

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR23LA295

ENGINE DATA MONITOR

Specialist's Factual Report

June 26, 2024

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A. ACCIDENT

Location: Renton, Washington
Date: July 31, 2023
Time: 0920 pacific daylight time (PDT)
Airplane: Lancair 360, N68XA

B. ENGINE DATA MONITOR SPECIALIST

Specialist: Gerald Kawamoto
Electronics 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 engine data monitor:

Recorder Manufacturer/Model: Advanced Flight Systems ACS 2002
Part Number: 20100-B
Recorder Serial Number: 20102

1.0 Device Description

The Advanced Flight Systems ACS 2002 electronic engine monitor that can display various aircraft engine and fuel status parameters. Depending on the installed software version, the device is capable of recording engine information on internal flash non-volatile memory at a pilot selectable interval.¹

1.1 Device Data Recovery

The device was in good condition upon arrival at the NTSB Vehicle Recorder Laboratory, as shown in figure 1. Historical data were recovered by the manufacturer and provided to the investigation team in plain text format.

¹ Non-volatile memory (NVM) is semiconductor memory that does not require external power for data retention.



Figure 1. ACS 2002 as received.

1.2 Device Recording Description

The data extracted included flights from July 29, 2023, through July 31, 2023 Recorded Time. Upon powering on the device, the internal clock was approximately one hour and eleven minutes offset from PDT, the local time of the accident. An offset of 4,260 seconds was applied to the data such that it appears in PDT in this report. The accident session started at 8:35:11 PDT and ended at 9:10:59 PDT on July 31, 2023. Data from the previous 3 flights is also included in this report. Data were recorded once approximately every 10 seconds. Table 1 shows ACS 2002 parameters.

Table 1. ACS 2002 parameters.

Parameter Name (units)	Parameter Description (units)
AMPS (A)	Amperage (amps)
CHT 1-4 (degF)	Cylinder Head Temperature # (degrees Fahrenheit)
EGT 1-4 (degF)	Exhaust Gas Temperature # (degrees Fahrenheit)
FUEL_COMP (gal)	Fuel Computer Calculated Fuel Remaining (gallons)
FUEL_FLOW (gph)	Fuel Flow (gallons per hour)
FUEL_PSI (psi)	Fuel Pressure (pounds per square inch)
HORSEPWR	Horsepower
MANIFOLD (inHg)	Manifold Pressure (inches of Mercury)
OIL_PSI (psi)	Oil Pressure (pounds per square inch)
OIL_TEMP (degF)	Oil Temperature (degrees Fahrenheit)
RPM	Engine Revolutions Per Minute
TANK 1 & 2 (gal)	Tank 1 & 2 fuel level indicator (gallons)
VOLTS (V)	Battery Voltage (volts)

D. FIGURES AND TABULAR DATA

Figure 2 is a plot of parameters for the accident flight. The time shown is 8:34:00 PDT to 9:12:00 PDT.

Figure 3 is a plot of parameters for final five minutes of the accident flight. The time shown is 9:06:00 PDT to 9:11:00 PDT.

Figure 4 is a plot of parameters for two flights recorded on July 30, 2023, the day prior to the accident flight. The first session started at 6:19:35 PDT and ended at 7:10:25 PDT. The second session started at 7:27:34 PDT and ended at 8:13:15 PDT. The time shown is 6:19:00 PDT to 8:15:00 PDT.

Figure 5 is a plot of parameters for a flight recorded on July 29, 2023, two days prior to the accident flight. The session started at 13:43:19 PDT and ended at 15:09:51 PDT. The time shown is 13:41:00 PDT to 15:11:00 PDT.

