

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



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FLIGHT DATA RECORDER

Specialist's Factual Report

August 25, 2022

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A. ACCIDENT

Location: Smithfield, North Carolina
Date: March 25, 2022
Time: 1613 eastern daylight time (EDT)
Airplane: Diamond Aircraft DA-40NG, N471BL

B. FLIGHT DATA RECORDER SPECIALIST

Specialist: W. Deven Chen
National Transportation Safety Board (NTSB)
Washington, DC

C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following devices:

Recorder Manufacturer/Model:	Garmin GDU 1054 SD Cards
Garmin GDU 1054 Part Number:	011-03470-60
Garmin GDU 1054 Serial Number:	494605116

1.0 Garmin GDU 1054 Description

The GDU 1054 is a versatile Electronic Flight Instrument System (EFIS) that can serve as a primary flight display (PFD), Multi-Function Display (MFD), Engine Information System (EIS), or a combination of all, depending on configuration. The unit comes with a 10.4-inch LCD display with 1024 x 768 resolution. It contains an Attitude Heading Reference System (AHRS) device and is capable of providing attitude information and air data information. The unit interfaces with a number of other compatible products and can display navigation, terrain, engine, weather, traffic and other parametric data streams. The unit is synthetic vision capable.

Depending on the display unit software, the aircraft can include a data logging feature. The data logging feature must be enabled by the aircraft operator and an SD card has to be installed in the upper slot of the unit to record data. Depending on the airframe and engine combination, as many as 64 parameters can be stored at a rate of one sample per second (1Hz). According to the manufacturer of the display unit, one flight hour can be stored in approximately 2 MB. With a 2 GB SD card, it can store over 1,000 flight hours.

1.1 Recorder Condition

The two SD cards were in good condition (Figure 1) and the data were extracted normally.



Figure 1. Two Garmin GDU 1054 SD Cards as Received.

1.2 Recording Description

The SD cards contained 1,463 data log files. Three sessions were recorded on March 25, 2022, at 08:00, 13:00 and 16:00 respectively. It was determined that the session recorded at 16:00, the last session of the recording, was the event flight. Its duration was approximately 7 minutes, with a rate of 1 sample per second.

1.2.1 Engineering Unit Conversions

All parameters were recorded in engineering units. Table 1 in Appendix A lists the recorder parameters verified and provided in this report. Additionally, table 2 describes the unit abbreviations used in this report.

1.3 Time Correlation

The data were recorded in eastern daylight time (EDT), the local time of the event.

D. FIGURES AND TABULAR DATA

Figures 2 to 7 contain data recorded during the event on March 25, 2022. All the parameters listed in table 1 are plotted except Latitude and Longitude.

Figures 2 and 3 show operational parameters during the event flight. Figures 4 and 5 show engine related parameters during the event flight. Figures 6 and 7 show Google Earth overlays of the event flight track, showing the departure from Johnston Regional Airport and subsequent descending left turn. Note that the weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

The corresponding tabular data used to create figures 2 to 7 are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

Submitted by:

