

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC23FA003

ONBOARD IMAGE RECORDER

Group Chair's Factual Report

July 6, 2023

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A. ACCIDENT

Location: Mokuleia, Hawaii
Date: November 5, 2022
Time: About 08:11 Hawaii-Aleutian standard time (HST)
Aircraft: Airborne Windsports Edge XT-912L, Paradise Air Hang Gliding, N444EZ

B. ONBOARD IMAGE RECORDER GROUP

A group was convened on December 6, 2022, and a summary of a video recording recovered from the device was prepared. The group consisted of the following individuals:

Group Chair	Kyle Garner Sr. Aerospace Engineer - Recorder Specialist National Transportation Safety Board (NTSB)
Group Member	Millicent Hill Investigator-In-Charge (IIC) NTSB
Group Member	Seth Cossel Air Safety Investigator Federal Aviation Administration - Honolulu
Group Member	Denise Sanders Founder and Co-owner Paradise Air Hang Gliding

C. FEDERAL CARRIAGE REQUIREMENTS

The aircraft was operating under the provisions of Title 14 *Code of Federal Regulations* Part 91 as an instructional flight and was not required to have a recording device installed.

D. DETAILS OF THE INVESTIGATION

The NTSB Vehicle Recorder Division received the following device:

Device Manufacturer/Model:	GoPro HERO9
Device Serial Number:	C3441325287319
microSD card:	16GB SanDisk Ultra

1.0 Device Description

The GoPro HERO9 is a compact digital camera designed for capturing video and photos in extreme environments. The camera can record up to 5K video at 30 frames per second, as well as lower-quality recording resolutions at higher frame rates.¹ The camera can also capture still images at a resolution of up to 14.75 megapixels.

The camera also features built-in GPS and Wi-Fi capabilities. Data are saved to an internal microSD card.

2.0 Device Condition

The GoPro HERO9 arrived at the Vehicle Recorder Division's laboratory in good condition. A 16GB microSD card was found intact and seated securely in the memory card slot.

3.0 Device Recording Description

The microSD card from the GoPro HERO9 was successfully imaged and searched forensically for traces of corrupted and unplayable video files. In total, the microSD card contained 64 videos, in LRV and MP4 format.²

4.0 Video File Information

All videos and photos contained on the microSD card were reviewed, and video containing the accident flight departure, cruise, and impact was identified.

The accident flight video was recorded at a resolution of 1920x1080 pixels and a frame rate of 29.97 frames per second. An audio track containing audio from the camera's internal microphone and the occupant's boom microphones was also recorded. The camera was mounted on the aircraft's right crossbar, was facing inward toward the aircraft and included a view of both occupants, the engine, the propeller, and portions of the wing.

5.0 Video Timing

The video file contained an embedded GPS-synchronized timestamp in coordinated universal time (UTC). The timestamp in UTC was converted to local time, HST, by subtracting 10 hours. All time referenced in the video summary is HST. The offset from video elapsed time to local time, HST, is shown below:

$$\text{Video local time, HST} = \text{video elapsed time} + 07:38:06.510$$

¹ 5K – a resolution format of 5120 x 2880 pixels.

² LRV = low-resolution video format = a video file format used by GoPro for video previews.

E. SUMMARY OF EVENTS

The recording began at approximately 07:38 HST and lasted 32 minutes and 46 seconds. The weather was partly cloudy with no restrictions on visibility during the accident flight. The light sport aircraft (LSA) was equipped with a ballistic parachute; however, the deployment of the parachute was not captured in the video.

When the video began, the aircraft was stationary on the ramp at Dillingham Airfield (PHDH), Mokuleia, Hawaii. A summary of pertinent events on the accident flight recording is provided in Table 1.

Table 1. Summary of events from the accident flight recording.

