NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

April 25, 2019

Non-Volatile Memory Devices

Specialist's Factual Report
By Ben Hsu

1. EVENT

Location:	Mesa, Arizona
Date:	July 17, 2017
Aircraft/ID:	Lancair Evolution / N571JM
Operator:	Private
NTSB Number:	WPR17FA155

2. EVENT SUMMARY

On July 17, 2017, at about 1650 mountain standard time, a single-engine experimental Lancair Evolution, N571JM, impacted terrain following a loss of control while on approach to Falcon Field, Mesa, Arizona. The private pilot and passenger were fatally injured and the airplane was substantially damaged. The airplane was owned and operated by the pilot under the provisions of 14 *Code of Federal Regulations* Part 91. The cross-country business flight departed from Phoenix Deer Valley Airport, Phoenix, Arizona about 1555 with a planned destination of John Wayne-Orange County Airport, Santa Ana, California. Visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan had been filed and activated.

3. DETAILS OF DEVICE INVESTIGATION

The National Transportation Safety Board's (NTSB) Vehicle Recorder Division received the following devices:

Device:	Apple iPhone 6s
Device Serial Number:	C7JQCF6CGRYG
Device:	Garmin 900X
Device Serial Number:	Unknown
Device:	L3 Trilogy
Device Serial Number:	Unknown
Device:	Dashcam (data file only)
Device Serial Number:	Unknown

The Apple iPhone 6s arrived in the laboratory exhibiting major damage. Figure 1 shows the device as it arrived. The device's internal components were transferred to a surrogate device and data was extracted normally using laboratory hardware and software.

The Garmin 900X arrived in the laboratory exhibiting major damage. Figure 2 shows the device as it arrived. The device typically stores data on an SD memory card. No memory card was located with the device; therefore, no data was recovered.

The L3 Trilogy arrived in the laboratory exhibiting major damage. Figure 3 shows the device as it arrived. Due to the damage, no data could be recovered from the device.

3.1. Apple iPhone Device Description

The Apple iPhone is a smartphone with Wi-Fi and cellular communication abilities running the iOS operating system. The device is equipped with GPS and can be used for navigation using applications installed by the user.

3.1.1. Apple iPhone Recovered Photos

The recovered photos pertinent to the investigation are included in this report as figures 4 through 9. In addition to imagery, the photos included metadata as Exif (Exchangeable image file format) data. The Exif data from these photos is summarized in Table 1 and includes date/time of image capture, 3D GPS location (including mean sea level altitude), true heading of the device, and speed-over-ground of the device at time of capture.

Table 1. Summary of photo metadata.

Figure No.	Original Filename	GPS Time (UTC)	Latitude (degrees)	Longitude (degrees)	GPS Altitude (feet)	GPS Speed (MPH)	GPS Image Direction (degrees)
4	IMG_0823.JPG	23:03:21	33.615417	-112.557214	13752.5474	74.09	283.83
5	IMG_0824.JPG	23:03:26	33.615464	-112.563644	13886.9772	74.15	275.82
6	IMG_0825.JPG	23:11:46	33.633769	-113.224472	22541.7547	94.00	189.75
7	IMG_0826.JPG	23:27:18	33.639467	-112.851983	10014.1247	77.53	268.69
8	IMG_0827.JPG	23:27:21	33.638786	-112.848031	10011.3829	77.88	268.99
9	IMG_0828.JPG	23:41:12	33.502678	-111.984847	5303.0212	41.58	165.32

Figure 1. Photo of the Apple iPhone 6s.

3.2. Dashcam Data Description

The data file contained video from a camera mounted facing forward on a road vehicle. The video's resolution was 1920x1080 pixels and the framerate was 25 frames-per-second. No audio was included in the data file. An aircraft can be seen crossing the frame of the video from an elapsed time of 00:56 (mm:ss) to 01:19. The aircraft enters the frame from the right side and initially appears to be at level flight. At approximately 01:12, elapsed time, the aircraft appears to roll approximately 90 degrees and begins to descend towards the ground until 01:19 when the view of the aircraft is obscured by trees. Due to the distance between the aircraft and the camera, the direction of the roll could not be determined. The flight path of the aircraft is at approximately 30 degrees downward pitch when it disappears from view.

