

National Transportation Safety Board

Office of Research and Engineering

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ENGINE DATA MONITOR

Specialist's Factual Report

May 16, 2023

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A. ACCIDENT

Location: Athens, Georgia
Date: December 29, 2022
Time: 1327 eastern standard time (EST)
Airplane: Piper PA-24-260, private operator, N9026P

B. ENGINE DATA MONITOR SPECIALIST

Specialist Kyle Garner
Sr. Aerospace Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

An engine data monitor (EDM) group was not convened. The NTSB Vehicle Recorder Division received the following EDM:

Recorder Manufacturer/Model: JPI EDM 930P
Part Number: 790000-C-3301
Recorder Serial Number: 10236

1.0 Device Description

The J.P. Instruments (JPI) EDM 930P is a panel-mounted device that displays critical engine data including, but not limited to, RPM, manifold pressure, oil pressure and temperature, fuel flow, and cylinder head and exhaust gas temperature. The device also features an alert system that notifies pilots of any potential engine problems and logs data to internal memory.

By default, the device is configured to record data once every 6 seconds and has internal non-volatile memory capable of storing over 100 hours of data. The device can be configured by the operator to sample data more or less frequently (every 2 to 500 seconds), which would shorten or extend the duration of data that can be stored, respectively. Recording begins when exhaust gas temperature (EGT) values exceed 500 degrees Fahrenheit, or engine RPM exceeds 500 RPM. If the device is not damaged, the data can be downloaded by the operator using a flash memory drive via the USB port on the front of the device.

1.1 Data Recovery

The EDM arrived with minor damage (missing pushbutton), however, the device powered on successfully, and the data were extracted from the device using instructions provided by the manufacturer. A photo of the EDM is shown in Figure 1.



Figure 1. JPI EDM 930P, as received.

1.2 Recording Description

The data extracted included 98 sessions from April 1, 2022, to the date of the accident, December 29, 2022. The accident flight was identified as the last flight of the recording, and its duration was approximately 22 minutes and 42 seconds. The device was configured to record data once every 6 seconds.

1.3 Time Correlation and Parameters

The device was powered on and it was noted that the time on the device was 15 minutes and 24 seconds behind true coordinated universal time (UTC). Correlation of the EDM data to the event local time, EST, was established by first correcting the device time to true UTC and then applying an additional 5 hours offset to change UTC to EST.

Table 1 describes the data parameters extracted from the EDM device.

Table 1. JPI EDM 930P parameters.

Parameter name (unit)	Parameter description (unit)
ALT (ft)	Altitude (feet)
AMP (Amperes)	Battery bus current (Amperes)
BAT (V)	Battery bus voltage (volts DC)
CHT1/2/3/4/5/6 (degF)	Cylinder head temperature - cylinder number (degrees Fahrenheit)
CLD (degF/min)	Shock cooling rate (degrees Fahrenheit per minute)
DATE (mm/dd/yyyy)	Date (month/day/year)
EGT DIF (degF)	Maximum EGT differential between cylinders (degrees Fahrenheit)
EGT1/2/3/4/5/6 (degF)	Exhaust gas temperature - cylinder number (degrees Fahrenheit)
FF (gal/hr)	Fuel flow rate (gallons per hour)
FP (psi)	Fuel pressure (pounds per square inch)
GRNDSPD (kts)	Groundspeed (knots)
HP (%)	Horsepower (percent)
HRS (hrs)	Engine tach time (hours)
LAT (deg)	Latitude (degrees)
LNG (deg)	Longitude (degrees)
MAP (inHg)	Manifold pressure (inches of Mercury)
OAT (degF)	Outside air temperature (degrees Fahrenheit)
OILP (psi)	Oil pressure (pounds per square inch)
OILT (degF)	Oil temperature (degrees Fahrenheit)
RPM	Engine revolutions per minute
TIME (HH:MM:SS)	Time UTC (hours:minutes:seconds)
USD (gal)	Fuel used (gallons)

D. OVERLAYS AND TABULAR DATA

Figure 2 and Figure 3 contain EDM data recorded during the accident flight on December 29, 2022. Figure 4 contains reference EDM data recorded on a previous flight on November 11, 2022.

