



Accident to the Cameron - A160
registered **F-HNIJ** operated by PACA'P Montgolfière
on Sunday 25 June 2023
at Valensole

Time	Around 07:50 ¹
Type of flight	Sightseeing flight, commercial
Persons on board	Pilot and six passengers
Consequences and damage	Pilot and five passengers seriously injured One passenger slightly injured Balloon envelope 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.	

**Loss of burner effectiveness due to exhaustion of propane
in standby cylinder, forced landing,
collision with medium-voltage power line**

1. HISTORY OF THE FLIGHT

Note: the following information is principally based on statements and data from the GNSS² computer used by the pilot of F- HNIJ.

Three balloons, including F-HNIJ, were in place on the Oraison permanent platform in order to carry out a sightseeing flight of around one hour for the benefit of 24 people³. A fourth balloon operated by a private pilot and not part of the group was also present on the take-off site. After the safety instructions had been given to the passengers, the operations to inflate the envelope started. The pilot of F-HNIJ, accompanied by six passengers, took off at 06:10 after the three other balloons and first of all headed south. Around ten minutes after taking off (see **Figure 1** point ①), he headed east to the Plateau de Valensole area. At 06:36 (point ②), he reached the highest point of his flight.

After a flight time of 1 h and 10 min (point ③), the pilot changed cylinders for the standby cylinder before starting the descent to land on a patch of land in the Asse valley. The pilot of balloon B then indicated over the radio to the pilot of balloon A which was at a low height overhead this patch of land not to land there as it would not be possible to retrieve the balloons. The pilot of F-HNIJ indicated that he rejected the approach⁴ on hearing this message at 07:23. He started heading west again to find another site, following the river Asse in the centre of the valley at a low height.

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

² The glossary of abbreviations and acronyms frequently used by the BEA can be found on its [web site](#).

³ The two other balloons were registered F-HCMJ and F-HTJJ (referred to as balloon A and balloon B respectively in the rest of the report).

⁴ The approach is the preliminary flight time to arrive at the threshold of the final descent before landing on the chosen site.

At 07:37 (point 4), i.e. around 1 h 30 min after taking off, he started a slow descent towards another patch of land situated less than 300 m before two very-high-voltage power lines perpendicular to the valley and the flight path of the balloon. At this point the balloon was around 700 m from the power lines. Believing that the balloon would probably land towards the end of the site and fearing a collision with the power lines if the landing had to be rejected, he chose to gain height to pass over the lines and land after them. After passing over the two VHV lines, he changed cylinders again, returning to one of the cylinders already used. Five minutes later, the pilot of balloon B landed in a field and then took off again, indicating over the radio not to land there as the owner of the field refused the landings. The pilot of F-HNIJ continued the flight and a few minutes later, when the balloon seemed to be heading towards a field of corn, it suddenly started losing height. The pilot actioned the burner⁵, to no avail, and observed that it was no longer providing power.

After a flight time of around 1 h 40 min (point 5), as the balloon was heading towards a medium-voltage power line (20,000 V), the pilot was obliged to land. He shut down the cylinder supply, the burner and the pilot light. He indicated that he then pulled the rapid deflation line. The envelope caught on the upper part of one of the power line poles then one of the envelope's steel suspension cables touched the power line cables, causing an electric arc which touched the pilot's upper body. The envelope then collapsed on the cables. The pilot managed to extinguish an incipient fire in his compartment close to the cylinders.

The basket then descended in steps. The pilot asked the passengers to evacuate the basket shortly after it had reached the ground. The passengers evacuated followed by the pilot who lost consciousness a few minutes later. The passengers administered first aid to him and alerted the emergency services with their mobile phones. The emergency services took charge of the pilot around ten minutes later.

The flight lasted 1 h 45 min with a flight time in ascent of around 50 min and a flight time in descent of 55 min.

⁵ See paragraph 2.4.1.

