

Are our countries ready staying ahead of
emerging underwater threats ...

... or are the gaps in our detection
systems leaving us exposed?

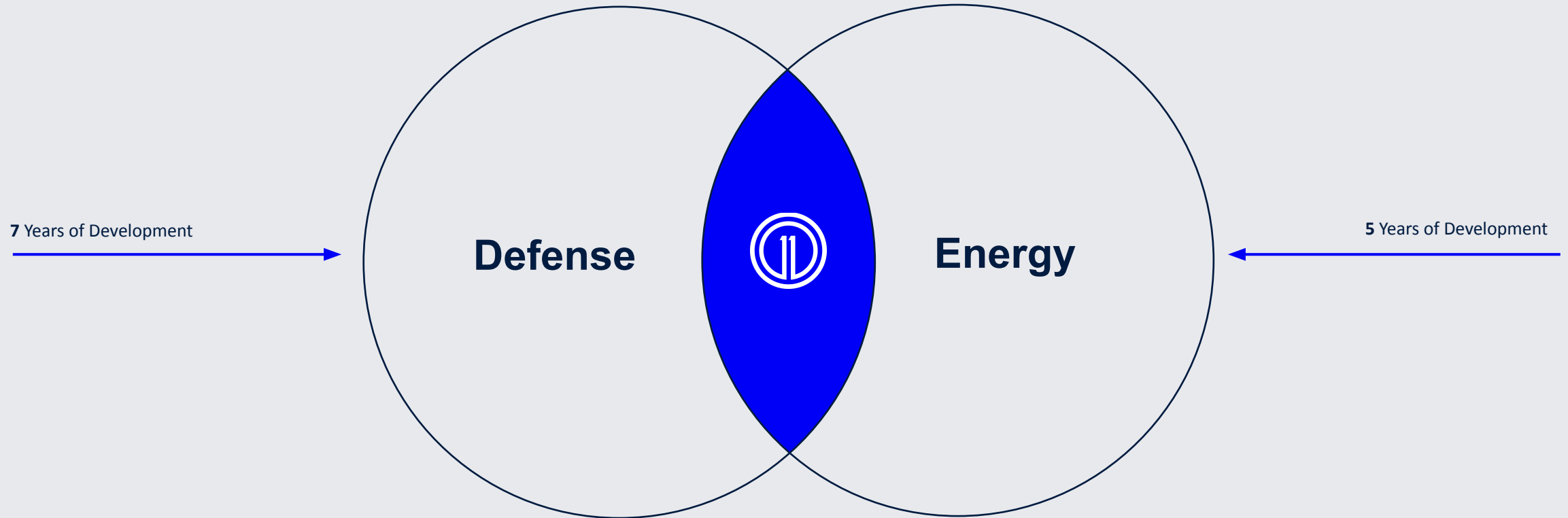


Unleashing the Power of Optical Fiber Sensing for ASW and Underwater Warfare



→ Mark Jacobs, CCO
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Optics11: Defending Offshore Energy, Empowering a Sustainable Europe.



Our Partners



Ministerie van Defensie



Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat



A satellite view of Earth showing the continents of Europe, Africa, and Asia. The image is taken from a high angle, showing the curvature of the planet and the dark blue of the oceans. The landmasses are covered in green vegetation and brown/tan urban and agricultural areas.

The Challenge

The Challenge



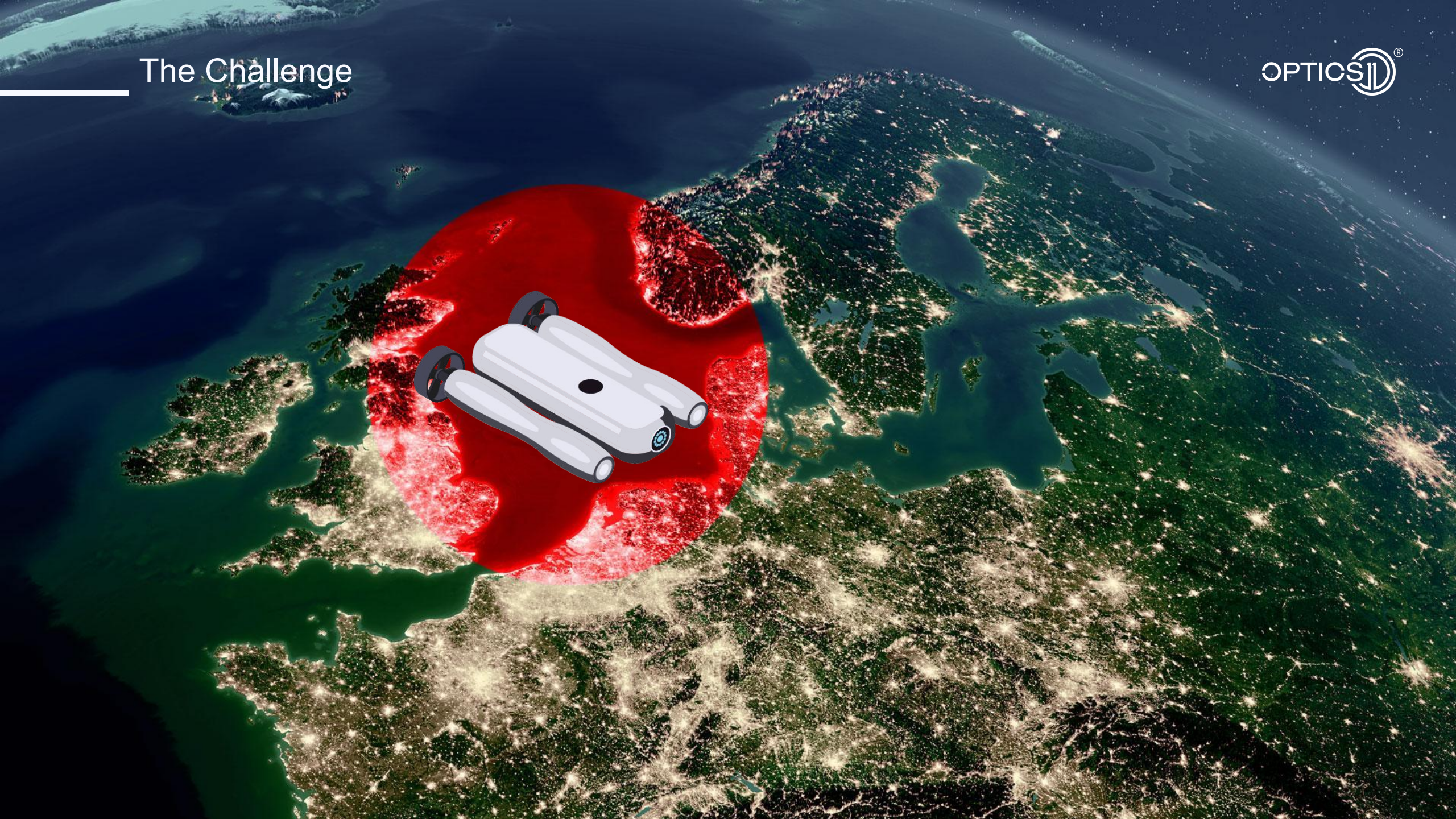
The Challenge



300 GW

10x till 2050

The Challenge



The Challenge

“ North Sea infrastructure, including turbines and undersea cables are prone to sabotage or to espionage and the topic is an extremely important one”



Alexander De Croo
Prime Minister of Belgium

EU SUMMIT: <https://www.france24.com/en/europe/20230424-european-summit-aims-to-scale-up-wind-energy-production-in-north-sea>

The Challenge

Europe

Europeans wade into fighting seabed threats with drones and sensors

Monday, Jan 9

By Staff

What is hybrid warfare? Inside the centre dealing with modern threats

6 February

REUTERS

Europe

European countries aim to turn North Sea into green power engine

By Kate Abnett

Royal Navy and NATO sharpen their ability to hunt submarines in the North Atlantic

10 May 2023



Strong underwater explosions in the Baltic Sea ripped gaps between Denmark and Sweden

NATO exercises to defend against threats to critical underwater infrastructure

By Imane Rachidi | EFE/Reykjavik | Est. 3min

10 May 2023

Since 24 April, NATO has mobilized 1,800 people and 12 ships, including the Alvaro de Bazan frigate, for "intense and challenging training" in a 200,000 square-mile area in the North Atlantic. [EPA/MARIT HOMMEDAL]

EURACTIV is part of the Trust Project >>>

An underwater scene showing a dark submarine on the left, moving towards the right. Sunlight rays penetrate the water from the surface, creating a bright, shimmering effect. The water is a deep blue color.

