

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR24FA215

COCKPIT DISPLAY - RECORDED FLIGHT DATA

Specialist's Factual Report

September 29, 2025

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A. ACCIDENT

Location: Big Creek, Idaho
Date: June 28, 2024
Time: 1734 mountain daylight time (MDT)
Airplane: Cessna 182, Depot Avionics Inc, N6210A

B. COCKPIT DISPLAY - RECORDED FLIGHT DATA SPECIALIST

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Electrical Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

The NTSB Vehicle Recorder Division received the following cockpit displays:

Recorder Manufacturer/Model:	Garmin GDU 470
Recorder Serial Number:	59D000556
Recorder Manufacturer/Model:	Garmin GDU 460
Recorder Serial Number:	7Y9102747
Recorder Manufacturer/Model:	Garmin GI 275
Part Number:	011-04489-10
Recorder Serial Number:	5MZ101682
Recorder Manufacturer/Model:	8 GB SD card (labeled G3X)
Part Number:	BI2023253234Y
Recorder Manufacturer/Model:	8 GB SD card (labeled GTX 375)
Part Number:	BI2023253234Y

1.0 GDU 460 and GDU 470 Descriptions

The Garmin Display Unit (GDU) 460 and GDU 470 are panel-mounted GPS receivers, with color liquid-crystal displays (LCD) in 10.6-inch landscape and 7-inch portrait respectively. They are variants of the Garmin G3X Touch series. The Garmin G3X series employs 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 mounted on the screen, or internally on a series of non-volatile memory (NVM) chips.

If not disabled, the units are capable of logging historical information at a variable rate to the 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 coordinated universal time (UTC) date and time, as well as an integer number of milliseconds since the unit was last powered.

1.1 GDU 460 and GDU 470 Data Recovery

The GDU 460 and GDU 470 arrived in good condition, as shown in Figure 1. Neither unit had an SD card inserted in the slot. An 8GB SD card (labeled G3X) also arrived in good condition, as shown in Figure 2. The SD card was read out using laboratory equipment.



Figure 1. Photos of the front of GDU 460 (left) and GDU 470 (right), as received.



Figure 2. Photo of G3X SD card, as received.

1.2 GDU 460 and GDU 470 Recording Description

The SD card contained 58 data logs from the GDU 460 starting from October 10, 2023, to April 2, 2024, and 42 data logs from the GDU 470 starting from April 7,

2024, to June 28, 2024. Two flight logs were recorded on June 28, 2024. The second flight log was identified as the accident flight and contained recorded data from 16:32:44 MDT to 17:30:27 MDT. A post-accident log was recorded from 17:31:00 MDT to 17:42:22 MDT. The data rate was 1 hertz (Hz) (one data sample per second).

Header information from the log files listed the GDU 460 as the PFD and the GDU 470 as the MFD.

1.2.1 GDU 470 Engineering Unit Conversions

There were no engineering units conversions applied to the GDU 470 data. The engineering units used in this report are based on documentation from the manufacturer of the GDU 470.

In appendix A, table 1 lists the GDU 470 parameters verified and provided in this report. Additionally in appendix A, table 2 describes the unit abbreviations used in this report.

1.3 GDU 470 Time Correlation

The GDU 470 recorded time in coordinated universal time (UTC). The data had a 6-hour UTC offset, in which 6 hours were subtracted to get local time, MDT.

2.0 GI 275 Description

The Garmin GI 275 is a multi-function instrument display with a 2.69-inch diameter semi-round liquid-crystal display (LCD). The unit employs a rotary knob and touch-screen user interface. Different versions of the GI 275 can function as either, Attitude Indicator (AI/ADI), Horizontal Situation Indicator (HSI), Course Deviation Indicator (CDI), Multi-function Display (MFD), or Engine Indication System (EIS). The device has recording capabilities and log files can be exported via Universal Serial Bus (USB) or Wi-Fi.

2.1 GI 275 Data Recovery

The GI 275 was in good condition (see Figure 3) and data were downloaded using the manufacturer's procedure by exporting flight logs to a USB memory stick.



Figure 3. Front (left) and side (right) view of GI 275, as received.

2.2 GI 275 Recording Description

The GI 275 download contained flight information for 349 logs starting from May 15, 2022, through June 28, 2024, and a post-accident log on July 5, 2024. Two logs were recorded on June 28, 2024. The second log was identified as the accident flight that contained recorded data from 16:32:54 MDT to 17:42:04 MDT. Additionally, the second log had a data gap where no data were recorded from 17:29:47 MDT to 17:30:55 MDT.

