ELAC SONAR

A COHORT PLC COMPANY

OPEN MINDED NAVAL SYSTEMS

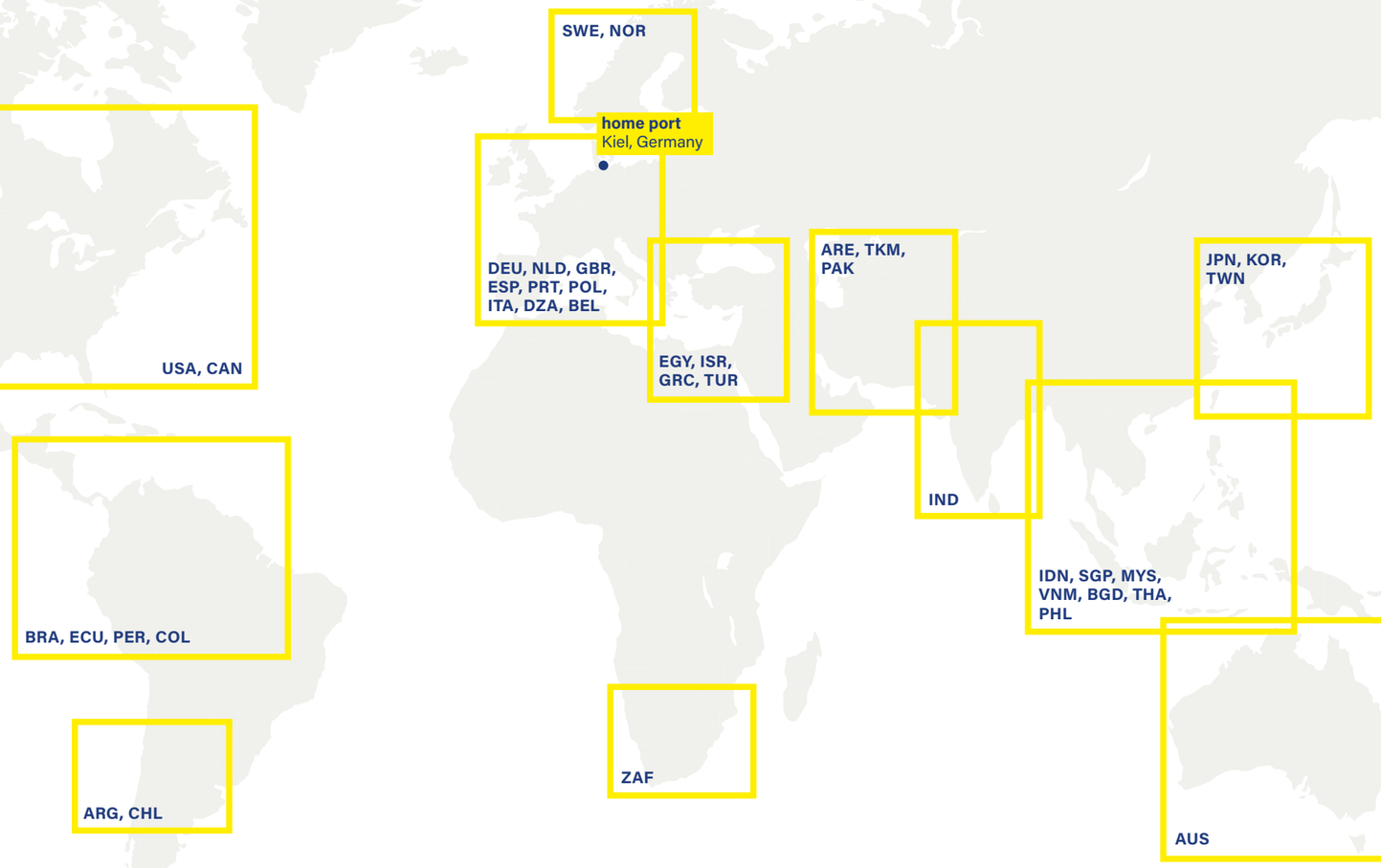
ELAC SONAR at a glance

We no longer think in terms of products but in holistic sonar solutions, completely driven by our customers' needs.

