

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident  
- Preliminary Report -  
AIID Ref No: CA18/2/3/10337



**Figure 1:** File picture of the ZS-TFH. (Source: <https://avcom.co.za/phpBB3/viewtopic.php?t=20994&start=405>)

Description:

On Wednesday, 21 June 2023 at 1409Z, a pilot on-board an Air Tractor AT-802A with registration ZS-TFH took off on a firefighting mission from Nelspruit Airport (FANS) in Mpumalanga province to Nooitgedacht Plantation in Ngodwana in the same province. The flight was conducted under visual flight rules (VFR) and under visual meteorological conditions (VMC) by day. The flight was also conducted under the provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.

The ZS-TFH pilot took off from FANS with a load of water and released the first load on the left side of the aircraft's approach (left side fire) and, thereafter, flew to Elandshoogte Airfield Runway 27 to refill the hopper with more water. The aircraft took off again to the fire scene. After the pilot released the second load of water on the right side of the fire, the aircraft crashed on the rising terrain. A video footage recorded by a spotter aircraft in the vicinity shows *the aircraft releasing its second water load and impacting the rising terrain and, thereafter, burst into flames. It catapulted forward for approximately 250 metres (m) before it came to rest in an inverted orientation facing north.*

The pilot was fatally injured, and the aircraft was destroyed by post-impact fire.

## Occurrence Details

**Reference Number** : CA18/2/3/10337  
**Occurrence Category** : Category 1  
**Type of Operation** : Agricultural Operations (Part 137)  
**Name of Operator** : Kishugu Aviation (PTY) LTD  
**Aircraft Registration** : ZS-TFH  
**Aircraft Make and Model** : Air Tractor AT- 802A  
**Nationality** : South African  
**Registration Marks** : ZS-TFH  
**Place** : Nooitgedacht Plantation, Ngodwana, Mpumalanga Province  
**Date and Time** : 21 June 2023 at 1436Z  
**Injuries** : Fatal  
**Damage** : Destroyed

## Purpose of the Investigation

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 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 apportion blame or liability.*

*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.*

## Investigation Process

The Accident and Incident Investigations Division (AIID) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence involving an Air Tractor AT-802A, which occurred at Nooitgedacht Plantation in Ngodwana, Mpumalanga province, on 21 June 2023 at 1436Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions.

The AIID has appointed an investigator-in-charge to lead the investigation. Notifications were sent to the State of Registry, Design and Manufacturer in accordance with CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The State of Design and Manufacturer had appointed a non-travelling accredited representative. The AIID will lead the investigation and issue the final report of this accident in accordance with CAR 2011 Part 12 and ICAO Annex 13.

The information contained in this preliminary report is derived from the information gathered during the on-going investigation into the occurrence. Later, an interim or final report may contain altered information in case new evidence is found during the on-going investigation that requires changes to the information depicted in this report.

*The AIID reports are made available to the public at:*

<http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx>

### Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*

*Accident — this investigated accident*

*Aircraft— the Air Tractor AT-802A involved in this accident*

*Investigation — the investigation into the circumstances of this accident*

*Pilot — the pilot involved in this accident*

*Report — this accident report*

2. *Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

**Disclaimer**

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

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<b>Abbreviation</b>	<b>Description</b>
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AOC	Air Operating Certificate
ASL	Air Service Licence
°C	Degrees Celsius
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FANS	Nelspruit Aerodrome
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knots
Km	Kilometres
OPS SPEC	Operation Specifications
m	Metres
METAR	Meteorological Aerodrome Report
MHz	Megahertz
QNH	Barometric pressure adjusted to sea level
SACAA	South African Civil Aviation Authority
SAPPI	South African Pulp and Paper Industries
SAWS	South African Weather Service
UTC	Co-ordinated Universal Time
VMC	Visual Meteorological Conditions
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

