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

August 7, 2015

Electronic Devices

Specialist's Factual Report
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1. EVENT

Location: Peachtree City, Georgia
Date: June 29, 2014
Aircraft/ID: Piper Sport, N957MD
Operator: Private
NTSB Number: ERA14LA316

On June 29, 2014, about 0918 eastern daylight time, a Czech Sport Aircraft Piper Sport, N957MD, was substantially damaged during a forced landing in Peachtree City, Georgia. The private pilot was seriously injured. Visual meteorological conditions prevailed, and no flight plan had been filed for the local flight from Atlanta Regional Airport – Falcon Field (FFC), Peachtree City, Georgia. The personal flight was conducted under the provisions of 14 *Code of Federal Regulations* Part 91.

2. DETAILS OF DEVICE INVESTIGATION

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

Device 1: Garmin GPSMAP 696
Device 1 Serial Number: 19717761

Device 2: Dynon EFIS-D100
Device 2 Serial Number: 004676

Device 2: Dynon EMS-D120
Device 2 Serial Number: 002777

The Dynon EFIS and EMS devices were received in good condition (figure 1). Power was applied to each unit using NTSB laboratory equipment. The devices powered on consistent with normal operation and the data from both devices were downloaded using manufacturer recommended procedures.

The Garmin GPSMAP 696 was received and an exterior examination showed impact damage consisting of a cracked screen (figure 2); however, power was applied to the device and startup was consistent with normal operation. Data was downloaded from the device using manufacturer recommended procedures.

Figure 1: Dynon EMS-D120 (Top, S/N 002777) and EFIS-D100 (Bottom, S/N 004676) as received

Figure 2: Garmin GPSMAP 696 (S/N 19717761) as received

2.1. Garmin GPSMAP 696 Device Description

The Garmin GPSMAP 696 is a portable GPS receiver capable of storing date, route-of-flight, and flight-time information for up to 50 flights. 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*[1] 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. The unit can also communicate with external devices such as a computer using a built in USB port.

2.1.1. Garmin GPSMAP 496 Data Description

The data extracted included one session on May 4, 2014[2]. The accident did not appear to be recorded.

2.2. Dynon EMS-D120 and EFIS-D100 Device Description

The Dynon Engine Management System (EMS) and Electronic Flight Indication System (EFIS) are panel-mounted display systems. Each device is capable of displaying EFIS or EMS data on a 7” LCD display. Data is stored on *non-volatile* memory and is

[1] Non-volatile memory is semiconductor memory that does not require external power for data retention.
[2] All dates and times are referenced to Coordinated Universal Time (UTC).

sampled at 5 samples per second. An optional internal battery is capable of operating the unit for a minimum of 1.5 hours when power loss is detected.

2.2.1. Dynon Dynon EMS-D120 and EFIS-D100 Data Description

The data extracted from the EMS-D120 included approximately 42 hours of data. The accident flight was located by the recorded GPS date and time parameters and spanned from 12:53:03 to 13:17:54 UTC on June 29, 2014, consisting of 216 data points[3].

The data extracted from the EFIS-D100 included approximately 74 hours of data. The accident flight was located by the recorded GPS date and time parameters and spanned from 12:53:06 to 13:18:24 UTC on June, 29, 2014, consisting of 212 data points[4].

2.2.2. Dynon D180 Parameters Provided

Table 1 describes data parameters provided by the EFIS and EMS devices included in this report. Table 2 describes its associated units. The engine is a four cylinder engine; however only EGT 1 and EGT 2 appeared to be recorded; similarly only CHT 1 appeared to be recorded.

Table 1: Dynon EMS and EFIS provided parameters

Parameter Name	Parameter Description
Time	GPS Time (UTC) as elapsed seconds since midnight
Fuel Pres	Fuel system pressure (psi)
RPM	Engine Speed (rpm)
Fuel Flow	Fuel Flow Rate (gph)
EGT #	Engine Exhaust Gas Temperature - # Indicates Cylinder (degF)
CHT #	Engine Cylinder Head Temperature - # Indicates Cylinder (degF)
Manifold Pres	Manifold Pressure (inHg)
Pressure Altitude	Pressure Altitude (ft)
Indicated Airspeed	Indicated Airspeed (kts)
Grnd Spd	Grnd Spd (kts)
Pitch	Pitch (deg)
Roll	Roll (deg)
Lat	Latitude (deg)
Long	Longitude (deg)

[3] The last 15 data points recorded by the EMS contained no valid GPS date or time.
[4] The last 6 data points recorded by the EFIS contained no valid GPS date or time.

