



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

| | | | | | | |
|--|----------------------|--|--------------------------|-----------------------------|----------------------|------|
| | | | | Reference: | CA18/2/3/7609 | |
| Aircraft Registration | ZS-GOS | Date of Accident | 26 December 2002 | Time of Accident | 0845Z | |
| Type of Aircraft | Beech 58 (Aeroplane) | | Type of Operation | Private | | |
| Pilot-in-command Licence Type | | Private | Age | 52 | Licence Valid | No |
| Pilot-in-command Flying Experience | | Total Flying Hours | 724.1 | | Hours on Type | 96.0 |
| Last point of departure | | Wonderboom Aerodrome (FAWB), (Gauteng Province) | | | | |
| Next point of intended landing | | Port St. John's Aerodrome, (Eastern Cape Province) | | | | |
| Location of the accident site with reference to easily defined geographical points (GPS readings if possible) | | | | | | |
| Ingele Mountains 8 nm East of Kokstad, KwaZulu-Natal (GPS position: South 30°35'588" East 029°35'122") | | | | | | |
| Meteorological Information | | Surface wind; 130°/10kt, Temperature; 19.5°C, Clouds; Scattered at 1000 ft AGL | | | | |
| Number of people on board | 1 + 1 | No. of people injured | 0 | No. of people killed | 1 + 1 | |
| Synopsis | | | | | | |
| <p>The pilot, accompanied by a passenger, departed from Wonderboom Aerodrome on a private flight to Port St. John's located on the south-east coast of South Africa.</p> <p>An instrument flight plan (IFR) was filed by the pilot prior to departure from FAWB. The aircraft was tracked via secondary surveillance radar as it climbed and maintained flight level 110 (FL110). Passing abeam Donnybrook, the pilot requested permission from air traffic control (ATC) to commence with his descent for Port St. Johns, which was granted. He was requested to report passing flight level 70 (FL70), which he acknowledged.</p> <p>The aircraft failed to arrive at Port St. Johns and a Search and Rescue was coordinated by the South African Search and Rescue Organisation (SASAR). The wreckage was located later the same day where it had collided with the Ingele Mountains, approximately 8 nm to the east of Kokstad. Both occupants were fatally injured in the accident.</p> | | | | | | |
| Probable Cause | | | | | | |
| Controlled flight into terrain by the pilot initiating his descent for Port St. Johns, at an altitude insufficient to ensure adequate terrain clearance during IMC conditions. | | | | | | |
| IARC Date | | | | Release Date | | |



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : U.E.C. Ericsson
Manufacturer : Beech Aircraft Corporation
Model : Beech 58
Nationality : South African
Registration Marks : ZS-GOS
Place : 8 nm East of Kokstad
Date : 26 December 2002
Time : 0845Z

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 (1997) 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 produce without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight:

1.1.1 The aircraft was flown on an approximately southerly routing to its intended destination of Port St. Johns. The pilot requested to climb to Flight Level 110 (FL110) shortly after he made contact with the Johannesburg East area controller, which was granted. According to the aircraft's radar track recording observations, the aircraft maintained this flight level at an approximate cruising speed of 175 knots.

1.1.2 Before reaching top of descent, the pilot requested the air traffic controller (ATC) for an update to obtain weather information from another pilot, flying the aircraft ZS-JFR that had just departed from Port St. Johns. The conversation with the pilot of

ZS-JFR was not recorded by air traffic navigational services, but the pilot of ZS-GOS confirmed to the Johannesburg East controller that he had heard the weather briefing of the other pilot.

- 1.1.3 Passing abeam Donnybrook, it can be observed from the radar track recording observations that the aircraft started to descend and the airspeed increased marginally. The pilot was instructed by ATC to report passing flight level 70 (FL70), which he acknowledged.
- 1.1.4 The aircraft passed approximately 8 nm to the East of Kokstad on a southerly heading and impacted with the Ingele Mountains at an altitude of approximately 6560 feet Above Mean Sea Level (AMSL) (refer to map below). The minimum off-route altitude (MORA) for the Kokstad area according to the aviation map (inserted below) was 9300 feet AMSL.
- 1.1.5 The accident occurred during daylight conditions at a geographical position determined to be South 30°35'58" East 029°35'122" at an elevation of 6 560 feet above mean sea level (AMSL).



