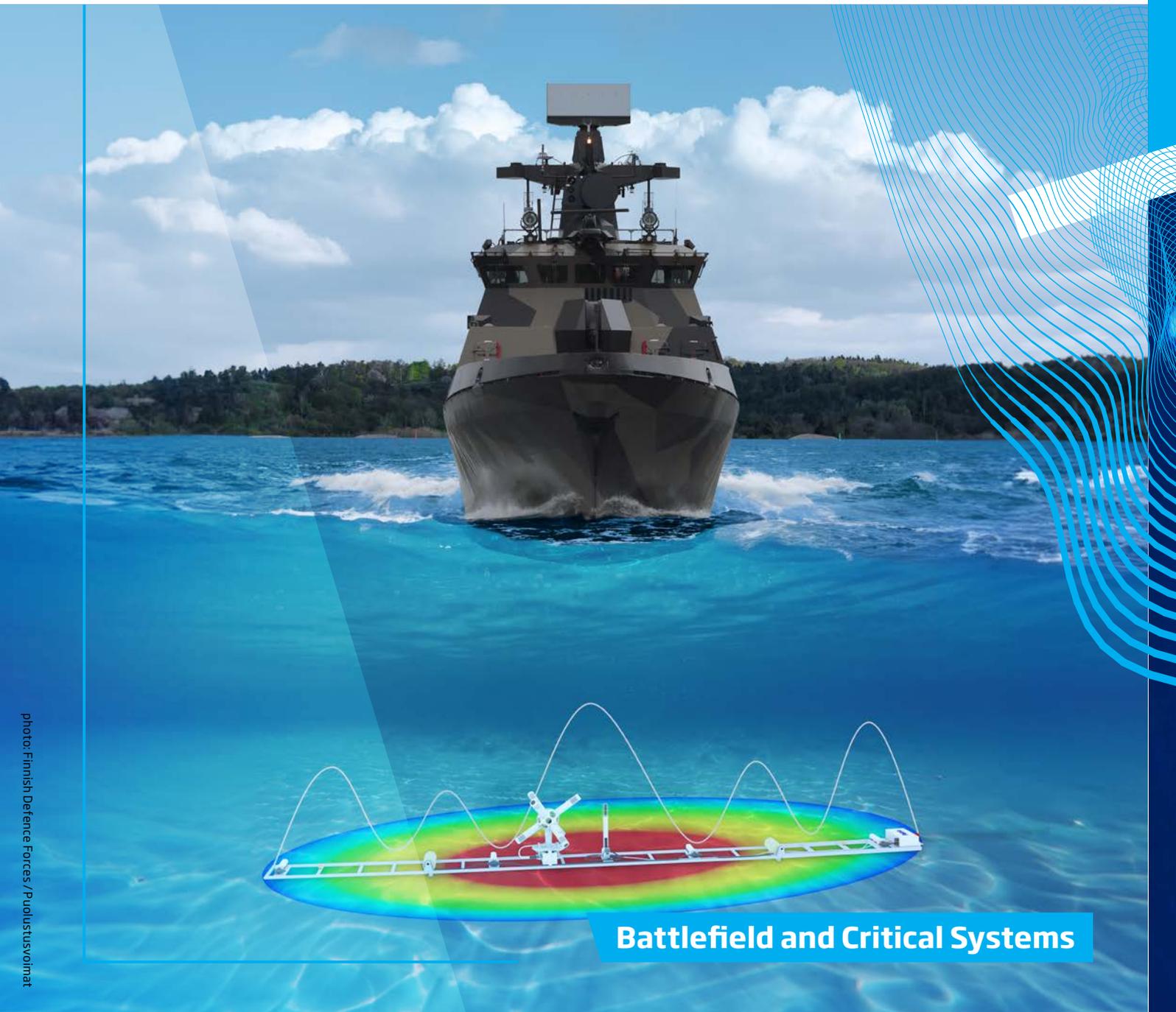


# **Patria** SIGMA & SIGMA Light

Signature measurement and analysis systems



**Battlefield and Critical Systems**

Protected Mobility and Defence Systems



Through Life Capability



Battlefield and Critical Systems



## EXTREME SURVIVABILITY

Finland is known for high technology and extreme resilience. The harsh nature and limited resources have pushed us to learn and innovate efficiently. Thorough preparation for the future is the backbone of our culture.

