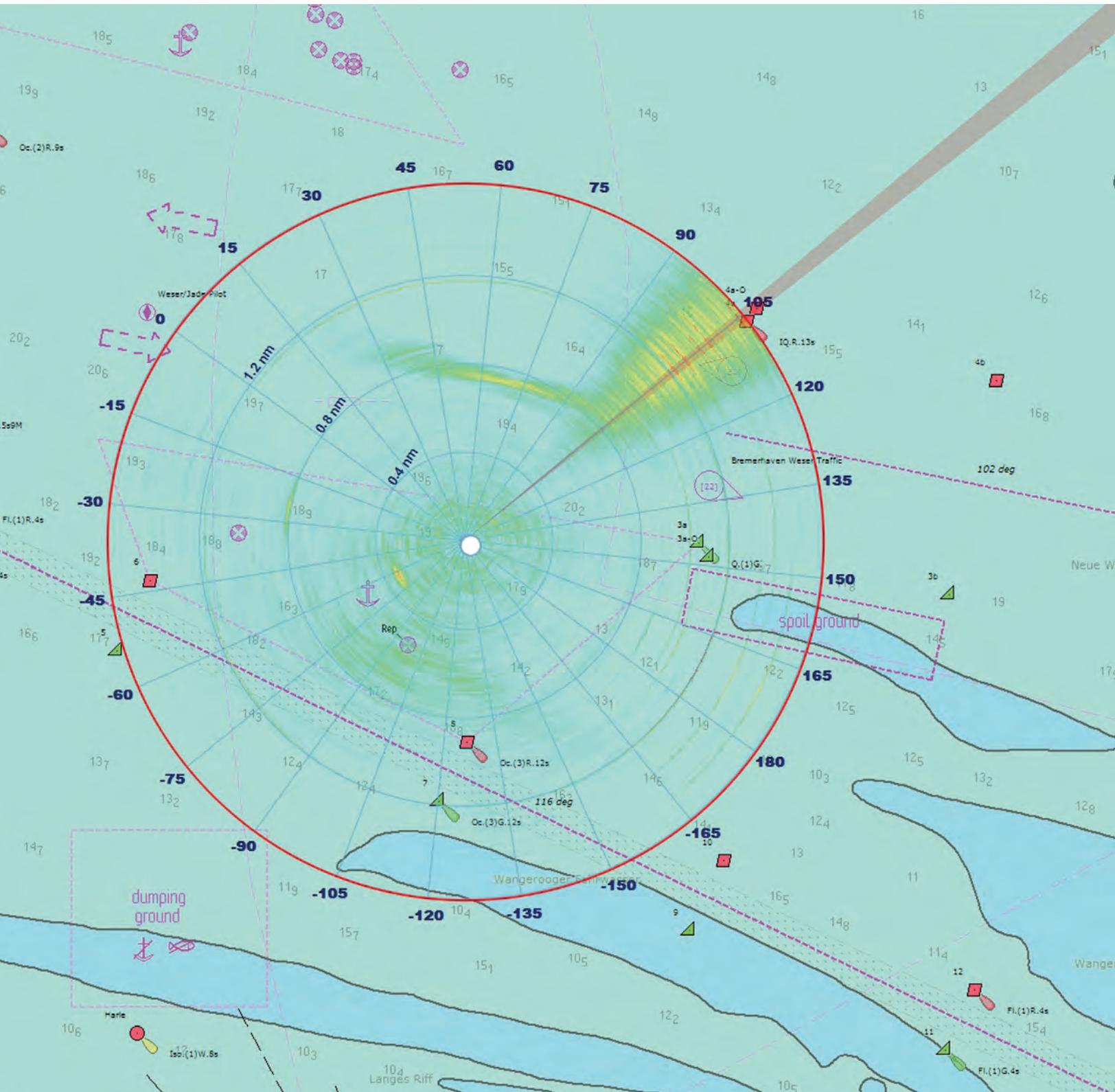




ELAC Nautik

Multipurpose Sonar SUBEYE

Safety and Security for Mega Yachts and Cruise Ships





Multipurpose Sonar SUBEYE

Cutting Edge Technology for High Value Ships

In general ships are solely equipped with sensors to observe the water surface and the sky above. Even high value ships like mega yachts and cruise liners are 'blind' to dangers lurking beneath the water surface. L-3 ELAC Nautik's idea is to add new sensors to the ship equipment that support the detection of underwater threats and improves the safety and security on board.

General

The multipurpose sonar SUBEYE offers the best protection against any underwater threat. The system scans under water and detects approaching dangers up to a distance of 3,000 m, thus maximizing the vessel's safety during navigation as well as while anchoring.

By now SUBEYE has become the standard when it comes to self-protection equipment on big yachts. The system can be delivered in different configurations and can be modified according to specific project requirements. SUBEYE completes the total spatial surveillance systems of ships with high safety requirements.

Navigation safety

SUBEYE makes it safer to go wherever you want. Even areas with inadequate nautical charts can be explored safely. With SUBEYE shallows, icebergs and other dangers become a predictable risk. With the forward looking cruise mode of the sonar system it is possible to detect objects in a distance of up to 3,000 m (10,000 feet), which significantly minimizes the danger of a collision with obstacles like reefs. This range is about 10 times the performance of other sonar systems.

