Accident to the CESSNA 208 "Caravan" registered **F-GUTS** on Thursday 25 April 2024 at Gap-Tallard aerodrome

Time	15:32[1]
Operator	C2C AVIATION
Type of flight	Ferry flight
Persons on board	Pilot
Consequences and damage	Aeroplane substantially damaged
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.	

Failure of propeller governor in aerodrome circuit, off-airfield forced landing

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, OGN[2] data, video recordings and the aircraft's FLARM data.

The pilot took off from Vérone-Boscomantico airport (Italy) at 14:01 bound for Gap – Tallard aerodrome.

On arriving at Gap, the AFIS service was open and paved runway 20 was in use. However, as there was already an aeroplane in the runway circuit for paved runway 02, the pilot decided to join the downwind leg for this same runway. The pilot arrived at the beginning of the downwind leg at an altitude of 3,460 ft, i.e. 760 ft above the altitude of the runway circuit. In the middle of the downwind leg (see **Figure** 1, point 1), the pilot indicated that he reduced power and then suddenly felt vibrations coming from the powerplant.

The pilot anticipated the turn onto the base leg in order to shorten his circuit pattern. In the middle of the base leg, the aeroplane was at an altitude of 2,760 ft, with a ground speed of around 100 kt (point 2). The aeroplane flew over the runway threshold at an approximate height of 185 ft, the ground speed was around 100 kt (point 3). As he was flying over the runway, the pilot slightly turned to the right (point 4) before turning left. He then carried out a forced landing in a clearing to the north of the runway.

The aeroplane finished its run on a bank at the end of the clearing. The pilot reported the accident on the Gap - Tallard aerodrome frequency and evacuated the aircraft unaided.

[1] Except where otherwise indicated, the times in this report are given in local time.
[2] The glossary of abbreviations and acronyms frequently used by the BEA can be found on its web site.

