

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

September 18, 2017

Personal Electronic Devices

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

1. EVENT SUMMARY

Location: Charleston, West Virginia
Date: May 5, 2017
Aircraft: Shorts Brothers SD3-30
Registration: N334AC
Operator: Air Cargo Carriers
NTSB Number: DCA17FA109

See the public docket for this investigation for a summary of the accident.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

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

Device Manufacturer/Model:	Battery/Charger
Serial Number:	ZFBEU2000703
Reference ID:	PED-05

Device Manufacturer/Model:	Apple iPad Mini 1
Serial Number:	F9FN8ADDFP84
Reference ID:	PED-07

Device Manufacturer/Model:	Apple iPad Mini 1
Serial Number:	F7RLWE92FP84
Reference ID:	PED-04

Device Manufacturer/Model:	LG Cell Phone
Serial Number:	602CYBD1594733
Reference ID:	PED-06

Device Manufacturer/Model:	Apple iPad Mini 1
Serial Number:	F4KL901NF19L
Reference ID:	PED-02

3.1. Device Description

PEDs are a category of devices comprised primarily of portable computing devices and mobile phones. Portable computing devices are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Depending on the model, mobile phones can perform many of the same tasks as portable computing devices, plus have voice call and text messaging capabilities. PED user and system data is typically stored on non-volatile memory¹ and can be accessed through manufacturer-provided interfaces.

3.2. Data Recovery

3.2.1. PED-05: Charger/Battery

Figure 1 shows PED-05, a charger/battery. It was undamaged but did not record any data.

Figure 1. PED-05, charger/battery.



3.2.2. PED-07: Apple iPad Mini 1

Figures 2 through 4 show back, front, and side views of PED-07, an iPad Mini 1. The device suffered severe impact damage. An internal inspection revealed the non-volatile memory chip was cracked in two places, as shown in figure 5. The damage was considered catastrophic and no further recovery attempts were made.

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

Figure 2. PED-07, back.



Figure 3. PED-07, front.



Figure 4. PED-07, side.



Figure 5. PED-07, non-volatile memory chip cracked.



3.2.3. PED-04: iPad Mini 1

Figures 6 and 7 show the front and back of PED-04, an iPad Mini 1. The device suffered severe impact damage. The screen was replaced and the device started normally. Information was downloaded using forensic imaging software.

Figure 6. PED-04, back.



Figure 7. PED-04, front.



3.2.4. PED-06: LG Cell Phone

Figures 8 and 9 show the front and back of PED-06, an LG Cell Phone. The phone suffered minor impact damage and the battery was missing. A replacement battery was installed and the unit started normally. The phone and 2GB microSD card were downloaded using forensic imaging software.

Figure 8. PED-06, front.



Figure 9. PED-06, back.



3.2.5. PED-02: Apple iPad Mini 1

Figures 10 and 11 show the PED-02, an iPad Mini 1, in a protective case and with the case removed. The unit suffered severe impact damage and was received powered on. The screen was replaced and information downloaded using forensic imaging software.

Figure 10. PED-02, front, in case.

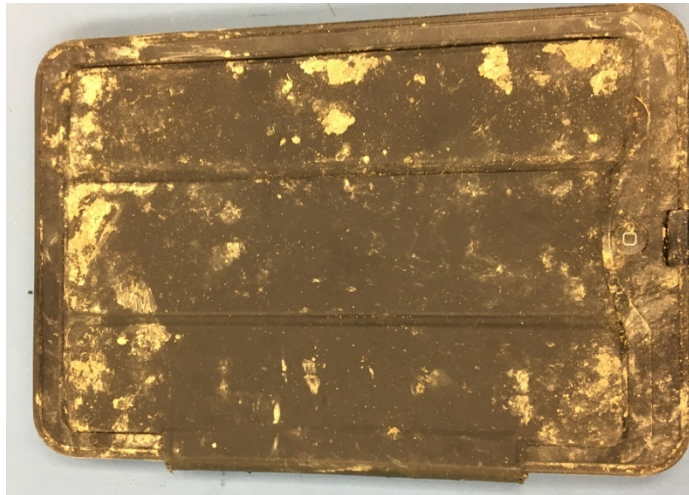


Figure 11. PED-02, front, with case removed.



4. DEVICE INVESTIGATIONS

4.1. Devices with no information recovered

PED-05 was a charger and contained no information. Data was not recoverable from the PED-07, an iPad Mini 1, due to cracks in the non-volatile memory chip.

4.2. Devices with information recovered

4.2.1. PED-04 and PED-06

Information was recovered from PED-04, an iPad Mini 1, and PED-06, a LG Cell Phone. Data was reviewed with the NTSB Human Performance Group Chairperson. See the Human Performance Group Chairperson Factual Report available in the public docket for this investigation for further information.

4.2.2. PED-02

Information from PED-02, the iPad Mini 1, was reviewed for pertinent content. There were a number of inflight videos taken from the cockpit of an aircraft, including the SD3-30 aircraft (though none from the accident flight).

