

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

February 25, 2014

Flight Data Recorder - 10

Specialist's Factual Report

By Sean Payne

1. EVENT SUMMARY

Location: Newark, New Jersey
Date: May 01, 2013
Aircraft: Airbus A330
Registration: LN-RKO
Operator: SAS
NTSB Number: DCA13FA082AB

On May 1, 2013, at Newark Liberty International airport (EWR), at about 7:24 pm (EDT) an Express Jet E145, flight number was taxiing northbound on Taxiway Romeo (R) for departure to Nashville, TN (BNA) from Runway 22R and was stationary on Taxiway R between the intersections of Taxiways Mike (M) and Yankee (Y) in sequence for departure. Taxiing behind the Express Jet was a Scandinavian (SAS) A333, flight number 908, awaiting departure to Oslo, Norway (ENGM). SAS was subject to a departure flow restriction so was advised to turn right at Taxiway M and hold short of Runway 22R at Taxiway M, with the plan to take the aircraft out of the departure sequence on Taxiway R. As SAS made the right turn onto Taxiway M the left wing struck the horizontal and vertical stabilizer of the Express Jet. The Express Jet airplane was towed back to the ramp and the SAS airplane taxied back to the gate. There were no reported injuries. The damage to the SAS airplane is minor with scratches on the winglet and the damage to the Express Jet airplane is substantial with damage to both the horizontal and vertical stabilizer.

2. FLIGHT DATA RECORDER GROUP

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

3. FDR Carriage Requirements

Federal regulations regarding the carriage requirements of FDRs on transport category aircraft can be found in 14 CFR Part 121.343 and Part 121.344. The incident aircraft, LN-RKO, was manufactured in 2003 and was required to be equipped with an FDR that recorded, at a minimum, the 88 parameters found in 14 CFR 121.344(f).

4. DETAILS OF FLIGHT DATA RECORDER INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following FDR:

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Recorder Manufacturer/Model: **Honeywell 4700 256 WPS**
Recorder Serial Number: **SSFDR-09083**

4.1. Honeywell 4700 256 WPS Description

The Honeywell Solid State Flight Data Recorder (SSFDR) records airplane 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 records a minimum of 25 hours of flight data. It is configured to record 256 12-bit words of digital information every second. Each grouping of 256 words is called a subframe. Each subframe has a unique 12-bit synchronization word identifying it as either subframe 1, 2, 3 or 4. The synchronization 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 (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-C124a.

4.1.1. Recorder Condition

The recorder was in good condition and the data was extracted normally as per the manufacturer’s procedures.

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 ground event was captured near the end of the recording and was found to be inside the time duration described in this report, from 07:17:50 PM EDT to 07:23:50 PM EDT.

4.1.2.1 Latitude and Longitude

The resolution for the FDR Latitude and Longitude parameters is 1.71661e-4 degrees. When converted to distance, the resolution of latitude and longitude are 62.58 feet North and about 17.08 feet West respectively; using a latitude of 40.699° N.

4.1.3. Engineering Units Conversions

The engineering units conversions used for the data contained in this report are based on documentation from the aircraft operator and 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

Appendix A lists the FDR parameters verified and provided in 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 = +.

4.2. Time Correlation

Correlation of the FDR data from SRN to the event local time, Eastern Daylight Time (EDT), is referenced in the 'Cockpit Voice Recorder – Factual Report'.

Accordingly, the time offset for the event flight data from SRN to local EDT is the following: EDT = SRN - 26425.4. Therefore, for the rest of this report, all times are referenced as EDT, not SRN.

4.3. FDR Plots and Corresponding Tabular Data

Figures 1 to 3 contain FDR data recorded during the 05/01/2013 event. All the parameters plotted are listed in table A-1.

Figure 1 shows an overview of the event, which includes the moments before the incursion as the aircraft is taxiing. Aircraft parameters are plotted during the event such as Engine 1 N1, ground speed, nose wheel angle, heading, left and right brake pedal position, brake pressures for wheels 1 through 8 and tri axis acceleration.

Figure 2 shows a detailed view of the event, which highlights the accelerations and brake parameters associated with the incursion of the aircraft.

Figure 3 shows a Google Earth overlay of the aircraft's position of the recorder latitude and longitude position during the ground event. The green path is the right side antenna's latitude and longitude and the red path shows the left side antenna's latitude and longitude. The overlay time period is from 07:01:17 PM to 07:49:53 PM EDT.

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.

