

# SWATHplus

High-resolution bathymetry and sidescan

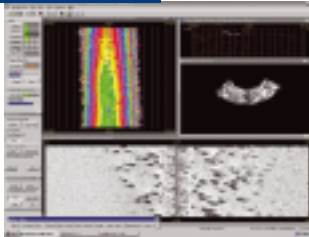
## Proven. Reliable. Robust. Versatile.

The shallow water survey system from SEA.

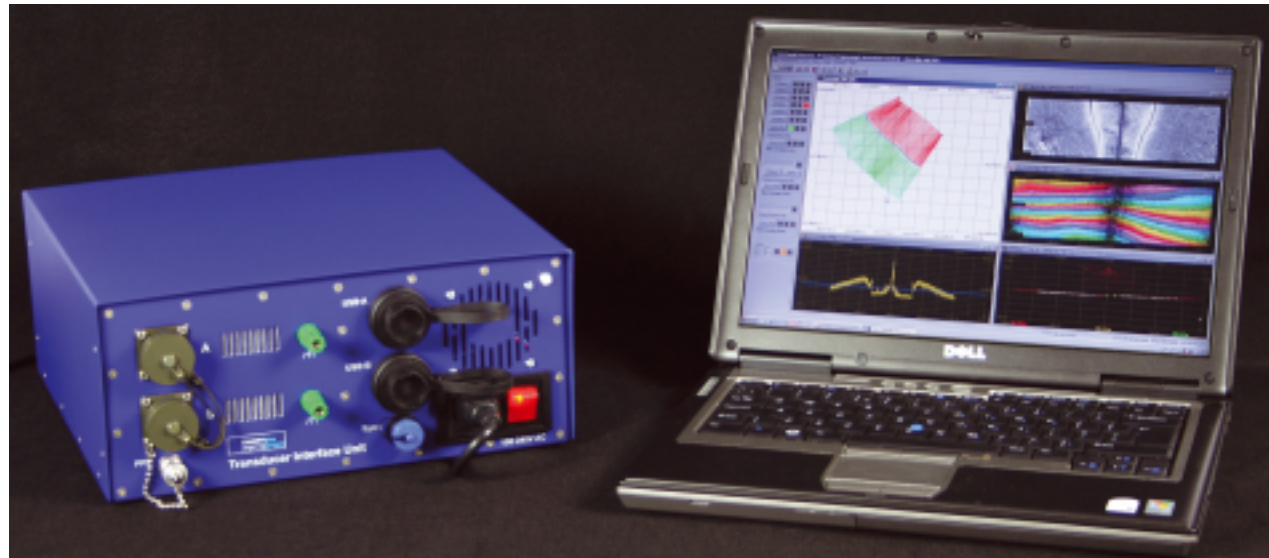
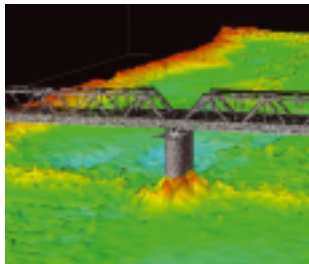
Accurate seabed mapping with co-registered bathymetry and sidescan.

Available in a range of operating frequencies to match your survey requirements.

For full coverage images and charts of the depth and sidescan imagery of the seafloor and inland waterways ▶



Provides high resolution 3D imaging for civil engineering inspection ▼ ▶



## introduction

No two hydrographic surveys are the same.

Neither are all environments the same.

But all hydrographic surveyors share the same goals...

Effective performance. Fast accurate data collection and processing. Reliable output. This is what hydrographic surveyors search for in sonar, and this is precisely what SEA's SWATH*plus* family of sonars delivers: a range of compact, robust and easily deployable systems for use in a variety of scenarios, for numerous, wide-ranging applications.