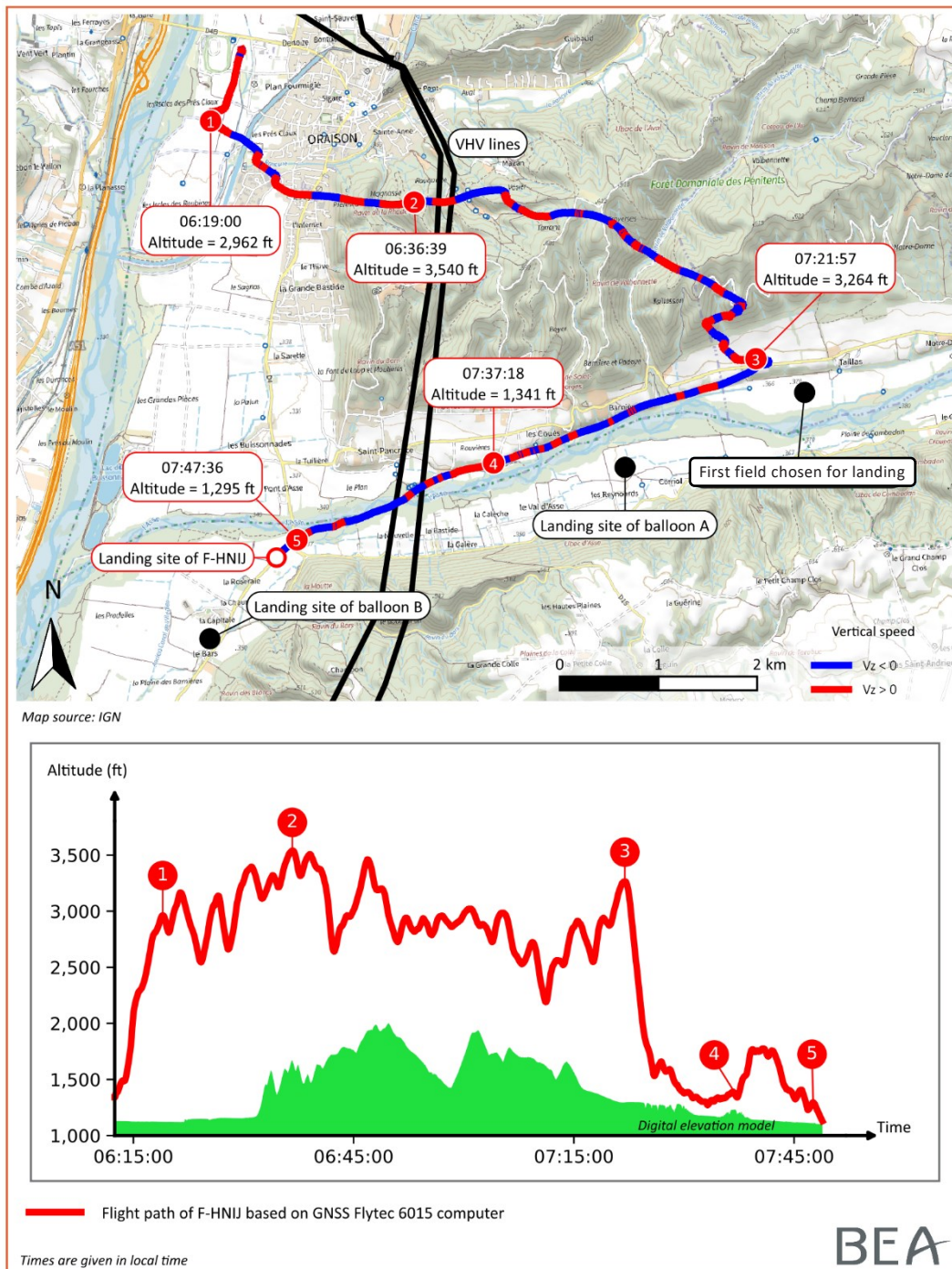


Figure 1: accident flight path

2. ADDITIONAL INFORMATION

2.1. Site and wreckage

The lower part of the envelope was substantially damaged (torn and burnt) and several metal suspension cables connecting the envelope to the load frame had ruptured (see **Figure 2**).



Figure 2: position of balloon after accident (Source: BGTA)

The pressure gauges on the four cylinders present in the basket indicated that three were empty and that the fourth cylinder only held 2% of propane. The cylinder connected was a Cameron CB599 (see paragraph 2.4.1).

