

THE “BATHYDRONE” FOR UNDERWATER SURVEY AND MAPPING

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A unique drone-based system for underwater mapping (bathymetry) was developed at the University of Florida. The system, called the “Bathydroner”, is comprised of a drone that drags, via a tether, a small vessel on the water surface in a raster pattern. The vessel is equipped with a COTS sonar unit that has down scan, side-scan and chirp capabilities and logs data onboard. Data can then be retrieved, post mission, from the vessel and plotted in a variety of ways. The system provides both isobaths (underwater topo plots) and contours of bottom hardness. Extensive testing of the system was conducted on a 5-acre pond, located at the University of Florida Plant Science and Education Unit in Citra, FL. Prior to performing scans of the pond, ground truth data was acquired with a RTK GPS unit on a pole to precisely measure the location of the bottom at over 200 locations. An assessment of the accuracy and resolution of the system was measured by comparison to the ground truth data. Additionally, underwater geometric features were submerged in the pond to assess the resolution of locating and identifying these features. During testing, our research group found that there are numerous advantages and attributes of the Bathydroner system including; ease of implementation and the ability to initiate surveys from the land without the need for a boat. The system is also inexpensive, light-weight, thus making transport convenient. The Bathydroner can raster at speeds of between 0 and 10 mph, and thus can be used in waters with swift currents. Additionally, there are no propellers or control surfaces underwater, so the vessel does not have a tendency to snag on floating vegetation. We have been able to raster an area of more than 10 acres in one battery charge and in less than 25 minutes.

PRESENTER BIO: Tony Diaz is a Ph.D. student in the Mechanical and Aerospace Engineering Department at the University of Florida. He is a member of the UF Unmanned Aircraft Systems Research Program and has been developing systems for water based survey and mapping and water sampling.