

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

February 28, 2022

Engine Monitoring Device

Specialist's Factual Report

By Sean Payne

1. EVENT

Location: Kodiak, Alaska
Date: November 7, 2021
Aircraft: WagAero Sportsman 2+2
Registration: N540AK
Operator: Private
NTSB Number: ANC22FA005

2. RECORDED FLIGHT DATA GROUP

A recorded flight data group was not convened.

3. DETAILS OF INVESTIGATION

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

Device: **Electronics International MVP-50P**
Device Serial Number: **247035**

3.1. Electronics International MVP-50P Device Description

The Electronics International MVP-50P 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, engine 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 of each parameter 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 is grouped by power cycle and identified by an MVP-50P assigned sequential flight number.

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

3.1.1. Electronics International MVP-50T Device Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had been relatively undamaged. The unit was powered on normally. The data were downloaded by interfacing the unit with a USB drive and selecting a memory dump.



Figure 1. Condition of EI MVP-50P received by the Vehicle Recorders Division.

3.1.2. Data Description & Time Correlation

The data extracted included a large number of sessions including the accident flight on November 7, 2021. Table 1 shows MVP-50P parameters that were validated and included in this report. Attachment 1 to this report is all the data that were validated from the MVP-50P.

The unit was set to record data at 3 Hz.

The time on the device was user set and was found to be approximately 1 hour ahead of local time, which was Alaska standard time (AKST). Timing information was adjusted by subtracting one hour from the device's internal clock. All times in this report appear as AKST.

Table 1. MVP-50P Parameters.

Parameter Abbreviation	Description
F. FLOW	Fuel Flow, gph (gallons per hour)
HP	Horsepower, % (Percent)
OIL P	Oil Pressure, psi (pounds per square inch)
OIL T	Oil Temperature, deg. F (degrees Fahrenheit)
VOLTS	Voltage, V (volts)
AMPS	Amperage, Amp (Amperes)
EST. FUEL	Estimated Fuel Remaining, GAL (Gallons)
OAT	Outside Air Temperature, deg. F (Degrees Fahrenheit)
VAC	Vacuum Pressure, HG (Inches of Mercury)
EGT #	Exhaust Gas Temperature – Cylinder #, deg. F (Degrees Fahrenheit)
CHT #	Cylinder Head Temperature – Cylinder #, deg. F (Degrees Fahrenheit)
M.P.	Manifold Pressure, HG (inches of Mercury)
RPM	Engine RPM, RPM (Revolutions Per Minute)
AIRSPD	Indicated Airspeed, KTS (Knots)
G METR	Normal Acceleration, G (g)

4. PLOTS AND TABULAR DATA

The following two figures contain MVP-50P data during the November 7, 2021, event.

Figure 2 is a plot of the entire accident flight recording from the MVP-50P. The plotted time interval is from 13:56:30 to 14:02:00 AKST. Recorded data began around 13:56:50 AKST. Cylinder head temperatures and exhaust gas temperatures rose normally upon the start of recorded data. For the next approximately four minutes, before 14:00:50, the recorded data showed the aircraft's RPM at around 1,500 RPM, and there was no obvious portion of the data that indicated an engine run up was performed. A review of other data on the device, did not indicate there was another recorded power session that day.

Around 14:00:50 AKST, engine RPM increased rapidly, eventually topping out close to 2,500 RPM. Recorded values for airspeed increased to around 60 knots. Fuel flow increased to about 25 gph, and manifold pressure increased to near 30 inches of Mercury while other engine performance parameters appeared nominal.

The recording terminated abruptly around 14:01:30 AKST. At that time, airspeed had a slightly increasing trend, and the recorded values for normal acceleration (G METR) showed an increase to nearly 1.5 g, then a return to about 1 g.

Figure 3 is a plot of the last approximate 1 minute and 30 seconds of the accident flight. The plotted time interval is from 14:00:00 to 14:01:40 AKST.

The corresponding tabular data used to create figures 2-3 are provided in electronic .csv format as attachment 1 to this report.

