

AWTSS-1



AUTONOMOUS WATER TELEMETRY SENSING SYSTEM
Integrated Platform for Proximal and in situ Sensing of Water Bodies

Autonomous Water Telemetry Sensing System

AWTSS-1

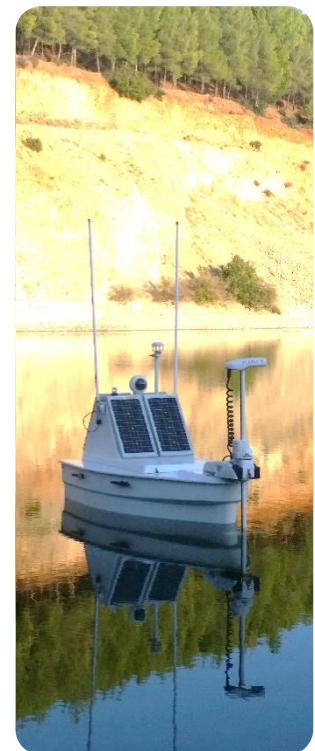
Platform for Proximal Sensing of Water Bodies

- ▶ It is able to measure and transmit via telemetry water quantity and quality data feeding Big data
- ▶ AWTSS-1 is continuously connected to the base station for the handling and data transferring
- ▶ The operator has full control of the navigation of the vessel as well as the measuring procedure and the measuring points

The operator has optical contact with the environment around and inside the vessel via remote cameras.

It can be moved easily in lakes, rivers, lagoons and coastal waters.

Using suitable controllers and servo – electric mechanisms the vessel is able to take telemetric measurements both at the water surface as well as in the water column profile.





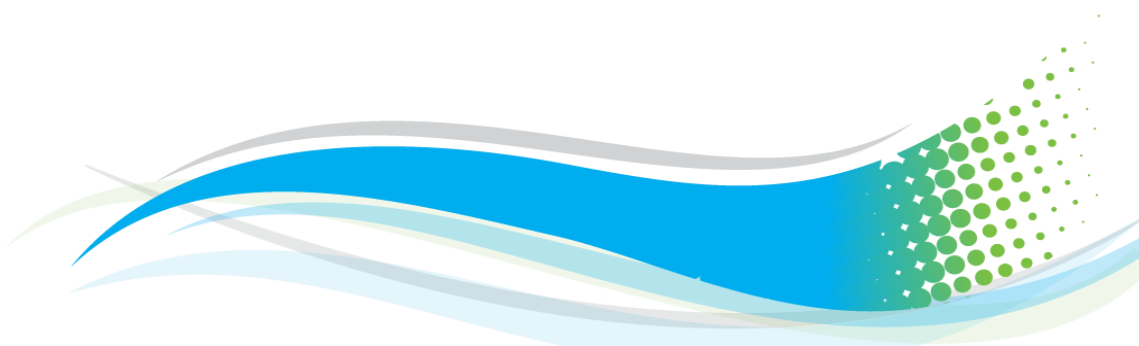
Automated Floating Mechanism for Auto-Deployment of AWTSS-1
Incorporating Sensing Actuating Mechanism of Water Column Measurements



The Automated Floating Mechanism is the Docking Station of the AWTSS-1



Autonomous Departing from Docking Station





AVAILABLE SENSORS

- ▶ Available Sensors
- ▶ Communication
- ▶ Integration
- ▶ General Specifications

AWTSS-1 can carry a variety of sensors and samples adapted to the user's needs some examples

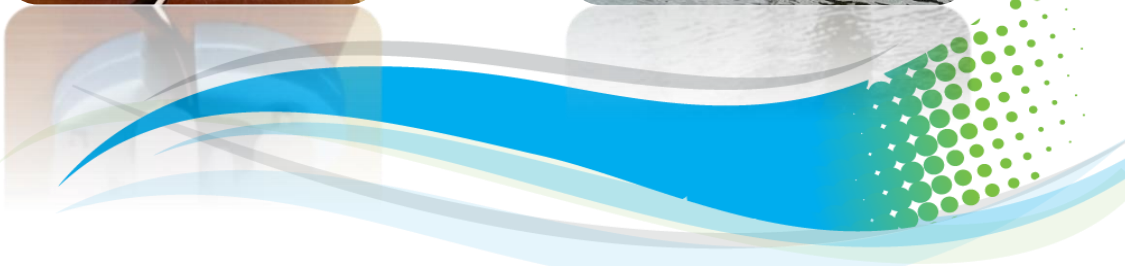
Exo2 6-Port Multiparameter Water Quality Sonde with Anti-fouling Wipe

