



## Accident to the CIRRUS - SR22 GTS registered F-HUGE

on 10 December 2018

at Beaubery (Saône-et-Loire)

<sup>(1)</sup>Except where  
otherwise indicated,  
times in this  
report are local.

Time	Around 11:20 <sup>(1)</sup>
Operator	Aéroclub AGILE
Type of flight	Cross country
Persons on board	Pilot and two passengers
Consequences and damage	Pilot and two passengers fatally injured, aeroplane destroyed

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

## Loss of control in flight without external visual references, collision with ground

### 1 - HISTORY OF THE FLIGHT

*Note: the following information is principally based on statements, data from the mobile phones of the occupants of the plane, the PFD computer and radio communication recordings.*

The pilot had planned a round-trip flight under VFR between Lognes-Émerainville aerodrome (Seine-et-Marne) and Villefranche-Tarare aerodrome (Rhône). He was accompanied by two passengers: a friend in the right seat who was an instructor pilot and would ensure all the radio exchanges, and a member of his family, in the rear.

The pilot, manager of a company, had to go to Villefranche-sur-Saône where, with his passengers, he had a professional appointment.

The departure was scheduled for the morning on a Cirrus SR22 belonging to a flying club at Lognes aerodrome. The pilot was a member of this club. On arriving at the aerodrome, they found the aeroplane parked at the back of the hangar. In order to optimize the preparation time of the aeroplane, the pilot chose to use the Cirrus SR22 GTS registered F-HUGE belonging to another flying club (neighbouring hangar) where he was also a member.

The pilot<sup>(2)</sup> took off at 10:05 (point ① of Figure 1). The first part of the flight was carried out with the autopilot in lateral NAV mode at altitudes which were frequently modified, varying between 2,500 ft<sup>(3)</sup> and 3,500 ft.

<sup>(2)</sup> It was not possible to confirm whether the passenger in the right seat had taken the controls during the flight.

<sup>(3)</sup> The altitudes are indicated with the altimeter setting at the QNH pressure (1028 hPa).



<sup>(4)</sup> From this point, the altimeter setting was at the standard atmospheric pressure (1013.25 hPa) and would not be modified for the rest of the flight.

<sup>(5)</sup> This was the last exchange between the plane and the Saint-Yan control tower.

<sup>(6)</sup> This information comes from the read out of the FD/AP inputs recorded in the PFD computer: in accordance with the operating logic of the autopilot, the AP controlled an opposite roll input with a bank of 17°. This is the maximum value that the AP can control. A stick input does not disconnect the AP and the loads accumulate (see § 2.4.3).

Midway into the flight, at 10:38, the pilot started a descent to 1,500 ft <sup>(2)</sup> and changed the autopilot settings in quick succession (alternation between NAV and HDG modes, selection of different headings) resulting in him making a U-turn during which the aeroplane reached a minimum height of 330 ft before turning west. The pilot then disconnected the autopilot and flight director (FD) and started climbing. He made a 360° turn. On completion of the turn, at an altitude of 5,000 ft, the passenger in the right seat contacted the Clermont FIS. He indicated that they intended to pass above the cloud layer and asked for the weather conditions at Lyon-Bron (Rhône) and Saint-Yan (Saône-et-Loire) aerodromes. The pilot then headed north and activated the flight director in HDG mode.

At 10:58, the pilot made a U-turn and continued at FL065<sup>(4)</sup> towards Villefranche-Tarare aerodrome with the autopilot in lateral NAV mode. A video taken by the passenger sat in the rear showed that they were above the clouds. The aeroplane was then established on FL075 <sup>(3)</sup>.

At around 11:10, now in contact with the Saint-Yan tower controller, the passenger in the right seat asked for and obtained the weather conditions at Valence-Chabeuil aerodrome (Drôme)<sup>(5)</sup> (visibility greater than 10 km and sky overcast at 5,200 ft).

