

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN22LA386

ELECTRONIC DEVICES

Specialist's Factual Report

May 9, 2023

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A. ACCIDENT

Location: Onalaska, Texas
Date: August 9, 2022
Time: 1709 Central Daylight Time (CDT)
Airplane: Air Tractor AT-802A, N830DA

B. ELECTRONIC DEVICES SPECIALIST

Specialist: Gerald Kawamoto
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 electronic devices:

Recorder Manufacturer/Model: Electronics International MVP-50T
Recorder Serial Number: 253424

Recorder Manufacturer/Model: Garmin Aera 796
Recorder Serial Number: 2CY015127

Recorder Manufacturer/Model: Multifunctional FHD Video Recorder
Recorder Serial Number: Unknown

The aircraft from which the devices were recovered had been submerged in water and all devices were dry upon arrival at the Vehicle Recorder Laboratory. Internal examinations of the devices revealed corrosion damage to the internal components, rendering each inoperable.

1.0 Electronics International MVP-50T Description

The Electronics International (EI) MVP-50T is a panel-mounted, color, electronic engine display allowing the operator to monitor and record parameters related to engine operations. Depending on the installation, parameters monitored may include 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 memory¹ for data storage of the parameters recorded and calculated. 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 is grouped by power cycle and identified by an MVP-50T assigned sequential flight number.

1.1 Electronics International MVP-50T Data Recovery

Figure 1 shows the device as received. An internally mounted microSD card was removed and readout normally using laboratory tools.



Figure 1. Front and back of the MVP-50T as received.

1.2 Electronics International MVP-50T Recording Description

Data included files recorded from October 21, 2021, through August 9, 2022 CDT. The last session started at 16:46:43 CDT and ended at 17:09:38 CDT on August 9, 2022, and contained the accident event. Data were sampled at approximately 3 Hz. Not all parameters recorded were validated by the recorder specialist. Table 1 describes MVP-50T parameters provided and verified in this report.

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

Table 1. Verified and provided EI MVP-50T parameters

Parameter Name	Parameter Description
GPS-LAT (deg)	Latitude (degrees)
GPS-LONG (deg)	Longitude (degrees)
GPS-ALT (ft)	GPS Altitude (feet)
GPS-SPEED (kts)	Groundspeed (knots)
GPS-TRACK (deg)	Ground Track (degrees)
ITT (degC)	Inter-Turbine Temperature (degrees Celsius)
NG (%)	Gas Generator Speed (percent)
NP (RPM)	Propeller Speed (revolutions per minute)
HP (HP)	Horsepower
F.FLOW (gph)	Fuel Flow (gallons per hour)
OIL P (psi)	Oil Pressure (pounds per square inch)
FUEL L & R (gal)	Left and Right Fuel Level (gallons)

2.0 Garmin Aera 796 Description

The Garmin Aera 796 is a battery-powered multi-function display and GPS receiver with a 7-inch diagonal high resolution touch screen. The unit includes a built-in Jeppesen database and can receive XM satellite radio for flight information including NEXRAD Radar, lightning, METARs, and TFRs. The unit can also perform and store weight and balance calculations. A built-in AOPA Airport Directory and SafeTaxi airport diagrams are included for selected airfields. With appropriate subscriptions, the unit can store and display geo-referenced VFR and IFR navigation charts, including IFR approach charts. The unit also has a "scratch pad" feature, allowing the user to hand write electronic notes.

The unit stores date, route-of-flight and flight-time information. A detailed track log including latitude, longitude, date, time and GPS altitude information is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the track log as a function of time or distance moved, depending on how the unit has been configured. The current track log can be saved to long-term memory. Track log storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile memory.

2.1 Garmin Aera 796 Data Recovery

The non-volatile memory chip was removed from the device and read out using laboratory tools. Data were unable to convert to engineering units. It was determined that data contained would likely be redundant to the GPS location data recovered from the Electronics International MVP-50T, thus, additional attempts at data conversion were not pursued.



Figure 2. Garmin Aera 796 as received.

3.0 Multifunctional FHD Video Recorder Description

The Multifunctional FHD Video Recorder features a 5-inch Organic Light-Emitting Diode (OLED) screen, stereo speakers, a built-in polymer lithium battery, supports input and output of 1080P HD, AV and HDMI video signal, and USB and SD plug-in.

Video can be recorded via an externally connected source to a mounted SD card or USB flash drive.

3.1 Multifunctional FHD Video Recorder Data Recovery

The device did not contain an SD card or USB flash drive, thus, no data were recovered.

