



**FINAL REPORT ON ACCIDENT TO DIAMOND DA – 40
AIRCRAFT VT-FGE OF IGRUA NEAR VILLAGE
SITADONGRI, CHINDWARA DISTRICT,
MADHYA PRADESH ON 24.12.2013**

(A. X. Joseph)
Deputy Director of Air Safety
Chairman Committee of Inquiry - VT-FGE

Capt. Sandeep Patil
Member
Committee of Inquiry - VT-FGE

Foreword

This document has been prepared based upon the evidences collected during the investigation, opinion obtained from the experts and laboratory examination of various components. The investigation has been carried out in accordance with Annex 13 to the convention on International Civil Aviation and under the Rule 11 of Aircraft (Investigation of Accidents and Incidents), Rules 2012 of India. The investigation is conducted not to apportion blame or to assess individual or collective responsibility. The sole objective is to draw lessons from this accident which may help to prevent such future accidents or incidents.

INDEX

<u>CONTENTS</u>		<u>PAGE No.</u>
	SYNOPSIS	2
1	FACTUAL INFORMATION	3
1.1	HISTORY OF THE FLIGHT	3
1.2	INJURIES TO PERSONS	6
1.3	DAMAGE TO AIRCRAFT	6
1.4	OTHER DAMAGE	6
1.5	PERSONNEL INFORMATION	7
1.6	AIRCRAFT INFORMATION	8
1.7	METEOROLOGICAL INFORMATION	10
1.8	AIDS TO NAVIGATION	10
1.9	COMMUNICATIONS	10
1.10	AERODROME INFORMATION	10
1.11	FLIGHT RECORDERS	12
1.12	WRECKAGE AND IMPACT INFORMATION	12
1.13	MEDICAL AND PATHOLOGICAL INFORMATION	15
1.14	FIRE	15
1.15	SURVIVAL ASPECTS	16
1.16	TESTS AND RESEARCH	18
1.17	ORGANISATIONAL & MANAGEMENT INFORMATION	23

1.18	ADDITIONAL INFORMATION	24
1.19	USEFUL AND EFFECTIVE TECHNIQUES	33
2	ANALYSIS	34
2.1	SERVICEABILITY OF AIRCRAFT	34
2.2	WEATHER	35
2.3	MONITORING OF THE AIRCRAFT BY ATC	35
2.4	PILOT HANDLING OF THE AIRCRAFT	36
2.5	CIRCUMSTANCES LEADING TO ACCIDENT	37
3	CONCLUSIONS	38
3.1	FINDINGS	38
3.2	PROBABLE CAUSE OF THE ACCIDENT	40
4	SAFETY RECOMMENDATIONS	40

**FINAL REPORT ON ACCIDENT TO DIAMOND DA – 40 AIRCRAFT VT-FGE
OF IGRUA NEAR VILLAGE SITADONGRI, CHINDWARA DISTRICT,
MADHYA PRADESH ON 24.12.2013**

1. Aircraft Type : Diamond DA-40
Registration : VT – FGE
Nationality : Indian
2. Owner/ Operator : Indira Gandhi Rashtriya Udan Academy, Raebareli.
3. Pilot – in –Command : Holder of Student Pilot Licence (SPL)
Extent of Injuries : Fatal
4. Place of Accident : Near Vil. Sitadongri Chindwara District, M.P
5. Date & Time of Accident : 24.12.2013, Approx. 08:30 UTC
Co-ordinates : Lat: 22°28'22"N Long: 78°32'46"E
6. Last point of Departure : Birsi Airport, Gondia
7. Point of intended landing : Birsi Airport, Gondia
8. Type of Operation : Training flight (Long Navigational Solo Flight)
9. Phase of Operation : During flight
10. Type of Accident : Controlled Flight into Terrain

(ALL TIMINGS IN THE REPORT ARE IN UTC)

Synopsis:

On 24.12.2013, IGRUA (Indira Rashtriya Udan Acadamy) Diamond DA- 40 aircraft Regn. VT-FGE was operating a long navigation cross country solo flight for the sector Gondia – Pachmarhi – Gondia. The solo flight was scheduled by the instructor for the Cadet pilot. This was his first solo long navigational VFR (Visual Flight Range) cross country flight.

The aircraft took off from Gondia at 0709 UTC from Runway 04 and climbed to planned altitude of FL-85 on radial 298 degrees. The Last aircraft position recorded from Nagpur VOR was 359 radial / 63.22 NM at 0757 UTC. Subsequently, there was no contact with aircraft.

As the ETA Gondia was 0915 UTC and the aircraft had not returned back to Gondia till 1030 UTC. At around 1030 UTC, Gondia ATC contacted VT-FGE however there was no reply. Thereafter it contacted Raipur, Jabalpur and Bhopal if the aircraft was in contact with them but aircraft was not in contact with any station. ATC relayed the message through other aircrafts but no reply was received. The ATC tried to contact cadet pilot continuously on his mobile phone but his mobile phone was switched off.

As the aircraft was not traceable, at 1130 UTC Gondia ATC informed to Mumbai FIC and the Search and Rescue was initiated by Mumbai FIC. All the local administration offices and Police Stations were informed reporting missing aircraft in area of Panchmarhi, Chindwara, Seoni, Nassingpur and Hosangabad.

On 25.12.2013, a forest Officers informed Police that an aircraft was found crashed near Village Sitadongri in Chindwara district, Madhya Pradesh and the case was registered under Mahuljhir village Police Station. Thereafter the Police informed the ATC Nagpur and IGRUA.

The Ministry of Civil Aviation constituted a committee of inquiry to investigate into the cause of the accident under Rule 11 (1) of Aircraft (Investigation of Accidents and Incidents), Rules 2012 comprising of Sh. A X Joseph as Chairman and Sh. Sandeep Patil as member vide order No. AV.15018/09/2014-DG dated 08.05.2014.

1. FACTUAL INFORMATION

1.1 History of flight

On 24.12.2013, IGRUA Diamond D-40 training aircraft, VT-FGE was scheduled for a long Navigation flight for the sector Gondia – Pachmarhi – Gondia. The Aircraft was refuelled to its full capacity of 152 litres by the AME prior to carrying out the daily inspection schedule on the aircraft. The certificate of release to service (CRS) was issued by the AME prior to the cross country flight. The Pre-flight inspection was also carried out by the licensed/authorized pilot and the cadet pilot, prior to the accident flight. The endurance of the aircraft was 04 hrs.

The accident sortie was the first sortie of the day for the aircraft VT-FGE. On the day of the accident, Cadet Pilot reported for flying at 0230 UTC. He was given mass briefing which includes weather, NOTAM and Standing orders by Flight Instructor In-charge. He reported for navigational briefing to his instructor for his navigation briefing for route. Instructor had checked for his sortie preparation regarding the frequency, communication procedures, estimate and ETA calculations, map reading procedures, DR procedures, emergency procedures, Grid MORA, VOR range, Mixture leaning procedure and CRS check of the aircraft. Subsequently, he proceeded to sortie around 0630 UTC.

The weather prior to take was fine with visibility more than 5 KM. The enroute weather for the cross country flight was also reported to be fine. Aircraft took off from Gondia at around 0709 UTC from Runway 04 and climbed to Flight Level 85 on radial 298°. After it came in contact with Nagpur ATC at 0739 UTC, the cadet pilot informed as per the flight plan VT-FGE is on a Non Stop cross country flight from Gondia to Gondia overflying Panchmarhi. The cadet pilot informed ATC Nagpur of estimate Panchmarhi 0815 UTC and ETA back Gondia 0916 UTC. Nagpur tower advised VT-FGE to remain with Gondia. However the cadet pilot informed ATC Nagpur that it was advised by Gondia to stay with Nagpur and the same was acknowledged by Nagpur tower at 0744 UTC. Thereafter, there was no recorded ATC transmission between Nagpur tower and VT-FGE.

Later on at around 1015 UTC the senior cadet pilot checked with other student pilots whether the aircraft VT-FGE had returned back from the cross country flight, since his ETA Gondia was 0916 UTC. He thereafter informed the instructor that prior to the cross country flight the cadet pilot had come to him and requested for his mobile to click some photographs as he doesn't have a mobile to take photographs and will return after the sortie.

At time 1030 UTC, IGRUA intimated ATC Gondia that the ETA for the aircraft VT-FGE was 0916 UTC which had not return back to Gondia till then. Thereafter ATC Gondia tried to contact aircraft VT-FGE and also contacted Raipur, Jabalpur and Bhopal to check the position of VT-FGE. However the aircraft VT-FGE was not in contact with any of these station. Thereafter ATC Gondia relayed the message through other overflying aircraft but there was no reply. Gondia ATC was also tried to contact the cadet pilot continuously on his mobile phone but his mobile phone was found switched off.

