

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR23FA344

ENGINE DATA MONITOR

Specialist's Factual Report

May 7, 2025

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. ENGINE DATA MONITOR SPECIALIST.....	3
C. DETAILS OF THE INVESTIGATION	3
1.0 EI MVP-50P DESCRIPTION	3
1.1 EI MVP-50P Data Recovery	4
1.2 EI MVP-50P Recording Description	4
1.2.1 EI MVP-50P Parameters Provided.....	4
1.3 EI MVP-50P Time Correlation	5
D. FIGURES AND TABULAR DATA.....	5

A. ACCIDENT

Location: Bellevue, Washington
Date: September 15, 2023
Time: 1058 Pacific daylight time (PDT)
Airplane: Seawind 3000, private operator, N57TJ

B. ENGINE DATA MONITOR SPECIALIST

Specialist Matthew Yandrick
Electrical Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

An engine data monitor (EDM) group was not convened. The NTSB Vehicle Recorder Division received the following EDM:

Recorder Manufacturer/Model: EI MVP-50P
Recorder Serial Number: Unknown

1.0 EI MVP-50P Description

The Electronics International Inc. (EI) 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: 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 recorded and calculated parameters. 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 memory 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. Alternatively, the internal memory card, either Compact Flash (CF) or microSD, may be removed for downloading. Each set of recorded data is grouped by power cycle and identified by an MVP-50P assigned sequential flight number.

1.1 EI MVP-50P Data Recovery

Figure 1 shows the condition of the EI MVP-50P upon arrival as the Vehicle Recorder Division. The internal CF card was removed, and data were downloaded using manufacturer's instructions.



Figure 1. The front and back view of the EI MVP-50P, as received at the Vehicle Recorder Laboratory.

1.2 EI MVP-50P Recording Description

The data extracted included 2,556 sessions from May 16, 2014, to September 15, 2023. The last session recorded from 10:53:13 PDT to 10:57:57 PDT on September 15, 2023, was identified to be related to the accident. The data were sampled at approximately 3 hertz (Hz).

1.2.1 EI MVP-50P Parameters Provided

Table 1 lists the EI MVP-50P parameters and units verified and provided in this report.

Table 1. Verified and provided parameters.

Parameter Name (units)	Parameter Description
AILERON (deg)	Aileron position (degrees)
AIRSPD (kts)	Indicated airspeed (knots)
AMPS (A)	Battery current (amperes)
CHT # (degF)	Cylinder head temperature - cylinder # (degrees Fahrenheit)
EGT # (degF)	Exhaust gas temperature - cylinder # (degrees Fahrenheit)
ELVTOR (deg)	Elevator position (degrees)
ENG C T (degF)	Engine carburetor temperature (degrees Fahrenheit)
ENG HRS (hrs)	Engine hours (hours)
F.FLOW (GPH)	Fuel flow rate (gallons per hour)
FLAPS (deg)	Flap position (degrees)
FLT TM (min)	Flight time (minutes)
FUEL L (GAL)	Fuel quantity at left tank (gallons)
FUEL P (PSI)	Fuel pressure (pounds per square inch)

Parameter Name (units)	Parameter Description
FUEL R (GAL)	Fuel quantity at right tank (gallons)
GEAR LEFT (V)	Left gear position (volts)
GEAR NOSE (V)	Nose gear position (volts)
GEAR RIGHT (V)	Right gear position (volts)
HP (%)	Engine linearized output power (percent)
HYD P (psi)	Hydraulic pressure (pounds per square inch)
M. P. (inHG)	Manifold pressure (inches of Mercury)
MSTR_WRN (discrete)	Master warning (0=Off, 1=On)
OIL P (PSI)	Oil pressure (pounds per square inch)
OIL T (degF)	Oil temperature (degrees Fahrenheit)
OAT (degF)	Outside air temperature (degrees Fahrenheit)
PR ALT (ft)	Pressure altitude (feet) ¹
RPM (RPM)	Engine rotational speed (revolutions per minutes)
RUDDER (deg)	Rudder position (degrees)
S. COOL (degF/min)	Shock cooling rate (degrees Fahrenheit per minute)
SC AT (degF)	Supercharger air temperature (degrees Fahrenheit)
SC OT (degF)	Supercharger oil temperature (degrees Fahrenheit)
TACH TM (hrs)	Tachometer time (hours)
TAS (kts)	True airspeed (knots)
VSI (fpm)	Vertical speed indicator (feet per minute)
VOLTS (V)	Battery voltage (volts)

Note: For parameters with a unit description of discrete, a discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

1.3 EI MVP-50P Time Correlation

The EI MVP-50P recorded data in PDT, the local time of the accident.