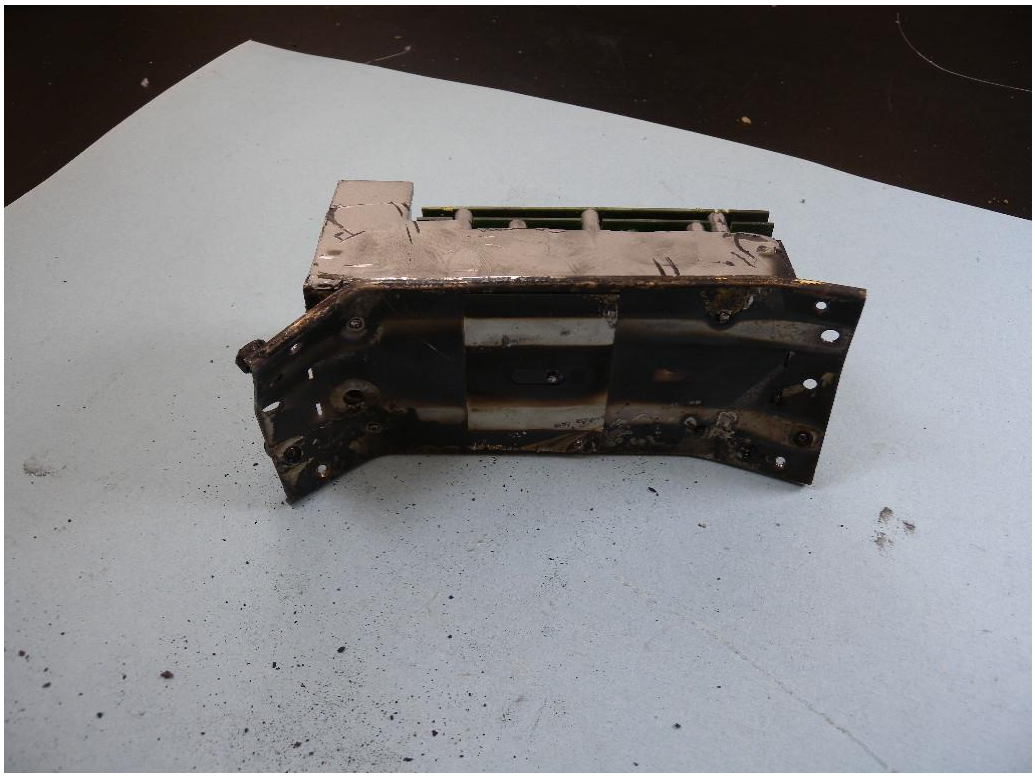

Figure 2. Photo of the Garmin 900X.

Figure 3. Photo of the L3 Trilogy.

Figure 4. Photo taken at 23:03:21 UTC of a portion of the PFD screen indicating both bus 1 and 2 voltages "LOW" and "A/C ON."

Figure 5. Photo taken at 23:03:26 UTC of a portion of the MFD screen indicating bus 1 and 2 voltages at 23.6V and flaps up.

Figure 6. Photo taken at 23:11:46 UTC of a portion of the MFD screen indicating bus 1 and 2 voltages at 23.4V and flaps up.

Figure 7. Photo taken at 23:27:18 UTC of a portion of the PFD screen indicating bus 1 and 2 voltages "LOW" and "A/C ON."