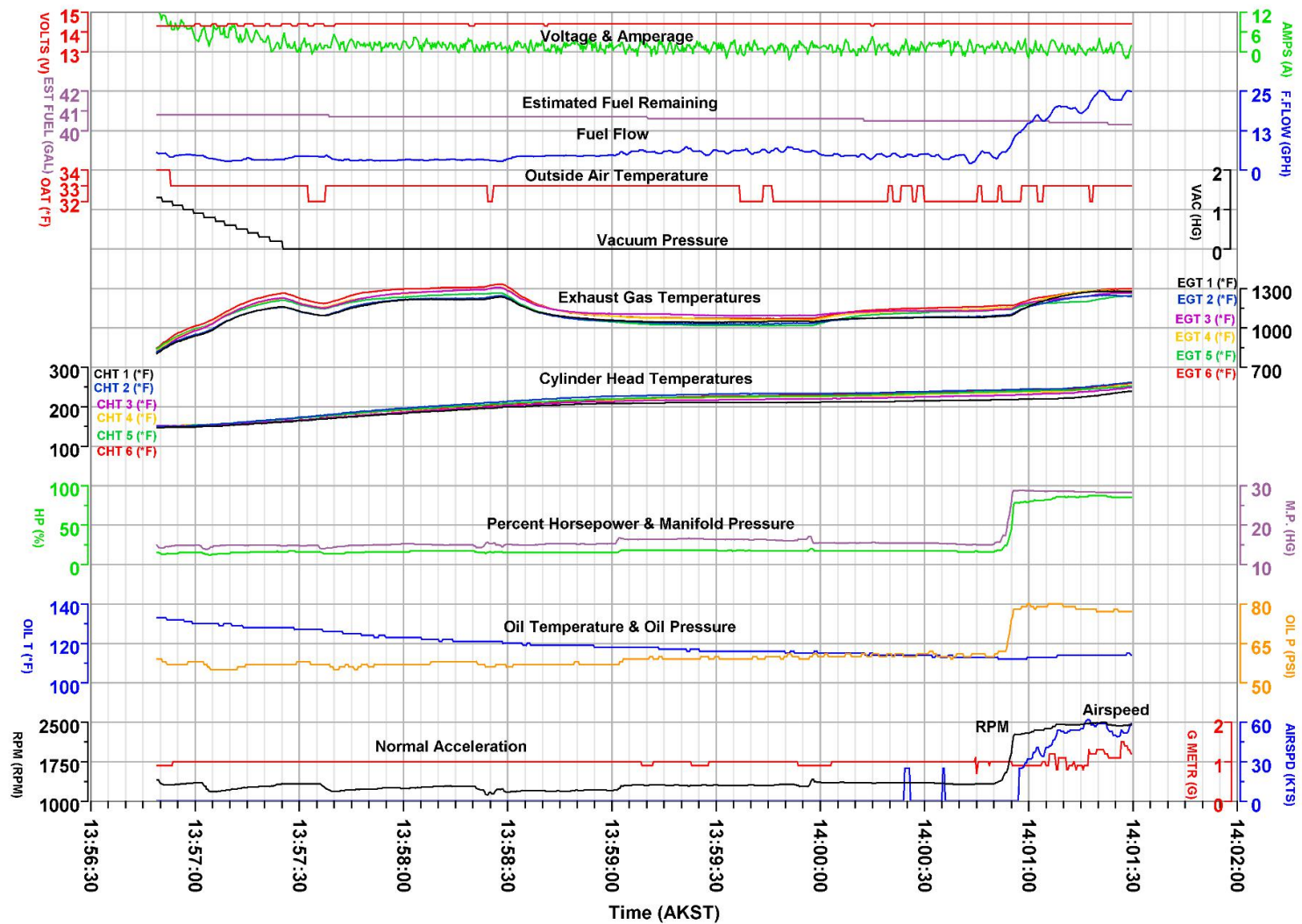


Figure 2. A plot of the entire accident flight recording form the MVP-50P.