Patria has grown from its Finnish heritage to a modern and international defence and technology company with over 100 years of experience. We use resources wisely, create innovative solutions and build intelligent systems that provide extreme survivability in any condition. We work with our customers throughout the entire lifecycle to ensure maximum value. Honest and straightforward co-operation is at the core of our work.

We build exceptional partnerships that last through critical operations. That's what it takes when you stand for your sovereignty.

**Trust us, we have been there.**

## TOTAL CONTROL

Improve your critical security with our C5ISTAR and cyber intelligence solutions.

Patria's innovative data services, with insightful visualizations and analytics, ensure that you have real-time, comprehensive situational awareness and a powerful mission control. We create a seamless defence system for those who want to have the advantage in every situation.

Stay one step ahead in your decisions with our turnkey solutions and be in total control.

**Patria - Extreme conditions embedded.**

# Patria SIGMA

Patria SIGMA is an advanced measurement system that captures the signature of any vessel in very high detail while it passes by the system. The system contains an onshore measurement station and a bottom-deployed sensor track that measures magnetic, electric, pressure and acoustic signals accurately in real time. The detailed signature measurement is extended and rotated into vessel's coordinate system by the measurement station thus providing, e.g., realistic top-down views to the signal levels in the underwater locations in the vessel's proximity.

The design of the measurement track fully supports permanent installation as well as portable operations. The system contains an onshore measurement station, the sensor track, handling equipment for the deployment and recovery of the track as well as a calibration system.

## Measurement station

The measurement station contains applications for sensor track calibration, measurement campaign planning and execution. For that, a comprehensive set of tools and views are available for monitoring and validating the measurements as well as for analysing the measurements in the collected signature database.

The sensor track is connected to the measurement station with a single power/data cable. The station itself is hardened and can be extended to contain up to three sensor tracks.

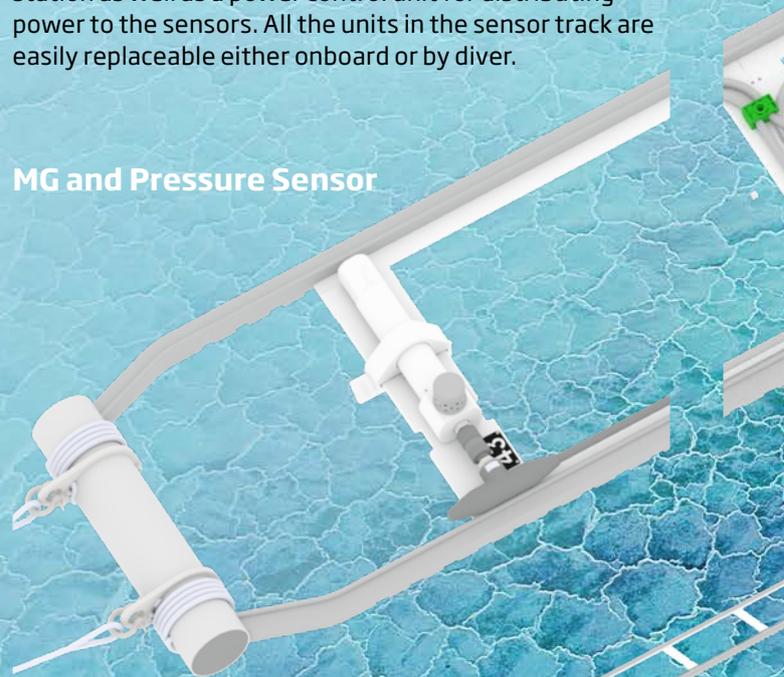
## Launch and Recovery of Portable Sensor Track

The 41 meter sensor track and its power/data cables are launched from two reels that fit into a 10-foot container. The flexible design of the track enables it to adapt well to the bottom contour while stretched to its position during the deployment. After anchoring the track into the bottom, the orientation of the sensor track as well as the positions of its sensors are accurately determined by using a positioning system supplied with the Patria SIGMA. For portable operations or maintenance purposes, the track is easily recovered to the reel on the deck with the help of a buoy attached to the end of the track.

