

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

November 2, 2020

Engine Data Monitor (EDM)

Specialist's Factual Report

By W. Deven Chen

1. EVENT SUMMARY

Location: Vaughn, New Mexico
Date: July 15, 2020
Aircraft: Piper PA-30
Registration: N8488Y
Operator: Private
NTSB Number: WPR20LA223

On July 15, 2020, at 1115 mountain daylight time, a Piper PA-30 (Twin Comanche) airplane, N8488Y, sustained substantial damage when it was involved in an accident near Vaughn, New Mexico. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 personal flight.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

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

Device Manufacturer/Model: J.P. Instruments EDM-760
Serial Number: 06234

3.1. Device Description

The J. P. Instruments EDM-760 is a panel mounted gauge that the operator can monitor and record up to 24 parameters related to twin engine operations. Depending on the installation engine parameters monitored, for both engines, can include: Exhaust Gas Temperature (EGT), Cylinder Head Temperature (CHT), Oil Pressure and Temperature, Manifold Pressure, Outside Air Temperature, Turbine Inlet Temperature, Engine Revolutions per Minute, Compressor Discharge Temperature, Fuel Flow, Carburetor Temperature, and Battery Voltage.

The unit can also calculate, in real-time, horsepower, fuel used, shock cooling rate, and EGT differentials between the highest and lowest cylinder temperatures. The calculations are also based on the aircraft installation.

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 from 2 to 500 seconds per sample. The memory can store up to 20 hours of data at a 6 second-per-sample rate. The data can then be downloaded by the operator using the J.P. Instruments software.

3.2. Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had no damage, as shown in Figure 1. The device powered up normally and data were downloaded using the manufacturer's software.



Figure 1: Top view and side view of JPI EDM 760 as received.

3.3. Data Description

The data extracted included three flights, having been recorded on July 8, 2020, July 14, 2020 and July 15, 2020 respectively. All three flights had over three hours of data. The last recorded flight on July 15, 2020 was determined to be the accident flight. Both the accident flight and the flight on July 14, 2020 are included in this report. The data were recorded at a 6 second-per-sample rate.

3.4. Data Time Correlation

The date and time on JPI EDM 760 devices are manually adjusted by the user. Devices begin recording data when power is applied and stops when power is disconnected. Time

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

displayed on the accident device was found to be 1 hour and 15 minutes ahead of Coordinated Universal Time (UTC). The device only provided time to the nearest minute. All times for this device have been adjusted to reflect this offset and are referred to as Mountain Daylight Time (MDT) for the rest of this report. The difference between UTC and MDT is 6 hours.

3.5. Parameters Provided

Table 1: JPI EDM 760 Data Parameters.

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Derived mountain daylight time (MDT) for recorded data point (HH:MM:SS)
L/RC1-4 (degF)	Left/Right engine Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
L/RE1-4 (degF)	Left/Right engine Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
L/RDIF (degF)	Left/Right engine Difference between low and high Exhaust Gas Temperature (degrees Fahrenheit)
L/RCLD (degF/MIN)	Left/Right engine Shock Cooling Rate (degrees Fahrenheit per minute)
BAT (V)	Bus Battery Voltage (voltage)

3.6. OVERLAYS AND TABULAR DATA

Figure 2 is a plot of parameters from the JPI device for the entire accident flight. The time interval is 07:30:00 to 11:10:00 MDT on July 15, 2020.

Figure 3 is a plot of parameters from the JPI device for approximately the last hour of the accident flight. The time interval is 10:10:00 to 11:05:00 MDT on July 15, 2020.

Figure 4 is a plot of parameters from the JPI device for approximately the final 15 minutes of the accident flight. The time interval is 10:50:00 to 11:03:00 MDT on July 15, 2020.

Figure 5 is a plot of parameters from the JPI device for the entire flight prior to the accident flight. The time interval is 07:50:00 to 11:30:00 MDT on July 14, 2020.

The tabular data recorded by the JPI EDM 760 device used to generate Figures 2-4 are included as Attachment 1, and the recorded data used to generate Figure 5 are included as Attachment 2 to this report. These attachments are provided in electronic comma-delimited (.csv) format.

