

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

August 25, 2021

## **Engine Data Monitor (EDM)**

**Specialist's Factual Report**  
**By Gerald Kawamoto**

### **1. EVENT SUMMARY**

Location: Cleburne, Texas  
Date: June 24, 2021  
Aircraft: American Aviation AA-1A  
Registration: N9261L  
Operator: Private  
NTSB Number: CEN21FA290

### **2. ENGINE DATA MONITOR GROUP**

An Engine Data Monitor group was not convened.

### **3. DETAILS OF INVESTIGATION**

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

Recorder Manufacturer/Model:	<b>JPI EDM-900</b>
Recorder Serial Number:	<b>06403</b>

#### **3.1. Device Description**

The J. P. Instruments EDM-900 is a panel mounted display that the operator can monitor and record multiple engine parameters related to engine operations and GPS parameters, if connected. 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, Turbine Inlet Temperature, Engine Revolutions per Minute, Compressor Discharge Temperature, Fuel Flow, Fuel Pressure, Fuel Level, Carburetor Temperature, and Battery Voltage.

The unit can also calculate, in real-time, horsepower, fuel used, shock cooling rate and EGT differentials between the 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.<sup>1</sup> The rate at which the data is stored is selectable by the operator from 1 to 500 seconds per sample. Data recording typically begins when RPM is greater than 500 rpm. The memory can typically store over 300 hours of data at a 6 second sample rate. For a

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

non-damaged unit, the data can then be downloaded by the operator using a USB flash drive and following the instructions on the unit.

### 3.1.1. Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an external examination revealed the device had sustained damage to the display, rendering it inoperable. The internal components were in good condition and the device powered on normally using a functioning laboratory display.



Figure 1. JPI EDM-900 as received.

### 3.1.2. Data Description

The EDM contained sessions recorded from March 26, 2021, through June 24, 2021. The EDM records time with the first data sample based on the unit's internal clock, which is set and updated by the operator. When powered on, the internal clock was approximately 4 hours and 20 minutes ahead of Central Daylight Time (CDT). An offset of 15,560 seconds was applied to the data plots to align the end of the JPI recording with the end of the available ADS-B data. The time is expressed as CDT for the remainder of this report. The device recorded at a 6 second-per-sample rate. The engineering unit conversions used for the data contained in this report are based on documentation from the manufacturer of the EDM.

### 3.2. Parameters Provided

Table 1 describes data parameters recorded by the device.

**Table 1. JPI EDM-700 Data Parameters**

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time for recorded data point (HH:MM:SS)
EGT 1-4 (degF)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
CHT 1-4 (degF)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
CLD (degF/min)	Shock Cooling Rate (degrees Fahrenheit per minute)
FF (gph)	Fuel Flow (gallons per hour)
USD (gal)	Fuel Used (gallons)
CRB (degF)	Carburetor Temperature (degrees Fahrenheit)
FP (psi)	Fuel Pressure (pounds per square inch)
HP	Horsepower (percent)
MAP (inHg)	Manifold Pressure (inches of Mercury)
RPM	Engine Revolutions Per Minute
OilP (psi)	Oil Pressure (pounds per square inch)
OilT (degF)	Oil Temperature (degrees Fahrenheit)
OAT (degC)	Outside Air Temperature (degrees Celsius)

### 3.3. Plots and Corresponding Tabular Data

Figure 2 contains EDM data for the accident flight recorded on June 24, 2021. The corresponding tabular data used to create this plot are provided in electronic (\*.csv) format as Attachment 1 to this report.<sup>2</sup>

<sup>2</sup> Comma Separated Value format.

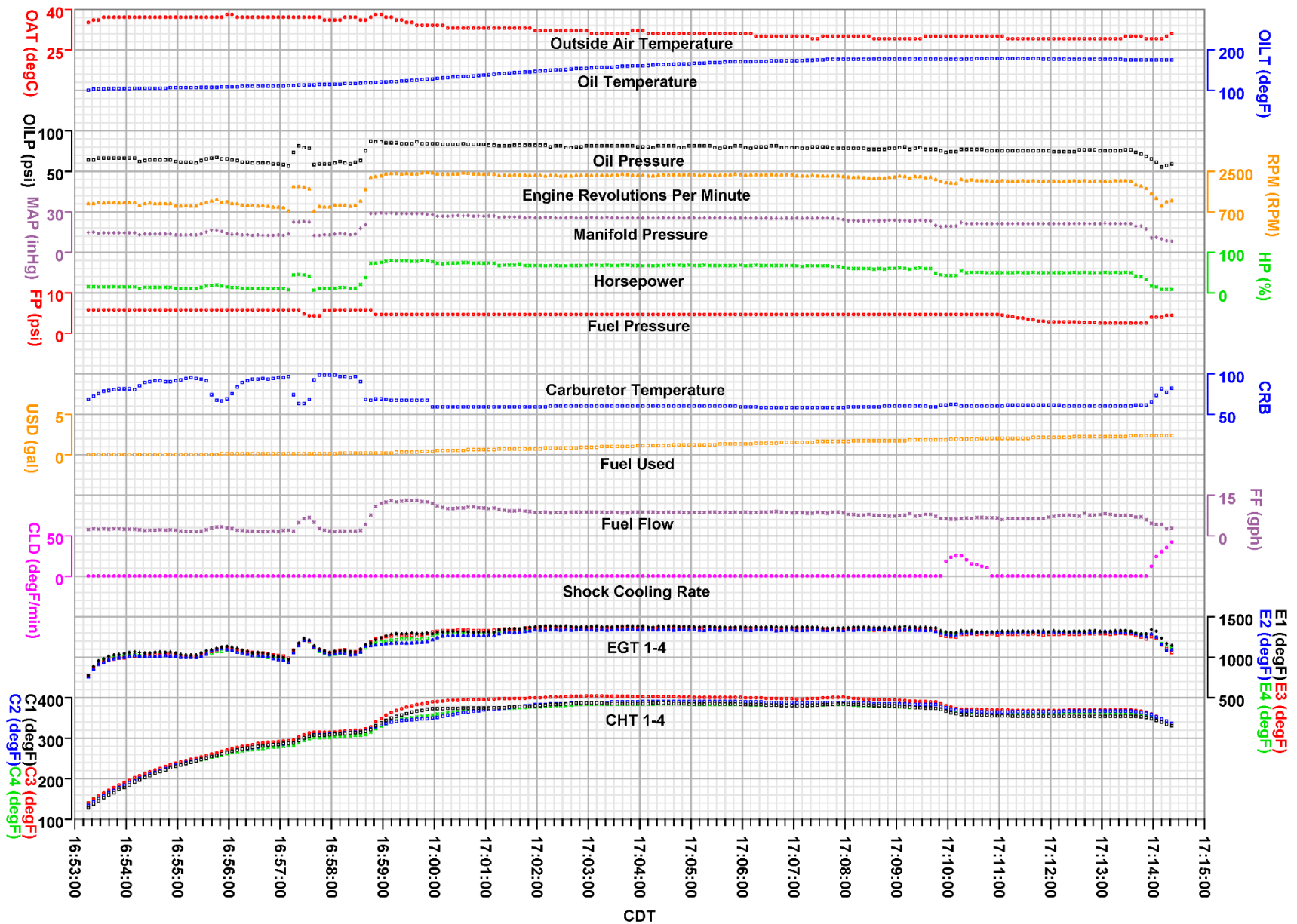


Figure 2. Plot of parameters for the accident flight recorded June 24, 2021.