

# Wärtsilä ELAC LOPAS

Compact and economic  
passive sonar system



ELAC LOPAS is a passive sonar system for refit on board of a submarine during modernisation or for newly designed small submarines. The key benefit is its unbeaten cost effectiveness ensured by focusing on features essential for an effective submarine operation. ELAC LOPAS operates with all present bow arrays or Wärtsilä ELAC Nautik's own supply.





# Wärtsilä ELAC LOPAS

Perfect solution for refits and midgets

ELAC LOPAS has been developed to exchange outdated or obsolete original passive sonar systems. Due to its compactness, it typically fits into the space of the former console without the need for any rearrangement of nearby equipment.

The concept of extensively re-using existing components as inboard cables, preamplifier boxes and even the array lowers the efforts for the replacement. Most important is the ability of ELAC LOPAS to adapt to the existing interfaces, e.g. Fire Control Systems or Gyros.

Wärtsilä ELAC Nautik's experience as a supplier of hydrophones and associated supplies makes us the ideal one-stop shop even if the original sensors, cables, baffles or pressure hull penetrations (PHPs) need to be exchanged as well. Wärtsilä ELAC Nautik also performs PHP-refurbishments. As a result, we return a fully rebuilt and tested PHP to the customer, saving valuable budgets.

### Key features

- Ultra-compact passive sonar system
- For refits and new designs
- Broadband detection
- Automatic target tracking
- Audio recording
- Meets all relevant military standards
- Extensive re-use of existing onboard components
- Interfaces with existing systems
- Onboard simulator (optional)

### Built-in growth potential

ELAC LOPAS is not limited to the passive bow sonar. It may also integrate an already installed intercept sonar or even an active sonar. As a result, the original operational concept remains valid.



Wärtsilä ELAC Nautik also offers an onboard simulator for easy and effective onboard training. This laptop- or PC-based system supports the training of the sonar operator based on predefined scenarios. All this for a fraction of the typical costs connected to such systems.

# System overview

Simple and effective integration

### Easy layout for perfect integration

The central component of the ELAC LOPAS system is the operator console MP 90. All electronics for beamforming, processing, control and display are combined in this ultra-compact console.

For an easy installation of the console, it can be dismantled in three parts: the upper and lower casing and keyboard part. These single parts even fit through the hatches of a submarine and can then be reassembled in the Combat Information Centre (CIC). So even without cutting the hull, the console can easily be installed.

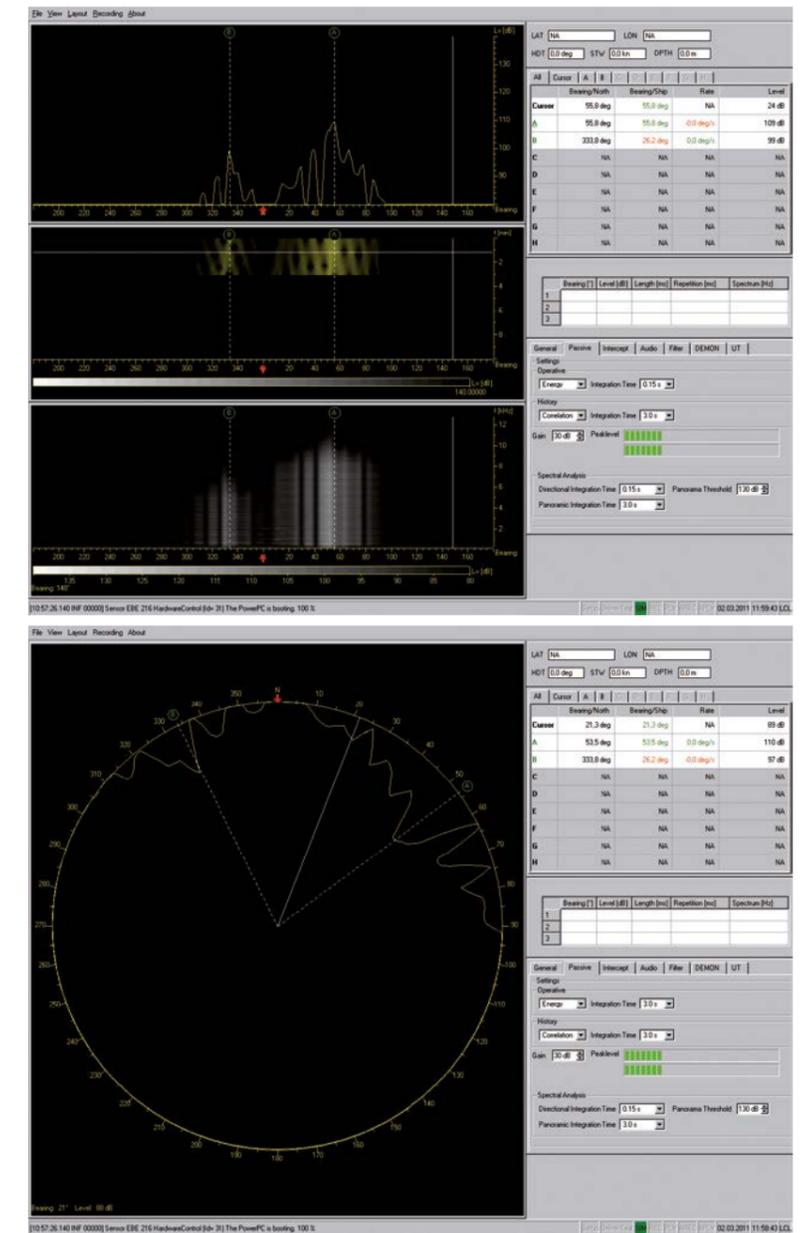
Wärtsilä ELAC Nautik refits new preamplifiers to the existing housing or delivers new supplies for new designs. PHPs may be refurbished and re-used as well or delivered new. In case of a refurbishment, Wärtsilä ELAC Nautik also requalifies the PHPs by pressure testing in our own pressure tanks.

