ENVIRONMENTAL

YSI Water Quality Instruments & Integrated Systems
Cutting-edge measurement technologies
Cutting-Edge Measurement Technologies

In partnership with

AANDERAA
a xylem brand

YSI

SonTek
a xylem brand

Sea Robotics

xylem
Let’s Solve Water

HYCAT

HYPACK
a xylem brand
Agenda

Water Quality
- ProDSS
- EXO Series

Water Flow
- FlowTracker
- RiverSurveyor
- HydroSurveyor

Advanced Sampling
- Vertical Profilers
- Eco Mapper
- HYCAT
- Hydrographic Software
- Wave Measurement

Aids To Navigation
- Beacons
- Audible Aids
Water Quality

EXO3 & ProDSS
ProDSS

One cable design simplifies field sampling

Optional depth sensor for profiling studies

USB On-The-Go connector for connecting to PC, recharging, and backing up data to USB flash drive

Long-life rechargeable lithium-ion battery
Optional built-in GPS sensor

Digital sensors are auto-recognized and displayed; color screen with graphing

Large memory stores over 100,000 data sets and 400 GLP records; 100 user-defined sites and 100 data IDs for easy data management

Backlit keypad for use in any lighting condition

Detailed on-screen Help function; backlit keypad

Rubber over-molded case provides extra protection and prevents slipping; provides an IP-67 (waterproof) rating with or without battery cover

MS (military-spec) connectors - rugged, waterproof, keyed, bayonet style quarter-turn lock

Rugged field cable features 2-year warranty
Up to 100 meter cable lengths available

Multiple weights can be installed at the bottom of the sensor guard

WWW.HOSKIN.CA
ProDSS

• One cable design ideal for multiparameter water quality testing and profiling
• Cable lengths available up to 100 meters
• Graphing on handheld
  • Stability during measurement
  • Stability during calibration

YSI ProSolo

Extreme flexibility for the measurement of a variety of combinations for dissolved oxygen, conductivity, and temperature along with depth.

*Other configurations coming soon*
ProDSS

Parameters

- Dissolved Oxygen (Optical)
- Turbidity
- pH
- ORP/Redox
- Conductivity
- Specific Conductance
- Total Dissolved Solids (TDS)
- Resistivity
- Total Suspended Solids (TSS)
- Depth
- Ammonium
- Ammonia
- Chloride
- Nitrate
- Total Algae (Blue/Green and Chlorophyll)
- Temperature
- GPS
EXO Sondes

The family of EXO water quality sondes has an option for every application. Ideal for in situ sampling and long-term monitoring.

For more, visit: YSI.com/EXO

EXO 1
- 4 Ports, internal battery, no wiper, spot sampling, short deployment

EXO 2
- 7 Ports, internal battery, wiper, extended deployment, Big5 + special parameters, Algae/ChlA FDOM

EXO 2s
- 7 Ports, no internal battery, wiper, spot sampling, Big5 + special parameters, Algae/ChlA FDOM

EXO 3
- 5 Ports, internal battery, wiper, extended deployment, Big5
- SDI-12 built in
EXO Sondes

• Continuous Long-term Water Quality Monitoring
• Smart sensor technology & Smart QC
• Cable-free operation
• Biofouling Protection – extended deployment times
• Titanium wet-mateable sensors
• Assisted calibrations
• Advanced adaptive sampling
EXO2 Sonde

Continuous Monitoring
6 ports + wiper port
Diameter: 7.62 cm (3.00 in)
Length: 71.10 cm (28.00 in)
EXO2 Anatomy

Battery Compartment

Reinforced Internal Structure

Welded Titanium Bulkhead and Connectors

High-Impact Xenoy Housing

Cable connector, battery valve, and expansion port for an additional sensor

Anti-fouling wiper keeps sensors clear of biofouling and lengthens deployment times by 25%
**EXO Smart Sensors**

