

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

November 24, 2015

Global Positioning System Device

Specialist's Factual Report

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1. EVENT SUMMARY

Location: Ama, Louisiana
Date: September 26, 2015
Aircraft: Zodiac CH-601-HD
Registration: N401
Operator: Private
NTSB Number: CEN15FA426

On September 26, 2015, at 1222 central daylight time, a Zodiac CH-601-HD single-engine airplane, N401, impacted terrain near St. Charles Airport (LS40), Ama, Louisiana. The pilot was fatally injured, and the airplane was substantially damaged. The airplane was registered to Buffalo RD, LC; New Orleans, Louisiana; and was operated by a private individual, as a 14 *Code of Federal Regulations* Part 91 personal flight. Day visual meteorological conditions (VMC) prevailed and a flight plan had not been filed. The airplane had departed LS40 at 1221 for a local flight.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

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

Device Manufacturer/Model:	Garmin Aera 500
Serial Number:	1QN015498

3.1. Device Description

The Garmin Aera 500 is a portable GPS unit designed for both automotive and aviation environments. It is capable of storing a detailed tracklog – including latitude, longitude, date, time, GPS altitude, and groundspeed information – within the unit whenever the

receiver has a lock on the GPS navigation signal. All recorded data is stored in non-volatile memory¹. Communication to the device is provided by a built-in USB port.

3.2. Data Recovery

The device arrived with minimal damage and was in working condition. The device was connected to a PC via a USB cable and was downloaded normally using the manufacturer's recommended procedure and associated software. Figures 1 and 2 show the front and back of the device in the laboratory.



Figure 1. Front of Garmin Aera 500.



Figure 2. Rear of Garmin Aera 500.

¹ Non-volatile memory (NVM) – Semi conductor memory that does not require a power source to retain data.

3.3. Data Description

The data extracted included 64 track logs/sessions from October 21, 2014, through September 26, 2015. The accident flight was recorded starting 17:19:02 UTC and ending 17:22:37 UTC on September 26, 2015. In addition, one previous flights on September 26, 2015, starting 16:37:01 UTC and ending 16:53:39 UTC, was determined to be of interest and is included in this report.

3.4. Parameters Provided

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

Table 1. GPS Data 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)
GPS Alt	Recorded GPS Altitude (feet)
Groundspeed	Average derived groundspeed (knots)
Track	Average derived true course (degrees)

3.5. OVERLAYS AND TABULAR DATA

Lighting and weather conditions during time of the accident are not accurately depicted when using Google Earth imagery. All times are given in UTC. Most recordings exhibited a collection of erroneous GPS altitude reading at the time the device was powered on and began logging. The erroneous GPS altitude positions generally show incorrect altitude records during the first few recorded GPS positions of each tracklog/session.

Figure 3 is a north up, top down overview of the tracklog associated with the accident flight. The GPS begins recording tracks near the tenant occupied end of LS40 at 17:19:02. At 17:21:18, the tracklog shows the aircraft began a takeoff roll. The recorded groundspeed along the runway during takeoff roll increases to a maximum of 84 knots at 17:21:45. The next recorded point shows a groundspeed of 60 knots 5 seconds later at 17:21:50. Derived groundspeed data varied between 45 and 96 knots as the aircraft took a southwesterly heading off the departure end of the runway. A potentially anomalous recorded point shows the aircraft at 262 feet GPS altitude and 3 knots before the last recorded point was logged at 17:22:37 at a GPS altitude of 66 feet and 3 knots. No further data was recorded.

Figure 4 is a north up, top down view of the departure end of the runway for the accident recording.

Figure 5 provides a 3 dimensional view of the accident recording looking down the aircraft's flightpath as it attempted a departure from LS40.

Figure 6 is a north up, top down view of the previous flight recorded on the accident day starting at 16:37:01 and ending 16:53:39.

Figure 7 is a 3 dimensional view of the previous flight's departure and arrival sequence to and from LS40. The perspective is oriented in the south-southwesterly direction. The aircraft departed LS40 to the west and reversed course toward the east and made a landing in the opposite direction of its original departure.

