

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

October 27, 2014

Cockpit Display – Recorded Flight Data

Specialist's Factual Report
By Charles Cates

1. EVENT SUMMARY

Location: Decatur, Illinois
Date: August 06, 2014
Aircraft: Raytheon/Hawker Beechcraft B36TC
Registration: N1069T
Operator: S.R. Aero LLC
NTSB Number: CEN14LA408

On August 6, 2014, at 1745 central daylight time, a Raytheon/Hawker Beechcraft B36TC airplane, N1069T, made an emergency landing after a partial loss of engine power near the Decatur Airport (KDEC), Decatur, Illinois. The pilot was not injured and the airplane sustained substantial damage. The airplane was registered to S.R. Aero LLC, and was operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight which operated on an instrument flight rules flight plan. The flight originated from the Macomb Municipal Airport (KMQB), Macomb, Illinois, at 1658.

2. RECORDED FLIGHT DATA GROUP

A recorded flight data group was not convened.

3. DETAILS OF FLIGHT DATA INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following device:

Recorder Manufacturer/Model: **Insight G3 Engine Monitor SD Data Card**
Recorder Serial Number: **1037US5545G**

3.1. Insight G3 Engine Monitor SD Data Card

The Insight G3 Engine Monitor is a cockpit display capable of displaying and recording engine parameters including Manifold Pressure, RPM, EGT, CHT, Fuel Flow, oil temperature, and oil pressure. Data is recorded on the SD card in CSV format.

3.1.1. Recorder Condition

The SD card was in good condition and the data were extracted normally from the card.

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3.1.2. Recording Description

The Insight G3 Engine Monitor SD card stores flight data in individual logs by flight date and time. It begins recording when the monitor is powered on so it records ground runs and test checks as well as flights.

The SD card contained more than 600 log files. The accident flight recording was identified and was approximately 45 minutes and 42 seconds.

3.1.3. Engineering Units Conversions

The flight log data stored in the individual files was converted to engineering units by the display unit.

Appendix A lists the parameters verified and provided in this report.

3.2. Time Correlation

The Insight G3 records time with the first data sample based on the unit's internal 24 hour clock. The clock is set by the user to local time, in this case central daylight time. All times in this report are referenced as central daylight time.

3.3. Plots and Corresponding Tabular Data

The following two figures contain data recorded during the August 6, 2014 event.

Figure 1 shows engine parameters from the full event flight including engine RPM, manifold pressure, fuel flow, oil pressure and temperature, TIT, EGT, and CHT. There are six values each for EGT and CHT; one corresponding to each engine cylinder.

The fuel flow signal is noisy beginning when the engine is brought to takeoff power, with values in cruise flight ranging from around 20 gallons per hour (GPH) up to about 95 GPH. In the final minute, fuel flow decays to 5 GPH and spikes up to 75 GPH before decaying a second time and not returning to previous recorded levels. Engine RPM tracks with the reduction and increase in fuel flow. RPM drops from about 2125 to about 1580 and then spikes back up to 2540 for a short time before dropping without recovering.

Figure 2 shows the last three minutes of recorded data for the event flight. The engine RPM, manifold pressure, fuel flow, and gas temperatures all track together in the final minute of recorded data.

The corresponding tabular data used to create these two plots are provided in electronic (*.csv¹) format as Attachment 1 to this report.

¹ Comma Separated Value format.

Figure 1. Plot of engine parameters during entire flight.