At time 1045, Gondia contacted Nagpur ATC on hot line and enquired about aircraft VT-FGE. Nagpur informed that since there was a shift change at that time, they had no information about the aircraft VT-FGE. At time 1058 UTC, Nagpur ATC informed Gondia ATC that VT-FGE contacted once after airborne from Gondia, thereafter there was no call made by VT-FGE to Nagpur ATC. Subsequently Gondia tower informed Nagpur to alert the local administration about the aircraft VT-FGE.

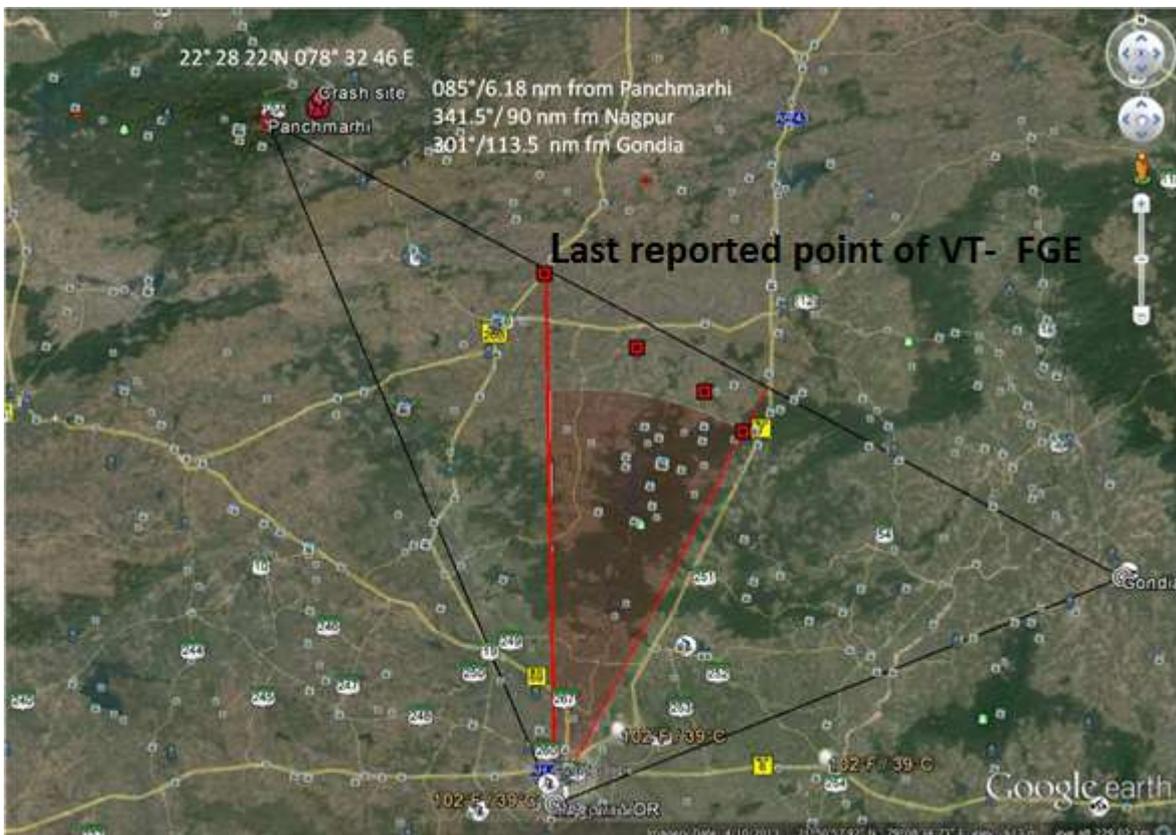
As the aircraft was not traceable, full emergency was declared and all the training flight departures were kept on hold at Gondia. At 1130 UTC Gondia ATC informed to Mumbai FIC and Air Force to initiate the search and rescue operation for aircraft VT-FGE. All the local administration office and police station were informed about the missing aircraft in areas of Panchmarhi, Chhindwara, Seoni, Nasingpur and Hosangabad.

As per Nagpur radar the aircraft last flying position was Chhindwara District, so Chhindwara Superintendent Police (S.P) was informed and both the mobile numbers provided by IGRUA were intimated to them by the search and Rescue team. The Police Inspector Chhindwara, intimated that the cadet pilot Mobile no. as per Flight plan was not active on 24.12.2013. However the second Mobile number provided by Gondia ATC was active and could be traced. After tracking the police Inspector informed that the mobile number was belonging to Vodafone, Uttar Pradesh and its information was available up to

0718 UTC near Satiya Village. Probably after the aircraft climbed to FL 85 the mobiles signal were lost.

Search and Rescue team received information from Collector Hossangabad late night that one of the aircraft was spotted near Tamia in Chhindwara district but collector Chhindwara could not confirm the news.

On 25.12.2013, Forest Officers informed Police and police in turn informed Nagpur ATC that an aircraft was found crashed with wreckage near Village Sitadongri in Chhindwara district, Madhya Pradesh and the case was registered under Mahuljhir village Police Station.



Crash site location with respect to Nagpur VOR and Gondia VOR

The aircraft had deviated 6.18 NM (11.45 KM) away from the ATC cleared flight path for Panhmarhi and crashed into the dense jungles near Village Sitadongri in Chhindwara district. The aircraft was completely destroyed and the wreckage was scattered in half km area from uphill to downhill in dense forest area. The trainee cadet pilot could not survive the accident. There was no evidence of fire.

1.2 Injuries to persons.

INJURIES	CREW	PASSENGERS	Others
FATAL	01	Nil	Nil
SERIOUS	Nil	Nil	Nil
MINOR	Nil	Nil	

1.3 Damage to aircraft.

The aircraft hit the high trees and was completely destroyed during the accident. The front portion of the fuselage was fully crushed. Cowlings, cabin were broken and rear side of the fuselage (towards the tail) was separated from the front portion of fuselage. The propeller had separated from engine crankshaft and both the blades were twisted from the root and the spinner was fully damaged and crushed. The engine had separated with its mounting and also separated from firewall. The fire wall was sheared off from the fuselage along with instrument panel. Both the wings had detached from the broken aircraft structure, the port wing aileron was attached however the star board wing aileron separated from its attachment point from the wing and found broken into pieces. The Elevator and rudder were in broken condition and found detached from its mount. The horizontal stabilizer had detached from its mounting.

In the cockpit the front instrument panel was found sheared from fuselage and was damaged. The throttle and mixture lever were found fully forward and the Prop Lever was in mid position and fuel tank selector knob was found in right tank selected. The front canopy had sheared from fuselage and broken. VHF system completely in damaged condition. The front seats found in damaged condition and rear seats were sheared off from its mounting to fuselage. The ELT was found sheared off from its mount and lying near to the main wreckage. All the three landing gears had sheared off from its attachment point to the fuselage.

1.4 Other damage: Nil

1.5 Personnel information:

1.5.1 Pilot – in – Command:

Age	:	18 ½ Years
Licence	:	SPL (A)
Date of Issue	:	17.06.2013
Valid up to	:	16.06.2018
Category	:	Aeroplane
Class	:	Single Engine
Endorsements as PIC	:	Diamond DA-40
Date of Medical Exam	:	25.11.2013
Med. Exam valid upto	:	24.11.2015
FRTTO License No.	:	Valid
Date of issue	:	10.07.2013
Valid up to	:	09.07.2023
Total flying experience	:	89:50 Hrs.
Experience on type	:	89:50 Hrs.
Experience as PIC on type	:	34:55 Hrs.
Total flying experience during last 90 days	:	31:05 Hrs.
Total flying experience during last 30 days	:	18:05 Hrs.
Total flying experience during last 07 Days	:	05:45 Hrs.
Total flying experience during last 24 Hours	:	03:25 Hrs.

1.6 Aircraft information:

1.6.1 The aircraft was manufactured by M/s Diamond Aircraft industries Inc., 1560 Crumlin Sideroad, London, Ontario, Canada in 2009. Diamond DA 40 aircraft is powered with one Lycoming IO-360-M1A, four cylinder, 180 horsepower normally-aspirated, direct drive, air cooled and horizontally opposed, fuel injector equipped engine. The engine has a Horsepower rating of 180 BHP with engine speed of 2700 RPM. The aircraft is fitted with Hartzell Propeller of model No. HC-C2YR-1BFP with two blades. The aircraft has a seating capacity for four persons including cockpit crew. The aircraft is certified for a single pilot operation. There is one canopy Door and one passenger Door. The aircraft has a total fuelling capacity of around 160 litres with useable fuel of 152 litres in main tanks and a total endurance of about 04 hours.

