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INVESTIGATION REPORT

Accident to the Pipistrel Virus SW 121 registered G-OVSI

on 09 May 2021
at Albert - Bray (Somme)

Time	Around 10:35[1]
Operator	Private
Type of flight	Cross country
Persons on board	Pilot
Consequences and damage	Pilot injured, aircraft destroyed
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.	

[1]Except where otherwise indicated, the times in this report are in local time.

Low-height flight over runway to offset wheel touchdown on landing, loss of control, in crosswind

1 - HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, radio communication recordings and the data recorded on the aircraft's equipment.

The pilot of G-OVSI carried out a cross-country flight from Damyns Hall aerodrome (UK) bound for Portorož airport (Slovenia). This flight was carried out with another pilot on board a second Virus SW 121. The pilots had planned to fly a first leg to Albert Bray aerodrome to complete the customs formalities.

During the flight to Albert Bray, the two pilots followed each other and communicated by radio.

The two pilots flew overhead the Albert-Bray installations and then joined the downwind leg to land on paved runway 27.

The pilot of the first Virus landed without incident.

Due to the distance between the touchdown zone and the position of taxiway B leading to the parking area, the pilot of G-OVSI chose to abort the final descent near the touchdown zone and to continue flight at low height while adjusting the power in order to land further on and reduce the taxiing time. When he flared to land, the aeroplane banked to the right and the pilot was unable to regain control.

The aeroplane struck the ground and came to a stop 150 m to the right of the runway centreline.

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2 - ADDITIONAL INFORMATION

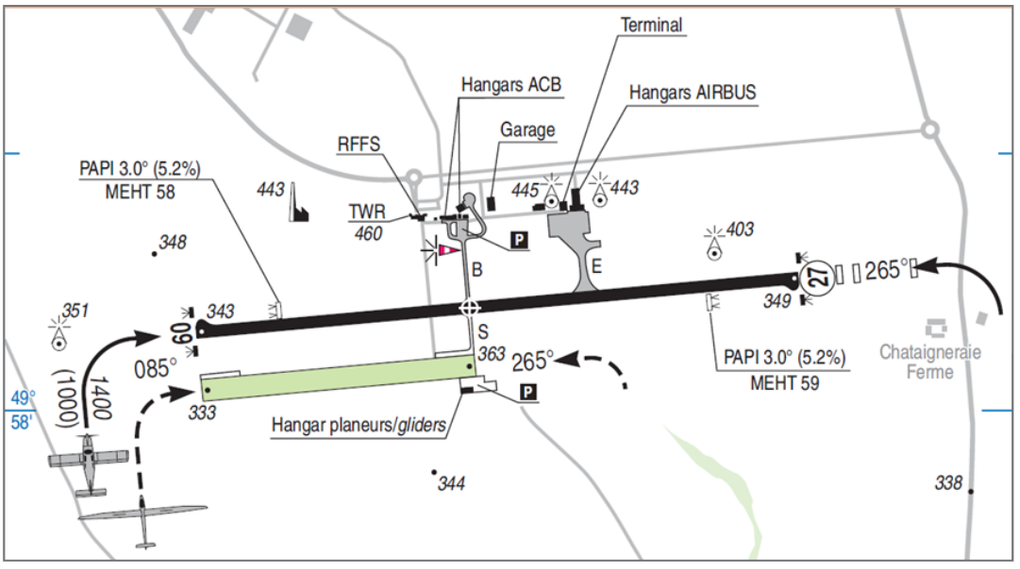
2.1 Aerodrome information

2.1.1 General

Albert Bray aerodrome is open to Public Air Traffic. Customs services are available upon prior notice.

The air traffic services are not provided on Sundays. The A/A frequency was therefore in use at the time of the event.

Paved runway 09-27 measures 2,200 m x 45 m. Taxiway B is around 1,200 m from the threshold of runway 27.



Source: AIS

Figure 1: excerpt from Albert Bray aerodrome VAC chart

2.2 Aircraft information

2.2.1 General

The Pipistrel Virus SW 121 is certified under the LSA certification standard.

