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

January 12, 2005

# Flight Data Recorder - 10

**Group Chairman's Factual Report**
**By Cassandra Johnson**

## A. EVENT

| | |
|---|---|
| Location: | Kirksville, Missouri |
| Date: | October 19, 2004, 1945 CDT (central daylight time) |
| Aircraft: | Jetstream 32, N875JX |
| Operator: | Corporate Airlines (d.b.a. American Connection), Flight 5966 |
| NTSB Number: | DCA05MA004 |

## B. GROUP

A group was not convened.

## C. SUMMARY

At approximately 1945 central daylight time (CDT), October 19, 2004, a Corporate Airlines, Inc. British Aerospace Systems Jetstream 3200, N875JX, operating as American Connection flight 5966, in accordance with 14 CFR Part 121, crashed while the flight was on approach to the Kirksville Regional Airport, Kirksville, Missouri. The flight was conducting a non-precision LOC/DME Runway 36 approach. Eleven of the 13 passengers and the 2 flight crewmembers were fatally injured. The two surviving passengers received serious injuries. The airplane was destroyed by impact and post-impact fire. The reported weather was visibility 3 miles in mist and an overcast ceiling at 300 feet.

A flight data recorder (FDR) was sent to the National Transportation Safety Board's Vehicle Recorder Laboratory for readout.

## D. DETAILS OF INVESTIGATION

On October 20, 2004, the Safety Board's Vehicle Recorder Division received the following FDR:

| | |
|---|---|
| Recorder Manufacturer/Model: | **L-3 Communications Fairchild Model F1000** |
| Recorder Serial Number: | **00511** |

The recorder sustained thermal damage to the outer sleeve but overall was in good condition (see figure 1). It was not apparent that the FDR's electronics weren't damaged, therefore, to ensure a successful download, Safety Board staff connected the FDR's solid-state flash memory (e.g. the recording medium) to the Safety Board's laboratory investigative recorder and a successful download was performed.

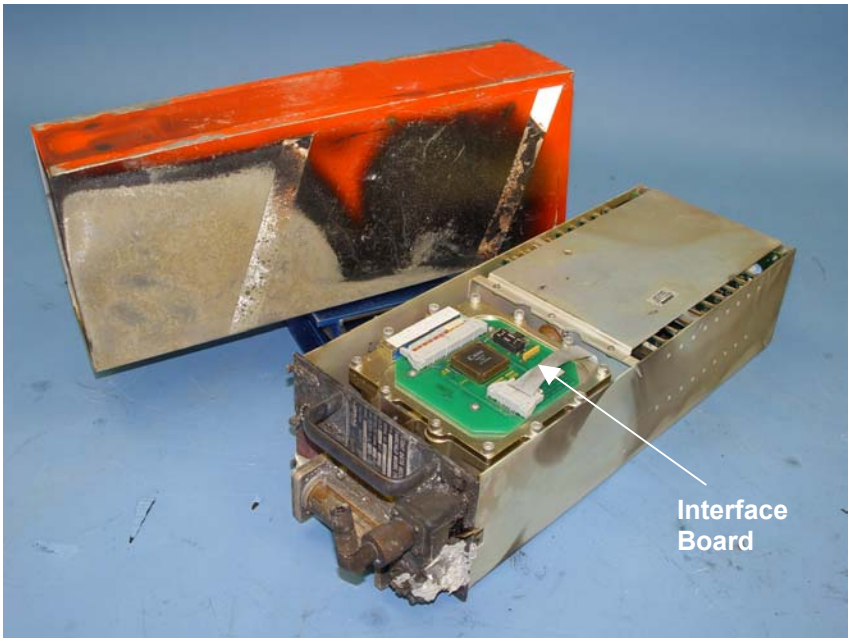


Figure 1: Recovered FDR

**Recorder Description**

This model FDR records airplane flight information in a digital format and uses 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.