The visual examination of the basket found burn marks at the end of the ruptured envelope suspension cables, very probably the result of the electric arc. In the pilot compartment, black marks which could correspond to projections of incandescent material were visible on the basket floor. No examination of the envelope was carried out.

2.2. Operator information

2.2.1. Organization

The hot air balloon registered F-HNIJ belonged to the commercial balloon operator PACA'P Montgolfière who had contacted the pilot as a reinforcement for the summer⁶. The PACA'P Montgolfière operations manual and procedures were applicable during the accident flight.

Since August 2022, PACA'P Montgolfière had been operating three hot air balloons for commercial purposes from the base at Claret. The accountable manager sometimes flew for Azur Provence Montgolfières from the Oraison platform. The accountable manager of PACA'P Montgolfière explained that only the Oraison platform was used for take-offs⁷.

⁶ The pilot was self-employed.

⁷ The Azur Provence Montgolfières operations manual indicated that the company regularly used three permanent platforms. Two were situated in Oraison and the third in Forcalquier (further to the west).

The propane bottles were filled at Oraison on the Azur Provence Montgolfières site. PACA'P Montgolfière used the services of the manager of Azur Provence Montgolfières who was an instructor and examiner to train its pilots.

2.2.2. Scope of accident flight

The flight was a commercial flight organised by the commercial balloon operator, Azur Provence Montgolfières. In order to carry all the customers of that day (24 in total) who had reserved separately, the operator needed an additional balloon and had subcontracted the flight to PACA'P Montgolfière in order to have an extra balloon⁸.

2.2.3. PACA'P Montgolfière operations manual

The operations manual stated that for in-flight management of the propane, each on-board cylinder shall have a functional gauge with which it will be possible to monitor the consumption of the on-board gas. It indicated that the pilot must take into account the evolution of this consumption in order to best manage his flight and not start using the standby cylinder. To ensure correct operation of the burner during a landing phase, the pilot shall preferably use cylinders with a gauge showing more than 30%.

2.3. Meteorological information

The French met office, Météo-France, based on the Arome model, estimated the meteorological conditions in the vicinity of the accident site as being:

- clear sky and good visibility;
- no low level phenomena;
- northerly wind of 10 km/h without gusts or turbulence below a height of 100 m, and remaining below 10 km between a height of 100 and 1,000 m;
- temperature at take-off site around +18°C;
- temperature at 06:36 between Oraison and Valensole of around +14°C at 1,070 m and around +11°C at 1,370 m.

The data recorded at 08:00 by the Météo-France Valensole automatic weather station (alt. 600 m), situated 9 km south-east of the accident site, indicated a mean wind from 040° of less than 5 kt.

Two of the pilots indicated that at 04:00, they had consulted the [Météociel](#) and [Météo-Parapente](#) websites. They explained that the data indicated a take-off in a south-south-westerly direction, with a wind of around 30 km/h at a height of 500 m becoming light close to the ground. They added that they planned to land between the towns of Villeneuve and Manosque.

However, the flight file provided to the pilot indicated a south-westerly surface wind of less than 5 km/h with gusts of 10 km/h and an ascent towards Brunet (commune situated south-east) for a planned flight time of one hour.

2.4. Balloon information

2.4.1. General

F-HNIJ was a Cameron A-160 balloon with a 4,500 m³ CB653 envelope and a Kubicek K25P T-partition basket with three separate compartments, capable of carrying a pilot and up to six passengers. It was equipped with a twin Ultramagic Mk21 burner with an independent fuel

⁸ Chartering: an operation whereby an owner makes an aircraft with crew available to a charterer.

supply. There were four cylinders in the pilot's compartment: two Cameron CB426s with a capacity of 29 kg each, a Cameron CB599 with a capacity of 22 kg and a Schröder VA-70 with a capacity of 30 kg. According to the balloon owner, each cylinder has an average consumption of between 50 and 60 kg/h. On this basis, the total liquid propane capacity of 110 kg carried on the flight provided a maximum endurance of around 1 h 55 min to 2 h 10 min, including the regulatory reserve fuel⁹.

