

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA23FA163

ONBOARD IMAGE & GPS DEVICE

Specialist's Factual Report

September 7, 2023

A. ACCIDENT

Location: Gainesville, Georgia
Date: March 25, 2023
Time: 13:52 eastern daylight time (EDT)
Gyroplane: Preiss AR-1, N47AR

B. ONBOARD IMAGE & GPS DEVICE SPECIALIST

Specialist: Sean Payne
Branch Chief - Vehicle Recorder Division
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

In agreement with the Investigator-In-Charge, an Onboard Image & GPS device group was not convened and a summary was prepared.

The NTSB Vehicle Recorder Division received the following devices:

Device Manufacturer/Model: GoPro HERO 7 Black
Device Serial Number: C3281327031459

Device Manufacturer/Model: Adventure Pilot iFly GPS
Recorder Serial Number: ZZ21040187

1.0 Device Condition

Both devices were in good condition and the data were downloaded using the manufacturer's procedure.

Figure 1 is a photo of the GoPro HERO 7 Black. Figure 2 is a photo of the Adventure Pilot iFly GPS.



Figure 1. Photo of GoPro Hero 7 Black.



Figure 2. Photo of iFly GPS.

1.1 Device Description

GoPro HERO 7 Black

The GoPro HERO is a compact, lightweight, POV digital camera enclosed in a ruggedized housing that allows the camera to be mounted in a variety of positions using an array of supported accessories.¹ Depending on the model, the camera can support higher than 4K HD² at 60 frames per second (fps) as well as other lower quality recording resolutions at higher frame rates.³ The camera can be set to record still images simultaneously or independently of a video stream at a resolution of up to 12 megapixels.⁴ The camera supports recording to micro SD cards.⁵ A built in Wi-Fi module allows users to connect to the camera either via an accessory remote control or via a smart phone app that permits camera control and image transfer.⁶

Adventure Pilot iFly GPS

The Adventure Pilot iFly GPS is a portable Global Positioning System (GPS). When a removable SD card is installed, it can record historical track information.

1.2 Device Recording Description

GoPro HERO 7 Black

A number of other .MP4 recordings were present on the microSD card that captured the accident pilot operating the accident gyroplane. The data range for these recordings were from July 5, 2022, to July 29, 2022. During this date range, there were 24 .MP4 files recorded. The recordings showed the gyroplane operating in the vicinity of Lee Gilmer Memorial Airport (KGVF), Gainesville, Georgia. Details of the recordings, including the accident and recordings of previous flights, are discussed below in section 3.0.

¹ POV - Point of View Shot - A photography technique that records the character's viewpoint from a singular camera location mounted in a manner that represents the character's field of view.

² HD - High Definition - A resolution generally consisting of greater than 480 lines of horizontal resolution.

³ 4K - A resolution format of 3840 x 2160 pixels.

⁴ Megapixel - (MP) - A count of a million pixels in an image or used to express the number of individual image sensor elements on a digital camera image sensor.

⁵ SD - Secure Digital - a standard for nonvolatile memory card used in portable devices.

⁶ Wi-Fi - A local area wireless technology that allows electronic devices to exchange data over a network.

Adventure Pilot iFly GPS

The Adventure Pilot iFly GPS device recorded a number of tracklog files. These files were converted to .CSV format using a COTS software tool.⁷ Only the accident flight and previous flight were plotted on Google Earth. These figures appear at the end section 3.0 where they are discussed in further detail.

2.0 Timing and Correlation

Timing for the summary of the GoPro HERO 7 Black summary is provided in video elapsed time. The format given is MM:SS, where MM is the number of elapsed minutes and SS is the number of elapsed seconds, both measured from the beginning of the accident recording.

The time in the figures for the iFly GPS are presented in the unaltered recorded GPS time which appeared to be in alignment with the local time of the accident, eastern daylight time (EDT).

3.0 Summary of Recording Contents

GoPro

Onboard Recordings Previous to the Accident Flight

In one early recording, an object consistent with the GoPro Wi-Fi remote was present on a lanyard around the accident pilot's neck. The start and stop of the .MP4 files were consistent with the accident pilot operating the GoPro remotely using this device.

