

National Transportation Safety Board

Office of Research and Engineering

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COCKPIT DISPLAY - RECORDED FLIGHT DATA

Specialist's Factual Report

March 4, 2025

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A. ACCIDENT

Location: Centerville, Utah
Date: October 10, 2023
Time: 1124 mountain daylight time (MDT)
1724 coordinated universal time (UTC)
Airplane: Vans RV-8, N75RT

B. COCKPIT DISPLAY - RECORDED FLIGHT DATA SPECIALIST

Specialist: Gerald Kawamoto
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C. DETAILS OF THE INVESTIGATION

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

Recorder Manufacturer/Model: Garmin GDU 460
Recorder Serial Number: 350000636

1.0 Garmin GDU 460 Description

The Garmin GDU 460 is a 10.6-inch display employing 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 unit has the ability to record data via an externally removable SD card or internally on a non-volatile memory (NVM) chip.¹ Historical logs may be copied to an SD card inserted into the slot provided on the front of the unit.

1.1 Garmin GDU 460 Data Recovery

The device sustained impact damage during the accident event, rendering it inoperable. There was no SD card installed or recovered. The circuit board containing the NVM chip is shown in figure 1. The chip was removed and a binary image of the chip was created using laboratory tools. The image was written to a blank chip and subsequently installed on a lab surrogate circuit board. Data were exported normally to a laboratory SD card using the manufacturer's procedures.

¹ Non-volatile memory (NVM) is semiconductor memory that doesn't require external power for data retention.



Figure 1. Garmin GDU 460 circuit board as received.

1.2 Garmin GDU 460 Data Description

Data included sessions recorded from July 30, 2022, through October 10, 2023. All data in this report are presented in MDT, the local time of the accident. The accident session started at 11:04:25 MDT and ended at 11:24:00 MDT on October 10, 2023. Table 1 describes Garmin GDU 460 parameters provided and verified in this report. Data were recorded at 5 samples per second.

Table 1. Verified and provided Garmin GDU 460 parameters.

Parameter Name (unit)	Parameter Description (unit)
Baro Altitude (ft)	Barometric Altitude (feet)
CHT # (deg F)	Cylinder Head Temperature (degrees Fahrenheit)
EGT # (deg F)	Exhaust Gas Temperature (degrees Fahrenheit)
Engine Power (%)	Engine Power (percent)
Fuel Flow (gal/hr)	Fuel Flow (gallons per hour)
Fuel Press (PSI)	Fuel Pressure (pounds per square inch)
GPS Altitude (ft)	GPS Altitude (feet)
GPS Ground Speed (kt)	Average Derived Ground Speed (knots)
GPS Ground Track (deg)	Average Derived True Course (degrees)
Indicated Airspeed (kt)	Indicated Airspeed (knots)
Latitude (deg)	Recorded GPS Latitude (degrees)
Lateral Accel (G)	Lateral Acceleration (gravitational acceleration)
Longitude (deg)	Recorded GPS Longitude (degrees)
Longitudinal Accel (G)	Longitudinal Accel (gravitational acceleration)
Magnetic Heading (deg)	Magnetic Heading (degrees)
Manifold Press (inch Hg)	Manifold Pressure (inches of Mercury)
Normal Accel (G)	Normal Acceleration (gravitational acceleration)
Oil Press (PSI)	Oil Pressure (pounds per square inch)
Oil Temp (deg F)	Oil Temperature (degrees Fahrenheit)
Pitch (deg)	Pitch Angle (degrees)
Roll (deg)	Roll Angle (degrees)
RPM (RPM)	Engine Revolutions per Minute
True Airspeed (kt)	True Airspeed (knots)
Vertical Speed (fpm)	Vertical Speed (feet per minute)

D. FIGURES AND TABULAR DATA

Figure 2 is a Google Earth overlay of the accident flight recorded on the Garmin GDU 460. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the accident flight. The appearance of the flight track may not be representative of the airplane's actual flight track and may be attributed to the update rate of GPS parameters as well as the software encoding of the GPS input to the device. GPS Altitude and Ground Speed are depicted for data points shown.

