

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

November 30, 2018

Recorded Flight Data

Specialist's Factual Report By Charles Cates

1. EVENT SUMMARY

Location: Tuskegee, Alabama
Date: October 15, 2017
Aircraft: Cirrus SR22T
Registration: N289CM
Operator: Private
NTSB Number: ANC18LA004

On October 15, 2017, about 1100 central daylight time, a Cirrus SR22T airplane, N289CM, sustained substantial damage during a forced landing following a partial loss of engine power shortly after takeoff from Moton Field Municipal Airport (06A), Tuskegee, Alabama. The airplane was registered to Skylane Partners, LLC and operated by the pilot as a visual flight rules flight under the provisions of 14 *Code of Federal Regulations* Part 91 when the accident occurred. The certificated private pilot and two passengers were not injured. Visual meteorological conditions prevailed, and an instrument flight plan had been filed.

2. FLIGHT DATA RECORDER GROUP

A recorded flight data group was not convened.

3. DETAILS OF FDR INVESTIGATION

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

Recorder Manufacturer/Model: **Cirrus Heads Up Technologies RDM**
Recorder Serial Number: **3026 21042**

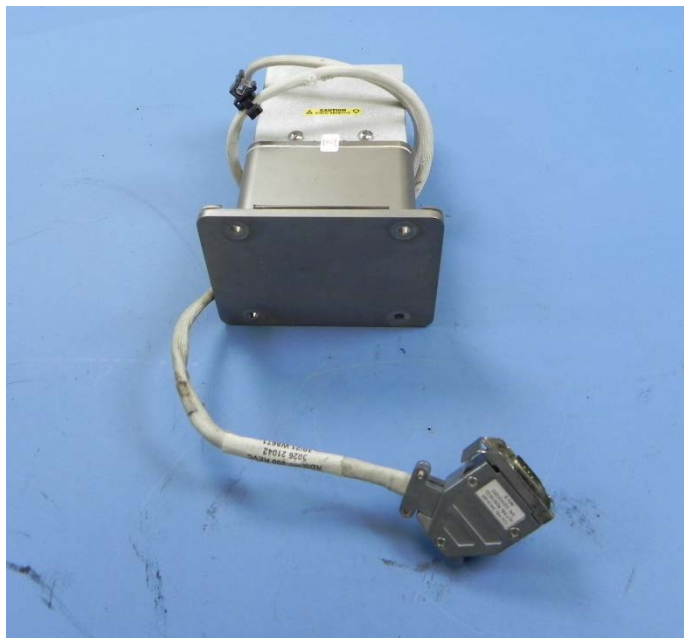
3.1. Heads Up Technologies RDM Description

The Heads Up Technologies recoverable data module (RDM) is a crash-hardened data storage unit installed in the tail of some Cirrus aircraft. The unit records flight, engine, and autopilot parameters. Data is logged once per second and stored internally on four thin small outline package (TSOP) memory devices inside the crash-hardened enclosure. When the storage limit of the memory device is reached, the oldest recording is deleted.

3.1.1. Recorder Condition

The recorder was in good condition and the data were extracted normally from the recorder. See figure 1 for the as-received condition of the RDM.

Figure 1. Flight recorder as received.



3.1.2. Engineering Units Conversions

Conversion of the RDM data from the raw recorded information to engineering units was based on documentation from the manufacturer of the device. Where applicable, the conversions have been changed to ensure that the parameters conform to the NTSB's standard sign convention that climbing right turns are positive (CRT=+).¹

Table A-1 lists the FDR parameters verified and provided in this report. Additionally, table A-2 describes the unit and discrete abbreviations used in this report.

3.2. Time Correlation

Correlation of the data to the event local time, central daylight time (CDT), was established using the recorded 24 hour coordinated universal time (UTC) and then subtracting 5 hours to change UTC to CDT.

3.3. FDR Plots and Corresponding Tabular Data

Figures 2 through 5 contain flight data recorded during the October 15, 2017 event. All the parameters listed in table A-1 are plotted except UTC Hours, UTC Minutes, and UTC Seconds.

