

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

October 8, 2019

Global Positioning System (GPS) Device

Specialist's Factual Report By Sean Payne

1. EVENT

Location: Elyria, OH
Date: June 30, 2019
Aircraft: Piper J-3C-65
Registration: N98527
Operator: Private
NTSB Number: CEN19FA191

2. Summary

On June 30, 2019 at 1445 eastern daylight time (EDT), a Piper J-3C-65 airplane, N98527, impacted terrain shortly after departing Elyria Municipal Airport (1G1), Elyria, Ohio. The sport pilot was fatally injured. The airplane was substantially damaged. The airplane was owned and operated by a private individual and the flight was conducted as a 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed.

3. DETAILS OF INVESTIGATION

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

Device Manufacturer/Model:	Appareo Stratus PRX V2
Serial Number:	202209

3.1. Device Description

The Appareo Status device is a self-contained battery powered unit that contains an internal AHRS,¹ GPS/WAAS receiver,² and ADS-B³ receiver in one compact unit. The

¹ The Attitude Heading Reference System consists of a set of 3-axis gyroscope, accelerometers and heading reference sensors that enable the unit to compute pitch, roll, and yaw motions.

² The Wide Area Augmentation System (WAAS) is an air navigation aid to augment the Global Positioning System (GPS), by improving its accuracy, integrity, and availability.

³ Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology deployed throughout the national airspace system. The ADS-B system is composed of aircraft avionics and a ground

unit communicates wirelessly with the pilot's iPad or iPhone ("iOS Device") to display all of the acquired information. The pilot needs to have a particular software application called ForeFlight⁴ installed on their iOS Device to view the Stratus data. In addition to communicating with the iOS Device, the Stratus device records GPS position and AHRS information internally on a non-volatile⁵ flash memory chip. Internal memory has the space to store over 13 hours of data.

3.2. Device Condition

Upon arrival at the Vehicle Recorder Laboratory, an examination revealed the unit had not sustained any damage and information was extracted using the manufacturer's software. Figure 1 is a photo of the device as received.



Figure 1. Photo of unit.

3.3. Data Description

This device is capable of storing data in NVM. This feature can be activated or deactivated by the user. Power was applied to the unit and the device was not configured to record. Figure 2 shows the device's configuration screen. The device's configuration

infrastructure. Onboard avionics determine the position of the aircraft by using the GNSS and transmit its position along with additional information about the aircraft to ground stations for use by ATC and other ADS-B services. This information is transmitted at a rate of approximately once per second. Operators equipped with ADS-B realize additional benefits from ADS-B broadcast services: Traffic Information Service - Broadcast (TIS-B) (traffic information) and Flight Information Service - Broadcast (FIS-B) (weather information).

⁴ iOS Device app (program) that communicates wirelessly with the Appareo Status unit to display aircraft's attitude, navigation, weather, and traffic information.

⁵ Type of solid state memory that does not require electrical power to retain information.

showed logging turned off, however, the section for “Flight Data Recorder” was turned on. Yellow arrows point these configurations in figure 1.

Information recorded to the device was further explored. The data extracted included information from August 19, 2018, through June 12, 2019. There were a total of 23 tracklogs. The event occurred on June 30, 2019. There were no data pertinent to the event recorded on the device. Figures 2 and 3 shows a list of all the logs recorded to the device.

A representative from Appareo suggested the Stratus device may have been turned off during the accident flight due to the absence of Flight Data Recorder logs on the date of the accident. The Appareo representative suggested that the “logging” button is related to track log recording via Foreflight, and that the “Flight Data Recorder” logs are for data stored on the Stratus device. Since information from the Stratus was extracted from a surrogate iPad, it does not necessarily reflect the settings of the two iPads recovered from the accident. For additional details related to the two iPads recovered from this accident, refer to Portable Electronic Devices (PED) – Specialist’s Factual Report which can be found in the public docket for this accident.

It was determined that there were no data recorded on the Stratus device pertinent to the event.

