

NATIONAL TRANSPORTATION SAFETY BOARD  
Office of Research and Engineering  
Washington, DC  
July 25, 2005

**ADDENDUM 1 TO THE AIRCRAFT PERFORMANCE STUDY AND  
CVR OVERLAY**

**Specialist's Report of Investigation  
By Abdullah K. Kakar**

**DCA05MA004**

**A. ACCIDENT**

Location: Kirksville MO

Date: October 19, 2004

Time: Approximately 1937 central daylight time (CDT<sup>1</sup>)

Aircraft: British Aerospace Jetstream 32, N87JX

**B. GROUP**

Not applicable

**D. SUMMARY**

At approximately 1937 central daylight time, October 19, 2004, a Corporate Airlines, Inc operating as American Connections flight 5966, BAE Systems Jetstream 3200, N875JX, operating in accordance with 14 CFR Part 121, crashed while the flight was on approach to the Kirksville Regional Airport (KIRK), 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.

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<sup>1</sup> All future time references will be in CDT unless otherwise specified.

## **E. PURPOSE OF ADDENDUM**

This addendum is to expand on the FDR and CVR clock correlation process explained in Section VII of the Aircraft Performance study and to include additional items to the CVR overlay.

### The FDR and CVR Clock Correlation Process

The correlation of FDR and CVR is accomplished using the common events recorded on both sources, which is generally the microphone keying activity. The microphone keying events are recorded on the FDR once every second, therefore the uncertainty of the event times can be  $-1$  to  $+0$  seconds. The CVR does not have a time sources, therefore the events are timed during playback. The CVR tape though is susceptible to variation in playback and or recorded speed, which affects the timing that is applied when the CVR is replayed. Therefore, if the tape is replayed at a different rate than was recorded then the times applied to the CVR events will be affected (or be in error).

To define the mapping of the CVR and FDR time the on and off times of the microphone keying recorded on the CVR and the FDR events are used as constraints for a straight-line correlation. However straight line correlation may not always occur due to variation in CVR tape speed as mentioned earlier. Multiple straight lines may be required to satisfy the constraints.

For the Kirksville CVR and FDR mapping a total of 20 keying events spanning the entire recording were measured to one hundredths of a second using the sound spectrum. Also, the sound spectrum was used to measure to tenth of a second the events during the last 28 seconds of recording. The results indicated that the FDR to CVR relationship was non linear and that two separate slopes were required to develop a correlation that passed through the once per second FDR mike key event band. This was indicative of a varying speed tape and that it was played back slower by about 3 % from recorded speed.

While the FDR records mike events once every second and since multiple mike key events were involved over a long period of time, the CVR/FDR correlation was actually much better than one second. To gain an understanding of the accuracy of the correlation a second set of independent slopes were calculated to determine what were the other possible slopes that could relate the CVR and FDR. The results showed that very little maneuvering was available to fit a slope through the band of the mike key events. The difference between the original and second set of slopes determined the accuracy of the correlation, which amounted to a maximum of 0.057 seconds.

### Additional Items Included in the CVR Overlay

- The two CVR transcript items listed below were added to figures 1S, 2S and 3S.

1936:47.7

**HOT-1** we get rid of the director.

1936:48.6

**HOT-B** [sound of beep]

- The time of the CVR transcript item listed below was changed to 1936:40.5 as a result of CVR Group Chairman's Factual Report Errata<sup>2</sup>.

1936:35.7

**HOT-1** what do you think?

- The word "Excerpt" was added to the title of figure 1S.
- A line was added to figure 1S to depict the runway touchdown zone elevation.
- A label to identify the trees in figure 2S was added.

All the updated figures are included in the following pages of the addendum.

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<sup>2</sup> See the CVR Group Chairman's Factual Errata.

