

ENVIRONMENTAL



YSI Water Quality Instruments & Integrated Systems

Cutting-edge measurement technologies



WWW.HOSKIN.CA

Cutting-Edge Measurement Technologies



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HYPACK
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In partnership with



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Let's Solve Water



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



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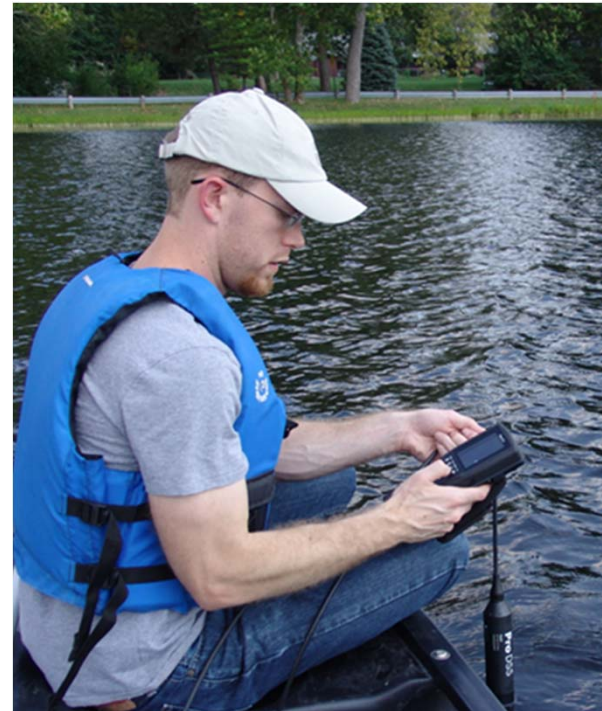
Water Quality

EXO3 & ProDSS



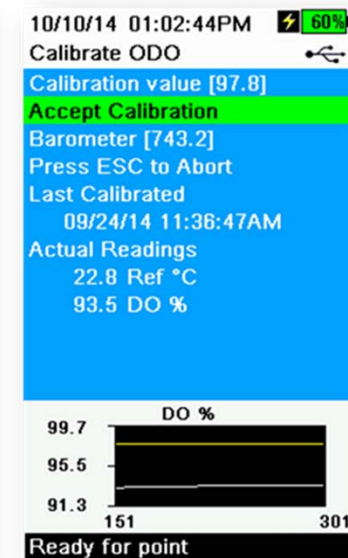
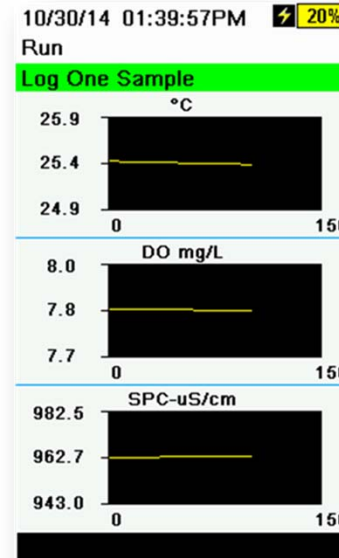
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ProDSS



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



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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



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EXO Sondes



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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 Handheld



EXO2^s



EXO3



EXO1



EXO2

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



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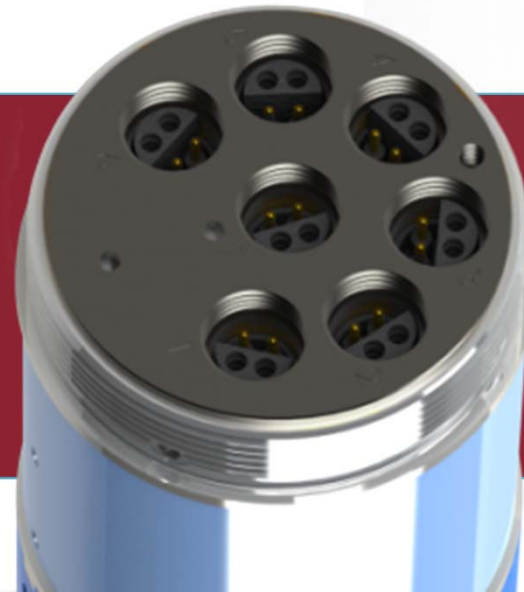
EXO2 Sonde



Continuous Monitoring
6 ports + wiper port

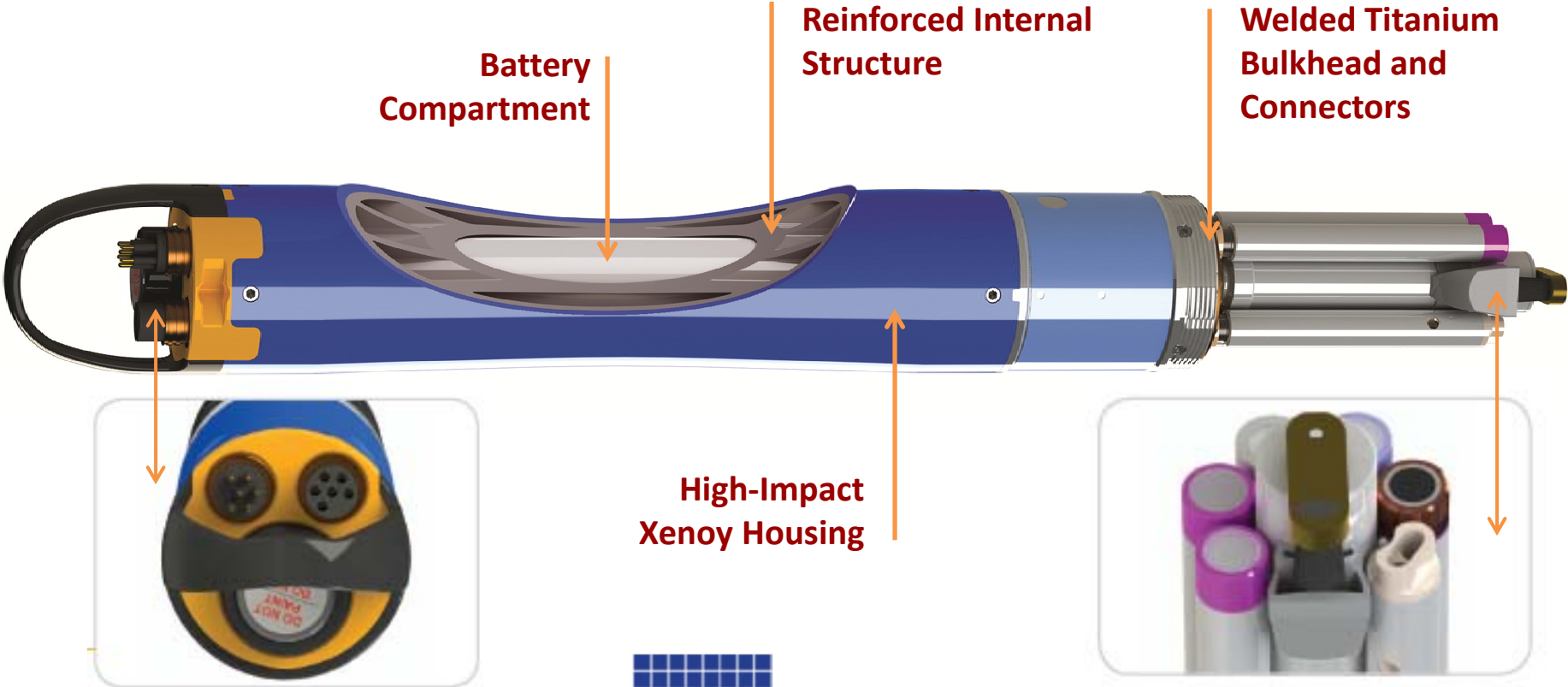
Diameter: 7.62 cm (3.00 in)