**How can we
transform
underwater
surveillance?**

The Solution

OPTICS II[®]

OPTICS II[®]

An aerial satellite-style view of the Earth, showing the Americas, Europe, and Africa. A large, semi-transparent blue circle is overlaid on the Atlantic Ocean, centered between North and South America. Inside this blue circle, the text "OPTICS II" is written in white, with a registered trademark symbol (®) to the upper right of the "II". The background shows the green and brown textures of the continents and the dark blue of the oceans, with city lights visible at night.

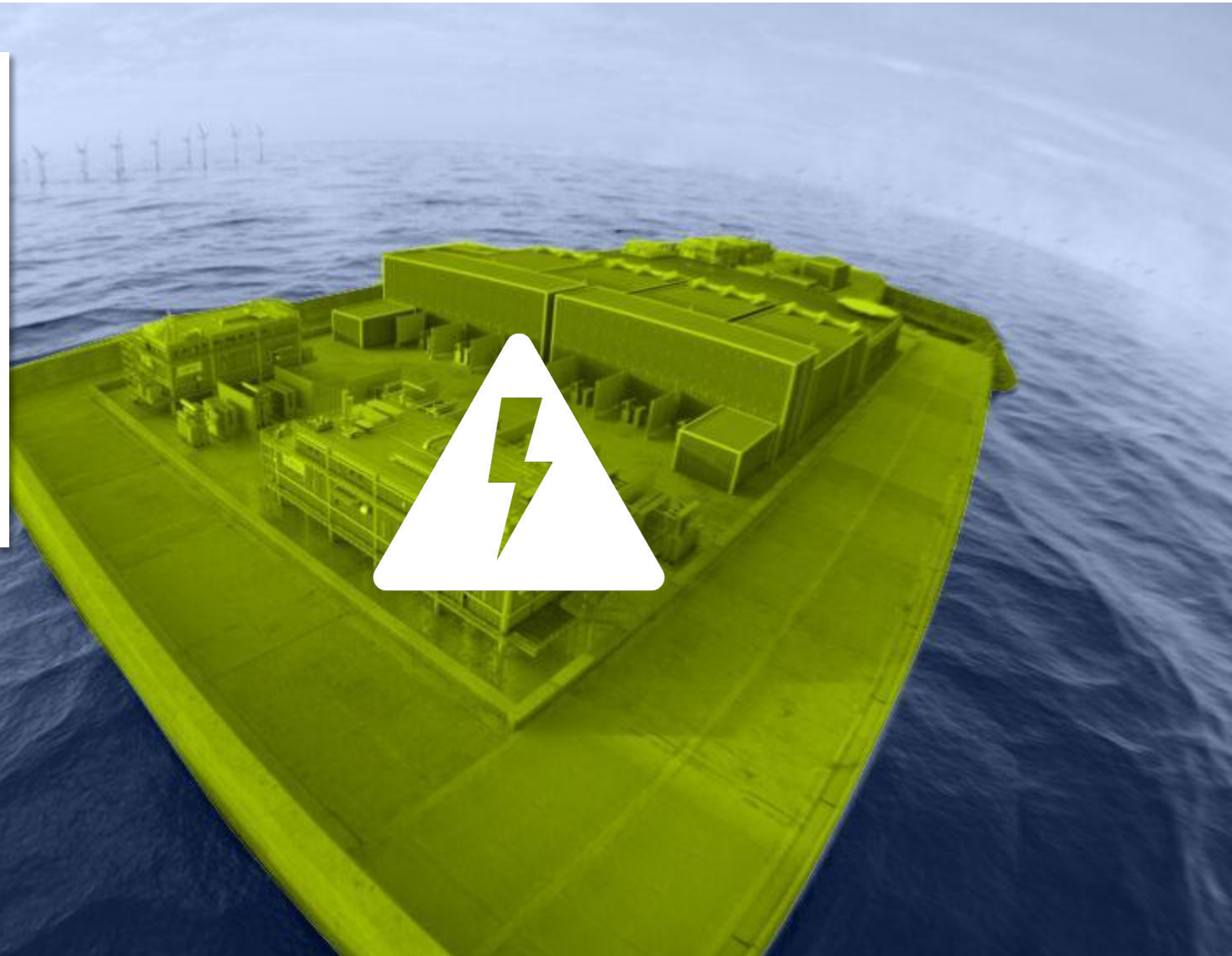
The Solution

For Offshore