# Corporate Airlines BAE 32 Crash Short of Runway Altitude vs Distance Profile with CVR Transcript Overlay Kirksville, MO October 20, 2004 DCA05MA004

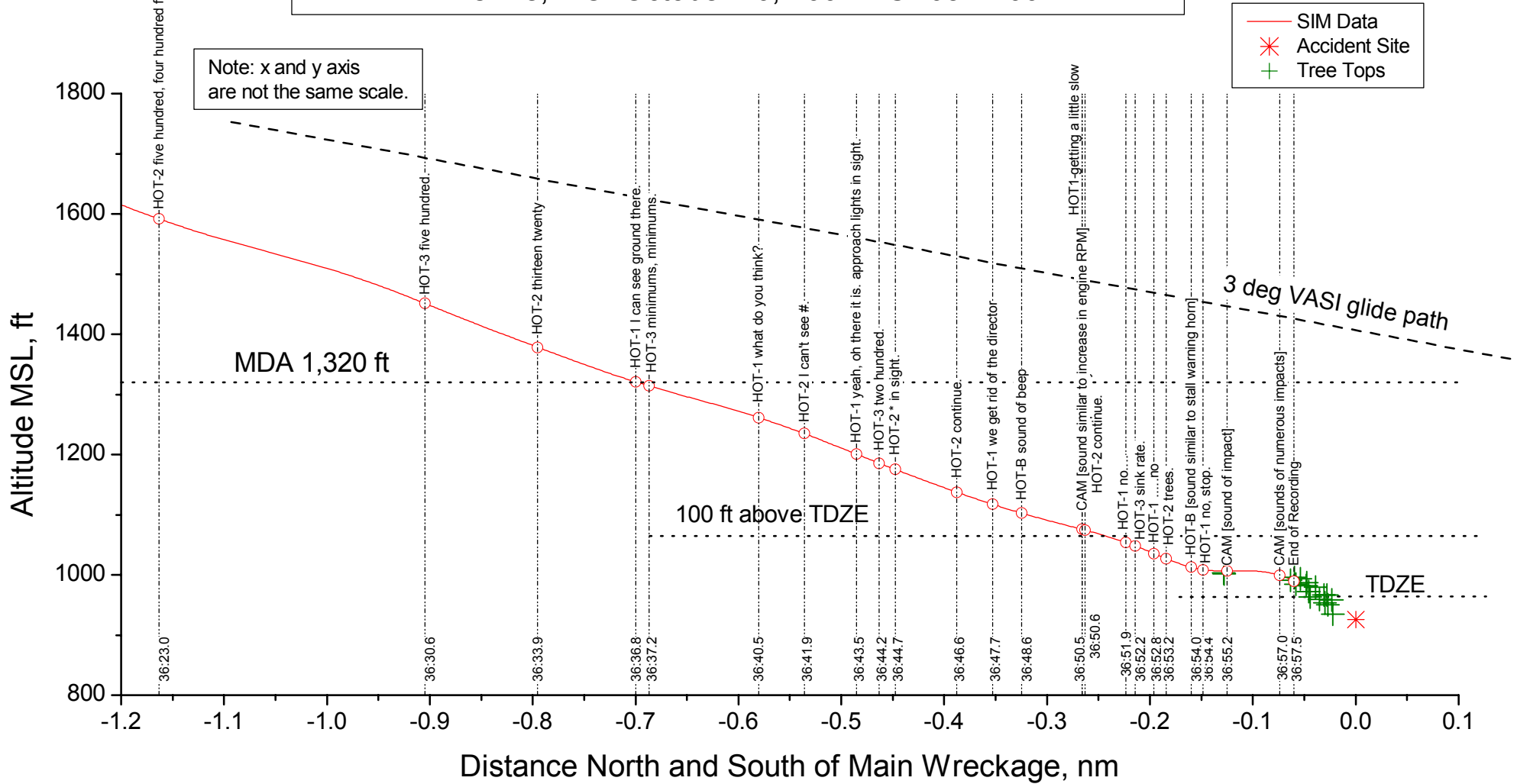


Figure1S. Altitude Profile with CVR Overlay

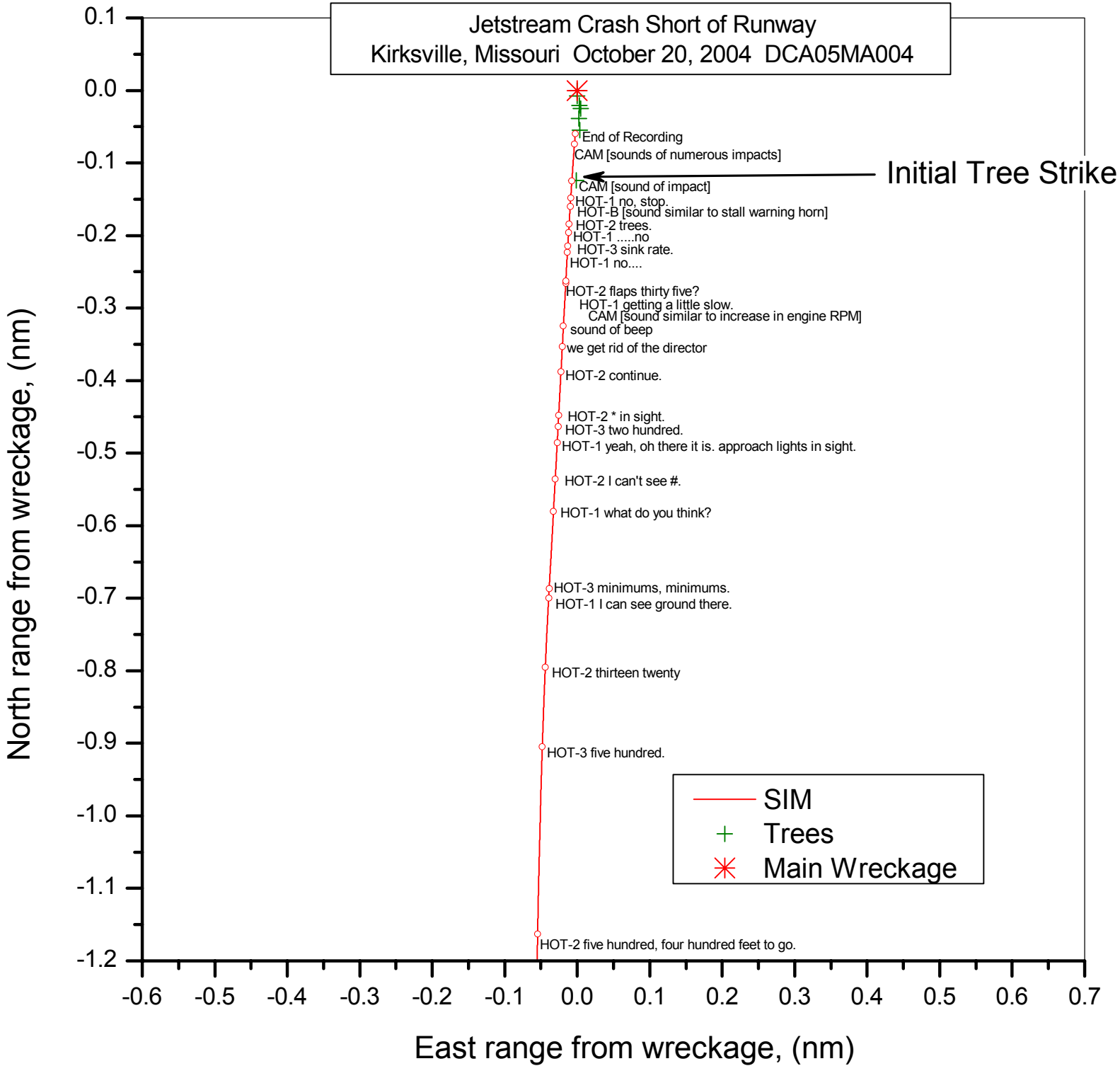