W. Deven Chen
Electrical Engineer - Recorder Specialist

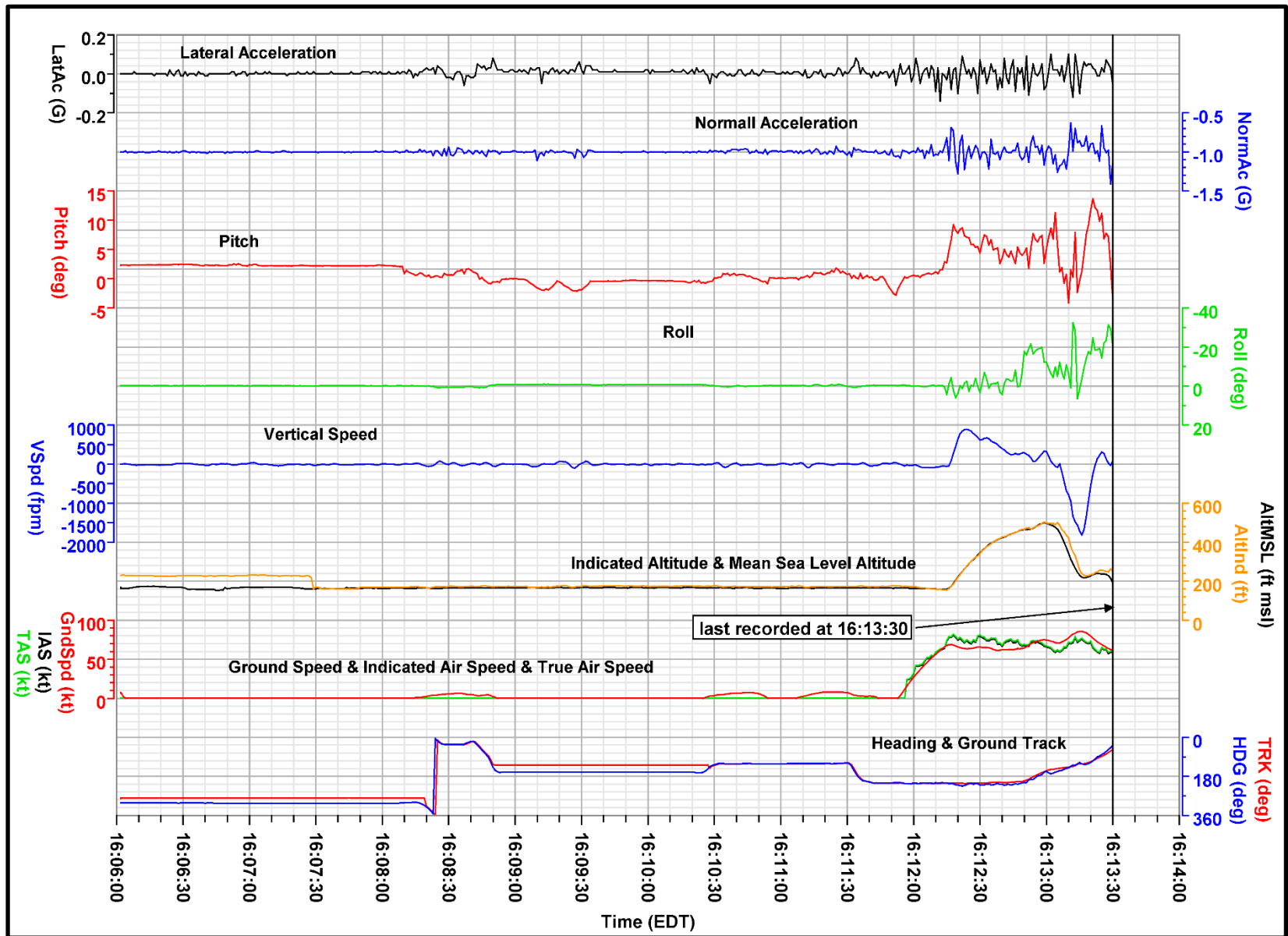


Figure 2. Plot of operational parameters for the entire event recording.