1.6.2 Construction: Diamond DA 40 is a composite aircraft having GFRP fuselage of semi-monocoque modelled construction. The fire protection on the firewall is of special fire-resistant matting, which is covered on the engine side by stainless steel cladding. The two main bulkheads are GFRP/CFRP items. The wings have a front and rear spar, each wing has a top shell and a bottom shell - a failsafe concept. The wings, as well as the aileron and flaps, are made of GFRP/CFRP, and are principally of sandwich construction. The wings are dihedral approximately 5 degrees. An aluminium fuel tank is installed in each of the wings. The airplane has a T - tail of GFRP semi-monocoque construction. Both the stabilizers have twin spars and a skin with no sandwich. Rudder and Elevator are of sandwich construction.

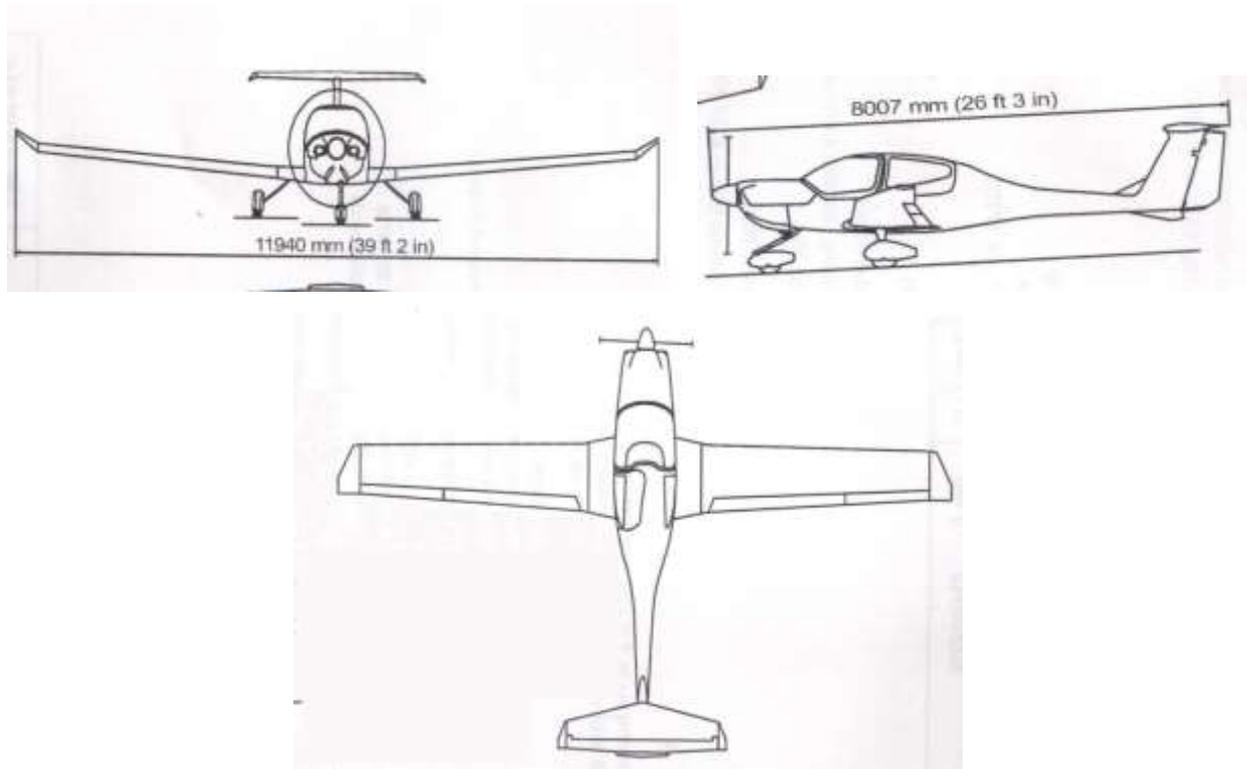


Fig: Three dimensional view showing front, side and top view

1.6.3 Scrutiny of the Airframe and Engine log books of the aircraft revealed that on the day of accident, the aircraft had done 3217:43 airframe hrs since new and 3212:25 since the renewal of last C of A. The engine had logged at 1217:50 hrs time since overhaul. The aircraft is 05 years old. The last C of A was done on 17.11.2009 and was valid till 28.04.2014. The aircraft was registered under Normal Category, Sub-division Passenger Category. The aircraft was registered with DGCA under the ownership of IGRUA. The aircraft is registered with Certificate of registration No. 3980 dated 30/07/2009.

The highest inspection schedule on this aircraft is 2000 Hrs/12 Years approved inspection schedule which was carried out on the aircraft on 23.10.2012 at 1997:53 airframe hrs.

1.6.4 Scrutiny of the aircraft records further revealed that all the modifications on the aircraft were found to be complied with at the time of accident.

1.6.5 Scrutiny of the snag register revealed that there was no snag reported on the aircraft prior to the accident flight.

1.6.6 The last radio communication/navigation check carried out on the aircraft was on 09.12.2013 and was found to be satisfactory. The check was valid upto 06.06.2014.

1.7 Meteorological information:

Gondia:

Time (UTC)	Visibility	Clouds	QNH
0600	5000	Few 10000 ft	1018
0700	5000	Few 10000 ft	1019
0730	5000	Few 10000 ft	1019

Satellite pictures were observed prior to the release of cross country flights by the instructor and discussed with the cadet pilot. The en-route weather for the flight path was reported to be fine.

1.8 Aids to navigation:

The aircraft deviated from its normal ATC track by 6.18 NM and crashed into the dense jungles near Village Sitadongri in Chindwara district. The aircraft was equipped with all navigational Equipments and was in the radar coverage of ATC Nagpur.

1.9 Communications:

The aircraft took-off from Gondia at 0709 UTC and was in contact with Gondia tower. At time 0743 UTC VT-FGE contacted Nagpur tower. The last transmission Nagpur tower had with VT-FGE was at 0743 UTC. There after there was no communication between aircraft VT-FGE and Nagpur or Gondia tower. There was also no communication with any overflying aircraft in that area.

1.10 Aerodrome information.

Birsi Airport Gondia

Co-ordinates

ARP : Latitude : N 21° 31' 24.8"
Longitude : E 080° 17' 15.7"

Elevation : 987 Ft.

Runway Orientation and dimension

Orientation: 04/22, Dimension: 2290 meters (7513 feet)

Approach and Runway Lighting

RWY.	APCH LGT	THR LGT	PAPI	Rwy Centre Line LGT
04	Yes	Yes	Yes	No

Met Services

MET services are available at the airport. TAF, Trend Forecast and Briefing is available.

Navigation and Landing Aids

NDB, DVOR and DME

ATS Communication Facilities are available provided by AAI

1.11 Flight recorders: As per existing Civil Aviation requirements flying training aircraft are not required to be fitted with CVR and FDR.

1.12 Wreckage and impact information.

The accident site was in the hilly region near Sitadongri village in Chhindwara district of Madhya Pradesh. The coordinates of the accident site are 22°28'22"N and 78°32'46"E.



Accident site (Hilly area with tall trees)



Downslope of the hills

Examining the accident site it was found that the aircraft was completely destroyed as it had disintegrated into pieces spread in an area of around 4000 sq m. The place where the accident occurred was adjacent to a hill top of approximately 2500 ft. height. On one side

of the hill top there is a deep gorge while on the other side were hills with a gradual slope covered with lot of high trees of hard wood.



***Aircraft first impact with tree on the hill top
after impact***

Aircraft part stuck on the tree

The aircraft impact marks were observed on one of the tree about 150 ft high above the hill top and around 220 ft. down the slope. This appears to be the first aircraft impact followed by the second impact with another tree around 20 ft. ahead of the first impact tree. Parts of left wing and the tail section as well as some parts of the canopy were found at the first point of impact. From the impact marks and the parts of the aircraft it can be ascertained that the left wing and the tail surface must have hit the trees and thereafter the aircraft went out of control.



***After initial impact aircraft disoriented and hit other trees moving
downslope***

Due to repeated impacts with the trees, the rudder, horizontal stabilizer, large portions of the tail section and some parts of the left wing sheared off from the aircraft and were scattered around, Thereafter the aircraft became totally uncontrollable and presumably moved ahead at a very high speed. Subsequent to the first impact it appears that the aircraft became uncontrollable and had another major impact breaking a big tree having bark of more than half a meter diameter which was around 350 ft. from the first impact causing the fuselage to break from the central area and liberate. Thereafter the remaining portion of the fuselage along with damaged right wing and the engine dragged ahead around 50 ft and settled down in a Nulla located 400 ft from the first impact.



Final position of the wreckage on downslope of the hill

Examining the main wreckage it was observed that the engine controls were found in fully forward position and the flaps were in retracted position. The forward acceleration of the aircraft was very high and that could be corroborated by the indication in the ASI which was found stuck at 185 kts (VNE 178 kts). The cockpit area got disintegrated as the instrumentation in the cockpit, the panels, aircraft documents etc were found spread around in a radius of 50 ft.



