marine environment – instruments and systems catalogue
## CONTENTS PAGE

### WHAT’S NEW
- OSIL Osprey Modem  
- OSIL Iridium ADCP Data Link  
- Hydrolab DataSonde 5X  
- Nortek Vector  
- OSIL 6m Gravity Corer  

### MARINE SYSTEMS
- Data Buoys and Data Loggers
  - Data Buoys  
  - Mooring Systems  
  - Subsea Frames  
  - Data Loggers and Data Telemetry  
- Underwater Tow Vehicles

### MARINE INSTRUMENTS
- Multiparameter Sondes, CTDs and SVs
  - AML Field Swappable Sensors  
  - CTDs and SVs  
  - AML Smart Sensors  
  - AML Logging Instruments  
  - Multiparameter Sondes and Sensors  
  - Standalone Sensors  
- Current, Flow, Waves and Tides
  - Current Profilers  
  - ADVs/Velocimeters  
  - Wave/Tide Gauges  
  - Single Point Current Meters  
  - HF Radar  
- Salinometers and Accessories
  - Salinometers  
  - Salinometer Accessories  
- Sediment Corers and Water Sampling
  - Sediment Corers  
  - Water Samplers  
- Oil Spill Detection  
- Acoustic Releases  
- AUV/ROVs  
- Underwater Cameras and Video

### METEOROLOGICAL INSTRUMENTS
- Sensors  
- Display Units

### CALIBRATION STANDARDS
- Salinity Standards  
- Nutrient Standards  
- Other Standards

### RENTAL EQUIPMENT

### APPLICATION NOTES
WHAT’S NEW

What’s new from OSIL?

OSIL Osprey Modem
- Applications - Provides real time access to web based data from any Campbell logger
- Features - SDI-12 and RS232 input, GSM/GPRS communication
- Benefits - Integrates directly to existing Campbell Logger Systems

OSIL Iridium ADCP Data Link
- Applications - Unique system capable of emailing full raw binary data sets from ADCPs via the Iridium Satellite gateway
- Features - Waterproof housing, suitable for installation on entire range of OSIL buoys
- Benefits - Allows for early data analysis, removes the requirement for site visits and the risk of losing data

Hydrolab DataSonde 5X (DS 5X)
- Applications - Long-term in situ measurement of up to 16 simultaneous parameters
- Features - Central cleaning system, up to 200 m deployment, Internal battery and memory
- Benefits - Ideal for extended deployments in harsh environments where fouling and sediment are abundant

Nortek Vector
- Applications - Collects high-resolution current velocity and pressure data in rapidly changing environments
- Features - Sampling rate 1-64Hz (output), small sampling volume
- Benefits - Integrates unique Doppler velocity measurements with other parameters (temperature, pressure, tilt & compass). Real time operation, continuous or burst sampling.
- Range/Accuracy - ±0.5% of measured value ±1 mm/s

OSIL 6m Gravity Corer
- Applications - Collects core samples of up to 6 m in length
- Features - Totally customisable design including weights and core lengths. Removable PVC core liner
- Benefits - Easy to use and reliable, replaceable carbon steel core catcher and cutter
### MARINE SYSTEMS - DATA BUOYS AND DATA LOGGERS

#### DATA BUOYS

<table>
<thead>
<tr>
<th>OSIL Shearwater Buoy</th>
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</thead>
<tbody>
<tr>
<td><strong>Applications</strong></td>
<td>Designed for long-term monitoring in estuaries, rivers and coastal applications</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Heavy duty hull and stainless steel topside construction</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Extra buoyancy supports a wider range of equipment</td>
</tr>
<tr>
<td><strong>Diameter/Buoyancy</strong></td>
<td>120 cm/ 500 kg</td>
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</table>

<table>
<thead>
<tr>
<th>OSIL Fulmar Buoy</th>
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<tbody>
<tr>
<td><strong>Applications</strong></td>
<td>Ideal for coastal and light offshore applications facing harsh monitoring conditions with significant wind and wave activity</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Heavy duty hull and galvanised steel construction with stainless steel top frame</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Large, high volume hull capable of surviving in a harsh environment</td>
</tr>
<tr>
<td><strong>Diameter/Buoyancy</strong></td>
<td>190 cm/ 2000 kg</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>OSIL Skua Buoy</th>
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<tbody>
<tr>
<td><strong>Applications</strong></td>
<td>Ideal for offshore applications with harsh monitoring conditions and significant wind and wave activity</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Heavy duty hull and galvanised steel construction with stainless steel top frame</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Large, high volume hull capable of surviving in a harsh environment, additional buoyancy</td>
</tr>
<tr>
<td><strong>Diameter/Buoyancy</strong></td>
<td>260 cm/ 7000 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OSIL Albatross Buoy</th>
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</thead>
<tbody>
<tr>
<td><strong>Applications</strong></td>
<td>Ideal for deep water offshore applications with harsh monitoring conditions with significant wind and wave activity</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Heavy duty hull and galvanised steel construction with stainless steel top frame</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Extra large, high volume hull capable of surviving in a harsh environment</td>
</tr>
<tr>
<td><strong>Diameter/Buoyancy</strong></td>
<td>300 cm/ 9000 kg</td>
</tr>
</tbody>
</table>
OSIL Small Field Buoy

- **Applications** - Cheap, quick and easy way to ensure constant and immediate data collection when other systems are out of action
- **Features** - Robust hull, through hull deployment tube for safer equipment deployment
- **Benefits** - Quick and easy to deploy, on a single point mooring system
- **Diameter/Buoyancy** - 60 cm / 75 kg

MOORING SYSTEMS

**Custom Moorings**

OSIL offer custom build mooring systems for a wide range of applications: Deep Water, Shallow Water, 2, 3 or 4-point, Catenary & Compliant Moorings, please contact us with your requirements.

- **Applications** - Custom built mooring to suit most applications
- **Features** - Custom specified mooring components, fully modelled for each application
- **Benefits** - Long service interval mooring requiring minimal maintenance, full mooring models as standard

SUBSEA FRAMES

**Seabed Mounting Frame**

- **Applications** - For sub-sea mounting of ADCPs, CTDs, ADVs, turbidity sensors and more
- **Features** - 316 stainless steel, acoustic release, retrieval buoy and low profile anti-trawl design
- **Benefits** - Robust frame built to the application’s needs
- **Size** - Sizes from 1m² and 300mm high
DATA LOGGERS AND DATA TELEMETRY

Campbell Data Logger

• Applications - Remote logging of data in harsh environments, including coastal, inshore and offshore applications
• Features - Communication via GSM, GPRS, VHF, UHF and Iridium Satellite, 4 Mb memory (standard) or 2 Gb via Compact Flash
• Benefits - Cost-effective data storage and telemetry solution, 100% compatible with any sensor on the market,

OSIL Falcon Data to Web Logger

• Applications - Remote data access in all environments where there is GSM/GPRS or Iridium Satellite coverage
• Features - RS232 and SDI-12 inputs, GSM/GPRS 2 way communications link, up to 30 days internal logging
• Benefits - Deployable in under 30 minutes. Simple interface setup for use with intelligent sondes, dedicated website provides secure remote data to multiple users

OSIL Falconet Data to Web Logger

• Applications - Remote data access in all environments where there is GSM/GPRS or Iridium Satellite coverage
• Features - RS232 and SDI-12 inputs, GSM/GPRS 2 way communications link, up to 30 days internal logging
• Benefits - Deployable in under 30 minutes. Compatible with new and existing systems, dedicated website provides secure remote data to multiple users

OSIL Kite GPRS Communications System

• Applications - Data access for coastal and inshore applications in harsh environments, where secure point to point communication is required
• Features - Pair of coded, bi-directional GPRS-based modems
• Benefits - Cost-effective, reliable & secure data transfer system

OSIL Osprey Modem

• Applications - Provides real time access to web based data from any Campbell logger
• Features - SDI-12 and RS232 input, GSM/GPRS communication
• Benefits - Integrates directly to existing Campbell Logger Systems
OSIL Iridium ADCP Data Link

- Applications - Unique system capable of emailing full raw binary data sets from ADCPs via the Iridium Satellite gateway
- Features - Waterproof housing, suitable for installation on entire range of OSIL buoys
- Benefits - Allows for early data analysis, removes the requirement for site visits and the risk of losing data

UNDERWATER TOW VEHICLES

MiniBAT FC60

- Applications - Lightweight towed vehicle with undulating wings, designed for use with a variety of data collection instruments
- Features - Tow body, onboard control electronics, onboard pressure sensor, remote adjustable wings, graphical interface software, control box and tow cable with 8 conductors
- Benefits - Allows rapid profiles to be collected at a much quicker rate than traditional data collection methods, saving time and money
- Depth/Speed - up to 60 m and 1 to 10 kts

