

**NATIONAL TRANSPORTATION SAFETY BOARD**  
Vehicle Recorder Division  
Washington, DC 20594

July 17, 2020

## **Image/Video Study**

**By Sean Payne**

### **1. EVENT**

Location: Chamberlain, South Dakota  
Date: November 30, 2019  
Aircraft: Pilatus PC-12/47E, N56KJ  
Operator: Private  
NTSB Number: CEN20FA022

### **2. SUMMARY**

On November 30, 2019, at 1233 central standard time (CST), a Pilatus PC-12/47E airplane, N56KJ, was destroyed during an impact with terrain near the Chamberlain Municipal Airport, (9V9), Chamberlain, South Dakota. The pilot and 8 passengers were fatally injured, and three passengers were seriously injured. The airplane was registered to Conrad & Bischoff, Inc. and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Instrument meteorological conditions prevailed, and the flight was operated on an instrument flight rules flight plan. The flight originated from 9V9 shortly before the accident and was destined for Idaho Falls Regional Airport (IDA), Idaho Falls, Idaho.

### **3. DETAILS OF INVESTIGATION**

Beginning on May 28, 2020 the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following electronic files:

Recorder Type: **iPhone XR**  
Filetypes: **Multiple .jpg and .mov files**

#### **3.1. Recorder Description**

The photos were determined to be from Personal Electronic Device (PED). Metadata showed the images and videos were recorded with an iPhone XR.

Metadata for the videos provided did not display the type of device they were recorded on, however, the file sequencing schema in the video files were similar to that from the image files and it was assumed the videos were created with the same PED, an iPhone XR.

### 3.2. Timing and Correlation

Metadata associated with the images were found to be in CST. The timestamp from each photo or video was assumed to be cellular carrier time and was not offset. Time stamps are given below for each image examined.

Metadata for timestamp associated with the video files showed times that were unreasonable for the known departure time of the accident flight. This is likely a result of the video being compressed and emailed at some point in the evidence chain of custody. Evidence of compression were detected based on the emailed file's file size when compared to the recording capability of the device. However, the succession of these video files showed the aircraft taxiing for departure and subsequently departing on what was known to be the accident flight.

### 3.3. Summary of Video Recording Contents

#### IMG\_7372.jpg – 11:02:49 A.M.

Figure 1 is an original unaltered photo of the aircraft at 11:02:49 A.M. The aircraft is on the ramp and a person is using a tool to deice the left wing. There is a ladder visible near the nose of the aircraft.



Figure 1. A photo taken at 11:02:49 A.M.

Figure 2 is a comparison between IMG\_7372.jpg zoomed in to show the aircraft's horizontal stab area. This photo has been cropped and the brightness and contrast has been adjusted. The photo on the right is that of an exemplar PC-12 taken at a similar angle by engineers at a Pilatus facility in Europe. An iPhone XR was used and the focal length was matched the represent the focal length shown in the metadata of the original photo. This focal length corresponded with the iPhone XR's widest setting. The comparison shows accumulated precipitation build-up above the leading edge of the horizontal stab. It also shows accumulated precipitation had built up on the vertical stab and icicles were present on the horizontal stab bullet fairing. There is visible moisture falling present in the photograph.



**Figure 2. A comparison between IMG\_7373.jpg and a photo of an exemplar PC-12 taken from a similar angle.**

### **IMG\_7377.jpg – 12:21:40 P.M.**

Figure 3 is an original unaltered photo of the aircraft at 12:21:40 P.M. The ladder that was visible previously near the nose is no longer in the image frame. There is an individual present in the cockpit.



**Figure 3. A photo taken at 12:21:40 P.M.**

Figure 4 is a comparison between IMG\_7377.jpg zoomed in to show the aircraft's horizontal stab area. This photo has been cropped and the brightness and contrast has been adjusted. The photo on the right is that of an exemplar PC-12 taken at a similar angle by engineers at a Pilatus facility in Europe. An iPhone XR was used and the focal length was matched the represent the focal length shown in the metadata of the original photo. This focal length corresponded with the iPhone XR's widest setting. The photo on the left shows accumulated precipitation forward of the horizontal stab's leading edge. The comparison shows accumulated precipitation build-up above the leading edge of the horizontal stab. It also shows accumulated precipitation build-up on the vertical stab and icicles were present on the horizontal stab bullet fairing. There is more visible moisture present falling when compared to the photograph taken at 11:02:39 A.M.



Figure 4. A comparison between IMG\_7377.jpg and a photo of an exemplar PC-12 taken from a similar angle.

### Comparison of IMG\_7372.jpg IMG\_7377.jpg

Figure 5 is a comparison of IMG\_7372.jpg taken at 11:02:49 A.M. and IMG\_7377.jpg taken at 12:21:40 P.M. The amount of time between these two photos was 1 hour 18 minutes and 51 seconds. Each of these photos have been cropped and the brightness and contrast adjusted to similar levels. In IMG\_7377.jpg there is additional accumulated precipitation when compared to IMG\_7372.jpg. Additionally, there is more visible moisture present falling in IMG\_7377.jpg when compared to IMG\_7372.jpg.



Figure 5. A comparison between IMG\_7372.jpg (left) and IMG\_7377.jpg (right)

## IMG\_7378.mov

Figure 6 is an unaltered still image export from IMG\_7378.mov. The video file shows the accident aircraft taxiing for takeoff.



Figure 6. An exported still image from IMG\_7378.mov.

Figure 7 is a comparison between IMG\_7378.mov zoomed in to show the aircraft's horizontal stab area. The photo on the right is that of an exemplar PC-12 taken at a similar angle taken at a Pilatus facility in Europe. The focal length of the original video still could not be determined. A Canon SLR was used to replicate the original still image export as closely as possible. A ladder was used to replicate the eye height of the original recording. Pilatus engineers reported that the elevator control surface will typically rest in a full nose down position when no input to the controls are made and that the elevator control surface deflection observed in the original

still export from the original witness video corresponded with a full nose down elevator deflection. Figure 7 shows the original still export cropped and zoomed (top) in comparison to the exemplar photo taken at the Pilatus facility (bottom). The exemplar photo taken at the Pilatus facility is annotated to show the vertical stabilizer fairing, the horizontal stabilizer fairing and the seam-line between the two fairings.



Figure 7. A comparison between a still image from IMG\_7378.mov (top) and a photo of an exemplar PC-12 (bottom) taken from a similar angle.

The exemplar photo at the bottom of figure 7 shows the free area above the horizontal stab in relation to the amount of vertical stabilizer fairing, the horizontal stabilizer fairing and the seam-line between the two fairings that is visible. In the photo of the accident aircraft at the top of figure 7, accumulated precipitation is visible on the top surface of the horizontal stab. The accumulated precipitation obscures some of the free area seen on the exemplar photo when related to surface area visible on the vertical stabilizer fairing, the horizontal stabilizer fairing and the seam-line between the two fairings.