**FDR Carriage Requirements**

Federal regulations regarding the carriage requirements of FDRs on aircraft can be found in the following regulations: 14 CFR 121.343, 14 CFR 121.344, 14 CFR 121.344a and 14 CFR 135.152. In general, for turbine-powered transport category aircraft manufactured on or before October 11, 1991, an FDR must be installed on board that records a minimum of 18 parameters, and for those turbine-powered aircraft that seat between 10 and 19 passengers, the minimum is 22 parameters. Newly manufactured aircraft are required to be equipped with an FDR that records a minimum of 88 parameters. However, the Jetstream 3201 aircraft are exempt from the 14 CFR 121.344a rules and need only comply with recording 6 parameters: time, altitude, airspeed, vertical acceleration, heading, and time of each radio transmission. The accident aircraft was in compliance with the Federal FDR carriage requirements.

**Recording Description**

The FDR recording contained approximately 130 hours of data. The timing of the FDR was measured in subframe reference number (SRN), where each SRN equals one

elapsed second. The accident flight was the last flight of the recording and its duration was approximately 41 minutes.

**Time Correlation**

Correlation of the FDR data from SRN to the accident local time was established with an offset provided by the Aircraft Performance Specialist in the Aircraft Performance Study. The accident flight data have been offset from SRN to local central daylight time (CDT) with the following relationship: Local time = FDR SRN + 396,519 seconds

**Engineering Units Conversions**

The engineering units conversions used for the data contained in this report are based on the National Transportation Safety Board's archived documentation. 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.

**Pressure Altitude**

This FDR records the parameter altitude as 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 have not been corrected for the local altimeter setting at the time of the accident.

**Invalid Data During the Last Recorded Second**

During the last second of FDR data, the FDR recorded the following data:

| Parameter Name | Value | Local Time | FDR SRN |
|---|---|---|---|
| Pressure Altitude | 23,057.94 feet | 19:37:00.51 | 467,139.515625 |
| Indicated Airspeed | 465.39 knots | 19:37:00.64 | 467,139.640625 |

These two data points are not physical possible and, therefore, are considered invalid and have been marked invalid in the tabular listing.

**Vertical Acceleration**

The FDR data was examined while the aircraft was on the ground (e.g., before take-off). During this time, vertical acceleration data were approximately 1.15 g's when it should be 1.0 g's. Therefore, a -0.15 g offset was applied to the vertical acceleration data. This offset is reflected in both the FDR plots and in the tabular data.

