

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

March 31, 2015

Personal Electronic Devices

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

1. EVENT

Location: Boonville, Missouri
Date: November 30, 2014
Aircraft: Bellanca 17-30A
Registration: N6629V
Operator: Private
NTSB Number: CEN15FA060

On November 30, 2014, about 0900 central standard time (CST), a Bellanca model 17-30A airplane, N6629V, was substantially damaged when it collided with terrain during landing approach to runway 36 at Jesse Viertel Memorial Airport (VER), Boonville, Missouri. The commercial pilot was fatally injured and his 3 passengers were seriously injured. The airplane was registered to and operated by the pilot under the provisions of 14 *Code of Federal Regulations* Part 91 without a flight plan. Day visual meteorological conditions prevailed for the cross-country flight that departed Spirit of St. Louis Airport (SUS), Chesterfield, Missouri, about 0738, and was originally destined for Charles B. Wheeler Downtown Airport (MKC), Kansas City, Missouri.

2. DETAILS OF DEVICE INVESTIGATION

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

Devices with No Pertinent Data

Device 1: Passenger's Apple iPod Touch
Device 1 Serial Number: CC0FFKFPDCP9
Device 2: Pilot's Motorola Droid Smartphone
Device 2 Serial Number: SJUG6065AA

Devices with Pertinent Data

Device 3: Pilot's Apple iPad Mini
Device 3 Serial Number: F4KM4536FCM6

Device 4: Passenger's Samsung Galaxy SIII Smartphone
Device 4 Serial Number: Unknown

2.1. Devices with No Pertinent Data

The passenger's Apple iPod Touch and pilot's Motorola Droid Smartphone were examined. Considering text messages, photos, and internet browser history, no content pertinent to the investigation was discovered.

2.2. Devices with Pertinent Data: Apple iPad Mini

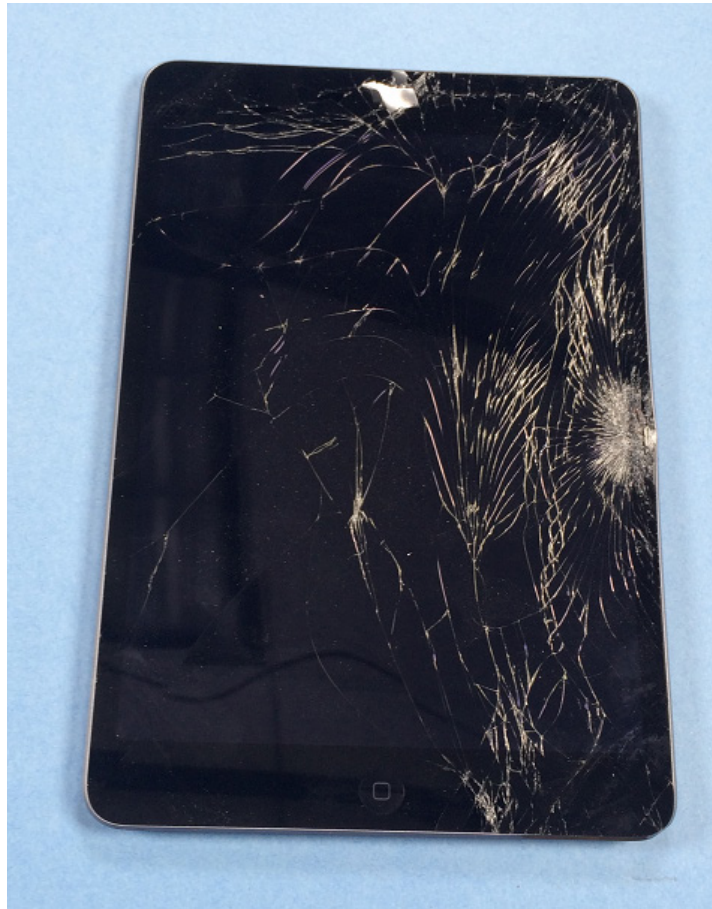
The Apple iPad Mini is a tablet computer with a high-resolution color touch-screen interface. All iPad devices support WiFi and Bluetooth connectivity, and varied capacities of non-volatile memory¹ for storage (depending on model). Some devices also support data connectivity via cell-phone networks. The iPad Mini implements its functionality by running programs called "Apps" capable of supporting web-browsing, email, audio/video playback, contact and calendar management, and numerous other specialized functions. User-installed Apps can be used to support functionality for electronic flight bags, flight planning and filing, aviation weather depiction, and electronic flight charts. Application data is stored in non-volatile memory and may include image, video, and position location information. Specialized application data may be stored in a proprietary file structure using numerous proprietary file formats. The amount and type of data stored varies based on the software version and configuration of the specific device.