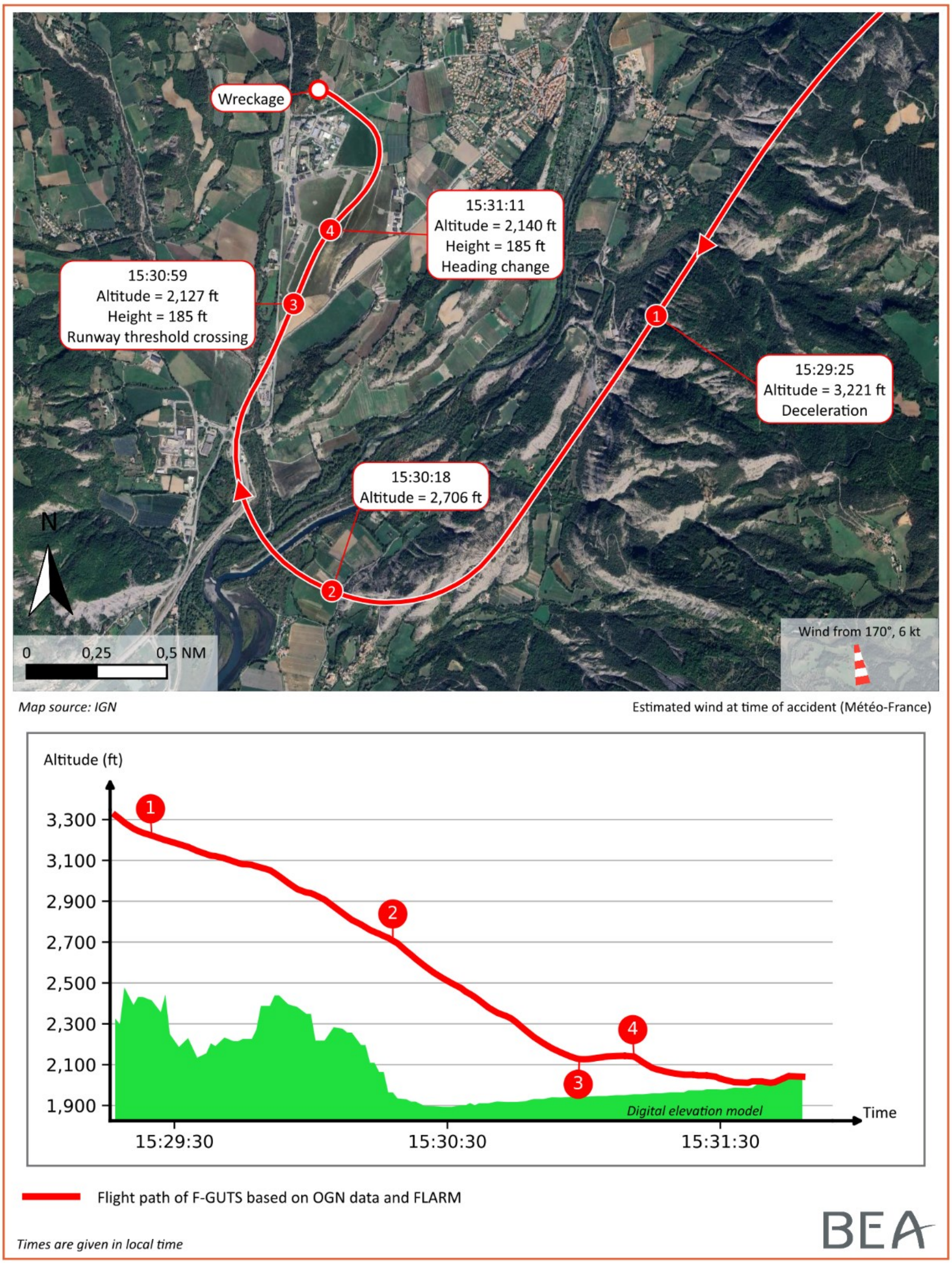

Figure 1: flight path of F-GUTS

2 ADDITIONAL INFORMATION

2.1 Meteorological information

At the time of the accident, the Météo-France weather station at Gap-Tallard aerodrome measured winds from 170° with an average speed of 6 kt, gusting to 13 kt. The sky was clear with visibility greater than 10 km The outside air temperature was 15°C with a dew point of -5°C.

2.2 Aerodrome information

Gap-Tallard aerodrome has three parallel runways oriented 02/20. Two of these runways are unpaved and measure 700 m x 80 m and 400 m x 60 m. The paved runway measures 945 m x 45 m.

During summer hours, which was the case on the day of the accident, an AFIS officer is present from 8:00 to 11:30 and from 13:00 to 16:30.

The VAC chart states that the high gliding and parachuting activity imposes specific operational constraints. Thus, in the parachuting or gliding activity slots, service aircraft (drop aeroplanes or tug aeroplanes) can use QFU 024° for landing instead of preferential QFU 204°.

