Unmanned Surveys with SeaRobotics HYCAT

By Hannah Marshburn

The boom of autonomous technology in hydrography is incontrovertible. To keep up with the rapid expansion of autonomous vehicles, HYPACK is hard at work updating our drivers to support AVs and include feedback from our users in the field. For my next few *Sounding Better!* articles, I would like to focus on unmanned vehicles we are actively testing for continual improvement projects. My specific focus will be on system set up and workflows.

This month the focus vehicle is the HYCAT, a multi-purpose water quality vehicle developed in partnership between SeaRobotics and Xylem. My next *Sounding Better!* article will be about our Mavlink driver and vehicles that use Mission Planner and Mavlink, like the Seafloor Systems HyDrone.

The HYCAT is an autonomous vehicle equipped with sensors for water quality testing, seafloor imaging, depth measurement, and environmental surveying. The HYCAT sensor suite includes the HydroSurveyor M9, the YSI EXO2 Shorty, a Hemisphere Atlas Link RTK GNSS Receiver, the Imagenex YellowFin Side Scan Sonar, and an onboard PC to run software applications. The HYCAT system communicates via onboard and shore-based 5.8 GHz radio antennas. The shore station also includes an OIS (Operator Interface System) that includes a remote controller, a communication system, and a laptop. Users use the laptop to run the SeaRobotics Command software, HYPACK®, and any other 3rd party software. The onboard radio link is connected to the data acquisition computer via Ethernet; virtual serial ports allow you to simultaneously communicate to various software programs through the shore station. Commands are sent through Ethernet from the PC to the communication system, then passed through a series of Ethernet switches to power the shoreside radio antenna.

Set up for the HYCAT is relatively simple. You set up an external power source for the shore station, and then connect the radio antenna and the PC to the communications box. The remote control is paired to the PC via a Bluetooth receiver. The onboard radio antenna attaches to the vehicle via an Ethernet port. You may then initialize the SRC software and HYPACK®. At this stage, you can perform any mission planning and perform any necessary field checks via the remote controller or HYPACK® software to ensure the vehicle receives commands properly.

The HYCAT has several operational modes: HYPACK® mode (which instructs the vehicle to begin the survey or planned mission in HYPACK®), standby mode (vehicle stands by), station keep (vehicle holds position autonomously using thrusters), or thruster mode (gives you power to control the vehicle with the remote controller). At any point during a survey, you can use the remote controller or HYPACK® to switch between operational modes.

HYPACK is working on a few continual improvement projects to ensure that autonomous missions with the HYCAT are seamless. If you have questions, comments, concerns please contact sales@hypack.com so that we can include your feedback in our development plans!