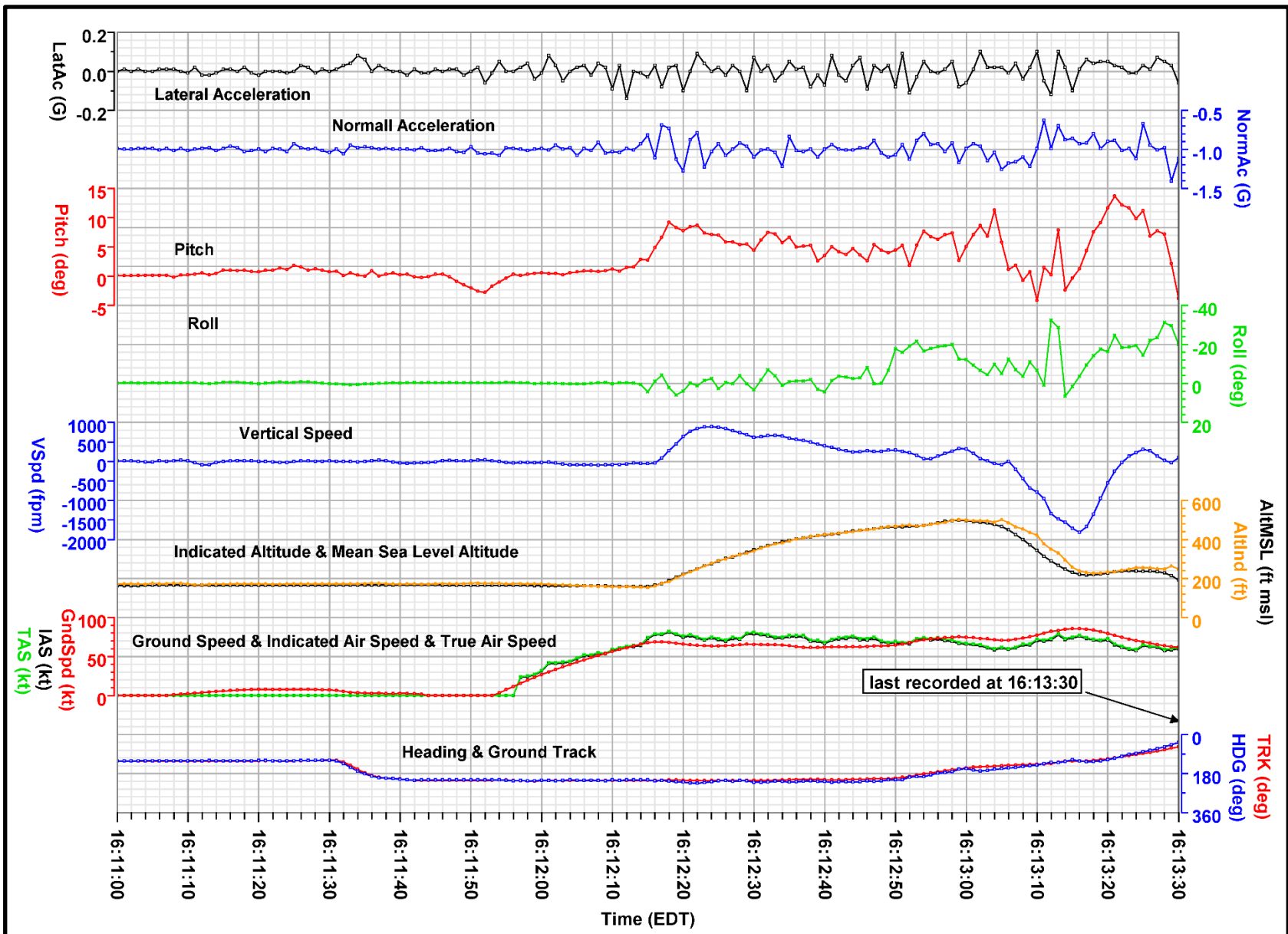


Figure 3. Plot of operational parameters for the final portion of the event recording.