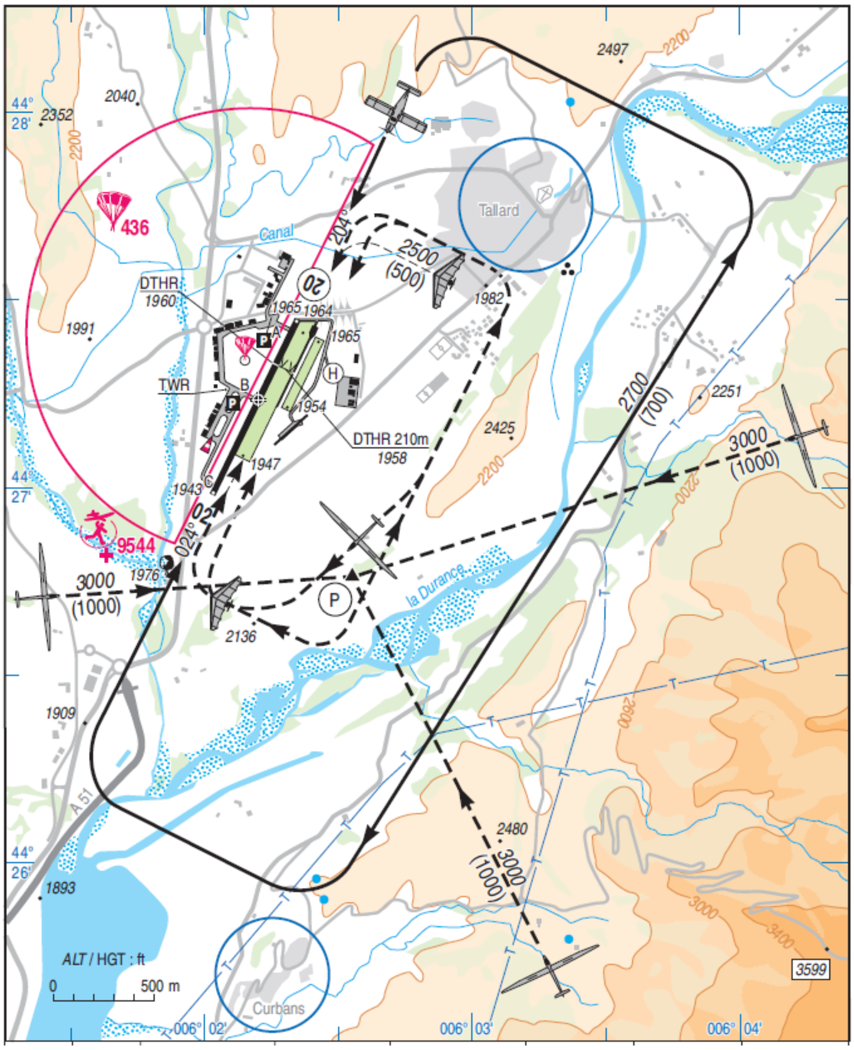

Figure 2: excerpt from Gap-Tallard aerodrome VAC chart (source: SIA)

2.3 Aircraft information

2.3.1 Cessna 208 Caravan

The Cessna 208 Caravan registered F-GUTS is a single-engine aircraft equipped with a Pratt & Whitney Canada PT6A-114A turbine engine developing 600 shp[3][4] and a McCauley metal three-blade, variable-pitch propeller. The aeroplane's maximum take-off weight is 8,035 lb (3,645 kg).

During an emergency landing without engine power, the emergency checklist states that the propeller must be feathered and gives an approach speed of 80 kt with the flaps extended to 30° (FULL position) or a speed of 95 kt with the flaps retracted.

The flight manual does not contain a specific emergency procedure in the event of a propeller governor failure.

2.3.2 Propeller governor information

2.3.2.1 General description

The C208 powerplant is equipped with a constant-speed propeller. This means that under normal flight conditions, the pilot sets a rotation speed with the propeller control lever. Subsequently, following an input on the power control lever, or in response to any external disturbance, the propeller pitch will be automatically adjusted by the pitch control system (propeller governor), in order to maintain a constant rotation speed.

2.3.2.2 Propeller and servo piston

The variation in the angle of attack of the propeller blades is controlled by a hydraulic piston, the servo piston, mounted at the front of the propeller hub. This servo piston is mechanically connected to the trailing edge of each blade root in order to modify the blade pitch.

Two mechanical forces act on the servo piston. On one side, a return spring pushes the piston with a constant force in the direction to increase the blade angle of attack (toward the "coarse pitch" position, then the "feather" position at maximum travel). On the other side, pressurized oil generates a force opposing the force produced by the spring in the direction to decrease the blade angle of attack.

This oil pressure is applied to the servo piston via the propeller governor (see paragraph 2.3.2.3).

2.3.2.3 Propeller governor

The propeller governor adjusts the oil pressure supplied to the servo piston. The system consists of two valves: the pilot valve and the beta valve.

The **pilot valve** (in blue in **Figure 3**) is the primary means of governing the propeller. Thus, in normal flight conditions, the pilot valve regulates the oil pressure delivered to the servo piston in order to maintain the propeller speed selected by the pilot.

[3] Shaft Horsepower.

[4] The PT6-114A turbine engine on F-GUTS is operated with the limitations of the PT6A-114 turbine, i.e. with a maximum power output of 600 shp. The C208 post S/N 20800277 are equipped with a PT6A-114A turbine engine developing 675 SHP.

The purpose of the **beta valve (in green in Figure 3**) is to provide the governor with a thrust reversal capability. This valve is installed upstream of the pilot valve and is mechanically actuated by the propeller reversing lever. When the poppet[5] of the valve is pushed in, the valve has no influence on the governor's hydraulic system. When the poppet moves forward, this initially prevents high-pressure oil from reaching the propeller servo piston. The pressure applied to the piston then remains constant. If the valve continues to move forward, the pressurized oil actuating the servo piston will be directed back to the reservoir, and hydraulic pressure will no longer be applied to the servo piston. In this case, the servo piston will be subject only to the force of the return spring and will move the propeller to the feathered position.

