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

September 15, 2021

Flight Data Recorder

Specialist's Factual Report
By Michael Portman

1. EVENT SUMMARY

Location: Fernandina Beach, Florida
Date: November 1, 2020
Aircraft: Hawker Beechcraft 400A
Registration: N456FL
Operator: Georgia Jet
NTSB Number: ERA21LA036

2. FLIGHT DATA RECORDER GROUP

A flight data recorder (FDR) group was not convened.

3. FDR CARRIAGE REQUIREMENTS

The event aircraft, N456FL, was not required to be equipped with an FDR.

4. DETAILS OF FDR INVESTIGATION

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

Recorder Manufacturer/Model: **L-3/Fairchild FA2100 256 wps**
Recorder Serial Number: **001287631**

4.1. L-3/Fairchild FA2100 256 wps Description

This model FDR records airplane flight information in a digital format using solid-state flash memory as the recording medium. The FA2100 can receive data in the ARINC 573/717/747 configurations and can record a minimum of 25 hours of flight data. It is configured to record 256 12-bit words of digital information every second. Each grouping of 256 words (each second) is called a subframe. Each subframe has a unique 12-bit synchronization (sync) word identifying it as subframe 1, 2, 3, or 4. The sync word is the first word in each subframe. The data stream is "in sync" when successive sync words appear at proper 256-word intervals. Each data parameter (e.g. altitude, heading, airspeed) has a specifically assigned word number within the subframe. The FA2100 is designed to meet the crash-survivability requirements of TSO-C124a.

4.1.1. Recorder Condition

The recorder was in good condition and the data were extracted normally from the recorder.

4.1.2. Recording Description

The FDR recording contained approximately 82 hours of data. Timing of the FDR data is measured in subframe reference number (SRN), where each SRN equals one elapsed second. The event flight was the last flight of the recording, and its duration was approximately 56 minutes. The parameters evaluated for the purpose of this report appeared to be in accordance with federal FDR carriage requirements.

4.1.3. Engineering Unit Conversions

The engineering unit conversions used for the data contained in this report are based on documentation from the Supplemental Type Certificate (STC) holder. 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 abbreviations used in this report.

4.1.4. Supplemental Type Certificate FDR Modifications

The aircraft was modified under an STC, named the Nextant 400A. Part of this STC included remapping and recertifying the FDR. The parameters Ground Speed, Landing Gear WOW L, and Landing Gear WOW R, were not included in the STC certification but were nonetheless recorded. These parameters were obtained and converted by coordinating with the recorder manufacturer and STC holder. These parameters were evaluated and appeared to be valid, however, per the recorder manufacturer, as these parameters were not certified, their validity cannot be guaranteed.

4.2. Time Correlation

Correlation of the FDR data from SRN to the event local time, eastern standard time (EST), was established by using the recorded Time GMT hours, Time GMT Minutes, and Time GMT Seconds and then applying an additional 5 hours offset to change GMT to EST.[2]

Accordingly, the time offset for the event flight data from SRN to local EST is the following: EST = SRN –245,641. Therefore, for the rest of this report, all times are referenced as EST, not SRN.

[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 = +.

[2] GMT is Greenwich Mean Time which is also known as Coordinated Universal Time (UTC).

4.3. FDR Plots and Corresponding Tabular Data

Figures 1 to 3 contain FDR data recorded during the event on November 1, 2020. All the parameters listed in table A-1 are plotted except Time GMT Hours, Time GMT Minutes, and Time GMT Seconds.

Figure 1 shows a plot of parameters for the entire incident flight. Figure 2 shows a plot of parameters for the final approximately 10 and a half minutes of recorder data. Figure 3 shows a plot of parameters for the final approximately 1 minute of recorder data, detailing the landing and rollout sequence.

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 1 to 3, including Time GMT Hours, Time GMT Minutes, and Time GMT Seconds, are provided in electronic comma separated value (*.csv) format as attachment 1 to this report.

