AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8727		
Aircraft Registration	**ZS-NAF**	**Date of Accident**	28 December 2009		**Time of Accident**	0755Z	
Type of Aircraft	Beech Bonanza F33A		**Type of Operation**		Private		
Pilot-in-command Licence Type	Private Pilot		**Age**	61	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		1 228.1		Hours on Type	Approx. 959.9	
Last Point of Departure	Vereeniging Aerodrome (FAVV), Gauteng						
Next Point of Intended Landing	Margate Aerodrome (FAMG), KwaZulu-Natal						
Location of the Accident Site with Reference to Easily Defined Geographical Points (GPS readings if possible)							
Platberg mountain, Free State (GPS co-ordinates: S28º15.44 E029º13.34 at an elevation of 6 194 ft)							
Meteorological Information	Surface wind 310º at 10 knots, visibility <1 000 m, temperature 20º, clouds BKN at 800 ft and 1 000 ft						
Number of People on Board	1 + 3	**No. of People Injured**	0	**No. of People Killed**	4		

Synopsis

The pilot, accompanied by three passengers, took off from Vereeniging Aerodrome (FAVV) on a private flight to Margate Aerodrome (FAMG). The flight was operating on an instrument flight rules (IFR) flight plan. The pilot maintained contact with Johannesburg East on frequency 124.5 MHz for the duration of the flight. The flight was uneventful until the pilot broadcasted to Johannesburg East ('Information') to report that he was experiencing an electrical problem and would like to divert to Harrismith Aerodrome (FAHR). Approximately six minutes after the pilot reported that they were diverting, the plane disappeared from the radar screen. The wreckage of the aircraft was located the same day at Platberg Mountain, 5.6 nm east of Harrismith Aerodrome.

The aircraft was destroyed by impact forces and all four occupants of the aircraft were fatally injured.

Instrument meteorological conditions (IMC) prevailed at the time of the accident.

Probable Cause

During controlled flight, the aircraft crashed into terrain during instrument meteorological conditions.

Contributory factor: undetermined electrical problem and loss of situational awareness

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Venter JA
Manufacturer : Beech Aircraft Corporation
Model : F33A
Nationality : South African
Registration Marks : ZS-NAF
Place : Platberg Mountain, Free State
(GPS co-ordinates: S28^{0}15.44 E029^{0}13.34)
Date : 28 December 2009
Time : 0755Z

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 two hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997), this report was compiled in the interests 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 given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Saturday, 28 December 2009, the pilot, accompanied by three passengers, flew the aircraft on a private flight from Vereeniging Aerodrome (FAVV) to Margate Aerodrome (FAMG). The pilot filed a flight plan with the Johannesburg Briefing department of the Air Traffic and Navigation Services (ATNS) company, which authorised him to perform an instrument flight rules (IFR) flight by day. The flight plan was activated by the air traffic centre at 0706Z. The flight was uneventful until the pilot broadcasted to Johannesburg East ('Information') to report that he was experiencing an electrical problem. The pilot informed the information centre of his intention to divert to Harrismith Aerodrome (FAHR); the aircraft was maintaining flight level (FL) 090 at that time and FAHR was approximately 12.7 nm to the right-hand side of the pilot. The pilot was flying in a southerly direction and had to make a right-hand bank turn to redirect the aircraft in the north-westerly direction back to FAHR.

1.1.2 After the pilot reported his intentions to divert to FAHR, at approximately 0746Z, Johannesburg East communicated back as follows: "There's no reported traffic. If you want to, turn right en route to FAHR, no reported traffic for your descent." The pilot's response to the controller was: "Thank you, sir, descending to Harrismith."

1.1.3 The controller on duty observed the aircraft on the radar screen descending to FL074 and then suddenly disappearing from the radar screen at 0752Z. The controller on duty stated that he requested another aircraft, which was on the vicinity to look for the aircraft at FAHR. The other aircraft landed at FAHR and the pilot broadcasted to Johannesburg East that ZS-NAF was not at FAHR. The aircraft was unable to take off again to start the search for ZS-NAF due to the unfavourable weather conditions, namely lack of visibility.

