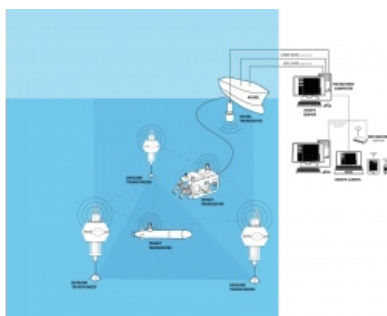


EVOLOGICS GMBH, GERMANY

Bionic Solutions for Underwater Communication



EvoLogics GmbH is a private high-tech enterprise with headquarters in Berlin, Germany. The company designs and manufactures underwater information and communication systems, as well as hydroacoustic sensors. Its core values are rooted in bionic concepts that combine state of the art engineering with the best ideas found in nature.



EvoLogics was launched in 2000 with a small group of scientists and R&D experts, aiming to develop innovative technologies for maritime and offshore industries. To solve the common problems of transmitting data underwater, the team turned to dolphins - the ocean's 'talking nation' - known to use a wide variety of acoustic signals to efficiently communicate in the most challenging underwater conditions. The resulting

EvoLogics S2C spread-spectrum communication technology grew into a whole 'ecosystem' of products that now includes several series of underwater acoustic modems, underwater positioning systems (USBL, LBL, SBL), networking protocols and developer frameworks, as well as novel robotic solutions.

EvoLogics Today

In 2016, EvoLogics remains a close-knit team of 32 employees. The company's main business is solutions for underwater communication, positioning, navigation and monitoring applications. [EvoLogics S2C R](#) and S2C M lines of underwater acoustic modems and positioning systems cater to various scenarios and provide a high degree of customisation as is shown in Figure 1.

To offer cutting-edge technology, research and innovation have been an essential part of the EvoLogics DNA since the company's inception - the company is an active collaborator of several EU-funded R&D projects and encourages academic efforts of the employees. EvoLogics' range of hardware and software developer solutions includes an open-source framework for underwater networking and targets scientists and researchers worldwide.

Current development is focused on intelligent integrated solutions extending the capabilities beyond communication and positioning into telecommunication centres and robotics.

Commercial Products

EvoLogics exports to international markets both directly and through its established distribution network. The company's key clients are offshore companies, fisheries, commercial service providers, state- and privately-funded research facilities and universities.

EvoLogics bestsellers are underwater acoustic modems that provide a highly reliable bidirectional data link along with acoustic positioning, broadcasting and networking. Applications range from retrieving data from subsea sensors and navigating unmanned underwater vehicles to deploying complex underwater sensor networks for monitoring and exploration. USBL and LBL positioning systems, coupled with EvoLogics positioning software (SiNAPS), are gaining popularity among the clients, see Figure 2.

EviNS (the EvoLogics intelligent Networking Software) is the company's framework for developing, testing, debugging and implementing underwater acoustic network protocols and customer-specific applications. Besides seamless integration with EvoLogics underwater modem hardware, EviNS is fully compatible with EvoLogics modem emulator (available as an online service and as a hardware box) that

makes it possible to work with a virtual network of underwater acoustic modems, significantly reducing time and cost for network protocol development.

EvoLogics is active in marine robotics - its communication technology is implemented in the company's unmanned surface vehicle, the [Sonobot](#). Available as a commercial product since 2011, the Sonobot was initially developed as an easy-to-deploy bathymetric survey vehicle for inland and harbour waters. Equipped with EvoLogics S2C-technology echo sounder, the vehicle has since been tested for LBL baseline calibration and mini-ROV deployment (Figure 3).

Research and Development

EvoLogics' ongoing R&D efforts focus on underwater acoustic communication and positioning for distributed underwater networks.

EvoLogics is part of the SWARMs (Smart and Networking Underwater Robots in Cooperation Meshes), an EU project focused on cooperative operation of unmanned underwater vehicles. Project collaborators aim to design a set of unified software and hardware components that will allow integrated operation of different UUVs, linked into a multimedia sensor network for various automated missions.

Another important project is WiMUST (Widely scalable Mobile Underwater Sonar Technology), where collaborators focus on engineering an intelligent distributed underwater array of marine robots for seismic acoustic surveys.

One of EvoLogics' recent R&D efforts in robotics is the BOSS (Bionic Observation and Survey System) project, a joint research effort, supported by the German Federal Ministry for Economic Affairs and Energy (BMWi). BOSS's goal is to create a powerful and flexible underwater exploration and monitoring system, particularly suitable to access hard-to-reach or yet unexplored areas with its unique functional properties.

Deployed in the target area for observation and survey, the BOSS system is a self-coordinating swarm of autonomous underwater vehicles (AUVs), all linked into a multimedia sensor network with the latest communication and navigation technologies. The AUV is the project's core innovation - engineered and built at EvoLogics, the experimental bionic vehicle is modelled after a Manta ray and can move through the water by wing-like movements of its "pectoral fins".

View on the Future

The EvoLogics philosophy of constant innovation defines the company's key directions for future development.

The team is working on expanding the functionality of EvoLogics underwater acoustic modems and positioning systems, and is soon to introduce atomic clock integration that will allow synchronisation with unprecedented accuracy. Constantly improving cost and time efficiency is the goal set for future hardware and software upgrades of the main product lines.

Underwater 'internet of things', allowing for intelligent cooperation between various vehicles and sensors, is the concept that guides EvoLogics' research and development team working on underwater networking protocols, a rapidly evolving field gaining momentum worldwide (Figure 4).

More Information

www.evologics.de