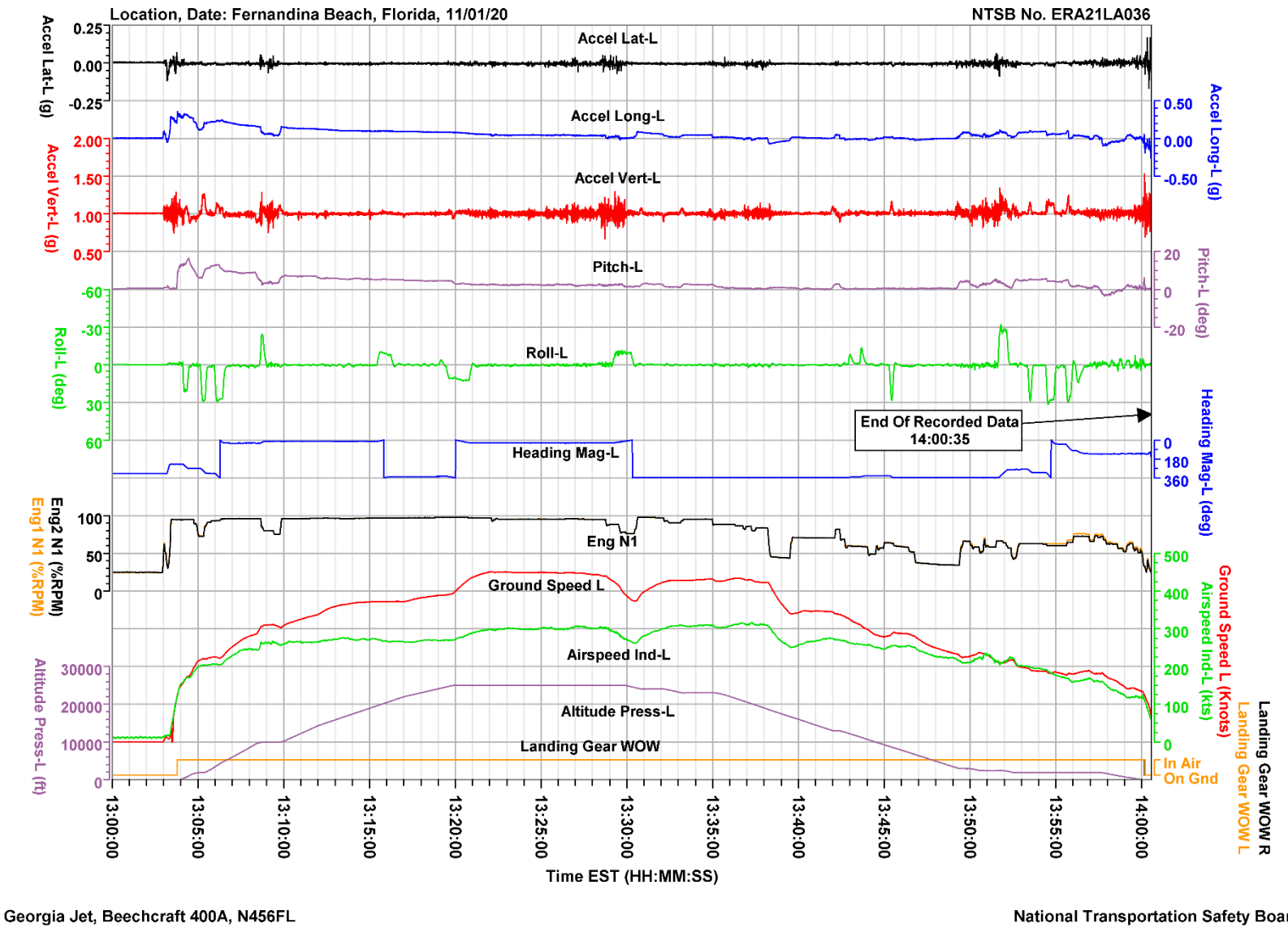

Figure 1. Plot of parameters during the entire flight.

