

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN23FA391

ELECTRONIC DEVICES

Specialist's Factual Report

February 9, 2024

A. ACCIDENT

Location: Wellington, Colorado
Date: August 31, 2023
Time: 1339 Mountain daylight time (MDT)
1939 Coordinated universal time (UTC)
Airplane: Schleicher Alexander GMBH & CO ASH 26E Motor Glider, N50FU

B. ELECTRONIC DEVICES SPECIALIST

Specialist: Steven Smith
Mechanical Engineer (Recorder Specialist)
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A group was not convened. The NTSB Vehicle Recorder Division received the following electronic devices:

Recorder Manufacturer/Model: LXNAV S80 Variometer
Recorder Serial Number: 00956

Recorder Manufacturer/Model: LXNAV V9 Sensor Box (attached)
Recorder Serial Number: 05708

1.0 LXNAV S80 Variometer Description

The LXNAV S8x/S10X is a standalone digital variometer, final glide calculator and navigation system with a simple moving map. The LXNAV S8x/S10x has both GPS/FLARM and PDA/PNA input/output. The unit has standard dimensions that will fit into a glider panel with an opening of 80 mm diameter (3.15-inch) or 57 mm diameter. It is also able to supply a PDA/PNA with power (5VDC/1A). The unit has an integrated high precision digital pressure sensor and inertial system. The sensors are sampled more than 100 times per second. Real Time Data is displayed via a digital vario needle, an airspace map, and a QVGA 320x240 pixel, 3.5-inch (S80/S100) or 2.5-inch (S8/S10), high brightness (1200 nits) color display with up to 4 variable numeric fields displayed. To adjust values and settings, the LXNAV S8x/S10x has two rotary push button knobs and three additional push buttons.

The LXNAV S8x/S10x can be expanded with one or more repeaters (LXNAV S8x/S10x) via the CAN bus. This allows both pilots in a two-seat glider to have independent control of all functions of each unit in the front or the rear seat.

1.1 LXNAV S80 Variometer Data Recovery

The LXNAV S80 Variometer and LXNAV V9 Sensor Box showed signs of slight impact damage, as shown in figures 1 and 2. A microSD card was removed from both the LXNAV S80 Variometer as well as the LXNAV Sensor Box, and the data were downloaded using the laboratory tools.



Figure 1. LXNAV S80 as received by the Vehicle Recorder's Lab.



Figure 2. LXNAV V9 Sensor Box attached to S80 as received by Vehicle Recorder's Lab.

1.2 LXNAV S80 Variometer Recording Description

The data extracted from the LXNAV S80 Variometer microSD card included 16 flight logs from May 3, 2023, to August 17, 2023. No flight log was pertinent to the accident flight. The data extracted from the LXNAV V9 Sensor Box microSD card included 69 1 Hz flight logs from June 21, 2021, to August 31, 2023. The last recorded flight log was determined to be associated with accident flight. The last recorded sample does not align with reported wreckage location. The manufacturer was contacted and the data discrepancy was determined to be a data buffering issue as a result of the abrupt loss of power of the LXNAV S80 Variometer during the accident sequence.

1.3 LXNAV S80 Variometer Engineering Unit Conversions

The flight logs extracted stored flight data in .igc files. The .igc files are defined as a text file format used in flight recorders, especially in gliders and in paragliders to certify performance. The files were not encrypted. The data stored in the B-record was 67 bytes long. To decode the B-record extensions, the I-record was parsed. The I-record defines any extensions to data recorded within the fixed B-record in the form of a list of appropriate Three-Letter Codes, data for which will appear at the end of subsequent B-records.

1.4 LXNAV S80 Variometer Time Correlation

LXNAV S80 Variometer data was recorded in universal coordinated time (UTC). The difference between MDT and UTC is 6 hours. The incident flight data has been offset from the recorded LXNAV S80 Variometer time to MDT by subtracting 6 hours. Therefore, for the rest of this report, all times are listed as MDT.

1.5 LXNAV S80 Variometer Parameters Provided

Table 1 lists the LXNAV S80 Variometer parameters verified and provided in this report.

Table 1. LXNAV S80 Variometer parameters verified.