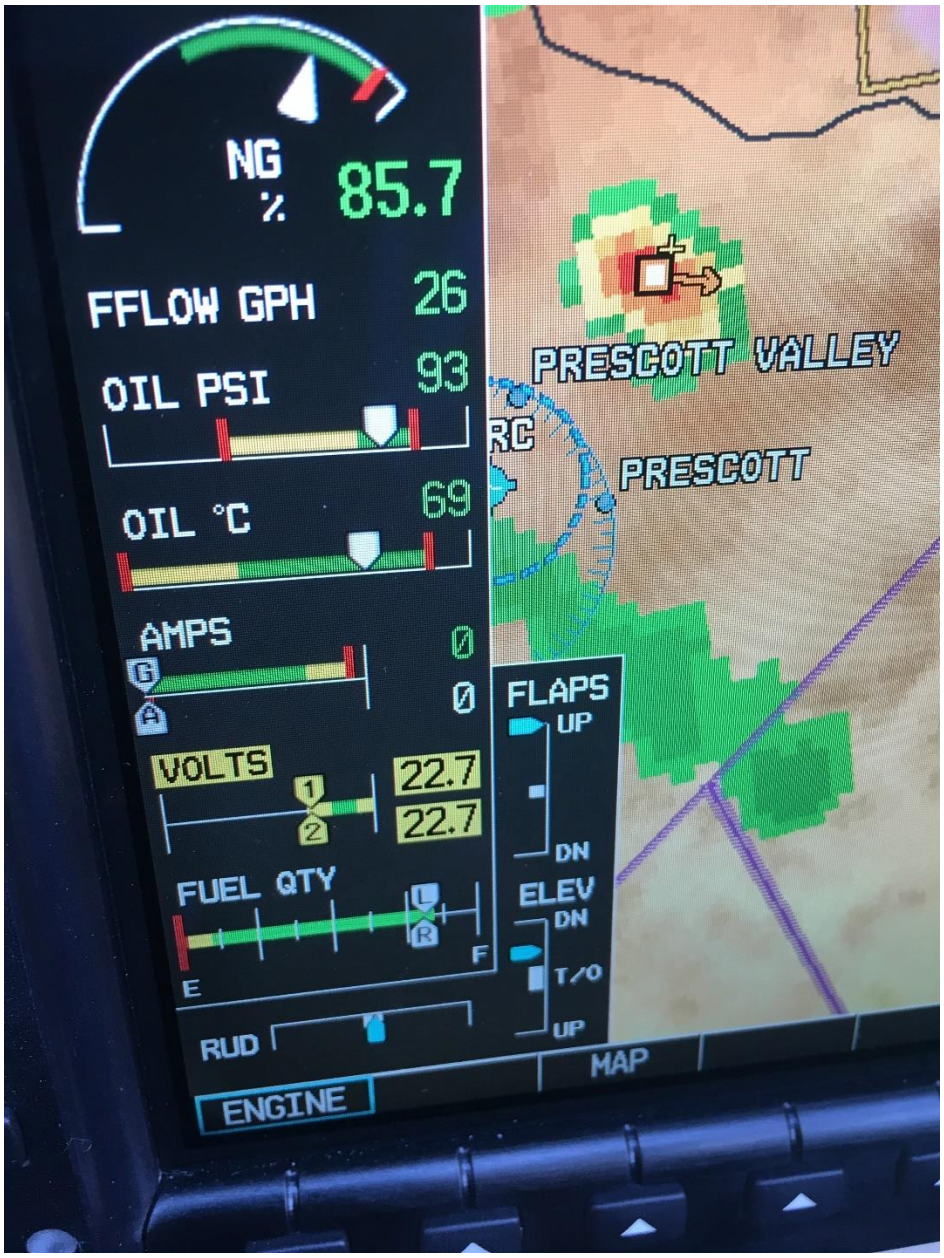

Figure 8. Photo taken at 23:27:21 UTC of a portion of the MFD screen indicating bus 1 and 2 voltages at 22.7V and flaps up.

Figure 9. Photo taken at 23:41:12 UTC of a portion of the MFD screen indicating bus 1 and 2 voltages at 19.6V and flaps.