On the day of the accident, on leaving Damyns Hall, G-OVSI had logged a total of 65 flight hours.

G-OVSI was equipped with a Garmin avionics suite made up of two multi-function screens. The memories of this equipment were read out in the scope of the investigation (see paragraph 2.7).

2.2.2 Flight manual information

According to the aeroplane's flight manual, it is recommended to land with the flaps fully extended (position +2) and the speedbrakes half extended.

In crosswind conditions, the manual recommends landing with the flaps in position +1.

The normal approach speed (IAS) with the flaps in position +2 is 60-65 kt.

The stall speed in the flaps +2 landing configuration indicated in the Limitations chapter of the flight manual is 47 kt.

The maximum demonstrated crosswind speed for landing is 18 kt.

The Virus SW 121 is equipped with a stall warning system which uses the Angle Of Attack (AOA) values measured by the pitot tube. When the AOA exceeds a threshold value, a symbolic representation of this angle is displayed on the PFD. When the aeroplane approaches stall, the system emits a "buzzer" warning whose frequency and strength varies according to the margin with respect to the threshold values set during the calibration of the system.

Source: Garmin

Figure 2: AOA display on PFD

2.2.3 Additional information

Pipistrel told the investigators that the stall warning system associated with the AOA is not the primary method of warning of a stall. This system was installed to provide an additional source of information for the pilot. In compliance with the LSA certification standard, the primary indications of an approaching stall are through the inherent aerodynamic qualities (e.g. buffeting) of the aeroplane.

This organisation of the approaching stall information into a hierarchal order does not appear in the Virus SW 121 flight manual. Pipistrel specified that this information will be included in the next version of the aeroplane's flight manual.

Based on the estimated weight of the aeroplane at the time of landing, Pipistrel indicated that the stall speed in the flap +2 configuration with speedbrakes retracted was 42 kt[(2)]. Pipistrel added that for speed values below 50 kt, in this configuration, the flight control surfaces are less effective.

[(2)] The stall speed was 45 kt with the speedbrakes completely extended.

2.3 Pilot's experience and statement

The pilot was a former military pilot. He held a CPL(A) licence with instructor and SEP ratings. The day of the accident, he had logged a total of around 2,600 flight hours, including 790 hours on SEPs, 49 hours on LSAs (Pipistrel Virus SW 121) and 3 hours on microlights (Pipistrel Alpha Trainer). In the previous 30 days, he had flown 31 h, all on the Virus SW 121. He had logged a total of around 1,360 flight instruction hours[(3)], including 26 instruction hours given on the Virus SW 121.

[(3)] 450 instruction hours had been given on military jets.

The pilot indicated that he had not seen the windsock during the overhead join. He knew that a crosswind had been forecast. He expected a 14 to 16 kt wind from 200-220° based on the TAF and METAR messages studied during flight preparation. He declared that both he and the second pilot knew that they were going to have to land on runway 27 even before flying overhead the installations.

The pilot explained that due to the landing distance available, he had chosen to land further forward on the runway. When he flared, slightly to the right of the runway centreline, at a height of roughly 5 ft, he thought that the plane had been subject to a gust of wind which lifted its left wing. According to him, while trying to counter the unwanted roll movement, the right wheel touched the runway, the aeroplane then bounced slightly and the three wheels touched down. After that, he indicated that the aeroplane stayed on the ground and deviated to the right. He used the rudder pedals and brakes to counter this deviation but the aeroplane continued to turn to the right. He could no longer remember exactly what happened next. He thought that he struck something which brought the aeroplane to a stop. He remembered cutting off the magnetos and the fuel supply and exiting the plane unaided.

The pilot declared that he had not had the impression that there was a problem with the engine, controls or controlling the aeroplane during the phase prior to the final impact.

The pilot explained that he had landed with the flaps in the +2 position and with an approach speed of 65 kt[(4)].

He could not remember if the stall warning system had triggered or not when flying along the runway.

[(4)] These elements were confirmed by the recorded data and radio communications.