MiniBAT FW100

- Applications - Lightweight towed vehicle with fixed wings, designed for use with a variety of data collection instruments
- Features - Tow body, user adjustable fixed wings and tow cable with 8 conductors
- Benefits - Allows data to be collected at a much quicker rate than traditional methods, saving time and money
- Depth/Speed - up to 100 m and 1 to 20 kts
AML FIELD SWAPPABLE SENSORS
Compatible with all AML Micro Sensors, SV Plus, CTD Plus & Minos instruments

- **Applications** - Suitable for high accuracy applications where no downtime is required
- **Features** - Field swappable SV, conductivity, temperature and pressure sensors with inbuilt cal constants
- **Benefits** - Saves on calibration and shipping costs, reduces instrument downtime and lowers cost of ownership

Sensors Available:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductivity</td>
<td>± 0.01 mS/cm</td>
</tr>
<tr>
<td>Temperature</td>
<td>± 0.005 °C</td>
</tr>
<tr>
<td>Depth</td>
<td>± 0.05% FS</td>
</tr>
<tr>
<td>SV</td>
<td>± 0.025 m/s</td>
</tr>
</tbody>
</table>

CTDs AND SVs

AML Smart CTD

- **Applications** - Designed for use on platforms for measuring conductivity temperature & pressure
- **Features** - 25 Hz sampling and rapid sensor response times for high speed applications
- **Benefits** - Size and flexibility ensures excellent fit with any host
- **Accuracy** - Conductivity ± 0.01 mS/cm, Temperature ± 0.005 °C, Pressure ± 0.05% FS

AML Micro SV

- **Applications** - Sound velocity measurement for survey, military and academic applications
- **Features** - Compact, hi-tech composite sound velocity sensor
- **Benefits** - Composite sensor provides users with longer intervals between calibrations
- **Accuracy** - Sound velocity ± 0.05 m/s
AML SMART SENSORS

- Applications - Sound velocity, pressure and temperature measurement for survey, military and academic applications
- Features - Small size, fast response sensors and high speed sampling rate with composite sensor and invar option
- Benefits - Ideal for integration into any existing data collection platform
- Accuracy -
  - Smart SV  Sound velocity ± 0.05 m/s
  - Smart SV & P  Sound velocity ± 0.05 m/s, Pressure ± 0.05% FS
  - Smart SV & T  Sound velocity ± 0.05 m/s, Temperature ± 0.005 °C

OTT Level CTD

- Applications - Accurate continuous or real-time measurement of conductivity, temperature, and depth
- Features - Ceramic pressure cells will not deform over time, providing long-term measurement stability
- Benefits - Corrosion resistant stainless steel housing. Remote data acquisition and other facilities available with ITC (Intelligent Top Cap)
- Range/Accuracy -
  - Pressure: 100m, ±0.05% FS
  - Temperature: -25 to 70°C, ±0.1°C
  - Conductivity: 0.001-2.00 mS/cm, ±0.5% of measured value, or 0.10-100.00 mS/cm, ±1.5% of measured value

YSI CastAway CTD

- Applications - Rapid CTD or SV profiling from vessels or dock side
- Features - LCD screen provides easy access for setup, deployment, and immediate data review
- Benefits - Integrated GPS, collect simple shallow SV and CTD profiles to 100m
- Accuracy - Sound velocity (derived) 0.15 m/s, Temperature 0.05°C, Salinity (derived) 0.1 (PSS-78)
AML LOGGING INSTRUMENTS

CTD Plus v2
• Applications - High accuracy CTD instrument for long-term monitoring or deep profiling work
• Features - 25 Hz sampling, rapid sensor response times, USB download capacity and flexibility to add composite SV sensor
• Benefits - Adaptable with surface to deep water capability
• Accuracy - Conductivity ± 0.001 S/m, Temperature ± 0.005 °C, Pressure ± 0.05% FS

SV Plus v2
• Applications - High accuracy SV instrument for long-term monitoring or deep profiling work
• Features - 25 Hz sampling, rapid sensor response times and USB download capacity
• Benefits - Adaptable with surface to deep water capability
• Accuracy - Sound velocity ± 0.05 m/s, Temperature ± 0.005 °C, Pressure ± 0.05% FS

Minos SV & Minos CTD
• Applications - Ideal for single person vertical profiling from small launches or boats
• Features - Small Size, rechargeable Lithium-Ion battery pack provides 30 hours of sampling, Xchange Compatible
• Benefits - Easier handling in small spaces, does not need to be returned for recalibration
• Accuracy - Sound velocity ± 0.05 m/s, Temperature ± 0.005 °C, Pressure ± 0.05% FS, Conductivity ± 0.01 ms/cm
MULTIPARAMETER SONDES AND SENSORS

DataSonde 5X - DS 5X
• Applications - Long-term in situ measurement of up to 16 simultaneous parameters
• Features - Central cleaning system, up to 200 m deployment, Internal battery and memory
• Benefits - Ideal for extended deployments in harsh environments where fouling and sediment are abundant

DataSonde 5 - DS 5
• Applications - Profiling or unattended monitoring of up to 16 simultaneous parameters
• Features - Internal battery and memory (up to 120,000 measurements), up to 200 m deployment, 7 built in expansion ports
• Benefits - Capable of simultaneous measurements with up to three optical probes

MiniSonde - MS 5
• Applications - Compact and lightweight for profiling or unattended monitoring, measuring up to 12 parameters simultaneously
• Features - Internal memory, optional battery pack, 44 mm (1.75”) housing, up to 200 m deployment
• Benefits - Capable of simultaneous measurements with up to three optical probes

Quanta
• Applications - Spot measurement of the primary parameters in a complete, cost-optimized system package that includes an easy-to-use, handheld display
• Features - 4 expansion ports, up to 10 simultaneous parameters
• Benefits - Backed by an unprecedented three-year warranty

Quanta-G
• Applications - Spot measurement in a complete, cost-optimized, stainless steel package that includes an easy-to-use, handheld display
• Features - 4 expansion ports, up to 8 simultaneous parameters
• Benefits - Heavy duty stainless steel housing, backed by an unprecedented three-year warranty
## Accuracy for Hydrolab Sensors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salinity</td>
<td>0 – 70</td>
<td>± 0.2</td>
</tr>
<tr>
<td>Temperature</td>
<td>-5 – 50 °C</td>
<td>± 0.1 °C</td>
</tr>
<tr>
<td>Depth</td>
<td>0 – 200 m</td>
<td>± 0.1 m</td>
</tr>
<tr>
<td>Turbidity (Self Cleaning)</td>
<td>0 – 3000 NTU</td>
<td>&lt;100 NTU: ±1 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;400 NTU: ±3 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;3000 NTU: ±5 %</td>
</tr>
<tr>
<td>Turbidity (4 Beam)</td>
<td>0 – 1000 NTU</td>
<td>± (0.5 % of reading + 1 NTU)</td>
</tr>
<tr>
<td>Dissolved Oxygen (Luminescence) LDO</td>
<td>0 – 60 mg/L</td>
<td>≤ 8 mg/l: ±0.1 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 8 mg/l to ≤ 20 mg/l: ±0.2 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;20 mg/l: ±10% reading</td>
</tr>
<tr>
<td>Dissolved Oxygen (Clark Cell)</td>
<td>0-50 mg/L</td>
<td>≤ 20 mg/l: ±0.2 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 20 mg/l: ±0.6 mg/l</td>
</tr>
<tr>
<td>Chlorophyll a</td>
<td>Dyn. measurem. range</td>
<td>±3 % signal level equivalents</td>
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<tr>
<td></td>
<td>low sensitivity: 0.03-500 µg/l</td>
<td>of 1 ppb rhodamine WT dye or</td>
</tr>
<tr>
<td></td>
<td>med. sensitivity:</td>
<td>higher using a rhodamine sensor</td>
</tr>
<tr>
<td></td>
<td>0.03-50 µg/l</td>
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<tr>
<td></td>
<td>high sensitivity:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.03-5 µg/l</td>
<td></td>
</tr>
<tr>
<td>Cyanobacteria</td>
<td>Dyn. measurem. range</td>
<td>±3 % signal level equivalents</td>
</tr>
<tr>
<td></td>
<td>low sensitivity:</td>
<td>of 1 ppb rhodamine WT dye or</td>
</tr>
<tr>
<td></td>
<td>150-2,000,000 cells/ml</td>
<td>higher using a rhodamine sensor</td>
</tr>
<tr>
<td></td>
<td>med. sensitivity:</td>
<td></td>
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<tr>
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<td>150-200,000 cells/ml</td>
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<tr>
<td></td>
<td>150-20,000 cells/ml</td>
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<tr>
<td>pH</td>
<td>0 – 14 units</td>
<td>± 0.2 units</td>
</tr>
<tr>
<td>ORP</td>
<td>-999-999 mV</td>
<td>±20 mV</td>
</tr>
<tr>
<td>Rhodamine WT</td>
<td>Dyn. measurem. range</td>
<td>±3 % signal level equivalents</td>
</tr>
<tr>
<td></td>
<td>low sensitivity:</td>
<td>of 1 ppb rhodamine WT dye or</td>
</tr>
<tr>
<td></td>
<td>0.04-1,000 ppb</td>
<td>higher using a rhodamine sensor</td>
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<td>0.04-100 ppb</td>
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<td></td>
<td>0.04-10 ppb</td>
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</table>
## HANDHELD COMMUNICATIONS

