

# **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

## **UAS Aerial Imagery Factual Report**

5/12/2019

### **A. ACCIDENT ERA19FA170**

Location: Naples, Fl  
Date: May 11, 2019  
Time: 1530 Eastern Daylight Time (EDT)  
Event: Crash into residential area, N7650Y, PA30

### **B. PERSONNEL**

UAS RPIC: Bill English  
NTSB UAS Program Lead  
Washington DC

### **C. ACCIDENT SUMMARY**

On May 11, 2019, about 1530 eastern daylight time, a Piper PA-30, N7650Y, was destroyed when it was involved in an accident near Naples, Florida. The private pilot was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

### **D. DETAILS OF IMAGERY**

#### **1.0 Equipment and Procedures**

#### **Equipment**

Mapping flights of the wreckage area and inspection flights to collect photo and video documentation were conducted on May 11, 2019, using the NTSB DJI Mavic 2 Professional (M2P) small unmanned aircraft system (sUAS, commonly known as a drone). The drone is equipped with a dual GPS/GLONASS receiver which provides georeferenced information on all still photos. The drone is equipped with an L1D-20C camera using the Hasselblad 1" CMOS sensor, with a focal length of 10.26 mm. Still photo resolution was 20 megapixels in JPG format. One video was taken in MP4 format, with 1080p resolution at 24 frames per second. Additional imagery of the final approach path to search for debris was gathered by the Collier County Sheriff's Department, using a DJI Mavic 2 Zoom, equipped with an FC Camera using the Sony Exmor 1/2.3 CMOS sensor. Those videos and images were not provided to the UAS RPIC.

Ground control points and evidence markers were documented with a Trimble GEO7X differential GPS receiver.

## **Procedures**

The accident site was in a residential area next to a house, with palm trees and live oak approximately 80 feet in height. Residential service powerlines crossed the area. The area under the final flight path was largely tree-covered with sparse houses. Airspace was Class G just outside the KAPF Class D. The flight was conducted under 14 CFR 107. Weather conditions were good VFR.

The M2P was flown in 2 overlapping grids at 120 and 100 feet above ground level (agl) over the main wreckage area capturing still images to create an orthomosaic terrain map. Additional oblique stills were taken of the main wreckage, tree strike marks, and the final descent area. Video of the approach area and along the descent path was also taken. The Collier County M2Z was flown in a scouting pattern on the north (far) side of the residential street to locate debris and pieces of wreckage.

Total mission time including gathering DGPS points was one hour 45 minutes.

## **Processing**

Photos were processed using Pix4D photogrammetry software to create an orthomosaic map of the wreckage location, as well as a 3D point cloud focusing on the tree strikes.

An initial view of the wreckage area processed using basic photo stitching with Microsoft ICE, for on-scene visualization and reference.

The double grid photos were processed using Pix4D to create a 3D point cloud and orthomosaic of the scene south of the road and near the residence. The orthomosaic map was output reference the WGS84/UTM zone 17N for best correlation with aeronautical data.

A detailed 3D model of the wreckage area using a double grid and oblique set of photos was processed in order to show more detail of the airplane and to measure tree strike marks.

The ground control points (GCPs) taken on scene were corrected using the Continuously Operating Reference Station (CORS) at Naples, FL (NAPL). The wreckage area and GCPs were in an area largely covered with trees, reducing the accuracy of the GPS solution to 30 cm. GCPs were exported in WGS84/EGM96 datum.

## **2.0 Imagery products**

Photographs and processed imagery are included below. Google Earth kmz tiles, orthomosaic geo-tiff, and point cloud in xyz format are included in the docket.

Figure 1 is a basic overhead view photo of the wreckage area. The general direction of flight of the airplane was from the upper right of the photo.



Figure 1 – Aerial photo over main wreckage site

Figure 2 is a closer zoomed photo of the tree strike and main wreckage.



Figure 2 – Close up overview of tree strike

Figure 3 is an excerpt from the orthomosaic in Google Earth format with select measurements indicated. The Google Earth kmz file is in the docket.



Figure 3 – Excerpt of Google Earth orthomosaic of accident area

Figure 4 is an overview looking backward along the route of flight. Some smaller pieces of wreckage were found in this area.



Figure 4 – Aerial overview photo, looking north back along route where small pieces of wreckage were located.

Figure 5 is a snapshot from the 3D point cloud in which the angle from the tree strike to the main impact mark can be measured. From the main break in the tree to the first evident ground impact is -41.9 degrees.

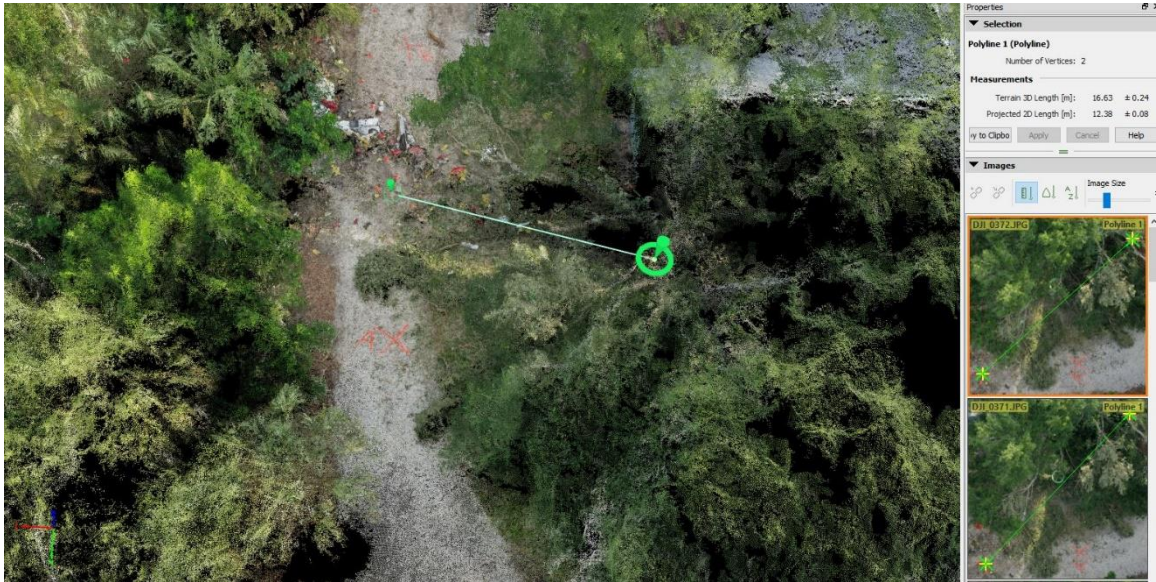


Figure 5 – 3D point cloud with angular measurement from tree strike to ground impact.

#### E. ATTACHMENTS

1. Orthomosaic Geo-tiff
2. Google Earth kmz
3. 3D Point Cloud xyz