Length: 71.10 cm (28.00 in)



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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



Total Algae

- Two sensors in one
- Chlorophyll + BGA-PC or PE



Turbidity

- Increased range without loss of accuracy



Smart Wiper System

- For use with EXO2 platform
- Superior anti-fouling
- Faster sampling response



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EXO Smart Sensors



Ph + ORP

- Removable probe head
- Guarded and Unguarded versions



Fluorescent Dissolved Organic Matter (fDOM)

- New for YSI



Ion Selective Electrode

- Replaceable module
- Ammonium, Chloride, Nitrate



Optical Dissolved Oxygen

- Improved accuracy above 200%
- Faster response
- Screw-on membrane



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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)

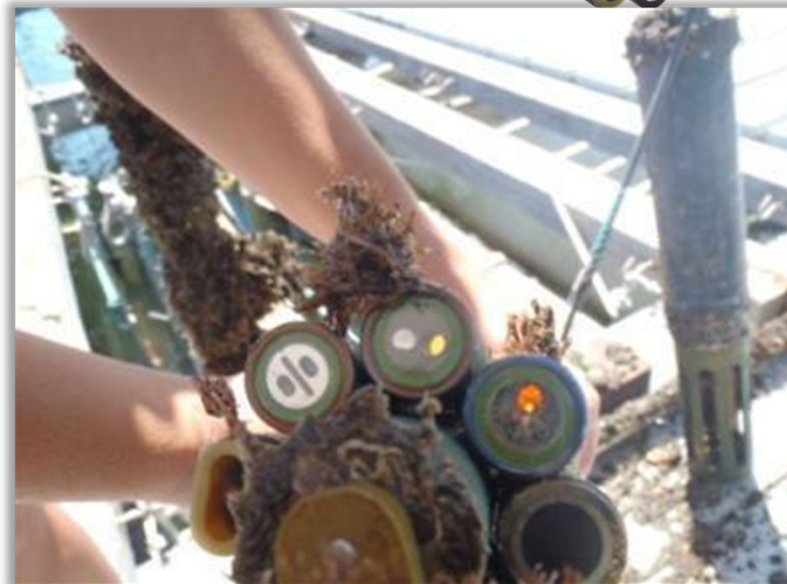


Photo shows sensor after 90-day deployment in the productive waters of the Gulf of Mexico. EXO2 deployed and tested for 4 years at this marine site

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



KOR



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EXO Go Wireless Adaptor



Via cable →



Windows-based PC or mobile device running KOR 2.0



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Water Flow



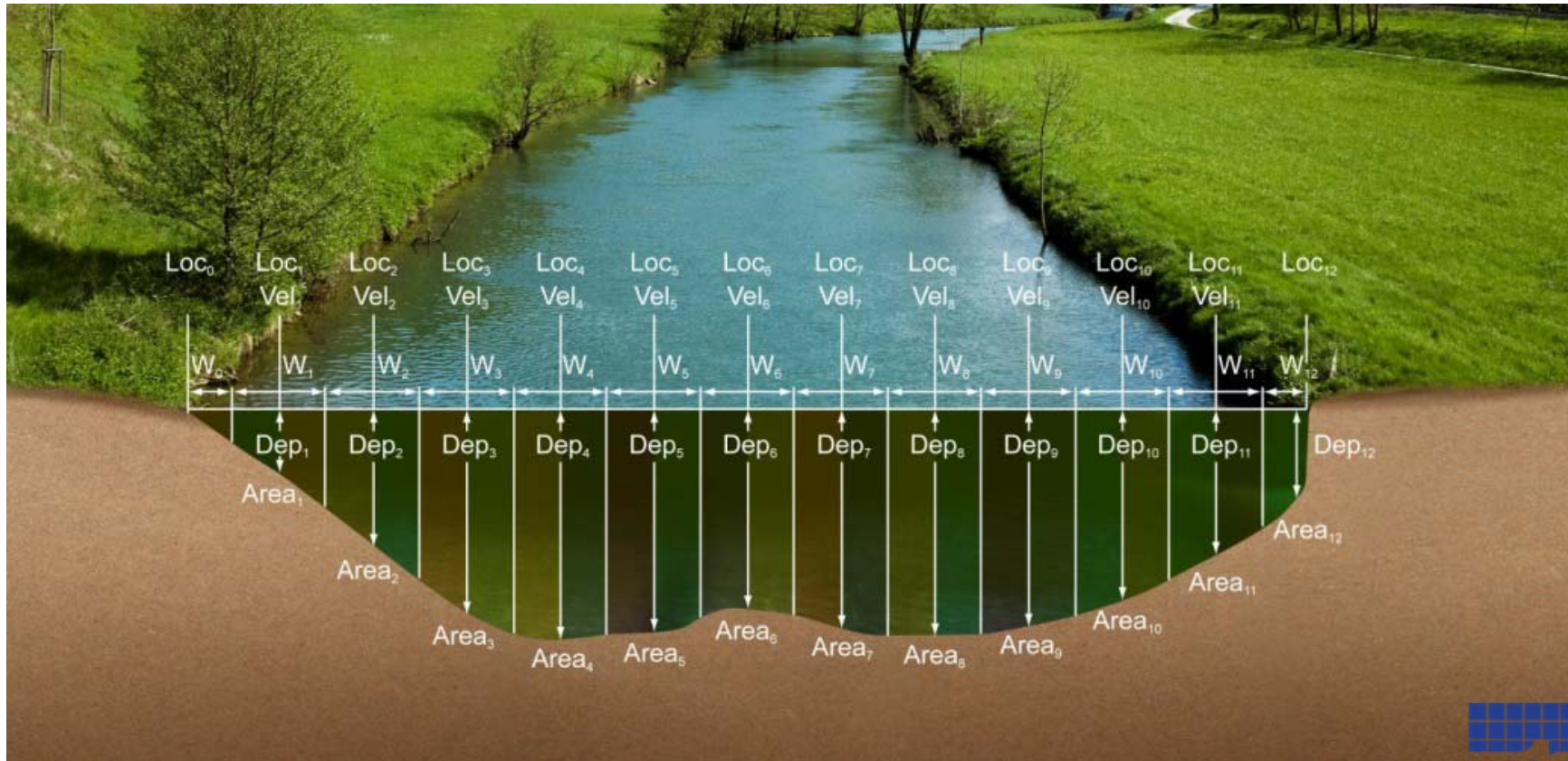
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FlowTracker 2



