



# Aviation Investigation Final Report

|                                |                                           |                         |             |
|--------------------------------|-------------------------------------------|-------------------------|-------------|
| <b>Location:</b>               | Mokuleia, Hawaii                          | <b>Accident Number:</b> | ANC23FA003  |
| <b>Date &amp; Time:</b>        | November 5, 2022, 08:11 Local             | <b>Registration:</b>    | N444EZ      |
| <b>Aircraft:</b>               | AIRBORNE WINDSPORTS Edge XT-912L          | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         | Aircraft structural failure               | <b>Injuries:</b>        | 2 Fatal     |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Instructional |                         |             |

## Analysis

The flight instructor and student were conducting a local area discovery flight in the weight-shift-control light sport aircraft. An onboard video of the accident flight and ADS-B data revealed that about 28 minutes into the flight the aircraft entered a right turn as the flight instructor stated another way for them to lose altitude was to “do spirals.” The aircraft then continued a tight descending right turn, and the descent rate and airspeed rapidly increased to near the aircraft’s maneuvering limitations for both bank angle and airspeed. As the aircraft rolled out of the right turn and near a wings-level attitude, three of the battens connecting the left-wing fabric to the wing structure released at the trailing edge. The left wing subsequently began to flutter, and the aircraft rapidly rolled left and entered a spiral dive, from which the pilot was unable to recover before impact with terrain.

A Service Instruction issued by the aircraft manufacturer listed three different factors that can cause the hinged batten to unload: 1) damage to the latch from incorrect loading of the fitting, 2) overtension of the batten within the pocket, and 3) operation outside the placarded limitation of the aircraft. While the investigation was not able to determine the state of battens before the accident, a performance study determined that the aircraft banked near its maximum recommended bank angle of 60° and near its maximum maneuvering speed of 73 kts in a right turn during the descent.

The battens that separated during the flight were not recovered and therefore could not be examined. Postaccident examinations of the airframe and engine revealed no additional evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. The parachute pin was removed and the parachute was partially deployed. It is likely

that the parachute was deployed without enough altitude remaining to fully open and arrest the descent.

Ethanol was detected at low levels in the flight instructor's liver and muscle tissue specimens collected during a postmortem examination. Some or all of the small amounts of detected ethanol may have been from postmortem production, and it is unlikely that ethanol effects contributed to the crash.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Structural failure of the wing for undetermined reasons, which resulted in a loss of control.

### Findings

|                 |                                          |
|-----------------|------------------------------------------|
| <b>Aircraft</b> | Flight surfaces (wing) - Failure         |
| <b>Aircraft</b> | (general) - Attain/maintain not possible |

## Factual Information

### History of Flight

|             |                                              |
|-------------|----------------------------------------------|
| Maneuvering | Aircraft structural failure (Defining event) |
|-------------|----------------------------------------------|

On November 5, 2022, about 0811 Hawaii-Aleutian standard time, an Airborne Windsports Edge XT-912-L weight-shift-control light sport aircraft, N444EZ, was substantially damaged when it was involved in an accident near Mokuleia, Hawaii. The flight instructor and initial/introductory flight training student were fatally injured. The aircraft was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the operator, Paradise Air Hang Gliding, the flight was a discovery flight lesson and should have lasted about 30 minutes. When the aircraft did not return, another pilot from the operator went to look for the aircraft, and he eventually spotted the wreckage about 2 miles west of the airport. A witness close to the accident site stated that the engine was running, and the aircraft descended in a nose-low attitude until impact.

According to ADS-B flight track data and video from a Go-Pro camera recovered from the aircraft wreckage, the aircraft taxied onto the runway for takeoff from Dillingham Airfield (HDH) about 0739. The aircraft flew east of the airport, maneuvering at varying altitudes and making a few 360° turns before turning back to the west. The aircraft flew along the coast towards Ka'ena Point, then made a left climbing turn toward HDH. The aircraft reached a maximum altitude of 5,670 ft mean sea level (msl), then descended to an altitude of 1,200 ft, and then climbed to 2,700 ft. The airplane completed a left 360° and continued to climb. After a second left turn the aircraft began a descent from 2,700 ft (see Figures 1 and 2).