### Hydrolab Surveyor
- **Applications** - Simple and rugged handheld display for spot measurement, set-up and monitoring with the Hydrolab sondes
- **Features** - Displays data in real-time, or can store up to 375,000 measurements
- **Benefits** - Oversize backlit screen and NEMA 6 enclosure

### Trimble® Recon®
- **Applications** - Handheld field computer for water quality sonde set-up and real-time monitoring
- **Features** - IP67 rating, increased memory, integrated Bluetooth and wireless LAN
- **Benefits** - Compact, low-cost multiparameter instruments
6600 V2
- Applications - Long-term in situ monitoring and profiling of CTD, pH, Chlorophyll, Turbidity, Rhodamine, DO and ORP
- Features - Long battery life, memory, wiped optical sensors and up to 200 m deployment
- Benefits - Deepest of YSI's multiparameter sondes

6820 V2
- Applications - Cost-effective sonde for profiling and spot-checking
- Features - Monitors turbidity, chlorophyll, conductivity, temperature, depth, DO and pH/ORP
- Benefits - Low-cost versatile system

6920 V2
- Applications - Cost-effective sonde for profiling and spot-checking
- Features - Monitors turbidity, chlorophyll, conductivity, temperature, depth, DO and pH/ORP with onboard memory and battery
- Benefits - Low-cost versatile system

650 MDS
- Applications - Optional Multiparameter Display System for field use with all YSI 6-Series Sondes
- Features - Waterproof IP-67 for reliable field use and optional barometer and GPS interface
- Benefits - Log real-time data, calibrate and set-up sondes for deployment and upload data to a PC

YSI Pro Series Handheld
- Applications - Short term, in field spot sampling of temperature, conductivity and PH.
- Features - Detachable cables and probes mean less downtime, and multiple probe or cable options.
- Benefits - Can accommodate any combination of Pro Series probes, cables and accessories.
STANDALONE SENSORS

OBS-3+ & OBS300 Turbidity Sensor

- **Applications** - Low cost, real-time turbidity monitoring
- **Features** - 1500m depth rating (titanium housing)
- **Benefits** - Innovative near-infrared OBS (Optical Back Scatter) monitoring method. Additional optics allow for obstruction avoidance
- **Range/Accuracy** - 0-4000 NTU (-T5 option), 2% of reading or 1 mg/l

OBS-3A Multi-Parameter Water Measurement System

- **Applications** - Multi-parameter OBS system measures sediment to 5000 mg/l, turbidity to 4000 NTU and also measures and logs wave height & period, depth (up to 200 m), temperature and salinity
- **Features** - Stores up to 200,000 measurements on internal flash memory
- **Benefits** - No cable required, runs up to 8,000 hours on 3 “D” cells
- **Range/Accuracy** - 0-4000 NTU (-N6 option), 2% of reading or 1 mg/l

OBS-5+ Turbidity Probe

- **Applications** - Low cost, real-time turbidity monitoring in high sediment concentrations.
- **Features** - Uses laser and dual photo detector system to measure concentrations up to 50,000 mg/l. System also records probe depth (up to 200 m), stores up to 200,000 measurements on internal flash memory
- **Benefits** - Runs up to 6 months on 3 alkaline “C” cells. Compact probe size
- **Range/Accuracy** - 0.4 to 1000 NTU, 1.5% of full scale

OBS500 Turbidity Probe with Antifouling

- **Applications** - Real-time turbidity monitoring in harsh environments
- **Features** - Dual backscatter and sidescatter sensors used to measure turbidity, refillable biocide chamber and shutter/wiper to prevent fouling
- **Benefits** - ClearSensor™ Antifouling Method provides more accurate measurements in biologically active water
- **Range/Accuracy** - 0 to 4000 NTU, ±2% of reading or 0.5 NTU

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## CURRENT, FLOW, WAVE AND TIDES

### CURRENT PROFILERS

**AWAC**
- **Applications** - Current profiles and wave height & direction data for coastal monitoring
- **Features** - Measures current speed and direction in 1 m thick layers from the bottom to the surface
- **Benefits** - Optional Acoustic Surface Tracking
- **Range/Accuracy** - 50 m (600 kHz), 1% of measured value ± 0.5 cm/s

**Aquadopp profiler**
- **Applications** - Small, inexpensive and lightweight profiler for use in depths of 1 to 100 m
- **Features** - For measurements on time scales larger than 1 second. Gives you speed and direction in up to 128 different layers of the water column
- **Benefits** - Insensitive to biofouling, no moving or protruding parts, can also collect wave data (PUV) interleaved with the mean current profiles
- **Range/Accuracy** - 60-90m (400 kHz), 1% of measured value ± 0.5 cm/s

**Aquadopp Z-Cell**
- **Applications** - Small and lightweight profiler with extended profiling range
- **Features** - “Cell Zero” provides 2D current velocity at instrument level
- **Benefits** - Provides detailed current velocity in the boundary layer
- **Range/Accuracy** - 18-25 m, 1% of measured value ± 0.5 cm/s

**Aquadopp HR-Profiler**
- **Applications** - High resolution current profiler targeted for use in boundary layer studies of the bottom 1-2 meters
- **Features** - Vertical resolution as fine as 0.7 cm or as fast as 8 Hz
- **Benefits** - Provides previously unattainable flow details
- **Range/Accuracy** - 6m (1.0 MHz), 1% of measured value ± 0.5 cm/s
Continental
- Applications - A current profiler designed to get the 200-250 m range required for an offshore deployment
- Features - Flexible deployment options
- Benefits - Also available for 2D applications
- Range/Accuracy - 200m (190 kHz), 1% of measured value ± 0.5 cm/s

ADP/ADCP
- Applications - Current profiling and wave measurement
- Features - Real-time, logging, bottom tracking and GPS input
- Benefits - Available in a variety of ranges and configurations suitable to any application
- Range/Accuracy - 3 to 180 m, ± 10 m/s at ± 1% measured velocity

Argonaut - SL
- Applications - Side-looking current meter for ports, harbours, platforms, riverbanks and bridge mounting
- Features - ADCP, P sensor, T sensor and 4 Gb memory
- Benefits - Measures currents, non-directional waves and tides
- Range/Accuracy - 0.1 to 120 m, ± 6 m/s at ± 1% measured velocity

OTT SLD
- Applications - Designed to monitor flow velocity and water level (optional) in small channels and rivers
- Features - Measures velocity in up to 9 adjacent cells with two Side Looking Dopplers
- Benefits - Can be extended to a continuously working discharge measurement system
- Range/Accuracy - ±10 m/s, 1% of measured value ±0.5 cm/s
ADV/VELOCIMETERS

Vector
- **Applications** - Collects high-resolution current velocity and pressure data in rapidly changing environments
- **Features** - Sampling rate 1-64Hz (output), small sampling volume
- **Benefits** - Integrates unique Doppler velocity measurements with other parameters (temperature, pressure, tilt & compass). Real time operation, continuous or burst sampling
- **Range/Accuracy** - ±0.5% of measured value ±1 mm/s

Vectrino
- **Applications** - Laboratory or field velocimeter measuring 3D velocity. Coherent Doppler processing used to study rapid velocity fluctuations
- **Features** - Sampling rate (output) up to 200 Hz with Vectrino+ Firmware. Sampling volume located away from sensor for undisturbed measurements
- **Benefits** - No appreciable zero offset
- **Range/Accuracy** - ±0.5% of measured value ±1 mm/s

Vectrino II
- **Applications** - Laboratory or field velocimeter measuring 3D velocity at rates up to 100 Hz, with added profiling capability
- **Features** - 1 mm vertical resolution over a range of 30 mm
- **Benefits** - No appreciable zero offset
- **Range/Accuracy** - ±0.5% of measured value ±1 mm/s

