



USBL POSITIONING AND COMMUNICATION SYSTEMS

PRODUCT INFORMATION GUIDE

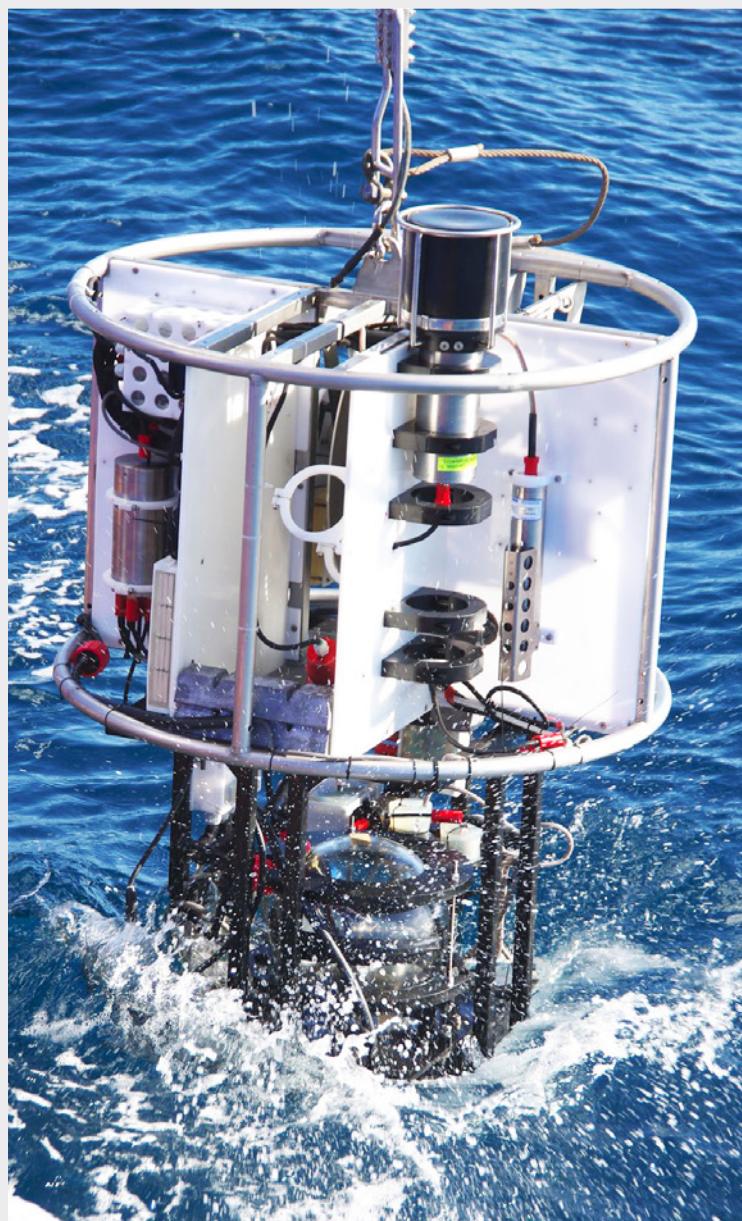


EvoLogics S2CR USBL-series underwater positioning and communication systems

EvoLogics S2CR USBL is a series of combined positioning and communication devices. Offering a powerful USBL transceiver functionality with full benefits of an S2C technology communication link, S2CR USBL devices provide accurate USBL tracking and full-duplex digital communication, delivering an excellent all-round performance ideal for application scenarios that demand space-, energy- and cost-saving solutions.

Switching between positioning and communication modes is not necessary: positioning data is calculated simultaneously with acoustic transmissions. Both features complement each other in a fully integrated positioning and communication system that opens new possibilities for a wide range of subsea applications.

