CEE HydroSystems USA Delivers ARC-Boats to California State Hydrologists

California Department of Water Resources hydrologists based in Red Bluff and Sacramento are building their unmanned survey capability by procuring several ARC-Boats, supplied by CEE HydroSystems USA for use with Sontek M9 and Teledyne RD Instruments RiverPro ADCPs. For river discharge and water velocity surveys where manned boat access is impossible, such as in front of dam structures, or where safety is a challenge, such as during flood stage measurements the ARC-boat represents an ideal way to get high quality measurement data. For more straightforward measurement locations and events, using a remotely-operated vehicle reduces setup time and can increase the number of sites visited during a field day. Even routine bridge measurements traditionally undertaken with tethered rope boats may be improved with the migration to a remote boat approach, as transects can be conducted upstream of the bridge, improving data quality by eliminating the potentially severe flow disturbance caused by the bridge piers.

After a field demonstration by CEE HydroSystems earlier in 2017 on the Sacramento River, DWR staff familiar with remotely-operated ADCP boats were impressed with the vehicle's smart design features and uniquely rugged construction. Having been purposefully designed for river cross section profiling with fixed propellers with independent rudder steering, the ARC-Boat can be effectively steered perpendicular to the flow even in very slow-moving water. For high velocity measurements, the hull form is highly buoyant at the bow and is watertight sealed for exceptional seaworthiness to prevent nerve-jangling of the operator in fast and turbulent water! The fully detachable bow section helps transporting the boat, and the battery swap procedure was a revelation for users familiar with other RC boats.

After the ubiquitous ADCP compass calibration, the ARC-Boat is ready to deploy. Stainless steel protective skids allow the boat to be launched in non ideal locations without damage to the props and rudder system. Surface debris, especially a concern during flood stage measurements is deflected away from the props and generous space between the props and the protective metalwork minimizes the entanglement hazard for vegetation. The ARC-Boat was designed in partnership with a national hydrological monitoring agency with the utmost scrutiny of any artifacts impacting data quality. So, the hull form is specially designed to minimize surface flow disturbance and electrical systems are carefully laid out and hard wired to keep ADCP compass deflection to an insignificant level.

The Sontek M9 installed on both Red Bluff and Sacramento ARC-Boats uses a basic local differential GPS solution for accurate relative positioning during the measurement and this is unaffected by deployment on the RC craft.

The built-in 2.4GHz Bluetooth radio in the Doppler profiler transmits the measurement data to the shore PC running the acquisition software. For trouble-free long range operation, external raised high gain antenna may be installed on the ARC-Boat to maximize the transmitted signal strength. Watch the ARC-Boat in action:

The ARC-Boat manufactured by coastal engineering and modeling experts HR Wallingford is an exceptionally thoughtful and rugged remotely-operated high performance survey boat originally designed for flood stage river discharge measurements using acoustic Doppler current profilers (ADCPs). In addition to supplying the CEE-USV, a specially adapted ARC-Boat for remote unmanned hydrographic surveying with single beam echo sounders and GNSS, CEE HydroSystems also sell and support the basic ARC Boat for hydrological users in the USA and Australia.

To learn more, visit:

www.ceehydrosystems.com