A Market Leader in Hydroacoustic Systems

We are innovative hydroacoustic experts dedicated to open standards, allowing customers maximum involvement and freedom to operate. Our product portfolio includes sonar solutions, underwater communication systems as well as navigation and multibeam echo sounders.

WE EQUIP INNOVATIVE NAVIES WITH ADVANCED SONAR SYSTEMS



100 Years of Experience

ELAC SONAR is a market leader in the design, manufacture and supply of hydroacoustic systems for naval applications. Our product portfolio includes SONAR solutions, underwater communication systems as well as navigation and multibeam echo sounders. Our products are developed and manufactured in Kiel, Germany, and are renowned for their high reliability, robustness and advanced technology.

We specialise in equipping new vessels with innovative products and developing customer-specific modernisation solutions. We also offer installation, logistics, and service support for all our products. If required, we can also provide product training.

Founded as ELAC (ELECTROACUSTIC GmbH) in 1926, our company has constantly worked to expand its product range. Today, ELAC SONAR systems and products are installed on almost all NATO vessels as well as supplied to the navies of most friendly nations. In addition to a steady growth in the naval market, we have achieved a worldwide reputation for hydroacoustic systems for research vessels and are an established and reliable partner to the commercial shipping industry. In 2020, ELAC SONAR became part of the Cohort Group.

GERMAN ENGINEERING BASED IN KIEL

Our home port Kiel is an important centre of naval and defence technology

Kiel is home to the German Navy and the NATO Centre of Excellence for Confined and Shallow Waters. It harbours a number of global players in naval shipbuilding and the naval systems industry, thereby offering a splendid access to resources and networks.

DEVELOPMENT AND MANUFACTURING IN GERMANY

Superior products from a real innovation driver

For almost 100 years, we have been manufacturing superior hydroacoustic products. We are innovation driver for the open system architecture of submarine sonars. As a development-oriented, medium-sized, high-tech company, we serve the military sector from our base in Kiel, Germany. Our products occupy a leading position on the world market.
Our way of thinking, our curiosity in combination with our technical know-how and the experience gained from almost 100 years of development history make ELAC SONAR a driver of innovation. Our competitive advantages and differentiating features result from application-oriented technology development. Our strong focus on in-house development results in exclusive patents and trademarks. We always rely on fair and motivating remuneration for the inventive work of our employees.

200+

Capacities

employees

engineers

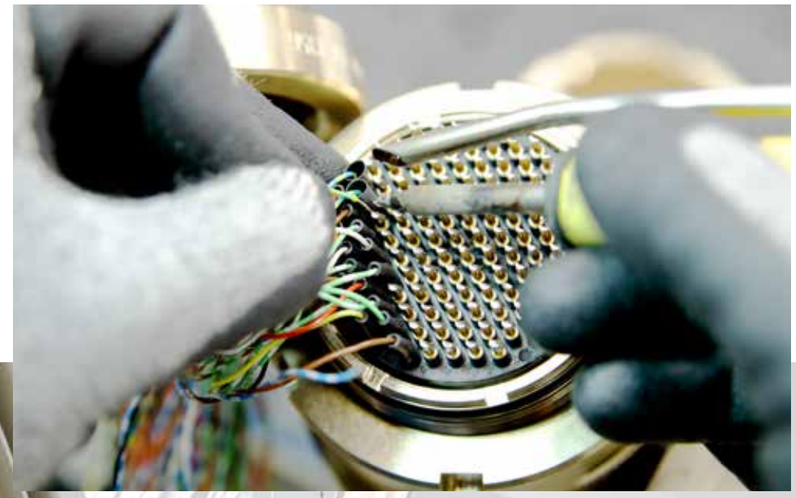
testing

manufacturing

6.800 m²
1 LOCATION

Key assets on site

- ✓ acoustical signal processing
- ✓ algorithm programming
- ✓ transducer assembly
- ✓ pressure tanks up to 120 bar
- ✓ testing tank 400 m³
- ✓ sonar show room