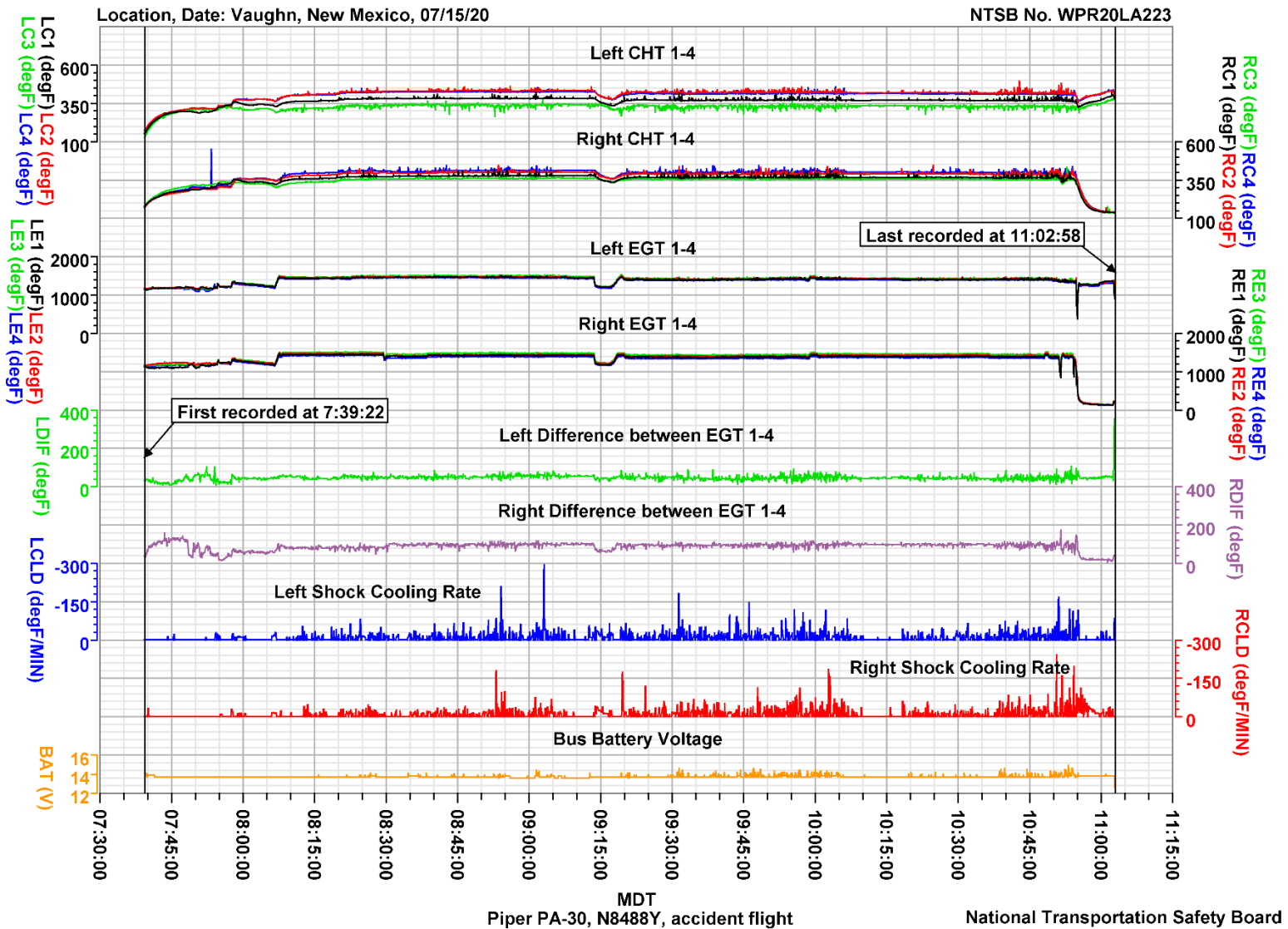


Figure 2: Plot of JPI EDM 760 data for the entire accident flight.