As the aircraft entered a right turn at 2,100 ft, the flight instructor told the student another way for them to lose altitude was to "do spirals." The aircraft then entered a tight descending right turn, rolling to near the recommended limit of 60° and increasing airspeed to near the maneuvering limit of 73 kts. As the aircraft rolled out of the right turn to a near wings-level attitude, three battens connecting the wing fabric to the wing structure released at the trailing edge of the left wing (see Figure 3). The left wing subsequently began to flutter, and the aircraft rapidly rolled left and entered an uncontrolled descending spiral dive. The last track data was observed at 0810, as the aircraft descended through 700 ft msl, at 20 knots.



Figure 1. ADS-B flight track for N444EZ, which depicts both outbound and inbound flight tracks.

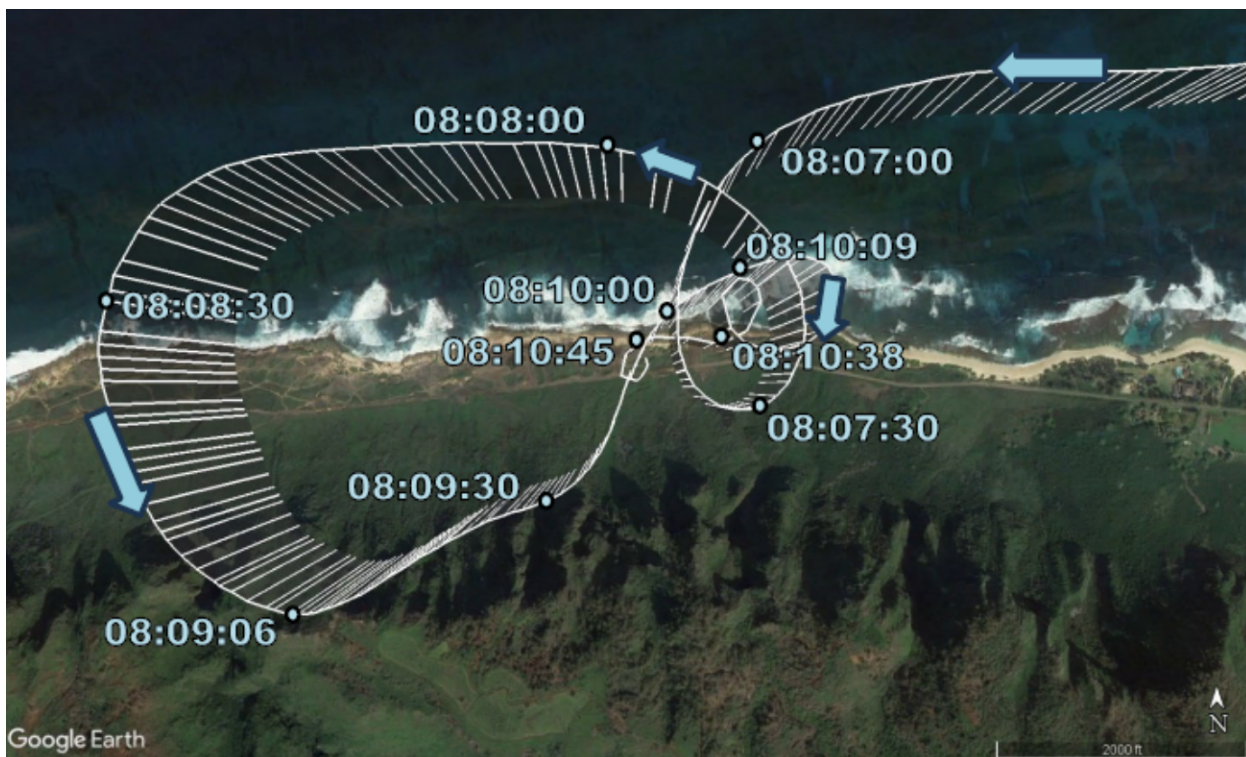


Figure 2. Overhead view of the ADS-B flight track which depicts the last portion of the flight.

