

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

August 21, 2019

Recorded Flight Data

Specialist's Factual Report By Kyle Garner

1. EVENT

Location: Shreveport, Louisiana
Date: February 28, 2019
Aircraft: Piper PA-46-350P
Registration: N428CD
Operator: Private
NTSB Number: CEN19FA088

On February 28, 2019, about 1039 central standard time, a Piper PA46-350P airplane, N428CD, impacted a river after departing from Shreveport Downtown Airport (DTN), Shreveport, Louisiana. The private pilot and passenger were fatally injured, and the airplane was substantially damaged. The airplane was registered to Lennard Properties LLC and was being operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. The airplane departed on an instrument flight rules flight plan during day instrument meteorological conditions, with a destination of Wilbarger County Airport (F05), Vernon, Texas.

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 devices:

Device 1: Electronics International MVP-50T
Device 1 Serial Number: 175053
Device 2: Appareo Stratus 2S
Device 2 Serial Number: 2S0098-40

3.1. Electronics International MVP-50T 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 memory¹ (NVM) 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.

3.1.1. Electronics International MVP-50T Device Data Recovery

Upon arrival at the Vehicle Recorder Division, an initial examination revealed the unit had been exposed to water (see Figure 1). The unit was cleaned and dried, however, it would not power on. The internal 16GB microSD card was found to be in good condition and was downloaded via commercially available data forensics software.



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

3.1.2. Data Description & Time Correlation

The data extracted included 477 sessions including the accident flight on February 28, 2019. The accident flight was the last recorded flight and was approximately 12 minutes long. Table 1 shows MVP-50T parameters included in this report and as tabular data in attachment 1 for the accident flight.

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

Table 1. MVP-50T Parameters

Parameter Abbreviation	Description
Airspeed	Airspeed, kts (knots)
Pressure Alt	Pressure Altitude, ft (feet)
Fuel Flow	Fuel Flow, gph (gallons per hour)
Fuel L	Fuel in left tank, gal (gallons)
Fuel Press	Fuel Pressure, psi (pounds per square inch)
Fuel R	Fuel in right tank, gal (gallons)
Fuel Rem	Fuel remaining, gal (gallons)
GPS Altitude	GPS Altitude, ft (feet)
GPS Lat	GPS Latitude, deg (degrees)
GPS Long	GPS Longitude, deg (degrees)
GPS Spd	GPS Speed, kts (knots)
GPS Track	GPS Track, deg (degrees)
ITT	Inter-turbine Temperature, degC (degrees Celsius)
MSTR WRN	Master Warning (discrete ("warning" or blank))
NG	Gas Generator Speed, % (percent)
NP	Power Turbine Speed, RPM (rotations per minute)
Oil Press	Oil Pressure, psi (pounds per square inch)
Oil Temp	Oil Temperature, degF (degrees Fahrenheit)
Takeoffs	Counter of takeoffs since system initialization
Torque	Torque, ft/lbs (foot pounds)
Vertical Speed	Vertical Speed, fpm (feet per minute)
Volts	Voltage, V (volts)

The unit was set to record data at one second intervals. Each set of data was preceded with a timestamp in local central standard time (CST), thus, no correction to time was required. All data in this report is presented in CST.

3.2. Appareo Stratus 2S Device Description

The Appareo Status 2S device is a self-contained battery powered unit that contains an internal AHRS,² GPS/WAAS receiver,³ and ADS-B⁴ receiver in one compact unit. The unit communicates wirelessly with compatible devices to display all the acquired information. In addition to communicating with compatible devices, the Stratus device records GPS position and AHRS information internally on a non-volatile flash memory chip. Internal memory has the space to store over 13 hours of flight data that is sampled at approximately 5 data records per second (5 Hz).

² The Attitude Heading Reference System consists of a set of 3-axis gyroscope, accelerometers and heading reference sensors that enable the unit to compute pitch, roll, and yaw motions.

³ The Wide Area Augmentation System (WAAS) is an air navigation aid to augment the Global Positioning System (GPS), by improving its accuracy, integrity, and availability.

⁴ Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology deployed throughout the national airspace system. The ADS-B system is composed of aircraft avionics and a ground infrastructure. Onboard avionics determine the position of the aircraft by using the GPS and transmit its position along with additional information about the aircraft to ground stations for use by air traffic control (ATC) and other ADS-B services. This information is transmitted at a rate of approximately once per second. Operators equipped with ADS-B realize additional benefits from ADS-B broadcast services: Traffic Information Service - Broadcast (TIS-B) (traffic information) and Flight Information Service - Broadcast (FIS-B) (weather information).

