BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile
www.bea.aero
@BEA_Aero

INVESTIGATION REPORT

Accident to the PITTS S2-A registered F-GIIZ
on 30 May 2020
at Carcassonne (Aude)

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

Time	15:30[1]
Operator	Private
Type of flight	Aerobatics
Persons on board	Pilot
Consequences and damage	Pilot fatally injured, aeroplane destroyed

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in May 2021. As accurate as the translation may be, the original text in French is the work of reference.

Erratum: After a supplementary examination of parts of the wreckage, the report has been modified with respect to information about the lower RH aileron (paragraphs 2.3 and 2.4).

Furthermore the scenario has been modified as follows:

Instead of: "During these manoeuvres, he was in the habit of performing a steep-angle climb after a level flight acceleration. On the day of the accident, the pilot performed this manoeuvre up to a height of 600 ft and lost control of the plane which then collided with the ground",

Read: "During these manoeuvres, he was in the habit of climbing nearly vertically after a level flight acceleration. On the day of the accident, the pilot performed this manoeuvre up to a height of 600 ft with a speed approaching zero. He then lost control of the plane which collided with the ground."

Loss of control after take-off during an aerobatic figure, collision with the ground, fire

1 - HISTORY OF THE FLIGHT

Note: the following information is principally based on an onboard camera and on the cameras present on the ground, statements and radio communication recordings.

The pilot contacted the controller at Carcassonne and requested taxi clearance for aerobatic manoeuvres overhead the aerodrome. At 15:29, the controller told the pilot that the wind was 070° and 14 kt and cleared him from intersecting taxiway A, to line up and take off from paved runway 10.

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

BEA2020-0182.en/**July 2021**

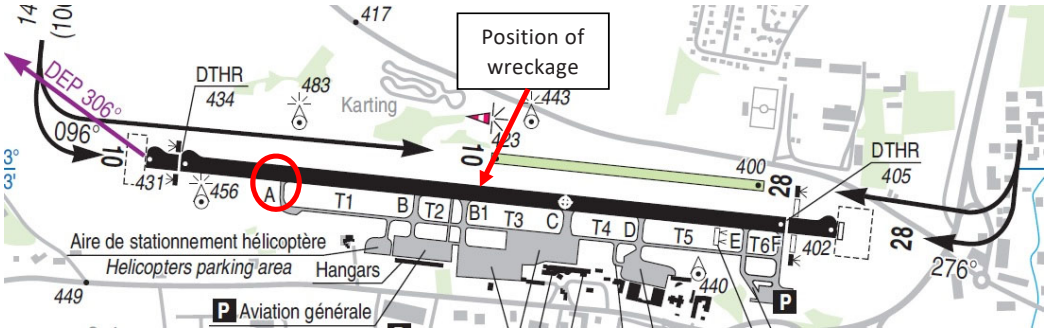


Figure 1: Excerpt from the Carcassonne aerodrome VAC chart

The pilot, seated in the rear seat, activated a smoke generating system, took off and performed a sudden pull-up manoeuvre before taking a practically vertical flight path.

Around 20 seconds later, the plane collided with the ground a few dozen metres from the start point of the climb and caught fire upon impact. The Aircraft Rescue and Fire Fighting Service immediately intervened.

2 - ADDITIONAL INFORMATION

2.1 Aeroplane information

The PITTS S2-A is an aerobatic biplane with two seats in tandem configuration. Both seats are equipped with controls but the pilot generally sits in the rear seat. F-GIIZ was equipped with a 200 hp (149 kW) Lycoming AEIO-360-A1E engine. The pilot owned the plane. At the time of the accident, the plane had logged 2,138 flight hours.

Source: Florent Péraudeau

Figure 2: F-GIIZ Pitts S2-A during an air exhibition

2.2 Pilot information

The 40-year-old pilot held an Airline Transport Pilot Licence - Aeroplanes (ATPL(A)) issued in 2004 and, prior to that, a Private Pilot Licence - Aeroplanes (PPL(A)) issued in 2001. He obtained basic and advanced aerobatic ratings in 2002.