All of the .MP4 files previous to the accident flight were reviewed. About 23 of the files showed gyroplane operations. Some of these files started on the ground, and others started while the gyroplane was already in flight. None of the .MP4 files revealed any obviously anomalous operations. Additionally, none of the files captured any indication of trouble with the gyroplane's engine, no maintenance activity was recorded, and no verbal comments from the pilot were recorded.

In the earlier files, the gyroplane was operating with a canopy structure. In the later files (closer in date to the accident, and including the accident flight), the gyroplane did not have the canopy structure present and was operating with an open cockpit.

⁷ Commercial off the shelf.

Four .JPG still photos were also captured. The metadata indicated the data of capture of these photos were March 19, 2023. The four photos appeared to have been accidentally captured. The photos showed the accident gyroplane inside a storage location. No tools, or maintenance related objects were visible in these photos.

Onboard Recordings Made on the Day of the Accident

Metadata indicated the recordings were made on March 25, 2023. The GoPro appeared to be mounted near the right side of the forward windscreen of the gyroplane. The GoPro provided a view externally facing (forward) from the cockpit region. These files are discussed below in accordance with their respective filenames.

File GX011551.MP4 - Duration 1 minute, 38 seconds

The recording showed the gyroplane operating over a populated area. Engine, rotor system, and wind noise were steady. Around 1 minute elapsed, the gyroplane turned slightly right toward a lake (Lake Lanier, Gainesville, GA). Engine noise appeared reduced, consistent with a reduction in power. Rotor noise was audible as steady state. The video ended at 1 minute and 38 seconds elapsed, the gyroplane was in a slight right bank near the lake's edge. Nothing anomalous was noted about the recording.

File GX011552.MP4 - Duration 5 minute, 0 seconds

The file was not a direct continuation of the last file. The file began with the gyroplane in a slightly different location near the lake (near Clark's Bridge Park, Gainesville, GA). The gyroplane transited from being over the lake toward a more suburban environment (North of Clark's Bridge Park). Engine, rotor, and wind noise were steady, and nothing anomalous about the recording was noted.

File GX011553.MP4 - Duration 0 minutes, 50 seconds

The file was not a direct continuation of the last file. The file began as the gyroplane was approaching a hill. The gyroplane made a right turn near the vicinity of the hill and passed over an area of clear vegetation and unpaved vehicular trails. Engine, rotor and wind noise were steady, and nothing anomalous about the recording was noted.

File GX011554.MP4 - Duration 11 minutes, 48 seconds

The file was not a direct continuation of the last file. The gyroplane was operating in an area that had both suburban homes with large lots and farmland. The gyroplane was maneuvering at the start of the recording over this area. For the first

approximate 4 minutes and 40 seconds of the recording, engine, rotor, and wind noise were steady, and nothing anomalous about the recording was noted.

Around 4 minutes and 40 seconds elapsed time, the engine noise appeared to surge three times. By 4 minutes and 50 seconds elapsed, the engine noise appeared to significantly lessen. Steady rotor noise was still audible. Figure 3 is a screenshot from the GoPro at this time which shows the terrain ahead and partially below the gyroplane.

Around 4 minutes and 50 seconds elapsed, the audio could be characterized as being primarily wind and rotor noise. At this time, the gyroplane appeared to pitch down and begin a steady, controlled descent.⁸ The gyroplane was on a heading toward suburban homes with large lots. These lots were partially cleared and partially trees. There was a road through the lots which appeared to contain powerlines along the road.

Around 5 minutes and 30, the gyroplane changed heading to the right and continued in a steady, controlled descent. Figure 4 is a screen capture at 5 minutes and 41 seconds elapsed showing the terrain in front of the gyroplane and partially below after it changed heading to the right.

Nine seconds later, at 5 minutes and 50 seconds elapsed time, the gyroplane made an additional right bank. The gyroplane was still in a controlled descent. Figure 5 is a screen capture at this time showing the gyroplane appearing to line up with a cleared grass upsloping lot. The accident location is indicated with a yellow arrow.

