

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

May 13, 2021

Global Positioning System

Specialist's Factual Report
by Joe Gregor

1. EVENT

Location: Morgan, Utah
Date: September 4, 2019
Aircraft: Cessna 210L Centurion
Registration: N94262
Operator: Hawkeye Helicopter LLC
NTSB Number: WPR19FA250

On September 4, 2019, about 1521 mountain daylight time (MDT), a Cessna 210L airplane, N94262, collided with terrain about 4 miles west of Morgan, Utah. The commercial pilot and pilot rated passenger were fatally injured and the airplane was substantially damaged. The airplane was being operated by Hawkeye Helicopter LLC as a Title 14 *Code of Federal Regulations* Part 91 aerial observation flight. Visual meteorological conditions prevailed for the flight that originated at about 1451 MDT from the Evanston-Utica County Airport (EVW) in Evanston, Wyoming.

2. DETAILS OF DEVICE INVESTIGATION

The National Transportation Safety Board Vehicle Recorder Division received the following Global Positioning System (GPS) device:

Device: Garmin Aera 660
Device S/N: 4NN007054

2.1. Garmin Aera 660 Device Description

The Garmin Aera 660 is a battery-powered portable GPS receiver with a 5-inch diagonal touchscreen operation display. The unit includes a built-in Jeppesen database and can receive XM satellite radio for flight information including NEXRAD radar, lightning, METARs, TAFs, and TFRs. The unit can also perform and store weight and balance calculations. A built-in AOPA Airport Directory and Safe Taxi Airport Diagrams are included for selected fields. The unit stores time-stamped and dated flight information for up to 50 flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 250 feet and ends when groundspeed drops below 30 knots for 10 minutes or more. A detailed track log – including latitude, longitude, date, time, and GPS

altitude information for an unspecified number of points – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Track log position is updated as a function of time or distance moved, depending on how the unit has been configured. Once the current track log memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current track log can be saved to long-term memory and 15 saved track logs can be maintained in addition to the current track log. Track log recording may be activated or de-activated at user discretion. Track log data is stored in non-volatile memory. The unit contains hardware and software permitting the download of recorded waypoint, route, and track log information to a PC via a built-in USB port. An internal button-battery is used to provide back-up power to support real-time clock operation during those periods when main power is removed.

2.1.1. Garmin Area 660 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the unit had impact damage compromising the external case and LCD (see figure 1). An internal inspection was performed and no obvious damage to the main circuit board was apparent.

Figure 1. External view of the Garmin Area 660.



The Area 660 stores recorded data in non-volatile memory. This particular device recorded data on an SDIN8DR1-128 128GB FLASH memory device mounted to the main circuit board. A surrogate unit was obtained, the LCD touchscreen display was transferred to the accident unit, and a normal download was performed using Garmin's BootCamp software running on a Windows PC.

2.1.2. Garmin Area 660 Data Description

Track log data dated from September 3, 2019 to September 4, 2019 was recovered from the unit.

3. GPS PARAMETERS PROVIDED

Table 1 describes the data parameters provided. Date, Time, Longitude, Latitude, and GPS Altitude are recorded by the device. Groundspeed and Track are derived by the download software using recorded information. Data from the accident flight recorded is provided in tabular format as Attachment 1 to this report.

Table 1. GPS Tabular Data Parameters.

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time (MDT) for recorded data point (HHMM:SS)
Latitude	Recorded Latitude (degrees)
Longitude	Recorded Longitude (degrees)
GPS Alt	Recorded GPS Altitude (ft)
Groundspeed	Average groundspeed between current and following data point (mph)
Track	Average true course between current and following data point (degrees)

4. OVERLAYS AND TABULAR DATA

All graphical overlays in this report were generated using Google Earth Pro. Data recovered from the Garmin Aera 600 (yellow) was overlain along with a SpiderTracks KML track (red) and the Lat/Lon location for the accident aircraft obtained from the investigator-in-charge (IIC). Note that the weather and lighting conditions depicted in Google Earth imagery do not necessarily reflect the conditions present during the accident flight.