Figure 2 is a plot containing engine data recovered from the device for the full accident flight, from 13:06:00 to 13:30:00 EST. The accident flight recording began at 13:06:38 EST and ended at 13:29:20 EST.

Figure 3 is a plot containing engine data recovered from the device for the final portion of the accident flight, from 13:22:30 to 13:29:30 EST.

Figure 4 is a plot containing engine data recovered from the device for a previous flight on November 11, 2022. The recording began at 16:22:04 EST and ended at 17:40:58 EST.

The corresponding tabular data used to create figures 2 to 3 and figure 4 are provided in electronic comma-separated value (CSV) format as attachment 1 and attachment 2 to this report, respectively.

Submitted by:

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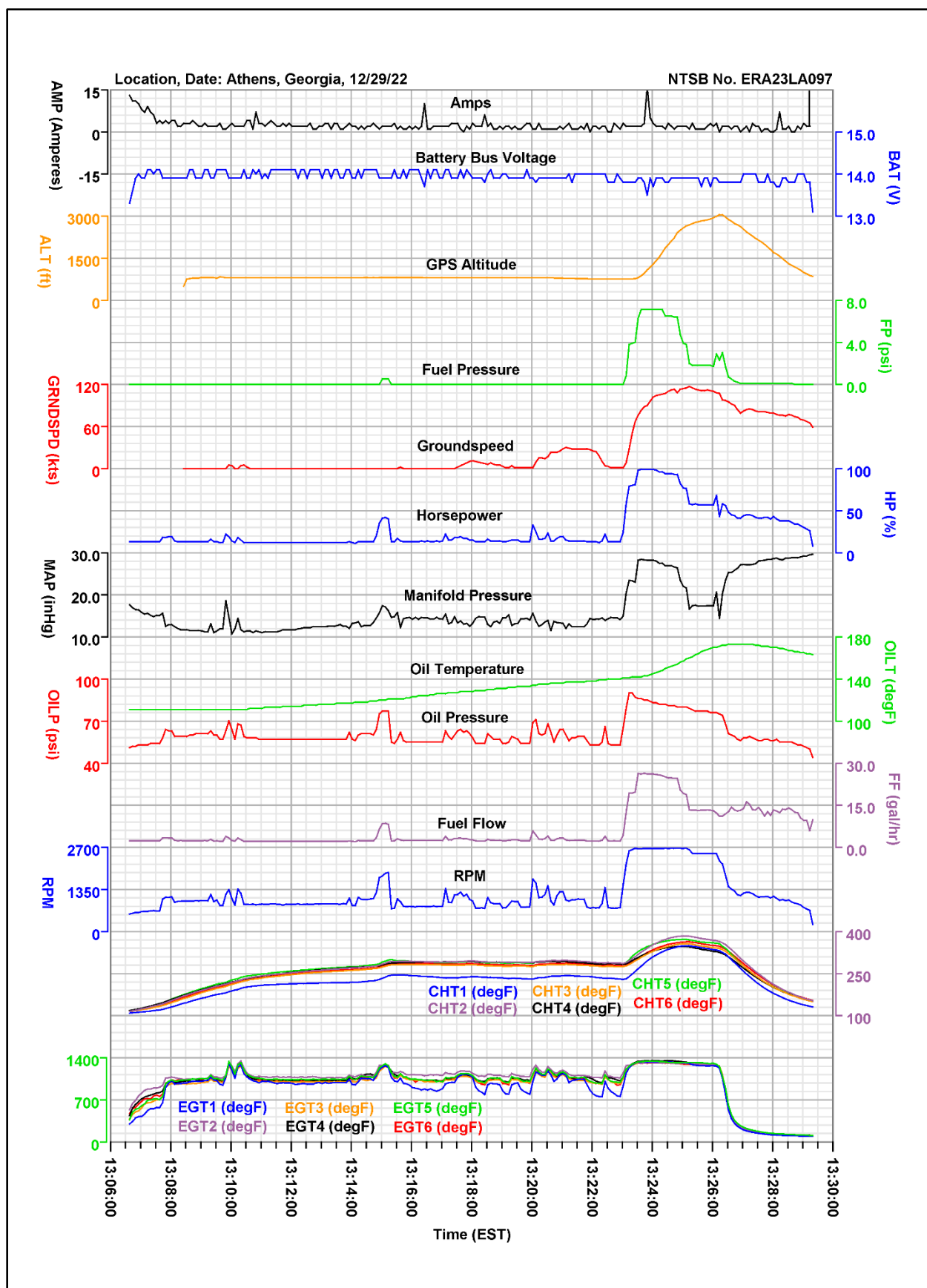


Figure 2. Plot of parameters for the full accident flight.