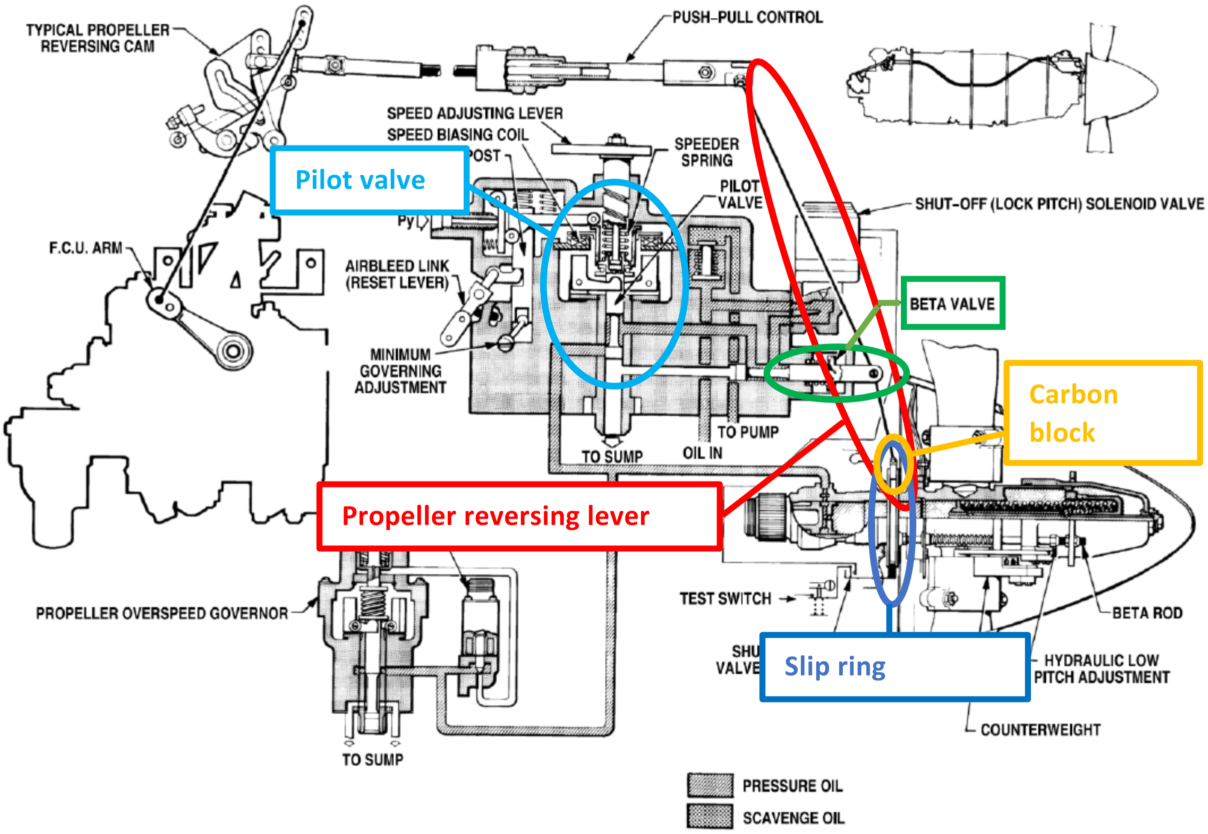

Figure 3: schematic diagram of propeller governor (source: Pratt & Whitney Canada)

At the propeller, the propeller reversing lever is also connected via a carbon block (in orange in **Figure 3**) to a slip ring (in dark blue in Figure 3) which follows the movements of the servo piston.

2.3.3 Specificities of F-GUTS

A maintenance operation requiring the removal of the propeller was performed between 13 February and 7 March 2024, by the Part 145-approved maintenance organization, ICARIUS. The aeroplane flew for 33 hours between this maintenance operation and the accident flight.

[5]The Beta valve's poppet is the moving part of the valve, directly attached to the propeller reversing lever.

Following this maintenance operation, the aeroplane was ferried to Verona, Italy, on 7 March by the pilot of the accident flight. From 9 March to 21 April , the aeroplane was dry leased to a skydiving club in Verona. During this period, the Verona skydiving club conducted 11 flights, totalling 30 flight hours and 90 landings with F-GUTS.

The accident occurred during the ferry flight at the end of this lease period.

2.4 Site and wreckage information

2.4.1 Accident site

The aeroplane collided with a bank at the edge of a field located 600 m north of the threshold of runway 20. Based on the examination of the wreckage, all the damage observed was caused by the collision with the ground.

The propeller was found in the feathered position on the wreckage.

Figure 4: accident site (source: BGTA)

The BEA carried out additional examinations on the powerplant.

2.4.2 Examination of propeller governor

The examination of the powerplant revealed the incorrect installation of the propeller reversing lever. In its normal position, this lever is positioned under a metal guide (see **Figure 5** and **Figure 6**) so that the carbon block cannot come out of the slip ring groove. On F-GUTS, it was positioned on top of the metal guide (see **Figure 7**).