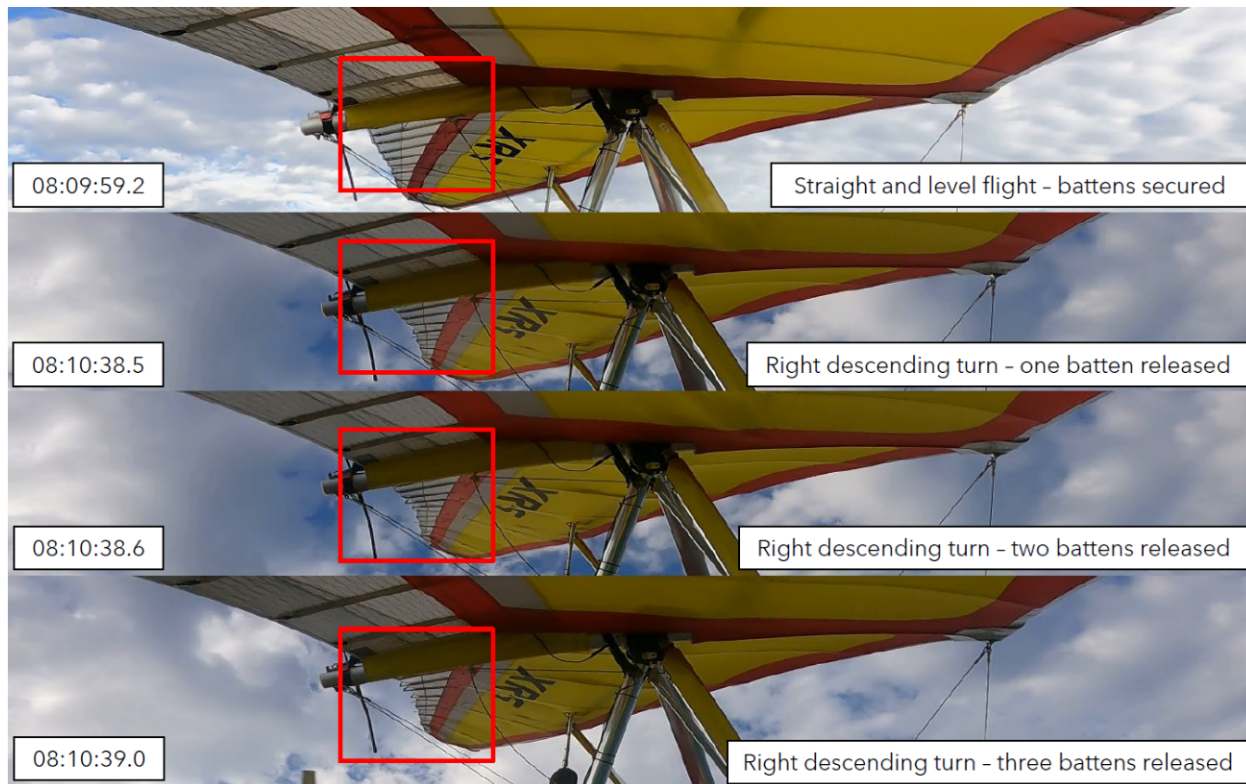


Figure 3. Sequence of four images from the GoPro camera that captured the batten end fittings release.

### Pilot Information

|                                  |                                                                                                                                                                                                                                                     |                                          |                  |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------|
| <b>Certificate:</b>              | Flight instructor                                                                                                                                                                                                                                   | <b>Age:</b>                              | 58, Male         |
| <b>Airplane Rating(s):</b>       | Single-engine land                                                                                                                                                                                                                                  | <b>Seat Occupied:</b>                    | Front            |
| <b>Other Aircraft Rating(s):</b> | None                                                                                                                                                                                                                                                | <b>Restraint Used:</b>                   | Lap only         |
| <b>Instrument Rating(s):</b>     | None                                                                                                                                                                                                                                                | <b>Second Pilot Present:</b>             | No               |
| <b>Instructor Rating(s):</b>     | Sport pilot                                                                                                                                                                                                                                         | <b>Toxicology Performed:</b>             |                  |
| <b>Medical Certification:</b>    | None                                                                                                                                                                                                                                                | <b>Last FAA Medical Exam:</b>            |                  |
| <b>Occupational Pilot:</b>       | Yes                                                                                                                                                                                                                                                 | <b>Last Flight Review or Equivalent:</b> | January 31, 2022 |
| <b>Flight Time:</b>              | (Estimated) 450 hours (Total, all aircraft), 450 hours (Total, this make and model), 430 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft) |                                          |                  |

