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Let's Solve Water

rQPOD/ArQPOD USV

THE MODULAR USV FROM XYLEM EXPLAINED

This overview describes the Xylem rQPOD. One of the key design requirements for the rQPOD was ease of portability and transportability. In particular, being able to be deployed easily by one person. This design criteria was met by utilising a unique modular system. The board and controller/thruster kits are packed separately and easily assembled on site making for a truly portable system.

The board is able to fit in the boot of any standard sized car and weighs 8Kg. The board carry bag includes integrated shoulder straps. The controller, thrusters and power supply fit in a waterproof case with integrated wheels, dimensions D280mm by H560mm by W400mm, weight 16Kg.

KEY SPECIFICATIONS

Top Speed	1.5 m/s
Duration (Manual Control Low Speed)	40 Minutes
Duration (Autonomous, 1.5 Knts)	2 to 3 Hours (6 to 9 km)
Temperature range	-10 to 40C
Transmitter range	500 m
IP Rating	IP67

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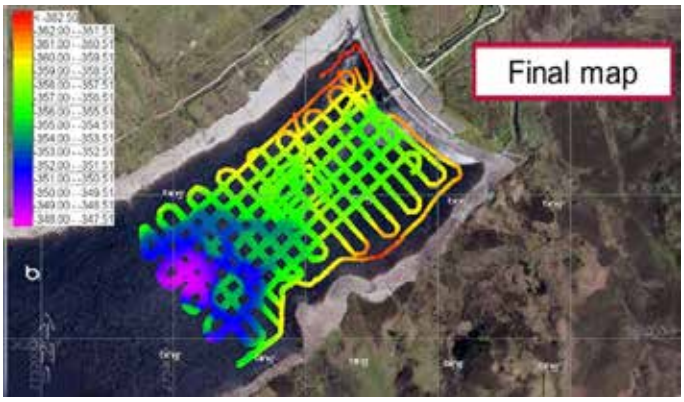
Module: rQPOD

This is the modular package with all required fixings that transforms the board into a remote boat. Complete with wet-mateable connectors, battery and navigation lights the rQPOD has everything you need to create a lightweight, easy to use remote boat.
(Part Number rQPOD)

Module: ArQPOD

Same as rQPOD, but adds GPS and CPU to enable survey line plans to be uploaded. This allows for autonomous operation of the USV, particularly useful for bathymetric surveys. The virtual anchor utility is also included which enables the boat to hold position using its GPS.
(Part Number arQPOD)



Position 1
Manual Control of USV

Position 2
Virtual Anchor. When activated will hold its position in water using the GPS (ArQPOD only)

Position 3
USV runs uploaded survey lines (ArQPOD only)

Able to toggle between 1-3 at anytime

Position 1
Reduced maximum speed, best bettery performance

Position 2
Medium Performance

Position 3
Top Speed Enabled, reduced battery performance

Precision Radio Control Transmitter
Access telemetry data including temperature, Battery Voltage
Audible alarms on high temperature and low voltage

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Module: Torrent Board

The Torrent Board was developed in conjunction with a team of SonTek RiverSurveyor M9/S5 users to be deployed in rivers across a wide range of velocities. The board comes "rQPOD ready" with pre-drilled fittings and capped cable runs for snag-free connection to the thrusters. Single or double moon pool versions are available as well as a mount kit to retrofit to other boards (modumounts).

(Part Numbers RadBd-M9, RadBd-Duo, RQMM1001)

RadBd-M9

RadBd-Duo

Module: Modumounts

The modumounts is a mounting kit that enables the rQPOD thrusters and control unit to be retrofitted to the Hydroboard 2 and Oceansciences Trimaran boats.

(Part Numbers RQMM1001)