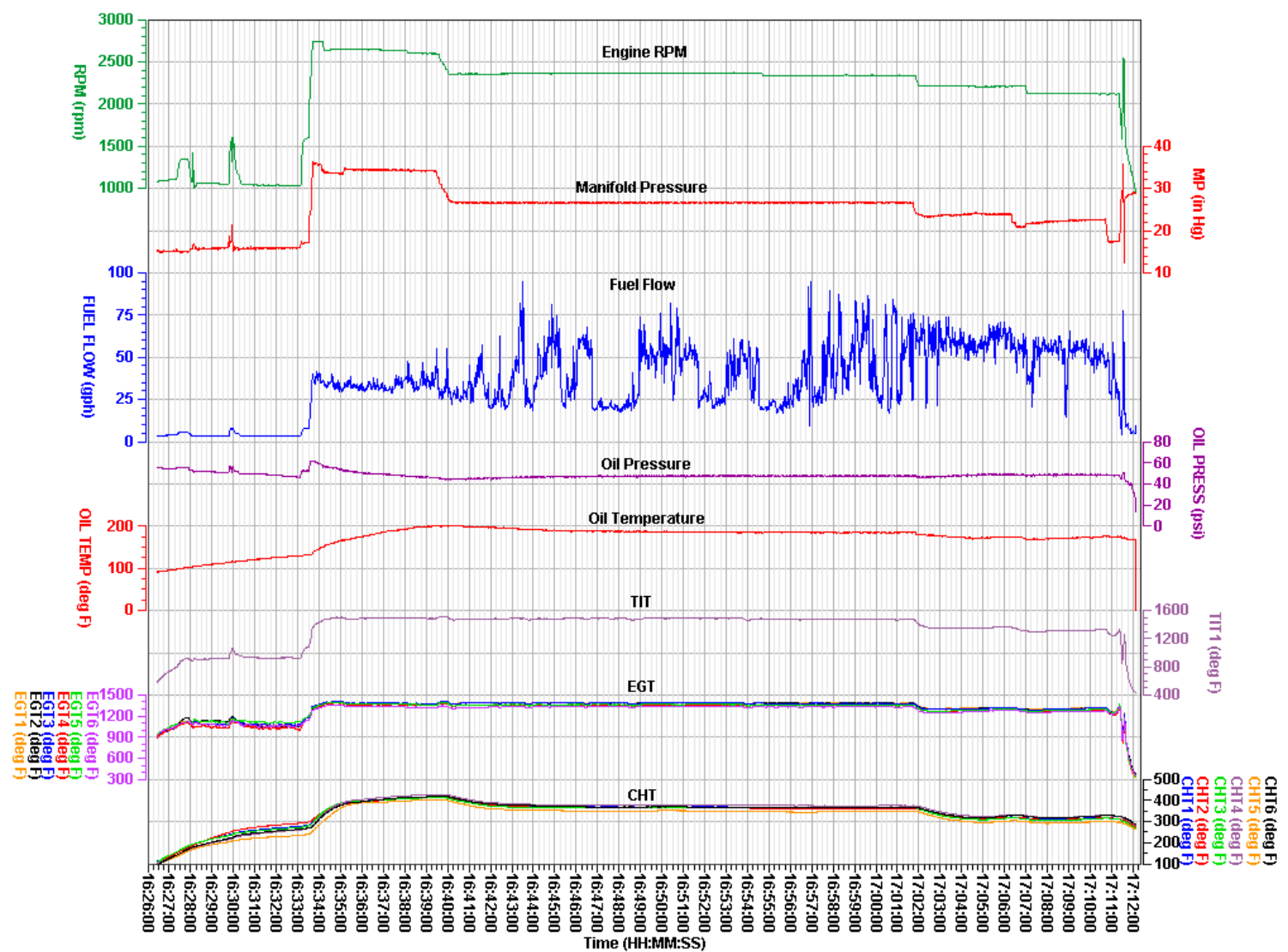
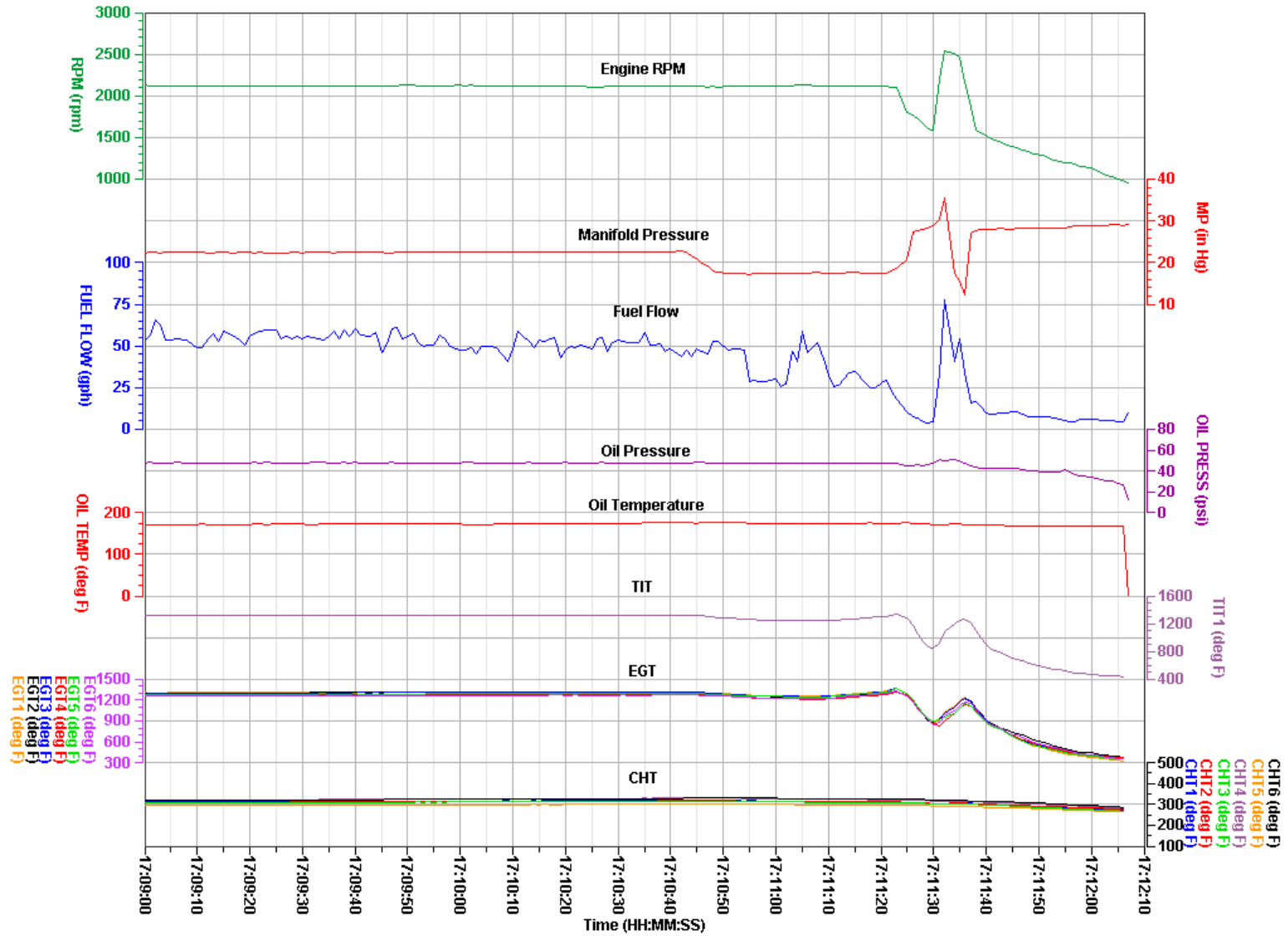


Figure 2. Plot of engine parameters during final 3 minutes of recorded data.



Revised: 27 October 2014

Event Flight

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APPENDIX A

This appendix describes the parameters provided and verified in this report. Table A-1 lists the parameters and table A-2 describes the unit abbreviations used in this report.

Table A-1. Verified and provided parameters.

Parameter Name	Parameter Description
1. CHT (deg F)	Cylinder head temperature
2. EGT (deg F)	Exhaust gas temperature
3. Fuel Flow (gph)	Fuel Flow
4. MP (in Hg)	Intake manifold pressure
5. Oil Pressure (psi)	Engine oil pressure
6. Oil Temperature (deg F)	Engine oil temperature
7. RPM	Engine revolutions per minute
8. TIT (deg F)	Turbine inlet temperature

Table A-2. Unit abbreviations.

Units Abbreviation	Description
deg F	degrees Fahrenheit
gph	Gallons per Hour
in Hg	inches of Mercury
psi	Pounds per Square Inch