- Patented S2C (Sweep Spread Carrier) Technology - spread spectrum technology based on extensive bionic studies
- Simultaneous USBL positioning and data transmissions
- Tracks up to 255 targets simultaneously
- Can be used as Inverted USBL
- Self-adaptive algorithms for reliable performance in adverse underwater conditions, built-in forward error correction and data compression
- Advanced communication protocol with several data delivery algorithms: send and receive large volumes of data with the highest bitrate possible in current conditions; send and receive short instant messages without interrupting the main data flow between devices
- Addressing and networking: build relay chains and underwater networks with broadcasting capabilities
- Low power consumption and additional power-saving options



APPLICATIONS

Positioning of offshore equipment

Track the positions of offshore equipment during installation to ensure accurate placement at predetermined coordinates

Navigation of ROVs and AUVs

Simultaneously track positions of multiple ROVs or AUVs and control their missions with instant commands

Cartography

Locate underwater features with geo-referenced coordinates when used together with GPS or differential GPS

Increase measurement accuracy

Track the position of sensors and detectors to increase the accuracy of measurements

Diver Tracking

Monitor positions of several divers and exchange information with them during the mission

MODULES AND OPTIONS

- AHRS (Attitude and Heading Reference System)
- GPS integration
- Integrated rechargeable battery
- Acoustic Wake-Up module
- Integrated data-logger available
- Acoustic releaser
- Short- mid- and long-range devices for shallow or deep water applications
- OEM versions available
- Compatible with S2C R modem and LBL solutions
- More options upon request

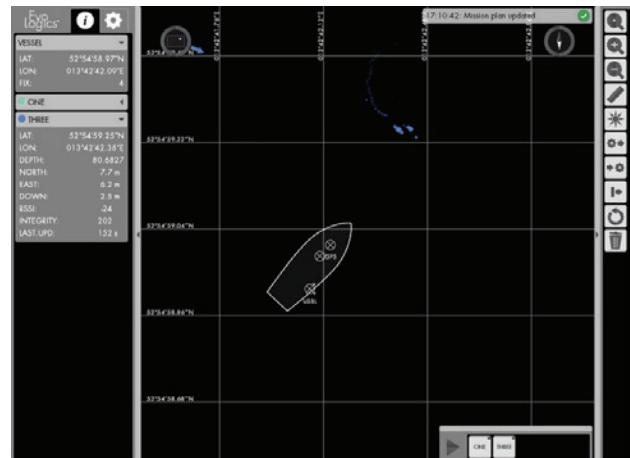
SENSOR INTEGRATION

- ADCP: Acoustic Doppler Current Profiler
- SVP: Sound Velocity Profiler
- CTD: Conductivity, Temperature, Depth, Pressure sensors
- INS: Inertial Navigation System
- More options upon request



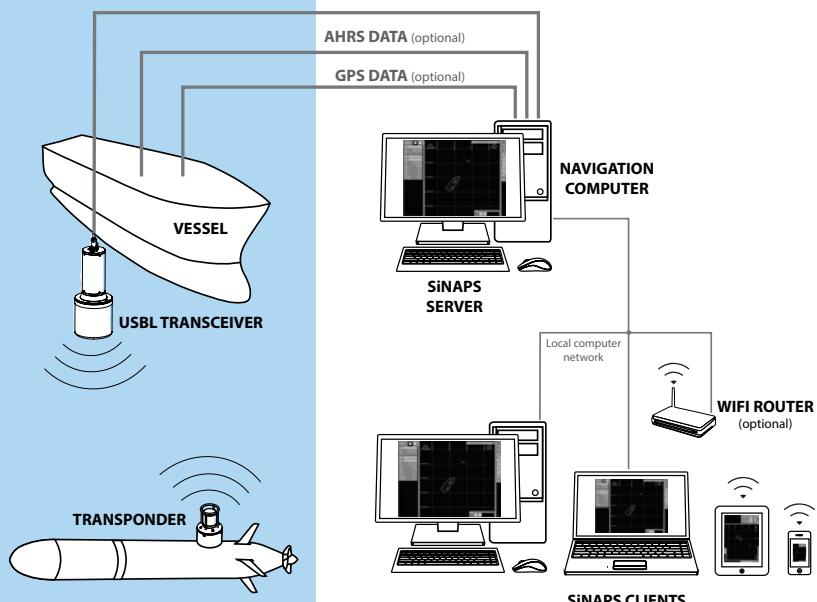
SiNAPS, the new S2C intelligent Navigation and Positioning Software

- Web-based user interface - use the software on any device in the local computer network
- Real-time multiple target tracking
- Extensive system configuration options
- Increased positioning accuracy when interfaced with an internal or external AHRS (Attitude and Heading Reference System) sensor and an external GPS receiver
- Useful display tools, distance measurement tool, settingsmanagement tools
- Advanced data management options: internal database, real-time NMEA data output, customizable data export



EvoLogics SiNAPS is a client-server application. The SiNAPS server is a software component, installed on the Navigation computer interfaced with the USBL transceiver and other external instruments. The SiNAPS server receives, processes and stores data from the USBL transceiver and external instruments. It performs all the necessary calculations to display this information on-screen.

