

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

March 10, 2016

Multiple Electronic Devices

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

1. EVENT

Location: Eaton, Colorado
Date: October 13, 2015
Aircraft: Beech G35
Registration: N394CW
Operator: Private
NTSB Number: CEN16FA011

On October 13, 2015, at 1134 mountain daylight time (MDT), a Beech G35 airplane, N394CW, collided with terrain near Eaton, Colorado. The commercial pilot and passenger were fatally injured. The airplane was registered to and operated by a private individual under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed. The flight originated from the Lyons-Rice County Municipal Airport (LYO), Lyons, Kansas, at 0918 central daylight time (CDT) and was destined for the Greeley-Weld County Airport (GXY), Greeley, Colorado.

2. DETAILS OF INVESTIGATION

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

Device 1: Apple iPad
Device 1 Serial Number: DLXQ20G6G5V4
Device 2: Apple iPhone 6
Device 2 Serial Number: F78NXTYAG5MN
Device 3: Dual SkyPro XGPS160
Device 3 Serial Number: NSD0004365

2.1. Apple iPhone and iPad Device Descriptions

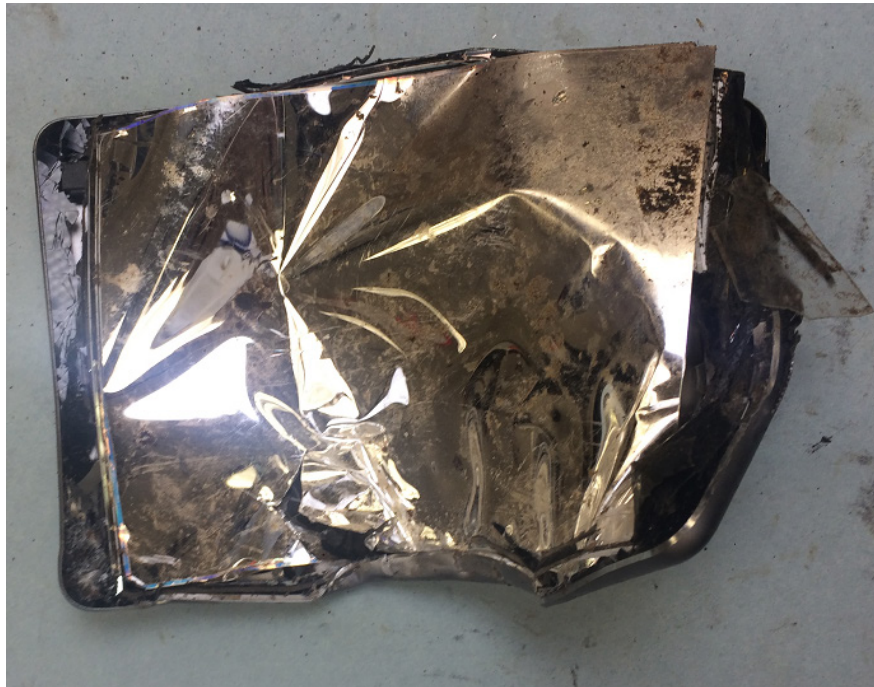
The Apple iPhone and iPad are touch-screen operated devices capable of text messaging, email, photo/video recording, audio (music) playback, and numerous other specialized functions depending on configuration. The iPhone is capable of cellular phone calls. The units are capable of accessing wireless 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 memory² 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.

2.1.1. Apple iPad Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had sustained significant impact damage, as shown in figure 1. An internal inspection revealed the main processor board and connectors were damaged, as shown in figure 2. Given the damage, it was determined repair was not possible and no further recovery efforts were made.

