



Accident to the Robin - DR300 - 180R
registered **F-BTBC**
on Tuesday 12 July 2022
at Revel-Montgey

Time	Around 19:35 ¹
Operator	Association Tarnaise de Vol à Voile
Type of flight	Glider towing
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. As accurate as the translation may be, the original text in French is the work of reference.	

**Glider higher than tug aircraft while being towed,
loss of control of aeroplane, release by glider pilot,
collision with trees then ground**

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and data from the glider's FLARM.

The pilot of the glider registered F-CBLG, accompanied by a second pilot in the rear seat, carried out a towed take-off at around 14:30 from Graulhet-Montdragon aerodrome (Tarn) for a flight overhead Gaillac (Tarn), Albi (Tarn), Réalmont (Tarn), Castres (Tarn) and Revel. For this flight, the pilot in the rear seat did not have the controls but was the pilot-in-command².

At around 18:00, when the glider was overhead the district of Revel, situated at around 30 km from Graulhet-Montdragon aerodrome, the pilot was unable to find uplifts to gain altitude. The two pilots therefore decided to land at Revel-Montgey aerodrome. After landing, they contacted their flying club to ask to be towed in order to return to Graulhet-Montdragon aerodrome.

At around 19:20, the tug pilot landed at Revel-Montgey. Once the tow cable was installed, the three pilots carried out the pre-flight checks, and in particular those relating to the cable and release system.

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

² See paragraph 2.1.

The tug pilot took off at 19:33 from runway 30³, the glider started its take-off run in the wing down position⁴. For this flight, the glider pilot was the pilot who did not have the controls for the take-off from Graulhet-Montdragon; he kept his rear seat position. The tug pilot started the initial climb on the runway centreline, then the glider pilots indicated that the tug aircraft slightly veered to the RH side.

A few moments later, the glider pilot lost sight of the tug aircraft as it had passed below his line of vision. He decided to release the tow cable, made an input on the cable release control and started a RH turn. Despite the action on the control, the cable was still attached and became very taut. The glider was dragged downwards.

The glider pilot pulled the release control again assisted by the passenger who simultaneously made an input on the control situated in the front. The cable was released from the glider. The glider pilot carried out a U-turn and landed on the reciprocal QFU of the Revel-Montgey aerodrome runway.

The tug aircraft collided with trees and then the ground around 900 m from the threshold of runway 12.

³ Paved runway 12/30 measuring 750 m x 18.

⁴ Wing down take-off: unassisted take-off, the glider is not kept in the horizontal position before the start of the take-off run.