ADV Hydra
- **Applications** - Autonomous measurement of current and waves with ability to add CTD and turbidity
- **Features** - 5, 10, 16 MHz ADV, up to 1 Gb memory and onboard P sensor
- **Benefits** - Robust, synchronised instrument for measuring turbulence
- **Range/Accuracy** - 0 to 500 cm/s at ± 1% measured velocity
WAVE/TIDE GAUGES

AWAC
- **Applications** - Current profiles and wave height & direction data for coastal monitoring
- **Features** - Measures current speed and direction in 1 m thick layers from the bottom to the surface
- **Benefits** - Optional Acoustic Surface Tracking
- **Range/Accuracy** - 50 m (600 kHz), 1% of measured value ± 0.5 cm/s

Aquadopp profiler
- **Applications** - Small and lightweight profiler for use in depths of 1 to 100 m
- **Features** - Inexpensive tool for shallow water measurements on time scales larger than 1 second. Gives you speed and direction in up to 128 different layers of the water column
- **Benefits** - Insensitive to biofouling, no moving or protruding parts, can also collect wave data (PUV) interleaved with the mean current profiles
- **Range/Accuracy** - 60-90m (400 kHz), 1% of measured value ± 0.5 cm/s

SINGLE POINT CURRENT METERS

Aquadopp Current Meter
- **Applications** - Probably the most versatile single-point current meter on the market. It is cost-effective, robust and has a wide range of applications
- **Features** - Measures 3D current from 1 s to several hours, adjustable cell size/position
- **Benefits** - Low maintenance, no moving parts, requires no recalibration and has no zero-point drift over time
- **Range/Accuracy** - ± 5 m/s at 1% of measured value ± 0.5 cm/s

HF RADAR

The SeaSonde
- **Applications** - Non-contact surface current and wave measurement system
- **Features** - Three configurations available which produce extremely accurate 2D surface current, velocity and wave maps
- **Benefits** - Land-based equipment, reliable data, flexible software parameters and remote access
- **Spatial Range** - 20 to 220 km, only possible with this system
SALINOMETERS AND ACCESSORIES

SALINOMETERS

Autosal Salinometer 8400B
• Applications - Recognised industry standard instrument for measuring salinity in the laboratory
• Features - Large volume high stability temperature control bath with unique continuous flow system
• Benefits - The most accurate salinometer available
• Range/Accuracy - 0.004 to 76 mS/cm at ± 0.002 Salinity

Portasal Salinometer 8410A
• Applications - Portable salinometer for ship-board or laboratory use
• Features - Digitised, user interface calculating salinity directly
• Benefits - Small and compact for onboard salinity analysis
• Range/Accuracy - 0.004 to 76 mS/cm at ± 0.003 Salinity

SALINOMETER ACCESSORIES

Autosal Computer Interface ACI-2000
• Applications - Allows automated data collection from the Autosal Salinometer
• Features - Connects directly to the Autosal’s BCD output for real-time data collection via RS232 output
• Benefits - Increases data recording quality and decreases analysis time by removing the need to manually record data
• Voltage - 12 Volts dc

Portasal Data Logger
• Applications - Allows automated data collection directly from the Portasal Salinometer
• Features - Connects to the Portasal’s RS232 port and connecting cables provided with Windows software
• Benefits - Increases data recording quality and decreases analysis time by removing the need to manually record data

W: www.osil.co.uk  E: osil@osil.co.uk  T: +44 (0)2392 488240
Salinity Bottle and Crates

- **Applications** - Storage of salinity samples
- **Features** - Bottles are type II glass with disposable plastic insert and polypropylene screw cap and crates are plastic coated wire mesh
- **Benefits** - Clear bottles allows analysts to identify samples with high particulates and crates provide secure storage of bottles, helping facilitate faster temperature equilibrium

Salinometer Pump

- **Applications** - Peristaltic pump designed for improved sample handling on Guildline’s Salinometers
- **Features** - Three speed, self-priming pump which allows use of inline filters
- **Benefits** - Increases sample throughput by up to 30% and allows remote sampling
SEDIMENT CORERS AND WATER SAMPLERS

SEDIMENT CORERS

OSIL Box (Spade) Corers

- **Applications** - Simple and reliable corers for biological, chemical and geological sampling with minimal disturbance and sample contamination

- **Features** - Unique double shovel and removable box design allows easy access to the sediment for sub-sampling, provides a large, well preserved sample

- **Benefits** - Easily deployed from a deck and reliable, removable weights allow the corer to be used with a range of sediment types

### Box (Spade) Corer Specifications

<table>
<thead>
<tr>
<th></th>
<th>Mega Box Corer</th>
<th>Box Corer</th>
<th>Mini Box Corer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
<td>0.25 m²</td>
<td>0.1 m²</td>
<td>0.05 m²</td>
</tr>
<tr>
<td>Weight</td>
<td>1000 kg</td>
<td>600 kg</td>
<td>50 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>50 x 50 x 120 cm</td>
<td>30 x 30 x 120 cm</td>
<td>20.3 x 20.3 x 40.6 cm</td>
</tr>
<tr>
<td>Operational Depth</td>
<td>Full Ocean Depth</td>
<td>Full Ocean Depth</td>
<td>0 to 100 m approx.</td>
</tr>
</tbody>
</table>
### OSIL Gravity Corer
- **Applications** - Collects core samples of up to 6 m in length
- **Features** - Totally customisable design including weights and core lengths. Removable PVC core liner
- **Benefits** - Easy to use and reliable, replaceable carbon steel core catcher and cutter

### OSIL Vibrocorer
- **Applications** - Modular system for collecting up to 9 m core samples with 100 mm diameters
- **Features** - Easily assembled dockside, or on the vessel, as either a 3 m, 6 m or 9 m system with 4.0 or 9.6 kW motor
- **Benefits** - Designed for horizontal recovery onto vessel, allowing for easy core operation and recovery

### Piston Corer
- **Applications** - Robust sediment corer designed for applications relating to geological studies, marine chemistry and sedimentology
- **Features** - Messenger operation, minimal ‘down’ time. Range of sizes available from 9m barrel length, 1000kg
- **Benefits** - Collects longer, less disturbed and more complete samples than a Gravity Corer
- **Weight/Core Length** - Up to 7000 kg and 30 m

### Custom Build Corers
OSIL offers a range of custom built gravity piston and vibro corers to suit a wide range of applications, please contact us with your requirements.
OSIL Multiple Corers

- **Applications** - Simple and reliable way of collecting a truly undisturbed sediment sample for chemical, biological and geochemical applications
- **Features** - Unique hydrostatically damped coring mechanism used to collect the sample
- **Benefits** - Can collect up to 12 cores in a single deployment

### Multiple Corer Specifications

<table>
<thead>
<tr>
<th></th>
<th>Mega Corer</th>
<th>Maxi Corer</th>
<th>Midi Corer</th>
<th>Mini Corer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Tubes</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>External Diameter (mm)</td>
<td>110 or 65</td>
<td>110 or 65</td>
<td>110 or 65</td>
<td>65</td>
</tr>
<tr>
<td>Length (mm)</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>300</td>
</tr>
<tr>
<td>Maximum Core Length (mm)</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>Corer Weight (kg)</td>
<td>735</td>
<td>600</td>
<td>465</td>
<td>88</td>
</tr>
</tbody>
</table>

Corer Before Release

Corer After Release
WATER SAMPLERS

Niskin Bottles
- **Applications** - Non-metallic, free-flushing sampler for general water sampling
- **Features** - PVC bottle, latex tubing spring closure (optional stainless steel), clamp bolts for attachments on a cable and mounting blocks for Multisampling System attachment
- **Benefits** - Can be individually or serially attached on a hydrocable and activated by messenger
- **Sample Volume** - 1.7 to 12 litres

OIL SPILL DETECTION

Slick Sleuth Oil Spill Detection Station
- **Applications** - Non-contact oil and hydrocarbon monitoring and detection on water or land
- **Features** - Real-time monitoring system with alarm and data transmission function via SMS, email and phone call.
- **Benefits** - Easy installation and virtually maintenance free
- **Range** - 0.2 m to 5 m above surface target

Slick Sleuth SS300-EX
- **Applications** - Non-contact oil and hydrocarbon monitoring and detection for hazardous gas environments
- **Features** - Designed and manufactured to comply with IEC/ATEX and UL/cUL requirements for installation in Zone1 and/or Class 1 Division 1 classified locations
- **Benefits** - Easy installation and virtually maintenance free
- **Range** - 0.2 m to 4 m above surface target
ACOUSTIC RELEASES