D. FIGURES AND TABULAR DATA

Figures 2 to 7 contain data recorded on the EI MVP-50P on the accident date, September 15, 2023.

Figures 2 to 4 are plots of the data parameters for the entire accident recording. The time interval displayed is from 10:53:00 PDT to 10:58:00 PDT.

Figures 5 to 7 are plots of the data parameters for the final portion of the accident recording. The time interval displayed is from 10:57:25 PDT to 10:58:00 PDT.

These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

The accident recording contained approximately 11 seconds of invalid data for some parameters from 10:57:13.7 PDT to 10:57:24.7 PDT. These parameters

¹ Pressure altitude is based on a standard altimeter setting of 29.92 inches of mercury (in Hg) and has not been corrected for the local altimeter setting at the time of the event.

included indicated airspeed, true airspeed, pressure altitude, vertical speed indicator, hydraulic pressure, carburetor temperature, super charger air temperature, super charger oil temperature, flap position, rudder position, elevator position, and aileron position.

According to the manufacturer, if the Engine Data Converter (EDC) sends an error message for a specific channel, the function associated with that channel will display "A-D" for the value.² An "OVR" message will be displayed if a channel on the EDC is over ranged with a voltage differential greater than 2.5 volts. Previous flights from June 20, 2014, until the accident flight exhibited identical error messages.

The discrete parameter, Master Warning was "ON" for the entire accident recording and did not contain error messages. On previous flights, Master Warning historically started each recording "ON" and changed states as engine RPMs were changing.

The corresponding tabular data used to create figures 2 to 7 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Submitted by:

Matthew Yandrick
Electrical Engineer – Recorder Specialist

² The Engine Data Converter converts the analog signals from the probes and transducers to a digital format.

