

**Accident** to the unidentified paramotor  
equipped with an ITV Awak 2 wing  
on 26 May 2019  
in Aroz (Haute-Saône)

<sup>(1)</sup>Unless otherwise specified, the times in this report are expressed in local time.

|  |                             |
|--|-----------------------------|
| <b>Time</b>  | Around 10:45 <sup>(1)</sup> |
| <b>Operator</b>  | Private                     |
| <b>Type of flight</b>  | Local flight                |
| <b>Persons on board</b>  | Pilot                       |
| <b>Consequences and damage</b>   | Pilot fatally injured       |
| <i>This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in January 2020. As accurate as the translation may be, the original text in French is the work of reference.</i> |                             |

**Asymmetric wing closure, loss of control,  
collision with the ground**

**1 - HISTORY OF THE FLIGHT**

*Note: The following information is primarily based on the data from the Go Pro-type camera attached to the lines of the wing.*

The pilot took off at about 10:35 from a field located in the municipality of Bucey-lès-Traves (Haute Saône). After performing low-height turns around the take-off site for six minutes, he continued his flight in a southerly direction, then in an easterly direction flying along the edge of a forest, gradually gaining height. While at cruising speed, around ten minutes after take-off and at an estimated height of 85 m, the right tip of the wing closed suddenly, causing the whole wing to close almost instantaneously. On closing, the wing passed behind the pilot, the paramotor fell and collided with the ground.

**2 - ADDITIONAL INFORMATION**

**2.1 Site and wreckage information**

The accident site was about one kilometre from the take-off site in the municipality of Aroz (Haute-Saône) in a field bordered by a wood to the north and a lighter coloured field to the south.

The technical examination of the wing, harness and propulsion system did not reveal any particularity or malfunction that could have contributed to the accident:

- the damage to the wing was caused by contact with the rotating propeller;
- the damage to the lines was due to them being wound round the propeller hub and/or their contact with the hot parts of the engine during the accident;

- ❑ no damage was observed on the harness;
- ❑ no pre-accident damage was found on the propulsion system, which was functioning at the time of impact with the ground.

At the accident site, the camera attachment device (consisting of a line and an empty plastic bottle) was found tangled up in the lines of the wing.

## 2.2 Meteorological information

The meteorological conditions at the accident site estimated by Météo-France were as follows:

- ❑ few clouds;
- ❑ northerly wind of an average wind speed of 4 to 6 kt, with a maximum instantaneous wind speed of 8 to 12 kt;
- ❑ visibility greater than 10 km;
- ❑ temperature 18 °C, dew point 11 °C.

These estimates are consistent with the 10:00 to 11:00 reports from the automatic meteorological station at Chargey-lès-Gray aerodrome (Haute-Saône) located 25 km southwest of the accident site.

## 2.3 Information relating to the paramotor

The paramotor comprised:

- ❑ an ITV Awak 2, category B<sup>(2)</sup> wing, with a flat surface of 20 m<sup>2</sup>;
- ❑ a Moster 185 type propulsion system, comprising a 2-stroke engine with a cylinder capacity of 185 cc and a two-blade carbon propeller;
- ❑ an R.Ultralight T.rex type harness.

With a surface area of 20 m<sup>2</sup>, this wing belongs to the “mini-wings” category. The “mini wings”, which are fast and quick to react allowing pilots to perform acrobatic figures, are intended for experienced pilots and require precision piloting.

The wing flight manual states that in the event of closure *“the re-opening [...] is very generally spontaneous and immediate, especially if the pilot takes care and flies with some braking when the conditions are likely to cause closures. [...] it cannot be excluded that after a massive closure which causes a turn, if nothing is done, it could generate into auto-rotation. To correct for this, the pilot should transfer his weight to the inflated side and brake on the outside of the turn”*.

The manufacturer delivered the new wing to the pilot in September 2018. The wing was not returned to the manufacturer for any reason. The technical examination of the wing showed that it displayed all the characteristics of a new wing.

The paramotor was not equipped with a reserve parachute. Although the harness can accommodate a parachute, this equipment is not mandatory.

<sup>(2)</sup>European Standard EN 926-2 of December 2013 on requirements and test methods for classifying flight safety characteristics.

## 2.4 Pilot information

The 51-year-old pilot had a paramotor ultralight pilot licence issued on 13 July 2012.

His exact experience at the time of the accident could not be determined, but there are several indications that he had extensive experience of flying paramotors, including with the wing used on the day of the accident:

- the pilot had accumulated over 600 hours of flight time between 2013 and 2016;
- he owned several wings, including a tandem;
- he had been using the ITV Awak 2 model since 2016.

He had also been paragliding for about ten years.