Figure 8 is a top down view of the both the tracklogs for the previous flight (red) and the accident flight's departure (blue). The previous flight tracklog shows the aircraft arrived in the opposite direction it departed. The previous flight tracklog ended a few feet west of the tenant occupied end of the runway at 16:53:39 and a new track log began at 17:19:02 in approximately the same position. Shortly thereafter, at 17:21:18, the aircraft departed LS40 on the accident flight.

Tabular data used to generate figures 3 through 8 are included as Attachment 1 in electronic comma-delimited (.CSV) format.

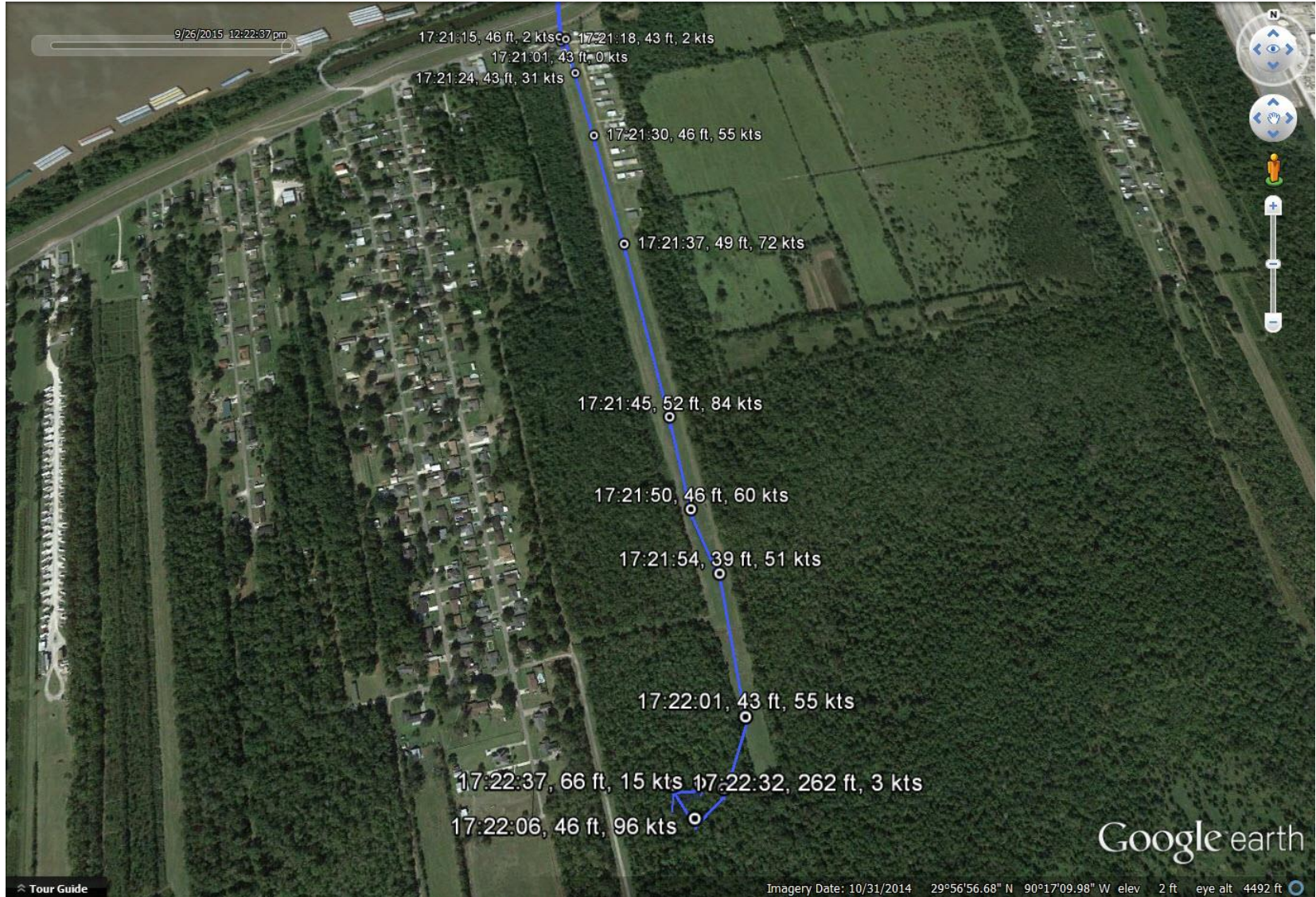


Figure 3. A north up, top down overview of the accident tracklog.