## 1. FACTUAL INFORMATION

### 1.1. History of Flight

- 1.1.1 On Wednesday afternoon, 21 June 2023 at 1409Z, a pilot on-board an Air Tractor AT-802A (Bomber) with registration ZS-TFH took off on a firefighting mission with a load of 3000 litres of water from Nelspruit Fire dispatch office at Nelspruit Airport (FANS), Mpumalanga province, to Nooitgedacht Plantation in the same province. The flight was conducted under visual flight rules (VFR) and under visual meteorological conditions (VMC) by day. The provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended were followed.
- 1.1.2 According to the operator, ZS-TFH was dispatched with a spotter aircraft, an AT-802, a Thrush, a Huey and a Black Hawk which were also missioned to extinguish the runaway fire that was reported at Nooitgedacht Plantation, a property of the South African Pulp and Paper Industries (SAPPI). ZS-TFH took off and routed west towards Nooitgedacht Plantation. After reaching the fire scene, ZS-TFH released the first load of water on the left side of the aircraft's approach (left side fire) and, thereafter, flew to Elandshoogte Airfield Runway 27 to refill the hopper with the second load of water. The pilot took off again from Elandshoogte Runway 27 at 1431Z to drop the second load on the right side of the fire. The aircraft crashed immediately after it had released the second load of water.
- 1.1.3 The video footage from the spotter aircraft shows *ZS-TFH dropping the second load of water at 1436Z (see Figure 2), about three (3) seconds later, the aircraft is observed impacting the ground hard and it burst into flames whilst catapulting forward. It came to rest in an inverted position on the rising terrain (see Figure 3).* After seeing the ZS-TFH on fire, the other aircraft which were part of the firefighting mission released their water loads on ZS-TFH to extinguish the fire.
- 1.1.4 According to the operator, the spotter pilot stated that he saw the Bomber (ZS-TFH) impact the ground hard and burst into flames. An eyewitness who is an employee of SAPPI was in a vehicle on the road. He stated that he observed the aircraft impacting the terrain beyond the point from where he had parked. He then ran up the hill to see if he could assist the pilot, but the aircraft was engulfed in flames when he reached the accident site.
- 1.1.5 The pilot was fatally injured, and the aircraft was destroyed by post-impact fire.
- 1.1.6 The accident occurred during daylight at Nooitgedacht Plantation (SAPPI) in Ngodwana at Global Positioning System (GPS) co-ordinates determined to be 25°39'33.03" South 030°32'10.01" East, at an elevation of 6322 feet (ft).





Figure 2: ZS-TFH releasing its second load of water. (Source: Operator)

