

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN21FA230

COCKPIT DISPLAY - RECORDED FLIGHT DATA

Specialist's Factual Report

November 15, 2022

A. EVENT

Location: Shreveport, Louisiana
Date: May 23, 2021
Time: 14:47 central daylight time (CDT)
Airplane: SubSonex JSX-2 experimental amateur built jet airplane, N465JC

B. COCKPIT DISPLAY - RECORDED FLIGHT DATA SPECIALIST

Recorder Specialist: W. Deven Chen
National Transportation Safety Board (NTSB)
Washington, DC

C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following cockpit display:

Recorder Manufacturer/Model:	Garmin GDU 460
Recorder Serial Number:	350001331

1.0 Recorder Description

The Garmin GDU 460 is a panel-mounted GPS receiver with 10.6-inch color liquid crystal (LCD) landscape display. It is a variant of the Garmin G3X Touch series. The Garmin G3X series employ a touch-screen user interface and can be utilized as a Primary Flight Display (PFD), Multi-Function Display (MFD), Engine Monitoring Device (EDM), or a combination of all, depending on how the unit is integrated with other compatible avionics products. The series have the ability to record data via an externally removable SD card mounted on the screen, or internally on a series of non-volatile memory (NVM) chips.

If not disabled, the unit is capable of logging historical information at a variable rate of up to 10 Hertz to internal NVM. Historical logs may be copied to a standard SD card inserted into the slot provided on the front of the unit in configuration mode. Data is exported in engineering units, in a comma separated value (CSV) format. Each record contains UTC date and time, as well as an integer number of milliseconds since the unit was last powered.

1.1 Recorder Condition and Data Recovery

The device had sustained severe impact damage upon arrival at the Vehicle Recorder Division, as shown in figure 1. An 8 giga-byte SD card was recovered from the front card slot, and it contained recorded data logs.



Figure 1. The Garmin GDU 460 as Received.

1.2 Recording Description

The SD card contained 100 data log files. The last log file recorded on May 23, 2021, was determined to be associated with the event flight. The recording was approximately 13 minutes and 9 seconds in duration and with a 1Hz sampling rate.

1.2.1 Parameters Provided

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

Table 1. Garmin GDU 460 data parameters provided.

Parameter Name (unit)	Parameter Description
AltMSL (ft)	Altitude above Mean Sea Level (feet)
AltP (ft)	Pressure altitude (feet)
Amps (A)	Electric current (amperes)
FF (gph)	Fuel flow rate (gallons per hour)
FP (psi)	Fuel pressure (pound per square inch)
GearP (psi)	Gear Pressure (pound per square inch)
GndSpd (kts)	Average groundspeed between current and previous data point (knots)

Parameter Name (unit)	Parameter Description
HDG (deg)	Heading direction relative to magnetic north (degrees)
IAS (kts)	Indicated air speed (knots)
LatAc (G)	Lateral acceleration (G)
Lat (deg)	Geometric latitude (degrees)
Lon (deg)	Geometric longitude (degrees)
NormAc (G)	Normal acceleration (G)
Pitch (deg)	Pitch Angle (degrees)
Roll (deg)	Roll Angle (degrees)
TAS (kts)	True air speed (knots)
TRK (deg)	Path on the surface of the Earth directly below aircraft (degrees)
Volts (V)	Electric voltage (volts)
Vspd (fpm)	Vertical Speed (feet per minute)

1.3 Time Correlation

The data were recorded in Coordinate Universal Time (UTC), and were converted to CDT, the local time of the event.

D. FIGURES AND TABULAR DATA

Figures 2 to 7 contain data recorded during the event on May 23, 2021. All the parameters listed in table 1 are plotted except latitude and longitude.

