RLDA
SURVEYING & MAPPING
An Earth Surveying and Mapping Firm

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THE KAYAK SURVEYOR

Surveyors at RLDA Surveying & Mapping are experienced at working in deep water. Established in 1954 in the Commonwealth of Puerto Rico, the firm has successfully completed thousands of projects for clients in both the private and public sector, and hydrographic surveys are a mainstay of its business. But when an engineering and architectural firm contracted the company in 2010 to perform pre- and post-construction hydrographic surveys for a new maritime police pier, RDLA surveyors encountered a new challenge. Would their traditional methods work in shallow water?

Renán López de Azúa, PLS, president and owner of RLDA, knew the answer. "Conventional survey vessels, usually 20 to 30 feet long, are not an option in small rivers, creeks and lagoons," he says. "To provide our clients with the most reliable hydrographic data in extremely shallow and soft-bottom water, we recognized that we needed to enhance our traditional surveying platform."

Led by de Azúa, RLDA's surveying team modified a kayak to handle data acquisition in water as shallow as 1 foot deep. The resulting vessel has proven useful far beyond the initial police pier project—and has opened new channels in the company's surveying business.

Hydrographic surveying in shallow water requires a unique approach.

By Fernando Biascoechea

Using a kayak was appealing for a number of reasons, explains de Azúa. These sleek, inexpensive and environmentally friendly vessels are easy to maneuver in a variety of water depths, cost little to maintain and can be deployed quickly.

RLDA chose a 13-foot 10-inch Torque Ocean Kayak with a Minn Kota saltwater trolling motor, stabilizing pontoons and a capacity of up to 475 pounds. On this platform, the surveyors installed two Hemisphere GPS VS101 Series GP Compass systems, which are designed to provide a highly accurate GPS heading that takes into account the pitch, roll, and speed of vessels. To obtain accurate depth data, the team added a Teledyne Odom hydrographic echosounder.

The team shielded the GPS receiver and echosounder components from the elements by placing them within an insulated case that is positioned on a desk-like support just in front of the area reserved for a laptop computer, which would run the standard HYPACK hydrographic survey and processing software.

After estimating the power consumption of the equipment and kayak (the trolling motor requires a high-capacity battery) and evaluating the available area, the surveyors positioned an additional three-battery bank behind the operator to ensure adequate power for the GPS and echosounder equipment. (The laptop would run from an independent power supply.) When fully charged, the resulting system would provide enough power to perform six to eight hours of survey work with all equipment and motors in use.

Squeezing all of this equipment onto a low-profile kayak was no easy task. A great deal of customization was required to accommodate all of the positioning, sounding, data integration and power components without compromising the kayak's weight limitations and balance, while ensuring that all of the equipment would be easily accessible from the operator's constrained position. Fortunately, everyone involved had a positive attitude. "Our team's enthusiasm, combined with the eagerness to succeed and create a reliable and safe shallow water survey platform made the process enjoyable," de Azúa says.

The real test for the new surveying vessel was the work on the maritime police pier project, which included numerous shallow and difficult-to-access areas. According to de Azúa, the retrofitted kayak passed the test with flying colors. "We had to deliver certified survey maps in both hard copy and digital formats," he explains. "The maps met all of the client's needs and expectations; there were no gaps due to shallow conditions. Further, we were able to complete the surveys ahead of schedule because of our ability to deploy quickly and maneuver in shallow water."

RLDA has since been able to use the kayak for several other projects. de Azúa is confident that the new platform will become an increasingly valuable asset in the future. "The use of the kayak surveyor has opened opportunities for work not possible when using traditional survey platforms," he says. "Quick, light and efficient, this survey package will provide our clients with survey data from areas that were previously unreachable, and in a more efficient manner. Shallow bodies of water are no longer a match when working from the kayak surveyor. Additionally, using only one operator/surveyor, it frees company's asset to be utilized in other projects—a crucial benefit that allows us to be more competitive in pricing our work."

Renán López de Azúa, PLS, president and owner of RLDA, collects survey data in shallow water. Opposite: de Azúa calibrates his equipment before heading out to perform the day's work.