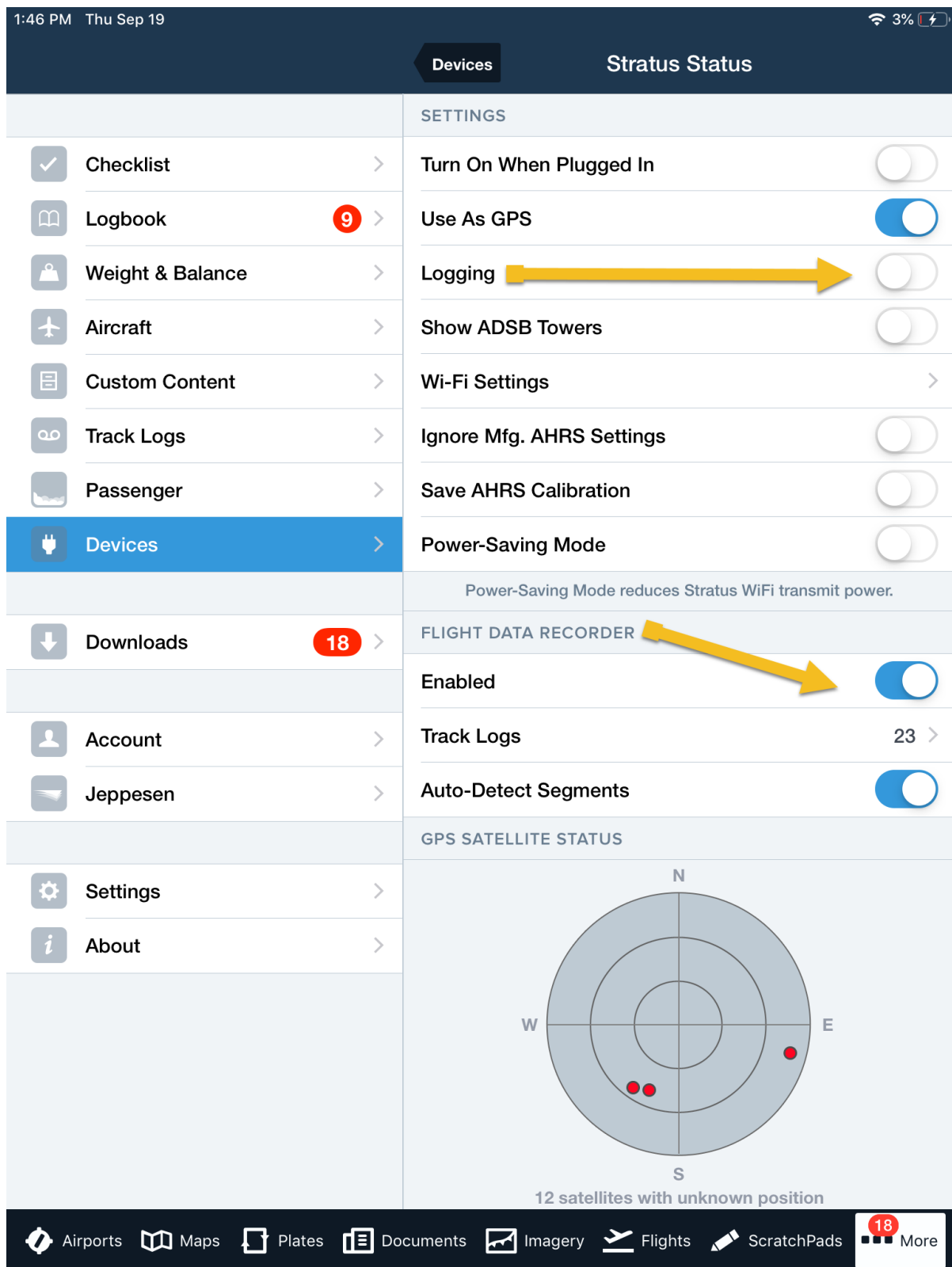


Figure 2. The logging configuration of the Stratus device as viewed on ForeFlight.