Figure 3 through figure 6 are plots of parameters recorded on the device. Pitch angle was offset from 0 degrees and is included for trending purposes.

Figure 3 is a plot of basic parameters of the entire accident flight. The time displayed is 11:14:00 MDT to 11:24:30 MDT.

Figure 4 is a plot of basic parameters for the final 6 minutes of the accident flight. The time displayed is 11:18:00 MDT to 11:24:10 MDT.

Figure 5 is a plot of engine parameters of the entire accident flight. The time displayed is 11:14:00 MDT to 11:24:30 MDT.

Figure 6 is a plot of engine parameters for the final 6 minutes of the accident flight. The time displayed is 11:18:00 MDT to 11:24:10 MDT.

The corresponding tabular data used to create Figure 2 through Figure 6 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Gerald Kawamoto
Recorder Specialist



Figure 2. Google Earth overlay of the accident flight recorded on the Garmin GDU 460.

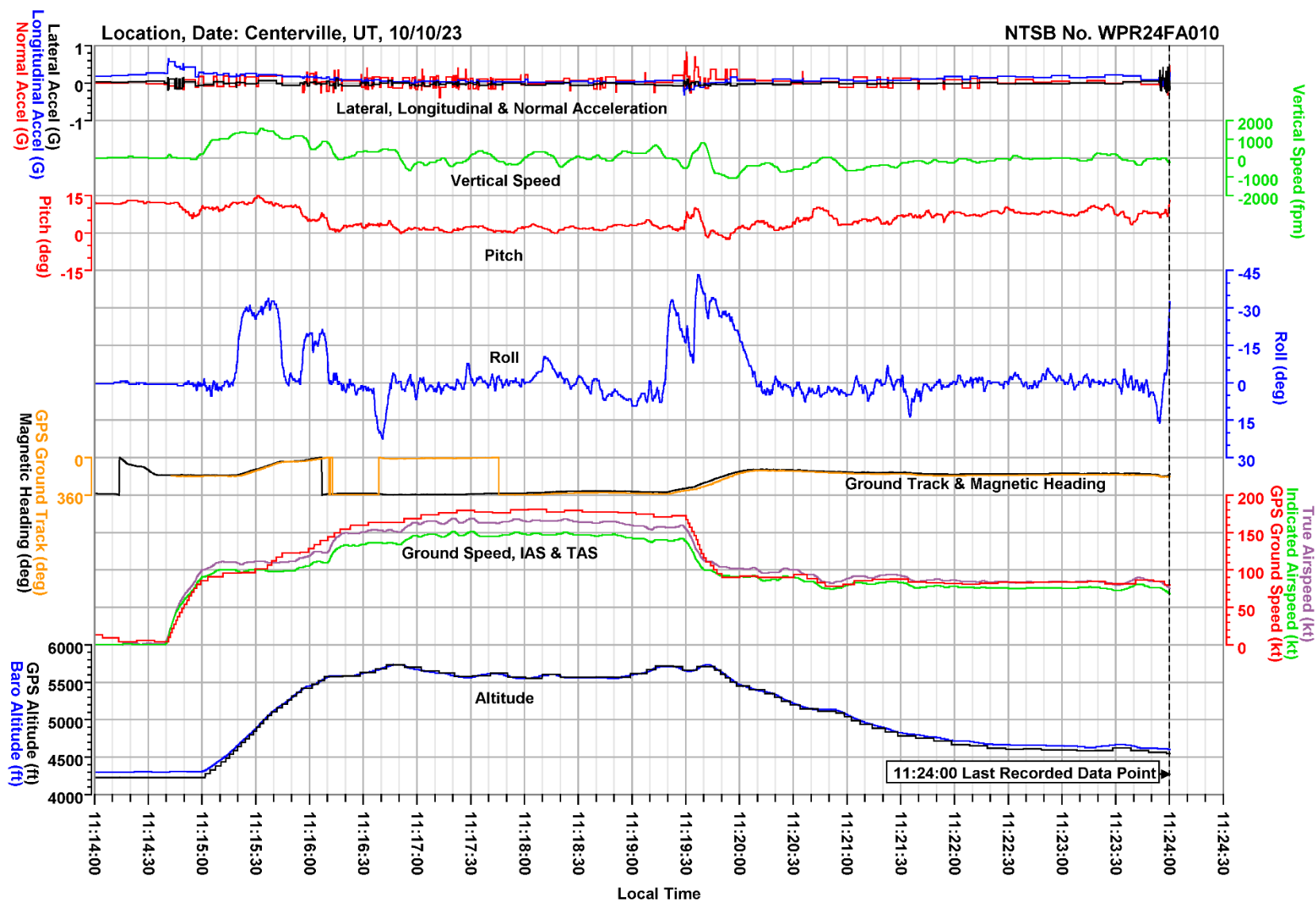


Figure 3. Plot of basic parameters for the accident flight.

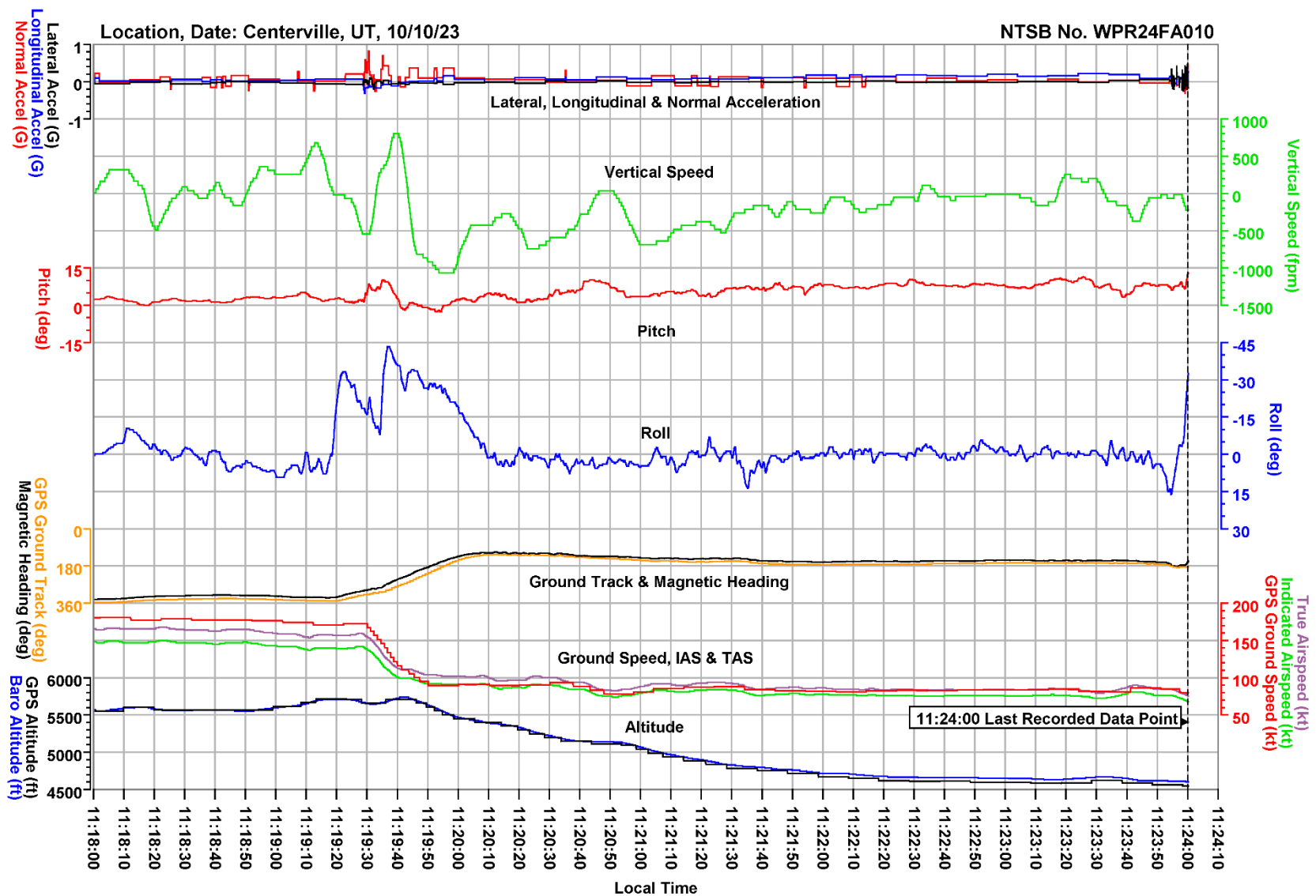


Figure 4. Plot of basic parameters for the final 6 minutes of the accident flight.