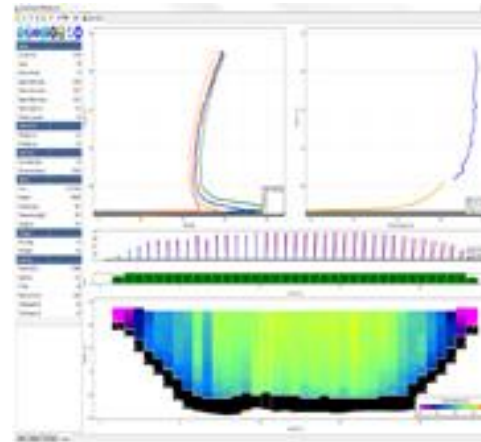


Patented Variable Depth Active Sampler
six different samples depending on
physicochemical parameters

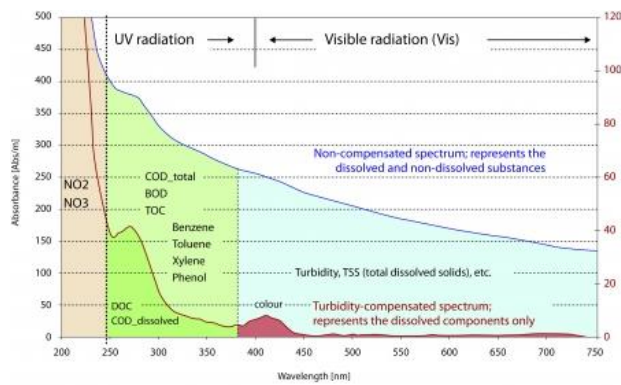


Lake deployment



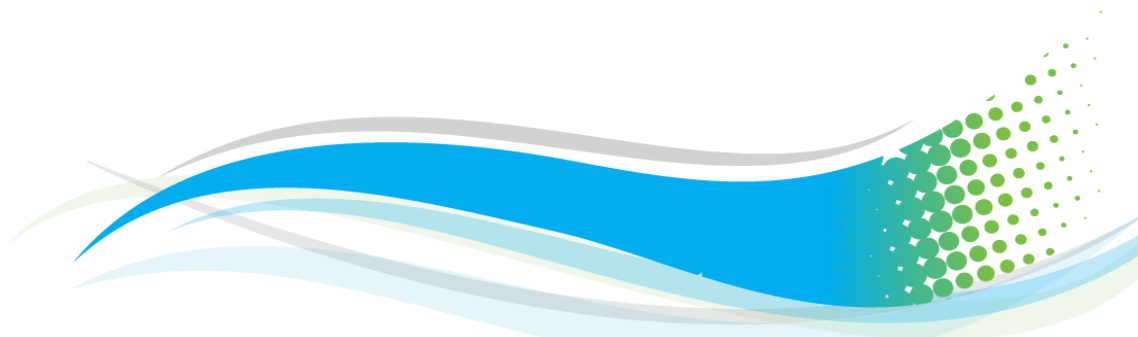


River Surveyor Passive Sampler Multi-Band - Multiple acoustic frequencies, Bathymetry, River flow and discharge measurements



spectro::lyser Passive Sampler

Spectral water footprint, NO₃-N, COD, BOD, TOC, DOC measurements, water quality monitoring



COMMUNICATION

- Wireless Lan
 - ▶ Long Range Omnidirectional Antenna
 - ▶ Long Range Parabolic Antenna
- LTE Modem
- Radio Control Receiver