Energy
Infrastructure

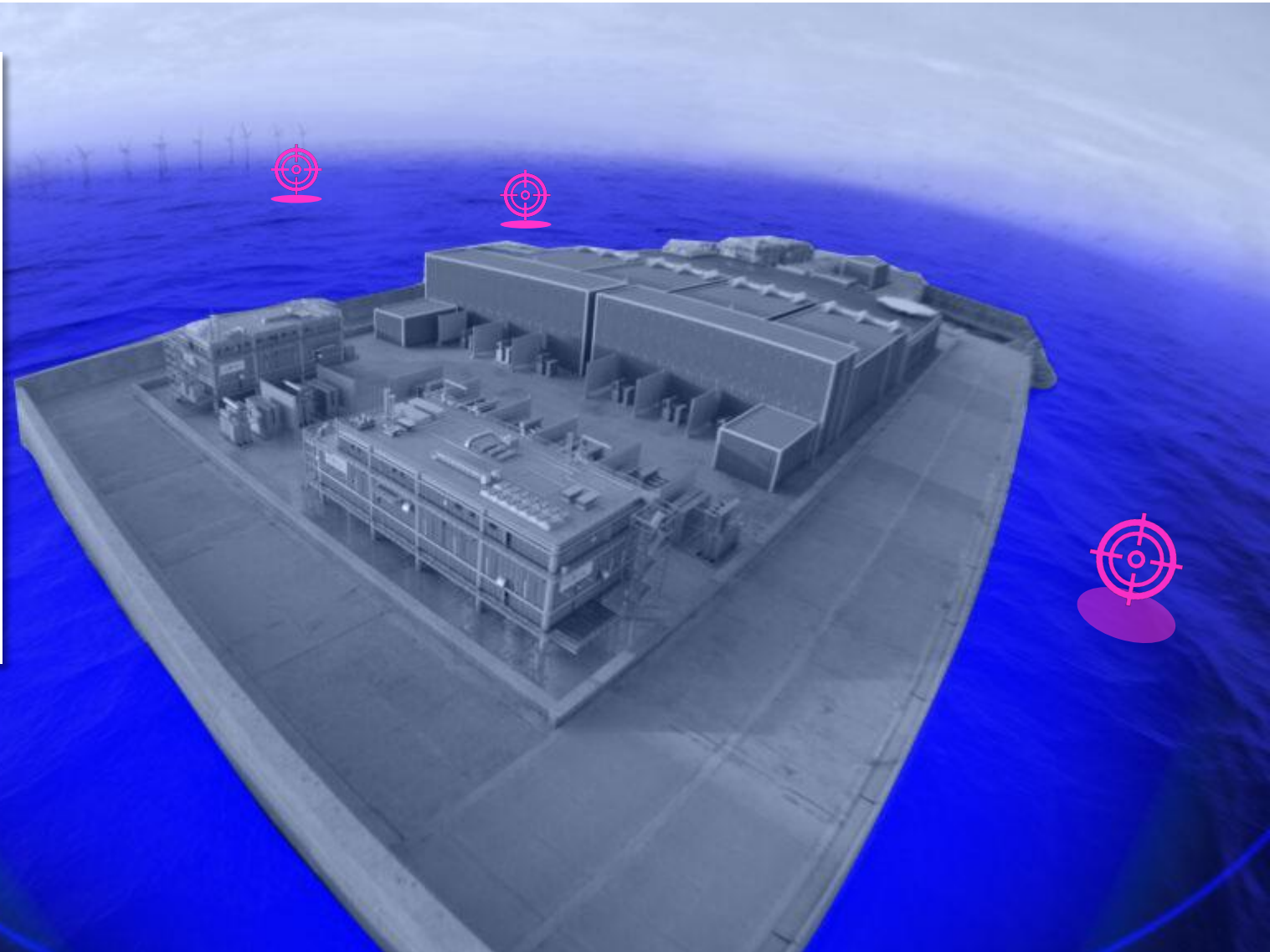
Princess Elisabeth
Energy Island

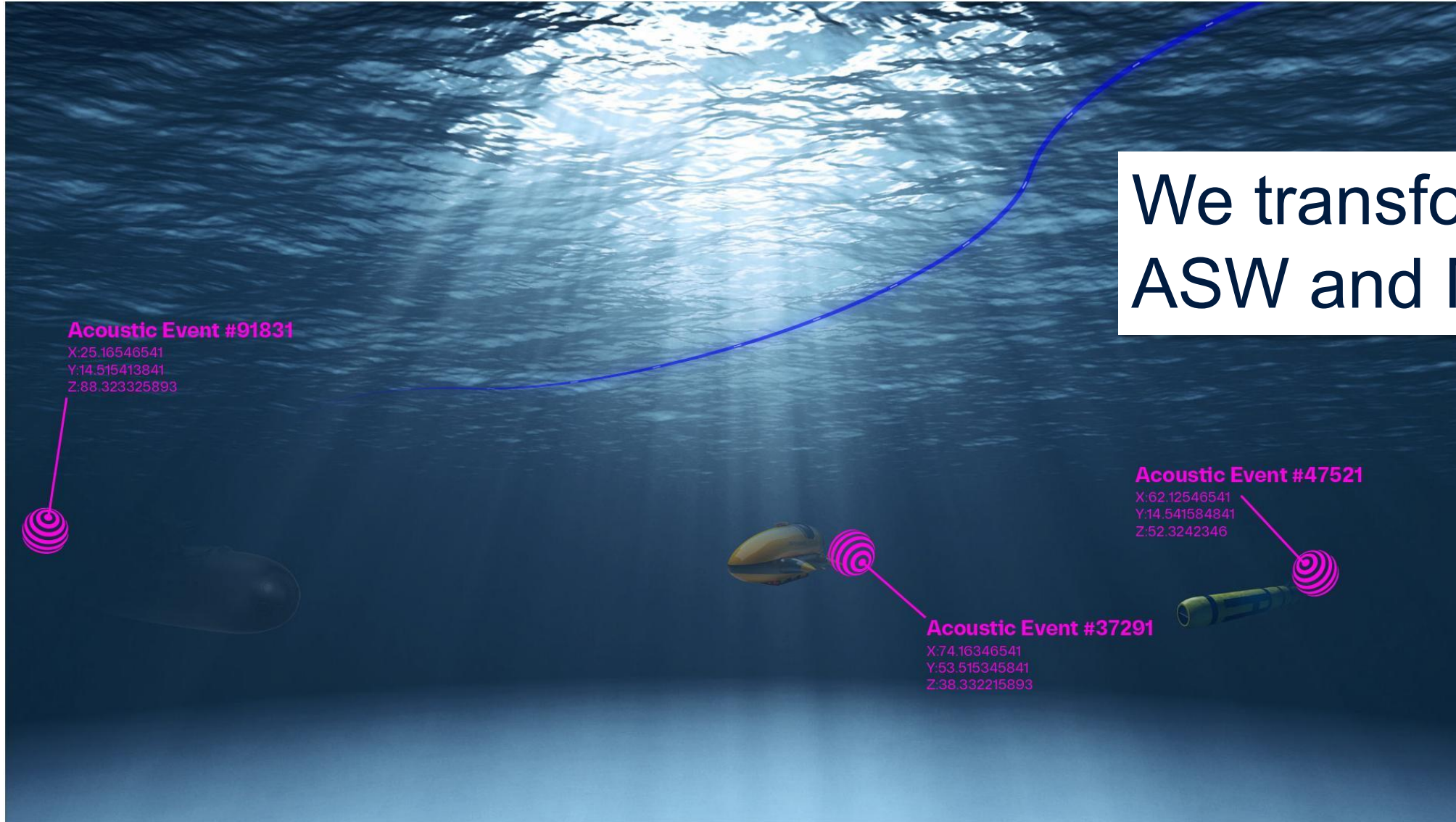


**We Protect the
Civil Energy
Infrastructure ...**



... and Help
Navies to
localize
Threats
Underwater.





We transform
ASW and MCM

Acoustic Event #91831

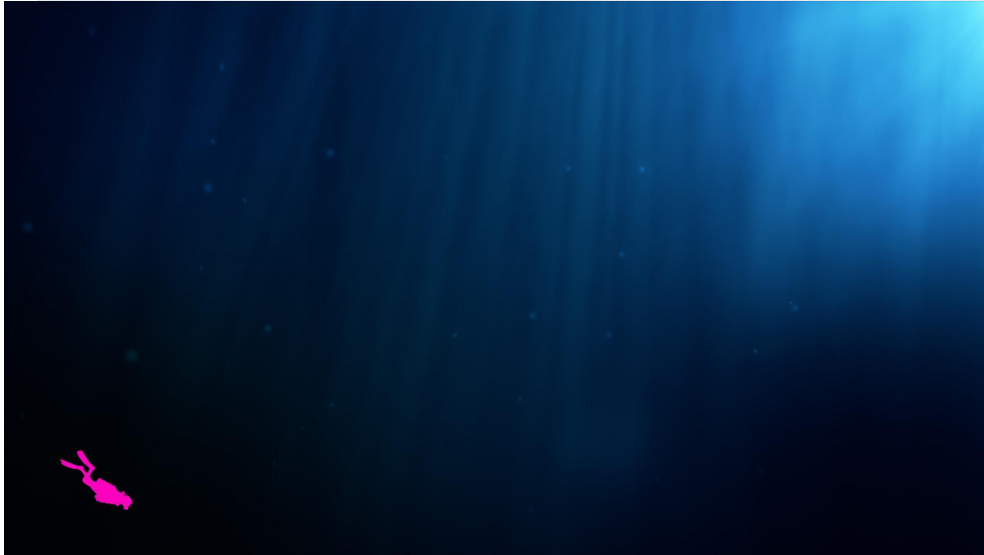
X:25.16546541
Y:14.515413841
Z:88.323325893

Acoustic Event #47521

X:62.12546541
Y:14.541584841
Z:52.3242346

Acoustic Event #37291

X:74.16346541
Y:53.515345841
Z:38.332215893



We can **hear**,
where others can not.

In **situations**,
when others can not.



We use light to listen.

