

SERO 250 Periscope System



We make it visible.

SERO 250 -

The ideal Solution for retrofit programs

- High-performance optics
- Two-axis, line-of-sight stabilisation
- Modular design
- 3-stage optical magnification changer
- Full combat system integration
- ESM-EW/GPS antenna interface
- Integrated IR camera sensor
- Integrated eyesafe laser rangefinder

The SERO 250 periscope system is part of the successful line of submarine periscopes designed and produced by Carl Zeiss Optronics GmbH.

The SERO 250 is a compact, state-of-the-art periscope system that fits perfectly into retrofit program solutions. Little or no structural modifications are required for installation. It makes use of existing hoisting mechanisms, periscope bearings, seals, etc. It is also ideal for boats where space is at a premium.

The SERO 250 periscope system allows excellent observation during the day and is equipped with an IR camera for night vision.

The SERO 250 periscope system can be used to monitor surface and air activity, to collect navigational data, and to detect and identify targets.

The SERO 250 periscope system provides video signals for parallel observation on combat system monitors.

The highly modular design features state-of-the-art technology, which simplifies logistics and facilitates maintenance.

A complete logistic support package is available, including spare parts, manuals, tools, jigs, training for customer staff and set up of customer logistic facilities.



Configuration

The SERO 250 periscope system consists of the following basic modules:

Head assembly

- Outer structure with combined ESM-EW/GPS antenna
- Heatable visual window
- IR window
- RAM coating (optional)
- Visual channel with 3-field-of-view changer module and stabilized elevation prism
- IR camera module (3 to 5 μm or 8 to 12 μm) with 2-field-of-view changer module and stabilized elevation mirror
- Solid state gyroscope for maximum reliability
- Eyesafe laser rangefinder (optional)

Periscope mast

- Modular optical design permits easy redesign for different mast lengths and diameters (180 mm or 190 mm)
- Illuminated reticle
- Day TV camera with 3-field-of-view changer (the TV channel does not affect the visual channel)
- HF antenna cables

Azimuth motor drive module

- Yoke-mounted, direct drive brushless torque motor
- Azimuth stabilisation

Hoisting yoke

- Customized yoke or minor modifications to the existing yoke
- Existing hoisting mechanism used for upgrades

Ocular box

- Very compact, space-saving design fits into same space as the replaced equipment
- Modular design for easy maintenance
- Binocular eyepieces, fully adjustable and heatable, with eyepiece data display
- Passive optical rangefinder
- 3 filters and selector
- Built in monitor for day TV and IR image display, with tactical data overlay
- Touch button control panel for periscope function and control
- BITE integrated via the monitor and control panel
- High-resolution digital camera interface
- Foldable handles with azimuth and elevation thumb control buttons
- Relative bearing sensor
- Microphone for internal communications

Video display

- Operations room video display for day TV and IR images with tactical data overlay
- Digital video recording
- Picture-in-picture for simultaneous display of recorded and realtime video

Electronics units

- Compact and modular for easy installation into existing boats
- Easy maintenance and replacement
- Electrical interface via a range of serial link options, adaptable to customer requirements



Specification

SERO 250

Mechanical Data

■ Periscope length	Application-specific, approx. 11 m
■ Mast tube diameter	180 mm or 190 mm
■ Ocular box diameter	390 mm
■ Weight of periscope	Approx. 825 kg

Visual Channel

■ Magnification	1.5x, 6x, 12x
Field of view (h x v)	
■ 1.5x magnification	38° x 30°
■ 6x magnification	9.5° x 7.5°
■ 12x magnification	4.75° x 3.75°

Day TV Camera

■ Type	Ruggedized commercial b/w CCD camera
■ Picture elements	min. 750 (h) x min. 580 (v)
■ Video output signal	CCIR

IR Camera

■ Wavelength range	3 to 5 μm or 8 to 12 μm
■ Narrow FOV	6.3° x 4.7°
■ Wide FOV	12.6° x 9.4°
■ Detector array	640 x 480

Laser Rangefinder (optional)

■ Eyesafe	class 1
■ Accuracy	5 m
■ Range	80–20,000 m

Line of Sight

■ Elevation range visual channel	-15° to +60°
■ Elevation range IR sight	-15° to +33°
■ Azimuth range	n x 360°

Stabilization

■ Elevation	Supported by internal gyro
■ Azimuth	Supported by ship gyro

Accuracy

■ Relative Bearing	$\pm 0.2^\circ$
■ Range	$\leq 5\%$

Environmental Conditions

Operating temperature

■ Outboard equipment	-25°C to +55°C
■ Inboard equipment	0°C to +55°C
■ Storage temperature	-40°C to +70°C

Antenna

■ Omni directional EW/RWR	2–18 GHz in one band
■ GPS	1.2 to 1.8 GHz

Subject to changes in design and further technical development