The corresponding tabular data recovered from the Advanced Flight Systems ACS 2002 unit used to create figures 2 through 5 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Gerald Kawamoto
Electronics Engineer – Recorder Specialist

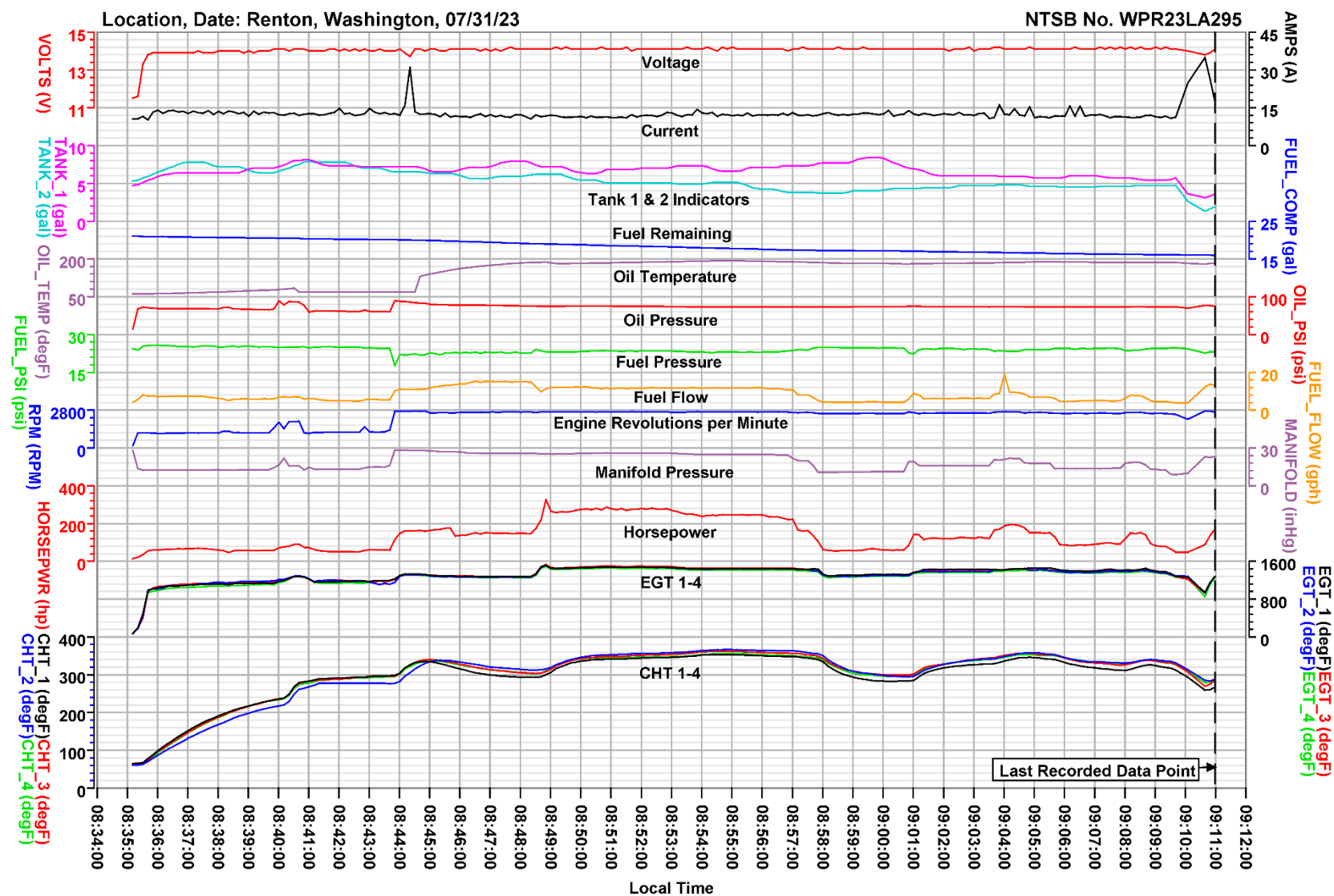


Figure 2. Plot of parameters for the entire accident flight recorded on the ACS 2002.