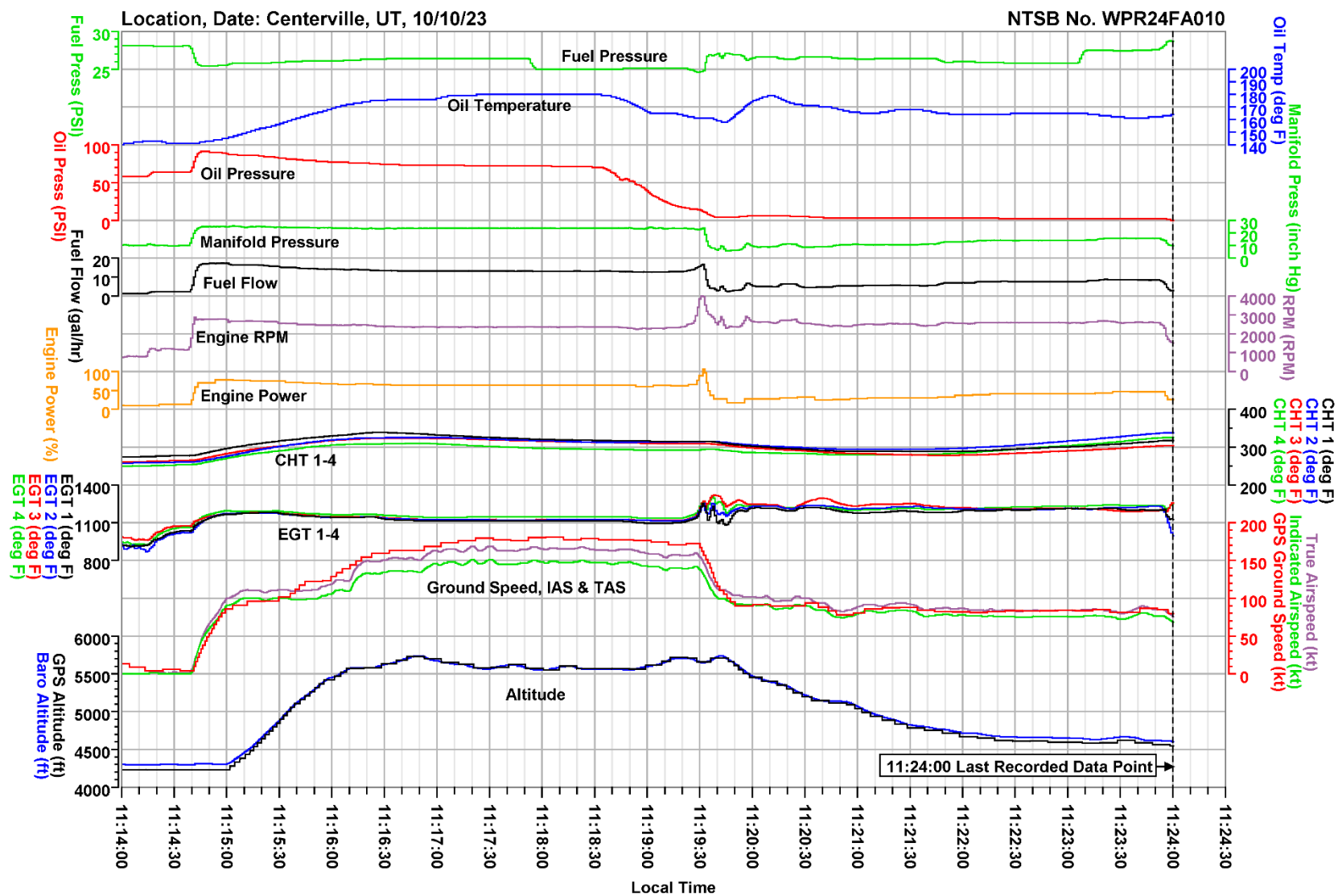


Figure 5. Plot of engine parameters for the accident flight.