At 11:11, the pilot made a sidestick input to change the heading by around 30° to the left <sup>(4)</sup>. During this manoeuvre, the aeroplane reached a left bank angle of 45°. The pilot then disconnected the autopilot which resulted in the cancellation of the opposing load on the controls<sup>(6)</sup>. He continued in manual flight for one minute and then re-engaged the autopilot with the lateral HDG mode and progressively returned to a southward path (160°). The pilot then selected different flight levels (FL070 and then FL075 again) before starting a descent at 11:16 to FL045 with the vertical VS mode <sup>(5)</sup> set to -1,000 ft/min.

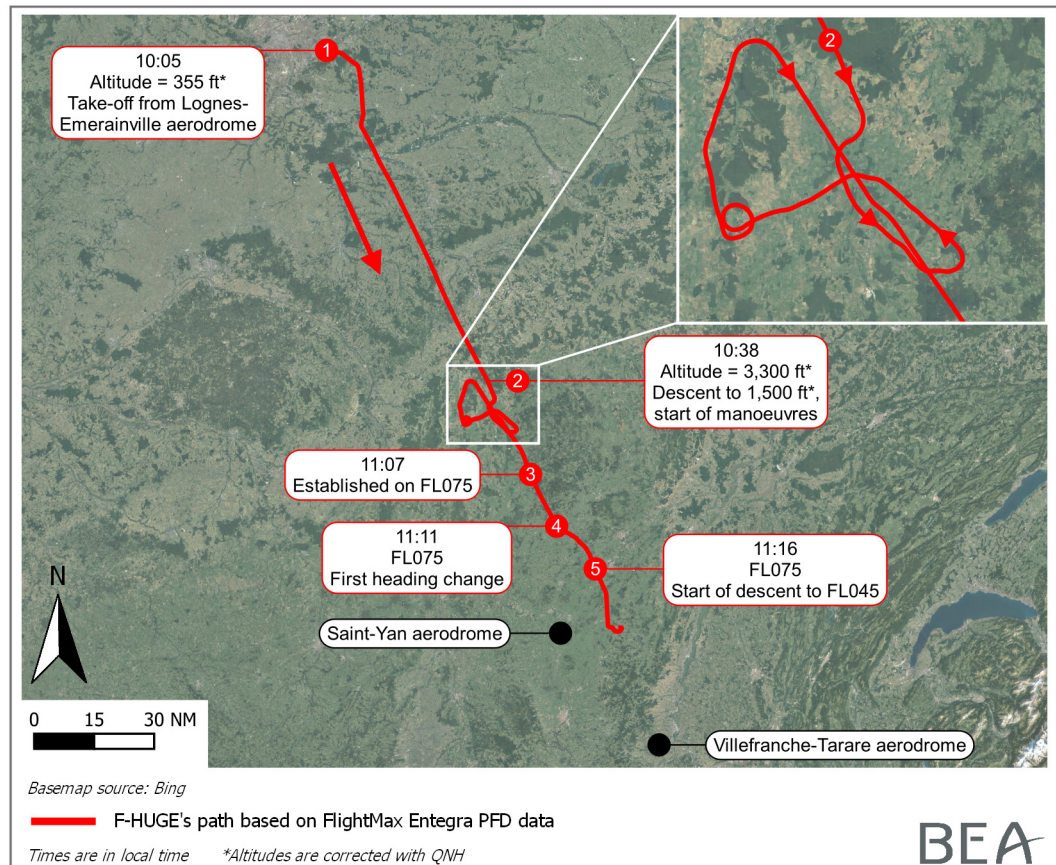


Figure 1: Flight path

At 11:18, flying through FL060, the pilot changed the heading again by around 20° to the right (route 180°) with the lateral HDG mode (point 6 of Figure 2) and then selected FL040. At 11:20, the pilot selected FL030 and a vertical speed of -500 ft/min.