2.2.1. Apple iPad Mini Data Recovery

Upon arrival at the NTSB Vehicle Recorder Division an exterior examination revealed the unit had sustained significant impact damage, as shown in figure 1. Power was applied to the unit and it started, though the screen image was fragmented. The unit was examined using a forensic download and through visual inspection of the fragmented display.

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

Figure 1. Apple iPad Mini as received.



2.2.2. Apple iPad Mini Data Description

According to the Investigator-in-Charge (IIC), the iPad Mini belonged to the pilot and was often used for inflight navigation. The iPad Mini had three email accounts configured, though the email content was not examined for this report. Text messages, photos, and internet Browser history contained no information pertinent to the investigation.

ForeFlight was installed on the device. Figure 2 shows the ForeFlight Map page with four annotations. The ForeFlight Map page revealed the following: a route from SUS to MKC (annotation 2); a distance of 186nm with an anticipated fuel burn of 17.4 gallons for a 1 hour and 10 minute estimated time enroute, based on no winds aloft (annotation 1 and annotation 3); and a true airspeed of 160 knots (annotation 4)².

² Pilot's Guide to ForeFlight Mobile, 34th Edition, states when 160 kts is entered at the end of a flight route search string, the "160" is interpreted as true airspeed.

ForeFlight is capable of recording a tracklog history. Figure 3 shows the tracklog history page. None of the tracklogs were older than August, 2014³.

The Bluetooth connection history of the iPad was examined. One Bluetooth connection labelled "XGPS150-313C51" was found ending on December 1, 2014. This connection identification is consistent with the use of a Dual Electronics XGPS150 model Global Positioning System (GPS) receiver. According to the IIC, the pilot used this model GPS connected to his iPad Mini.

³ Internal databases on the device were also examined and no more recent tracklogs were discovered.

Figure 2. ForeFlight Map Page.

