

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC21FA065

PERSONAL ELECTRONIC DEVICES

Specialist's Factual Report

February 7, 2023

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A. ACCIDNET

Location: Eagle River, Alaska
Date: July 26, 2021
Time: 1320 Alaska daylight time (AKDT)
Airplane: Cessna 172P, N65698

B. PERSONAL ELECTRONIC DEVICES SPECIALIST

Specialist: W. Deven Chen
Electrical Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following personal electronic devices (PEDs):

Device Manufacturer/Model:	Apple iPhone 12 Pro Max (pilot)
IMEI Number:	356713110832944
Device Manufacturer/Model:	Apple iPad mini 5 (pilot)
Serial Number:	DMPYT5KHLMV7
Device Manufacturer/Model:	Apple Watch Series 5 (pilot)
Serial Number:	WR-50M
Device Manufacturer/Model:	Apple iPhone 12 Pro (flight instructor)
IMEI Number:	354957730066589
Device Manufacturer/Model:	Apple iPad Pro (flight instructor)
Serial Number:	F6QYL020GXQ4
Device Manufacturer/Model:	Apple Watch Series 1 (flight instructor)
Serial Number:	WR-IPX7

Three of the devices belonged to the pilot, and the other three belonged to the flight instructor.

1.0 Recorder 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.

1.1 Data Recovery

The data recovery of each of the six devices are detailed in the following six sessions.

1.1.1 Apple iPhone 12 Pro Max (pilot)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had no damage, as shown in Figure 1. The device powered on normally and was locked with a 4-digit passcode. The pilot's family provided 8 possible passcodes, but none of them unlocked the device. Thus, there was no data recovered from this device.



Figure 1. Front and back of the Apple iPhone 12 Pro Max as received.

1.1.2 Apple iPad mini 5 (pilot)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had sustained severe impact damage, as shown in Figure 2. The

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

motherboard was removed from the device and placed into a surrogate device. The device powered on and was locked with a 4-digit passcode. The 8 possible passcodes provided by the pilot's family were tried, but none of them unlocked the device. Thus, there was no data recovered from this device.



Figure 2. The Apple iPad mini 5 as received.

1.1.3 Apple Watch (pilot)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had no damage, as shown in Figure 3. The device powered on normally and was locked with a 4-digit passcode. The 8 possible passcodes provided by the pilot's family were tried, but none of them unlocked the device. Thus, there was no data recovered from this device.



Figure 3. Front and back of the Apple Watch as received.

1.1.4 Apple iPhone 12 Pro (flight instructor)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had no damage, as shown in Figure 4. The device powered on normally and was locked with a 6-digit passcode. The device was unlocked with the passcode provided by the flight instructor's family. ForeFlight² was one of the many applications running on the background of the device, however, the accident flight was not recorded. The last track log recorded on ForeFlight was on July 24, 2021. The last photo on the device was taken at 12:01 pm on July 26, 2021, the accident date. This photo shows a view of the cockpit within the accident aircraft before the accident flight. Figure 5 shows this photo. The Hobbs meter on the photo shows 2280.9 hours. Besides these, there was no pertinent data to this investigation presented on the device.



Figure 4. Front and back of the Apple iPhone 12 Pro as received.

² ForeFlight - Integrated flight App for pilots to plan, brief and file flight plans; it also logs flights.



Figure 5. Photo taken within the accident aircraft before the accident flight stored on the Apple iPhone 12 Pro.

1.1.5 Apple iPad Pro (flight instructor)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had sustained severe impact damage, as shown in Figure 6. The motherboard was removed from the device and placed into a surrogate device. The device powered on and was not locked with any passcode. ForeFlight was running on the background, however, it stored the exact same data as the ForeFlight on the flight instructor's phone, and the accident flight was not recorded. Logbook Pro³ was also

³ Logbook Pro - a flight logbook application for pilots to log Certificates, Ratings, Medicals, Flight

running on the background. Figure 6 shows the Summary Bar of the Logbook Pro, and it shows there were total of 281 flights and 535.5 hours logged. Beside these, there was no pertinent data to this investigation presented on the device.



Figure 6. The Apple iPad Pro as received.