①

Immune to interference

Optical signals do not interfere with other systems, as well is not influenced by others

②

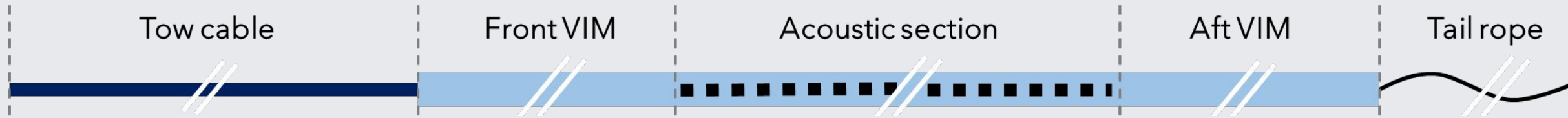
Small dimensions

Miniature sensors can be embedded in a thin line reelable array

③

Long distances

Acquisition unit and hydrophone section can be spaced kilometers apart



④

No local power

There is no local power required in the array

⑤

Challenging environments

Sensors can withstand liquids, extreme temperatures, corrosive environments and more

⑥

Long Lifetime

Sensors and cabling will last a lifetime without maintenance

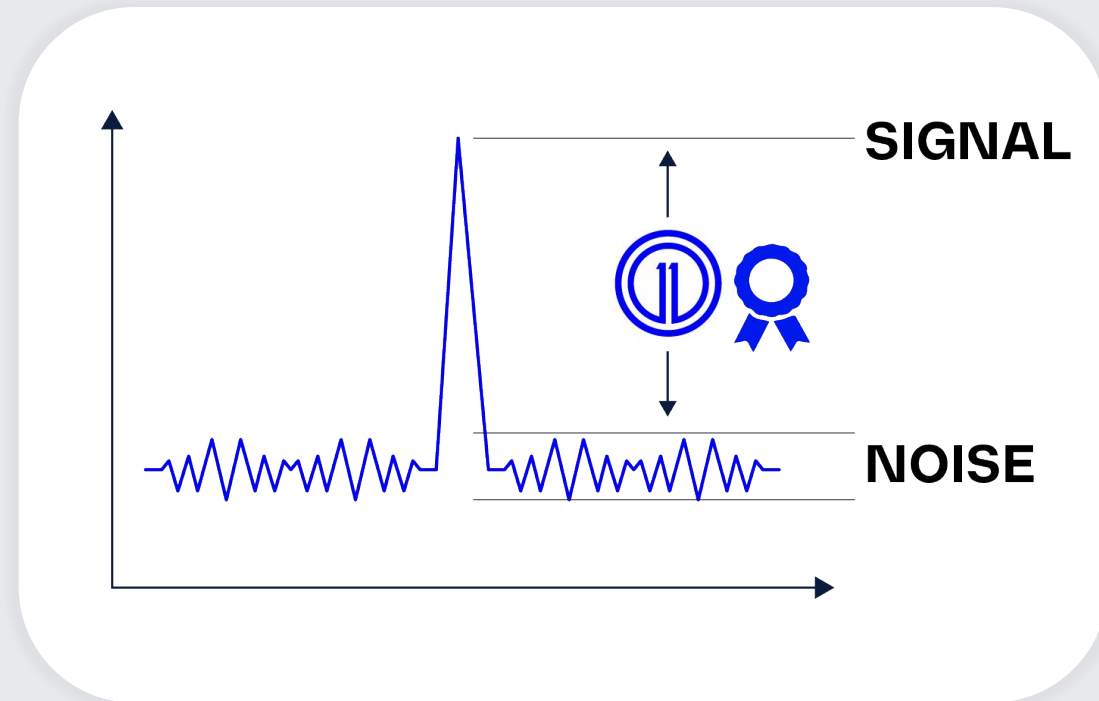
⑦

Flexible multiplexing

100s sensors can be endlessly daisy chained to thin fiber cables

Why Optics11?

1. **Best signal-to-noise ratio**
(extremely sensitive)
2. **Unique** capabilities for **dynamic** as well as **static applications**





We produce the **smallest optical hydrophones** in the world.