Due to the incorrect installation, the carbon block was no longer properly held in the slip ring groove, and it came out of it (see **Figure 7**). This allowed the propeller reversing lever to move and action the Beta valve until the propeller was feathered.

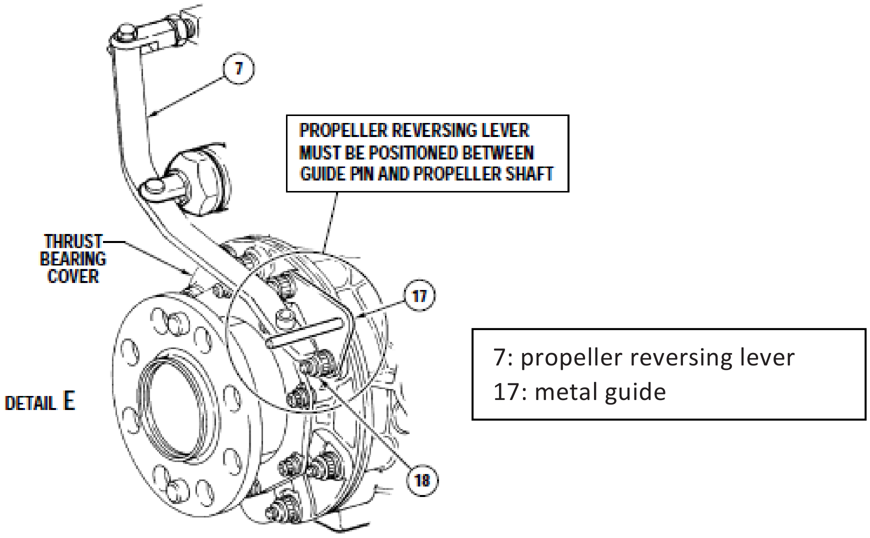

Figure 5: excerpt from PT6A-114A engine maintenance manual (source: Pratt & Whitney Canada)