1.1.4 At approximately 0753Z, South African Search and Rescue (SASAR) received an emergency locator transmitter (ELT) beacon distress signal from a location in the Harrismith area. SASAR immediately activated a ground-and-air search-and-rescue operation in the location where the ELT beacon signal was transmitted. The ground-and-air search-and-rescue operation was terminated by SASAR at approximately 1127Z when information that the wreckage of an aircraft was spotted on the mountain was received from the air search-and-rescue team. SASAR received information from the search-and-rescue team that the aircraft (ZS-NAF) was involved in an accident and that all occupants were fatally injured. The aircraft was destroyed in the accident sequence.

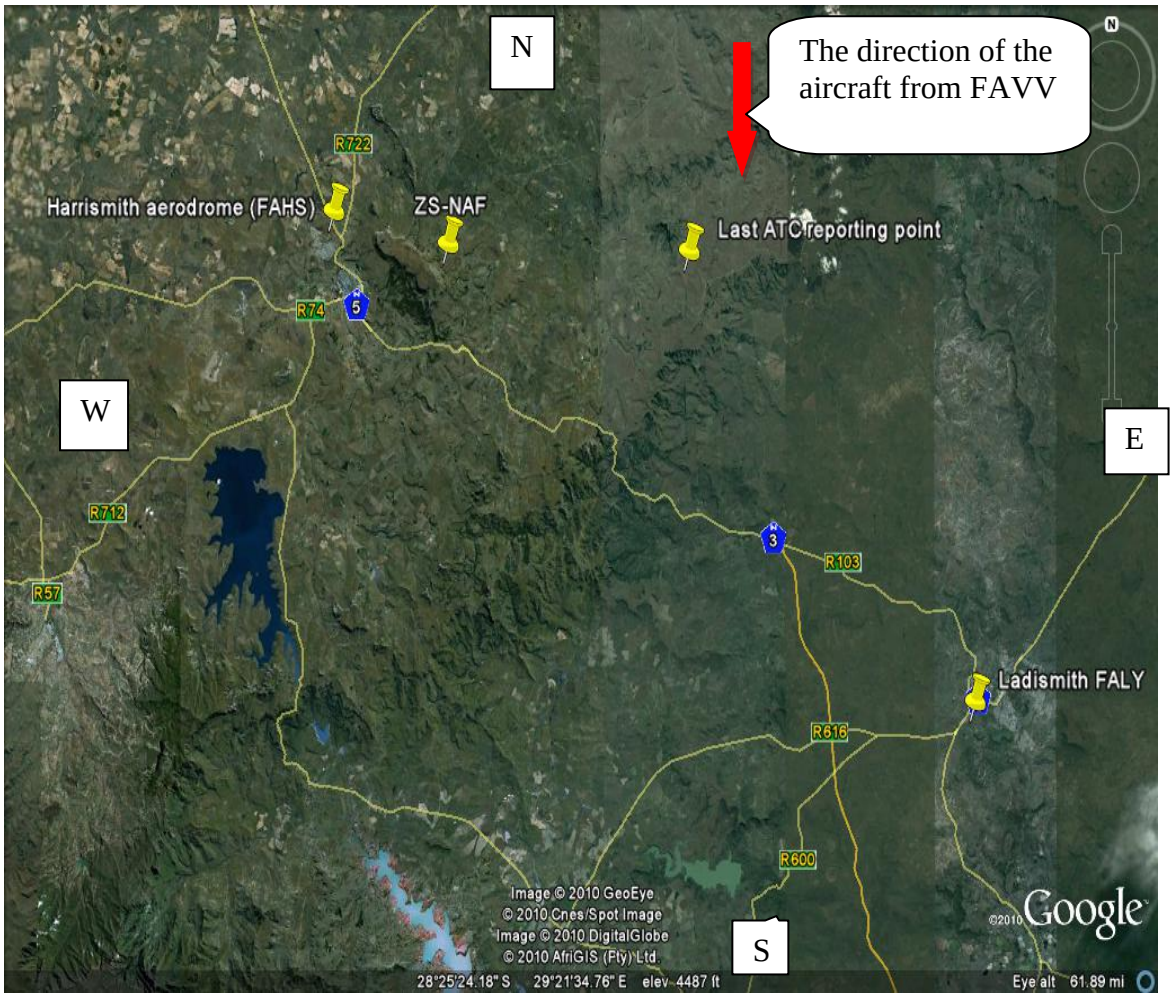

Figure1: The flight path of ZS-NAF

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	3	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed in the accident sequence.

