

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

May 18, 2016

Flight Data Recorder

Specialist's Factual Report By Cassandra Johnson

1. EVENT SUMMARY

Location: West Palm Beach, Florida
Date: July 22, 2015
Aircraft: Bombardier CL-600-2B16
Registration: N613PJ
Operator: USAC Airways 691 LLC
NTSB Number: ERA15LA288

On July 22, 2015, about 1410 eastern daylight time, a Canadair CL-600-2B16, N613PJ, operated by USAC Airways 691 LLC, was substantially damaged when it struck an all-terrain ground vehicle (ATV) while taxiing at Palm Beach International Airport (PBI), West Palm Beach, Florida. Both airline transport pilots were not injured. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the flight, which was destined for Opa-Locka Executive Airport (OPF), Miami, Florida. The positioning flight was operated under the provisions of Title 14 *Code of Federal Regulations* Part 91.

2. FLIGHT DATA RECORDER GROUP

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

3. FDR Carriage Requirements

The event aircraft, N613PJ, was manufactured in 1992, and was operating such that it was required to be equipped with an FDR that recorded 15 parameters¹, as cited in both 14 CFR Part 91.609(c) Appendix E and 14 CFR Part 135.152(a) Appendix B.

4. DETAILS OF FDR INVESTIGATION

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

Recorder Manufacturer/Model:	Honeywell SSUFDR
Recorder Part Number:	980-4120-GXUN
Recorder Serial Number:	20490

¹ Altitude rate and angle of attack are not required since the recorded pressure altitude fine has a resolution of 1.2 feet. Additionally, leading edge flaps is not required because the aircraft is not equipped with leading edge flaps.

4.1. Honeywell SSUFDR Description

The SSUFDR 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 SSUFDR is designed to meet the crash-survivability requirements of TSO C124.

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 27 hours of data. Timing of the FDR data is measured in subframe reference number (SRN), where each SRN equals one elapsed second. The event was recorded at the end of the FDR.

The parameters evaluated for the purpose of this report appeared to be in accordance with federal FDR carriage requirements, except the following 7 parameters: indicated airspeed, stabilizer trim position or pitch control position, engine power (each engine), trailing edge flaps, thrust reversers (each engine), spoiler/speedbrake, and autopilot status. The operator was informed of these parameters deficiencies.

4.1.3. Engineering Units Conversions

FDR data frame documentation is essential for decoding FDR data (for example, changing the raw binary data into engineering units) and it is the operator's responsibility to maintain the FDR data frame documentation for decoding the FDR.

The operator was unable to provide the FDR data frame documentation. Therefore, NTSB had to rely on archived documentation from Honeywell, the recorder manufacturer. In the end, only 8 of the required 15 parameters appeared to be recording data consistent with expected data. If proper documentation was available, there is potential more recorded information could be recovered.

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=+).²

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.

² 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 = +.

4.1.4. Pressure Altitude

This FDR records both pressure altitude coarse and pressure altitude fine. Pressure altitude coarse has a resolution of about 33 feet (ft) and pressure altitude fine has a resolution of about 1.2 ft. Both pressure altitude parameters are based on a standard altimeter setting of 29.92 inches of mercury (in Hg). The pressure altitude information presented in the FDR plot and in the electronic data have not been corrected for the local altimeter setting at the time of the event.

4.2. Time Correlation

The timing of the FDR data was left as SRN since real time (for example, Coordinated Universal Time) was not recorded, nor is it required to be recorded.