Lightweight Release Transponder (LRT)
• Applications - Versatile release ideal for shallow, light-weight mooring applications
• Features - Both transmit and receive functions and optional rope canister
• Benefits - Compact and low-cost release with up to 52 month battery life
• Depth/Load - 500 m, 125 kg

ORT/DORT
• Applications - Rugged and reliable acoustic release ideal for deep water deployments
• Features - Spring-assisted release mechanism suitable for long deployments
• Benefits - Compact size allows easy installation onto subsea frames or AUVs
• Depth/Load - 2000 or 6000 m, 1275 kg

Heavy Load DORT
• Applications - Rugged and reliable acoustic release ideal for heavy, deep water deployments
• Features - Spring-assisted release mechanism suitable for long deployments
• Benefits - Available in different housing lengths
• Depth/Load - 7000 m, 2500 kg

P-DORT
• Applications - Heavy duty release suitable for deep water deployments
• Features - Automatic release function at depth and conventional release mode, suitable for deployments of 12 months
• Benefits - Reliable release mechanism and corrosion resistant
• Depth/Load - 7000 m, 2500 kg
AUV & ROV

SeaLion Remote Operated Vehicle
- **Applications** - Mobile underwater camera system ideal for pipeline work, river and ocean searches and hazardous site inspection
- **Features** - Six motor propulsion which operates at up to 3 mph
- **Benefits** - More powerful version of the SeaOtter, reduces deep water search time and allows you to locate and video target from a vessel
- **Depth Rating** - 150 m (optional 300 m)

SeaOtter Remote Operated Vehicle
- **Applications** - Mobile underwater camera system ideal for pipeline work, river and ocean searches and hazardous site inspection
- **Features** - Four motor propulsion which operates at up to 2 mph
- **Benefits** - Reduces deep water search time and allows you to locate and video target from a vessel
- **Depth Rating** - 150 m
UNDERWATER CAMERAS AND VIDEO

DV-1 Dropped Video
• Applications - Ideal for site checking and provides a variety of underwater searches
• Features - High resolution camera, two 100 watt quartz halogen lights and 45 m cable
• Benefits - Quick and easy low-cost site checking
• Depth Rating - up to 300 m

MC-1 Mini Camera
• Applications - Lightweight, underwater camera system that can be easily mounted
• Features - High resolution camera with 45 m cable
• Benefits - Ideal for applications where low-cost and small size are essential
• Depth Rating - up to 150 m

TOV-1 Towed Vehicle
• Applications - Large scale underwater searches
• Features - High resolution camera, wide angle lens, corrosion proof housing, two 100 watt halogen lights and 45 m cable
• Benefits - Compact system for rapid deployment
• Depth Rating - up to 150 m
METEOROLOGICAL INSTRUMENTS

SENSORS

Barometric Pressure Sensor OMC-506
• Applications - High precision sensor for land based Met systems, offshore platforms and Metocean buoys
• Features - 16 bit stable piezoresisitive transducer
• Benefits - Robust design for the marine market
• Range/Accuracy - 800 to 1100 hPa at 0.05% FS

Barometric Pressure Sensor CS100
• Applications - Provides accurate unattended measurements over a wide range of elevations
• Features - Uses Setra’s Setraceram capacitive sensor and IC analogue circuit
• Benefits - Excellent value for money, highly accurate and offers good long term reliability
• Range/Accuracy - 600 to 1100 mb ± 0.5 mb at 20°C

MultiMet Probe OMC-410
• Applications - Multiparameter weather measurement system suited to industrial, coastal and marine monitoring
• Features - Wind speed and direction, temperature, humidity, pressure and optional internal data logger
• Benefits - All-in-one solution for the hardest environments
• Accuracy - Wind Speed: ± 2 %, Wind Direction: ± 3°,
Temperature: < ± 0.3°C,
Humidity: 23°C < ± 1.5% RH 10-95%,
Barometric: 0.2 hPa

Rain Gauge OMC-210
• Applications - High precision and reliable rain gauge
• Features - Catchment funnel and gold-plated bucket
• Benefits - Designed to work under extreme conditions
• Bucket Size - 0.1 mm or 0.2 mm
### Rain Gauge ARG100

- **Applications**: Simple, accurate and reliable rain gauge designed to minimise wind-driven sampling errors
- **Features**: Vacuum formed UV-resistant plastic
- **Benefits**: Rugged and low cost
- **Bucket Size**: 0.2 mm or 0.25 mm

### Rain Gauge SBS500/500H

- **Applications**: Aerodynamically designed to minimise wind-driven sampling errors
- **Features**: Deep collector body reduces ‘splash out’ errors, extremely rugged, optional heater, built-in levelling device
- **Benefits**: Provides increased rainfall catch with minimal airflow interference, optional heater
- **Bucket Size**: 0.2 mm or 0.25 mm

### Rain Gauge 52202/52203

- **Applications**: Simple, accurate and reliable rain gauge
- **Features**: Optional heater, levelling adjustment, intake screen
- **Benefits**: Manufactured to WMO specifications, optional heater with thermostatic control
- **Bucket Size**: 0.1 mm

### Temperature Sensor OMC-443

- **Applications**: Highly accurate temperature sensor for land or ship based systems
- **Features**: Built in amplifier with 4 to 20 mA output, requires radiation shield
- **Benefits**: Measuring range of -40 to +60°C
- **Accuracy**: < ± 0.3°C

### Temperature and Humidity Sensor OMC-406

- **Applications**: Highly accurate and precise combined temperature and humidity sensor
- **Features**: Two 4 to 20 mA outputs from a single probe, requires radiation shield
- **Benefits**: Humidity range: 0 to 100% RH, Temperature range: -40 to +60°C
- **Accuracy**: Humidity at 23°C < ± 1.5% RH 10-95%, Temperature < ± 0.3°C
Temperature and RH Probe CS215
- Applications - Cost-effective temperature and humidity probe
- Features - Field changeable Swiss-made combined digital humidity and temperature element based on CMOSens® technology, shown to work to specifications in extreme weather conditions.
- Benefits - Excellent measurement accuracy and stability
- Accuracy - Humidity at 25°C < ± 2% RH 10-90%, Temperature < ± 0.3°C

Temperature and RH Probe HMP45C
- Applications - Temperature and humidity sensor offering low power consumption and good long term stability
- Features - Uses PRT for temperature measurement; capacitive RH chip for RH, removable probe head
- Benefits - Negligible hysteresis, high accuracy, insensitive to dust, very good tolerance against chemicals
- Accuracy - Humidity at 20°C < ± 2% RH 10-90%, Temperature < ± 0.2°C

Wind Speed and Direction Sensor OMC-160
- Applications - Combined inline wind speed and direction sensor
- Features - Stainless steel body with cup and vane sensors
- Benefits - Robust, corrosion resistant and easy to install
- Accuracy - Speed < 2% typical, Direction < 3°

Wind Speed and Direction Sensor-IS OMC-150
- Applications - Intrinsically safe combined inline wind speed and direction sensor
- Features - Stainless steel body with cup and vane sensors
- Benefits - Robust, corrosion resistant and easy to install
- Accuracy - Speed < 2% typical, Direction ± 2°

WindSonic™ Ultrasonic Wind Sensor
- Applications - Maintenance-free wind speed and direction monitor for true ‘fit and forget’ wind sensing
- Features - 2-axis ultrasonic wind sensor, corrosion free, UV stable material, true 0-359° operation (no dead band)
- Benefits - Robust and lightweight, low cost ultrasonic sensor with no moving parts
- Accuracy - Speed ± 2%, Direction ± 3°
DISPLAY UNITS

Meteorological Display OMC-938
- Applications - Specifically designed to display wind speed and direction and four other parameters
- Features - Multi-purpose display, compatible with multitude of sensor outputs
- Benefits - Display in m/s, knots, mph, km/h or Beaufort and selectable intervals

Multi-Functional Display OMC-934
- Applications - A DIN 144 instrument for indicating four different parameters
- Features - Multi-purpose display, compatible with multitude of sensor outputs
- Benefits - Interface available for most common sensors

Wind Display OMC-138
- Applications - Digital combined display for wind speed and direction suited to the meteorology market
- Features - Easy read out of wind information via numerical display and LEDs
- Benefits - Display in m/s, knots, mph, km/h or Beaufort and selectable intervals

Wind Display OMC-139
- Applications - Digital combined display for wind speed and direction suited to the marine market
- Features - Easy read out of wind information via numerical display and LEDs
- Benefits - Display in m/s, knots, mph, km/h or Beaufort
CALIBRATION STANDARDS - SALINITY STANDARDS

IAPSO Standard Seawater
Standard Seawater, as approved by the International Association for Physical Sciences of the Ocean (IAPSO), is the only transfer standard for Practical Salinity that is recognised by all the major oceanographic bodies.