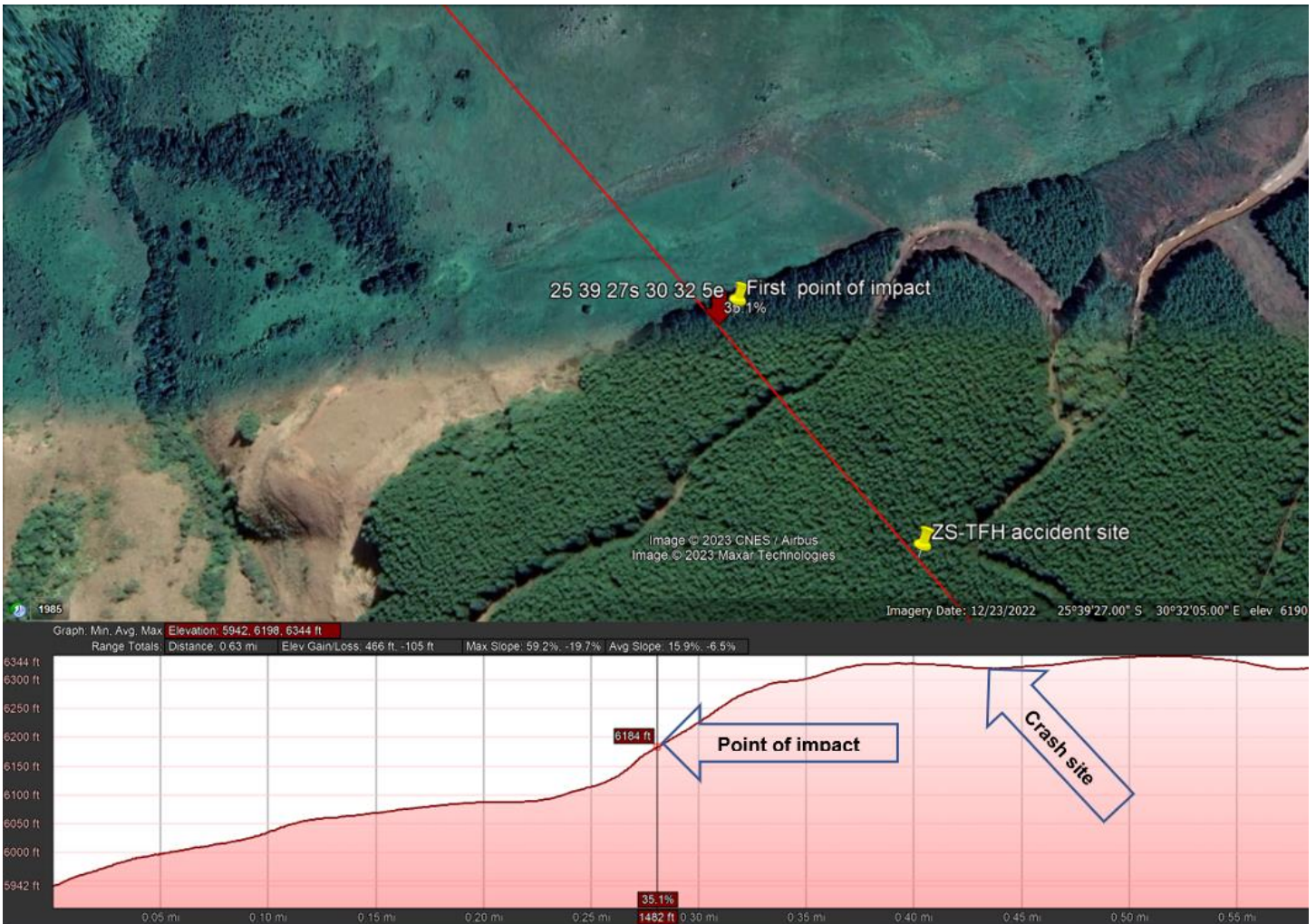


Figure 3: An aerial view (top) and elevation profile (bottom) of the crash site. (Source: Google Earth)

## 1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	1	-	-	1	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	-	-	-	-	-
<b>Total</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>

Note: Other means people on the ground.

## 1.3. Damage to Aircraft

1.3.1. The aircraft was destroyed by post-impact fire.



Figure 4: The wreckage post-accident.

## 1.4. Other Damage

1.4.1. None.

## 1.5. Personnel Information

Nationality	South African	Gender	Male	Age	49
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night and Instrument ratings				
Medical Expiry Date	31 July 2023				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.



**Flying Experience:**

Total Hours	3 146.80
Total Past 24 Hours	2.5
Total Past 7 Days	4.7
Total Past 90 Days	15.9
Total on Type Past 90 Days	15.9
Total on Type	273.2

- 1.5.1. The pilot was initially issued a Commercial Pilot Licence (CPL) on 26 February 2009 under Part 67 of the South African Civil Aviation Regulations (CAR) 2011. The revalidation of the licence was conducted on 5 June 2023, after which a licence was reissued with an expiry date of 30 June 2024. The pilot was employed by the operator on 1 May 2019.
- 1.5.2. The pilot was issued a Class 1 medical certificate on 26 July 2022 with an expiry date of 31 July 2023.
- 1.5.3. The hours in the table above are as per the pilot's logbook, which was last updated on 20 June 2023.
- 1.5.4. The pilot's last day off was on 13 June 2023. He was rostered to be on duty from 14 to 21 June 2023, but only flew on 17, 19, 20 and 21 June 2023.

**1.6. Aircraft Information**

- 1.6.1. Air Tractor AT-802A (Source: <https://at802f.com/aircraft-overview/aircraft-equipment/>)

*The Air Tractor AT-802A has a Pratt & Whitney PT6A-67AG 1350 turboprop engine. The aircraft are fitted with a 5-blade constant speed reversing Hartzell propeller. It has an 820-gallon fiberglass hopper, heat-cured derakane resin and 18-gallon foam tank. The aircraft is fitted with computer-controlled rotary-actuated fire gate doors to provide a constant flow rate for drops. It has 11.0-12 low-pressure tyres with dual 4-piston brakes and electrically operated high-lift flaps. The aircraft has 308-gallon fuel tanks, LED position and strobe lights, 600-watt retractable landing lights and LED nose mounted lights. It is fitted with an attitude gyro, turn windows.*