The track log corresponding to the accident flight began at 1434:52 MDT on September 4, 2019, with the flight taking off to the west from Evanston-Utica County Airport (EVW) in Evanston, Wyoming (see figures 2 - 4). Airspeed took off to the west at about 1457 MDT and turned south to intercept Rt 81 before turning westward again to track along the north side of a pipeline or powerline scar visible on the Google Earth maps. The flight overflew the Loose Creek Reservoir before making a left 180-degree turn to the east.

About four minutes later, the flight made a right 180-degree turn back to the west while descending, to overfly the dam on the west side of the reservoir once again at approximately 6560 ft GPS altitude at 1513:40 MDT. After passing over the dam, the flight continued to the southwest tracking over a narrow valley while flying at or near the altitude of the surrounding peaks until it reached Croyden, UT. The flight then turned toward the west to follow Rt 84 to a point abeam the Round Valley Golf Course. The flight then executed a left 135-degree turn to fly southeast.

The last recorded Garmin GPS track point was logged approximately 30 seconds later, at 1521:14 MDT, with the aircraft at 5988 feet GPS altitude and a groundspeed of approximately 120 mph. The last recorded SpiderTracks location was approximately 0.7 miles to the southeast of the last recorded Garmin GPS point. The accident location was approximately 2.1 miles to the southeast of the last recorded SpiderTracks location. The time at which the aircraft arrived at these last two locations is not known with precision.

Figure 2. Google Earth overlay of the accident flight.