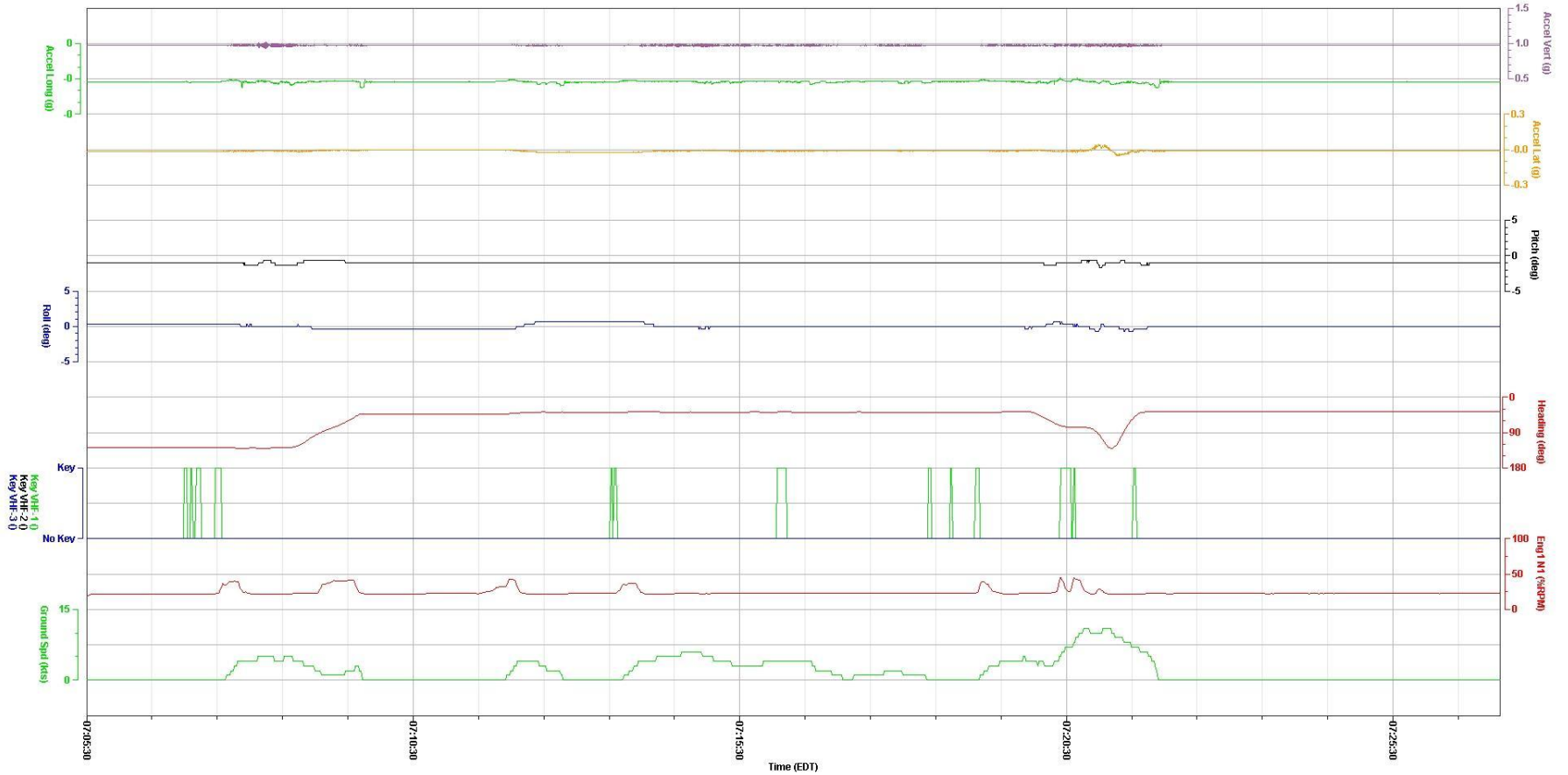
The corresponding tabular data used to create figures 1 to 3 are provided in electronic comma separated value (*.csv) format as attachment 1 to this report.

