



POSEIDON

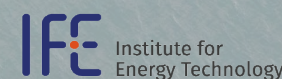
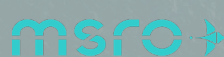
Pollution Observation from Space:
Environmental Imaging for
Detections in the Oceans & Nearshore

Earth Observation and Artificial Intelligence for Maritime Pollution Detection, Monitoring and Compliance

Georgia Karadimou, KSAT

Senior Project Manager, MSc Geologist

Environmental Crimes Workshop – 1 October 2026, ESRIN



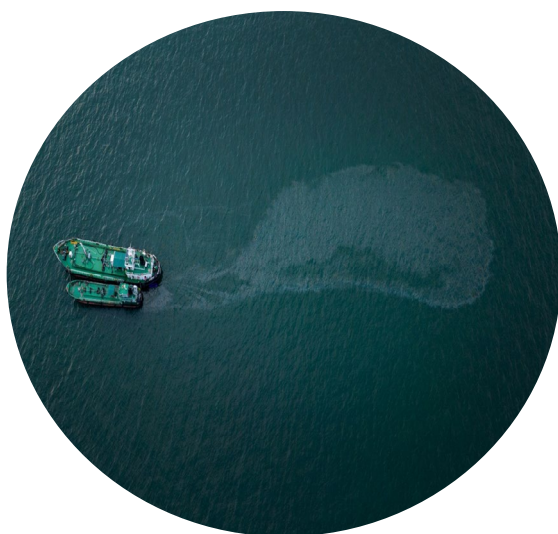
This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101296478.

The POSEIDON project

Our goal:

CLUSTER - 4 | 5 M EUR | June 2026 - May 2029

Leverage optical and radar-based satellite technology for improving services that can identify & detect...



Oil spills
(including sea ice
conditions)



Vessels and methane
emissions



Chemicals, sewage, garbage,
emissions, and other
pollutants

...released from vessels

Expected outcomes

- Improvement and wider implementation of AI algorithms for detection of oil spill type in terms of Bonn identification codes and in compliance with MARPOL
- Increased maritime pollution detection and characterisation with reduced errors
- Improved analysis of wider and more remote areas with complex sea conditions
- Enhanced forecasting of potential spill/pollution conditions that support faster maritime authorities/safeguards response
- Development of oil spill and pollution regulations
- Attribution of pollution source (oil, methane, garbage) to single vessel source

Impact

- **Industrial/Economic**
 - Innovative processing
 - Application across different regions
 - Improved support to decision making
- **Scientific**
 - Cross Disciplinary R&D and innovation activities (publications and conferences)
 - New knowledge related to AI in satellite remote sensing
- **Environmental**
 - Ocean pollution monitoring
 - Improved incident management
- **Societal**
 - Environmental benefits and improvement of public awareness of satellite based imaging and ocean protection research through open science practices and communication

