

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

November 9, 2017

Onboard Image Recorder

Specialist's Factual Report
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1. EVENT

Location:	Chelan, Washington
Date:	July 1, 2017
Aircraft:	North Wing Sport, N492XB
Operator:	Private
NTSB Number:	WPR17FA139

2. GROUP

A group was not convened.

3. SUMMARY

On July 1, 2017 about 0730 Pacific daylight time, a North Wing Sport, N492XB, was destroyed when it impacted mountainous terrain near Chelan, Washington. The pilot who was the registered owner of the airplane, and a pilot-rated passenger sustained fatal injuries. The flight was operated under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan had been filed. The local flight originated from Lake Chelan Airport (S10), Chelan, Washington, about 0630.

4. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received a Garmin VIRB:

Recorder Manufacturer/Model:	Garmin VIRB Elite
Recorder Serial Number:	3AP091290

Recorder Manufacturer/Model:	Unidentified Android Device
Recorder Serial Number:	Unknown

Recorder Manufacturer/Model:	Samsung Tablet
Recorder Serial Number:	R52H806KP5EJ

In agreement with the Investigator-in-Charge (IIC), the Unidentified Android Device and Samsung Tablet were not repaired or recovered, as it was determined they would not further inform the investigation.

4.1. Recorder Description

The Garmin VIRB Elite is a point-of-view camera capable of recording high-definition video and audio, as well as synchronized position information from its embedded GPS receiver. Optionally, the device can wirelessly connect to external sensors, such as a heart rate monitor. Information is recorded to a removable microSD card.

4.2. Recorder Damage

Upon arrival at the NTSB Vehicle Recorder Division, it was evident that the Garmin VIRB Elite had suffered minor impact damage, as shown in figure 1. A 4 GB removable microSD Card was intact in the device, as shown in the bottom view from figure 1.

Figure 1. Garmin VIRB Elite as received (top view on top, bottom view on bottom).



4.3. File Recovery

The file system on the microSD card only contained one “.fit” file, but no video files.¹ A binary image of the microSD card was made and file patterns indicative of movie files or fragments (specifically, H.264 format) were identified. Each fragment was repaired using commercial software and various exemplar, uncorrupted VIRB formats (varying resolution and frame rate). The accident flight audio and video were recovered at 1280 x 720 resolution and 30 frames per second. The recovery process resulted in video/audio that was out of alignment by less than 2 seconds, and video that was missing about 15% of the frames per second.

4.4. Timing and Correlation

Times in this report are reported as elapsed time from the start of the recovered video, expressed as mm:ss; where *mm* are minutes and *ss* are seconds.

4.5. Summary of Recording Contents

In agreement with the IIC, a video group did not convene and only this summary report was prepared.

Weather conditions were high cirrus clouds and visibility better than 20 miles. Audio was consistent with being recorded from pilot headsets connected via an intercom to the VIRB device.

When the video began, the aircraft was on final approach to the S10 airport. Pilot 1 was offering advice on power and glidepath, and Pilot 2 was speaking in a manner consistent with him flying the aircraft.

By 02:15, the aircraft was on a short final to runway 20 at S10.

At 02:25, as the aircraft was just about to touchdown on the threshold of runway 20, Pilot 1 said “nope, there’s an antelope on the runway,” and laughed. The aircraft’s engine sound increased, and the aircraft began to climb (Pilot 1’s statement was consistent with a go-around training scenario).

At 02:40, Pilot 1 directed Pilot 2 to re-enter the pattern. Pilot 1 suggested Pilot 2 make a radio call, and Pilot 2 reported on the radio he was remaining in the traffic pattern.

During the pattern, Pilot 1 offered advice on the altitude and distance from the runway. Pilot 2 reported on the radio he was downwind at S10.