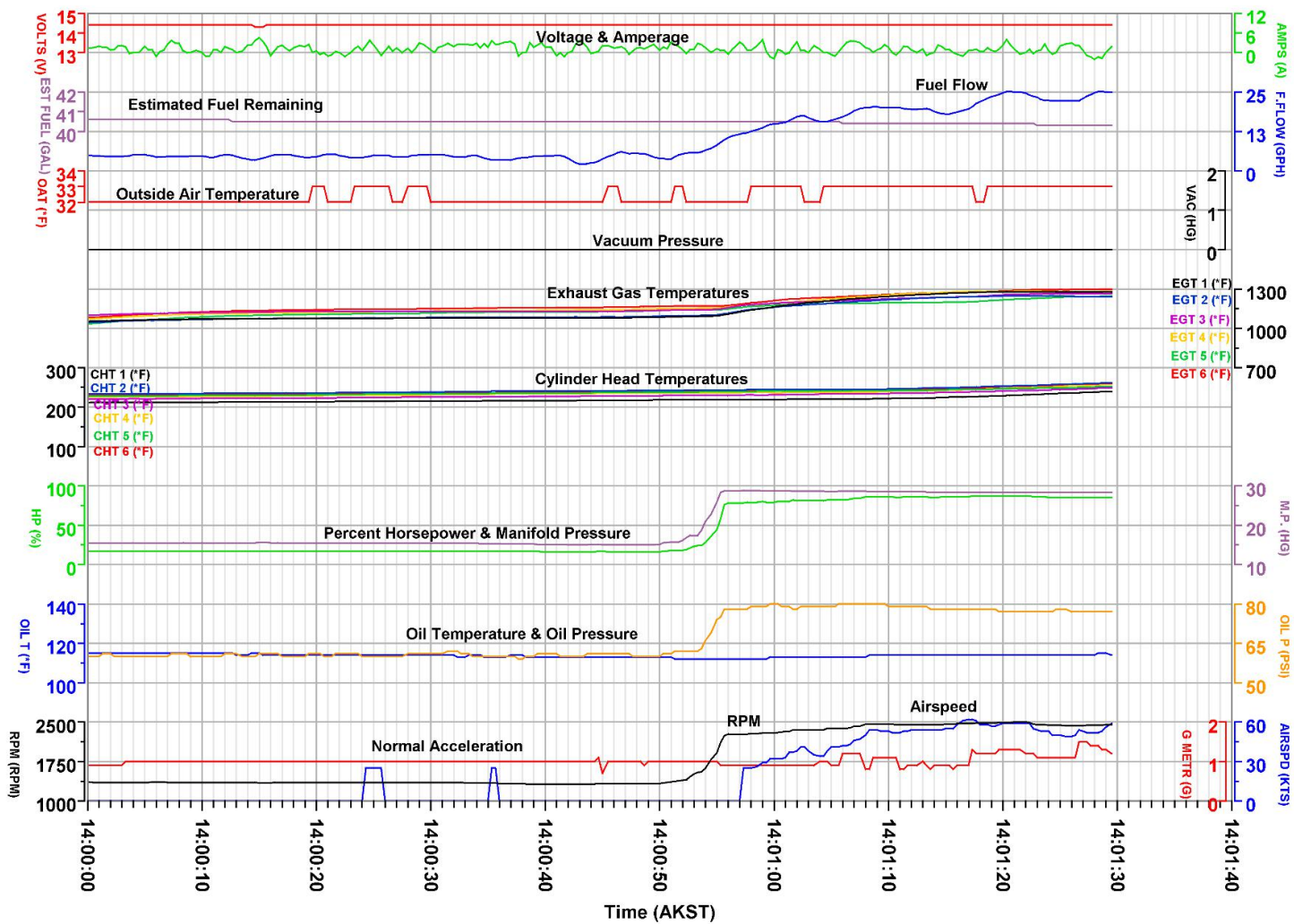


Figure 3. A plot of the last 15 minutes of the accident flight.