

Development of Communication Device for Riverboat

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Background

The Riverboat is developed by Ocean Science for Teledyne RDI Workhorse instruments to enable the hydrographer to perform flow measurements from bridges, cableways or manned boats.

The Riverboat consists of a Trimaran hull design with the centre hull equipped with a water tight compartment, which houses the communication devices and power supply. The Trimaran hull is a lightweight and stable platform in different flow conditions and this makes it ideal instrument in the flow measurement process.

Flow measurement is performed using an Acoustic Doppler Current Profiler (ADCP) that measures the water velocity and water depth throughout the section.



The presence of bed movement and high sediment loads during flood events especially in alluvial soils conditions influences the accuracy of these measurements and the following instrumentation is incorporated to accurately determine the instrument position and depth measurement.

- A100 GPS
- TriTech Echo Sounder

The data captured from the ADCP, GPS and Echo Sounder during the flow measurement is transferred from the Riverboat to a field computer using a communication device.

WinRiver II is the operating software used by RDI for the collection and processing of flow measurement data and the software is also able to supply real time information about flow, area and water depth measurements.



The number of data channels that are required if an ADCP, GPS and Echo Sounder is used during the flow measurements consist of three and therefore the communication devices that are currently available on the market is not sufficient for these purposes. The use of Bluetooth modems is an option however it is not robust enough for field work and a minimum of three modems will be required, which makes this impractical.


Communication Device Project


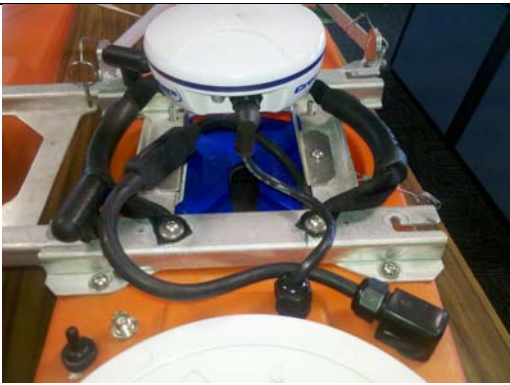

The Department of Natural Resources, Environment, The Arts and Sport in conjunction with Under Water Video Systems started a communication device project for the Riverboat consisting of the following development work.

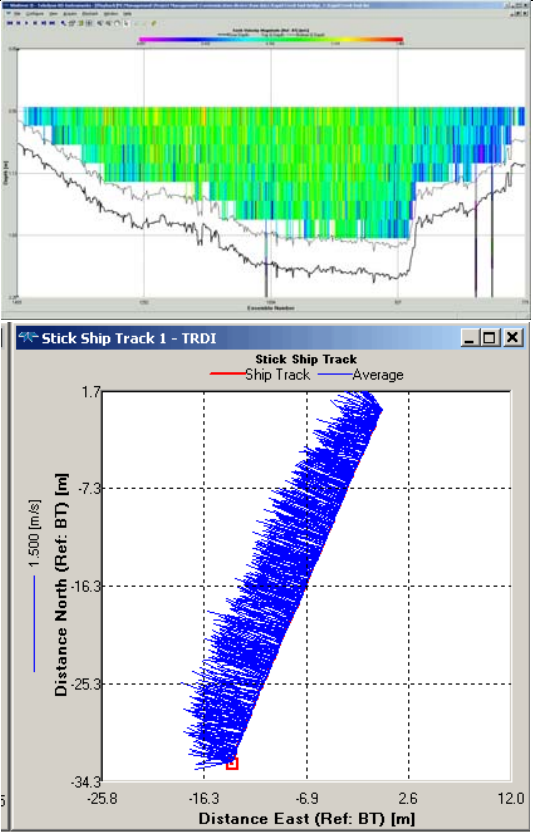
- a) Identify of three channel communication devices available on the market. The device must accommodate baud rate requirements of the different sensors.
- b) Single power supply for all three sensors. The power supply must accommodate voltage requirements of the different sensors.
- c) Communication device, power supply and wiring must be installed in existing water tight compartment.
- d) Manufacture of new shortened sensors cables.
- e) Manufacture mounting bracket for Echo Sounder.
- f) Drafting of an operational manual
- g) Undergo field tests

The outcomes of the project and the development work done by the different organisations are summarised in Table 1.

Table 1

Development	Description	Company
Three channel radio modem	<p>HydroLink ML3 Series</p> <p>The HydroLink ML3 is a three channel radio modem. Each channel has a different baud rate to accommodate the different sensors.</p>	 <p>Ocean-science</p>
Single power supply for all sensors	<p>The power supply is connected to two onboard batteries and can supply 12V and 24V</p>	 <p>Underwater Video Systems</p>

Development	Description	Company
<p>Installed in existing water tight compartment</p>	<p>All instruments relating to radio modems, power supplies and batteries must be housed within the existing water tight compartment.</p> 	<p>Underwater Video Systems</p>
<p>Shortened sensor cables</p>	<p>All sensor cables must be replaced with shortened versions.</p> <p>No excess cables must be on the outside of the hull</p> 	<p>Underwater Video Systems</p>
<p>Mounting Bracket for Echo Sounder</p>	<p>The mounting bracket for the echo sounder is situated at the back of the centre hull of the Riverboat</p> 	<p>Underwater Video Systems</p>

Development	Description	Company
Field tests	<p>Field tests were performed to verify the communication device and the incorporation of the ADCP, echo sounder and GPS data in WinRiver II.</p> 	NRETAS

Summary

The setup of the system is straightforward especially with the wiring that is clearly marked and the self-explanatory manuals. It is important to note that the radio modems at the Riverboat and field computer is part of a set and cannot be switched if you have multiple systems.

The configuration of the ADCP, GPS and Echo Sounder in WinRiver II is also simple and the only real issue is to identify which com port is assigned to each USB converter. The new Panasonic Tough Books purchased have two serial ports incorporated in the docking station, which resolves the USB converter issues.

The system developed by Underwater Video Systems and Oceanscience is more user-friendly and robust than any other communication devices available for this type of application. Although only preliminary tests were performed this is definitely the solution for Riverboats and RDI instrumentation.

On behalf of NRETAS I just want thank Underwater Video Systems, Oceanscience, RDI and Anthony Easman for their efforts in the development and testing of the instrumentation.