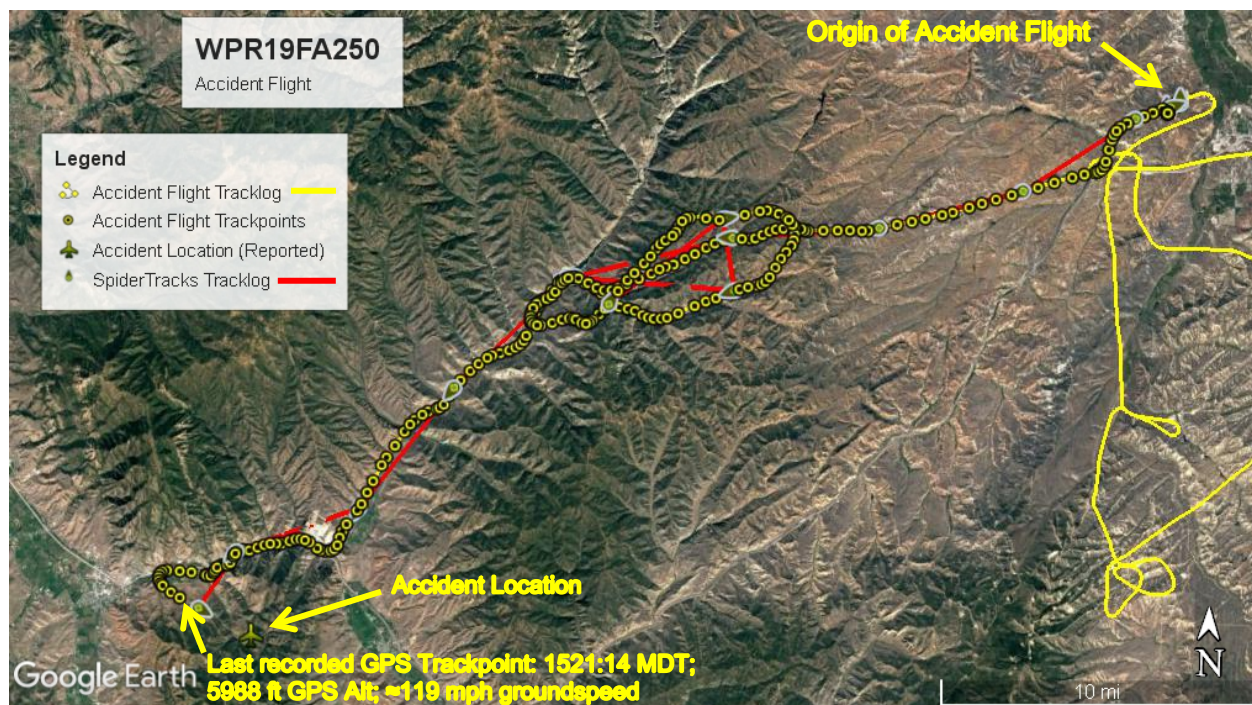


Figure 3. Accident flight from ≈ 1514 MDT to last recorded point at 1521:14 MDT.

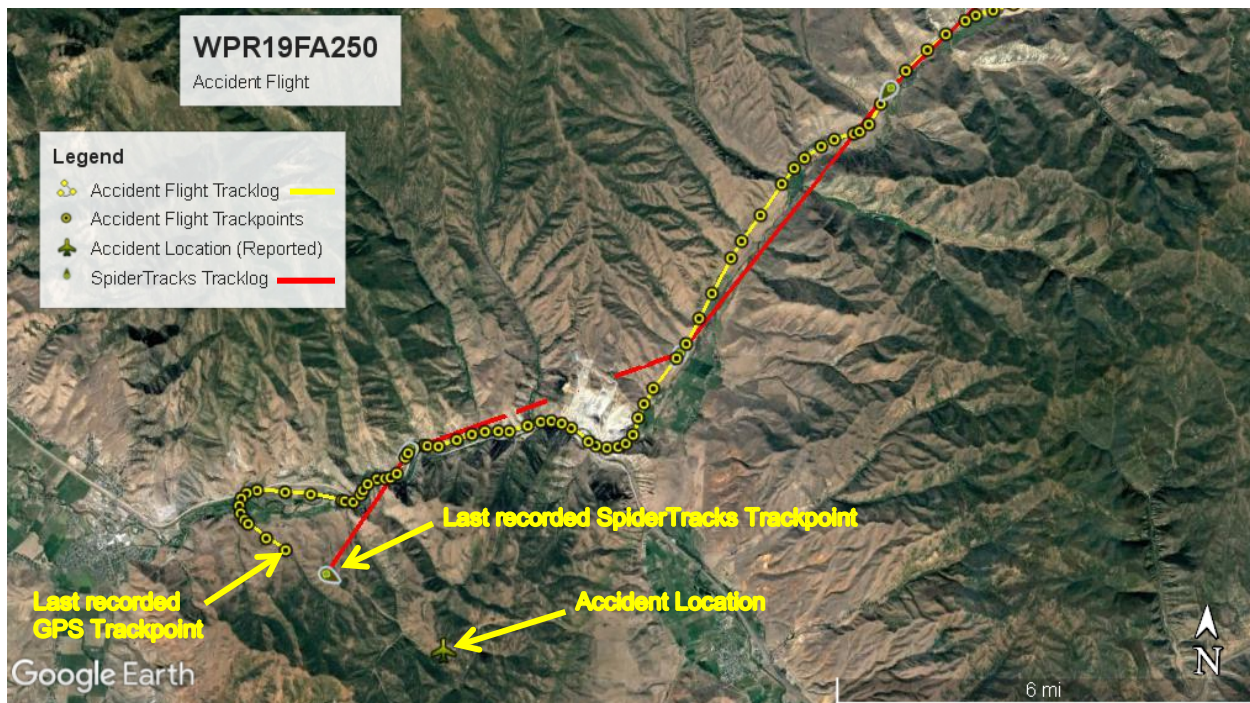


Figure 4. Google Earth 3-D Overlay showing last recorded two minutes Accident Flight.