Figures 2 to 4 show parameter plots during the event flight. These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

Figures 5 to 7 show Google Earth overlays of the event flight track. The reported wreckage location is shown with a red pin. Note that 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 figures 2 to 7 are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

Submitted by:

W. Deven Chen
Electrical Engineer – Recorder Specialist

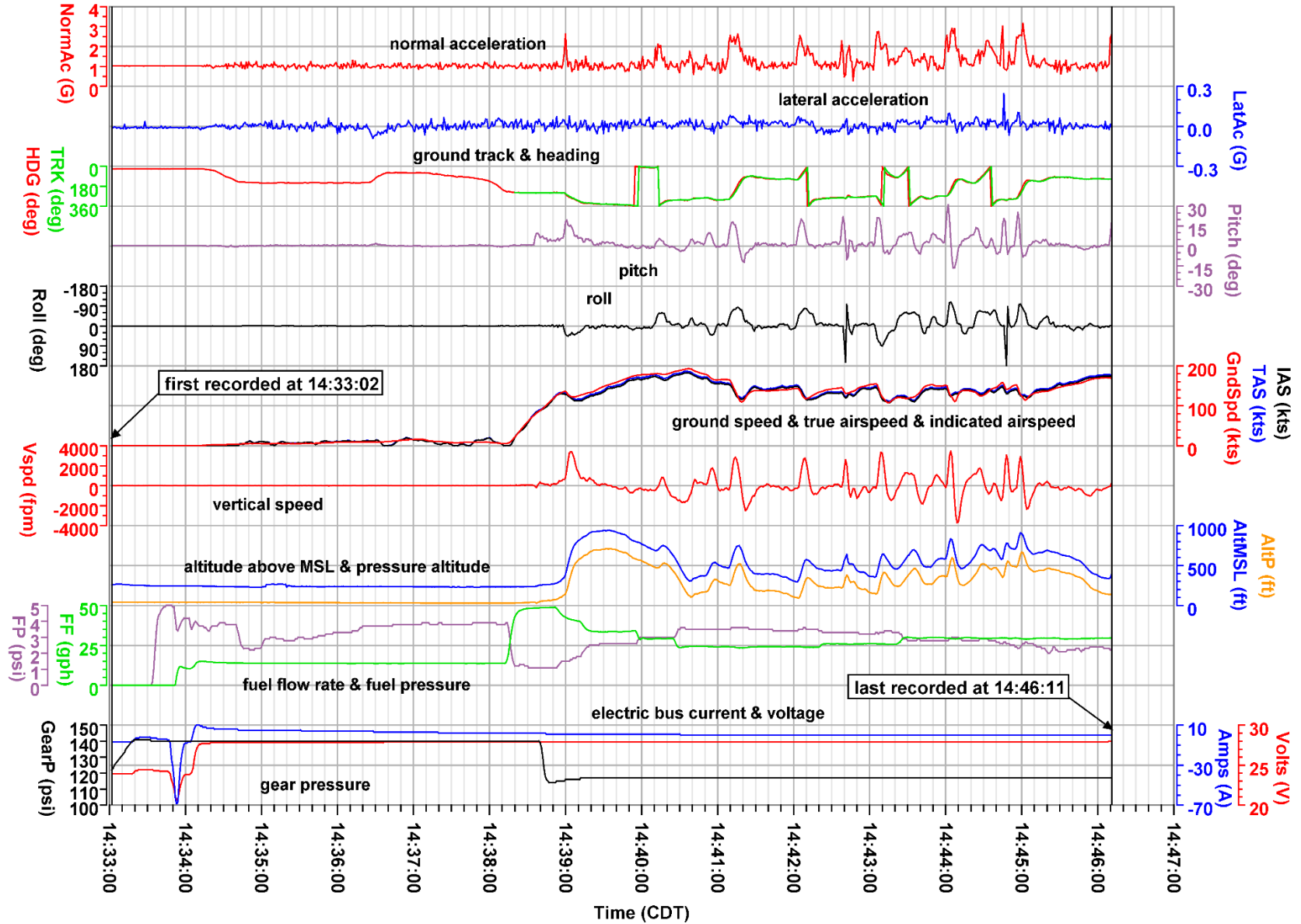


Figure 2. Plot of data parameters for the entire event recording.