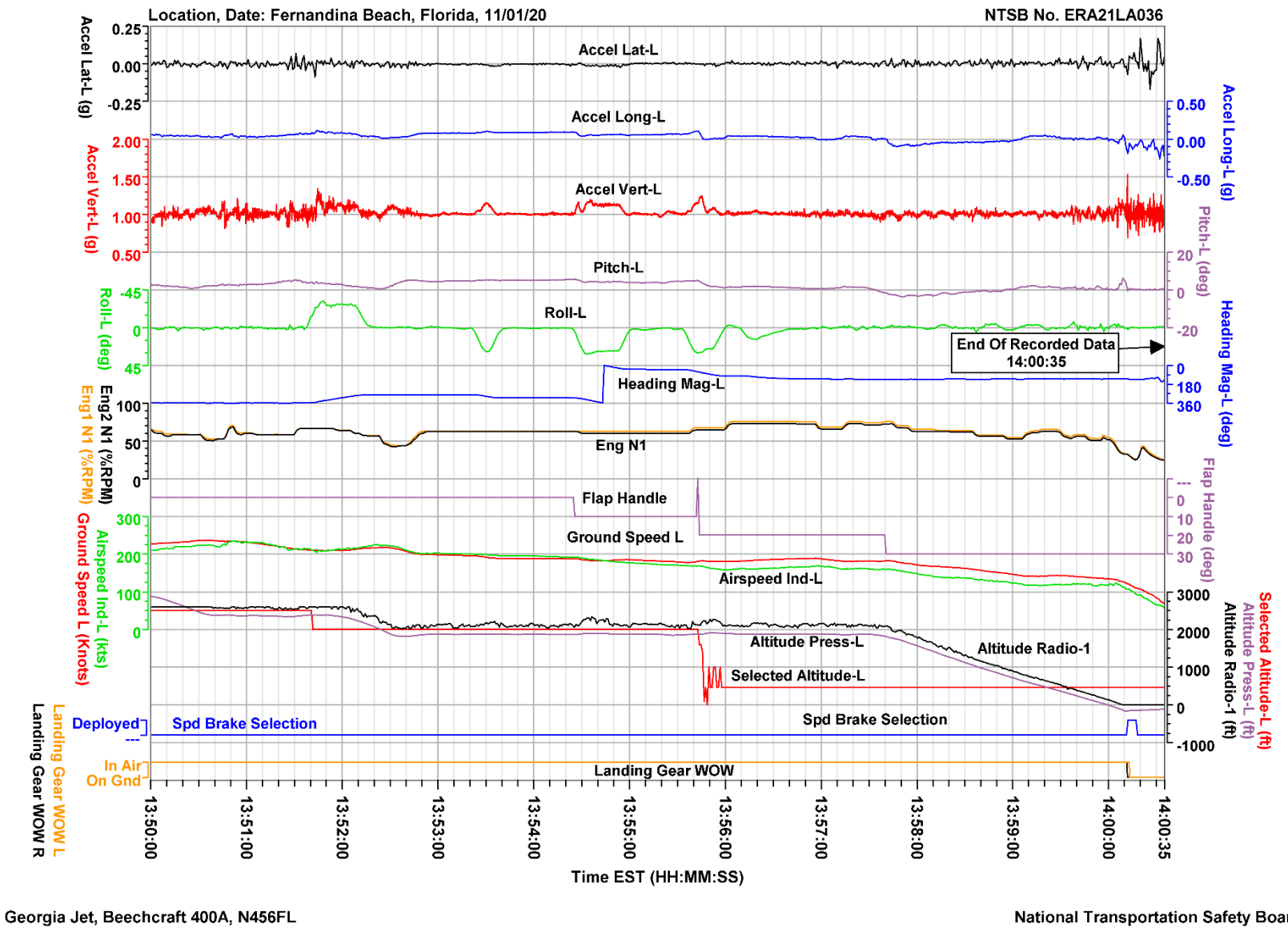

Figure 2. Plot of parameters during the final descent.