The SiNAPS client is the web-based user interface of the positioning system. It displays real-time information about the positions of the Vessel and the targets, provides access to data management tools and system configuration settings. The user interface can be opened in most current web-browsers on any device in the local computer network. It is possible to open SiNAPS clients on multiple devices at once. To access SiNAPS UI, one must simply navigate the web-browser to the correct address.



A USBL transceiver is mounted on a Vessel and uses acoustic signals to determine the distances and bearings to the tracking targets. The USBL transceiver measures the time from transmission of its acoustic interrogation signal until an acoustic reply from the Transponder is detected and converts it to distance to the Transponder. Containing several transducers separated by a short distance (the ultra-short baseline antenna), the transceiver calculates the angle to the Transponder using the phase-differencing method.

Transponders are attached to several tracking targets, for example, to autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs), towfish etc. The Transponders reply to acoustic signals from the USBL transceiver with their own acoustic pulses, allowing it to calculate their positions. Optional third-party external instruments (an AHRS sensor and/or a GPS receiver) provide information about the vessel's orientation and real-world coordinates. The customer's Navigation computer is interfaced with the USBL transceiver and the external instruments and is connected to the local computer network.

EvoLogics positioning software, the SiNAPS, is installed on the Navigation computer. EvoLogics SiNAPS positioning software controls the positioning system and provides display features to monitor the mission in real-time.

SPECIFICATIONS

		S2CR 48/78	S2CR 42/65	S2CR 18/34	S2CR 12/24	S2CR 7/17
GENERAL	OPERATING DEPTH	Delrin Aluminium Alloy Stainless Steel Titanium	200 m 1000 m 2000 m 2000 m	200 m 1000 m 2000 m 2000 m	200 m 1000 m 2000 m 2000 m	200 m 1000 m 2000 m 6000 m 6000 m
	OPERATING RANGE		1000 m	1000 m	3500 m	6000 m 8000 m
	FREQUENCY BAND		48 - 78 kHz	42 - 65 kHz	18 - 34 kHz	13 - 24 kHz 7 - 17 kHz
	TRANSDUCER BEAM PATTERN		horizontally omnidirectional	wide-angle 100 degrees	horizontally omnidirectional	directional 70 degrees hemispherical
USBL	SLANT RANGE ACCURACY ¹⁾		0.01 m	0.01 m	0.01 m	0.01 m 0.01 m
	BEARING RESOLUTION		0.1 degrees	0.1 degrees	0.1 degrees	0.1 degrees 0.1 degrees
	NOMINAL SNR		10 dB	10 dB	10 dB	10 dB 10 dB
CONNECTION	ACOUSTIC CONNECTION		up to 31.2 kbit/s	up to 31.2 kbit/s	up to 13.9 kbit/s	up to 9.2 kbit/s up to 6.9 kbit/s
	BIT ERROR RATE				less than 10 ⁻¹⁰	
	INTERNAL DATA BUFFER				1 MB, configurable	
	HOST INTERFACE ²⁾				Ethernet, RS-232 [RS-485 ³⁾ /422 optional]	
	INTERFACE CONNECTOR				up to 2 SubConn® Metal Shell1500 Series	
POWER	POWER CONSUMPTION	Stand-by Mode Listen Mode ⁴⁾ Receive Mode ⁵⁾ Transmit Mode	2.5 mW 5 - 285 mW less than 1.3 kW 5.5 kW, 250 m range 8 kW, 500 m range 18 kW, 1000 m range 60 kW, max. available	2.5 mW 5 - 285 mW less than 1.3 kW 5.5 kW, 250m range 8 kW, 500m range 18 kW, 1000m range 60 kW, max. available	2.5 mW 5 - 285 mW less than 1.3 kW 2.8 kW, 1000m range 8 kW, 2000m range 35 kW, 3500m range 80 kW, max. available	2.5 mW 5 - 285 mW less than 1.3 kW 2.5 kW, 1500m range 5 kW, 3000m range 15 kW, 6000m range 40 kW, 8000m range 80 kW, max. available
	POWER SUPPLY ⁶⁾					External 24 VDC (12 VDC optional) or internal rechargeable battery (optional)
	DIMENSIONS ⁷⁾	Housing Total length	Ø110 x170 mm 315 mm	Ø110 x170 mm 315 mm	Ø110 x170 mm 315 mm	Ø113 x220 mm 365 mm
		USBL sensor	Ø130 x145 mm	Ø130 x145 mm	Ø130 x145 mm	Ø175 x145 mm
	WEIGHT, dry/wet	Delrin Aluminium Alloy Stainless Steel Titanium	4790/1090 g 5500/1800 g 11400/6200 g 9900/4900 g	4790/1090 g 5500/1800 g 11400/6200 g 9900/4900 g	5775/730 g 5500/1800 g 13130/6130 g 9830/4830 g	8500/4230 g 9800/5300 g 13640/9540 g 13420/8920 g
						8500/4230 g 9800/5300 g 13640/9540 g 13420/8920 g

