

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

July 20, 2021

Flight Data Recorder

Specialist's Factual Report
By Cassandra Johnson

1. EVENT SUMMARY

Location: Victorville, California
Date: May 19, 2020
Aircraft: Boeing 737-800
Registration: N820TJ
Operator: Swift Air LLC
NTSB Number: DCA20LA107

2. FLIGHT DATA RECORDER GROUP

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

3. FDR CARRIAGE REQUIREMENTS

The event aircraft, N820TJ, was manufactured in 1998, 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). Only parameters relevant to this event are provided in this report.

4. DETAILS OF FDR INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received an electronic file containing the FDR data from the N820TJ aircraft.

4.1. FDR Data File

The FDR data in the electronic file was configured such that 256 12-bit words of digital information were recorded 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 (for example, pressure altitude, pitch angle, roll angle, and magnetic heading) has a specifically assigned word number within the subframe.

4.1.1. Recording Description

The FDR recording contained approximately 26 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 41 minutes. The parameters evaluated for the purpose of this report appeared to be in accordance with federal FDR carriage requirements.

4.1.2. Engineering Unit Conversions

The engineering unit conversions used for the data contained in this report are based on documentation from the aircraft manufacturer. 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, Pacific daylight time (PDT), was established by using the recorded Time GMT hours, Time GMT Minutes, and Time GMT Seconds and then applying an additional 7 hours offset to change GMT to PDT.²

Accordingly, the time offset for the event flight data from SRN to local PDT is the following: PDT = SRN – 37,344. Therefore, for the rest of this report, all times are referenced as PDT, not SRN.

4.3. FDR Plots and Corresponding Tabular Data

Figure 1 contains FDR data recorded during the event on May 19, 2020, and shows the entire flight. All the parameters listed in table A-1 are plotted except Latitude, Longitude, Time GMT Hours, Time GMT Minutes, and Time GMT Seconds.

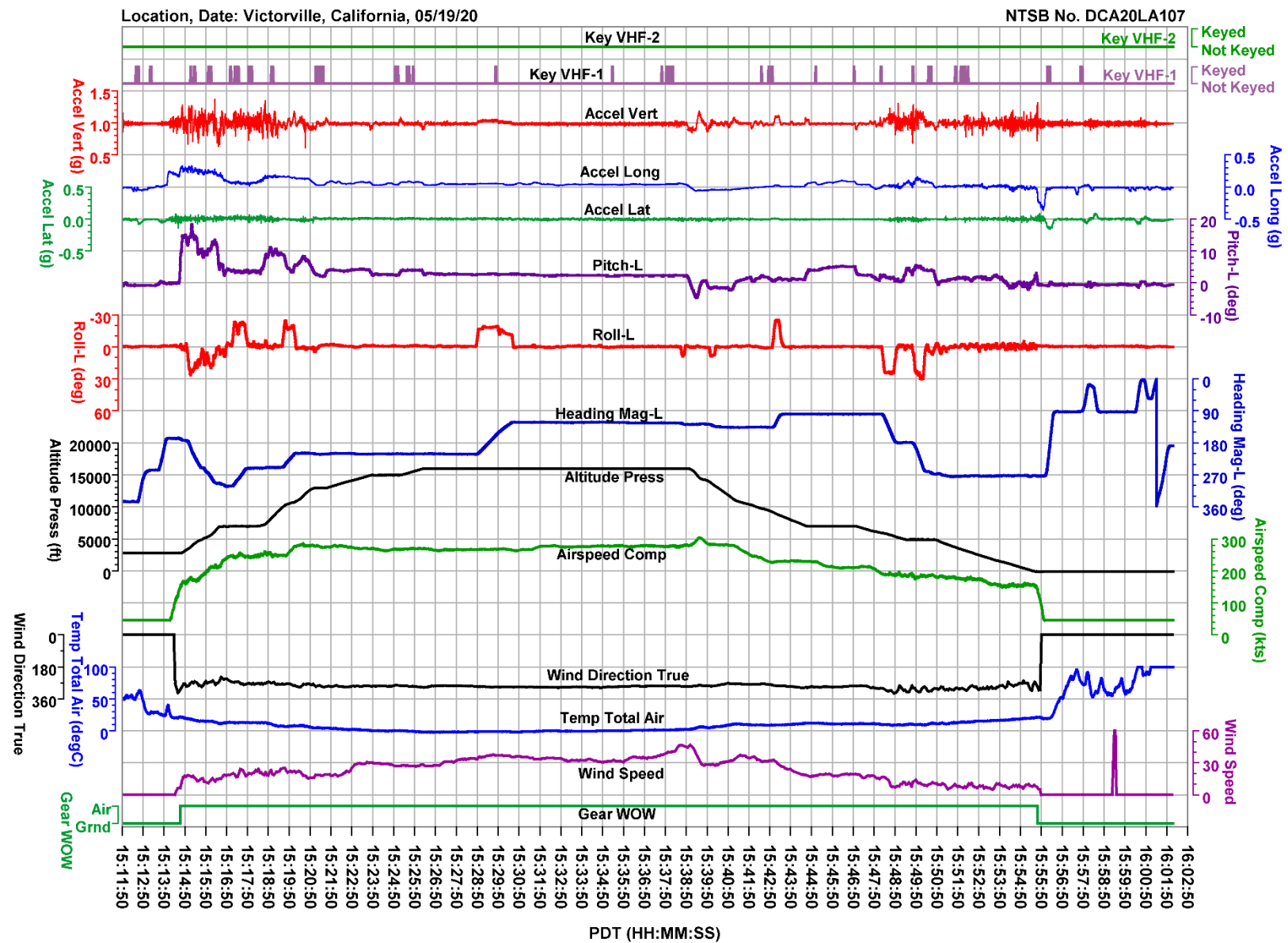
Figure 1 is configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

The FDR data indicated the aircraft took off from Victorville Airport (VCV), Victorville, California at 15:14:38 PDT and 41 minutes later at about 15:55:38 PDT landed at San Diego International Airport (SAN), San Diego, California.

The corresponding tabular data used to create figure 1, including Latitude, Longitude, 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.

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).



Swift Air LLC, Boeing 737-800, N820TJ

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Figure 1. Plot of basic parameters during entire flight.

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 Comp	Computed Airspeed	kts
Altitude Press	Pressure Altitude	ft
Gear WOW	Landing Gear Weight on Wheels	
Heading-L	Left Magnetic Heading	deg
Key VHF-1	Microphone Keying-1	
Key VHF-2	Microphone Keying-2	
Latitude	Latitude Position	deg
Longitude	Longitude Position	deg
Pitch-L	Left Pitch Angle	deg
Roll-L	Left Roll Angle	deg
Temp Total Air	Total Air Temperature	degC
Time GMT Hrs	Greenwich Mean Time Hours	hrs
Time GMT Min	Greenwich Mean Time Minutes	min
Time GMT Sec	Greenwich Mean Time Seconds	sec
Wind Direction True	Wind Direction True	deg
Wind Speed	Wind Speed	kts

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
degC	degrees Celsius
ft	feet
g	unit of gravitational acceleration
hrs	hours
kts	knots
min	minutes
sec	seconds