Table 2: Unit Abbreviations

Units Abbreviation	Description
UTC	Coordinated Universal Time
psi	pounds per square inch
deg	degree
degF	degree Fahrenheit
rpm	revolutions per minute
ft	feet
gph	gallons per hour
inHg	inches mercury
kts	knots

3. OVERLAYS AND TABULAR DATA

The following overlays and plots were generated from the EMS and EFIS data.

Figure 3 is a graphical overlay generated using Google Earth for the entire recorded event flight on June 29, 2014.

Figure 4 is a plot of basic aircraft and engine data during the event flight from 13:10:00 to 13:18:24 UTC.

Tabular data used to generate Figures 3 and 4 are included as Attachment 1. These attachments are provided in electronic comma-delimited (.CSV) format.

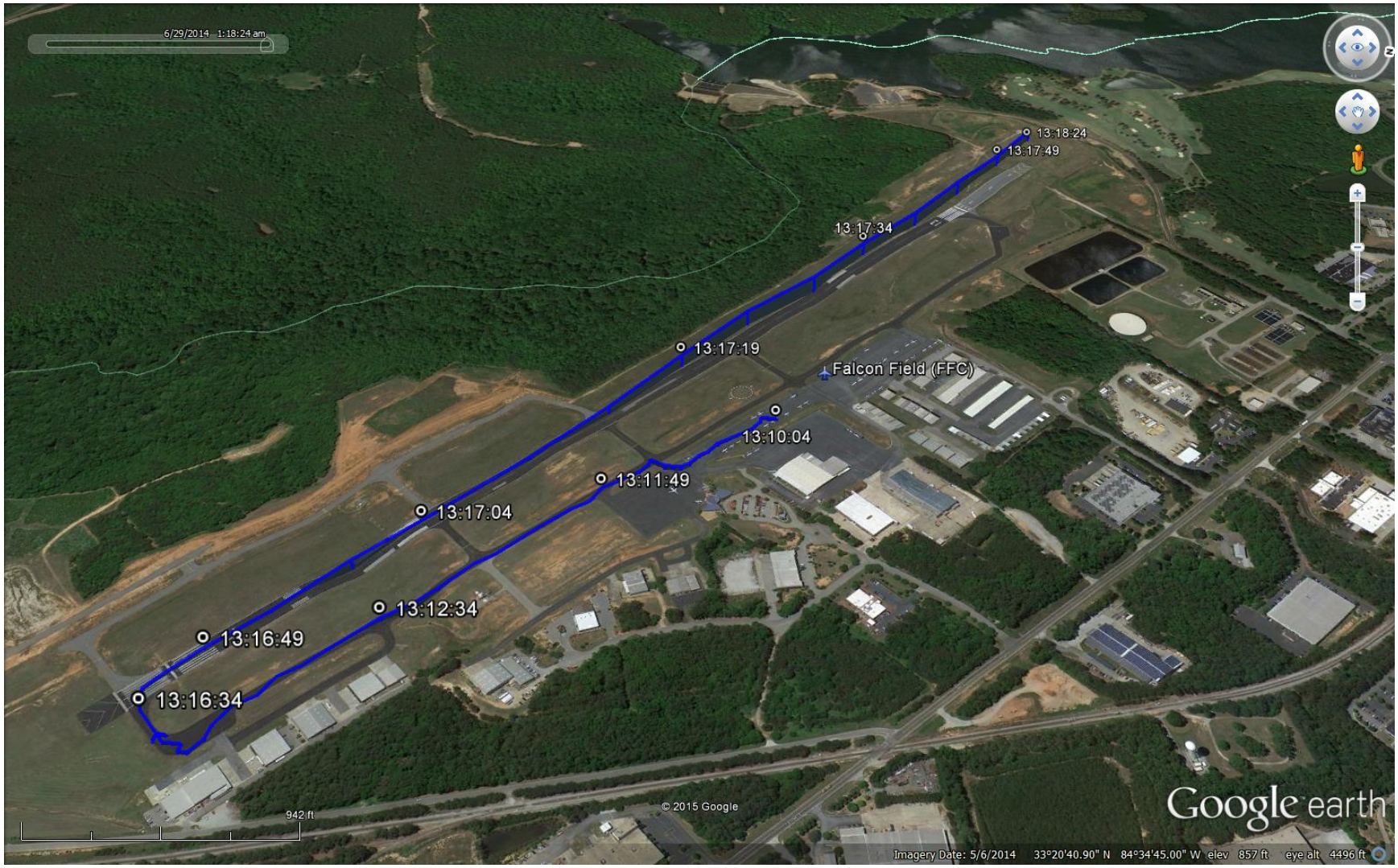

Figure 3: Overlay of GPS position data for event flight

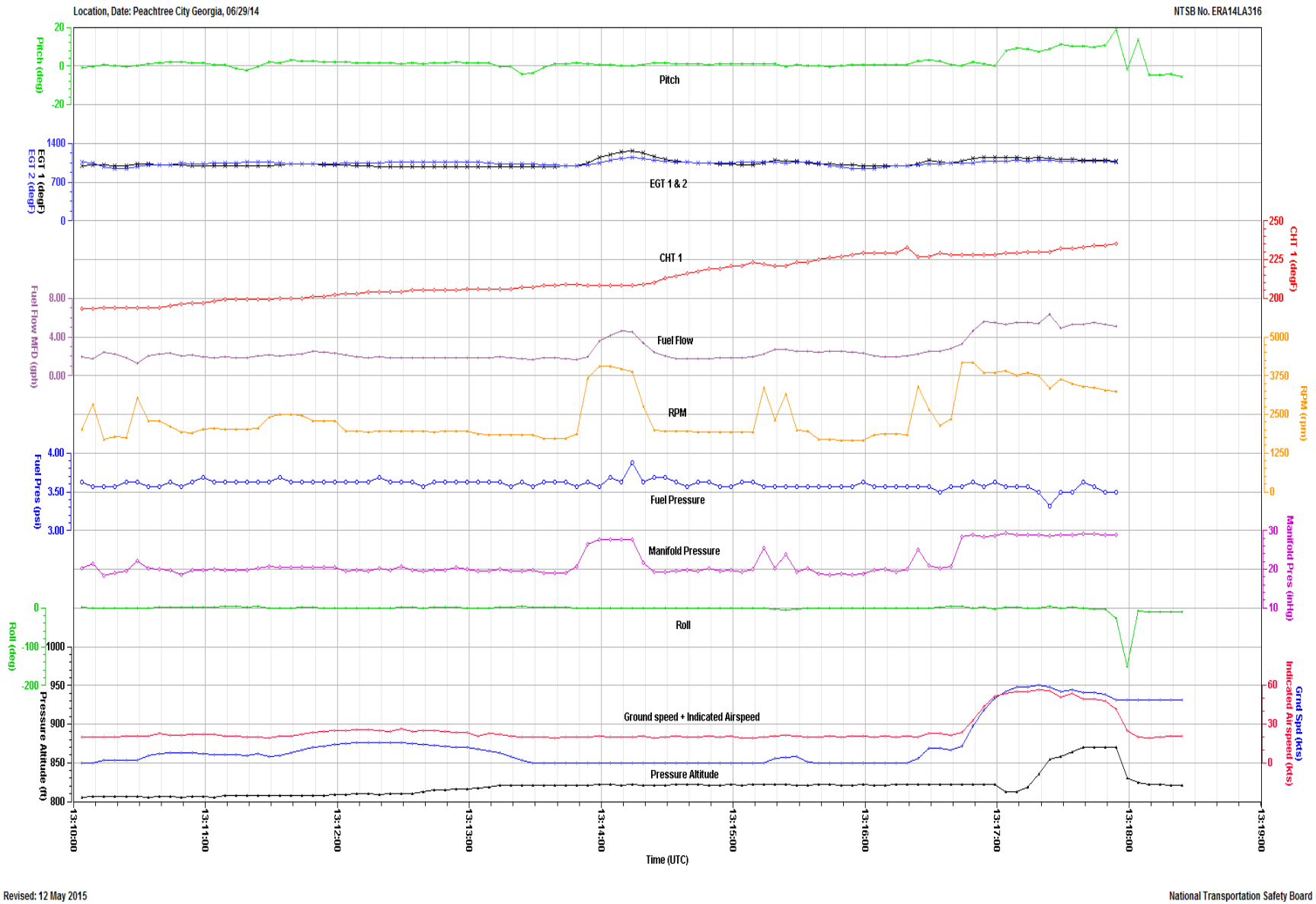

Figure 4: Plot of basic engine and aircraft parameters during event flight