Figures 2 and 3 contain basic aircraft parameters. Figures 4 and 5 contain engine parameters.

¹ CRT=+ means that for any parameter recorded that indicates a climb or a right turn, the sign for that value is positive. Also, for any parameter recorded that indicates an action or deflection, if it induces a climb or right turn, the value is positive. Examples: Right Roll = +, Pitch Up = +, Elevator Trailing Edge Up = +, Right Rudder = +.

Figures 2 and 4 cover a time period from engine start until the aircraft came to a stop. Figures 3 and 5 contain the same parameters as figures 2 and 4, respectively, and have an expanded time scale from the time of takeoff until the aircraft came to a stop.

Figures 2 and 3 show that the engine was started at about 10:41:20 CDT and run up to 1700 rpm about 90 seconds later. The run up lasted approximately 30 seconds. The aircraft began to taxi at 10:44:55 CDT and turned on to the runway heading and began to accelerate for takeoff at 10:47:20 CDT.

Figures 4 and 5 show that the aircraft rotated for takeoff at 10:47:45 CDT at 75 knots. Pitch stabilized at 11 degrees and airspeed reached a peak of 85 knots, although airspeed began to decrease at about one knot per second, slowing to 79 knots. The engine was stable during the initial climb at about 2,480 rpm and manifold pressure of 35.2 inHg. Fuel flow was about 41 gph.

At 10:48:07 CDT, the climb was interrupted at 250 ft pressure altitude (487 ft GPS altitude). Airspeed began to increase again, at about two knots per second. At 10:48:10 CDT the aircraft began a turn to the left, and engine manifold pressure and fuel flow increased to a peak of 40.3 inHg and 48.1 gph, respectively. Within one second, both engine EGT and TIT began to decrease.

At 10:48:30 CDT, engine RPM began to decrease along with manifold pressure and fuel flow. The aircraft was descending at this time. At 10:48:39 CDT, the aircraft reached ground level and groundspeed decelerated from 89 knots to 0 at 10:48:48 CDT. The engine also stopped turning at that time.

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 through 5, including UTC Hours, UTC Minutes, and UTC Seconds, are provided in electronic comma separated value (*.csv) format as attachment 1 to this report.

Figure 2. Plot of basic parameters from engine start until the airplane came to a stop.