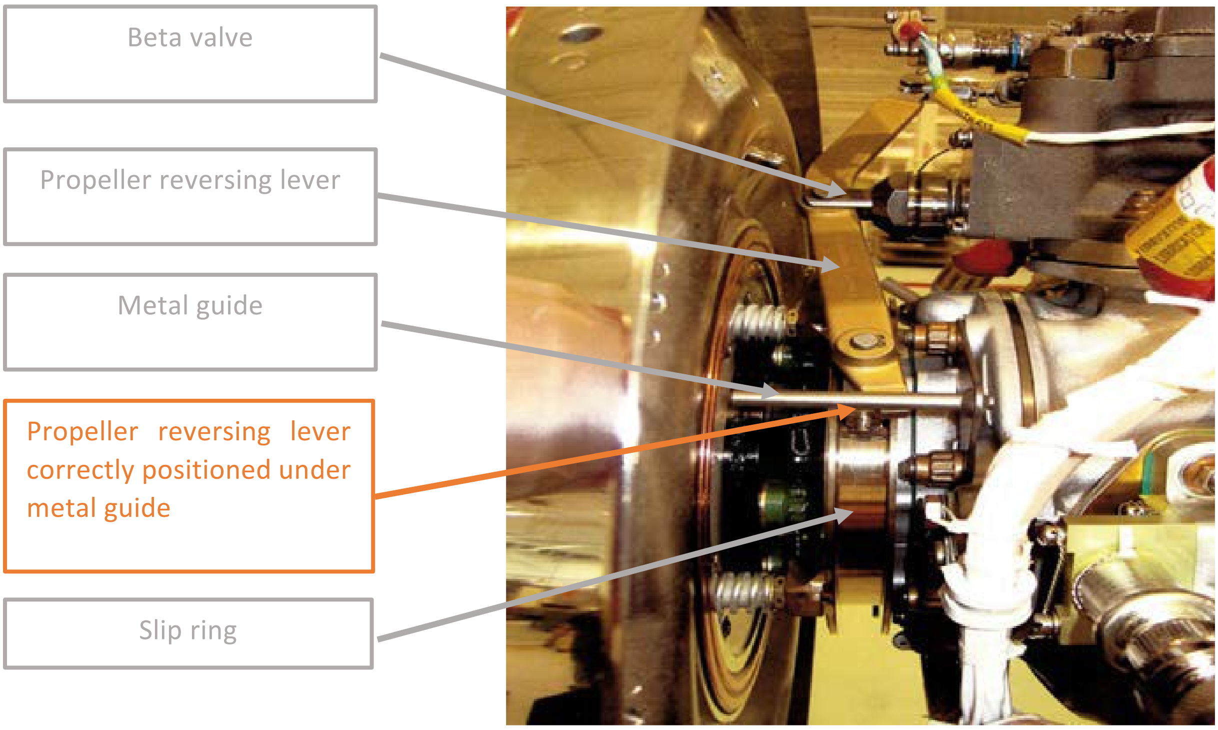

Figure 6: photo of the correct installation of the propeller reversing lever on a PT6 engine (source: NTSB)

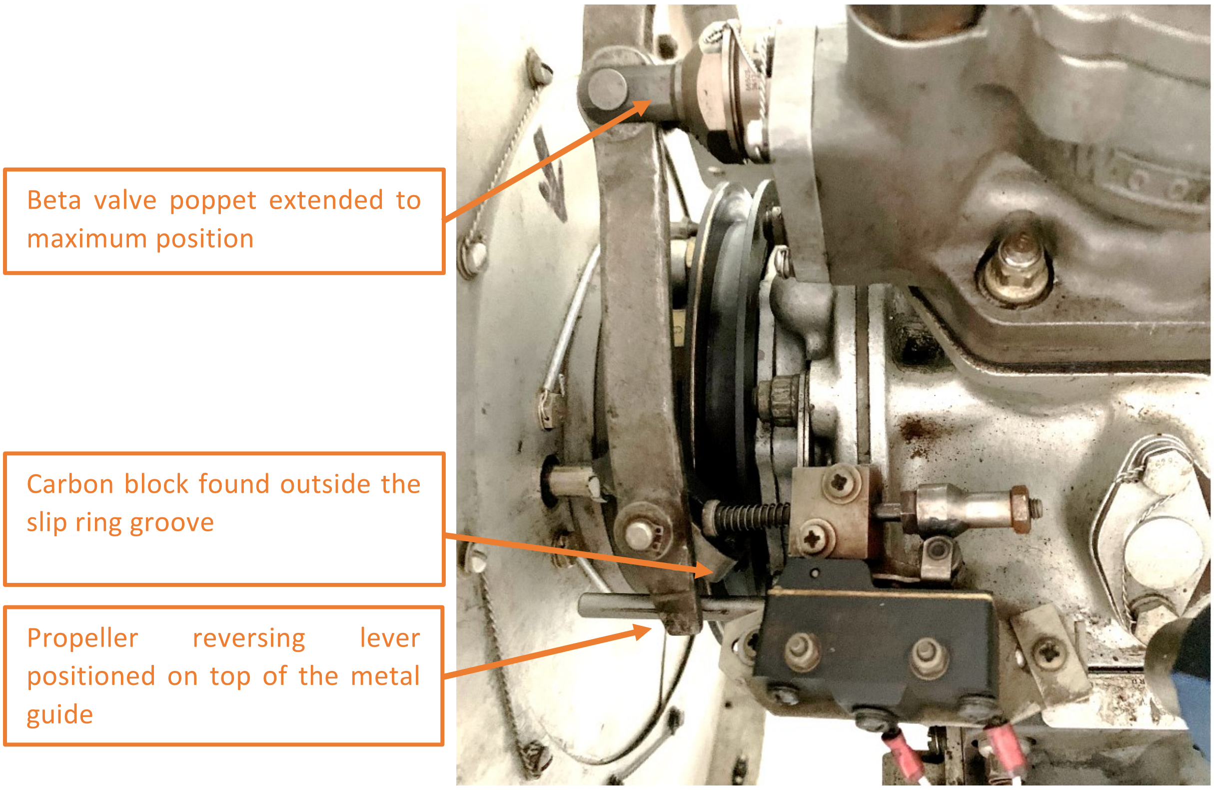

Figure 7: photo of installation of propeller reversing lever taken on the wreckage of F-GUTS (source: BEA)

2.5 Publications concerning the installation of the propeller reversing lever

The AMM (Aircraft Maintenance Manual) warns of the importance of correctly positioning the propeller reversing lever under the metal guide and refers to the engine maintenance manual for the propeller reversing lever installation procedure.

The engine maintenance manual describes the lever installation procedure in detail and mentions the risk of incorrectly positioning the lever, illustrating it with **Figure 5**.

