

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

March 22, 2022

Engine Monitor

**Specialist's Factual Report
by Nick Swann**

1. EVENT

Location: Naples, Florida
Date: December 19, 2020
Aircraft: Piper PA-46-310P
Registration: N662TC
Operator: Private
NTSB Number: ERA21LA087

2. DETAILS OF INVESTIGATION

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

Device: **Insight G4 Engine Monitor SD¹ Card**
Device Serial Number: **Unknown**

2.1. Insight G4 Engine Monitor Device Description

The Insight G4 is an engine data monitor device. It is capable of monitoring engine parameters including, but not limited to, cylinder head temperature (CHT), exhaust gas temperature (EGT), fuel flow information, and acceleration data. Data is stored on an SD memory card installed in the front panel of the device.

2.1.1. Insight G4 Engine Monitor SD Card Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an attempt was made to mount the SD card to a laboratory computer. This process was unsuccessful, and the SD card was sent to a third-party vendor for repair. The vendor was able to successfully reconstruct the file structure of the SD card, and the recovered data were sent to the NTSB.

2.1.2. Insight G4 Engine Monitor Data Description

The data extracted included 288 sessions from May 23, 2019, through December 19, 2020. The event flight was the last session, recorded starting at 18:37:11 recorder time and ending at 19:36:33 recorder time on December 19, 2020 (3,557 total data points). Parameters used in this report are summarized in table 1.

¹ SD – Secure Digital – A type of non-volatile memory card used extensively in portable devices.

Table 1. List of Parameters Used in this Report

Plot/Table Label	Parameter Name	Units
EGT	Exhaust Gas Temperature	degrees Fahrenheit
CHT	Cylinder Head Temperature	degrees Fahrenheit
TIT	Turbine Inlet Temperature	degrees Fahrenheit
MP	Manifold Pressure	inches mercury
TACH	Tachometer RPM	Rotations per minute
POWER ROP	Engine Power	horsepower
TAKEOFF AXIS	Longitudinal Acceleration	milli-G
LATERAL AXIS	Lateral Acceleration	milli-G
VERTICAL AXIS	Normal Acceleration	milli-G

2.3 Time Correlation

According to the installation manual, the Insight G4's clock is set during installation. The data in this report will be referred to as recorder time because no correlation was possible between the recorder time and UTC (Coordinated Universal Time) or the local time.

2.4 Plots and Corresponding Tabular Data

The following figures contain data recorded during the event flight. Relevant parameters recorded by the Insight G4 are included below. The data used to create these plots are attached to this report in electronic (*.csv) form.

Figure 1 is an overview of recorded data from the event flight. At 19:03:30 the RPM and Power parameters began abruptly decrease to zero. They remained this way for the duration of the recording. This data is believed to be invalid.

Figure 2 shows the recorded engine data at the end of the flight.

Figure 3 shows some engine parameters and all three accelerometers at the end of the flight.