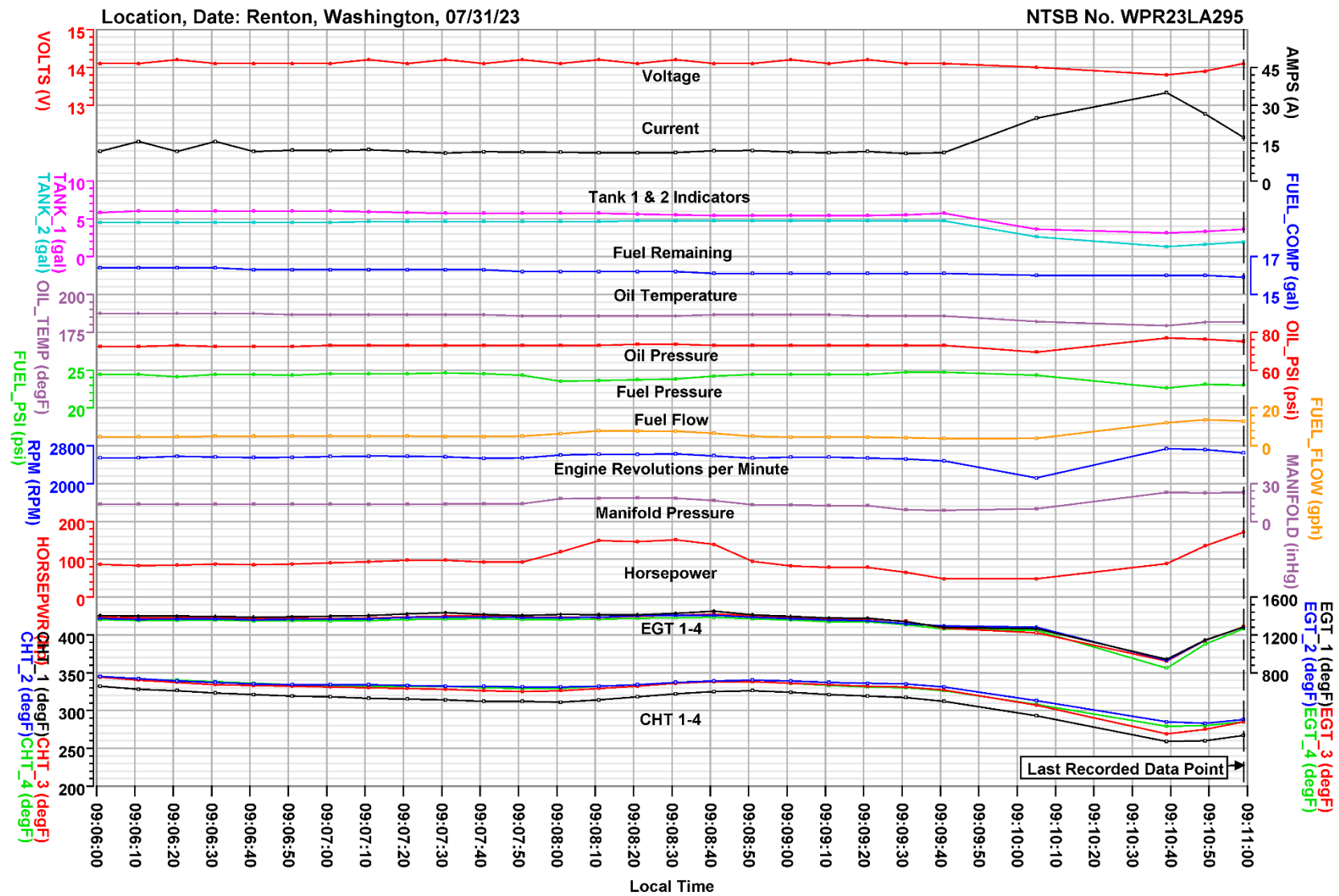


Figure 3. Plot of parameters for the last 5 minutes of the accident flight recorded on the ACS 2002.

