

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

December 9, 2019

Engine Data Monitor (EDM)

Specialist's Factual Report

By W. Deven Chen

1. EVENT SUMMARY

Location: Los Banos, California
Date: December 6, 2018
Aircraft: Beechcraft A36TC
Registration: N361TC
Operator: Private
NTSB Number: WPR19LA039

On December 6, 2018, at 1230 Pacific standard time, a Beech A36TC airplane, N361TC, collided with a fence following a loss of engine power while on approach for landing at Los Banos Municipal Airport (LSN), Los Banos, California. The private pilot was not injured. The airplane sustained substantial damage to the tail section. The airplane was privately owned and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed. The flight originated from Reid-Hillview Airport (RHV), San Jose, California at 1145.

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. Instrument EDM 930
Serial Number:	05067

3.1. Device Description

The J.P. Instrument (JPI) EDM 930 is a panel-mounted gauge with color display that allows the operator to monitor and record up to 24 parameters related to engine operations. Depending on the installation, engine parameters monitored 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 (RPM), Fuel Flow, Amperage Load and Bus Voltage etc..

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

The unit includes a GPS interface to any GPS device.

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 1 to 500 seconds per sample. The memory can store up to 30 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, the unit was in good condition, as shown in Figure 1. The device powered up normally and data were downloaded using the manufacturer's software.



Figure 1: JPI EDM 930 as received (front and back).

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

3.3. Data Description

The data extracted included 68 sessions from September 24, 2017, through December 6, 2018. The last recorded session was determined to be related to the accident and is included in this report. The data was recorded at a 6 second-per-sample rate.

3.4. Data Time Correlation

The date and time on JPI EDM 930 devices are manually adjusted by the user. Devices begin recording data when power is applied and stops when power is disconnected. Time displayed on the accident device was found to be 25 minutes behind of Coordinated Universal Time (UTC). The device only provided time to the nearest minutes. All times for this device have been adjusted to reflect this offset and are referred to as Pacific Standard Time (PST) for the rest of this report. The difference between UTC and PST is 8 hours.

3.5. Parameters Provided

Table 1: JPI EDM 930 Data Parameters

Parameter Name	Parameter Description
Time	Calculated Time (PST) for recorded data point (HH:MM:SS)
EGT 1-6 (F)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
CHT 1-6 (F)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
Differential Temp. of EGT(F)	EGT differentials between highest and lowest cylinder temperatures
CLD (F/min)	Shock Cooling Rate (degrees Fahrenheit per minute)
OAT (F)	Outside Air Temperature (degrees Fahrenheit)
Turbine Inlet Temp. (F)	Turbine Inlet Temperature (degrees Fahrenheit)
Manifold Pressure (inHg)	Manifold Pressure (inches of mercury)
Fuel Flow (GPH)	Fuel Flow (gallons per hour)
Fuel Used (gal)	Fuel Used (gallons)
FP (psi)	Fuel Pressure (pounds per square inch)
Engine Rotational Speed (rpm)	Engine RPM (revolutions per minute)
OIL Temp (F)	Oil Temperature (degrees Fahrenheit)
OIL Pressure (psi)	Oil Pressure ((pounds per square inch)
Horse Power (%)	Percent of Maximum Horsepower (percentage)
Engine Rotational Speed (rpm)	Engine Rotational Speed (revolutions per minute)
Bus Voltage (V)	Bus Voltage (voltage)
Amperage Load (Amps)	Load Current (amperes)