The unit was found to perform as an Air Data/Attitude/Heading Reference System (ADAHRS) and the data were sampled at 1 Hz.

2.2.1 GI 275 Engineering Unit Conversions

There were no engineering units conversions applied to the GI 275 data. The engineering units used in this report are based on documentation from the manufacturer of the GI 275.

In appendix A, table 1 lists the GI 275 parameters verified and provided in this report. Additionally in appendix A, table 2 describes the unit abbreviations used in this report.

2.3 GI 275 Time Correlation

The GI 275 recorded time in UTC. The data had a 6-hour UTC offset, in which 6 hours were subtracted to get local time, MDT.

3.0 GNX 375 Description and Data Recovery

An 8GB SD card (misabeled GTX 375) for a Garmin GNX 375 arrived in good condition, as shown in Figure 4. The Garmin GNX 375 is panel-mounted device with

the 4.8-inch display that combines a GPS navigator and ADS-B transponder.¹ The unit has an SD card for loading databases and updating software. The SD card can also be used to export WAAS diagnostics and ADS-B traffic data.²

A review of the contents of the SD card did not reveal any historical flight data, thus, no accident-related data were recovered.



Figure 4. Photo of GTX 375 SD card, as received.

D. FIGURES AND TABULAR DATA

Figure 5 to Figure 11 contain GDU 470 and GI 275 data recorded during the event on June 28, 2024. All the parameters listed in appendix A, table 1 are plotted.

Figure 5 to Figure 7 are Google Earth overlays of the accident flight recorded on the GDU 470. The associated displayed data points include a local timestamp, GPS altitude, and GPS groundspeed. The weather and lighting conditions in Google Earth do not represent the conditions present at the time of the accident flight. Figure 5 shows the ground track from departure at Smiley Creek Airport (U87), Smiley Creek, Idaho to Big Creek Airport (U60), Big Creek, Idaho. Figure 6 shows approximately the last 14 minutes of the accident flight and Figure 7 shows the end of the accident flight with the reported wreckage location marked with a blue pin.

Figure 8 is a plot of select parameters of the entire accident flight recorded on the GDU 470 and GI 275. The time displayed is 16:30:00 MDT to 17:32:00 MDT.

¹ Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology deployed throughout the national airspace system. The ADS-B system is composed of aircraft avionics and a ground infrastructure. Onboard avionics determine the position of the aircraft by using the GPS and transmit its position along with additional information about the aircraft to ground stations for use by air traffic control (ATC) and other ADS-B services. This information is transmitted at a rate of approximately once per second. Operators equipped with ADS-B realize additional benefits from ADS-B broadcast services: Traffic Information Service - Broadcast (TIS-B) (traffic information) and Flight Information Service - Broadcast (FIS-B) (weather information).

² The Wide Area Augmentation System (WAAS) is an air navigation aid to augment the Global Positioning System (GPS), by improving its accuracy, integrity, and availability.

Figure 9 is a plot of engine parameters of the entire accident flight recorded on the GDU 470. The time displayed is 16:30:00 MDT to 17:31:00 MDT.

Figure 10 is a plot of select parameters for approximately the final 4 minutes of the accident flight recorded on the GDU 470 and GI 275. The time displayed is 17:26:15 MDT to 17:31:00 MDT.

Figure 11 is a plot of engine parameters for approximately the final 4 minutes of the accident flight recorded on the GDU 470. The time displayed is 17:26:15 MDT to 17:30:30 MDT.

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.

