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

November 18, 2013

Electronic Devices Factual Report

Specialist's Factual Report
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1. EVENT

Location:	Conway, South Carolina
Date:	August 3, 2013
Aircraft:	Beech D55
Registration:	N7641N
Operator:	Private
NTSB Number:	ERA13FA348

On August 3, 2013, about 1250 eastern daylight time (EDT), a Beech D55, N7641N, owned and operated by a private individual, was destroyed by post impact fire/explosion when it impacted a telephone pole and then terrain near Conway, South Carolina. The private pilot and two passengers were fatally injured. The flight departed from Conway-Horry County Airport (HYW), Conway, South Carolina, about 1200. Visual meteorological conditions prevailed, and no flight plan was filed for the personal flight which was conducted under the provisions of 14 *Code of Federal Regulations* Part 91.

2. DETAILS OF DEVICE INVESTIGATION

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

Devices with Unrecoverable Data

Device 1:	Apple iPad Mini
Device 1 Serial Number:	F4KKJ4LAF194
Device 2:	Unidentified Device
Device 2 Serial Number:	Unknown
Device 3:	Garmin Aera 560
Device 3 Serial Number:	Unknown
Device 4:	BF Goodrich Stormscope
Device 4 Serial Number:	Unknown
Device 5:	Garmin GTN 750
Device 5 Serial Number:	Unknown

Device with Recoverable Data

Device 6: Apple iPhone 5
Device 6 Serial Number: DNVJLX9SDTTN

2.1. Devices with Unrecoverable Data

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the Apple iPad Mini (figure 1), an unidentified device (figure 2), a Garmin Aera 560 (figure 3), a BF Goodrich Stormscope (figure 4), and a Garmin GTN 750 (figure 5) had sustained extensive structural and/or heat damage. Recovery was attempted, but due to the damage, data was not recovered.

Figure 1. Apple iPad Mini.

Figure 2. Unidentified device.

Figure 3. Garmin aera 560.

Figure 4. BF Goodrich Stormscope.

Figure 5. Garmin GTN 750.

2.2. Apple iPhone 5 Device 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[1]. 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.

2.2.1. Apple iPhone 5 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained significant impact damage, as shown in figure 6. The device was disassembled, as shown in figure 7. The main internal board was installed in a surrogate unit, and the surrogate unit started normally, as shown in figure 8. Data was then extracted through an examination of user interface screens and electronic downloads.

Figure 6. Apple iPhone 5 impact damage.

[1] A short-range, low bandwidth wireless protocol used in consumer electronics used mostly for low-overhead functions.

Figure 7. Apple iPhone 5 disassembled.

Figure 8. Apple iPhone 5 started in surrogate unit.

2.2.2. Apple iPhone 5 Data Description

The iPhone belonged to the accident piot. A number of aviation related applications were installed, including ForeFlight and aviation reference books. However, none of the applications had position or flight planning data relevant to the accident flight.

Figure 9 shows a history of iPhone activity from July 31, 2013 through August 3, 2013 ending at 17:00 EDT, with activity grouped by hours. A few text messages on August 3, 2013 at around 10:00 EDT were exchanged with one of the passengers of the flight arranging a meeting time.

Tabular data used to generate figure 9 is included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.

Figure 9. History of iPhone activity (EDT).

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Jul 31												MSGi=1		MSGi=4 MSGo=4	PHi=1 VM=1		MSGi=1 MSGo=1	MSGi=3 MSGo=4	MSGi=1 PHi=1	MSGi=2 MSGo=2 PHi=1	PHo=2			
Aug 01										MSGi=2 MSGo=2 PHi=1 PIC=2 VM=1	MSGi=1	MSGi=3 MSGo=1			MSGi=1	MSGi=1	MSGi=1 MSGo=2		MSGi=1	PHi=2 PHo=2				
Aug 02								PHo=2			MSGi=3 MSGo=2			PHi=1			PHi=1	PHi=1 PHo=2	PHi=1					PIC=2
Aug 03										MSGi=7 MSGo=8 PIC=3 Wifi=1	MSGi=12 MSGo=9 PHi=2 PHo=2	MSGi=2 PHo=2 Blu=1	MSGi=1 PHi=1 PIC=1 Blu=1	MSGi=2 PHi=1 VM=1	MSGi=8 VM=1	MSGi=1 PHi=4	PHi=1							

Codes:

- MSGi: incoming text message
- MSGo: outgoing text message
- PHi: incoming phone call
- PHo: outgoing phone call
- VM: voicemail
- PIC: picture
- Wifi: connected to wifi network
- Blu: connected to Bluetooth device