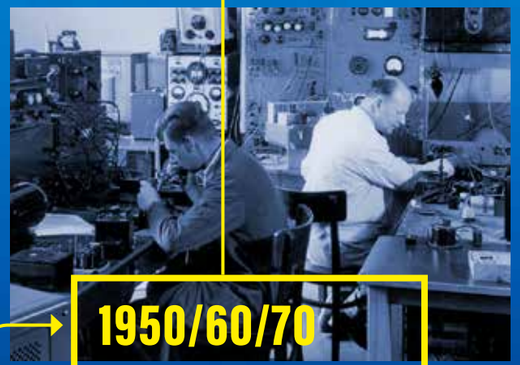
FIRST MOVER IN UNDERWATER COMMUNICATION AND SONAR TECHNOLOGY

1926

ELECTROACUSTIC GmbH (ELAC) founded. First manufacturers of echo sounders, submarine sonars and foghorns.

1930/40

Major sonar supplier for the German Navy.



1950/60/70

Leading supplier of sonar / hydroacoustic solutions for the German and allied navies.

1980/90

Development and manufacture of **heavyweight torpedo sonars, ASW and submarine sonars.**

2000/10/20

Launched **first digital underwater communication** system.

Successful market introduction of **open-architecture-based KALEIDOSCOPE** submarine sonar suite.

Roll-out for **open sonar processing platform** 2nd generation.

Go-to Market: anti-submarine-warfare (ASW) sonar **HUNTER and KALEIDOSCOPE 2.0.**

Launch of **fully digitalised hydrophones.**

STAKEHOLDERS OF ELAC SONAR

1926 ELAC

1978 Honeywell

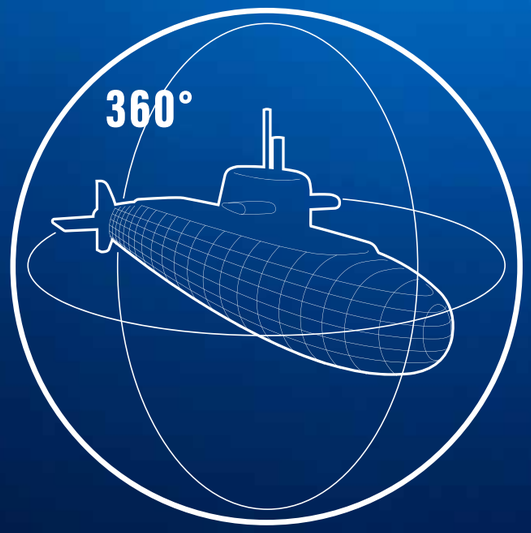
1994 Allied Signal

1998 L3 Communications

2015 Wärtsilä

2020 Cohort PLC

THE NEXT SIGNIFICANT MOVE IN SONAR TECHNOLOGY



Sphere
by ELAC SONAR

THOUSANDS OF SENSORS ON YOUR SHIP'S HULL? NO PROBLEM. GO AHEAD.

Each of the thousands of sensors delivers data to the processing suite fostering data superiority

Reduce obsolescence through use of off-the-shelf processing hardware

Committed to involving your industry and naval experts in the life cycle of your solution

Highest possible degree of customisation to meet your sensor demands

Highest possible commitment to open standards for military systems

Highest rating in cyber security by built-in virtualisation capability

A REVOLUTIONARY SYSTEM ARCHITECTURE OF UNPRECEDENTED SIMPLICITY, SCALABILITY, INTEROPERABILITY.

The next significant move in sonar technology

Sphere® by ELAC SONAR is the answer to all requirements in surveillance, mine & collision avoidance, underwater communication and measurement. We no longer think of sonar technology in terms of products, but in terms of holistic solutions that are completely customer driven. We focus on simplicity, scalability and interoperability. Sphere® integrates previously separate sonar systems into one versatile, unified system.

Sphere® generates, transmits and processes big sonar data from all existing user functions and sensors. This way, maximum customer benefit for current and future projects is achieved.