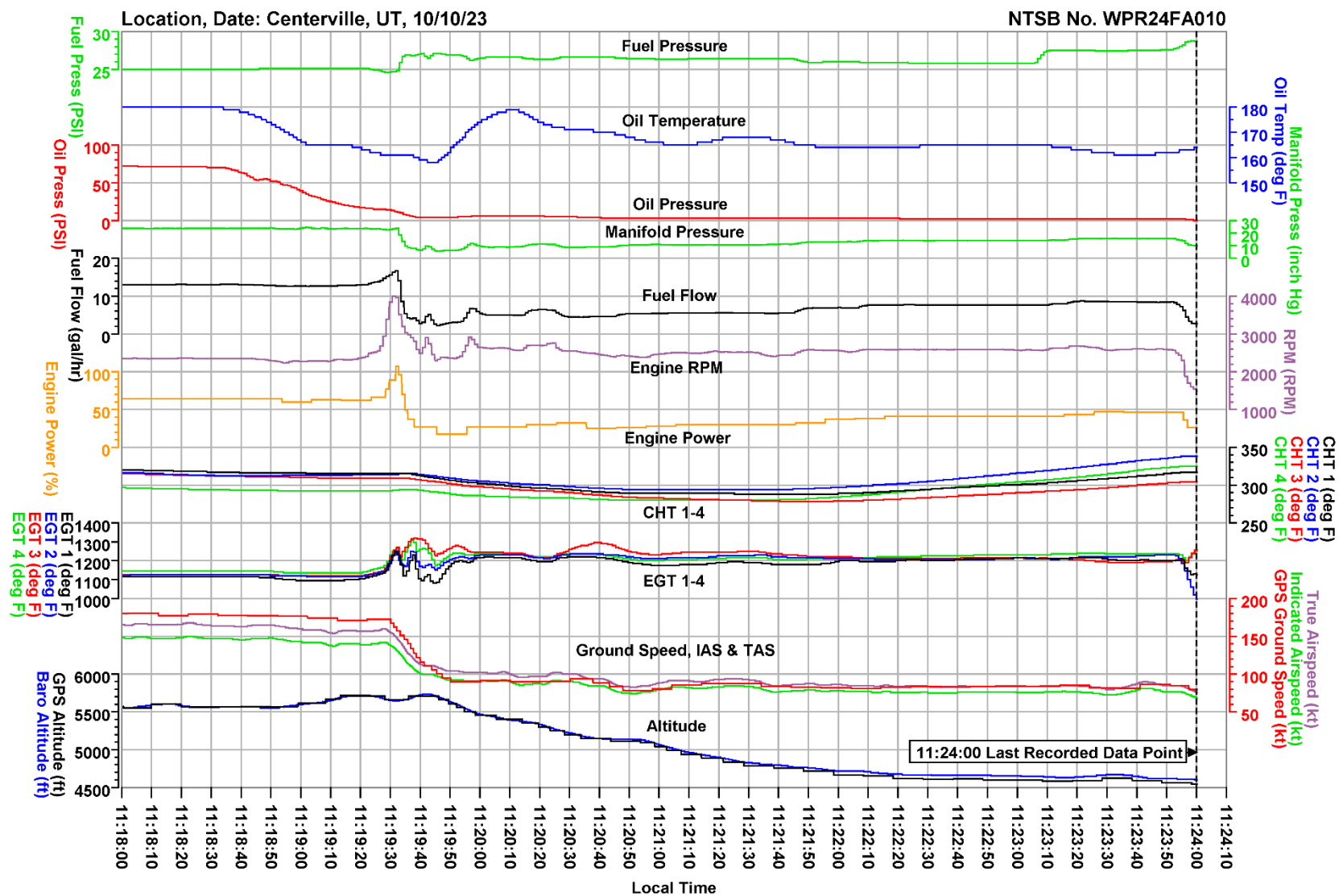


Figure 6. Plot of engine parameters for the final 6 minutes of the accident flight.