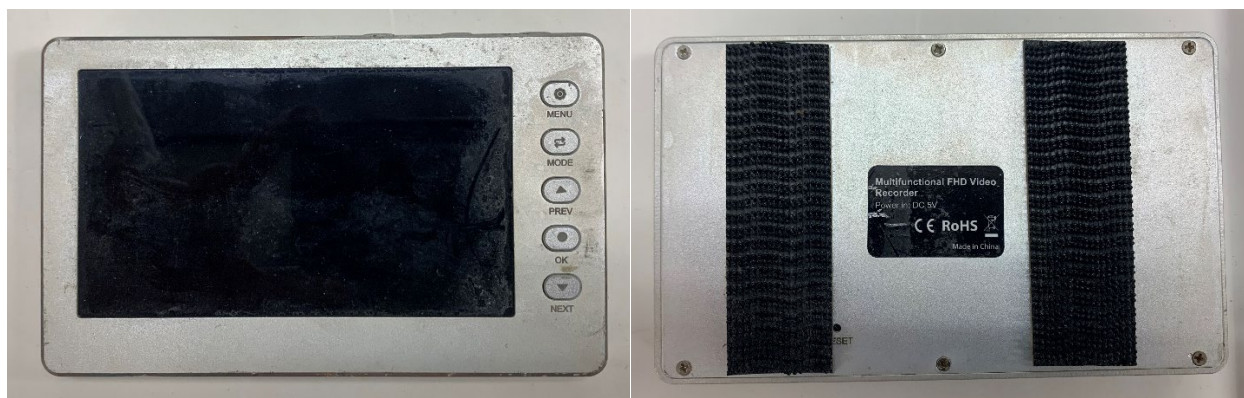


Figure 3. Front and back of the Multifunctional FHD Video Recorder as received.

D. FIGURES AND TABULAR DATA

Figures 4 and 5 are Google Earth overlays of the accident flight recorded on the Electronics International MVP-50T. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the accident flight. Figure 4 shows the entire flight. Figure 5 shows the end of the flight.

Figure 6 is a plot of parameters of the entire event flight. The time displayed is 16:48:00 to 17:10:00 CDT.

Figure 7 is a plot of parameters of the final two minutes of the event flight. The time displayed is 17:07:30 to 17:09:40 CDT.

The corresponding tabular data used to create figures 4 through 7 are provided in CSV format as attachment 1 to this report.

Submitted by:

Gerald Kawamoto
Recorder Specialist

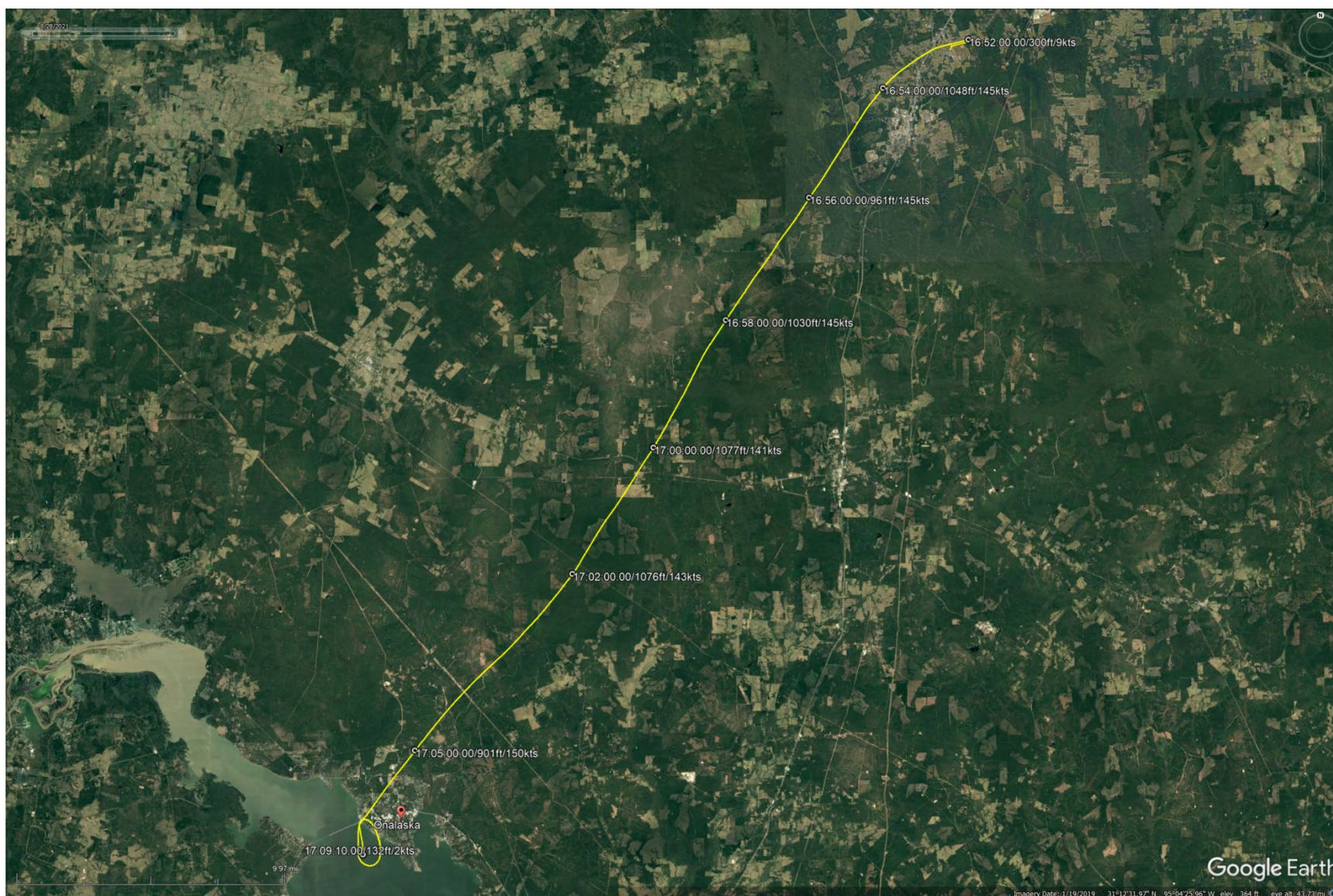


Figure 4. Google Earth overlay of the entire accident flight recorded on the EI MVP-50T.

