

ladar Ai

# Ladar AI

Innovative Detection Sensor Suite Technology for the  
Maritime, Environmental Monitoring, and Offshore Industry

2024

2024

# About Us

Ladar-AI Limited is a UK company focused on specializing in the development of multi-sensor technology for monitoring, detection, and surveillance applications in the maritime and offshore industry.

Experienced in the development of sensor technology and breakthrough automated ship collision avoidance and (semi-)submerged target detection solutions.

## Ladar-AI

Redefining the Global  
Maritime Transport Industry -  
one Innovation at a Time.

## EC/UKRI

Funding received from  
the EC and UKRI for  
technology projects

Unique IPR protected by  
robust patent portfolio



9

Patent families  
granted and  
awaiting approval  
for 1 more



# The LADAR Journey - advancements of hardware



2013

## MK1

- 45 kg processing unit + 5 kg sensor head weight
- Pseudo coded low-power waveform



2019

## MK2

- Proof-of-concept Single-beam lidar
- Raw data streaming Minimal software features



2023

## MK3

- 2 kg processing unit + 5 kg sensor head weight
- Multi-beam Lidar integration with cameras
- Software features
- Real-time FPGA processing
- Adaptive Lidar wave-form
- AI and advanced signal processing
- Multi-wavelength features

# Problem



## High Cost of Incidents

Industry loses billions to **collisions/contact incidents** yearly. Congestion/incidents only expected to increase.



## Impact on the Environment

Vessels and Offshore Windfarms have devastating impact on the ocean environment, from **plastic pollution and higher emissions**.



## Risk to Critical Infrastructure

Offshore energy facilities face **threats**: terrorism, piracy, theft, trafficking etc. Requiring **enhanced monitoring & alerts in ports/ offshore infrastructure**.



## Lack of Technology for Autonomous Future

Current sensor capabilities are inadequate for future remote-operated & autonomous vessels, particularly on large commercial merchant vessels.

# Real World Applications



## Optimal Situational Awareness

Utilizing cutting-edge sensor technology, creates a highly detailed digital representation of the surroundings, enabling **3D mapping** and **AI-augmented identification** of objects, above & semi-submerged in the water surface.



## Collision Avoidance Decision Support & Remote Operated Vessels

Enhanced multi-sensor data fusion and 3D mapping of the near-proximity environment, providing data input for **Decision Support System** as aid to navigation, and for complex algorithms for **collision avoidance** following the Collision Regulations at Sea (**COLREGS**).



## Security of Critical Maritime Infrastructure

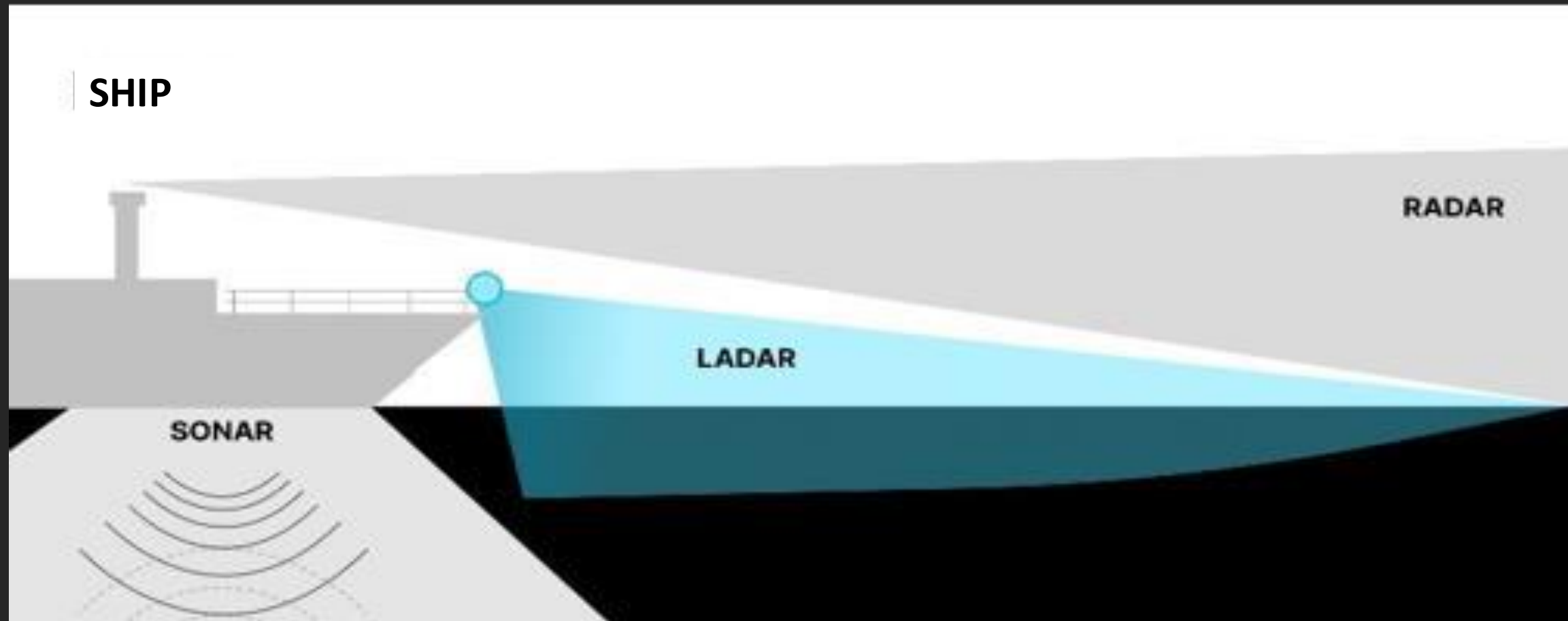
Security and surveillance features for marine infrastructure, with focus on floating energy infrastructure, such as offshore windfarms, FSRU/LNG port infrastructure, oil rigs. **Continuous, real-time, autonomous monitoring and detection with alerts/alarms** in case of safety zone breach.