The POSEIDON partners

KSAT
KONGSBERG
KONGSBERG SATELLITE SERVICES

 **CLEAN OCEANS**

IFE Institute for Energy Technology

EOMAP

 **GHGSAT**

fugro


hcmr
ΕΛΚΕΘ

msro

KIOST
KOREA INSTITUTE OF
OCEAN SCIENCE & TECHNOLOGY



서울대학교
SEOUL NATIONAL UNIVERSITY

KOPRI
Korea Polar Research Institute

Partners expertise/involvement



Coordination
Oil spills
Vessels
Business
AI



Business
AI



Water quality
Sewage
Marine Litter
Business
AI



Water quality
Sewage
Marine Litter
Business
AI



Vessels
Methane
Business
AI



Oil spills
Sea ice
AI



서울대학교
SEOUL NATIONAL UNIVERSITY

Oil spills
Sea ice
AI



Institute for
Energy Technology

Water quality
Sewage
Marine Litter
Business
AI



Water quality
Sewage
Marine Litter
Oil Spills
Methane
Business
AI



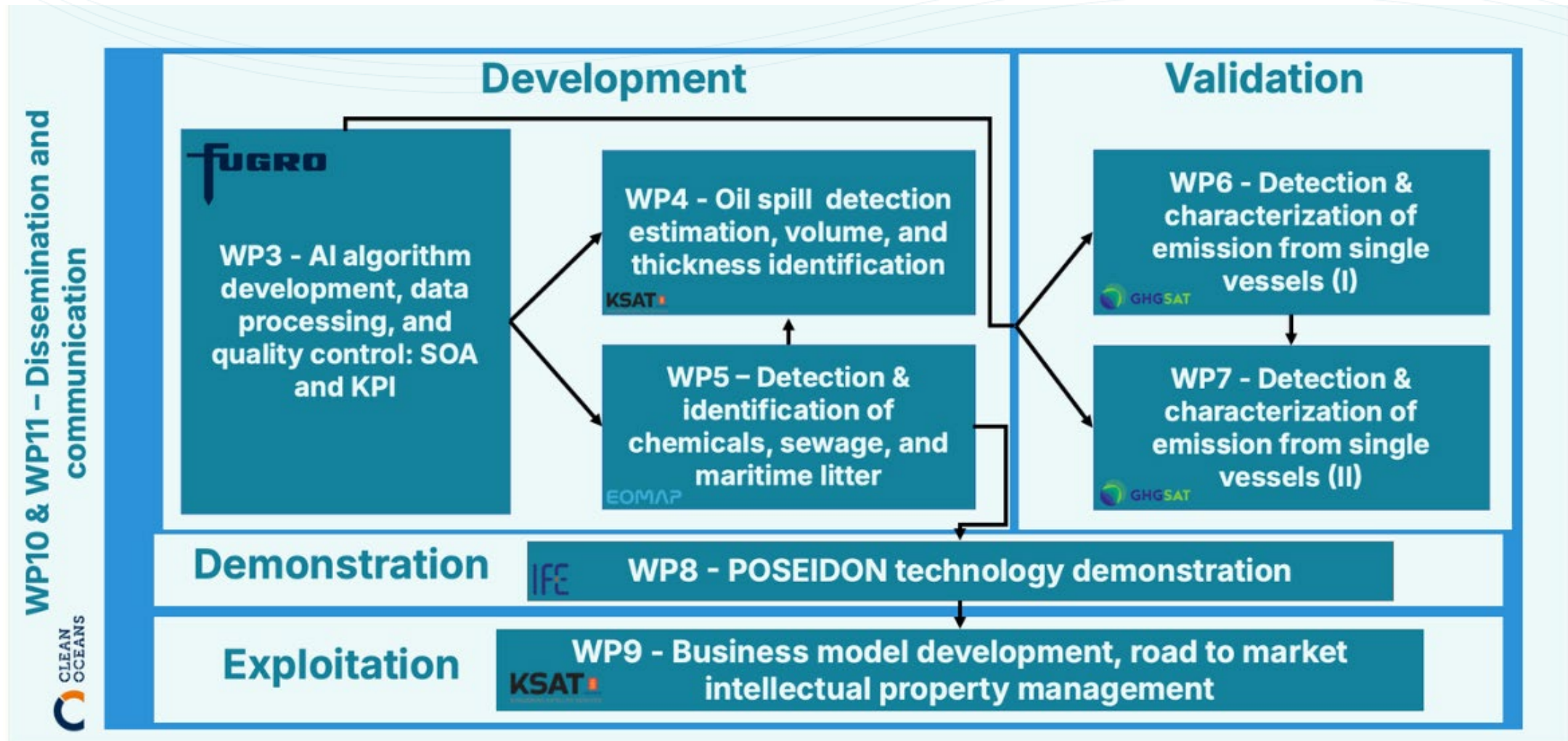
Communication
Dissemination
Business
AI

Work Packages, Deliverables, Milestones

WP	WP name	Short name	Start Month	End Month
1	Project Management I	KSAT	M1	M12
2	Project Management II	KSAT	M13	M36
3	Algorithm Development Data Processing and Quality control: State of the Art + KPIs	Fugro	M1	M36
4	Oil spill detection, estimation of volume and thickness, identification	KSAT	M1	M36
5	Detection of ship-based chemicals, sewage and maritime litter	EOMAP	M1	M27
6	Detection and attribution of emissions from single vessels I	GHGSat	M1	M18
7	Detection and attribution of emissions from single vessels II	GHGSat	M18	M30
8	POSEIDON Technology Demonstration	IFE	M13	M36
9	Business model development, road to market and Intellectual Property Management	KSAT	M1	M36
10	Communication and Dissemination and Stakeholder engagement I	Clean Oceans	M1	M12
11	Communication and Dissemination and Stakeholder engagement II	Clean Oceans	M13	M36

