



Accident to the AIR CREATION BioniX² 13 SKYPPER 912 S
identified **21ANN**
on Thursday 5 October 2023
at Vignoles

Time	Around 18:15 ¹
Operator	Aéroclub de Bourgogne
Type of flight	Sightseeing flight, commercial
Persons on board	Pilot, passenger
Consequences and damage	Pilot fatally injured, passenger seriously injured, microlight 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.

Unnecessary manoeuvres for the management of the flight, tumbling, rupture of wing, collision with ground, during a local flight for remuneration

1 HISTORY OF THE FLIGHT

Note: the following information is principally based on statements, data recorded by the Safesky application and a video taken by an eyewitness.

The passenger had been gifted a revenue sightseeing flight in a flex-wing microlight. The pilot, accompanied by the passenger, took off at around 18:00 from runway 02² at Beaune - Challanges aerodrome. He first climbed to a height of around 75 m, then made an initial low pass over a field, less than 5 m from the ground (see **Figure 1**, point ①). He then climbed to a height of around 40 m and performed a second low pass (point ②). After climbing to a height of about 800 m, he descended approximately 50 m and reached a ground speed of about 125 km/h, then carried out a pull-out. The last valid point (point ③) was recorded at the end of this pull-out, at 18:12:41. The ground speed at this point was around 40 km/h and the height around 800 m. The pilot then lost control of the microlight, which turned over, ejecting the pilot from his seat. The wing broke, and the microlight continued to fall, colliding with the ground.

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

² Paved runway measuring 910 m X 30.