**Student pilot Information**

|                                  |                                                                     |                                          |          |
|----------------------------------|---------------------------------------------------------------------|------------------------------------------|----------|
| <b>Certificate:</b>              |                                                                     | <b>Age:</b>                              | 17, Male |
| <b>Airplane Rating(s):</b>       |                                                                     | <b>Seat Occupied:</b>                    | Rear     |
| <b>Other Aircraft Rating(s):</b> |                                                                     | <b>Restraint Used:</b>                   | 4-point  |
| <b>Instrument Rating(s):</b>     |                                                                     | <b>Second Pilot Present:</b>             | No       |
| <b>Instructor Rating(s):</b>     |                                                                     | <b>Toxicology Performed:</b>             |          |
| <b>Medical Certification:</b>    |                                                                     | <b>Last FAA Medical Exam:</b>            |          |
| <b>Occupational Pilot:</b>       | No                                                                  | <b>Last Flight Review or Equivalent:</b> |          |
| <b>Flight Time:</b>              | 0 hours (Total, all aircraft), 0 hours (Total, this make and model) |                                          |          |

The flight instructor's total flight experience was provided by the operator. His pilot logbook was not located.

**Aircraft and Owner/Operator Information**

|                                      |                               |                                       |                 |
|--------------------------------------|-------------------------------|---------------------------------------|-----------------|
| <b>Aircraft Make:</b>                | AIRBORNE WINDSPORTS           | <b>Registration:</b>                  | N444EZ          |
| <b>Model/Series:</b>                 | Edge XT-912L                  | <b>Aircraft Category:</b>             | Weight-shift    |
| <b>Year of Manufacture:</b>          | 2016                          | <b>Amateur Built:</b>                 |                 |
| <b>Airworthiness Certificate:</b>    | Special light-sport (Special) | <b>Serial Number:</b>                 | XT-912-0508     |
| <b>Landing Gear Type:</b>            | Tricycle                      | <b>Seats:</b>                         | 2               |
| <b>Date/Type of Last Inspection:</b> | August 11, 2022 100 hour      | <b>Certified Max Gross Wt.:</b>       | 992 lbs         |
| <b>Time Since Last Inspection:</b>   |                               | <b>Engines:</b>                       | 1 Reciprocating |
| <b>Airframe Total Time:</b>          | 1455.2 Hrs                    | <b>Engine Manufacturer:</b>           | Rotax           |
| <b>ELT:</b>                          | Not installed                 | <b>Engine Model/Series:</b>           | 912UL           |
| <b>Registered Owner:</b>             | Marc Hill                     | <b>Rated Power:</b>                   | 80 Horsepower   |
| <b>Operator:</b>                     | NaluVentures LLC              | <b>Operating Certificate(s) Held:</b> | None            |
| <b>Operator Does Business As:</b>    | NaluVentures LLC              | <b>Operator Designator Code:</b>      |                 |

The aircraft was owned by the flight instructor and operated by Paradise Air Hang Gliding. The operator performed most of the airplane's maintenance, including the annual and 100-hour inspections.

### Meteorological Information and Flight Plan

|                                         |                                  |                                                 |                   |
|-----------------------------------------|----------------------------------|-------------------------------------------------|-------------------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                      | Day               |
| <b>Observation Facility, Elevation:</b> | PHHI, 840 ft msl                 | <b>Distance from Accident Site:</b>             | 13 Nautical Miles |
| <b>Observation Time:</b>                | 07:55 Local                      | <b>Direction from Accident Site:</b>            | 117°              |
| <b>Lowest Cloud Condition:</b>          | Scattered / 4900 ft AGL          | <b>Visibility</b>                               | 10 miles          |
| <b>Lowest Ceiling:</b>                  | Broken / 6000 ft AGL             | <b>Visibility (RVR):</b>                        |                   |
| <b>Wind Speed/Gusts:</b>                | 3 knots /                        | <b>Turbulence Type<br/>Forecast/Actual:</b>     | None / None       |
| <b>Wind Direction:</b>                  | 130°                             | <b>Turbulence Severity<br/>Forecast/Actual:</b> | N/A / N/A         |
| <b>Altimeter Setting:</b>               | 30.13 inches Hg                  | <b>Temperature/Dew Point:</b>                   | 25°C / 17°C       |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |                                                 |                   |
| <b>Departure Point:</b>                 | Mokuleia, HI (PHDH)              | <b>Type of Flight Plan Filed:</b>               | None              |
| <b>Destination:</b>                     | Mokuleia, HI (PHDH)              | <b>Type of Clearance:</b>                       | None              |
| <b>Departure Time:</b>                  | 07:40 Local                      | <b>Type of Airspace:</b>                        | Class G           |

A Global Data Assimilation System (GDAS) sounding showed average winds in the area of the accident were equal or greater to 14 knots at or below 5,000 ft.

