AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9287		
Aircraft Registration	**ZS-JTW**	**Date of Accident**	6 February 2014		**Time of Accident**	17:20Z	
Type of Aircraft	PA-25-260 (Aeroplane)		**Type of Operation**		Agricultural		
Pilot-in-command Licence Type	Commercial		**Age**	52	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		5 345,8		Hours on Type	47	
Last point of departure	Parys Aerodrome, Free State (FAPY)						
Next point of intended landing	Parys Aerodrome, Free State (FAPY)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
At the geographical coordinates S26 53,538 E027 29,567.Elevation 1407m.							
Meteorological Information	Surface wind: easterly at 10kt. Visibility: good. Cloud base: 1 000 ft						
Number of people on board	1 + 0	**No. of people injured**	1	**No. of people killed**	0		

Synopsis

The pilot took off from Runway 06 at Parys Aerodrome at 17:20Z for a night crop-spraying exercise. During take-off, and while at approximately 100 feet above ground level, the pilot experienced turbulences, due to a thunderstorm in the area, which caused the airspeed to decay in a stall resulting in a crash. The pilot sustained minor injuries and the aircraft was destroyed on impact.

The investigations revealed that the airspeed decayed during take-off as a result of angle of attack being high.

Probable Cause

Failure to maintain flying speed resulting in a stall and a subsequent crash

Contributory factor:

Thunderstorm activity at night.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner	**:** Graaff BG
Name of Operator	**:** Private
Manufacturer	**:** Piper Aircraft Corporation
Model	**:** PA-25-260
Nationality	**:** RSA
Registration Marks	**:** ZS-JTW
Place	**:** 800m from Parys Aerodrome at the coordinates S26 53,538 E027 29,567
Date	**:** 6 February 2014
Time	**:** 17:20Z

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 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 took off from Parys Aerodrome with the intention of completing crop-spraying 30nm away. According to the pilot, he carried out the pre-flight and the chemical loading, started the aircraft and warmed up the engine for approximately five minutes. He then taxied to the runway and backtracked on runway 06, as the wind was approximately 090°at 10kt.

1.1.2 During line-up and application of full power on the runway, the pilot checked static RPM and continued with the take-off. The aircraft rotated at 70mph and accelerated to 80mph (miles per hour) which is the best rate of climb. At approximately 100 feet above ground level (AGL) he experienced turbulence and the indicated airspeed (IAS) remained at 80mph. The aircraft began to lose height and the pilot turned the aircraft to the right into the wind to a heading of approximately 080 degrees. The aircraft continued to lose height while heading towards high ground: the pilot turned to the left to avoid impacting the high ground. The aircraft continued to lose height, with full throttle and fuel pump 'ON'. It crashed into an open field approximately 800m (meters) from the threshold of runway 06.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained extensive damage to the propeller, fuselage and wings. The undercarriage broke off.

Figure 1: Damage to the aircraft.

1.4 Other Damage

1.4.1 None

1.5 Personnel Information

Nationality	RSA	Gender	Male	Age	52
Licence Number	0270197023	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instrument				
Medical Expiry Date	30 September 2014				
Restrictions	Corrective lenses				
Previous Accidents	None				

Flying Experience

Total Hours	5 345,8
Total Past 90 Days	56
Total on Type Past 90 Days	30,6
Total on Type	47

1.6 Aircraft Information

Airframe

Type	PA-25-260	
Serial Number	25-7556020	
Manufacturer	Piper Aircraft Corporation	
Year of Manufacture	1974	
Total Airframe Hours (At time of Accident)	3 806,7	
Last MPI (Date & Hours)	22 January 2013	3 717
Hours since Last MPI	89,7	
C of A (Issue Date)	17 February 2012	
Expiry date	16 February 2016	
C of R (Issue Date) (Present owner)	8 July 2010	
Operating Categories	Restricted Part 137	

Engine

Type	Lycoming 0-540 G1 A5
Serial Number	L-18390-40A
Hours since New	Unknown
Hours since Overhaul	415

Propeller

Type	McCauley 1A200FA8452
Serial Number	107532
Hours since New	Unknown
Hours since Overhaul	100

Aircraft weight and balance

Basic empty weight	1 720lb
Pilot's weight	187lb
Fuel	137ℓ (95,9lb)
Load	528lb
Total	2 530,9

1.6.1 The maximum take-off weight for this aircraft is 2 900lb. The aircraft was therefore within limits.

1.7 Meteorological Information

1.7.1 The following weather conditions at the time and place of the accident were obtained from the pilot's questionnaire:

Wind direction	Easterly	Wind speed	10kt	Visibility	Good
Temperature	20˚ C	Cloud cover	4/8	Cloud base	1 000ft
Dew point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation instruments as per the manufacturer's design. None was reported unserviceable prior to or during the accident.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as required by the regulator. There were no recorded defects to this equipment prior to the flight.