## Environmental Monitoring & Wildlife Protection

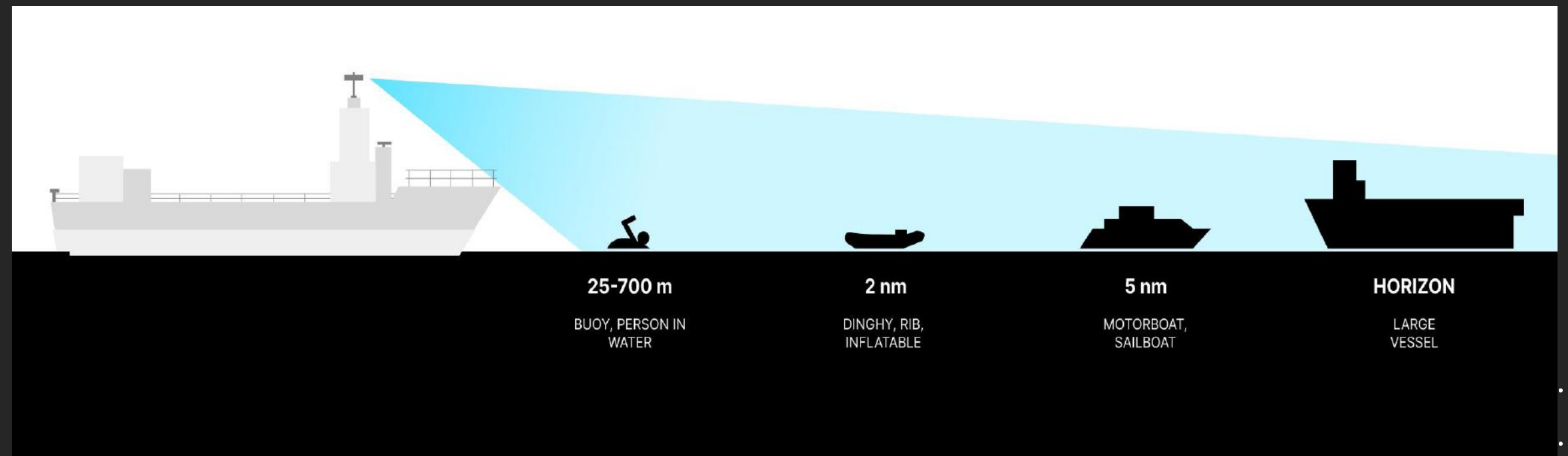
Equipped to **detect, report, count and track** marine mammals, including endangered whales, near offshore facilities such as offshore windmill farms. Also able to detect **marine plastic debris, floating containers, ghost nets** that are a danger to environment and navigation.