The flight file provided to the pilot indicated an average fuel consumption of 40 kg/h, a planned flight time of 1 h, a maximum endurance of 1 h 30 min, and a take-off weight of 1,106 kg for a maximum take-off weight of 1,234 kg.

The envelope had totalled 493 ascents (flight time of 523 h 30 min) since it was manufactured in 2000.

There was no record of any tears in the envelope in the balloon's logbook.

During the annual/100-hour inspection carried out in 2019 at 463 h 40 min (434 ascents) with a tear test, it was mentioned on the certificate of release to service in the balloon logbook that there was substantial discolouration of the envelope in places. The certificate stated that the remaining time to overhaul was 50 h. The same comment was made at the time of the annual/100-hour inspection carried out in 2020 at 494 h 50 min (465 ascents) and the 50 h time before overhaul limit was noted in the logbook.

At the end of the last annual/100-hour inspection with a tear test carried out in February 2023 at 518 h 30 min (487 ascents), the remaining time before overhaul limit and the existence of the discolouration were not indicated on the certificate of release to service added to the logbook. The next inspection was scheduled for February 2024.

2.4.2. Flight manual emergency procedures

The F-HNIJ flight manual stated that emergency landings can be carried out by partially opening the parachute valve, the rapid deflation system or the Velcro rip panel at heights of 15 m or less. If contact with electrical cables cannot be avoided, it is recommended that the pilot:

- initiate a rapid descent so that contact with the cables will be made by the envelope instead of the basket;
- shut off all fuel supplies at the cylinder valves and;
- vent the fuel lines before contact.

2.5. Estimating required flight endurance

The practical guide for balloon pilots¹⁰ indicates that when preparing a flight, it is useful to include the time that will be spent looking for a site in the flight time. Depending on the type of terrain and the difficulties involved, this time can be around 20 min, or even longer in particularly inhospitable areas. It is also indicated that various circumstances can delay the moment of landing. Reserve fuel will then be needed to continue the flight without danger. To this end, it is recommended that the pilot ensure that there is sufficient propane in the cylinder (at least 40%) before starting the approach, and that there is another standby cylinder that is full.

⁹ Regulatory safety margin allowing 30 minutes of flight over flat terrain.

¹⁰ *Guide pratique du pilote de montgolfière*, Philippe Foubert, 2nd ed., 2017, Éditions Cépaduès.

2.6. Pilot's experience and statement

The 45-year-old pilot held a free balloon pilot licence obtained in 2014 along with the group B hot-air balloon class rating¹¹ obtained in March 2021. He had obtained the instructor rating in May 2019 and the additional "commercial flight" rating in March 2021. He had logged a total of 292 ascents of which 2 ascents on type (and 13 ascents on A-180s¹²), including 4 ascents in the previous 3 months of which 2 ascents on type.

He managed a company which carried out introductory flights with an Ultramagic balloon of 5,100 m³ equipped with a basket for eight people. He indicated that he mainly flew in the Yonne area. On 3 June 2023, he had carried out a conversion course on a JZ34 balloon with a volume of 3,399 m³, with the manager of Azur Provence Montgolfières during which he had carried out two flights of one and a half hours, from Oraison, to discover the region. The day before the accident flight, he had carried out a material conversion flight of one hour on an A-160 balloon. It was not the first time that he had taken part in a commercial sightseeing flight organised by Azur Provence Montgolfières.

The pilot explained that the day of the accident, he was expected at the take-off site at 05:00 and that it was not him that had prepared the flight (identity of passengers, load weight, endurance, etc.). The cylinders had already been filled. He had then attended the safety briefing for the passengers carried out by the manager of PACA'P Montgolfière. He explained that there had been no briefing between the pilots or specific instructions about where to land in Asse valley. According to him, the other two pilots had just told him to follow them and not to fly separately. He added that in flight, they gave him instructions.

He indicated that there were four cylinders in the basket and that he had not used them to inflate the balloon before take-off¹³. He explained that he had used the two burner units in flight and had rapidly changed cylinder a first time when the remaining propane was 15%.