**Airframe:**

Manufacturer/Model	Air Tractor AT-802A	
Serial Number	802A-0214	
Year of Manufacture	1990	
Total Airframe Hours (At Time of Accident)	1930	
Last Inspection (Hours & Date)	1924.7	31 May 2023
Hours Since Last Inspection	5.3	
CRS Issue Date	31 May 2023	
C of A (Issue Date & Expiry Date)	10 February 2015	29 February 2024

C of R (Issue Date) (Present Owner)	3 February 2015
Type of Fuel Used	Jet A1
Operating Category	Agricultural Operations (Part 137)
Previous Accidents	None

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

### Engine:

Manufacturer/Model	Pratt & Whitney PT6A-67F
Serial Number	PCE-RZ 0019
Part Number	PT6A-67F
Hours Since New	1265.9
Hours Since Overhaul	TBO not yet reached

### Propeller:

Manufacturer/Model	Hartzell HC-B5MA-3D
Serial Number	HBA 1685
Part number	HC-B5MA-3D
Hours Since New	1265.3
Hours Since Overhaul	190.4

1.6.2. According to available information, the aircraft was first registered to the present owner on 3 February 2015. The Certificate of Release to Service (CRS) was reissued on 31 May 2023 with an expiry date of 30 May 2024 or at 2024.7 hours, whichever occurs first.

1.6.3. Overhaul intervals are 2500 hours for the engine and 2500 hours for the propeller blades.

## 1.7. Meteorological Information

1.7.1 The weather information entered in the table below was obtained from the South African Weather Service (SAWS) report for FANS on 21 June 2023 at 1500Z. FANS is located 43 kilometres (km) from the accident site.

Wind Direction	80°	Wind Speed	2kts	Visibility	5km
Temperature	19°C	Cloud Cover	Scattered	Cloud Base	1 300ft
Dew Point	11°C	QNH	1019 hPa		

## 1.8. Aids to Navigation

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Regulator for the aircraft type. There were no recorded defects with the navigational equipment prior to the flight.

## 1.9. Communication

1.9.1. The aircraft was equipped with a standard communication system as approved by the Regulator for the aircraft type. There were no recorded defects with the communication system prior to the flight. The aircraft was in communication with the dispatching officer on frequency 123.55-Megahertz (MHz).

## 1.10. Aerodrome Information

1.10.1 The accident did not occur at or near an aerodrome, but 17 kilometres (km) south-east of Elandshoogte Airfield Runway 27.

Aerodrome Location	Elandshoogte, Nelspruit, Mpumalanga Province
Aerodrome Status	Unlicensed
Aerodrome GPS coordinates	25°30'21.76" South 030°29'43.19" East
Aerodrome Elevation	6273 ft
Runway Headings	09/27
Dimensions of Runway Used	1159 X 12
Heading of Runway Used	N/A
Surface of Runway Used	Asphalt
Approach Facilities	None
Radio Frequency	124.8 MHz

## 1.11. Flight Recorders

1.11.1. The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation.

## 1.12. Wreckage and Impact Information

1.12.1. The aircraft impacted the rising terrain and the wreckage dispersed in a radius of 350m. The aircraft impacted the terrain with the left-side main landing gear and the hopper, and then burst into flames and skidded forward for approximately 250m before it came to rest in an inverted position facing north.



**Figure 5:** A rock with blue paint from the aircraft's hopper.

1.12.2 Both the main landing gears and the hopper separated from the fuselage and dispersed in the direction in which the aircraft catapulted and came to rest. The tail wheel remained on the main wreckage. The wings were damaged by impact forces but remained on the fuselage. The flaps and ailerons separated from the wings.



**Figure 6:** Direction of flight, the fire and position of the eyewitness. (Source: Operator)

1.12.3 The aircraft was flying perpendicular to the wind direction (see Figure 7).





**Figure 7:** ZS-TFH releasing water. (Source: Operator)



**Figure 8:** The front view of the main wreckage with damaged wings.





**Figure 9:** Left view of the main wreckage.

1.12.4 The right-side flap was found approximately 10m from the main wreckage and burnt, indicating that it was severed before the aircraft came to rest.