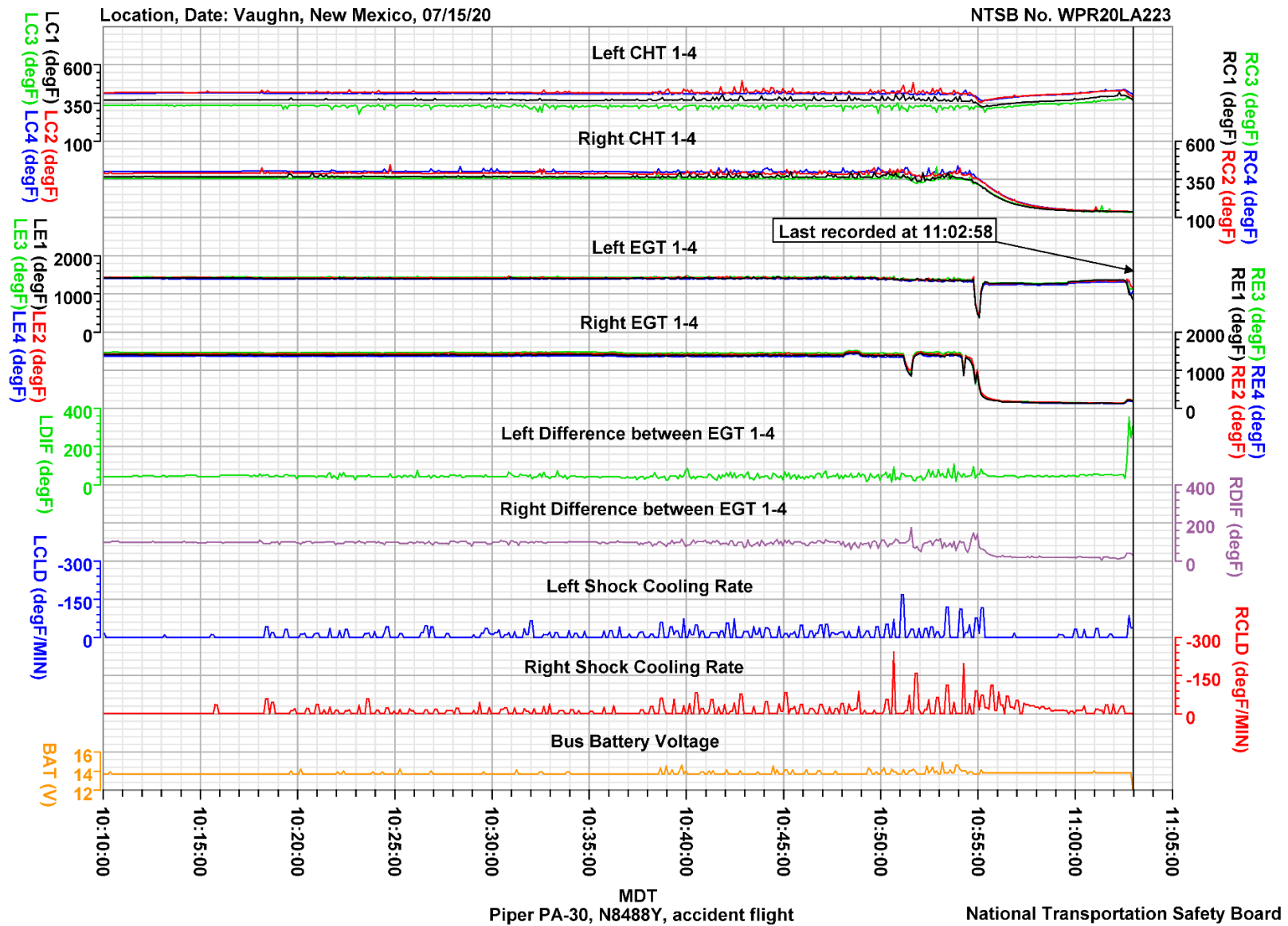


Figure 3: Plot of JPI EDM 760 data of approximately the last hour of the accident flight.