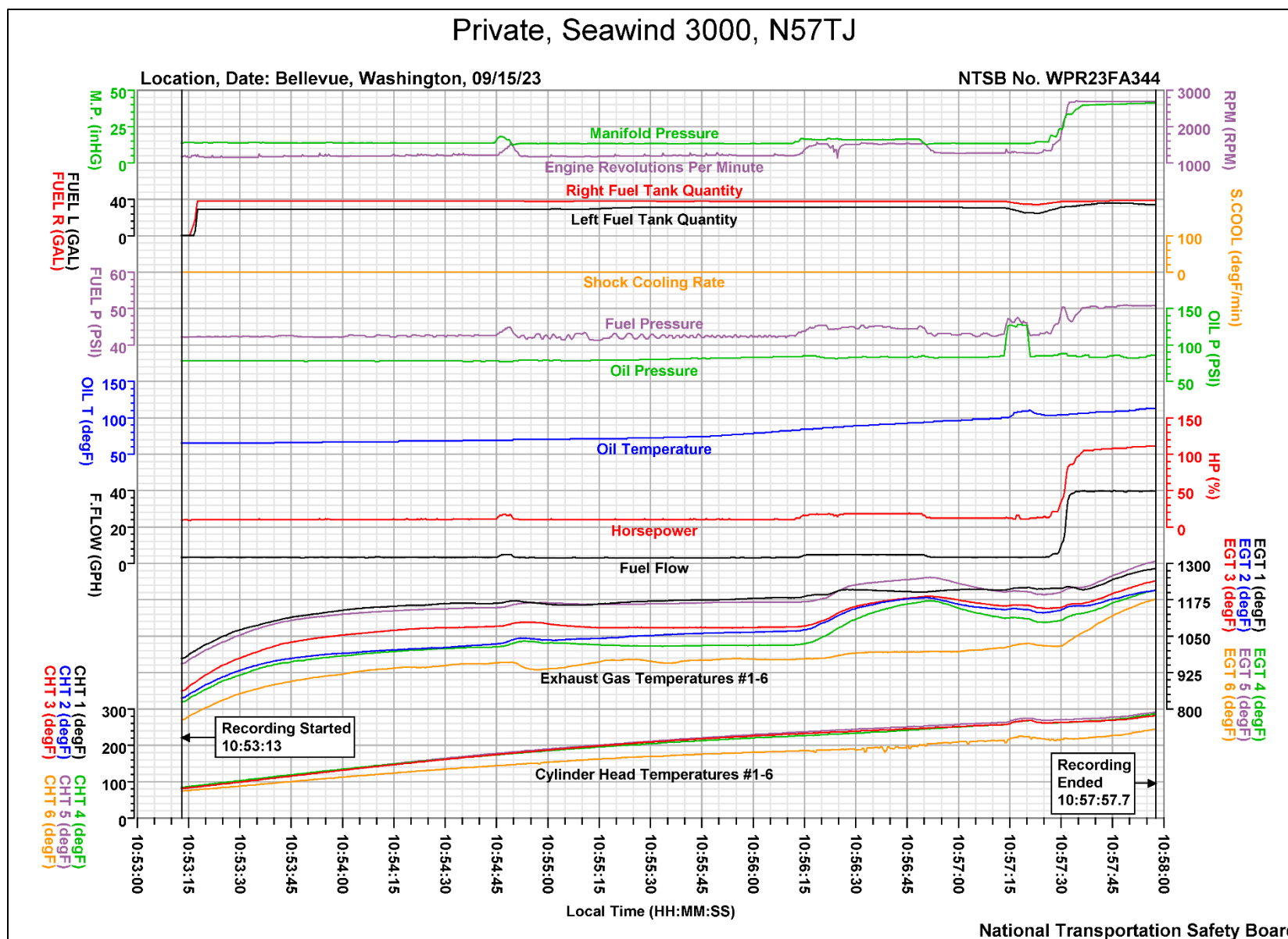


Figure 2. Plot of data parameters for the entire accident recording from 10:53:13 to 10:57:57.7 PDT.