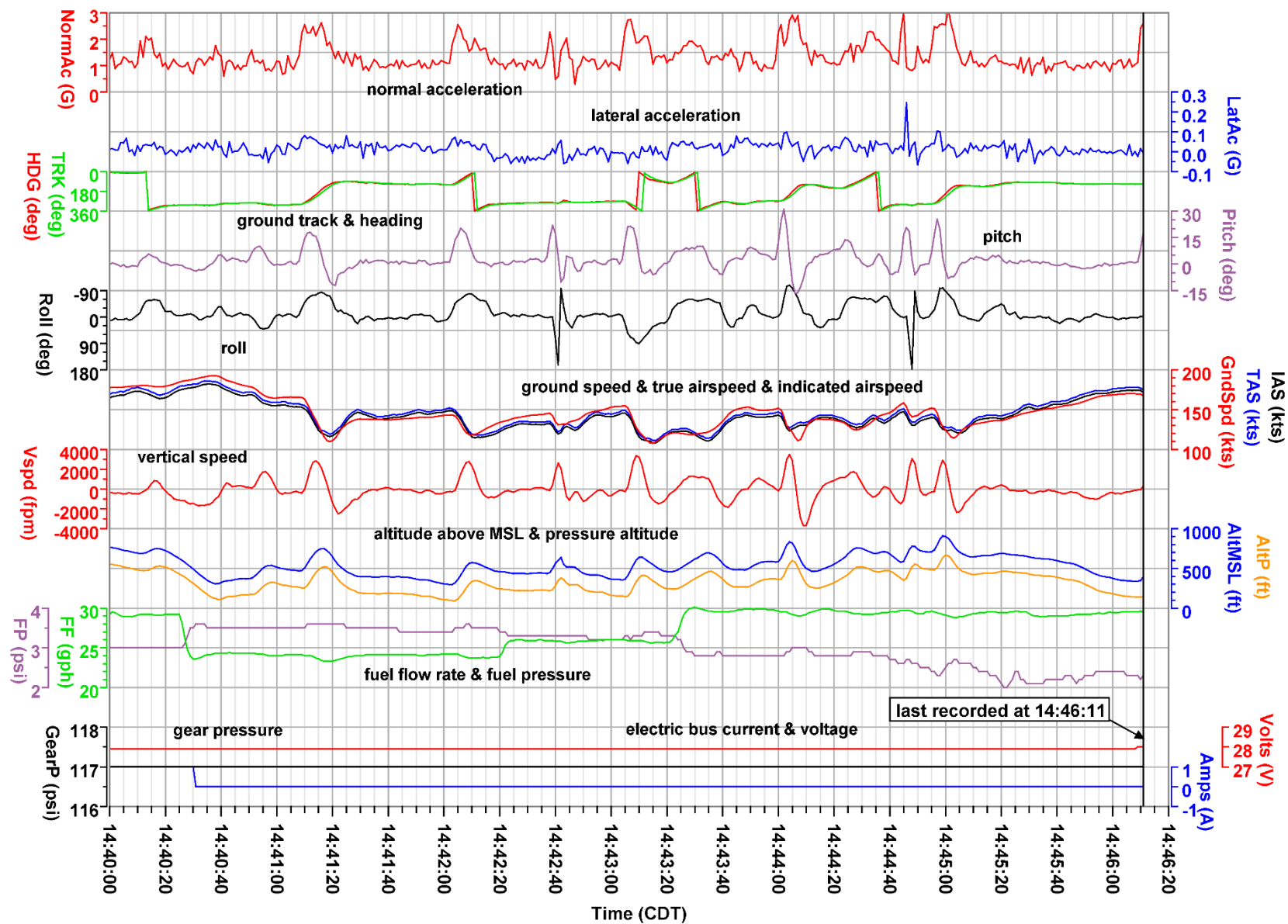


Figure 3. Plot of data parameters for the session between 14:40:00 and the last recorded point.