Figure 2: The damage caused to the aircraft

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1 Pilot-in-command:

Nationality	South African	Gender	Male	Age	61
Licence Number	**********	Licence Type	Private Pilot		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument rating and Night rating				
Medical Expiry Date	30 September 2010				
Restrictions	Corrective lenses				
Previous Accidents	None				

1.5.2 Pilot-in-command Flying Experience:

Total Hours	1 228.1
Total Past 90 Days	6.2
Total on Type Past 90 Days	6.2
Total on Type	Approx. 959.9

Note: The pilot logbook could not be located during the course of the investigation. The flying hours above were obtained from the South African Civil Aviation Authority (SACAA) pilot's file, indicating his last pilot's licence renewal, dated 11 October 2009. The instrument flight rule test was done on 11 October 2009.

1.6 Aircraft Information

1.6.1 Airframe:

Type	F33A	
Serial Number	CE1553	
Manufacturer	Beechcraft Aircraft Corporation	
Date of Manufacture	1991	
Total Airframe Hours (At Time of Accident)	Approx. 1 709.4	
Last MPI (Date & Hours)	14 November 2009	1 698.0
Hours Since Last MPI	Approx. 11.4	
C of A (Issue Date)	18 October 1999	
C of R (Issue Date) (Present Owner)	10 October 2001	
Operating Categories	Standard	

Note: Due to the level of destruction, the investigators were unable to locate the Hobbs meter or tachometer reflecting the airframe hours at the time of the accident. Furthermore, neither the flight folio nor charts could be found after the accident.

1.6.2 Engine:

Type	Teledyne Continental IO-520-BB
Serial Number	1000978
Hours Since New	Approx. 11.4
Hours Since Overhaul	TBO not reached

On 6 October 2009, the aircraft was fitted with a newly rebuilt engine, as the engine had reached life limit. On 3 November 2009, a mandatory service bulletin was issued by the engine manufacturer (Teledyne Continental Aircraft Engine); the purpose of the bulletin was to disseminate information on the identification of TCM engines (new, overhauled, rebuilt or repaired) assembled with hydraulic lifters identified by part numbers 657913, 657915 and 657916, and removal of those lifters from service. The aircraft ZS-NAF was one of the aircraft to which the bulletin applied. The aircraft was recalled after flying 9.3 hours, and the lifters were installed on 24 November 2009 by an approved aircraft maintenance organisation (AMO).

1.6.3 Propeller:

Type	McCauley 3A32C406C
Serial Number	901626
Hours Since New	1 709.4
Hours Since Overhaul	995.8

Note: These were the last hours recorded in the propeller logbook on 11 November 2009.

1.6.4 Electrical system:

The system circuitry is the single-wire, ground-return type, with the aircraft structure used as the ground return. The battery ON-OFF switch, the alternator ON-OFF switch and the magneto/start switch are located on the left subpanel. The circuit breaker panel is located on the right subpanel and contains circuit breakers for the various electrical systems. Some switch-type circuit breakers are located on the left subpanel.

Battery

14 -Volt system

A 35 ampere-hour, 12 V battery is located on the right forward side of the firewall.

Alternator

14 Volt- systems

A 70 A, 12 V, gear-driven alternator is standard equipment. The alternator is designed to maintain approximately 70 A output at 1 700 revolutions per minute (RPM) to provide aircraft electrical power.

1.7 Meteorological Information

Below is information as obtained from an official weather report from the South African Weather Services (SAWS).

1.7.1 Surface analysis:

A trough of low pressure was present over the central interior of the country with a high pressure over the north-eastern part of the country. There was a lot of moist air in circulation east of the trough that caused cloudy, misty conditions over the eastern escarpment. The location of the accident site was also within the escapement area.

1.7.2 Satellite image:

The 0800Z satellite image shows cloudy conditions in the Harrismith area.