Figure 1. Plot of basic parameters during the ground incursion

SAS, Airbus A330, 908, LN-RKO

Location, Date: Newark NJ, 05/01/13

NTSB No. DCA13FA082B



Revised: 19 July 2013

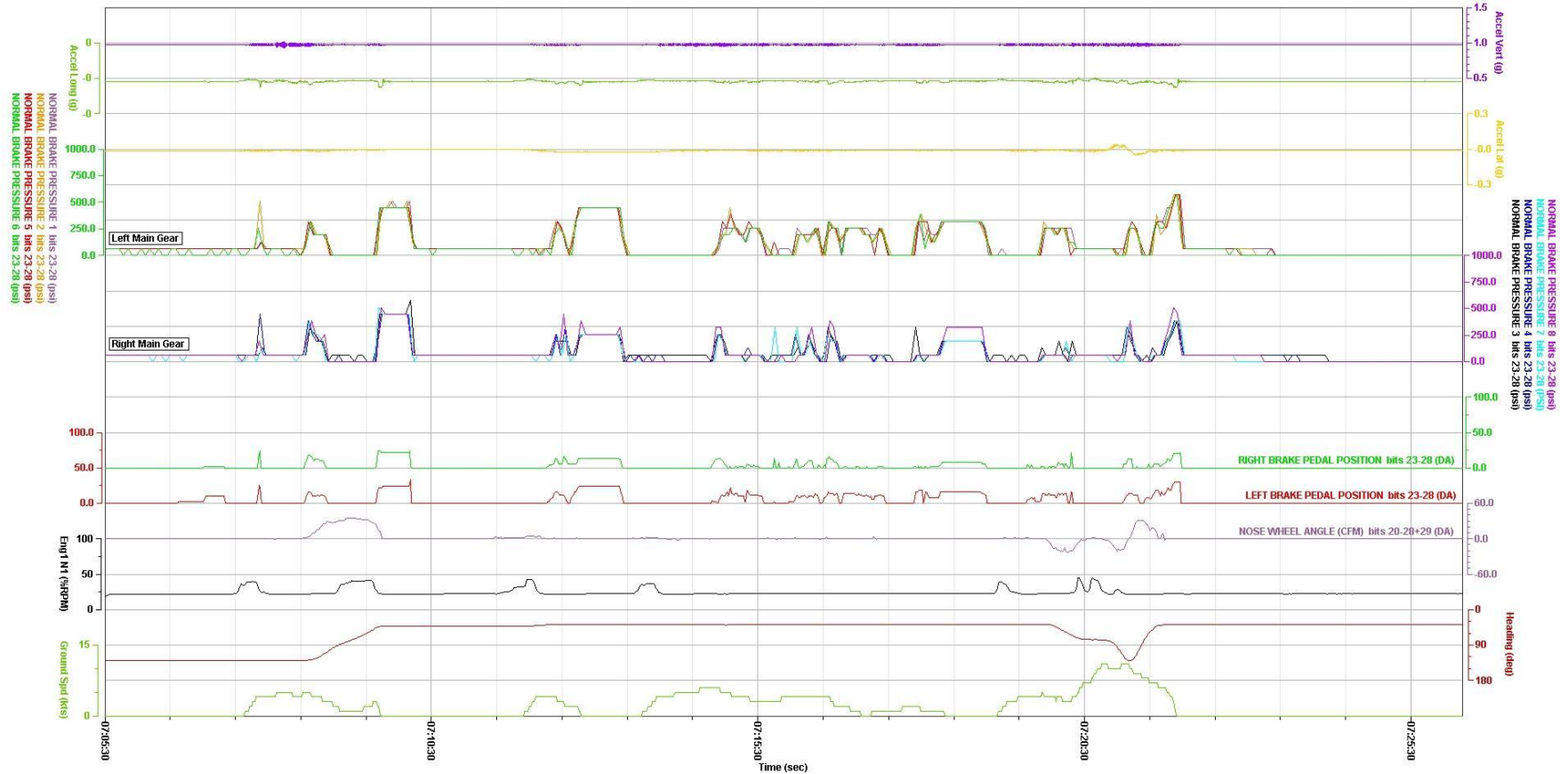
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Figure 2. Plot of brake parameters during the ground incursion

