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

September 13, 2006

Flight Data Recorder - 10

Specialist's Factual Report
By Cassandra Johnson

A. EVENT

Location:	Boston, Massachusetts
Date:	June 9, 2005, 1940 EDT
Aircraft:	Airbus A330-301, EI-ORD
Operator:	Aer Lingus, Flight 132
NTSB Number:	NYC05IA095A

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 29, 2005, the Safety Board's Vehicle Recorder Division received the following FDR:

Recorder Manufacturer/Model: **Honeywell SSFDR, Model 980-4700, 128 Word**
Recorder Serial Number: **3227**

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

Recorder Description

The Honeywell Solid State Flight Data Recorder (SSFDR) records airplane flight information in a digital format using solid-state flash memory as the recording medium. The SSFDR 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 128 12-bit words of digital information every second. Each grouping of 128 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 128-word intervals. Each data parameter (e.g. altitude, heading, airspeed) has a specifically assigned word number within the subframe. The SSFDR is designed to meet the crash-survivability requirements of TSO–C124.

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 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 + 1,192.48 seconds

Engineering Units Conversions

The engineering units conversions used for the data contained in this report are based on documentation from the aircraft manufacturer. 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 two tables lists the selected FDR parameters provided and verified in this report including the associated label. Table 1 includes all parameters plotted, whereas, Table 2 includes parameters not plotted but provided in the tabular data.

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 Comp (kts)	Computed Airspeed (knots)
5. Altitude Press (ft)	Pressure Altitude (29.92 in Hg) (feet)
6. Altitude Radio-1 (ft)	Radio Altitude 1 (feet)
7. Altitude Radio-2 (ft)	Radio Altitude 2 (feet)
8. Elevator-L (deg)	Left Elevator Position (degrees)

[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**
9. Elevator-R (deg)	Right Elevator Position (degrees)
10. Eng1 N1 (% rpm)	Engine 1 N1 (% rpm)
11. Eng2 N1 (% rpm)	Engine 2 N1 (% rpm)
12. Gear WOW-L	Left Gear Weight on Wheels
13. Gear WOW-N	Nose Gear Weight on Wheels
14. Gear WOW-R	Right Gear Weight on Wheels
15. Ground Spd (kts)	Ground Speed (knots)
16. Heading Mag (deg)	Magnetic Heading (degrees)
17. Key VHF	Microphone VHF Key 1 (discrete)
18. Pitch (deg)	Pitch Angle (degrees)
19. Roll (deg)	Roll Angle (degrees)
20. Stick Pitch F/O (deg)	Stick Position First Officer (degrees)

Table 2	
Tabular Listing Label	**Parameters Not Plotted But Provided in the Tabular Data**
21. Latitude (deg)	Latitude Position (deg)
22. Longitude (deg)	Longitude Position (deg)