Tables 1 and 2 contain information from PED-02. Times are provided in Coordinated Universal Time (UTC).

Table 1 shows pertinent internet browser history in calendar year 2017. Table 2 shows pertinent internet browser tabs that were open on the device when recovered. There was one pertinent bookmarked internet browser link, "AWC - ADDS TAFs", at address <http://www.aviationweather.gov/taf>.

There were five images of Air Cargo Carrier aircraft logbook pages, only one of which was at high enough resolution to be pertinent. Additionally, documents containing medical information and a pilot resume were recovered and are addressed in the Human Factors reports available in the public docket for this investigation.

Table 1. Internet browser history.

Time (UTC)	Visits	Title	URL
2017-05-05 00:50:24	2	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf%20kcrw&format=decoded&metars=on&layout=on
2017-05-05 00:50:18	2	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf+kcrw&format=decoded&submit=Get+TAF+data
2017-05-05 00:50:07	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-05-04 01:27:55	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-05-04 01:26:24	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-05-04 01:25:18	1	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf+kcrw&format=decoded&metars=on&submit=Get+TAF+data
2017-05-04 01:25:02	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-05-03 01:33:54	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-05-02 00:58:32	2	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf%20kcrw&format=decoded&metars=on&layout=on
2017-04-27 01:24:46	2	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf+kcrw&format=decoded&submit=Get+TAF+data
2017-04-27 01:24:26	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-27 01:24:07	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-27 01:21:19	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-04-22 07:48:05	1	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Kroa+kcrw+kbkw+khts+&format=decoded&metars=on&submit=Get+TAF+data
2017-04-22 07:47:23	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-22 02:02:46	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-04-22 02:02:23	1	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf%20klex%20kroa&format=decoded&metars=off&layout=on

Time (UTC)	Visits	Title	URL
2017-04-22 02:02:17	1	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf+klex+kroa&format=raw&submit=Get+TAF+data
2017-04-22 02:01:52	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-22 02:01:18	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-20 07:12:46	4	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf+kcrw+klex+kroa&format=decoded&metars=on&submit=Get+TAF+data
2017-04-20 07:12:34	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-20 01:31:58	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-20 01:30:58	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-04-20 01:29:59	4	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf+kcrw+klex+kroa&format=decoded&metars=on&submit=Get+TAF+data
2017-04-20 01:29:42	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-19 07:29:20	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-11 01:03:18	4	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf+kcrw+klex+kroa&format=decoded&metars=on&submit=Get+TAF+data
2017-04-08 01:30:42	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-08 01:30:29	5	AWC - Aviation Weather Center	http://www.aviationweather.gov/
2017-04-05 23:56:07	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-05 23:55:47	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-04-04 02:19:23	4	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=Ksdf+kcrw+klex+kroa&format=decoded&metars=on&submit=Get+TAF+data
2017-04-04 02:19:03	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-04-04 02:15:05	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp

Time (UTC)	Visits	Title	URL
2017-04-04 02:14:33	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-03-30 00:11:50	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-30 00:07:00	5	AWC - Aviation Weather Center	http://www.aviationweather.gov/
2017-03-29 01:01:17	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-29 01:01:02	5	AWC - Aviation Weather Center	http://www.aviationweather.gov/
2017-03-28 07:14:58	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-28 02:24:33	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-28 02:22:58	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-03-22 07:33:33	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-22 07:33:26	5	AWC - Aviation Weather Center	http://www.aviationweather.gov/
2017-03-22 01:19:02	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-22 01:18:48	5	AWC - Aviation Weather Center	http://www.aviationweather.gov/
2017-03-15 01:18:31	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-15 01:16:26	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-03-15 00:19:05	14	AWC - Radar	http://www.aviationweather.gov/radar

Time (UTC)	Visits	Title	URL
2017-03-15 00:17:45	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-03-14 01:22:31	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-11 02:28:13	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-03-10 07:52:02	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-03-10 02:22:32	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-03-03 02:51:29	11	AWC - ADDS Wind Temp Data	http://www.aviationweather.gov/windtemp
2017-02-28 23:44:26	19	AWC - ADDS TAFs	http://www.aviationweather.gov/taf
2017-02-28 23:43:41	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-02-28 23:43:17	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-02-08 02:36:24	14	AWC - Radar	http://www.aviationweather.gov/radar
2017-01-17 08:36:44	14	AWC - Radar	http://www.aviationweather.gov/radar

Table 2. Internet tabs open.

Time (UTC)	Title	URL
2017-05-05 00:49:38	AWC - ADDS TAFs	http://www.aviationweather.gov/taf/data?ids=ksdf%20kcrw&format=decoded&metars=on&layout=on
2017-04-23 10:06:46	Charleston, WV Weather Forecast and Conditions - The Weather Channel Weather.com	https://weather.com/weather/today/l/USWV0138:1:US