



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9509	
Aircraft Registration	ZS-SLS	Date of Accident	16/12/2015		Time of Accident	09:34Z
Type of Aircraft	Cessna 182Q		Type of Operation	Private Flight_(Part 91)		
Pilot-in-command Licence Type	PPL	Age	57	Licence Valid	Yes	
Pilot-in-command Flying Experience	Total Flying Hours	403,8		Hours on Type	295,2	
Last point of departure	Graaff-Reinet (FAGR), Eastern Cape					
Next point of intended landing	Plettenberg Bay (FAPG), Western Cape					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
13,23 nm west of Humansdorp, Eastern Cape (GPS S34° 01' 49.24" E024° 27' 48.36"); elevation 1462ft.						
Meteorological Information	Surface wind 230° at 10 knots; clouds FEW at 1500', SCT at 4600' Temperature 18.9°C and dew point 16,9 °C; QNH 1016					
Number of people on board	1+2	No. of people injured	1	No. of people killed	2	
Synopsis	The pilot accompanied by two passengers and a small dog departed from Wonderboom Airport at 0510Z on a private flight to Plettenberg Bay (FAPG) via Graaff-Reinet Airport (FAGR) for refuelling. The pilot indicated that he did not file a flight plan. At FAGR the aircraft was refuelled and they rested for approximately 30 minutes before taking off. The aircraft was on a 200° heading straight south for the scenic views in the Tsitsikama area. The pilot said they were flying at 3500ft AGL and clear of clouds. The official weather report indicated scattered clouds with different bases, between 1500ft and 4500ft AGL. The pilot said they experienced turbulence which made it difficult for him to control the aircraft. He said he did not remember impacting the mountain, but remembered waking up finding himself and passengers in the wrecked aircraft. All occupants suffered severe injuries. At 0934Z he called George tower (ATC) using his cell phone to advise ATC that they had had an accident. He advised ATC that they were on a mountain and that he could see a wind farm, but was not sure of their position. ATC initiated search and rescue and requested aircraft flying in the area to keep a look-out for a crashed aircraft. The aircraft was discovered an hour later and military and police helicopters were used to reach the accident site. When they arrived at the accident site they found that the two passengers were fatally injured. The pilot was airlifted to hospital, where he spent a month in a coma. He was discharged 8 weeks later. The investigation discovered that the aircraft had entered an area of turbulence, started losing height and impacted the mountain.					
Probable Cause Loss of control in turbulence conditions resulting in collision with the mountain (Lost control in adverse weather)						
SRP Date	28 March 2017		Release Date			

**AIRCRAFT ACCIDENT REPORT**

Name of Owner : African Aero Safaris
Name of Operator : African Aero Safaris
Manufacturer : Cessna Corporation
Model : Cessna 182Q
Nationality : South Africa
Registration Marks : ZS-SLS
Place : Humansdorp
Date : 16 December 2015
Time : 0934Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011) this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to establish legal liability.

Disclaimer:

This report is produced without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION**1.1 History of Flight**

1.1.1 The pilot, two passengers and a small dog were preparing for a flight to Plettenberg Bay. The pilot indicated that he had done his pre-flight and was airborne at 0510Z and the flight was uneventful. He did not file a flight plan and departed from Wonderboom Aerodrome (FAWB) on a private flight to Plettenberg Bay Aerodrome (FAPG) via a refuelling stop at Graaff-Reinet Airport (FAGR). The distance from FAWB to FAGR is 445nm and would have lasted 3h40 min in no-wind conditions. Their stop at FAGR only lasted 30 minutes and the aircraft was refuelled.

- 1.1.2 The pilot indicated that they took off from FAGR and climbed to 3500 feet above ground level (AGL). They routed on a southerly heading (200°), which would take them directly to the Tsitsikama area for scenic views. Air traffic services at George Airport said the aircraft never made radio contact with them, except during the emergency.
- 1.1.3 The pilot indicated that during the flight they remained clear of cloud and that the official weather report indicated there were scattered clouds in the vicinity with bases from 1500 to 4500 feet AGL. The pilot said he must have been about 10 km from Tsitsikama when the aircraft experienced severe turbulence and the aircraft started losing height rapidly.
- 1.1.4 The pilot said he was unable to control the aircraft and did not remember impacting the mountain. When he regained consciousness, he used his cell phone to call George tower (tower) at 09:34Z and advised them that they had had an accident and was unsure of their position. He advised tower that the only thing he could see was a wind farm in a distance. He gave ATC details of the flight and that there were three people on board, all were seriously injured. Tower initiated search and rescue (SAR) by alerting the Aeronautical Rescue Coordination Centre (ARCC) and South African Police Service (SAPS) of the aircraft that had had an accident in the mountains. An R44 operating in the vicinity spotted the wreckage an hour later.

