NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

October 30, 2017

Witness and Onboard Video

Specialist's Factual Report
By Bill Tuccio, Ph.D.

1. EVENT

Location:	San Juan, Puerto Rico
Date:	July 4, 2017
Aircraft:	Piper PA-28-180, N9427J
Operator:	Horizon Aviation
NTSB Number:	ERA17LA227

2. GROUP

A group was not convened.

3. SUMMARY

On July 4, 2017, at 1721 Atlantic daylight time, a Piper PA28-180, N9427J, operated by Horizon Aviation, was substantially damaged when it impacted the San Antonio Canal shortly after takeoff from Fernando Luis Ribas Dominicci Airport (SIG), San Juan, Puerto Rico. The private pilot and three passengers were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight, which was conducted under the provisions of 14 *Code of Federal Regulations* Part 91.

4. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received two video files, one from onboard the airplane, the other from a handheld camera that was being used by a witness located at a nearby marina.

4.1. Recorder Description

The onboard video was produced using a personal electronic device. The witness video was produced using a point-of-view camera. Both were high definition format, color video with audio.

4.2. Timing and Correlation

Each video is described in its corresponding video elapsed time, HH:MM:SS.t; where HH are hours, MM are minutes, SS are seconds, and t are tenths of a

second. 00:00:00.0 is the beginning of each file. The onboard and witness videos were not time aligned.

4.3. Summary of Recording Contents

Figure A-1 shows points along the aircraft path, in onboard video elapsed time, produced in Google Earth. The yellow pin markers ( ), show precise measures of aircraft position; the red “e” markers ( ) show approximate positions; and the remaining markers show the approximate location of the witness video and impact point.

4.3.1. Onboard Video

Sound observations in this report were aided by examining the audio sound spectrum. See the Sound Spectrum Study in the public docket of this accident for additional information. No pertinent crew voices were discernable during the flight and no flight instruments were ever in the field of view of the camera.

At 00:00:00, the airplane was entering the runway, about to start takeoff roll, as seen in figure 1. Visibility was greater than 10 miles, with scattered clouds. Background noise was loud. Later in the video it was evident the video was being taken by the passenger in the rear left seat and the pilot window was open throughout the recording, causing variations in microphone noise. The left fuel cap was in place and no fluid was leaking from it.

Figure 1. Image at start of video, 00:00:00 onboard video elapsed time.

At 00:00:15.5, the airplane was lined up on the runway and engine noise began to increase, similar to an increase in engine power, and the airplane began to accelerate. By 00:00:17.4, the engine noise was louder and steady.

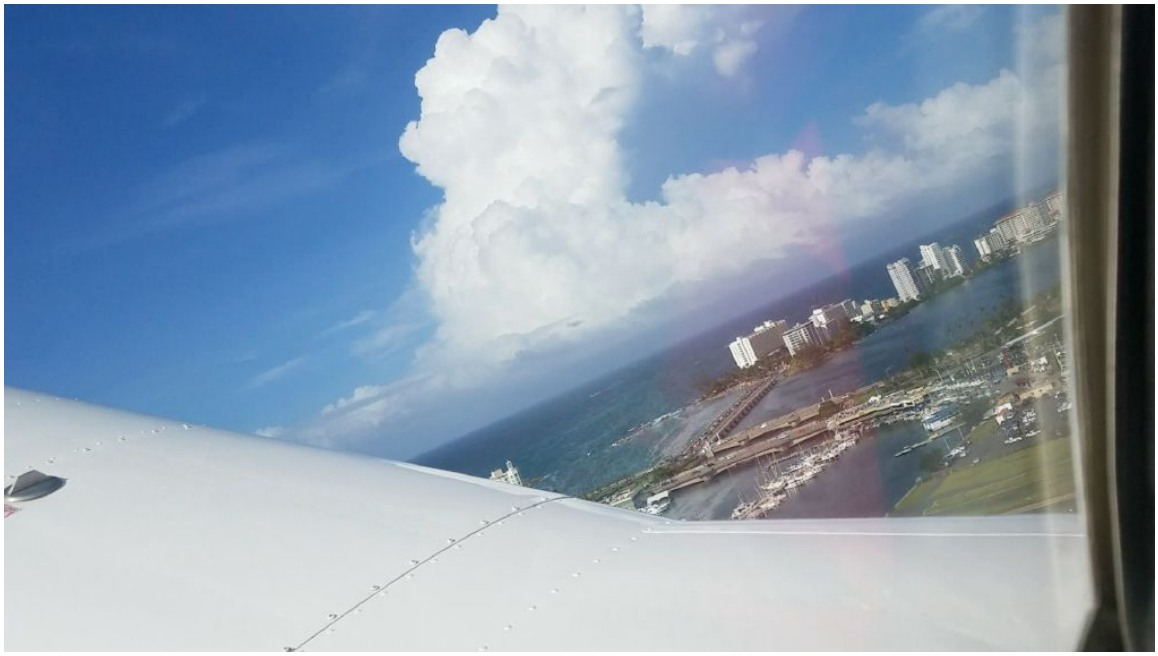
By 00:00:35.2, the airplane lifted off the runway (the exact liftoff time could not be discerned). The engine noise was the same as it was at 00:00:17.4.