Figure 1:1 - FlowTracker2 with 2D Probe

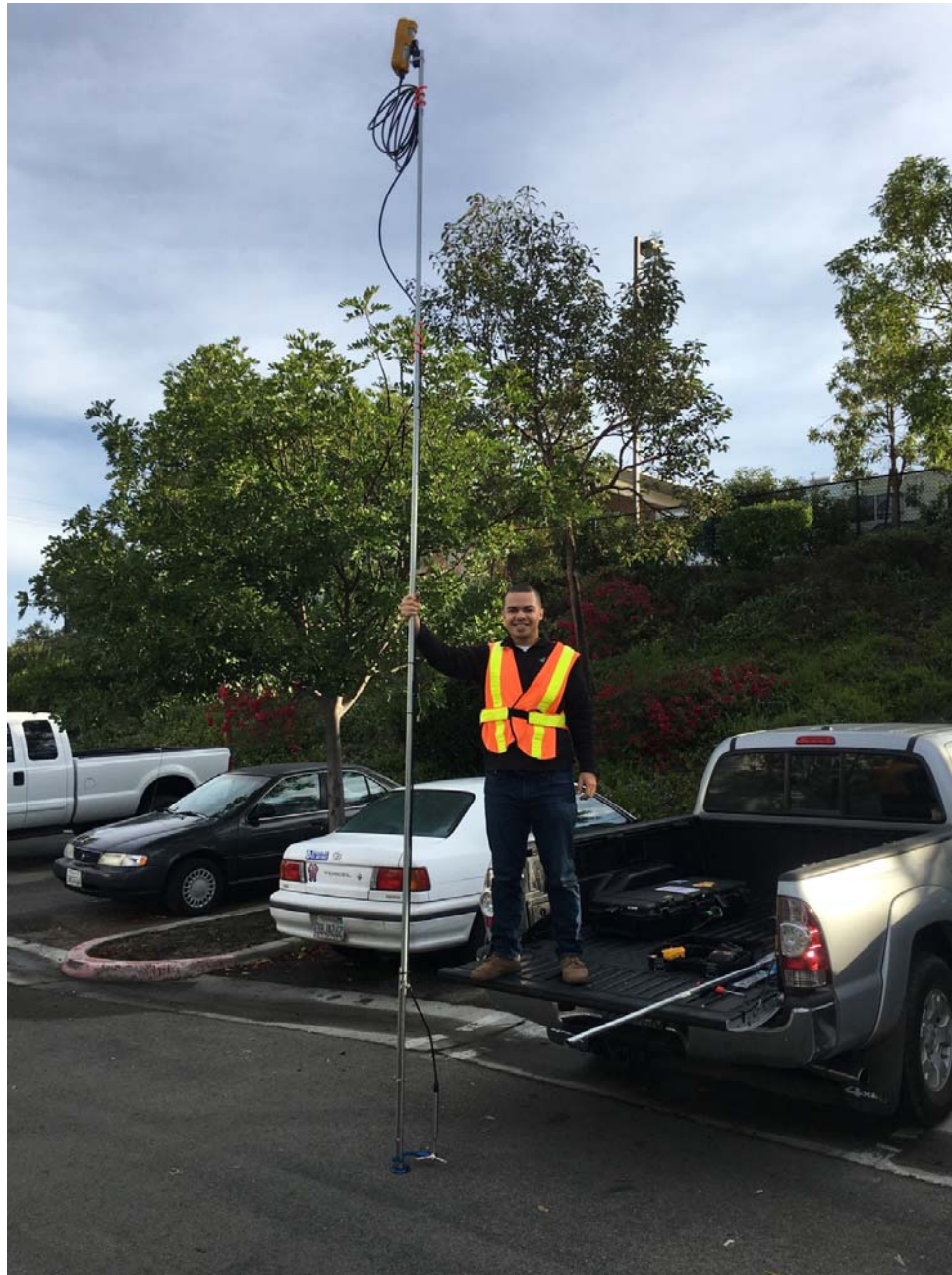
FT2 Measurement Protocol



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New, longer FT2



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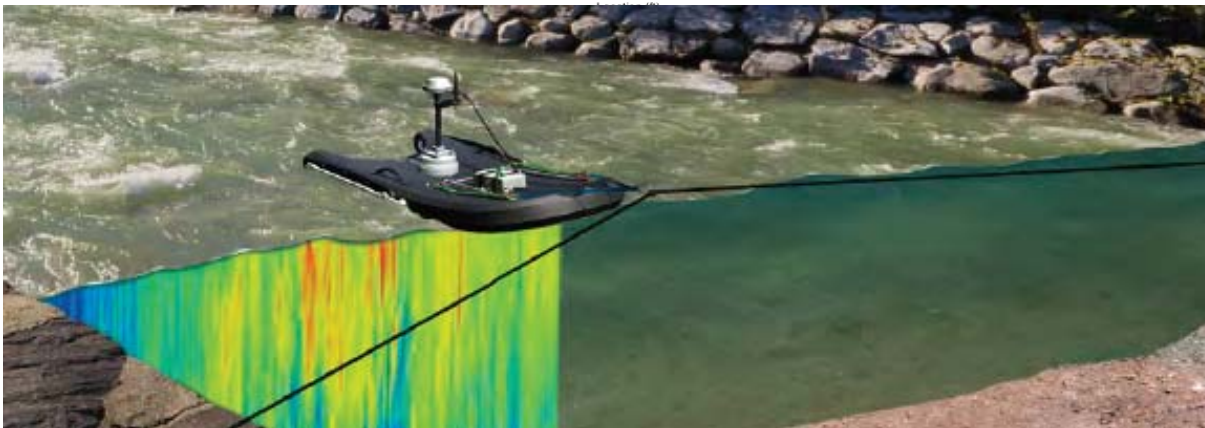
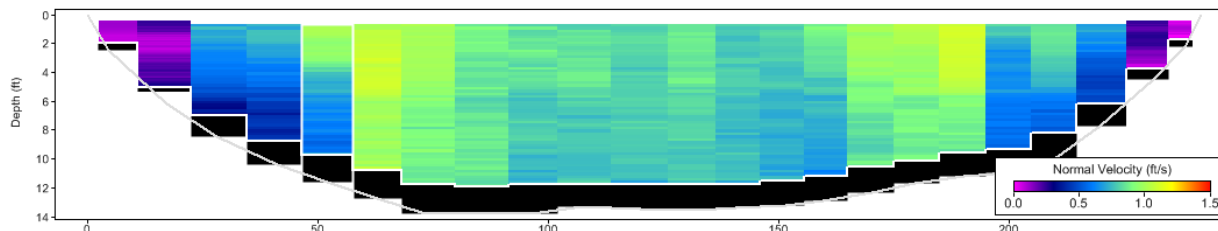
FlowTracker 2

M9/S5 RiverSurveyor



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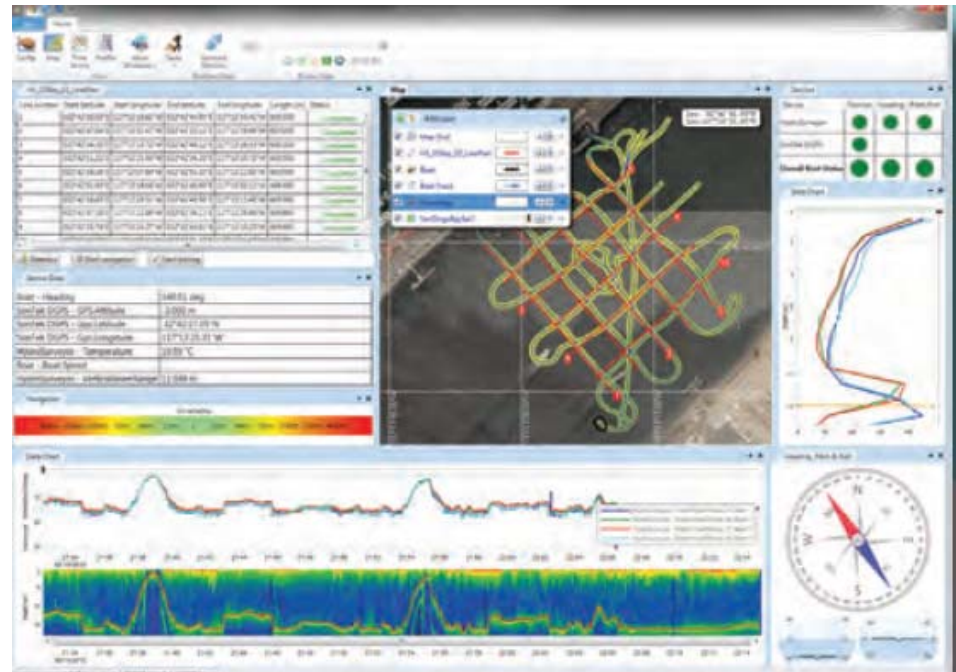
- Acoustic Doppler (Current) Profilers
- Automatically measure velocity and direction for the entire vertical column from the surface, looking down (0.3 to 40 m)
- Can be used at stationary locations (like wading measurements) or from moving boat
- Ideal for non-wadable sites