31 Deliverables: 17 Public, 14 Sensitive - 7 Milestones

Complementarity of WPs



Technical Objectives:

Oil spills

Vessels and methane emissions

Chemicals, sewage, marine plastics, water quality

Technical objectives – Oil spills

- Develop robust technologies and methodologies for oil spill detection and characterization
- Improve AI-based methods for detecting oil spills and estimating spill volume and relative thickness
- Adopting and further develop AI methods for oil spill detection in sea ice conditions
- Develop and refine drift models to reconstruct past spill trajectories and predict future spread under varying environmental conditions
- Define the data requirements and standards needed for reliable oil spill detection and drift monitoring across diverse marine environments
- Establish a robust ground-truth dataset for AI model training and validation through in-situ sampling and validation campaigns in selected use-case regions

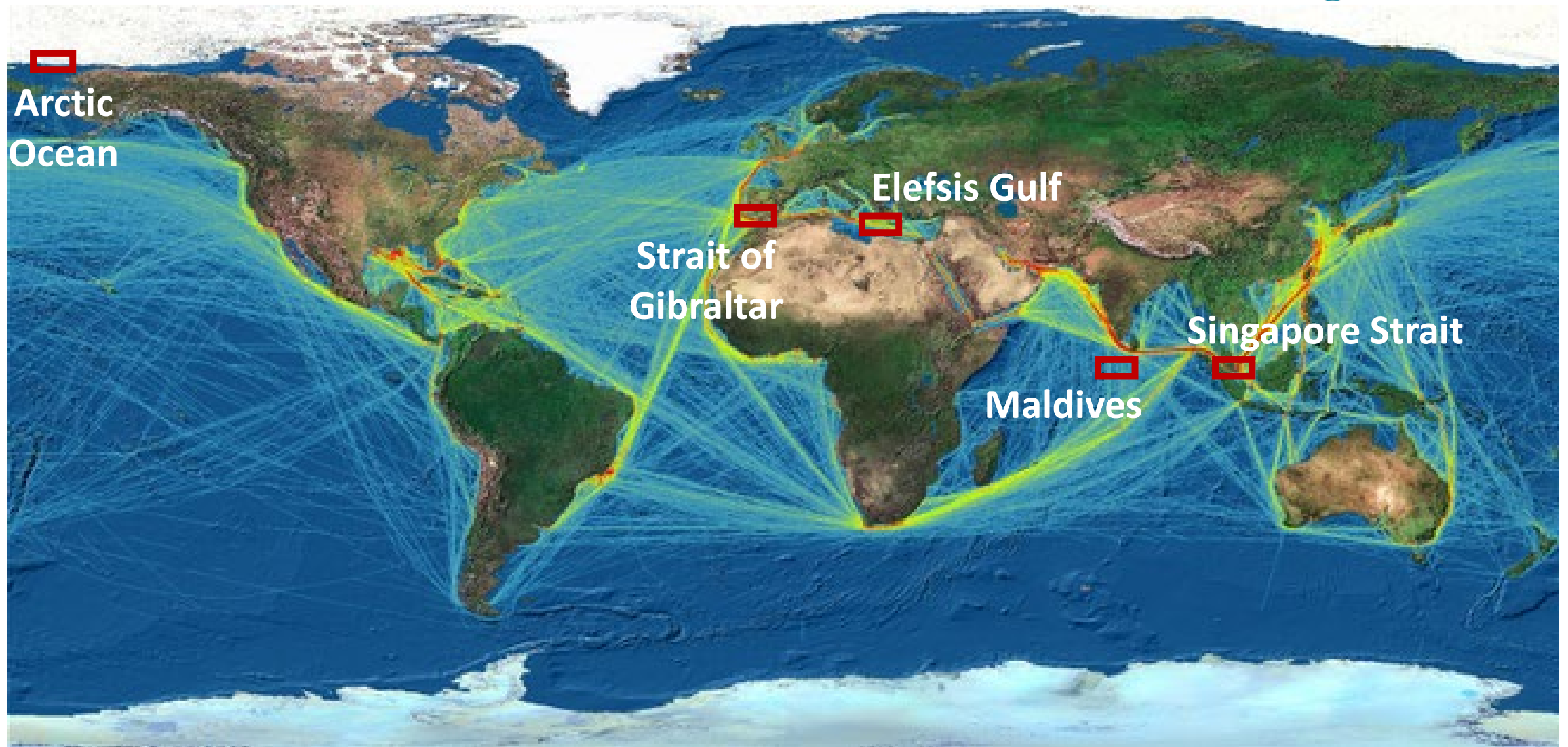
Technical objectives – Vessels and methane emissions