Aircraft speed indicator stuck at 185 knts

One of the main landing gear strut and the nose gear strut with wheel assembly was found at the impact point and the main wheel assemblies were found 100 to 150 ft away from the main wreckage. The ELT antenna got detached from the fuselage structure and was lying on the ground. The engine and propeller had signs of impact causing the propeller and the after gear ring from the front portion of the engine to shear off.



Sudden impact of propeller shows breaking of shaft under power

The cadet pilot body had disintegrated after the aircraft impacted with trees. Upper torso of the cadet pilot was found 20 ft. left of the broken tree and the lower torso of the cadet was found 20 ft ahead of the Nulla. Few of the body parts were also found on the trees. Throughout the course of impacts there was no fire as no burning marks were found in the wreckage. The oil from the engine totally spilled out on the engine. There was no fuel

found in the fuel tanks as the tanks were badly ruptured under impact. Pieces of two different mobile phones were recovered from the aircraft wreckage however they were severely damaged/partially burned and were not in a condition to recover any data.



Battery of two different mobile phones, Circuit board of one Phone & One sim card recovered from crash site.

1.13 Medical and pathological Information:

The parts of the cadet pilot body were found spread around the aircraft wreckage. The body was identified by his blood relations and also by one of the instructors of IGRUA. The post-mortem was carried out at District Chindwara, Madhya Pradesh on 26.12.2013 and as per the doctors opinion the mode of death of cadet pilot was shock which was caused by excessive haemorrhage due to crush injury and damage to vital parts. As per the report the approximate time passed since death was within 24 to 48 hours of post-mortem examination.

1.14 Fire:

There was no pre or post impact fire.

1.15 Survival aspects:

At time 1030 UTC Gondia ATC intimated to Nagpur ATC that aircraft VT-FGE was untraceable. The Nagpur ATC thereafter called up VT-FGE and also relayed through overflying aircraft however it was not contactable. At time 1130 UTC Gondia ATC called up Mumbai FIC to initiate search and rescue operation. As per the Search and Rescue (SAR) procedures the SAR is initiated in case the aircraft is not in contact beyond 30 minutes of its estimated time of arrival (ETA). In this particular case the search and rescue operation was initiated at time 1130 UTC which was more than two hours beyond the ETA of the accident aircraft.

Search and Rescue Initiated by Mumbai

Date / Time in UTC	Actions initiated by Mumbai
24.12.2013	
1130	At 11315, message received from OCC Supervision that an a/c VT FGE DA-40 aircraft from operating cross country flight Gondia to Gondia overflying Panchmari, M.P on radial R298 and 122 NM, ETA back was 0916 but did not land back. Last contact with Nagpur at 0745 and last RADAR pick at Nagpur at time 0757 approx. 63.66 NM north of Nagpur.
1210	The aircraft last flying position as per radar was Chhindwara District, so Chhindwara Superintendent Police (S.P) was informed about the missing aircraft at around 1210 UTC.
1230	Contacted District Collector, Hossangabad and briefed him about the incident.
1235	Informed Executive Director, (ATM), AAI was intimated about missing aircraft.
	Informed General Manager Search and Rescue (SAR) about missing aircraft
1240	SAR again contacted S.P. Chhindwara for latest updates, S.P informed

	that message has been sent to Control Room and Police Station however no news about ill-fated aircraft.
1315	SAR again Contacted Collector Hossangabad, however no information about the aircraft.
1440	Message received from Police Inspector that the cadet pilot Mobile no. as per Flight plan was not active on 24.12.2013. However the second Mobile No. of another trainee cadet pilot received from Gondia was active. After tracking the police Inspector informed that it is of U.P, Vodafone and its information was available up to 0718 UTC near Satiya Village.
1530	Briefed GM (SAR), GM (ATM) and WSO (night) and handed over to night WSO. No information received in the night.
25.12.2013	
0125	SAR received information from Collector Hossangabad that late night message received that one aircraft was spotted near TMIA in Chhindwara district, but collector Chhindwara could not confirm the news.
0315	SAR sent a request letter to MLU to activate Air Headquarters for Air Search.
0357	SAR informed that another aircraft belonging to IGRUA departed from Gondia for Air Search mission.
0503	SAR received message from 3AF MLU that Air Headquarter has informed Nagpur Helicopter unit and they will provide a M-17 Helicopter form SAR Mission.
0510	SAR received message from S.P. Chhindwara that a dead body along

	with aircraft parts are sighted in Sita Dongri near Piparia area.
0540	Informed DGCA
0545	Alerted Army Control Room in Panchmari.
0600	The Army officer Adjutant Colonel, Panchmari informed that message received from Local Sarpanch that aircraft is crashed and body is on the top of tree.
0636	Collector Hossangabad, confirmed that dead body in SATUA rescue forest lying on top of tree near TAMIA, and coordinator of the site 2228 21 N 4 0783246E.
0746	Forest Officer reported that ill-fated aircraft is in the forest area and dead body is there, he is proceeding to the site.
0753	Informed GM (SAR) and GM (ATM).
0920	The forest Officer reported from Site that the body of Pilot is in pieces and aircraft is white in colour with Registration VT-FGE and Emblem of IGRUA and Police has cordoned the area.
0930	Informed ED (ATM), AAI and DGCA.
0930	SAR action terminated.

The accident was not survivable.

1.16 Tests and research:

1.16.1 On 17-01-2015 a real time exercise was carried out on a same type of aircraft (Diamond D 40) and on the same sector Gondia – Pachmarhi – Gondia. The flight was carried out by an instructor from IGRUA. The effectiveness of the VHF transmission largely depends upon the prevailing weather conditions. However in a fair weather condition on an average the transmission is effective for this kind of distances. This exercise was carried out to ascertain the effectiveness of VHF transmission between the aircraft and the ATC in a fair weather conditions. A test flight was carried out on the same route to check that if any distress/May Day call was made by the student pilot prior to accident for assistance or informing ATC about the situation and weather the transmission could be heard by the ATC or any over flying aircraft.

The Nagpur ATC was advised to give the same flight routing and altitude as that of the accident flight to monitor the VHF communication between the aircraft and Nagpur ATC. The aircraft took-off from Gondia at 1306 IST on radial 298 thereafter proceeded to Pachmarhi which was at 122 NM. The aircraft landed back safely at time 1516 IST at Gondia. During the flight the instructor made number of calls to Nagpur ATC while proceeding to Pachmarhi and also on the return leg to check the readability of VHF. The same is tabulated below:

Call log to Nagpur

Time	Altitude	Distance GDA (298 Radial)	Radial NNP	Distance NNP
1324	8000	19	052	61
1337	8000	43	045	56
1349	8000	64	014	58
1400	8000	84	355	65
*1410	8000	103	345	79
*1419	8000	119	336	90
1427	7000	105	342	78
1439	7000	80	359	63
1450	7000	54	023	55
1500	7000	31	047	58

*No contact with Nagpur

During the exercise it was established that while maintaining flight around 8000 feet on radial 298 there was always two ways transmission. However between 103 to 119 NM while going and returning back there was no VHF transmission established between the aircraft and Nagpur ATC. VT-FGE wreckage was found 6.16 NM away from the flight path. The instructor had also gone over the accident area and was able to establish contact with Nagpur ATC.

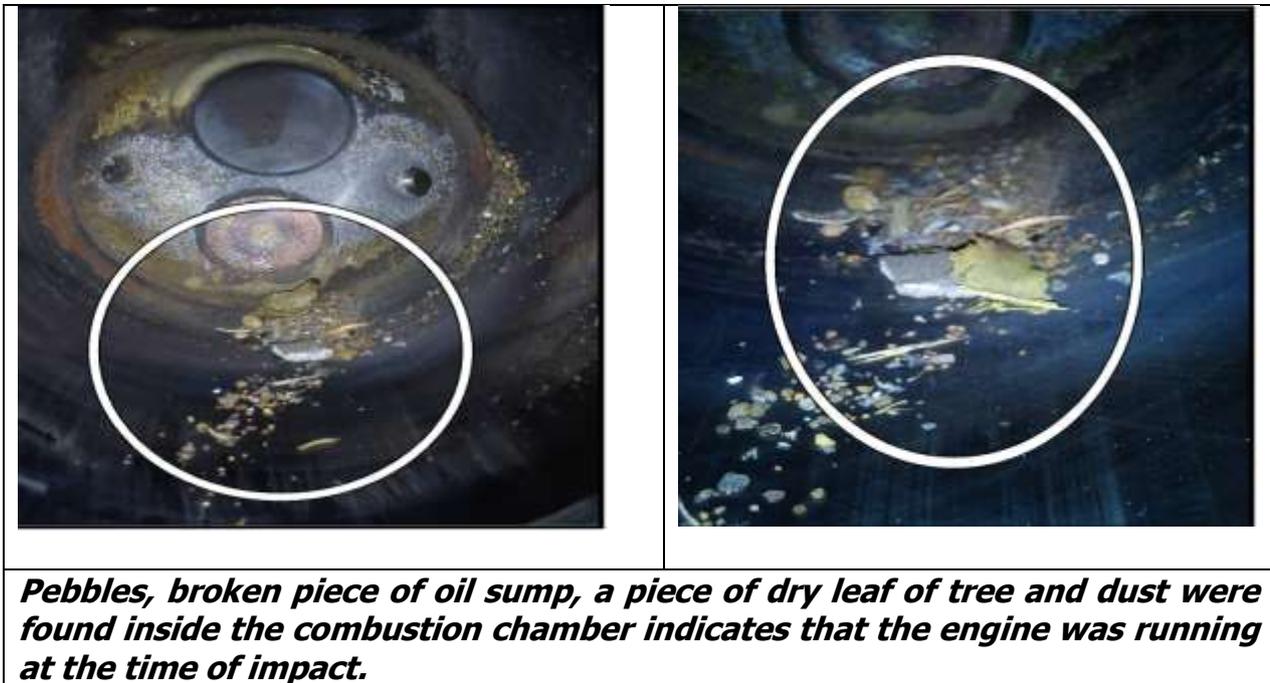
1.16.2 Engine Strip Examination Report:

The engine of the accident aircraft was stripped examined at DGCA approved engine overhaul workshop progressively.

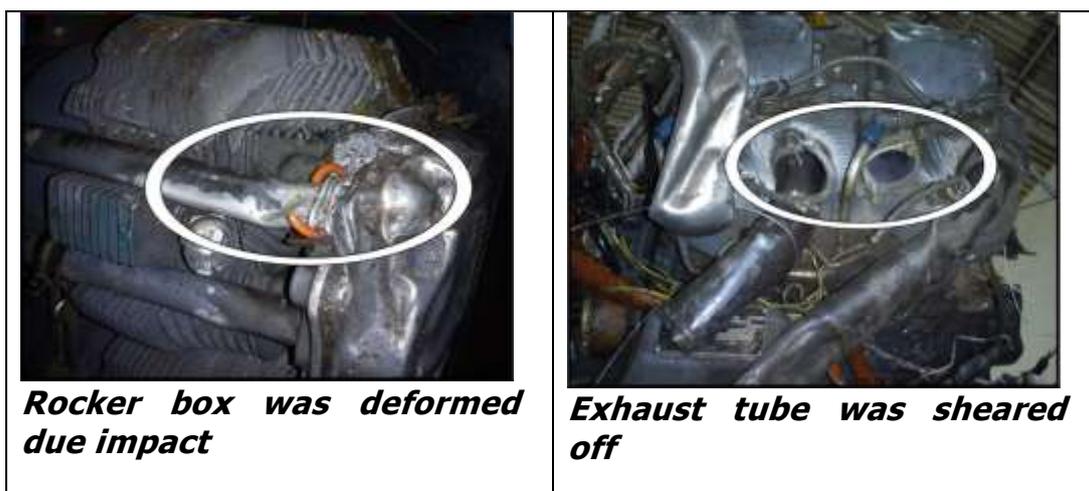
Physical Observation on visual examination:

1) Cylinder No. 1

Few pebbles, a broken piece of oil sump, a piece of dry leaf of tree and dust were found inside the combustion chamber of the cylinder. No other abnormalities noticed.



Fins were damaged, rocker box found deformed, induction tube was not found with the engine & induction flange on the cylinder was broken into half, exhaust tube was sheared off. Push rod found bent.



Cylinder No.2:

Induction tube sheared off from sump, exhaust tube was sheared off, Oil drain tube was broken.



Induction tube and exhaust tube was sheared off

2) Cylinder No. 3

Dust like material was observed inside the combustion chamber. No other abnormalities noticed.



Dust like material observed inside Combustion chamber



Exhaust tube was found sheared

Exhaust tube was found sheared, induction was intact and its seal was satisfactory.

3) Cylinder Nos. 2 & 4 Combustion chamber was found clean.

4) All the pistons were found satisfactory.

5) The condition of crank shaft, apart from the sheared off portion found satisfactory.

6) The cam shaft condition was satisfactory.

7) Presence of oil noticed at all journal of crank shaft.

8) Condition of all connecting rods found satisfactory.

9) The condition of all fuel nozzles found satisfactory.

10) The top & bottom spark plugs of No. 1 cylinder found damaged. Other spark plugs were intact.



Crankshaft flange was sheared off near the propeller attachment flange.



Sump was broken from the induction area due impact.



Top reservoir was cracked which might have caused oil to drain out

Rig Test of Accessories

Fuel Flow divider:

The Rig test for the flow divider was carried out and found satisfactory.

Spark Plugs:

Other than the Top & bottom spark plugs of No. 1 cylinder the rig test of remaining 6 spark plugs found satisfactory.

Observation:

- i) The propeller shaft had sheared off near the propeller attachment flange. The type of failure on the propeller shaft indicates that the engine was running and delivering power at the time of accident. Also the debris observed inside the No. 1 Cylinder indicates these were sucked into the induction port at the time of accident.
- ii) With the observation made during disassembly it appears that engine was running and delivering power at the time of accident. The above damages observed were due the result of the aircraft accident.

1.17 Organizational and management information:

Indira Gandhi Rashtriya Udan Academy (IGRUA) is a premier Flying Training school in India. The school has one Chief Flying Instructor, one Flying Instructor In-Charge, five Flight Instructors and 6 Assistant Flight Instructors for imparting training to the trainee pilots. The academy has a total of 25 aircraft out of which 4 are Zlin, 5 Trinidad TB-20, 14 Diamond DA-40 and Two DA-42. All the aircrafts are registered in the Normal Category.

Several flying procedures have been locally formulated by IGRUA for trainees. These include entry and exit procedures for entering and exiting the sectors from runway. These procedures also give detailed instructions to pilots to report position once they are 'established in the sectors' during local flying and also to report operations normal call every 10/15 minutes giving radial, distance and altitude information to ATC. Actions necessary in the event of an air crash also has been developed and the check list circulated to the trainees.

In September 2009 the CFI IGRUA had issued a Standing Order wherein the trainee students were warned of indulging into low flying activities. It also reflects severe actions would be initiated against the trainee students indulging into low flying activities.

In the northern belt within the country during winters there is visibility problem due heavy fog. The IGRUA sets up a temporary camp at Gondia for a period of three months from December to February to avoid delay/obstruction in safe student flying. For this

operation number of aircraft along with instructor and students are temporarily based at Gondia.

1.18 Additional information:

1.18.1 Statement of the instructor:

On 24.12.2013 the cadet pilot reported for mass briefing by the instructor at around 0230 UTC wherein all standing orders NOTAMS and weather briefing was carried out. His long navigation sortie briefing for the sector Gondia – Panchmurhi – Gondia was carried out by the instructor himself. During this briefing the trainee pilot was checked for his sortie preparations regarding the frequency, communication procedures, estimates and ETA calculations, Map reading procedures, Grid MORA for the route was 5700 feet, mixture leaning procedures and emergency procedures, subsequently the involved cadet pilot was released for sortie at approximately 0700 UTC.

1.18.2 Sequence of events recorded on ATC Tape Transcript:

For the situational assessment leading to the accident of VT-FGE. The tape transcript of Nagpur Tower frequency (118.1 Mhz) dated 24/12/2013 between 0730 UTC to 1055 UTC was analysed and following was established.

(a) As per Tape transcript from Gondia, the aircraft, VT-FGE took off from Gondia at 0709 UTC from Runway 04 and climbed to Flight Level 85 on radial 298 degrees. The cadet pilot reported position with respect to Gondia VOR was obtained clearance from ATC Gondia for Nagpur radar on 298 radial at 80 NM.

(b) At time 0739 UTC VT-FGE called Nagpur tower and informed that VT-FGE is on a Non Stop cross country flight from Gondia to Gondia overflying Panchmarhi. The cadet pilot informed ATC Nagpur of Climb and cruise and maintaining flight level 85. The cadet pilot reported the position as 298 radial and 45 DME outbound Gondia estimate Panchmarhi 0815 UTC and ETA back Gondia 0916 UTC on radial 298.

(c) At 0744 UTC VT-FGE was advised by Nagpur ATC to maintain communication with Gondia. At 074410 UTC cadet pilot informed ATC Nagpur that it was advised by Gondia to stay with Nagpur and the same was acknowledged by Nagpur tower at 074410 UTC.

(d) Thereafter, there was no recorded ATC transmission between Nagpur tower and the aircraft VT-FGE.

(e) At time 1030 UTC, IGRUA intimated ATC Gondia that the ETA for the aircraft VT-FGE was 0916 UTC which had not return back to Gondia till then.