## benefits

- Compact, man-portable, robust design
- Co-registered bathymetry and sidescan
- Fully functional high quality sidescan
- High resolution across the entire swath
- Wide swaths in shallow waters
- Interferometric technology
- Integrated 3D visualisation with fly-through and editing
- Interface with major hydrographic processing and visualisation software packages
- Miniaturised electronics for AUV and ROV applications
- Detection of mid-water targets
- Transducers include advanced 1-3 composite technology
- CE approved

## applications

- Shallow water hydrographic survey
- Navigational charting
- Environmental monitoring
- Dredging operations
- River, harbour, lake and dam management
- Marine archaeology
- Wreck location
- Marine civil engineering inspection
- Pipeline and cable routeing survey and inspection
- Hull inspection
- Harbour security
- Military rapid environmental assessment

## frequency options

Frequency options for optimised usage are as follows:

**468 kHz** Best solution for small craft, shallow surveys, inland waterway, civil engineering inspections – recommended for use in zero to 50 metres depth

**234 kHz** Ideal for sea port and harbour inspections and coastal surveys – zero to 100 metres depth

**117 kHz** Large areas deep water continental shelf – zero to 300 metres depth

## technical specifications

### Universal Mounting System

- Permits bow or side mounting
- Readily deployed on vessel of opportunity

### System Transducers

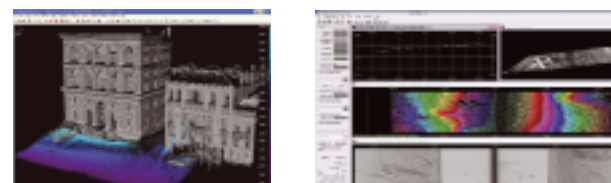
- Compact and lightweight system
- 3 frequency options 468 kHz, 234 kHz and 117 kHz

### Transducer Interface Unit

- Real time sonar data acquisition to PC
- 2 SWATH*plus* transducer connectors: MIL-C-26482
- 2 USB connections to PC computer
- 2 signal ground connections: screw terminal
- Sync port; supports trigger pulse output to echosounders
- 1 Pulse Per Second port for precise timing: BNC
- 230 V Mains in: IEC connector 100-240 V AC mains, < 20 W
- Size 120 mm H x 290 mm W x 285 mm D

### System Computer and Software

SWATH*plus* interfaces to high performance Laptop or Desktop PC running Microsoft Windows XP and Vista Laptop may be supplied or user selected for best utilisation of off the shelf interface solutions to suit survey system requirements



### Two key software applications...

#### Swath Processor

Real-time and first-line replay functions, including:

- Controlling the sonar electronics system
- Acquiring data from the sonar electronics
- Acquiring data from the auxiliary systems, through the PC's serial and Ethernet ports
- Storing raw data
- Converting the raw data to depth, position and amplitude (xyza), combining auxiliary data, such as motion, position, etc.
- Filtering the data
- Displaying the data
- Storing processed data in a range of formats

#### Grid Processor

Post-processing functions, including:

- Creating gridded digital terrain model (DTM)
- Displaying depth and amplitude
- Displaying statistical information
- Comparison of overlapping data sets
- Automatic 'patch test' calibration, giving accurate sensor offset data
- Filtering and adjusting the data in the grid
- 2D depth numerical and colour-map chart views; scaled print-out
- 3D surface and point cloud views
- Interactive depth editing in 3D view
- Depth, sidescan or statistical information shown in 2D and 3D views

### Sensor Interfaces

Interfaces to most industry standard auxiliary sensors, including:

- Attitude: CodaOctopus F180 series, Applanix POS/MV and Wavemaster, Ixsea Octans and Hydrins, TSS DMS, and many others
- GPS systems: All NMEA 0183- compatible systems
- Gyro compasses: All NMEA 0183- compatible systems
- Real-time and profiling speed of sound sensors, allowing full depth correction
- Echosounders
- SEA's ECHO*plus*

### Third-Party Software Support

Open-format file and TCP/IP data exchange and control.

Full real-time sonar control and process:

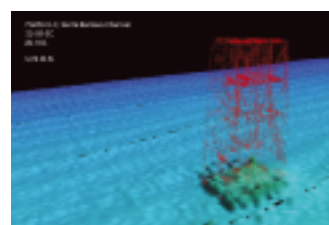
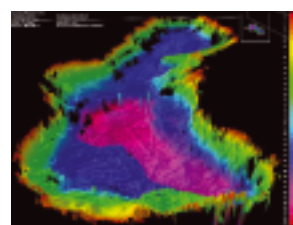
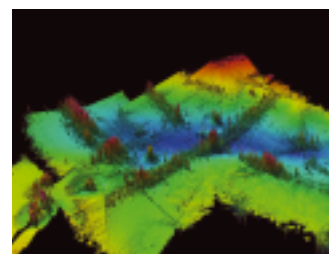
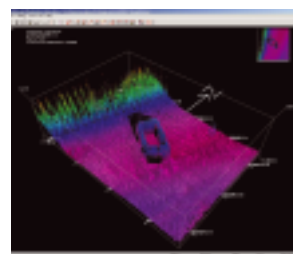
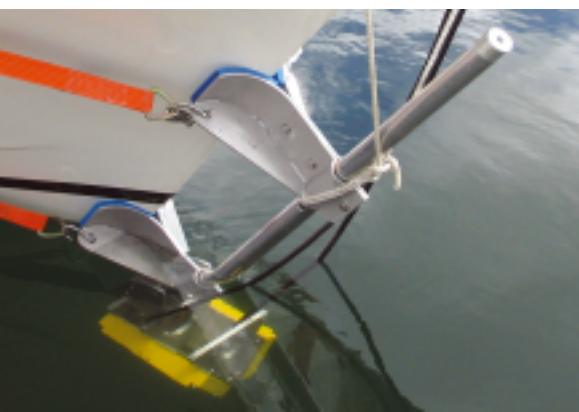
- GPS's QINSy
- PDS2000
- Hypack

Data processing and visualisation:

- Caris
- Surfer
- Any ASCII xyz-compatible system

Sidescan processing:

- CodaOctopus' Geosurvey
- Chesapeake Technologies' SonarWeb
- SeeByte's SeeTrack
- Any XTF-compatible system



## world-wide system owners

Cardiff University  
China Maritime Safety Administration  
CIDCO Canada  
Codevintec srl  
Electricité De France (EDF)  
Fugro John Chance Land Surveys Inc

Fugro (Middle East)  
GEMS International  
Geological Survey Canada Atlantic  
Korean Ocean Research  
Development Institute  
Marine and Coastal Geoscience

Marine Safety, Queensland  
Queensland Department of Transport  
Sakawe Mining Corporation  
Seabed BV  
Shanghai Water Supplies Bureau  
STES

TEMA  
UK Environment Agency  
University of St Andrews  
Underwater Survey Technology 21  
US Geological Survey  
Virginia Institute of Marine Science

## performance parameters

	SWATHplus-L	SWATHplus-M	SWATHplus-H
<b>Sonar Frequency</b>	117 kHz	234 kHz	468 kHz
<b>Recommended Depth to*</b>	300 m	100 m	50 m
<b>Maximum Swath Width*</b>	Up to 600 m	Up to 300 m	Up to 150 m
<b>Swath Width*</b>	Up to 15 times depth, up to maximum swath width (typically 7-12 times, depending on water conditions and bottom type)		
<b>Resolution Across Track (best case)*</b>	5 cm	2 cm	1 cm
<b>Beam Width, Azimuth</b>	1.7°	1.1°	1.1°
<b>Transmit Pulse Length</b>	68 $\mu$ s to 1 ms	34 $\mu$ s to 500 $\mu$ s	17 $\mu$ s to 250 $\mu$ s

## dimensions

Transducer	Height/mm	Width/mm	Depth/mm	Weight in air/kg	Weight in water/kg
<b>SWATHplus-L</b>	235	550	90	13	1.6
<b>SWATHplus-M</b>	160	350	60	6	0.9
<b>SWATHplus-H</b>	100	215	42	1	0.1

Transducer integral cable length **20 m (SWATHplus-L and -M)** and **16 m (SWATHplus-H)**.

\*Parameters are given for guidance only and may vary according to survey conditions.  
All specifications subject to change without notice.

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Further information from SEA

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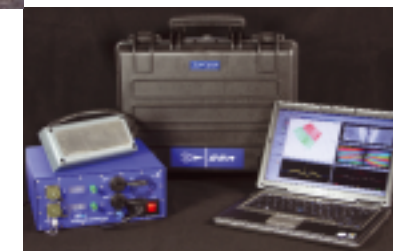
**facsimile** +44 (0) 1373 831 133

**email** info@sea.co.uk

**web** www.sea.co.uk

**BS EN ISO 9000:2000**  
(ISO 9000-3 UK TickIT for software)

SWATHplus fully supports survey requirements for special order specifications, as set out in IHO Standards for Hydrographic Surveys, Special Publication 44, 4th Edition, April 1998.



**SEA**