SAS, Airbus A330, 908, LN-RKO

Location, Date: Newark NJ, 05/01/13

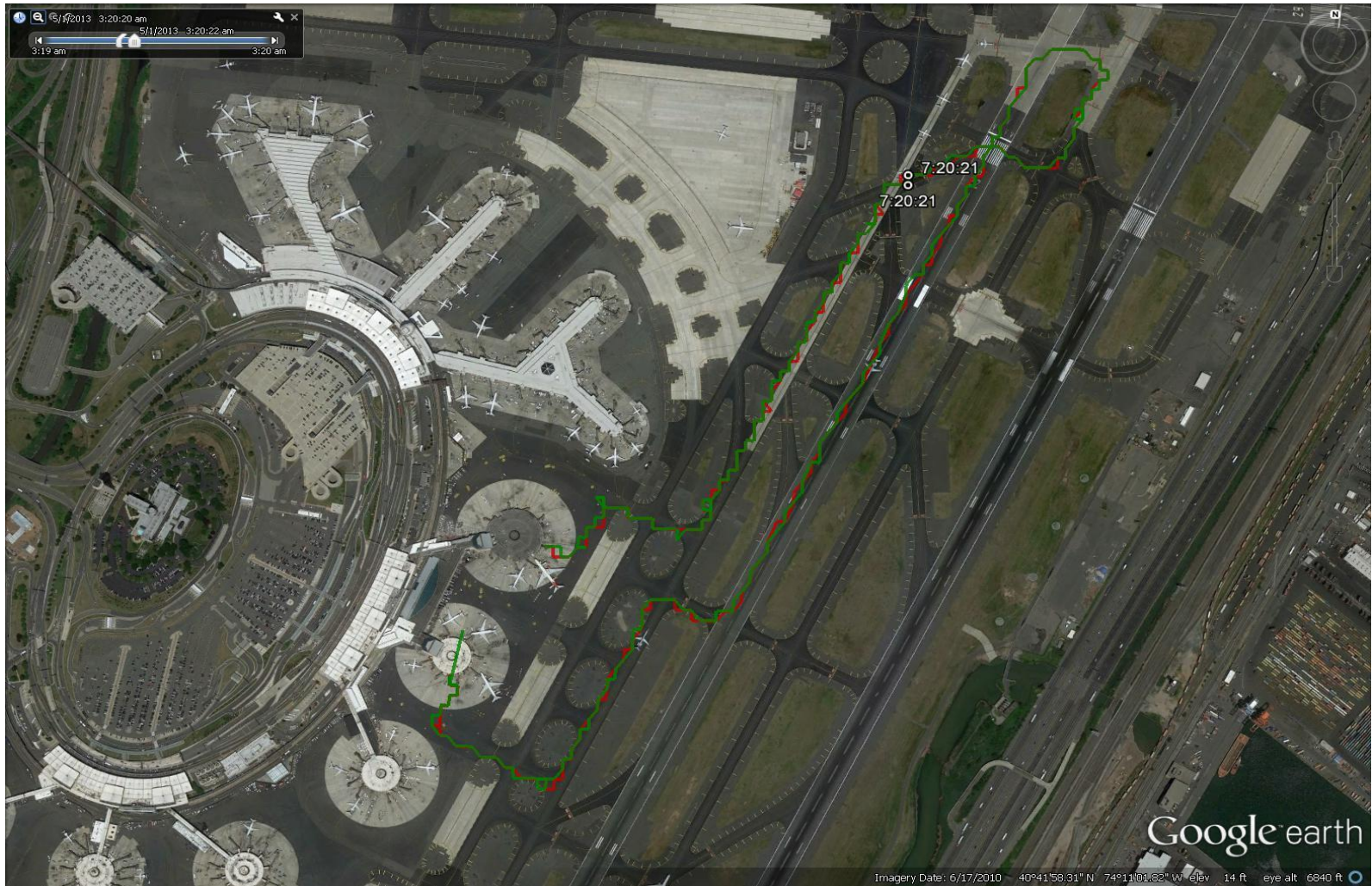
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Figure 3. Overlay of GPS position during the ground incursion (North Up)



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 Name	Parameter Description
1. Eng 1 N1 (%RPM)	Engine 1 N1
2. Ground Spd (Kts)	Ground Speed
3. Nose Wheel Angle (DA)	Nose Wheel Angle
4. Heading (deg)	Heading
5. Left Brake Pedal Position (DA)	Left Brake Pedal Position
6. Right Brake Pedal Position (DA)	Right Brake Pedal Position
7. Normal Brake Pressure 1 (psi)	Brake Pressure Wheel 1
8. Normal Brake Pressure 2 (psi)	Brake Pressure Wheel 2
9. Normal Brake Pressure 3 (psi)	Brake Pressure Wheel 3
10. Normal Brake Pressure 4 (psi)	Brake Pressure Wheel 4
11. Normal Brake Pressure 5 (psi)	Brake Pressure Wheel 5
12. Normal Brake Pressure 6 (psi)	Brake Pressure Wheel 6
13. Normal Brake Pressure 7 (psi)	Brake Pressure Wheel 7
14. Normal Brake Pressure 8 (psi)	Brake Pressure Wheel 8
15. Accel Lat (g)	Lateral Acceleration
16. Accel Long (g)	Longitudinal Acceleration
17. Accel Vert (g)	Vertical Acceleration

Table A-2. Unit abbreviations.

Units Abbreviation	Description
%RPM	percent revolutions per minute
Kts	knots
deg	degrees
psi	Pounds per square inch
g	g