The previous ITV Awak 2 wing owned by the pilot between 2016 and 2018 had been inspected annually or every 100 hours as required under the regulations.

## 2.5 Paramotor piloting information

### 2.5.1 Flight management in turbulent conditions: best practices

Flying in turbulent air requires a great deal of care and active piloting to mitigate any pendulum movements and prevent closures. The effects of wind shear, created in particular by thermals<sup>(3)</sup>, can lead to sometimes sudden and asymmetric changes in the wing speeds, which must be anticipated and corrected as quickly as possible.

By holding the brake controls, the pilot can feel in his hands the tightening or slackening of the controls connecting him to each half-wing, as well as the variations in angle of attack and speed. When a loss of resistance in one control is felt, it can be immediately compensated for by an input on the opposite brake.

A continuous and moderate tension on the brakes will therefore allow the pilot to feel and control the movements created by the turbulence, thus protecting him against accidental closures.

### 2.5.2 Reactions to asymmetric closure

The risk in the event of an asymmetric closure is that the pilot will lose control of the wing, which may start to auto-rotate and enter an uncontrollable spiral to the ground. It is therefore important to react quickly.

The *Fédération Française de Vol Libre* (FFVL) indicates that an asymmetric wing closure is characterized by a lack of contact with the wing on the closed side and a sensation of falling in the harness on this same side. The priority in such a case is to stay on course and avoid falling in the harness towards the side of the closed half-wing: the pilot should shift his weight in the harness to the side opposite to the closure, keep his forearms in contact with the risers, brake on the opposite side and try to stay on course by looking into the distance along the desired path<sup>(4)</sup>.

<sup>(3)</sup>Vertical air movements.

<sup>(4)</sup>Recommendations issued by the FFVL on <https://parapente.ffvl.fr>

## 2.6 Read-out of the video recording

A Go-Pro camera was found at the accident site. It was a trailing camera that was hooked to the trailing edge of the wing by means of a device made from a plastic bottle and a line and which filmed the flight from the rear. The accident flight was recorded and the video established the following:

- ❑ The paramotor swayed laterally when cruising close to the accident site, indicating turbulent air.
- ❑ While cruising, the pilot skirted a wood to his left, which may explain the presence of thermally-induced convective movements; at the time of the accident, he was between this wood and a lighter coloured field. The temperature contrast between these two zones could also give rise to the presence of thermals.
- ❑ The pilot released the right control handle from the sixth minute of the flight, i.e., two minutes before the wing closed.
- ❑ The flight height increased rapidly in the last minute of the flight, the pilot seemed to be in fast uplifts.
- ❑ The right lines slackened, less than a second later the wing closed and passed behind the pilot. No reaction can be observed on the video. The pilot continued to be propelled forward by the engine. The paramotor collided with the ground within less than five seconds.
- ❑ The pilot was not wearing a helmet.

Lastly, the camera and its support structure may have interfered with the reopening of the wing after it closed.

The propulsion system did not display any significant rpm variation before or during the wing closure and was still operating when it hit the ground.

## 3- CONCLUSIONS

The conclusions are established solely on the basis of the information that came to the knowledge of the BEA during the investigation. They are in no way intended to apportion blame or liability.

### Scenario

The pilot encountered turbulent conditions while cruising. In the accident area, the presence of a field to the pilot's right and a wood to his left may have generated vertical air movements, known as "*thermals*". Thermals can generate turbulence. These may have contributed to an asymmetric closure of the right side of the wing.

As the pilot's hand was not positioned on the right brake control, he did not recognize the first signs of a closure and could not react quickly to regain control of the wing. The reactive nature of the wing meant that the pilot had to react quickly.

The pilot's forward, rightward movement, which may have been caused by the engine torque at the time of the closure, accelerated the action of the wing passing behind the pilot, not leaving him time to regain control.

Finally, the camera that was attached to the paramotor may have impeded the reopening of the wing.

### Contributing factors

The following factors may have contributed to the asymmetric closure of the wing and loss of control:

- flying in turbulent meteorological conditions;
- not holding the right brake control during the flight;
- the use of a very reactive wing requiring quick reactions.

### Safety lessons

This accident is a reminder that flying at low height compromises the chances of recovery from an abnormal situation, such as a wing closure, and the proper functioning of the reserve parachute when the paramotor is fitted with one.

Nowadays, there is safety equipment (reserve parachute, helmet, etc.) designed to mitigate the consequences of a paramotor accident. It is the responsibility of each pilot to assess the value of using this equipment when managing their safety.

Finally, the use of a camera trailing system, which is attached to the wing by a line, can compromise the reopening of the wing in the event of its closure. In turbulent conditions, which are more likely to generate wing closures, the use of such a system can make recovery from these situations more difficult.