

# NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

February 19, 2021

## Electronic Devices

### Specialist's Factual Report

By Gerald Kawamoto

#### 1. EVENT SUMMARY

Location: Lihue, Hawaii  
Date: December 26, 2019  
Aircraft: Airbus AS350 B2  
Registration: N985SA  
Operator: Private  
NTSB Number: ANC20MA010

#### 2. GROUP

A group was not convened.

#### 3. DETAILS OF INVESTIGATION

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

Device Manufacturer/Model:	<b>Apple iPhone 6</b>
Serial Number:	<b>356981065059694</b>
Device Manufacturer/Model:	<b>Apple iPhone X</b>
Serial Number:	<b>353040094841136</b>
Device Manufacturer/Model:	<b>Apple iPhone 8</b>
Serial Number:	<b>359497086930299</b>
Device Manufacturer/Model:	<b>LG Cosmos 2</b>
Serial Number:	<b>107KPZK0231373</b>
Device Manufacturer/Model:	<b>Garmin GPS Navigator Data Cards</b>
Serial Number:	<b>N/A</b>
Device Manufacturer/Model:	<b>Avionics Innovations DMP-300 2 GB CF Card</b>
Serial Number:	<b>N/A</b>

##### 3.1. Personal Electronic Devices Description

PEDs are a category of devices comprised primarily of portable computing devices and mobile phones. Portable computing devices are typically capable of taking photos and videos, internet access, email, messaging services, and can run user-installed

applications to perform specific tasks. PED user and system data are typically stored on non-volatile memory<sup>1</sup> and can be accessed through manufacturer-provided interfaces.

### 3.1.1. Personal Electronic Devices Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, external examinations revealed the devices had sustained significant impact damage, as shown in Figures 1 through 4, rendering them inoperable. The logic boards were removed and tested for functionality using surrogate parts. The boards were determined to be unrecoverable due to damage with exception to the iPhone X. Tests indicated the device was potentially recoverable and the logic board was sent to an external data recovery facility for attempted recovery. The device was able to power on and was protected by a 6-digit numeric passcode. Potential passcodes obtained were unable to unlock the device, thus no data were recovered. Figure 5 shows the iPhone X board powered on using surrogate laboratory equipment at the data recovery facility.



Figure 1. Front and Back of iPhone 6 as received.

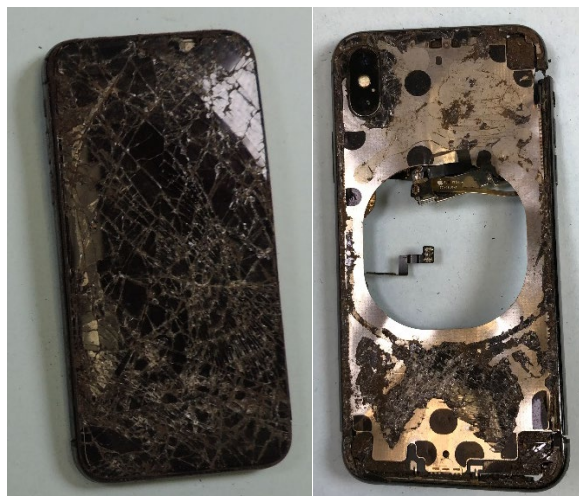


Figure 2. Front and Back of iPhone X as received.

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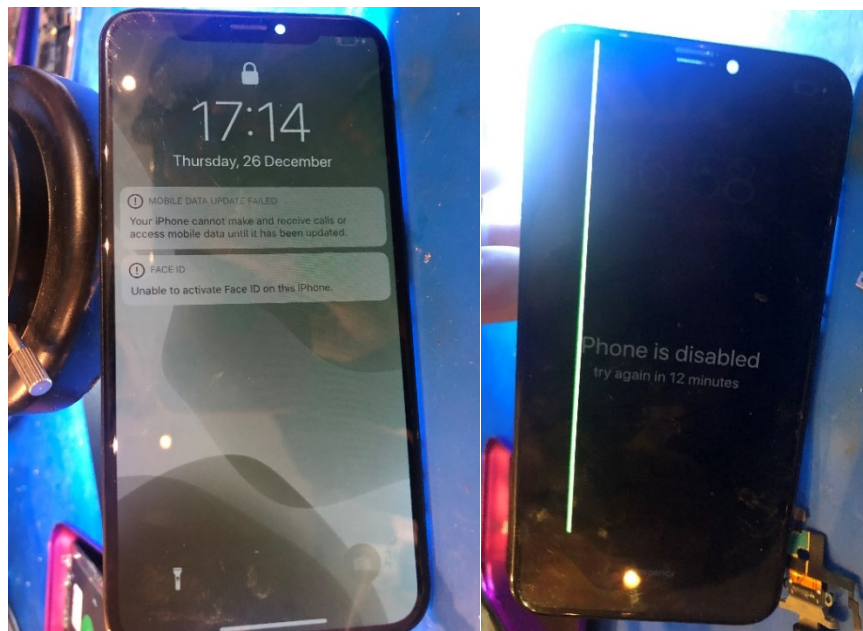
<sup>1</sup> Non-volatile memory is semiconductor memory that does not require external power for data retention.



**Figure 3. Front and Back of iPhone 8 as received.**



**Figure 4. Front and Back of LG Cosmos 2 as received.**



**Figure 5. iPhone X board powered on in test equipment at data recovery facility.**

### 3.2. Garmin GPS Navigator Data Card Description

Garmin GPS Navigator data cards contain GPS database information. Databases are periodically updated with the latest terrain and obstacle data. Updated terrain data cards may be obtained from the manufacturer.

#### 3.2.1. Garmin Data Card Data Recovery

The data cards were in good condition upon arrival at the Vehicle Recorder Laboratory, as shown in Figure 6, and card information was viewed by installing them in a functioning Garmin GNS 430. Figure 7 shows the Database Versions Page with the cards installed in the functional unit. The two bottom lines highlighted in yellow represent databases not within their effective dates.



Figure 6. Garmin Data Cards as received.



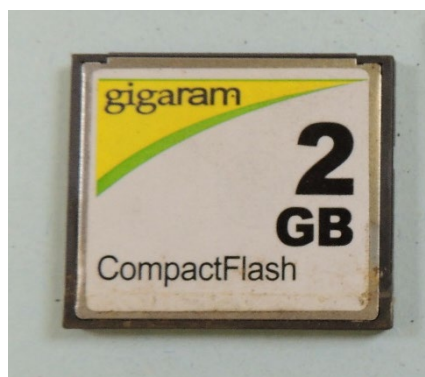
Figure 7. Database Versions Page.

### **3.3. Avionics Innovations DMP-300 Description**

The Avionics Innovations DMP-300 is a digital media player that plays MP3 voice and music audio files recorded on Compact Flash (CF) memory cards that are prepared and installed by the user.

#### **3.3.1. Avionics Innovations DMP-300 Data Recovery**

The 2 GB Compact Flash card was in good condition upon arrival at the Vehicle Recorder Laboratory, as shown in Figure 8. The card was readout and included a total of 28 MP3 files. The files were not recorded during the accident event. The files primarily consisted of music with exception of one file that was consistent with a standard safety briefing recording.



**Figure 8. Compact Flash card as received.**