1.10 Aerodrome Information

Aerodrome Location	FAPY (Parys)	
Aerodrome Co-ordinates	S265313,94 E0273019,11	
Aerodrome Elevation	4 740ft	
Runway Designations	06	24
Runway Dimensions	1 343m x 20m	1 343m x 20m
Runway Used	06	
Runway Surface	Asphalt	
Approach Facilities	Nil	

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder or cockpit voice recorder. The regulations do not require either of these to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information

1.12.1 The airspeed decayed and the aircraft impacted with the ground approximately 800m from the runway threshold. The wreckage of the aircraft remained intact following the accident.

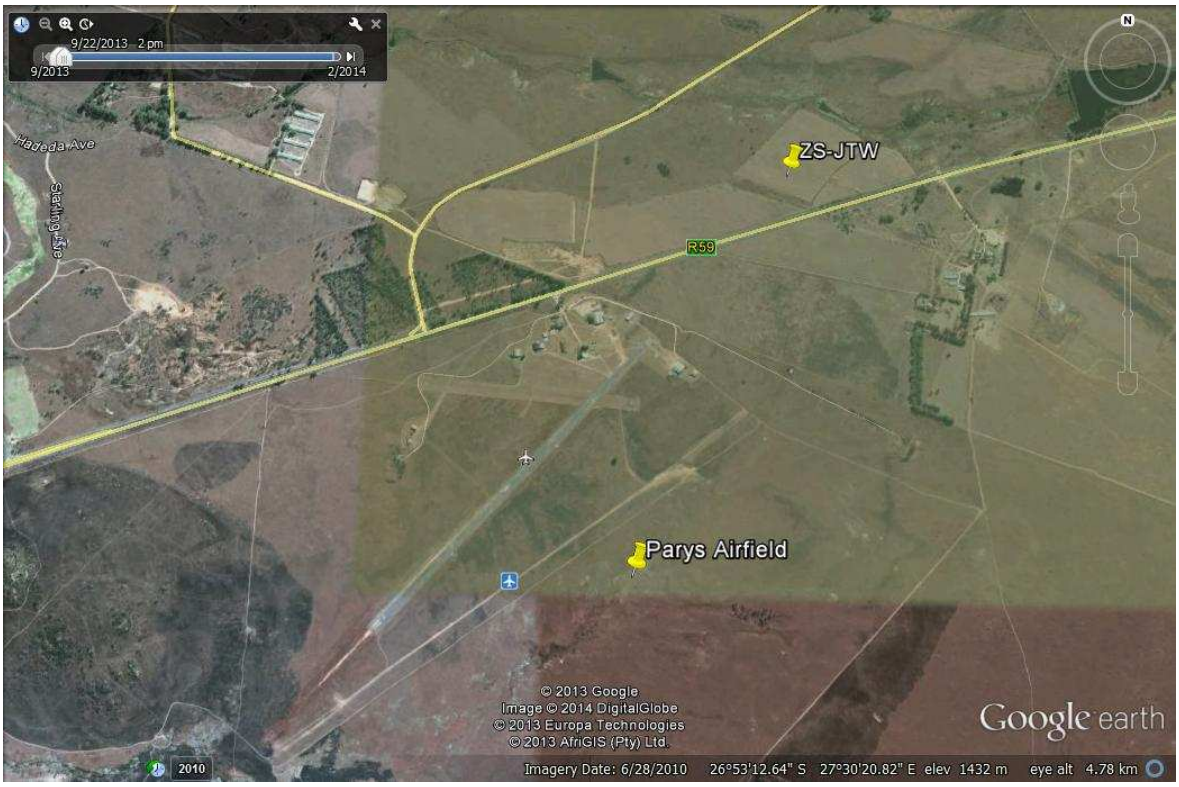


Figure 2: Aerodrome layout as obtained from Google Earth.