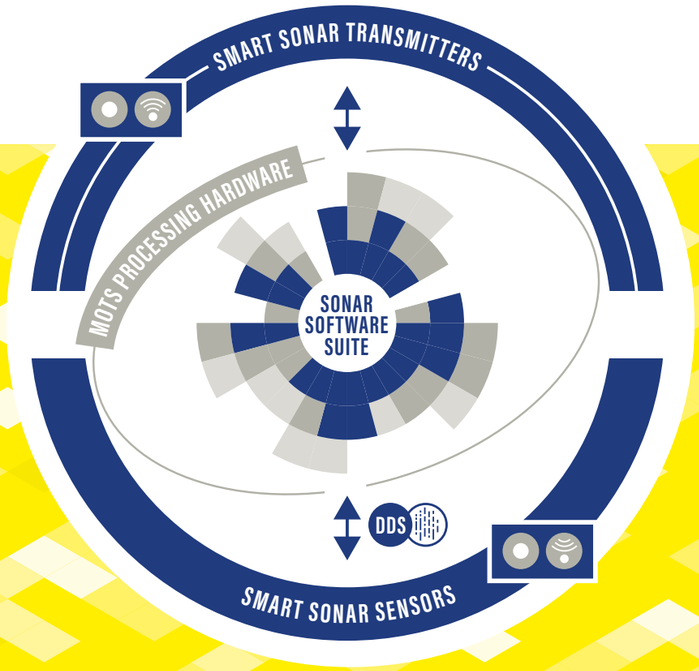
We provide Sphere®. Through real modular architecture in hardware and software, customer-specific configuration of components and even user-implementable algorithms, you make it your product.

smart sonar transducers at the wet-end

MOTS sonar processing environment

expandable generic sonar application platform

open DDS middleware-based dataflow



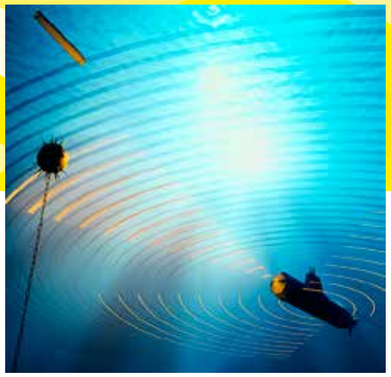
SPHERE® BY ELAC SONAR
ONE SYSTEM — COUNTLESS APPLICATIONS

	submarine operations	submarine hunting	submarine rescue
surveillance (active & passive)	✓	✓	✓
mine and collision avoidance	✓	✓	✓
underwater communication	✓	✓	✓
measurement (depth & speed)	✓	✓	✓

PRODUCTS

We understand the requirements needed for different operational scenarios. We have pre-configured our products to use as stand-alone solutions or integrated system parts.

SPHERE® INSIDE
PASSIVE SURVEILLANCE



The innovative passive sonar suite SPHERE® PASSIVE SURVEILLANCE ensures an increase in combat value and offers a decisive operational advantage to our customers. The processing software uses the open-architecture-based DDS which enables the insertion of third-party applications and the hosting on alternative common processing platforms.

Open sonar suite for submarines

SPHERE® PASSIVE SURVEILLANCE, the compelling evolution of KALEIDOSCOPE 2.0 which we have developed over the past 20 years, laid the foundation for our open sonar processing platform and fully digitised hydrophones. Based on this open platform, we have also renewed our SPHERE®-based anti-submarine warfare (ASW) sonar with HUNTER 2.0, demonstrating our nearly 100-year history of success in the ASW market.

The SPHERE® PASSIVE SURVEILLANCE open sonar suite is an advanced, fully integrated sonar system designed to meet the mission requirements of modern conventional submarines. It provides full spatial, full spectral and full temporal coverage.

- The detection and tracking functionality includes narrowband passive sonar, broadband passive sonar for contact detection, contact tracking and contact correlation.
- The analysis functionality integrates passive narrowband, acoustic intercept and customer-provided intelligence libraries, as well as tracking and contact classification tools.