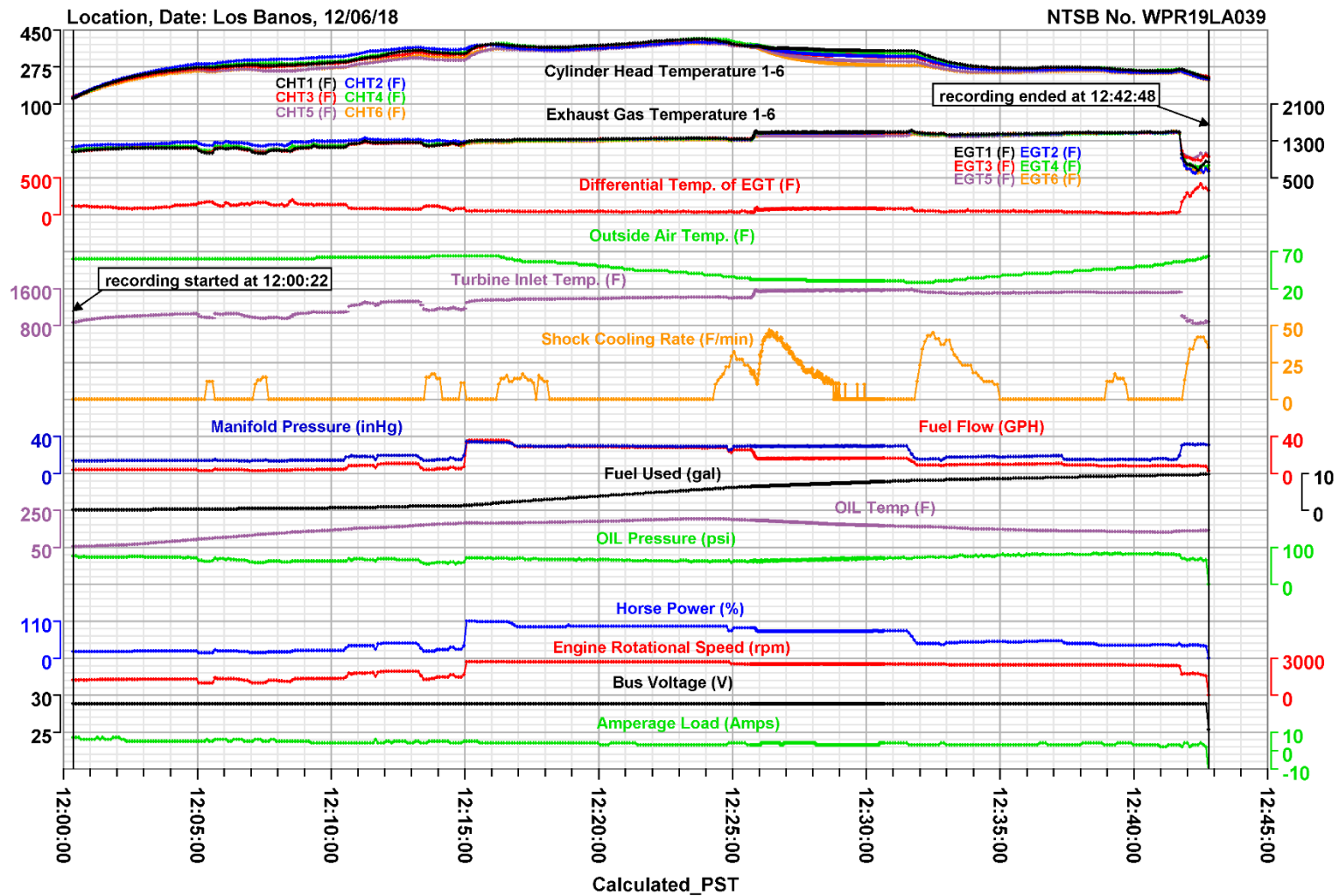
3.6. OVERLAYS AND TABULAR DATA

Figure 2 is a plot of parameters from the JPI device for the accident flight. The time interval is 12:00:00 to 12:45:00 PST on December 6, 2018.

Figure 3 is a plot of parameters from the JPI device for the last 1 minute and 48 seconds of the accident flight. The time interval is 12:41:00 to 12:43:00 PST on December 6, 2018.

The tabular data from the accident flight recorded by the JPI EDM 930 device is included as Attachment 1. These attachments are provided in electronic comma-delimited (.csv) format.