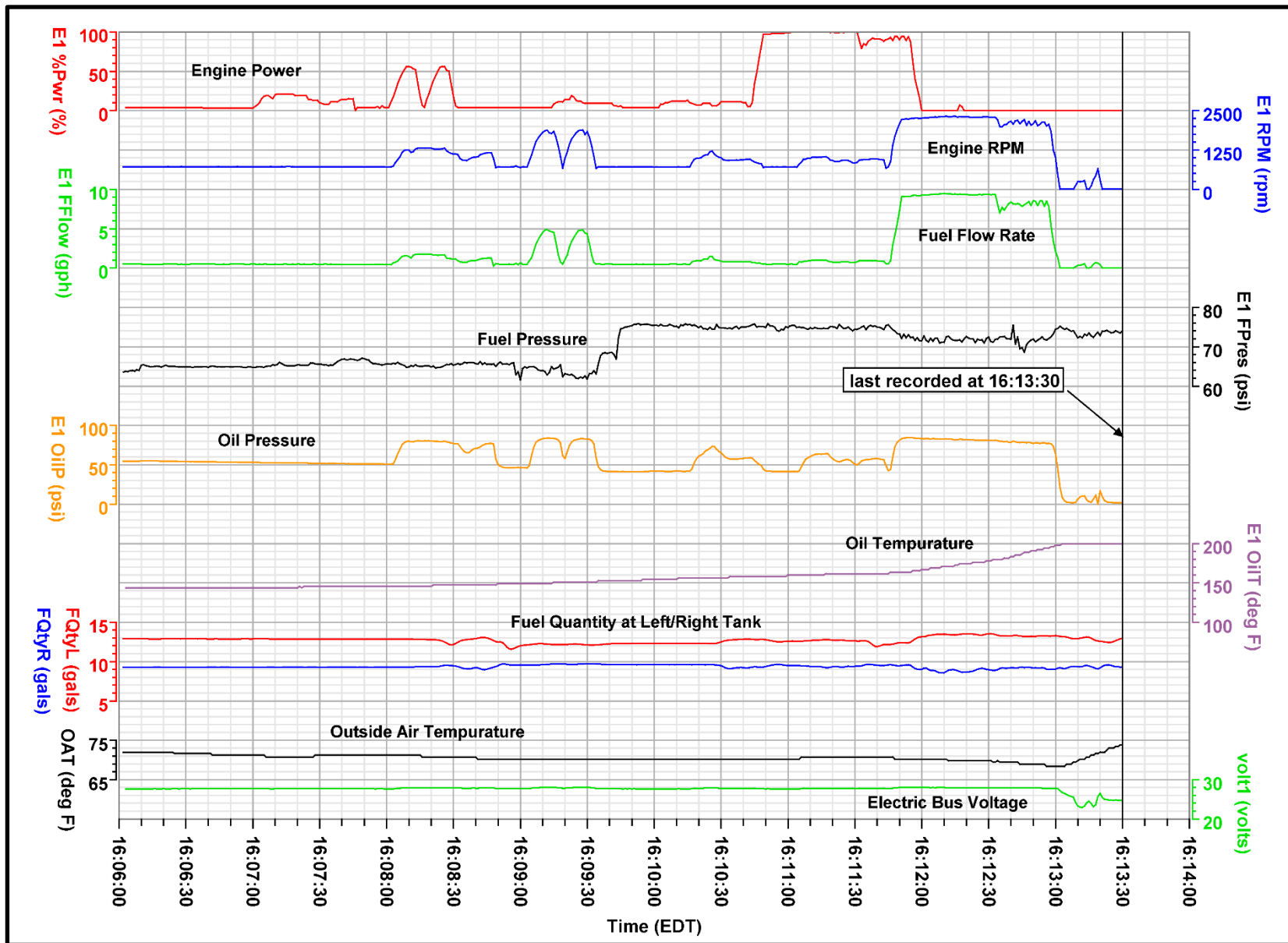


Figure 4. Plot of engine parameters for the entire event recording.