The gyroplane continued a descent straight ahead toward the up-sloping lot. Figure 6 is a screen capture at 5 minutes and 59 seconds elapsed time. A yellow arrow indicates the approximate wreckage location. A red arrow indicates a utility pole. Power lines were not immediately apparent in the camera's image.⁹

At 6 minutes and 2 seconds elapsed time, the gyroplane impacted the powerlines. There were no visible evasive maneuvers prior to the gyroplane striking the powerlines. The impact with the powerlines appeared to last for approximately 2 seconds. There was a sound similar to a metallic cable stretch (plucked cable under tension) at this time. The gyroplane's motion can be described as an initial rapid pitch up. Around 6 minutes and 4 seconds elapsed time, a sound similar to a wire breaking was noted, the gyroplane's rapidly pitched nose down and began a rapid roll to the left. Though it is difficult to quantify the gyroplane's motion due to the camera's digital stabilization scheme, impact appeared to be nose low and approximately 90 degrees left roll. The area around the camera's image at this time was cut grass. Upon impact at approximately 6 minutes and 6 seconds elapsed, the camera

⁸ This camera utilizes a digital stabilization scheme which dampens camera movement, and may not accurately represent the rate of pitch or roll change of the gyroplane.

⁹ What is visible by the human eye vs the camera was not quantified.

appeared to tumble and came to rest. There were no sounds consistent with being from the pilot after impact. This recording ended at 11 minutes and 48 seconds elapsed time.

A new recording began which appeared to be a continuation of the last recording. Around 8 minutes elapsed time emergency sirens were noted. Around 11 minutes and 45 seconds into this recording, a voice, presumably from a first responder, or a bystander was audible. The voice stated, "hello, hello."

An additional new recording began which appeared to be a continuation of the last recording. Additional sirens were heard rapidly approaching the wreckage location. Multiple voices were heard, the conversations weren't transcribed. One voice stated, "I'm just a neighbor," and, "it appears to be leaking fuel." Another voice stated, "sir, can you hear me?" The voice consistent with that of the self-identified neighbor stated, "when he came down it was two big booms," and, "he obviously hit some powerlines," and, "snapped - sounded like a rifle shot." There were some additional comments related to leaking fuel and attempts to extricate the pilot. The recording ended at 3 minutes and 52 seconds elapsed.

Adventure Pilot iFly GPS Data

Figure 7 is a Google Earth overlay of the GPS data associated with the flight previous to the accident. Note that all Google Earth overlays may not accurately depict the weather and lighting conditions present at the time the data was logged.

Figure 8 is a Google Earth overlay of the GPS data associated with all the recorded tracklog points recorded during the accident flight.

Figure 9 is a Google Earth overlay of the GPS data associated with the departure portion of the accident flight.

Figure 10 is a Google Earth overlay of the GPS data associated with the maneuvers in the vicinity of the accident flight.

Figure 11 is a Google Earth overlay of the GPS data associated with the final descent phase of the accident flight.

Figure 12 is a Google Earth overlay of the GPS data associated with tracklog points recorded near the wreckage location.

All data used to create these plots are appended to this report as Attachment 1. The data is provided in comma separated values (.CSV) format.



Figure 3. A screen capture taken at 4 minutes and fifty seconds elapsed time. This was the time when the engine, rotor and wind noise lessened significantly.



Figure 4. A screen capture at 5 minutes and 41 seconds elapsed time showing the terrain in front and partially below the gyroplane after it changed heading to the right.



Figure 5. A screen capture at 5 minutes and 52 seconds elapsed time. The accident site is indicated with a yellow arrow (approximated).



Figure 6. A screen capture at 5 minutes and 59 seconds elapsed time showing the gyroplane's final approach to the upsloping lot. The accident site is indicated with a yellow arrow (approximated). A utility pole is indicated with a red arrow.

Submitted by:

Sean Payne
Branch Chief - Vehicle Recorder Division



Figure 7. GPS tracklog data associated with the flight previous to the accident.