3.2.1. Appareo Stratus 2S Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had been exposed to water (see Figure 2). The unit was cleaned and dried, however, it would not power on. The NVM chip was removed from the circuit board and data were downloaded via commercially available data forensics software.



Figure 2. Condition of Stratus 2S received by the Vehicle Recorders Division

3.2.2. Appareo Stratus 2S Data Description

The data extracted included sessions from November 4, 2018 through February 18, 2019 (236,140 total data points). However, the device did not contain data from the accident flight.

4. PLOTS AND TABULAR DATA

The following four figures contain MVP-50T (EDM) data during the February 28, 2019 event.

Figure 3 is a Google Earth presentation of the flight track of the accident aircraft obtained from GPS data recorded on the EDM. The accident aircraft departed from Shreveport Downtown Airport (DTN), Shreveport, Louisiana at about 10:37:13 CST. The last data point was recorded at 10:40:07 CST, approximately three minutes later, at a GPS altitude of 1217 feet, groundspeed of 83 knots, and a vertical speed of -6818 feet per minute.

Figure 4 is a graphical presentation of the basic flight parameters including airspeed, pressure altitude, and vertical speed recovered from the EDM for the entire accident flight. GPS altitude, GPS speed, and GPS track are also depicted on the figure for reference.

Figure 5 is a graphical presentation of engine parameters recovered from the EDM for the entire accident flight. Airspeed and altitude are also depicted on the figure for reference.

Figure 6 is a graphical presentation of engine parameters recovered from the EDM for the last minute of the accident flight. Airspeed and altitude are also depicted on the figure for reference.

