

**LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL**

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| <b>Reference Number</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CA18/2/3/10535                                                                                                                 |                    |                                          |                             |                                        |                          |       |
| <b>Classification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Accident                                                                                                                       |                    | <b>Date</b>                              | 11 December 2024            |                                        | <b>Time</b>              | 0405Z |
| <b>Type of Operation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Private (Part 94)                                                                                                              |                    |                                          |                             |                                        |                          |       |
| <b>Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                |                    |                                          |                             |                                        |                          |       |
| <b>Place of Departure</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Albert Falls Farm Airfield, KwaZulu-Natal Province                                                                             |                    | <b>Place of Intended Landing</b>         |                             | Eva's Airfield, KwaZulu-Natal Province |                          |       |
| <b>Place of Occurrence</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Runway 10 at Albert Falls Farm Airfield, approximately 21.7km north of Pietermaritzburg Airport (FAPM), KwaZulu-Natal Province |                    |                                          |                             |                                        |                          |       |
| <b>GPS Co-ordinates</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Latitude</b>                                                                                                                | 29°27'27" S        | <b>Longitude</b>                         | 030°22' 01.0" E             | <b>Elevation</b>                       | 1200ft                   |       |
| <b>Aircraft Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                |                    |                                          |                             |                                        |                          |       |
| <b>Registration</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ZU-KAB                                                                                                                         |                    |                                          |                             |                                        |                          |       |
| <b>Make; Model; S/N</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Micro Aviation SA; Bat Hawk R (Serial Number: 0132)                                                                            |                    |                                          |                             |                                        |                          |       |
| <b>Damage to Aircraft</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Substantial                                                                                                                    |                    |                                          | <b>Total Aircraft Hours</b> | 5.7                                    |                          |       |
| <b>Pilot-in-command</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                |                    |                                          |                             |                                        |                          |       |
| <b>Licence Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Private Pilot Licence                                                                                                          |                    | <b>Gender</b>                            | Male                        |                                        | <b>Age</b>               | 40    |
| <b>Licence Valid</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Yes                                                                                                                            | <b>Total Hours</b> | 1 757.2                                  | <b>Total Hours on Type</b>  |                                        | 476.2                    |       |
| <b>Total Hours 30 Days</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 19.8                                                                                                                           |                    | <b>Total Flying on Type Past 90 Days</b> |                             |                                        | 20.2                     |       |
| <b>People On-board</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1+0                                                                                                                            | <b>Injuries</b>    | 0                                        | <b>Fatalities</b>           | 0                                      | <b>Other (on ground)</b> | 0     |
| <b>What Happened</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                |                    |                                          |                             |                                        |                          |       |
| <p>On Wednesday morning, 11 December 2024, a pilot on-board a Bat Hawk R aircraft with registration ZU-KAB was on a private flight from Albert Falls Farm Airfield in KwaZulu-Natal province to Eva's Airfield in the same province. Visual meteorological conditions (VMC) prevailed at the time of the flight which was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot reported that he lost directional control of the aircraft during the take-off run on the grass-covered runway at Albert Falls Farm Airfield, and the aircraft drifted to the left side of the runway because he did not compensate the drift with the right rudder. The aircraft ultimately exited the runway during which the left wing impacted the trees. The aircraft came to a stop on the left side of the runway. The pilot switched off the fuel and master switch before he disembarked from the aircraft.</p> <p>The pilot was not injured during the accident. The aircraft sustained damage to the propeller, wings, tail, windshield and undercarriage.</p> |                                                                                                                                |                    |                                          |                             |                                        |                          |       |