The pilot's logbook was not found. His experience is therefore not known precisely but was around 10,000 flight hours.

The examination of the plane's logbook indicated that the first flight made by the pilot in F-GIIZ was on 18 August 2015 and that, since this date, he was the only pilot to fly this plane. He had logged a flight time of 71 hours and 10 minutes in this plane, almost exclusively in aerobatic flight.

The plane was grounded from 13 March to 15 May 2020 during the lockdown period due to the COVID-19 health crisis. The pilot then made several aerobatic flights in F-GIIZ: 15 May (20 minutes), 20 May (17 minutes), 24 May (18 minutes) and 28 May (17 minutes).

2.3 Examination of site and wreckage

The wreckage was found on the left edge of paved runway 10, a few metres after intersecting taxiway B1 and 580 m after intersecting taxiway A which the pilot had left to line up on the runway.

It was burnt to a large extent. After the initial observations, it was moved to a hangar at the aerodrome. Initially, the lower RH aileron was not found on the wreckage or in the vicinity of the accident site. During an in-depth examination of the debris, parts of the aileron, notably fragments of its spar and trailing edge were subsequently found. The fragments of the aileron spar show, notably, forward deformations at the hinges caused by the inertia of the aileron during the collision with the ground. The examination of the wreckage and the control linkage did not show any failure prior to the accident.

Observations indicate that the plane struck the ground with a steep nose-down attitude and a bank angle of close to zero.

The engine was removed by the BEA. Its examination did not bring to light any element that could have resulted in a reduction of power or abnormal operation.

2.4 Examination of the video recordings

Carcassonne aerodrome is equipped with surveillance cameras. One of these, located on the roof of the control tower, filmed the accident. The recording showed that the pilot immediately adopted a vertical flight path before it was out of the camera's range. Around 20 seconds later, the plane reappeared with a steep nose-down attitude, a few dozen metres from the climb path. It exploded when it collided with the ground and immediately caught fire. The Aircraft Rescue and Fire Fighting Service vehicle was putting out the fire less than one minute later.

Careful observation of the footage did not identify any component that could have detached in flight, both during the take-off and during the fall and collision with the ground.

