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

August 7, 2014

Electronic Devices

Specialist's Factual Report
by Bill Tuccio, Ph.D.

1. EVENT

Location:	Ruther Glen, Virginia
Date:	May 9, 2014
Aircraft:	Eagle C-7
Registration:	N3016Z
Operator:	Private
NTSB Number:	ERA14FA231

On May 9, 2014, about 1940 eastern daylight time (EDT), an Eagle C-7 Balloon, N3016Z, was destroyed by fire after a landing attempt to a field and subsequent impact with powerlines near Ruther Glen, Virginia. The commercial pilot and two passengers were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight that departed from Meadow Event Park, Doswell, Virginia, approximately 3.75 miles to the south of the accident location. The flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

2. DETAILS OF DEVICE INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following devices:

Device 1:	Garmin GPS 12
Device 1 Serial Number:	Unknown
Device 2:	Apple iPhone 4S
Device 2 Serial Number:	Unknown
Device 3:	Motorola Barrage V860 Cellphone
Device 3 Serial Number:	MEID: 268435458116077627
Device 4:	Apple iPhone 5C
Device 4 Serial Number:	F73LR762FFHH

2.1. Garmin GPS 12 and Apple iPhone 4S Data Recovery

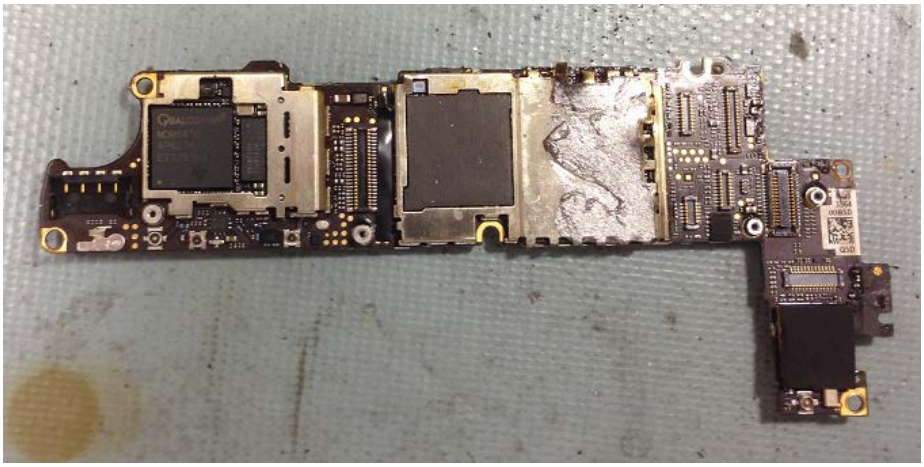
Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed both devices had sustained severe fire damage. Figure 1 shows the Garmin GPS 12 and

figure 2 shows the Apple iPhone 4S. Internal inspection of both devices revealed internal damage (figure 3 shows the iPhone 4S internal component board). No further recovery attempts were attempted.

Figure 1. Garmin GPS 12 as received.

Figure 2. Apple iPhone 4S as received.

Figure 3. iPhone 4S internal component board.



2.1.1. Garmin GPS 12 and Apple iPhone 4S Data Description

No data was recovered from the Garmin GPS 12 or Apple iPhone 4S.

2.2. Motorola Barrage V860 Cellphone Description

The Motorola Barrage is a flip phone design capable of voice calls, text messaging, email, and photo/video recording. Data is stored on non-volatile memory[1] and may include call logs, text messaging logs, photos, videos, and location information. The device may also contain a removable microSD card.

2.2.1. Motorola Barrage V860 Cellphone Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained severe structural damage. The screen component of the flip phone was missing; however, the base unit was intact and contained a 2GB microSD card, as shown in figure 4.

[1] Non-volatile memory is semiconductor memory that does not require external power for data retention.

Figure 4. Motorola Barrage.

2.2.2. Motorola Barrage V860 Cellphone Data Description

The phone belonged to the accident pilot. Due to damage, only the microSD card was examined for this report. The phone contained 22 still photos and 7 video clips with timestamps between January 2011 and May 3, 2014. Only the May 3, 2014 photo was determined to be pertinent to the investigation and is shown in figure 4. The photo shows a balloon basket in the back of a silver pickup truck. The pickup truck has a logo “Starship Adventures” and a phone number 302-943-5481 printed on the side. The two people in the photo were redacted for the purpose of this report.

Figure 5. Photo timestamped May 3, 2014.

2.3. Apple iPhone 5C Description

The Apple iPhone is a touch-screen operated smart-phone capable of voice calling, text messaging, email, photo/video recording, audio (music) playback, and numerous other specialized functions depending on configuration. The unit is capable of accessing wireless networks using the IEEE 801.11n protocol (wifi) and other wireless devices supporting Bluetooth . Specialized functions are supported by additional user-installed program applications (Apps). Application data is stored in non-volatile memory and may include call logs, text messaging logs, image, video, and position location information. In addition, specialized application data may be stored in a proprietary file structure using numerous file formats including: binary, ASCII, HTML, SQL, etc. The amount and type of data stored varies based on the software version and configuration of the specific device.

2.3.1. Apple iPhone 5C Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the iPhone had been exposed to smoke or fire. Figure 6 shows the unit in the blue case and with the blue case removed; smoke residue is evidenced on the device. The device started normally and was password protected. The IIC provided the correct password and information was downloaded from the phone normally.

Figure 6. Apple iPhone 5C in case and with case removed.