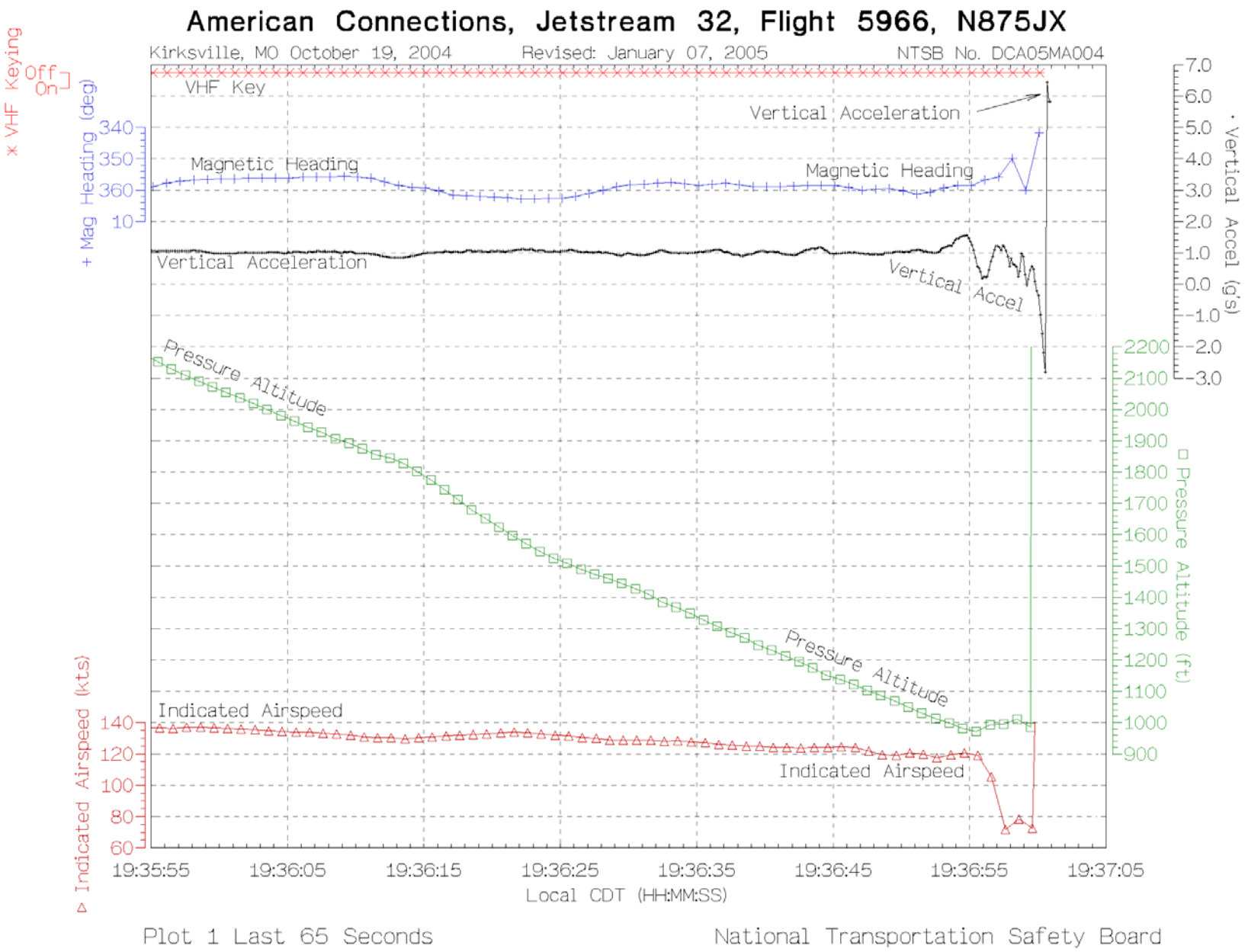
**Plots**

The following three plots contain FDR information describing the flight on October 19, 2004, during which the subject event occurred.