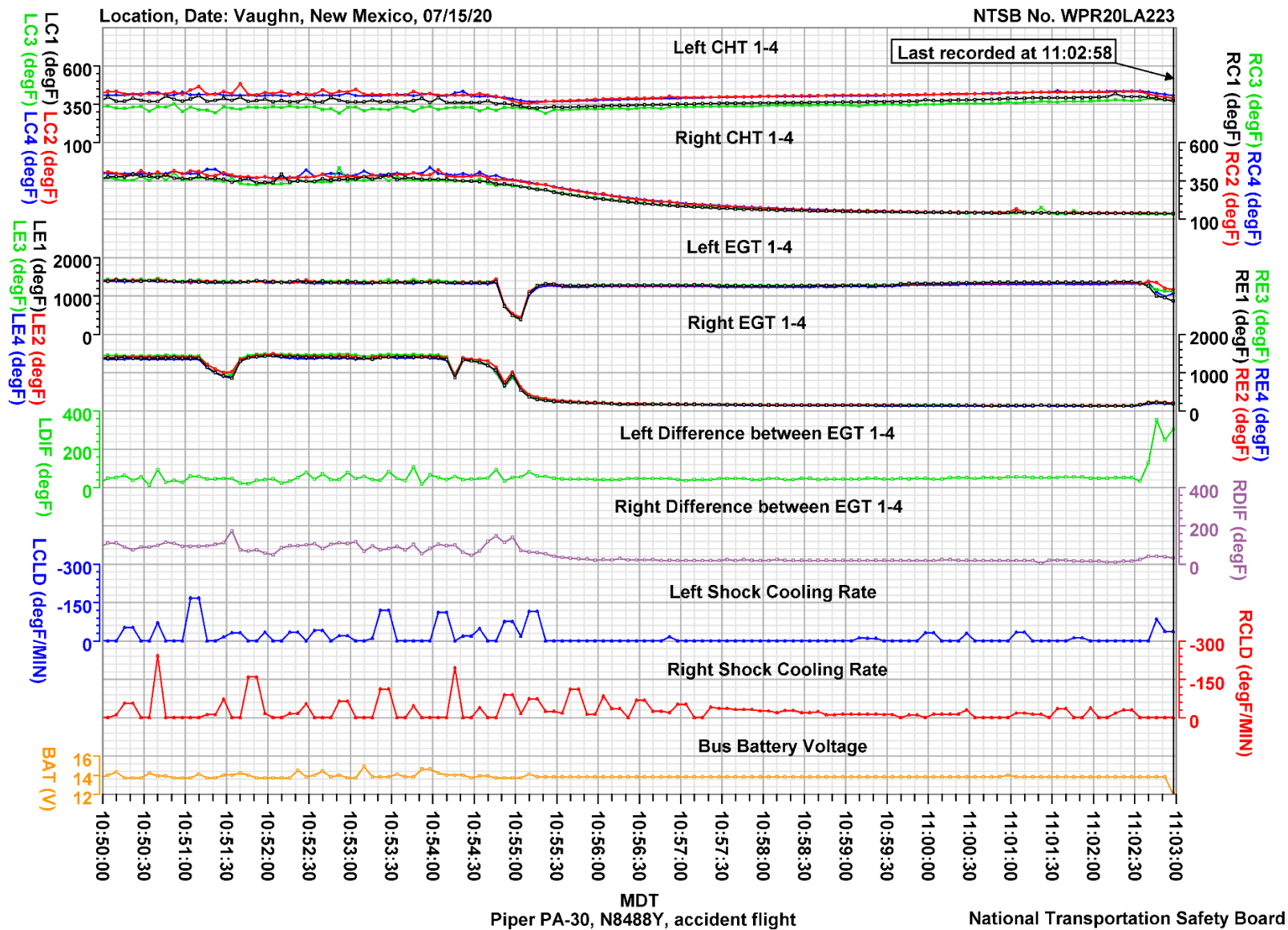


Figure 4: Plot of JPI EDM 760 data of approximately the last 15 minutes of the accident flight.