- **P-Series**
  Normal Standard Seawater, \((S=35)\) is accurately calibrated in electrical conductivity ratio \((K15)\) and in salinity. This is the main single-point calibration standard for salinity measurement.

- **10L-Series**
  Low Salinity Standard Seawater, \((S=10)\) is accurately calibrated in conductivity ratio for the temperature range 15°C to 30°C. This standard provides an additional calibration point for low salinity work, e.g. Baltic Sea.

- **30L-Series**
  Low Salinity Standard Seawater, \((S=30)\) is accurately calibrated in conductivity ratio for the temperature range 15°C to 30°C. This standard is used in conjunction with P-Series to determine instrument offset and linearity at lower salinities.

- **38H-Series**
  High Salinity Standard Seawater, \((S=38)\) is accurately calibrated in conductivity ratio for the temperature range 15°C to 30°C. This standard is used in conjunction with P-Series to determine instrument offset and linearity at higher salinities, e.g. Mediterranean Sea.

- **Linearity Pack**
  When analysing samples at salinities away from 35, it is important to know the salinometers’ offset across the working range to improve data quality. Developed to enable the linearity of instruments to be checked more easily, this pack contains; 4 x P-Series, 2 x 38H-Series, 2 x 30L-Series and 2 x 10L-Series, complete with full instructions.
NUTRIENT STANDARDS

Freshwater Nutrient Standards Kit (FNSK)
For the preparation of non-marine working standards, this kit contains concentrates of Nutrient Standard Solutions (50ml each of phosphate, nitrite, nitrate, silicate, ammonia) and de-ionised water (2 x 1 Litre) for the preparation of fresh standards. Each kit contains full instructions.

Low Nutrient Seawater (LNS)
Seawater matrix salts affect the kinetics and colour intensities of the colorimetric methods widely used in the determination of dissolved nutrients. In order to eliminate these salt effects, it is essential that working calibration solutions are prepared in a seawater matrix. Low Nutrient Seawater (LNS) can be used for the preparation of fresh standards, as a refractive-index blank, or as wash solutions. For lower accuracy work, LNS may also be used to define the zero-concentration calibration points.

LNS has defined maxima for phosphate, nitrite, nitrate and silicate. Owing to atmospheric effects, the ammonia concentration (although low at the time of bottling), cannot be guaranteed. LNS is available in packs of 10 x 1 Litre bottles.

Marine Nutrient Standards Kit (MNSK)
Calibration of analytical systems for nutrients in seawater requires standards to be prepared in seawater. This kit contains concentrates of Nutrient Standard Solutions (50ml each of phosphate, nitrite, nitrate, silicate, ammonia) and Low Nutrient Seawater (2 x 1 Litre) for the preparation of fresh standards. Each kit contains full instructions.

Nutrient Standard Solutions (NSS)
Concentrated solutions of phosphate, nitrite, nitrate, silicate and ammonia are available for the preparation of working standards. NSS should be diluted with Low Nutrient Seawater (LNS) or de-ionised water to prepare working standards for the measurement of nutrients in seawater/freshwater samples respectively.

NSS Concentrations: Phosphate 100µM, Nitrite 100µM, Nitrate 1000µM, Silicate 1000µM, Ammonia 10000µM.
OTHER STANDARDS

Iodate Standards
These high precision standards are available for the laboratory determination of dissolved oxygen in seawaters. The standards comprise 0.01 Normal Potassium iodate solutions which are used to standardise the thiosulphate solution in the widely used Winkler titration method.

Iodate standards are supplied in packs of 5 x 100ml and 10 x 100ml brown glass bottles.

Atlantic Seawater Conductivity Standard
This filtered natural ocean water has a salinity of 35. It may be used for a wide range of applications, including; field probe calibration/checks, chemical analysis, particle studies and any other applications which require open-ocean seawater. The label value is quoted in salinity and in specific conductance (mS/cm) with a confidence of ± 0.2%.

Atlantic seawater is available in packs of 4 x 5L bottles or 10 x 500ml bottles.

Performance Evaluation (PE) Standards
Designed to be used as part of ongoing quality assurance programmes, these uniquely coded samples are supplied to the laboratories for analysis. After analysis the laboratory-determined value is sent to Ocean Scientific, who issue a certificate showing the true value, the analysts' value and any error. PE Samples for salinity, phosphate, silicate, nitrite, nitrate and ammonia are available.
RENTAL EQUIPMENT

A wide range of OSIL equipment is available to rent, here is a selection:

MULTIPARAMETER SONDES, CTDs AND SVs
6600 Multiparameter Sonde
SMART SV & P
SV Plus v2
Hand Held Display
Cables

SEDIMENT CORERS AND WATER SAMPLERS
Box Corer
Mini-Box Corer
Square Box Gravity Corer
Multiple Corer
Niskin Bottles

UNDERWATER TOWED VEHICLES
MiniBAT FC60
MiniBAT FW100
V-Fin

CURRENT METERS
AWAC
Aquadopp Current Meter

BUOYS
OSIL Small Field Buoy
OSIL Shearwater Buoy

SALINOMETERS
Autosal Salinometer 8400B
Portasal Salinometer 8410A
FULMAR BUOY CONTRIBUTES TO OCEAN OBSERVATORY

The Instituto de Investigaciones Marinas (CSI-IIM) have utilised an OSIL Fulmar Buoy for their contributions to the RAIA Iberian Margin Ocean Observatory.

An Ocean Observatory has been established along the Iberian margin of the Euro-region, Galicia-Northern Portugal, in order to obtain continuous meteorological, oceanographic and biological data, complemented by predictive models.

The operational nature of the institutes involved will guarantee the future sustainability of the observatory as well as the availability of data and models to all the other participants, present and future, and to the end users.

The local objective is to provide continuity to an existing series of measurements along the zonal line passing through the mooring site off Cabo Silleiro, which has been the focus of observations for several decades.

OSIL worked closely with IIM participants to specify and develop a suitable platform. The platform selected was the 1.9 m OSIL Fulmar buoy, equipped with an ACDP, a wind speed and direction sensor, a string of Seabird CT sensors and a GPS watch circle. Data is transmitted from the buoy using an inductive modem (which sends data up any insulated wire using a modulated signal) and is transferred via Iridium satellite.

The buoy will provide coverage of the hydrographic properties and currents of the complete water column and local surface meteorological forcing in real time, which will enable IIM to place their process studies in context.
OSIL’s Fulmar Buoy is a versatile instrumentation platform ideally suited for collection and measurement of oceanographic, meteorological (metocean) and water quality data parameters in inshore coastal areas, as well as open water applications.

Instrumentation can be deployed anywhere from near surface to the seabed. The buoys can be moored in a fixed position with either single point, dual point or compliant mooring (where required).

The system is supplied with a range of sensors that can specified by the customer. All buoys are fitted with solar panels, navigation/warning lights and other markings as necessary. A range of telemetry options are available (UHF/VHF, GSM, GPRS, Satellite), selected to suit both the location and application requirements. OSIL provide a complete data telemetry solution, including either desk top or web-based software packages to access the data.

The buoys have a total buoyancy of 2000 kg, and a reserve buoyancy of 1000 kg after fitting the equipment such as solar panels, battery packs and monitoring instrumentation, etc.

The OSIL range of buoys are manufactured using rotationally moulded polyethylene hulls, which are foam filled for added security. The hulls are constructed around a galvanised steel or welded polyethylene central structure, which has a large hole through the centre which allows the passage of instrumentation and cables from the tower down through the water column to the seabed. By utilising a ‘Moon Pool’, instrumentation in the centre of the buoy is well protected from damage during deployment and operation.
The 60th research cruise of the RSS James Cook completed recently, having spent 5 weeks in the North East Atlantic in rough seas and high winds, collecting samples from the Darwin Mounds and Rockall Bank (North-West of Scotland) for Oceanlab researchers Dr. Evina Gontikaki & Neils Jobsvogt.

The overall aim of the cruise was to investigate the different biotopes and faunal communities in the area, assess the extent of human impact on these habitats and the effects of protection measures in marine protected areas.

The first part of the Oceanlab project was a laboratory based experiment aimed at further understanding the degradation of organic matter at bathyal depths, and particularly the effect of introducing fresh organic matter from surface waters on the rate of decomposition in sediments.