Figure 3: The wreckage of the aircraft.

1.12.2 The marks on the propeller perpendicular to its axis suggest that the engine had power prior to the accident.

Figure 4: Picture of the engine

1.13 Medical and Pathological Information

1.13.1 Not applicable.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The occupant was properly restrained by safety harnesses and due to the relatively low impact force, the accident was considered survivable.

1.16 Tests and Research

1.16.1 None.

1.17 Organisational and Management Information

1.17.1 This was an agricultural flight.

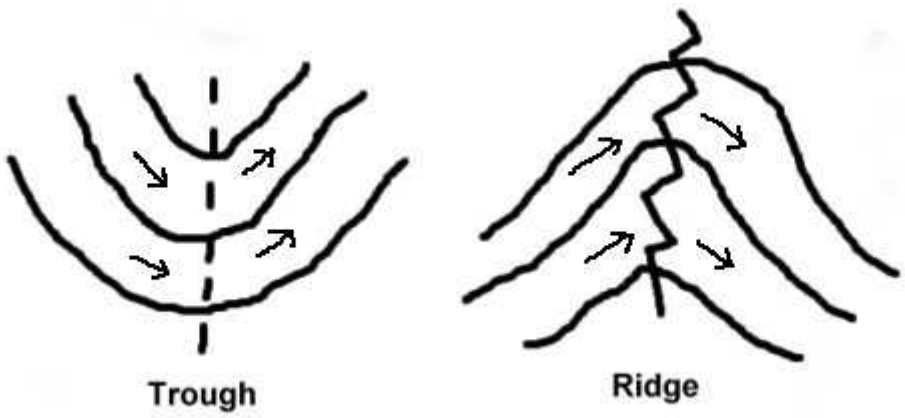
1.18 Additional Information

1.18.1 The following was extracted from *Meteorology for pilots* by Mike Wickson.

Thunderstorms

"In thunderstorms, substantial shafts of air may be encountered with no warning which can be moving either vertically up or down. Such shafts may be virtually side by side and the shear will then be very marked and violent. Entering a vertical updraught or downdraught from a horizontal airflow, the aeroplane's momentum will at first keep it on its original path relative to the new direction of flow. In addition to a loss of airspeed, it will also be realised that the shift of relative airflow will affect the angle of attack of the wing which may result in either an increase or decrease in angle. A slight increase of angle may not cause much concern. However if the aircraft is already on the approach with a high angle of attack an increase might put the wing near the stall and any decrease will bring about a loss of lift. Neither result is desirable when near the ground. Normally, the risk of a downdraught will be more likely than an updraught when below 1 000 feet."

Trough of low



A trough is generally associated with bad weather. Frequently, a hot or cold front lies along the centre line of the trough. A front is the boundary between two masses of air at different temperatures. Under these conditions the weather will be in accord with the type of front: either cold-front weather or warm-front weather. Even if there is no front present, then the strong convergence of the air on either side of the trough centre line, meeting from different directions, can cause the air to lift sharply. The weather can include towering clouds, thunderstorms and heavy showers.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 The pilot was properly rated and medically fit for the flight. According to the pilot's account, the wind was 090° at 10kt and therefore he took off from Runway 06. This might be caused by wind shear activity which is attributed to thunderstorm; a sudden change in wind direction and speed. During take-off the airspeed decayed due to windshear which caused the aircraft to lose altitude: as a result it impacted with the ground.

2.2 It is also possible that a nearby thunderstorm brought about windshear. This could have caused the airspeed to decay, which in turn would have caused the aircraft to lose altitude and crash into the ground. Thunderstorms are associated with windshear. The official report of the SA Weather Service revealed that there were thunderstorms in the area at the time of the accident.

2.3 According to available maintenance records, the aircraft was properly maintained. The mandatory periodic inspection was conducted as per regulations. The aircraft did not display any defect or malfunction that could have contributed to the accident.