1.2 Injuries to Persons:

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

1.3 Damage to Aircraft:

1.3.1 The aircraft was destroyed during the impact sequence with mountainous terrain.



Photo 1. A view of the wreckage following impact with mountainous terrain.

1.4 Other Damage:

1.4.1 Minor damage was caused to the environment.

1.5 Personnel Information:

1.5.1 Pilot-in-command:

| | | | | | |
|---------------------|---|---------------|---------|-----|----|
| Nationality | Swedish | Gender | Male | Age | 52 |
| Licence Number | ***** | Licence Type | Private | | |
| Licence valid | No | Type Endorsed | Yes | | |
| Ratings | Instrument Rating (expired on 22 November 2002) | | | | |
| Medical Expiry Date | 30 November 2002 | | | | |
| Restrictions | Must wear corrective lenses while flying | | | | |
| Previous accidents | None | | | | |

Flying Experience:

| | |
|----------------------------|-------|
| Total Hours | 724.1 |
| Total Past 90 Days | 6.4 |
| Total on Type Past 90 Days | 6.4 |
| Total on Type | 96.0 |

*NOTE: The flying hours reflected above were obtained from the pilot's flying logbook. The last entry in his logbook was dated 10 November 2002.

The pilot completed his conversion onto the Beech 58 type aircraft on 10 August 2000, during which period a total of 6 hours' dual flight training was logged.

On 22 November 2001 the pilot performed a practical flight test for an Instrument Rating after he had passed all the theoretical examinations required. The flight test was conducted under the auspices of an approved Aviation Training Organisation (ATO). Following submission of all the required paperwork, the SACAA endorsed the pilot's licence with an Instrument Rating with an expiry date of 22 November 2002.

No evidence could be found that the pilot had renewed his aviation medical certificate or his pilot's licence prior to the accident flight, which rendered his pilot's licence invalid at the time of the accident.

1.6 Aircraft Information

Airframe:

| | | |
|--|----------------------------|-------------|
| Type | Beech 58 | |
| Serial Number | TH-91 | |
| Manufacturer | Beech Aircraft Corporation | |
| Year of Manufacture | 1969 | |
| Total Airframe Hours (At time of Accident) | 5 870.7 | |
| Last MPI (Hours & Date) | 5 833.3 | 4 July 2002 |
| Hours since MPI | 37.4 | |
| C of A (Issue Date) | 13 June 2000 | |
| C of R (Issue Date) (Present owner) | 24 July 1974 | |
| Operating Categories | Standard | |

*NOTE: The aircraft hours reflected in this column were obtained from the aircraft's Flight Folio, with the last entry recorded on 16 December 2002, which was believed to be his last flight prior to the accident flight.

Engine No. 1:

| | |
|----------------------|---------------------------------|
| Type | Teledyne Continental IO-520-C8B |
| Serial Number | 287341-R |
| Hours since New | 607.2 |
| Hours since Overhaul | T.B.O. not yet reached |

Engine No. 2:

| | |
|----------------------|---------------------------------|
| Type | Teledyne Continental IO-520-C8B |
| Serial Number | 287364-R |
| Hours since New | 641.9 |
| Hours since Overhaul | T.B.O. not yet reached |

Propeller No. 1:

| | |
|----------------------|------------------------|
| Type | Hartzell PHC-J3YF-2CF |
| Serial Number | ED 3613-A |
| Hours since New | 542.4 |
| Hours since Overhaul | T.B.O. not yet reached |

Propeller No. 2:

| | |
|----------------------|------------------------|
| Type | Hartzell PHC-J3YF-2CF |
| Serial Number | ED 3607-A |
| Hours since New | 542.4 |
| Hours since Overhaul | T.B.O. not yet reached |

1.6.1 Weight & Balance

According to the Pilot's Operating Handbook (POH), Section 2, Limitations, the maximum take-off weight (MTOW) for the aircraft type was not allowed to exceed 5400 pounds.

