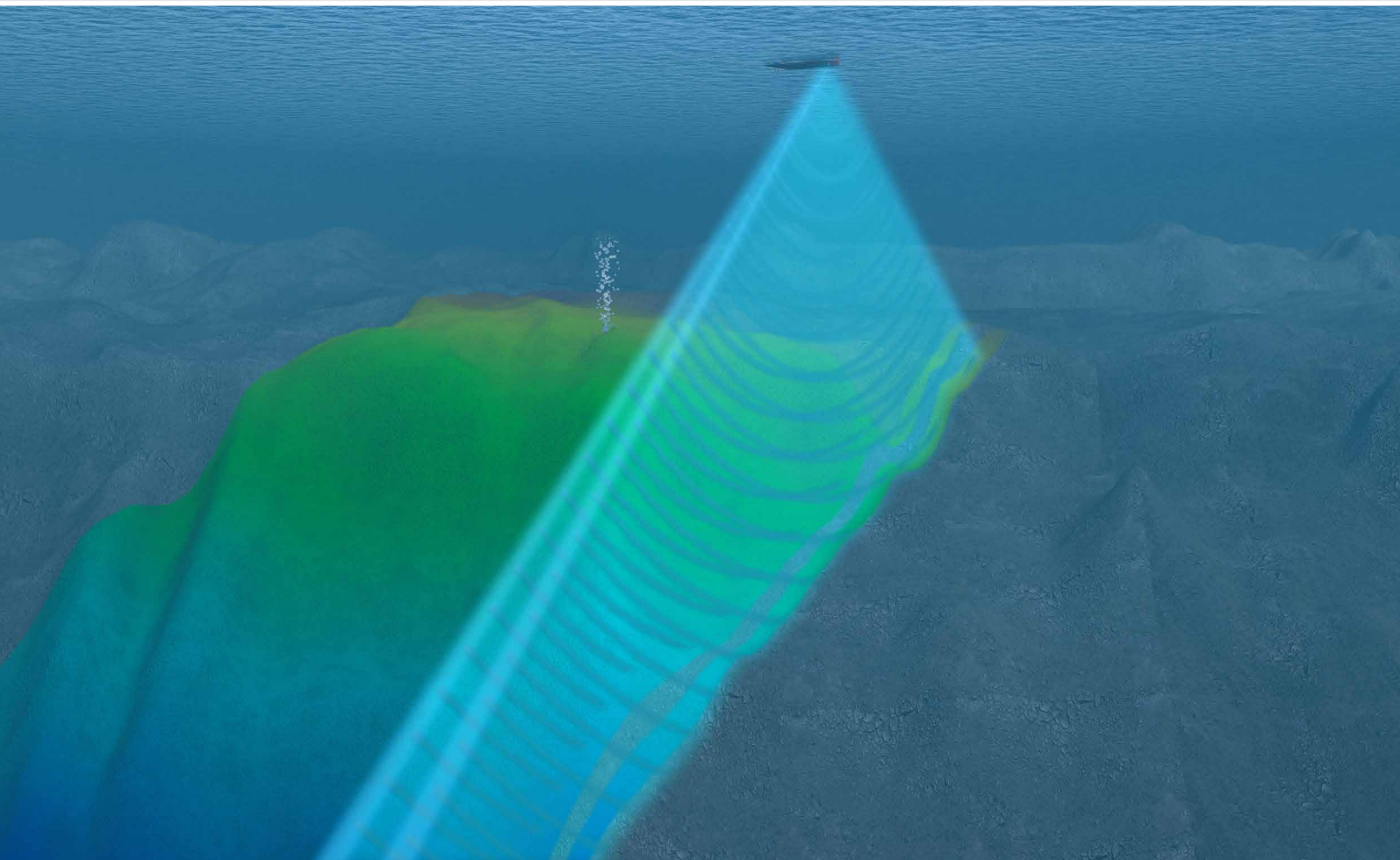


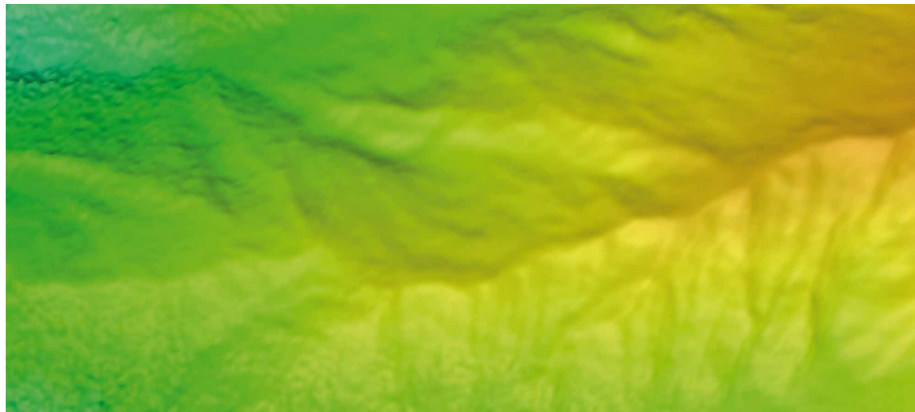
Wärtsilä ELAC SeaBeam 3030

Mapping the Continental Rise



30 kHz | 7,000 m Depth Performance | 7,000 m Swath Coverage | Swept Beam™ | Multi-Ping | WCI





