

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

November 16, 2016

Onboard Image Recorder

Specialist's Factual Report
By Sean Payne

1. EVENT

Location:	Stephenville, Texas
Date:	March 26, 2016
Aircraft:	Grumman American Aviation Corp. AA-1B, N8883L
Operator:	Private
NTSB Number:	CEN16LA134

2. GROUP

A group was not convened.

3. SUMMARY

On March 26, 2016, about 1115 central daylight time (CDT), a Grumman American Aviation Corp. AA 1B airplane, N8883L, impacted terrain during a forced landing near Stephenville, Texas, following a loss of engine power. The pilot and his passenger sustained minor injuries. The airplane was substantially damaged during the forced landing. The airplane was registered to and operated by the pilot as a 14 *Code of Federal Regulations* 91 personal flight. Day visual meteorological conditions prevailed along the route of flight about the time of the accident, and the flight was not operating on a flight plan. The flight originated from the Dallas Executive Airport, near Dallas, Texas, about 0958 and was destined for the Stephenville Clark Regional Airport (SEP), near Stephenville, Texas.

4. DETAILS OF INVESTIGATION

On April 27, 2016, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following digital imaging device:

Recorder Manufacturer/Model:	GoPro Hero HD
Recorder Serial Number:	C3111026045192

4.1. Recorder Description

The GoPro HERO HD is a compact, lightweight, POV¹ 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. The camera supports 1080 HD² as well as other lower quality recording resolutions at higher frame rates. The camera can be set to record still images independently of a video stream at a resolution of up to 5 megapixels.³ The camera includes a wide angle aspherical lens that provides a maximum of 170 degrees viewing angle. The camera supports recording to micro SD⁴ cards up to 64 GB in size.

4.2. Recorder Damage

Upon arrival at the NTSB Vehicle Recorder Division, it was evident that the GoPro Hero HD had not sustained any heat or structural damage and the imagery information was extracted from the micro SD card normally, without difficulty.

4.3. Video Files

The GoPro's SD card contained 54 files. Of those 54 files, nine files were video recordings, 42 were still image files and three were thumbnails⁵.

Of the video files, GOPR0047.mp4, GOPR10047.mp4 and GOPR20047.mp4 were associated with a previous flight to the accident. GOPR0048.mp4 was a short recording that did not show any flight activity. Files GOPR0049.mp4, GOPR10049.mp4, GOPR20049.mp4, GOPR30049.mp4, and GOPR40049.mp4 captured the accident flight, the accident sequence and post-accident content. During the flight recordings, the GoPro automatically segments long recordings when a file reaches 17 minutes and 34 seconds in length, resulting in the above file segmentations.

The camera showed an over the shoulder field of view of pilot and front seat passenger. Most of the instrument panel and engine controls were visible to the recorder. Ground features were visible outside of the aircraft's windscreen. At times, varying lighting conditions made it difficult to view the instrument panel and the actions of the occupants. Engine noise obstructed audio of the pilot or passenger's voices for most of the flight. The recordings were made inverted as the camera was likely mounted upside down and were corrected in post processing by the NTSB.

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 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.

⁴ SD – Secure Digital – a standard for nonvolatile memory card used in portable devices.

⁵ Thumbnail – a reduced size representation of a digital picture or video file.

4.4. Timing and Correlation

The times used in this report are expressed as local time of the accident (CDT).

Timing of the summary was established by correlating the GoPro's internal time clock to local time of the accident. At the laboratory, the GoPro showed a timing offset of 630 days, 20 hours, 37 minutes and 13 seconds (54,423,433 seconds). This offset was applied the start time of each recording. Therefore, the following equation was applied:

$$\text{GoPro Time} + 54,423,433 \text{ seconds} = \text{CDT.}$$

Timing information in the summary reflects the corrected local time in CDT.

4.5. Summary of Recording Contents

In agreement with the Investigator-In-Charge, a video group did not convene and a summary report was prepared.