1.7.3 Weather conditions in the vicinity of the accident:

Wind Direction	310°	Wind Speed	10 kt	Visibility	< 1 000 m
Temperature	20°C	Cloud Cover	BKN	Cloud Base	800 ft and 1 000 ft
Dew Point	15°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as per the standard equipment list approved by the regulator. There were no recorded defects with respect to navigational equipment prior to or during the flight. The aircraft was fitted with a KFC 200 autopilot and a 430 GNS GPS.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as per the standard equipment list approved by the regulator. There were recorded defects to communication equipment prior to the flight.

1.9.2 The aircraft was in communication with Johannesburg East on frequency 124.5 MHz. At 0740Z, the aircraft transmitted on the Johannesburg frequency and the conversation proceeded as follows:

Time	**Station transmitting**	**Text of transmission**
07:40:10Z	ZS-NAF	Johannesburg East, NAF, good morning.
07:40:17Z	ATC	NAF, good morning, Joburg, no reported traffic FL90, report LYV.
07:40:23Z	ZS-NAF	Thank you, sir, FL090, LYV next, NAF.
07:45:25Z	ZS-NAF	Johannesburg Information, un Johannesburg East, NAF.
07:46:30Z	ATC	NAF go ahead.
07:46:40Z	ZS-NAF	Johannesburg East, NAF.
07:46:46Z	ATC	NAF, Joburg, go ahead.
07:46:47Z	ZS-NAF	Sir we are experiencing an electrical problem, we request to divert to Harrismith.
07:46:54Z	ATC	NAF there's no reported traffic. If you want to, turn right en route to Harrismith, no reported traffic for your descent.
07:47:01Z	ZS-NAF	Thank you, sir. Descending to Harrismith.
07:48:25Z	ATC	NAF, Joburg.
07:48:36Z	ATC	NAF, Joburg.
07:48:38Z	ZS-NAF	Joburg, NAF.
07:48:40Z	ATC	Okay, just confirm you'd like your search to remain with Johannesburg plus one hour?
07:48:58Z	ATC	NAF, did you copy, over?
07:49:02Z	ZS-NAF	I copied, thank you, sir.
07:49:04Z	ATC	I enquired about your search and rescue; do you want it to remain in force?

07:49:08Z	ZS-NAF	To remain in force at this stage.
07:49:09Z	ATC	Thank you. Will call them or will you give them a telephone call?
07:49:17Z	ZS-SXL	Uh, Joburg East from SXL, NAF advises he would like his search and rescue to remain intact.
07:40:22Z	ATC	SXL, thanks very much. If you could ask him there to give us a call when he's safe on the ground at Harrismith. Thanks sir.
07:49:31Z	ZS-SXL	Thanks, I'll advise him accordingly. Break, NAF from SXL, Joburg East advises just give them a telephone call when you are safe on the ground in Harrismith.

1.10 Aerodrome Information

1.10.1 The accident did not occur on an aerodrome. The accident occurred on the Platberg mountain at an elevation of 6 194 ft, GPS co-ordinates S28^{0}15.44 E029^{0}13.34.

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR), and neither was required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information

1.12.1 The location of the accident site was on Platburg mountain, GPS co-ordinates S28^0 15.44 E029^{0}13.34 at an elevation of 6 194 ft. Evidence suggested that the aircraft was heading in north-westerly direction towards FAHR.

1.12.2 The aircraft broke up in the ground impact sequence, shedding its components and parts in the wreckage path. The location of the wreckage was approximately 5 m away from first point of impact.

1.12.3 The location of the propeller was approximately 3 m from the main wreckage. The damage caused to the propeller indicated that it was rotating when it impacted the ground.

1.12.4 Evidence suggested that the undercarriage was still retracted into the fuselage at the time of the impact.

1.12.5 The magnetos were damaged and the alternator was not found at the accident site. The instrument panel was crushed and damaged by the impact forces. All the knobs were loose during the onsite investigations.

1.12.6 The GPS was recovered but was not downloaded due to damage. No flight (IFR/VFR) charts were found at the accident site.

Figure 3: The wreckage distribution

Figure 4: The damaged propeller

1.13 Medical and Pathological Information

1.13.1 Due to the disruption of the aircraft cockpit and cabin area, all aircraft occupants were fatally injured.

1.13.2 According to the post-mortem report, all occupants of the aircraft were fatally injured due to multiple injuries. There were no toxicology tests done.