Kayak Surveyor Components

VESSEL – 13'10" TORQUE OCEAN KAYAK

- Includes a battery box and kill switch.
- 100% sealed connections prevent corrosion and short circuits.
- Extra-large rudder designed to optimize steering.
- Infinitely variable speed control.
- Large covered bow hatch.
- Weedless wedge prop offers weed-free cruising.
- Durable Minn Kota saltwater trolling motor delivers 33 pounds of quiet power.

ECHO SOUNDER – TELEDYNE ODOM HYDROGRAPHIC SYSTEM

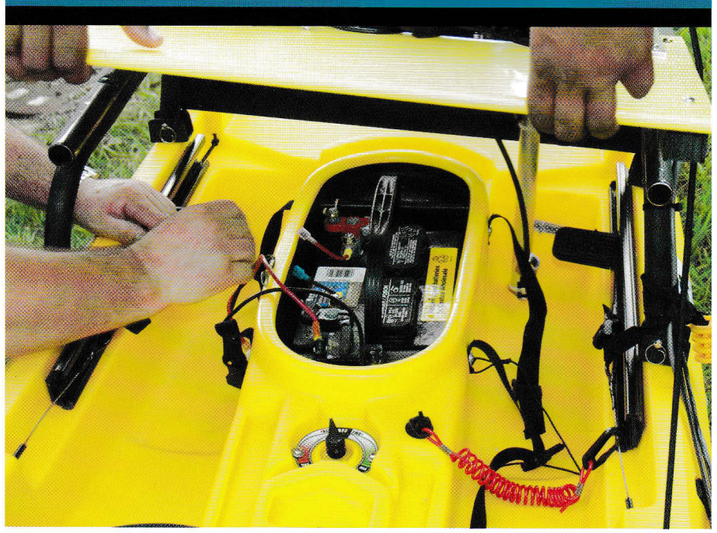
- Designed for inshore and near-coast hydrographic marine surveys up to 800 meters of water depth.
- Its ease of use, portability and cost efficiency make this device a perfect choice for shallow water surveys.
- The sensor unit is compact, interfaces directly to a standard laptop PC and comes complete with power and data cables for data acquisition.
- The dual-frequency transducer operates at 210 kHz, 8 degrees.

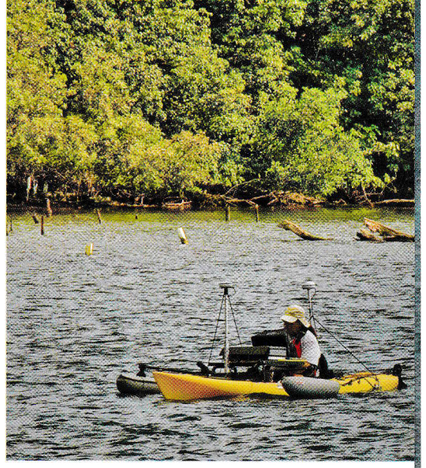
DATA INTEGRATION SOFTWARE – HYPACK

- Designed for hydrographic data collection and processing with single-beam, multibeam, side scan sonar, etc.
- Full navigation with AIS integration.
- S57 chart update and real-time verification.
- Real-time 3D terrain modeling with AVI recording.
- Real-time altitude for keel clearance.
- Provides reports for sections, volumes, TIN models, plots and side scan mosaics.

POSITIONING EQUIPMENT – HEMISPHERE GPS VS101 SERIES GP COMPASS

- Professional heading and positioning unit.
- Affordable solution delivers 2D GPS heading accuracy better than 0.1 degree rms.
- Differential positioning accuracy of less than 60 cm, 95% of the time.
- Integrated gyro and tilt sensors deliver fast startup times and provide heading updates during temporary loss of GPS.
- Fast heading and positioning output rates up to 20 Hz.





The kayak platform provides a low-maintenance, highly efficient surveying tool. Below: The main battery runs the electric kayak motor for a full day. An additional three-battery bank behind the operator (not shown) provides adequate power for the GPS and echosounder equipment.

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