In addition, a Service Information Letter (SIL)[6] concerning the incorrect installation risk was published by Pratt & Whitney Canada in March 2016.

Furthermore, following several investigations that highlighted the safety risk posed by the incorrect installation of the propeller reversing lever and metal guide, the NTSB issued a document in December 2016 containing two safety recommendations requesting urgent action from the FAA and the engine manufacturer:

- the first recommendation addressed to the FAA was to issue a special information bulletin, requesting maintenance personnel to visually verify, during routine scheduled inspections and after any propeller re-installation on a Pratt & Whitney PT6A engine, that the propeller reversing lever and metal guide are correctly positioned, and, if necessary, to correct any incorrect installation;
- a second recommendation called on Pratt & Whitney Canada to complete the development and implementation of a new metal guide design as soon as possible to prevent incorrect installation of the propeller reversing lever and the metal guide.

[6] Document in the Media Library tab of this report's webpage.

Following the NTSB's recommendation, the FAA issued a SAFO (Safety Alert for Operators) in 2020, incorporating the information presented in the NTSB document.

In the scope of this investigation and in response to the NTSB's recommendation, Pratt & Whitney Canada informed the NTSB and the BEA in September 2025 that a modification to the metal guide design had been certified. This new design will be installed in production on engines equipping the Cessna Caravan (PT6A engines, models 114, 114A, and 140) from the first quarter of 2026 onwards. This design modification will be accompanied by a Service Bulletin to retrofit in-service engines with the new metal guide.

Pratt & Whitney Canada added that the installation of a new metal guide is being considered for other PT6A models, but that additional work remains to be done.

2.6 Maintenance workshop information

2.6.1 Context of maintenance operation

ICARIUS AEROTECHNICS is a Part 145 approved maintenance organization and a part CAO[7] approved airworthiness management organization.

The role of the airworthiness management organization is to define the maintenance operations that must be performed to keep the aeroplane airworthy. It then prepares a work order detailing the tasks to be performed by the maintenance organization. The maintenance organization receives the work order and is responsible for carrying out the maintenance tasks. Each file includes a list of critical tasks identified by the organization.

According to Regulation (EU) 1321/2014[8], a critical maintenance task is a task that "*involves the assembly or any disturbance of a system or any part of an aircraft, engine or propeller that, if an error occurred during its performance, could directly endanger the flight safety*." A critical task therefore implies the implementation of an error recovery barrier. This may, for example, take the form of a double check of the maintenance operations by two different people.

Even if the manufacturer does not define the critical tasks, the maintenance organization must assess the criticality of the tasks carried out in order to determine whether an independent check is necessary. Regulation (EU) 1321/2014 provides, in AMC 1 CAO.A.060(h), a list of tasks that must be reviewed to assess their criticality. This list includes, in particular, the overhaul, calibration or installation of engines, propellers, drive shafts and accessory gearboxes.

These elements are also included in the maintenance organization's procedures.

In the case of the Cessna 208, no critical tasks were defined by the manufacturer. The re-installation of the propeller was not considered critical by the maintenance organization at the time of the accident. This was changed following the accident.

[7] Combined Airworthiness Organisation.

[8] Commission regulation of 26 November on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (Version in force the day of the accident).

Furthermore, the airworthiness management organization was not aware of the SIL published by the engine manufacturer or the SAFO published by the FAA, which mentions the risks associated with the installation of the propeller reversing lever.

2.6.2 Statements from maintenance workshop personnel

As part of the investigation, the BEA interviewed several personnel, including the workshop manager. He stated that the re-installation of a propeller on a PT6 engine is an operation routinely performed by the workshop. The circumstances in which the installation error occurred could not be identified.

2.7 Video analysis

A video of the aeroplane flying over the runway a few seconds before the forced landing was taken from the control tower.

Based on this video, it was possible to establish that the flaps were extended. However, It was not possible to determine their exact position. Furthermore, still based on this video, the propeller appeared to be feathered or in a position close to feathered at this point in the flight.

2.8 Pilot information and statement

The 62-year-old pilot held a CPL obtained in 2003 along with the CRI(A), FI(A) and IR/SE(A) ratings and the SEP, Cessna SET and Pilatus PC6 SET class and type ratings. The pilot had held the IR/ME(A) type rating until 2020 and the Cessna 406/425 and Beechcraft 300/1900 ratings until 2019 and 2020 respectively. He was also an examiner pilot. At the time of the accident, he had logged more than 9,000 flight hours, including 869 hours on single turboprop Cessnas (Cessna 208 Caravan or Cessna 208B Grand Caravan). The pilot had flown 35 hours in the month preceding the accident. He added that he regularly carried out parachute drops at Gap-Tallard aerodrome.