2.4 Other statements

2.4.1 Witnesses on ground

Several witnesses on the ground gave corroborating statements indicating that they saw the aeroplane fly along the runway at a height of around 1.50 m. The left wing rose and the aeroplane veered to the right over the grass at the edge of the runway. The pilot was then said to have corrected the flight path. The aeroplane did not touch the runway. He next carried out a 10 m pull up and stalled.

2.4.2 Pilot of other Pipistrel

The pilot of the other Virus was the owner of both aeroplanes. He was also an instructor.

When he lands with a Pipistrel SW 121 in strong wind conditions with gusts, he usually flies the approach with the flaps in the +1 position and adopts a speed of 65 kt to land.

He added that he had not felt any turbulence on final and that he had landed normally.

2.5 Meteorological information

The 08:30 METAR indicated that the conditions at the time of landing were CAVOK and that there was a 13 kt wind from 180°.

According to a study carried out by the French Met Office, based on the data recorded by the weather station on the aerodrome, the average wind recorded between 08:30 and 08:40 was 13.6 kt from 180°. During the landing phase, the maximum wind values recorded were between 15 and 18 kt.

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2.6 Examinations on site

The wreckage was lying in the grass, around 150 m from the runway centreline. It was oriented 086°.

It was not possible, on and around the paved runway, to identify signs corresponding to the aeroplane's manoeuvre as described by the pilot.

The grass both sides of the runway was relatively high. No obvious signs of the aeroplane's run were identified around the wreckage.

The checks carried out on the wreckage (continuity of flight controls, engine controls, fuel) did not reveal a failure prior to the accident. The propeller was rotating, but without signs of being powered, at the time of impact with the ground.

The speedbrakes and flaps were found in the retracted position. It is possible that they were moved after the accident and before the observations made by the investigators.

The findings on the site were consistent with the aeroplane stalling at low height.

2.7 Recorded data

The data recorded in the memories of the avionics suite equipping the aeroplane was collected. Its analysis provided the following information:

- The pilot carried out the approach on a slope of around 6° with an aiming point before the aiming point markings of threshold 27. The indicated airspeed during the approach varied between 65 and 70 kt, with an engine speed of 3,100 rpm.
- He then flew along the runway[(5)] for around 35 s. During this phase, despite adjusting the power to around 3,500 rpm, the aeroplane's speed decreased down to 43 kt. The pilot then increased the power to 4,500 rpm (see Figure 3, point ❸). A 15° right roll excursion was recorded (see Figure 3, point ❷) while the speed increased to 46 kt.
  A second roll excursion was recorded with a right bank which reached 20° and a decrease in pitch attitude of nearly 7° (see Figure 3, point ❹). This was followed by acceleration peaks which might correspond to a bounce (see Figure 3, point ❺) when the aeroplane approached the edge of the runway. During this sequence, the power, after a slight decrease, increased to 4,900 rpm.
- The subsequent variations in pitch, roll, altitude and speed seem to indicate that the pilot no longer had control of the flight path. The last recorded position (❻) showed the aeroplane at a height of around 6 m, with a left roll of 29°, a nose-up attitude of 12° and a speed of 42 kt.

(5) The recorded data could not be used to determine the height of this flight along the runway with accuracy.