Key Features

Multipurpose sonar system with up to 4 operation modes in one system

Long detection range of up to 3,000 m

Easy and intuitive operation

Collision and intrusion warnings / automatic alarms

Interfaces to ship navigation and security systems

Long range detection of noisy crafts on surface and underwater

System size allows easy installation

SUBEYE is qualified both for new buildings and modernization projects





System Overview

Professional Sonar Solution for Demanding Projects

Active security

While anchoring high value ships need individual protection to provide an optimum of security to all passengers and crew members. With the panoramic anchor mode of the SUBEYE sonar it is possible to detect and track intruding objects at a range of up to 3,000 m, too. The 360° sonar array scans the full sphere and information of the complete area's underwater situation is always available.

Passive security

As a new feature a passive detection parallel to the active scans has been implemented into the system. This feature allows the detection of fast approaching speedboats by identifying their typical noise signature. Thus such boats can be detected and tracked even if they are not visible on the radar. With this sensor the approach of rubber dinghies, plastic and wooden boats can be detected very early which makes it possible to classify the vessels with appropriate camera systems. In case of a real threat a significant time gain helps to realize the situation and to decide about further actions.

Diver detection

SUBEYE is optimized regarding range and resolution for an increased safety and security of the ship. If a reliable detection of underwater targets of small sizes and their discrimination from marine mammals is required an additional sensor is available to be added to the SUBEYE sonar as an option. This diver detection sensor enables the operator to detect and track small-sized objects like divers at long distances.

Operation concepts

The SUBEYE sonar system can be used as a stand-alone system, but can also be interfaced to the ship navigation or ship security system. The geo referenced display with a sea chart in the background and the automatic alarms help the operator to realize potential threats early.

Easy integration and operation

The hardware of the SUBEYE sonar system allows an easy integration into any ship design. Only minor modifications of the ship's hull are required and no special sonar dome is required. Thus the sonar system is qualified both for new buildings and modernization projects. The sonar array is installed on a hoisting gear and SUBEYE is ready for operation at any time, no special preparation or set-up is needed.

All equipment is produced by L-3 ELAC Nautik in Kiel (Germany) and has to pass an extensive quality control process. This 100% quality control makes sure that the components that are delivered to the customer are without any defects and will operate at maximum performance.

Intuitive MMI

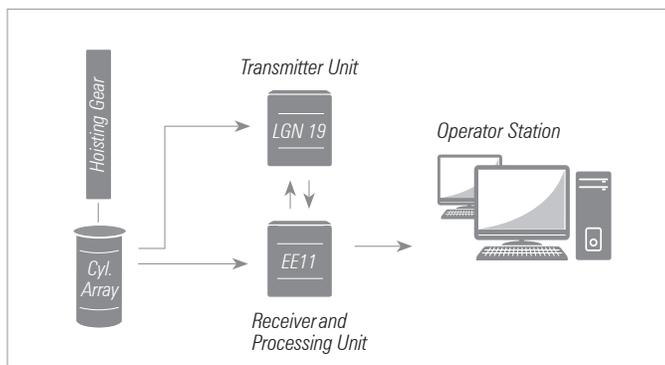
The SUBEYE MMI is the most operator focused solution on the market. It was developed and modified in close cooperation with experienced captains, navigation and security officers and usability experts.

The easy and intuitive design of the MMI together with the automatic mode of the sonar system allows even inexperienced users to achieve good detection results. Experienced operators can change settings to increase the performance of the system.

Specifications and Technical Data

SUBEYE at a Glance

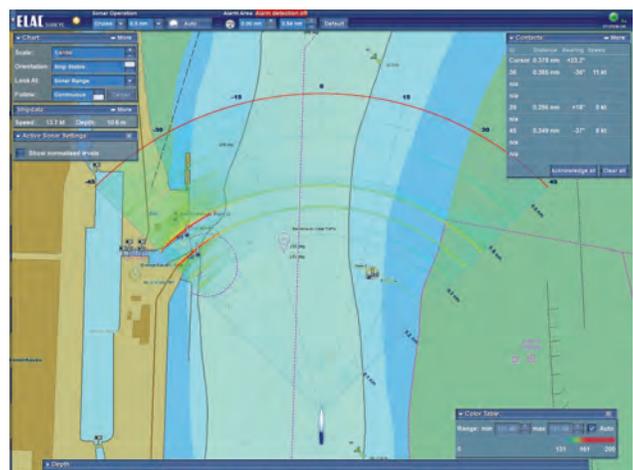
Technical Data	
Operation frequencies active modes	30 kHz (LF) and 70 kHz (HF)
Transducer array type	Cylindrical (LF) and planar (HF) array
Range scales	0.05/0.25/0.5/0.8/1.0/1.6 nautical miles
Typical detection ranges	Objects with TS = 25 dB (e.g. reefs): 3,000 m (10,000 ft) Objects with TS = 0 dB (e.g. buoys): 350 m (1,000 ft)
Sector size	Cruise mode HF 90° vertical 20° horizontal Cruise mode LF 60° vertical 26° horizontal Anchor mode LF 360° vertical 26° horizontal
Bearing accuracy	< 2° (LF) < 1° (HF)



Basic multipurpose sonar SUBEYE configuration



SUBEYE in anchor mode. Two suspicious objects are passively detected and their direction is shown on the display.



SUBEYE in cruise mode. The walls of the harbor entrance are detected and displayed as obstacles. Thus the information on the electronic chart is verified by the sonar.