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

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# Flight Data Monitoring Data Study

**Specialist's Report**
**by Bill Tuccio, Ph.D.**

## 1. EVENT

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| Location: | Frisco, Colorado |
| Date: | July 3, 2015 |
| Aircraft: | Airbus Helicopter Inc. (formerly American Eurocopter) AS350B3e |
| Registration: | N390LG |
| Operator: | Air Methods Corp |
| NTSB Number: | CEN15MA290 |

On July 3, 2015, at 1339 mountain daylight time, an Airbus Helicopter Inc. (formerly American Eurocopter) AS350B3e helicopter, N390LG, impacted the upper west parking lot 360 feet southwest of the Summit Medical Center helipad (91CO), Frisco, Colorado. A post-impact fire ensued. Visual meteorological conditions prevailed at the time of the accident. The helicopter was registered to and operated by Air Methods Corp and the flight was conducted under the provisions of 14 *Code of Federal Regulations* Part 135 on a company flight plan. The airline transport pilot was fatally injured and two flight nurses were seriously injured. The public relations flight was enroute to Gypsum, Colorado.

## 2. DETAILS OF INVESTIGATION

The helicopter was equipped with an Appareo Vision 1000 onboard image recorder. The Appareo Vision 1000 device is a small self-contained image, audio, and data recorder that is typically mounted in the overhead of an aircraft's cockpit.[1] The device records cockpit images at a rate of four times per second and can record two audio tracks that are synchronized with the image data. The device also contains a GPS receiver for satellite-based time, position, altitude, and speed data and a self-contained, real-time inertial measuring unit that provides three-axis accelerations and pitch, roll, and yaw data. No data was recovered from the device after the accident, due to extensive damage.

The Investigator-in-Charge (IIC) obtained historical data that had been collected from the accident helicopter by the operator for use in a flight data monitoring (FDM) program. The data consisted of only of parametric data, as image/audio data was not part of the FDM program.

[1] For further details on this device, see the *Onboard Image Recorder Factual Report* in the public docket for this accident.

## 2.1. Purpose of the Study

The purpose of the study was to examine the historical FDM data to answer two questions:

1. What was the frequency of preflight hover checks at 91C0?

2. What was the initial direction of takeoff out of 91C0?

## 2.2. Group

An FDM group was not formed.

## 2.3. Methodology

The operator supplied the NTSB 27 files of historical FDM data related to departures from 91C0. One of the files had a structural problem, leaving 26 files for analysis.

Historical data were examined as follows:

1. Each data file was examined in Google Earth to narrow the file's duration to those data points related to a takeoff at 91C0 (that is, ignoring the data for the enroute portion).

2. Select parameters pertinent to the study were plotted on strip charts for the duration of the data identified in step 1.

3. The data were examined for data quality and to identify patterns relevant to study questions (1) and (2).

4. FDM data was further analyzed using Appareo animation/replay software to validate findings.

## 2.4. Results

During step 1 of the methodology, poor data quality was evidenced by drop outs and fluctuations of GPS data, as well as pitch and roll parameters. Altitude data was often well below ground elevation, and derived altitude above ground level was discontinuous. Strip plots and data animations/replays confirmed the data quality issues.

## 2.5. Discussion and Conclusions

Due to the data quality issues, study questions (1) and (2) could not be answered. According to Appareo, the GPS signal was intermittent and the pitch parameter was not calibrated. The data quality issues were brought to the attention of Appareo and Air Methods Corp.