

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC22LA035

ENGINE MONITORING DEVICE

Specialist's Factual Report

July 29, 2022

A. ACCIDENT

Location: Yakutat, Alaska
Date: May 24, 2022
Time: 15:10 Alaska daylight time (ADT)
23:10 Coordinated universal time (UTC)
Airplane: de Havilland DHC-3, Private, N703TH

B. ENGINE MONITORING DEVICE SPECIALIST

Specialist Steven Smith
Mechanical 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 Monitoring Device:

Recorder Manufacturer/Model: Electronics International MVP-50T
Part Number: N/A
Recorder Serial Number: 206836

1.0 Device Description

The Electronics International MVP-50T is a panel-mounted, color, electronic engine display allowing the operator to monitor and record parameters related to engine operations and user customizable parameters. Depending on the installation, parameters monitored may include engine parameters, oil pressure and temperature, outside air temperature, propeller revolutions per minute (RPM), fuel flow, fuel levels, and battery voltage and amperage. User customizable parameters may be defined by installation, examples include but are not limited to sensors for door states, annunciators, and flight control positions.

The unit contains non-volatile memory (NVM) for data storage of the parameters recorded and calculated.¹ The rate at which the data is stored is selectable by the operator. The recording function also records minimum and maximum values for each flight. The data is stored in engineering units in comma separated value (.csv) format on an internal microSD card, using a Linux file system format. The data can be downloaded to a USB memory device via a USB port on the front of the unit or by removing the internal microSD card. Each set of recorded data

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

is grouped by power cycle and identified by an MVP-50T assigned sequential flight number.

1.1 Data Recovery

Upon arrival at the Vehicle Recorder Division, an initial attempt to power on the device by applying 12 VDC failed. The device was taken apart and the internal 8GB microSD card was found to be in good condition and was downloaded via commercially available data forensics software.



Figure 1. Photo of EI MVP-50T received by the Vehicle Recorders Division.

1.2 Recording Description

The data extracted included approximately 2412 sessions from July 26, 2018, through May 24, 2022.² The accident flight was recorded starting at 14:45:01 ADT and ending at 15:08:57 ADT on May 24, 2022.

² All dates and times are referenced to elapsed device time.

1.3 Parameters Provided

Table 1 describes data parameters provided by the EI MVP-50T device. Since the device was not linked via a GPS, parameters such as Latitude, Longitude, Time, Airspeed, and Altitude were not recorded.

Table 1. EI MVP-50T Data Parameters.

Parameter Name	Parameter Description (units)
Amps	Amperage, A (amps)
Fuel F	Fuel Flow, gph (gallons per hour)
Fuel Press	Fuel Pressure, psi (pounds per square inch)
MSTR_WRN	Master Warning (discrete ("warning" or blank))
NG	Gas Generator Speed, % (percent)
NP	Power Turbine Speed, RPM (rotations per minute)
OAT	Outside Air Temperature, degF (degrees Fahrenheit)
Oil Press	Oil Pressure, psi, (pounds per square inch)
Oil Temp	Oil Temperature, degC (degrees Celsius)
Torque	Engine Torque, % (percentage)
Volts	Voltage, V (volts)

1.4 Time Correlation

The data contained on the microSD card was in local Alaska daylight time. However, this time was user input, as opposed to GPS time. An attempt to power on the device and compare the device's elapsed time to GPS time failed, as the unit was unable to be powered on. Therefore, no correlation of the recorded data from elapsed time to the precise accident time was established. The recording has a 5 second delay at the start and ends 3 seconds prior to the first and last recorded samples from the Garmin aera 796 GPS. Therefore, all times displayed in the Figures 2 and 3 are in the device's elapsed time.

D. OVERLAYS AND TABULAR DATA

Data obtained from the EI MVP-50T was used to produce the following overlays and tabular data. Because the unit was not linked through a GPS, only engine and some additional sensor parameters were only able to be plotted. No latitude or longitude data was stored in this device.