The research team used a megacorer, supplied by OSIL, to collect sediment cores from 500, 700 and 900 m in the Darwin Mounds area, which were then incubated after addition of different quantities of 13C-labelled fresh organic matter into the samples.

The progress of the degradation of fresh and old organic matter for each quantity level and depth was monitored once a week for 21 days. The experiment will provide important insights into carbon cycling processes in the North East Atlantic and enable us to test what effects future changes in the amount carbon falling to the seafloor might have on the communities living in the sediment.
The second part of the project was focused on assessing the impact of trawling activities on infaunal communities (animals that reside in the sediment). Sediment samples were taken from 3 stations inside the Darwin mounds protected area, and from another 3 stations outside (but nearby) the protected area, using the megacorer. Changes in the relative abundance and biodiversity of infaunal communities due to trawling will likely have an effect on the sediment biogeochemistry and ecosystem processes such as carbon cycling and nutrient regeneration. However, information on the effect of trawling on these communities is lacking.

The Mega Multiple Corer used on the cruise is a hydrostatically damped multiple-corer (penetration rate ~1 cm/s), designed to collect high quality undisturbed samples of surface sediments, including the sediment/water interface and overlying supernatant water. Each of the four multiple corers available, Mega, Maxi, Midi and Mini, provide a simple and reliable way of collecting the most accurate sample possible by eliminating the bow wave generated by traditional corers.

The rugged frame of the corer is made from 316 stainless steel and the core tubing itself can be manufactured from acrylic, polycarbonate or stainless steel, depending on the requirements of the customer. With a deployment rate of approximately 1 metre per second on the descent, coupled with a retrieval rate at winch speed, the corers are ideal for rapid assessment work.

For further information please contact:
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Email: osil@osil.co.uk
Web: www.osil.co.uk
The Skomer Marine Nature Reserve is one of only three marine nature reserves in the UK. This is the only one in Wales and is run by the Countryside Council for Wales. Skomer’s waters are famed for their underwater scenery and amazing range of marine life. Situated as it is where northern and southern species overlap, there is a huge variety of wildlife of all shapes and colours - making it a great place to study and monitor changes in the marine environment.

The Countryside Council for Wales required a biological monitoring solution to run alongside their automated weather station and existing temperature probes on the seabed of Skomer Marine Nature Reserve.

The CCW MNR staff contacted OSIL and, through discussion, it was suggested that an OSIL Shearwater buoy could be deployed with a YSI 6600 multiparameter sonde, fitted with CTD, D/O, turbidity, pH and chlorophyll sensors. The sonde has been fitted just below the buoy, with the cable running through the hull of the buoy to the surface.

The data is telemetered using a GSM communication system that is linked to the main CCW website, where data is displayed, and the local office. (http://environmental-change.ccw.gov.uk:81/?command=RTMC&screen=Skomer%20Buoy).

The CCW MNR staff team, based at Martin’s Haven, monitor the seas around Skomer using many techniques, including diving and underwater photography. Both short term and long term changes and trends can be picked up in this way, and the work on the site is very important in helping to understand the marine environment better, and particularly the impacts of climate change on our seas.

Morgan Parry, CCW Chairman said:

“Over the last 20 years, a clear picture has emerged of the Reserve’s marine habitats and the wildlife they harbour. And, critically, there is an ever improving understanding of the factors that affect this marine environment, including the impacts of climate change on our seas.”
“The aim is to build upon a long term data set of on-site oceanographic data. Seabed temperature and secchi disc records from the area date to 1992. Most of the biological monitoring starts around this time, but some goes back to 1984.” said Mark Burton of the Skomer MNR.

CCW will use the information gathered from monitoring and research work to advise on the measures required under the Marine Act, in particular the requirement to create an ecologically coherent network of Marine Protected Areas. With climate change and other challenges facing the marine environment, it is more important than ever that Skomer, and other Marine Nature Reserves, remain protected.
APPLICATION NOTE

TIDAL TURBINE ASSESSMENT BY ADCP

Tidal energy can provide a highly predictable and sustainable level of energy that is dependent on the tidal cycle.

The emerging technologies for tidal energy generation provide two very different approaches: impoundment schemes, such as barrages and lagoons, or streams that directly utilise the tidal current - that is, tidal stream turbines.

Tidal stream turbines can be fully submerged below the water level and thus do not provide a visual obstruction to the landscape, although they may have an impact on the local marine environment. They can be seabed mounted, for example by way of a pile-driven stanchion, or floated at a desired depth through the water column.

There are a number of devices currently under development that fall into a number of categories. The main types are horizontal or vertical axis turbines, although other designs are venturi devices that can be used to concentrate the flow and oscillating hydrofoils that move up and down through the water column, generating electricity by way of the pumping of hydraulic fluids.

An evaluation of the performance of horizontal axis tidal turbines (HATTs) has been undertaken by Cardiff University at two sites off the Welsh Coast of the UK.

The sites, one in the Severn estuary and one off Anglesey, were initially surveyed with a hull mounted Acoustic Doppler current profiler, supplied by OSIL, to establish the local velocity profiles.

Once the bathymetry of the area had also been established, energy extraction from a three-bladed 10 m diameter turbine was studied using a quasi-static computational fluid dynamics model and velocity profile data from the acoustic Doppler current profiler surveys.

The ADCP transect surveys produced detailed current velocity profiles throughout the water column, and the flow regimes over a tidal cycle in order to assess whether the currents possessed the necessary strength to power the HATT.
The turbine performance calculation is highly dependent on the velocity used; the velocity should be monitored around five turbine diameters upstream, at the depth of its axis of rotation.

For tidal energy extraction to prove viable, a typical flow velocity of between 2 m/s and 3 m/s must be observed at mean spring tide.

The maximum peak velocities for both sites were found towards the water surface, with the Anglesey site providing a much higher velocity.

It is suggested that the peak velocity at the Severn estuary site is, at 1.8 m/s, unlikely to provide a suitable level of power to be viable. The turbine would also need to be located around 25 m below the surface to avoid shipping, which would mean that the turbine would never encounter the peak tidal velocity.

The Anglesey site would, however, meet the economic requirements even at neap tide, particularly if the turbine was positioned at 20 m depth, or higher.
The Northern Ireland Environment Agency were asked to investigate a fish kill event at the popular angling location of Ballykeel Lough Erne, Co. Down.

Anglers reported a large number of dead fish floating on the surface of the water, and washed ashore around the angling stands of the fishery, which was also confirmed by the Department of Culture, Arts & Leisure (DCAL).

Inspectors from the Northern Ireland Environment Agency were, at short notice, required to monitor the water quality at different depths in the 8m deep fly-fishing lake, to ascertain if the brown trout died as a result of a dissolved oxygen mixing event.

The OSIL Small Field Buoy was specifically selected for this application, due to restrictions imposed on the types of vessels allowed on the freshwater lake.

The buoy is small at 0.6m in diameter and 1.2m in length, lightweight (just 25 kg), and easy to deploy by two people from a small craft, such as a rowing boat. The buoy’s single point mooring also assists in ease of deployment and recovery.

Inspectors from the Northern Ireland Environment Agency took water samples, and deployed an OSIL Small Field Buoy, with two Hydrolab sondes at different depths, set up for internal logging which provides up to 30 days data on up to 16 parameters simultaneously.
OSIL’s Small Field Buoy is designed for use in applications where data needs to be obtained ASAP, and where other data collection systems would be difficult to deploy from small vessels.

The small, lightweight buoy is designed for long-term use, and carries a GPRS enabled data logger, solar panels and battery backup.

Constructed with a machined foam centre and durable rubber coating, the Buoy has a central through hull compartment designed to accommodate a water quality sonde while providing protection from collision damage and accurate equipment positioning.

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APPLICATION NOTE

ARGONAUT-SL USED IN BERTH MANAGEMENT SYSTEMS

One of Strainstall UK Limited’s primary marine safety systems is their Berth Management System, which is used chiefly for the docking of VLCCs (oil tankers) and LNG (liquid natural gas) carriers. The Berth Management System provides assistance to vessels on their approach to the berth and during mooring by monitoring the conditions of the sea and surrounding area to ensure the complete safety of the vessel. The system undertakes continuous surveillance of the mooring and vessel related parameters, such as speed and position of the vessel on approach, weather conditions and oceanographic parameters.

A system such as Strainstall’s needs to be in place to ensure that the docking operation is performed within defined environmental limits and strict approach speed limits, as large impact on the fenders and jetty equipment may cause considerable damage. In relation to this, environmental monitoring of parameters such as current and tides needs to be undertaken as the conditions will affect the manoeuvring of the ship during berthing.

