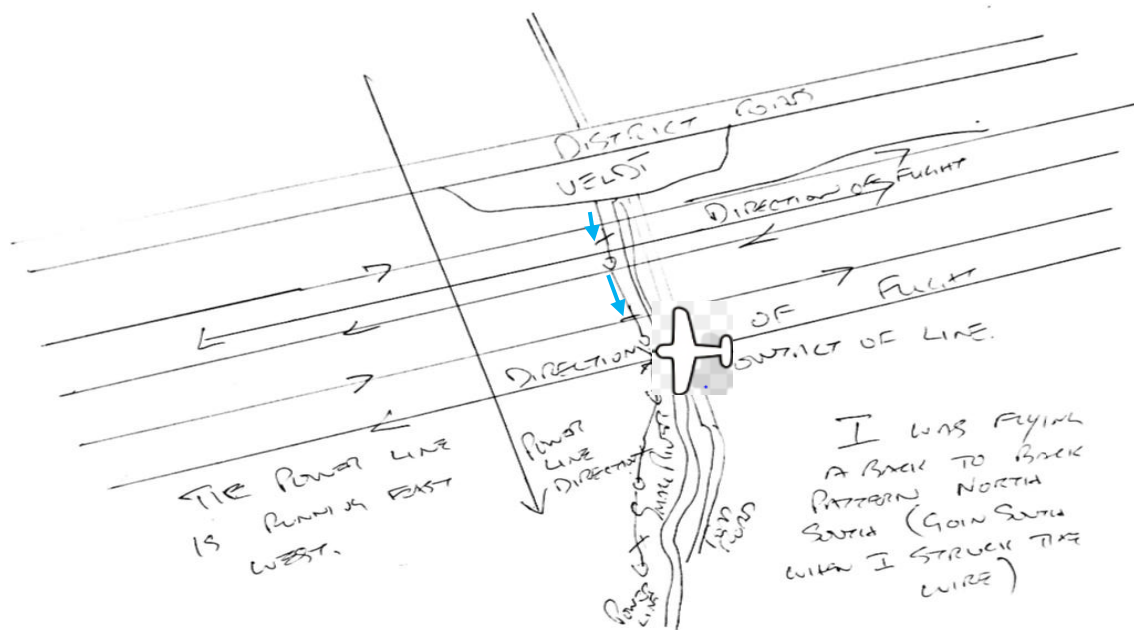


LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

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|--|---|-----------------|-----------------------------------|---|---------------------|--------------------------|----|
| Reference Number | CA18/3/2/1429 | | | | | | |
| Classification | Serious Incident | Date | 31 December 2022 | | Time | 0658Z | |
| Type of Operation | Agriculture (Part 137) | | | | | | |
| Location | | | | | | | |
| Place of Departure | Vrede Private Airstrip, Free State Province | | Place of Intended Landing | Vrede Private Airstrip, Free State Province | | | |
| Place of Occurrence | Powerlines on the north-side of the maize field at Cornelia Farm, Free State Province | | | | | | |
| GPS Co-ordinates | Latitude | 27°37'02.07" S | Longitude | 28°47'.47.85" E | Elevation | 5 380 feet | |
| Aircraft Information | | | | | | | |
| Registration | ZS-AVA | | | | | | |
| Make; Model; S/N | Air Tractor Inc; AT502A (Serial Number: 502A-3365) | | | | | | |
| Damage to Aircraft | Substantial | | | Total Aircraft Hours | 222.6 | | |
| Pilot-in-command | | | | | | | |
| Licence Type | Commercial Pilot Licence (CPL) | | Gender | Male | | Age | 68 |
| Licence Valid | Yes | Total Hours | 14 503.5 | | Total Hours on Type | 169.1 | |
| Total Hours 90 Days | 22.9 | | Total Flying on Type Past 30 Days | 22.9 | | | |
| People On-board | 1 + 0 | Injuries | 0 | Fatalities | 0 | Other (on ground) | 0 |
| What Happened | | | | | | | |
| <p>On Saturday morning, 31 December 2022, a pilot on the Air Tractor 502A aircraft with registration ZS-AVA was spraying pesticide on the maize field at Cornelia Farm in Bloemfontein, Free State province, when the serious incident occurred. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot reported that around 0530Z, he met up with the chemical mixture/loader personnel (ground crew) at Vrede Private Airstrip whereafter they held a briefing of the day's activities. Later, the pilot conducted a pre-flight inspection on the aircraft and nothing abnormal was noticed. The aircraft had fuel in the tanks that equated to 3 hours flight time and 1 750 kilograms (kg) of chemical in the hopper tank. At 0600Z, the pilot started the engine and took off. He then proceeded to Cornelia Farm, approximately 16 nautical miles (nm) north-west at a speed of 135 knots.</p> <p>Upon arrival at Cornelia Farm at approximately 0635Z, the pilot circled the field to be sprayed to inspect if there were hazards or potential obstacles. The pilot noticed the power lines which spanned from the east to the west next to the maize field that was to be sprayed. He then performed two spray runs in a consistent south to north pattern at 3 feet (ft) above ground level (AGL). All the turns that were conducted after the application of the chemical were left turns and were consistent with altitude gains of about 200ft AGL. During the third spray run, the aircraft flew through the power lines, which</p> | | | | | | | |