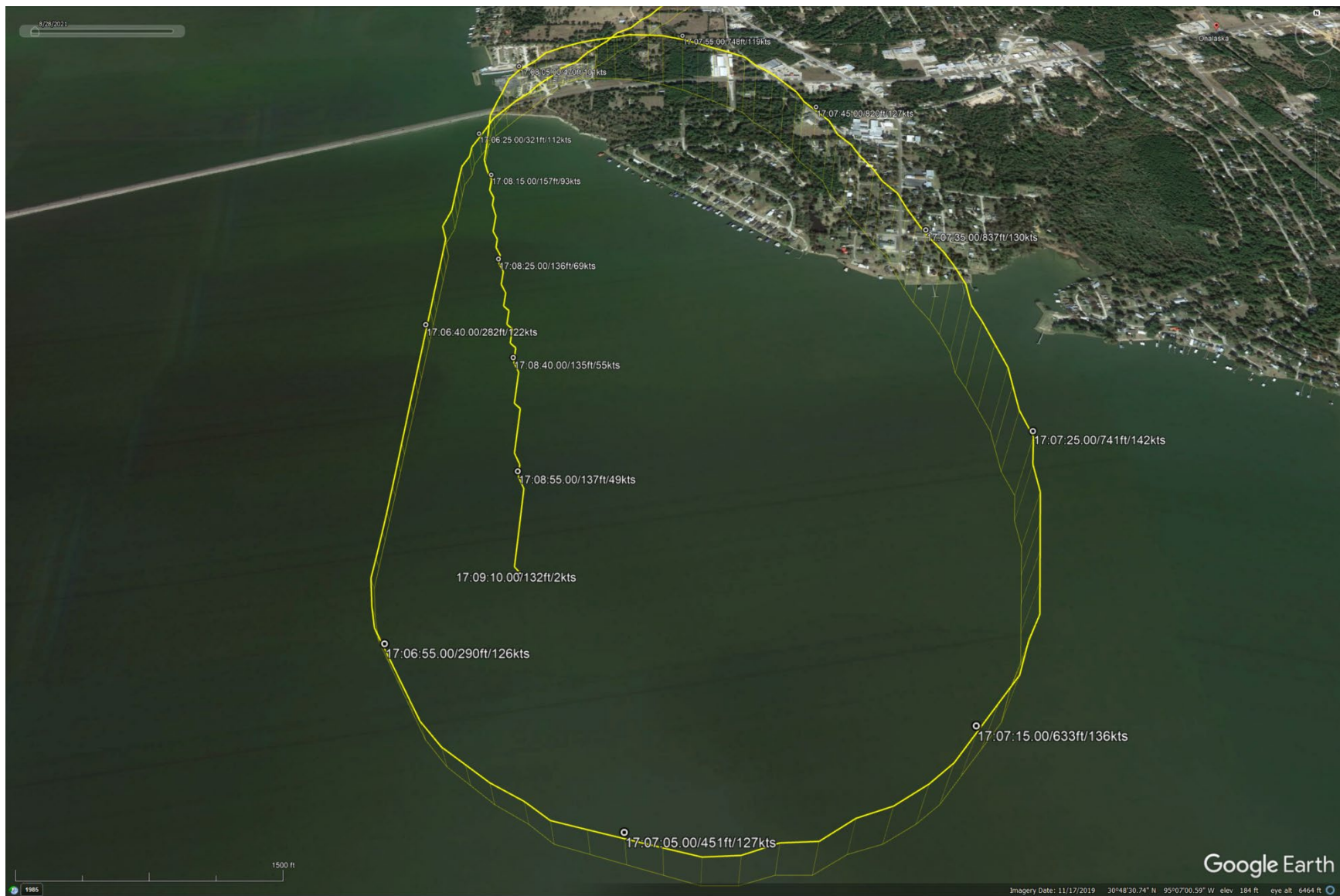


Figure 5. Google Earth overlay showing the end of the accident flight recorded on the EI MVP-50T.

Air Tractor 802A, N802DA

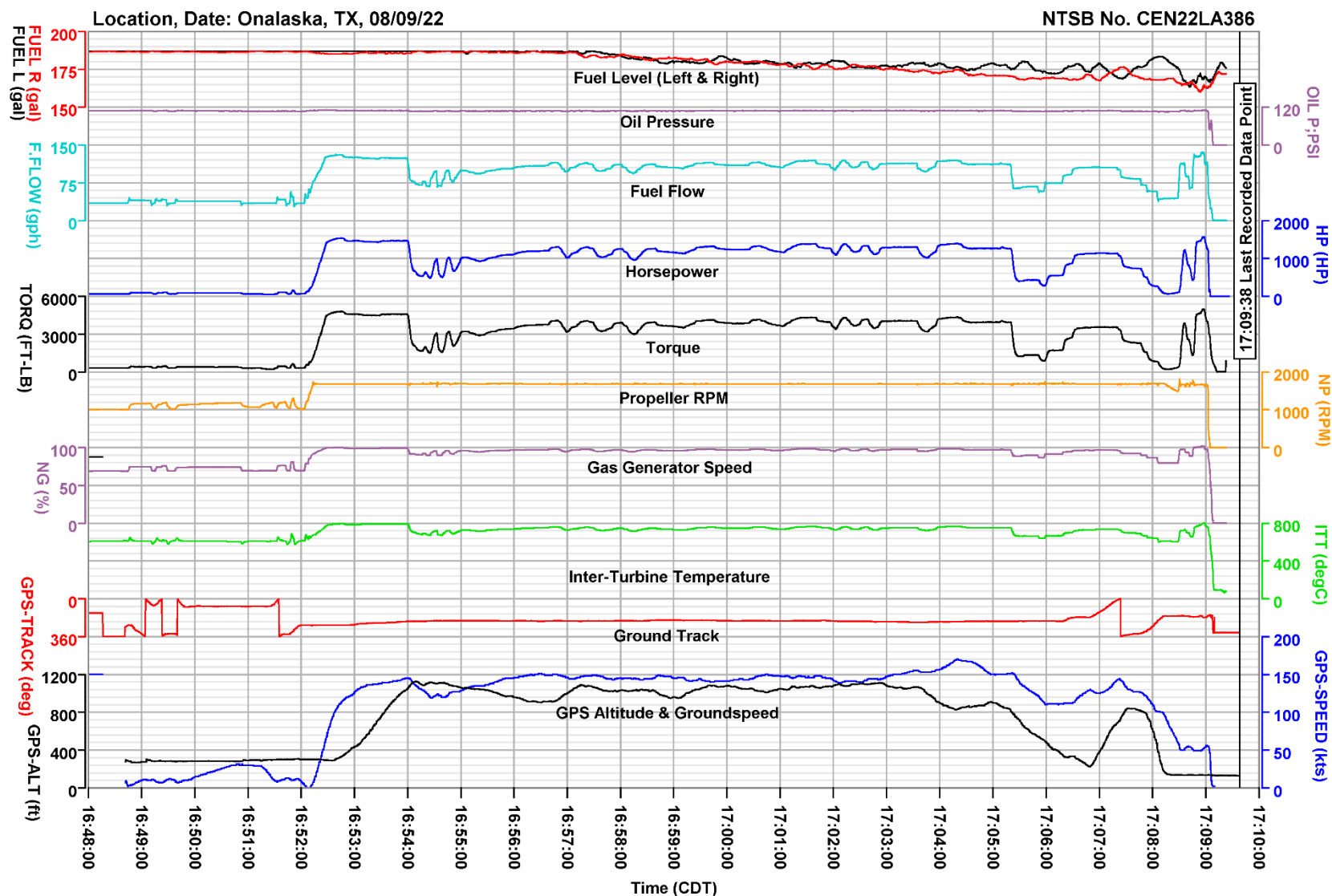


Figure 6. Plot of EI MVP-50T parameters for the entire accident flight.