- Detection and characterization of emissions from single vessels
- Increased detection sensitivity and reliability in complex maritime environments
- More robust methane retrieval algorithms for satellite-based vessel monitoring
- Integrate RF detection with existing SAR & optical
- Improve AIS association across all sensor sources
- Increase automation to reduce latency & scale capacity
- New Capabilities: develop entity recognition (optical & RF signatures), which will enable identification of reporting & non-reporting vessels

Technical objectives – Chemicals, sewage, marine plastics, water quality

- Chemical & Sewage Detection via Water Quality Proxies
- Novel Phytoplankton Pigment Stress Marker Method
- Marine Litter & Floating Macroplastic Detection
- Probabilistic Source Attribution to Vessels
- AI-Driven Near-Real-Time Alerting System

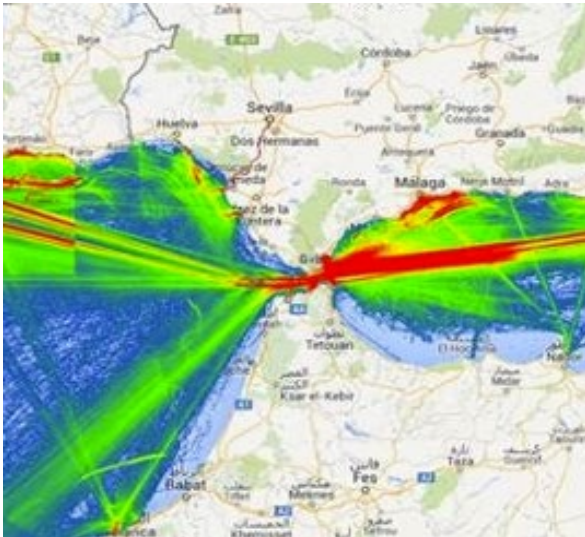
The POSEIDON use cases



(source: Luxspace 2010)

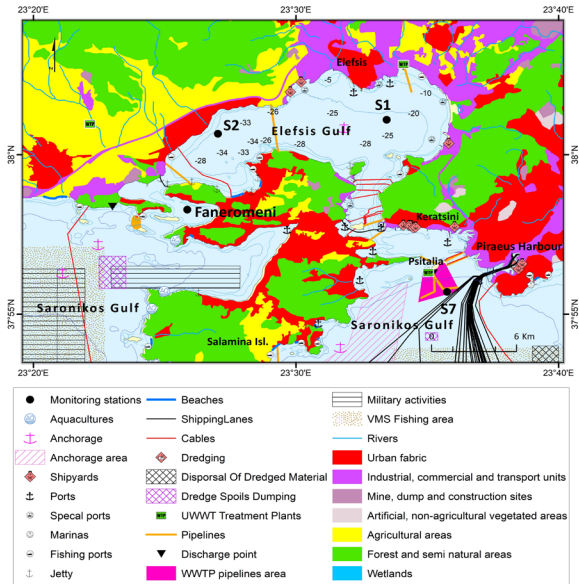
Strait of Gibraltar

(Demonstration site)



