

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

February 9, 2018

Electronic Devices

Specialist's Factual Report

By Jane Foster

1. EVENT SUMMARY

Location: Dayton, Tennessee
Date: June 20, 2016
Aircraft: Rockwell International 112A
Registration: N1299J
Operator: Private
NTSB Number: ERA16LA226

On June 20, 2016, about 1240 eastern daylight time, a Rockwell International 112A, N1299J, impacted trees during a forced landing following a total loss of engine power near Dayton, Tennessee. The private pilot was the only occupant and received serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the personal flight. The flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. The flight originated from Whiteside County Airport – Jos H Bittorf Field (SQI), Rock Falls, Illinois, with an intended destination of Pickens County Airport (JZP), Jasper, Georgia.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

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

Device 1:	Garmin GPSMAP 396
Device 1 Serial Number:	28213098
Device 2:	JPI EDM-800
Device 2 Serial Number:	17663

4. Garmin GPSMAP 396 Device Description

The Garmin GPSMAP 396 is a battery-powered portable 12-channel GPS receiver with a 256-color TFT LCD display screen. The unit includes a built-in Jeppesen database and is capable of receiving XM satellite radio for flight information including NEXTRAD radar, lightning, METARs, TAFs, and TFRs. The unit stores date, route-of-flight, and flight-time information for up to 50 flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 500 feet, and ends when groundspeed drops below 30 knots for 10 minutes or more. A detailed tracklog – including latitude, longitude, date, time, and GPS altitude information for an unspecified number of points – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the tracklog as a function of time or distance moved, depending on how the unit has been configured. Once the current tracklog memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current tracklog can be saved to long-term memory and 15 saved tracklogs can be maintained in addition to the current tracklog. Tracklog storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile¹ memory. 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 using the NMEA 0183 version 2.0 protocol. The unit can also communicate with external devices such as a computer using a built in USB port. An internal button-battery is used to back-up power to the internal memory and real-time clock during those periods when main power is removed.

4.1. Garmin GPSMAP 396 Data Recovery

The device was received undamaged. The device was read out normally using manufacturers software. Figures 1 and 2 show the device as received.

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

Figure 1. Front of Garmin GPSMAP 396 as received.



Figure 2. Back of Garmin GPSMAP 396 as received.



4.2. Garmin GPSMAP 396 Data Description

The data extracted included 24 track logs from February 5, 2016² through June 20, 2016. The accident flight was recorded starting 13:20:52 UTC and ending 16:41:44 UTC on June 20, 2016.

4.3. Garmin GPSMAP 396 Parameters Provided

Table 1 describes data parameters provided by the GPS device. Date, Time, Latitude, Longitude, and GPS Altitude are recorded by the device. Groundspeed and Track are derived from the recorded parameters.

Table 1: GPS Data Parameters

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time (UTC) for recorded data point (HH:MM:SS)
Latitude	Recorded Latitude (degrees)
Longitude	Recorded Longitude (degrees)
GPS Alt	Recorded GPS Altitude (feet)
Groundspeed	Average derived groundspeed (knots)
Track	Average derived true course (degrees)

5. JPI EDM-800 Device Description

The J. P. Instruments EDM-800 is a panel mounted gauge that the operator can 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, 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 memory 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 sample rate. The data can then be downloaded by the operator using the J.P. Instruments software.

² All dates and times are referenced to Coordinated Universal Time (UTC).

5.1. JPI EDM-800 Data Recovery

The device was received undamaged. The device was read out normally using manufacturers software. Figures 3 and 4 show the device as received.

Figure 3. Face of the JPI EDM-800.