He specified that when he changed to the standby cylinder before starting the approach to the first plot of land, the pressure gauges on the other two cylinders showed 25%. He added that he began to worry when overhead the river and considered landing in the riverbed several times, but changed his mind as he was concerned that it would not be possible to recover the balloon. After crossing the two VHV power lines, he shook the standby cylinder, which seemed light to him, and changed back to one of the cylinders, which indicated 25%. The pilot indicated at this point that the burner was no longer delivering full power.

Several months after the accident, he added that before inflation, he had noticed a tear of five to ten centimetres in the parachute at the top of the envelope, which he had reported to the manager of Azur Provence Montgolfières, who had replied that the balloon had flown the previous day without any problems. At the time, he had not indicated that he wished to cancel the flight.

Note: In the absence of an examination of the envelope by the BEA after the accident, the investigation was unable to confirm the presence of this tear in the envelope. However, the total duration of the flight between take-off and the accident and the manoeuvres during the flight (ascents/descents) were consistent with the estimated endurance (see paragraph 2.4.1).

¹¹ Group B = hot air balloons between 3,401 and 6,000 m³ (the CAMERON A160 is 4,531 m³ and the A180 is 5,098 m³).

¹² Balloon with an envelope of around 5,100 m³ able to carry a pilot and seven or eight passengers.

¹³ A fifth cylinder, left on the ground, was used for the inflation.

2.7. Statements

2.7.1. Pilots of other balloons

The other pilots indicated that the pilot of F-HNIJ stayed overhead Oraison for a longer period than them, before heading east to join them.

According to the manager of Azur Provence Montgolfières (pilot of balloon B), the pilot of F-HNIJ flew over two uncultivated plots of land in the Asse valley. He specified that during the flight, they had just shared wind information (speed and direction) on the radio to facilitate the flight of the private pilot and that of F-HNIJ. They specified that each pilot remained completely free to make his own decisions and manage his flight.

The owner of F-HNIJ (pilot of balloon A) stated that he had never been aware of a tear in the envelope and that nothing had been reported to him about this on previous flights, particularly the last flight on the previous day.

He indicated that the cylinders had been filled the day before and checked using the bleed screw¹⁴ on the morning of the flight. Just after the accident, when he shook them, he noticed that the cylinders were all empty. He specified that all the balloons took off with one hour of endurance and thirty minutes of reserve fuel.

In his opinion, it is best to change cylinders when the propane level reaches 30%, as the level drops rapidly after that. He specified that he landed for the first time after 1 h 05 min in a cultivated field and then moved the balloon onto a road with the help of the ground crewman to deflate it. He said that balloon B landed once after a flight time of 1 h 30 min before taking off again and landing ten minutes later. He considered that the Asse valley is sheltered from the northerly wind and offers numerous possibilities for landing in good conditions before the two VHV lines.

The pilot of balloon A added that each pilot in the group was autonomous and that the pilot of F-HNIJ was an instructor. In this context, as the flight path followed by F-HNIJ in the valley was towards land allowing it to land before the two VHV lines, the pilot of balloon A was not worried and was then surprised to see that he did not land before the VHV lines.

2.7.2. Passengers of F-HNIJ

One of the passengers explained that the pilot had changed cylinders at the highest point of the flight, during the descent and then overhead the river before the VHV power lines. Another passenger indicated that it seemed to him that the pilot's attitude changed during the descent after having to abandon the landing on the plot that he had initially chosen and that he then seemed quite tense. According to the passengers, after a flight time of 1 h and 10 min, the pilots had exchanged with each in order to determine where they were going to land. Ten minutes later, they heard the pilot of F-HNIJ ask the other pilots, over the radio, where they had landed.

Once they were in the bottom of the valley, one of the passengers heard him say, "*Là, il faut que je me pose, je n'ai pas le choix !*" (I've got to land right now, I've no choice). When he climbed to cross over the two VHV power lines, he seemed to be in a panic and made repeated inputs on the burner. Several passengers indicated that at this point the burner flame was getting smaller and smaller

¹⁴ The bleed screw acts as a level indicator, releasing liquid propane when the cylinder is full.

and looked more like yellow sparks, which according to one of them, was a sign of incorrect combustion¹⁵.