At 11:20:20, the descent was stopped at around 4,500 ft by selecting a vertical speed of 0 ft/min, then +500 ft/min and FL080. The aeroplane climbed again. Twenty seconds later, as the autopilot was executing the climb with an attitude of around 3°, the selected vertical speed increased to +950 ft/min. Once again, the pilot overrode the autopilot by banking the aeroplane 45° to the left. The pilot then disconnected the autopilot (7) and the flight director. He next made a right turn followed by a left turn with bank angles of around 30 to 40°. During this left turn, the plane's bank and attitude were not stabilized but the altitude remained between 4,300 and 4,600 ft.

At 11:22:10 (8), the pilot started a left turn with a bank angle exceeding 90° and a nose-down attitude reaching 30°. The aeroplane collided with the ground with high energy around 30 s later.

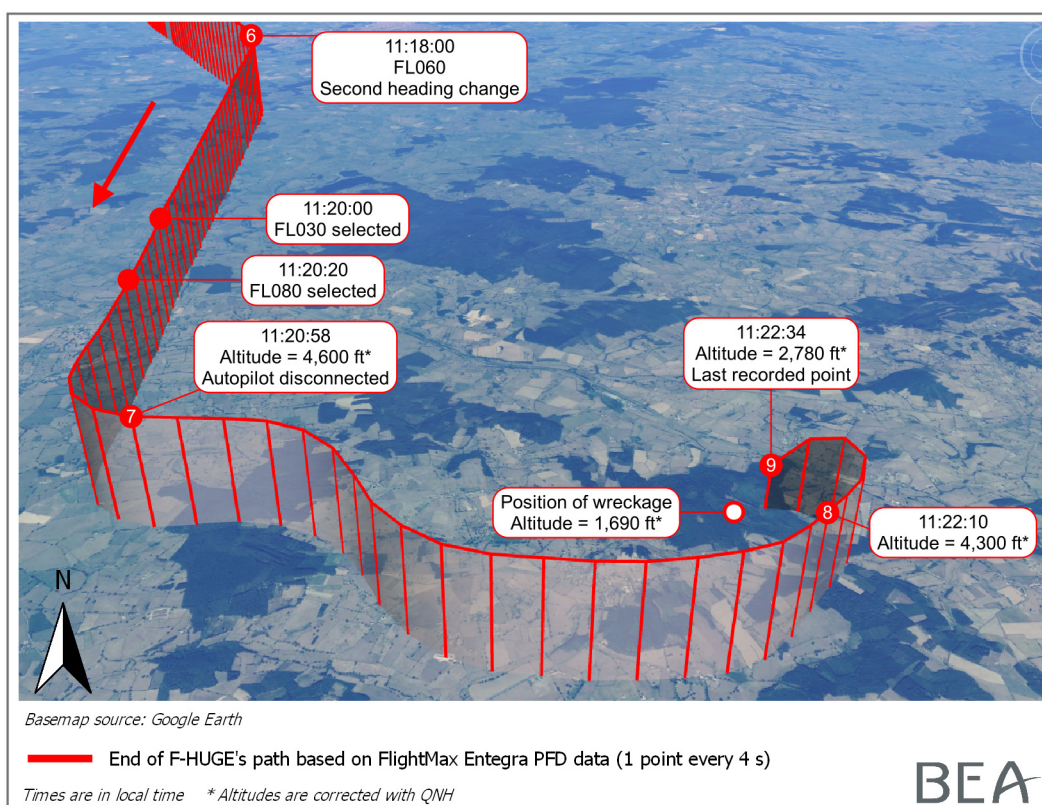


Figure 2: End of the path



## 2 - ADDITIONAL INFORMATION

### 2.1 Meteorological information

The information provided by Météo-France made it possible to establish that the pilot had consulted the weather information at around 05:45 and 06:45, on the Aérweb site, before leaving his place of residence. He had updated this data in the flying club facilities before his departure.

An instructor pilot from the flying club explained that he was on the premises in the morning and that he had had the opportunity of exchanging a few words with the pilot concerning the planned flight. Knowing the destination region, he explained that he had warned the pilot of the probability of encountering, at this time of year, meteorological conditions which would not allow him to continue the flight in VMC, notably in the morning. He added that the pilot had replied that if this was the case, he would try and pass below the clouds.