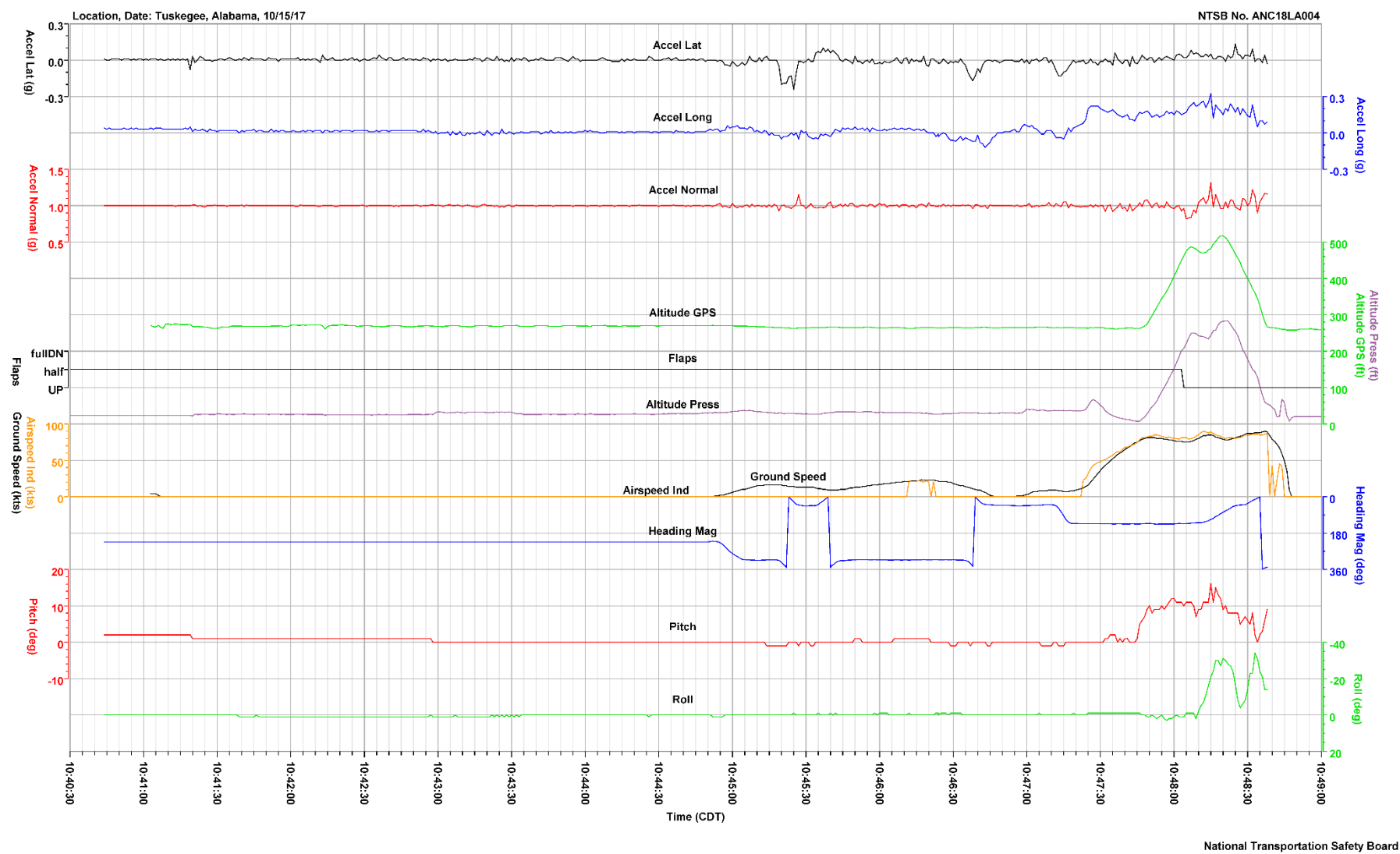
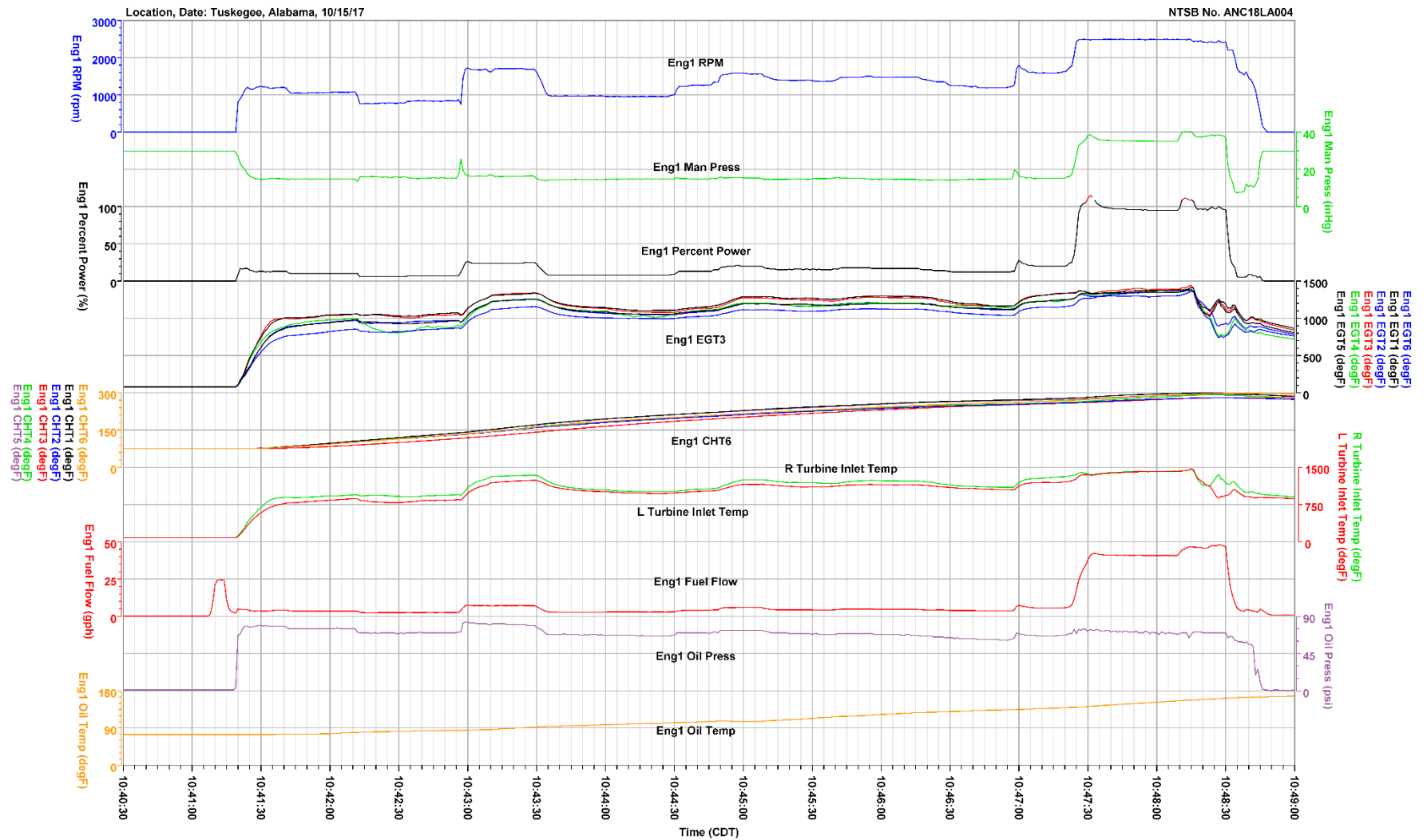