The corresponding tabular data used to create Figure 5 to Figure 11 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Matthew Yandrick
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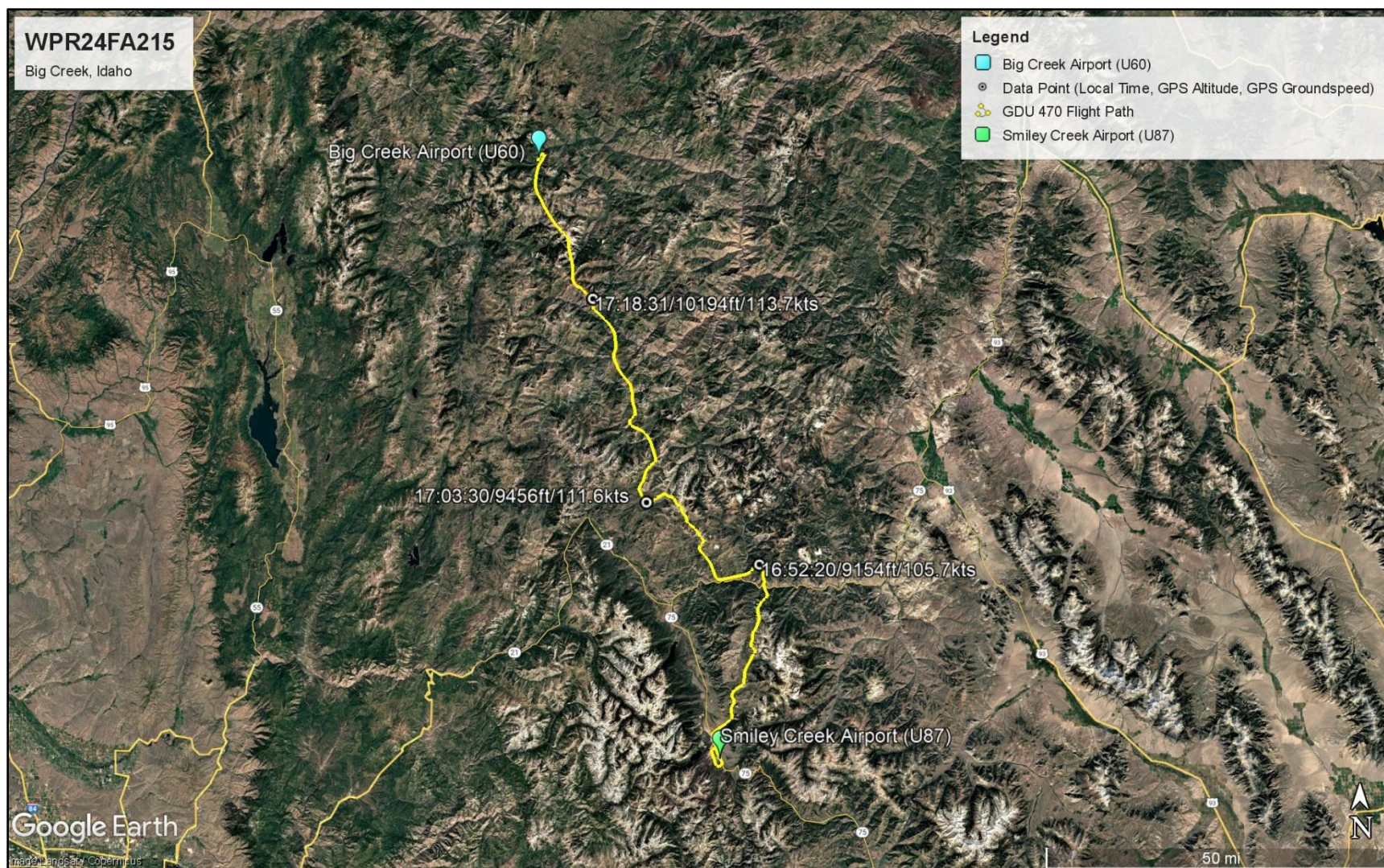


Figure 5. Google Earth overlay of the entire accident flight recorded on the GDU 470.



Figure 6. Google Earth overlay showing approximately the last 14 minutes of the accident flight recorded on the GDU 470.