System design

SPHERE® PASSIVE SURVEILLANCE is based on MOTS hardware and performance-tested sonar processing software. The wet end (hydrophones) are fully designed, manufactured and tested in-house. The modular design allows for easy upgrades and future enhancements, offering reduced life cycle costs.

At the core of SPHERE® PASSIVE SURVEILLANCE are the hydrophone arrays, which convert acoustic data into electrical data, and the sonar processor, which processes acoustic data into contact information.

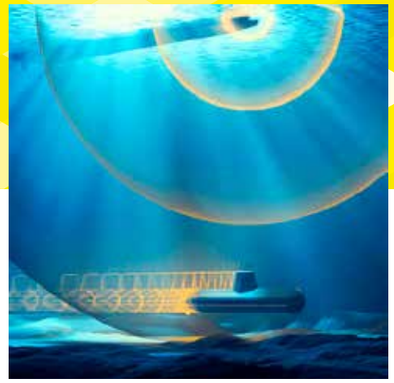
Key features

- **open architecture**
- **commercial standards**
- **MOTS**
- **military-hardened**
- **opportunities to implement technical innovations***
- **allows for rapid change and the addition of new capabilities***
- **ready for AI/ML based data analytics and big data processing***

* no need for additional industry support; customer-owned and confidential intellectual property

view product on website

SPHERE® INSIDE
HUNTER 2.0



HUNTER 2.0 is a mid-frequency, hull-mounted sonar providing active and passive surveillance, analysis and classification capabilities. The processing software is based on open architecture DDS, allowing the addition of third party applications and hosting on alternative common processing platforms.

Hull mounted sonar

HUNTER 2.0 is a hull mounted sonar carrying out anti-submarine warfare (ASW) in active and passive modes in shallow and deep waters for panoramic detection of submarines and other objects.

HUNTER 2.0 is the most cost effective and best performing solution for new or modernisation programmes for destroyers, frigates, corvettes or offshore patrol vessels (OPV).

Key features

- **locating underwater contacts for underwater situational awareness**
- **locating mines for mine avoidance**
- **detection of AUVs and midget-submarines**
- **sonar pulse intercept detection / torpedo warning**
- **automatic target detection and tracking linking into combat management system (CMS) and fire control equipment**
- **classification of underwater targets**
- **audio channel**
- **performance monitoring and fault location (PMFL)**
- **sonar performance prediction of the day**
- **onboard simulator**
- **raw data recording**

view product on website

SPHERE® INSIDE
PILOS 2.0

Pinger localisation sonar

PILOS 2.0 is a broadband passive sonar. Designed specifically for surface vessels to detect and track underwater noise and signals generated by sonar systems, emergency beacons and other acoustic sources. PILOS 2.0 significantly reduces the time taken to locate a submarine in distress by providing accurate bearing information and a large search radius, even on a rescue vehicle operating at high speed.

PILOS 2.0 is equipped with a sophisticated circular array providing full 360 degree coverage over a frequency range of 1 to 50 kHz. Through the use of a target tracking algorithm, it is possible to visualise the bearing of multiple noise sources simultaneously. In addition to the broadband trackers, PILOS 2.0 features frequency based narrowband trackers. These allow the user to specify a frequency range and to detect and track pingers in a selected frequency range only.

To further increase the chance of detecting an emergency pinger, even in the most noise polluted environments, PILOS 2.0 features a full-fledged frequency analysis system. The initial detection of slow pingers is supported by a transient analysis. Once detected, the pulse parameters are evaluated by the intercept processing and can be cross-referenced to the emergency pinger parameters.

PILOS 2.0 offers a detection range of up to 70,000 meters for signals generated by an emergency sonar beacon system (also available from ELAC SONAR). With the capability to receive underwater telegraphy and telecommunication signals, PILOS 2.0 is an indispensable asset to any search and rescue mission.

The PILOS 2.0 capability is focused on locating a distressed submarine in accordance with the internationally established Allied Tactical Procedure ATP-57(B).