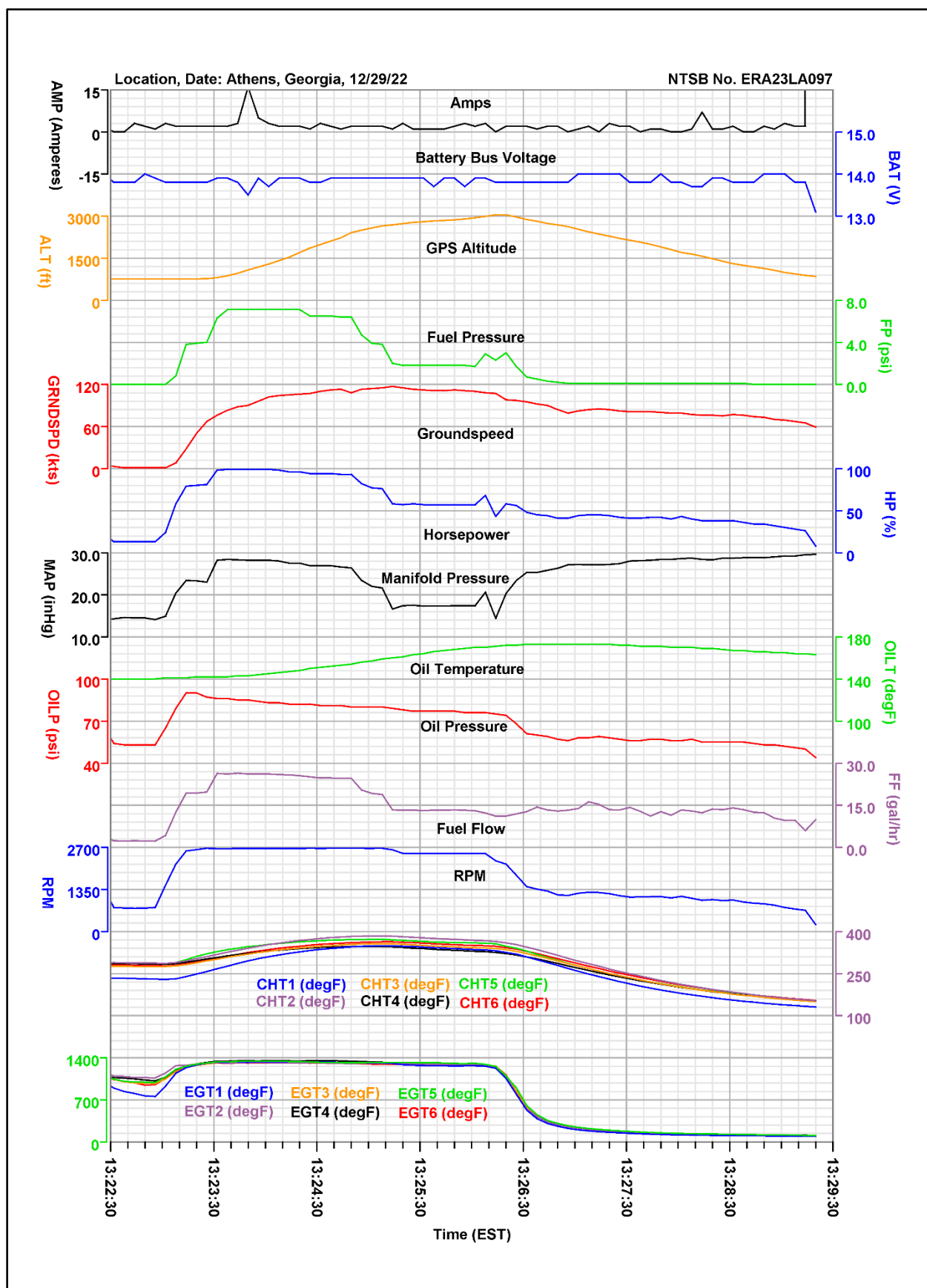


Figure 3. Plot of parameters for end of accident flight.