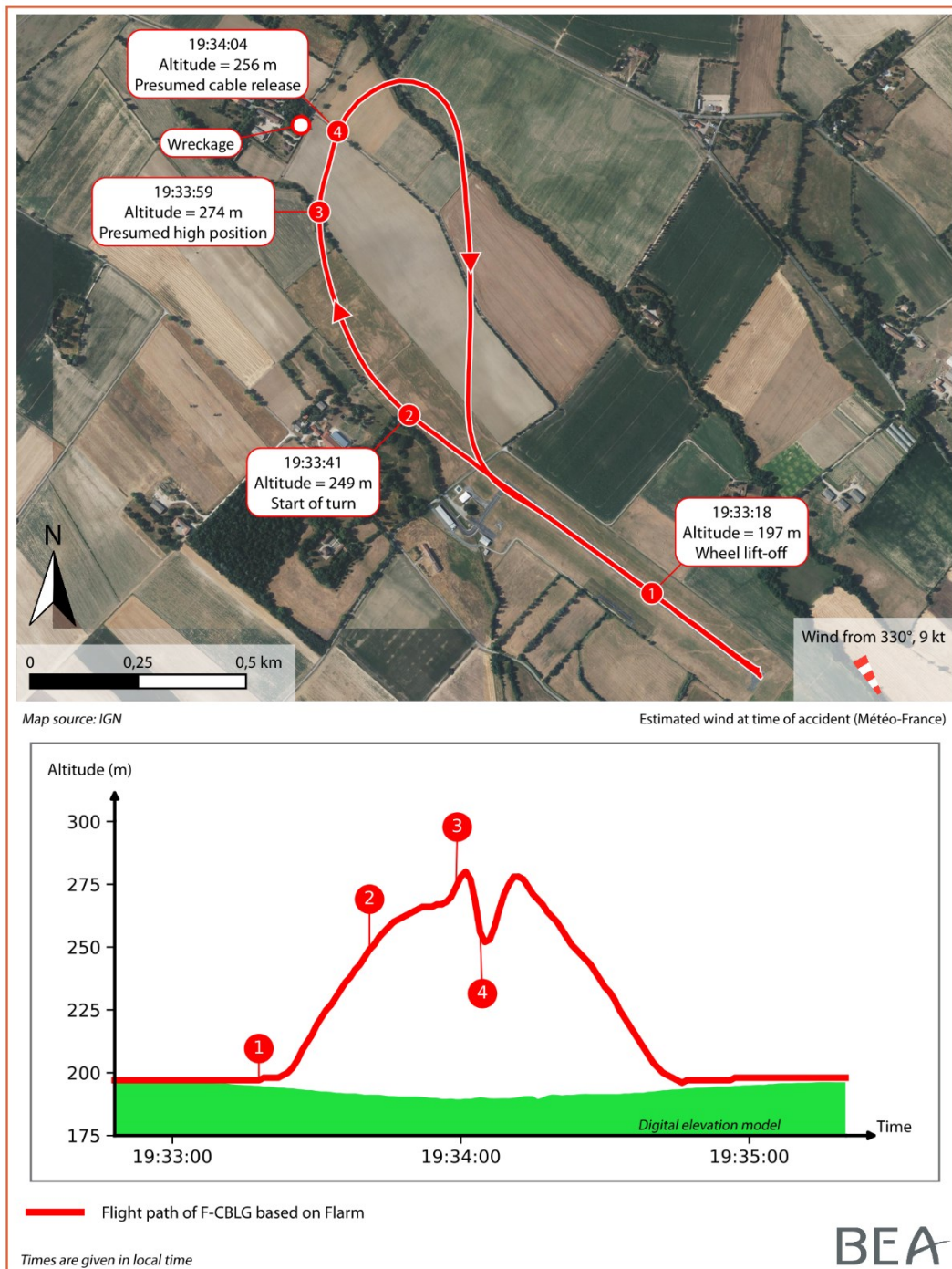


Figure 1: flight path of F-CBLG (source: BEA)

2 ADDITIONAL INFORMATION

2.1 Pilot information

The 20-year-old tug pilot held an aeroplane Private Pilot Licence (PPL(A)) obtained in July 2020 along with the Single Engine Piston (SEP) rating. He had logged 200 aeroplane flight hours including 31 hours in the previous 3 months, 27 hours 30 minutes of which on type.

He held the sailplane towing rating, obtained in 2021 in another flying club. Before the accident flight, the pilot had carried out thirteen towing days with the Tarn sailplane association between

March and July 2022. On the day of the accident, he had carried out 11 tow operations before the occurrence flight.

The 21-year-old glider pilot sat in the rear seat held a glider pilot licence obtained in 2017. The restrictions concerning the carrying of passengers and cross-country flights had been lifted in August 2020. He started flying gliders in 2015 and had logged at the time of the accident, around 125 glider flight hours. This was his first flight on a Centrair C201 “Marianne”. He had carried out several flights on the Duo Discus twin-seater and was used to flying the Centrair C101 “Pegase” that he described as the single seat version of the “Marianne”. For nearly all his flights, he had carried out towed take-offs.

He also held a microlight pilot certificate obtained in 2017 with a logged flight time of around 40 h.

He declared that after concerting with the pilot in the front seat, it was decided in the briefing at Graulhet that he would be the pilot-in-command for the flight. He added that as pilot-in-command, he had taken the rear seat in the glider and had kept this position during the take-off from Revel-Montgey. He added that the glider cable release system had been tested at Revel-Montgey, and that he had personally hooked on and tightened the cable while the other pilot actioned the controls in the cockpit. He indicated that his forward vision was not hindered from the rear seat as he was a lot taller than the pilot in the front seat.

