

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

October 4, 2021

Flight Data Recorder

Specialist's Factual Report
By Christopher Babcock

1. EVENT SUMMARY

Location: Alexandria, Louisiana
Date: April 20, 2018
Aircraft: Boeing MD-83
Registration: N807WA
Operator: Caribbean Sun Airlines
NTSB Number: DCA18FA144

2. FLIGHT DATA RECORDER GROUP

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

3. FDR CARRIAGE REQUIREMENTS

The event aircraft, N807WA, was manufactured in 1993, and was operating such that it was required to be equipped with an FDR that recorded, at a minimum, 34 parameters, as cited in Title 14 *Code of Federal Regulations* Part 121.344(d)

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 64 wps**
Recorder Serial Number: **357061**

4.1. L-3/Fairchild FA2100 64 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 64 12-bit words of digital information every second. Each grouping of 64 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 64-word intervals. Each data parameter (for example 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 392 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 1 hours and 43 minutes.

4.1.3. Engineering Unit Conversions

The engineering unit conversions used for the data contained in this report are based on documentation from the operator. This documentation did not include conversions for Control Column Position, a parameter that was included in the last FDR System Integrity Check, dated January 8, 2018. An approximate conversion was developed using the maximum extents of the control column. 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.

4.2. Time Correlation

Correlation of the FDR data from SRN to the event local time, Central Daylight Time (CDT), was established by using the recorded Time GMT hours and Time GMT Minutes and then subtracting 5 hours to change GMT to CDT.² Because seconds were not recorded and Time GMT Minutes was only sampled every 4 seconds, timing is only accurate to 4 seconds.

Accordingly, the time offset for the event flight data from SRN to local CDT is the following: CDT = SRN – 1360116.

4.3. FDR Plots and Corresponding Tabular Data

Figure 1 contain FDR data recorded during the event on April 20, 2018. Figure 2 contains FDR data recorded on the previous flight. Figure 3 contains FDR data recorded 2 flights prior to the accident