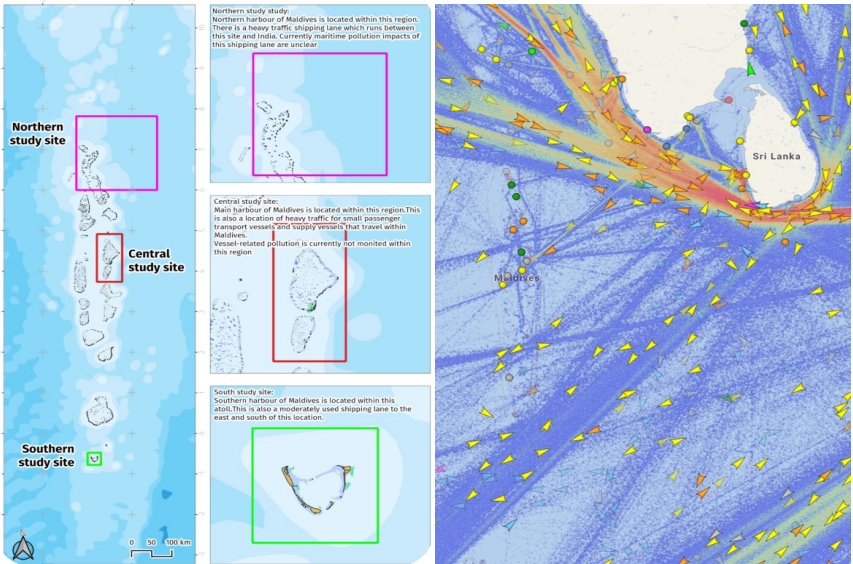
Elefsis Gulf

(Validation and demonstration site)



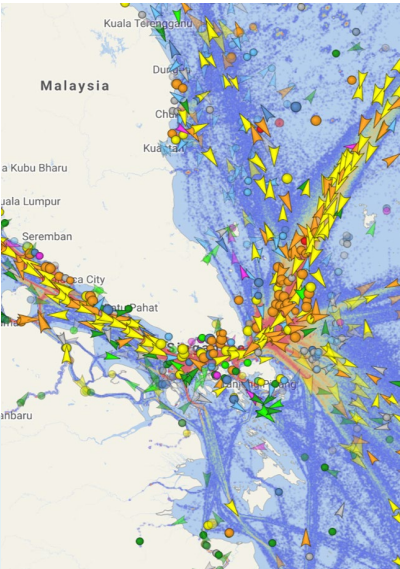
Maldives

(Validation and demonstration site)



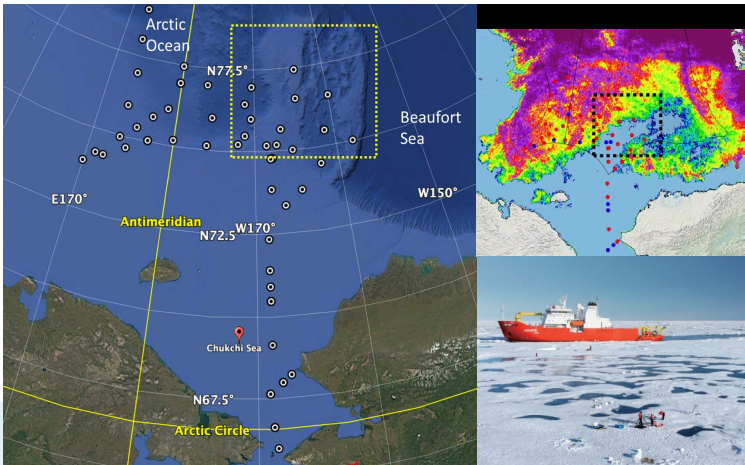
Singapore Strait

(Demonstration site)

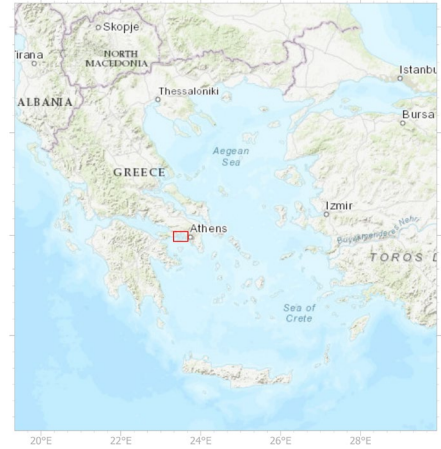
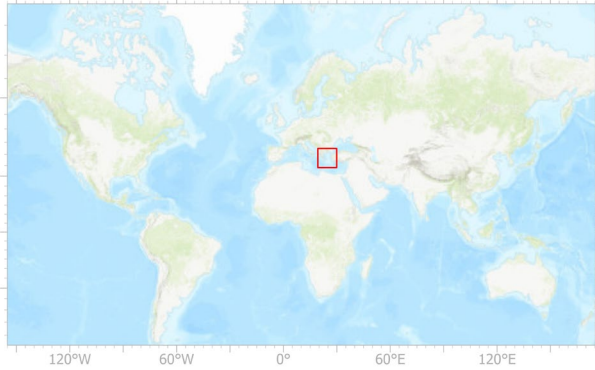