Parameter Name (unit)	Parameter Description (unit)
ACZ (g)	Vertical Acceleration (unit of gravitation acceleration)
Alt GPS (ft)	GPS Altitude (feet)
Alt Press (ft)	Pressure Altitude (feet)
GSP (kts)	Groundspeed (knots)
Latitude (deg)	Latitude (degrees)
Longitude (deg)	Longitude (degrees)
TAS (kts)	True Airspeed (knots)

Parameter Name (unit)	Parameter Description (unit)
TRT (kts)	True Track (degrees)
UTC TIME (HH:MM:SS)	Coordinated Universal Time (Hours:Minutes:Seconds)

D. FIGURES AND TABULAR DATA

Figures 3 to 6 contain data recorded during the event on August 31, 2023. All the parameters listed in table 1 are plotted except UTC Time, Latitude, and Longitude.

Figures 3 and 4 are time history plots of the entire recorded flight and the final two minutes of the recording, respectively.

Figures 5 and 6 are graphical overlays generated using Google Earth presenting the entire flight and the final recorded portion leading up to the accident, respectively. Weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

The data show the following:

- **13:17:14 MDT:** The unit began recording.
- **13:20:22 MDT:** The aircraft departed Owl Canyon Gliderport (4CO2).
- **13:25:53 MDT:** The aircraft began heading north-northwest.
- **13:30:37 MDT:** The aircraft began descending from 7750 ft.
- **13:33:57 MDT:** The aircraft briefly held level around approximately 7218 ft and 67 kts groundspeed before it continued to descend.
- **13:39:43 MDT:** Groundspeed was 58 kts and the GPS Altitude was 5899 ft. End of recorded data.

The corresponding tabular data used to create figures 3 to 6 are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

Submitted by:

Steven Smith
Mechanical Engineer (Recorder Specialist)

