

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA22LA112

ENGINE MONITORING DEVICE

Specialist's Factual Report

August 22, 2022

A. ACCIDENT

Location: Palm Coast, Florida
Date: January 31, 2022
Time: ~13:00 eastern standard time (EST)
Airplane: Cessna 195, Private, N597K

B. ENGINE MONITORING DEVICE SPECIALIST

Specialist: Steven Smith
Mechanical Engineer (Recorder Specialist)
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

An Engine Monitoring Device group was not convened. The NTSB Vehicle Recorder Division received the following Engine Monitoring Device:

Recorder Manufacturer/Model: JPI Instruments EDM 700
Part Number: EGT-701-7C
Recorder Serial Number: 7664

1.0 Device Description

The JPI EDM-700 is a panel-mounted gauge that allows the operator to monitor and record up to 24 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 (OAT), Turbine Inlet Temperature (TIT), Engine Revolutions Per Minute (RPM), Compressor Discharge Temperature, Fuel Flow, Carburetor Temperature, and Battery Voltage. The unit can also calculate in real time, percent of maximum horsepower, fuel used, shock cooling rate, and EGT differentials between highest and lowest cylinder temperatures. The calculations are also based on the aircraft installation. The unit contains non-volatile memory for data storage of the parameters recorded and calculated. The rate at which the data is stored is selectable by the operator from 2 to 500 seconds per sample. The memory can store up to 20 hours of data at a 6 second-per-sample rate. The data can then be downloaded by the operator using the J.P. Instruments software.

1.1 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, the device exhibited minor signs of damage, as shown in Figure 1. The device powered on normally and data were downloaded using laboratory tools.

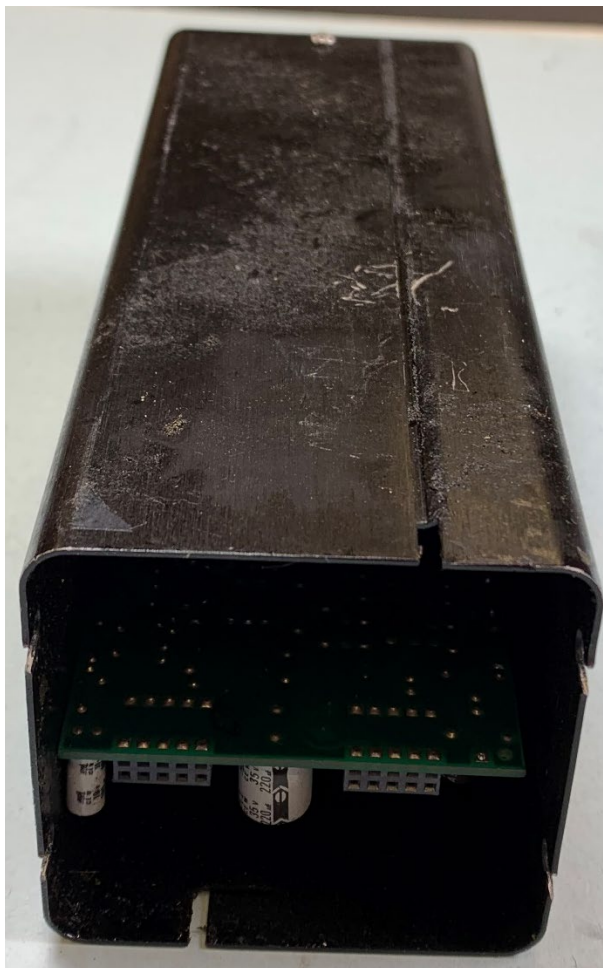


Figure 1. Engine Monitoring Device as delivered to the Vehicle Recorder Division.

1.2 Recording Description

The data extracted included 21 sessions from April 15, 2021, through January 31, 2022. All parameters were recorded at a rate of one sample every six seconds. The accident flight was the last flight of the recording, and its duration was approximately 25 minutes.

1.3 Parameters Provided

Table 1 describes data parameters provided by the engine monitoring device.

Table 1. EDM 700 Data Parameters.