Arctic Ocean

(Demonstration site)

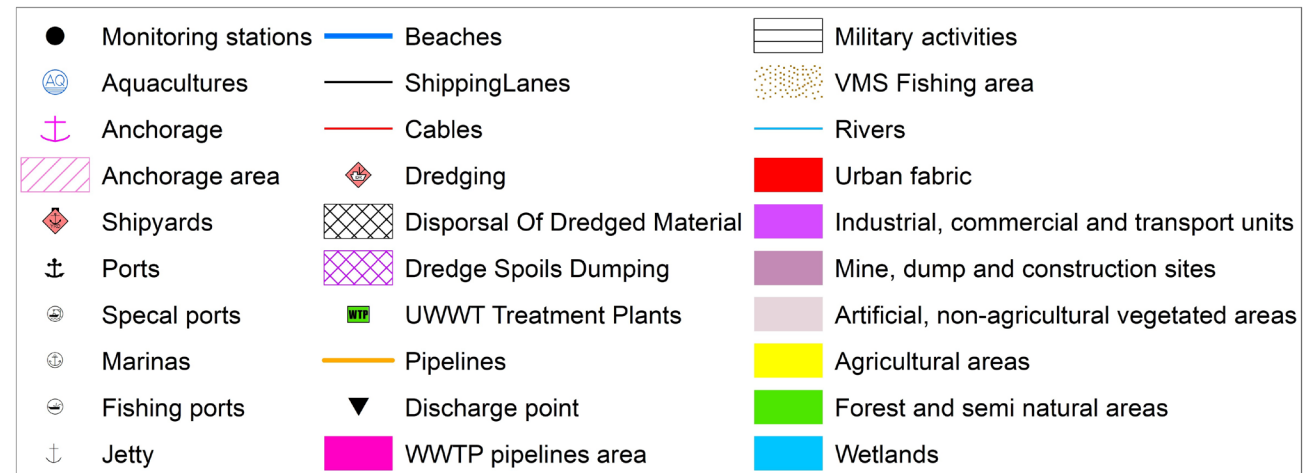
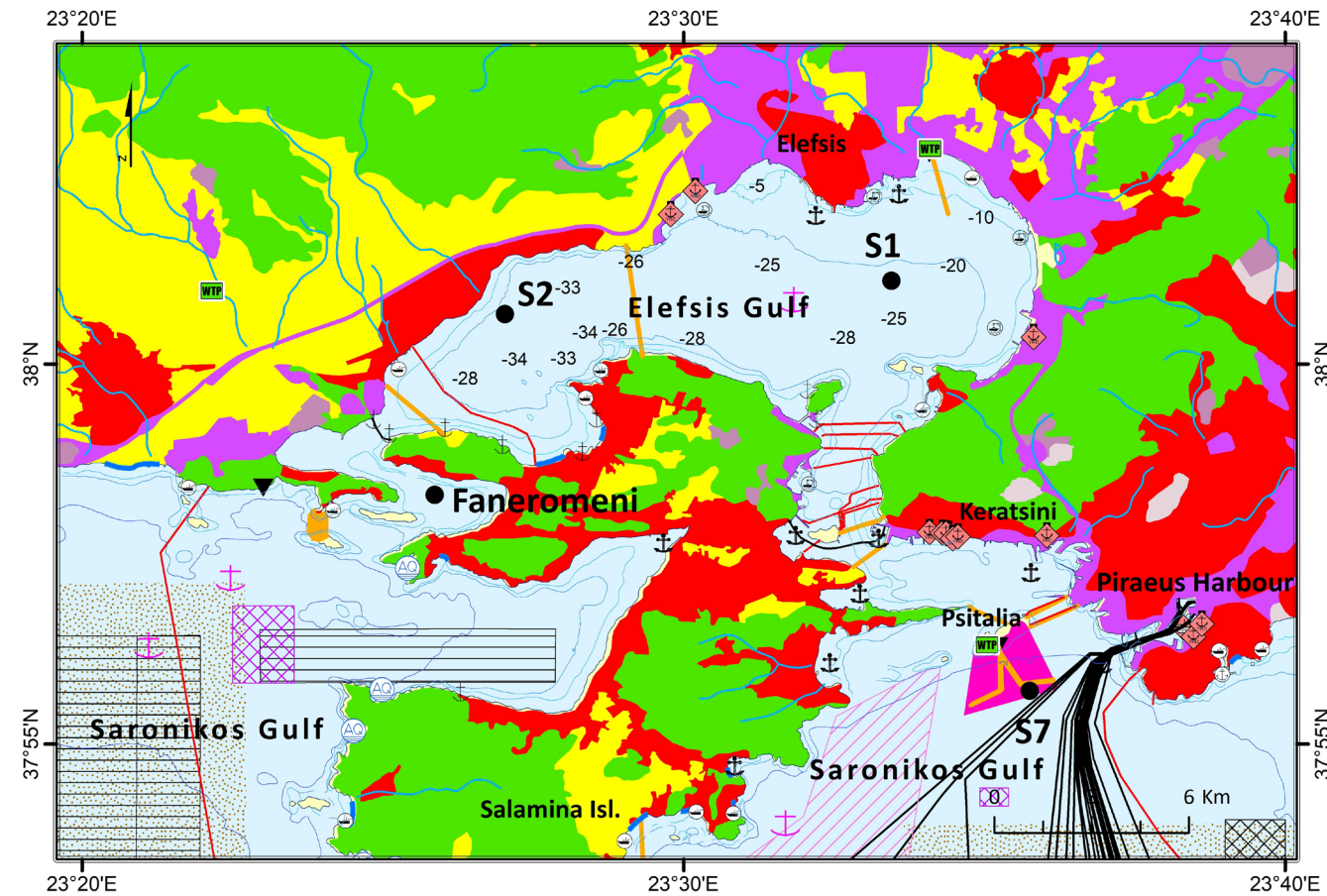