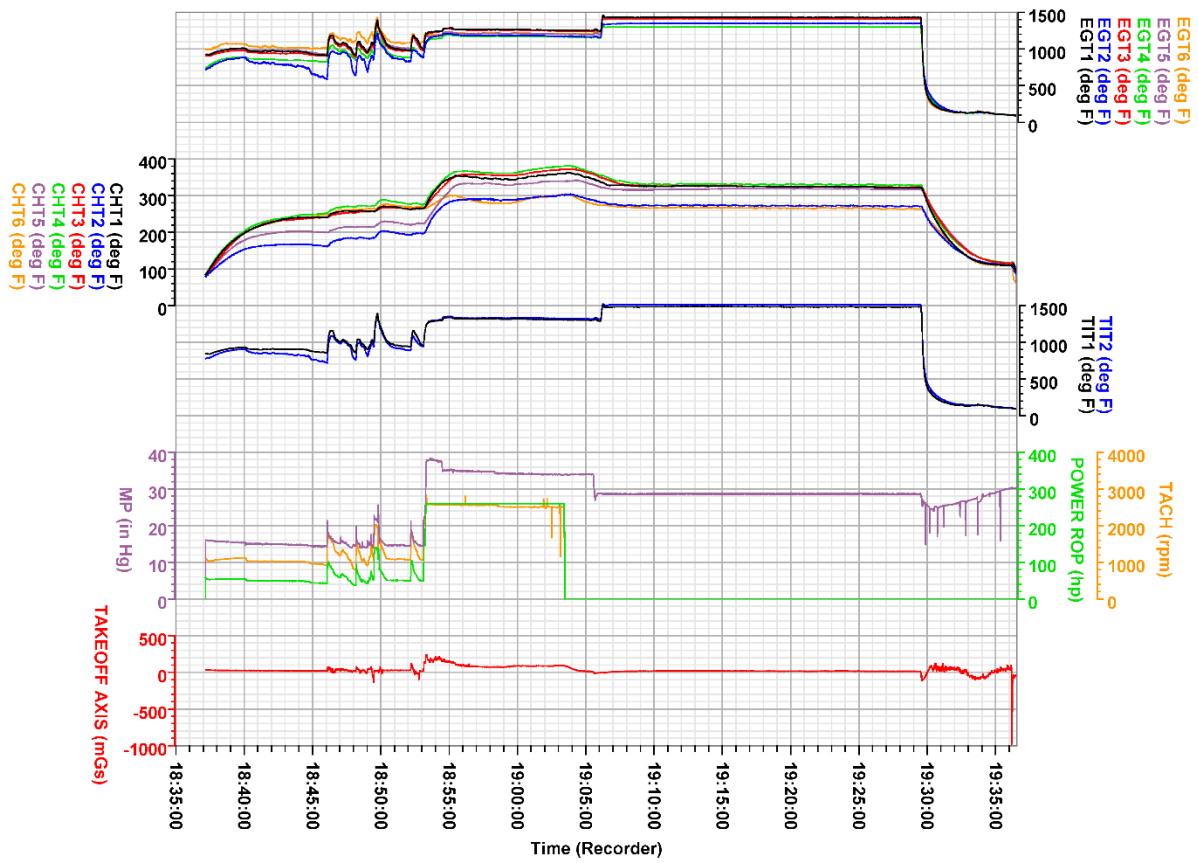


Figure 1. Engine data from the entire event flight

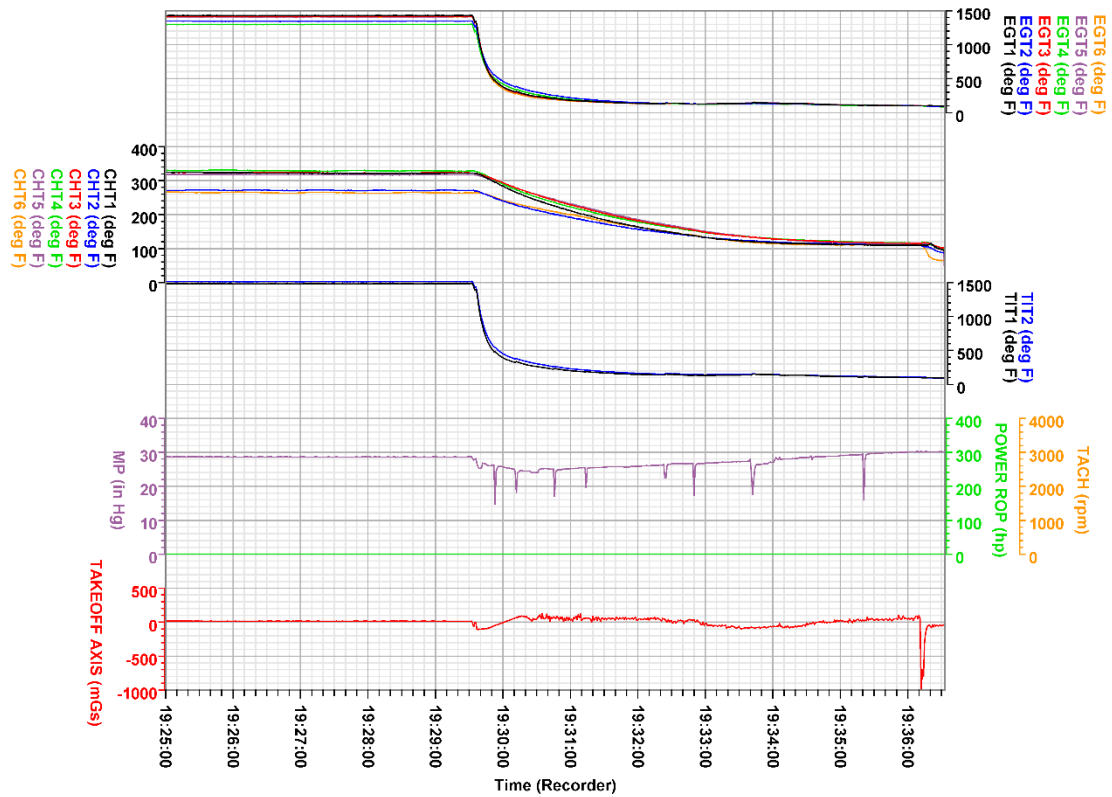