1.14 Fire

1.14.1 There was no evidence of pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 Due to the effect of the high-impact forces sustained by the aircraft, which crumpled the entire cockpit, and the extent of the damages to other parts of the fuselage, the accident was not considered survivable.

1.15.2 The aircraft was located approximately four hours after SASAR received an ELT beacon distress signal from the aircraft. Due to the nature of the site, it was very difficult for the medical team to access the site. The bodies of the occupants of the aircraft were airlifted from the wreckage by a helicopter.

1.16 Tests and Research

1.16.1 The propeller was sent to a metallurgist for further investigation. The following report was produced by the metallurgist:

"The visual examination revealed propeller blades 1 and 2 with severed tips, propeller blade 3 fractured from the hub and the spinner severely damaged on impact. Cutting marks in the spinner suggest that as the spinner lost rotational speed on impact, propeller blades 1 and 2 impacted the spinner at the respective positions, thus signifying a non-stationary propeller on impact.

The impact-damaged spinner was found pressed over and covering the fractured hub position at propeller blade 3. Therefore, it can be deduced that propeller blade 3 was severed from the propeller hub prior to the final impact of the spinner. The leading edge of propeller blade 3 showed extensive damage, suggesting rotational speed on impact.

The variation in damage to the three blades can be attributed to the levels of available kinetic energy during the impact sequence; blade 3 impacted the ground and with more kinetic energy available (high relative RPM) and was severed from hub, followed by blade 1 with fractured tips, and finally blade 2, which was severely damaged and was found bent in the aft direction on impact, typical of a high-angled, lower RPM impact scenario.

The propeller hub as well as blade 2 revealed fracture surfaces with no clear indications of pre-impact crack formation. Following the fracture propagation at the position of blade 3 and comparing to the fractures starting at the blade 2 position, it can be reasoned that blade 2 was almost severed from the hub in the same manner.

The inside of the propeller hub revealed the positions of the remaining blade 1 and 2. Indentation marks on the blade stubs made by the corresponding counterweights (only one counterweight from blade 3 was retrieved) clearly indicate the relative positions of the blades on impact. After lining up these impact positions, an angle of attack of blades 1 and 2 could be determined. This angle of attack, taking into account that slight deviations may be possible due to impact, corresponds more closely with that of a constant-speed propeller under power than a 'fully feathered' position.

Discussion and Conclusions

Note: all conclusions are based on the investigation results obtained from the

supplied parts only. Some sections of the relevant assembly could not be located at the crash site or from the third party.

Taking into account that the alleged impact ground speed is considered to be slower than typical cruising ground speed, the effect that the (lower) airspeed will have on the RPM of the propeller in the fully feathered position, and the resistance on the rotating propeller from the six-cylinder (assume non-operating) engine, it is unlikely that the level of damage to the propeller blades and hub can be attributed to a non-operational engine leaving constant speed propeller in the fully feathered position.

The angle of attack of the remaining blades on impact also suggests that engine oil pressure was in fact available to activate the constant speed mechanism. As this is a function of the throttle and other cockpit settings, it will be almost impossible to conclusively determine the percentage of power output of the aircraft engine from the supplied parts alone at the moment of impact."

It was concluded that the propeller was rotating at the time of the accident but the percentage of power produced was not determined. This conclusion is based on the evidence of the propeller damages and the test above.

1.16.2 During inspection of the wreckage, there was no obvious visible damage to the electrical wires that could be linked to the cause of the electrical problem experienced by the pilot.

1.17 Organisational and Management Information

1.17.1 This was a private flight. The pilot was the owner of the aircraft.

1.17.2 The aircraft maintenance organisation (AMO) that certified the last mandatory periodic inspection (MPI) on the aircraft prior to the accident was correctly approved.