CONFIGURATION OPTIONS

HOUSING

DELTRIN

Plastic non-magnetic corrosion-resistant housing, depth rating 200 m

ALUMINIUM ALLOY

Light metal housing for short-term deployments, depth rating 1000 m

STAINLESS STEEL

Robust metal housing, suitable for long-term deployment in harsh environments, depth rating 2000 m

TITANIUM

Corrosion resistant, suitable for long-term deployment in harsh environments, depth rating 6000 m

INTERFACE

1 CONNECTOR

RS-232⁸⁾ or

Ethernet

2 CONNECTORS

RS-232 + RS-232 or

RS-232 + Ethernet

MODULES

WAKE-UP MODULE⁹⁾

RS-232 interface

✓

Ethernet interface

✗

RS-232 + RS-232 interface

✓

RS-232 + Ethernet interface

✗

INTERNAL AHRS¹⁰⁾

RS-232 interface

✗

Ethernet interface

✓

RS-232 + RS-232 interface

✗

RS-232 + Ethernet interface

✓



Unique application scenarios might require additional customizing. EvoLogics experts are always ready to address any special requests!

¹⁾ Slant range estimation is based on the measured propagation time, slant range accuracy depends on sound velocity profile, refraction and signal-to-noise ratio.

²⁾ See the Configuration Options for available standard interface combinations.

³⁾ RS-485 protocol does not support duplex communication and must be customized.

Contact EvoLogics for more information!

⁴⁾ User-configurable Listen Mode is only available with a Wake-Up module installed.

Power consumption in Listen Mode depends on Listen Mode settings.

⁵⁾ Power consumption for the RS-232 interface option. Add 600 mV for the Ethernet interface option.

⁶⁾ Contact EvoLogics for more information on power supply options!

⁷⁾ S2CR 48/78, 18/34 - dimensions of a Delrin housing, other builds are slightly larger;

S2CR 12/24, 7/17 - dimensions of a titanium housing, other builds are slightly smaller.

Contact EvoLogics for more information on device dimensions!

⁸⁾ One RS-232 Interface can be replaced with either RS-485 or RS-422 interface.

More interface configurations available by special request. Contact EvoLogics for more information!

⁹⁾ The Wake Up Module turns the rest of the device on if it detects incoming acoustic signals or incoming data on the host interface. Once the device completes receiving or transmitting data, it switches itself off.

Please note: the Wake Up Module is only compatible with the RS-232 interface! It is not compatible with Ethernet, RS-485 or RS-422.

¹⁰⁾ Internal Xsens® MTi AHRS (Attitude and Heading Reference System) compensates the changes of roll, pitch and heading. Power consumption increases by 400 mV with AHRS installed.

ABOUT US

EvoLogics GmbH develops underwater information and communication systems based on bionic concepts, combining cutting edge engineering with the best ideas found in nature. The advanced product features have become enabling technologies for deep water exploration and production.

EvoLogics range of products offers highly reliable, flexible and cost-effective solutions for multiple underwater communication, positioning, navigation and monitoring applications. We strive for innovation and invest our vast experience into developing, manufacturing and supporting products that deliver an excellent performance and solve the most challenging tasks.

The company was founded in 2000 in Berlin, Germany, by a group of leading international scientists and maritime engineering experts. The company since focuses on developing innovative solutions for maritime and offshore industries, as well as smart robotic systems design and bionic research.

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