bars. Therefore AGL was selected in CAT-I mode and manually all the CAT-III lights was turned ON.
22. As per AAI AIP supplement 43/2012 dated 19/11/2012, the lights should be inspected before initiation of LVP and there after every 2 hours; even at the cost of delaying the aircraft; however on the day of incident M/s DIAL did not carry out any follow up inspection after the initiation of LVP.
23. On 31/01/2017, the runway 10/28 was taken over by DIAL for maintenance at 18:40:00 UTC and it was handed back for operations at 21:20:00 UTC. During that time circuits were in local control of DIAL maintenance team and handed back to ATC after maintenance was completed.
24. As per AAI AIP supplement 43/2012 dated 19/11/2012, during low visibility for departure from runway 28 from Terminal 1 taxiway 'C' and from Terminal 2 & 3 taxiway 'P' should be used. While VT-JFY was given taxi instruction from taxiway 'W' to line up runway 28.
25. As per AAI AIP supplement 43/2012 dated 19/11/2012, it is the responsibility of tower supervisor to check lighting is correctly selected and operating properly on the commencement of LVP. However it appears that tower supervisor did not notice that taxiway 'C' to 'W' crossing light was ON at that time

26. The other pilots who operated from runway 28 via taxiway 'C' just before the incident did not inform about the misleading lighting configuration to ATC. A feedback from those pilots may have alerted the controller and incident could have been averted by taking corrective measure.

### **3.2 Probable cause of Incident**

Under LVP conditions, the runway crossing lights from taxiway 'C' to 'W' were switched ON inadvertently by the tower controller which automatically switched OFF the taxiway 'C' curve light leading to runway 28 that led to the incident.

#### Contributory factors

- Absence of external visual reference due low visibility.
- Non-adherence to standard procedure of checking the correct selection of lights on the commencement of LVP by ATC.
- Lack of supervision by AGL CMS monitoring team of DIAL.
- Non-adherence to standard procedure of follow up inspection after the initiation of LVP by DIAL.

### **4. SAFETY RECOMMENDATIONS**

1. DGCA may advice DIAL and ATC for exploring the possibilities for keeping runway crossing lights energised only for a period (just sufficient for an aircraft to cross the runway) after switching it ON thereafter it should go OFF automatically.
2. AAI should conduct appropriate AGL refresher course for all ATCOs.
3. DIAL should develop a robust monitoring of AGL infrastructure and facilities for LVP operations.



(Akhil Shukla)  
Air Safety Officer  
Inquiry Officer, VT-IEM

Date: 28.05.2019

Place: New Delhi