### Airport Information

|                             |                         |                                  |      |
|-----------------------------|-------------------------|----------------------------------|------|
| <b>Airport:</b>             | DILLINGHAM AIRFIELD HDH | <b>Runway Surface Type:</b>      |      |
| <b>Airport Elevation:</b>   | 14 ft msl               | <b>Runway Surface Condition:</b> | Dry  |
| <b>Runway Used:</b>         |                         | <b>IFR Approach:</b>             | None |
| <b>Runway Length/Width:</b> |                         | <b>VFR Approach/Landing:</b>     | None |

### Wreckage and Impact Information

|                            |         |                             |                      |
|----------------------------|---------|-----------------------------|----------------------|
| <b>Crew Injuries:</b>      | 1 Fatal | <b>Aircraft Damage:</b>     | Substantial          |
| <b>Passenger Injuries:</b> | 1 Fatal | <b>Aircraft Fire:</b>       | None                 |
| <b>Ground Injuries:</b>    |         | <b>Aircraft Explosion:</b>  | None                 |
| <b>Total Injuries:</b>     | 2 Fatal | <b>Latitude, Longitude:</b> | 21.579707,-158.23777 |

Postaccident examination of the fuselage revealed it was intact and impact damaged. Flight control continuity was confirmed from the control inputs to the control surfaces. The wing mast was impact damaged; the mast safety cable remained attached. The safety pin was removed from the parachute and it was partially deployed. The battens that separated during the flight were not recovered and therefore could not be examined.

The engine remained attached to the airframe. The carburetors were separated from the engine and impact damaged. The fuel tank was breached and empty. All three propeller blades remained attached to the hub; the outboard portions of all the blades were impact separated.

### Flight recorders

The operator had installed a GoPro HERO9 digital camera mounted on the right wing pointing toward the pilot and passenger.

### Medical and Pathological Information

The Department of the Medical Examiner, City and County of Honolulu, performed the autopsy of the pilot. According to the autopsy report, the pilot's cause of death was massive blunt force trauma, and the manner of death was accident. The Federal Aviation Administration (FAA) Forensic Sciences Laboratory performed toxicological testing of the postmortem tissue of the

pilot. Ethanol was detected in liver tissue and muscle at 0.012 g/hg and 0.024 g/hg, respectively.

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance. FAA regulation imposes strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater. Alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by extensive traumatic injury.

## Tests and Research

---

The National Transportation Safety Board conducted a performance study for this accident. The study included a review of ADS-B and GoPro video data. The data revealed the aircraft began a steep descending turn near the end of flight. The aircraft rapidly gained speed to near its  $V_a$  while in a bank near its maximum recommended bank angle of 60°. For about 10 seconds of the right turn the aircraft was near the maximum recommended bank angle and  $V_a$ . Shortly after, three left batten hinges released, causing the left wing to flutter before the aircraft eventually entered a left spiral dive.

## Additional Information

---

The manufacturer issued AirBorne Service Instruction SB-019, Issue 1, dated January 9, 2015. The instruction states there are several factors that can cause the hinged batten fittings to unload.

1. Damage to the latch from incorrect unloading of the fitting.
2. Over tension of the batten within the pocket.

### 3. Operation outside the placarded limitation of the aircraft.

The Aircraft Operating Instructions advise not to exceed 60°. Additionally, the maneuvering speed,  $V_a$ , for the aircraft with the XR-S wing is listed as 73 kts.

## Administrative Information

|                                          |                                                                                                         |
|------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Investigator In Charge (IIC):</b>     | Hill, Millicent                                                                                         |
| <b>Additional Participating Persons:</b> | David Welch; FAA/FSDO; Honolulu, HI<br>Denise Sanders; Paradise Air Hang Gliding; Haleiwa, HI           |
| <b>Original Publish Date:</b>            | November 14, 2024                                                                                       |
| <b>Last Revision Date:</b>               |                                                                                                         |
| <b>Investigation Class:</b>              | <a href="#">Class 3</a>                                                                                 |
| <b>Note:</b>                             |                                                                                                         |
| <b>Investigation Docket:</b>             | <a href="https://data.nts.gov/Docket?ProjectID=106253">https://data.nts.gov/Docket?ProjectID=106253</a> |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).