Air Tractor 802A, N802DA

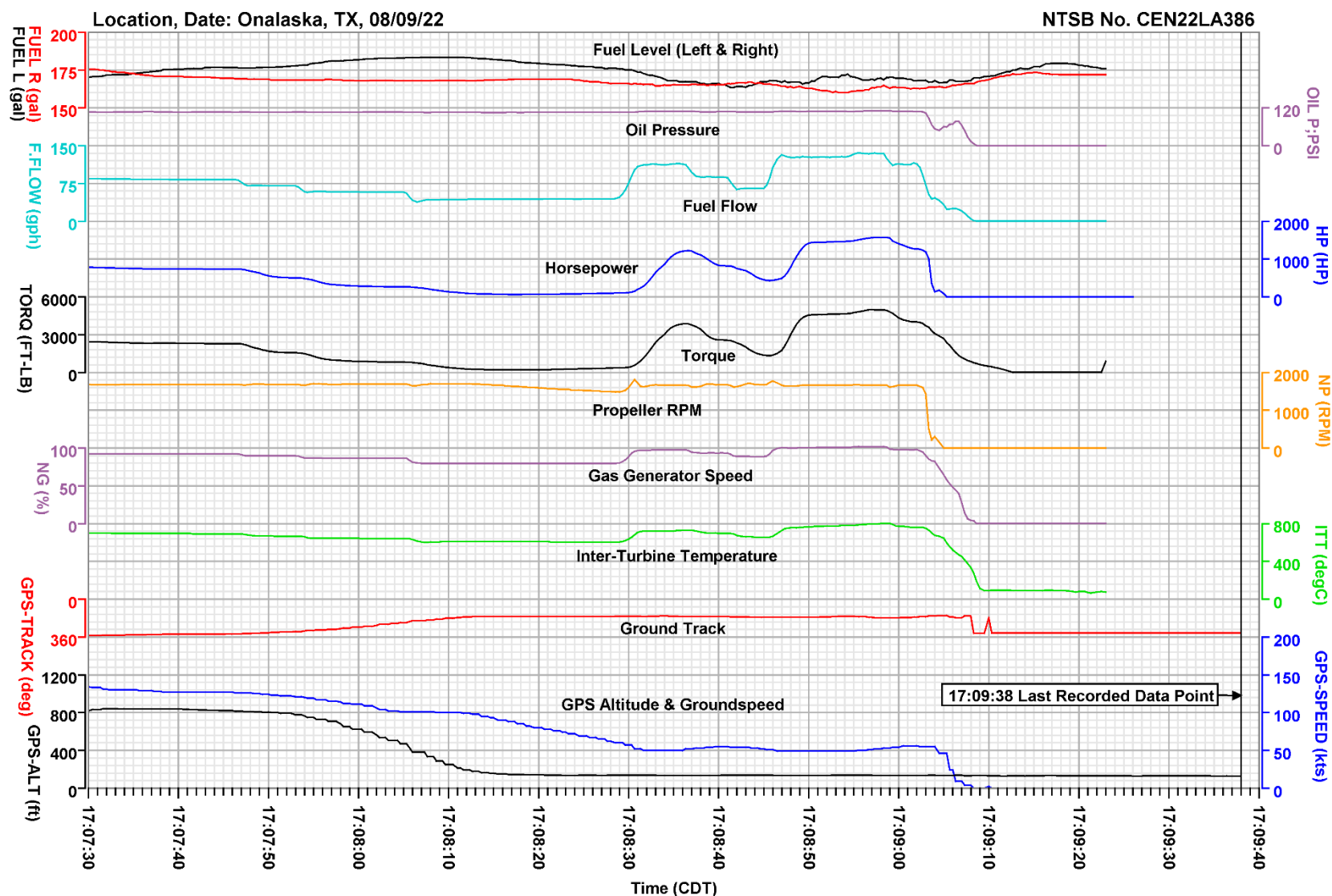


Figure 7. Plot of EI MVP-50T parameters of approximately the final 2 minutes of the accident flight.