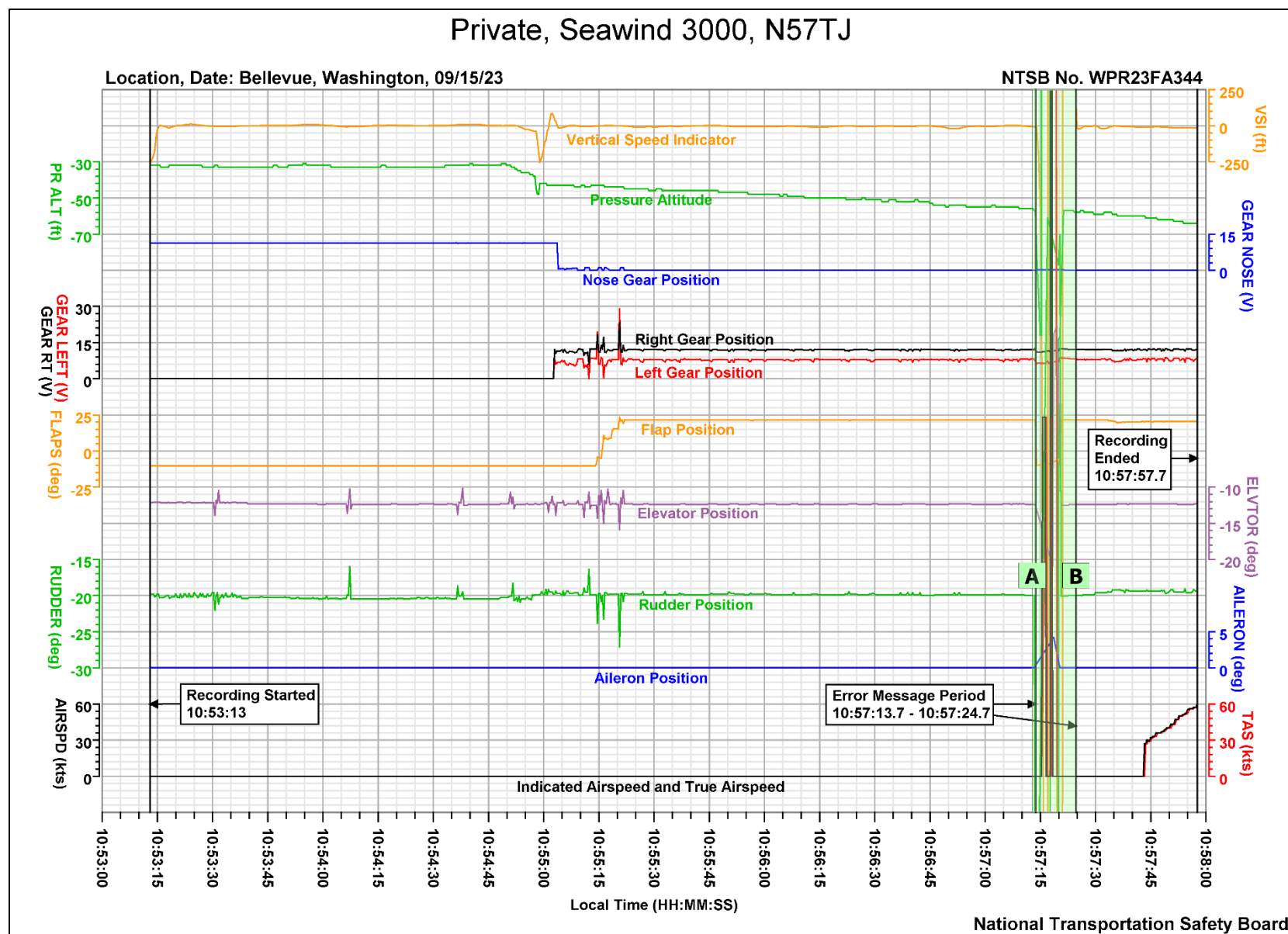


Figure 3. Plot of data parameters for the entire accident recording from 10:53:13 to 10:57:57.7 PDT.