Elefsis Gulf (validation and demonstration site)



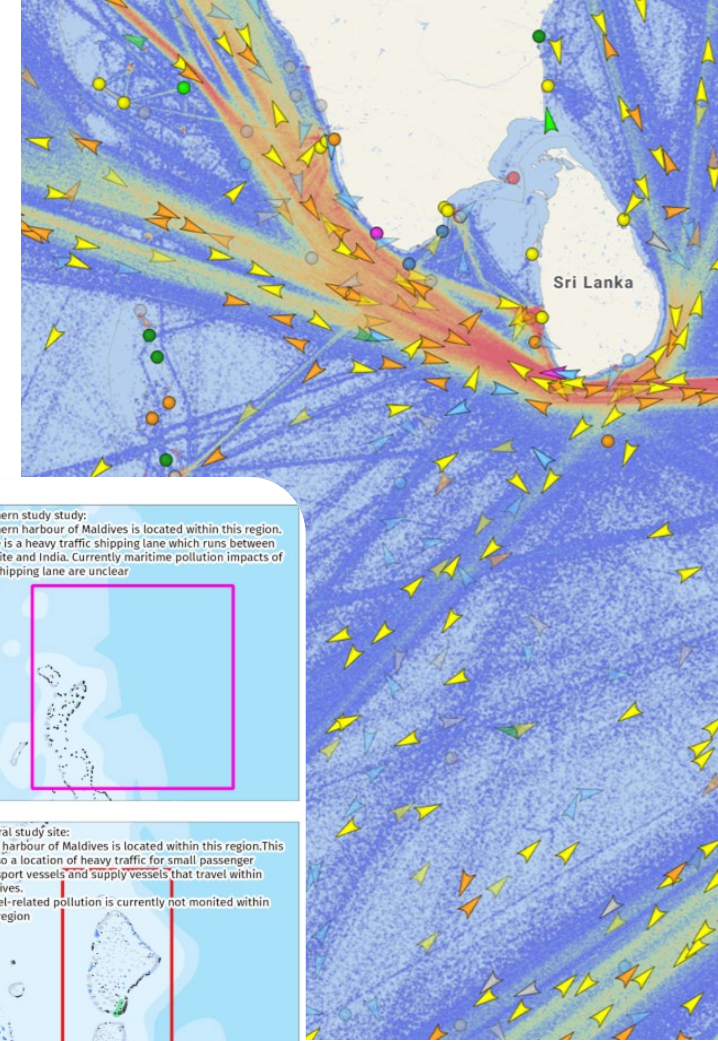
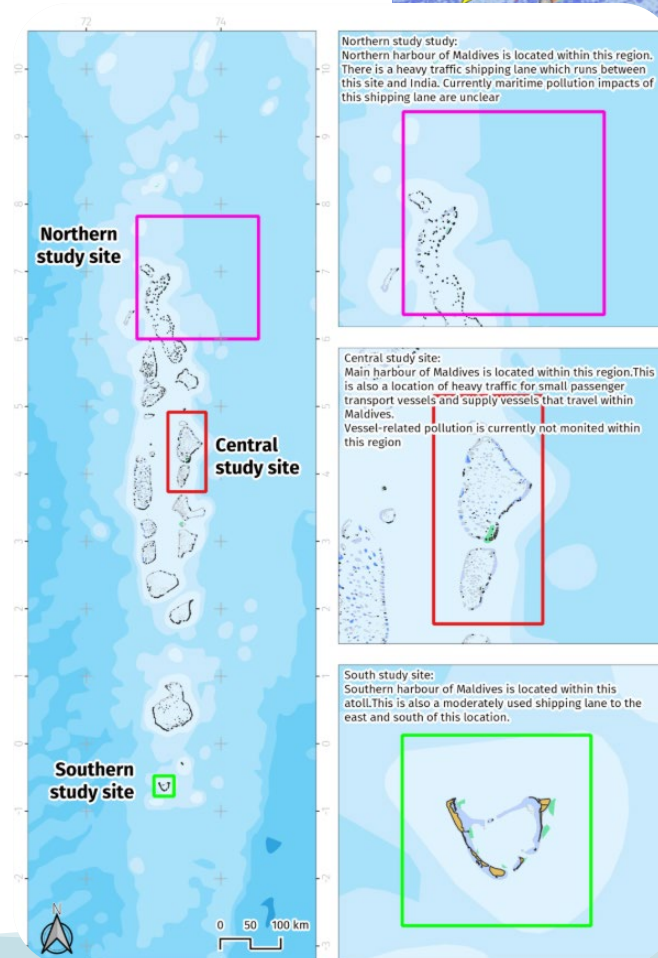
- Ship- related marine litter, sewage, oil, and methane emission in the Elefsis Gulf

- Anthropogenic Activities