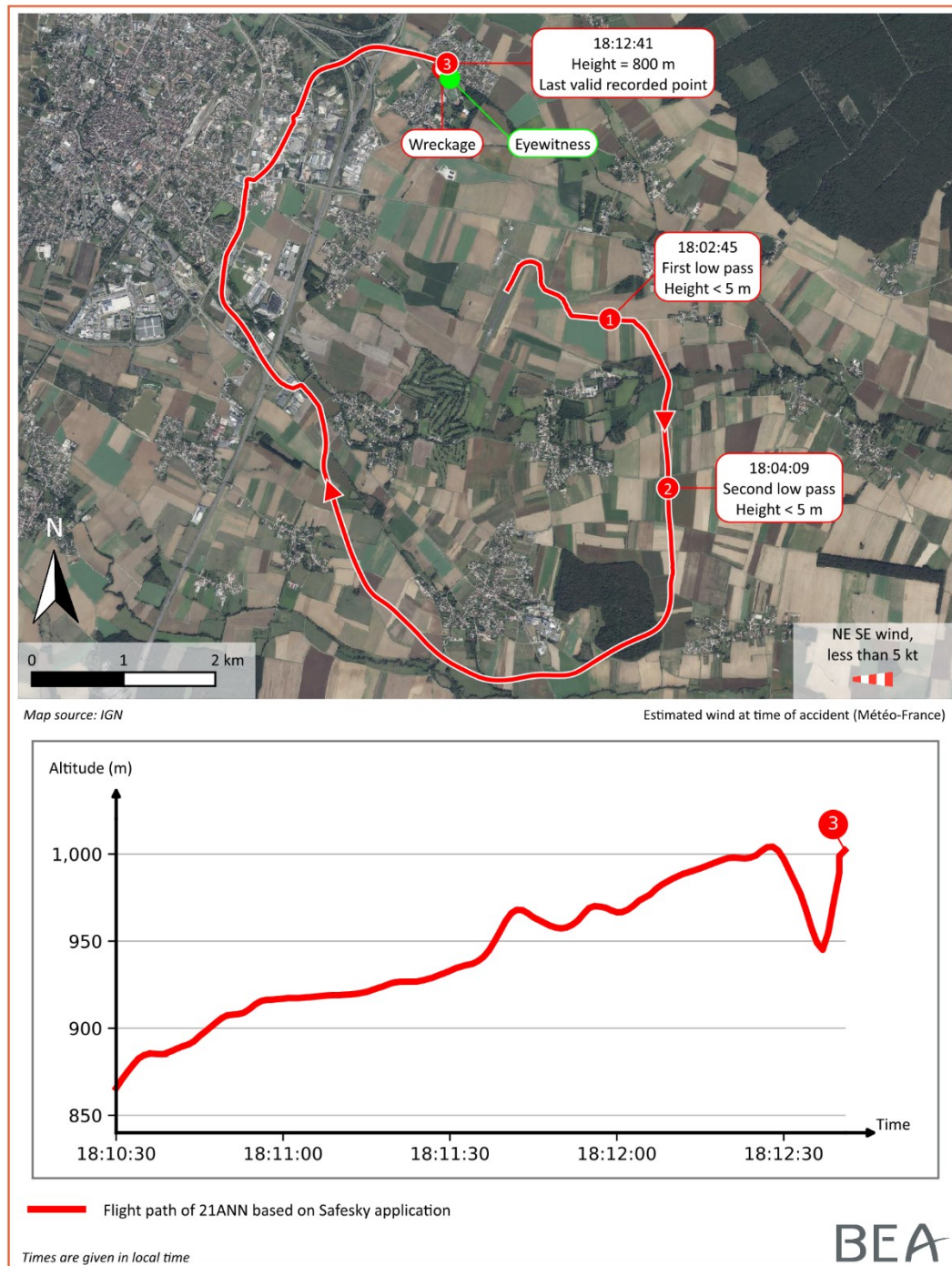


Figure 1: flight path of flex-wing

2 ADDITIONAL INFORMATION

2.1 Microlight information

The microlight consisted of a BioniX2 13-type wing and a Skypper 912 S three-wheel trike, both produced by Air Création. It was powered by a Rotax 912 ULS engine. It was not equipped with an airframe parachute.

The wing operating manual specifies in the flight envelope section, that stalls are only permitted on a descent slope with engine in idle. The stall behaviour section states that a stall performed with a nose-up attitude will result in a sudden stall dive with the aircraft quickly taking a nose-down attitude. As with all flying wings, this manoeuvre can lead to uncontrollable tumbling and structural failure.

The hang block was still in the “aft” factory setting. The maintenance manual states that moving the hang block to a position other than aft is not necessary in normal conditions of use. Ageing of the wing may justify a different setting. This was not the case for the wing of this microlight, which had been flown for around two years and 286 hours at the time of the accident.

The stall speed indicated in the manual is 65 km/h, the speed not to be exceeded in very turbulent air is 130 km/h and the VNE is 189 km/h.

The two tandem seats are fitted with three-point safety belts (two lap straps and a shoulder strap).

Aéroclub de Bourgogne leased the microlight from the company that owned it, for sightseeing and instruction flights. Information gathered during the investigation indicated that the flex-wing was regularly maintained.

2.2 Site and wreckage information

The wreckage was located in a garden at around two kilometres from the aerodrome. The wing was bent in two on its upper surface. On the LH side of the wing, the forward leading edge and the crossbar had ruptured between battens No 2 and No 3.

