National Transportation Safety Board
Office of Research and Engineering
Washington, DC 20594

ERA23FA001

ONBOARD RECORDERS

Specialist's Factual Report

August 7, 2023

A. ACCIDENT

Location: Hermantown, Minnesota
Date: October 1, 2022
Time: 2317 central daylight time (CDT)
0417 October 2, 2022 coordinated universal time (UTC)
Airplane: Cessna 172S, Svetfur Aviation LLC, N262TA

B. ONBOARD RECORDERS SPECIALIST

Specialist: Michael Portman
Aerospace Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

An onboard recorders group was not convened. The NTSB Vehicle Recorder Division received the following devices:

Recorder Manufacturer/Model: Stratus 2S
Part Number: 15351D-000008
Recorder Serial Number: 2S025144

Recorder Manufacturer/Model: Garmin GTN 750
Part Number: 011-02282-00
Recorder Serial Number: 1ZA018210

Recorder Manufacturer/Model: DAC International GDC31
Part Number: 1049400003
Recorder Serial Number: 20851

1.0 Stratus 2S Description

The Appareo Status device is a self-contained battery powered unit that contains an internal AHRS, GPS/WAAS receiver, and ADS-B receiver in one compact unit.[1, 2, 3] The unit communicates wirelessly with the pilot's iPad or iPhone ("iOS

[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

Device") to display all the acquired information. The pilot needs to have a particular software application called ForeFlight installed on their iOS Device to view the Stratus data.[4] In addition to communicating with the iOS Device, the Stratus device records GPS position and AHRS information internally on a non-volatile flash memory chip.[5] Internal memory has the space to store over 13 hours of data.

1.1 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minor damage as shown in Figure 1. However, the device was able to be powered on and the data were downloaded normally using the manufacturer's procedure.

Figure 1. Photo of the Stratus 2S showing minor scuffs and scratches.

ground 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.

1.2 Recording Description

The data extracted included sessions from September 13, 2022, through September 28, 2022.[6] The accident flight occurred on October 1, 2022 (October 2, 2022 UTC). Therefore, no accident data were recorded on this device.

2.0 Garmin GTN 750 Description

The Garmin GTN 750 is a panel-mounted GPS receiver featuring a 6.9-inch color liquid crystal (LCD) display. It has a GPS/SBAS engine and is TSO-C146c certified for primary domestic, oceanic, and remote navigation including en route, terminal, and non-precision approaches, and approaches with vertical guidance, such as LPV and LNA/VNAV. The unit can simultaneously display approach information and weather and traffic data in relation to their position on a large, color moving map display. Its color moving map features a built-in database that shows cities, highways, railroads, rivers, lakes, and coastlines. The unit has a slot on the front for purchased electronic databases containing all airports, VORs, NDBs, Intersections, FSSs, Approaches, DPs/STARs and SUA information. A flight plan composed of multiple waypoints, including user-defined waypoints, can be programmed in the unit. The GTN 750 also includes a TSO approved airborne VHF communications transceiver and TSO approved airborne VOR/Localizer and Glideslope receivers. The unit contains an internal SD card storing flight log data, which can be accessed through the slot in the right side of the unit. If the unit is equipped with a firmware v6.50 or later, the internal SD card will store a limited set of flight data information.

2.1 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained impact damage, as shown in Figure 2, which prevented the device from being powered. An SD card was located along with the device, which, when read, was determined to be a supplemental data card with charts and navigation information, but no recorded flight data. An additional SD card was recovered from within the unit; however, the card did not contain any recorded flight data. Therefore, no data were recovered from this device.

[6] All dates and times are referenced to coordinated universal time (UTC).

Figure 2. Photo of Garmin 750 showing impact damage.

3.0 DAC International GDC31 Description

The GDC31 is a roll steering converter, which interfaces with GPS and the autopilot to provide roll steering outputs to maneuver the aircraft. Upon consultation with the device manufacturer, it was determined that the GDC31 does not record any data. Therefore, no data were recovered from this device.

Submitted by:

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