Only basic flight characteristics, engine control and fuel control events were summarized. All times are given in CDT in the format HHMM:SS.

4.5.1. Video Recording: GOPR0047.mp4, GOPR10047.mp4 and GOPR20047.mp4

The recording began on March 26, 2016, at 0806:09 as the pilot appeared to be completing a checklist at a hold short line. The mixture control lever appeared to be in the full rich position. The fuel selector valve appeared to be set to the right tank. At 0807:19, the pilot applied takeoff power and by 0807:35 the aircraft was airborne. The aircraft began climbing and headed toward the direction of the sun. Because the camera was pointed into the sun, the instrument panel was not clearly captured by the GoPro. The lighting conditions in the cockpit made it difficult to determine aircraft instrument readings and engine control settings.

Around 0810:07, the pilot placed his right hand near the fuel pump switch, the fuel pump switch position could not be determined. Around 0811:56, the aircraft was around 3,100 feet, the RPMs were set around 2200 RPM. Throughout the recording, the pilot's right hand was often placed near the throttle and mixture controls, it could not be determined whether the pilot was adjusting the mixture.

Around 0826:11 the pilot was seen adjusting with the mixture using a screwing motion. Altitude was around 2,900 feet and the rpm gauge indicated somewhere between 2,100 and 2,200 rpm.

Around 0841:17, it was noted that the altimeter indicated the aircraft was descending. The power setting during this portion of flight appeared about the same as seen previously, between 2,100 and 2,300 rpms. Around 0844:47, the aircraft's instruments showed it had leveled at 2,500 feet, a slight increase in rpm was noted.

By 0850:41, the aircraft had descended to around 2,000 feet. The rpm indicator still showed around 2,000 rpm.

Around 0852:13, the fuel selector valve became visible on the recording. The fuel selector valve was seen set to the left tank. Due to the lighting conditions of the cockpit, it could not be determined when the pilot had manipulated the fuel selector valve's position. The mixture appeared to be in the full rich position as the aircraft began descending through 2,000 feet around 0852:15. Engine power setting changes were made as the pilot maneuvered for a landing.

By 0855:27, the aircraft had landed. The fuel selector valve was seen in the left tank position, the fuel pump switch position could not be determined. The mixture still appeared to be in the full rich position. The recording ended at 0856:55 as the pilot shut down the aircraft.

4.5.2. Video Recording: GOPR0049.mp4, GOPR10049.mp4, GOPR20049.mp4, GOPR30049.mp4, and GOPR40049.mp4

The recording began at March 26, 2016, at 1013:01 near a hold short line. The mixture control lever appeared to be in the full rich position. The fuel selector valve appeared to be set to the left tank. The fuel pump switch position appeared to be in the "ON" position. At 1013:28, the pilot applied takeoff power and by 1013:42, the aircraft was airborne.

Around 1016:21, the pilot appeared to make a slight reduction in power, the aircraft was climbing through 1,900 feet and the rpm gauge indicated around 2,300 rpm. The pilot later leveled at 2,000. The rpm gauge showed around 2,200 rpm.

Around 1027:28, the fuel tank selector valve was seen in the right tank position. It could not be determined when the pilot switched from the left position to the right position.

Around 1031:16, the pilot increased power to around 2,400 rpms and aircraft began climbing out of 2,000 feet. By 1035:19, the aircraft was passing 3,000 feet and climbing. Around 1037:29, the pilot adjusted the mixture as the aircraft approached 4,000 feet. Rpm was still indicated around 2,400. The pilot adjusted the mixture for the next few minutes, and around 1039:05, the pilot reduced power using the throttle to around 2,300 rpm. The aircraft appeared to be level around 4,500 feet.

Around 1052:13, the pilot appeared to begin a descent out of 4,500 feet. The rpm gauge showed around 2,300 rpm. The mixture appeared to be in an unquantified less than full rich position as set previously. The aircraft continued descending with the mixture set in the same position. Around 1059:29 third video, the pilot switched the fuel pump switch to the "ON" position and moved the fuel selector

valve from the right tank to the left tank position. The pilot appeared to have left the fuel pump switch in the "ON" position. The aircraft was level around 3,300 feet. Around 1101:07, the pilot switched the fuel pump switch to the "OFF" position.