The hydrophone array can be re-used or refitted with new supplies by Wärtsilä ELAC Nautik, e.g. different KE 9 hydrophone types that replace P20 or P200 hydrophones. The same applies for the outboard cables. Even a complete new hydrophone array may be designed and delivered.

ELAC LOPAS interfaces to existing Fire Control Systems, Gyros, plotting tables or periscopes. Wärtsilä ELAC Nautik takes over such task, provided that a sufficient interface description of these systems is available.



KE 9 hydrophones



Intuitive HMI

# Specifications and technical data

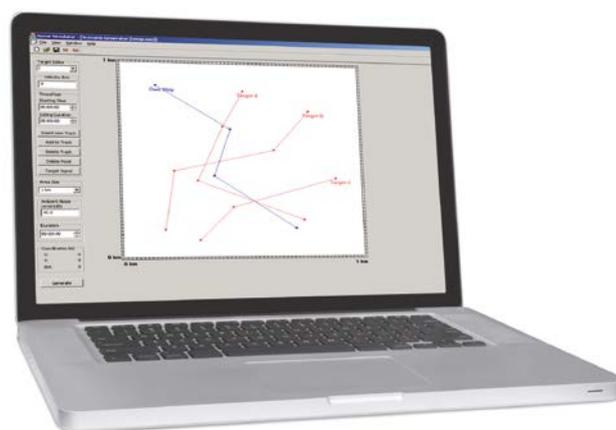
## Wärtsilä ELAC LOPAS at a glance

Technical data	
Operating frequency	0.3 - 12 kHz
Number of preformed beams	96 (192 half beams)
Automatic target tracking	8 ATT channels
Integration time	0.3 - 19 s
History presentation	10 / 30 / 60 min
Bearing accuracy	≤ 0.5° (ideal conditions assumed)
Frequency of audio channel	0.3 - 12 kHz
Frequency of UT channel	1 - 12 kHz
Spectral analysis	96 beams simultaneously
DEMON analysis	Yes
Data recording	Audio (digital)
Power supply	220 V / 50 Hz single-phase 115 VAC 60 Hz / 660 VA

Sonar simulator	
Scenario generator	Track definition by instructor (targets and own boat) Selection of predefined scenarios
Passive target simulation	Broadband noise Tonal Doppler effects
Noise effects	Gaussian ambient noise
Ocean model	Follows a homogeneous ocean model (uniform propagation medium) Targets are point sources of acoustic energy Doppler effects and spherical spreading are continuously recalculated
Sonar system simulation	Broadband simulation Narrowband simulation DEMON simulation Audio simulation



Everything within reach with the operator console MP 90



Sonar simulator showing training scenario

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