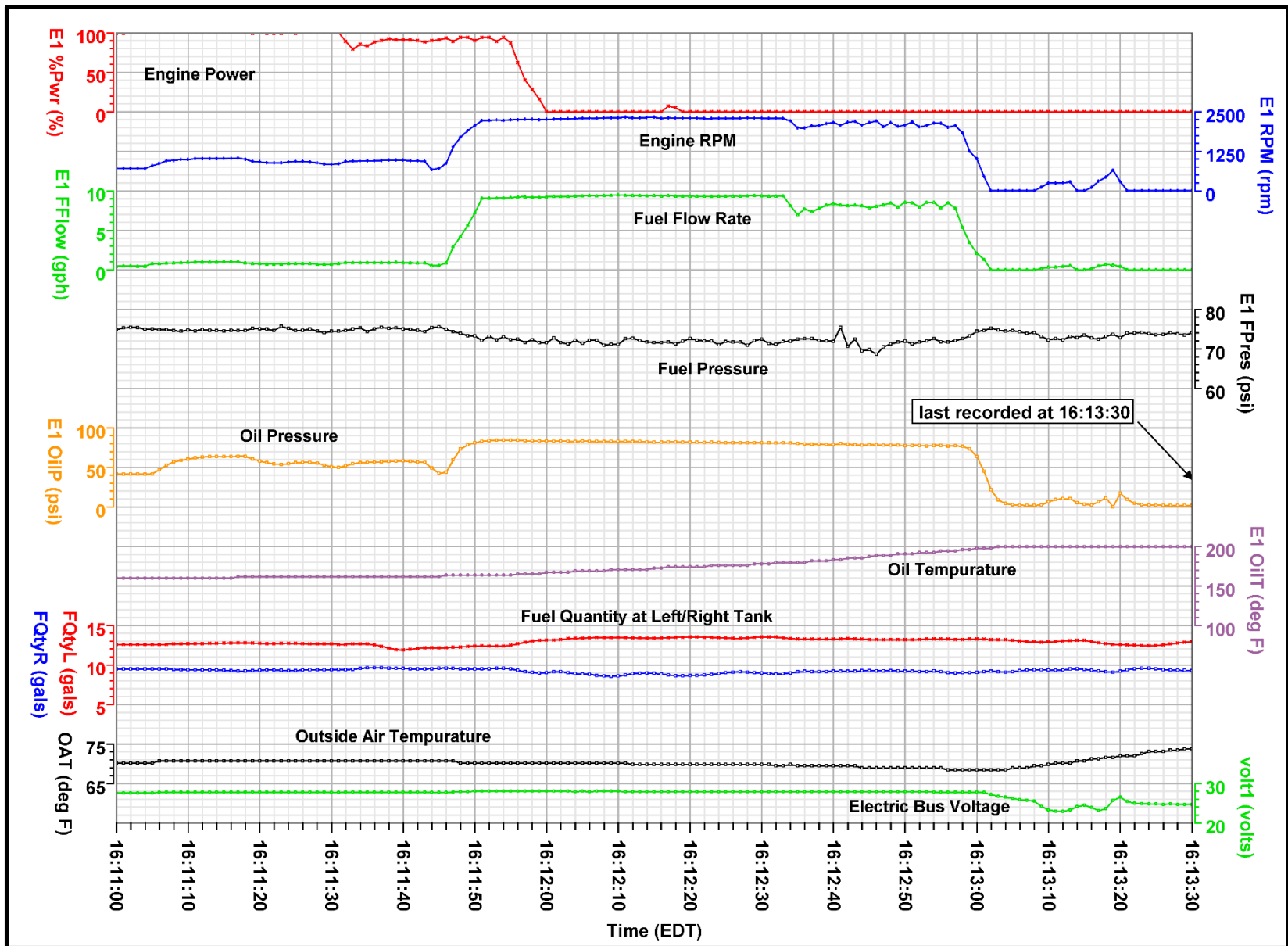


Figure 5. Plot of engine parameters for the final portion of the event recording.



Figure 6. Overlay of the event flight track in Google Earth with North up.