# Ladar filling the Detection Gap

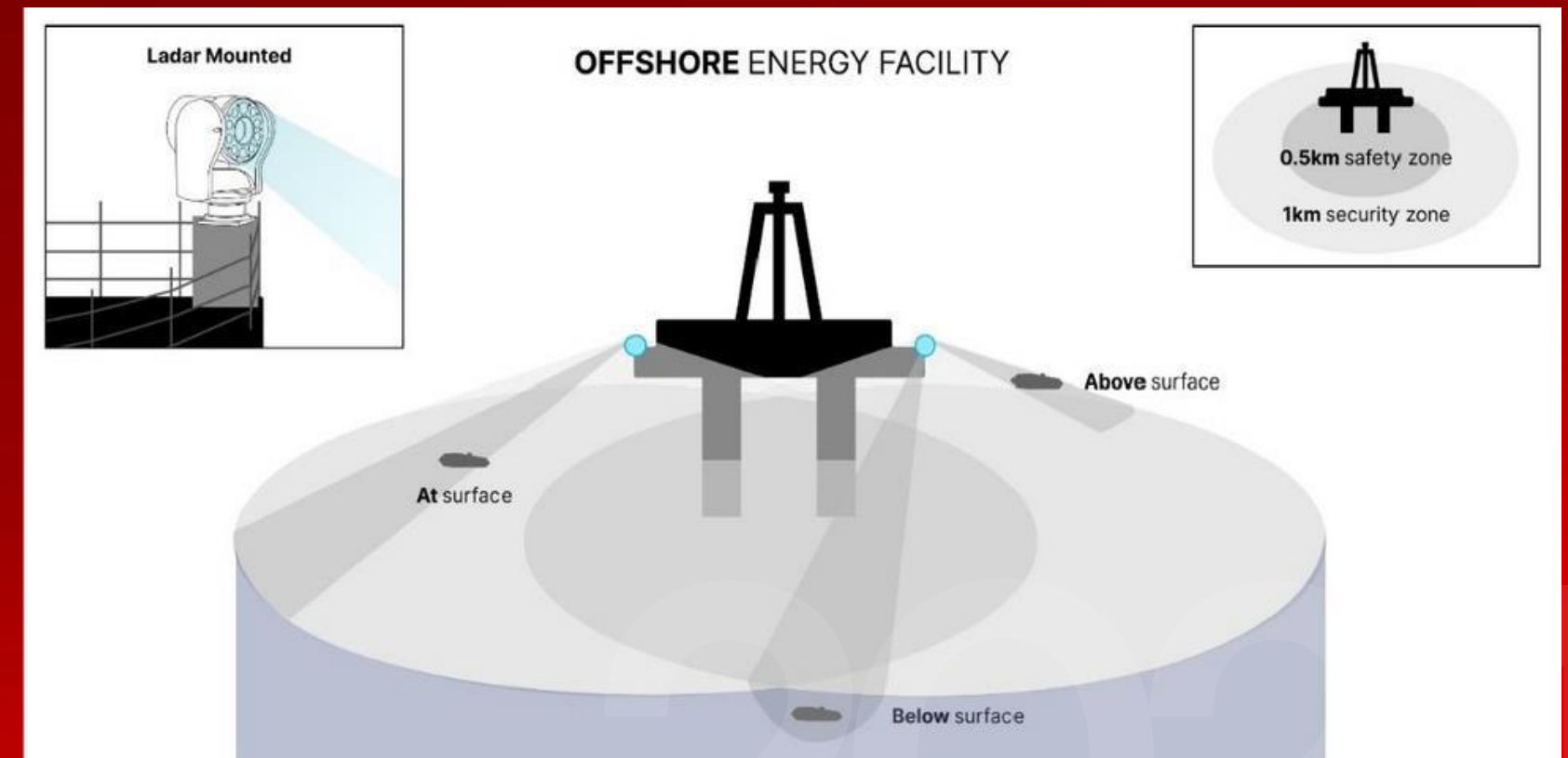
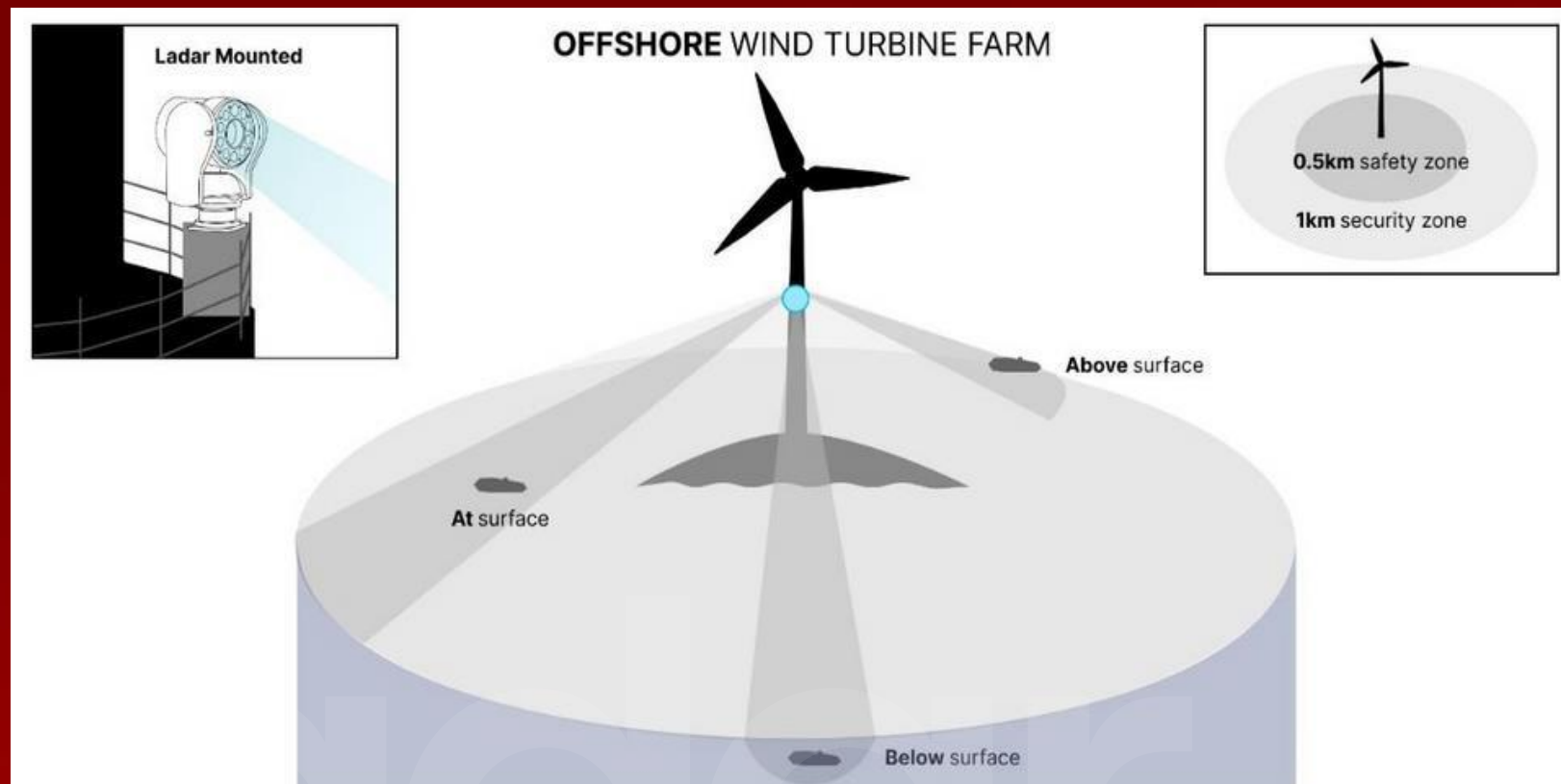