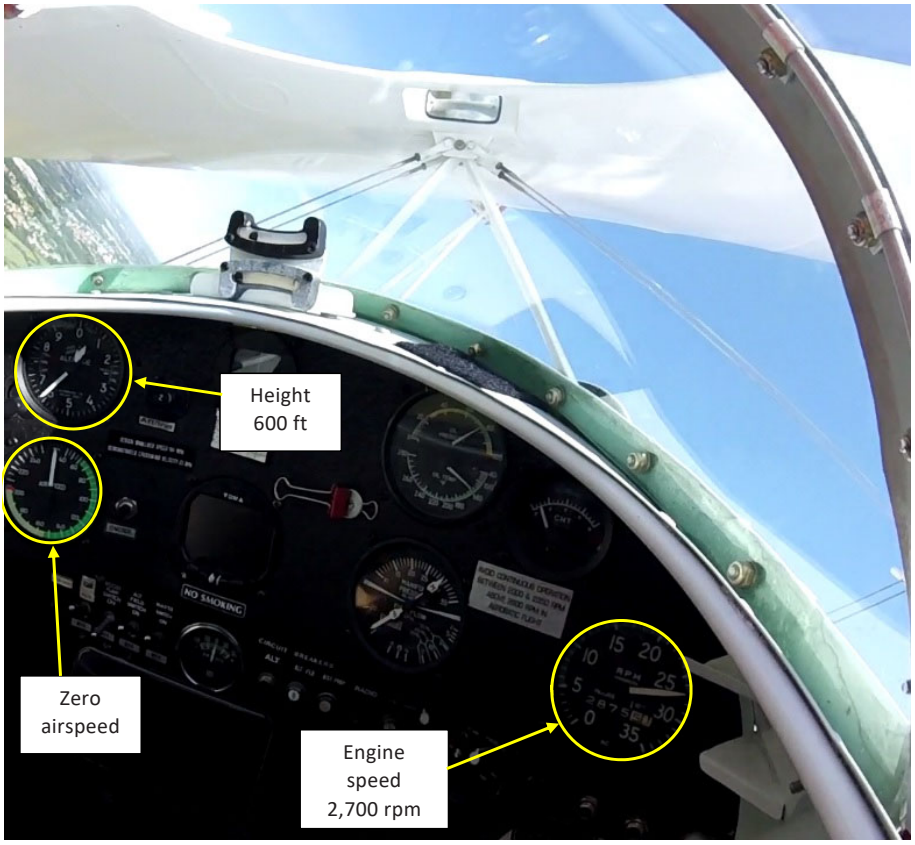
Source: Carcassonne aerodrome

Figures 3 and 4: Take-off and collision with the ground

The pilot had installed a camera on board his plane that filmed the instrument panel. The recording showed that the pilot accelerated up to approximately 100 kt[(2)] before performing the pull-up manoeuvre. Throughout the take-off phase and at the start of the chandelle climb, the engine rating was maintained at 2,750 rpm. During the climb, the speed gradually decreased to below the lowest level marked on the airspeed indicator (40 kt) whilst the engine rating remained at 2,700 rpm, without variation or abnormal noise. At around 600 ft in height, the plane tilted left then nose-down before descending in a spin for approximately six seconds. The pilot attempted several actions on the throttle control and on the ailerons[(3)] without managing to regain control of the plane before it collided with the ground.

[(2)] The Pitts S2-A flight manual specifies a rotation speed of 63 kt.

[(3)] Any possible actions on the rudder cannot be seen in the video.



Source: Onboard camera

Figure 5: Loss of control

2.5 Statements

Several people witnessed the accident, notably the air traffic controllers and the Aircraft Rescue and Fire Fighting Service duty personnel, as well as pilots on the ground. Some stated that the pilot was in the habit of making vertical take-offs when he performed manoeuvres overhead the aerodrome.

2.6 Study of similar occurrences

The BEA contributed to the Aviation Safety Report 2018[4] published by the DGAC along with a study on risk-taking in light aviation during the execution of dangerous manoeuvres not necessary for normal flight.

The findings of the study covering the period from 2004 to 2018 established that, in France, all categories of aircraft together, the BEA had listed at least 120 accidents occurring during manoeuvres not necessary for normal flight, denoting a clear taking of risk by the pilots. At least 70 of these accidents had caused the death of 120 people, i.e. 13.5% of light aircraft fatalities over the period.

The study identified a number of factors contributing to the taking of risk, including:

- level of risk awareness for a pilot in a given situation;
- level of knowledge and the capacity to understand and anticipate a risk situation;
- alteration of the risk awareness due to deterioration in health, fatigue or the effects of psychoactive substances;
- the desire to 'put on a show' for people on the ground or for the passenger;
- thrill seeking.

The study also reiterated that, in all cases, most of the established rules are in place to reinforce the safety margins and that no pilot should disregard them.

[4] https://www.ecologie.gouv.fr/sites/default/files/rapport_securite_aerienne_2018.pdf

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 pilot planned to perform aerobatic manoeuvres overhead the aerodrome in his plane, as he had frequently done before. During these manoeuvres, he was in the habit of climbing nearly vertically after a level flight acceleration. On the day of the accident, the pilot performed this manoeuvre up to a height of 600 ft with a speed approaching zero. He then lost control of the plane which collided with the ground.

Safety lessons

Starting an acrobatic figure at very low height constitutes risk-taking, which goes against the rules of the aerobatics discipline. Indeed, aerobatics is governed by a number of rules including the definition of an aerobatic box.