The device began recording at approximately 14:45:01 elapsed device time. The last recorded parameter was as at 15:08:57 elapsed device time on May 24,

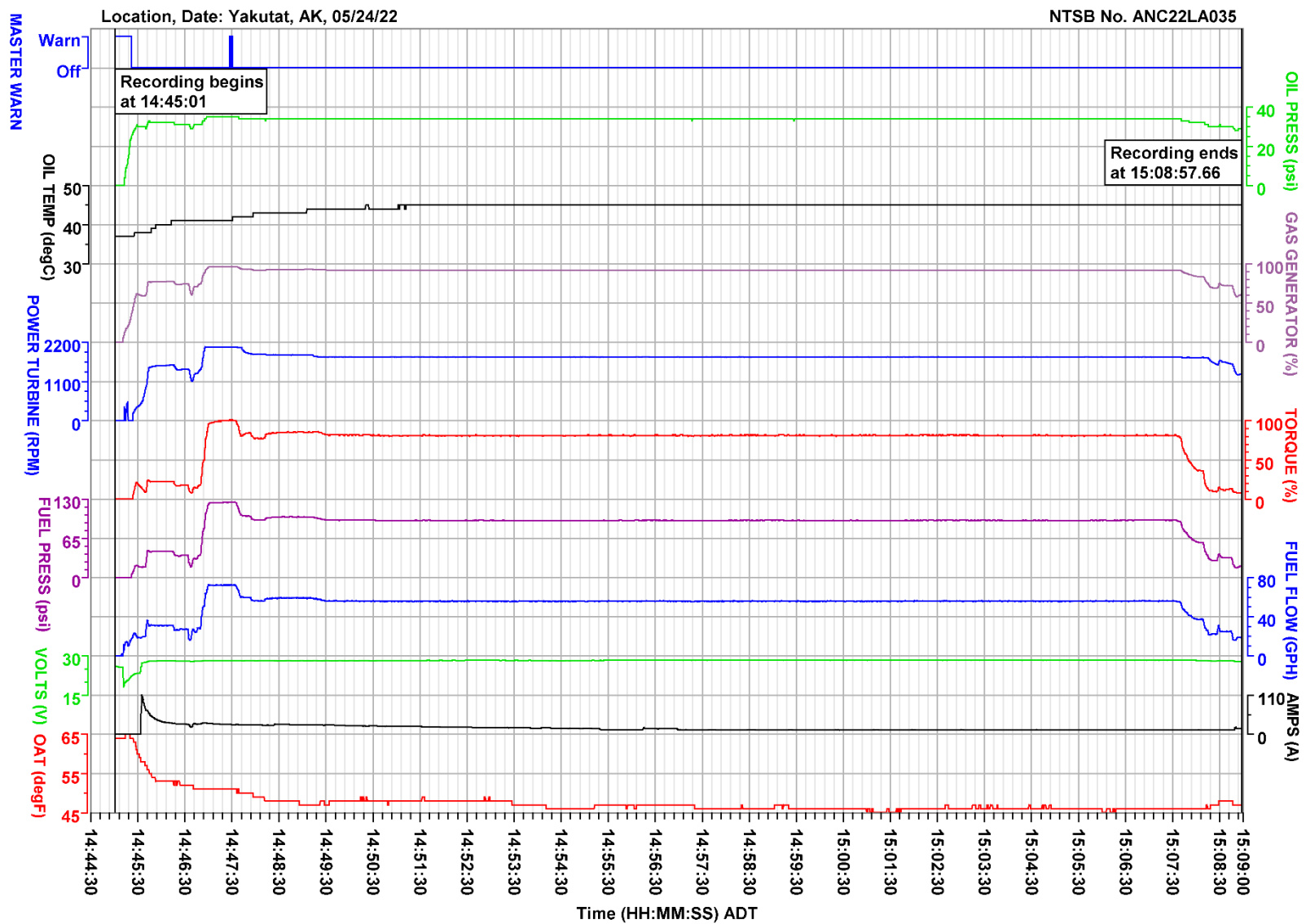
2022. Due to data buffering on the EI MVP-50T unit, the data recording may have ended before the accident event.

Figure 2 and Figure 3 show basic parameters during the entire accident flight and the final two minutes before the accident occurred, respectively.

The corresponding tabular data used to create Figure 2 and Figure 3 for the entire accident flight for all the parameters listed in Table 1 are provided in electronic comma separated value (CSV) format as Attachment 2 to this factual report. The attachment contains additional parameters that were recorded, but not plotted, during the accident flight.