Beach A36, N361TC, the Accident Flight

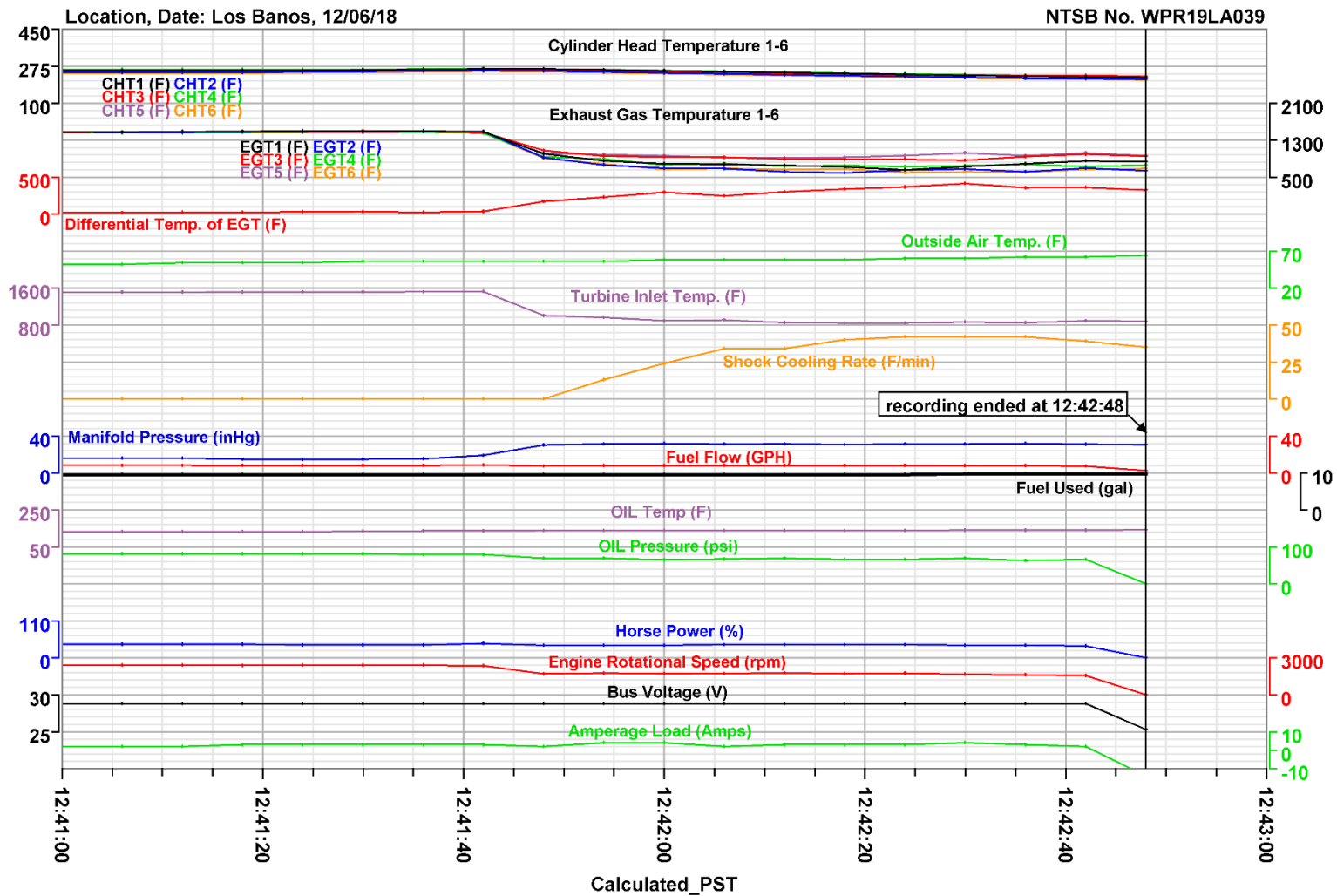


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Figure 2: Plot of data from the JPI EDM 930 of the accident flight.

Beach A36, N361TC, Last 1 minute and 48 seconds



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Figure 3: Plot of data from the JPI EDM 930 of the last 1 minute and 48 seconds of the accident flight.