Key features

- **360° broadband passive sonar**
- **automatic detection & tracking**
- **intercept & transient analysis**
- **frequency analysis system**
- **underwater telephone receiver**
- **raw data recording & replay**
- **retractable transducer array**
- **open-architecture-based DDS middleware**

view product on website

SPHERE® INSIDE
SCOUT 2.0

Mine avoidance sonar for submarines

SCOUT 2.0 is the most flexible solution for obstacle and mine detection on board of a submarine. The split transmitter and receiver arrays allow integration in virtually any bow design. The outstanding performance against moored mines and MLOs makes SCOUT 2.0 the first choice.

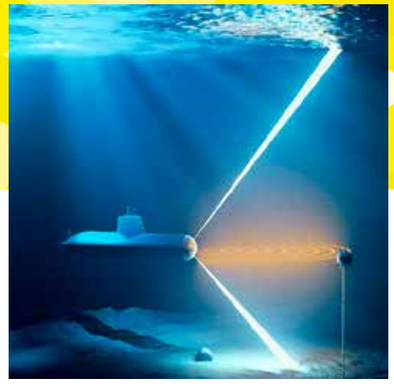
SCOUT 2.0 makes submarine operations in dangerous areas safer. This forward looking Mine and Obstacle Avoidance Sonar (MOAS) offers high-performance detection of mines and objects in the water column, below the surface and on the seafloor with sufficient range to avoid hazardous outcomes. Numerous navies currently operate the system in different configurations.

Flexibility is the key

SCOUT 2.0 is operated on newly built submarines as well as on modernised ones. The modular design of components allows a flexible integration of the transmitter and receiver array as well as the inboard electronics. Control and display may be integrated in a dedicated console or multi-function control consoles already on board. In addition to MLO detection, SCOUT 2.0 offers features such as bottom mapping for forward looking terrain charting and an optional surfacing mode to avoid collision with silent objects.

ELAC SONAR's experience in designing and producing highly specialised transducers is a valuable asset in the process of integrating the arrays into the submarine's bow. The arrays can be adapted according to the available space between the torpedo tubes and other sensors in order to to guarantee the best possible fit.

Like all naval systems offered by ELAC SONAR, SCOUT 2.0 has been designed, built and certified in accordance with military standards, ensuring the highest possible availability and reliability of the system.



SCOUT 2.0 makes submarine operations in dangerous areas safer.

Key features

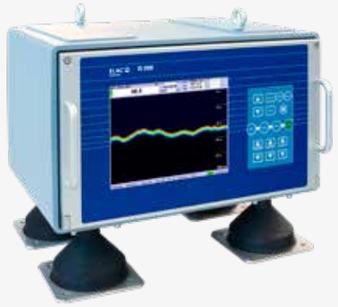
- **detection of MLOs in the water column**
- **3D forward looking sonar**
- **meets military standards**
- **for refits and new designs**
- **stand-alone or fully-integrated**
- **safety distance to MLO**
- **interfaces with existing systems**
- **bottom mapping mode**
- **surfacing aid (optional)**

view product on website

VE 5900

Naval echosounder system for submarines

- meets all relevant military standards
- up to four channels with split display
- designed for frequencies from 12 kHz to 1 MHz
- measures depth below keel and diving depth
- blanking, keying and EMCON key interfaces
- single-pulse mode
- data storage for more than 7 days
- integrated online and offline BITE
- 19” rack compatible



The major advantage of the VE 5900 submarine version is the ability to sound up and down.

LAZ 5400

Naval echo sounder for surface vessels

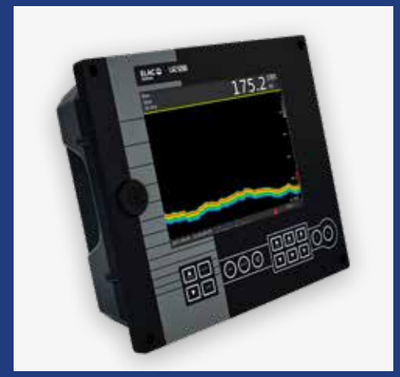
- meets IMO requirements
- meets relevant military standards
- designed according to MED 2014/90/EU
- interface to bridge alert management (BAM) according to IMO resolution MSC.302 and IEC 61924-2
- lightweight ethernet interface (LWE) according to IEC 61162-450
- automatic and reliable operation from shallow to deep water
- open-architecture-based DDS middleware for complete integration in integrated bridge systems (IBS)
- possibility for IBS manufacturers to design own HMI and complete integration in IBS software
- transducers tested according to military standards

The LAZ 5400 combines IMO regulations with military robustness.