Just before the collision with the power line, the pilot said, “*Mayday, je n’ai plus de gaz !*” (Mayday, I’ve no more gas!) and then “*Mayday, on va se crasher !*” (Mayday, we’re going to crash!).

According to one of the passengers, they had received instructions to wear comfortable clothes.

Note: The analysis of the photos and videos taken by the passengers during the flight found that they were all wearing clothes with long sleeves, some of the clothes were made from synthetic fibre. They all had long cotton trousers on except for one passenger who was wearing a cropped pair of trousers. One passenger was wearing a hat. The pilot was in a short-sleeve t-shirt and was wearing a cap and leather gloves.

They explained that after the collision with the power line, glowing pieces of envelope fell on them as they crouched in the safety position at the bottom of the basket, burning them on various parts of their bodies (head, torso, back, stomach, arms, legs).

3. CONCLUSIONS

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

Scenario

Although the flight file handed to the pilot indicated an endurance of 1 h 30 min, the flight time of 1 hour 45 min between the take-off and the accident remains less than the estimated theoretical endurance of between 1 h 55 min and 2 h 10 min based on the indications given by the balloon owner. The possibility of an overconsumption linked to a possible tear in the envelope mentioned by the pilot cannot be totally excluded. However, given the variations in altitude during the flight which certainly gave rise to an increase in consumption, the actual duration of the flight and the residual quantity of propane remaining in the cylinders, the hypothesis of a tear in the envelope seems unlikely.

After the three balloons had flown for 1 h 10 min, and the pilot of F-HNIJ was in descent on the standby cylinder to land on a plot of land in the valley, one of the two other pilots advised him over the radio against landing there. The pilot of F-HNIJ started looking for another plot of land, by descending to change direction and then stayed at a low height over the river. He did not then find a suitable spot to safely land. He was obliged to gain altitude again to avoid the VHV power lines crossing the valley which resulted in him extending his flight and consuming the remaining propane in the standby cylinder. After passing over the two VHV power lines, the pilot returned to one of the previous cylinders which indicated 25% before observing a loss of burner effectiveness. One of the other pilots who had just landed on a plot of land and had had to take off again at the farmer’s request indicated over the radio not to land there. As a consequence, the pilot of F-HNIJ had to extend the flight even further, thereby consuming the remaining propane in the cylinder. A few minutes later, when the balloon was in descent and heading towards a medium voltage power line,

¹⁵ The manual for balloon pilots, “*Méthode pédagogique du pilote de montgolfière*” (Thierry Foubert, 2020, Éditions Cépaduès) specifies that with a nearly-empty tank, the main burner is totally ineffective (it is practically in the gas phase) and can put the occupants in danger.

the pilot activated the two burner units to gain height. He then observed that the burner flame was ineffective and was not able to avoid the collision despite his actions to deflate the envelope beforehand.

Contributing factors

The following factors may have contributed to the exhaustion of the standby propane and to the collision with the power line:

- limited knowledge of the sector in which he was flying which meant that the pilot could not anticipate and was not conscious of the local difficulties and constraints in the valley which included the difficulties in retrieving the balloons and passengers;
- unplanned in-flight adaptation to the differences between the weather forecasts and the aerological conditions actually encountered locally which resulted in the pilot flying in a sector which he did not know well;
- the influence of the messages passed on the radio by the pilots of the other two balloons, which may have led the pilot, who was acting on behalf of another operator who owned the balloon, to modify his plan of action and to continue the flight using the stand-by propane because the flight time was longer than that of the other pilots;
- the inadequate framework and flight preparation for flights involving several balloons, some of which were subcontracted to another operator, which may more or less implicitly influence the management of the flights, particularly when they are commercialised.

Safety lessons

Activation of rapid deflation system

In the 2000-2023 period, the BEA's database includes three balloon accidents, two of which resulted in fatal injuries, following collisions with power lines causing electric arcs and fires of varying severity in all or part of the basket and/or envelope:

- [accident to F-GKER in 2001](#);
- [accident to F-HTML in 2012](#);
- [accident to F-HIII in 2023](#).

The pilot's decision to activate the rapid deflation system in order to land as quickly as possible before the power line and to close the pilot lights and cylinder valves very probably reduced the consequences of the collision with the power line cables for the occupants.

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