

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

April 23, 2021

Engine Data Monitor (EDM)

Specialist's Factual Report
By Gerald Kawamoto

1. EVENT SUMMARY

Location: Tuntutuliak, Alaska
Date: February 6, 2020
Aircraft: Piper PA-32R-300
Registration: N7632C
Operator: Paklook Air Inc
NTSB Number: ANC20FA017

2. ENGINE DATA MONITOR GROUP

An Engine Data Monitor (EDM) group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following EDM:

Recorder Manufacturer/Model: **Electronics International CGR-30P**
Recorder Serial Number: **157626**

3.1. Electronics International CGR-30P Description

The Electronics International CGR-30P is a panel-mounted instrument that can monitor and record up to 66 parameters related to engine operations. Depending on the installation engine parameters monitored can include:

- Exhaust Gas Temperature (EGT)
- Cylinder Head Temperature (CHT)
- Oil Pressure and Temperature
- Manifold Pressure
- Outside Air Temperature
- Engine Revolutions per Minute
- Fuel Pressure
- Battery System Voltage
- Battery System Amperage

The unit can also optionally be connected to an external GPS to provide real-time calculation of range and endurance. Additionally, when connected to an external GPS source, the device can calculate additional fuel management parameters such as Gallons Remaining to Destination and other estimations of fuel usage.

The unit contains an internal non-volatile¹ microSD² card for data storage of the parameters recorded and calculated. The data are stored at a rate of 3 samples per second. The amount of data stored is dependant on the size of the microSD card installed on the device's internal board. Additionally, the recording feature will begin to overwrite older flight files when it has stored 1,500 flights. For a non-damaged unit, the data can be downloaded by the operator using a USB flash drive and following the instructions on the unit when accessed from the "USB and Data Recording Screen."

3.1.1. Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an external examination did not reveal significant signs of damage. The device powered on, however, the display was not functional and data weren't able to be downloaded via USB. The internal 16 GB microSD card was removed, and data were downloaded using laboratory tools.



Figure 1. Electronics International CGR-30P as received.

3.1.2. Data Description

The EDM recording contained 1,016 sessions from December 18, 2015, through February 6, 2020. The last session was recorded on February 6, 2020, starting at 11:35:08 and ending at 12:03:57.

The EDM records time with the first data sample based on the unit's internal clock. This clock is set and updated by the operator. Due to the condition of the device, the correlation to a standard time was unable to be verified and is referred to as Recorded Time for the remainder of this report. The exported data files contained time stamps indicating "Local Time" and also gave a reference to "Zulu Time." The difference between Local Time and Zulu Time was 8 hours.

¹ Non-volatile – electronic memory that does not require power to retain data.

² microSD – Secure Digital – a non-volatile memory card format.

3.1.3. Parameters Provided

The engineering units conversions used for the data contained in this report are based on documentation from the manufacturer of the EDM. Table 1 contains parameters recorded by the device.

Table 1. CGR-30P Parameters.

Parameter Name	Parameter Description and Units
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time for recorded data point (HH:MM:SS)
EGT 1-6 (degF)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
CHT 1-6 (degF)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
ENGINE (gph)	Fuel Flow (gallons per hour)
FUEL P (psi)	Fuel Pressure (pounds per square inch)
HP (%)	Horsepower (percent)
MAP (inHg)	Manifold Pressure (inches of Mercury)
OAT (degC)	Outside Air Temperature (degrees Celsius)
OIL P (psi)	Oil Pressure (pounds per square inch)
OIL T (degF)	Oil Temperature (degrees Fahrenheit)
Engine RPM	Engine Revolutions Per Minute
VOLTS (V)	Battery System Voltage (Volts)

3.2. Plots and Corresponding Tabular Data

The following figure contains EDM data recorded on February 6, 2020.

The corresponding tabular data used to create this plot are provided in electronic (*.csv³) format as Attachment 1 to this report.

³ Comma Separated Value format.