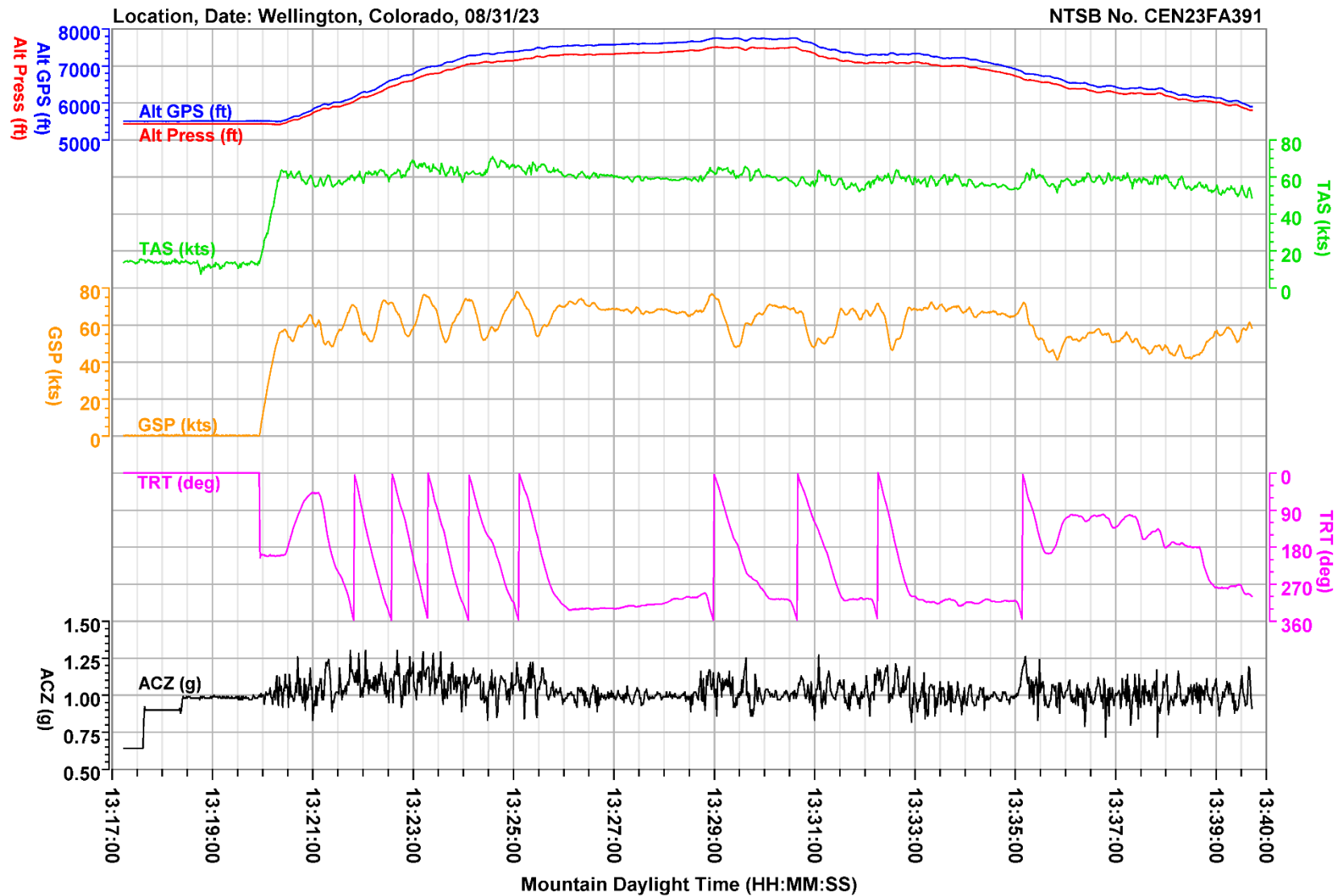


Figure 3. Time history plot of the verified recorded parameters for the entire flight.

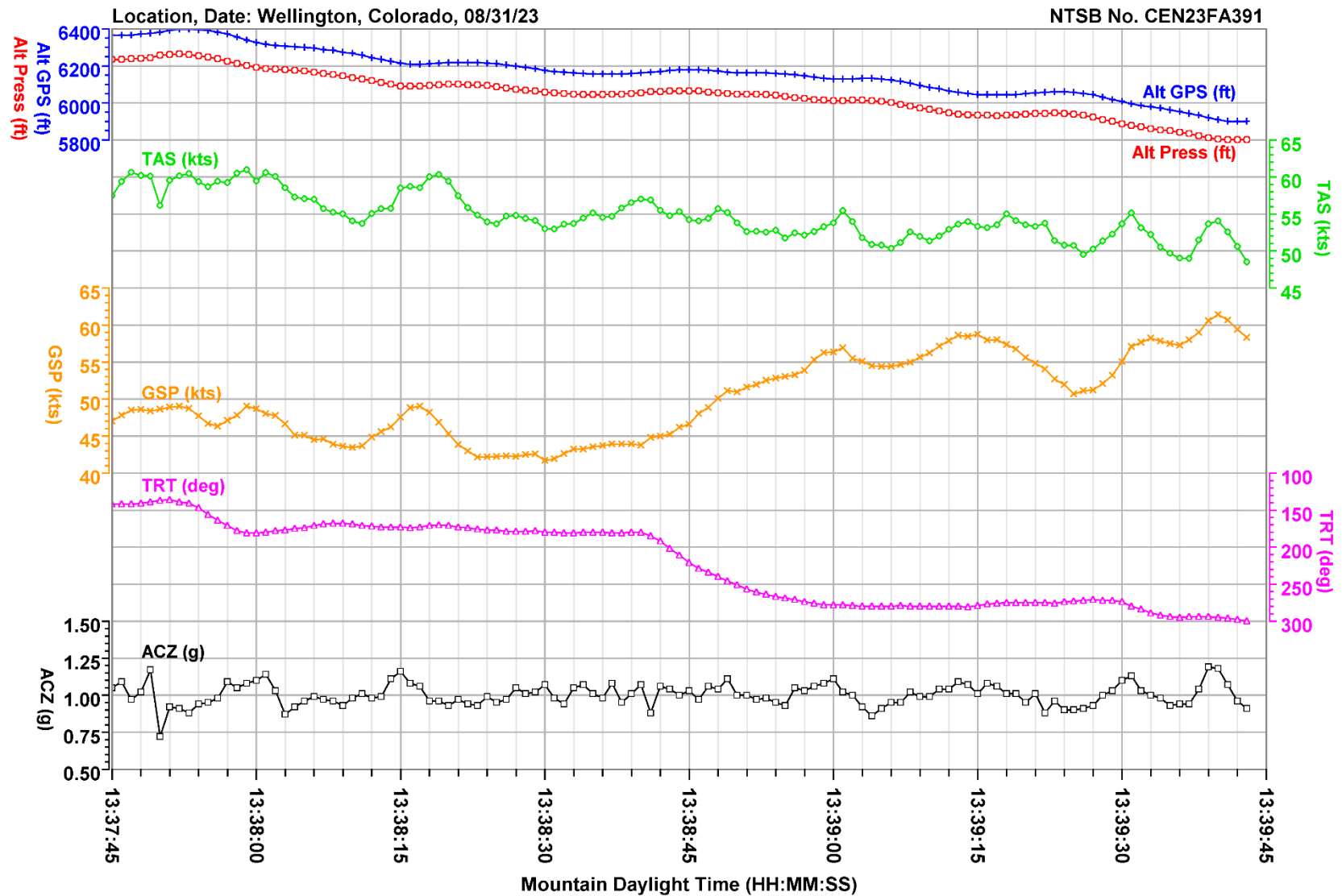


Figure 4. Time history plot of the verified recorded parameters for the final 2 minutes of the recording.