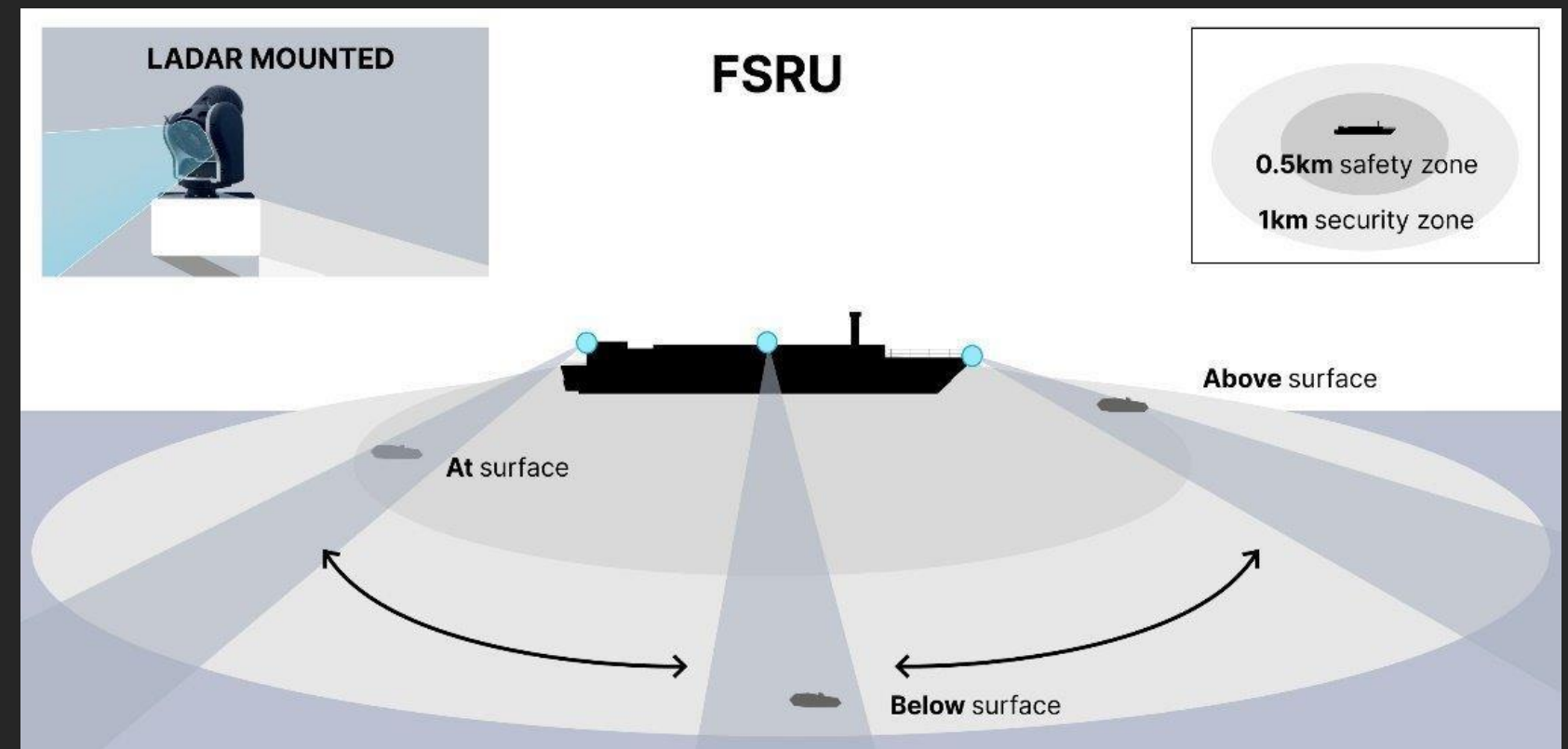