## Sensor Track

The sensor track contains a hydrophone, 3D UEP and eight equally spaced sensor units. Each sensor unit embodies a highly sensitive 3D magnetic sensor and a pressure sensor. The track also includes a measurement control unit for transferring the data to an onshore measurement station as well as a power control unit for distributing power to the sensors. All the units in the sensor track are easily replaceable either onboard or by diver.

### MG and Pressure Sensor



# Permanent Installations

The design of the system enables the sensors and the units of the sensor track to be mounted on permanent underwater stands when needed. In this case, the wetend units are supplied with additional mounting plates and without the sensor track frame.

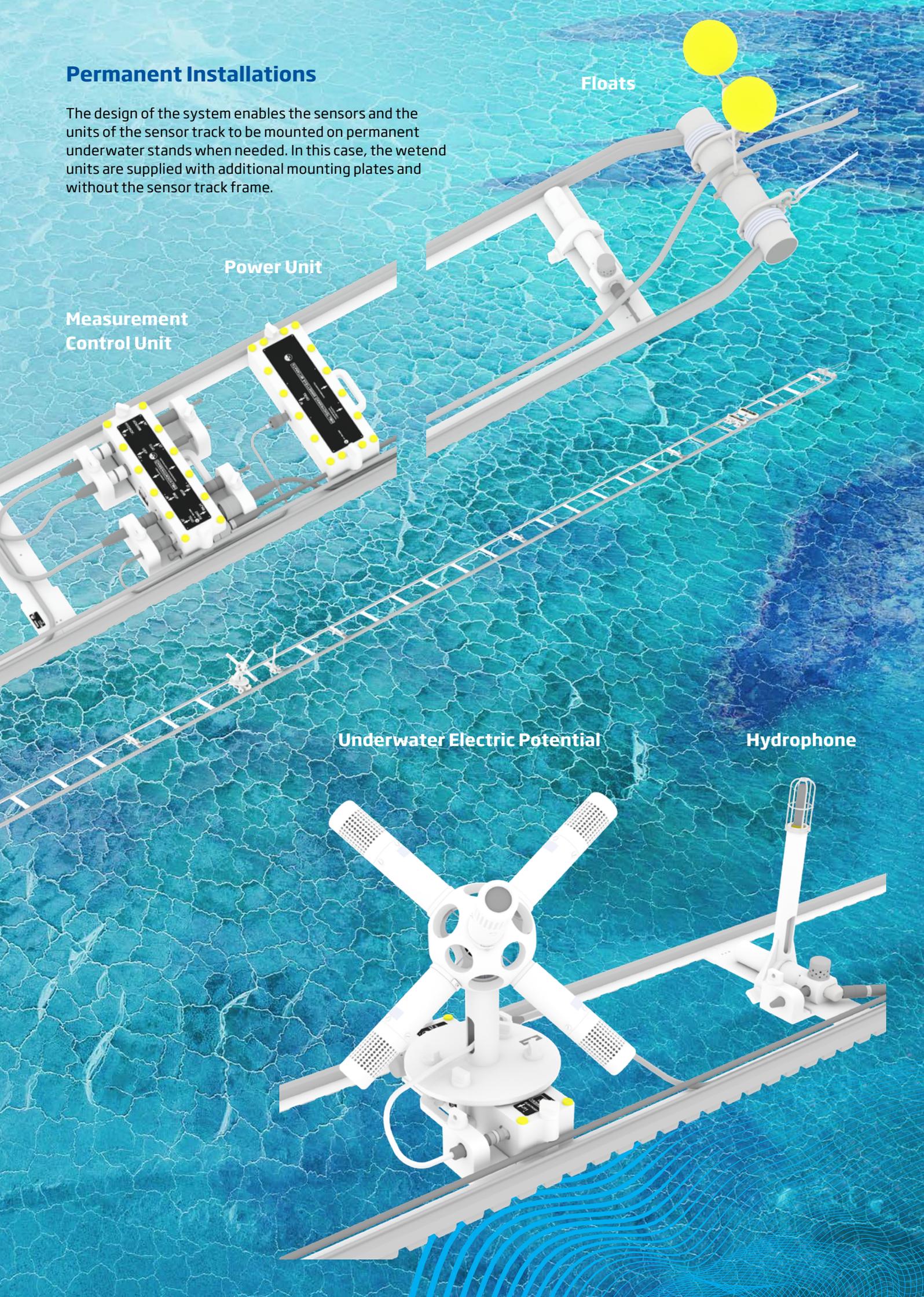
Floats

Power Unit

Measurement Control Unit

Underwater Electric Potential

Hydrophone



# Patria SIGMA Light

Patria SIGMA Light is a lightweight portable measurement system that captures signature of any vessel in high detail. The system contains a bottom-deployed rigid sensor track that measures magnetic, electric, pressure and acoustic signals of the vessel accurately while it passes by the system. The design of the measurement track fits perfectly to portable operations because the track can be transported to the desired location with a small boat and installed in an hour.

## Compact Solution

The system contains the foldable sensor track, a battery, local data storage and a recovery system. All these components locate on the sea bottom during the measurement campaign without any physical components on the surface or interfaces to other systems. The recovery of the system is carried out from the boat without divers.

The system is supplied with a rugged laptop containing a measurement and analysis application. After recovering the track, the recorded data is imported from the local data storage to the laptop for offline data analysis. Alternatively, the track can also be supplied with a buoy which contains a WLAN connection to the laptop. This enables real-time data monitoring and storing with the analysis application. The measurement data can also be exported from the laptop to the Patria SIGMA Light measurement station.



# Patria SIGMA

## Key features

- Measures signature of underwater and surface vessels in very high detail
- Automatic adaptation to seafloor geometry