At 04:00, Pilot 1 told Pilot 2 his pattern should be closer to the runway. As the airplane banked left, Pilot 2 asked, “you have controls?” to which Pilot 1 responded, “yeah, yeah I have the aircraft.” Pilot 1 continued to explain pattern distances and visual cues. Pilot 1 pointed out the “third mark right there” on the

¹ In agreement with the IIC, the “.fit” file was not further investigated.

runway, and Pilot 2 acknowledged. Pilot 1 said, "okay, your engine's off. So we gotta make that third mark" (engine sound continued at lower level).

At 04:24, Pilot 2 said, "okay I have controls." Pilot 1 acknowledged saying, "you can go ahead and do it." Pilot 1 went on to tell Pilot 2 about the glide capability of the plane, concluding, "so I'll show you here on the first one." Pilot 2 then said, "you have the controls." Pilot 1 responded, "yeap, I have the aircraft." At this point the aircraft was turning left base.

Pilot 1 continued to talk and fly as the aircraft approached the runway and touched down on the third "mark" (runway centerline marker) at 5:15. The aircraft then took off.

On the climb out, at 05:30, Pilot 1 said, "so you have the aircraft." Pilot 2 responded, "I have the aircraft." Pilot 1 continued to talk and asked Pilot 2 to repeat the engine failure maneuver. Pilot 1 continued to provide flying technique pointers to Pilot 2.

At 07:06, while on downwind, Pilot 1 said, "okay foot off the throttle...you gotta make that third mark." Pilot 2 acknowledged.

At 07:57, Pilot 2 touched down on the third "mark" (runway centerline marker) and then took off again.

At 08:10, as they aircraft climbed out, Pilot 1 said, "the only other thing that we gotta do is just a diversion." Pilot 2 responded, "we did the diversion already," expanding that the Antelope on the runway was the diversion. Pilot 1 explained a diversion was going to a different place than one's intended destination.

At 08:28, Pilot 1 said, "so basically you passed the test. And ah so if you want to just go fly around some." Pilot 2 said he wanted to do more flying and "check the wing out." Pilot 1 reiterated Pilot 2 had passed the test which was "basically over...you're a Sport Pilot." Pilot 2 thanked Pilot 1. As the aircraft continued to climb away from the airport, the pilots discussed Pilot 2's performance and the turbulent weather conditions. The pilots further discussed finding areas where there was less turbulence.

By 10:00, the aircraft was flying away from S10 airport and Pilot 2 said, "okay. So I let off the wing. Flies nice and straight. I push out and it comes right back" (the nose moved up and back down to level). Pilot 1 commented, "pull back and let go and it goes right back" (the nose moved down and back up to level). Pilot 2 commented, "it goes right back. Almost puts you in a stall." At the time, the aircraft was flying over a river valley, as shown in figure 2.

Figure 2. Recorded image between 10:00 and 10:35.



As they continued to fly along the river at 10:35, Pilot 2 said he wanted to get farther away so he could do turns and feel the reaction of the wing.

At 10:45, Pilot 2 initiated a conversation about aircraft equipment that continued between the two for the next minute. Pilot 2 concluded this conversation saying he wanted to get a little farther from the pattern.

At 11:45, Pilot 2 initiated a conversation about some real estate that was for sale below the aircraft until about 12:15.

At 12:20, Pilot 2 asked, “so you have these for?” Pilot 1 responded, “oh heavy ah turning. Heavy turning. If I want to turn really steep and then roll out of it...bankin’ and crankin’ near the ground. Close low-level stuff. It gives me more leverage. And that’s the only time I ever use it really. But it’s more ergonomic for the feel of your hand.” The pilots then talked about a “shared” airport they were flying over.

At 13:00, Pilot 2 once again initiated a conversation about aircraft handling qualities as he turned the aircraft right. Pilot 1 commented on the turn, and overbanking tendencies above 45 degrees of bank. At 13:47, the aircraft had turned 360 degrees. Pilot 1 then said they should turn left and the aircraft began to turn left.

During the turn, Pilot 2 commented on the aircraft handling qualities. Pilot 1 offered explanations for the handling qualities while the aircraft turned. At 14:18, after 180 degrees of turn (back towards the S10 airport), the aircraft turn stopped and the

wings leveled. As the pilots continued to discuss aircraft handling qualities in a turn, the aircraft banked left and continued to turn left.

