

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

October 17, 2018

Non-Volatile Memory Devices

Specialist's Factual Report
By Ben Hsu

1. EVENT

Location: Stevensville, Montana
Date: February 23, 2017
Aircraft/ID: Beech A36TC / N3803J
Operator: Private
NTSB Number: WPR17LA064

2. EVENT SUMMARY

On February 23, 2017, about 1300 mountain standard time, a Beechcraft A36TC, N3803J, was substantially damaged when it impacted terrain shortly after takeoff from Stevensville Airport (32S), Stevensville, Montana. The private pilot and his passenger received minor injuries. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed.

3. DETAILS OF DEVICE INVESTIGATION

The National Transportation Safety Board's (NTSB) Vehicle Recorder Division received the following devices:

Device: Garmin GPSMAP 396
Device Serial Number: 28210856

Device: Electronics International MUX-8A
Device Serial Number: Unknown

Both devices exhibited minimal damage as they arrived at the laboratory. Figure 1 shows the Garmin device and figure 2 shows the Electronics International device.

The devices were inspected, and power was applied normally using laboratory hardware. Data was downloaded from both devices using the manufacturer's tools.

3.1. Garmin Device Description

The Garmin GPSMAP 396 is a portable GPS receiver capable of storing date, route-of-flight, and flight-time information. A detailed tracklog – including latitude, longitude, date,

time, and groundspeed information – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. All recorded data is stored in non-volatile memory.¹ The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information to a PC via a built-in serial port. The unit can also communicate with external devices such as a computer using a built in USB port. An internal battery is used as back-up power to the internal memory and real-time clock during those periods when main power is removed.

3.1.1. Garmin Data Description

The data extracted included 86 sessions from February 19, 2016 through February 23, 2017. The last two sessions, recorded on February 23, 2017, were recorded on the ground and no accident-pertinent data was recorded.

3.2. Electronics International Device Description

The Electronics International MUX-8A is a data recording device designed to be used with other Electronics International aircraft engine instruments. The MUX-8A records data provided to it by other compatible devices connected to it. Data is recorded on non-volatile memory contained inside the device.

3.2.1. Electronics International Data Description

The last session recorded on the device was determined to be pertinent to the accident and is included in this report. An unknown malfunction within the device caused the timestamps to be incorrectly recorded. Therefore, the timestamps are provided “as recorded” and no time correlation could be performed.

3.2.2. Electronics International Parameters Provided

Table 1 describes data parameters recorded by the device. The recorded time is based on the unit’s internal clock, which is set and updated by the user.

Table 1. Electronics International MUX-8A Recorded Parameters

Parameter Name	Parameter Description
Time	Time for recorded data point (as recorded)
Eng1 CHT# (degF)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
Eng1 EGT# (degF)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
OAT (degF)	Outside Air Temperature (degrees Fahrenheit)
OilP (psi)	Oil Pressure (pounds per square inch)
OilT (degF)	Oil Temperature (degrees Fahrenheit)
TIT (degF)	Turbine Inlet Temperature (degrees Fahrenheit)

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

4. OVERLAYS AND TABULAR DATA

Figure 3 is a plot of engine parameters from the accident flight recorded on the Electronics International MUX-8A device.

The tabular data from the accident flight recorded by the Electronics International MUX-8A device is included as Attachment 1. This attachment is provided in electronic comma separated value (CSV) format.

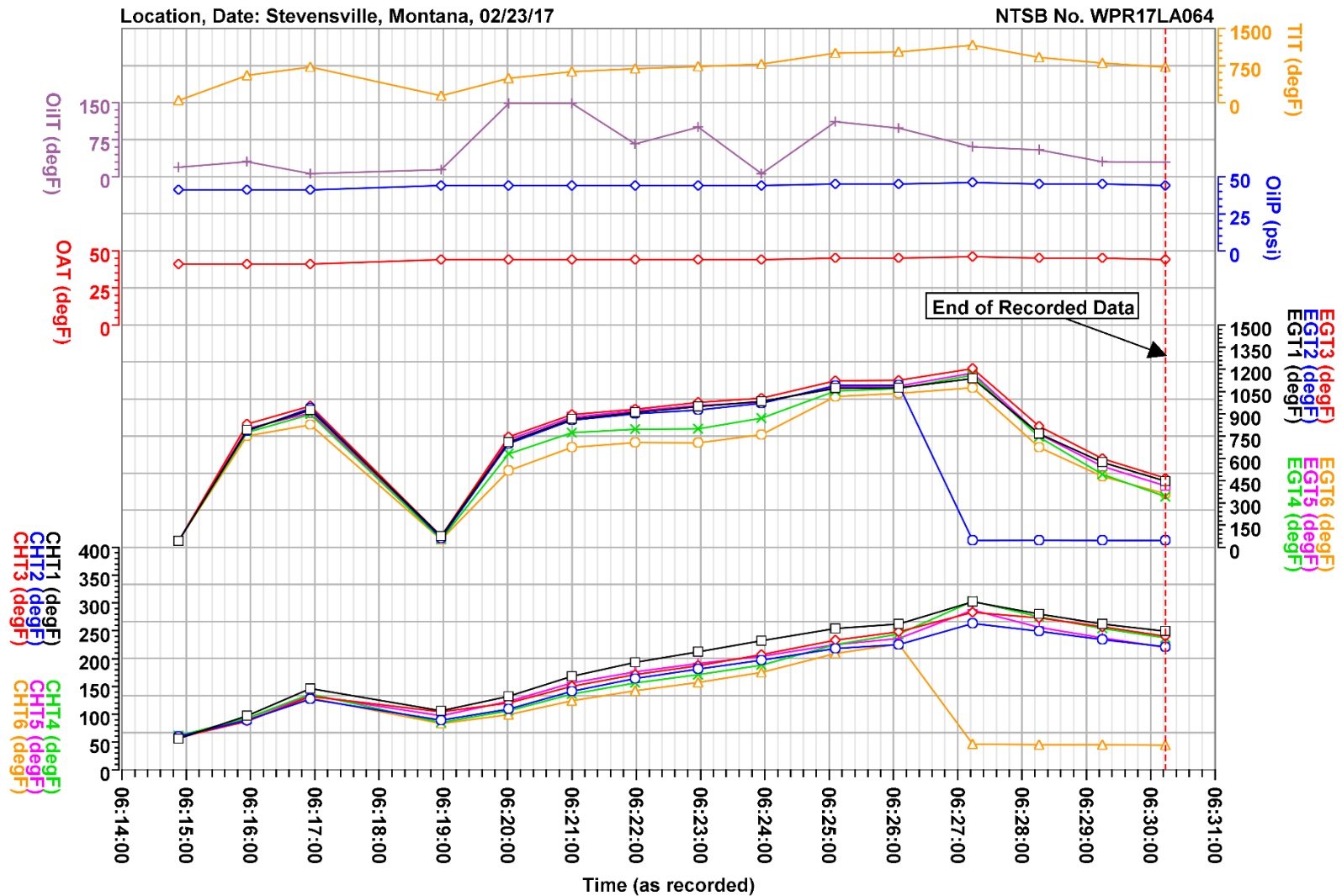


Figure 1. Garmin GPSMAP 396



Figure 2. Electronics International MUX-8A

Private, Beech A36TC, Flt. N/A, N3803J



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Figure 3. Plot of accident flight data from the Electronics International MUX-8A