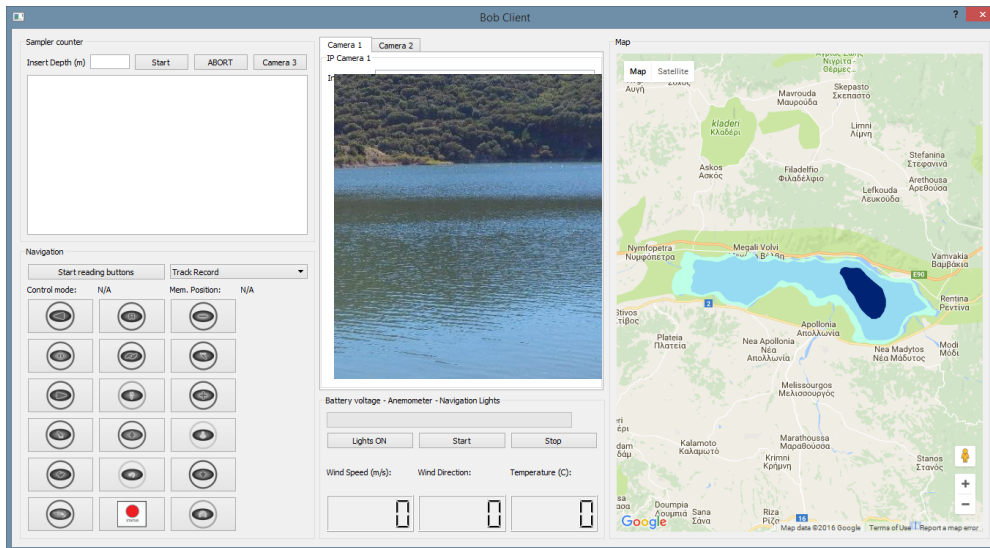
NAVIGATION

- Autonomous vertical and horizontal mission and telemetry
- Fail safe mode
- Safety mode (Anti-theft)
- Collision Detection
- 6 Predefined Paths



Mission predefined path example

INTERGRATION



Control and Handling Software user interface with external camera input

CONTROL AND HANDLING SOFTWARE

- Optical confirmation for the user's commands sent by UHF telemetry
- Snapshots of the internal and external cameras
- Real time measurements from the wind speed / wind direction, The software calculates and present the true wind direction as well the relative wind direction to the vessel
- Real time measurements from Air temperature
- Real time measurements from Relative humidity
- Real time measurements of the Battery Voltage
- Real time measurements of the GPS data
- Real time measurements of the Vessel speed and direction
- Indication of the depth where the Multiparameter probes is taking measurements (winch depth)