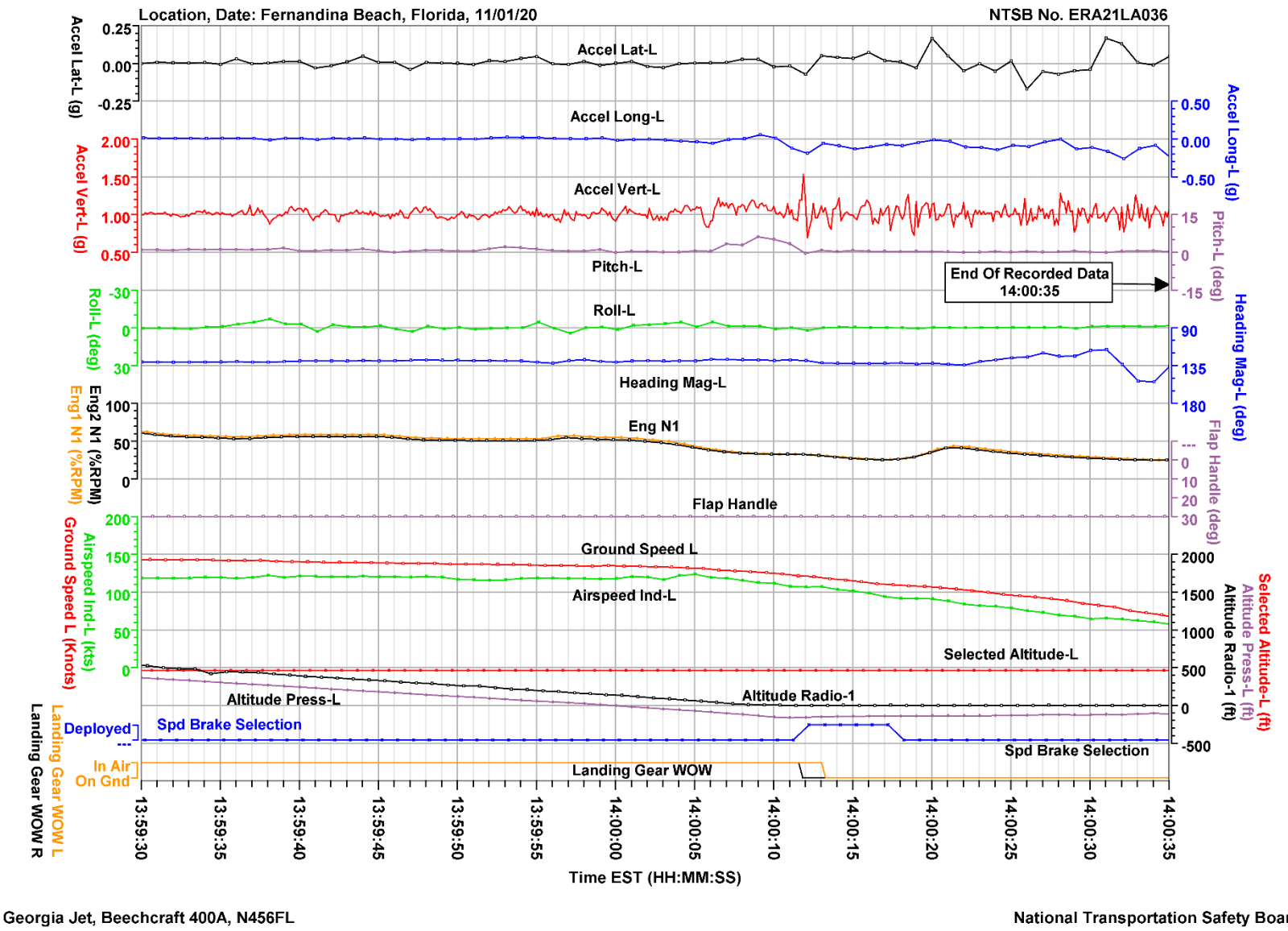

Figure 3. Plot of parameters during the landing and rollout sequence.

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 abbreviations used in this report.

Table A-1. Verified and provided FDR parameters.

Plot/Table Labels	Parameter Names	Units
Accel Lat-L	Lateral Acceleration – left data bus	g
Accel Long-L	Longitudinal Acceleration – left data bus	g
Accel Vert-L	Vertical Acceleration – left data bus	g
Airspeed Ind-L	Indicated Airspeed – left data bus	kts
Altitude Press-L	Pressure Altitude – left data bus	ft
Eng1 N1	Engine 1 Fan Speed	%rpm
Eng2 N1	Engine 2 Fan Speed	%rpm
Heading Mag-L	Magnetic Heading – left data bus	deg
Landing Gear WOW-L	Left Main Landing Gear Weight on Wheels	
Landing Gear WOW-R	Right Main Landing Gear Weight on Wheels	
Pitch-L	Pitch Angle – left data bus	deg
Roll-L	Roll Angle – left data bus	deg
Selected Altitude-L	Selected Altitude – left data bus	ft
Spd Brake Selection	Speed Brake Selection	
Time GMT Hrs-L	Greenwich Mean Time Hours – left data bus	hrs
Time GMT Min-L	Greenwich Mean Time Minutes – left data bus	min
Time GMT Sec-L	Greenwich Mean Time Seconds – left data bus	sec

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

NOTE: Parameters with a blank unit description in table A-1 are discretes. 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 abbreviations.

Unit Abbreviations	Descriptions
deg	degrees
kts	knots
g	g
ft	feet
hrs	hours
min	minutes
sec	seconds
%rpm	percent revolutions per minute