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

September 18, 2006

Flight Data Recorder - 10

Specialist's Factual Report
By Cassandra Johnson

A. EVENT

Location:	Boston, Massachusetts
Date:	June 9, 2005, 1940 EDT
Aircraft:	Boeing 737-300, N394US
Operator:	US Airways, Flight 1170
NTSB Number:	NYC05IA095B

B. GROUP

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

C. SUMMARY

On June 9, 2005, about 1940 eastern daylight time, an Airbus A330-301, EI-ORD, operated by Aer Lingus as flight 132 (EIN 132), and a Boeing 737-3B7, N394US, operated by US Airways as flight 1170 (USA 1170) were involved in a runway incursion at General Edward Lawrence Logan International Airport (BOS), Boston, Massachusetts. There were no injures to the 12 crew members, and 260 passengers on the Airbus, or the 6 crew members, and 103 passengers on the Boeing. Neither airplane was damaged. Visual meteorological conditions prevailed and an instrument flight rules flight plan had been filed for both flights. Aer Lingus flight 132 was conducted under the provisions of CFR Part 129, and was destined for Shannon, Ireland. US Airways flight 1170 was conducted under the provisions of CFR Part 121, and was destined for Philadelphia, Pennsylvania.

D. DETAILS OF INVESTIGATION

On June 16, 2005, the Safety Board's Vehicle Recorder Division received the following FDR:

Recorder Manufacturer/Model: **L-3 Communications Fairchild Model F1000, 64 Word**
Recorder Serial Number: **00345**

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

Recorder Description

This model FDR records airplane flight information in a digital format using solid-state flash memory as the recording medium. The F1000 can receive data in the ARINC 573/717/747/542a 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 either 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 (e.g. altitude, heading, airspeed) has a specifically assigned word number within the subframe. The F1000 is designed to meet the crash-survivability requirements of TSO–C124.

Recording Description

The FDR recording contained approximately 38 hours of data. Timing of the FDR data is measured in subframe reference number (SRN), where each SRN equals one elapsed second. The FDR data was scanned and the incident take-off was located.

Time Correlation

Correlation of the FDR data from SRN to the incident local time (Eastern Daylight Time) was established with an offset provided by the Aircraft Performance Specialist. The incident take-off FDR data has been offset from SRN to local time as follows:

Eastern Daylight Time = SRN - 38,061.63 seconds

Engineering Units Conversions

The engineering units conversions used for the data contained in this report are based on documentation from US Airways. Where applicable, changes to the conversions have been made to ensure the parameters conform to the Safety Board's standard sign convention, of climbing right turns are positive (CRT=+)[1]. The parameters presented in this report decoded as expected.

The following table lists the selected FDR parameters provided and verified in this report including the associated plot label.

Table 1

Plot Label	Parameter Name
1. Accel Lat (g)	Lateral Acceleration (g)
2. Accel Long (g)	Longitudinal Acceleration (g)
3. Accel Vert (g)	Vertical Acceleration (g)
4. Airspeed Indicated (kts)	Indicated Airspeed (knots)
5. Altitude Press (ft)	Pressure Altitude (29.92 in Hg) (feet)
6. Control Column (deg)	Control Column Position (degrees)
7. Elevator (deg)	Elevator Position (degrees)
8. Eng1 N1 (% rpm)	Engine 1 N1 (% rpm)
9. Eng2 N1 (% rpm)	Engine 2 N1 (% rpm)
10. Heading Mag (deg)	Magnetic Heading (degrees)
11. Key VHF	Microphone VHF Key 1 (discrete)

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

Table 1	
Plot Label	**Parameter Name**
12. Pitch (deg)	Pitch Angle (degrees)
13. Roll (deg)	Roll Angle (degrees)