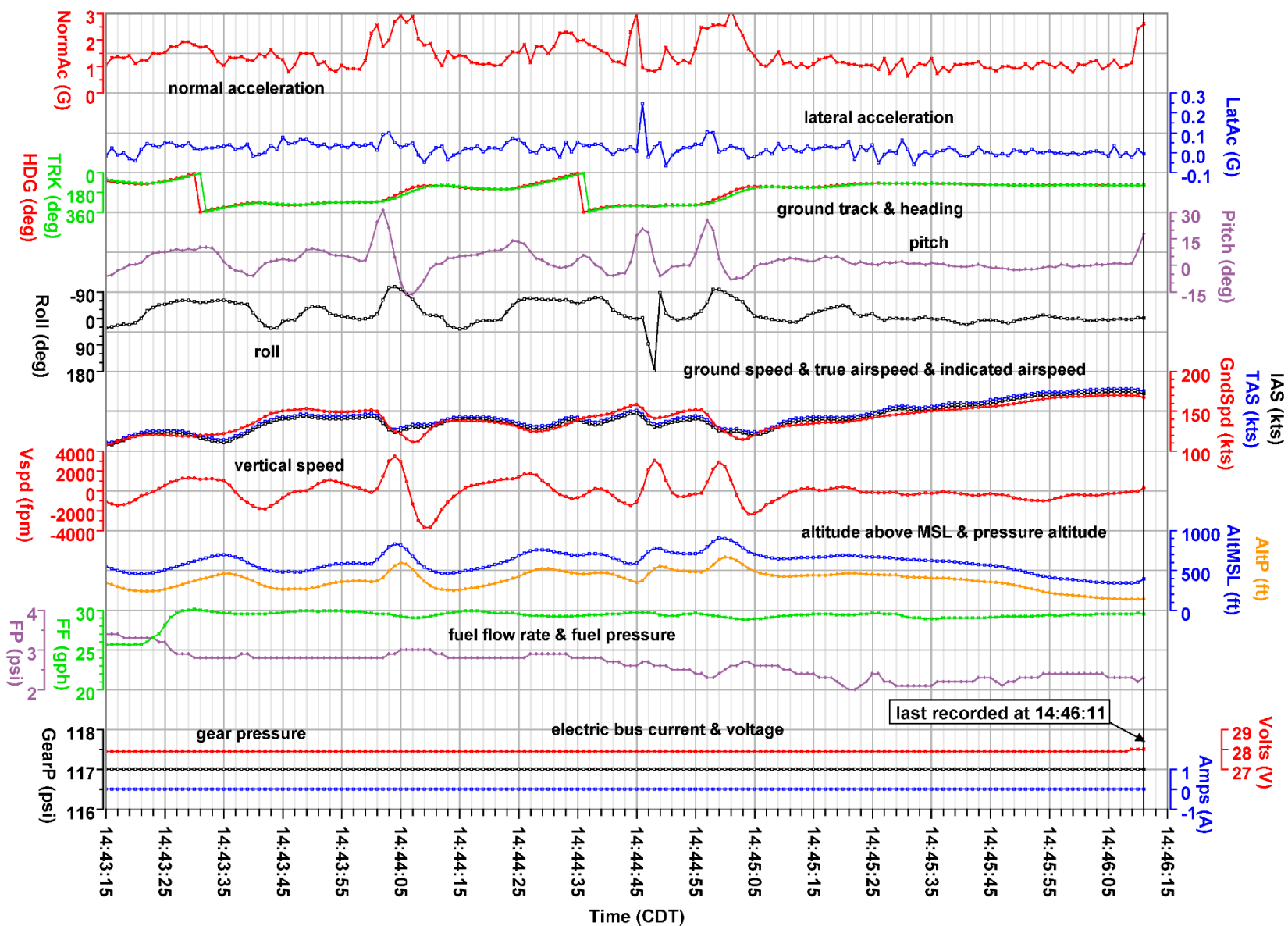


Figure 4. Plot of data parameters for the session between 14:43:15 and the last recorded point.