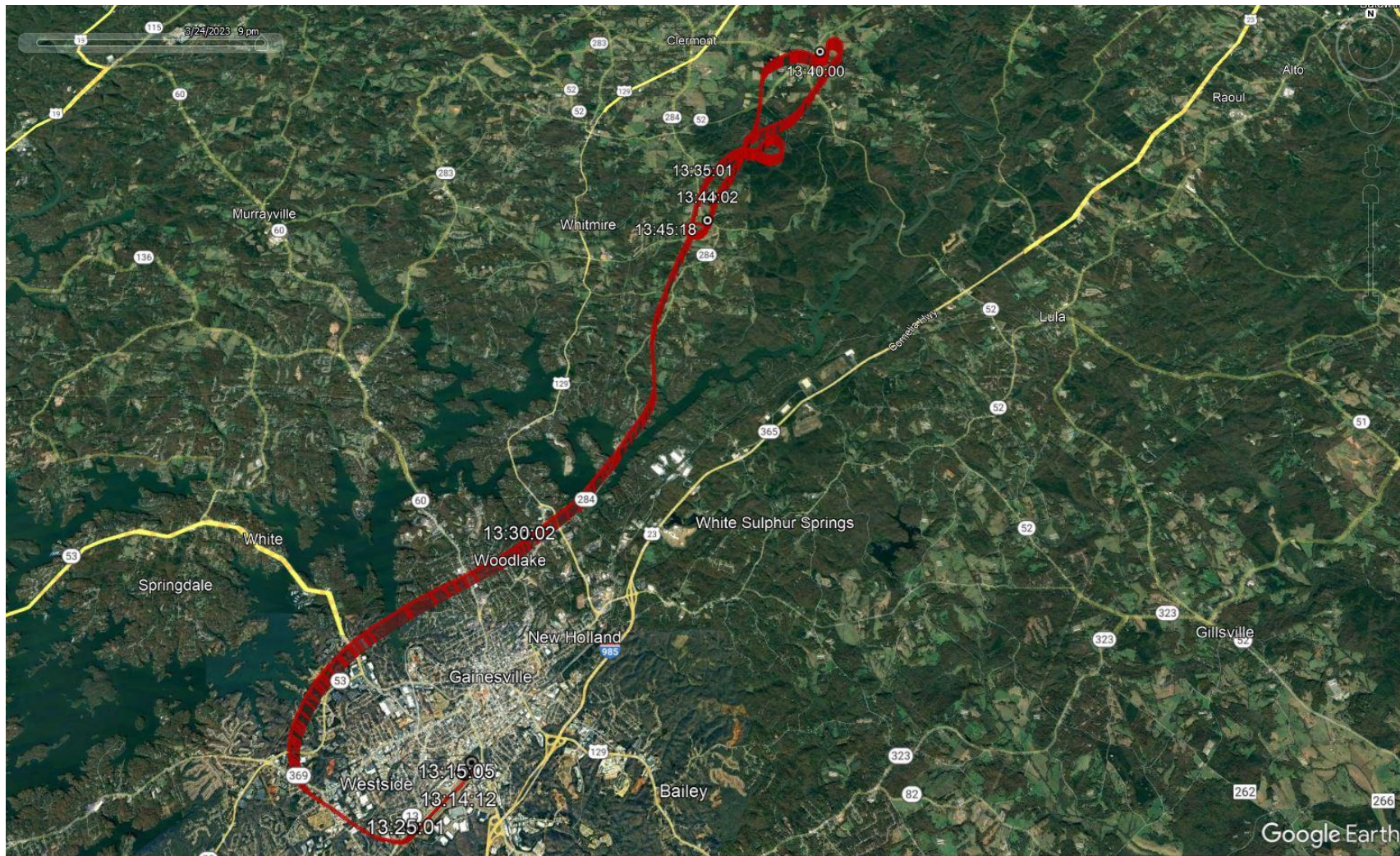


Figure 8. GPS tracklog data associated with all the GPS tracklog points for the entire accident flight recording.



Figure 9. GPS tracklog data associated with the departure portion of the accident flight.