At 00:00:46.7, the camera had panned right, making it clear the pilot's window was open.

Between 00:00:54.9 and 00:01:18.8, the background noise contained more of an "airy" noise, similar to relative wind from the airplane motion interfering with the camera microphone (most likely from the pilot’s open window). The engine noise, slightly obscured by this "airy" noise, did not seem to change during this period.

At 00:01:16.3, the airplane rolled slightly right, as shown in figure 2. Prior to this time, the airplane roll (bank angle) had been essentially level.

Figure 2. Image at 00:01:16.3 onboard video elapsed time.



Between 00:01:18.7 and 00:01:19.7 the engine noise decreased.

At 00:01:20.0, the airplane roll (bank) was level again.

Between 00:01:27.2 and 00:01:30.1, the engine noise further decreased.

At 00:01:30.8, the airplane began to bank left.

Figure 3 shows the aircraft left bank angle at 00:01:32.2, which had increased from 00:01:30.8. The right side of the image is cropped to eliminate a view of the interior occupants.

Figure 3. Image at 00:01:32.2 onboard video elapsed time.

By 00:01:34.9, it was evident the aircraft was descending in a left-banked turn.

Between 00:01:34.0 and 00:01:36.6, there was a momentary increase in background noise, similar to an increase in engine noise.

Between 00:01:36.8 and 00:01:37.7, the background noise decreased slightly, similar to a decrease in engine noise.

Between 00:01:38.6 and 00:01:44.3, the engine noise stayed at approximately the same levels.

Based on sound, the aircraft impacted the water at about 00:01:44.6.

From 00:01:42.2 until the end of the recording at 00:01:47.6, the camera image was obscured by the videographer's hand.

4.3.2. Witness Video

At 00:00:00.0, the video began on a dock (see figure A-1 for the location of the witness video). The camera was mounted on an aluminum rod held by the videographer. There was a drop of water on the lens that obscured most of the upper right quadrant of the video image.

At 00:00:15.3, the accident airplane was visible in the video (see figure 4), flying level in roll (climb/descent/pitch was not discernable), and the airplane's engine noise was faintly recorded.

Figure 4. Witness video at 00:00:15.3 (annotated).

The accident airplane had gone out of the field of view of the camera and, by 00:00:27.3, had re-entered the field of view.

Between 00:00:27.3 and 00:00:35.6, the airplane was mostly obscured by the water droplet on the lens.

By 00:00:370, the airplane emerged from behind the camera's obscuring water droplet, in a descent, banking left towards the marina area near the videographer.

At 00:00:38.3, the airplane was banked left approximately 45 degrees, turning towards the marina area, pitched slightly down.

At 00:00:40.1, the airplane bank was level and the pitch was also relatively level.

By 00:00:40.9, the airplane began to bank left, with the pitch level to slightly nose down.

By 00:00:41.5, the airplane's bank was about 45 degrees left and the pitch was slightly nose down, as shown in figure 5.

Figure 5. Witness video at 00:00:41.5 (annotated and redacted).

At 00:00:41.9, the airplane was about to impact the water but was obscured by the water droplet on the camera lens.

At 00:00:42.5, the airplane's right wing was momentarily visible as it emerged to the right of the obscuring water droplet on the lens.

At 00:00:42.7, the airplane had descended below obscuring boats between the videographer and the impact point.

At 00:00:43.0, a splash of water began from the airplane's impact with the water; any view of the airplane itself during impact was obscured by boats between the videographer and the impact point. By 00:00:45.2, most of the splash of water had dissipated.

From the impact until the end of the witness recording at 00:02:01.0, people in the marina area responded to the accident in various ways, offering assistance.

By 00:01:06.9, a helicopter appeared and circled at a low altitude over the impact point. By 00:01:29.3, the helicopter was hovering over or near the impact point until the end of the recording.

By 00:01:53.1, sounds of sirens were recorded by the camera.

Figure A-1. Aircraft trajectory points in onboard video elapsed time.