The 24-year-old pilot in the front seat held a restricted SPL obtained in 2020. He had obtained the extension to carry passengers in May 2021 and, at the time of the accident, did not have the extension for cross-country flights (obtained in August 2022). On the day of the accident, he had logged around 100 flight hours, including around 40 hours in the previous month, over eight flights. He had flown around 20 h on the Marianne at the time of the accident. He indicated that he had had the controls of the glider when taking off from Graulhet-Montdragon, but confirmed that the other pilot had been designated as the pilot-in-command for all of the flight.

2.2 Aircraft information

F-BTBC was a Robin DR300 built in 1971. It was equipped with a four-cylinder Lycoming O-360 engine providing a maximum power of 180 hp at a speed of 2,700 rpm and a Duc FLAIR-2 five-blade propeller, model H-FLR2_5-D-I_C.

According to the DR300-180 flight manual, the stall speed is 98 km/h in the clean configuration and 96 km/h with the flaps in the take-off position.

The DR300-180 flight manual provides the take-off performance when towing, with a standard atmosphere, full thrust, with a Sensenich 76EM8S5-0-54 or -58 propeller adapted for towing and for a two seat Bijave glider which is lighter than the Marianne⁵. The towing speed in climb given in the chart is 105 km/h.

At the time of the accident, at an altitude of 250 m, the density altitude was around 3,400 ft. According to the flight manual, in these conditions, the climb performance of the DR300-180 when towing is around 560 ft/min.

⁵ The Bijave’s maximum weight is 550 kg while the Marianne’s maximum weight is 655 kg.

The tug aircraft was equipped with a tow hook. The control for actuating this hook was located on the LH side of the pilot in the left seat.

F-CBLG was a Marianne Centrair C201B glider built in 1987. It was equipped with a Europa G 72/G 73 release system manufactured by TOST. The tow speed recommended in the flight manual was 120 km/h⁶. The flying club recommended a speed of 125 km/h. The glider was equipped with a tow hook located under the nose (see paragraph 2.5) and a winch hook located further back, under the fuselage.

The glider flight manual and the flying club check-list did not mention checking the release system in the actions to be carried out before each flight. However, the tow hook manual recommended checking its operation before each take-off⁷. This practice was also systematically taught by the flying club.

The cable used for towing was a standard model measuring 48.5 m long.

2.3 Meteorological information

On the day of the accident, there was a high-pressure system over all of Metropolitan France with high temperatures and a strong sun. Météo France estimated the weather conditions at Revel-Montgey aerodrome at the time of the accident as being:

- wind from 330°, 9 kt;
- CAVOK;
- temperature 34°C, dew point 6°C;
- QNH 1019 hPa.

Météo France also estimated the wind between an altitude of 200 m and 300 m:

- wind from 325°, 12 kt at 19:00;
- wind from 315°, 10 kt at 20:00.

The recordings made by the Revel-Montgey security cameras showed the windsock at the time of the accident. The windsock indicated:

- that the wind direction was roughly on the axis of runway 30;
- the wind was light (below 5 kt).

2.4 Site and wreckage information

The wreckage of the tug aircraft was found in a wooded area close to the aerodrome. The damage observed in the vegetation showed that the aeroplane had struck a tree near its top and had then fallen to the foot of it.

The wreckage was complete and grouped together except for part of the right wing which was suspended in intermediate branches. The tow cable was hanging in the upper branches, at a height of around 15 m. The body of a pigeon and feathers were found in the tree near parts of the wreckage. The examination of the wreckage which followed did not find any evidence of a bird strike.

⁶ The flight manual does not specify the flight phase associated with this speed (cruise or climb).

⁷ "You should make a practice of carefully checking the release and the manual release mechanism before each TO." (Source: TOST User Manual)

The flight controls and the cable release system controls were continuous. The flaps were found in the take-off position⁸.

All of the damage observed was the result of the collision with the vegetation and the ground.

The damage to the propeller indicated the transmission of engine torque during the collision but it was not possible to determine the power provided by the engine. The examination of the latter did not reveal any malfunction likely to have contributed to the accident.

2.5 Read-out of recorded data

The tug aircraft was equipped with a Flarm. The unit was damaged during the collision with the vegetation and its memory component could not be found. It was not possible to retrieve any tug aircraft OGN⁹ data with respect to the accident flight. The telephone belonging to the tug pilot was retrieved and contained the SDVFR application. The accident flight was not recorded; only the tug aircraft flight between Graulhet-Montdragon and Revel-Montgey was recorded.