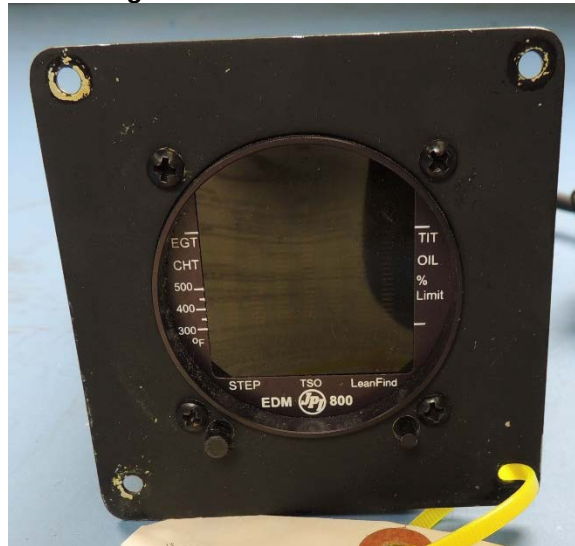
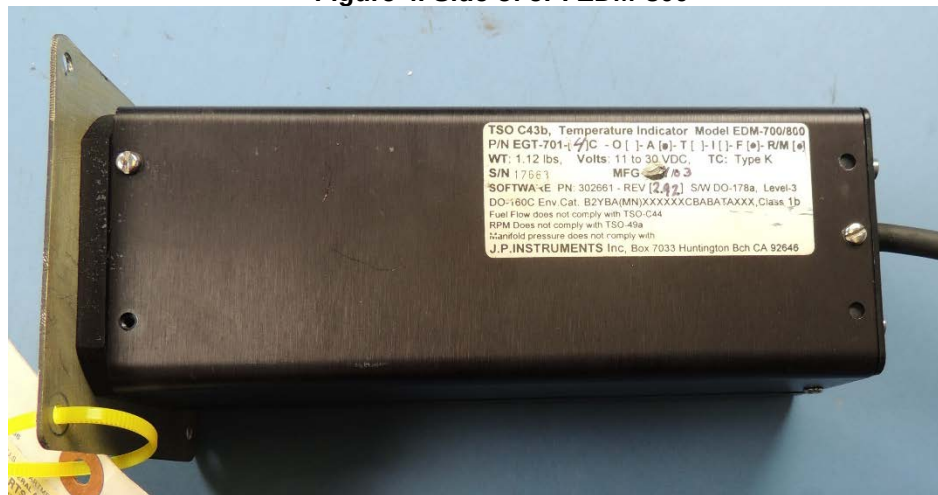


Figure 4. Side of JPI EDM-800



5.2. JPI EDM-800 Data Description

The data extracted included 12 sessions from March 6, 2016³ through June 20, 2016. The accident flight was recorded starting 13:38:54 UTC and ending 16:51:48 UTC on June 20, 2016.

6. Overlays and Tabular Data

Figure 5 is a graphical overlay generated using Google Earth for the accident flight. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

The flight departed the Whiteside County Airport at approximately 13:30:45 UTC. The last recorded point was at 16:51:48 UTC on September 24, 2011, with a GPS altitude of 1985 feet above Mean Sea Level (MSL) and a ground speed of 66 knots. Due to data buffering on the GPS unit, the data recording may have ended before the accident event.

Figure 6 is a graphical overlay generated using Google Earth zoomed in on the end of the recorded data from the GPS device.

Figure 7 is a plot showing the engine parameters recorded by the JPI EDM-800 for the full accident flight. Figure 8 is a plot showing the engine parameters recorded by the JPI EDM-800 for the end of the flight.

Tabular data from the Garmin GPSMAP 396 used to generate figures 5 and 6 are included as Attachment 1. Tabular data from the JPI EDM-800 are included as Attachment 2. These attachments are provided in electronic comma-delimited (.CSV) format.

³ All dates and times are referenced to Coordinated Universal Time (UTC).

Figure 5. Google Earth overlay showing accident flight.