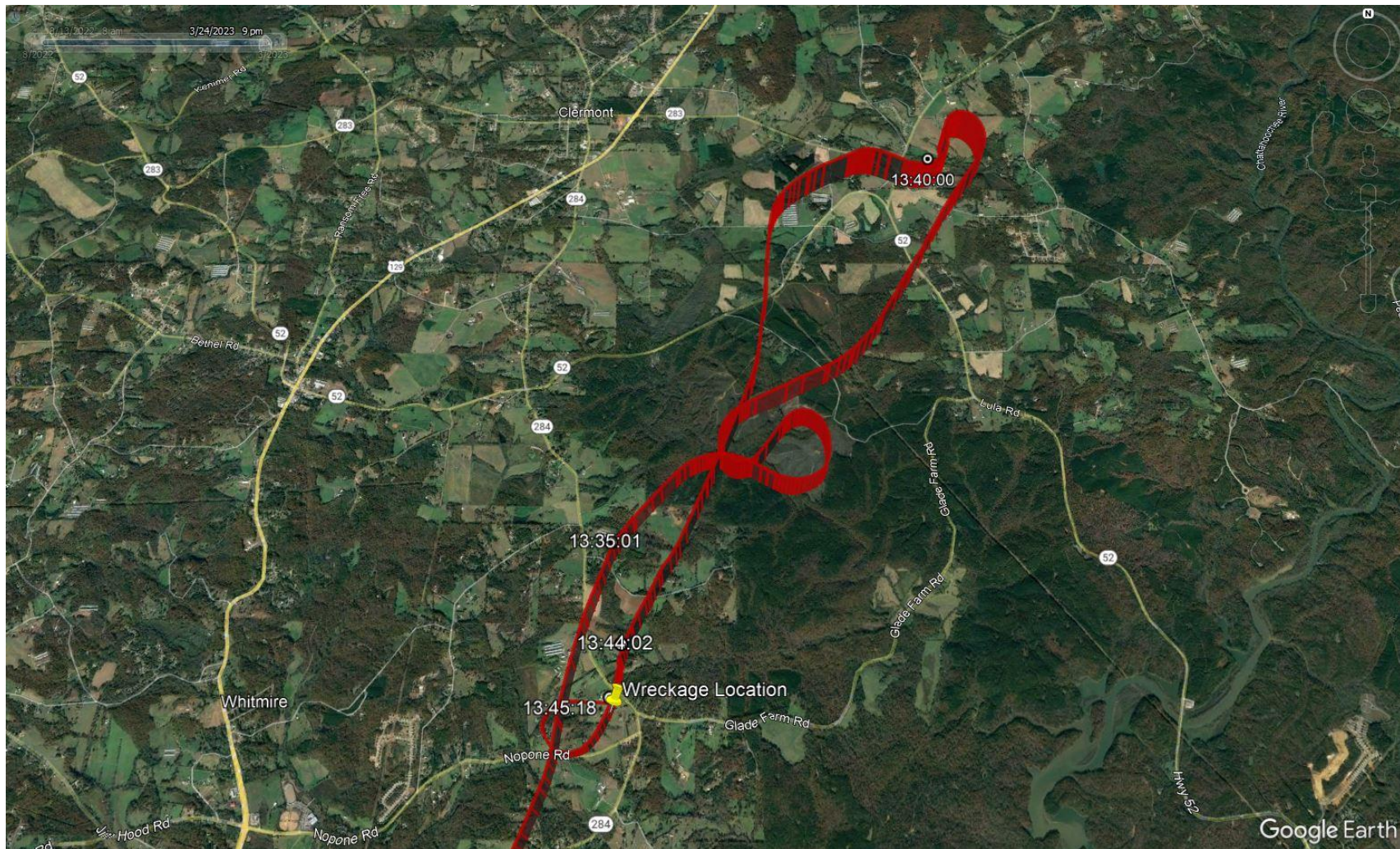


Figure 10. GPS tracklog data associated with GPS tracklogs recorded in the vicinity of the wreckage location.