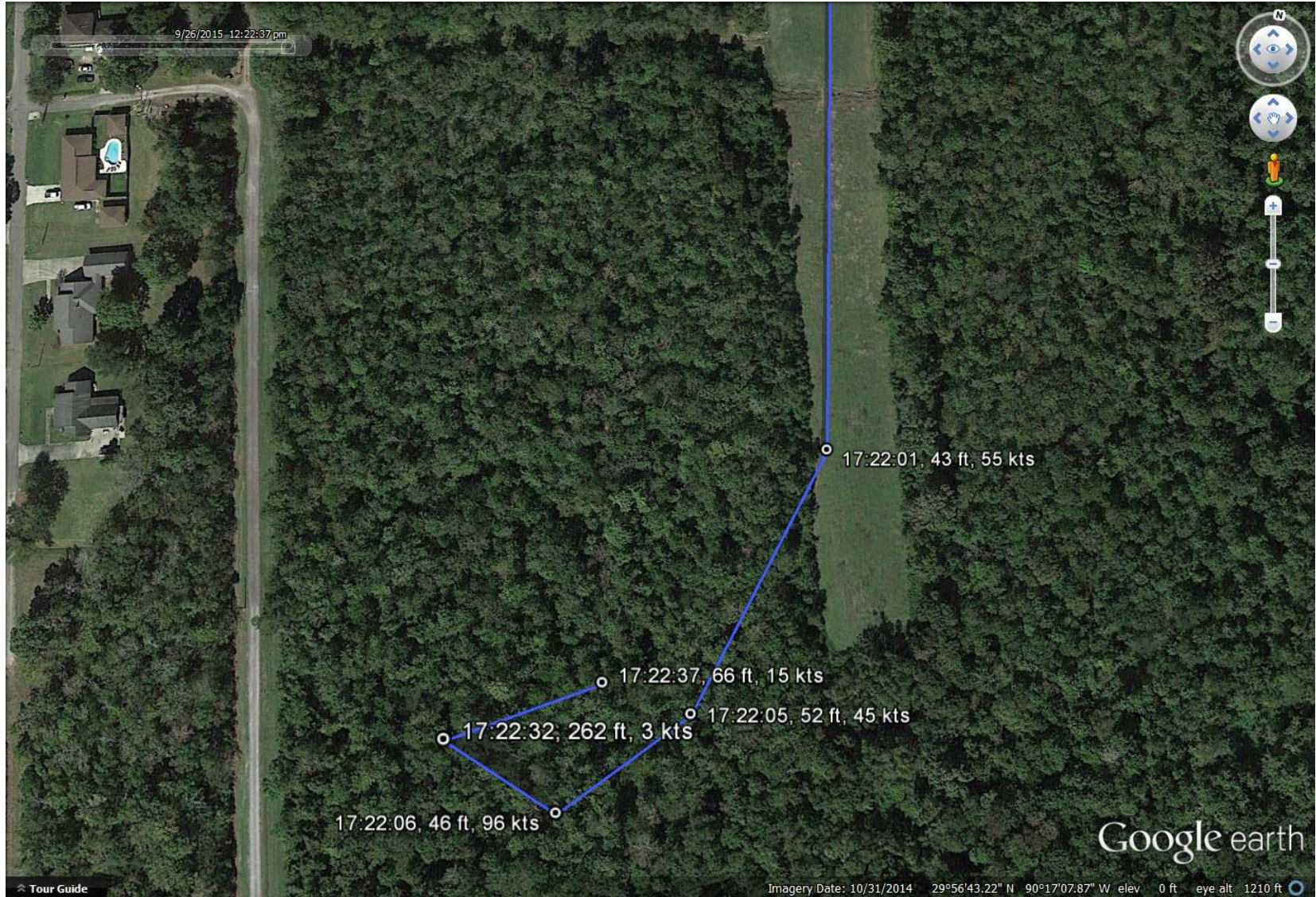


Figure 4. A north up, top down overview of the departure end of the runway showing the accident tracklog.



Figure 5. A 3 dimensional view of the accident tracklog from a perspective of the departure end of the runway.