#### 2.1.1 10:00 FRANCE SIGWX chart

The 10:00 (09:00 UTC) FRANCE low level SIGWX chart (SFC – FL150) was available from 08:00, before the departure of the plane.

The major part of the path, excluding the departure, was situated in a single zone marked out by a scalloped line. The main information concerning the path was the presence of:

- ☐ cumulus (Cu) and stratocumulus (Sc), broken (BKN) and locally scattered (LOC SCT), based at an altitude of between 1,500 ft and 3,000 ft, with the tops between 5,000 ft and 8,000 ft;
- ☐ rain and showers;
- ☐ moderate icing between 3,000/4,000 ft and 8,000 ft;
- ☐ visibility greater than 8 km and locally reduced to values between 5 and 8 km, probably due to rain.

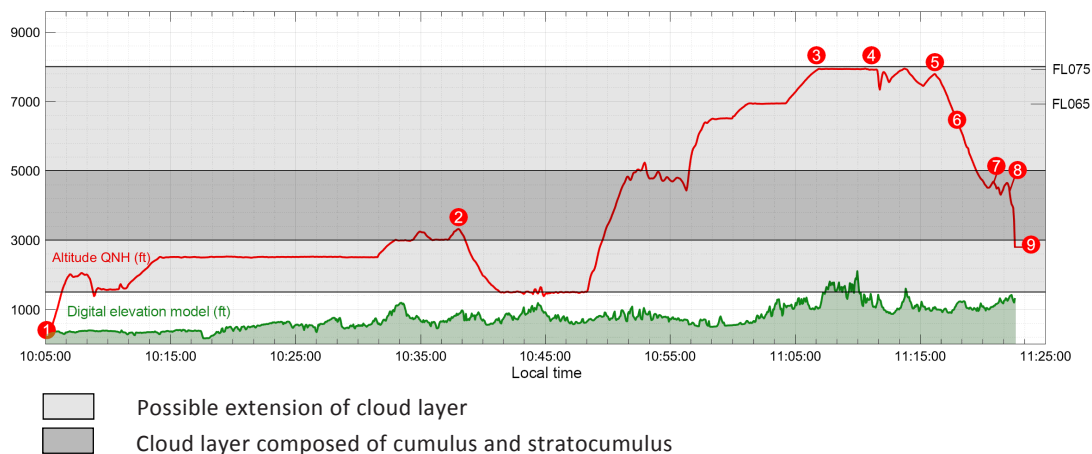


Figure 3: Vertical profile of flight and cloud layer according to 10:00 FRANCE SIGWX chart

An instructor, flying under IFR aboard a TB20 at the time of the accident indicated that he was manoeuvring at FL070 near Saint-Yan aerodrome. He observed slight icing on his plane's wings.

Note: the 10:00 WITEM chart forecast wind on the route:

- ☐ north-westerly between 10 and 25 kt at FL020;
- ☐ north-westerly between 20 and 25 kt at FL050.

## 2.1.2 Aerodrome meteorological data (METAR and TAF)

### Before departure

The Saint-Yan aerodrome<sup>(7)</sup> 09:30 METAR gave the following information:

- ☐ visibility greater than 10 km;
- ☐ scattered (SCT) clouds at an altitude of 2,300 ft;
- ☐ broken (BKN) clouds at 5,400 ft and at 6,200 ft;
- ☐ temporarily, rain showers, visibility reduced to 4 km and overcast (OVC) clouds at 2,100 ft.

The Saint-Yan aerodrome 06:00 TAF gave the following information:

- ☐ visibility greater than 10 km;
- ☐ broken (BKN) clouds at an altitude of 2,800 ft;
- ☐ temporarily, between 07:00 and 16:00, visibility reduced to 4 km, rain showers and broken (BKN) clouds at 2,100 ft, few (FEW) clouds at 3,800 ft with towering cumulus (TCU).

