

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA23FA256

PERSONAL ELECTRONIC DEVICE (PED)

Specialist's Factual Report

March 7, 2025

ACCIDENT

Location: Montebello, Virginia
Date: June 4, 2023
Time: 15:23 eastern daylight time (EDT)
Airplane: Cessna 560, N611VG

Personal Electronic Device (PED) Specialist

Specialist: Sean Payne
Branch Chief - Vehicle Recorder Division
National Transportation Safety Board (NTSB)

DETAILS OF THE INVESTIGATION

In agreement with the Investigator-In-Charge, an Personal Electronic Device (PED) group was not convened, and a summary was prepared.

The NTSB Vehicle Recorder Division received the following electronic device:

Device Manufacturer/Model: FitBit Luxe
Device Serial Number: 3A428A69C901

1.0 Device Description

FitBit Luxe

The Fitbit Luxe is a compact fitness and health tracker featuring a AMOLED color touchscreen display with automatic brightness adjustment. It includes continuous heart rate monitoring, SpO2 tracking, sleep analysis, and stress management tools via electrodermal activity (EDA) scanning.¹ The device supports 24/7 activity tracking, including step counting, calories burned, and active zone minutes, with SmartTrack automatic exercise recognition. It is equipped with Bluetooth 4.2 for syncing with iOS and Android devices and offers up to five days of battery life on a single charge. The iOS or Android device is used to facilitate syncing data with a cloud account that the user can access via an online portal or a smartphone application. The Luxe is water-resistant up to 50 meters and integrates with the Fitbit app for detailed health insights and firmware updates. The FitBit line is owned by Google.

¹ SpO2 - Oxygen saturation - a medical term that refers to the percentage of oxygen in the blood. SpO2 is typically measured with a pulse oximeter, which is a device that emits infrared and red light. The absorption of this light can be used to determine the amount of oxygenated and deoxygenated hemoglobin in the blood.

2.0 Data Recovery

A FitBit Luxe, serial number 3A428A69C901, was recovered from the accident. No other electronic devices and no smartphones were recovered from the wreckage site. The FitBit Luxe was retained to examine if the device stored any data on device, prior to syncing with any iOS or Android device. The FitBit Luxe recovered from the accident site is pictured in figure 1. The device displayed signs of impact damage and was missing the associated wearable bracelet. While the screen appeared to be intact, the rear of the device indicated some thermal damage. The device was not powered in the laboratory.



Figure 1. The FitBit Luxe which was recovered from the accident site. The front of the FitBit, which includes the screen is pictured on the left. The rear of device is pictured on the right.

Recovery of data from the device was predicated on the assumption that it would contain SpO2 and heart rate monitoring information. As explained in the device description, typical operation involves a connected smartphone device, which is used to assemble and transmit the wearable device data to a cloud storage environment. The smart phone associated with this device/passenger was not located at the accident site. Further search efforts of the wreckage site and the wreckage material did not recover any other electronic devices.

Since the aircraft was in flight for just over two hours, and the accident aircraft did not have an inflight Wi-Fi system, the associated smartphone would likely have never connected cellularly to the cloud service. This means that any SpO2 or heart rate data that may have been collected during the accident flight on the associated smartphone would not have made it to the cloud storage environment. For this reason, the recovery effort of the FitBit data was focused on identifying and retrieving

any data that would have been stored on the FitBit device itself. The ability of the FitBit to store any data on the device is not published.

Forensic law enforcement partners were contacted in a request for information about other law enforcement cases involving FitBit devices. The only experiences related to data recovery from the device were related to accessing information from the connected smartphone or issuing a search warrant for data stored on a Google controlled cloud platform. None of the data recovery experiences involved retrieving data stored on the FitBit device itself.

On December 7, 2023, the NTSB Vehicle Recorder Lab contacted the data protection office at FitBit with a request for data retrieval assistance. On the same date, the FitBit data protection office responded stating that they “don’t share customers’ personal information except in limited circumstances.” Additionally, the response discussed the procedure to re-contact the office with a criminal court order, a subpoena, a search warrant or “matter involving exigent circumstance.”

In discussion with NTSB General Counsel’s office, an attempt was made to determine ownership of the FitBit device, so that a subpoena could be issued to Google referencing the name and associated email account of the user. By May 13, 2024, NTSB Transportation Disaster Assistance division was able to work with the family members to produce the name and account holder information. On May 20, 2024, a subpoena was issued to Google. The subpoena was two parts. One part requested any cloud stored health data from the associated user for the time period between June 3, 2023, and June 5, 2023. The other portion of the subpoena requested engineering conversion data from a raw binary read of the NVM portion of the associated onboard memory device on the FitBit.

On June 7, 2024, Google issued a response to the subpoena stating that they would not produce documents in response to the subpoena.

Around this time, an independent third-party forensic laboratory was contacted in an effort to contract an exploit of any on device data from the FitBit. The third-party lab responded that they did not have an exploit for a chip read of the associated chip on the FitBit device.

By October 2024, the NTSB contacted the manufacturer of the chip associated with the FitBit device, Ambiq Micro. An engineer from the chip manufacturer confirmed that the associated chip could contain a small subset of non-volatile memory (NVM), but had no documentation as to the stored contents of this portion of the chip. Furthermore, the chip manufacturer stated that the OEM² [Google] can elect to “lock” certain sections of the chip and that, “there could be a chance that we are never able to look at the memory without their [Google] help.” After clarifying that Google did not respond to a data request in a subpoena, the chip manufacturer attempted to connect me to Google through their own relationships, but were unsuccessful. Last, the chip manufacturer relayed that based on their experience with the device, it was likely that any device data collected on the FitBit would be quickly transferred to the associated smartphone device via Bluetooth and it was unlikely that

² OEM - Original Equipment Manufacturer

there would be the desired health data stored on the device. Furthermore, the chip manufacturer stated that in their experience, the NVM portion of their chip would likely not store this type of information, and that many OEMs elect to use SRAM (volatile memory) as a buffer for the data. This SRAM, since it is volatile, meaning that it requires power to store data, would not contain recoverable information.

No data was recovered from the device.

Summary

Efforts to recover SpO2 and heart rate data from the FitBit device were hindered by the absence of the associated smartphone and the lack of cloud synchronization due to the aircraft's in-flight conditions. Initial inquiries with law enforcement revealed no precedent for retrieving data directly from a FitBit device, and Google's refusal to comply with an NTSB subpoena further limited access to potential cloud-stored data. A forensic lab was consulted but lacked an exploit to extract on-device data, leading to outreach to the FitBit chip manufacturer, Ambiq Micro. While the chip manufacturer confirmed the presence of non-volatile memory (NVM), they indicated that Google could have locked access on the chip, and they were unable to facilitate contact with Google. Moreover, they suggested that health data was likely stored temporarily in volatile memory (SRAM) or transferred to the smartphone rather than retained on the FitBit itself. Ultimately, no recoverable data was found on the device.

Prepared by:

Sean Payne
Branch Chief - Vehicle Recorder Division
NTSB