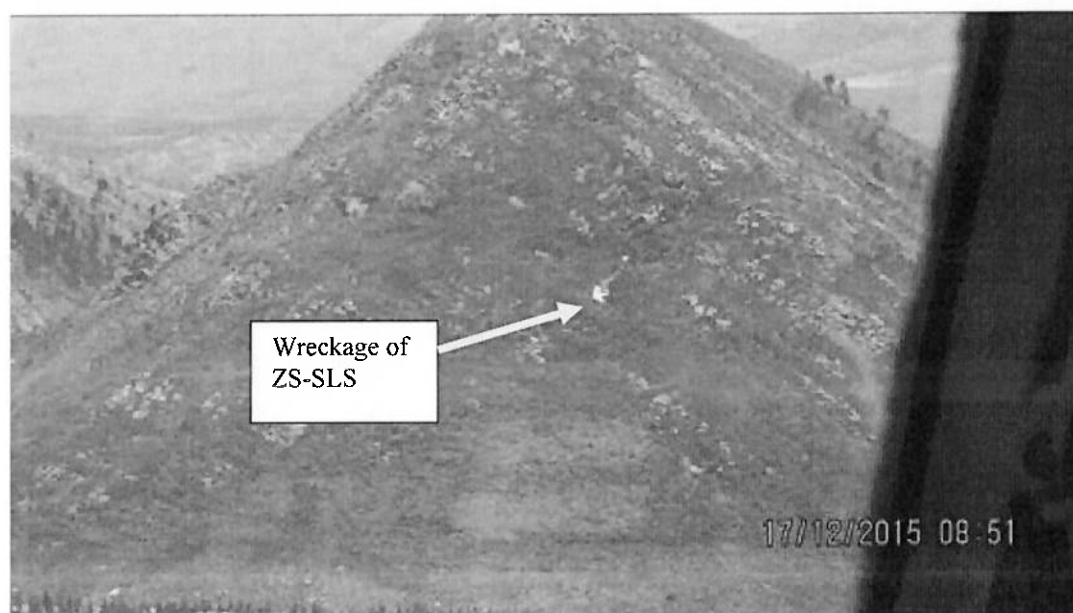


Figure 1: The aircraft is not easy to see due to white rocks on the mountain.

- 1.1.5 The aircraft had impacted the side of the mountain at an elevation of 1462 feet AMSL (GPS 34°01' 49.24" E024° 27' 48.36"S) near Humansdorp. The area was remote and inaccessible, and South African National Defence Force (SANDF) and

South African Police Services (SAPS) helicopters were used to drop off paramedic personnel and their rescue equipment. The team of AIID investigators was dropped off by SAPS near the accident site.

- 1.1.6 The investigation found that the aircraft's right wing first made contact with the mountain and then the aircraft skidded across the face of the mountain for several metres before coming to rest. Two of the occupants suffered fatal injuries and the pilot suffered severe injuries. The dog was not injured. He spent a month in the intensive care unit and was discharged two months after the accident. The aircraft was destroyed.



Figure 2: The aircraft flew due south. Green line is the track flown.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	2	-
Serious	1	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed.