HydroSurveyor



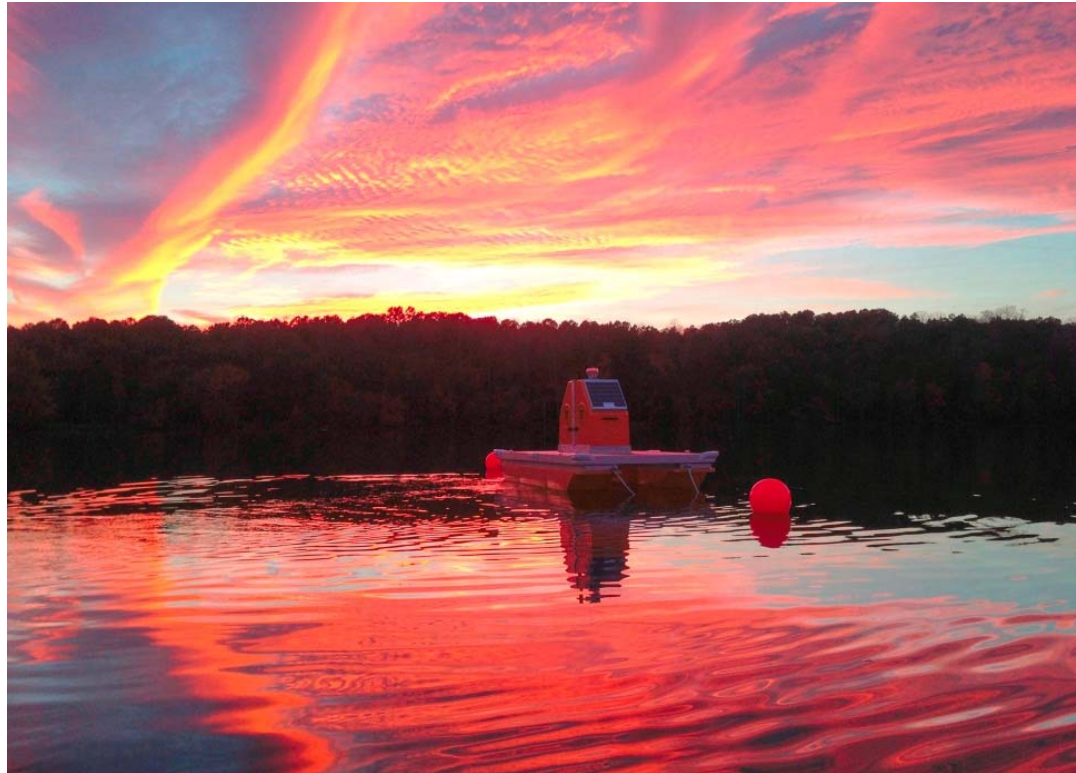
- Flexible and Fast
- All Inclusive
- Software Centric



The HydroSurveyor is a system designed to collect bathymetric, water column velocity profile, and acoustic bottom tracking data as part of a hydrographic survey.



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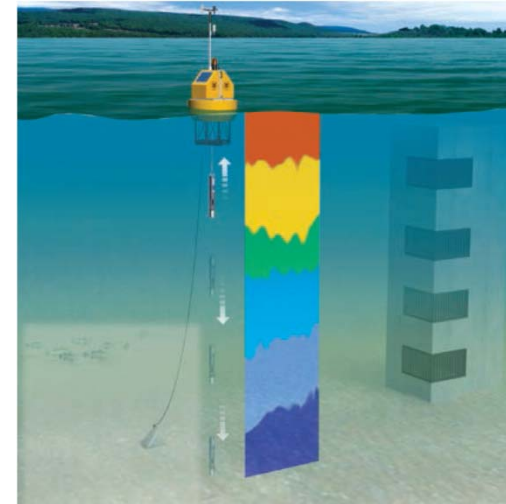
YSI SYSTEMS AND SERVICES: VERTICAL PROFILING SYSTEMS

Monitoring Systems & Services Delivering Better Results



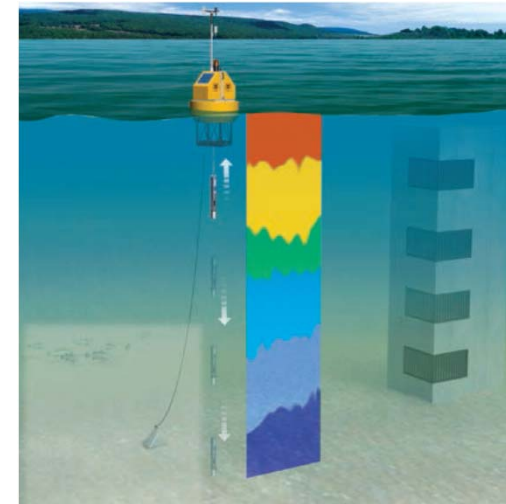
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Advanced Sampling



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Advanced Sampling with EXO



EcoMapper is a cost-effective tool for *quickly* and *easily* collecting high-resolution water quality, bathymetry, and sonar data.



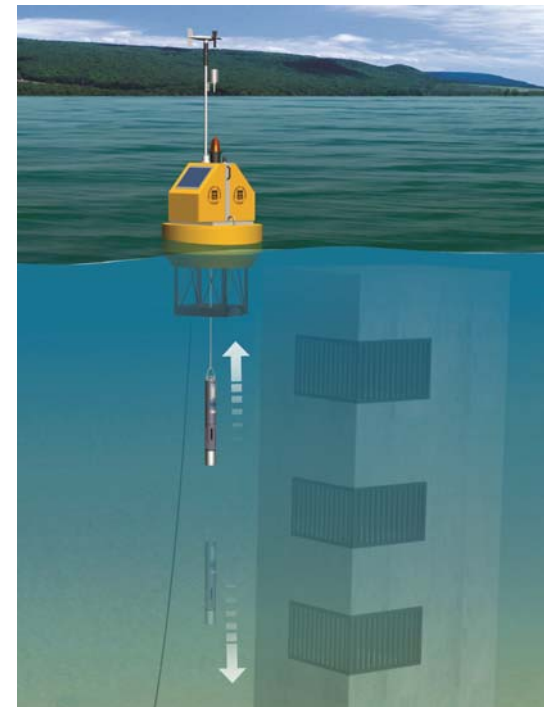
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Why an Automated Profiler?