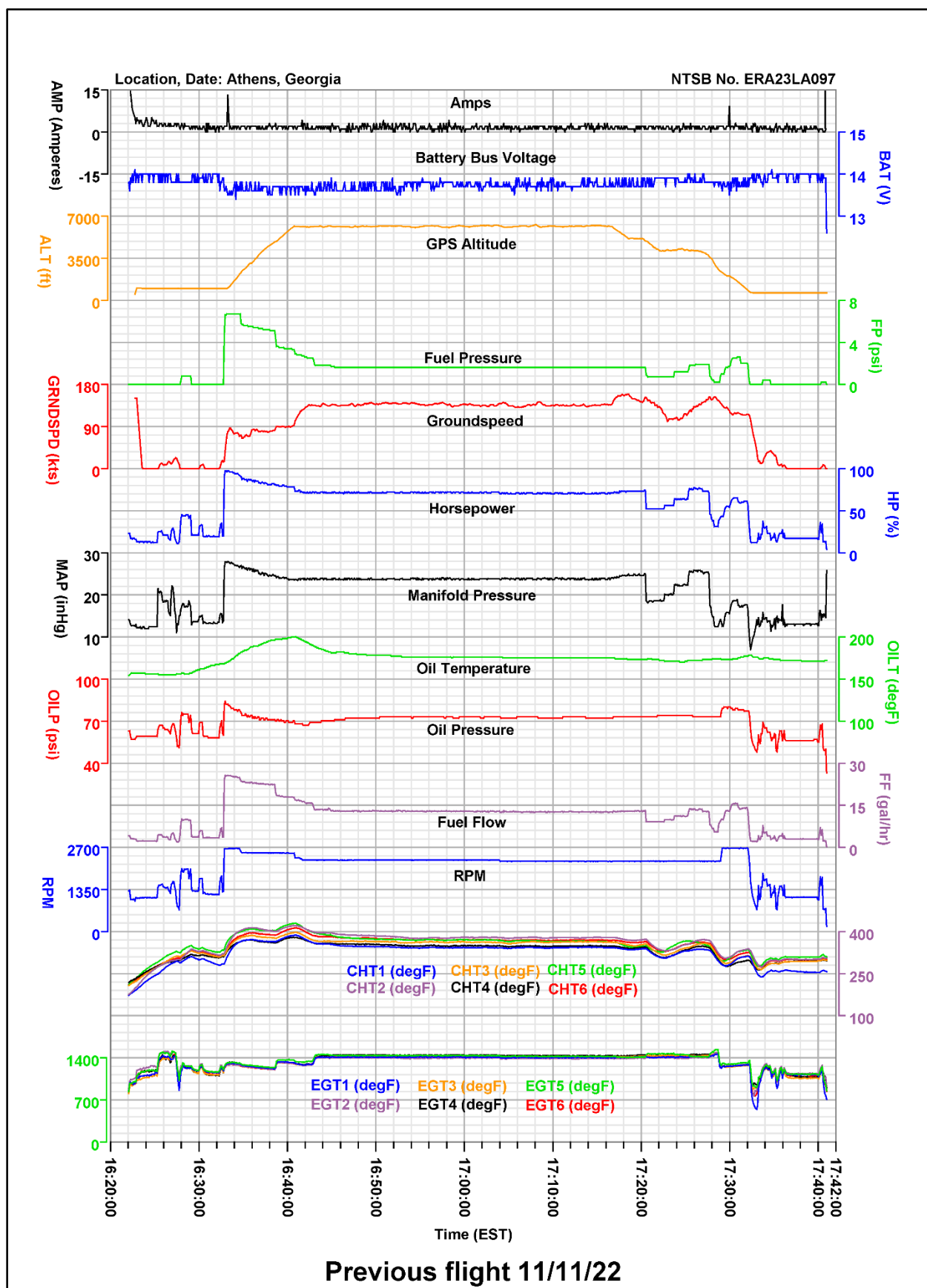


Figure 4. Plot of parameters for previous flight on November 11, 2022.