At the time of the accident there were two adult occupants on board the six-seater aircraft with some luggage for their intended stay in Port St. Johns as well as two small dogs (Jack Russels).

The aircraft had been airborne for over two hours when the accident occurred, which would have resulted in substantial reduced take-off weight due to the fuel that had been burned off during the flight.

The aircraft was considered to have been operated within the weight and balance envelope as stipulated in the POH at the time of the accident.

1.7 Meteorological Information:

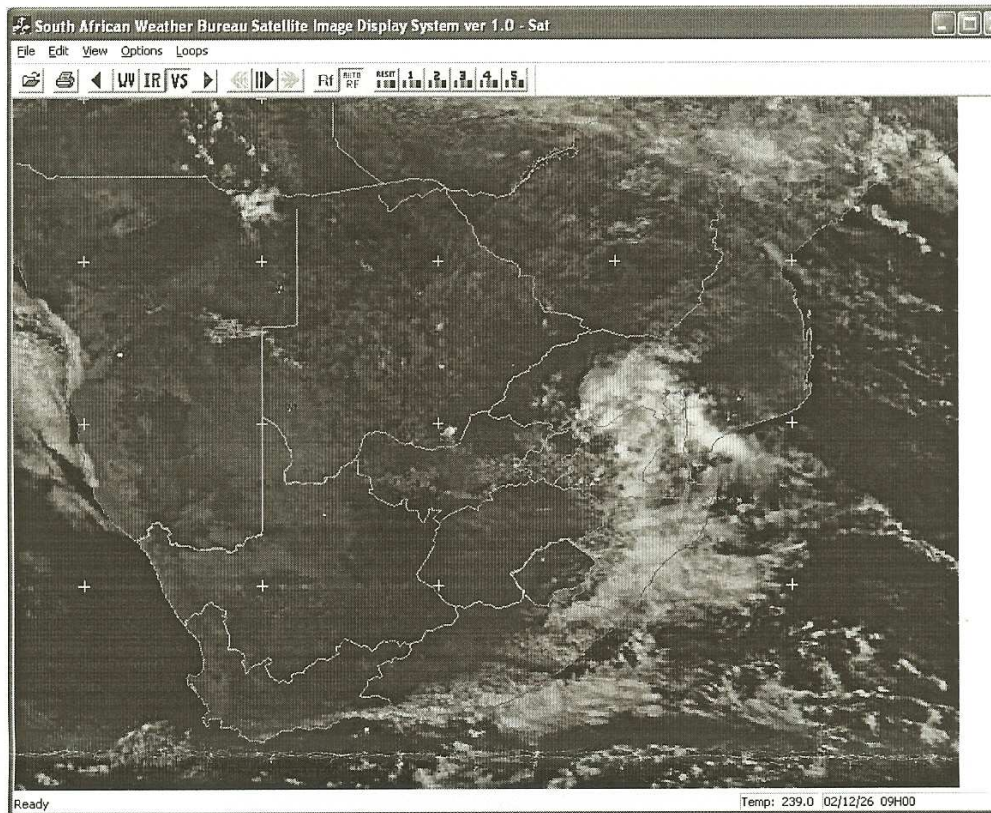
1.7.1 An official weather report was obtained from the South African Weather Services (SAWS) following the accident, reflecting the following:

1. Surface Analysis:

A cold front had moved through KwaZulu-Natal (KZN) and the high pressure system behind the front was feeding moist air in over KZN, causing cloudy conditions over the province.

2. Satellite Imagery:

The 0900Z visual image for 26 December 2002 shows cloudy conditions over the eastern parts of the country, including KwaZulu-Natal and the Eastern Cape.