(f) Thereafter ATC Gondia contacted Raipur, Jabalpur and Bhopal to check the position of VT-FGE. However the aircraft VT-FGE was not in contact with any of these station.

(g) Thereafter ATC Gondia relayed the message through other overflying aircraft but there was no reply. Simultaneously Gondia ATC was also tried to contact the cadet pilot continuously on his mobile phone but his mobile phone was found switched off.

(h) At time 1045, Gondia contacted Nagpur ATC on hot line and enquired about aircraft VT-FGE. Nagpur informed that since there was a shift change at that time, they had no information about the aircraft VT-FGE.

(i) At time 10:58:13 UTC, Nagpur ATC informed Gondia ATC that VT-FGE contacted once after airborne from Gondia, thereafter there was no call made by VT-FGE to Nagpur ATC. Subsequently Gondia tower informed Nagpur to alert the local administration about the aircraft VT-FGE.

(j) As the aircraft was not traceable, full emergency was declared and all the training flight departures were kept on hold at Gondia. At 1130 UTC Gondia ATC informed to Mumbai FIC and Air Force to initiate the search and rescue operation for VT-FGE. Gondia ATC informed all local administration office and police station about missing aircraft in areas of Panchmarhi, Chindwara, Seoni, Nasingpur and Hosangabad.

1.18.3 Flight monitoring by Air Traffic Controller Nagpur and Gondia:

On 23.12.2013 IGRUA had filed a flight plan with Gondia ATC for the cadet pilot to operate long navigational cross country flight Gondia – Panchmurhi – Gondia on 24.12.2013. As per the flight plan the aircraft took-off with revised ETD and finally got airborne at time 0709 UTC. The aircraft came in contact with Nagpur ATC at 0739 UTC and informed that VT-FGE is on a Non Stop cross country flight from Gondia to Gondia overflying Panchmarhi. The cadet pilot reported the position as 298 radial and 45 DME outbound Gondia estimate Panchmarhi 0815 UTC and ETA back Gondia 0916 UTC on radial 298.

ATC Nagpur advised VT-FGE to remain in contact with Gondia, however VT-FGE informed Nagpur tower that Gondia advised to remain with Nagpur. The last transmission between the Nagpur ATC and the aircraft VT-FGE was at 0744 UTC. There was no transmission thereafter.

The Nagpur tower controller was aware that VT-FGE was on a cross country flight however during the shift change at 0830 UTC he did not brief the new controller about the training cross country flight. The new controller also did not check the Flight Progressive Strip (FPS) for the training aircraft as its position was overdue for handing over VT-FGE to Gondia.

As there was a shift change at Gondia tower the ETA for VT-FGE was also missed by the controllers. It was only after IGRUA brought to the notice of Gondia ATC at 1030 UTC that VT-FGE had still not returned from cross country, the search was initiated by Gondia ATC.

1.18.4 ATC watch taking over procedures

As per the Airports Authority of India's Manual of Air Traffic Services Part – I

During the shift change, or whenever an Air Traffic Controller is relieved irrespective of the duration of relief, a mandatory 15 minutes overlap period shall be provided in which the relieved ATCO (Air Traffic Controller) shall brief the relieving ATCO of complete traffic situation. The relieving officer shall plug-in the Head-set and monitor the progress of the traffic. The relieved officer will brief the relieving officer on all active and pending list of traffic. The relieving ATCO shall make a log entry of having received briefing and understood the traffic situation before assuming charge of Air Traffic Control duties in an Unit. The relieving officer shall first 'take over watch' in the logbook and sign to that effect followed by the 'handing over watch' by the relieved officer.

1.18.5 Training profile of cadet pilot:

As per the records of cadet pilot, after the completion of the general flying and the instrument flying the performance of the cadet pilot was assessed and found satisfactory. He was thereafter released for solo flight as his flight parameter analysis for the flight undertaken by him was found satisfactory. He was then cleared by the simulator instructor to start the navigational sortie. His dual performance in the short navigation was

found average and his RT communication was slow. However his RT communication improved during the long navigational sorties. The cadet pilot was assessed and thereafter released for short solo navigation flight and after successful completion of 02 such sorties for 02 hours 40 minutes the cadet pilot was released for long navigation sortie. The cadet pilot had done a sortie with the instructor for Gadarwara on radial 315 approximately 117 NM from Gondia for general familiarisation of the area. The cadet pilot was thereafter released for long navigational solo flight for Panchmurhi on radial 298 and 122 NM from Gondia. At the time of accident his total flying experience was 89 hours and 50 Minutes.

Cross Country Flight

Date	Duration	Duel /Solo	Route
10.12.13	02:20	Duel	Gondia – Gadarwara - Gondia
13.12.13	02:20	Duel	Gondia – Kaskal - Gondia
14.12.13	02:25	Duel	Gondia – Gaurela - Gondia
17.12.13	02.20	Duel	Gondia – Kaskal - Gondia
23.12.13	01.25	Solo	Gondia – Brahmapuri - Gondia
23.12.13	01:15	Solo	Gondia – Korch - Gondia

1.18.6 Radar Plots from Nagpur ATC

After the accident the radar situational data display was replayed and it was observed that the aircraft VT-FGE was maintaining flight level 85 and bearing 359/66.66 Nm (Approx. 6 Nm front of Chindwara city) squaking 2000 at time 0757 UTC and 80 Nm from Gondia VOR. Thereafter the signal dropped from the radar. The aircraft wreckage was found around 45 Nm from the position the signal had dropped from the radar. If the aircraft was cruising at an average speed of around 110 to 120 knots then it would have taken at least 25 to 30 minutes for the aircraft to reach the accident site. Also after the aircraft dropped from the radar the ATC controller also failed to monitor/check the position of VT-FGE and did not make any call to check the position of the aircraft. If the aircraft had developed any technical snag then as per procedure it would have called the ATC or relayed its position from the overflying aircraft in the area. However there was no call made by VT-FGE. Secondly if any transmission/transponder failure would have occurred then also as per procedure he would have not continued the flight and diverted to Nagpur station for assistance.



VT-FGE painted on Nagpur radar



VT-FGE last painted on Nagpur radar



VT-FGE disappeared from Nagpur radar

1.18.7 Flight monitoring of data stored in Multi function Display:

DA-40 aircraft cockpit has a Multi Function Display (MFD) which has a provision to insert an external Secure Digital data Card (SD). This card is an ultra small flash memory card designed to provide high capacity memory in small size (32 x 24 x 2.1 mm). This card is made of plastics material weighing approximately 2 grams. There is a provision that the vital aircraft parameters are recorded on this SD card during the flight. After the flight the data card can be removed and the flight parameters can be monitored to check the cadet performance.



Location of Secure Digital (SD) card which records aircraft primary parameters



Plastic Secure Digital (SD) card which records aircraft parameters

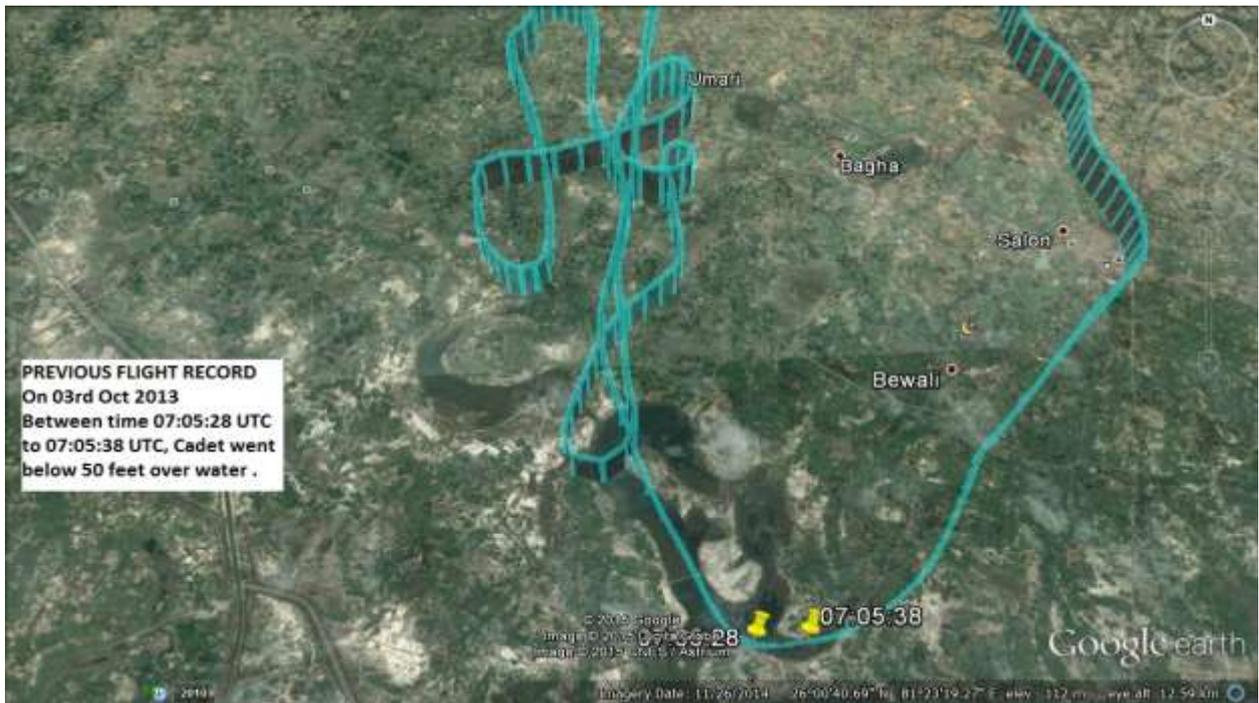
After the accident the aircraft was completely destroyed and the SD card could not be recovered from the aircraft.