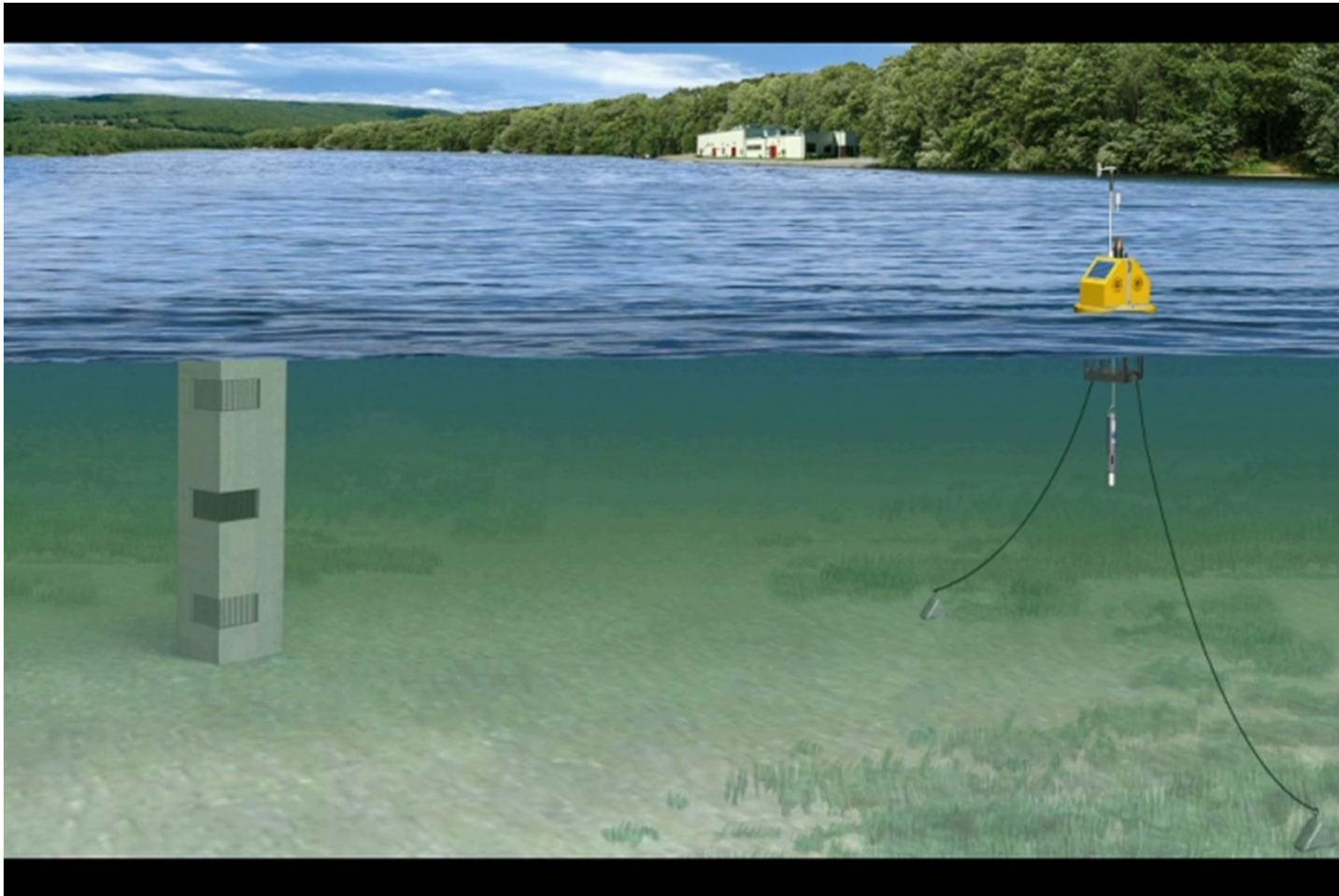
Improved Data Quantity & Quality

- 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



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Why an Automated Profiler?



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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



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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



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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

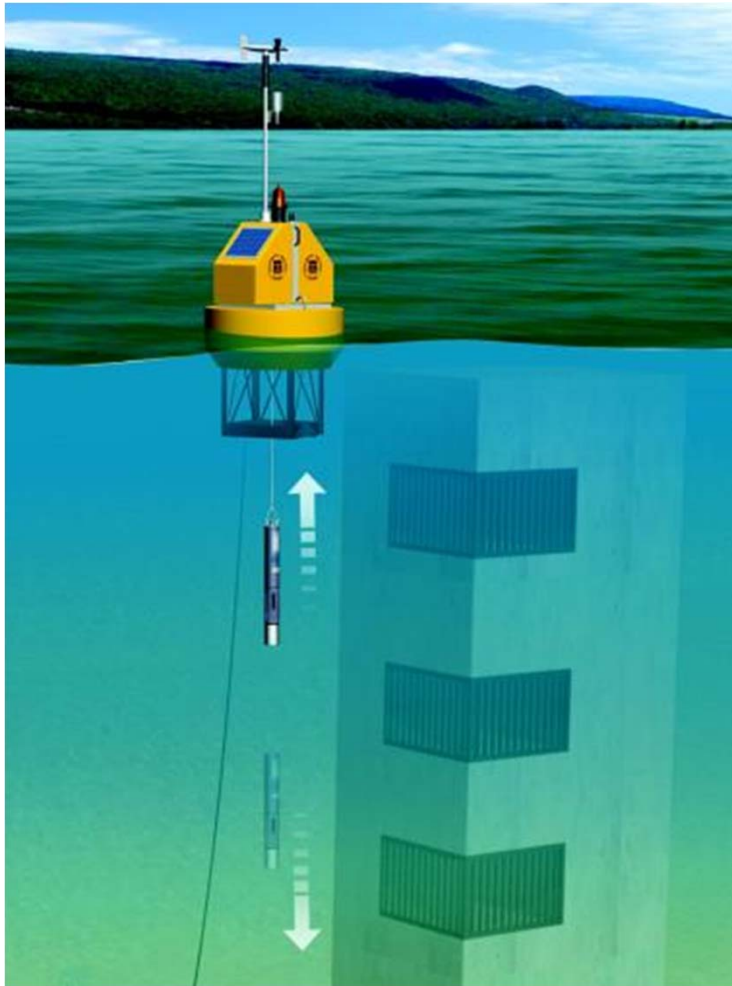


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Source Water Monitoring



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YSI Integrated System Buoy Fleet

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



PISCES



EMM 68



EMM 700



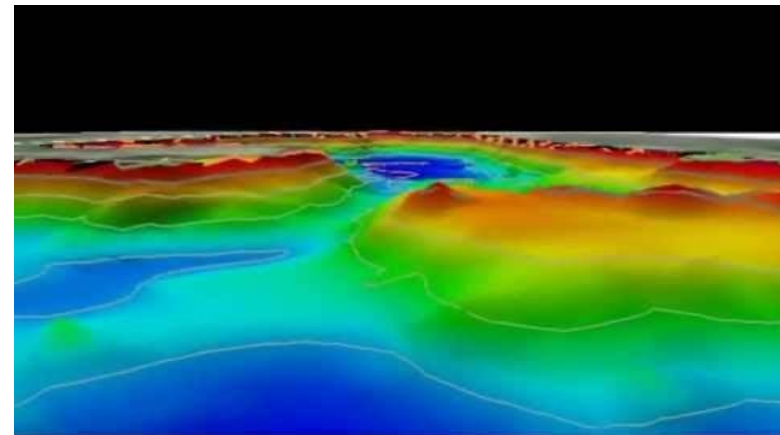
EMM 2.0



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.