1.18 Additional Information

1.18.1 Account from the deceased pilot/owner's friend:

The deceased pilot/owner's friend indicated to the investigators that he and the deceased pilot were good friends on both a business and a social level. They both flew on a regular basis over the last 3–4 years, at least monthly and sometimes as much as 3–4 times a month. He informed the investigators that he regarded the deceased pilot as a very competent pilot who allowed no margin for any chances, and he would never hesitate to fly with him as pilot. During the time that they flew together, the friend learnt a lot about the technical history of ZS-NAF. He indicated that in the last 3–4 months before the accident, they flew less as ZS-NAF's engine neared 1 700 hrs and the pilot needed to go to his Botswana practice. Around September, the aircraft received a new engine and at the same time, the deceased pilot was due for his instrument rating renewal. The pilot called the friend for a flight with the new engine but had to cancel the following day as the AMO reported a problem with the alternator as well as an exhaust baffle issue. After the pilot received the aircraft from the AMO, he and the friend went on a short casual flight and the pilot informed the friend that he was experiencing problems with the

autopilot. He then returned the aircraft to the AMO and was quite disappointed as he had to postpone his instrument rating renewal. During November, they flew again and the pilot said that when he slave the autopilot to NAV1, the aircraft drifted off course. The pilot had to make corrections to fly under instrument rules. The friend stated that the pilot informed the testing officer who was doing his instrument flight rating test about the autopilot problem. On 3 or 4 December 2009, the pilot and friend both went for a casual flight as the pilot wanted to make sure that the autopilot issue/NAV1 issue had been resolved. After the pilot took off, he had to return back to land as he needed visuals and was concerned about clouds, and the 'storm scope' indicated some activity at about 50 nm. On the 8 December 2009, they took the aircraft for a casual flight again, heading towards Vaaldam/Frankfort area. The pilot tested the autopilot/NAV1 and was fairly convinced that the issue had been sorted out, but that he would still keep an eye on it.

1.18.2 Situational awareness (SA):

Situational awareness is not simply a mental picture of aircraft location. Rather, it is an overall assessment of each element of the environment and how it affects a flight. On one end of the SA spectrum is a pilot who is knowledgeable of every aspect of the flight; consequently, such a pilot's decision-making is proactive. With good SA, such a pilot is able to make decisions well ahead of time and evaluate several different options. On the other end of the SA spectrum is a pilot with poor SA; such a pilot lacks vision of future events and is forced to make decisions quickly, often with limited options.

During a typical IFR flight, a pilot operates at varying levels of SA. For example, a pilot may be cruising to his or her destination with a high level of SA, when ATC issues an unexpected standard terminal arrival route (STAR). Since the pilot was not expecting the STAR and is not familiar with it, SA is lowered. However, after becoming familiar with the STAR and resuming normal navigation, the pilot returns to a higher level of SA. Factors that reduce SA include distractions, unusual or unexpected events, complacency, high workload, unfamiliar situations and inoperative equipment. In some situations, a loss of SA may be beyond a pilot's control. For example, a pneumatic system failure and associated loss of the attitude and heading indicators could cause lower SA.

Source:
http://www.faa.gov/library/manuals/aviation/instrument_flying_handbook/media/FAA-H-8083-15A%20-%20Chapter%2011.pdf

1.18.3 Aircraft fuel and capacity:

According to the pilot's son on 26 December 2009, he and his father (the pilot) took off from Vereeniging for a local flight around the Vaaldam and landed back at the Vereeniging aerodrome. After landing, they filled up the aircraft tanks with the AVGAS that was kept in the hangar. They filled up the left wing completely and then added the last 7.9 US gallons to the right wing, which was just over half full when they landed.

The aircraft is designed for operation on 100/130 grade aviation gasoline. However, the use of 100LL (Blue) is preferred. The fuel capacity is 50 US gallons and 44 US gallons is usable. The engine-driven fuel injector pump delivers approximately 10 US gallons of excess fuel per hour, which bypasses the fuel control and returns to the tank being used.

The aircraft was refuelled two days prior to the flight; the left-hand tank was completely filled (approximately 25 US gallons) and the right-hand tank was filled to just above half full (approximately 15 US gallons). The total fuel on board was approximately 40 US gallons with 34 US gallons usable fuel. The total flying time was 2 hours 10 minutes according to the flight plan. With the total of 34 US gallons on board, the aircraft's endurance was approximately 3.4 hours.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 28 December 2009, the pilot, accompanied by three passengers, took off from Vereeniging Aerodrome to Margate Aerodrome. The pilot filed an instrument flight rule (IFR) flight plan for the flight. The pilot reported an electrical problem to ATC and requested to divert to Harrismith Aerodrome. The aircraft impacted a mountain at an elevation of 6 194 ft while diverting to Harrismith Aerodrome.