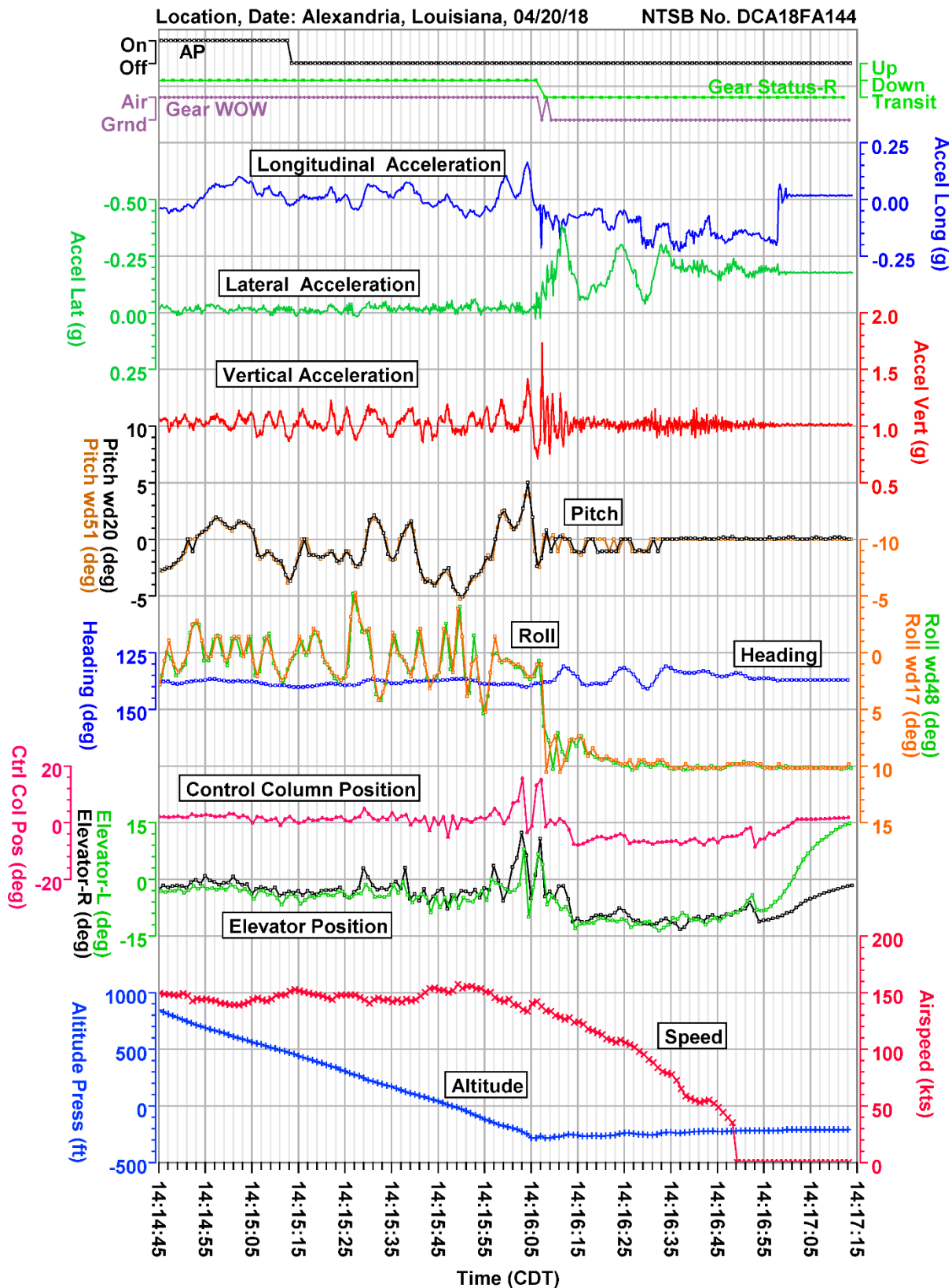
These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

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 = +.