-because size matters-

Capabilities

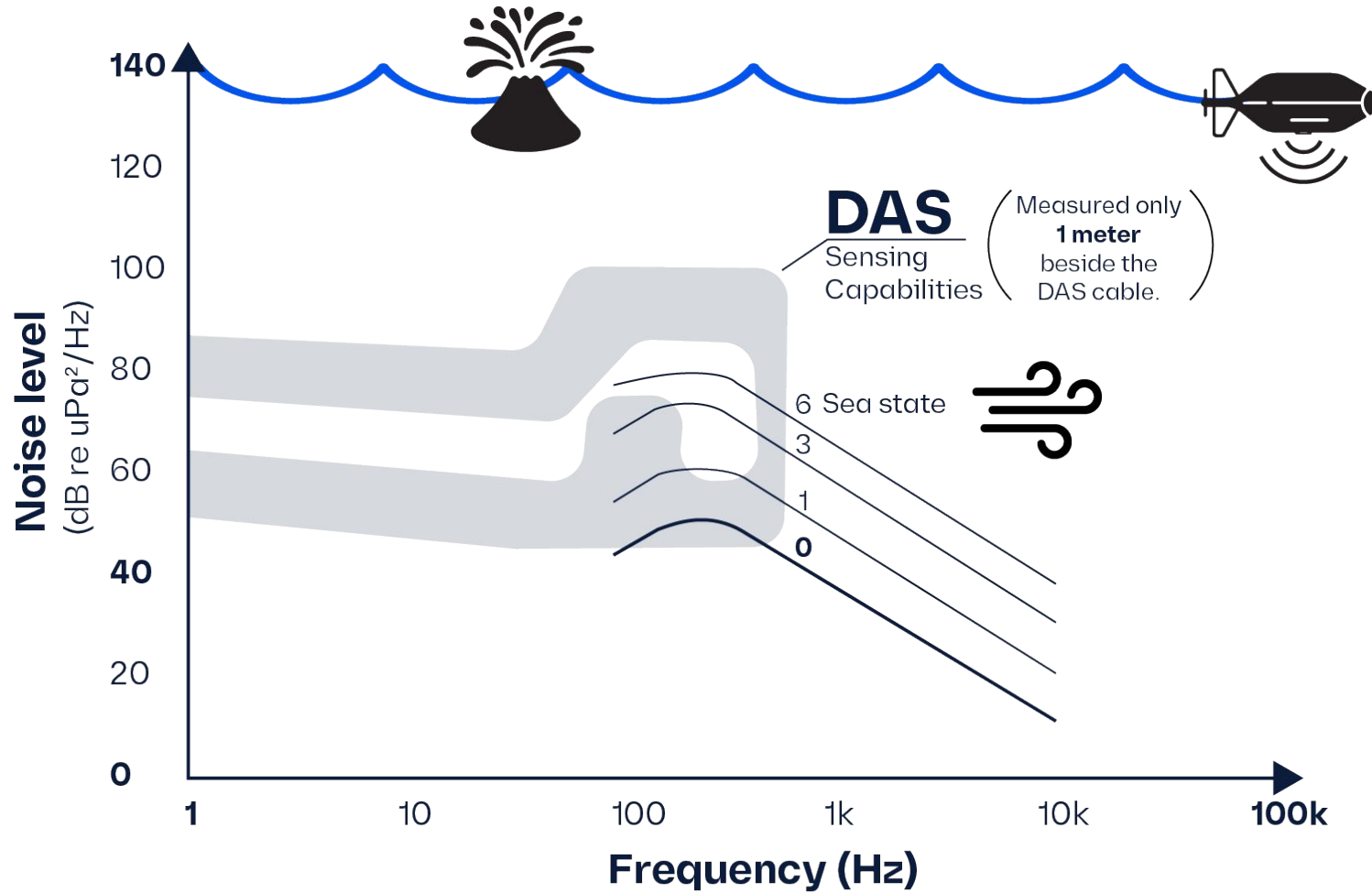


OTADES - Optical Towed Array Detection System

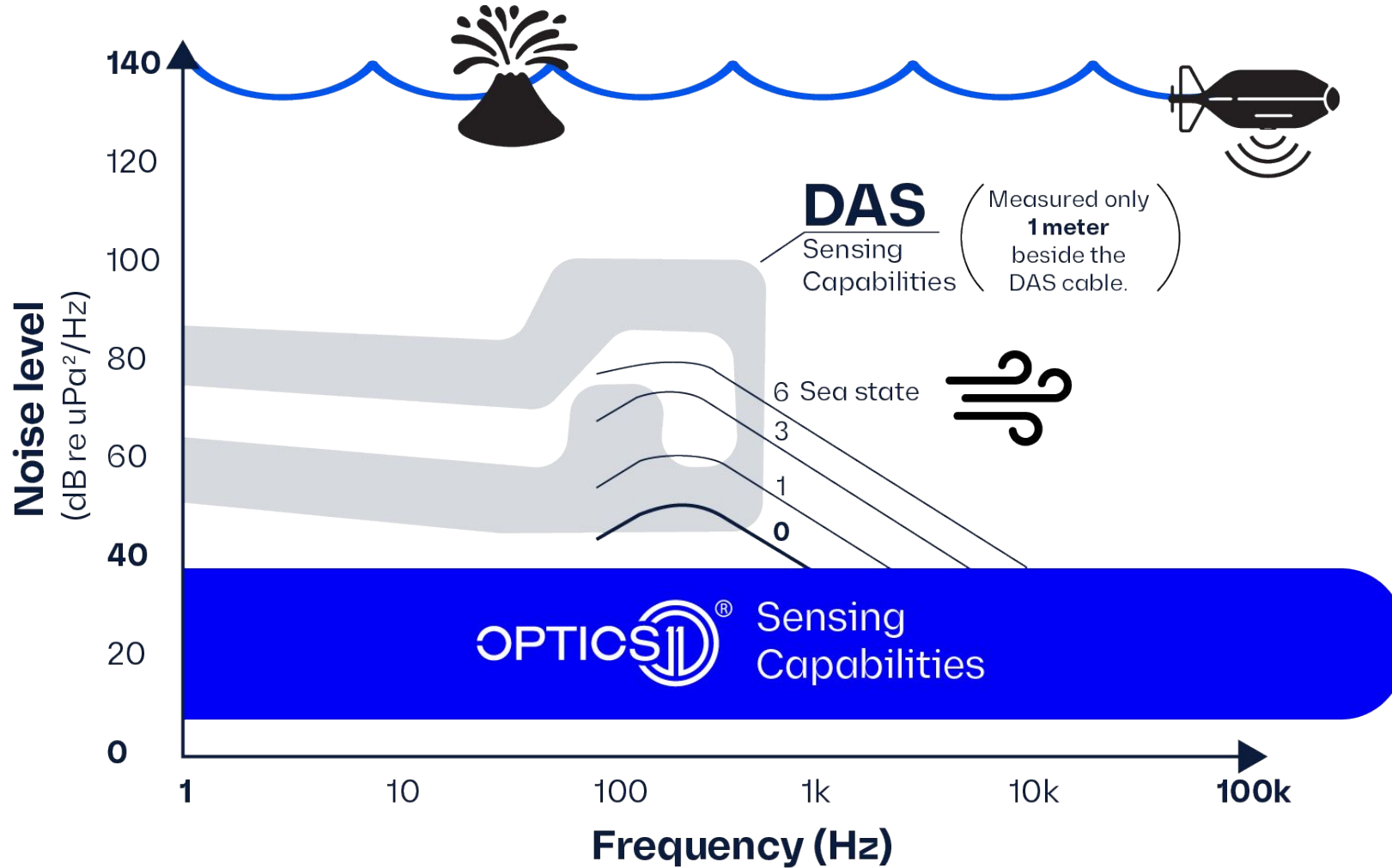
- **Thin form factor** – winchable / low drag / small footprint
- **hundreds of sensors**; long length array
- High towing speed (**>25 knts**)
- **Simple, robust** and elegant design
- **More economical** (as investment as well as in lifetime)



Distributed Acoustic Sensing (DAS) vs. OTADES

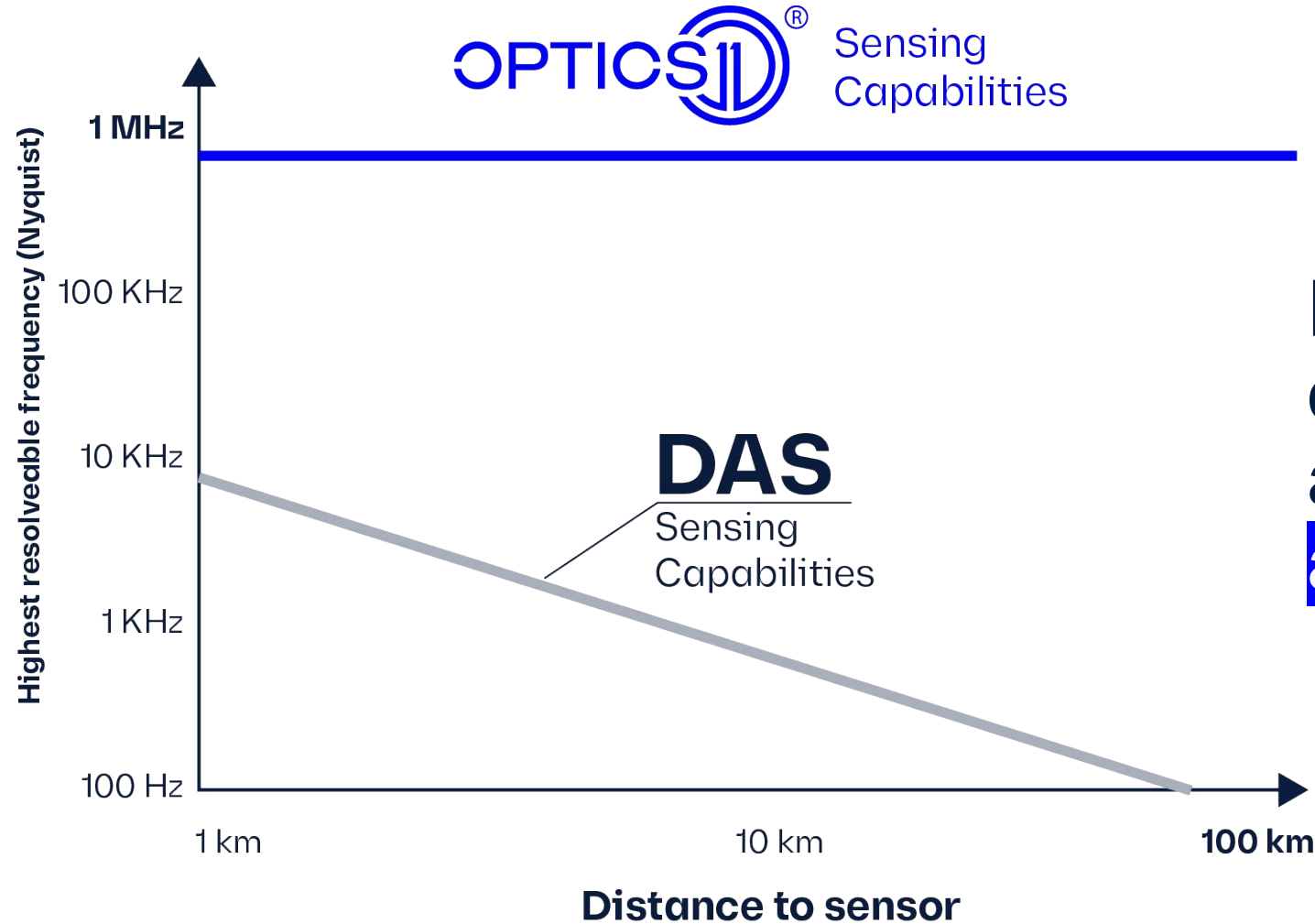


Distributed Acoustic Sensing (DAS) vs. OTADES



Extremely low noise floor.