LAZ 5200

Navigation echo sounder

- meets IMO requirements (Wheelmark)
- designed according to MED 2014/90/EU
- single or dual frequency version available
- interface to bridge alert management (BAM) according to IMO Resolution MSC.302(87) / IEC 61924-2
- interfaces to ship navigation system according to IEC 61161-1 and IEC 61162-450 (LWE)
- more than 170 hours of data storage for water column data, depth data, position, date and time, settings
- up to 6,000 m depth performance
- automatic and reliable operation from shallow to deep water depths
- 10.4” high contrast LCD display
- open-architecture-based DDS middleware for complete integration into IBS and possibility to design own HMI



LAZ 5200 provides reliable seafloor detections from shallow to deep waters.

DL 3000

Doppler log for high-performance speed measurement

- independent speed and distance sensor
- support for inertial navigation system (INS)
- speed over ground (longitudinal, transverse and vertical components)
- speed through water (longitudinal, transverse and vertical components)
- distance covered over ground and through water
- water depth below transducer
- speed of current & direction of current
- undisturbed of mussels or fouling compared to pressure log

Using ultrasound and applying the Doppler Effect, highly accurate measurements up to more than 400 metres water depth are possible.

SB 3012 2G / SB 3020 2G

Deep water multibeam system

- up to 11,000 m (12 kHz) or up to 9,000 m (20 kHz) depth performance
- up to 31,000 m (12 kHz) or 10,000 m (20 kHz) swath coverage
- patented Swept Beam™ technology
- multi-ping mode
- real-time water column imaging (WCI)
- optional ice resistant projector and hydrophone arrays

Deepwater multibeam systems operating in 12 kHz or 20 kHz according to customers' needs.

SB 3030 2G / SB 3050 2G

Medium-depth multibeam system

- up to 7,500 m (30 kHz) or 3,000 m (50 kHz) depth performance
- up to 7,500 m (30 kHz) or 4,000 m (50 kHz) swath coverage
- multi-ping mode
- high-resolution water column imaging (WCI)
- full auto mode for reliable and easy system operation
- advanced transmission beam steering mobile versions

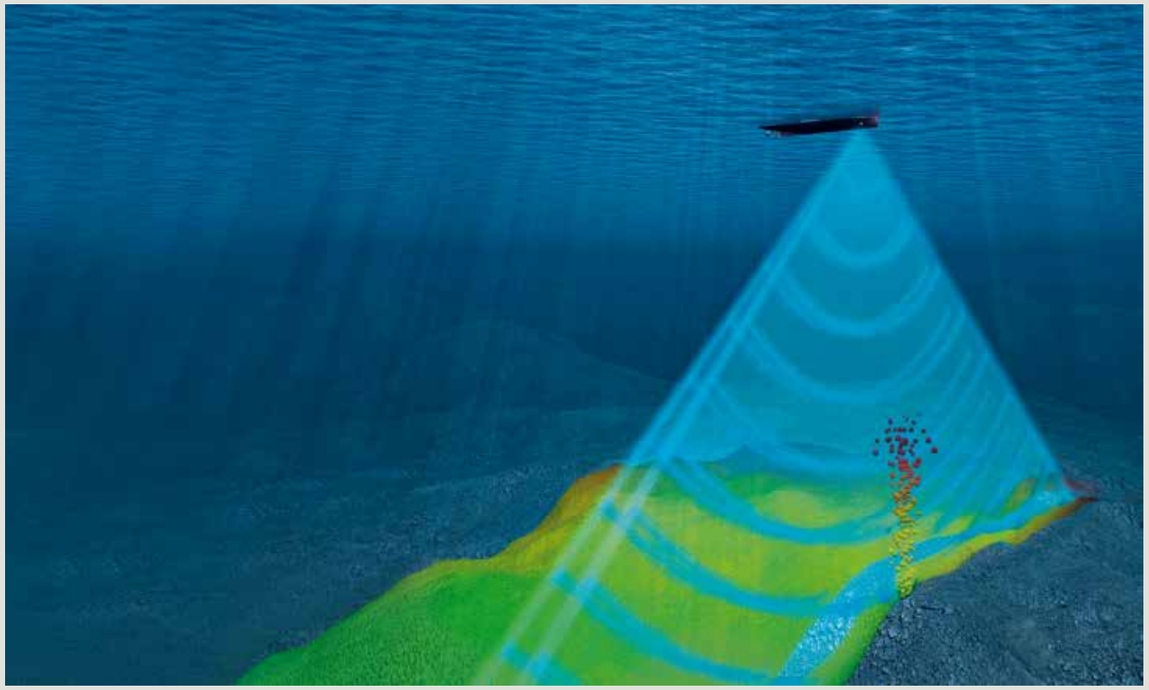
SB 3030 2G / 3050 2G are the ideal hydrographic sensor for mapping the continental rise (30 kHz) and slope (50 kHz).