2.3.2. Apple iPhone 5C Data Description

The iPhone belonged to one of the passengers. Information pertinent to the investigation included 44 still photographs and one 24 second video taken on the day of the accident; 7 of the still photographs were taken on the ground.

Figure 7 shows a photograph (5253576.jpg) of a balloon basket in front of the truck shown in figure 5; the photo was taken on May 9, 2014, at 18:38:24 EDT. An inflator fan is shown to the right of the basket. Above the basket is one burner assembly. People in the photo were redacted for the purpose of this report.

Figure 7. Photo 5253576.jpg taken 5/9/2014 at 18:38:24 EDT.

Each photograph and video contained metadata of the date, time, latitude, and longitude of the photo. Table 1 shows the metadata for all the photos and videos. Figure 8 shows select points on a Google Earth overlay. Note the weather and features shown in Google Earth are from satellite imagery at an earlier date and may not reflect the weather and features at the time of the accident.

Descriptions of all photographs and videos from table 1 are contained in the On-Board Video Factual Report available in the public docket for this accident.

Table 1. Metadata of photos and videos from iPhone 5C.

Item	Date	Time	Latitude	Longitude	Filename
Photo	5/9/2014	19:37:02	37.9016000	-77.4225000	5253630.jpg
Photo	5/9/2014	19:36:57	37.9011000	-77.4226000	5253629.jpg
Photo	5/9/2014	19:36:46	37.9003000	-77.4229000	5253628.jpg
Photo	5/9/2014	19:36:43	37.9000000	-77.4230000	5253627.jpg
Photo	5/9/2014	19:34:12	37.8901000	-77.4251000	5253626.jpg
Photo	5/9/2014	19:34:05	37.8894000	-77.4252000	5253625.jpg
Photo	5/9/2014	19:34:00	37.8890000	-77.4253000	5253623.jpg
Photo	5/9/2014	19:33:55	37.8886000	-77.4254000	5253620.jpg
Photo	5/9/2014	19:33:50	37.8883000	-77.4254000	5253619.jpg
Photo	5/9/2014	19:33:47	37.8880000	-77.4254000	5253618.jpg
Photo	5/9/2014	19:33:02	37.8853000	-77.4258000	5253617.jpg
Photo	5/9/2014	19:32:04	37.8826000	-77.4266000	5253614.jpg
Photo	5/9/2014	19:30:43	37.8799000	-77.4266000	5253613.jpg
Photo	5/9/2014	19:30:37	37.8832000	-77.4331000	5253612.jpg
Photo	5/9/2014	19:29:34	37.8779000	-77.4265000	5253611.jpg
Photo	5/9/2014	19:29:06	37.8772000	-77.4264000	5253610.jpg
Photo	5/9/2014	19:28:29	37.8762000	-77.4262000	5253607.jpg
Photo	5/9/2014	19:28:16	37.8760000	-77.4261000	5253606.jpg
Photo	5/9/2014	19:26:10	37.8732000	-77.4262000	5253605.jpg
Photo	5/9/2014	19:26:07	37.8731000	-77.4262000	5253604.jpg
Photo	5/9/2014	19:25:56	37.8728000	-77.4261000	5253603.jpg
Photo	5/9/2014	19:25:36	37.8723000	-77.4260000	5253602.jpg
Photo	5/9/2014	19:15:34	37.8623000	-77.4260000	5253601.jpg
Photo	5/9/2014	19:14:56	37.8619000	-77.4260000	5253600.jpg
Photo	5/9/2014	19:14:18	37.8617000	-77.4259000	5253599.jpg
Photo	5/9/2014	19:14:13	37.8617000	-77.4259000	5253598.jpg
Photo	5/9/2014	19:13:57	37.8615000	-77.4258000	5253597.jpg
Photo	5/9/2014	19:13:53	37.8614000	-77.4258000	5253596.jpg
Photo	5/9/2014	19:13:38	37.8611000	-77.4258000	5253595.jpg
Video	5/9/2014	19:12:58	37.8601000	-77.4253000	5253592.mov
Photo	5/9/2014	19:10:21	37.8579000	-77.4250000	5253591.jpg
Photo	5/9/2014	19:09:39	37.8569000	-77.4247000	5253590.jpg
Photo	5/9/2014	19:09:07	37.8563000	-77.4244000	5253589.jpg
Photo	5/9/2014	19:09:03	37.8560000	-77.4248000	5253588.jpg
Photo	5/9/2014	19:07:01	37.8538000	-77.4240000	5253586.jpg
Photo	5/9/2014	19:06:35	37.8530000	-77.4239000	5253585.jpg
Photo	5/9/2014	19:05:59	37.8520000	-77.4241000	5253584.jpg
Photo	5/9/2014	19:05:23	37.8523000	-77.4242000	5253581.jpg
Photo	5/9/2014	18:49:48	37.8523000	-77.4243000	5253580.jpg

Item	Date	Time	Latitude	Longitude	Filename
Photo	5/9/2014	18:48:19	37.8511000	-77.4240000	5253579.jpg
Photo	5/9/2014	18:44:32	37.8511000	-77.4240000	5253578.jpg
Photo	5/9/2014	18:44:28	37.8511000	-77.4240000	5253577.jpg
Photo	5/9/2014	18:38:24	37.8511000	-77.4240000	5253576.jpg
Photo	5/9/2014	18:07:29	37.8510000	-77.4241000	5253574.jpg
Photo	5/9/2014	18:07:11	37.8510000	-77.4241000	5253572.jpg

Figure 8. Select points from iPhone 5C photo/video metadata on May 9, 2014.