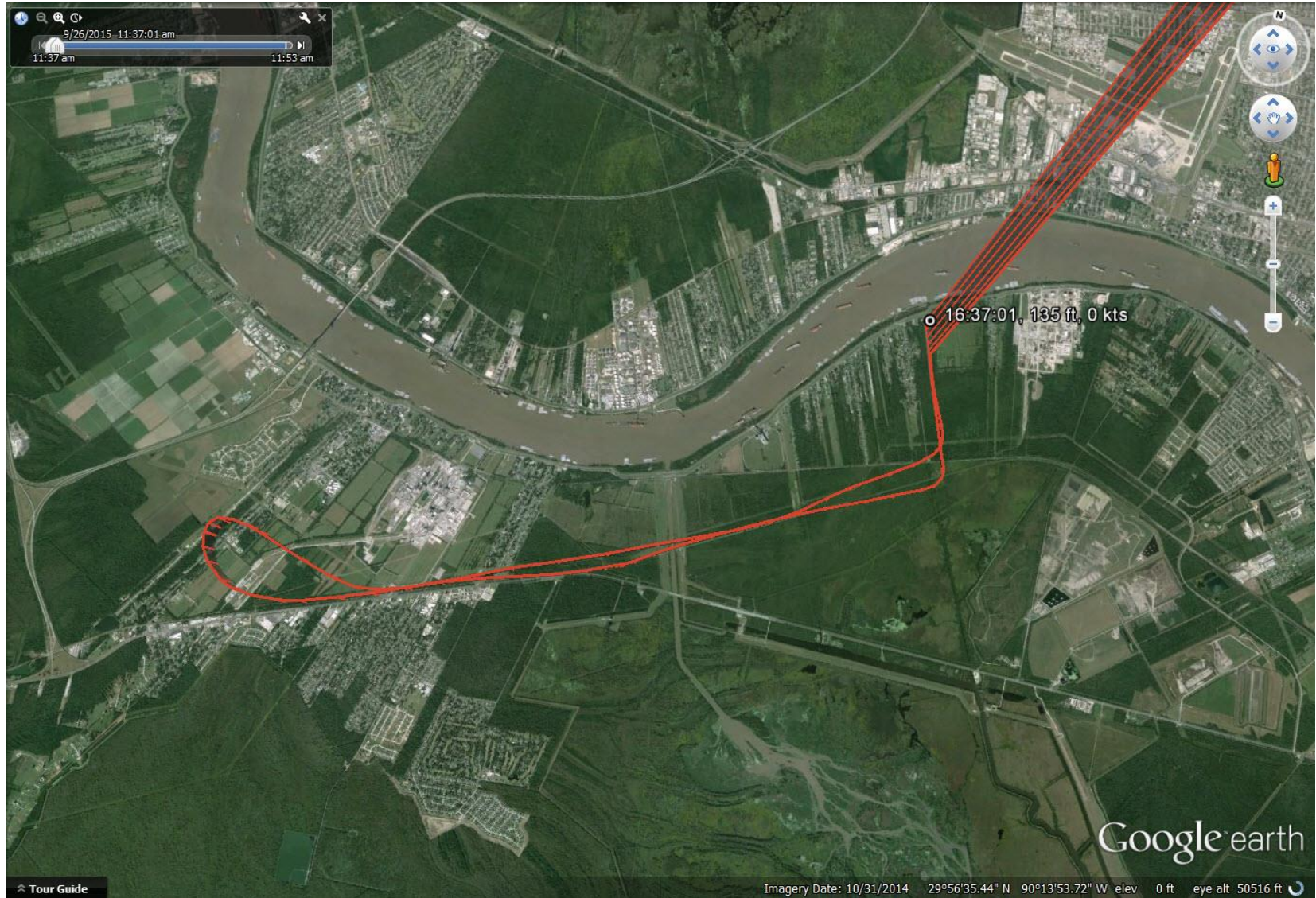


Figure 6. A north up, top down overview of the tracklog associated with the previous flight. The first few recorded altitude positions were determined to be anomalous.



Figure 7. A 3 dimensional view the departure and arrival leg of the previous flight. Perspective is toward the south-southwest. The first few recorded altitude positions were determined to be anomalous.



Figure 8. A north up, top down overview of both the previous flight's tracklog (red) and the accident flight's tracklog (blue). The two recordings show the previous tracklog ending and the accident flight tracklog beginning in the same area.