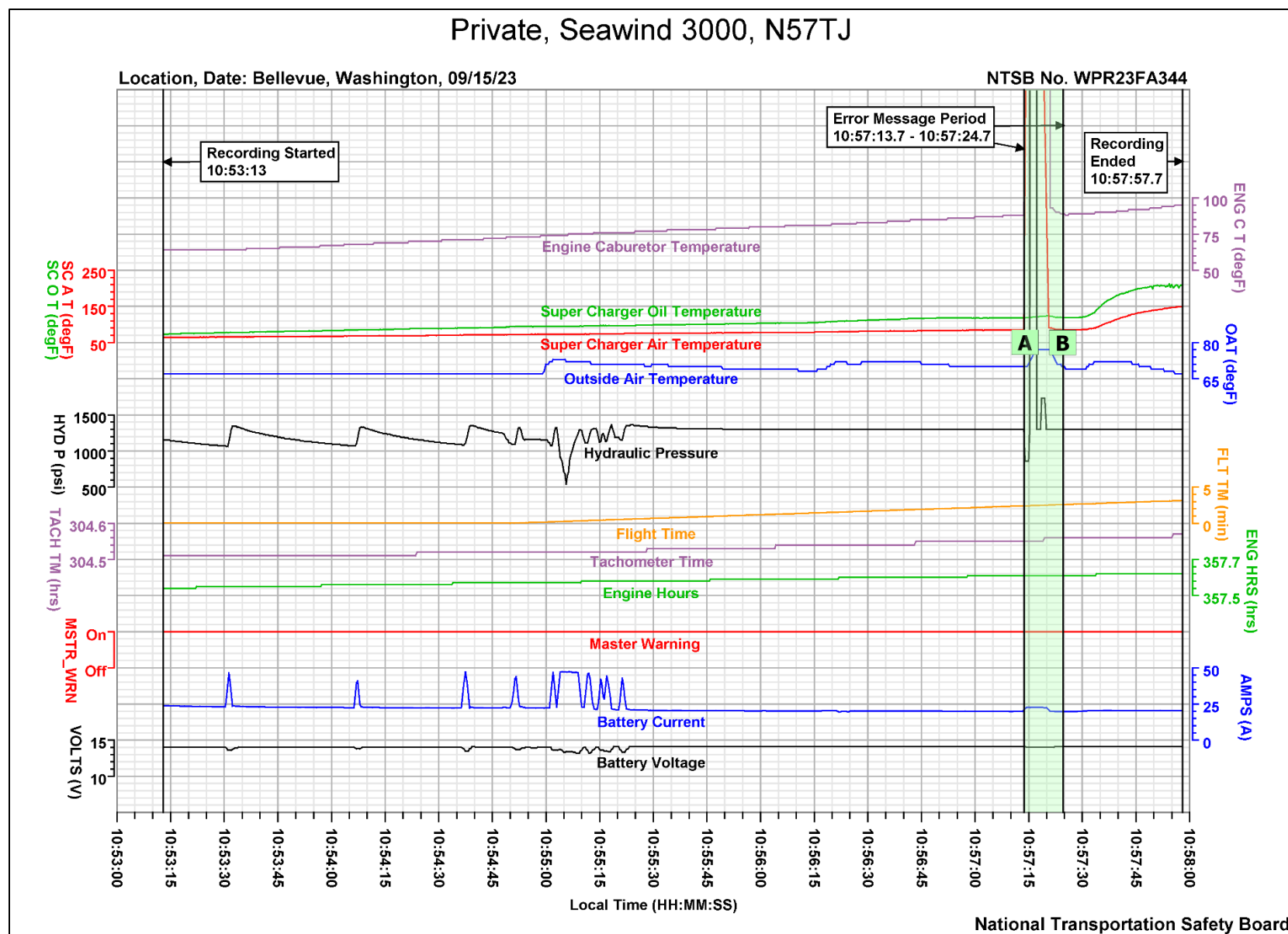


Figure 4. Plot of data parameters for the entire accident recording from 10:53:13 to 10:57:57.7 PDT.