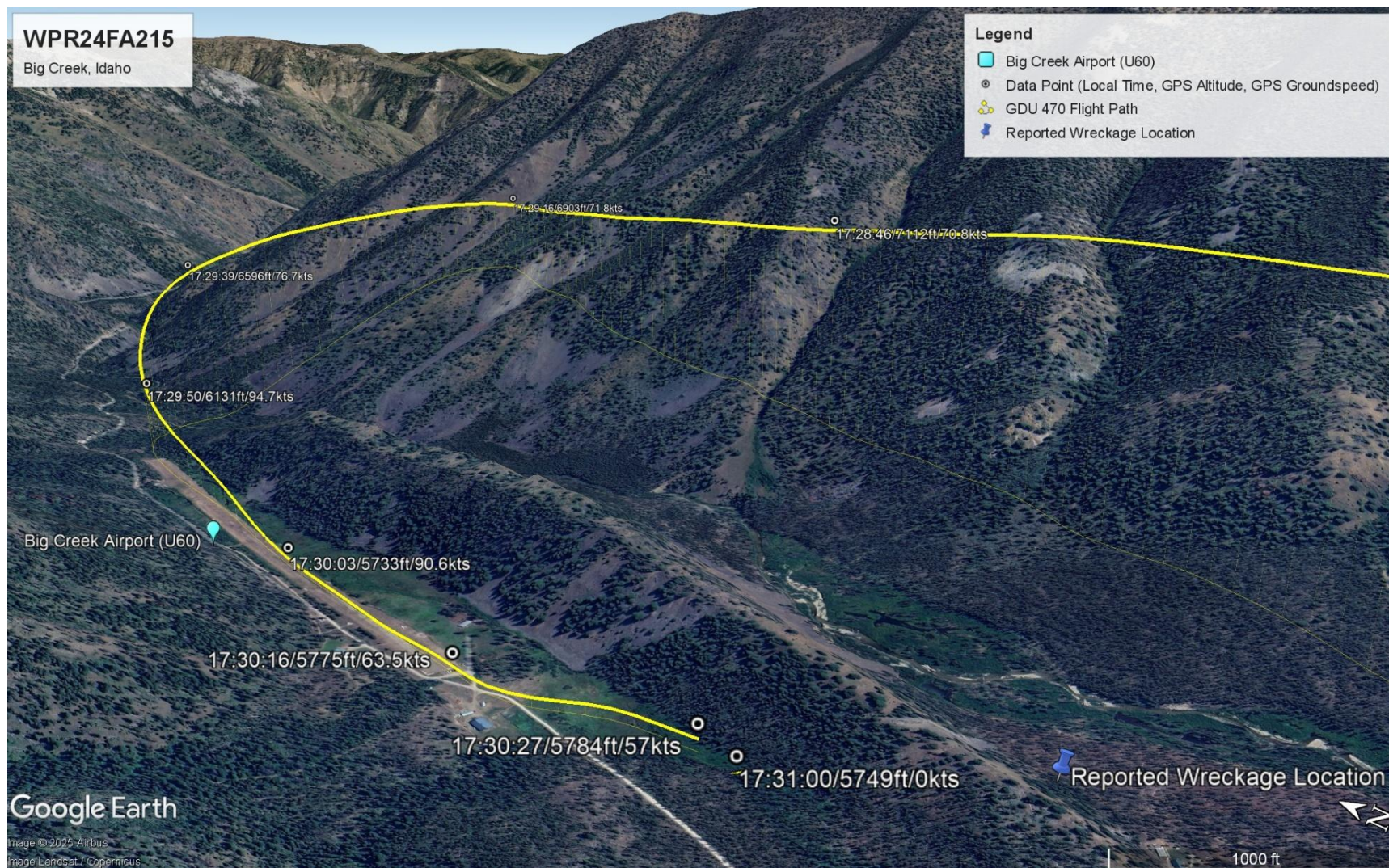