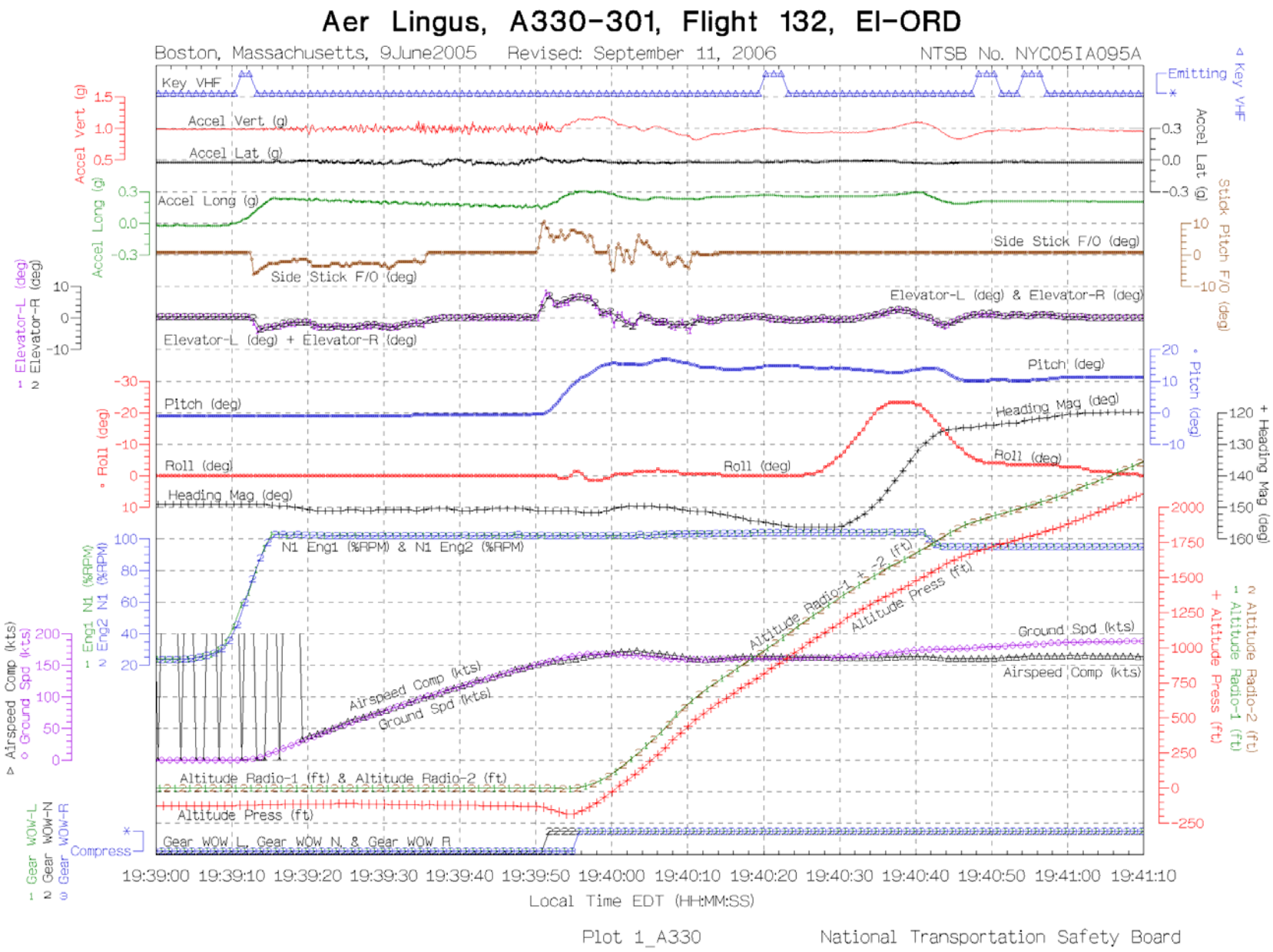
Pressure Altitude

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., 69,547.582 SRN to 69,677.852 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


Aer Lingus, A330-301, Flight 132, EI-ORD
Boston, Massachusetts, 9June2005 Revised: September 11, 2006 NTSB No. NYC05IA095A
Key VHF
Emitting
Accel Vert (g)
Accel Lat (g)
Accel Long (g)
Side Stick F/O (deg)
Elevator-L (deg) & Elevator-R (deg)
Elevator-L (deg) + Elevator-R (deg)
Pitch (deg)
Roll (deg)
Heading Mag (deg)
N1 Eng1 (%RPM) & N1 Eng2 (%RPM)
Airspeed Comp (kts)
Ground Spd (kts)
Altitude Radio-1 (ft) & Altitude Radio-2 (ft)
Altitude Press (ft)
Gear WOW L, Gear WOW N, & Gear WOW R
Compress
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_A330
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Tabular Data

A tabular listing of the data used to create Plot 1 including the FDR parameters listed in Table 2 and 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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