were subsequently severed by the propeller blades. The pilot maintained control of the aircraft and flew back to Vrede Private Airstrip, and landed safely. The aircraft sustained substantial damage to the propeller blades leading edge tips and the right-side elevator. The pilot disembarked from the aircraft unharmed.



Sketch 1: An illustration of the aircraft's flight path and the approximate area of contact with the lines – the maize field sprayed is depicted on the right.
(Source: Pilot)



Figure 1: Damage on one of the blades leading-edge tip. (Source: Operator)



Figure 2: Damaged right-side elevator. (Source: Operator)

The pilot

A review of the pilot's aerial application experience (skills) revealed that he had more than 14 000 flight hours on a variety of aircraft. According to the South African Civil Aviation Authority (SACAA) form number CA 12-03 (pilot questionnaire), the pilot had 14 503.5 total flight hours on various aircraft and 169.1 hours on type. A review of the activities in the days leading up to the serious incident indicated that the pilot was well-rested on the day, and that the operational pace was slowing down towards the end of year.

Aircraft Information

The occurrence aircraft is an Air Tractor AT-502A single-seat, cantilever low wing, all-metal aircraft with fixed conventional landing gear. The aircraft is powered by a PT6A-34AG Pratt and Whitney turboprop engine rated at 750 horsepower (hp), which drove a Hartzell three-blade constant speed reversible pitch propeller. The aircraft is primarily used for agricultural aerial work and equipped with an AG-NAV precision Global Positioning System (GPS). The hopper tank is made of fiberglass and has a 500 United States (US) gallon capacity. The horizontal stabiliser is all-metal and strut-braced with added rigidity. The vertical fin is cantilever. The elevators and rudder are of all-metal construction and sealed to prevent chemical entry.

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| Findings |
| <ol style="list-style-type: none"> 1. The pilot was issued a Commercial Pilot Licence (CPL) by the Regulator on 10 June 2022 with an expiry date of 30 June 2023. 2. The pilot had flown a total of 14 503.5 hours of which 169.1 hours were on the aircraft type. 3. The pilot had a Class 1 aviation medical certificate that was issued on 22 June 2022 with an expiry date of 29 December 2023. The pilot had a restriction to wear suitable corrective lenses and he was fit to conduct the flight in accordance with (IAW) the existing regulations. 4. The pilot had the aircraft type endorsed on his licence. 5. The last 100-hour Mandatory Periodic Inspection (MPI) that was conducted on the aircraft prior to the accident flight was certified by an approved person on 18 December 2022 at 151.8 airframe hours. The aircraft had logged 222.6 total hours at the time of the accident, which meant that the aircraft was flown a further 70.8 hours since the last inspection. 6. The aircraft was issued a Certificate of Release to Service (CRS) on 18 December 2022 with an expiry date of 18 December 2023 or at 251.8 total airframe hours, whichever occurs first. 7. The aircraft maintenance organisation (AMO) that performed the last MPI had a valid approval certified that was issued by the Regulator on 26 July 2022 with an expiry date of 31 July 2023. 8. The operator was issued an Air Operating Certificate (AOC) on 30 December 2022 with an expiry date of 31 December 2023. The ZS-AVA aircraft was authorised on the Operation Specifications certificate which was issued by the SACAA with an effective date of 14 December 2022. 9. The aircraft had a Certificate of Airworthiness (C of A) that was issued on 8 August 2022 with an expiry date of 7 August 2023. The aircraft was airworthy when it dispatched for the flight. 10. The aircraft's Certificate of Registration (C of R) was issued on 8 July 2022. |
| Probable Cause |
| The aircraft collided with the power lines on the north-side of the maize field whilst the pilot was engaged in a chemical spray operation. The pilot maintained control of the aircraft and routed back to the departure airstrip where he landed safely. |
| Contributing Factors |
| None. |
| Safety Action |
| None. |
| Safety Recommendation/Message |
| None. |
| About this Report |
| <i>The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using</i> |

information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

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

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, 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.

Disclaimer

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

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