IGRUA download these data from SD card regularly from the aircraft, however they are monitored on random bases only or when the particular cadet solo flight performance has to be assessed. After the accident the committee asked IGRUA to check the data stored on the SD card for few of the earlier solo flight of the cadet pilot involved in the accident. The recorded data was analysed viz-viz the clearance given to carry out the solo sortie. It was observed that on following two occasions the cadet pilot had indulge in low flying and breach of discipline.

1. On 03/10/2013- Cadet was cleared to operate in sector D (Radial 165-195 FSG) between 8 to 15 NM and between 2500-3500 feet. Cadet pilot engaged into low flying and as per the data available it flew around 50 feet above the small lake in the sector. The data also revealed that the aircraft had engaged into dive with engine power max to attain speeds of around 170 knots during dive with pitch angle of minus 15 degrees (-15°). This was serious indiscipline flying by the cadet pilot as the student pilots are not permitted to fly beyond 120 knots and also with such high negative pitch angles.



Graphical representation of DFDR data for low flying on 3/10/2013



Path followed by aircraft during low flying

2. On 05/10/2013- Cadet was cleared to operate in sector C (Radial 105-135 FSG, other same as above). However Cadet proceeded to Sector D instead, whereas per time in data, another cadet was flying. As per the data both of cadets were flying at the same time in same sector as if carrying out formation flying.



Formation flying carried out by Cadet Pilot on 05th Oct 2013

Since the data is checked randomly by the IGRUA instructors this could not be detected earlier and came to the knowledge only after the accident. However the other cadet involved in above activity was later suspended for 6 months for breach in discipline.

After the accident the IGRUA instructors had monitored the flight parameters for other students who were released for sector Gondia – Punchmarhi – Gondia earlier to the accident. It was observed that few of the students had indulged into low flying over the accident area. The IGRUA management immediately stopped this particular sector for cross country and had initiated actions against the students.

There had been number of cases with IGRUA earlier also wherein cadet pilots had indulged into low flying activities and this was in the knowledge of the Instructors and the Management. IGRUA had issued number of standing orders and warnings/suspensions to the cadet pilot who were caught engaged in low flying. In October 2011 IGRUA Zlin aircraft was involved in an accident due cadet pilot indulging into low flying. Though the aircraft was completely destroyed, the student pilot survived the accident. IGRUA had taken an action against the cadet and he was terminated from the flying institute. In another case two students were terminated from IGRUA for indulging into dangerously low flying during the solo flight.

1.18.8 Flight Monitoring by M/s IGRUA for Cadet Pilots

M/s IGRUA main base is at Raibareli and all the local flying activities are carried out in an uncontrolled airspace. However M/s IGRUA has its own ATC setup which is manned by the CPL holders and retired ATCO's for co-ordination of flights for local flying and cross country. All the flight following for the cross country flights from Raebareli airstrip is co-ordinated by the CPL holders/instructors from local ATC.

As Raibarelli is in Northern belt of the country, it is severely affected by fog during winters due which M/s IGRUA sets up a temporary camp at Gondia which has a better weather conditions for flying activities during winters. Since Gondia is a controlled airspace and has an established Air Traffic Management Services M/s IGRUA co-ordinates with ATC for all local and cross country flying activities.

1.19 Useful or effective investigation techniques: NIL

2. ANALYSIS:

2.1 Serviceability of the aircraft

Prior to the accident flight the aircraft had a valid C of A. The highest inspection schedule on this aircraft is 2000 Hrs/12 Years approved inspection schedule was carried out on the aircraft on 23.10.2012 at 1997:53 airframe hours. The engine had logged at 1217:50 hrs time since overhaul. Scrutiny of the aircraft records further revealed that all the modifications on the aircraft were found to be complied with at the time of accident. Scrutiny of the snag register revealed that there was no snag reported on the aircraft prior to the accident flight. Prior to accident flight the aircraft weight & balance was well within the operating limits.

The aircraft was in VHF contact with the Nagpur radar till 0744 UTC and no abnormal operation was reported by the cadet pilot to the ATC. The aircraft VT-FGE was painted on the Nagpur radar after take-off from Gondia at 0709 UTC till 0757 UTC. The position at which the aircraft was dropped on the radar was radial 298/80 NM from Gondia and radial 359/ 63.66 NM from Nagpur VOR. However the aircraft wreckage was found around 6.18 NM away from its designed flight track about 113.5 NM from Gondia and 90 Nm from Nagpur. The aircraft had travelled around 42 NM from the time it disappeared from the radar. It is presumed that if the trainee pilot had encounter any emergency it would have definitely made a distress call or a MAY DAY to ATC which could have also been picked up by any overflying aircraft in the area. As per emergency procedures the trainee cadet pilot has to divert to the nearest station for assistance.

After the accident the aircraft structure was completely destroyed. However the engine was sent for strip examination at DGCA approved shop. As per the shop report, during disassembly it appears that engine was running and delivering power at the time of accident. The propeller shaft had sheared off near the propeller attachment flange. This type of failure on the propeller shaft indicates that the engine was running and delivering power at the time of accident. Also the debris observed inside the No. 1 Cylinder indicates these were sucked into the induction port at the time of accident. The damages observed were due the result of the aircraft accident.

From the above it is inferred that serviceability of the aircraft was not a contributory factor to the accident.

2.2 Weather:

Prior to flight from Gondia, the weather was obtained by the cadet pilot for 0600 UTC which was reported to be visibility 5000 meters clouds at 10000 feet. Thereafter the briefing was carried out by the instructor wherein Satellite pictures were observed and the en-route weather for the flight path was reported to be fine. The weather reported by ATC prior to take-off at 0709 UTC was visibility 5000 meters, winds 150/02 knots. The aircraft was cleared for flight level 85 and came in contact with Nagpur ATC at 0739 UTC. No adverse weather was reported by Nagpur ATC to VT-FGE for the flight path.

From the above it is inferred that the weather during the period of training flight for the flight path Gondia – Panchmarhi - Gondia was fine and is not a factor to the accident.

2.3 Monitoring of the aircraft by ATC.

As per the flight plan aircraft VT-FGE was on a non-stop cross country flight from Gondia to Gondia overflying Panchmarhi. The aircraft came in contact with Nagpur ATC at 0739 UTC and reported the position as 298 radial and 45 DME outbound Gondia estimate Panchmarhi 0815 UTC and ETA back Gondia 0916 UTC on radial 298. The last transmission between the Nagpur ATC and the aircraft VT-FGE was at 0744 UTC. Aircraft VT-FGE was painted on the radar till the time 0757 UTC after the aircraft VT-FGE dropped from the radar there was no call made by the ATC to check the position of the aircraft. There was no transmission thereafter. The Nagpur tower controller was aware that VT-FGE was on a cross country flight however during the shift change at 0830 UTC he did not brief the new controller about the training cross country flight. The new controller also did not check the Flight Progressive Strip (FPS) for the training aircraft as its position was overdue for handing over to Gondia. As there was a shift change at Gondia tower also the ETA for VT-FGE was also missed by the tower controller at Gondia. It was only after IGRUA brought to the notice of Gondia ATC at 1030 UTC that VT-FGE had still not returned from cross country, the search was initiated by Gondia ATC.

From the above it is inferred that due to shift change at Nagpur and Gondia the relieving controller did not brief the incoming controller about the aircraft VT-FGE as its position

was overdue from its ETA. This non-adherence to the standard practices by the tower controllers delayed the search & rescue operations.

2.4 Pilot handling of the aircraft:

On 24.12.2013, IGRUA Diamond D-40 training aircraft, VT-FGE was scheduled for a long Navigation cross country flight for the sector Gondia – Pachmarhi – Gondia. The Aircraft was inspected by AME as per daily inspection schedule and CRS was issued by the AME. The Pre-flight inspection was also carried out by the licensed and authorized pilot, prior to handing the aircraft to the trainee cadet pilot for the cross country flight. The accident sortie was the first sortie of the day for the aircraft VT-FGE.