Parameter Name	Parameter Description (units)
BAT (V)	Battery Voltage (Volts)
CHT 1 - CHT 7 (degF)	Cylinder Head Temperature # (degrees Fahrenheit)
CLD (degF/min)	Shock Cooling Rate (degrees Fahrenheit per minute)
Date	Date for the recorded data point, (MM/DD/YYYY)
EGT 1 - EGT 7 (degF)	Exhaust Gas Temperature # (degrees Fahrenheit)
OAT (degF)	Outside Air Temperature (degrees Fahrenheit)
Time	Device Time in UTC (HH:MM:SS)

1.4 Time Correlation

The operator of the JPI Instruments EDM-700 sets the time manually. Because of this, the time recorded by the device is an approximate time, in UTC. Correlation of the recorded time to the accident local time, EST, was established with an offset of 5 hours. Therefore, for the rest of this report, all times are referenced as EST, not elapsed.

D. OVERLAYS AND TABULAR DATA

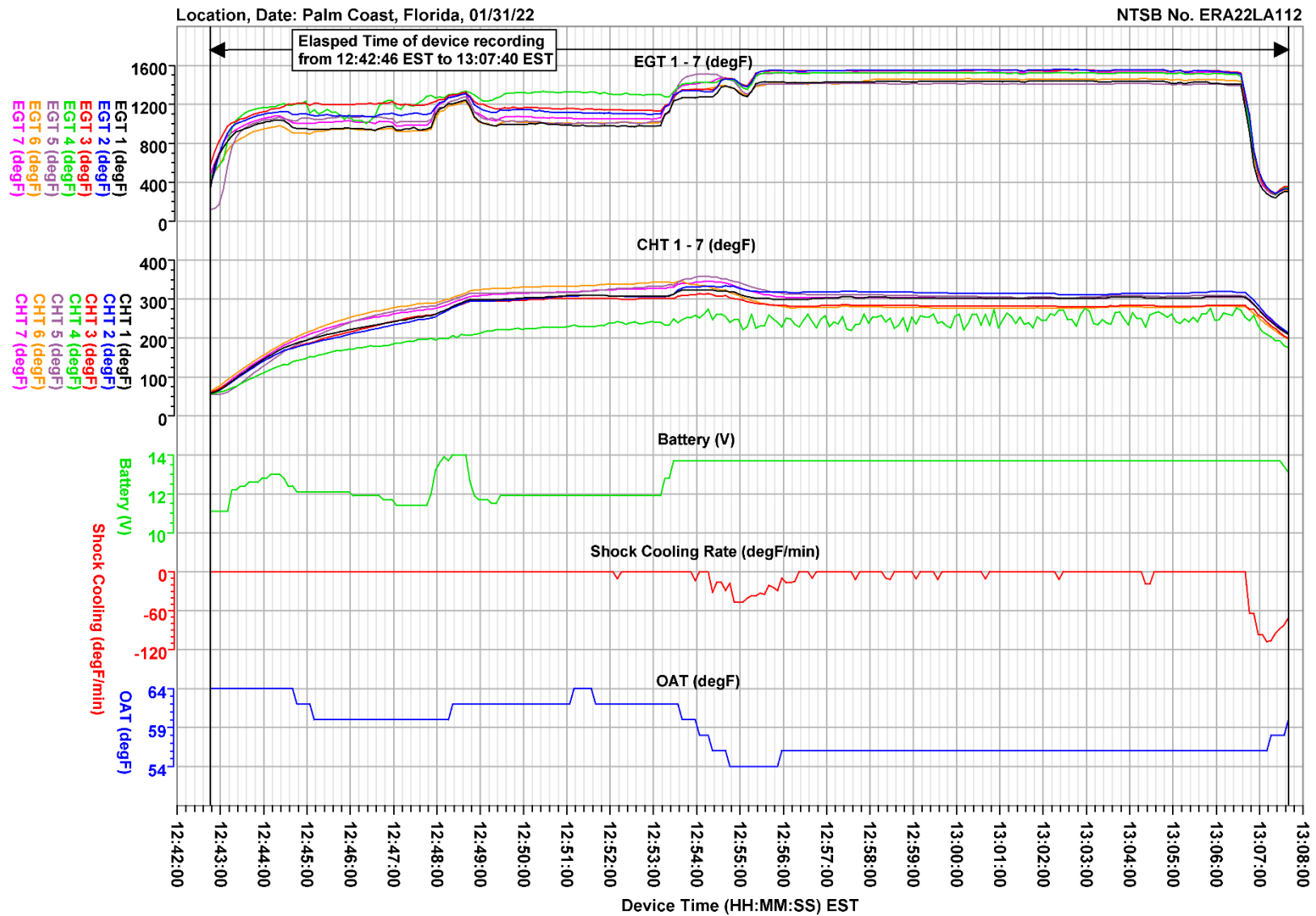
Data obtained from the JPI Instruments EDM-700 was used to produce the following plots. Figure 2 and Figure 3 are plots that show the accident session and the final minute and forty seconds, respectively.

