

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

Aerial Imagery Factual Report

10/13/2017

A. ACCIDENT WPR17FA151

Location: Marineland, Fl.
Date: July 13, 2017
Time: 2258 Eastern Daylight Time (EDT)
Event: N2173S, PA44-180, Inflight Breakup

B. PERSONNEL

UAS Program Lead: Bill English
 National Transportation Safety Board
 Washington, D.C.

C. SUMMARY

On July 13, 2017, about 2258 eastern daylight time, a Piper PA-44-180, N2173S, was destroyed during a descent and subsequent inflight breakup near Marineland, Florida. The flight instructor and private pilot receiving instruction were fatally injured. Visual meteorological conditions prevailed and no flight plan was filed for the cross-country flight which originated from Brunswick, Georgia, at an undetermined time with an intended destination of the Ormond Beach Municipal Airport (OMN), Ormond, Florida.

The flight reported to Air Traffic Control that they had OMN in sight while at an altitude of about 5,400 feet mean sea level (MSL). Shortly after, radar and radio communication was lost with the accident airplane. The main wreckage was located by air units about 1141 on July 14, 2017, inverted within a heavily wooded area.

Initial wreckage inventory revealed significant portions of both wings were missing.

D. DETAILS OF IMAGERY

1.0 Equipment and Procedures

Equipment

Search flights were initiated on the morning of July 15 using two small unmanned aircraft systems (sUAS, commonly known as drones) platforms:

The NTSB DJI Inspire 1 is equipped with a dual GPS/GLONASS receiver which provides georeference information on all still photos. The drone was equipped with the FC350Z (Z3) camera using the Sony Exmor 1/2.3" CMOS sensor, with a focal length of 3.6 mm. Still photo resolution is 12 megapixels in JPG or RAW format. Zoom capability is 3.5x optical and 2x digital.

The NTSB DJI Phantom 4 Professional is equipped with a dual GPS/GLONASS receiver which provides georeference information on all still photos. The drone was equipped with an FC6310 camera using the Sony Exmor 1" CMOS sensor, with a focal length of 8.8 mm. Still photo resolution is 20 megapixels in JPG or RAW format.

Procedures

The main wreckage and search area were in Class G airspace. No wildlife refuge or similar areas were overflowed. Initially, radar indicated that a search might enter the Class D airspace of Flagler Executive Airport (FIN), so the NTSB obtained an amended Certificate of Authorization or Waiver (eCOA) from the FAA to operate within the controlled airspace at and below 150 feet above ground level (agl). However, the authorization was not needed as the search never entered controlled airspace.

The UAS pilot and IIC consulted known information to plan a search area. Using the location of the main wreckage, ATC radar data, and location data of floating debris that had been retrieved by rescuers, a "pie" shaped search area was plotted initiating over the west bank of the Matanzas River. Mangrove and marshland on the west side of the river was considered the most likely location, so a small boat was requested in order to bring the drone close to the mangrove areas to maximize search efficiency. While awaiting the boat, the Inspire drone with zoom camera was launched from the east side of the river and conducted a search of the west bank shore and reed/marsh area. Some possible targets were spotted. See Figure 1.



Figure 1 – View of search area from east side of river. Circle indicates left wing.

Upon arrival of the small boat, the pilot was carried across the river and entered a small creek between islands. Two sorties using the Phantom 4 Pro were launched from the boat in different positions. The drone was flown in a series of radial segments covering the search area. In order to maximize coverage, the flights were conducted at 200 feet agl, and flown at higher airspeed than usual, since high overlap for photogrammetry was not necessary. Total flight time was less than 30 minutes. Real time search for the components was not possible due to pilot workload, monitor size, and sun glare.



Figure 2 – UAS Pilot recovering drone to boat

Processing

Approximately 330 still photographs were taken. Initially no processing was performed in the interest of time. The UAS pilot and NTSB airworthiness investigator reviewed raw imagery on a laptop screen in shade and quickly identified the wings. See Figures 3 and 4.



Figures 3 and 4 – Left Wing and Right Wing in unprocessed photos.

Locations were roughly calculated using the embedded EXIF data and Google Earth, and provided to search crews. The searchers located the wings and other debris easily.

2.0 Imagery products

Approximately 330 high resolution photos were gathered and provided to the IIC on scene. Select still images and samples of processed products are included in this section and in the docket for this accident.

Photogrammetric products were not considered high priority for this investigation. While on scene, a low resolution orthomosaic map of the search area was developed and exported in Google Earth kmz format for the use of investigators and recovery personnel. The missing portions of the airplane were easily identified in the orthomosaic.

The wreckage location and significant radar returns were added to the orthomosaic to aid visualization of the breakup and flight path. See figure 5.



Figure 3 – Orthomosaic including wings, main wreckage, miscellaneous wreckage, radar targets, and search area.

◆ = Transponder 📍 = Primary

3.0 Attachments

Attachment 1 – Google Earth kmz export