

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

May 18, 2016

Ground Observer Videos

Specialist's Factual Report
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1. EVENT

Location: Cameron, Missouri
Date: June 27, 2015
Aircraft: Pitts S-2B
Registration: N877UP
NTSB Number: CEN15FA282

2. SUMMARY

On June 27, 2015, about 1353 central daylight time, a Christen Industries Pitts S-2B, N877UP, sustained substantial damage when it impacted terrain during an aerobatic flight over the Cameron Memorial Airport (EZZ), Cameron, Missouri. The airline transport pilot received fatal injuries. The airplane was registered to and operated by the pilot under the provisions of the 14 *Code of Federal Regulations* as a Part 91 airshow flight. Day visual meteorological conditions prevailed for the airshow demonstration flight that departed from EZZ about 1330. No flight plan was filed.

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received three image files containing video and audio that captured the accident. Examination of Video 1's metadata, also known as EXIF data, showed that it was taken using an iPhone 6+. Video 2 and 3's source could not be determined with EXIF data but appeared to be by handheld cameras.¹

Each file was captured from their respective ground observer. Figure 1 is a google earth overlay that shows the approximate location of each ground observer. Video 3 was considered to contain redundant information at

¹ Information found in the EXIF data can vary depending on file format. Some examples of EXIF data are geotagging, file creation data, and camera settings. The video file from the event flight appeared to have GPS data tag recorded at a variable rate from once a second to a max of three times a second.

significantly worse quality compared to the other videos; therefore its contents are not included in the summary of this report.

Figure 1. Approximate impact and observer's location.



3.1. Video-1 File Description

Video 1 was recorded in QuickTime Movie (.mov) format at 59 frames per second (fps) and a resolution of 1920x1080 pixels. The duration of the video was 51 seconds. The file's EXIF data showed the file was created on 1351:26 central daylight time (CDT).

Throughout the recording the camera tracked the aircraft's movement with the sky mostly in the background with ground references occasionally appearing in few frames. Figure 2 shows a frame containing ground references with the runway wind sock visible. The sound of the airshow announcer was predominately heard along with the aircraft's engine throughout the recording. The impact occurred at approximately 47 seconds video elapsed time. Video 1 is included as attachment 1 to this report.

Figure 2. A frame from Video-1 showing wind sock and smoke oil trail.



3.2. Video-2 File Description

Video 2 was recorded in MPEG-4 (.mp4) format at 29 frames per second (fps) and a resolution of 1280x720. The duration of the video was 2 minutes and 5 seconds; however, the video appears to be edited following the 2 minutes and 3 seconds mark where the camera's view cuts to show first responders on the runway. Therefore, the last 2 seconds are omitted.

Throughout the recording the camera tracked the aircraft's movement with the sky predominately in the background. As a consequence no ground reference points could be discerned until the moment of impact. The sound of the aircraft's engine was predominately heard throughout the recording. The impact occurred at approximately 2 minutes video elapsed time. Video 2 is included as attachment 2 to this report.

3.3. Timing and Correlation

The iPhone 6+ receives its cellular network. Using the time of Video 1 and the time of impact from each video; Video 2 and 3 were correlated to local time, CDT. Table 1 gives a summary of correlated start and stop times of each file.

Table 1. File Start, Stop, and Duration

File	Start (hhmm:ss)	Stop (hhmm:ss)	Duration (min:sec)
Video 1	1351:26	1352:17	00:51
Video 2	1350:13	1352:16	02:03

4. SUMMARY OF RECORDED CONTENTS

In brief the video files showed the aircraft performing aerobatic maneuvers. The aircraft was producing a smoke oil trail throughout the video.

At 1351:56 CDT, the aircraft was straight and leveled as it prepared for its next maneuver two seconds later.

At 1351:58 CDT, the aircraft began to climb. The smoke oil trail indicated a constant angle climb. Two seconds later the aircraft rolled left wing down as it continued its constant angle climb.

At 1352:02 CDT, the aircraft performed a 360 degree rolling maneuver which resulted in the aircraft tumbling toward the ground. The tumble was similar to an aerobatic maneuver known as the "Lomcovak". At this time, the sound of the engine became faint and the trailing smoke oil began to dissipate.

At 1352:11 CDT, the aircraft continued tumbling and smoke oil trails became visible again when the sound of the engine became noticeable again. The sound of the engine and smoke oil trails remained noticeable until impact.

At 1352:12 CDT, the aircraft ended its tumble but continued nose down descending toward the ground.

At 1352:13 CDT, the sound of the engine ends as the aircraft impacted the ground.