At 1104:25, the pilot pushed the mixture control to the full rich position. The altitude was around 3,400 feet. Engine rpm was indicated as 2,300 rpm. The fuel selector valve was still on the left tank.

At 1104:29, the fuel pressure gauge was seen dropping from a value of around 5 psi to near zero psi (near maximum deflection of the fuel pressure gauge to the left). At 1104:47, the engine was heard losing power, the rpm gauge was seen dropping through 1,500 rpm. The pilot immediately switched from left tank to right tank on the fuel selector valve and then quickly switched the fuel pump to the "ON" position. During this time, the gyro suction gauge dipped and quickly regained needle position to the green range as the engine regained power around 1104:52. The fuel pressure gauge also returned to a value of at least 5 psi. The pilot checked the fuel pump switch position, the mixture and put his hand near the throttle. The aircraft continued flying level around 3,300 feet at around 2,400 rpm. Moments later, the rpm gauge began indicating around 2,500 rpm and remained there. The pilot's hand covered the throttle position as the aircraft continued on in cruise flight. During this time, the aircraft was in a slow descent.

Around 1108:33, the aircraft leveled around 3,100 feet and the rpm gauge indicated around 2,300 rpm.

Around 1111:33, the fuel pressure gauge was seen dropping from a value of around 5 psi to near zero psi (near maximum deflection of the fuel pressure gauge to the left). At 1111:59, the engine once again began losing power. The rpm gauge showed a drop from around 2,100 rpm. The aircraft was at 2,750 feet and descending. The airspeed indicator showed around 120 mph. The engine regained a bit of power and settled around 1,900 rpm. The pilot looked in the vicinity of the engine control area and then began scanning the horizon. Around 1112:28, the engine once again lost power, the rpm gauge quickly dipped to around 1,100 rpm. The aircraft began descending through 1,500 feet as the engine surged multiple times. Around 1112:59 the pilot stated something similar to "I'm coming straight in." The aircraft was around 2,200 feet in altitude, the VSI showed around 800 feet per minute descent rate. The fuel pressure indication remained at maximum deflection to the left (a near zero reading) for the rest of the recording.

Around 1113:12, rpm dropped under 1,000 rpm and the airframe began vibrating prominently causing the camera to shake. The propeller appeared to be windmilling. The airspeed indicator showed around 80 mph. The pilot was seen adding a nose up command to the elevator control, the stall horn began indicating a stall. The stall horn occasionally activated as the aircraft descended

toward the ground. The pilot began maneuvering the aircraft toward an open area to the right of the aircraft, but at 1113:35 and around 1,700 feet, the pilot began a left turn toward another area of ground. The stall horn continued to activate intermittently. The airspeed indicator showed around 80 mph. The instrument panel readings became difficult to quantify due to an extensive airframe vibration.

Around 1113:45, a roadway and powerlines came into view. The aircraft was in a shallow left bank, airspeed around 80 mph, stall horn blaring.

The stall horn continued to activate as the aircraft headed toward an area of trailers and vehicles. The pilot appeared to be adding a positive pitch command in the final moments of flight. The airspeed indicator showed around 60 mph. The aircraft appeared to strike the top of a trailer and roll sharply to the right around 1113:53. The camera became detached from its mounting location. Individual video frames showed the aircraft's canopy material fracturing as the impact sequence continued. Individual video frames showed the pilot's body being ejected and later impacting the ground outside, and in front of the aircraft. The camera tumbled in the grass and came to rest.

As the camera rested in the grass, it continued to record video and audio. The pilot was seen walking in front of the camera. The pilot's statements were consistent with being on a phone call. During a portion of the phone call around 1118:13, the pilot stated, "the airplane's new to me, it's got... I just run it outta fuel", the pilot's voice trailed off. The recording later ended.