Strainstall use SonTek’s Argonaut-SL sideways facing ADCP in their Berth Management Systems to monitor the current present at the time of berthing. SonTek recognised the need to measure water velocity and level in open channels during applications such as this and the SL was their solution. The SL, known as the Side-Looker, is intended for side mounting on bridges, canal walls and riverbanks, ideally on an existing structure. It is available in three models all with different sampling ranges, the SL3000’s being 0.1m - 5m, the SL1500 0.2m - 20m and the SL500 reaching up to 120m. The assortment of ranges mean that the SL is suited to a variety of channels from narrow rivers to wide ports.

The Argonaut-SL’s narrow beam width, combined with unmatched side lobe suppression, provides the superior acoustic directivity necessary for achieving maximum horizontal range, which is free of interference from boundaries and obstacles. The SL comes with the Windows software packages ViewArgonaut and FlowPack, but it is also compatible with other software, which Strainstall illustrates by using it with their Berth Management software.

The right position for the Argonaut-SL needs to be ascertained for each Berth Management System set up by Strainstall so that sufficient data can be provided. To achieve the most accurate results in...
this application, Strainstall considered the installation, survivability, maintenance and cost constraints of the SL and deduced that the berth itself would be the most appropriate structure for the sensor. From this position the SL can monitor the current as the vessel is approaching the berth which is the primary operational requirement and when current measurement is most critical.

Within the berth, Strainstall must also take practical restraints into consideration. The mooring dolphins can have an affect on the water flow into the berth and, therefore, can affect the data recorded. From this Strainstall have deduced that whenever possible the SL should be deployed from a catwalk, which is a walkway that links the mooring dolphins. To install an Argonaut-SL onto a catwalk a deployment frame or support is needed which must be designed to suit the structural design of the catwalk, allowing for easy deployment and recovery. The frame will need to be light enough so that it can be lifted for cleaning and be stiff enough to avoid vibration in strong currents.

If deploying the SL on a catwalk the signal cable can be routed to a junction box on the catwalk which is then connected to a central control room via fixed site cabling. A PC is located in the control room running Strainstall’s Berth Management software which integrates the SL’s data with the other measured parameters.

Mr Dave Vodden, Engineering Manager at Strainstall, explains that the Argonaut-SL was chosen because, “being an ADCP, marine fouling is far less of a problem than with impellor type current meters.” This means that time can be saved by only having to clean the instrument every three months.

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Situated in Galicia in the north west of Spain, the Ria de Vigo is a river valley that has sunk tectonically and has been flooded by the sea. The Ria is connected to the open sea via a narrow northern channel and a wider and deeper southern channel. Due to the low tidal Circulation, the Ria de Vigo can be susceptible to harmful algal blooms (HABs), which can kill fish, contaminate seafood with toxins and fundamentally alter whole ecosystems.

Due to the potential impact of HABs a project was funded by the Xunta de Galicia to investigate the high productivity and the sporadic occurrence of HABs in the Ria de Vigo.

The main interest was in an invasion of warm downwelling waters that seem to coincide with rapid developments of HABs at various times of the year. The project was designed to closely examine this phenomenon using spatial and temporal datasets collected using OSIL’s lightweight tow vehicle, the MiniBAT FC60.

The field data was collected in two phases, the first in September 2006 during the change of water conditions from summer upwelling to winter downwelling, which is when harmful algal blooms often occur. The second phase will take place in June 2007 during conditions of typical summer upwelling to form a contrast with the conditions of the first phase. Dr Barton, the project’s co-ordinator explains, “our observations will be crucial in interpreting the dynamics of the HABs that coincided with the warm water inflow.”

The field data was collected using a range of instruments, including the MiniBAT FC60 which was fitted with a variety of apparatus to measure chlorophyll and turbidity, amongst other parameters. The MiniBAT FC60 allows rapid profiles to be collected behind a vessel and it eliminates the need to continuously stop and take profiles as in traditional data collection. It also gave the team time to cover the whole Ria at a much quicker rate and better spatial resolution was achieved.

The MiniBAT FC60 was the ideal instrument to use for this type of investigation as Dr Barton explains, “we chose the MiniBAT FC60 as the towed vehicle as it is the most capable of carrying a flexible payload and it is well proven in the field.”
The FC60 MiniBAT was fitted with an AML Micro CTD to measure conductivity, temperature and pressure and a Wet Labs WetStar to measure fluorescence plus an OBS 3 to measure turbidity. By monitoring these parameters spatially and temporally in the ria the team were able to identify the conditions that most favoured the HAB. Dr Barton clarifies “with the back up of the experienced OSIL team, we were able to maximise the use of the system and succeeded in capturing previously unseen aspects of the inflow.”

![Image of route taken with the FC60 MiniBAT on 26th Sept 2006](image)

Data collected with the MiniBAT on 30th Sept 2006

The team cycled the MiniBAT FC60 to a depth of 30 metres every few hundred meters and, because the sensors were taking samples every 25 seconds, “a dense array of data was obtained which provided great detail on the parameter distributions,” Dr Barton explains, “overall the MiniBAT has proved a huge success for the HABs project.”

In summary the MiniBAT FC60 offers the perfect solution to collecting profiled spatial data sets, quickly and efficiently using a wide range of equipment and sensors.

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CODAR’S HF RADAR SYSTEM HELPS SPANISH AUTHORITIES MONITOR THEIR COASTLINES

In 2002, Spain witnessed the Prestige oil tanker sink off its north-west coast and it acted as a wake up call highlighting the importance of preparing for such a crisis. It led to Spain’s government prioritising the improvement of maritime protection and coastal management proceedings.

Puertos del Estado is part of the Spanish Ministry of Public Works and as well as supporting the development of technologies, they operate various oceanographic monitoring networks for measurement and prediction of physical variables such as waves, sea levels and point currents. One of their primary functions involves finding new technology which could help increase the safety of navigation and the efficient management of Spain’s harbours.

The HF Radar is identified worldwide as an essential component for improving the monitoring of coasts and, as Codar Ocean Sensors’ SeaSonde currently accounts for 80% of the worlds operational HF Radar systems it is an obvious place for anyone interested in monitoring waves and current to start.

An agreement was signed in April 2005 by the Spanish Ministry of Public Works, which has responsibility in Maritime Security and Pollution in the sea, to install two Codar HF Radar current and wave monitoring systems in the Galician Rias Baixas coast.

Codar’s SeaSonde combines state of the art technology with reliability and convenience, providing it’s customers with the only solution for their ocean observation needs. It is the only system that can offer ranges of up to 200km with a proven track record, and will provide years of real-time data over large coverage areas. It is able to provide surface current and wave maps and will deliver quality data, while being easy to maintain due to positioning on land. Codar can provide between two and fifty stations for a system based around a central site.

The purpose of the two systems in Galicia was to:

- Validate the reliability and flexibility of the radar technology for real applications.
- Validate the quality of the data in hard topographic and environmental surroundings.
- Run trajectory spill models with radar data input.

The locations of the two systems are the lighthouses in Finisterre and Silleiro, making a distance of 92km between the radar systems. The Finisterre site is well suited to such a system because of the SeaSonde’s flexibility and Finisterre’s existing buildings. It is important to Codar to have as little influence on the surrounding environment as possible and as
Finisterre is a tourist site and was a main priority. At the site it was possible to position the transmission antenna inside the lighthouse’s fenced area, laying the cables through existing lanes. The receiving antenna could then be placed on an existing mast, which conveniently positioned the two antenna over one wavelength apart. Both the antenna at the Silleiro site were placed on a platform at a distance of 100m from the sea.

The radars send out a signal every second and the reflected spectre is then analysed by the computers installed in the respective lighthouses. Current maps and wave information are generated every 20 minutes and data is archived every hour. The central server is connected online to a second server at Puertos del Estado who then make the data available to the public online at www.puertos.es.

The Galicia experience has shown that Codar’s SeaSonde can provide reliable, high quality data and that it is ready to be integrated into operational oceanography monitoring schemes. The radars have shown a reliability higher than 99.5% in the three months since they have been installed.

After careful analysis and application studies conducted by Merchant Marine it was concluded that the SeaSonde data could provide a significant improvement to emergency planning and response in the area. Merchant Marine have supplied funding for continued operations, making the SeaSonde units permanent deployments in Galicia.

For further reading on the initial SeaSonde deployment in Galicia and the results, please refer to the following publication which is available to download from both OSIL and CODAR’s websites:

*Comparison of CODAR SeaSonde HF radar operational waves and currents measurements with Puertos del Estado buoys.* Final report of Puertos del Estado, Spain, March 2006. Marta Alfonso, Enrique Alvarez and Jose Damian Lopez.

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