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



Figure 3. Overview of Accident Flight

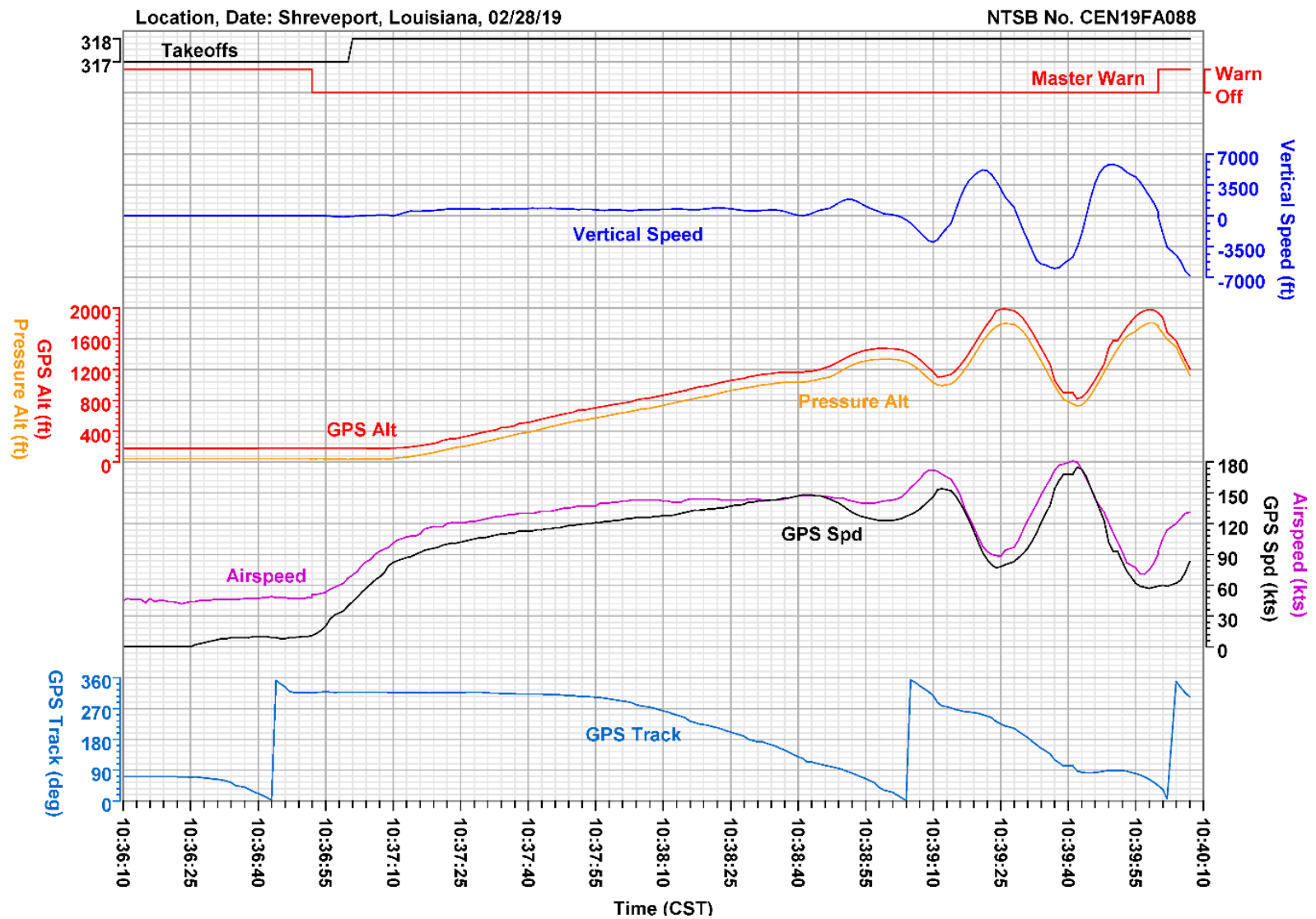


Figure 4. Basic Flight Parameters – Full Accident Flight

