

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

October 23, 2014

On Board Image Recorder

Specialist's Factual Report
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1. EVENT

Location: Dietrich, Idaho
Date: June 29, 2014
Aircraft: Aerospatiale Helicopter AS350B2, N350CR
Operator: Reeder Flying Service
NTSB Number: WPR14LA272

2. GROUP

A group was not convened.

3. SUMMARY

On June 29, 2014, about 1730 mountain daylight time, an Aerospatiale AS350B2, N350CR, collided with terrain near Dietrich, Idaho. Reeder Flying Service was operating the helicopter under the provisions of 14 *Code of Federal Regulations* Part 135. The commercial pilot and two passengers sustained serious injuries. The helicopter sustained substantial damage during the accident sequence. The cross-country aerial photography flight departed Twin Falls, Idaho, about 1630 with a planned destination of Rexburg, Idaho. Visual meteorological conditions (VMC) prevailed and no flight plan had been filed. A GoPro camera was sent to the National Transportation Safety Board's Vehicle Recorder Division for readout.

4. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following device:

Recorder Manufacturer/Model: **GoPro Hero 3+ Black with
64GB Sandisk Ultra microSD Card**
Recorder Serial Number: **41EC48A**

4.1. Recorder Description

The GoPro Hero 3+ Black is a self-contained, battery powered camera/recorder that stores audio and high definition color imagery to an on-board microSD memory card. The duration of the recorded video is a function of the size of the memory card and the selected resolution and recording frame rate.

4.2. Recorder Damage and Video Recovery

Upon arrival at the audio laboratory, it was evident that the device had not sustained any heat or structural damage, as shown in figure 1. However, only two files were found on the microSD card and neither was the accident flight. The device was powered on and indicated it was set to record at a resolution of 1920 x 1440 at 48 frames per second.

According to GoPro and various support forums, the 64 GB Sandisk Ultra MicroSD card installed in the camera was not fully compatible with the GoPro Hero 3+ Black at the selected high resolution and high frame rate. Some forum users reported file corruption and data loss with incompatible cards and high frame rates.

In order to fully examine the microSD card's contents, a binary image was created of the microSD card. The image was searched and about 15 files were recovered, one of which contained fragments of the accident flight and the accident sequence. The fragments were reconstructed into a playable video file downsampled in resolution and frame rate.

Figure 1. GoPro Hero 3+, accessories, and microSD card.



4.3. Video Files

The video fragment recovery process resulted in about 6 minutes of excellent quality, 30 frames per second video and good quality audio. Due to the nature of the recovery process, the audio was slightly out of synchronization with the video.

4.4. Timing and Correlation

Timing of the transcript is expressed as Video Elapsed Time, which is time from the beginning of the recovered recording.

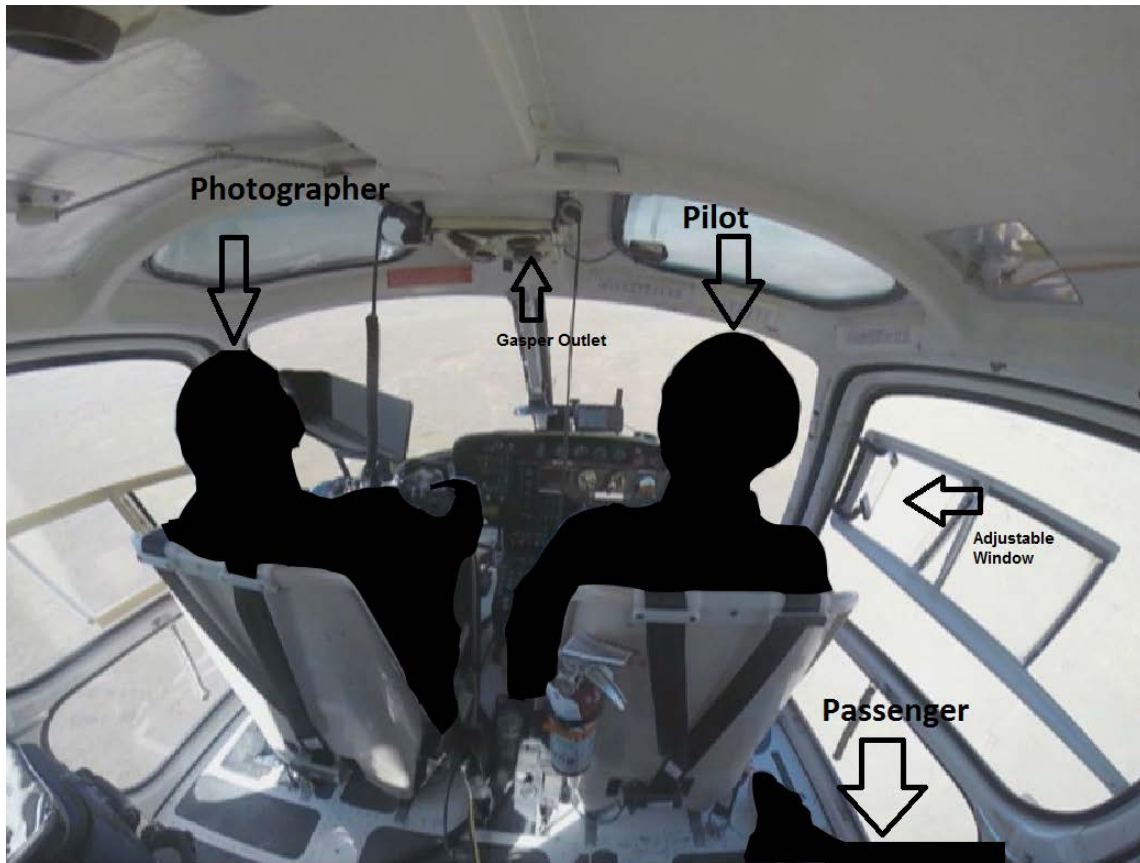
Times are expressed as MM:SS.t, where MM are minutes, SS are seconds, and t are tenths of a second.