3. CONCLUSION

3.1 Findings

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

3.1.2 The pilot had a valid instrument rating at the time of the accident.

3.1.3 The pilot had a valid medical certificate which was due to expire on 30 September 2014.

3.1.5 According to available records, the aircraft was properly maintained.

3.1.6 Weather was a contributory factor to the accident.

3.1.7 The airspeed decayed as a result the aircraft stalled.

3.2 Probable Cause/s

3.2.1 Airspeed decayed once airborne during take-off.

3.3 Contributory factor

3.3.1 Thunderstorm activity at night

4. SAFETY RECOMMENDATIONS

4.1 None.

Annexure 1: South African Weather Service

South African Weather Service
ISO 9001 Certified Organisation

AIRCRAFT ACCIDENT REPORT

Record Reference: ZS-JTW-2014-02-06
Document Type: Report
Version: 1

Document Control

Version and Amendment Schedule

Version	Version Date	Author	Description of Amendments
1	24 February 2014	Luthando Masimini	Document Created

Scope

The meteorological information provided in this report includes the following:

Observational weather data at/or in the vicinity of the aircraft accident/incident closer to the time of occurrence. These include but are not limited to:

(i) Remote sensing data such as Satellite; RADAR imagery; etc.
(ii) Observational surface data in the form of METARs or SYNOPs - which contain weather elements such as:
- Dry-bulb and Dew-point temperatures;
- Wind speed and direction;
- Cloud cover;
- Visibility;
- Weather; and the
- QNH.

Purpose

To provide the South African Civil Aviation Authority (SACAA) with meteorological information required for their inquest into an aircraft accident/incident closest to the time of occurrence.

Background

An aircraft accident is reported to have taken place on the 06th February 2014 at approximately 1720 UTC. The aircraft registration is given as ZS-JTW and the GPS co-ordinates for the accident site S26° 88.538 E027° 50.567.

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

(i) Satellite image

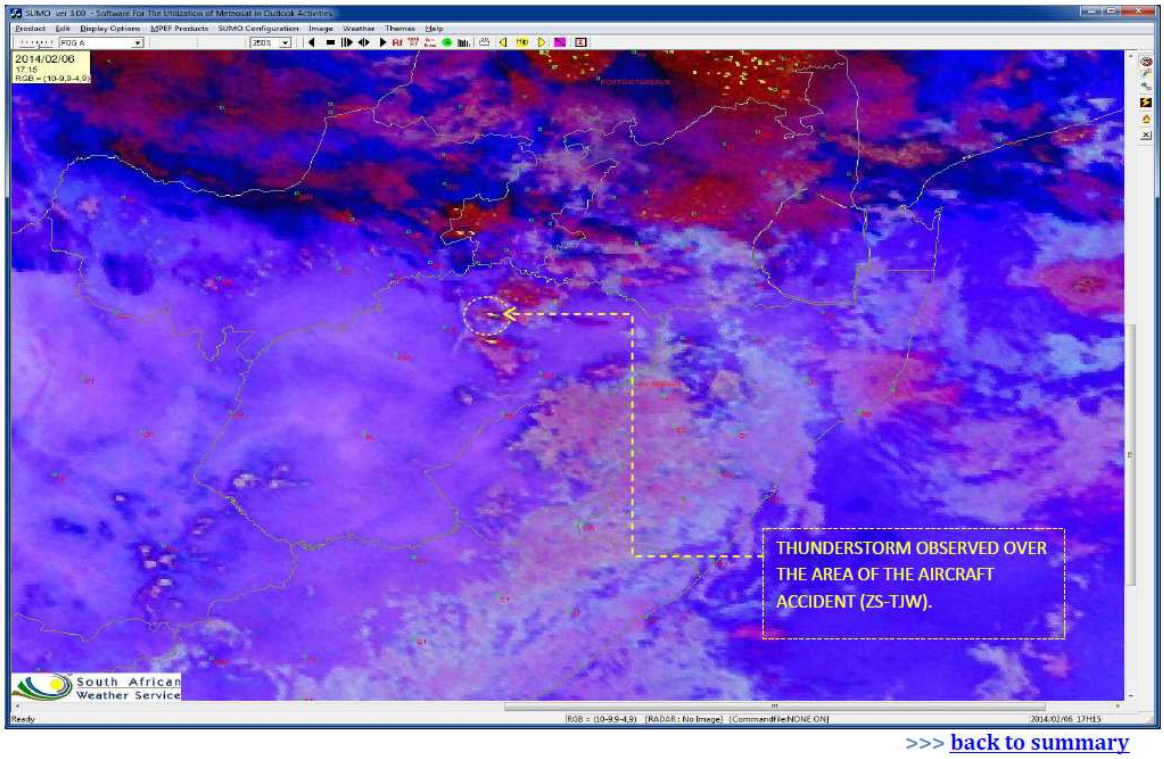
Thunderstorms clouds were observed in the vicinity of the aircraft accident site provided in the form of GPS coordinates (see Attachment A).