In summary, the device began recording at approximately 12:42:46 EST. The last recorded parameter was as at 13:07:40 EST on January 31, 2022.

The corresponding tabular data used to create Figure 2 and Figure 3 are provided in electronic comma separated value (CSV) format as Attachment 1 to this report.

Submitted by:

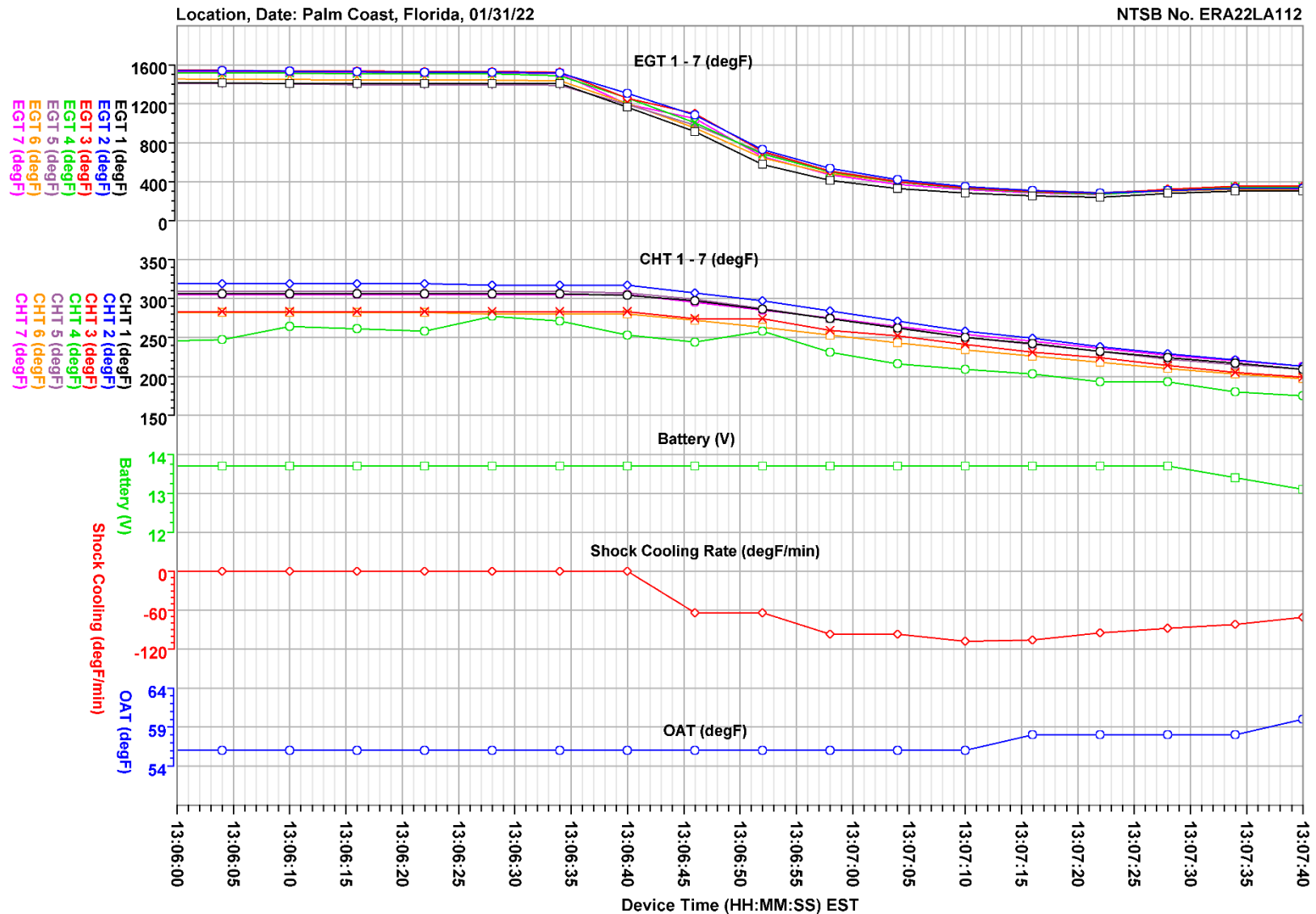
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Figure 2. Plot of engine monitoring device parameters for the entire flight.



Private, Cessna 195, N597K

Figure 3. Plot of engine monitoring device parameters for final one minute and forty seconds.

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