4.5. Summary of Recording Contents

In agreement with the Investigator-In-Charge, a video group did not convene and only this summary report was prepared.

The GoPro camera was mounted behind the pilots capturing the field of view shown in figure 2. The photographer was on the left with a video viewing device in front of him and an electronic device on his lap. The pilot was seated to the right and another passenger was seated in the rear with his feet forward just into the lower right field of view.

Figure 2. GoPro field of view with personnel and select objects annotated.



The recording began when a hand covered most of the field of view and the helicopter was on the ground. After an unknown time discontinuity, the video began in flight at 00:17.0. In the video description that follows, times are shown enclosed in square brackets at the beginning of each paragraph.

The following paragraphs describe the helicopter being flown steadily by the pilot until the pilot became unresponsive. When the pilot became unresponsive, the helicopter track and attitude became erratic and descended into the ground.

[00:17.8] In flight. Photographer was in the left seat with viewing device in front of his face connected to electronic equipment in his lap. Pilot was in the right seat. Photographer and pilot were both wearing shoulder harnesses. The foot of another passenger was to the far right of the video field of view. Engine sound obscured any voices unless otherwise noted. Until the upset at 05:36.9, the helicopter flew steady in nearly the same direction with the same engine sound.

[00:25.8] Photographer adjusted the camera, pilot moved his head right and left.

[00:36.9] Pilot moved his left hand in front of him and used his right hand to reach below and to the right of his seat, while looking down and to the right.

[00:41.7] Pilot used his left hand to pick up a water bottle from the center console between the pilot and the photographer. Pilot drank the water. Photographer continued to look through the viewing device, using both his hands to manipulate controls on the device in his lap.

[01:01.7] Pilot used his left hand to replace the water bottle in the center console area.

[01:04.2] Pilot touched his own face with his left hand.

[01:13.4] Photographer looked out the left window. Pilot looked to the left and then back forward.

[01:25.8] Photographer looked to the right at the pilot, motioned with his hand, and spoke to pilot (voice was obscured by engine sound). Photographer then resumed looking through the viewing device.

[01:34.7] Pilot moved his head slightly left and right for the next 20 seconds.

[02:04.2] Pilot moved his head right and then left.

[02:19.1] Pilot touched his own face with his left hand.

[02:24.2] Top of head of rear seat passenger moved into the lower right field of view.

[02:24.8] Pilot moved his head slightly left and right for the next 15 seconds.

[02:42.6] Pilot moved his head to the left and back to the center. Photographer continued to look through viewing device.

[02:54.3] Photographer moved his head to the left of the viewing device.

[03:02.3] Photographer moved his head to the right of the viewing device, looked at the pilot, and spoke (voice was obscured by engine sound). Pilot turned his head about 45 degrees left towards the photographer. Pilot's head turned back to the right and then straight ahead as photographer continued to talk and point ahead. Pilot nodded his head up and down.

[03:10.6] As the photographer and pilot continued to talk, the pilot raised his left hand and pointed ahead. Pilot then lowered his left hand.

[03:19.0] Pilot turned his head to the left then back to the center. Photographer nodded his head.

[03:39.1] Photographer continued to look through the viewing device, using both hands to manipulate controls on the device on his lap.