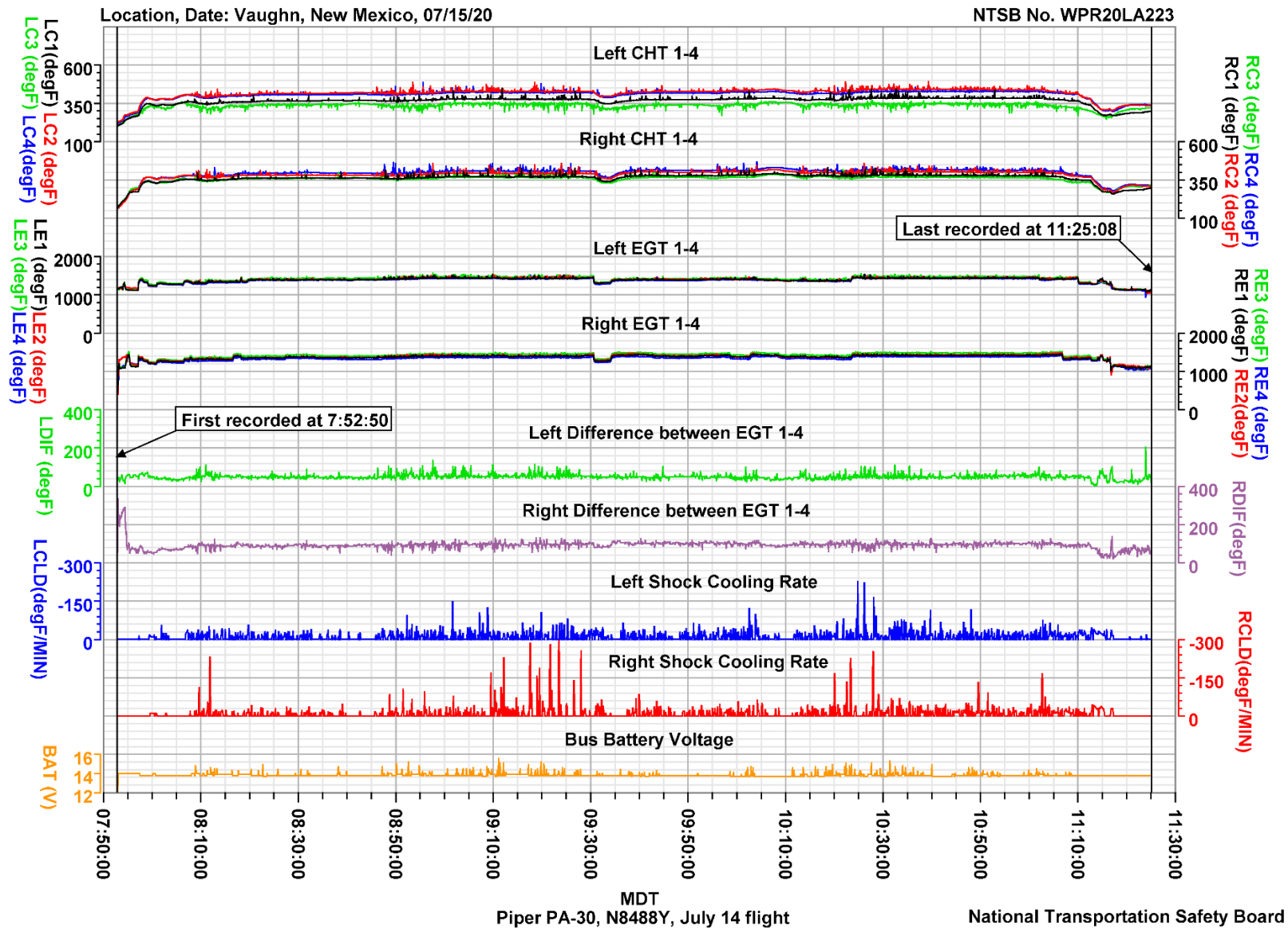


Figure 5: Plot of JPI EDM 760 data for the flight on July 14, 2020.