(ii) Surface data

Observational data in the form of a Synoptic chart and a meteorological aerodrome reports (METAR) made at Kroonstad (FAKS) is included as Attachments B and C respectively - to reflect on the most likely surface conditions within the estimated time of occurrence of the accident. The observational data is also summarised below:

	1600 UTC:	1700 UTC:	1800 UTC
Dry-bulb temperature:	27.0 ºC	26.0 ºC	23.0 ºC
Dew-point temperature:	16.0 ºC	16.0 ºC	17.0 ºC
Wind dir. and speed:	230º 03KT	200º 04KT	150º 08KT
Visibility:	Nil	Nil	Nil
Weather phenomenon:	Nil	Nil	Nil
Cloud amount & base:	Nil	Nil	Nil
QNH:	1013hPa	1014hPa	1015hPa

ATTACHMENT A: Satellite image for 1715Z on the 06th February 2014



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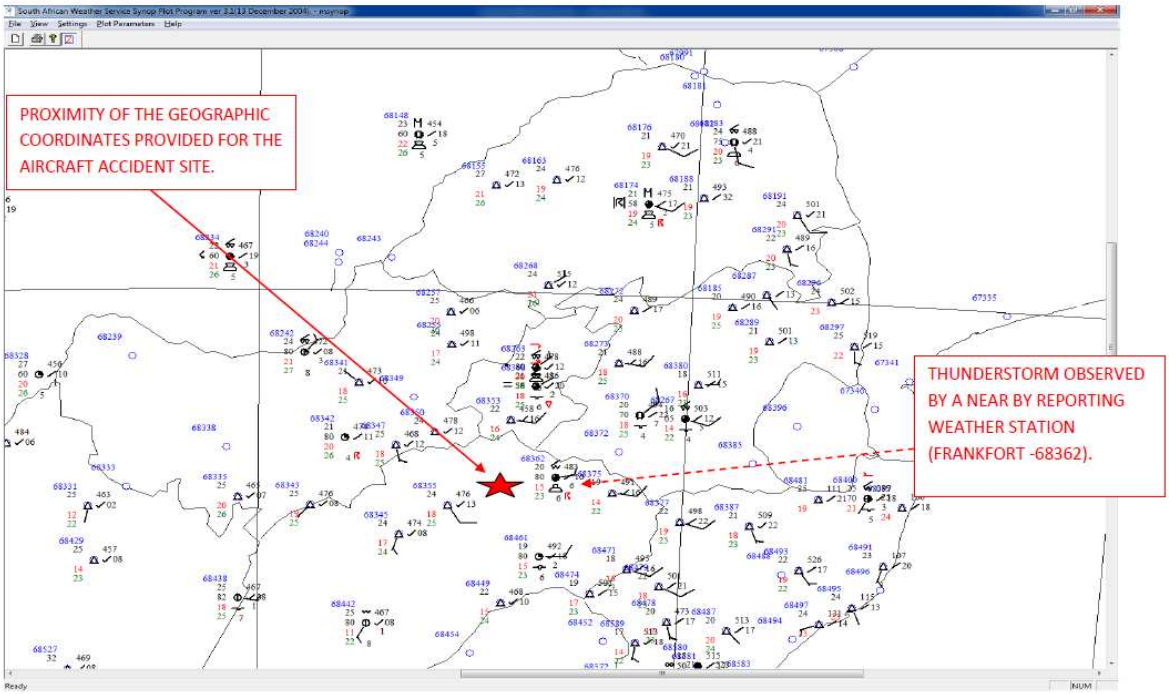
ATTACHMENT B: 1800 UTC Synoptic chart for the 06th February 2014



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ATTACHMENT C: Surface observations (METAR)

METAR for Kroonstad included to reflect on the most likely surface conditions closer to the time of occurrence of the aircraft accident of the 06th of February 2014 in the vicinity of Heilbron (according to the geographic coordinates provided at the beginning of the report - page 3).

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