

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR24FA150

GLOBAL POSITIONING SYSTEM (GPS) DEVICE

Specialist's Factual Report

October 29, 2025

A. ACCIDENT SUMMARY

Location: Thurlow, Montana
Date: May 14, 2024
Time: 0720 mountain daylight time (MDT)
Airplane: Piper PA-18-150, N14323

B. GLOBAL POSITIONING SYSTEM (GPS) DEVICE SPECIALIST

Specialist: Jonathan Xue
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 GPS device:

Recorder Manufacturer/Model:	Garmin GPSMAP 496
Recorder Serial Number:	19712680

1.0 Device Description

The Garmin GPSMAP 496 is a battery-powered portable 12-channel GPS receiver with a 256-color thin-film transistor (TFT) liquid-crystal display (LCD) display screen. The unit includes a built-in Jeppesen database and is capable of receiving XM satellite radio for flight information including NEXRAD radar, lightning, METARs, TAFs, and TFRs. A built-in AOPA Airport Directory and SafeTaxi Airport Diagrams are included for selected fields. The unit stores date, route-of-flight, and flight-time information for up to 50 flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 250 feet, and it 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 is stored within the unit when the receiver has a lock on the GPS navigation signal. Position is updated within the track log 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 storage may be activated or de-activated at user discretion. All recorded 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

serial port. An internal button battery is used to back up power to the internal memory and real-time clock during those periods when main power is removed

1.1 Device Condition and Data Recovery

The Garmin GPSMAP 496 device sustained impact damage, the condition of the device is shown in Figure 1. The non-volatile memory (NVM) chip was removed from its main circuit board, read out, and converted into engineering units using laboratory tools.



Figure 1. The top and back of the Garmin GPSMAP 496 as received.

1.2 Recording Description

The downloaded data contained 13 sessions, from February 16, 2024, to May 14, 2024. The last session, recorded on May 14, 2024, was identified to be associated with the accident event. The duration of this recording was 37 minutes and 16 seconds, from 6:43:19 to 7:20:35 MDT. The recording rate ranged from 1 to 123 seconds per sample.

1.2.1 Parameters Provided

Table 1 lists the recorder parameters verified and provided in this report.

Table 1. Garmin GPSMAP 496 data parameters provided.

Parameter Name (unit)	Parameter Description
GPS Alt (Ft)	Geometric altitude above mean sea level (feet)
Latitude (Deg)	Geographic latitude (degrees)
Longitude (Deg)	Geographic longitude (degrees)
Time	Time (MDT) for recorded data point (HH:MM:SS)
Heading	Derived from compass direction between previous aircraft position and current position

Parameter Name (unit)	Parameter Description
Average Groundspeed	Derived from distance between previous position and current position over the time elapsed between those two points

1.3 Time Correlation

The data was recorded in coordinated universal time (UTC), and it was converted to MDT, the local time of the event. MDT is behind UTC by 5 hours.

D. FIGURES AND TABULAR DATA

Figure 2 and Figure 3 are Google Earth overlays of the accident flight. Figure 2 shows the entire accident flight, and Figure 3 shows the final portion of the accident flight.

The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

The corresponding tabular data used to create Figure 2 and Figure 3 are provided as attachment 1 in electronic comma-separated value (CSV) format to this report.

Submitted by:

Jonathan Xue
Computer Scientist – Recorder Specialist

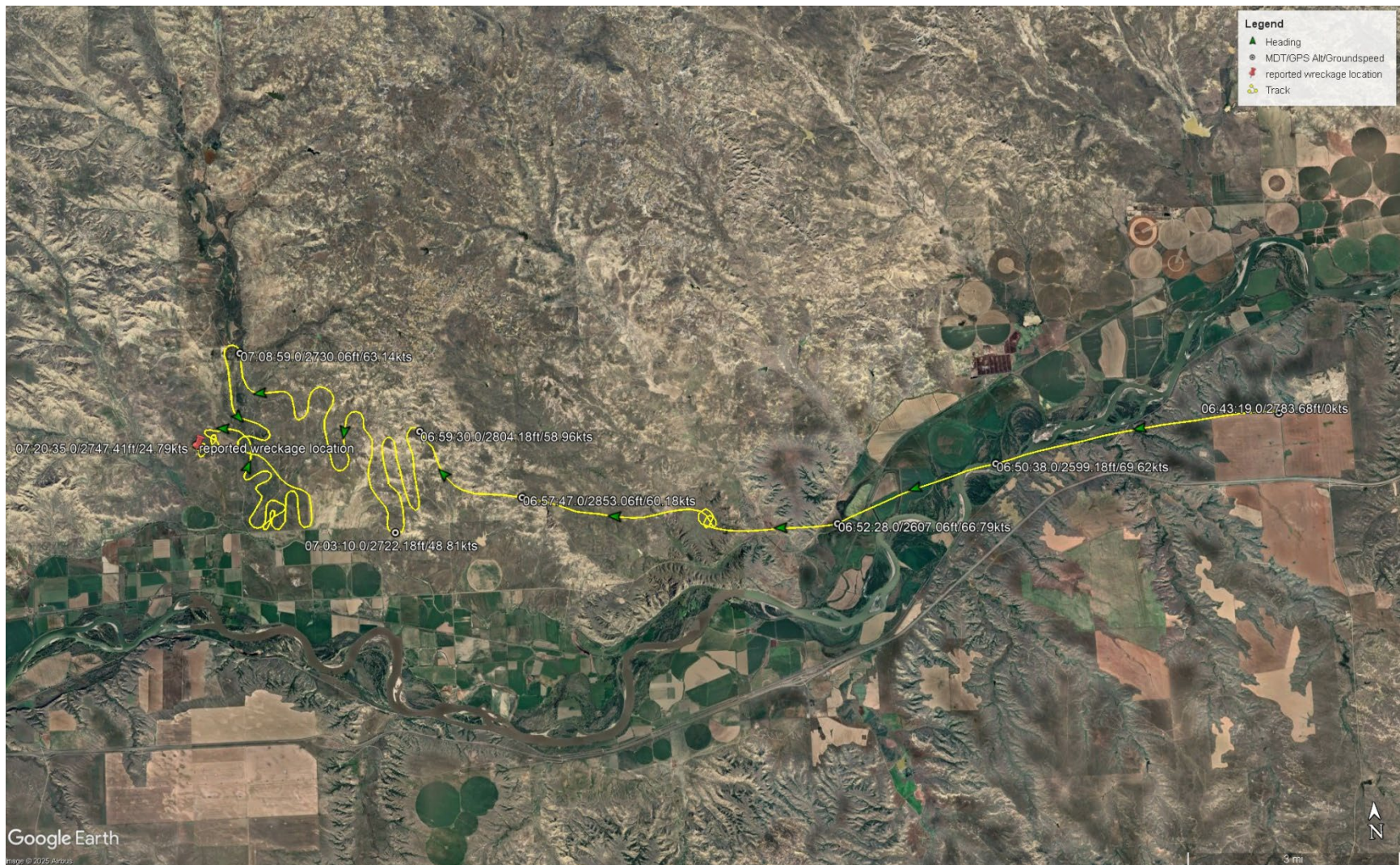


Figure 2. Google Earth overlay of the entire event flight on May 14, 2024.

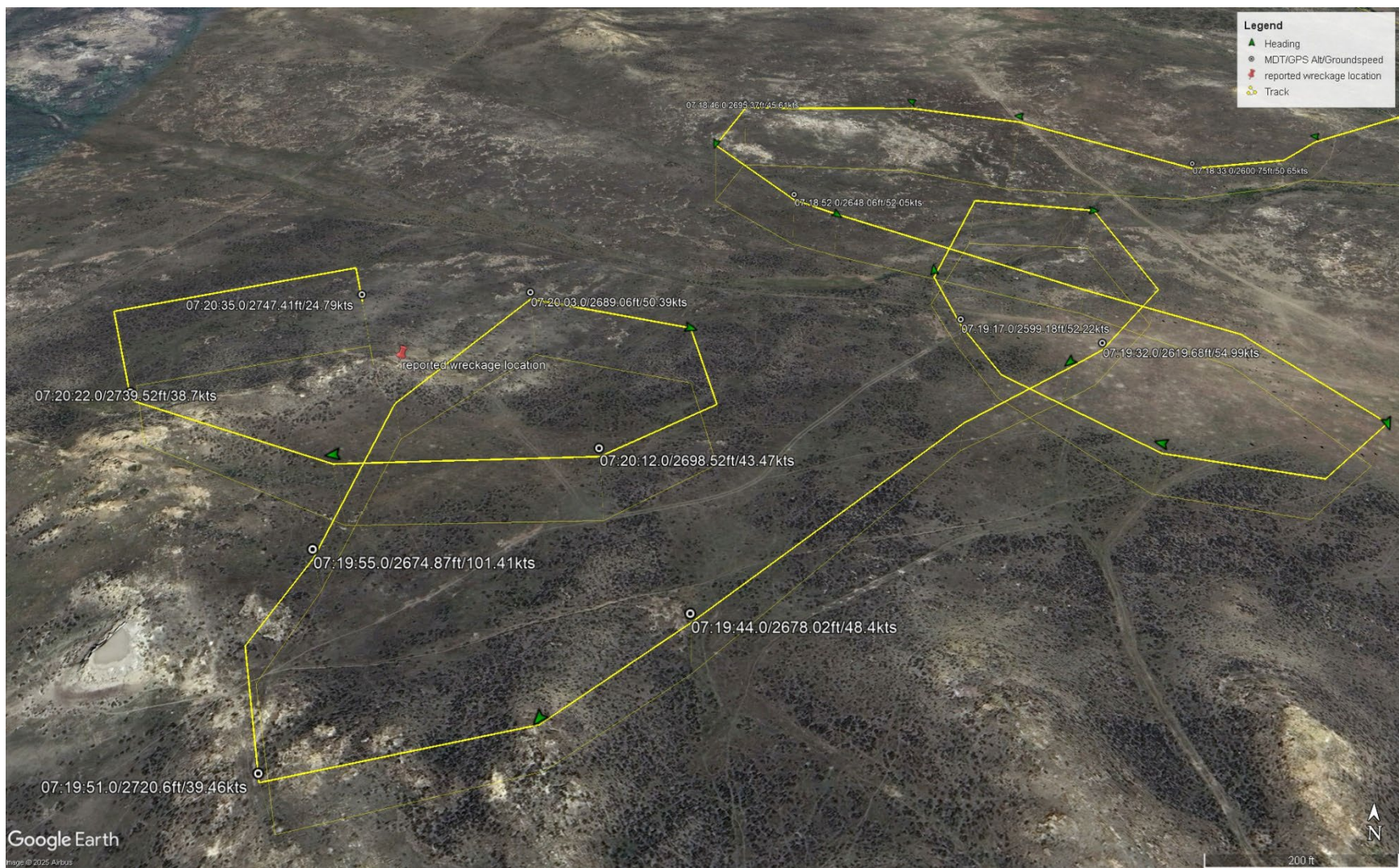


Figure 3. Google Earth overlay of the final portion of the event flight.