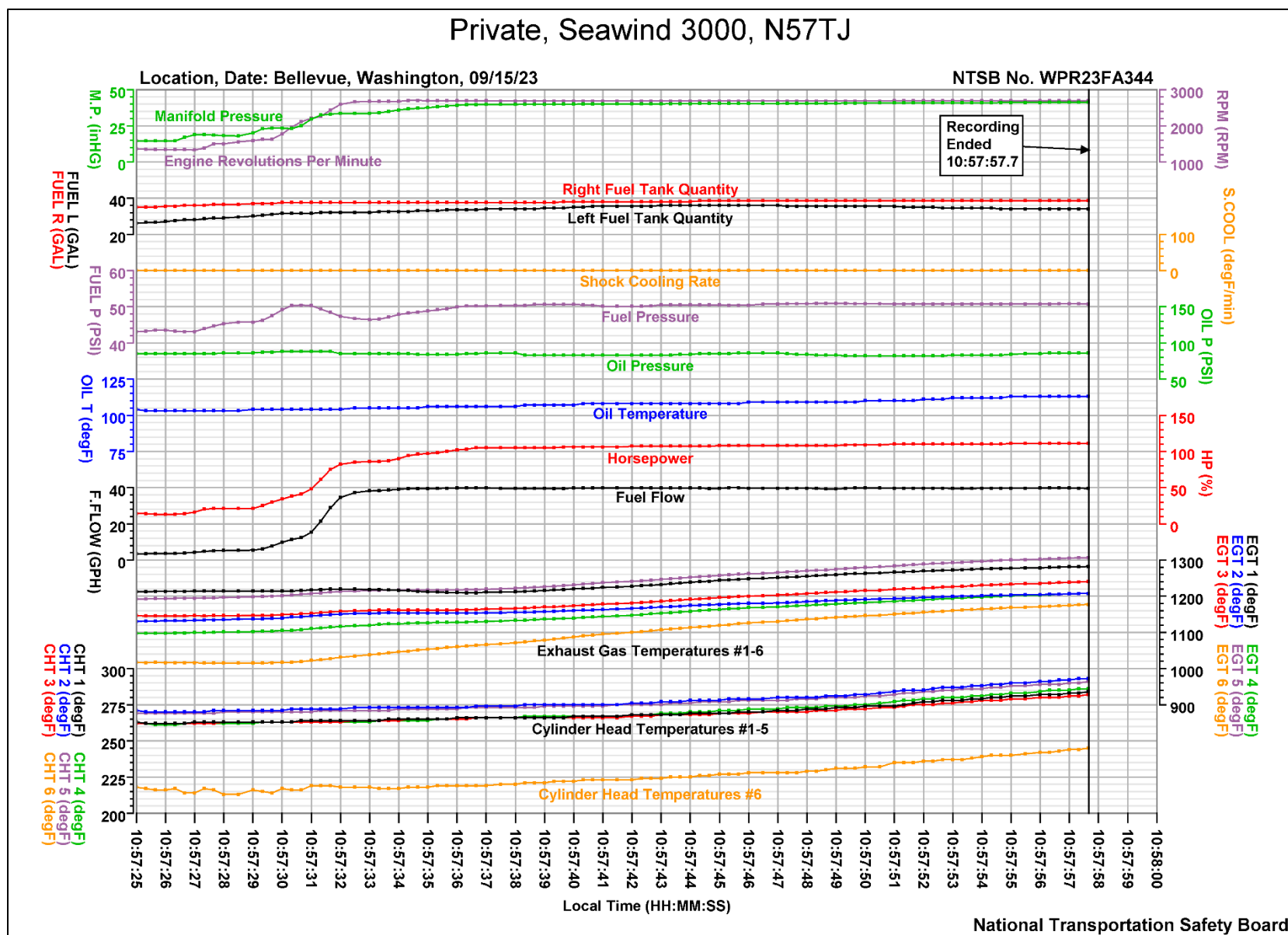


Figure 5. Plot of data parameters for the final portion of the accident recording from 10:57:25 to 10:57:57.7 PDT.

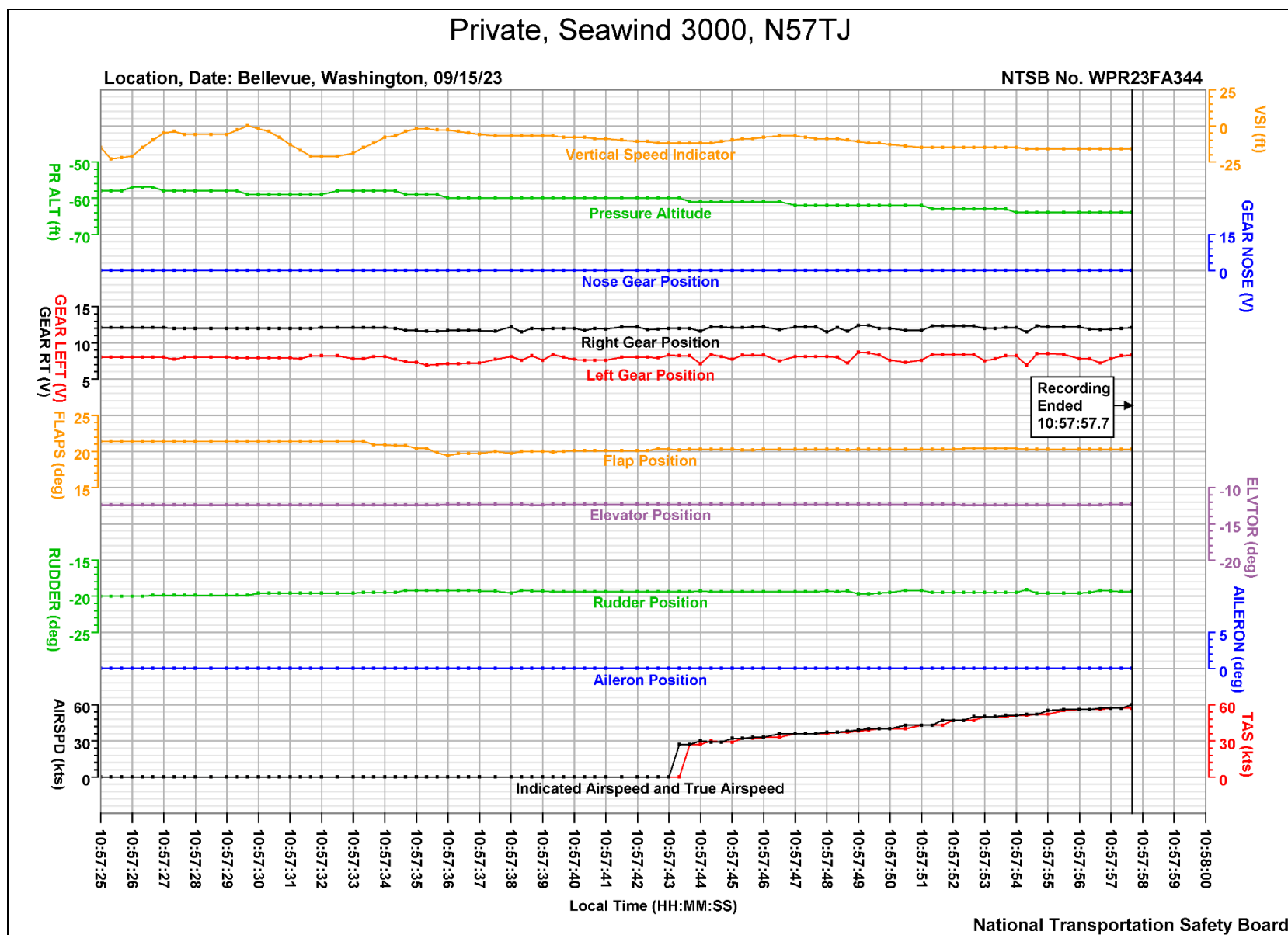


Figure 6. Plot of data parameters for the final portion of the accident recording from 10:57:25 to 10:57:57.7 PDT.

