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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**EvoLogics S2C LBL Underwater Positioning and Communication Systems**

EvoLogics LBL systems bring the benefits of long baseline (LBL) acoustic positioning to offshore and maritime applications that demand highly accurate results. S2C R-series underwater acoustic modems that operate as transponders, deployed around the working area in an array of geo-referenced baseline nodes, allow to track and navigate mobile targets with highest accuracy that does not depend on the depth. Combining highly accurate LBL positioning with full benefits of an S2C technology communication link, an S2C LBL system delivers 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.

- Full compatibility - use S2C R- and M-series modems as pingers or transponders
- Patented S2C (Sweep Spread Carrier) Technology - spread spectrum technology based on extensive bionic studies
- LBL positioning with up to 1.5 cm accuracy
- Simultaneous LBL positioning and data transmissions, multiple target tracking
- “Silent” positioning mode: targets do not transmit beacon signals and self-position with broadcasts from baseline nodes
- Self-adaptive algorithms for reliable performance in adverse conditions, 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

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**APPLICATIONS**

**Positioning of offshore equipment**
Track positions of offshore equipment during installation to ensure highly accurate placement at defined 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

**Sensor network tracking**
Track drifts of moored sensors and detectors for accurate geo-referencing of their measurements

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

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**MODULES AND OPTIONS**

- AHRS (Attitude and Heading Reference System)
- GPS integration
- Integrated rechargeable battery
- Powersaving acoustic Wake-Up module
- Integrated datalogger
- Acoustic releases and floatation collars
- Short- mid- and long-range devices for shallow or deep water applications
- OEM versions available
- Compatible with S2C R modem and USBL solutions

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**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
EvoLogics LBL Communication and Positioning System: typical configuration

An LBL positioning system uses an array of sea-floor mounted baseline transponders. Their exact locations are known, so they are used as reference points for determining target positions. Baseline transponders reply to acoustic interrogation signals from target-mounted transceivers with their own acoustic pulses, allowing a target transceiver to calculate its position by measuring the distance between itself and each transponder of the baseline array.

Baseline transponders are either mounted in sea-floor stands or equipped with acoustic release mechanisms and flotation collars for easier recovery to the surface. They are deployed around the work site and carefully calibrated prior to LBL system operation. Target transceivers are mounted on positioning targets, for example, on autonomous underwater vehicles (AUVs), remotely operated vehicles (ROVs) etc., and use acoustic signals to determine distances to baseline nodes.

A GPS receiver is installed on the vessel for accurate calibration of the baseline transponder array after its deployment. During calibration, the vessel moves above the deployed baseline transponders to accurately determine their location. Coupled with a vessel transceiver, the GPS receiver provides the baseline nodes’ positions in real-world coordinates.

Third-party or built-in AHRS sensor (Attitude and Heading Reference System) provides information about the vessel’s orientation during calibration to eliminate positioning errors. The navigation computer is installed on the vessel, interfaced with the vessel transceiver and other external instruments and connected to the local computer network. EvoLogics positioning software, the SiNAPS, and the Transponder communication utility, a web-based tool to monitor and control the baseline transponders, are accessible from the navigation computer to configure, control and monitor the mission.

SiNAPS Positioning Software

EvoLogics SiNAPS positioning software is a client-server application. SiNAPS server is installed on the navigation computer and interfaced with the vessel transceiver and other external instruments. SiNAPS server receives, processes and stores data from the transceiver and external instruments.

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 UI can be opened in most current web-browsers on multiple devices in the local computer network at once.
The LBL Positioning System uses S2C® modems in baseline transmitter configuration. Standard R-series and M-series modems can be configured as target transceivers.

**OPERATING DEPTH**
- Delrin
- Aluminum Alloy
- Stainless Steel
- Titanium

**FREQUENCY BAND**
- 48 - 78 kHz
- 42 - 65 kHz

**OPERATING RANGE**
- 1000 m
- 3500 m

**TRANSPONDER BEAM PATTERN**
- Horizontally omnidirectional
- Wide-angle omnidirectional
- Narrow-angle omnidirectional
- Spherical
- Lobe directional
- 70 degrees
- Hemispherical
- 80 degrees
- Omnidirectional

**ACOUSTIC CONNECTION**
- Up to 4 transponders
- Ethernet and serial combinations
- Up to 4 transponders

**BIT ERROR RATE**
- Less than 10⁻⁹
- Less than 10⁻¹⁰

**INTERNAL DATA BUFFER**
- 1 MB, configurable
- 1 MB, configurable
- 1 MB, configurable

**INTERFACE**
- Ethernet or RS-232

**POWER SUPPLY OPTIONS**
- External
- Internal

**POWER CONSUMPTION**
- Standby Mode
- Low Power Mode
- Recovery Mode
- Transmit Mode
- Transmit Mode

**PLUG & PLAY VERSION**
- Rechargeable battery, 5 Ah or 10 Ah

**HOUSING OPTIONS**
- Delrin
- Aluminum Alloy
- Stainless Steel
- Titanium

**DIMENSIONS**
- Housing
- Total length

**WEIGHT**
- Dry/vent

**WAKEUP MODULE**
- not compatible with Ethernet

**POWER SWITCH**
- not compatible with Ethernet

**ADVANCED TIMEKEEPING MODULE**

**SDM VERSION**

**ACOUSTIC RELEASE DEVICE**

**FLATTOP COLLAR**

**PRESSURE SENSOR**

**CABLE-MOUNTED TRANSDUCER**

**CEM VERSION**

**APPLICATIONS**
- Fast short and medium range transmissions in horizontal channels
- Fast short and medium range transmissions in vertical and short channels
- Long range transmissions in vertical and long channels, new range
- Long range transmissions in vertical and short channels, new range
- Fast short and medium range communication for UUVs

**SPECIFICATIONS AND CONFIGURATION OPTIONS**

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Specifications subject to change without notice. © EvoLogics GmbH - August 2018

1) One RS-232 Interface can be replaced with a RS-422 interface. Contact EvoLogics for more information!

2) Power consumption for RS-232 interface. Add 500 mW if an Ethernet interface is installed. Add 300 mW if the Wake-Up module is installed. Power consumption in Listen Mode depends on Listen Mode settings.

3) One RS-232 Interface can be replaced with a RS-422 interface. Contact EvoLogics for more information!

4) 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 and weights!

5) 300 VDC available for 42/65 models. Contact EvoLogics for more information on external and internal power supply options!

6) The Wake-Up Module turns the set of devices on or off during incoming acoustic signals or incoming data on one host interface. Once the device completes receiving or transmitting data, it switches itself off. 2-channel version available for 8-series.

7) The Power Switch allows to provide power supply to up to 4 external instruments and turn them on/off on command

8) Plastic magnetic corrosion resistant housing for short-term deployments, depth rating 200 m

9) Robust metal, suitable for long-term deployments in harsh environments, depth rating 1000 m or 2000 m

10) Connection resistant housing, suitable for long-term deployment in harsh environments, depth rating 6000 m

11) The Wake-Up Module is only compatible with RS-232 interface. It is not compatible with Ethernet or RS-422.

12) The Power Switch is a single-channel version only.

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PRODUCT INFORMATION GUIDE