### Conductivity and Temperature
- Improved Temp. accuracy and response
- Improved Conductivity range
- Required for all monitoring applications

### Turbidity
- Increased range without loss of accuracy

### Total Algae
- Two sensors in one
- Chlorophyll + BGA-PC or PE

### Smart Wiper System
- For use with EXO2 platform
- Superior anti-fouling
- Faster sampling response
EXO Smart Sensors

**Ph + ORP**
- Removable probe head
- Guarded and Unguarded versions

**Ion Selective Electrode**
- Replaceable module
- Ammonium, Chloride, Nitrate

**Fluorescent Dissolved Organic Matter (fDOM)**
- New for YSI

**Optical Dissolved Oxygen**
- Improved accuracy above 200%
- Faster response
- Screw-on membrane
EXO2 Sonde

Parameters Available
• Ammonium
• Barometric Pressure
• Blue-green Algae, Phycocyanin
• Blue-green Algae, Phycoerythrin
• Chloride
• Chlorophyll
• Conductivity
• Depth
• Dissolved Oxygen, % air saturation
• Dissolved Oxygen, mg/L
• fDOM(CDOM)
• Nitrate
• pH
• ORP
• Temperature
• Turbidity
• Salinity
• Specific Conductance
• Total Dissolved Solids (TDS)
• Total Suspended Solids (TSS)

Photo shows sensor after 90-day deployment in the productive waters of the Gulf of Mexico. EXO2 deployed and tested for 4 years at this marine site.
EXO3

5-port: 4 sensors + central wiper

Integral SDI-12

Uses fewer batteries

Fits into 6-series installations

*Less expensive, purpose-built sonde for standard water quality monitoring*
EXO Handheld

- Full-Color LCD
- USB & GPS
- Wet-Mateable Connector
- Barometer
- IP-67 Housing
- Built in Li-Ion battery
- KOR Software
EXO Go Wireless Adaptor

Via cable

Windows-based PC or mobile device running KOR 2.0
Water Flow
FlowTracker 2

Figure 1:1 - FlowTracker2 with 2D Probe

- Battery Compartment
- LCD Screen
- Handheld
- Keypad
- Probe Cable
- Communication Connector
- Probe
FT2 Measurement Protocol
New, longer FT2
FlowTracker 2
M9/S5 RiverSurveyor

- Acoustic Doppler (Current) Profilers
- Automatically measure velocity and direction for the entire vertical column from the surface, looking down (0.3 to 40 m)
- Can be used at stationary locations (like wading measurements) or from moving boat
- Ideal for non-wadable sites
HydroSurveyor

- Flexible and Fast
- All Inclusive
- Software Centric

The HydroSurveyor is a system designed to collect bathymetric, water column velocity profile, and acoustic bottom tracking data as part of a hydrographic survey.
YSI SYSTEMS AND SERVICES:
VERTICAL PROFILING SYSTEMS
Monitoring Systems & Services Delivering Better Results
Advanced Sampling
EcoMapper is a cost-effective tool for *quickly* and *easily* collecting high-resolution water quality, bathymetry, and sonar data.
Why an Automated Profiler?

Improved Data Quantity & Quality

• Provides a high resolution data set
  • Resolution of 0.5 meters
  • More data than spot checking or manual profiling
• Takes the “guess work” out of monitoring
  • Accuracy through automation
  • Reliable
  • Works during critical storm events
• Through telemetry, data is delivered to your desktop
  • Eliminate costly and potentially dangerous trips to the field
Why an Automated Profiler?
Types of Profilers

Fixed Vertical Profiler

Applications
- Dam
- Pier
- Piling
- Or other stationary location

Configuration
- NEMA 4X Electronics Enclosure
- Solar or A/C power system
- Mechanical, non-corrosive winch
- Automatic vented level compensation
Fixed Profiler Installation Examples
Types of Profilers