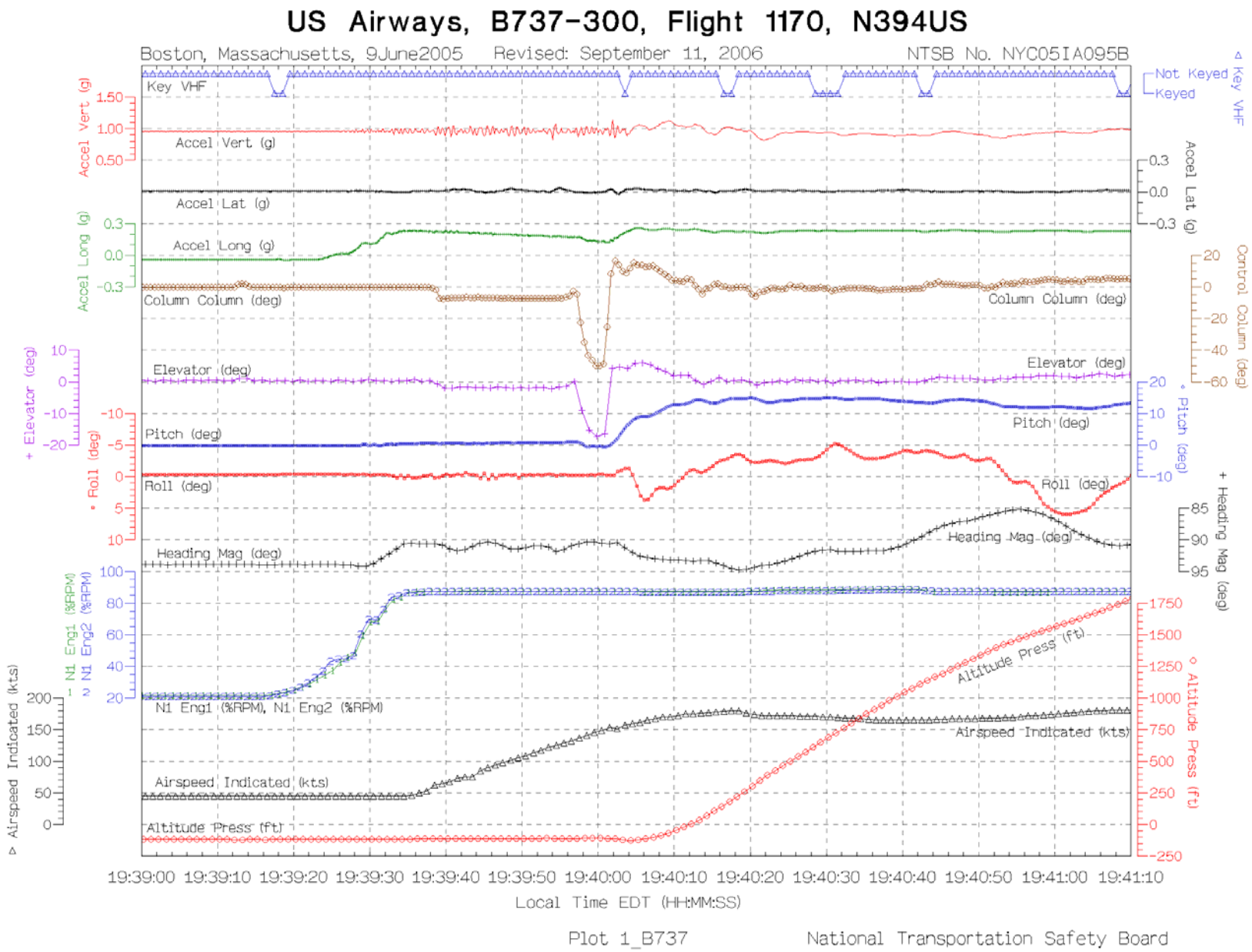
Pressure Altitude

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 plot and in the electronic data have not been corrected for the local altimeter setting at the time of the incident.

Take-Off Event Plot

The FDR parameters listed in Table 1 are presented in the following plot for the take-off event. As discussed earlier, the SRN was correlated to local time; therefore, the x-axis scale in this plot is local time and covers from 19:39:00 EDT to 19:41:10 EDT (i.e., 108,801.63 SRN to 108,931.63 SRN). In addition, this plot 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 are towards the top of the page.

Plot 1


US Airways, B737-300, Flight 1170, N394US
Boston, Massachusetts, 9June2005 Revised: September 11, 2006 NTSB No. NYC05IA095B
Key VHF
Not Keyed
Keyed
Accel Vert (g)
Accel Lat (g)
Accel Long (g)
Column Column (deg)
Elevator (deg)
Pitch (deg)
Roll (deg)
Heading Mag (deg)
N1 Eng1 (%RPM), N1 Eng2 (%RPM)
Airspeed Indicated (kts)
Altitude Press (ft)
19:39:00 19:39:10 19:39:20 19:39:30 19:39:40 19:39:50 19:40:00 19:40:10 19:40:20 19:40:30 19:40:40 19:40:50 19:41:00 19:41:10
Local Time EDT (HH:MM:SS)
Plot 1_B737 National Transportation Safety Board

Tabular Data

A tabular listing of the data used to create Plot 1 including the original SRN can be found as Attachment 1 to this report. Attachment 1 is a comma separated value (.CSV) format file and is only available in electronic format.

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