

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

January 15, 2015

Global Positioning System Device

Specialist's Factual Report By Ben Hsu

1. EVENT

Location: Bunn, North Carolina
Date: April 13, 2014
Aircraft/ID: LET L33 / N318BA
Operator: Private
NTSB Number: ERA14LA199

2. DETAILS OF DEVICE INVESTIGATION

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

Device: Garmin GPS 12
Device Serial Number: 36006590

The Garmin Global Positioning System (GPS) device was found in good condition (Figure 1). Power was applied to the unit using NTSB laboratory equipment. Device startup was consistent with normal operation. GPS data was downloaded using normal methods and Garmin's Mapsource software.

2.1. Garmin GPS 12 Device Description

The Garmin GPS 12 is a battery operated hand-portable GPS unit capable of creating a tracklog stored in *non-volatile*¹ memory. Each tracklog point includes the date and time along with the latitude and longitude position of the GPS unit. The GPS 12 does not record altitude information. The unit contains hardware and software permitting download of recorded waypoint, route, and track log information via a Garmin proprietary interface. The unit communicates with other electronic devices via a serial port employing the NMEA 0183 protocol. An internal button-battery is used to back-up power to the real-time clock during those periods when main power is removed.

2.2. Garmin GPS 12 Data Description

The data extracted included four sessions from April 13, 2014². The last session was determined related to the accident is included in this report.

¹ Non-volatile memory is semiconductor memory that does not require external power for data retention.

² All dates and times are referenced to Coordinated Universal Time (UTC) unless otherwise specified.

2.3. GPS Parameters Provided

Table 1 describes data parameters provided by the GPS device. Date, Time, Latitude, and Longitude are recorded by the device. Groundspeed and Course are derived from the recorded parameters.

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time (UTC) for recorded data point (HH:MM:SS)
Latitude	Recorded Latitude (degrees)
Longitude	Recorded Longitude (degrees)
Groundspeed	Average groundspeed between current and previous data point (knots)
Course	Average course between current and previous data point (degrees)

Table 1: GPS Data Parameters

3. OVERLAYS AND TABULAR DATA

Figure 2 is a Google Earth overlay depicting an overview of the last session recorded on the device. Weather and lighting conditions depicted in Google Earth overlays are not necessarily representative of conditions during the accident.

Figures 3 and 4 are Google Earth overlays depicting the beginning and end of the last session recorded, respectively.

Tabular data used to generate Figures 2-4 are included as Attachment 1. The attachment is provided in electronic comma-separated value (CSV) format.



Figure 1: Garmin GPS 12 (S/N 36006590)