1.4 Other Damage

1.4.1 The area around the wreckage was soaked with avgas fuel and some vegetation was damaged by the aircraft skidding across the mountain surface.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	57
Licence Number	027 233 7049	Licence Type	PPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night				
Medical Expiry Date	30 September 2016				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	403,8
Total Past 90 Days	16,8
Total on Type Past 90 Days	16,8
Total on Type	295,2

1.6 Aircraft Information

Airframe:

Type	Fixed undercarriage	
Serial Number	18266066	
Manufacturer	Cessna Aircraft Company	
Date of Manufacture	1978	
Total Airframe Hours (At time of Accident)	3488,6	
Last MPI (Date & Hours)	24/04/2015	3450,8
Hours since Last MPI	38,8	
C of A (Expiry Date)	13 April 2016	
C of R (Issue Date) (Present owner)	29/11/2011	

Operating Categories	7	Private
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Engine:

Type	Continental
Serial Number	465911
Hours since New	429,6
Hours since Overhaul	Not yet reached

Propeller:

Type	McCauley
Serial Number	777676
Hours since New	481,9
Hours since Overhaul	Not yet reached

1.7 Meteorological Information

Wind direction	230°	Wind speed	10	Visibility	Unknown
Temperature	18,9	Cloud cover	SCT	Cloud base	1500-4600
Dew point	16,9				

(ii) Surface observations:

A synop message recorded at Cape St. Francis and METARs from the Port Elizabeth (FAPE) weather station are included in Attachment C-1 and C-2, respectively. The bases of the low clouds reported at FAPE, which is located to the east of the accident area where the bulk of the clouds were sitting, were at 1500ft - 4600ft agl. These cloud bases were improving (lifting) over FAPA during the given period of investigation (between 0900 and 1030 UTC). Observed surface winds were moderate south-westerly (10kt) but fresh to strong and gust to the east, in the FAPE area. This suggests the passage of a coastal low in the FAPE area. Refer to Attachment C for observational data.

Figure 3: SAWS weather synopsis

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational equipment as approved at the time of certification by the regulator. No defects were recorded or reported prior to or during the accident flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication systems and none was reported unserviceable prior to the accident.

1.10 Aerodrome Information

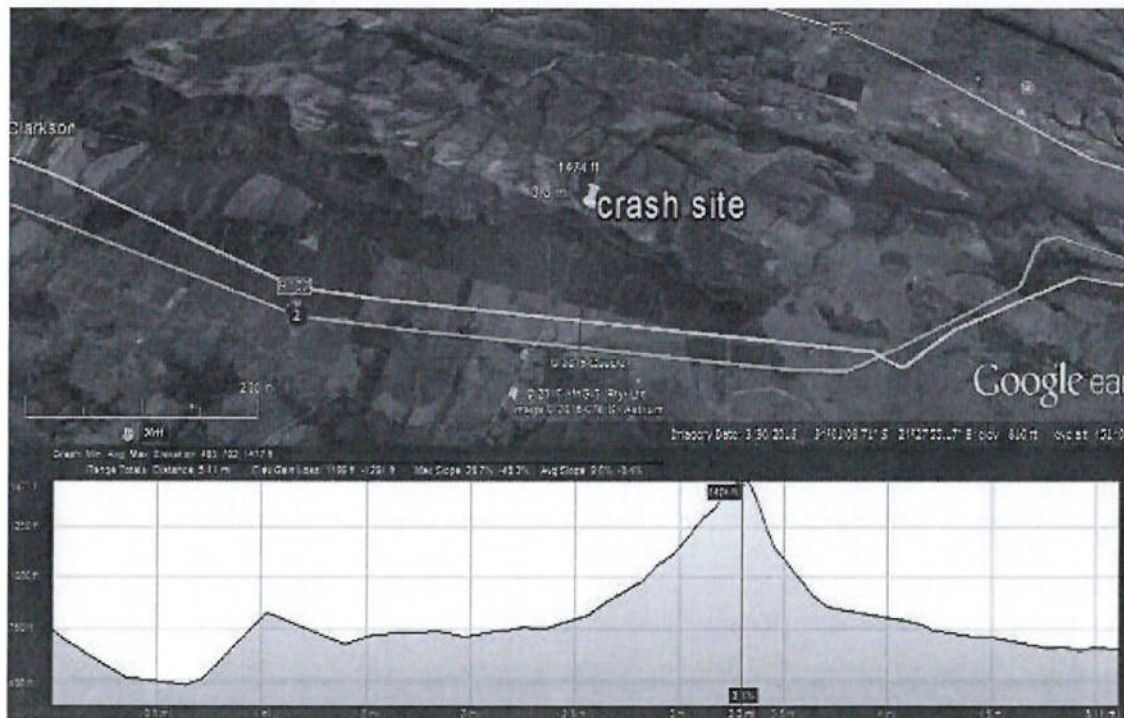


Figure 4: The area profile of the crash site

1.10.1 The accident did not happen at an aerodrome. The aircraft impacted the side of a mountain before coming to a stop.