3. Weather conditions in the vicinity of the accident.

No official weather observations are available regarding the time and place of the accident. The weather observations at Matatiele and Underberg were, however, as follows:

| | <u>Matatiele</u> | <u>Underberg</u> |
|-------------------------|------------------|--------------------------------|
| Surface wind | 130°/6kt | 130°/12kt |
| Visibility (horizontal) | 10km | 10km |
| Cloud | 7/8SC 5000ft | 7/8CB 600-1000ft |
| Present weather | Nil | Thunderstorm, no precipitation |
| Temperature | 19.5°C | 19.2°C |
| Dew point | 14.9° | 15.6°C |
| Pressure altitude (QNH) | 1019 hPa | 1020 hPa |

Based on the synoptic and other meteorological data available, the most likely weather conditions at the time (0845Z) and place of the accident were:

| | |
|--------------|---------------------------------------|
| Surface wind | 130°/5-10 knots |
| Temperature | 20°C |
| Dew point | 17°C |
| Cloud | Broken / scattered at 1 000 feet AGL. |

1.8 Aids to Navigation:

1.8.1 The aircraft was equipped with standard navigational equipment certified for this type of aircraft and suitably equipped for IFR-flight. There were no ground-based navigational stations in the area of the accident site. It appeared that the pilot had used the GPS-unit to navigate, as no aeronautical maps were recovered from the accident scene.

1.8.2 The aircraft was fitted with the following navigational aids:

Magnetic Compass
Transponder
Automatic Direction Finder (ADF)
Very High Frequency Omni-directional Radio Range (VOR)
Global Positioning System (Bendix/King BMD150)
Weather Radar

1.9 Communications:

1.9.1 The aircraft was cleared for take-off by air traffic control (ATC) at Wonderboom Aerodrome at 0628Z on the VHF frequency 120.6 MHz.

1.9.2 The aircraft was under radar control (Johannesburg eastern sector) and was cleared to descend from FL110 to FL070 at 0820Z. The active VHF radio frequency at the time was 119.9 MHz.

1.9.3 The pilot of ZS-GOS requested ATC to communicate with the pilot of ZS-JFR who had just departed for Port St. Johns in order to obtain a weather update at Port St. Johns. The response from the pilot of ZS-JFR was not recorded.

- 1.9.4 The aircraft disappeared from radar during the descent and ATC made several attempts to call the aircraft, without any response.
- 1.9.5 There was no further contact with ATC and no distress messages were received by ATC or any other traffic.
- 1.9.6 The communication equipment on board the aircraft was serviceable, as the pilot communicated several times with ATC during the flight prior to the accident.