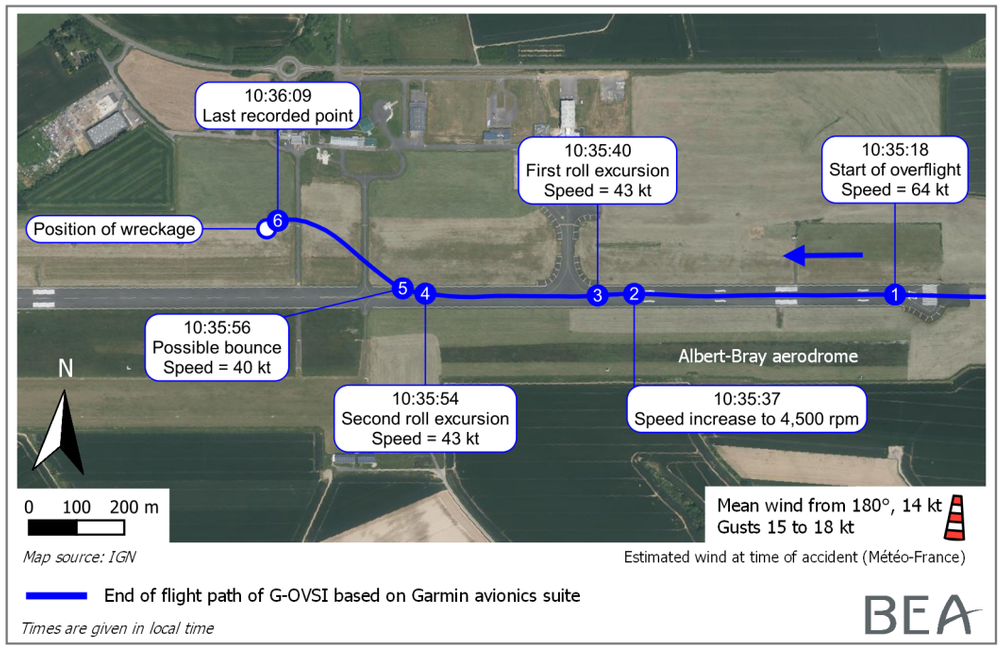

Figure 3: flight path of G-OVSI

Stall warning system

The AOA parameters are recorded by the aeroplane's avionics. The investigation tried to establish a correlation between these parameters and the possibility of the stall warning being activated (see paragraph 2.2.2) during the flight along the runway but was not able to draw any conclusions about this.

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

The approach and landing were carried out in crosswind conditions compatible with the limitations of the Virus SW 121.

During the landing, the pilot of G-OVSI flew along the runway at a height of around 1.50 m with the intention of touching down further on and thus taxiing over a shorter distance.

During this flight phase along the runway, the speed of the aeroplane in the order of 43 kt was below the stall speed established as the operating limitation in the flight manual for the chosen configuration (47 kt). It was close to the stall speed estimated by the manufacturer in the flight conditions (42 kt).

The aeroplane's roll attitude was destabilised twice probably due to variations in the crosswind. During the second destabilization which occurred when the pilot had initiated a reduction in power to land, the aeroplane bounced on the runway. The pilot then increased power. The investigation was not able to determine if this was a deliberate action and in this case, what his intentions were.

The pitch and roll evolutions which followed seem to indicate that the pilot had lost control of the flight path. It is not possible to affirm whether the pitch actions were controlled or not. The aeroplane very probably stalled at the end of this phase.

Contributing factors

The following factors may have contributed to the loss of control on landing:

- An insufficient speed for flying over the runway at a low height.
- The decision to manoeuvre overhead the runway at a low height in wind conditions close to the demonstrated limits for this aeroplane without anticipating the risks associated with this manoeuvre.

Safety lessons

Non-essential flight manoeuvres

The BEA has repeatedly underlined the risks involved in performing non-essential flight manoeuvres. The low-height flight along the runway described in this report could be considered comparable with a non-essential manoeuvre even if the intentions were different from the cases identified, where, for the most part, the pilot was looking for thrills or wanting to put on a show. In this case, it may not have been obvious for the pilot to identify that he was taking a risk. This accident serves as a reminder that improvising a non-essential manoeuvre for which he has not been trained exposes the pilot to risks that he is not able to fully anticipate.

Approaching stall on Pipistrel Virus SW-121

Although the Virus SW 121 is equipped with a stall warning system, based on an AOA probe, associated with a display on the multifunction screen and aural warnings, Pipistrel do not consider this system as the primary method for indicating a stall, in accordance with the aeroplane's certification standard.

The presence of a stall warning system may reduce the pilots' vigilance with respect to aerodynamic signs warning of a stall.

Pilots must, first of all, remain receptive to the aerodynamic information provided by their aeroplane, such as buffeting or a reduction in the effectiveness of the controls and anticipate, according to these indications, an approaching stall.