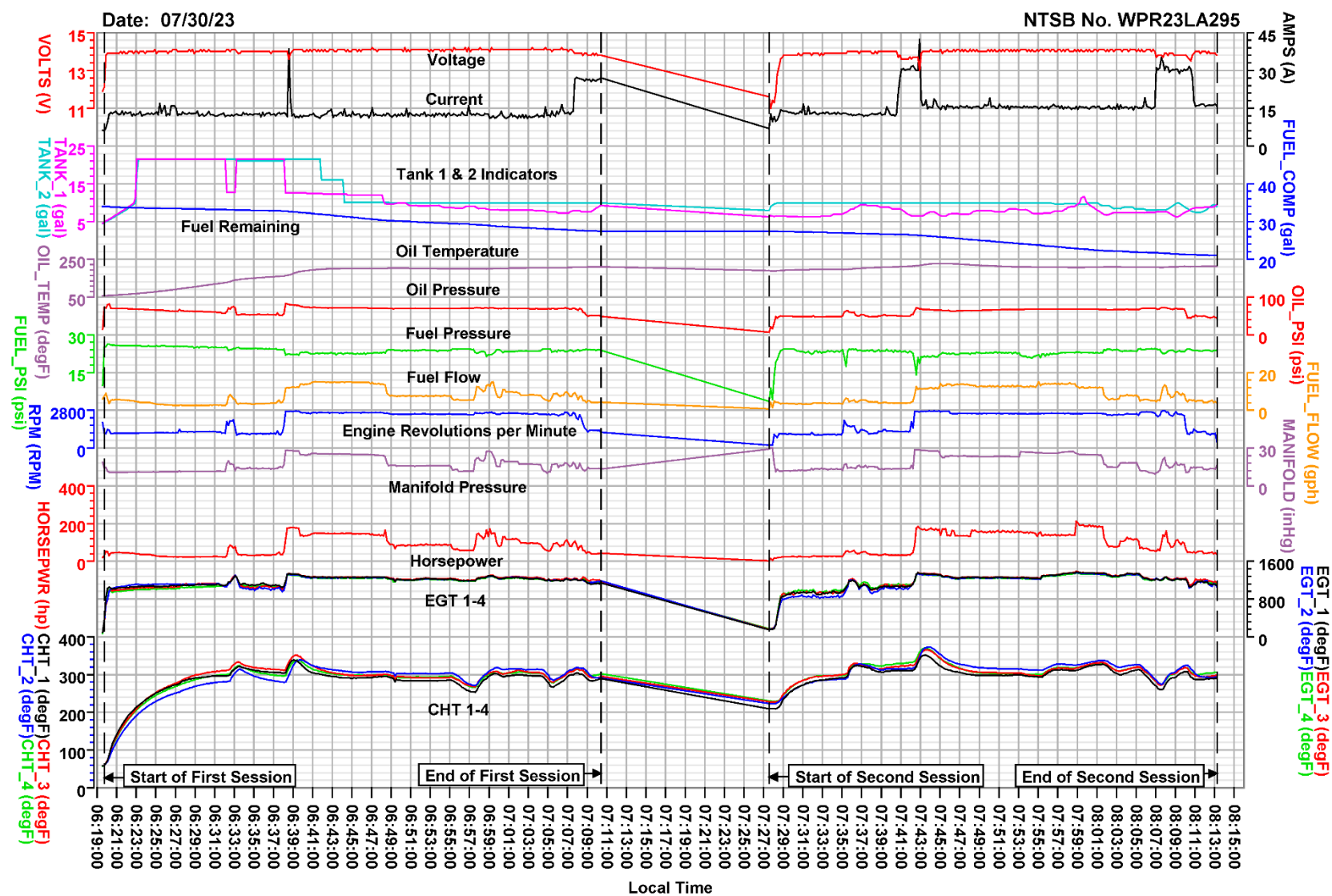


Figure 4. Plot of parameters for two flights recorded on July 30, 2023, the day prior to the accident flight.