SB 3050 N 2G

Multibeam system for naval applications

- bottom mapping (rapid environment assessment)
- submarine hunting (surface vessels)
- submarine rescue operations
- bottoming procedures (submarines)
- gas flare detection
- shock proven electronics and transducers

SB 3050 N 2G is a medium-depth multibeam system for naval applications for surface vessels and submarines.



UT 3000 2G

Digital and analogue underwater communication

- analogue communication acc. to STANAG 1475
- digital data communication via text messages and data files using digital coding algorithms like MFSK
- Digital underwater communication according to NATO STANAG 1481 (IFS - Identification Friendly Submarine)
- capable of data transfer acc. to JANUS standard (STANAG 4748) for absolute interoperability (including applications for automated data exchange in DISSUB scenarios and SMS communication)
- Ability to actively participate in digital underwater networks
- supports up to four transducer groups with up to 1400W transmission power
- meets all relevant military specifications
- sectoral- and omni-directional transmission
- space diversity reception
- data link interface for remote operation of SEB 34 and optional streaming interface for reception and transmission of customer-specific communication methods
- optional external operation and display unit BDE 34 connected via ethernet
- optional multi-lingual user interface

A robust digital underwater communication is the basis for an infinite number of new applications for submarines at speed and depth.

Proven design based on over 20 years of experience in digital underwater communications with over 200 systems sold worldwide.

UT 2200

Analogue / emergency underwater communication

- communication according to STANAG 1475
- sonar beacon operation according to STANAG 1382
- compatible to NATO underwater telephones
- compact and ruggedised design
- tested according to military standards
- low power consumption

The UT 2200 is perfectly equipped for emergency situations with its robust design and integrated lithium battery pack.

SBE 1

Sonar beacon / distress pinger for submarines

- compact and ruggedised construction
- independent of the ship's main power supply
- proven design, meeting the requirements of STANAG 1382 Ed. 2 and STANAG 1298 Ed. 3
- BITE for battery and electronic circuits
- long operational life through internal lithium battery
- main control unit installed in watertight and pressure-proof housing

As a life-saving alarm system, the SBE 1 sonar beacon guarantees a proven concept with extreme reliability.

ST 30

Sonar transponder

- electronic unit in stainless steel housing
- interfaces to external control and supervision system (SCADA)
- designed for operation in harsh environments
- EMC-protected design
- mountable to each kind of windmill foundation
- wide frequency-range transducer
- detection of 8.1 kHz interrogation signals
- transmission of beacon signals in the range of 7 to 7.8 kHz according to BSH regulation

Being mounted to the foundations of offshore wind-mills, the ST 30 is a sonar transponder for avoiding the collision of a submarine with the pylons of offshore wind farms.

Innovative hydroacoustic experts dedicated to open standards, granting customers maximal involvement and freedom to operate.

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