[03:49.1] Pilot turned his head to the right and back to the center. Photographer talked (voice was obscured by engine sound) with his head pointed towards the pilot; then he turned his head towards the back, smiling, and then turned his head forward.

[04:19.3] Pilot moved his left hand up to adjust the gasper air outlet while looking up towards the gasper.

[04:31.3] Pilot moved his left hand to the center, and used his right hand to put his fingers outside the right window. Pilot adjusted the window. Pilot's hair began to move from the new open window angle's resulting airflow.

[04:45.3] Pilot moved his right hand back to the center (in front of him) and moved his left hand back to the left.

[04:47.7] Pilot moved his head left and right.

[05:00.1] Pilot moved his left hand to the center, and used his right hand to put his fingers outside the right window.

[05:09.5] Pilot moved his right hand back to the center (in front of him) and moved his left hand back to the left.

[05:13.3] Pilot leaned forward and looked to the right. Photographer also looked to the right.

[05:21.1] Pilot moved his head to the left and then back to center.

[05:28.7] Photographer moved his hand sideways, left to right; above the forward dashboard as the photographer spoke (voice was obscured by engine noise).

[05:36.9] Up to this point, helicopter had been travelling in level flight, on a relatively straight course, with relatively constant engine noise.

[05:36.9] Pilot's head leaned to the right and the pitch of helicopter began to rise. Sound of engine noise decreased.

[05:38.8] Pilot's head slumped forward and to the left. From this point until end of the recording, pilot's movements were flaccid and limp with no evidence of muscle tone.

[05:39.2] Photographer looked at the pilot.

[05:40.7] Pitch of helicopter passed through about 10 degrees nose up and began to turn to the left; photographer reached his right hand in front of the pilot and pushed the pilot to the right.

[05:41.7] Pilot slumped further forward against the shoulder harness belts and to the right. Photographer's right arm continued to stay in front of the pilot until the end of the recording; consistent with the photographer holding the control stick of helicopter. Helicopter was about 15 degrees nose up and banked about 30 degrees left.

[05:42.4] Helicopter banked about 70 degrees left and about 15 degrees nose up. A chirping sound, similar to the low RPM warning, began.

[05:44.1] Helicopter banked about 90 degrees left and pitch lowered through the horizon. Photographer was looking to the left, leaning to the right, and still reaching in front of the pilot; consistent with holding the control stick of the helicopter.

[05:44.8] Helicopter banked about 120 degrees left and pitched about 15 degrees nose down. The chirping sound, similar to the low RPM warning, continued.

[05:46.1] Helicopter's nose was pointed nearly straight down to slightly inverted.

[05:49.2] Helicopter's nose began to rise towards the horizon and the bank angle was about 30 degrees left. The passenger in the back moved forward and grabbed the slumped, flaccid pilot first with his right hand and then with his left (passenger's left hand was on the pilot's shirt collar), pulling the pilot backwards away from control panel. Photographer was looking towards the right, with his right hand in front of the pilot and his left hand on the left vertical window post. From this point until the end of the recording, photographer remained essentially in this position.

[05:51.6] Pitch of the helicopter began to lower again, through about 20 degrees nose down; helicopter rolled left through about 30 degrees of bank. Rear

seat passenger let go of the pilot; pilot's head was flaccid and moving back. Helicopter began to yaw and roll to the left.

[05:53.9] Helicopter heading turned left about 200 degrees (taking about 4 seconds), pitch continued down to about 20 degrees nose down, and bank was nearly level. The chirping sound stopped.

[05:56.6] Helicopter yaw, roll, and pitch changes paused and the helicopter was momentarily steady.

[05:57.0] Helicopter began to yaw and roll to the right (pitch was nearly level with the horizon) as the pilot's head slumped forward and to the right. Unintelligible voices were yelling.

[06:00.5] Helicopter rolled right through about 30 degrees of bank and pitch lowered through about 10 degrees nose down. Pilot's left arm was down to his left and his right arm was in front of his face.

[06:02.7] Helicopter was about 20 degrees nose down and approaching the ground at a rapid rate.

[06:04.5] Pilot's head slumped backwards, such that the pilot's nose was pointed towards the top of the helicopter and his right arm was in front of his chin. Helicopter began to roll to the right (reducing bank angle), passing through about 20 degrees of left bank.

[06:06.4] Helicopter was about to impact the ground. Helicopter was about 20 degrees nose down, about 10 degrees left bank, and a high rate of descent. Pilot's head was far back, flaccid, with pilot's nose pointed straight up with his right arm on his neck.

[06:07.7] The recording ended as the helicopter impacted the ground.