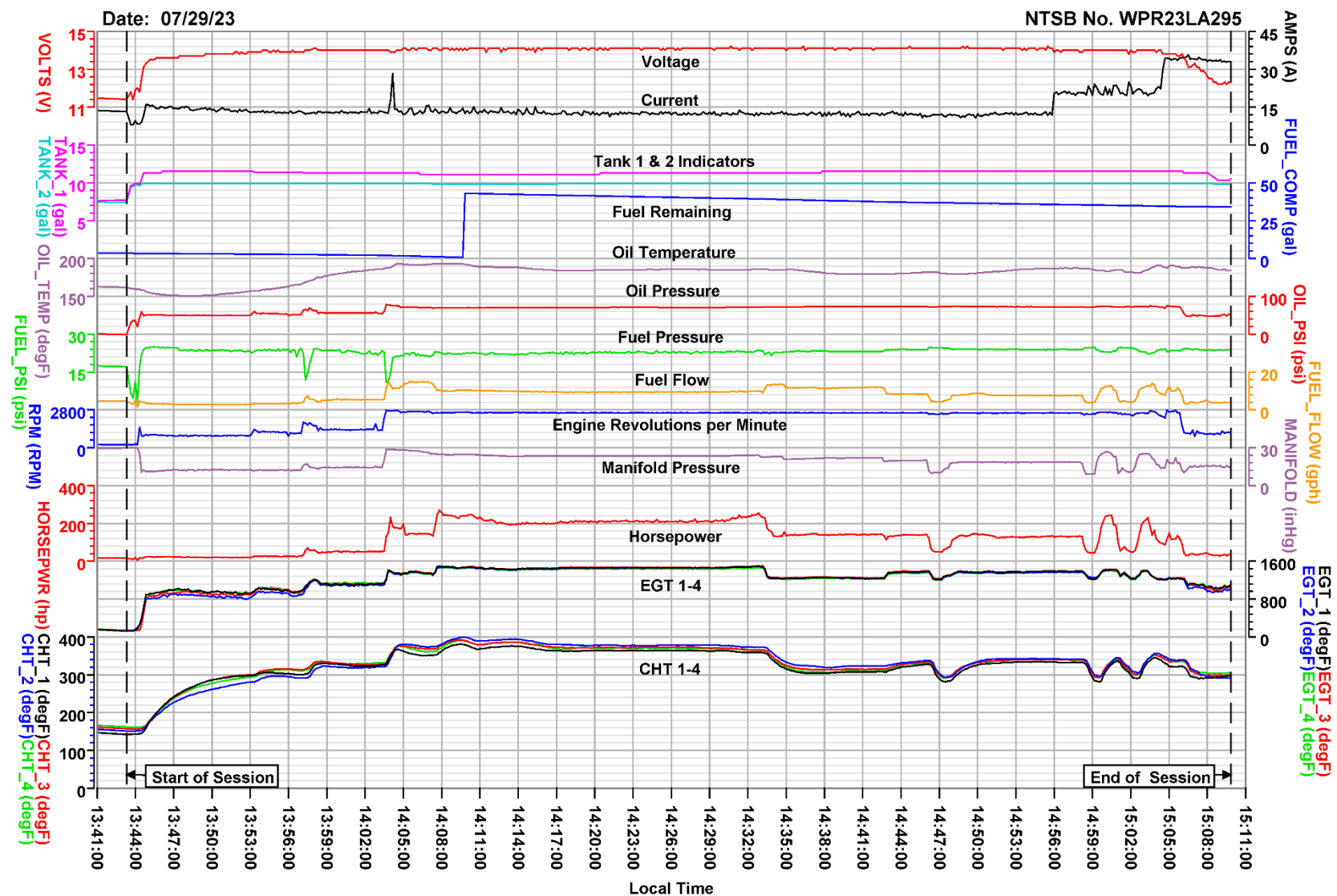


Figure 5. Plot of parameters for a flight recorded on July 29, 2023, two days prior to the accident flight.