1.10 Aerodrome Information:

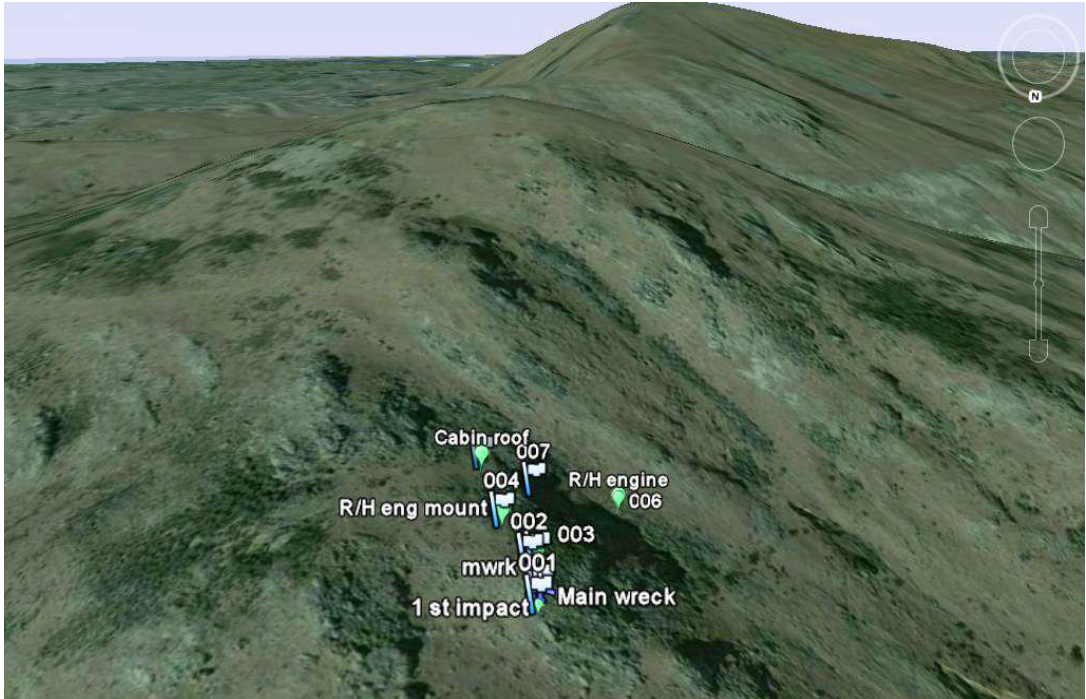
- 1.10.1 Not relevant to this accident.

1.11 Flight Recorders:

- 1.11.1 The aircraft was not equipped with a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR), nor was it required by regulation to be fitted to this type of aircraft.
- 1.11.2 During the on-site investigation, a Bendix/King BMD150 GPS was recovered from the accident site. The GPS was forwarded to the manufacturer in the United Kingdom to download any recorded track information that might have been available on the non-volatile memory of the unit. It was not possible to obtain any information from the unit.

1.12 Wreckage and Impact Information:

- 1.12.1 The aircraft flew in a southerly direction when it impacted with the Ingele Mountains at an altitude of approximately 6 560 feet AMSL. The initial impact point of the aircraft against the side of the mountain was at a point where the incline of the mountain side was approximately 45°. The main wreckage of the aircraft was found a few feet higher at a position which was recorded as South 30°35'588" East 029°35'122". Below is an illustration of the impact position as viewed in a southerly direction.



Google Earth view of the impact on the side of the Ingele Mountains in southerly direction.

1.12.2 The major points of the accident scene were plotted by means of a GPS and if the accident site is viewed from above, the following lay-out is produced.



Photo 2. An aerial view of the actual impact on the side of the Ingele Mountains.



Wreckage layout plotted on Google Earth.

- 1.12.3 The component of the aircraft that was found furthest away from the main wreckage was the right-hand engine at a distance of 82m in a direction of 224°M. Most of the accessories of the engine had been broken off from the main engine assembly as the engine was flung in the direction of impact. The remainder of the engine was inspected as it was found, and no pre-impact failures were observed.
- 1.12.4 The upper part of the fuselage was located to the left of the right engine. The cabin roof had separated from the rest of the wreckage and was flung 63m in a direction of 196°M forward of the main wreckage. Several other wreckage fragments were found spread on the mountainside between these three main points.
- 1.12.5 The left-hand engine was located under the main wreckage and was also significantly damaged by the impact forces. Both engines were inspected as comprehensively as possible at the accident site, but were not recovered from the accident site, as no pre-impact failures were observed.
- 1.12.6 Both propellers had failed during impact, and the blades of the propellers were located at different points on the accident site.

1.13 Medical and Pathological Information:

1.13.1 Pilot

The medico-legal post-mortem examination concluded that the cause of death was due to multiple injuries. No suitable specimen was available for alcohol or drug analysis.

1.14 Fire:

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

1.15 Survival Aspects:

1.15.1 Due to the high impact forces associated with this accident, as well as the destruction of the cockpit/cabin area, this was not considered to be a survivable accident.