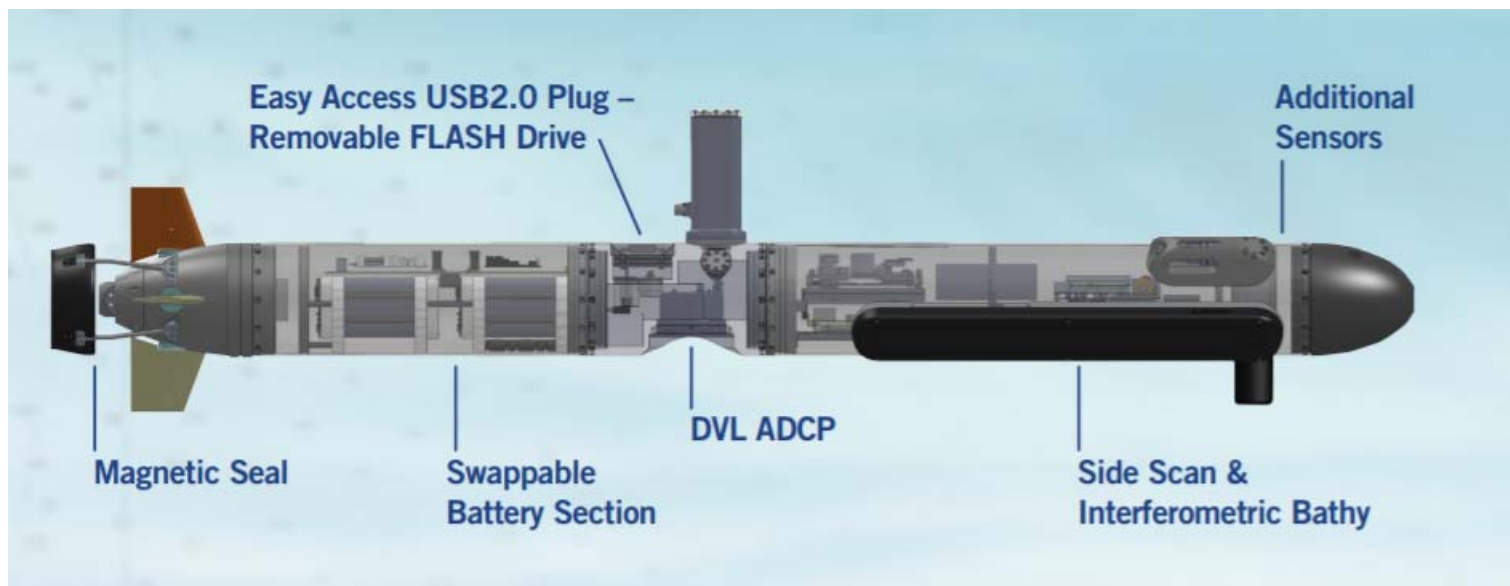


[Click to Play Video](#)



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EcoMapperAUV



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HYCAT – Autonomous Surface Vehicle (ASV)



Click to Play

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



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Major Vehicle Functions



Water Quality Measurement

- Up to 18 parameters

Bathymetry

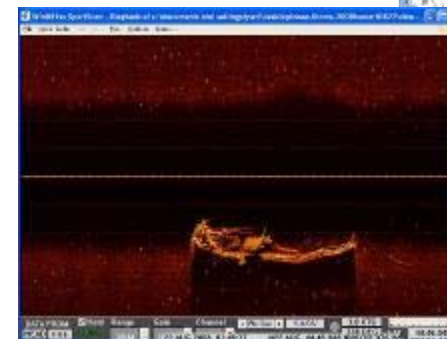
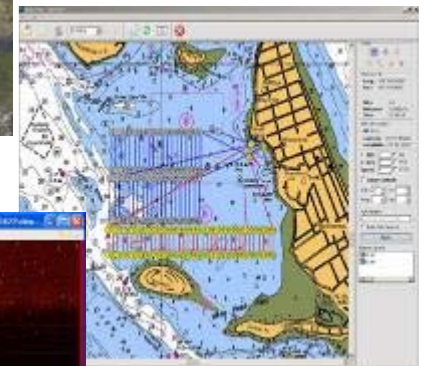
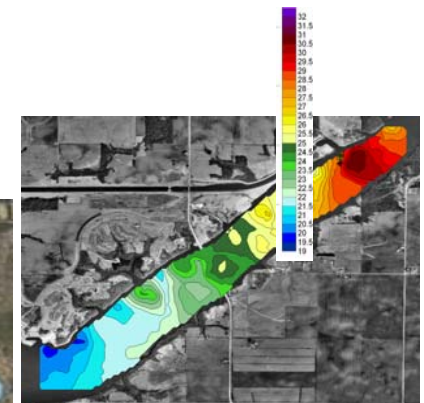
- Submerged terrain
- Compute volume

Navigation

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

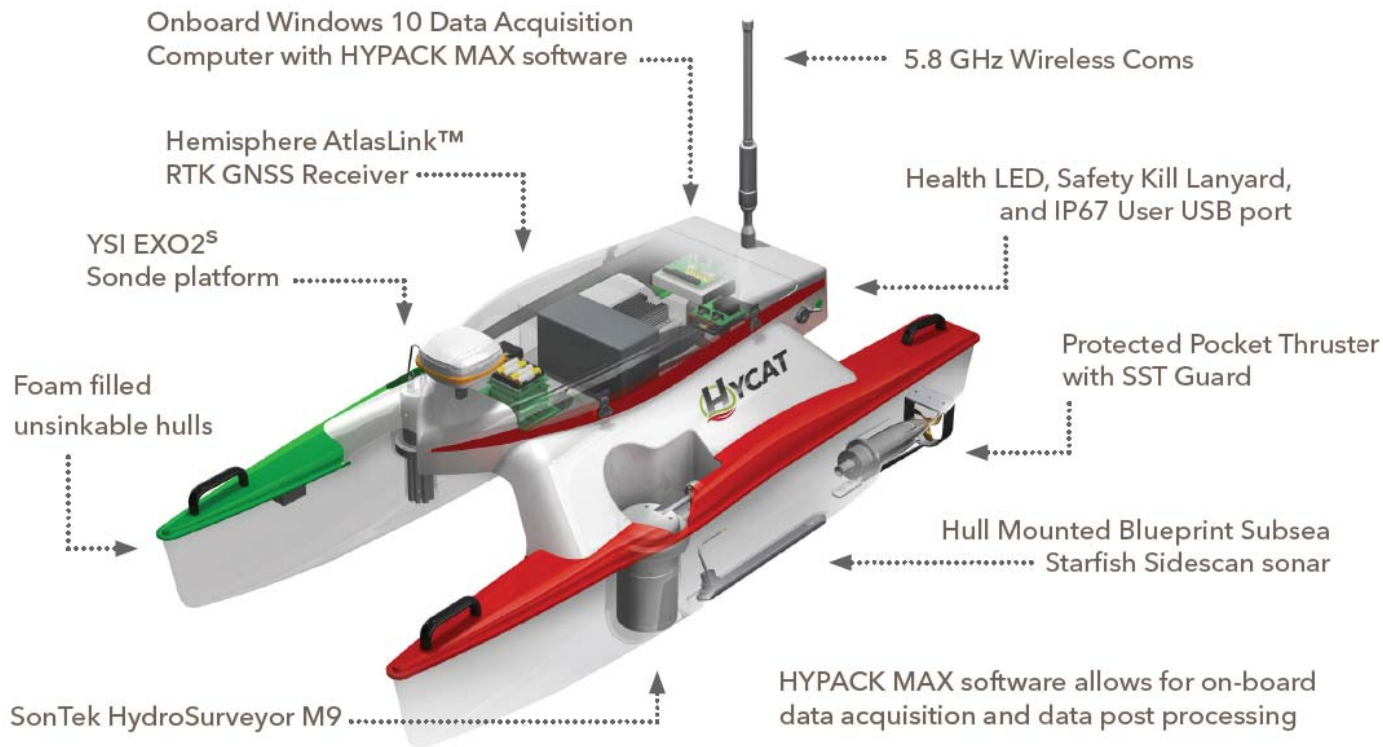
Sonar & Video Imagery

- Side-scan and Multi-beam sonar
- Video and still imaging



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HYCAT – Autonomous Surface Vehicle (ASV)



Xylem Brands



In partnership with



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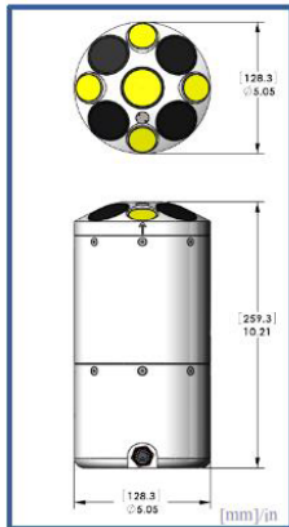
HYCAT – Autonomous Surface Vehicle (ASV)