1.11 Flight Recorders

1.11.1 The aircraft was not required by regulations to have flight recorders fitted.

1.12 Wreckage and Impact Information

1.12.1 According to the pilot, he was maintaining 3500 feet AGL from FAGR when they encountered turbulence. The aircraft lost approximately 2000 feet in height and the pilot lost control of the aircraft before impacting the side of the mountain with the right-hand wing tip. It is not clear what was the aircraft's heading was when it impacted the mountain. After impact the aircraft continued to skid across the

mountain surface before coming to rest. The pilot had no recollection of how they impacted the mountain.



Figure 5: Aircraft wreckage on an inclined slope

1.12.2 Aircraft debris, which included the propeller, airframe panels and one of the doors, was scattered over the area between first point of impact and the point where the aircraft came to rest. It was difficult to take measurements of all debris due to hostile terrain.



Figure 6: Aircraft parts strewn over the mountain

1.12.3 The accident site, which was high on the side of the mountain (1462ft AMSL), would have been difficult to access without the assistance of SAPS. The area was sloping down and slippery due to cloudy conditions prevailing earlier. For the sake of all personnel's safety, the wreckage had to be secured by ropes before occupants could be freed.

1.13 Medical and Pathological Information

1.13.1 After the accident, the pilot managed to contact George tower using his cell phone. He advised George tower that there were three occupants and that they were all seriously injured. The other two occupants succumbed to their injuries before rescue personnel reached them. The pilot, who suffered multiple injuries (one to the head as well), was airlifted to St George's Hospital and remained in hospital for two months.

1.13.2 The post-mortem and blood toxicology reports of the passengers were still outstanding at the time of compiling this report.

1.14 Fire

1.14.1 There was no post-impact fire, but there was a strong smell of avgas fuel in the area.

1.15 Survival Aspects

1.15.1 The accident was considered not survivable due to the damages sustained by the aircraft.

1.16 Tests and Research

1.16.1 None

1.17 Organisational and Management Information

1.17.1 The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.

1.17.2 The last MPI was certified on the 24 April 2015 by AMO 0247 at 3292,6 airframe hours and the aircraft had flown a further 196 hours.