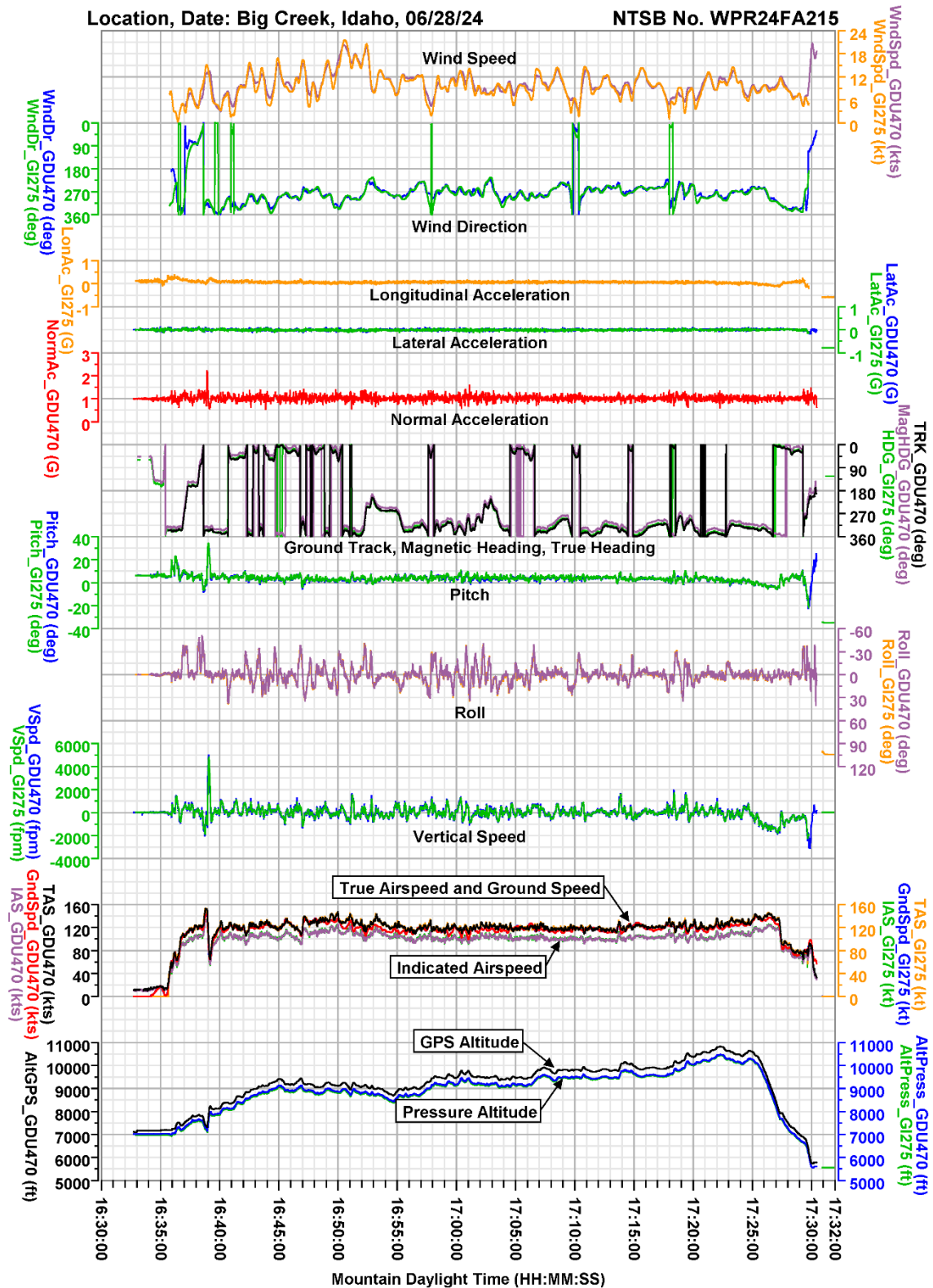