The Lyon Saint-Exupéry aerodrome<sup>(8)</sup> 09:30 METAR gave the following information:

- ☐ visibility greater than 10 km;
- ☐ few (FEW) clouds at an altitude of 3,420 ft;
- ☐ broken (BKN) clouds at 6,820 ft.

The Lyon Saint-Exupéry aerodrome (amended) 06:22 TAF gave the following information:

- ☐ visibility greater than 10 km;
- ☐ broken (BKN) clouds at an altitude of 4,820 ft.

### At time of accident

The Saint-Yan aerodrome 11:30 METAR gave the following information:

- ☐ visibility greater than 10 km;
- ☐ scattered (SCT) clouds at an altitude of 2,400 ft;
- ☐ broken (BKN) clouds at 3,200 ft;
- ☐ overcast (OVC) clouds at 5,300 ft;
- ☐ temporarily, visibility reduced to 4 km, rain showers and overcast (OVC) clouds at 2,100 ft.

<sup>(7)</sup> Altitude = 796 ft.  
Aerodrome situated  
at 40 NM north of  
Villefranche-Tarare  
aerodrome.

<sup>(8)</sup> Altitude = 821 ft.  
Aerodrome situated  
at 24 NM south of  
Villefranche-Tarare  
aerodrome.

<sup>(9)</sup> Altitude = 659 ft.  
Aerodrome situated  
at 18 NM south of  
Villefranche-Tarare  
aerodrome.

### 2.1.3 Weather reports and synthesis

A photo taken by the passenger in the right seat at around 10:20 showed that the aeroplane was flying below the cloud layer. At this point, it was en route with an altitude of 2,500 ft.

At around 10:55, in contact with the Clermont FIS, the passenger in the right seat specified that they were at 5,000 ft, in sight of the ground, above scattered clouds and that they were going to try and pass above the cloud layer to cruise at 6,500 ft. He then asked for the weather conditions at Lyon-Bron aerodrome and then at Saint-Yan aerodrome. The controller asked him to stay in VMC and recommended being careful as later on they would have to re-descend.

The controller provided the following information, based on the METARs:

At Lyon-Bron aerodrome<sup>(9)</sup>:

- ☐ visibility greater than 10 km;
- ☐ broken (BKN) clouds at an altitude of between 5,460 ft and 6,060 ft;
- ☐ temporarily, a few towering cumulus (FEW TCU) at an altitude of 3,160 ft and broken (BKN) clouds at 3,660 ft.

At Saint-Yan aerodrome:

- ☐ visibility greater than 10 km;
- ☐ broken (BKN) clouds at an altitude of 2,300 ft;
- ☐ overcast (OVC) clouds at an altitude of 3,300 ft.

At around 10:57, above the cloud layer after having reached 6,500 ft (information confirmed by the video taken by the passenger in the rear), the passenger in the right seat told the controller that they were in CAVOK conditions at this point and that they were resuming their cross-country flight to Villefranche-Tarare aerodrome. He added that should there be a problem, they would turn around and descend.

The meteorological conditions estimated by Météo-France (French national meteorological service) at the accident site were the following: broken and overcast stratocumulus and cumulus probably based between an altitude of 1,500 ft and 2,000 ft. In this zone and at the time of the accident, there were several cloud layers, the base of the lowest cloud layer being situated at an altitude of around 1,500 ft, the top of the highest cloud layer may have been situated above 5,000 ft. A witness specified that the clouds were clinging to the top of the high ground. There was rain, with visibility reduced to 5 km.

When the aeroplane's path is overlaid on the rain charts, it can be seen that the pilot was heading towards an area of precipitation.