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



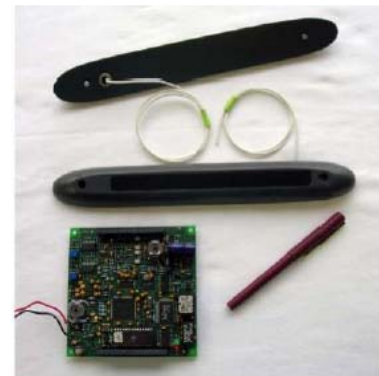
RiverSurveyor-M9

- Weight in Air: 2.3 kg (5.0 lb)
- Weight in Water: -0.6 kg (-1.3 lb)

EXO2 Multiparameter Sonde (shorty)



12VDC nom (9-16)
.12 amps
USB output



Shown with standard transducers & board



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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



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HYCAT – Autonomous Surface Vehicle (ASV)

Performance



Specification	Published	Actual
LOA (in)	72	72
Beam (in)	36	36
Draft (in)	7	7
Weight (lb)	120	115.5
Max Speed (kts)	5	8.0
Endurance (hrs)		
@ 2 Knots	6	8.5
@ 3 knots	4	6.0
@ 4 knots	2	2.8



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HYCAT – Autonomous Surface Vehicle (ASV)



Design



Integrated Sensor Wells



Recessed EXO



HYCAT – Autonomous Surface Vehicle (ASV)



Ease of Transportation



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HYCAT – Autonomous Surface Vehicle (ASV)



Launch and Recovery



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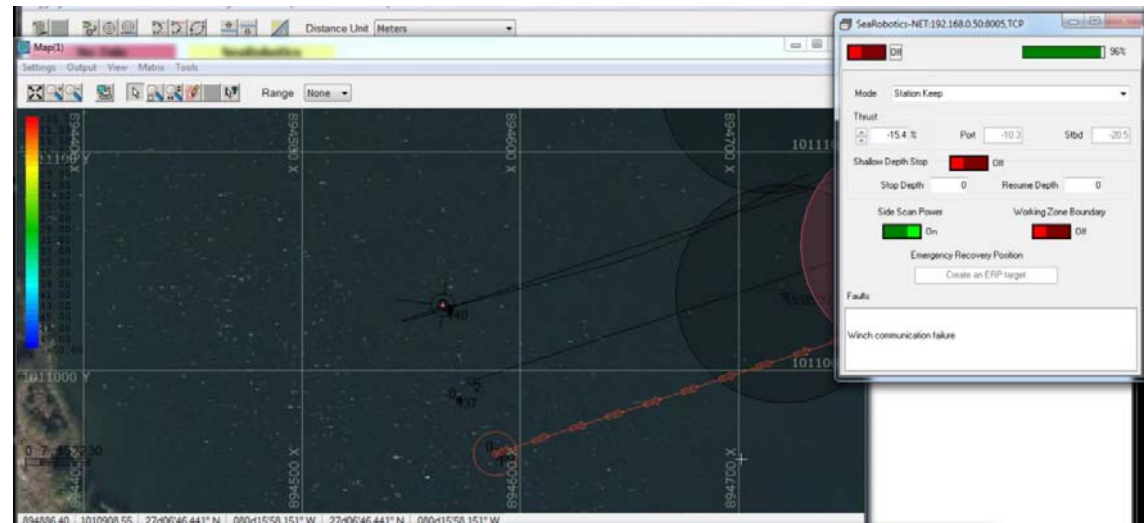
Autonomy and HYPACK Control

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



HYPACK
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ASV Operations: A Case Study

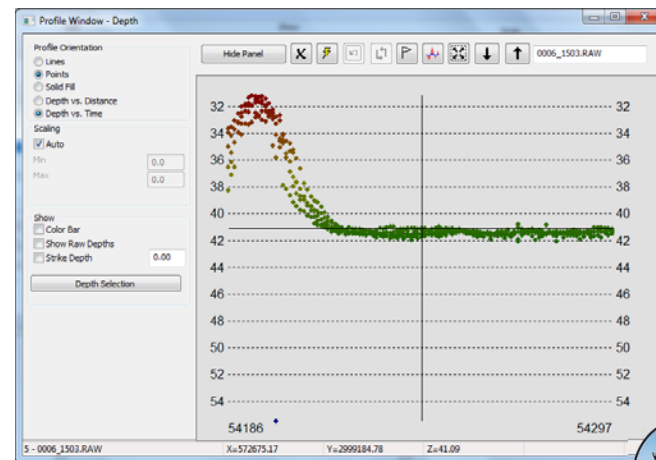
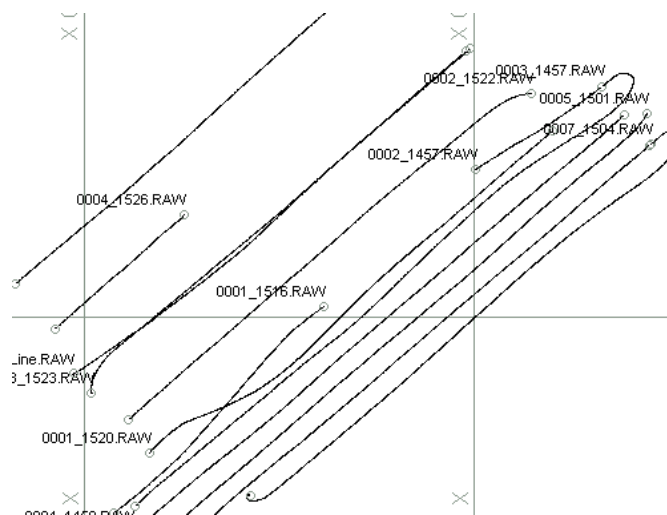
Survey area: 1700 linear meters

Total survey lines: 12

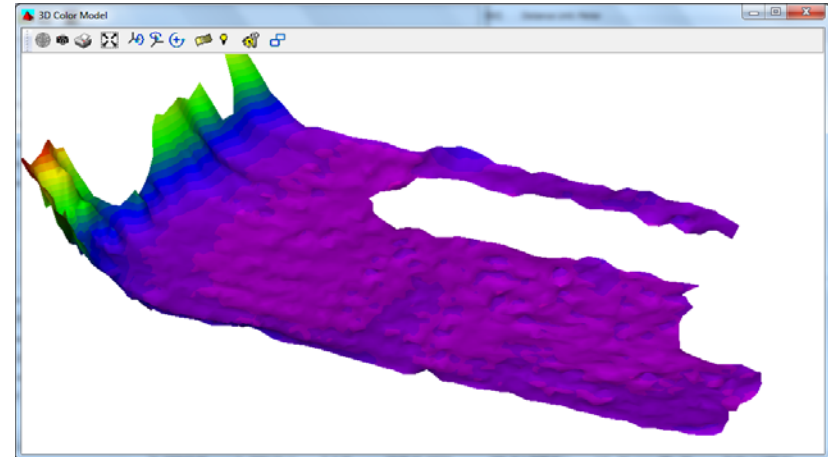
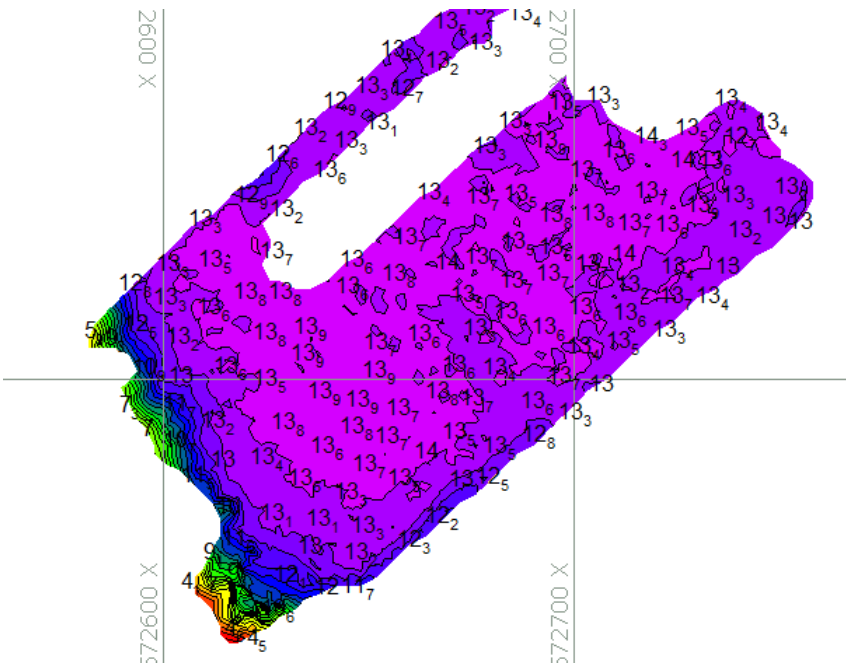
Total survey time: 45 minutes