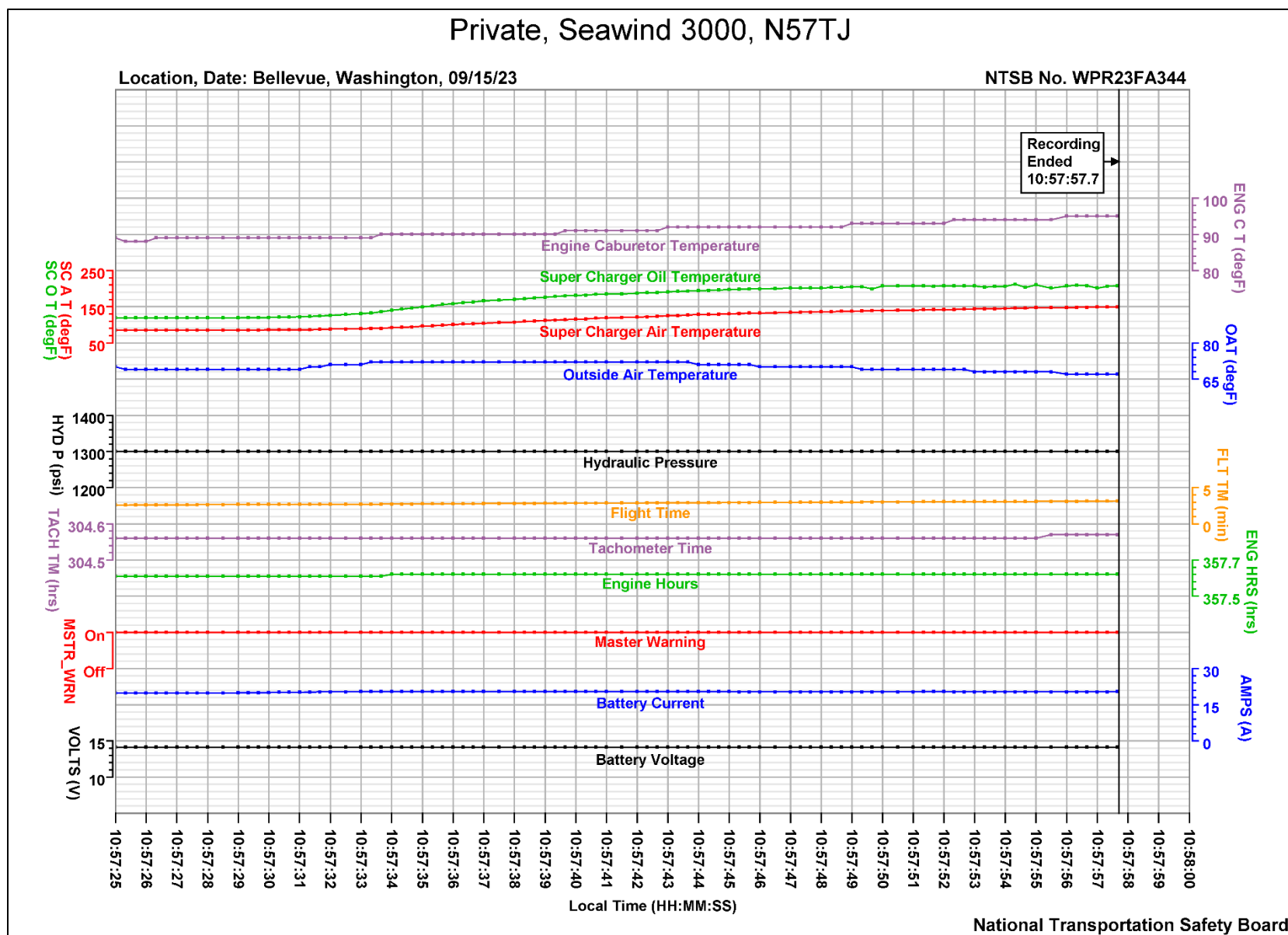


Figure 7. Plot of data parameters for the final portion of the accident recording from 10:57:25 to 10:57:57.7 PDT.