Wärtsilä ELAC SeaBeam 3030

Medium-Depth and Deep Water Multibeam System

ELAC SeaBeam 3030 is the latest generation medium-depth multibeam system from Wärtsilä ELAC Nautik, including multi-ping operation. This advanced system collects real-time bathymetric data, bottom amplitudes, side scan data and Water Column Imaging (WCI) data in medium water depths and deep waters, meeting all relevant survey standards. Due to its depth performance in combination with wide coverage, ELAC SeaBeam 3030 is the ideal hydrographic sensor for mapping the continental rise.

Performance

ELAC SeaBeam 3030 operates in the 30 kHz frequency band in water depths ranging from 6 m below the transducers to approx. 7,000 m. ELAC SeaBeam 3030 has an across-ship swath width of up to 5.5 times of water depth. A maximum of 918 beams is provided for each multi-ping. The data are fully compensated for roll, pitch and yaw motion of the vessel. The depth accuracy of the sonar sensor exceeds the IHO (International Hydrographic Organization) requirements.

Multi-Ping Mode

A huge advantage of the ELAC SeaBeam 3030 is the multi-ping mode, transmitting and processing two swaths per ping cycle. Multi-ping operation allows higher maximum survey speeds without losing 100% bottom coverage. This is especially important for narrow along-ship beam widths. At

a fixed survey speed, the data density is doubled, increasing the target detection and classification abilities.

High-Density Mode

ELAC SeaBeam 3030 has 386 beams in equiangular and multi-ping mode. The swath coverage can be decreased from the maximum down to 60 degrees, leaving the number of reception beams constant. If the coverage is below 60 degrees, the number of beams is decreased.

Basic Transmission Technique

ELAC SeaBeam 3030 uses a transmission technique which fully stabilizes pitch and yaw motion of the vessel. This is achieved by splitting the transmit fan into several sectors which can be steered individually. This technique guarantees a stable straight coverage under the vessel.

Key Features

Up to 7,000 m Depth Performance

Up to 7,000 m Swath Coverage

Multi-Ping Mode

High-Resolution Real-Time Water Column Imaging (WCI)

Advanced Transmission Beam Steering

Mobile Version for 3° x 2° Beam Widths

Projector Modules for Flush Installation Available



ELAC SeaBeam 3030 multibeam system

System Overview

Compact Design for Easy Integration

Advanced Transmission Beam Steering

ELAC SeaBeam 3030 includes a new functionality for the automatic cyclical steering of the transmitted swath in the along-ship direction (pitch direction). This functionality is particularly relevant for analyzing objects like submarines, gas flares or leaks during stationary vessel operation or if the multibeam echo sounder is installed on a fixed platform.

The user can specify an angle range and an angular increment, resulting in a periodic oscillation of the transmitted swath to bow and to aft. Via this functionality, an entire volume area under the ship is automatically ensonified without requiring any movement of the vessel. This feature is a great tool for Water Column Imaging, the analysis of gas flares or submarine detection.

Transducer Array

The projector array and the hydrophone array are arranged in a mills cross configuration. Pre-amplifiers are built into the hydrophone array. The projector array as well as the hydrophone array are split in multiple modules (projector module LSE 331 and hydrophone module KE 16). This allows customizing the required along-ship and across-ship beam widths.



Gondola installation and mobile bracket



The standard installation of the transducer array is flush with the ship hull. A blister or a gondola installation is also possible. For mobile applications with beam widths of $3^\circ \times 2^\circ$, a transducer bracket for pole installation is available.

Transceiver Unit SEE 37

The transceiver unit contains the entire transmitter and receiver electronics, including the transmitter amplifiers, the transmit beamformer, the receive amplifiers and conditioning of the reception signals, the receive beamformer and a sonar control board. Additionally, the transceiver unit provides the interfaces for all external sensor data.

Operator Station

The operator station is a PC of the latest technology, providing a graphical user interface on high-resolution TFT monitor(s) for controlling the system, using Wärtsilä ELAC Nautik's HydroStar operator software. It communicates with the sonar electronics via Ethernet, both for sonar control and acquisition of sonar data.

The HydroStar operator software records bathymetric data and provides various real-time data displays for quality control. HydroStar also supports third-party software packages for data acquisition like HYPACK, EIVA or QINSy.

Water Column Imaging (WCI) Workstation

WCI data can always be logged without any extra installation. In order to display real-time data from the water column and seafloor, an additional WCI station is required (option).