Figure 7. Google Earth overlay of the end of the accident flight recorded on the GDU 470. The reported wreckage location is marked with a blue pin.

DEPOT AVIONICS INC., Cessna 182, N6210A

Location, Date: Big Creek, Idaho, 06/28/24

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Figure 8. Plot of select parameters for the entire accident flight recorded on the GDU 470 and GI 275.

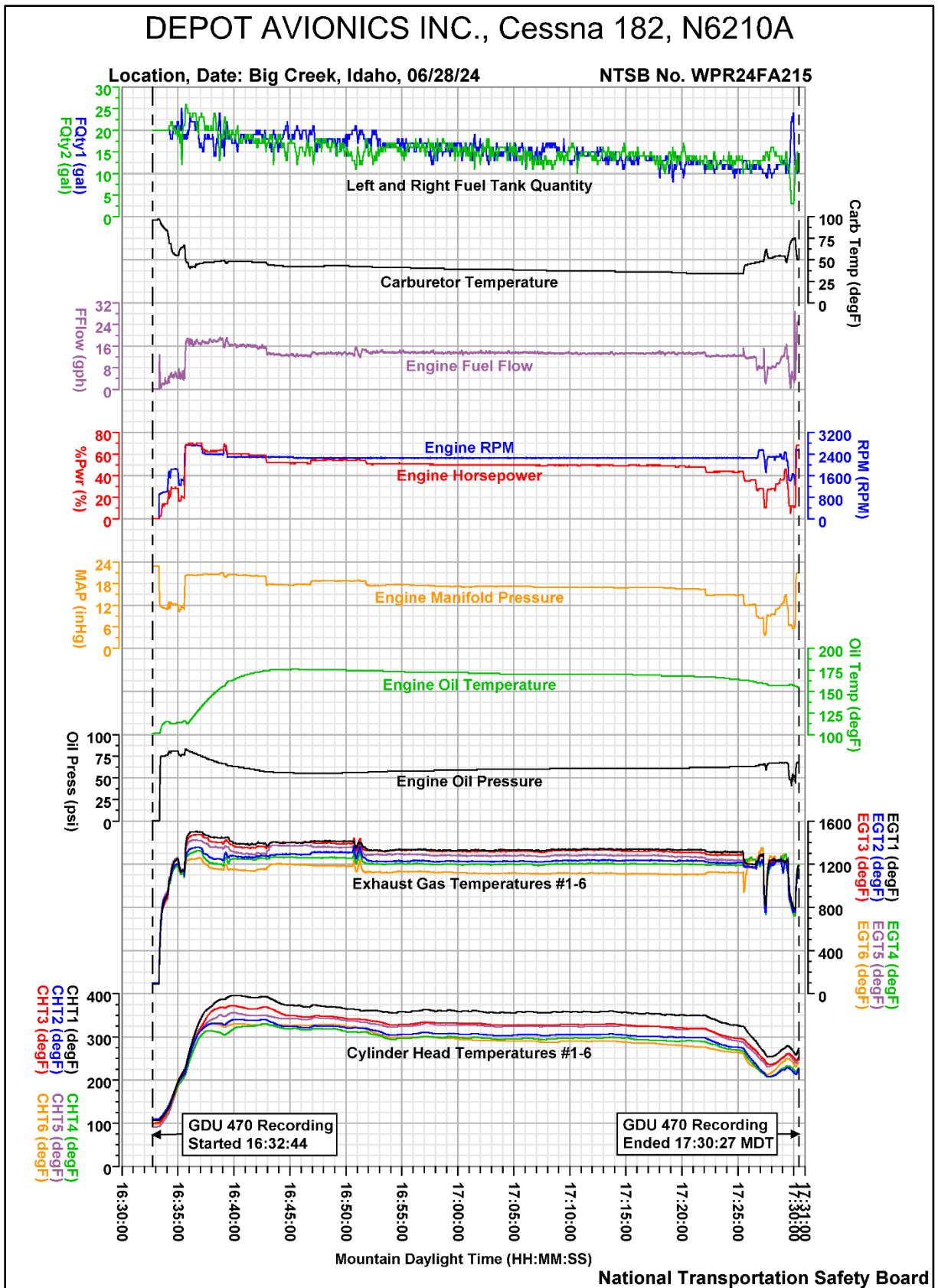


Figure 9. Plot of engine parameters for the entire accident flight recorded on the GDU 470.