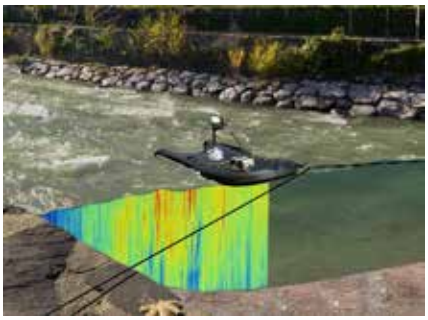

RQMM1001

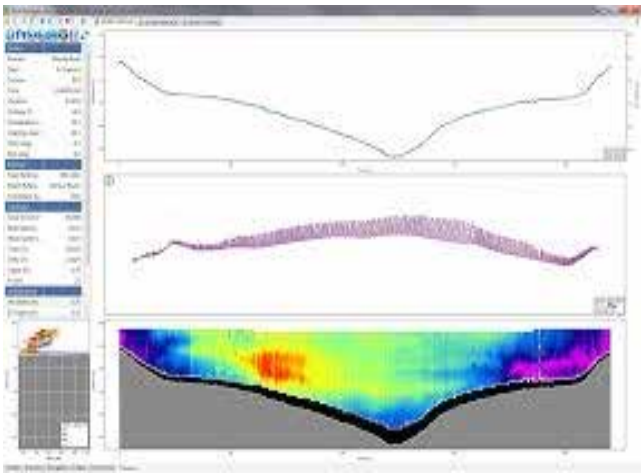

RQMM1001

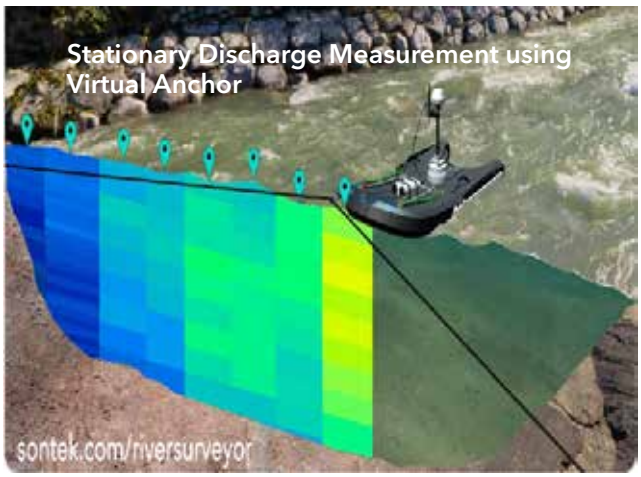
DISCHARGE MEASUREMENTS

The design focus for the rQPOD was ADCP discharge measurements, specifically, the SonTek S5/M9. Boat speed and control are critical for reliable, accurate and repeatable ADCP moving boat discharge measurements. The rQPOD has responsive and throttled acceleration minimising rapid direction or speed changes. In addition the boat can be controlled precisely at very slow speeds.

SonTek implemented the ability to undertake stationary discharge measurements using a virtual tagline where station distances are determined from the SonTek GPS coordinates. The ArQPOD virtual anchor feature where toggling a switch on the controller results in the boat holding its position in the water can thus be used to make stationary discharge measurements.







Surveying

The rQPOD is tightly integrated with a variety of survey instruments including the SonTek Hydrosurveyor-M9, Stealth Scan Sidescan sonar, single beam echosounders from CEE and Echologger dual frequency echosounders. The ModuPC serves as the interface between survey instruments, data collection and shoreside data access. Coupled with an ability to run autonomous survey missions the rQPOD presents as an extremely versatile and portable platform for any survey requirement.

(Part Number: ModuPC)

- Connects via remote desktop over WIFI (~200m range) or SIM
- Inbuilt DGPS
- 7AH 12v lithium battery <100Whours
- Runs Hypack (not included) or any other program
- Dedicated instrument connectors for YSI EXO (including SOA DCP)/ SonTek M9/stealth-scan and external GPS using splitter cable fly's
- External Rs232, USB and 12v dc out.

(Part Number: ModuPC)

SonTek M9-Hydrosurveyor
Bathymetry and Currents
Stealth Scan Sidescan
(PN SScan)

PC & Powersupply
(PP ModuPC)
Stealth Scan Sidescan
(PN SScan)

HYPACK
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Also Available:
Single Beam Echo Sounder
Dual Frequency Echo Sounder
(PN SBSensor; DFSensor)

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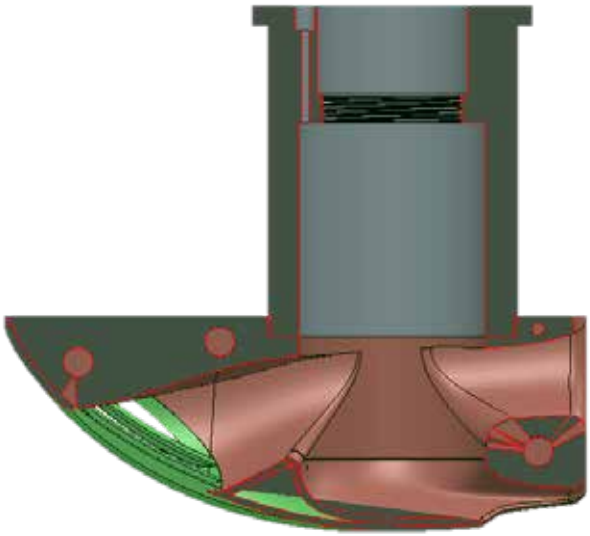
Surface Water Quality Data Collection

The whalemount is a custom designed flow through chamber for using the YSI EXO multi parameter sondes with the rQPOD. The design criteria was to minimise aeration and fouling issues associated with water quality data collection from moving vessels. With up to 5 water quality parameters measured concurrently, the rQPOD can gather surface water quality efficiently and accurately. Using the YSI handheld that features inbuilt GPS, water quality data can be georeferenced or alternatively, the ModuPC can be used to collect georeferenced WQ data.

(Part Number: Whalemount)



Remote Surface Grab Sample Collection

Combining the Xylem Ai1 Monitoring System and the Xylem GWI SP100, the rQPOD can be used to collect discrete water quality samples remotely. Each sampling location is georeferenced and sample volume activation and control is activated remotely via PC or Phone/Tablet.

(Part Number: Samplersys)

SP100 Portable Sampling Pump

- Easy push-button control for exact sample size
- One litre per minute rate at 4 foot head
- Internal rechargeable battery
- Pump approximately 150 litres (40 gallons) between rechargings Weatherproof enclosure
- 15’ pickup hose with strainer provided
- Lightweight, rugged, and weather resistant enclosure

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YSI
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Applications

Given the variety of instruments that can be used with the rQPOD as well as its portability and versatility, the system has been used in a variety of applications. **These include:**

i) routine discharge measurements in streams and rivers
ii) bathymetric surveys in lakes, wastewater ponds and rivers
iii) pollutant source detection using the YSI water quality sonde
iv) reservoir integrity investigations using the side scan sonar
v) remote grab sampling at lakes

Mining Pit Lake Volume Survey

Wastewater pond volume survey and remote grab samples

Coastal bathymetric and surface water quality survey

Precision Control for surveying in tight/small spaces

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