Figure 2. Engine data at the end of the flight

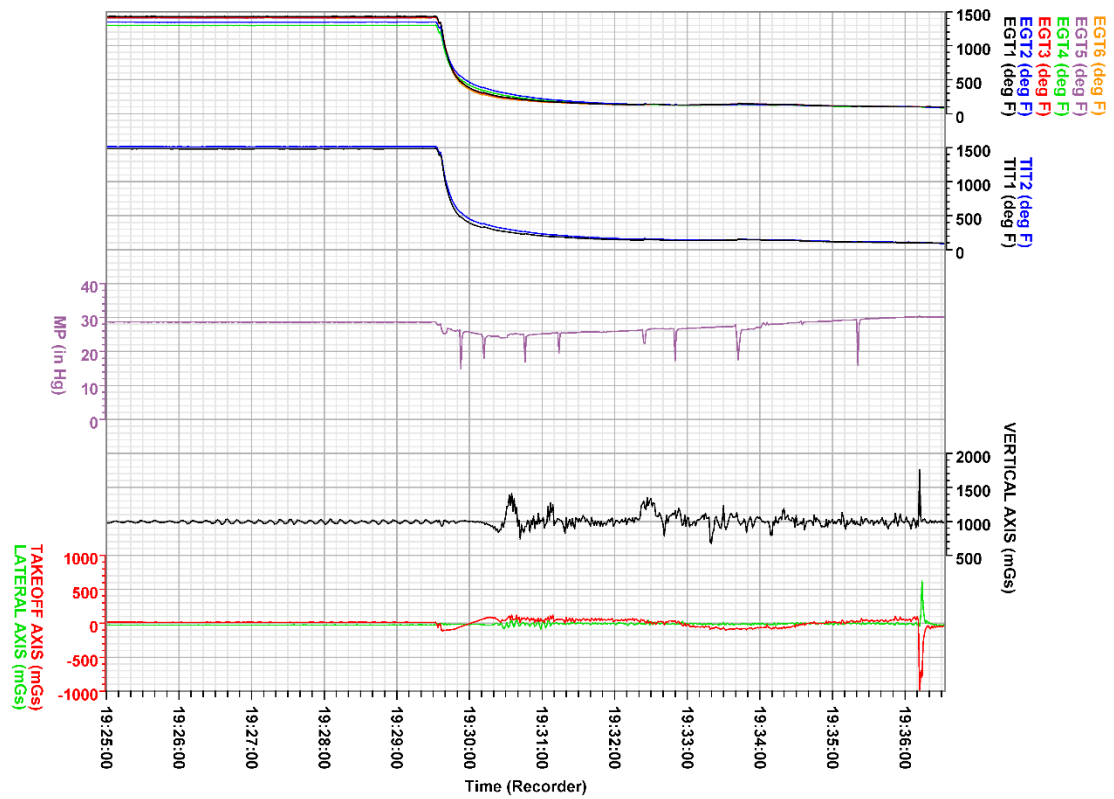


Figure 3. Engine data with all 3 accelerometer readings