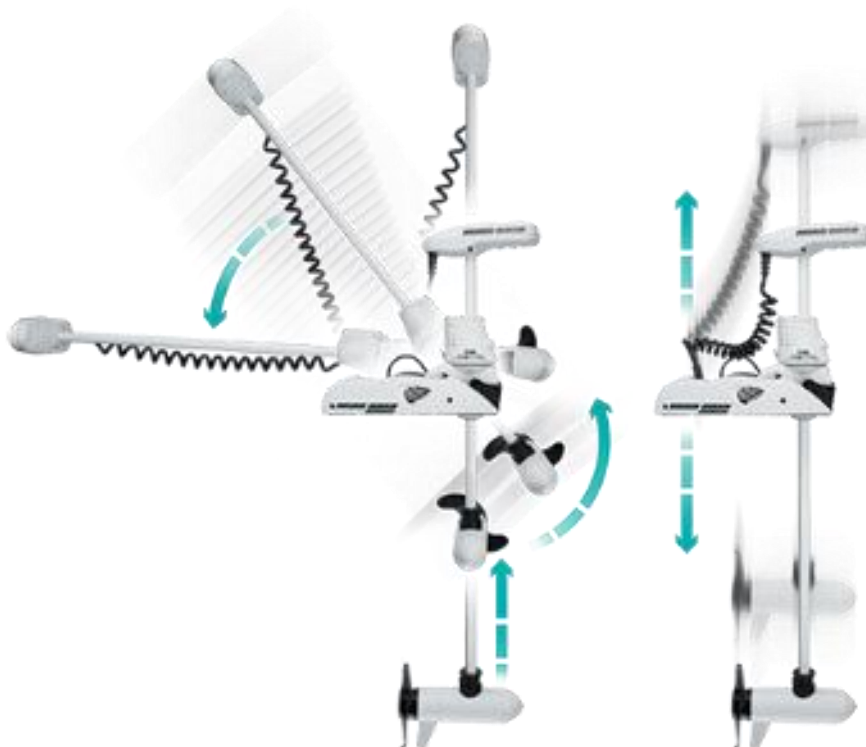
GENERAL SPECIFICATIONS

Remote Control Futaba T10J + Booster	Via long range up to 20 km using booster Scherrer - TxRx700 Lite
Control via 3G GPRS	Via the GPRS router type Zyxel LTE3301-Q222 4G/3G install on the vehicle
Control via WiFi	Via the Wi-Fi connection from the ALGIZ 10X rugged PC, which is installed on the vehicle
Propulsion	Via the electric motor MINN KOTA - RT80/ST/i-Pilot/80/24/54"
Electric power	Via 2 X 100 AH, rechargeable batteries. The solar panels, the batteries the upper part of the vessel, will have alarm switches connected to the SCOM. In case of movement of the above the SCOM will send SMS alarm and will turn on audible alarm at 120 DB, simultaneously the unit will send SMS alarm. Also it will turn on the main power to the rugged PC and the cameras
Charging system	Land charged via 220 V / 50 Hz, incorporated charger. During the mission and the mooring, via 40 Watt solar panels. The ROV can operate continue at mission stage for at least 4 hours
Visual monitoring	Two controlled cameras. One for the external vehicle environment monitoring and one for interior. The vehicle has internal lighting via low power ultra-bright LEDs
Marine Lantern	Equipped with the self-charged Sealite SL-15
Rugged PC	Onboard ALGIZ 10X for the vehicle and peripherals control as well for the data storage
Lighting	The vehicle has internal lighting via low power ultra-bright LEDs, The light is sufficient for the remote inspection, via the internal camera, the whole interior and the various modules (winch, switches, etc)
Auxiliary safety system	Via the SMS controlled SCOM 100 module. The user via SMS can switch on/off all the critical parts as well can be alerted by SMS in case of malefactions

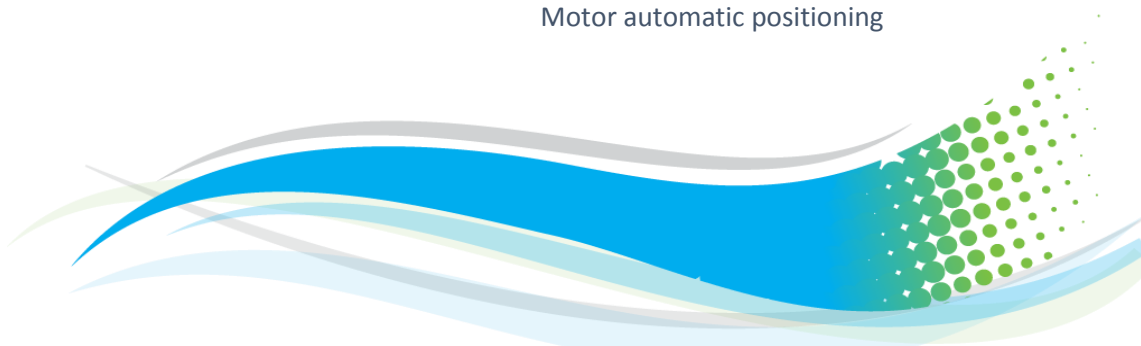


Propulsion System

Maximum thrust	36 Kg
Type	RipTide
Operation Voltage	24 Volts DC
Length of axis	137 cm
Weight	16 kg
Maximum power consumption	56 A
Nominal power consumption	10-15 A, during the mission
Propeller	Weedless wedge 2
Speed	Adjustable
Auto stow & deploy	Gets your motor in and out of the water automatically using the remote
Control	The motor is controlled from the UHF telemetry, as well remotely via the rugged PC (GPRS, Wi-Fi). The user has full control for the speed, direction, waypoints and generally all the function an controls



Motor automatic positioning



Vessel

Material	Polyester
Type	AWTSS-1 consists of two parts, the lower part that hosts all the electronic equipment and the upper part that has the antennae and solar panels and external camera. The two parts are firmly sealed to each to other, offering full isolation to water
Access to interior	The top part can be opened in order to give full access to the interior and electronics
Maximum external length	2.05 m
Maximum external width	1.15m
Maximum height	1.00 m
Weight out of the water	140 Kg
Maximum payload	150 Kg
Maximum suggested engine power	8 HP
Maximum engine weight	35 Kg
Vessel displacement with the maximum load	295 Kg
GPS	The vessel has 2 GPS. One in the motor and on in the Rugged PC
Vessel sensors	Inside the Vessel has a temperature and relative humidity sensor. Outside is installed a wind speed / wind direction sensor. The software will correct automatically the wind direction according the heading of the vessel and will display the true wind direction
Winch type Nova EWK 2000	The vessel is equipped with the Winch type Nova EWK 2000. The winch has 30m stainless wire rope with diameter 2mm. The winch is remotely controlled via the rugged PC (GPRS, or Wifi), or via the UHF remote control. The maximum loads which the winch can handle is 907Kg. The winch can be used in combination with the exo2 Multiparameter probe for water profiling up to 30m. The depth is actively monitored by the software using a suitable shaft encoder
Profiler port	On the center of the bottom part there is a 20 cm whole with the suitable, water isolation. The profiler (and other equipment) can be have access to the water