On the day of the accident, Cadet Pilot reported for flying at 0230 UTC. He was given briefing for his sortie preparation regarding the frequency, communication procedures, estimate and ETA calculations, map reading procedures, emergency procedures by the instructor. Subsequently, the cadet pilot got airborne for the sortie at around 0709 UTC from Runway 04 and climbed to Flight Level 85 on radial 298 degrees. The weather prior to take-off was fine with visibility more than 5 KM. The enroute weather for the cross country flight was also reported to be fine.

The cadet pilot informed Nagpur ATC about the Non Stop cross country flight from Gondia to Gondia overflying Panchmarhi. The estimate for Panchmarhi was 0815 UTC and ETA back Gondia was 0916 UTC. The last transmission between the aircraft VT-FGE and the Nagpur ATC was at 074410 UTC. Thereafter, there was no recorded ATC transmission between Nagpur tower and VT-FGE.

After the accident the radar situational data display was replayed and it was observed that the aircraft VT-FGE was at flight level 85 bearing 359/66.66 Nm (Approx. 6 Nm front of chindwara city) squawking transponder code 2000 at time 0757 UTC. Thereafter the signal dropped from the radar. The aircraft wreckage was found around 42 Nm away from the position the signal had dropped from the radar. If the aircraft was cruising at an average speed of around 110 to 120 knots then it would have taken at least 25 to 30 minutes for the aircraft to reach the accident site. If the aircraft had developed any technical snag then as per procedure it would have called the ATC or relayed its position from some

overflying aircraft. However there was no call made by VT-FGE. Secondly if any transmission/transponder failure would have occurred then also as per procedure he would have not continued the flight and diverted to Nagpur station for assistance. There was no transmission made by the aircraft reporting any distress or encountering any emergency.

The aircraft wreckage was recovered from the dense jungles near Village Sitadongri in Chindwara district which was around 6.18 NM off track from the designated flight track. It is evident that the cadet pilot deviated from the flight track and probably ventured into low flying into the hilly area as was cleared for FL 85 and the accident occurred at altitude of 2500 ft AGL. While carrying out low flying there is a possibility that the cadet pilot may have come very close to the hills in a nose down condition with high speed not realising the height of the trees on top of the hills. It is evident from the engine report that the engine was developing power at the time of impact and also the flaps were in retract position. Further the airspeed indicator recovered from the accident site recorded speed of the aircraft 178 knots which is only obtainable in nose down condition with maximum engine power. The cadet pilot misjudged the heights of the tall trees over the hill top and hit the top of the tree with high speed and thereafter lost control of the aircraft and crashed into the jungle which led to the fatal accident. The wreckage of the aircraft was spread over a large area and chopping off the trunk of a tree indicates the aircraft impacted with high speed which was also evident from the body of the cadet pilot which had disintegrated and spread over a large area.

From above it is inferred that the cadet pilot probably indulged into low flying which eventually resulted into a fatal accident. Pilot handling of the aircraft is a factor to the accident.

2.5 Circumstances leading to the Accident:

The trainee cadet pilot was cleared by the instructor to go for the solo long Navigation Non Stop cross country flight from Gondia to Gondia overflying Panchmarhi. The aircraft VT-FGE was painted on the radar after take-off from Gondia maintaining flight level 85, however at time 0757 UTC around 80 Nm from Gondia and 63.3 Nm from Nagpur the aircraft suddenly disappeared from the radar.

As per the circumstantial evidences the cadet pilot deviated from the flight track and indulged into low flying in nose down condition with high speed and engine power. The damages sustained by the aircraft reflects that while flying close to the hill the cadet pilot misjudged the heights of the tall trees over the hill top. While attempting to clear the obstacles over the hills it hit the top of a tree with high speed and thereafter lost control of the aircraft and crashed into the jungle which led to the fatal accident.

3. CONCLUSIONS:

3.1 Findings:

- a) The Certificate of Airworthiness and the Certificate of Registration of the aircraft was current/valid on the date of accident.
- b) The CRS was valid on the day of accident.
- c) The Cadet pilot was appropriately qualified to operate the training flight.
- d) All the concerned Airworthiness Directive, Service Bulletins, DGCA Mandatory Modifications on this aircraft and its engine were found complied with.
- e) The AME had carried out daily inspection schedule prior to incident flight at night and released the aircraft for flight.
- f) This accident occurred on the first flight of the day.
- g) The aircraft, VT-FGE took off from Gondia at 0709 UTC from Runway 04 and climbed to Flight Level 85 on radial 298 degrees for Panchmarhi.
- h) At time 0739 UTC VT-FGE came in contact with Nagpur tower and informed about the Non Stop cross country flight from Gondia - Panchmarhi - Gondia overflying.
- i) The cadet pilot informed ATC Nagpur its position and maintaining flight level 85. The cadet pilot reported the position as 298 radial and 45 DME outbound Gondia estimate Panchmarhi 0815 UTC and ETA back Gondia 0916 UTC on radial 298.
- j) Thereafter, there was no recorded ATC transmission between Nagpur tower and the aircraft VT-FGE.
- k) Senior cadet pilot informed the instructor that prior to the cross country flight the cadet pilot had come to him and requested for his mobile to click some photographs as he doesn't have a mobile to take photographs and will return it after the sortie.
- l) At time 1030 UTC, IGRUA intimated ATC Gondia that the ETA for the aircraft VT-FGE was 0916 UTC and the aircraft had not return back to Gondia till then.

- m) Due to shift change at Nagpur and Gondia the relieving controller did not brief the incoming controller about the aircraft VT-FGE as its position was overdue from its ETA. This non-adherence to the standard practices by the tower controllers delayed the search & rescue operations.
- n) Thereafter ATC Gondia contacted Raipur, Jabalpur and Bhopal to check the position of VT-FGE. However the aircraft VT-FGE was not in contact with any of these station. Thereafter ATC Gondia relayed the message through other overflying aircraft but there was no reply.
- o) Gondia ATC was also tried to contact the cadet pilot continuously on his mobile phone but his mobile phone was found switched off.
- p) As the aircraft was not traceable, at 1130 UTC full emergency was declared and Gondia ATC informed Mumbai FIC and Air Force to initiate the search and rescue operation for VT-FGE.
- q) Gondia ATC informed all local administration office and police station about missing aircraft in areas of Panchmarhi, Chindwara, Seoni, Nasingpur and Hosangabad.
- r) On 25.12.2013, Forest Officers from Chindwara district informed Police that an aircraft was found crashed near Village Sitadongri in Chindwara district, Madhya Pradesh. Thereafter the police information the Nagpur ATC.
- s) The aircraft wreckage was recovered from the dense jungles near Village Sitadongri in Chindwara district which was around 6.18 Nm away from the designated flight track.
- t) The cadet pilot after deviating from the flight track it appears was carrying out low flying into the hilly area.
- u) The body of the cadet pilot was found scattered around the aircraft wreckage. As per the post-mortem the doctors opined that the mode of death of cadet pilot was shock which was caused by excessive haemorrhage due to crush injury and damage to vital parts.
- v) After the accident the aircraft structure was completely destroyed. However the engine was sent for strip examination at DGCA approved shop. As per the shop report, the engine was running and delivering power at the time of accident.

- w) After the accident IGRUA instructors checked the few of the solo flight of the involved cadet recorded in the data card of Multi Function Display (MFD). The cadet pilot had carried out low flying on previous occasion. Since the data is checked randomly by the IGRUA instructors this could not be detected earlier and came to the knowledge only after the accident.
- x) While analysing the sorties prior to the accident of the cadet pilot it was observed that the cadet pilot had carried out low flying in nose down conditions with high engine power and negative pitch angles of around 15 degrees.
- y) The weather at the time of take-off from Gondia was fine with visibility 5KM. The enroute weather for the cross country flight was reported to be fine.

3.2 Probable cause of the accident:

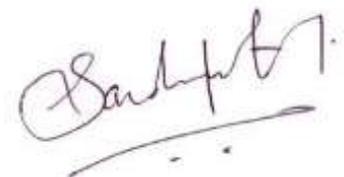
The cadet pilot deviated from his flight path and while flying low over the hills misjudged the heights of the tall trees over the hill top and while attempting to clear the obstacles hit the top of a tree and resulted into the fatal accident.

4. SAFETY RECOMMENDATIONS:

1. DGCA may consider monitoring of flights of all flying clubs to ensure flight performance and discipline.



(A.X. Joseph)
Deputy Director Air Safety Officer
Chairman Committee of Inquiry



Capt. Sandeep Patil
Member Committee of Inquiry

Place: New Delhi

Date: 11.09.2015