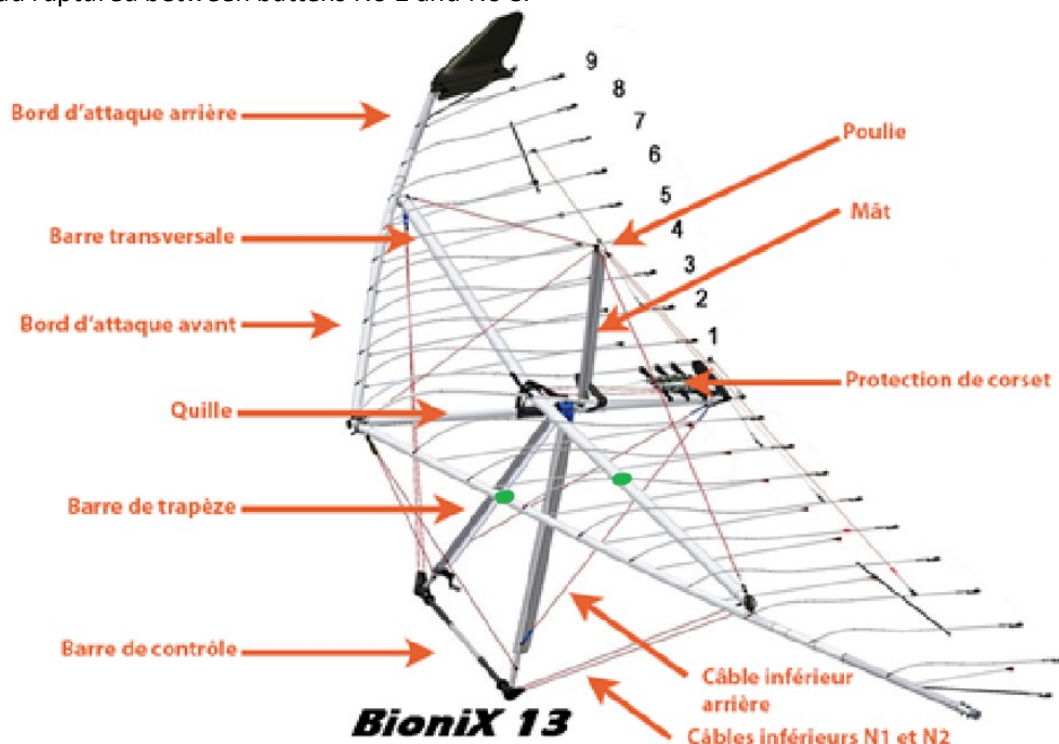


Figure 2: general diagram of the wing, position of ruptures in green (source: Air Création)

The LH side of the trike was substantially damaged, in particular the LH landing gear (wheel, triangle, damper). The upper beam of the trike and the forward tube attaching plates had ruptured. Due to these ruptures, the wing was only connected to the trike by the safety strap (see **Figure 6**).

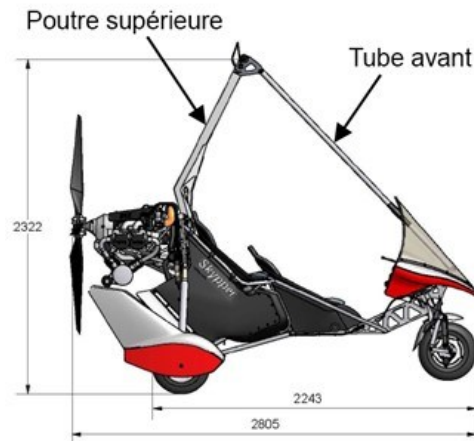


Figure 3: general diagram of trike (source: Air Création)

The passenger was still strapped in with her lap straps and shoulder strap when the emergency services arrived.

The lap strap of the pilot's belt was found separated from the female buckle. The male and female buckles were connected. There were parallel rubbing marks and a damage mark perpendicular to the strap. According to the owner, these marks were not present before the accident. This would seem to indicate that the strap had slipped, freeing itself from the buckle. The plastic loop was found at the end of the strap (see **Figure 4**). This position is not compatible with a strap passed through the buckle. The loop was probably moved to the end of the strap when it slipped. It was not possible to determine the lap strap setting. The shoulder strap was wound in its reel at the rear of the seats and showed no marks.

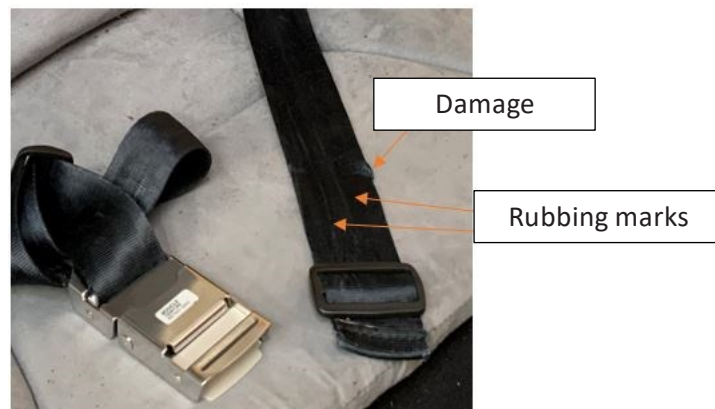


Figure 4: lap straps of pilot's belt: on LH side, male and female parts of buckle connected together, on RH side, strap separated from female buckle (source: BEA)

2.3 Examination information

2.3.1 Examination of video

A video of the end of the flex-wing's fall was taken by an eyewitness. The analysis of this video showed that the wing had already ruptured before it hit the ground. The forward tube had detached from the upper beam before the collision with the ground (see **Figure 5**).