Pontoon Vertical Profiler

- **Applications**
  - Lakes
  - Reservoirs
  - Ponds
  - Estuaries

- **Configuration**
  - Sealed electronics pressure case
  - 6’x12’ Pontoon Platform
    - Grated aluminum “clean” decking
  - Solar power system
  - Mechanical, non-corrosive winch
  - Automatic level compensation
    - Depth sounder
Types of Profilers

Buoy Vertical Profiler

- **Applications**
  - Near Coastal
  - High energy environments
- **Configuration**
  - Sealed electronics pressure case
  - 2 meter oceanographic buoy
    - Closed cell, Ionomer foam
    - Galvanized steel structure
  - Solar power system
  - Mechanical, non-corrosive winch
  - Automatic level compensation
    - Depth sounder
Source Water Monitoring
YSI Integrated System Buoy Fleet

- Payload Requirements
- Wave Conditions
- Current Conditions
- Depth Considerations
- Deployment Logistics

PISCES  EMM 68  EMM 700  EMM 2.0
EcoMapperAUV

The next generation of autonomous water quality vehicles. The i3XO EcoMapper generates high-resolution maps of water quality, water currents, bathymetry, and sonar imagery.
EcoMapperAUV
HYCAT – Autonomous Surface Vehicle (ASV)

Man Portable Autonomous Surface Vessel (ASV)
A safe efficient means to collect hydrographic data in coastal, remote and limited access areas.

- Bathymetry
- Water quality
- Habitat mapping
- Discharge measurements
- Infrastructure inspection
- Search and rescue operations
Major Vehicle Functions

Water Quality Measurement
- Up to 18 parameters

Bathymetry
- Submerged terrain
- Compute volume

Navigation
- GPS - when on the surface
- DVL – bottom/water track when below the surface

Sonar & Video Imagery
- Side-scan and Multi-beam sonar
- Video and still imaging
HYCAT – Autonomous Surface Vehicle (ASV)

- Onboard Windows 10 Data Acquisition Computer with HYPACK MAX software
- Hemisphere AtlasLink™ RTK GNSS Receiver
- YSI EXO2Sonde platform
- Foam filled unsinkable hulls
- HYPACK MAX software allows for on-board data acquisition and data post processing
- Health LED, Safety Kill Lanyard, and IP67 User USB port
- Protected Pocket Thruster with SST Guard
- Hull Mounted Blueprint Subsea Starfish Sidescan sonar
- 5.8 GHz Wireless Coms

In partnership with: Xylem Brands, SonTek, SeaRobotics
HYCAT – Autonomous Surface Vehicle (ASV)

**Onboard Sensors**
- SonTek M9: RiverSurveyor &/or HydroSurveyor
- YSI EXO 2 (Shorty) multiparameter Sonde
- BluePrint Subsea Starfish 453 side scan sonar
- Hemisphere AtlasLink L1/L2 GNSS receiver
- (Optional) Impact Subsea ISA500 single beam sonar
  M9 ADCP

**EXO2 Multiparameter Sonde (shorty)**
- 12VDC nom (9-16)
- .12 amps
- USB output

**RiverSurveyor-M9**
- Weight in Air: 2.3 kg (5.0 lb)
- Weight in Water: -0.6 kg (-1.3 lb)
HYCAT – Autonomous Surface Vehicle (ASV)

Autonomy

Control Modes
• Automatic waypoint following
• Automatic planned line following
• Auto heading
• Station Keep
• Thruster
• Stream Gauge

Fail safes
• Anti grounding
• Exit boundary
• GNSS data quality monitoring
• Auto return to recovery position
• Full System health monitoring
  • System current & voltage
  • Battery capacity
  • Coms status
  • Heading sensor data
  • Electronics temperatures
  • Thruster outputs
HYCAT – Autonomous Surface Vehicle (ASV)