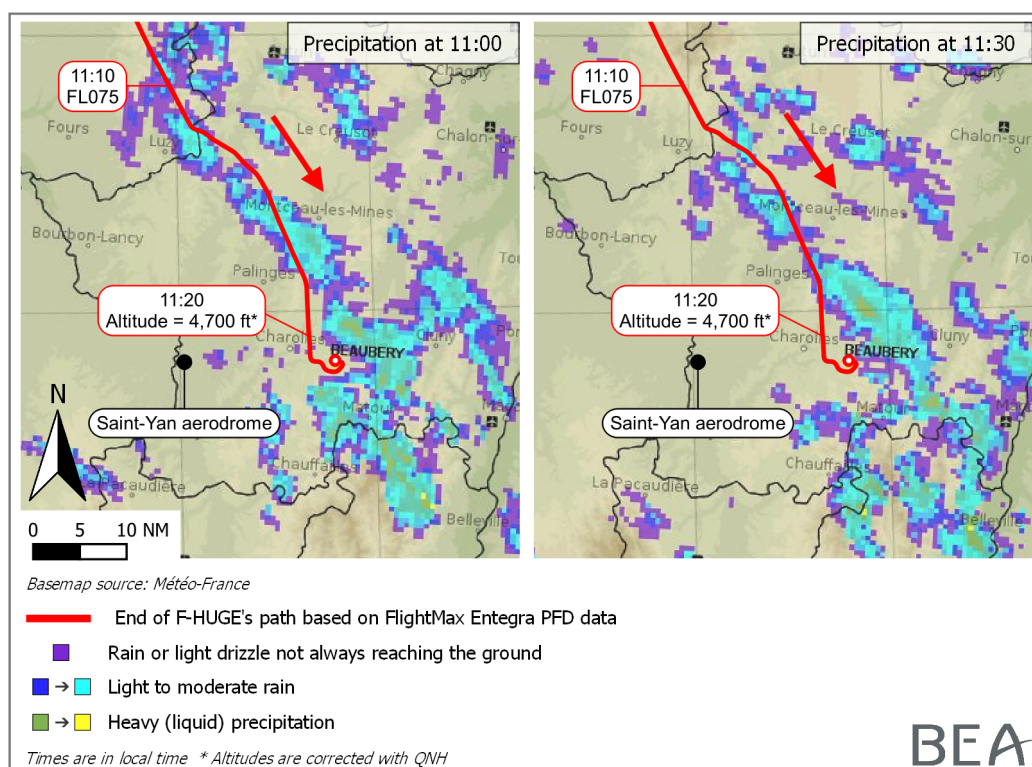


Figure 4: Rain charts at 11:00 and 11:30

A witness on the ground, at around one kilometre from the accident site, indicated that he heard an engine noise which was sufficiently loud to make him step outside the building that he was in. He saw the aeroplane coming out of the cloud layer. He explained that he then went back inside and did not see the end of the plane's path.

## 2.2 Site - wreckage

The accident site was situated at 31 NM north of Villefranche-Tarare aerodrome and at 17 NM east of Saint-Yan aerodrome (a flight time of around seven minutes).

The site was located in a hilly region, on the east slope of Mont Botey, a few dozen metres below the peak situated at around 1,840 ft. The terrain is entirely planted with fir trees which can reach heights of around 15 m. Aeroplane debris was spread over an area of a width of around 50 m and a length of around 200 m.

The examinations of the wreckage found that the aeroplane had collided with tree tops with a slight right bank followed by a high-energy collision with the ground, the wings nearly horizontal. All of the damage observed was very probably the result of the collision with the trees and the ground; the fuselage and cockpit were completely destroyed.

It was also observed that:

- ☐ all of the control surfaces (ailerons, elevator, rudder and flaps) were in place and attached;
- ☐ the failures and directions of the flight controls suggest that they were continuous before the collision with the ground;
- ☐ the throttle, mixture and propeller pitch controls were continuous at the time of the collision with the ground;
- ☐ the engine was providing torque but it is not possible to say how much.

The emergency parachute was not in its housing anymore. The examination of the wreckage was not able to determine if the parachute had been activated in flight, however, the canopy was not deployed and the pyrotechnical devices had not been triggered. It was not possible to draw conclusions about the correct operation of the emergency parachute system.