**Figures 10 and 11:** Shows bottom and top view of the right-side flap.

1.12.5 Both the left and right ailerons broke off from the wing trailing edge during the accident sequence.





**Figure 12:** The right-side aileron with the trim tab missing. **Figure 13:** Shows the left-side aileron with the trim tab still attached.

1.12.6 The jackscrew was found in an open position, indicating that the flaps were extended (down).



**Figure 14.** The open flap jackscrew.

1.12.7 Parts of the aircraft separated and scattered in different directions, including the propeller blades. Only three (3) of the five (5) blades were recovered.





**Figures 15, 16 and 17:** Three of the five propeller blades that were recovered from the accident site.

### **1.13. Medical and Pathological Information**

1.13.1. To be discussed in the final report.

### **1.14. Fire**

1.14.1. A post-impact fire ensued and destroyed the aircraft.

### **1.15. Survival Aspects**

1.15.1. The accident was not considered survivable because of the impact forces that destroyed the aircraft's cabin, as well as the intense post-impact fire.

### **1.16. Tests and Research**

1.16.1. To be discussed in the final report.

## 1.17. Organisational and Management Information

- 1.17.1. The flight was conducted in accordance with the provisions of Part 137 (Agricultural Operations) of the CAR 2011 as amended.
- 1.17.2. The AMO which carried out the last maintenance inspection prior to the accident flight had an approved AMO certificate that was issued by the Regulator on 1 January 2023 with an expiry date of 31 January 2024.
- 1.17.3. The operator was last audited by the Regulator on 10 November 2022, and was issued an Air Operating Certificate (AOC) on 14 November 2022 with an expiry date of 30 November 2023. The ZS-TFH aircraft was endorsed on the operator's operations specifications (OPS SPEC).
- 1.17.4. The operator was issued an Air Service Licence (ASL) on 8 July 2019.

## 1.18. Additional Information

- 1.18.1. None.

## 1.19. Useful or Effective Investigation Techniques

- 1.19.1 To be discussed in the final report.

## 2. FINDINGS

### 2.1. General

From the available evidence, the following preliminary findings were made with respect to this Accident. These shall not be read as apportioning blame or liability to any organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings** — are statements of all significant conditions, events, or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

### 2.2. Findings

- 2.2.1. The pilot was issued a Commercial Pilot Licence (CPL) on 26 February 2009 in accordance with Part 67 of the South African CAR 2011. He revalidated the licence on 5 June 2023 with an expiry date of 30 June 2024.
- 2.2.2. The pilot was issued a Class 1 medical certificate on 7 December 2021 with an expiry date of 31 July 2023.
- 2.2.3. The pilot last updated the flight folio on 20 June 2023.

- 2.2.4. The AMO which conducted the last maintenance inspection prior to the accident flight had an approved AMO certificate that was issued by the Regulator on 1 September 2022 with an expiry date of 31 September 2023.
- 2.2.5. The last annual inspection on the aircraft was conducted on 31 May 2023 at 1924.7 airframe hours. The aircraft was issued a Certificate of Release to Service (CRS) on 31 May 2023 with an expiry date of 30 May 2024 or at 2024.7 hours, whichever occurs first.
- 2.2.6. The operator was last audited by the Regulator on 10 November 2022 and was issued an AOC on 14 November 2022 with an expiry date of 30 November 2023. The ZS-TFH aircraft was endorsed on the operator's Ops Spec.
- 2.2.7. The operator was issued an ASL on 8 July 2019.
- 2.2.8. Clear weather conditions prevailed at the time of the flight.
- 2.2.9. The aircraft was flying perpendicular to the wind direction.
- 2.2.10 The aircraft first impacted the rising terrain with the left-side main landing gear and the hopper before it burst into flames and skidded forward for approximately 250m; it came to rest in an inverted position facing north.

### **3. ON-GOING INVESTIGATION**

- 3.1. The AIID investigation is on-going and the investigators will be looking into other aspects of this occurrence which may or may not have safety implications.

**This report is issued by:  
Accident and Incident Investigations Division  
South African Civil Aviation Authority  
Republic of South Africa**