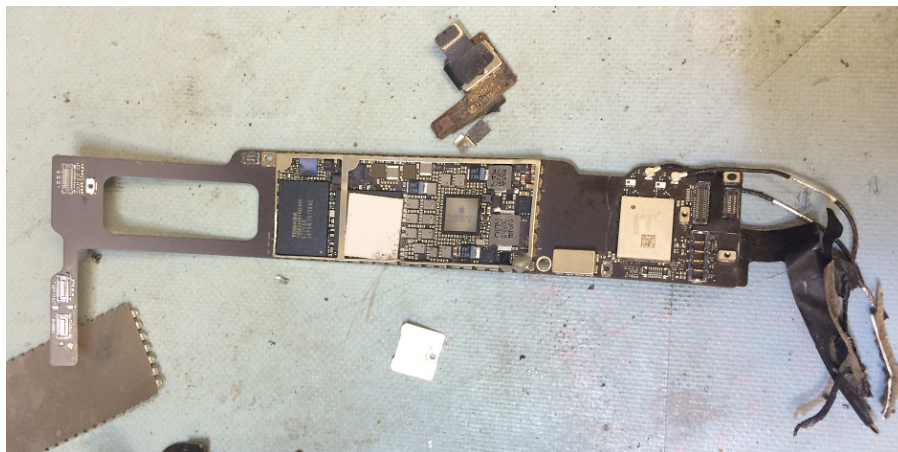
Figure 1. iPad as received.



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

² Non-volatile memory is semiconductor memory that does not require external power for data retention.

Figure 2. iPad main processor board.



2.1.2. Apple iPhone Data Recovery

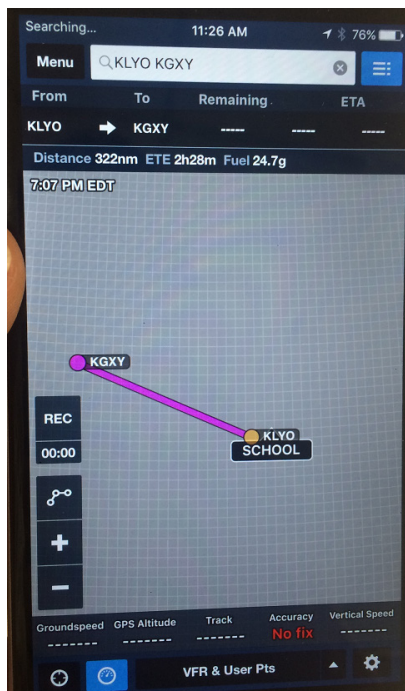
Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minimal damage. The Investigator-in-Charge (IIC) provided a passcode and information was downloaded from the device using forensic software.

2.1.3. Apple iPhone Data Description

The device contained various aviation-related applications, including ForeFlight, Cloud Ahoy, and a Dual XGPS160 status tool. No photos, phone calls, emails, or text messages were pertinent to the investigation.

Figure 3 shows the screen when the iPhone's ForeFlight application was started. The route "KLYO KGXY" in the search bar, shown in the navigation bar, and shown on the map correspond to the departure and destination airports described by the IIC related to the accident flight. The distance computed by ForeFlight for the route was 322 nautical miles, a time enroute of 2 hours and 28 minutes, and a fuel burn of 24.7 gallons.

Figure 3. iPhone ForeFlight screen.



2.2. Dual SkyPro XGPS160 Device Description

The Dual SkyPro XGPS160 is a battery operated, Bluetooth wireless satellite navigation receiver. The unit is capable of receiving position information from the U.S. Global Positioning System and Russian GLONASS. The unit may operate for 10 hours on a rechargeable battery. When enabled by the user, the unit can record up to 20 hours of position and altitude data to internal non-volatile memory at a sample rate of 1 Hz. The information may be downloaded using mobile hardware and applications capable of Bluetooth connections.

2.2.1. Dual SkyPro XGPS160 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minimal damage. The unit was powered on, a wireless connection was established using the Dual Electronics Corporation XGPS160 Status Mobile Application, and information was downloaded normally.

2.2.2. Dual SkyPro XGPS160 Data Description

Only one log, taking up 6% of the Dual XGPS160's memory, was on the device. The log was from September 17, 2015, and was not pertinent to the investigation.