1.15.2 The aircraft was equipped with an Emergency Locator Transmitter (ELT), which was destroyed during the impact sequence. The unit, which is designed to transmit a distress signal once activated (as in the case of an accident) was of no value in locating the wreckage and therefore hampered the chances of survivors being found, if any, within the critical time frame.

1.16 Tests and Research:

1.16.1 GPS Unit.

During the on-site investigation, a Bendix/King BMD150 GPS was recovered from the accident site. The GPS was forwarded to the manufacturer in the United Kingdom to download any recorded track information that might have been available on the non-volatile memory of the unit. It was not possible to obtain any information from the unit.

1.17 Organisational and Management Information:

1.17.1 This was a private flight with the pilot also being the owner of the aircraft.

1.17.2 The last maintenance inspection that was carried out on the aircraft prior to the accident was certified by Aircraft Maintenance Organisation (AMO) No. 247 on 4 July 2002. The AMO was in possession of a valid CAA Approval Certificate.

1.18 Additional Information:

1.18.1 Processing of filed flight plan.

The flight plan is received by a clerk in the Air Traffic Navigation Service (ATNS) filter centre. It remains the responsibility of the pilot to ensure that all the required information as called for, has been entered when submitting a flight plan. It further remains the responsibility of the pilot to ensure that the flight can be conducted safely along the intended route. The flight plan was filed prior to the pilot's departure from Wonderboom Aerodrome for a flight directly to Port St. Johns with a departure time of 0630Z.

On acceptance of a flight plan, the air traffic service unit receiving the flight plan or any changes thereto is obligated to check it for compliance with the format, data conventions and completeness and to indicate acceptance of the flight plan or change thereto to the originator. There is no obligation to verify the acceptance of the route and height to be flown as defined by the pilot-in-command.

1.18.2 Planning of the route to be flown.

It is the responsibility of the pilot-in-command to plan the flight to ensure adequate separation with the terrain as stipulated in Part 91.02.8(1) of the Civil Aviation Regulations of 1997. Reviewal of the applicable aeronautical maps/charts would have indicated to the pilot that the minimum off route altitude (MORA) for the Kokstad area was 9 300 feet AMSL and that deviating from such altitude without visual reference to the ground/terrain could jeopardise the safety of the flight, due to high ground/mountainous terrain in the area.

1.18.3 Prevailing weather conditions:

Several statements were obtained from residents (farmers) staying in the vicinity of the accident site. They all concurred that the mountain was covered in mist/low cloud with light drizzle in certain areas at the time of the accident. The clouds only started to clear in the late afternoon.

1.19 Useful or Effective Investigation Techniques:

1.19.1 None.

2. ANALYSIS

- 2.1 The pilot, whose licence and IF rating had expired some time prior to the accident flight, was engaged in a private flight from Wonderboom Aerodrome to Port St. Johns in the Eastern Cape. The pilot had filed an IF flight plan and was under radar control until the aircraft disappeared from radar, following a request to commence with his descent for his intended destination.
- 2.2 The selected flight level (FL), as filed with the ATS Unit by the pilot, nominated FL110 for a flight directly from FAWB to Port St. Johns. Passing abeam Donnybrook the pilot requested ATC for approval to commence with his descent from FL110, which ATC acknowledged and requested that he would report when passing flight level 70. The pilot never reported passing flight level 70 and the aircraft disappeared from radar while on the descent. Several attempts by ATC to establish communication with the aircraft failed. It should be noted that it remains the pilot-in-command's prerogative and responsibility to ensure the safety of the flight and the ATC will not question the pilot's selection/decision of routing, flight level selection or descent request should traffic allow such a request.
- 2.3 The weather information provided by the South African Weather Services indicated that during the time of the accident, poor weather conditions prevailed in the area where the accident occurred. This was confirmed by several residents (farmers) who were interviewed in the vicinity of the accident site.