DEPOT AVIONICS INC., Cessna 182, N6210A

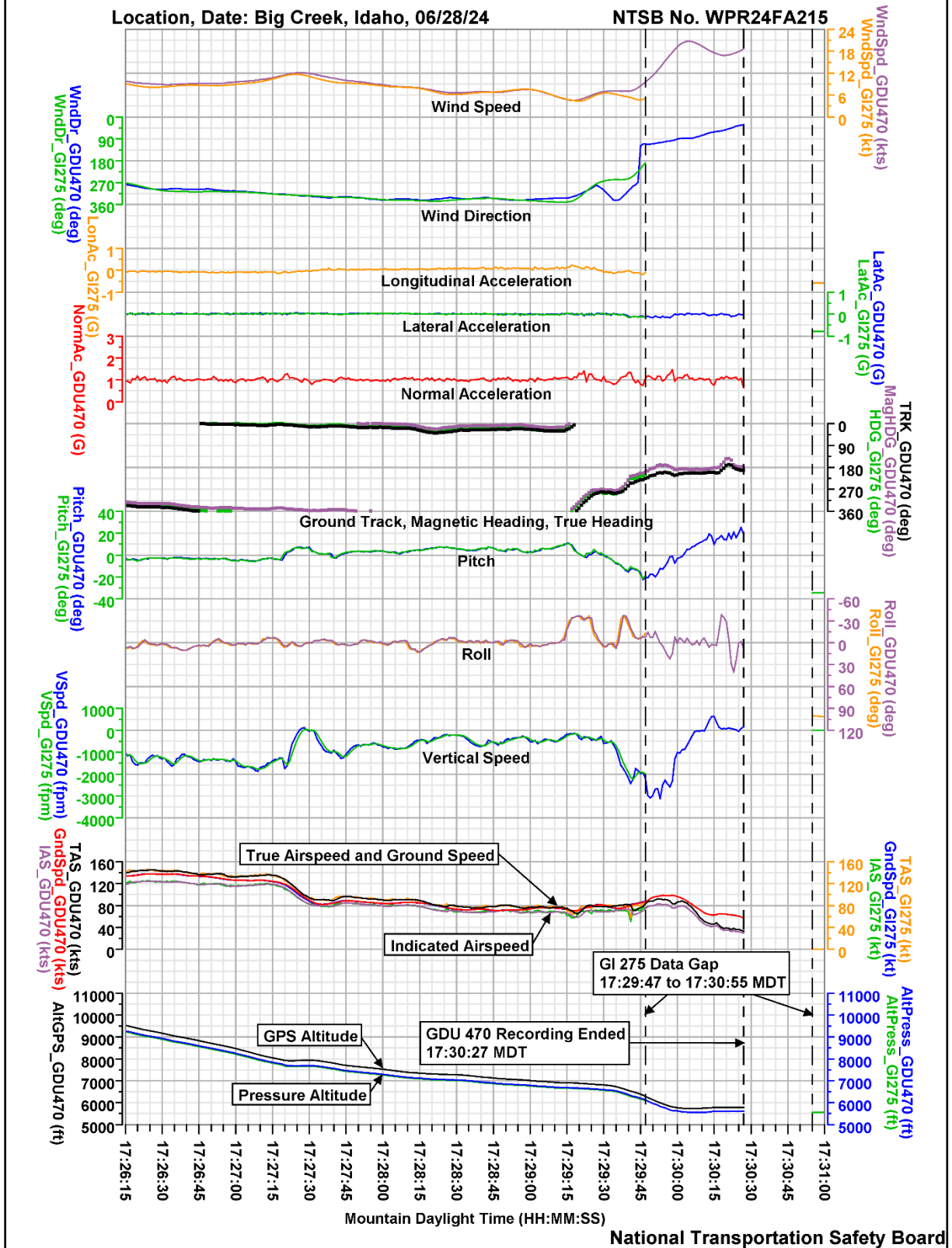


Figure 10. Plot of select parameters near end of accident flight recorded on the GDU 470 and GI 275.