Figure 3. Plot of engine parameters from engine start until the airplane came to a stop.



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Figure 4. Plot of basic parameters from the start of takeoff until the airplane came to a stop.

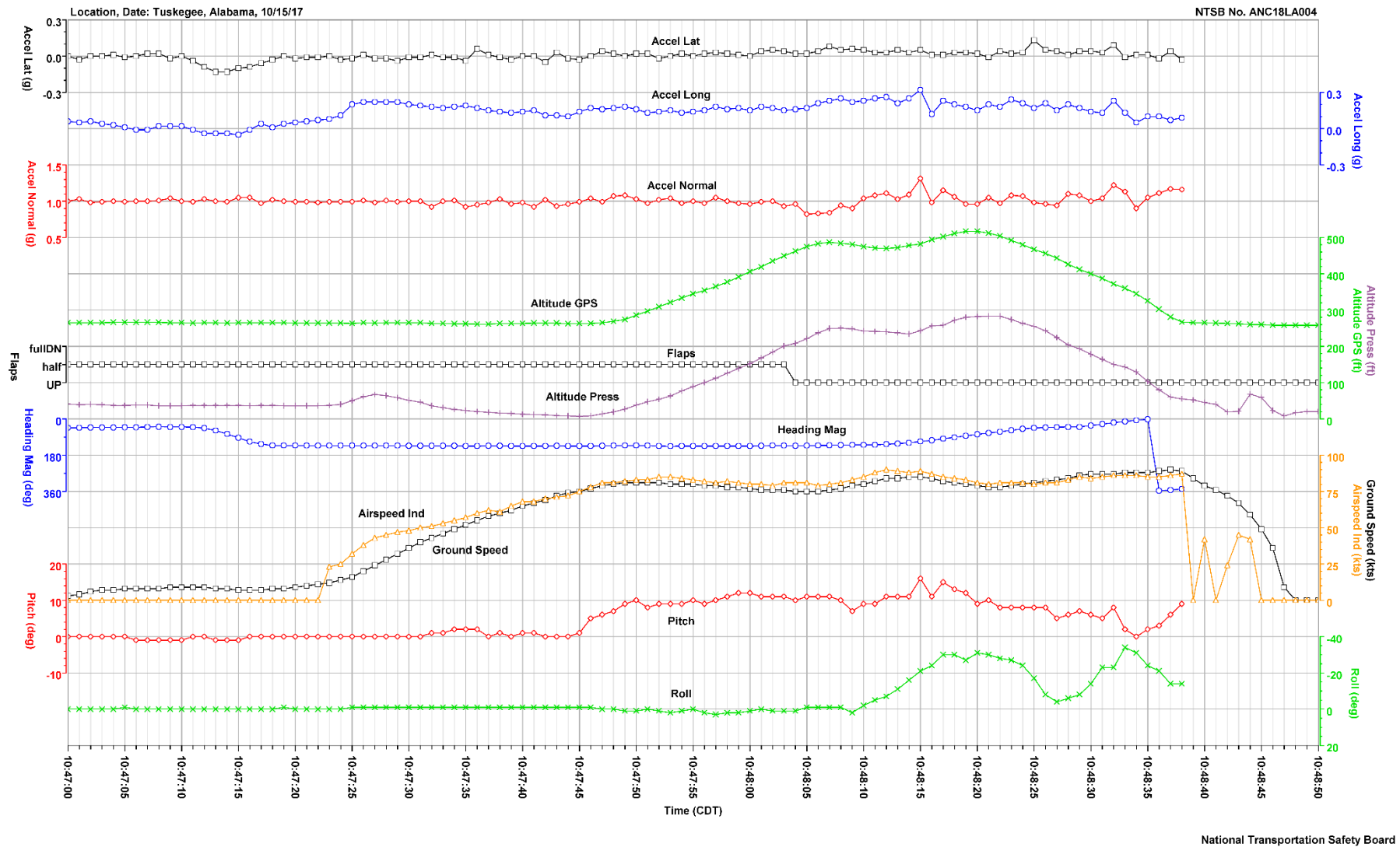
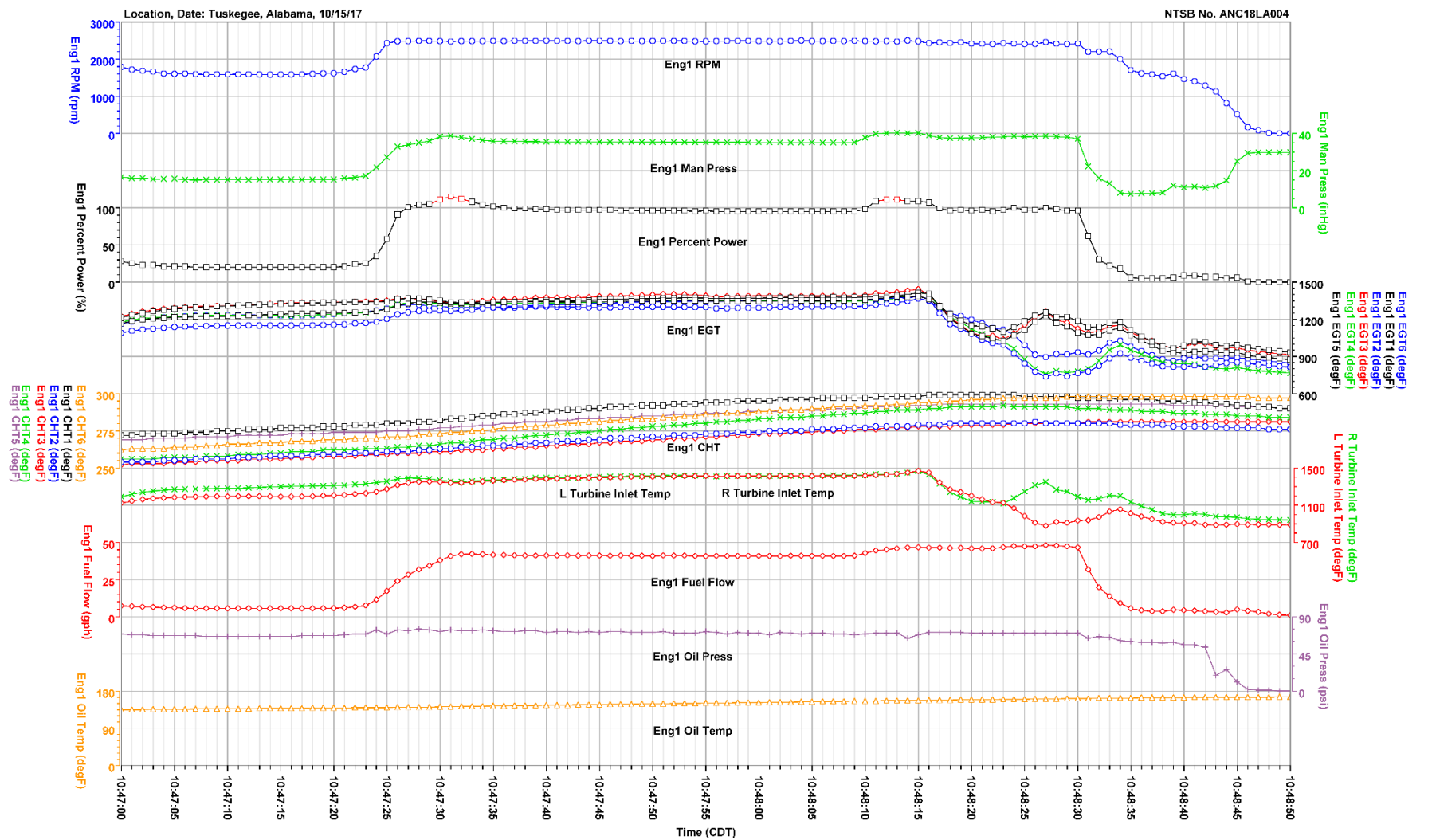