The glider's Flarm data was read-out by the BEA (see **Figure 2** below).

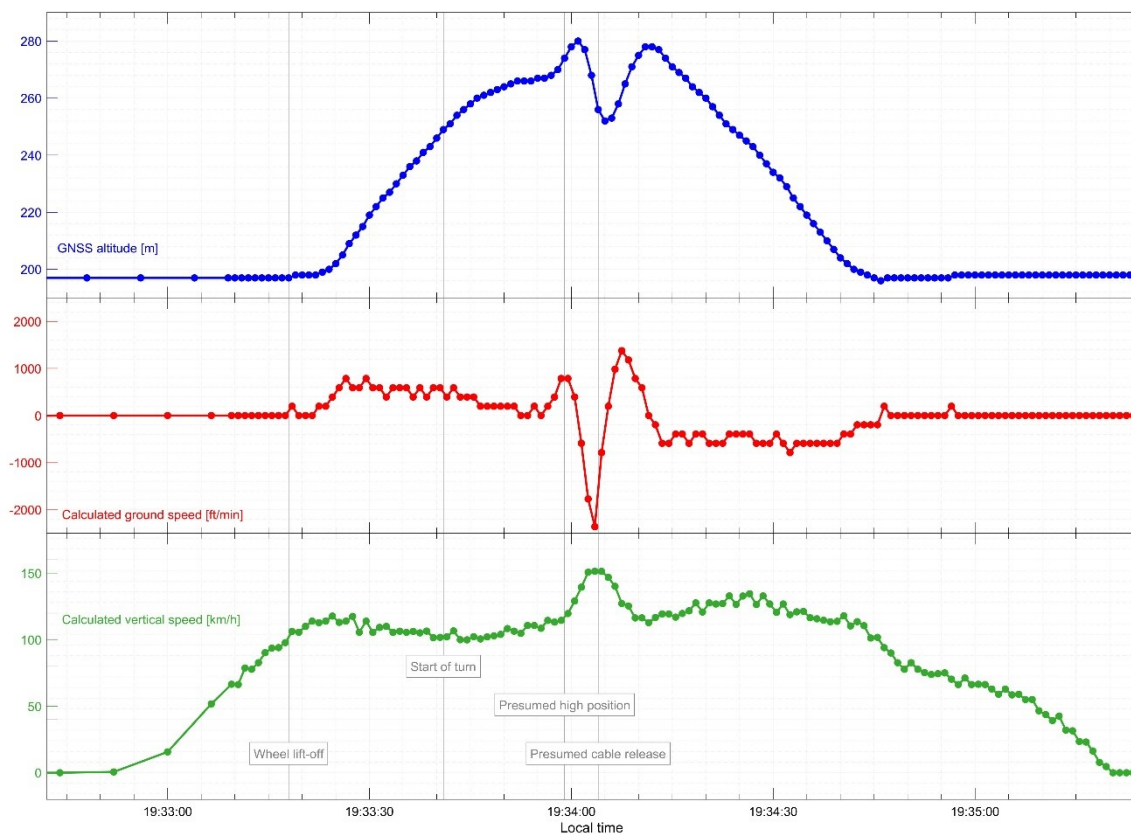


Figure 2: flight parameters taken from glider's Flarm (source: BEA)

⁸ i.e. 15°.

⁹ Open Glider Network.

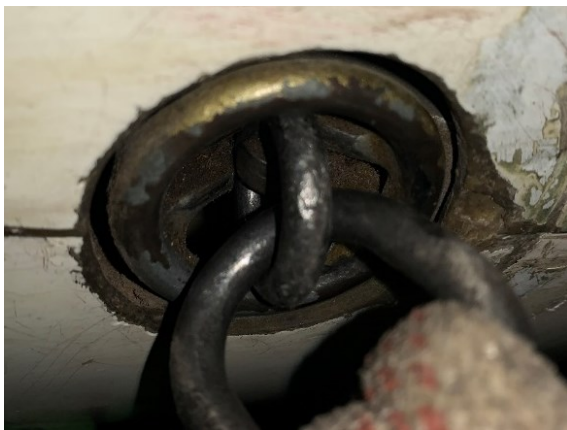
The analysis of this data made it possible to determine the following chronology:

- the glider left the ground at around 19:33:18 and then accelerated up to a ground speed of approximately 115 km/h;
- at 19:33:24, it started to gain height with a vertical speed of between 400 and 800 ft/min;
- during this climb phase, the glider's ground speed progressively decreased to around 100 km/h. Given the wind information available, its air speed was probably higher without it being possible to accurately estimate it;
- at 19:33:41, the glider's flight path started to inflect into a RH turn;
- between 19:33:46 and 19:33:56, the glider's rate of climb decreased, reaching an altitude of around 270 m;
- at 19:33:57, the glider's altitude rapidly increased up to 280 m, before swiftly decreasing in the following moments. During this phase, the glider's ground speed rapidly increased. This phase can very probably be associated with the glider being in a high tow position and then being pulled downwards by the tug aircraft;
- after losing an altitude of around 25 m, the glider gained altitude again. The BEA considered that the effective release of the cable corresponds to the first moment when the glider's rate of descent started to decrease, at 19:34:04;
- the glider pilot then carried out a U-turn and landed on the reciprocal QFU of the aerodrome.

2.6 Examination of glider release system

On the glider, the release system dedicated to towing is composed of:

- a TOST metal hook screwed onto the glider's structure (see **Figure 3** and **Figure 4**);



*Figure 3: hook in CLOSED position
(source: BEA)*



*Figure 4: hook in OPEN position
(source: BEA)*

- a yellow front seat control and a yellow rear seat control (positioned to be actioned by the left hand in accordance with regulations) (see **Figure 5** and **Figure 6**).



Figure 5: front seat in glider
(source: BEA)



Figure 6: rear seat in glider
(source: BEA)

To activate the release system, the operating handle has to be pulled rearwards.

Tests were carried out on the BEA's premises to measure the force that had to be applied to the handles to action the release system. These tests were carried out in the front and rear seats for various cable tensions and with the glider airframe oriented in three different positions with respect to the horizontal.

Without cable tension, in the front and rear seats, the traction force to be applied to the handle was respectively 11 and 18 daN higher than the value specified in the TOST manual but remained below the maximum force specified in the applicable certification requirements¹⁰ which was 20 daN whatever the release configuration.

When the cable was taut, in the front seat, the traction force to be applied to the handle remained homogeneous, between 9 and 11 daN, below the maximum force specified in the certification requirements. In the rear seat, the traction force that had to be applied to the handle was 4 to 9 daN more than in the front seat. However, this value remained below or equal to the maximum force set out in the certification specifications.

The tests carried out by the BEA did not reveal any malfunction of the release system.

Tests were also carried out on the tug aircraft's release system. During these tests, the release was effective, whatever the configuration, with no blocking or friction point.

Although the BEA did not carry out tests on other gliders, several of the flying club pilots indicated that, generally speaking, releasing the cable from the rear seat of the Marianne subjectively appeared to them to be harder than on other gliders they were used to.

¹⁰ Certification specifications applicable to Centrair 201B: JAR 22 dated 1 April 1980 modified by amendments dated 18 May 1981, 13 September 1982 and 31 January 1983.

2.7 Information regarding high position in glider

The high position is covered in glider pilot training as well as in tug pilot training. The French civil aviation safety directorate (DSAC) and the French glider federation (FFVP) have underlined the threats linked to the high position of the glider and the recommended measures to avoid this situation in the following videos: [Haute tension \(tension in the tow line\)](#) and [Les positions hautes en remorquage \(high tow positions\)](#).

The glider pilot manual states in the section about towed flight, that if the glider climbs too high behind an aircraft, this position can quickly become dangerous. Once a certain limit determined by the effectiveness of the tug aircraft's elevator is exceeded, this can result in the tug-glider combination entering an uncontrollable nose-down attitude which risks finishing on the ground.

For the tug pilot, the immediate measure recommended by the guide if the glider starts to rise, is to immediately release the glider.