Time, HST	Observation
07:38:07	<i>[Start of accident flight video]</i> The camera was mounted on the LSA's right crossbar. The LSA was on the ground at PHDH and the engine was not started. The instructor was in the front seat and the student was in the rear seat. The LSA was equipped with dual controls: a control bar for the instructor and a D-bar for the student. The instructor and student were both wearing helmets with visors.
07:38:41	The instructor started the engine.
07:38:49	The LSA began to taxi to the departure runway at PHDH. While taxiing, the instructor introduced features of the LSA to the student. The student asked about stalls and the instructor demonstrated the movement of the control bar.
07:39:09	The instructor made a radio call and indicated they would depart runway 8 and be traveling eastbound after takeoff.
07:40:52	The LSA began its takeoff roll on runway 8. The instructor explained the proper takeoff procedure to the student.
07:41:21	The instructor asked the student to put his hands on the D-bar. The instructor then demonstrated the technique for trimmed flight.

Time, HST	Observation
07:41:46	The instructor demonstrated turns and climbs.
07:42:12	The instructor explained to the student that maintaining a light grip on the D-bar was necessary to "feel what is going on in the air". The student maintained a tight grip on the D-bar and the LSA began to slowly lose altitude.
07:42:37	The instructor asked the student to let go of the D-bar and the instructor corrected the student's pitch reversal.
07:46:14	The instructor discussed winds coming over the mountains from the southeast. The instructor demonstrated the technique for flying through mildly turbulent air.
07:48:29	After completing a right turn, the instructor stated they would climb to a higher altitude.
07:49:16	The student asked if they could fly through a cloud. The instructor responded that they had to maintain visual flight rules and could not fly through a cloud, however, they could fly around a cloud. The LSA continued to travel northeast away from the airfield and climb to a higher altitude.
07:49:16 to 07:58:07	The LSA continued to climb and travel toward the northeast.
07:58:26	The instructor stated that they were at an altitude of 5,000 feet.
07:58:27	The LSA started a 180-degree turn to travel toward the southwest.
07:59:29	The instructor commented they were at an altitude of 5,500 feet.

Time, HST	Observation
07:59:39	The instructor reduced engine power and began to glide back toward the airfield. The position of the aircraft was slightly offshore.
07:59:55	The instructor reminded the student to not maintain a tight grip or pull on the D-bar.
08:01:20	The instructor made a radio call indicating they were at an altitude of 4,000 feet and "feet wet over cement city". ³
08:03:58	The instructor made a radio call indicating they were at an altitude of 2,500 feet abeam the drop zone at PHDH and headed westbound.
08:06:05	Sound similar to an increase in engine power was noted.
08:06:22	Sound similar to a further increase in engine power was noted.
08:06:56	The LSA was still over the water. The LSA started a left turn toward the mountains and then began to climb in altitude.
08:07:34	The LSA continued to turn to the left, making a 360-degree turn away from the mountains.
08:07:56	The LSA was parallel with the shoreline over the water. The LSA continued to climb.
08:08:16	The LSA began a left 180-degree turn back toward the airfield.
08:09:04	Sound similar to a decrease in engine power was noted.

³ Per the operator, this was a common phrase used by the instructor and other pilots to indicate a position over the water abeam apartment buildings located on the coast.

Time, HST	Observation
08:10:09	The instructor stated, "so another way we can kinda lose altitude as well- if we got- is when you do turns. so you can kinda do spirals they call them. pull the bar in slightly do a 360 degree turn. so now we're- we sort of losing altitude. we're losing about twelve-- fifteen hundred feet a minute altitude." The instructor pulled the control bar towards him and to the left and the LSA entered a right-banked descending turn.
08:10:38	The LSA remained in a right-banked descending turn. Flutter in the trailing edge of the left wing at midspan was noted. As the LSA continued the right-banked descending turn, three of the batten end fittings at the midspan of the left-wing released, as shown in Figure 1 below.
08:10:38 to 08:10:49	With the batten end fittings released, the LSA started to bank sharply to the left. The LSA appeared to be at the same altitude as the peak of the adjacent mountain. The instructor stated, "let go of the bar. let go of the bar. let go of the bar." The student let go of the D-bar. The instructor stated, "all right good job". The left descending bank rapidly increased to a steep descending left turn. Flutter in the trailing edge of the left wing at midspan continued. The three batten end fittings were still released, as described above. The instructor moved the control bar toward him.
08:10:50	The LSA entered a left spiral dive.
08:10:52	The video ended before impact.⁴ <i>[End of accident flight video]</i>

Submitted by:

Kyle Garner
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⁴ After video is captured by the GoPro, there is a slight delay as the video is written to the internal memory device. If a power interruption or sudden impact occurs during this time, it is likely that the video data not written to the internal memory device will be lost and unrecoverable.