1.18 Additional Information

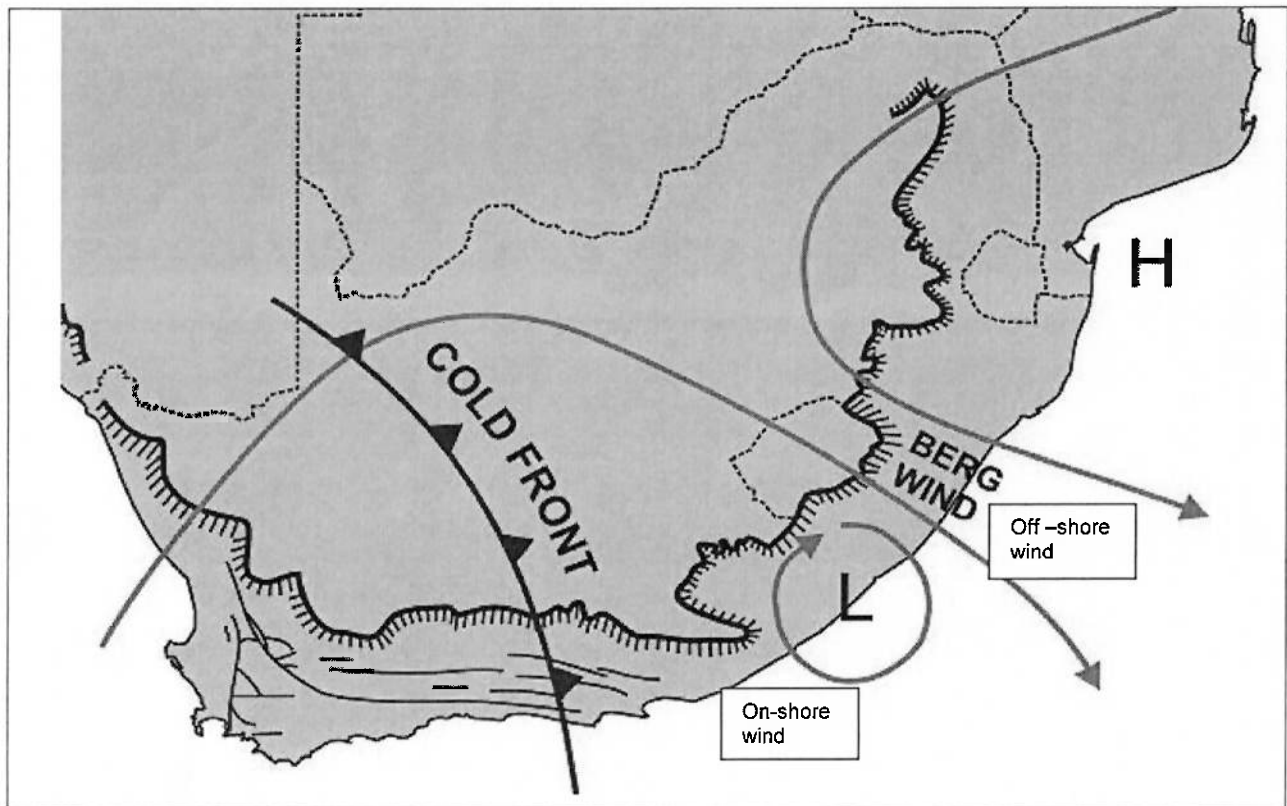


Figure 6: Typical coastal weather conditions in the area

The weather pattern commonly associated with a berg wind and accompanying coastal low along the coast of South Africa. The light blue lines indicate surface wind directions. The "H" indicates the position of a portion of the South Indian Ocean Anticyclone (high pressure system); the "L" indicates the position of the coastal low.

1.18.1 Extract from Tyson, P.D.; Preston-Whyte, R.A. (2013). Coastal Lows and Berg Winds. In: *The Weather and Climate of Southern Africa*. (Second ed.). Cape Town: Oxford University Press. pp. 77, 127, 144–145, 187–188, 190–194, 203–204, 272

Coastal lows are initiated by the interaction of large-scale weather systems such as the quasi-permanent South Atlantic and South Indian Ocean Anticyclones (high-pressure systems), the cold fronts that approach the subcontinent from the South Atlantic Ocean, as well as the pressure systems on the plateau, causing air that has been warmed on the plateau by 2–3 days of sunny weather to flow down the Great Escarpment on to the coastal plain either on the west or south coasts of the country (i.e. causing a berg wind). The descending air warms up adiabatically, heating up the coastal plain, while at the same time causing an off-shore wind which blows the surface water away from the land to be replaced by cold water which wells up from the depths. This upwelling of cold subsurface water from the ocean increases the ocean-

land temperature difference, causing an on-shore wind. The on-shore airflow is strengthened by the fact that the berg wind is not only hot, but it is also "stretched" vertically due to the sudden lowering of the floor over which it moves below the escarpment. Its low density, therefore, lowers the atmospheric pressure on the coast.^[4] This low pressure area caused by the berg wind draws the dense moist maritime air onshore to the right of the off-shore berg wind. Shear forces between these on- and off-shore winds on the right hand side of the berg wind tend to cause clockwise (or cyclonic) rotation of the air in this region. In addition, on reaching the escarpment the maritime air curves to the right round the low-pressure zone due to Coriolis forces (in the southern hemisphere) accentuating the cyclonic circulation of the "coastal low". The entire system is capped by an inversion consisting of a layer of warm air that has moved horizontally off the plateau at the level of the upper edge of the escarpment. This inversion layer prevents the upwardly spiralling cyclonic air of the coastal low from rising above 1000–1500 m, thus preventing it from causing significant precipitation.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