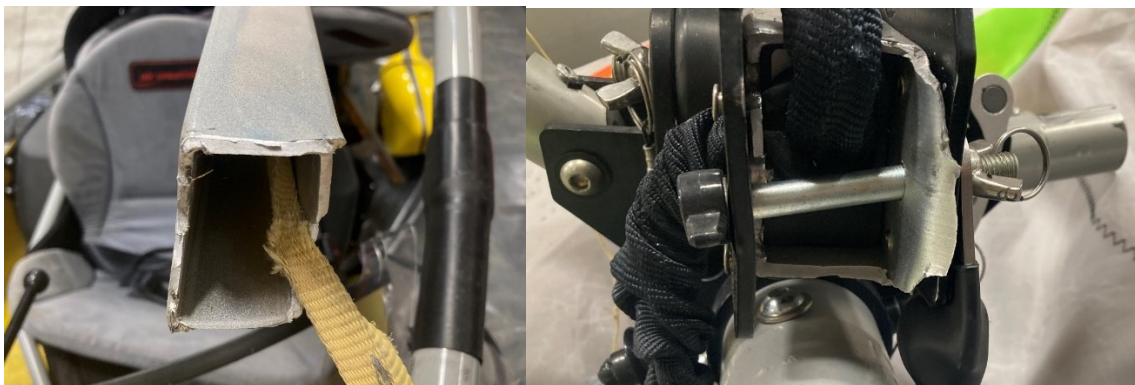


*Figure 5: forward tube in green, original position in red, junction with wing circled in yellow
(source: video from eyewitness' telephone)*

2.3.2 Examination of wing and trike

The microlight trike and wing were transported to the BEA and examined.

All the damage observed on the wing structure and on the trike was of a sudden nature, the result of overloading. Signs of interaction between the control bar and the forward tube indicated an unusual pitch attitude of the aircraft, consistent with a large pitch movement, characteristic of tumbling (see paragraph 2.7).



*Figure 6: fracture face of upper beam: on LH side, trike side with strap, on RH side, wing side
(source: BEA)*

2.3.3 Examination of belts

The female metal buckle of the lap belt was equipped with a locking cam to lock the webbing in place.

The metal buckle on the passenger's belt was correctly assembled, with the locking cam groove turned towards the "window" through which the strap passed (see **Figure 7**).



Figure 7: female metal buckle on the passenger's lap belt (source: BEA)

On the other hand, the metal buckle locking cam on the pilot's lap belt was found positioned in the opposite direction. The absence of rub marks on the cam and the absence of deformation suggest that it had been incorrectly assembled.



Figure 8: female metal buckle of pilot's lap belt (source: BEA)

The metal buckles are produced by Anjou Aéro, model [Steel "349 buckle"](#). This manufacturer proposes a complete lap belt and torso restraint system kit 349 (buckles and straps) complying with standards TSO C22g and TSO C114 applicable for certified aviation.

Air Création uses another supplier for the webbing and carries out the final assembly of the buckles and straps. When designing the trike, Air Création carried out tests on its assembly, to meet the regulatory criteria applicable to microlights in various countries. These tests are detailed in the trike's technical file: with all the straps attached, the manufacturer states that the belts can withstand lateral forces of 380 kg, downward and upward forces of 570 kg, and forward forces of 1,140 kg. Visual inspections are carried out during production.

Some differences between these two types of webbing are visible, notably the thickness of the hem (see **Figure 9**).



Figure 9: detail of webbing and hem: on LH side, Anjou Aéro strap, on RH side, strap assembled on Air Création microlight (source: Anjou Aéro/BEA)

After the accident, Air Création carried out a tensile test on a belt with a strap assembled the wrong way round (see **Figure 10**) on the female side of the buckle. It can be observed that the locking cam turned over, and the strap and buckle separated. A light mark can be seen on the locking cam.