The pilot reported arriving in Verona at 11:18 after flying for 1 h and 50 min on a PC6. He then inspected the Cessna 208 before going to lunch. After his meal, at around 13:30, the pilot performed a walk-around inspection. He took off at 14:01. The flight over Italy and the crossing of the Alps proceeded without any notable incident.

On arriving at Gap, he heard that a pilot carrying out a parachute drop activity was in the circuit for runway 02. To avoid hindering him, and after contacting the AFIS, he also decided to land on runway 02, despite the tailwind indicated by the AFIS (160° and 5 kt). The pilot reported entering the runway circuit at a speed of approximately 100 kt. As he extended the flaps to 10° and reduced power, the pilot noticed "strong and unusual vibrations" and observed that the propeller was in an unknown position, between the coarse pitch and the feathered position. He initially thought it was a governor problem and increased power twice, but the problem persisted. He then suspected an FCU[9] problem and moved the "Emergency Power" lever a few centimetres, but to no effect. He specified that the torque indication was at 0. He added that he believed the engine was still delivering low thrust.

He indicated that as he was unable to definitively identify the cause of the failure, he followed the approach references he usually used as a parachute drop pilot. He flew a close base leg and extended the flaps to 20°. He reported completing the final turn approximately overhead the A51

[9] Fuel Control Unit.

toll gate (see **Figure 2**). The pilot could not remember whether he extended the flaps to 30° on final. In the base leg, the aeroplane was flying at 85 kt. The pilot was surprised by "the aeroplane's lift-to-drag ratio" and thought it would glide less. The aeroplane flew over the runway at a height he estimated to be between 150 and 300 ft. Realising that he would not be able to land on the runway, the pilot slightly veered to the right-hand side and envisaged carrying out a circuit at low height. He saw that he did not have sufficient height to successfully complete this manoeuvre. He then veered to the left-hand side and decided to land in a field slightly to the left-hand side of the runway axis. The ground sloped away to the left of the flight path. During the landing run, the pilot tried to keep the aeroplane on the axis of the field, but the aircraft veered left and struck a bank. The pilot indicated that the aeroplane came to a stop with the engine still operating. He then activated the cut-off valve. He sent a final radio message before cutting off the batteries and evacuating the aeroplane.

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.

Scenario

On arriving at the aerodrome after a ferry flight of approximately 1 h 30 min, the pilot joined the circuit for runway 02. The wind had a tailwind component for landings on this runway, but the pilot did not want to hamper a parachute drop aeroplane, also on the circuit for runway 02. In the downwind leg, the propeller feathered due to a malfunction in the propeller pitch governor.

The pilot performed a close base leg. Ultimately he was too high on final and flew over the runway at a height of around 185 ft before making a forced landing in a field near the runway.

The malfunction of the propeller governor was the result of the propeller reversing lever being incorrectly installed during the last maintenance operation performed on the aeroplane, a little less than two months before the accident flight.

Contributing factors

The following factors may have contributed to an error in the installation of the propeller reversing lever:

- the very probable absence of a double-check by the maintenance workshop, for the correct position of the propeller reversing lever after the maintenance operation. The re-installation of a propeller was not considered a critical task by the maintenance workshop;
- the design of the metal guide of the propeller governor, making it possible to incorrectly install the propeller reversing lever.

The following factors may have contributed to the pilot flying over the runway at low height and to the forced landing in a field:

- the arrival in the runway circuit at an altitude approximately 750 ft higher than recommended;
- inadequate flight path management following the failure of the propeller governor.

Measures taken following accident

The maintenance workshop has defined propeller re-installation as a critical task. As a consequence, after each propeller re-installation, an independent inspection is performed to check that the maintenance task has been properly completed. This practice reduces the risk of the incorrect installation of the propeller reversing lever.

Furthermore, in response to an NTSB recommendation following several cases of the incorrect installation of the propeller reversing lever, the engine manufacturer has designed and obtained the certification for a new metal guide design that prevents the incorrect installation of the reversing lever on engines equipping the Cessna Caravan (PT6A – 114/114A/140 engines). This new design will be featured on engines produced from the first quarter of 2026. It will also be possible to retrofit older engines via a Service Bulletin.

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.