- 2.4 FL110 would have been more than adequate to remain well above the MORA for the Kokstad area, which was 9 300 feet AMSL. It is unclear as to why the pilot commenced with the descent while still approximately 140 nm from his intended destination. The only possible explanation could be that weather conditions at his intended destination were not that favourable either, and that he intended to get below the cloud base in order for him to continue VFR below cloud towards Port St. Johns. The pilot did communicate with the pilot of ZS-JFR that departed from Port St. Johns during his approach, to obtain a weather update from him for Port St. Johns; however, this communication was not recorded by air traffic navigational services.
- 2.5 It would appear that the pilot did very little, if any flight planning when it came to terrain minimas for his intended flight and that he relied on his experience and the assistance of the GPS to conduct a successful flight. The investigating team did not find any aeronautical maps/charts at the accident site. It can therefore be assumed that there were no such maps on board the aircraft and therefore the pilot was unable to check his en route terrain minimas. He commenced with the descent unaware of what the terrain was like underneath him, as he most probably had no visual reference to the ground/surface due to the inclement weather conditions that prevailed at the time. Being the holder of an instrument rating (IF), which had lapsed on 20 November 2002, the pilot had very little concern about proceeding with the descent into cloud, however; he did it without knowing what the actual topography of the terrain below him was like, nor was he aware of the MORA for the area; which would have been of considerable value to him if he had had an aeronautical map of the area available.
- 2.6 It is evident from the impact with terrain, that the aircraft was descending and that it was at a considerable forward speed, with no evidence to indicate that the pilot had sight of the terrain prior to impact.

3. CONCLUSION

a) Findings

- (i) The pilot's licence (private pilot with IF Rating) had lapsed on 30 November 2002, which rendered it invalid at the time of the accident.

- (ii) No evidence could be found that the pilot had made any attempt to renew his aviation medical certificate or pilot's licence.
- (iii) The aircraft was properly maintained and had a valid Certificate of Airworthiness at the time of the accident.
- (iv) The Maintenance Release for the aircraft was valid and the investigation team found no technical fault with the aircraft.
- (v) The pilot had filed an instrument flight plan for FL110, and the aircraft was tracked via secondary surveillance radar until it disappeared from the radar screen while on the descent for Port St. Johns.
- (vi) The aircraft was declared missing as it had disappeared from radar and no communication could be established with the aircraft, nor did it arrive at its intended destination. An official search was activated by the South African Search and Rescue Organisation (SASAR).
- (vii) The aircraft was located where it had impacted with the Ingele Mountains at an altitude of 6 560 feet, 8 nm to the East of Kokstad while on the descent for Port St. Johns.
- (viii) Both occupants on board were fatally injured.
- (ix) To ensure adequate terrain clearance/separation for the route flown, the MORA for the Kokstad area was 9 300 feet AMSL.
- (x) No official weather report was available at the location of the accident site, although overcast conditions accompanied by drizzle in certain areas were reported by residents (farmers) staying in the vicinity of the accident.
- (xi) The aircraft was equipped with an ELT, which was destroyed in the impact sequence, and was therefore of no value to the official search for the missing aircraft.

b) Probable Cause/s

- (i) Controlled flight into terrain by the pilot while initiating his descent for Port St.

Johns at an altitude insufficient to ensure adequate terrain clearance during IMC conditions.

c) Contributory Factor/s:

- (i) Improper flight planning.
- (ii) Disregard for standard safe operating procedures.

4. SAFETY RECOMMENDATIONS

4.1 In its safety promotions programme, safety seminars and other methods of information distribution, the SACAA should make pilots aware of the danger of flying without proper planning of the selection of routes and altitudes. The limitation of GPS-information and the dangers of relying solely on GPS-information without taking safe altitudes into consideration should be emphasised.

5. APPENDICES

5.1 There are no appendices to this report.

Comments

Pilot asked for clearance which was not feasible – immovable object

AIID investigate...flight plan? Controlled flight? ATC's responsibility (research office)

Expired license, medical, maps – pilot. Record license no on the flight plan...to check if license is valid or not. - part of research office to do.

Standardise GPS co-ordinates

Submitted through the office of the SM.