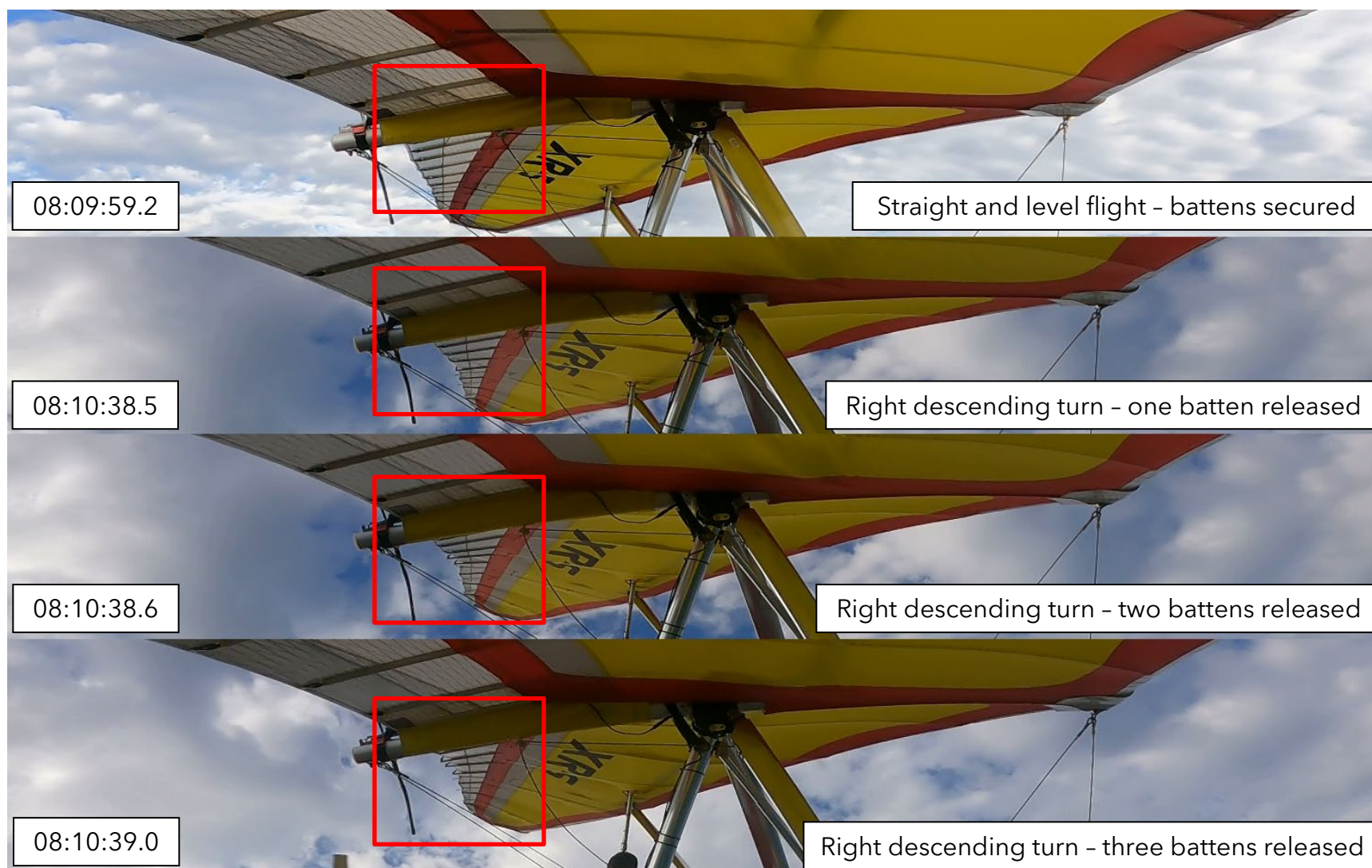


Figure 1. Progression of batten end fittings releasing from 08:09:59 to 08:10:39 HST.