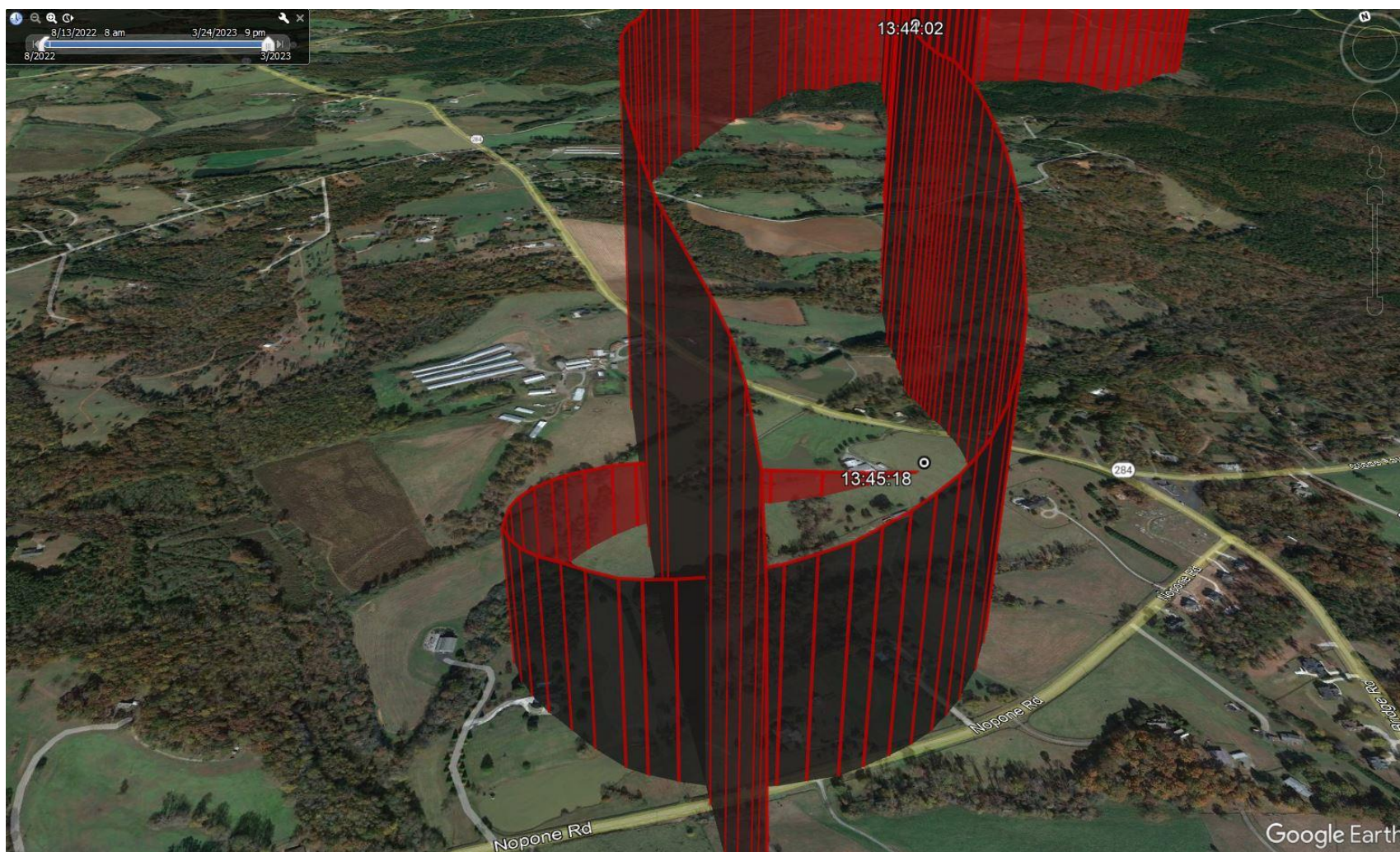


Figure 11. GPS tracklog data associated with the gyroplane's descent to the accident location.



Figure 12. GPS tracklog data associated with the gyroplane's final tracklog points.