

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR21FA048

ELECTRONIC DEVICES

Specialist's Factual Report

June 21, 2022

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A. ACCIDENT

Location: Los Angeles, California
Date: November 12, 2020
Time: 1143 Pacific standard time (PST)
Airplane: Cessna 182T, N939CP

B. ELECTRONIC DEVICES SPECIALIST

Specialist W. Deven Chen
Electrical Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following devices:

Recorder Manufacturer/Model:	GoPro
Part Number:	Unknown
Recorder Serial Number:	Unknown
Recorder Manufacturer/Model:	Garmin G1000
Part Number:	Unknown
Recorder Serial Number:	Unknown

1.0 GoPro Description

The GoPro is a compact, lightweight, 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. Depending on the model, the camera supports 4K (resolution of 3840 x 2160 pixels) high definition at 60 frames per second (fps) as well as other lower quality recording resolutions at higher frame rates. The camera can be set to record still images simultaneously or independently of a video stream at a resolution of up to 12 megapixels. The camera includes a wide-angle aspherical f/2.8 glass lens that provides a maximum of 170 degrees viewing angle. The camera supports recording to micro-SD¹ cards. 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.

¹ SD – Secure Digital – a standard for nonvolatile memory card used in portable devices.

1.1 GoPro Condition

Upon arrival at the Vehicle Recorder Division, the GoPro was noted to have sustained severe thermal damage, as shown in figure 1. The micro-SD card found on the GoPro was burned, as shown in figure 2. The extent of the damage precluded normal and advanced recovery procedures and additional attempts were unsuccessful in yielding usable data. Therefore, no data pertinent to the event were recovered.



Figure 1. GoPro as received.

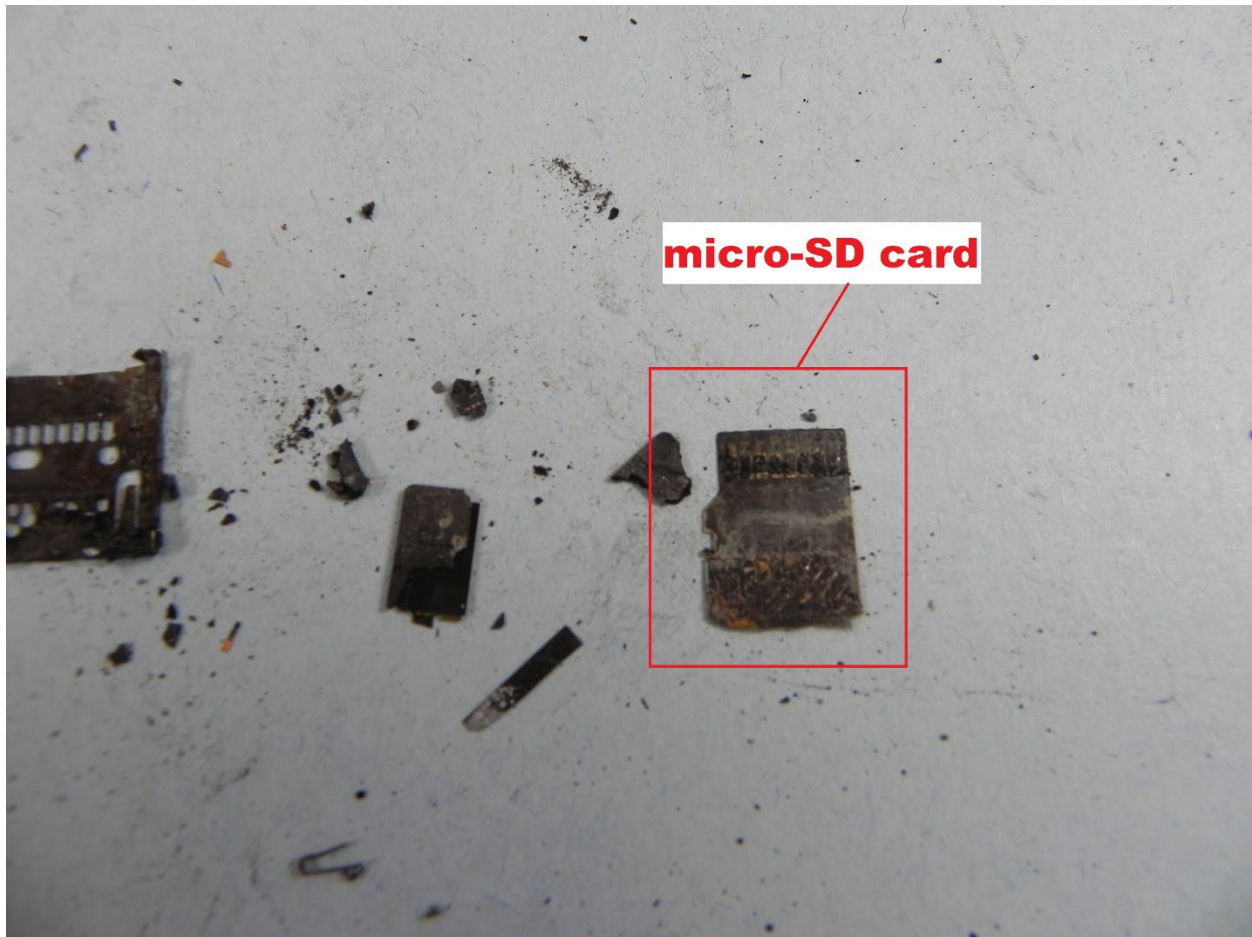


Figure 2. Micro-SD card found on the GoPro.

2.0 Garmin G1000 Description

The Garmin G1000 is a versatile Electronic Flight Instrument System (EFIS) that can serve as a Primary Flight Display (PFD), Multi-Function Display (MFD), Engine Information System (EIS), or a combination of all, depending on configuration. The unit comes with a 10.4-inch LCD display with 1024 x 768 resolution. The unit contains an Attitude Heading Reference System (AHRS) device and is capable of providing attitude information and air data information. The unit interfaces with a number of other compatible products and can display navigation, terrain, engine, weather, traffic and other parametric data streams. The unit is synthetic vision capable.

Depending on the display unit software, the aircraft can include a data logging feature. The data logging feature must be enabled by the aircraft operator and an SD card has to be installed in the upper slot of the unit to record data. Depending on the airframe and engine combination, as many as 64 parameters can be stored at a rate of one sample per second (1Hz). According to the manufacturer of the display unit,

one flight hour can be stored in approximately 2 MB. For a SD card with 2 GB in size, it can store over 1,000 flight hours.

2.1 Garmin G1000 Condition

Upon arrival at the Vehicle Recorder Division, the Garmin G1000 was shown to have sustained severe thermal damage, as shown in figure 3. There was no recoverable SD card presented on the device's SD card slots, as shown in figure 4. The internal main circuit board was too burned to have survivable memory chips, as shown in figures 5 and 6. The extent of the damage precluded normal and advanced recovery procedures and additional attempts were unsuccessful in yielding usable data. Therefore, no data pertinent to the event were recovered.



Figure 3. Garmin G1000 as received.



Figure 4. View of Garmin G1000 SD Card slots.



Figure 5. View of Garmin G1000 main circuit board top side.



Figure 6. View of Garmin G1000 main circuit board bottom side.

Submitted by:

W. Deven Chen
Electrical Engineer - Recorder Specialist

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