Monitoring capability in the **detection gap** not covered by radar or sonar today

Accurate **surface level**, and **semi-submerged** object detection, **enhancing** the digital representation of the surroundings



# Security of Critical Maritime Infrastructure



# Ladar in Action



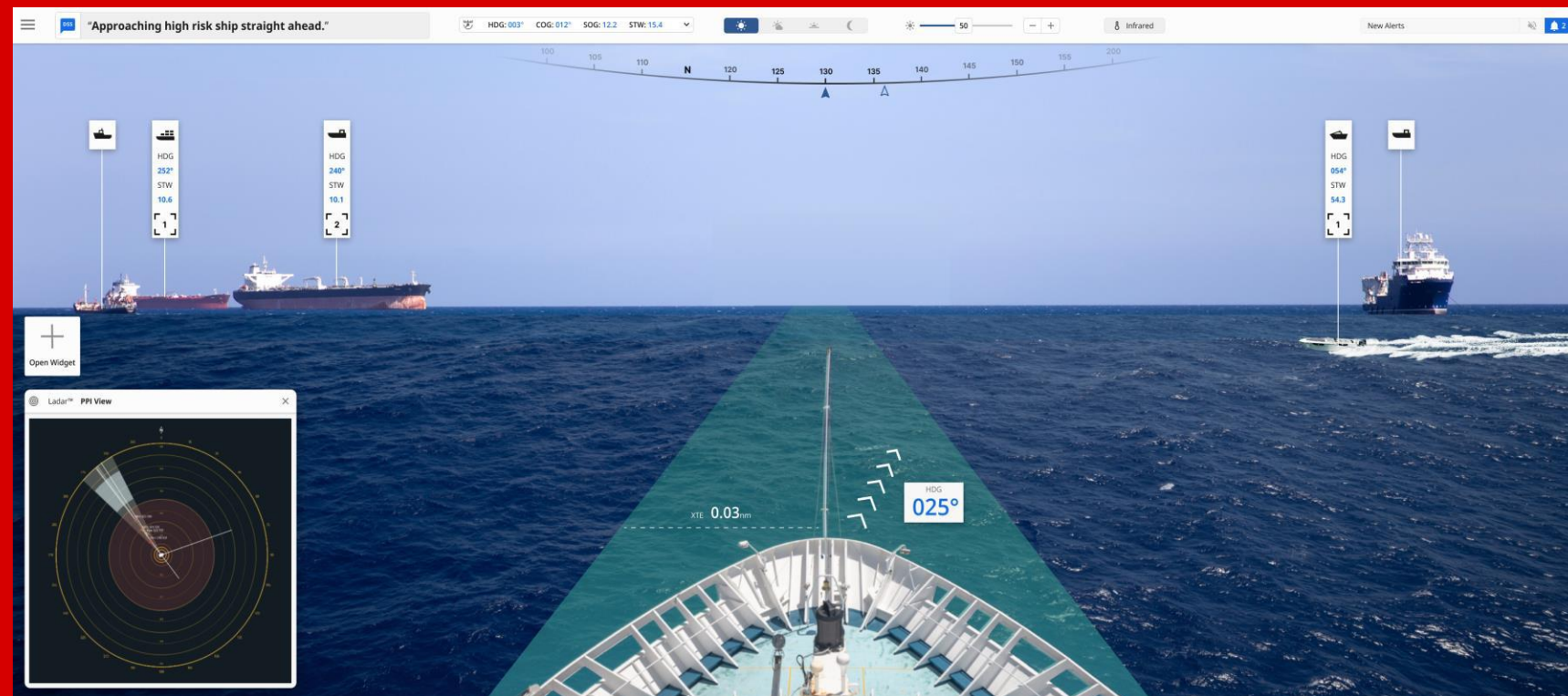