Figure 5. Plot of engine parameters from the start of takeoff until the airplane came to a stop.



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APPENDIX A

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

Table A-1. Verified and provided FDR parameters.

Plot/Table Labels	Parameter Description	Units
Accel Lat	Lateral Acceleration	g
Accel Long	Longitudinal Acceleration	g
Accel Normal	Vertical Acceleration	g
Airspeed Ind	Indicated Airspeed	kts
Altitude GPS	GPS Altitude	ft
Altitude Press	Pressure Altitude	ft
Eng1 CHT#	Engine Cylinder Head Temperature, Cylinder #	degF
Eng1 EGT#	Engine Exhaust Gas Temperature, Cylinder #	degF
Eng1 Fuel Flow	Engine Fuel Flow	gph
Eng1 Man Press	Engine Intake Manifold Pressure	inHg
Eng1 Oil Press	Engine Oil Pressure	psi
Eng1 Oil Temp	Engine Oil Temperature	degF
Eng1 Percent Power	Engine Power	%
Eng1 RPM	Engine speed	rpm
Flaps	Flap Position	discrete
Ground Speed	Speed over the ground	kts
Heading Mag	Magnetic Heading	deg
L Turbine Inlet Temp	Turbine Inlet Temperature, Left Cylinder Bank	degF
Pitch	Pitch Angle	deg
R Turbine Inlet Temp	Turbine Inlet Temperature, Right Cylinder Bank	degF
Roll	Roll Angle	deg
UTC Hours	UTC Time Hours	hrs
UTC Minutes	UTC Time Minutes	min
UTC Seconds	UTC Time Seconds	sec

NOTE: The pressure altitude parameter is based on a standard altimeter setting of 29.92 inches of mercury (in Hg). The pressure altitude information presented in the plots and tabular data has not been corrected for the local altimeter setting at the time of the event.

NOTE: A discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

Table A-2. Unit and discrete abbreviations.

Unit and Discrete Abbreviation	Description
deg	degrees
degF	degrees Fahrenheit
ft	feet
fullDN	flaps down
gph	gallons per hour
half	flaps 50%
hrs	hours
inHg	inches of Mercury
kts	knots
min	minutes
psi	pounds per square inch
rpm	revolutions per minute
sec	seconds
UP	flaps up