Performance

<table>
<thead>
<tr>
<th>Specification</th>
<th>Published</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOA (in)</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Beam (in)</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Draft (in)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Weight (lb)</td>
<td>120</td>
<td>115.5</td>
</tr>
<tr>
<td>Max Speed (kts)</td>
<td>5</td>
<td>8.0</td>
</tr>
<tr>
<td>Endurance (hrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@ 2 Knots</td>
<td>6</td>
<td>8.5</td>
</tr>
<tr>
<td>@ 3 knots</td>
<td>4</td>
<td>6.0</td>
</tr>
<tr>
<td>@ 4 knots</td>
<td>2</td>
<td>2.8</td>
</tr>
</tbody>
</table>
HYCAT – Autonomous Surface Vehicle (ASV)

Design

Recessed EXO

Integrated Sensor Wells
HYCAT – Autonomous Surface Vehicle (ASV)

Ease of Transportation
HYCAT – Autonomous Surface Vehicle (ASV)

Launch and Recovery
Autonomy and HYPACK Control

Control Modes
- Automatic waypoint following
- Automatic planned line following
- Auto heading
- Station Keep
- Thruster
- Stream Gauge

Fail safes
- Anti grounding
- Exit boundary
- GNSS data quality monitoring
- Auto return to recovery position
- Full System health monitoring
  - System current & voltage
  - Battery capacity
  - Heading sensor data
  - Electronics temperatures
  - Thruster outputs

One user interface provides:
- Increased situational awareness for operators
- Intuitive survey planning, acquisition, and vessel operation
- Realtime survey planning & execution
ASV Operations: A Case Study

Survey area: 1700 linear meters
Total survey lines: 12
Total survey time: 45 minutes
Line spacing: 5 meters initially, then expanded to 15 meters
Data processing: 10 minutes for bathymetry
Data Output - Contour Map With Sounding Overlay

3D rendering with vertical exaggeration of 3x
Data Collection Using the EXO Sensor (16 Parameters)

Select any of the 16 parameters for processing.

Creation of time series X, Y, sensor

Simultaneously collected with other sensors

Cross section of temperature
MOTUS Measure Waves from Navigation or Data Buoy

The Aanderaa MOTUS Directional Wave, Current and Water Quality tuned two proven buoy platforms:

- Tideland SB138-P MOTUS
- YSI EMM 2.0 MOTUS

Ask Aanderaa and YSI about additional buoy platforms
Environmental Monitoring | Offshore Oil & Gas Platforms | Marine Terminals | Harbors and Coastal

Weather Station
- Compact modular design
- Self-contained
- Rugged construction
- Flexible configurations

Horizontal Profiler
- Compact modular design
- Self-contained
- Rugged construction
- Flexible configurations

Vented Tide Sensor
- Compact modular design
- Self-contained
- Rugged construction
- Flexible configurations
Aids to Navigation – Tideland Solutions

World leader in Aids to Navigation
- Over 1000 port and coastal AtoN systems delivered worldwide
- Over 60 years in business starting as supplier to offshore oil industry
- Members of IALA, IAPH, UKHMA, RTCM, IEC, and NAM

Products include:
- Lighted Beacons and Floating Aids
- Radio Aids and AIS AtoN
- Audible Aids
- Power Sources
- Support Structures
- Remote Monitor & Control

Services
- Installation
- Maintenance
- Consultancy
Hoskin Rentals

Hoskin Scientific Can Provide Rentals for All Environmental Applications
Hoskin Service
About Hoskin

Hoskin Scientific has been supplying testing and monitoring instrumentation to the Canadian market for over 70 years.

Our Environmental department provides everything from systems integration services, water quality, oceanography and aquaculture, to meteorology, hydrology, indoor air quality, soil science, and plant science. We provide solutions for monitoring and sampling biological and chemical parameters in the environment. Hoskin Scientific can equip you to collect the data you need for your project whether through a purchase or rental.

Each office across Canada has sales and service staff readily available to assist you in choosing the right product and having equipment or instrumentation serviced. To find out more about Hoskin Scientific, visit our website today: www.hoskin.ca