- 2.1 The pilot was properly qualified for this flight and his medical certificate was up to date.
- 2.2 The pilot did not file a flight plan for a flight from Wonderboom Airport (FAWB) to Platenberg Bay (FAPG) via Graaff-Reinet (FAGR) for refuelling. After completing pre-flight checks they took off at 05:10Z and headed direct to FAGR. At FAGR they refuelled and rested for 30 min before their next departure.
- 2.3 On their route to FAPG the pilot opted for a southerly heading (200°) via Tsitsikama for its scenic views before reaching their destination. He indicated that they maintained 3500ft AGL and were not in contact with any air traffic service unit. The pilot said they experienced severe turbulence, that the aircraft lost height rapidly and that he was unable to control it. He did not remember impacting the mountain. When he regained consciousness, he was in a wrecked aircraft and the passengers had sustained serious injuries and were trapped.
- 2.4 At 09:34Z the pilot used his cell phone to call George Tower and advised them that his passengers and himself had been injured in an accident and required assistance. The pilot said he was unaware of his position and told tower that the

only thing he could see was a wind farm in a distance. Search and rescue was initiated and aircraft in the area were requested to look out for a crashed aircraft. An hour later an R44 spotted the wreckage of an aircraft on the side of the mountain. The terrain was not easy to access, since it was densely vegetated, steep and slippery because of the clouds present earlier that day.

- 2.5 SASAR (South African Search and Rescue) personnel were assisted by the SANDF helicopter that hoisted them down to the accident site with their equipment. The wreckage had to be secured first before anything could be done. It was on the edge of the mountain and jaws of life had to be used to free the trapped passengers. The pilot was taken to hospital, but the two passengers succumbed to their injuries at the accident site.
- 2.6 According the South African Weather Services (SAWS) report, at the time of the accident there were scattered clouds with bases from 1500ft to 4500ft AGL. The report also indicates that there were coastal lows; see paragraph 1.18.1 above.
- 2.7 The pilot indicated that they were cruising at 3500ft AGL before losing height drastically. It is unclear whether he lost consciousness before impacting the mountain. An examination of the formation of coastal lows (see above), shows that the area they were flying in tends to form coastal lows and that when the berg winds flow from inland to the coast, they have a downward force, causing the aircraft to lose approximately 2000ft in height. It is probably at this point that the pilot was knocked unconscious and only came to after the accident.

3. CONCLUSION

3.1 Findings

- 3.1.1 The aircraft was certified, equipped and maintained in accordance with existing regulations.
- 3.1.2 The aircraft was airworthy when it departed on the flight.
- 3.1.3 The aircraft was under power when it impacted the mountain.
- 3.1.4 Due to the destruction of the aircraft by impact forces, it could not be determined whether any pre-impact failure or system malfunction contributed to this accident.

3.1.5 The pilot was licenced and qualified for the flight in accordance with existing regulations.

3.1.6 The pilot was admitted to St George's hospital and was in a coma for a month. He was released two months after the accident.

3.2 Probable Cause/s

3.2.1 Loss of control in turbulence conditions resulting in collision with the mountain (Lost control in adverse weather)

4. SAFETY RECOMMENDATIONS

4.1 None

5. APPENDICES

5.1 Annexure A – SAWS synopsis

5.2 Annexure B – satellite images by SAWS

Annexure A

SUMMARY OF OBSERVED WEATHER CONDITIONS CLOSER TO THE ESTIMATED TIME OF OCCURRENCE OF THE AIRCRAFT ACCIDENT

(i) Satellite image:

Low clouds were observed along the south coast including the accident area ([Attachment A](#)). The low clouds are likely to have caused rain/drizzle and/or mist, as well as obscuration to the mountains in the vicinity of the accident site (mountain range in a north-east orientation along the south coast on the top image in [Attachment A](#)).

(ii) Surface observations:

A synop message recorded at Cape St. Francis and METARs from the Port Elizabeth (FAPE) weather station are included in [Attachment C-1](#) and [C-2](#), respectively. The bases of the low clouds reported at FAPE, which is located to the east of the accident area where the bulk of the clouds were sitting, were at 1500ft - 4600ft agl. These cloud bases were improving (lifting) over FAPE during the given period of investigation (between 0900 and 1030 UTC). Observed surface winds were moderate south-westerly (10kt) but fresh to strong and gust to the east, in the FAPE area. This suggests the passage of a coastal low in the FAPE area. Refer to [Attachment C](#) for observational data.

(iii) Vertical wind and temperature profile:

A Skew-T logP diagram recorded by a descending aircraft at the Port Elizabeth Airport (FAPE) at approximately 1042 UTC is included in [Attachment B](#). The ascent also shows an onshore flow with fresh to strong south-westerly winds (15-22kt) at levels closer to the surface.

Annexure B