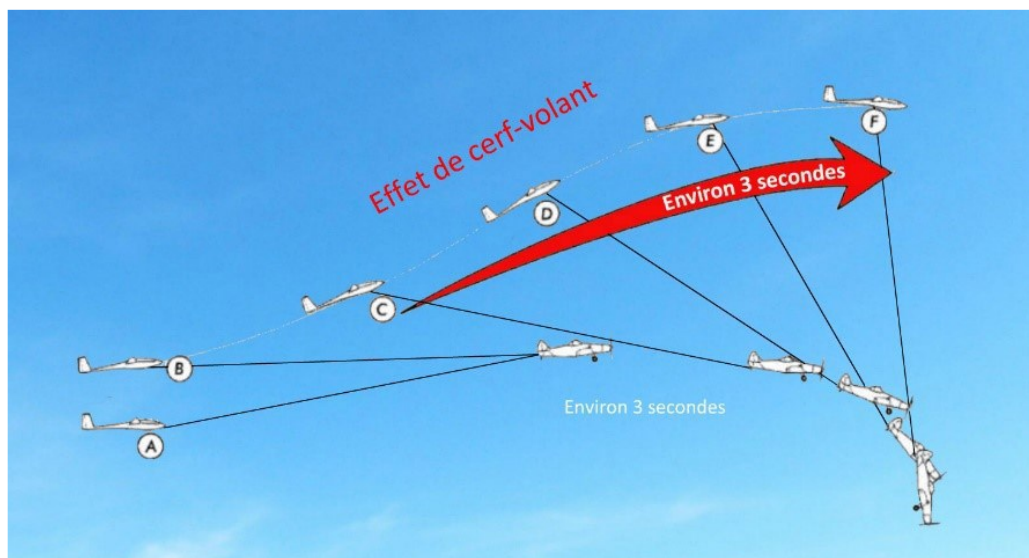


Figure 7: high position of glider (source: FFVP, towing safety seminar)

3 CONCLUSIONS

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

Scenario

During the climb, the glider found itself above the tug aircraft. The investigation was not able to determine the exact circumstances of this in the absence of the tug aircraft's flight path data.

When the glider pilot became aware of the glider's high position, he pulled on the handle to actuate the release system. The glider pilot then started a RH turn thinking that the cable had been released. The input on the release handle had been insufficient and the cable remained hooked to the glider.

The combination of the glider's high position and the glider pilot starting to turn very probably generated substantial tension in the tow cable which loaded the rear of the tug aircraft. The tug pilot lost control of his aeroplane.

The two occupants in the glider simultaneously pulled on their release handles which activated the opening of the tow hook and freed the cable.

The investigation was not able to determine if the tug pilot had tried to release the cable.

Given the low height at which the loss of control occurred, the tug pilot was not able to regain control and the aeroplane collided with a tree and then the ground.

Contributing factors

The following factors may have contributed to the late release of the cable and to the loss of control of the tug aircraft:

- the pilot's lack of experience on the accident glider where the force to be applied to the release control in the rear seat is substantially higher than in the front seat and, according to witnesses, in other club gliders;
- piloting the glider from the rear seat which may have made monitoring the position of the tug aircraft more difficult.

Safety lessons

Unusual position of glider in towed flight

The topic of unusual position of glider in towed flight is one of the safety lessons for gliders identified by the BEA in [2021](#) and [2022](#). This type of accident was the subject of three BEA reports in 2021 and three in 2022 in which two people were fatally injured, two people seriously injured and one person injured.

Threat and Error Management (TEM)

The FFVP particularly promotes TEM by means of a [sheet](#)¹¹ addressed to instructors and a [video](#) accessible to all on the FFVP site. This type of initiative can help instructors and pilots to identify, before the flight, situations in which the threats are cumulative, as was the case for the flight in this accident, and to think about the means to be put in place to manage them.

In particular, the glider pilot's lack of experience on the Marianne and the fact that he was piloting from the rear seat were threats that could have been taken into account and managed, for example by carrying out a prior local familiarisation flight, or a flight with an instructor. A flight with an instructor in the front seat can also be useful before the first flight from the rear seat as pilot-in-command. In a previous BEA report concerning the [accident to the F-CFKJ in April 2016](#), mention was also made of similar contributing factors and safety lessons.

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

¹¹ In agreement with the FFVP, this sheet is available in the media library of the page dedicated to this safety investigation.