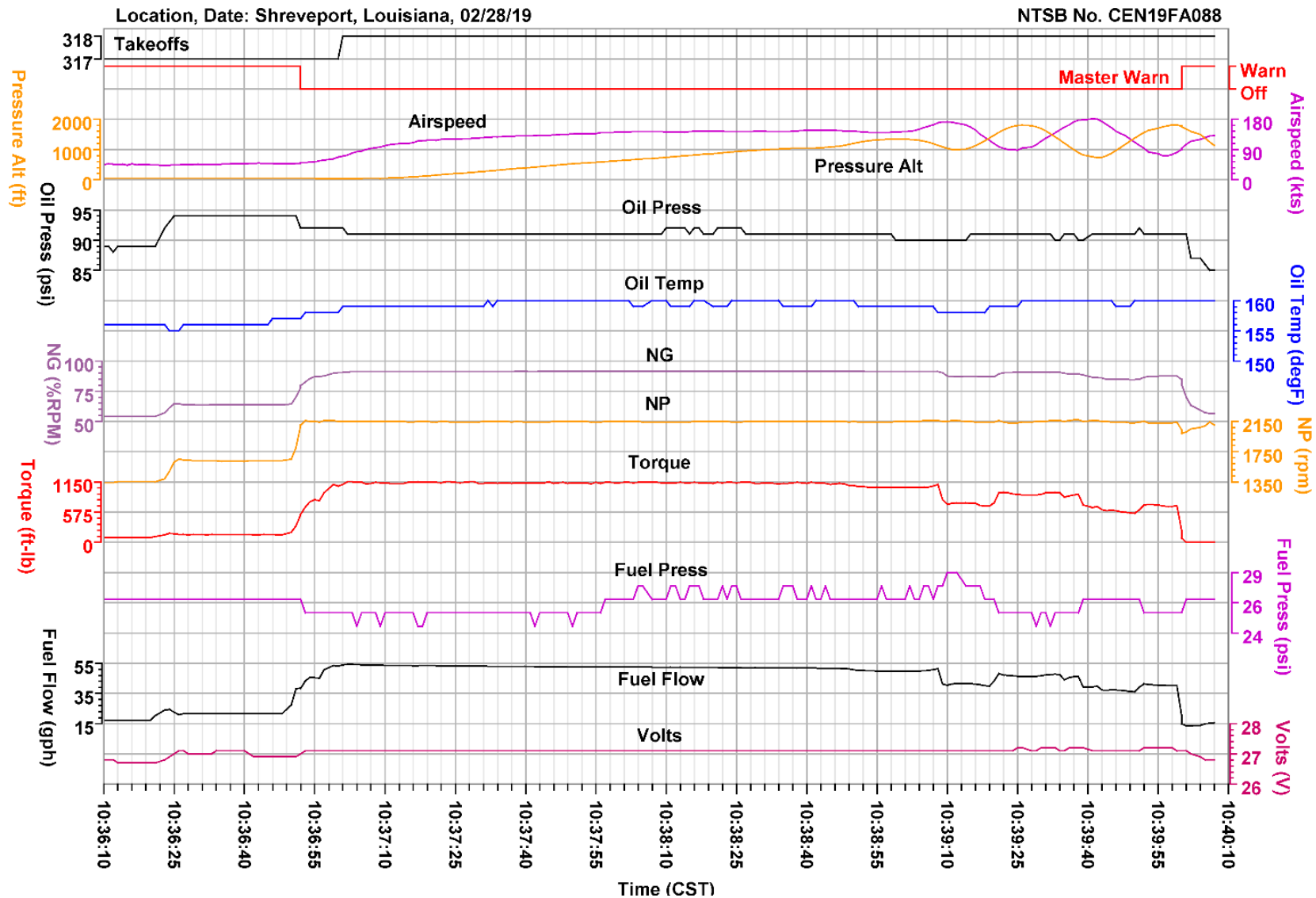


Figure 5. Engine Parameters – Full Accident Flight

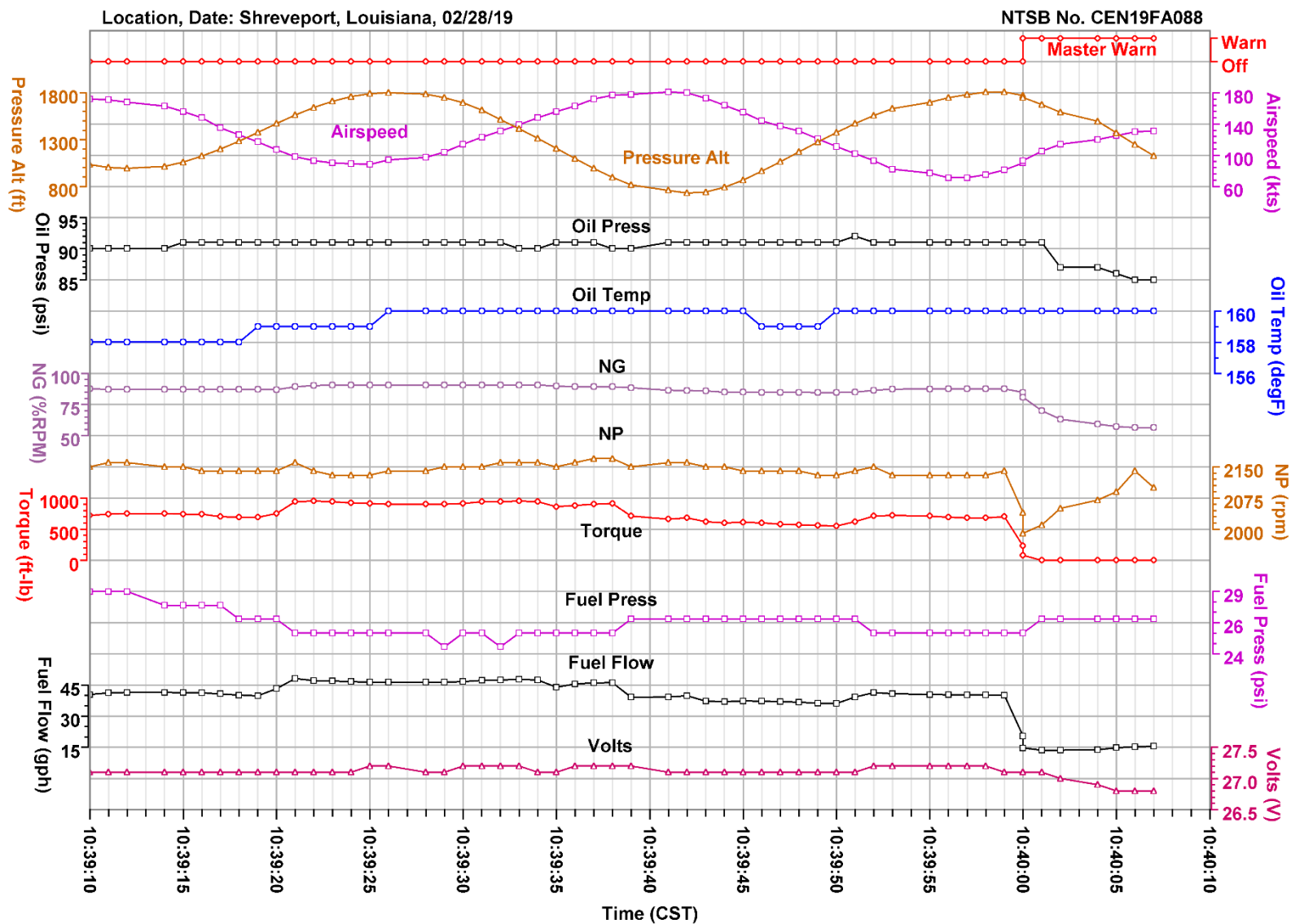


Figure 6. Engine Parameters – Final Minute of Accident Flight