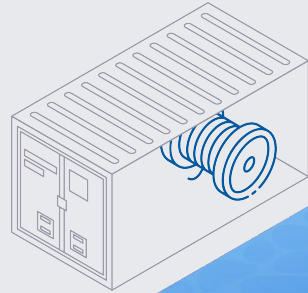
Distributed Acoustic Sensing (DAS) vs. OTADES



Enables tracking of shipping and active sensors at >100km

Surface Vessels

- No permanent installation
 - “ASW in a box”
- Very long arrays are possible

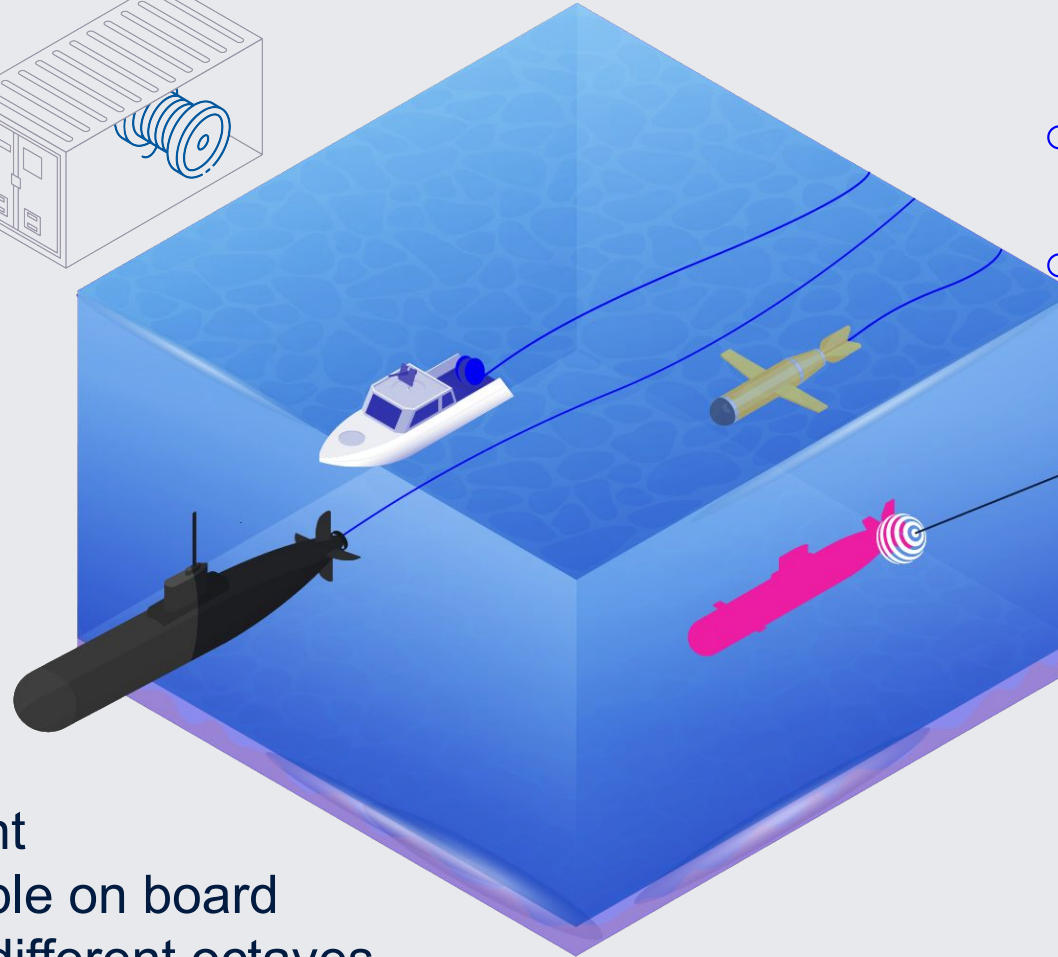


Unmanned Vessels

- Low drag, weight & Power use
- Small footprint

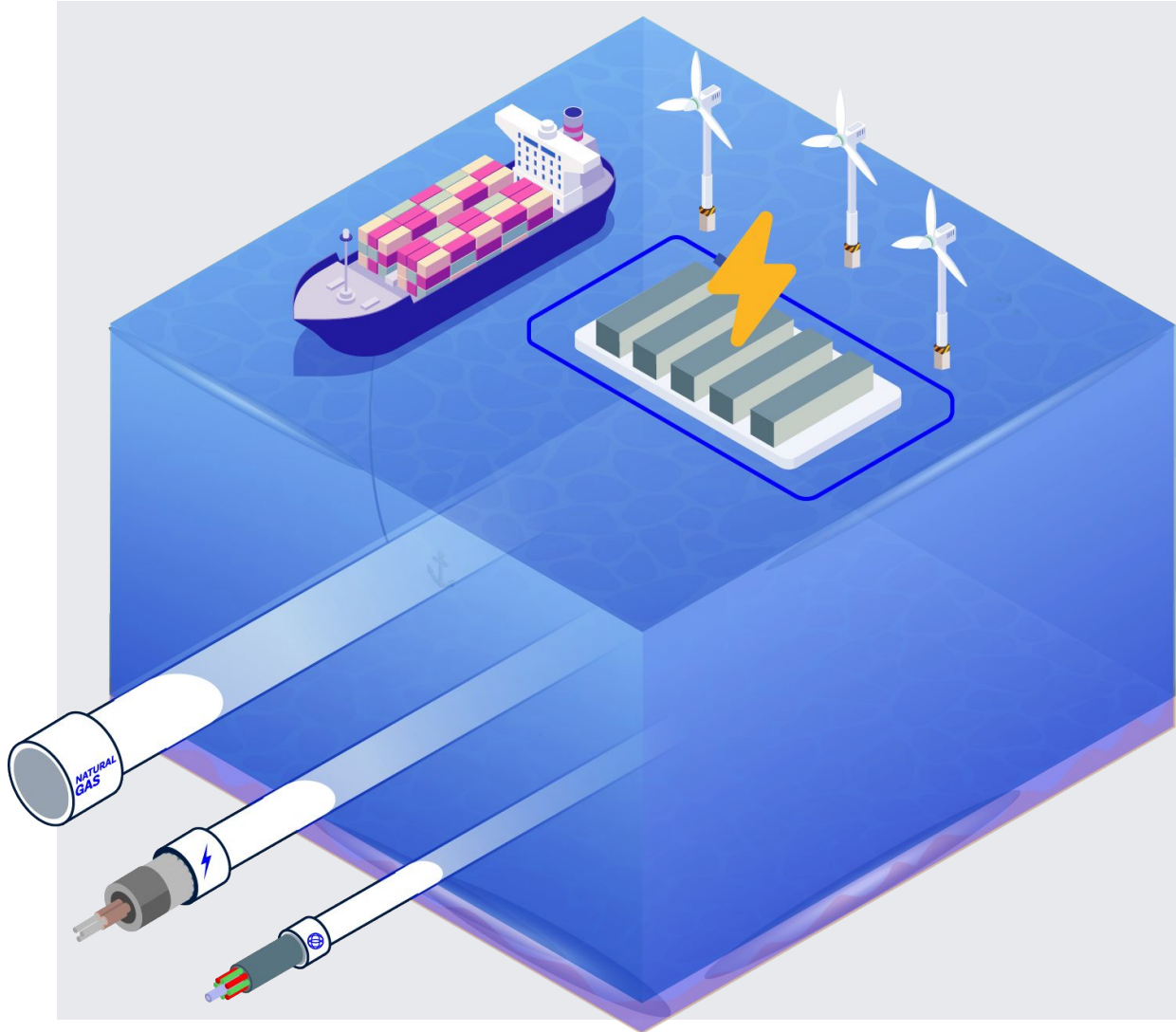
Submarines

- Flexibility in deployment
 - Winchable /Stowable on board
- Many hydrophones in different octaves