4.3. FDR Plots and Corresponding Tabular Data

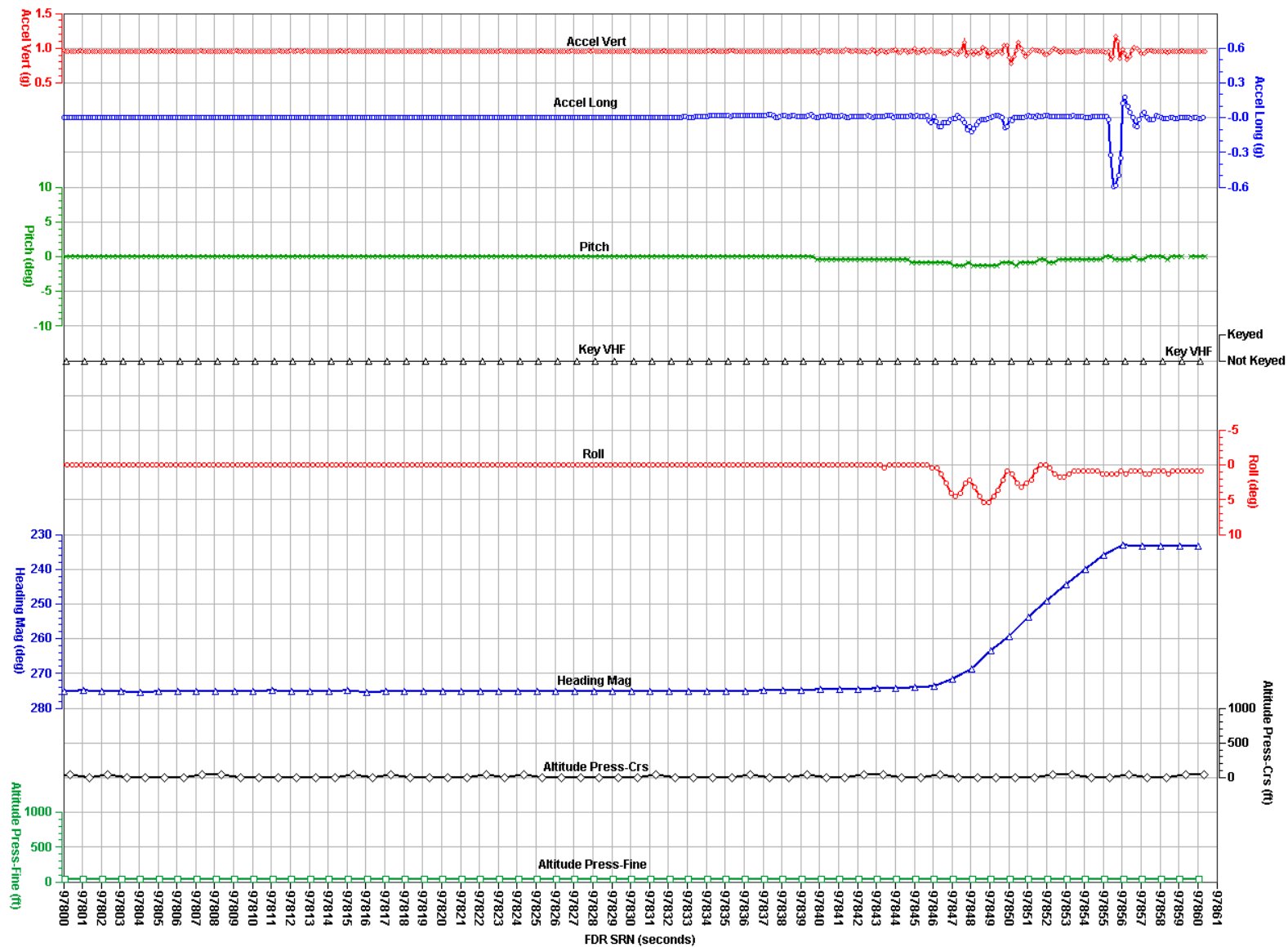
Figure 1 contains FDR data recorded during the July 22, 2015 event and covers the last 60 minutes of movement from 97,800 SRN to 97,860 SRN (the x-axis ends at 97,861 SRN). All the parameters listed in table A-1 are plotted.

This figure is 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.

In summary, the FDR data indicated between 97,855 SRN and 97,856 SRN, the longitudinal acceleration changed from about 0 g to -0.60 g's which is consistent with forward motion. During this time, the magnetic heading changed from 236 degrees to 233 degrees. Four seconds later at 97,860 SRN, the FDR data ends.

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

Figure 1. Plot of parameters during last minute of data.



APPENDIX A

This appendix describes the parameters provided and verified in this report. Table A-1 lists the parameters and table A-2 describes the unit abbreviations used in this report.

Table A-1. Verified and provided FDR parameters.

Parameter Names	Plot/Table Labels	Units
Longitudinal Acceleration	Accel Long	g
Magnetic Heading	Heading Mag	deg
Microphone Keying	Key VHF	
Pitch Angle	Pitch	deg
Pressure Altitude Coarse	Altitude Press-Crs	ft
Pressure Altitude Fine	Altitude Press-Fine	ft
Roll Angle	Roll	deg
Vertical Acceleration	Accel Vert	g

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..

Units Abbreviation	Description
deg	degrees
ft	feet
g	g