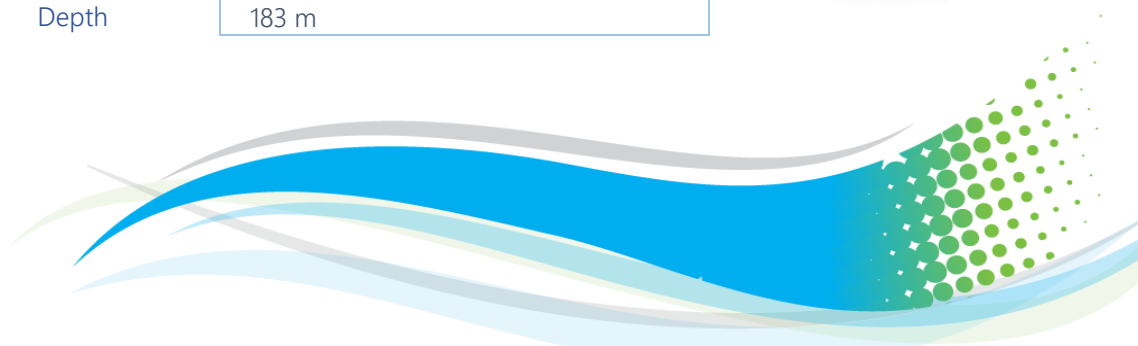


Onboard Rugged PC

Size	275 mm x 171 mm x 32 mm
Type	ALGIZ 10X
Weight	1.3 kg
Operating	-20 °C to 60 °C
Drop	26 drops from 1.22 m
Vibration	MIL-STD-810G, Method 514.6 Procedure I
Sand & Dust	IP65, IEC60529
Water	IP65, IEC60529
Processor	Intel® quad-core N2930 1.83 GHz Processor with 2.16 GHz boost.
Memory/Disk	4GB DDR3 RAM/128 GB SSD
Operating System	Windows 10 Enterprise LTSB (64-bit)
Screen	10.1" LED high, touch. Ambient light sensor
Battery	Hot-swappable Li-Ion Battery Pack, Standard battery: 5300 mAh (39.22 Wh)
Connections	1 x USB 2.0 port*, 1 x USB 3.0 port, 1 x 9-pin serial RS-232 port*, 1 x VGA*, 1 x DC power port*, 1 x RJ45 10/100/1000 LAN, 1 x microSD Slot, SDXC 1 x Audio/Microphone
Audio	Speaker / Mic / Headset jack
PAN	Integrated BT v4.0 / v2.1
Cellular (WWAN)	Sierra Wireless MC7304 / MC354, LTE, HSPA+ GSM/GPRS
Navigation	Integrated u-blox® GPS, WAAS/EGNOS/MSAScapable
Camera	5 Megapixel Camera + LED flash

Depth sonar type echo 150

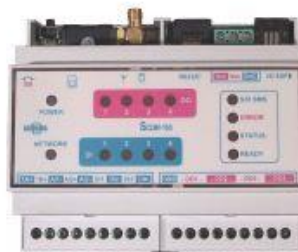
Display	102 mm diagonal, 256 × 160 pixels, 8-level gray
Temperature Range	-15°C to 70°C
Compass Safe Distance	250 mm
Frequency	200 kHz
Power Source Voltage Range	10–20 Vdc
Depth	183 m





Safety System

Setup	The setup and control is done via mobile phone. Simply insert a SIM card with your name and phone number in the phone list and press the startup button during power up!
Type	SCOM
Power supply	12/24 VDC $\pm 10\%$, 30mA to 0.25 A max
Wireless modem	Quad Band GSM (850/900/1800/1900MHz)
Digital inputs	4, 0-30VDC, expandable to 36 (8 GE- DIO-42 modules)
Digital outputs	4, relay 250V/8A (AC1), expandable to 20 (8 GE- DIO-42 modules)
Analog inputs	2, AI1: 0-10V, 0-1V, AD592 Temperature sensors, AI2: 0-20/4-20mA, expandable to 18 (4 GE-AI-4 modules)
Counters	4, 2 KHz max
Indications	LED, I/O & control states
Serial interface	RS232C, up to 921 kBit/s
Dimensions	106 x 90 x 58 mm
Command set	Over 60 ASCII SMS commands for system, configuration, alarm settings and remote control
	Will act as security system completely isolated from the rest telemetry arrangements and will have its own SIM cart for SMS control
	It will switch on/off the electrify to the main energy distribution unit of the ROV via SMS commends
Pre Programmed	It will provide the real time values form the sensors connected on its parts via SMS after the user request by SMS
	The user can program circular activation / deactivation of peripheral devices unit the relays of the unit
	The user can switch ON/OFF the cameras via SMS (interrupting their power connection)
	It will measure the voltage of the battery and send SMS alarm in case of low level





SYSTEM CONNECTION DIAGRAM