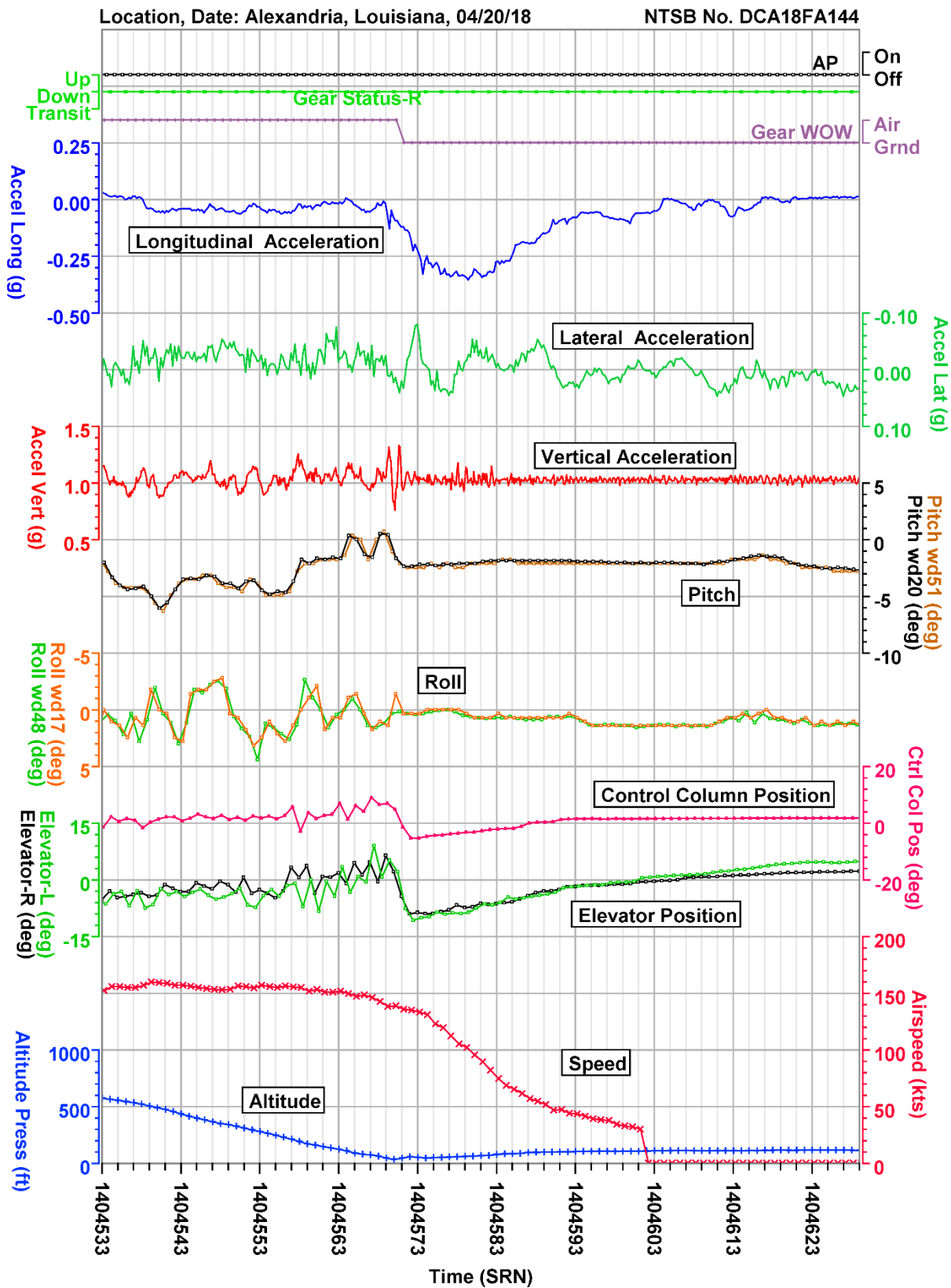
² GMT is Greenwich Mean Time which is also known as Coordinated Universal Time (UTC).

The corresponding tabular data used to create figures 1-3 are provided in electronic comma separated value (*.csv) format as attachments 1-3 to this report.