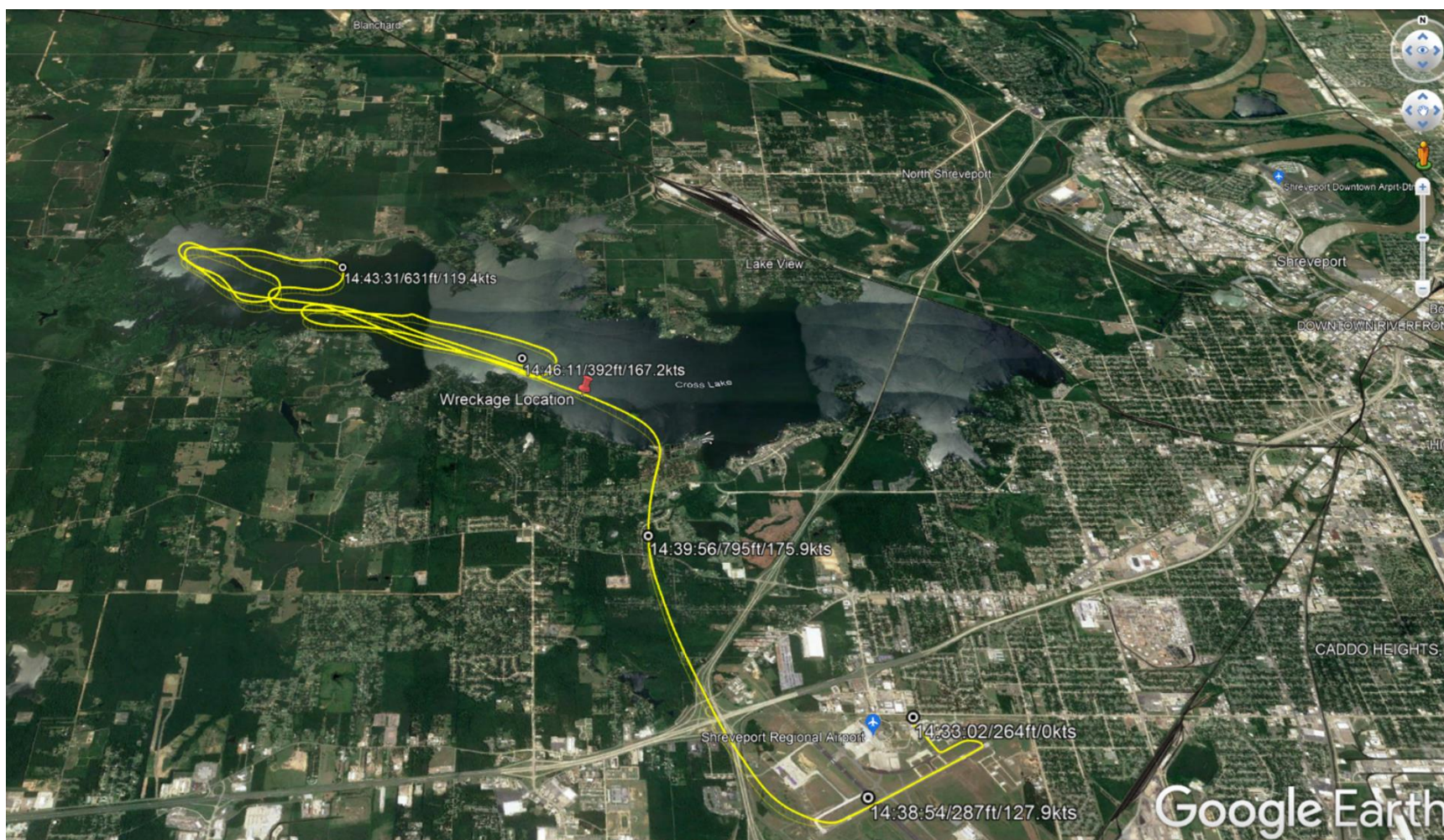


Figure 5. Google Earth overlay of the entire event flight track.



