

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

July 10, 2017

Onboard Image Recorder

Specialist's Factual Report
By Sean Payne

1. EVENT

Location: Hurricane, Utah
Date: December 10, 2015
Aircraft: Vans Aircraft RV-7, N307AB
Operator: Private
NTSB Number: WPR16FA036

2. GROUP

A group was not convened.

3. SUMMARY

On December 10, 2015, about 1347 mountain standard time, a Barnett Allen Experimental amateur built, Vans Aircraft, Inc., RV7 airplane, N307AB, experienced an inflight break up, and sustained substantial damage when it impacted terrain about 3 miles west of the General Dick Stout Field Airport, Hurricane, Utah. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 91. The airline transport pilot and passenger were fatally injured. Visual (VMC) meteorological conditions prevailed, and no flight plan had been filed. The local personal flight departed from an unknown airport at an undetermined time.

4. DETAILS OF INVESTIGATION

On December 18, 2015, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following imaging device:

Recorder Manufacturer/Model: **GoPro Hero 4 Session**
Recorder Serial Number: **C3141324890770**

4.1. Recorder Description

The GoPro Hero 4 Session is a compact, lightweight, point of view (POV)¹ 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 high definition (HD)² as well as other lower quality recording resolutions at higher frame rates. The camera can be set to record still images in lieu of a video stream at a resolution of up to 8 megapixels.³ The camera supports recording to micro Secure Digital (SD)⁴ cards up to 64 GB in size. Built in Wi-Fi⁵ connectivity 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.

4.2. Recorder Damage

Upon arrival at the NTSB Vehicle Recorder Division, it was evident that the GoPro Hero 4 Session and the associated mounting hardware had sustained significant impact damage (figure 1). The associated mounting hardware was broken at the attach point. The associated circular filter was shattered. The Hero 4 Session was extracted from the mounting hardware and found to be intact (figure 2). The 64 GB micro SD card was found intact and seated securely in the device's memory card slot (figure 3). The micro SD card is shown extracted from the device in figure 4.

Figure 1. The GoPro Hero 4 Session in the associated mounting hardware.



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

Figure 2. The GoPro Hero 4 Session removed from the mounting hardware.



Figure 3. The micro SD card as recovered, seated properly in the device.



Figure 4. The micro SD card extracted from the device.



4.3. Video Files

The micro SD was read on a PC using a write blocker⁶. The micro SD card revealed a file and folder structure consistent with a GoPro camera. The micro SD card contained 25 .mp4⁷ video files of 1920 x 1080 pixels in resolution with a frame rate setting of 29.97 frames per second (fps). The card also contained a large number of .jpeg⁸ still image files associated with a time lapse mode utilized by the camera. The card also contained two video files associated with a time lapse mode that automatically produces video files from a series of still image files.

The micro SD card was searched forensically for traces of corrupted and unplayable video files⁹. The search produced 53 fragments of video data. Each fragment was reconstituted using file recovery software. The recovery software did not produce any video files consistent with the accident flight.

Of the 25 present .mp4 video files, a number of flights were recorded in the accident aircraft. A summary of two of these video files are below in section 4.5. All other recordings present on the card were not deemed relevant to the accident investigation.

4.4. Timing and Correlation

No time correlation was established for any of the contents of the micro SD card.

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. All times are given in the format MM:SS, where MM are minutes and SS are seconds elapsed from the start of the recording.

4.5.1. Video Recording One: GOPR0385.mp4

The camera was mounted inside the aircraft's cockpit and provided a view forward over the pilot's right shoulder of the instrument panel and the horizon. At approximately 00:16 into the recording the pilot pitched up slightly and performed an aileron roll to the right. The duration of the 360 degree aileron roll was approximately 4.75 seconds until the wings became level with the horizon again. The video ended around 02:55.

⁶ Write blocker – a hardware device that enables read only operations.

⁷ .mp4 – a file container associated with compressed video files.

⁸ .JPG – a popular compression standard for still images.

⁹ Image recorders exposed to high impact scenarios have the potential to produce corrupted, missing or unplayable media files due to abrupt cessation of power to the recording device or the ejection of the device's removable media card. A standard laboratory procedure is used to examine the device's media for potentially missing video and image files from devices involved in high impact scenarios.

4.5.2. Video Recording Two: GOPR0387.mp4

The camera was mounted on the left wing of the aircraft and provided a view of the entire left side of the fuselage, engine cowling, propeller and tail. The pilot started the aircraft, taxied to and departed the active runway. The pilot performed a right turn out from the departure airport and continued climbing. At 11:11 into the recording, the pilot pitched up slightly and performed an aileron roll to the right. The duration of the 360 degree aileron roll was approximately 4.5 seconds until the wings became level with the horizon again. The video ended around 12:00.