THE "SIPPER" DRONE-BASED WATER SAMPLING SYSTEM

Henry Tingle, Andrew Ortega, Tony Diaz, Jordan Bernstein, Chad Tripp, Peter Ifju
Mechanical and Aerospace Engineering Department, University of Florida, Gainesville, FL, USA

A drone-based water collection system, called the "Sipper", was developed at the University of Florida to sample for water borne pathogens such as K-brevis and HAB. The system is comprised of a drone (any drone capable of carrying the weight of the system) and a vessel that is lowered to draw water into sterile containers. Over the past two years, the system has gone through two prototypes. The initial version was tested in the inter-coastal waters surrounding the Whitney Lab. Water was collected from both land based launch locations and from a boat (skiff) based launch. It was found that the system could collect water as far away as ½ mile from the launch point. Set-up, collection, and breakdown at any location could be achieved on the order of 20 minutes. The system proved to be practical and water could be collected without a boat for many of the locations making the system convenient. In the original system a winch mechanism was built into the drone thus making it dependent on that specific platform. A second prototype was developed to make the system drone agnostic. The second version is self-contained, having the winch mechanism within the Sipper unit (instead of on the drone), along with the sterile containers, peristaltic pump, and electronic circuitry to control the sequence of lowering the Sipper to the water surface, pump water, and retrieving it back to the drone. During testing many attributes of the system were realized including its ease of use, versatility, and allowing water to be collected without exposing crew to air borne pathogens. The presentation will cover the development, design, and testing of the Sipper system.

PRESENTER BIO: Henry Tingle 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 drone-based water sampling, as well as survey and mapping.