At 14:35, the aircraft rolled level and the turn stopped, as the aircraft headed away from the S10 airport. Pilot 2 then initiated a conversation about the aircraft's winglets. Pilot 1 then explained and demonstrated yaw, as the aircraft nose yawed left and right. Pilot 2 asked how Pilot 1 was doing that. And then Pilot 2 said he wanted to try, and the nose yawed left and right. Pilot 2 compared the handling to his own "trike."

At 16:08, the aircraft turned left as the pilots continued to talk about aircraft handling qualities. As Pilot 1 talked, the nose moved up and down (as if the pitch bar was being exercised back and forth). As this conversation ended at 16:37, the aircraft had turned towards the S10 airport, and continued to turn left.

At 16:45, the pilots talked about other traffic on the radio inbound to S10. Pilot 1 talked about the automated AWOS.² Pilot 1 then spoke on the radio and advised the inbound aircraft of the AWOS frequency. Pilot 1 directed Pilot 2 to change the aircraft's radio frequency to "950" (the AWOS frequency).

At 18:06, the AWOS began to play in response to three microphone clicks. The AWOS reported wind calm, altimeter 29.91. At this time, the aircraft was heading away from S10 airport as shown in figure 3.

Figure 3. Recorded image at 18:06.



² AWOS means Automated Weather Observing System.

At 18:25, Pilot 1 directed Pilot 2 to change the radio frequency back to “90,” and Pilot 2 acknowledged.

At 18:38, Pilot 2 mentioned he had seen wolves in this area. Pilot 1 acknowledged.

At 18:43, Pilot 1 said, “come out of the power.” The engine sound decreased.

At 18:45, Pilot 1 said, “you given’ me nose bleed.” Both pilots laughed, as the plane banked left, towards the river.

At 18:50, Pilot 1 said, “I like low level stuff.”

At 18:51, Pilot 1 asked, “Have anybody showed you the spiral dive yet?” Pilot 2 responded, “Yes. We went over it the other day.”

At 18:57, Pilot 1 confirmed, “@ showed you that.” Pilot 2 responded, “Yes.”³

At 19:00, Pilot 1 asked, “So did he show you the stall...” (Pilot 2 said something unintelligible), as Pilot 1 continued, “in a turn? In a spiral?” Pilot 2 responded, “Yes.”

At 19:05, Pilot 1 said (as the plane banked right), “Okay so in other words if we turn it steep...like so.” Figure 4 shows the aircraft attitude at 19:09.

Figure 4. Recorded image at 19:09.



³ @ is a redaction placeholder for a person’s name.

At 19:10, Pilot 1 said, “and shove out on the bar.” At this time, the rate of turn increased. Pilot 1 continued, “and stall it.” Figure 5 shows the aircraft attitude at 19:12.

Figure 5. Recorded image at 19:12.



At 19:13, Pilot 1 said, "There's a stall. Right there." Pilot 2 responded with surprise and an expletive. Figure 6 shows the aircraft attitude and position at 19:16.

Figure 6. Recorded image at 19:16.



At 19:16, Pilot 1 continued, "In the spiral dive." Pilot 2 exclaimed, "Holy # dude."⁴

By 19:20, the aircraft had rotated nearly 360 degrees, was rotating rapidly right, and was pointing vertically down."

⁴ # is a redaction placeholder for an expletive.

At 19:22, Pilot 2 repeated his prior exclamation louder. At the time the aircraft was rotating right and straight down, as shown in figure 7.

Figure 7. Recorded image at 19:22.



At 19:23, Pilot 1 exclaimed “back.” The video ended about the time the aircraft impacted the ground in a right rotation—after about a total of two and one half rotations from entry into the maneuver at 19:05—as the pilots grunted/moaned.⁵

⁵ Because the video was recovered and frames were possibly lost, the total rotations may have been as high as 3 to 3 and one half.