DEPOT AVIONICS INC., Cessna 182, N6210A

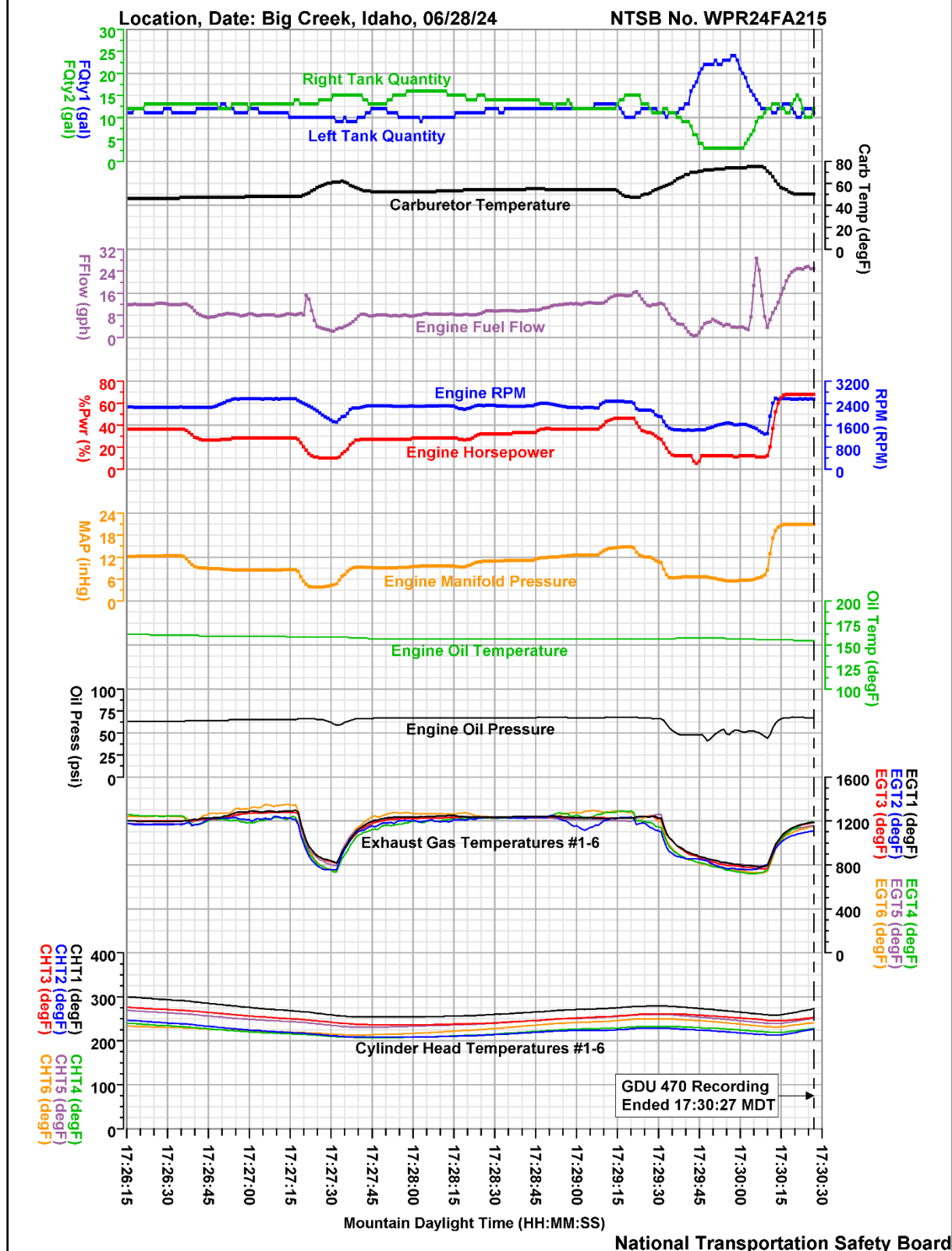


Figure 11. Plot of engine parameters at the end of the accident flight recorded on the GDU 470.

APPENDIX A. VERIFIED AND PROVIDED PARAMETERS FROM GARMIN 470 AND GARMIN GI 275

This appendix describes the parameters provided and verified in this report. Table 1 lists the Garmin 470 and Garmin GI 275 parameters and Table 2 describes the unit abbreviations used in this report.

Table 1. Verified and provided parameters.

Parameter Name (units)	Parameter Description	Source
Date (MM/DD/YYYY)	Date for recorded data point (Month/Day/Year)	GDU 470, GI 275
Time (HH:MM:SS)	Time (EDT) for recorded data point (Hour:Minutes:Seconds)	GDU 470, GI 275
%Pwr (%)	Engine Horsepower	GDU 470
AltGPS (ft)	GPS Altitude	GDU 470
AltPress (ft)	Pressure Altitude	GDU 470, GI 275
Carb Temp (degF)	Carburetor Temperature	GDU 470
CHT# (degF)	Cylinder Head Temperature Cylinder # ³	GDU 470
EGT# (degF)	Exhaust Gas Temperature Cylinder #	GDU 470
FFlow (gph)	Engine Fuel Flow	GDU 470
FQty1 (gal)	Left Fuel Tank Quantity	GDU 470
FQty2 (gal)	Right Fuel Tank Quantity	GDU 470
GndSpd (kts)	Groundspeed	GDU 470, GI 275
HDG (deg)	Heading True	GI 275
IAS (kts)	Indicated Airspeed	GDU 470, GI 275
LatAc (G)	Lateral Acceleration	GDU 470, GI 275
Latitude (deg)	Recorded Latitude Coordinate	GDU 470
LonAc (G)	Longitudinal Acceleration	GI 275
Longitude (deg)	Recorded Longitude Coordinate	GDU 470
MagHDG (deg)	Magnetic Heading	GDU 470
MAP (inHg)	Engine Manifold Pressure	GDU 470
NormAc (G)	Normal Acceleration	GDU 470
Oil Press (psi)	Engine Oil Pressure	GDU 470
Oil Temp (degF)	Engine Oil Temperature	GDU 470
Pitch (deg)	Pitch	GDU 470, GI 275
Roll (deg)	Roll	GDU 470, GI 275
RPM (RPM)	Engine Revolutions Per Minute	GDU 470
TAS (kts)	True Airspeed	GDU 470, GI 275
TRK (deg)	GPS Ground Track	GDU 470
VSpd (fpm)	Vertical Speed	GDU 470, GI 275
WndDr (deg)	Wind Direction	GDU 470, GI 275
WndSpd (kts)	Wind Speed	GDU 470, GI 275

Table 2. Unit abbreviations.

Unit Abbreviations	Descriptions
%	percent
deg	degrees
degF	Degrees Fahrenheit
fpm	feet per minute

³ Depending on aircraft configuration number of cylinders that are instrumented varies. In the data plots the '#' is replaced with the appropriate cylinder ID.

Unit Abbreviations	Descriptions
ft	feet
gal	gallons
gph	gallons per hour
G	unit of gravitational acceleration
inHg	inches of Mercury
kts	knots
psi	pounds per square inch
rpm	revolutions per minute