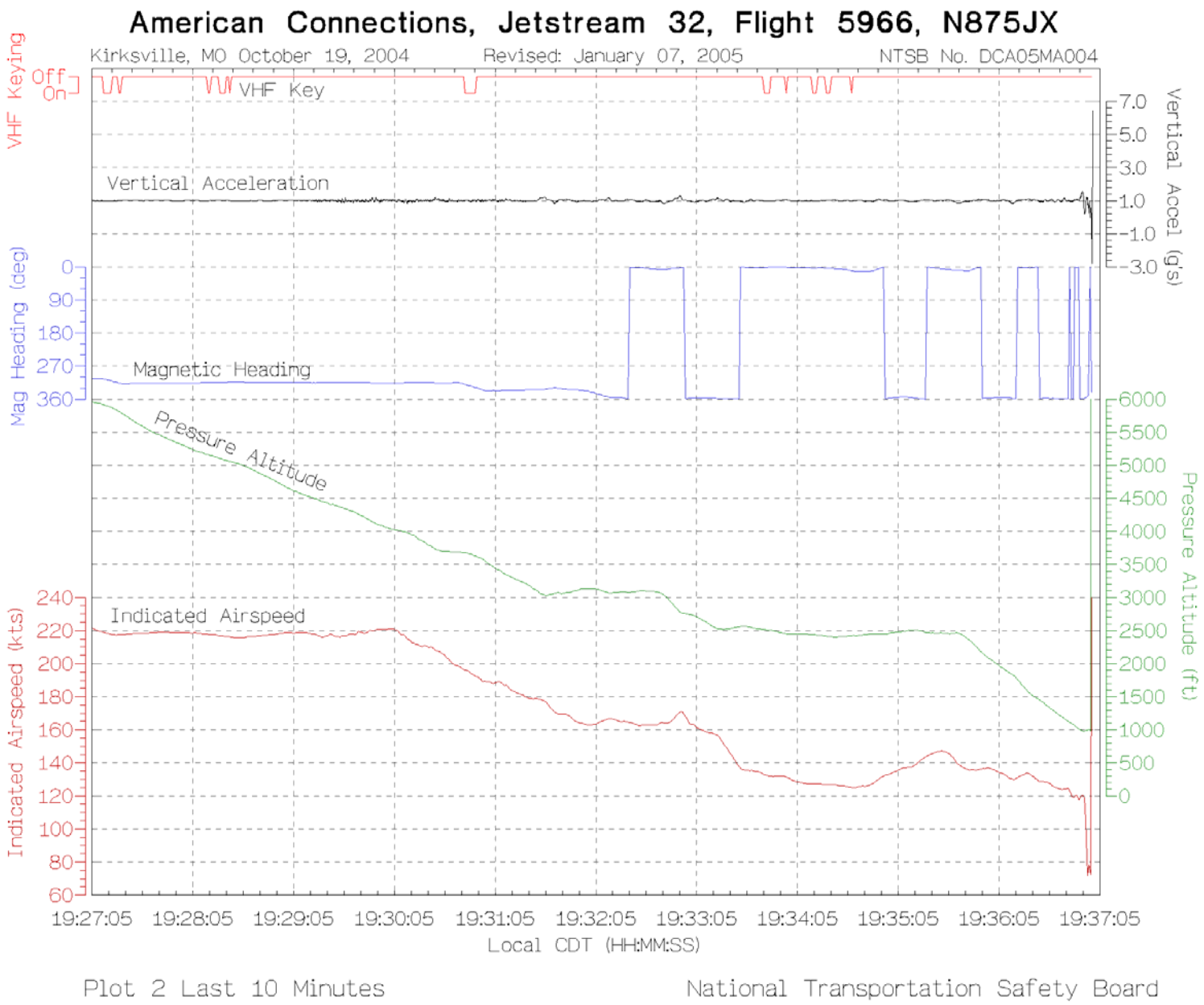
- Plot 1: The last 65 seconds of the event flight
- Plot 2: The last 10 minutes of the event flight
- Plot 3: The entire event flight

[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 = +.