**Figure 1:** The arrow shows the direction of take-off on the runway used. (Source: Pilot)



**Figure 2:** The aircraft at the accident site. (Source: Pilot)

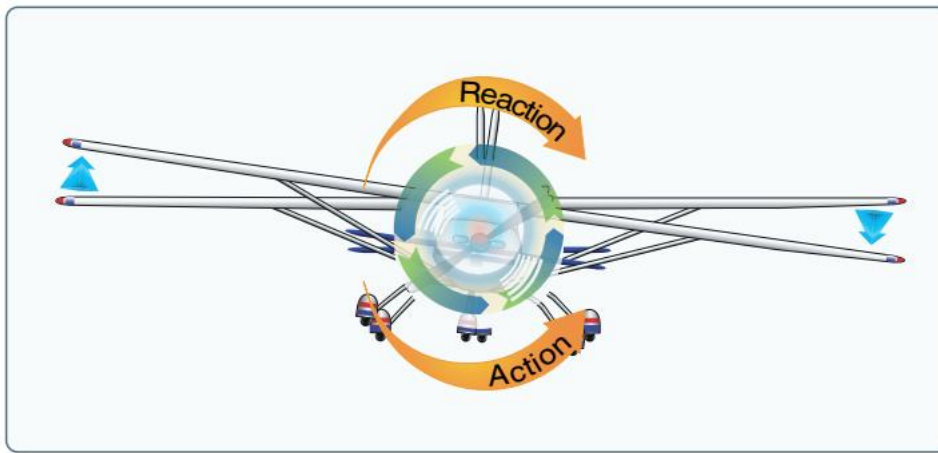


**Figure 3:** The front view of the aircraft. (Source: Pilot)

The pilot reported that the aircraft was airworthy at time it was dispatched for the flight. There was nothing abnormal that would have affected the steering mechanism of the aircraft. The pilot lost directional control due to the engine torque effect for which he did not adequately compensate.

Torque Reaction (Source: [https://www.faa.gov/sites/faa.gov/files/07\\_phak\\_ch5\\_0.pdf](https://www.faa.gov/sites/faa.gov/files/07_phak_ch5_0.pdf))

*Torque reaction involves Newton's Third Law of Physics— for every action, there is an equal and opposite reaction. As applied to the aircraft, this means that as the internal engine parts and propeller are revolving in one direction, an equal force is trying to rotate the aircraft in the opposite direction. [Figure 5-47]*



**Figure 5-47. Torque reaction.**

When the aircraft's wheels are on the ground during the take-off roll, an additional turning moment around the vertical axis is induced by torque reaction. As the left side of side of the aircraft is being forced down by torque reaction, more weight is being placed on the left main landing gear. This results in more ground friction, or drag, on the left tire than on the right, causing a further turning moment to the left. The magnitude of this moment is dependent on many variables. Some of these variables are:

1. Size and horsepower of engine
2. Size of propeller and the rpm
3. Size of the aircraft
4. Condition of the ground surface

This yawing moment on the take-off roll is corrected by the pilot's proper use of the rudder or rudder trim.

#### Findings

1. The pilot was initially issued a Private Pilot Licence (PPL) on 26 May 2015. The licence was reissued on 12 May 2023 with an expiry date of 31 May 2025. The pilot was appropriately rated for the flight and the aircraft type was endorsed on his licence. He had 1 757.2 total flying hours of which 476.2 hours were on the aircraft type. The pilot had last flown the aircraft type on 10 December 2024.
2. The pilot had a Class 2 aviation medical certificate that was issued on 9 April 2024 with an expiry date of 21 June 2026 with no restrictions.
3. The last inspection of the aircraft was certified on 8 October 2024 at zero (0) airframe hours after which a Certificate of Release to Service (CRS) was issued with an expiry date of 7 October 2025 or at 100 hours, whichever comes first. At the time of the accident flight, the aircraft had accrued 5.7 hours since new.

4. The Authority-to-fly (ATF) Certificate was initially issued on 13 November 2024 with an expiry date of 12 November 2025.
5. The Certificate of Registration (C of R) was issued to the present owner on 30 August 2024.
6. Evidence suggested that the runway was generally flat, even and well maintained, providing a suitable runway surface that would not have posed any challenges to the aircraft during landing or take-off under normal circumstances.
7. The pilot lost directional control of the aircraft during take-off on the grass-covered runway because of the failure to compensate for the engine torque effect. This resulted in the aircraft drifting to the left before exiting on the left side of the runway; it came to rest in the shrubs.

**Probable Cause(s)**

Loss of directional control of the aircraft during take-off on the grass-covered runway due to the failure to compensate for the engine torque effect which resulted in the aircraft drifting to the left and exiting the runway. It came to rest in the shrubs.

**Contributing Factor(s)**

None.

**Safety Action(s)**

None.

**Safety Message**

None.

**About this Report**

*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 information supplied in the initial notification, as well as from follow-up desktop 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**

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**This report is issued by:**

**Accident and Incident Investigations Division  
South African Civil Aviation Authority  
Republic of South Africa**