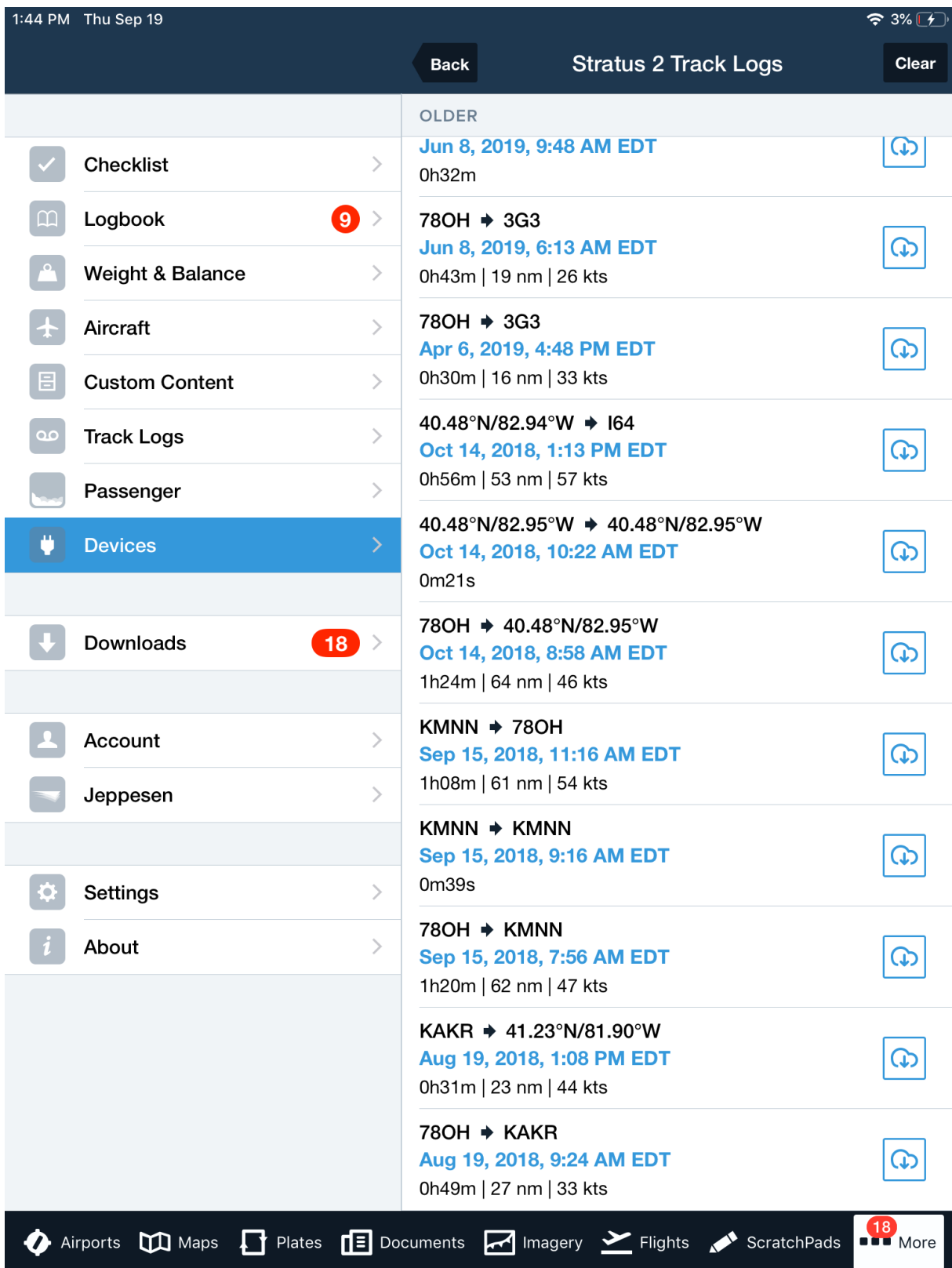


Figure 3. A list of flight logs recorded on the device between August 19, 2018 and June 8, 2019.

1:44 PM Thu Sep 19

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Stratus 2 Track Logs

Clear

OLDER

✓ Checklist >

I40 → 78OH

Jun 12, 2019, 1:11 PM EDT

0h54m | 57 nm | 64 kts

📖 Logbook 9 >

I40 → I40

Jun 12, 2019, 12:41 PM EDT

6m46s | 2 nm | 16 kts

👤 Weight & Balance >

I43 → I40

Jun 12, 2019, 11:25 AM EDT

1h16m | 84 nm | 67 kts

✈ Aircraft >

39.49°N/82.23°W → I43

Jun 11, 2019, 2:52 PM EDT

0h30m | 34 nm | 68 kts

📄 Custom Content >

39.82°N/82.18°W → 39.79°N/82.18°W

Jun 11, 2019, 2:32 PM EDT

1m18s | 2 nm | 76 kts

🔗 Track Logs >

I40 → I40

Jun 11, 2019, 1:54 PM EDT

3m29s

👤 Passenger >

3G3 → 3G3

Jun 8, 2019, 2:16 PM EDT

1m40s

🔌 Devices >

3G3 → 3G3

Jun 8, 2019, 1:29 PM EDT

0h46m

⬇ Downloads 18 >

3G3 → 3G3

Jun 8, 2019, 1:03 PM EDT

0h26m

👤 Account >

3G3 → 3G3

Jun 8, 2019, 11:37 AM EDT

0h37m

✈ Jeppesen >

3G3 → 3G3

Jun 8, 2019, 10:59 AM EDT

⚙ Settings >

ℹ About >

📍 Airports

🗺 Maps

📄 Plates

📄 Documents

🖼 Imagery

✈ Flights

📝 ScratchPads

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Figure 4. A list of flight logs recorded on the device between June 8, 2019 and June 12, 2019.

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