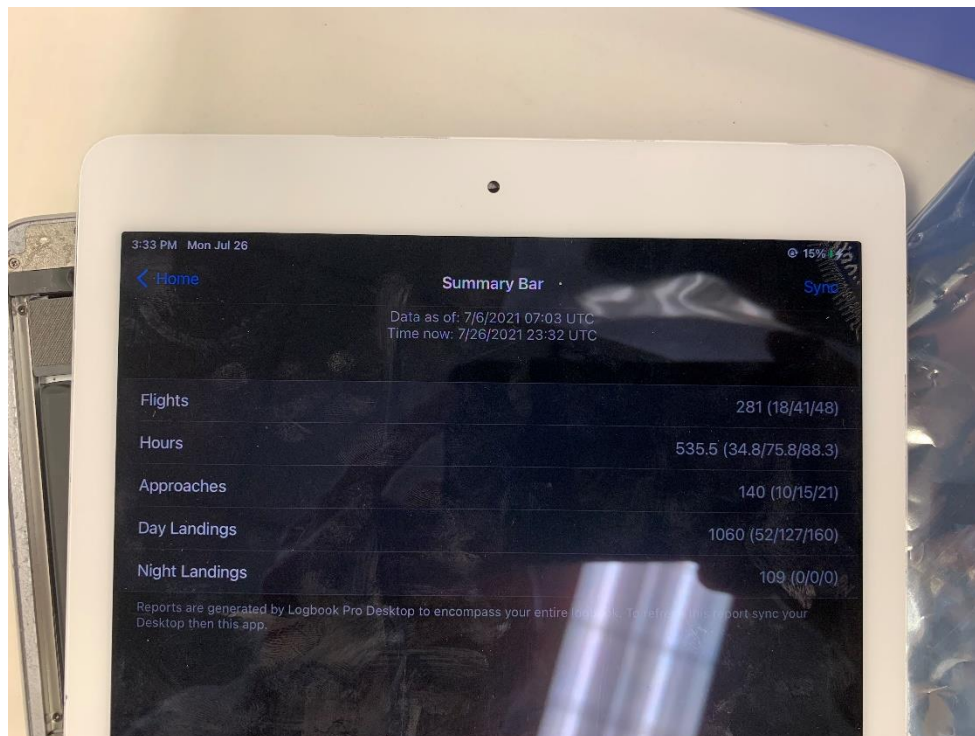


Figure 7. The Summary Bar of Logbook Pro on the Apple iPad Pro.

Reviews, Historical data, and flight (actual or simulator) and view detailed and extensive reports.

1.1.6 Apple Watch Series 1 (flight instructor)

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed that the device had no damage, as shown in Figure 8. The device powered on normally and was locked with a 4-digit passcode. The device was unlocked with the passcode provided by the flight instructor's family. The device was synced to the flight instructor's phone, and the stored data were viewed on the phone.

The heart rate data shown on the Apple Health app⁴ on the phone indicated that there were heart rate data points recorded between 11:00 to 16:00 on July 26, 2021, the date of the accident. The data stored on the Apple Health app were exported. An examination of the heart rate recording showed that there were total of 47 data points recorded between 11:00 to 16:00 on the accident date. The first 28 of those data points were recorded before 13:20, the time of the crash. The 28 pre-crash data points had a range of 59 to 94 beats per minute (BPM), with an average of 74 BPM. The next 14 data points from about 13:23 to about 14:26 progressively trended upward, with a range of 46 to 128 BPM and an average of 94 BPM. The last five data points were recorded (118, 78, 84, 77 and 76 BPM) from about 14:48 to about 15:20. Note that the Apple Watch measured heart rates with an optical sensor and that the level of accuracy of the heart rate recording was unknown.

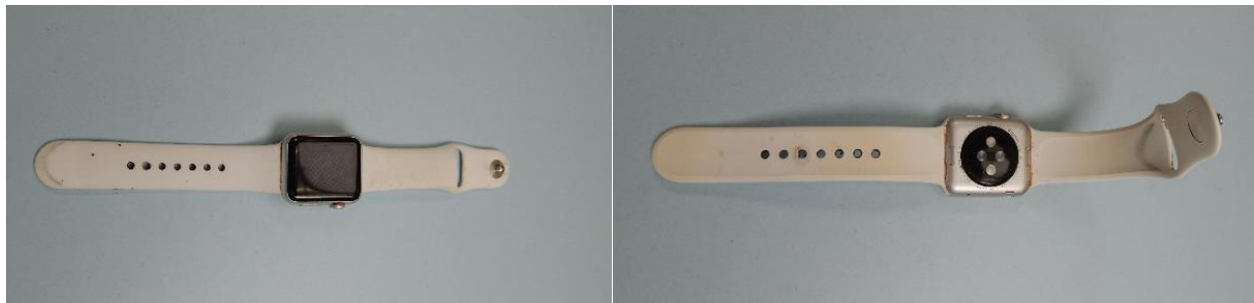


Figure 8. Front and back of the Apple Watch Series 1 as received.

⁴ Apple Health app - a health informatics mobile app developed by Apple Inc. The application holds physical tracking data such as step counts and can pull data from smartwatches, fitness trackers and other devices.