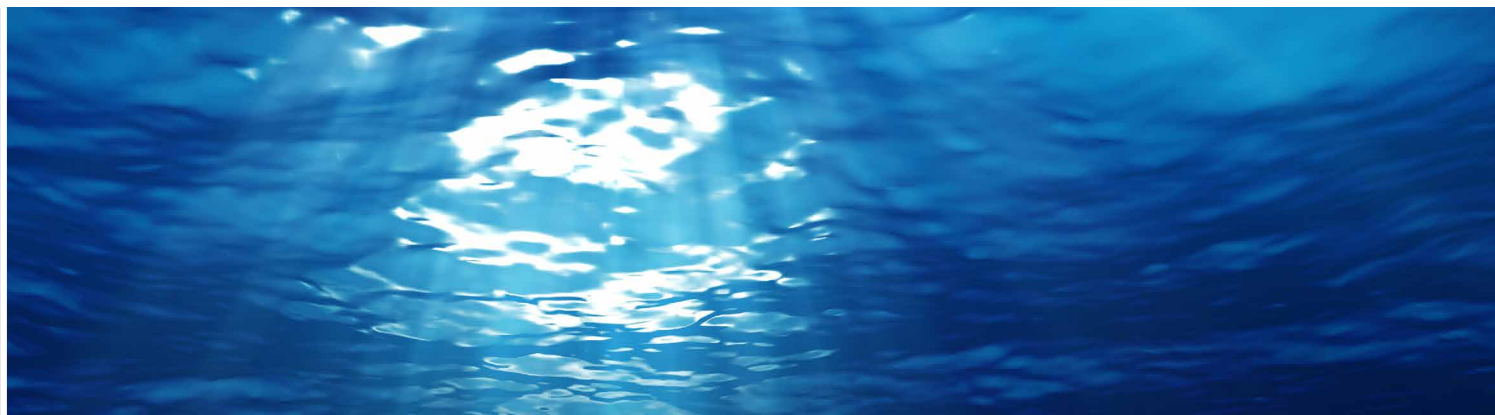
The WCI station is a PC of the latest technology with high-resolution TFT monitor, receiving data for each ping from the transceiver unit via Ethernet. The HMI for water column imaging is the ELAC WCI Viewer, including an impressive functional scope:

- Online and offline visualization of WCI data
- Different window types for sonar data visualization
- Different scaling and range options
- Forward and backward data playback as movies or single pictures
- Object and event functionalities
- Display of external sensor data

These capabilities are very useful for identifying any kind of objects in the water column or on the bottom like gas flares or submarines.

Bottom Slope Data Interface

ELAC SeaBeam 3030 provides a serial data output of bottom slope data. These data are calculated via linear regression and are e.g. useful for the automatic steering of a sub-bottom profiler.



Specifications and Technical Data

Wärtsilä ELAC SeaBeam 3030 at a Glance

Technical Data	
Operating frequency	26 kHz band (nominally 30 kHz)
min. depth	6 m below transducer
max. depth	Approx. 7,000 m (depending upon the ship own noise of the and upon the sea state)
Along-ship beam width	1°, 1.5° or 3°
Across-ship beam width	1° or 2°
Operation modes	Single-ping and multi-ping
Pulse length	0.4 ms - 10 ms
Pulse length modes	Manual and automatic
max. swath coverage sector	5.5 times of water depth
max. swath coverage	approx. 7,000 m (depending on the ship's own noise and the sea state)
Swath coverage modes	Manual and automatic
Reception beam spacing	Equidistance or equiangular
max. number of beams	918 (equidistance, multi-ping) 386 (equidiangular, multi-ping)
Depth accuracy (sonar sensor)	In accordance with IHO SP44

Interfaces	
Power	115 V / 60 Hz or 230 V / 50 Hz single-phase
Motion	RS232 / RS422 or Ethernet
Heading	RS232 / RS422 or Ethernet
Position	RS232 / RS422 or Ethernet
Surface sound velocity	RS232 / RS422
Sound velocity profile	RS232 / RS422 or Ethernet

Special Output Interfaces	
Center depth interface	RS232, ASCII format
Bottom slope data interface	RS232, similar to NMEA 0183

Motion Stabilization / Compensation	
Roll	± 15°
Pitch	± 10°
Yaw	± 5°

Physical Specifications*				
	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Hydrophone array 1° / 2°	176 / 176	402 / 402	3,134 / 1,620	168 / 84 (without frames and cables)
Projector array (curved) 1° / 1.5° / 3°	195 / 195 / 195	3,820 / 2,732 / 1,644	530 / 530 / 530	300 / 200 / 100 (without frames and cables)
Projector array (flat) 1° / 1.5° / 3°	160 / 160 / 160	3,303 / 2,200 / 1,100	735 / 735 / 735	306 / 204 / 102 (transducer only)
Mobile transducer bracket (incl. transducers)	487	1,961	1,514	420 (without cables)
Transceiver unit	1,352	607	904	225
Operator station	177 (4 HE)	483 (19" rack)	505	14

*Dimensions may change due to special installation requirements. Please ask for dimensional drawings. The typical tolerance of weights is ±10%.