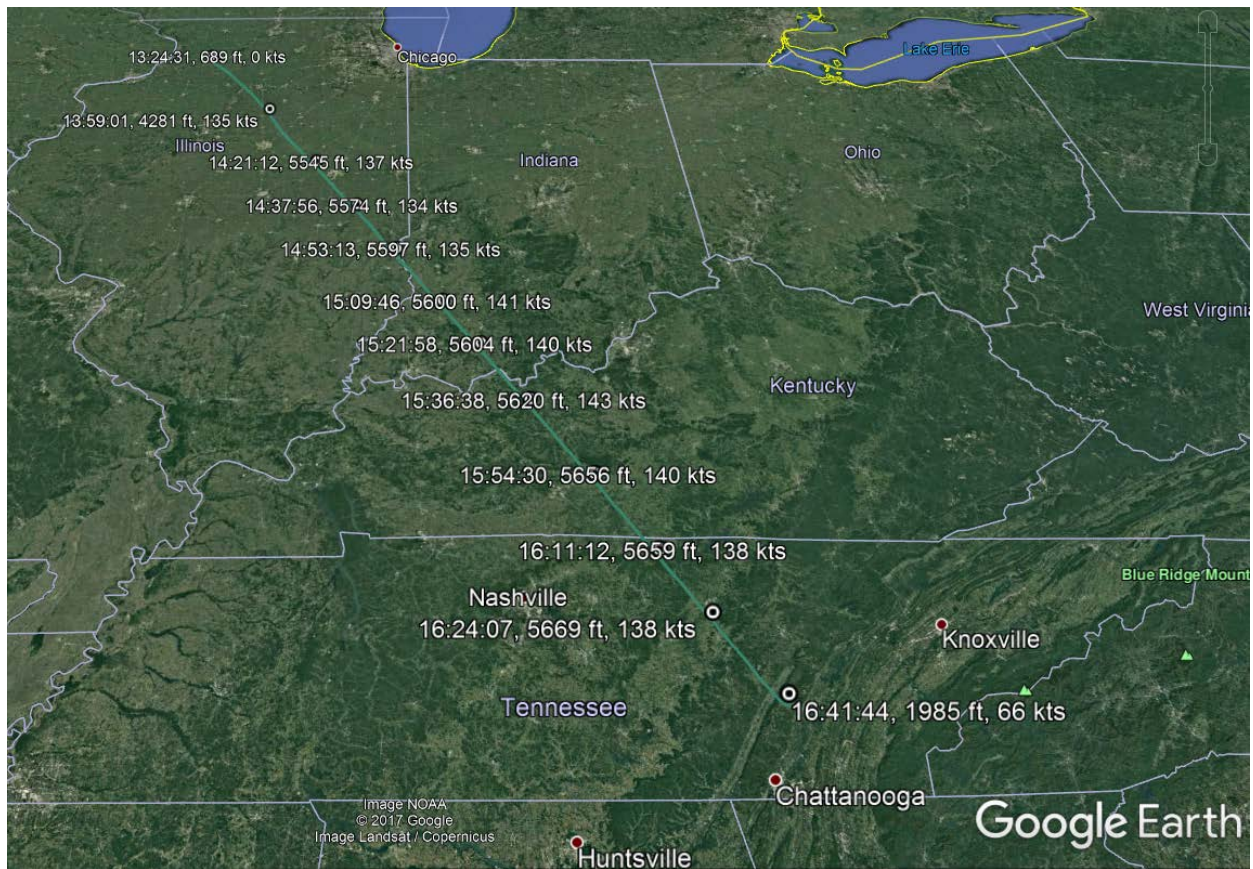


Figure 6. Google Earth overlay showing end of accident flight.

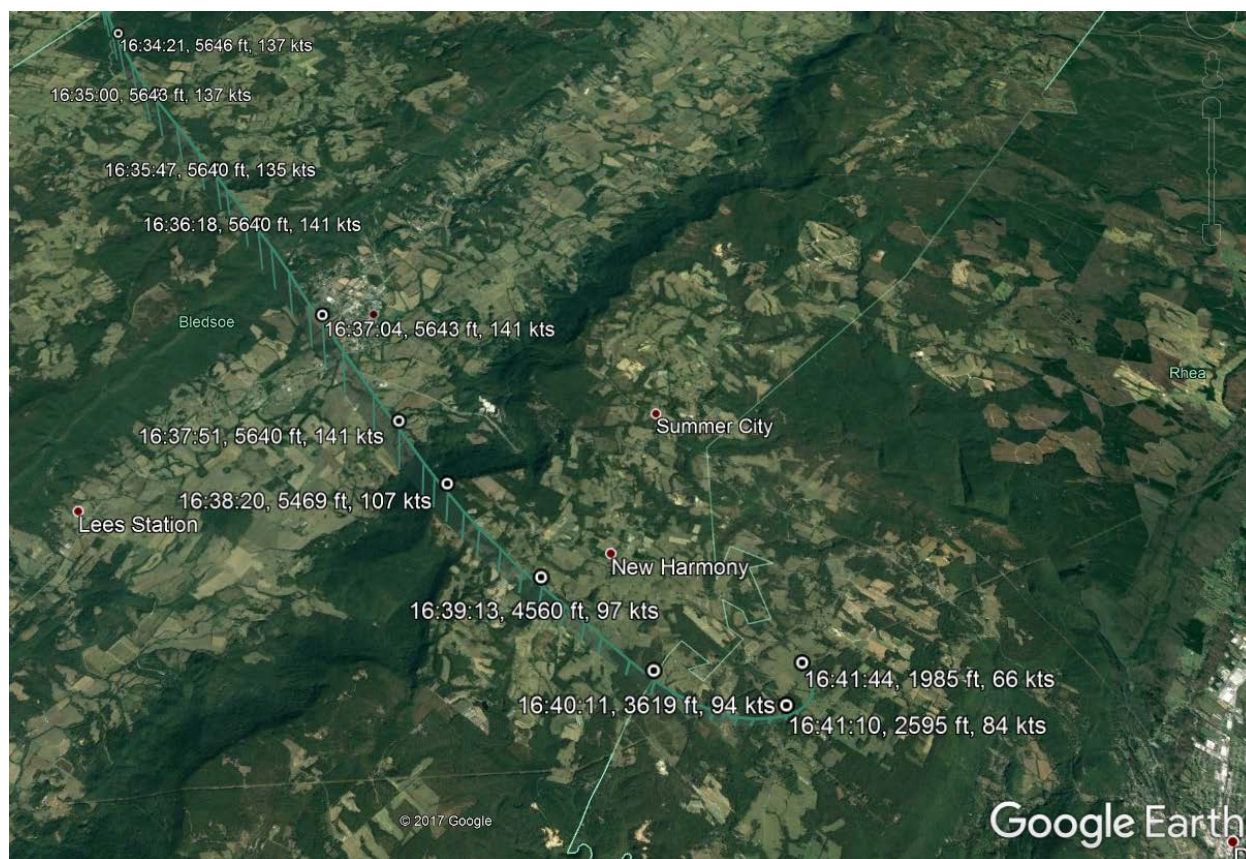


Figure 7. Plot of the JPI Data for the accident flight.

