

Search Drone (UAV) Project – Norton Search Team, Venezuela YV2480

Presentation Brief:

The presentation covers the impending use of a UAV to help locate the wreckage of a downed Cessna 182 in the jungle of Venezuela. The wreckage is that of a missionary aircraft YV2480 piloted by Bob Norton.

I want to outline the search thus far by multiple helicopter searches, satellite imagery analysis in the attempt to identify points of interest, interviews with indigenous people that saw the aircraft in distress to ascertain search perimeters and flight direction, and flight predictive analysis by members of MAST (Missing Aircraft Search Team).

Quickly outline the key members in the team and their contributions. Bob Edwards, JD Brown, John Dill, Tim Evinger, Edan Cain.

The Search:

On February 16, 2009, Bob Norton and 6 others went missing in the jungles of Venezuela while on an emergency medical flight in a Cessna 182, tail number YV2480. What has happened since that time has resulted in the development of new technologies that will hopefully assist in locating the crash site and will help with search efforts in the future.

Here in the U.S., a volunteer team of engineers, programmers, pilots and other technicians came together to assist the Venezuelan Civil Protection and the Indigenous Indians in their search efforts for Bob and the others.

The U.S. led team initially conducted satellite image analysis and containment analysis to try and help determine the location of the crash site. Current satellite images were obtained of some of the critical zones from GeoEye and Digital Globe. The team trained volunteers to scan and search the images using GoogleEarth tools to identify any points of interest (POIs) that might be a piece of the plane or a swath or damaged foliage in the jungle canopy. After several months of analysis, two team members took the most promising POI GPS data points down to investigate. The Civil Protection provided aviation support to conduct the search, however, no traces of the crash site were found.

The next trip down, one of the team members, went into the jungle into one of the priority zones to work with the Indigenous Indians on the ground search. After four challenging days in the jungles and no results, the team member returned home to the U.S. where the decision was made to pursue other technologies that might assist in locating the crash site under the jungle canopy. The U.S. team began developing a search drone that they believe will be beneficial in locating the crash site.

The UAV:

Outline the scope of work that we have planned for this mission, not only for use in this search but how it correlates to SAR in general with the sensors that we will be flying, both from a high tech standpoint, to the more mundane in the sense of giving us COMS by acting as a repeater where terrain has limited us previously.

Speak about the technologies involved, from radios, GPS, image geo-tagging and auto rectification, accelerometers / gyros / magnetometers and the computers involved. This will also cover the creation of a 3D terrain model based on capturing a 2D mosaic of the ground we wish to fly from altitude so that the 3D terrain model can be used in the flight planning for low level sensor deployment.

Sensors: The search for lightweight FLIR (forward looking infrared), radar including lightweight Synthetic Aperture Radar (SAR) and Foliage Penetrating Radar (FOPEN). Tests and hopes with an appeal to anyone that knows of something we could use. The issues with funding.

Aircraft launch and recovery issues within a jungle environment and proposed solutions and work currently underway by Tennessee Technological University.

The UAV aircraft that we currently have. Issues with Gas versus electric.

Lessons learned from speaking to the team responsible for the Trans Atlantic Model Project (TAM5).

Mapping. Real time POI mapping. Imagery and video including infrared. POI transmission and mission planning based on these. Public website maps for public interaction and situational awareness.

Finishing with a quick demo of GPS radios and real time mapping, UAV ground station software, triangulation for use in radio beacon location, image geo-tagging and geo-rectification. If time allows, brief on ESRI's coming release of the ArcGIS runtime, deployment via thumb drive that contains mapping data for use in the field when disconnected.