Figure 6. Google Earth overlay of the portion from 14:20:27 to the last recorded point.

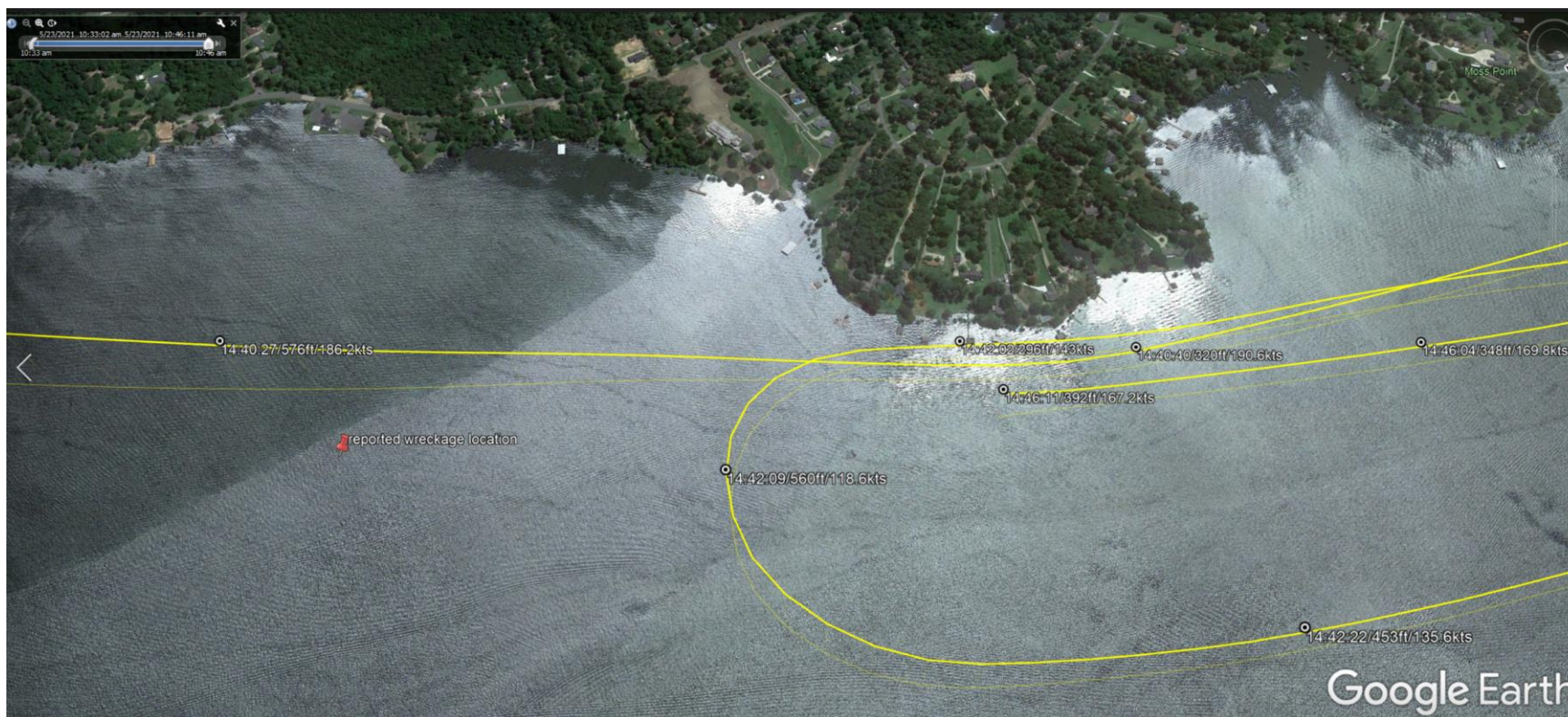


Figure 7. Google Earth overlay of the final portion and the reported wreckage location.