Figure 10: on LH side, correct assembly of strap on metal female buckle, on RH side, reverse assembly (source: BEA/ Air Création)

2.4 Pilot information

The pilot, 58 years old at the time of the accident, held a microlight pilot licence along with the flex-wing rating with passenger carrying privileges obtained in 1992. He also held the fixed-wing rating with passenger carrying privileges since 2019 and the microlight instructor rating since 2021. He had totalled around 20 flight hours with the flex-wing of the accident in the previous 12 months. He had flown 2 hours 30 minutes in the 3 months prior to the accident, including a sightseeing flight of around 1 hour carried out the previous week.

In 2020, he obtained a medical fitness certificate for flying microlights with no restrictions.

The autopsy report mentioned a weight of 109 kg. It indicated crushing in the thorax area. Similar injuries are seen when the control bar of a flex-wing suddenly swings back towards the pilot, during a tumbling phenomenon.

Statements gathered during the investigation indicate that the pilot was in the habit of only fastening the lap straps.

2.5 Passenger's statement

The passenger indicated that the pilot helped her get her equipment on and fasten her belt before the flight. He explained where to put her feet, on the rear foot pedals, and warned her that these were the flight controls for turning. She added that the pilot's shoulder strap, which passes in front of the passenger seat, was not fastened.

She indicated they took off "very gently", gaining altitude "little by little". She described how the pilot then did a few "up and down wing swings, just to get the feel". She explained that the pilot told her it was to show her "how to gain altitude quickly".

Above Vignoles, she suddenly heard what sounded like a loud "rustle of wind". She indicated that the trike suddenly climbed, pitched up and then turned over. She specified that they were then upside down and that the pilot fell out of the microlight. She indicated that she could no longer remember the exact order of the events between hearing the noise and the microlight inverting. She explained that the microlight then turned around itself as it fell, until it collided with the ground.

2.6 Meteorological information

The meteorological conditions estimated by the French met office, Météo-France, at Vignoles and close to Beaune - Challanges aerodrome were as follows:

- visibility greater than 10 km;
- haze with very high cirrus clouds probably above 6,000 m;
- wind between surface and 2,000 ft not exceeding 5 kt, varying in direction from north-east to south-east;
- ground temperature between 16 and 19°C, dew point temperature between 8 and 9°C;
- slight to no turbulence;
- no precipitation.

2.7 Tumbling phenomenon

Tumbling is a well-known risk for flex-wing microlights, and is defined as the microlight tumbling around its pitch axis.

The microlight pilot manual explains that tumbling follows a stall in ascent, with the wing creating a nose-down torque that causes it to rotate, while the trike tilts backwards due to its weight. This is followed by the wing tipping forward and the microlight rolling over onto its back, often leading to a rupture of the wing. An input to recover from a stall that is too rough can contribute to this tipping forward movement.

The most risky situations, to be avoided "absolutely" according to the manual, are stalls at full power, a series of increasingly radical stalls, abrupt power reductions on a steep climb, and stalls obtained by a rapid thrust on the control bar, even with the engine idling. It also recommends that if the pilot enters

a stall in climb, or as soon as he feels he is in a situation conducive to tumbling, that he hold the control bar firmly so that it does not slip out of his hands. When in an actual tumble, the pilot's only chance of salvation is to deploy his airframe parachute.

In the last ten years, the BEA has published two accident reports³ concerning flex-wing microlights in which the tumbling phenomenon is discussed.