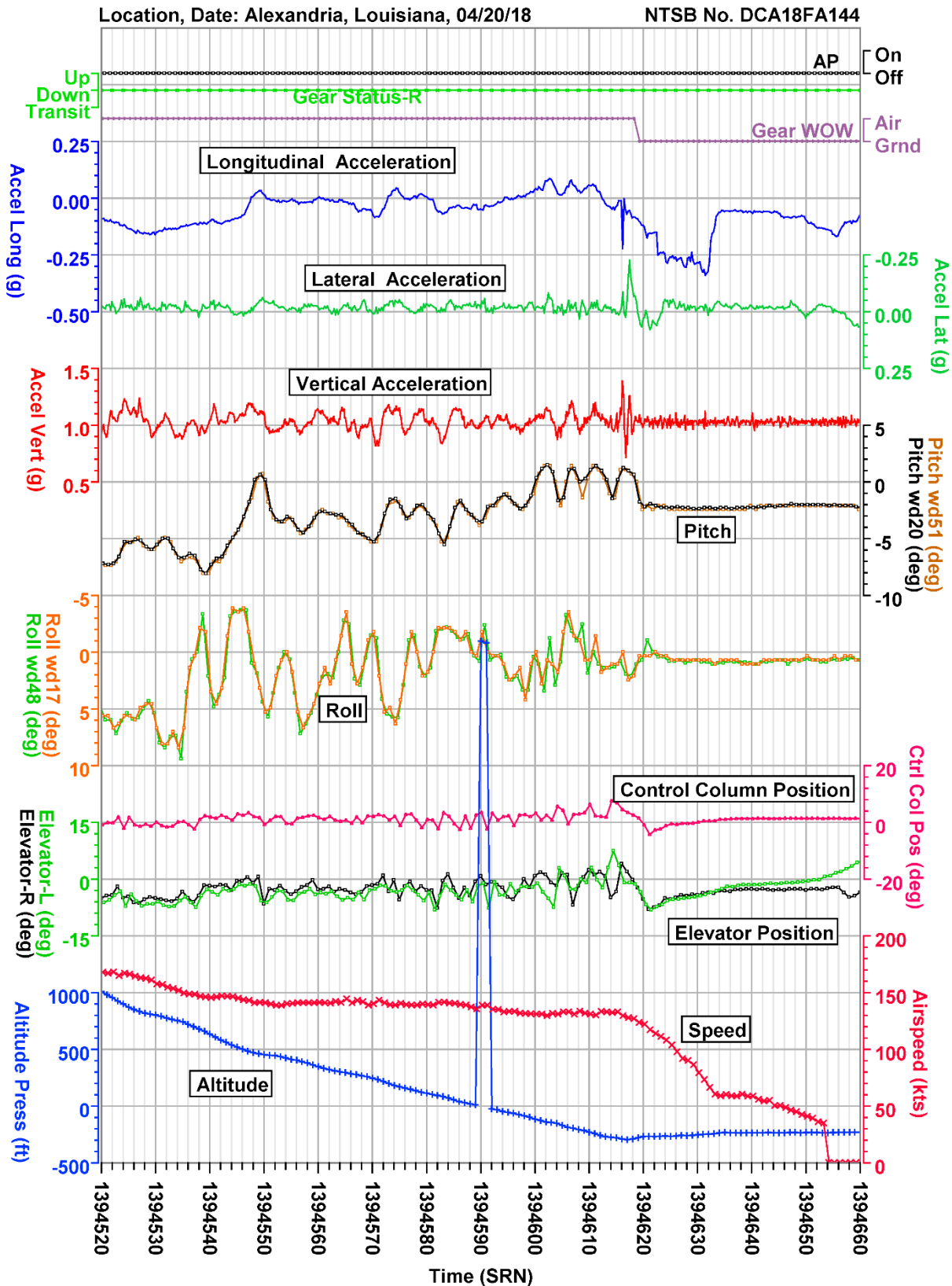
Caribbean Sun Airlines, Boeing MD-83, N807WA



Caribbean Sun Airlines, Boeing MD-83, N807WA



Caribbean Sun Airlines, Boeing MD-83, N807WA



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	Lateral Acceleration	g
Accel Long	Longitudinal Acceleration	g
Accel Vert	Vertical Acceleration	g
Airspeed	Indicated Airspeed	kts
Altitude Press	Pressure Altitude	ft
AP	Autopilot Status	
Ctrl Col Pos	Control Column Position	deg
Elevator-L	Left Elevator Position	deg
Elevator-R	Right Elevator Position	deg
Gear Status-R	Right Main Landing Gear Status	
Gear WOW	Landing Gear Weight on Wheels	
Heading	Magnetic Heading	deg
Key VHF-1	Microphone Keying-1	
Key VHF-2	Microphone Keying-2	
Pitch wd20	Pitch Angle word 20	deg
Pitch wd51	Pitch Angle word 51	deg
Roll wd17	Roll Angle word 17	deg
Roll wd48	Roll Angle word 48	
Time GMT Hrs	Greenwich Mean Time Hours	hrs
Time GMT Min	Greenwich Mean Time Minutes	min

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.

NOTE: Pitch and roll are both sampled 2 times per second, however, the two samples are recorded at different precision and are plotted separately.

Table A-2. Unit abbreviations.

Unit Abbreviations	Descriptions
deg	degrees
kts	knots
g	g
ft	feet
hrs	hours
min	minutes