2.2 The pilot was properly licensed and qualified for the flight. The pilot had more than 1 000 hours flying hours and was the owner of the aircraft since 2001. On 11 October 2009, the pilot did his instrument flight rule test using the same aircraft. The pilot's experience and recent training should have prepared him to fly under instrument flight rules.

2.3 The pilot was flying IFR in IMC conditions before he reported that he was experiencing electrical problems. The pilot requested to divert to Harrismith Aerodrome, which was 12.7 nm behind him. The next aerodrome was Ladysmith Aerodrome, which was 27 nm ahead of him.

2.4 The propeller analysis indicated that the engine was operational at the time of the accident. It was impossible to determine the power output of the aircraft engine at the time of impact.

2.5 Both of the aircraft's fuel tanks ruptured on impact. It was impossible for the investigators to measure the actual amount of fuel in the aircraft at the time of the accident. The aircraft was refuelled two days prior to the flight; the left-hand tank was completely filled (approximately 25 US gallons) and the right-hand tank was filled to just above half full (approximately 15 US gallons). The total fuel on board was approximately 40 US gallons with 34 US gallons usable fuel. The total flying time was 2 hours 10 minutes according to the flight plan. With a total of 34 US gallons on board, the aircraft's endurance was approximately 3.4 hours. The flight was approximately 55 minutes in duration until impact.

2.6 With both the propeller analysis and the fuel calculations, it is evident that the engine was operational prior to impact.

2.7 The pilot reported electrical failure before diverting to Harrismith. The investigation could not make a definitive determination regarding what caused the electrical problem. The alternator was not found at the site for tests.

2.8 According to available records, all the faults that the aircraft had prior to the flight were rectified.

2.9 The pilot experienced an electrical problem in adverse weather conditions, and impacted the mountain while diverting to Harrismith Aerodrome. The pilot was in control of the aircraft at the time of the accident.

2.10 It is very likely that the pilot lost situational awareness due to the unexpected electric failure in IMC and the additional workload as the autopilot would have been deactivated if the aircraft was experiencing any electrical problem. It was evident from the statements and information received by the investigator that the pilot relied mostly on the autopilot to fly during IFR.

2.11 According to the pilot who was asked to look for ZS-NAF, he landed at Harrismith Aerodrome and was not able to fly to the mountain to look for ZS-NAF as the visibility was bad due to mist. It was evident that the visibility was very bad in the mountains, and hence the investigator concluded that the aircraft encountered CFIT (controlled flight into terrain) in IMC.

2.12 The following evidence supported the conclusion that the aircraft encountered CFIT:

- The pilot was distracted due to an electrical problem or while trying to determine the cause of the abnormality.
- Extreme weather conditions prevailed at the time of the accident.
- The pilot likely lost situational awareness and impacted the mountain.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot had a valid pilot's licence and was properly rated for the aircraft type.

3.1.2 The pilot had a valid medical certificate.

3.1.3 The pilot held a valid instrument rating, which entitled him to fly IFR in IMC.

3.1.4 The aircraft was properly certified and maintained in accordance with SACAA regulations.

3.1.5 Cloudy conditions, with fog and very low clouds, prevailed over the mountain on the day of the accident.

3.1.6 The pilot and all three passengers were fatally injured in the accident.

3.1.7 The pilot reported to ATC that he was experiencing an electrical failure.

3.1.8 There was insufficient evidence to determine if the circuit breaker popped or what the pilot did to attempt to rectify the electrical problem.

3.1.9 There were no GPS downloads due to damage to the GPS.

3.1.10 No IFR/VFR flight charts were found at the accident site.

3.2 Probable Cause/s

3.2.1 During controlled flight, the aircraft crashed into terrain during instrument meteorological conditions.

3.2.2 Contributory factor: undetermined electrical problem and loss of situational awareness.

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 None.

Report reviewed and amended by the Advisory Safety Panel

-END-