Acoustic Event #8823

X:35.16546541
Y:54.51584841
Z:98.32215893

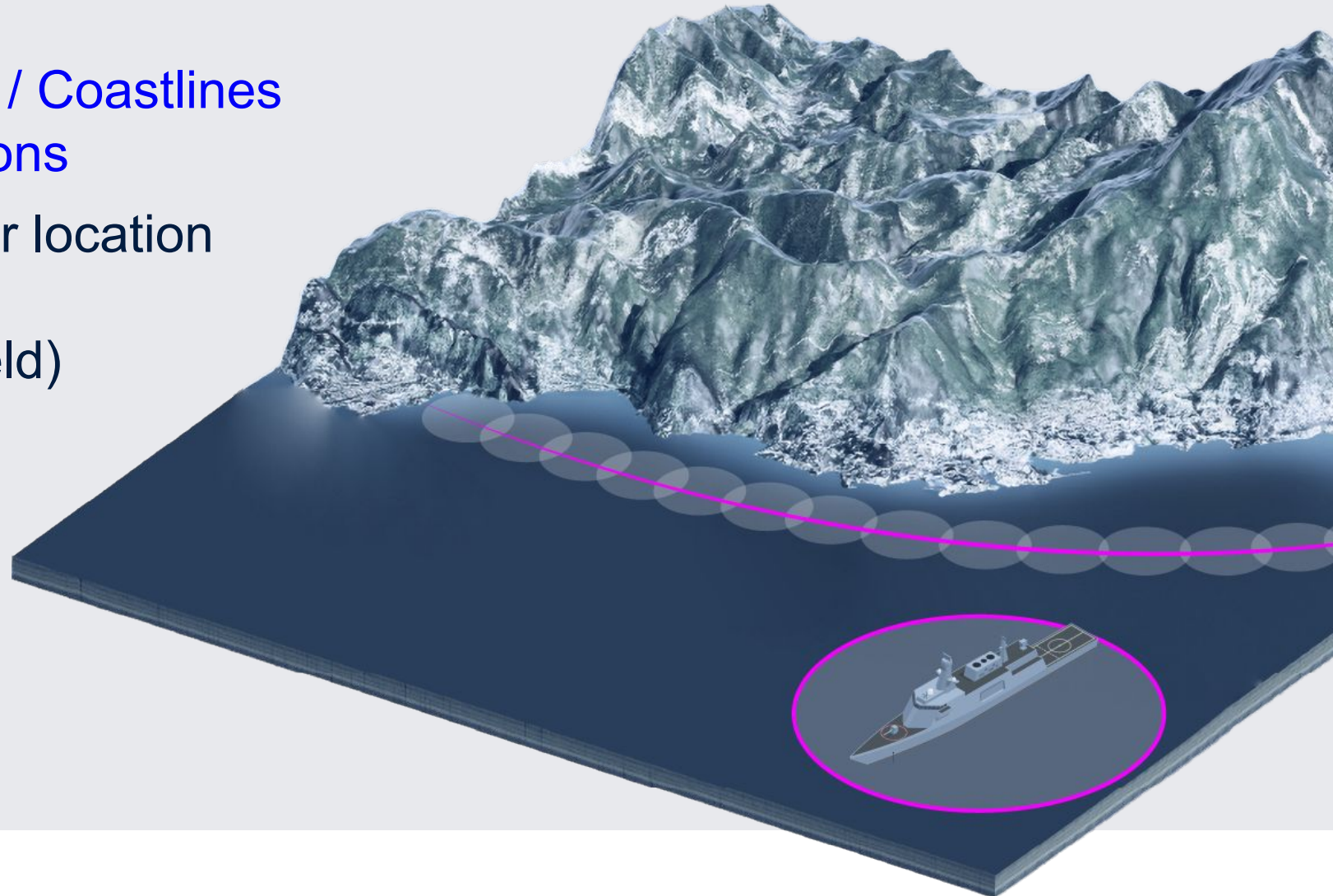


Surveillance for Critical Energy Infrastructure and Energy Islands

- No local power at sensor location
- Cover long distances
- Undetectable (no EM field)
- Relatively simple installation

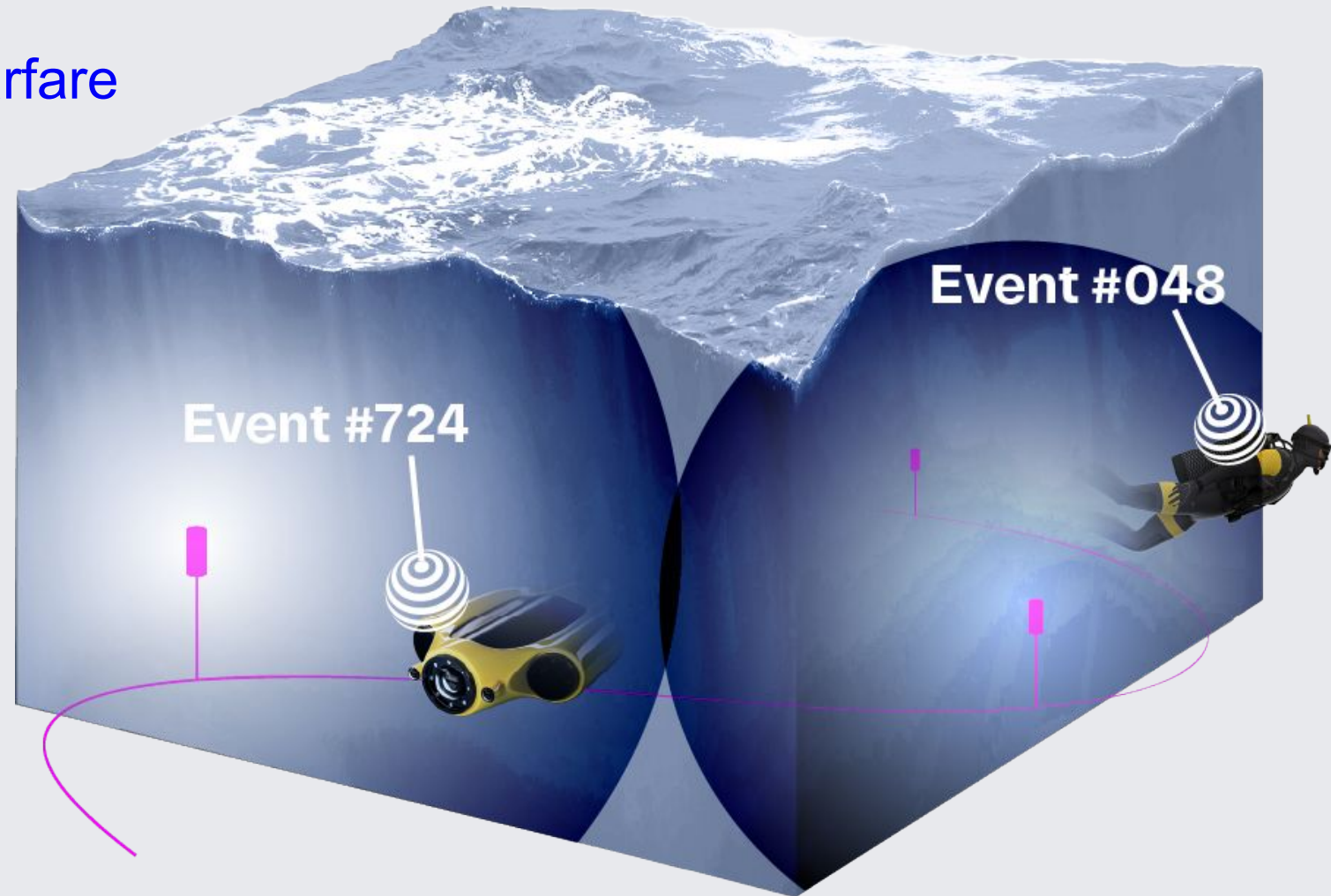
Surveillance for Harbors / Coastlines and Expeditionary Missions