# Software Features

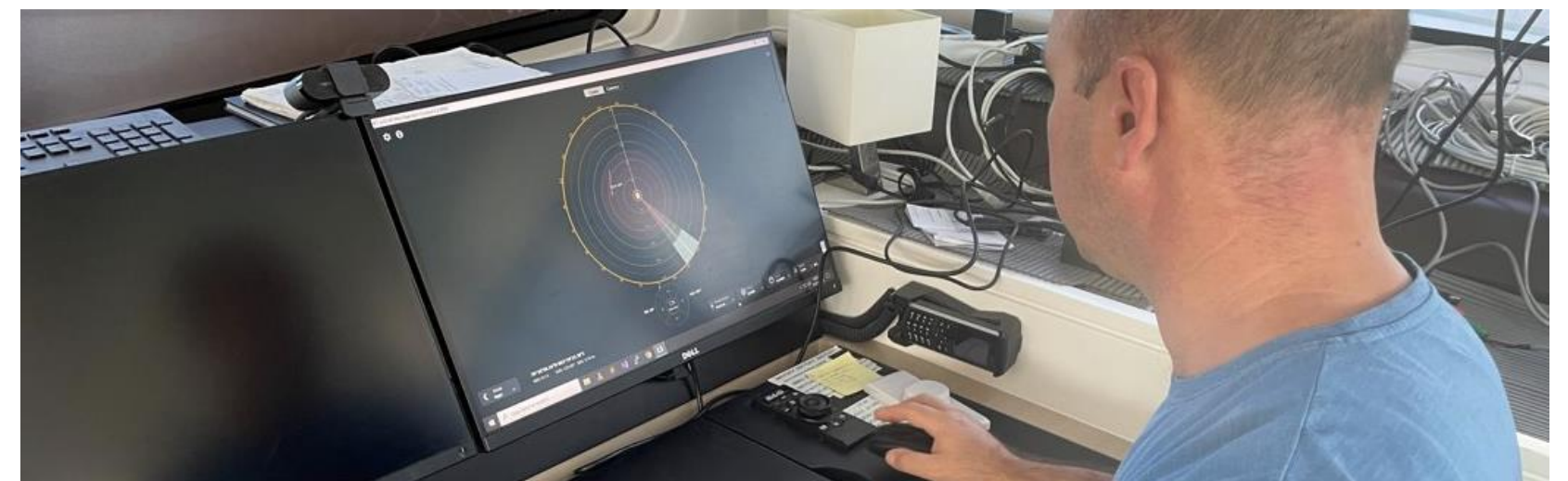
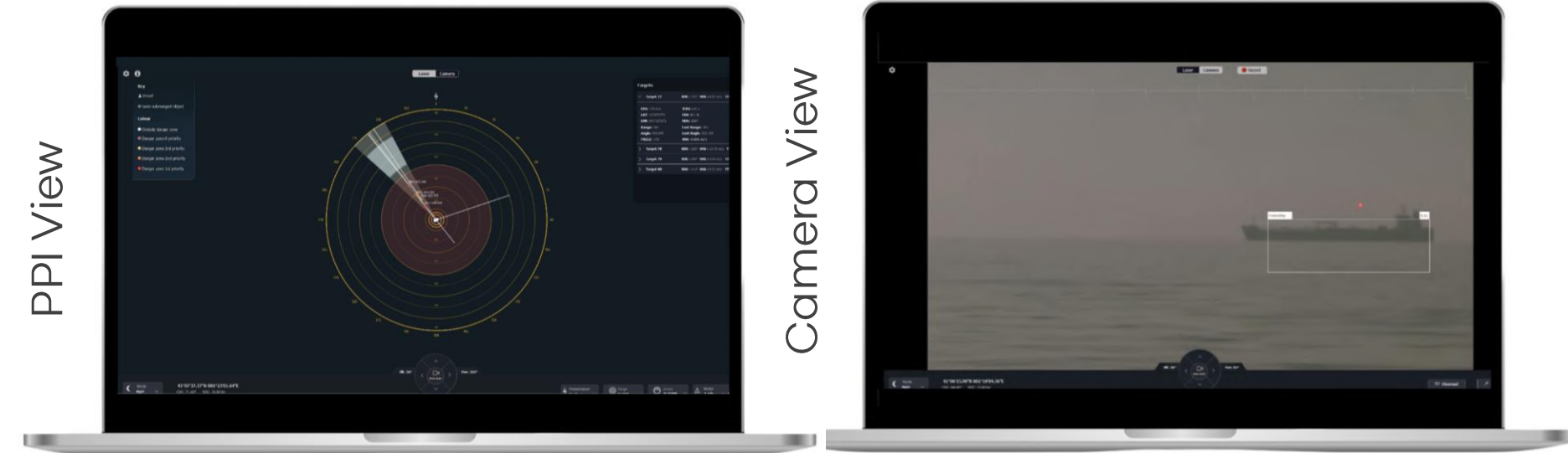
**Multi usage:** Variety of vessels, & can be integrated in other bridge systems

**GUI display** of detected objects which pose a **hazard to vessels** or yachts

Works in **all possible visibility conditions**



Ladar View in a Decision Support System GUI ([SafeNav System](#))