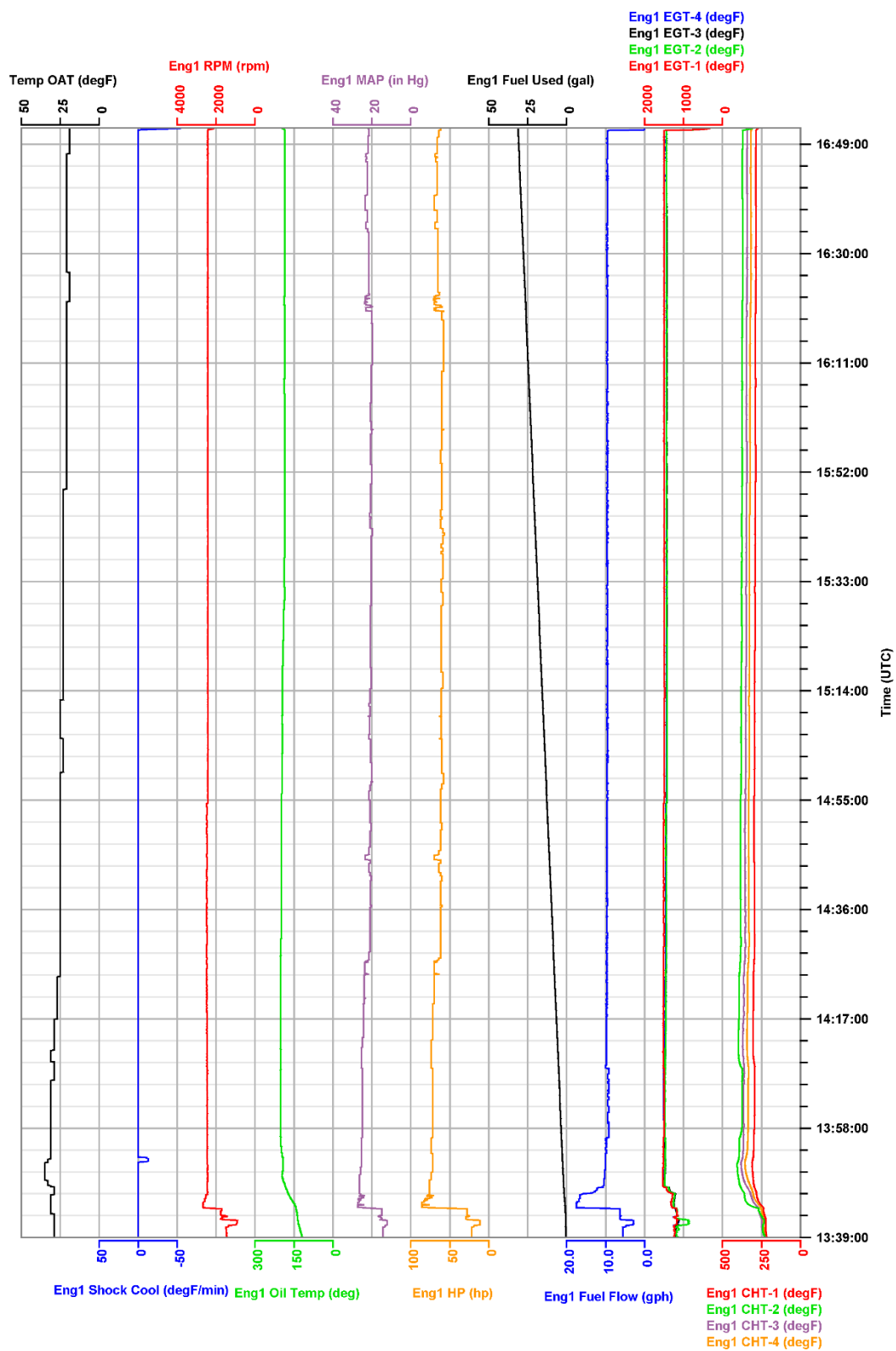


Figure 8. Plot of the JPI data for the end of the accident flight.