Submitted by:

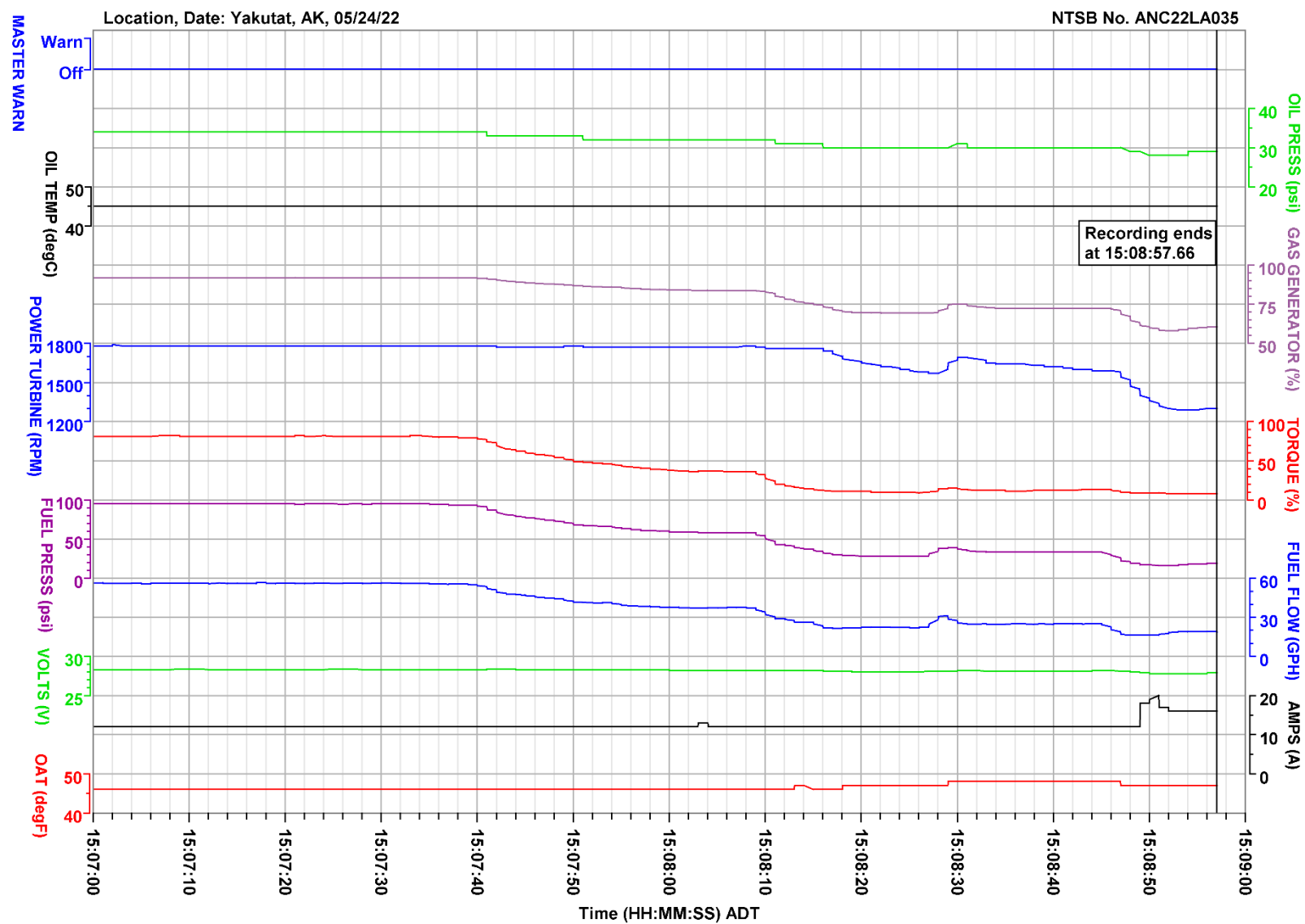
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Figure 2. Plot of EI MVP-50T parameters for the entire flight.



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Figure 3. Plot of EI MVP-50T parameters for the last two minutes before the end of the recording.