# Product Overview

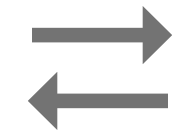
Height  
**35** cm



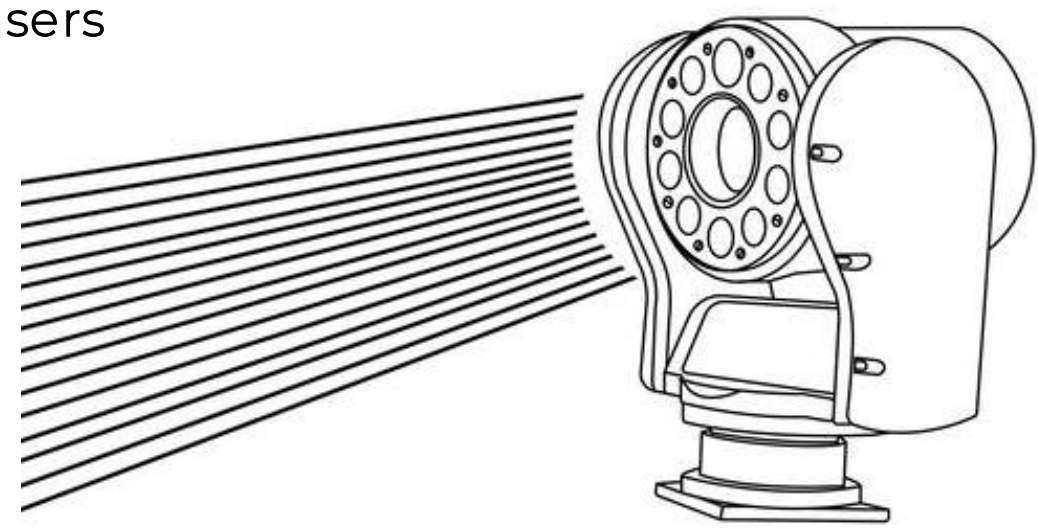
- Visual Camera**
- Laser Transmitters**  
(Tx) (total 8)
- Laser Receiver**  
(Rx)
- Thermal Camera**  
(IR)
- Pan Tilt Unit**  
(PTU)
- Base**

Length **23** cm      Width **26** cm

## 16 Horizontal Lasers



Horizontal Panning



<b>Detection Range</b> (surface targets)	Digital Optical / Thermal cameras: up to 5 nautical miles
<b>Detection Range</b> (semi-submerged / submerged targets)	25-700 meters with the Lidar lasers (depending on height of installation)
<b>Detection depth</b> (submerged target)	Maximum ~5 meters
<b>Azimuth (Pan) scanning</b>	0 - 120° variable, 0 - 100° degrees/sec scan rate
<b>Azimuth (Pan) scan repeat time</b>	2.4 sec minimum/full scan
<b>Elevation (Tilt) scanning</b>	Fixed or -45° to +20° degrees, , 0 - 100° degrees/sec scan rate
<b>Elevation (Tilt) scan repeat time</b>	1.3 sec minimum/full scan
<b>Laser receiver aperture</b>	75 mm, polarized
<b>Laser receiver array</b>	16 elements covering 4.8° (vertically oriented)
<b>Lidar</b>	Laser Product Classification: Class 3R eye-safe per IEC/EN 60825-1: 2014 Wavelengths: Red (800nm) / IR (950nm) / Blue-green (560nm) Horizontal beam width: 1.4 mrad Vertical beam width: 5 mrad (0.3 deg) x 8 beams Integration time: 0.5 ms min, 20 ms typ
<b>Digital Optical Camera</b>	FOV: 18° x 14°, 1920 x 1080 pixels Angular resolution: 0.1 mrad
<b>Thermal Camera</b>	FOV: 18° x 14° Angular resolution: 0.5 mrad
<b>Power Consumption</b>	50 W (Sensor unit) 230 W (Processing unit)
<b>Operating Temperature</b>	-50° to 40° C
<b>Weight</b>	5kg (Sensor unit) 2kg (Processing unit)
<b>Unit housing</b>	Standard IP67, water and dust resistant (EX proof in the future)
<b>Integrated sensors</b>	IMU, Magnetometer, GNSS (AIS, Radar etc. to be integrated in the future)
<b>Integration</b>	AIS, Radar etc. can be integrated in the future

# Company Traction



**50+**

Customer **interviews**  
across 8 countries

**3**

**Letters of intent**

**5**

**Leads in the pipeline**

**40+**

**Requests for order**

# Thank You




**Captain JORGEN  
GRINDEVOLL**

CEO

20+ years of experience in maritime industry, maritime tech inventor, experienced in setting up new start ups and following scale-up of innovative marine technologies



## Contact Us

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