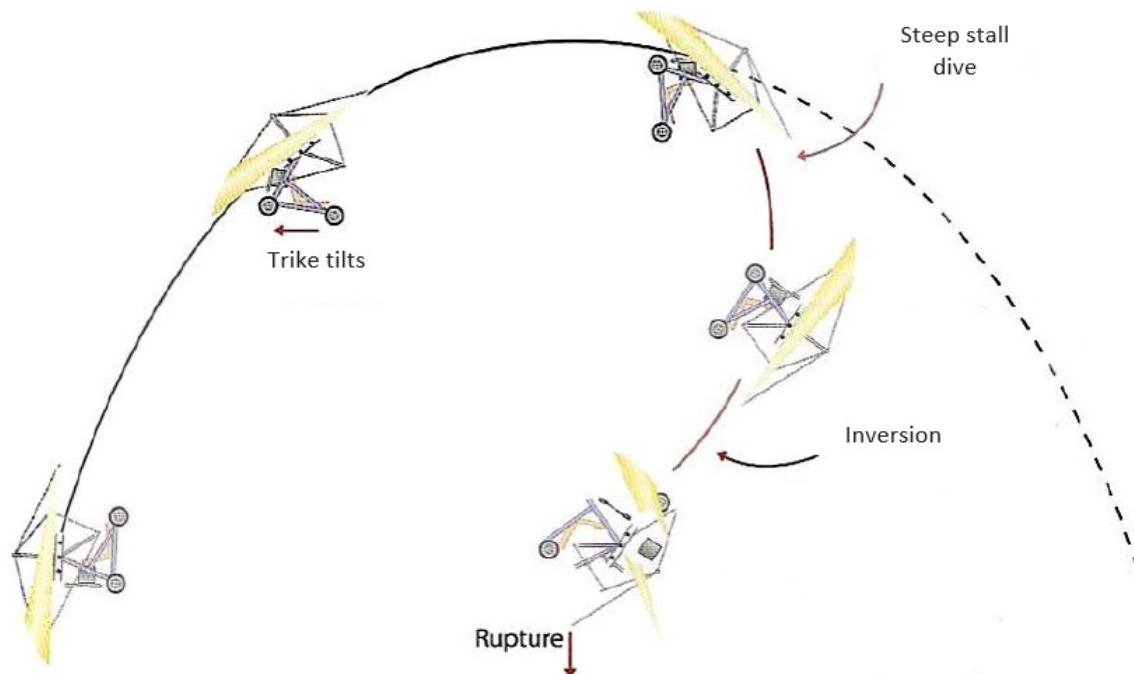


Figure 11: representation of the tumbling phenomenon
(source: microlight pilot manual, annotations BEA)

3 CONCLUSIONS

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

Scenario

The occupants of the flex-wing microlight were carrying out a sightseeing flight. The pilot performed "thrill manoeuvres" that reduced safety margins, including low passes and a pull-out. During the ascent of this pull-out, the flex-wing was flying at low speed and stalled. It then started tumbling. When the flex-wing turned over onto its back, one of the pilot's lap belt straps slipped and was freed from the buckle. The pilot who was no longer fastened in his seat was then ejected. The flex-wing continued its fall until collision with the ground.

The loosening of the strap in the female buckle may have been aided by incorrect assembly of the locking cam, or by the inverted assembly of the strap around this cam. This loosening may also have been facilitated by not using the shoulder strap. Once loosened to its full length, the strap came out of its metal buckle due to the thinness of its hem.

³ [Accident to the DTA Dynamic Feeling 912 identified 77BIQ on 20 August 2022 at Meaux-Esbly](#) and [Accident to the Air Création Skypper identified 69ABU on 31 March 2015 at Belleville Villié-Morgon](#).

Safety lessons

Sight-seeing flights and non-essential manoeuvres for the management of the flight

During sightseeing flights, pilots may be keen to give passengers a memorable flying experience. This can lead to manoeuvres not necessary for the management of the flight, with the risk of flying outside the aircraft's flight envelope.

Non-essential manoeuvres for the management of the flight is a recurrent subject, discussed in particular, in the BEA's [2023 Safety Lessons General Aviation](#) and in the BEA's contribution to the 2018 [Air Safety Report](#) published by the DGAC. Several contributing factors to risk-taking were identified, including wanting to put on a form of show for third parties on the ground, or even for the passenger, or the search for thrills.

Knowledge of microlight flight envelope

The [Safety Bulletin for Microlight Pilots](#) states that the pilot must have good knowledge of the flight envelope of his flex-wing, including the stall angle and speed range, to prevent the risk of tumbling. It also states that the pilot's indiscipline is the primary factor for getting into danger and recommends smooth piloting actions.

Measures taken

Anjou Aéro and Air Création have checked the buckle locking cams of the production batches concerned. On the date of publication of this report, no incorrect assembly of the locking cam had been noted. In addition, Air Création has issued two documents relating to safety belts. One is a service bulletin entitled *KAIR 24001 - Safety belts* addressed to customers concerned by the production batches, asking them to inspect the locking cams. The other is a service note explaining the adjustment and use of safety belts, and including a reminder of the importance of using the shoulder belt.

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