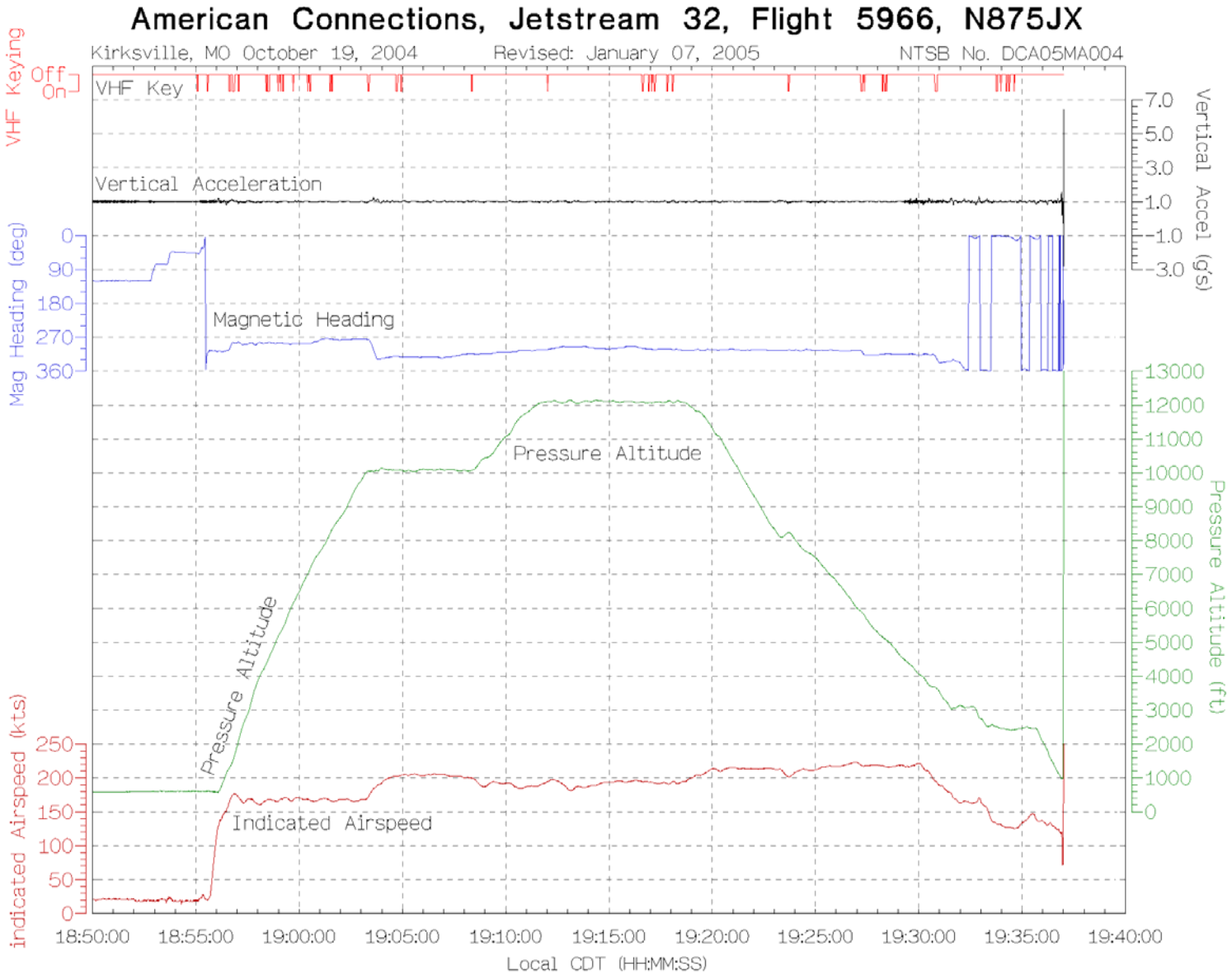
# Plot 1


American Connections, Jetstream 32, Flight 5966, N875JX
Kirksville, MO October 19, 2004
Revised: January 07, 2005
NTSB No. DCA05MA004
× VHF Keying
Off
On
VHF Key
+ Mag Heading (deg)
340
350
360
10
Magnetic Heading
Magnetic Heading
Vertical Acceleration
Vertical Acceleration
Vertical Accel
· Vertical Accel (g's)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
Pressure Altitude
Pressure Altitude
□ Pressure Altitude (ft)
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
Indicated Airspeed
Indicated Airspeed
△ Indicated Airspeed (kts)
140
120
100
80
60
19:35:55
19:36:05
19:36:15
19:36:25
19:36:35
19:36:45
19:36:55
19:37:05
Local CDT (HH:MM:SS)
Plot 1 Last 65 Seconds
National Transportation Safety Board

# Plot 2


American Connections, Jetstream 32, Flight 5966, N875JX
Kirksville, MO October 19, 2004
Revised: January 07, 2005
NTSB No. DCA05MA004
VHF Keying
Off
On
VHF Key
Vertical Acceleration
Vertical Accel (g's)
7.0
5.0
3.0
1.0
-1.0
-3.0
Mag Heading (deg)
0
90
180
270
360
Magnetic Heading
Pressure Altitude
Pressure Altitude (ft)
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Indicated Airspeed (kts)
Indicated Airspeed
240
220
200
180
160
140
120
100
80
60
19:27:05
19:28:05
19:29:05
19:30:05
19:31:05
19:32:05
19:33:05
19:34:05
19:35:05
19:36:05
19:37:05
Local CDT (HH:MM:SS)
Plot 2 Last 10 Minutes
National Transportation Safety Board

# Plot 3




Plot 3 Entire Flight

National Transportation Safety Board

**Tabular Data**

A tabular listing of the data used to create the above three plots 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. This file contains both time scales: local time and SRN. In the file, local time has a resolution of seconds truncated to 2 decimal places, whereas, SRN has the highest resolution (1/64).

The values for the two invalid data points (see Invalid Data During the Last Recorded Second) are provided in the tabular listing but have also been marked invalid.

Cassandra Johnson
Vehicle Recorder Division