The condition of the wreckage did not permit the correct operation of the autopilot to be checked.

## **2.3 Pilot and passenger in right seat information**

### **2.3.1 Pilot**

The 51-year-old pilot held a PPL(A) licence issued in 2014 and a night flight rating issued in 2015.

He had logged 460 flight hours of which more than 200 hours on the SR22. He had carried out 14 flight hours in the previous 90 days and around 3 hours 20 min in the 30 days preceding the accident, all on the SR22.

During the last three years, he had flown nearly exclusively on the Cirrus SR22 equipped with either Avidyne or Garmin avionics.

### **2.3.2 Passenger in right seat**

The 65-year-old passenger in the right seat held a CPL(A) licence issued in 1990. He held FI(A) and night flight ratings.

He had logged around 7,250 flight hours.

A member of the pilot's family explained that this passenger had already accompanied the pilot several times on flights in France and abroad.

## **2.4 Aircraft information**

### **2.4.1 General**

The F-HUGE was a Cirrus SR22 GTS, a single-engine plane of mostly composite construction, with low wings and fixed tricycle landing gear. It was equipped with a 310-hp Teledyne Continental IO 550 N engine.



The aeroplane was equipped with a Cirrus Airplane Parachute System (CAPS) incorporated in a composite unit containing a parachute and rocket, situated aft of the baggage compartment bulkhead. It could be deployed by pulling the handle situated in the cockpit ceiling, above the windshield. According to the flight manual, the decision height for activating the parachute is 2,000 ft and the maximum demonstrated deployment speed is 133 kt.

F-HUGE was equipped with an Avidyne avionics suite with two glass cockpit type screens (PFD and MFD) and an S-TEC 55X autopilot. It was also equipped with an Enhanced Ground Proximity Warning System (EGPWS) and a Stormscope. The SR22 that the pilot had initially planned to use is equipped with a Garmin avionics suite whose functionalities are equivalent to that of the F-HUGE avionics suite.

At the date of the accident, the aeroplane had logged around 3,100 flight hours. There had been no mention of any particular anomaly on the plane in general or on the autopilot in particular when the last maintenance work was carried out.

#### **2.4.2 Examinations of electronic devices found on board aircraft**

Two mobile phones and a tablet were found on board the aircraft. A video taken during the occurrence flight was recovered during the examination of these items.

A photo and a message sent at the beginning of the flight were also retrieved by the BEA.

The MFD and PFD along with the EGPWS computer were examined. Only the data from the PFD could be read out and analysed. The history of the flight (see [§ 1](#)) and the various paths in the present report are based on this data. No information regarding the propulsion system was recorded in the data retrieved.

#### **2.4.3 Type and composition of autopilot**

The S-TEC 55X autopilot installed on F-HUGE was a two-axis (roll and pitch) automatic system.

Movements around the roll axis are made using the aileron trim motor and the associated cartridge.

The autopilot controls the pitch axis by means of a pitch trim servo which is attached to the elevator control cables via a bridle cable. The autopilot orders on the pitch axis generate a signal which is sent to the trim servo which acts on the elevator control cables. A clutch on the servocontrol allows the pilot to mechanically override the system if an electrical dysfunction prevents the pilot from disconnecting the autopilot.

The autopilot is composed of a control unit on the pedestal to select the guide modes, and pushbuttons, "AP ON" and "AP OFF & FD ON" on the top left side of the instrument panel to respectively engage the autopilot or activate just the flight director.

The aeroplane was equipped with an electrical control system for the pitch and roll trim. It is operated by a four-way trim switch installed on each sidestick (refer to [Figure 5](#)). This switch can only be used to trim the plane if the autopilot is not engaged.



Figure 5: Stick on pilot's side

<sup>(10)</sup> On the later Cirrus models, a red "AP DISC/TRIM INTR" button has been added to each stick, forward of the trim switch.