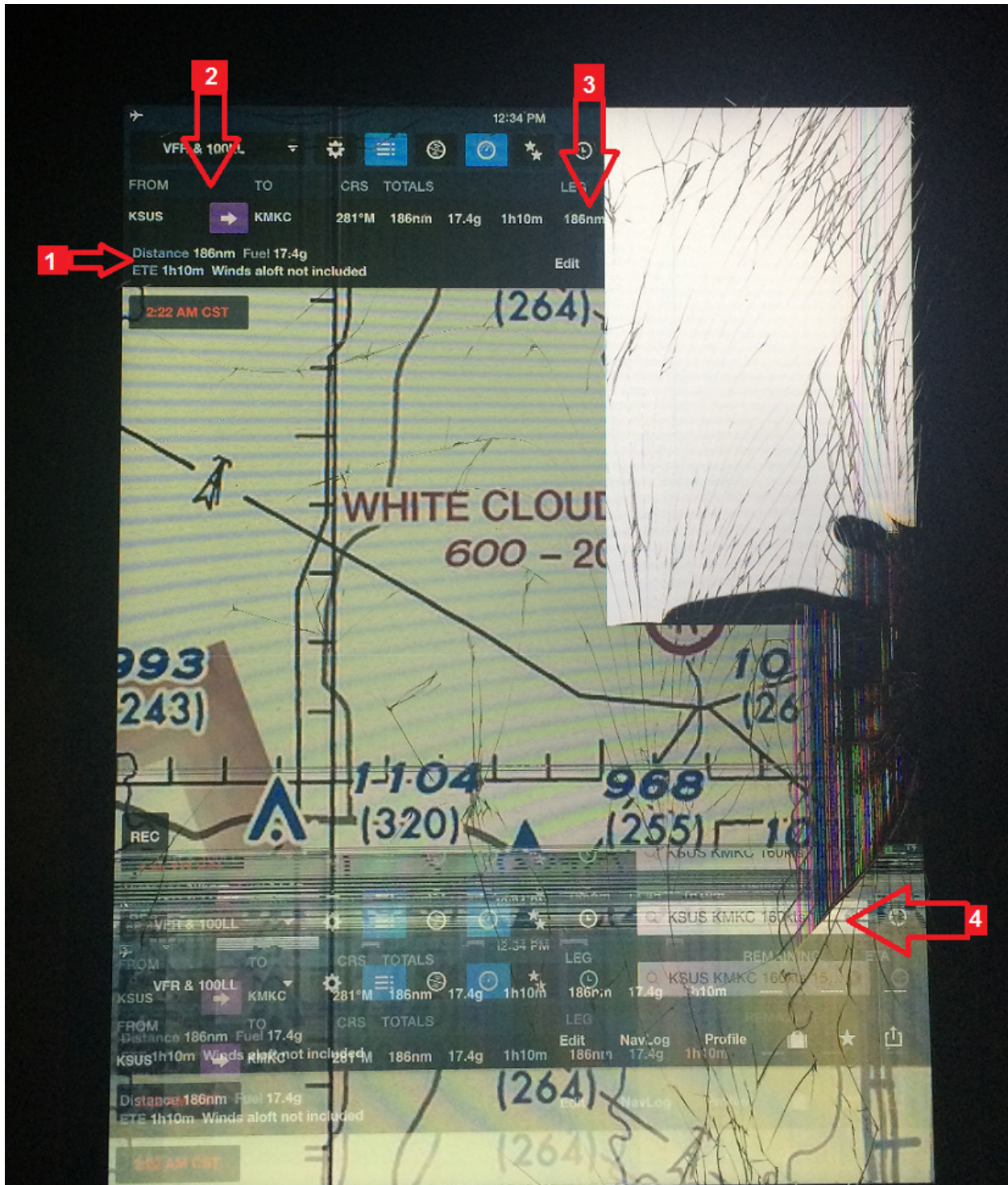
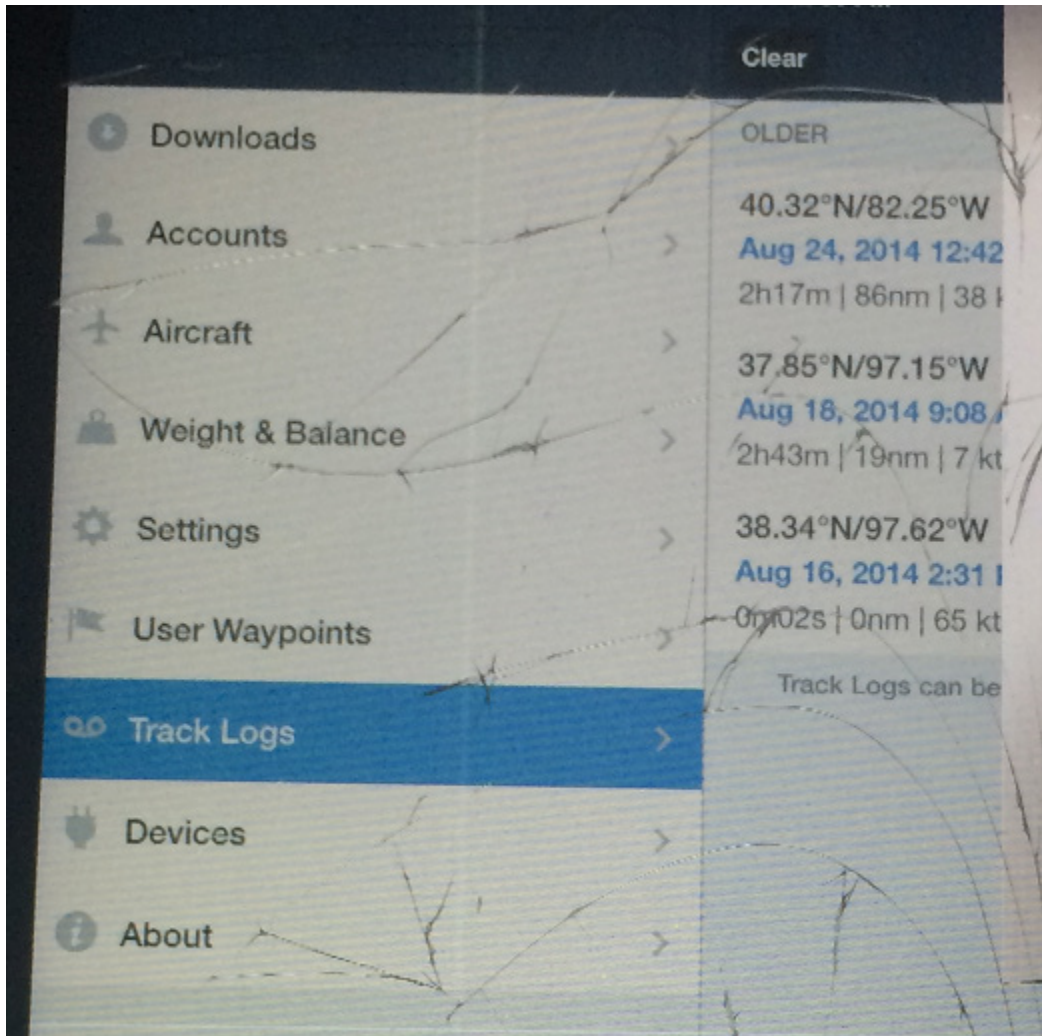