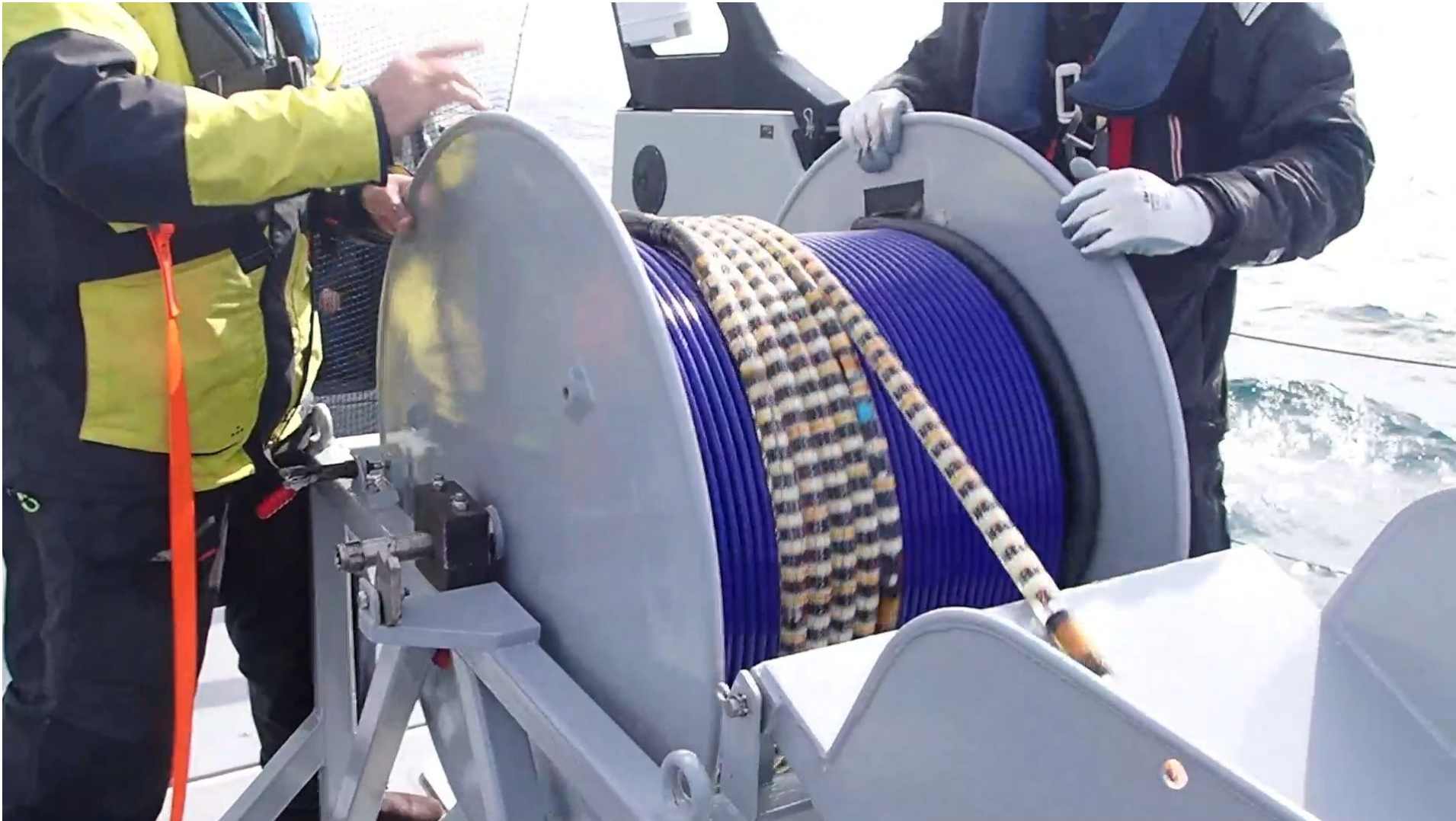
- No local power at sensor location
- Cover long distances
- Undetectable (no EM field)
- Fast to deploy /retrieve

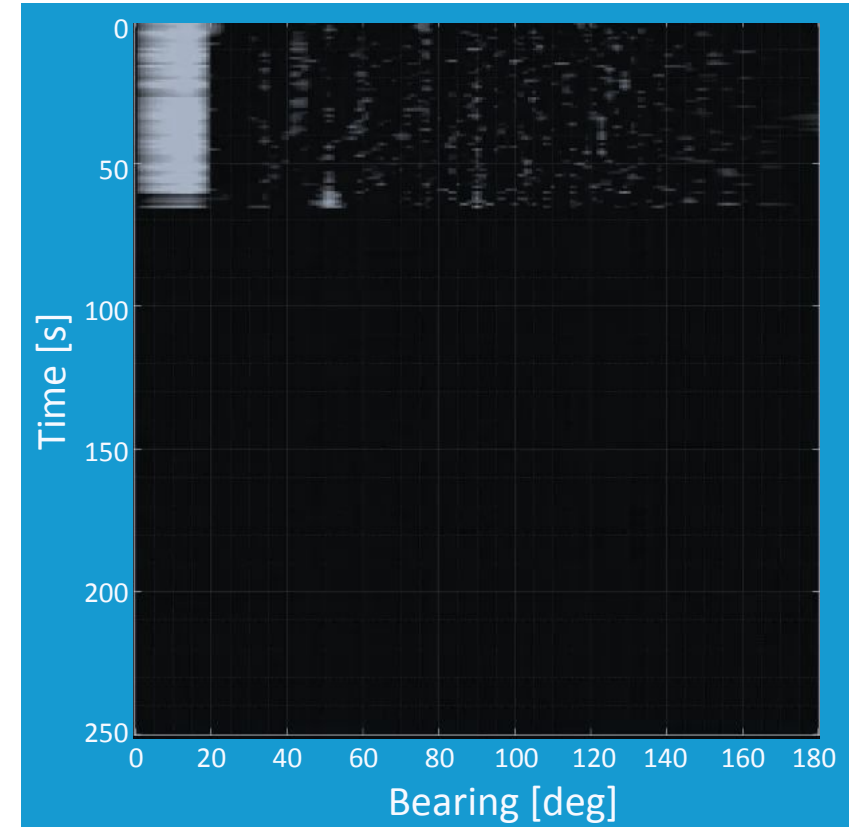


Surveillance for Seabed warfare

- Perimeter & barrier monitoring
- Sensors < 1000m apart
- Main fiber on/in seabed
- Sensors elevated to avoid damping by ground







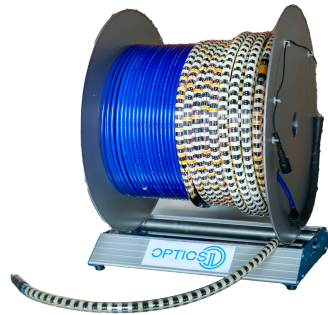


OTADES

Our answer to
today's and tomorrow's
challenges.



Thank You!



Download the presentation and
visit us at Stand E29!

Get the vCard

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mark.jacobs@optics11.com