Figure 2S. Ground Track with CVR Overlay

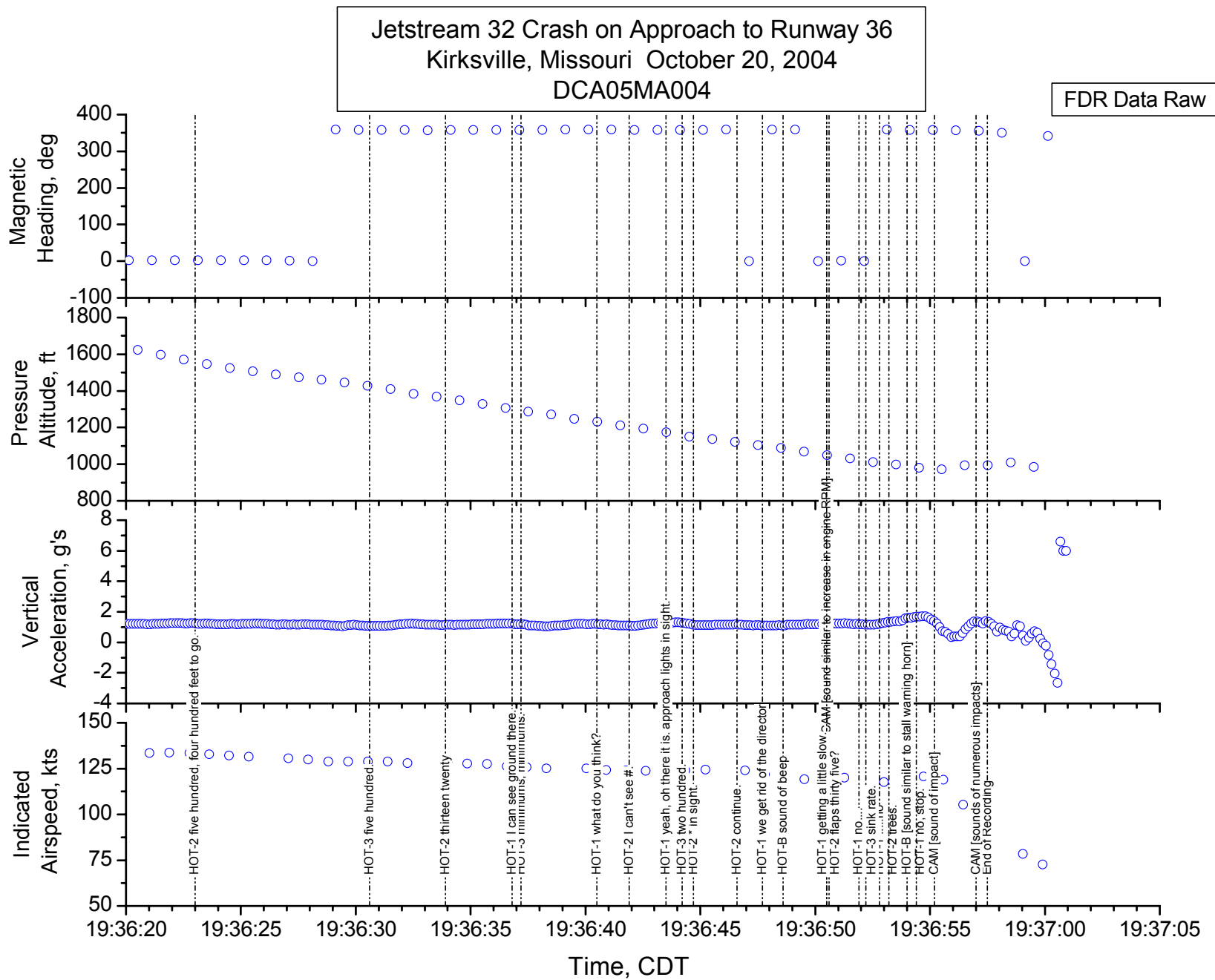


Figure 3S. FDR Data with CVR Overlay