- Fixed and portable solution available
- Onshore measurement station with comprehensive set of tools for both measurement campaign execution and signature analysis
- Database for vessel signatures

## Wetend system

- Sensor track: 41 m x 59 cm x 60 cm
- Sensor track (on the cable reel): 600 kg
- Hybrid sea cable (1500 m on the drum) 650 kg
- Launch and recovery system of above wetend system fit into a 10-foot container
- Maximum operational depth: 60 m  
Can be extended to 100 m
- Maximum sea cable length: 4500 m

## Sensor performance and measuring capability

- 3D Magnetic field sensors (8 pcs)  
Measuring range:  $\pm 100\,000$  nT  
Bandwidth: 0 - 1000 Hz
- 3D Electric field sensor (UEP/ELFE)  
Bandwidth: 0 - 3 kHz
- Pressure sensors (8 pcs)  
Measuring range: 0 - 6 bar
- Acoustics sensor (hydrophone)  
Frequency range: 1 Hz - 40 kHz

## Power supply

- Sensor track power supply: 150 VDC, 1 A
- Measurement station power supply: 230 V/50 Hz
- UPS device included

## Measurement station

- Two operator positions
- Hardened computers
- Transportation with six cases (each 76x53x46 cm)
- Operator positions can easily fit into, e.g., a 20-foot container

# Patria SIGMA Light

## Key features

- Measures signature of underwater and surface vessels in high detail
- Lightweight and foldable structure
- Transportable with small boat and installable in an hour
- Standalone data collection
- Data analysis application in rugged laptop
- Data can be transported to Patria SIGMA Light measurement station for further analysis

## Wetend system

- Folded sensor track: 50 kg, 25 cm x 50 cm x 350 cm
- Unfolded sensor track: 20 cm x 50 cm x 650 cm
- Recovery system and battery: 25 kg
- Maximum operational depth: 60 m
- Hybrid sea cable: 25 - 65 kg, 60 - 150 m

## Sensor performance and measuring capability

- 3D Magnetic field sensors (4 pcs)  
Measuring range:  $\pm 100\,000$  nT  
Bandwidth: 0 - 1000 Hz
- 3D Electric field sensor (UEP/ELFE)  
Bandwidth: 0 - 3 kHz
- Pressure sensors (4 pcs)  
Measuring range: 0 - 6 bar
- Acoustics sensor (hydrophone)  
Frequency range: 1 Hz - 40 kHz

## Power supply

- Battery pack 24 VDC
- Battery life: 4 days with non-stop recording

## Environmental conditions

Information on utilised chemicals will be delivered according to REACH/RoHS.

# Patria

When it is not an option.

[www.patriagroup.com](http://www.patriagroup.com)