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



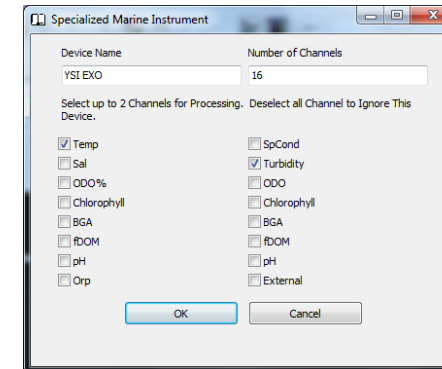
Data Collection Using the EXO Sensor (16 Parameters)



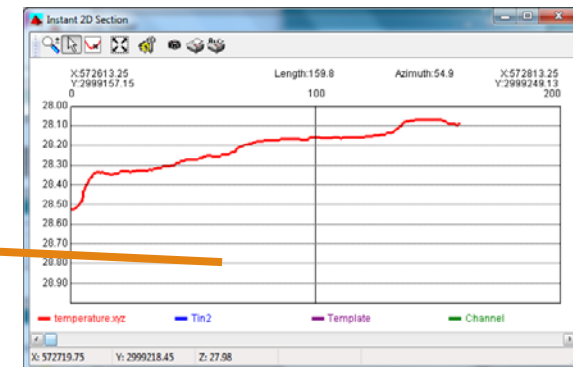
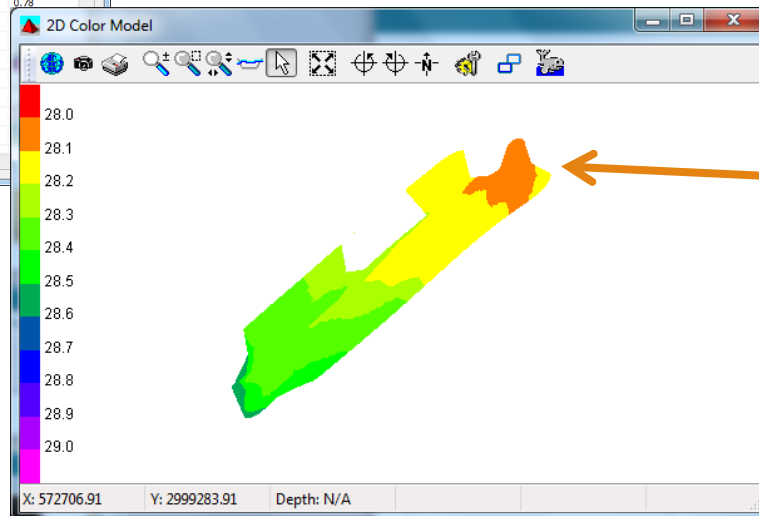
Select any of the 16 parameters for processing.

Creation of time series X, Y, sensor

Simultaneously collected with other sensors



Record	Time	Raw Depth 1	Raw Depth 2
1	15:03:06.57	28.47	0.92
2	15:03:07.56	28.48	0.87
3	15:03:08.58	28.49	0.88
4	15:03:09.58	28.50	0.88
5	15:03:10.58	28.51	0.84
6	15:03:11.58	28.52	0.83
7	15:03:12.58	28.53	0.78
8	15:03:13.58	28.53	
9	15:03:14.99	28.53	
10	15:03:15.59	28.52	
11	15:03:16.59	28.52	
12	15:03:17.60	28.52	
13	15:03:18.59	28.52	
14	15:03:19.60	28.52	



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

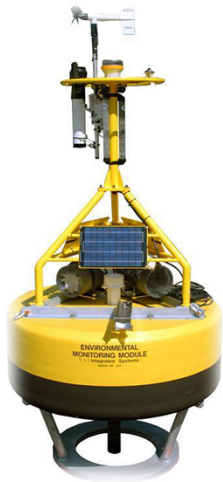


AANDERAA

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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



HARBOUR MONITORING STATION

Weather Station

Wireless Communication

Smartguard Datalogger

YSI incorporated

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Horizontal Profiler

Vented Tide Sensor

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



EXO³



Hoskin Scientific Can Provide Rentals for All Environmental Applications

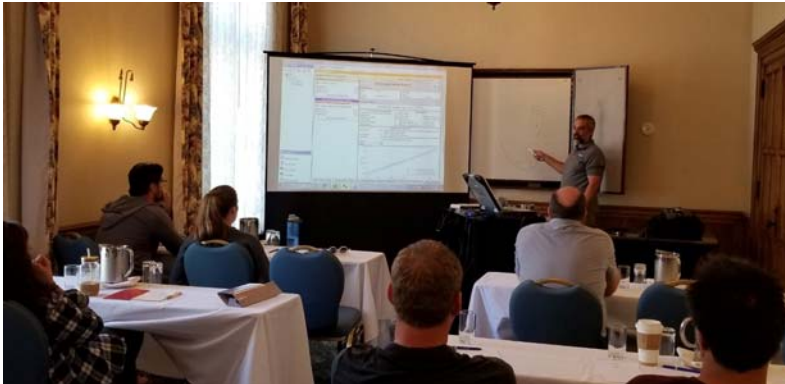


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Hoskin Training



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Hoskin Service



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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

Burnaby, British Columbia

3735 Myrtle Street

Burnaby, BC V5C 4E7

Phone: (604) 872-7894

Toll Free: (800) 663-3023

Fax: (604) 872-0281

Email: salesv@Hoskin.ca

Edmonton, Alberta

**Integrated Systems &
Service Centre Only**

Unit 100, 18138 105th
Avenue

Edmonton, AB T5S 2T4

Phone: (780) 434-2645

Email: edmontonservice@hoskin.ca

Burlington, Ontario

*(serving Ontario and the
Maritime provinces)*

4210 Morris Drive
Burlington, ON L7L 5L6

Phone: (905) 333-5510

Toll Free: (800) 665-5871

Fax: (905) 333-4976

Email: salesb@Hoskin.ca

Saint-Laurent, Quebec

300 Rue Stinson

Saint-Laurent, QC H4N 2E7

Phone: (514) 735-5267

Toll Free : (866) 520-5267

Fax: (514) 735-3454

Email: salesm@Hoskin.ca