On F-HUGE, the autopilot could be disconnected by pressing the four-way trim switch<sup>(10)</sup>. Pressing this switch also disconnects the flight director.

A stick input would not disconnect the autopilot and the loads would accumulate.

The examination of the maintenance documents and the analysis of the data recorded by the onboard systems did not show any autopilot failure.

### 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, accompanied by two passengers, one of whom was an instructor pilot sat in the front right seat, undertook a flight under VFR between Lognes-Émerainville aerodrome and Villefranche-Tarare aerodrome, for professional reasons.

The forecast and actual weather conditions compromised both a VFR flight carried out entirely under the cloud layer due to the terrain, and a "VFR on top" flight due to the conditions at destination which did not guarantee that a safe descent could be made. The continuation of the flight in adverse weather conditions required the pilot to adapt his strategy.

The first half of the flight was carried out under the cloud layer. About midway into the flight, the pilot started descending probably to stay in sight of the ground. The height of the terrain preventing him from continuing on his heading, the pilot passed above the cloud layer and climbed back to FL075. He continued the flight after the passenger in the right seat had obtained the weather conditions at Lyon-Bron and Saint-Yan aerodromes from the Clermont FIS controller. The latter had asked him to be prudent and the passenger in the right seat had replied that if it was not possible to continue, they would turn around and descend. The use of the autopilot during this first part of the flight suggests that the pilot mastered its different operating modes.

The passenger in the right seat then asked for the weather conditions at Valence-Chabeuil aerodrome. It is possible that the pilot and passenger had envisaged making a diversion.

At 48 NM from destination, the pilot started descending to FL045. The investigation was not able to determine the reason for this choice when the plane was above the cloud layer.

In the five minutes that followed, the pilot made a heading alteration and changed the autopilot settings several times (altitudes and vertical speeds selected). He probably flew through a cloud layer. In the space of 30 s, the pilot selected a descent to FL030 and then a climb to FL080 before entering a steep-bank turn, overriding the autopilot which he disconnected.

At an altitude of 4,500 ft, he made several turns in manual control. He very probably had had to deal with broken, indeed overcast cloud cover, accompanied by showers. During these manoeuvres, probably without external visual references, the plane's attitude was not stabilized. During a turn, the pilot very probably lost control of the plane which collided with the ground with high energy, around 2,600 ft below.

During the flight, the plane was manually controlled several times, notably during turn manoeuvres which were tighter than those which would have been performed with the autopilot engaged. This could correspond to phases of skirting around cloud masses. In the second part of the flight, the path changes made with the autopilot engaged, in manual or by countering the autopilot were more frequent and could testify to the growing difficulties experienced by the pilot in managing the flight. The last part of the flight (from point 7 of Figure 2) was entirely flown in manual, probably without external visual references. It was not possible to establish who was the pilot flying during the manual flight phases.

### Contributing factors

The professional reason behind the flight to the destination aerodrome may have contributed to the decision to undertake and then continue the flight in adverse weather conditions for a VFR flight.

### Safety lessons

Over the last few years, BEA safety investigations have brought to light accidents and incidents linked to undertaking or continuing a flight despite obvious adverse weather conditions. Studies<sup>(11)(12)</sup> previously carried out have also shown how the determination to arrive at destination (get-home-itis), such as the professional reason for this flight, can distort the risk assessment at departure and make the decision to divert or turn around all the more difficult as the destination gets closer.

<sup>(11)</sup> [https://www.ecologie.gouv.fr/sites/default/files/rapport\\_securite\\_aerienne\\_2016.pdf](https://www.ecologie.gouv.fr/sites/default/files/rapport_securite_aerienne_2016.pdf)

<sup>(12)</sup> [https://bea.aero/fileadmin/uploads/tx\\_scalaetudessecurite/the.get.home.itis\\_syndrome\\_01.pdf](https://bea.aero/fileadmin/uploads/tx_scalaetudessecurite/the.get.home.itis_syndrome_01.pdf)