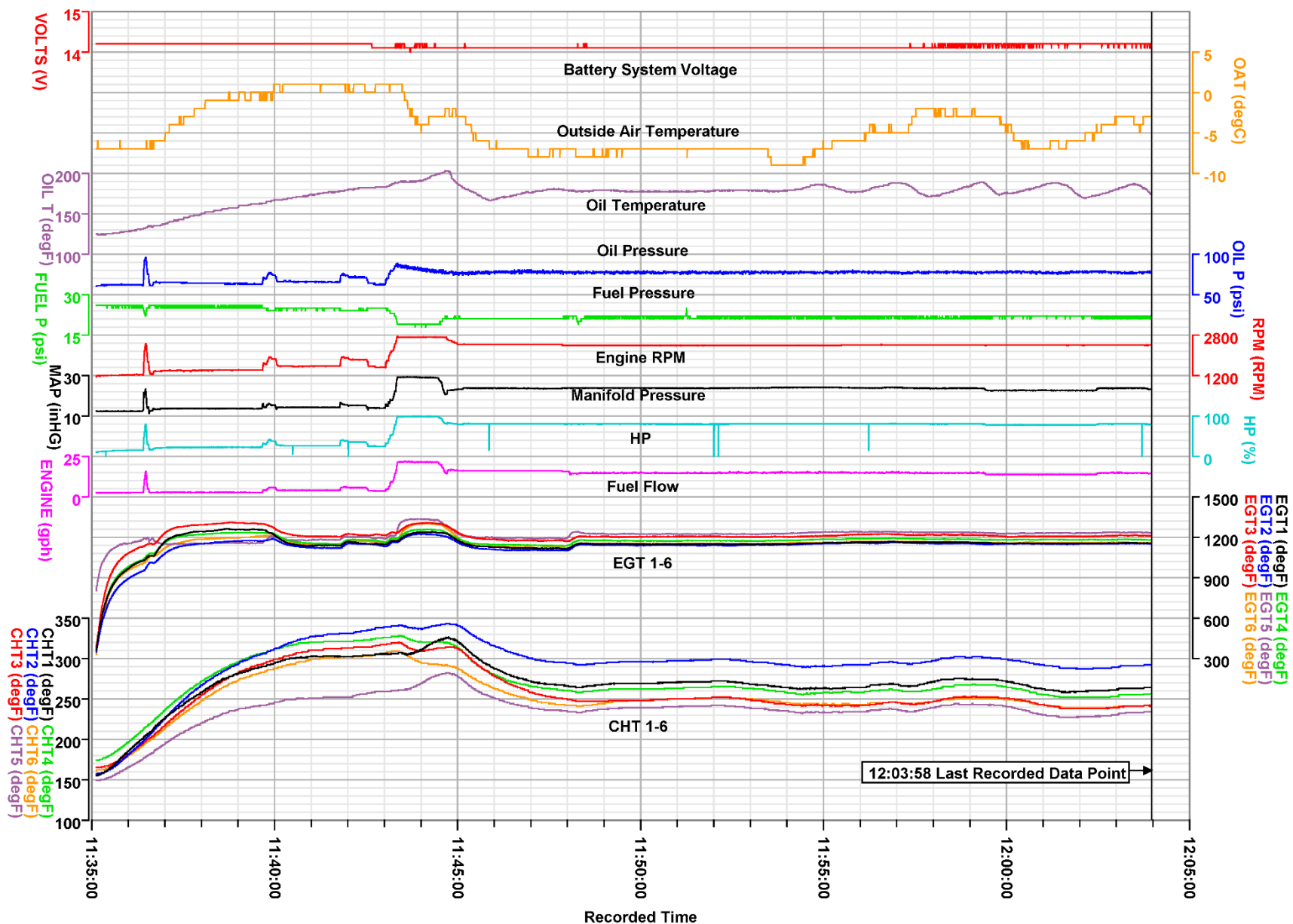


Figure 2. Plot of parameters recorded on February 6, 2020.