Figure 3. ForeFlight tracklog history.



2.3. Devices with Pertinent Data: Samsung Galaxy SIII Smartphone

The Samsung Galaxy S III is a touch-screen smartphone capable of voice calling, text messaging, email, photo/video recording, audio (music) playback, and numerous other specialized functions depending on configuration. Specialized functions are supported by additional user-installed program applications supported by the Android operating system. Application data is stored in non-volatile memory and a removable microSD card, and may include call logs, text messaging logs, image, video, and position location information. In addition, the specialized application data may be stored in a proprietary file structure using numerous file formats. The amount and type of data stored varies based on the software version and configuration of the specific device.

2.3.1. Samsung Galaxy SIII Data Recovery

Upon arrival at the NTSB Vehicle Recorder Division an exterior examination revealed the unit had not sustained any damage. The unit was powered on and the contents examined.

2.3.2. Samsung Galaxy SIII Data Description

Text messages found on the device were not pertinent to the investigation. Four photos taken while the aircraft was inflight were pertinent and are shown in figures 4 through 7. Photo time stamps indicated the photos were taken on November 30, 2014 between 08:26:47 and 08:31:51 CST. During the five-minute period of recovered photos, cloud cover in the vicinity of the aircraft increased from clear skies to low-level, overcast stratocumulus clouds⁴.

Figure 4. Photo time stamped November 30, 2014 at 8:26:47 CST.



⁴ Cloud types were determined using the NOAA Sky Watcher Chart (<http://www.weather.gov/os/brochures/cloudchart.pdf>).

Figure 5. Photo time stamped November 30, 2014 at 8:27:03 CST.



Figure 6. Photo time stamped November 30, 2014 at 8:29:59 CST.



Figure 7. Photo time stamped November 30, 2014 at 8:31:51 CST.