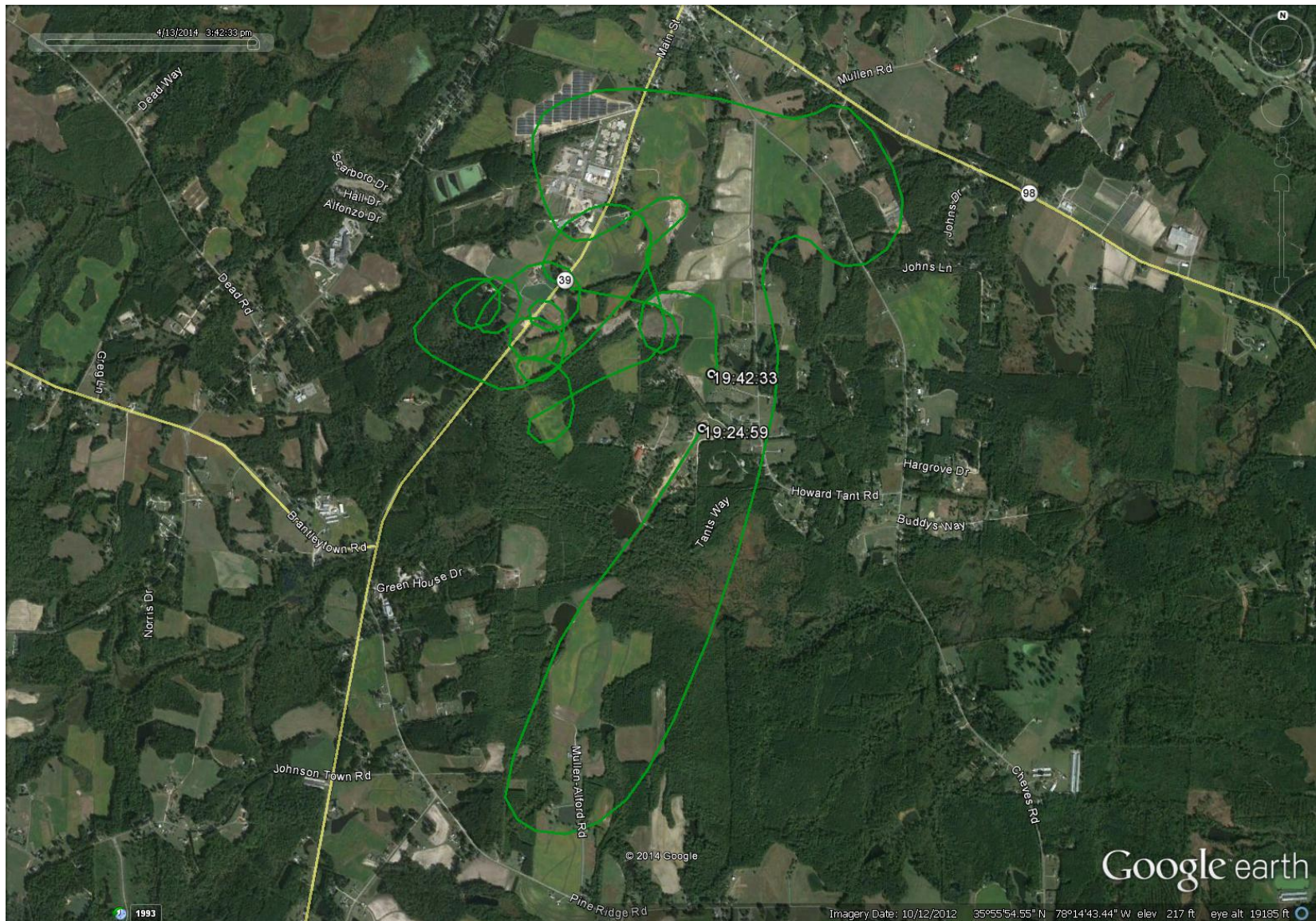


Figure 2: Overview of last session recorded

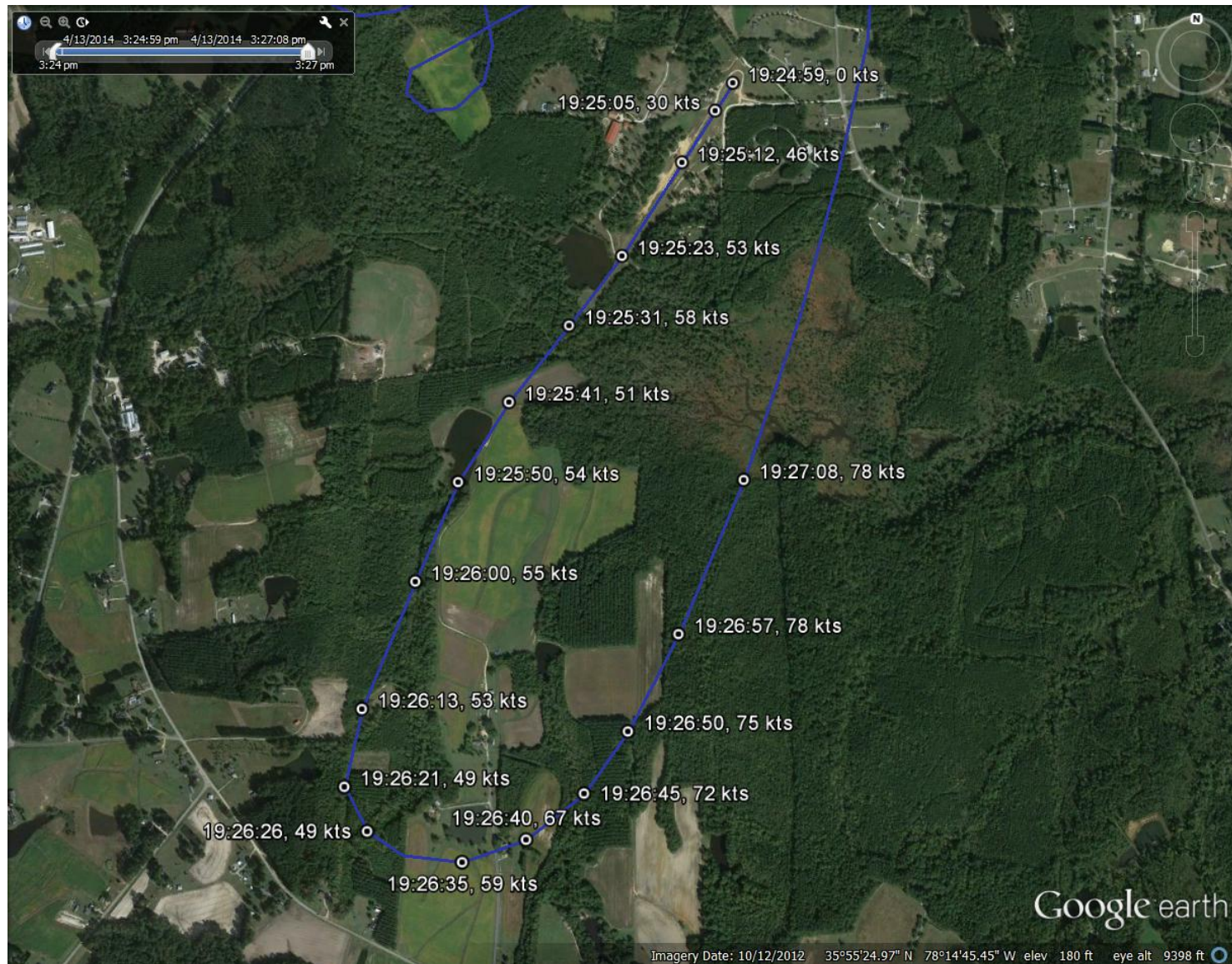


Figure 3: Start of last session recorded



Figure 4: End of last session recorded