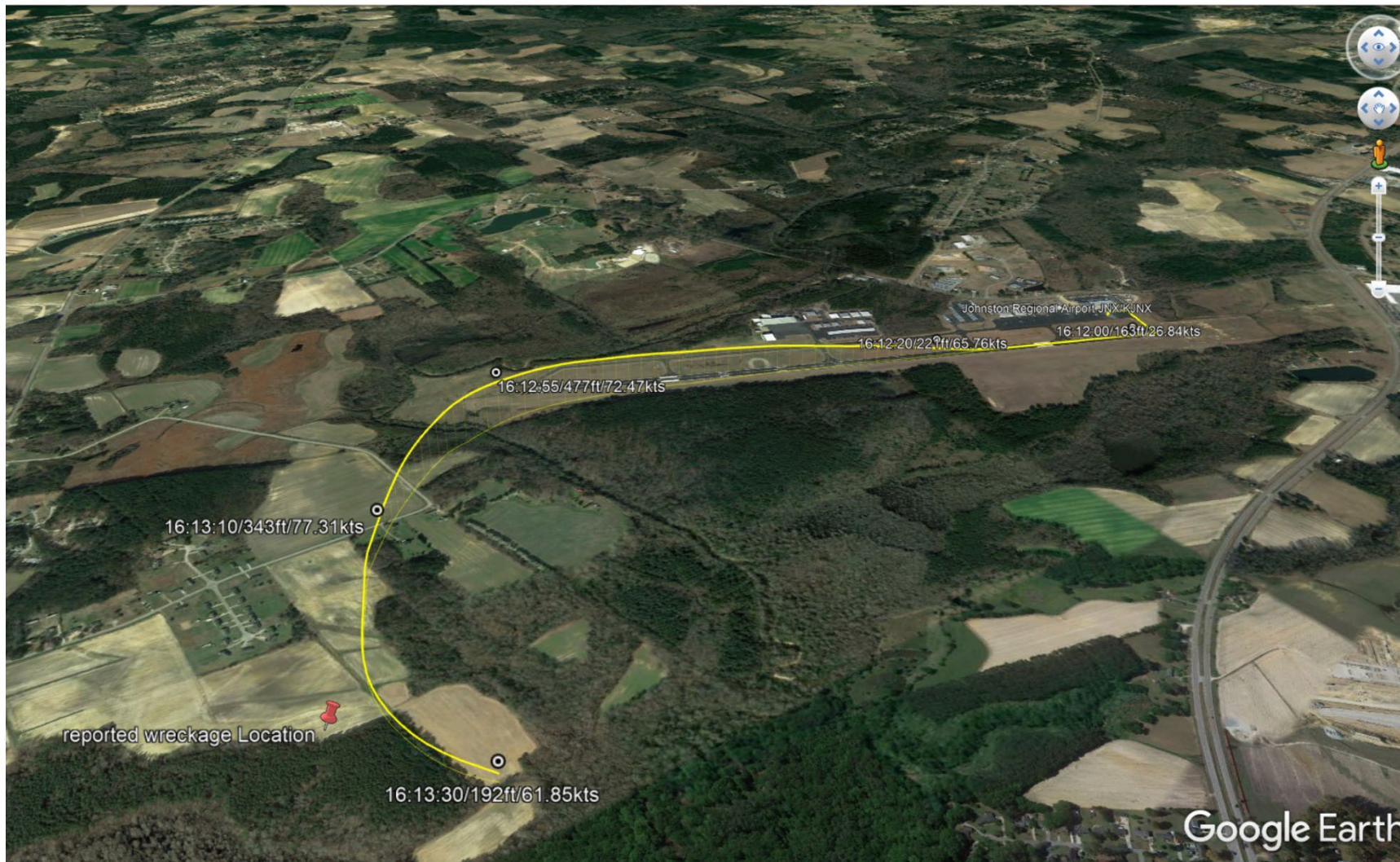


Figure 7. Overlay of the event flight track in Google Earth.

APPENDIX A

This appendix describes the parameters provided and verified in this report. Table 1 lists the plot/table labels, parameter names, and units. Additionally, table 2 describes the unit abbreviations used in this report.

Table 1. Verified and provided parameters.

Plot/Table Labels	Parameter Names	Units
LatAc	Lateral Acceleration	G
NormAc	Normal Acceleration	G
Pitch	Pitch Angle	deg
Roll	Roll Angle	deg
VSpd	Vertical Speed	fpm
AltInd	Indicated Altitude	ft
AltMSL	Mean Sea Level Altitude	ft
GndSpd	Ground Speed	kt
IAS	Indicated Air Speed	kt
TAS	True Air Speed	kt
HDG	Heading	deg
TRK	Ground Track	deg
Latitude	Latitude Position	deg
Longitude	Longitude Position	deg
E1 %Pwr	Engine Percent Power	%
E1 RPM	Engine RPM	rpm
E1 FFlow	Engine Fuel Flow Rate	gph
E1 FPress	Engine Fuel Pressure	psi
E1 OilP	Engine Oil Pressure	psi
E1 OilT	Engine Oil Temperature	degF
FQtyR	Fuel Quantity at Right Tank	gals
FQtyL	Fuel Quantity at Left Tank	gals
OAT	Outside Air Temperature	degF
Volt1	Electric Bus Voltage	volts

Table 2. Unit abbreviations.

Unit and Discrete Abbreviations	Descriptions
G	unit of gravitation acceleration
deg	degrees
fpm	feet per minute
ft	feet
kt	knots
%	percent
rpm	rotations per minute
gph	gallons per hour
psi	pounds per square inch
degF	degrees Fahrenheit
gals	gallons