Figure 5. Google Earth overlay of the entire recorded flight.

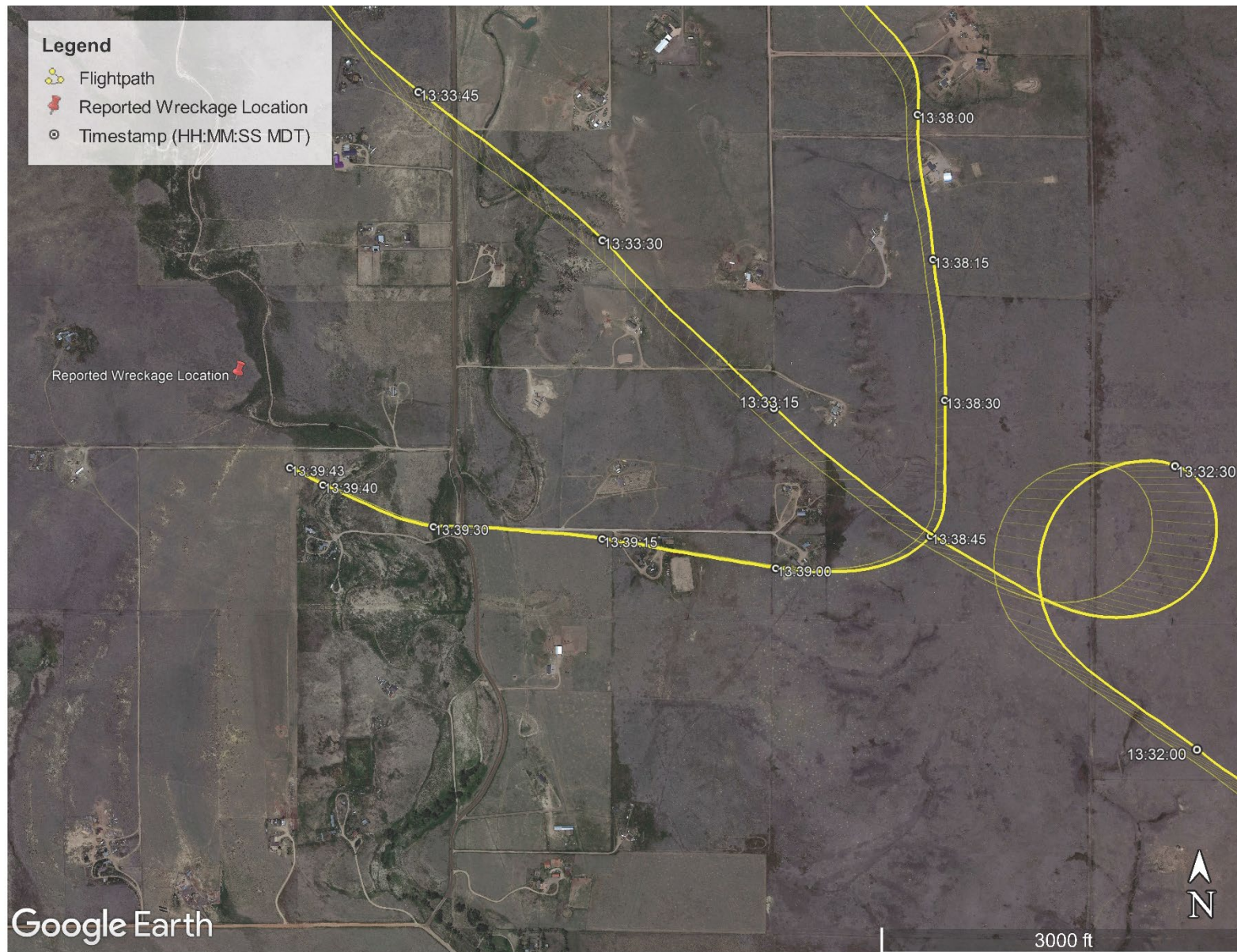


Figure 6. Google Earth overlay of final recorded portion from the LXNAV S80 Variometer.