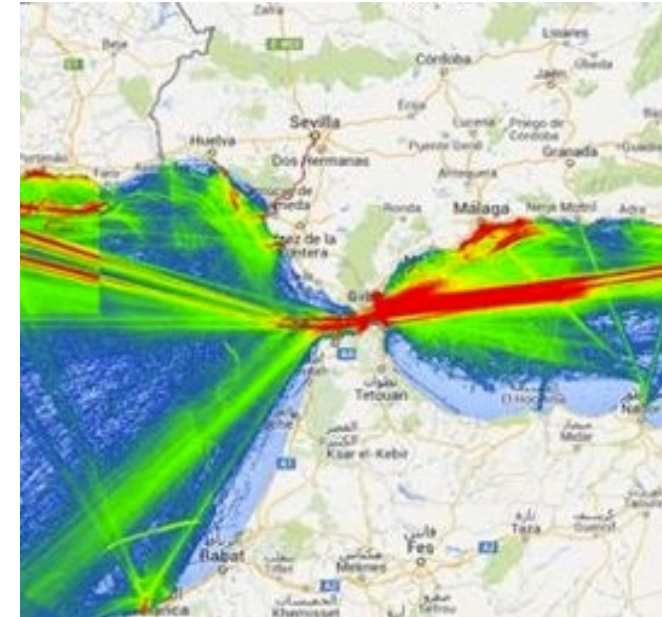
Maldives (validation and demonstration site)

- Indian Ocean Maritime Crossroads
- High-Value Marine and Tourism Environment
- Diverse Pollution Risk Profile
- Value for National Stakeholders



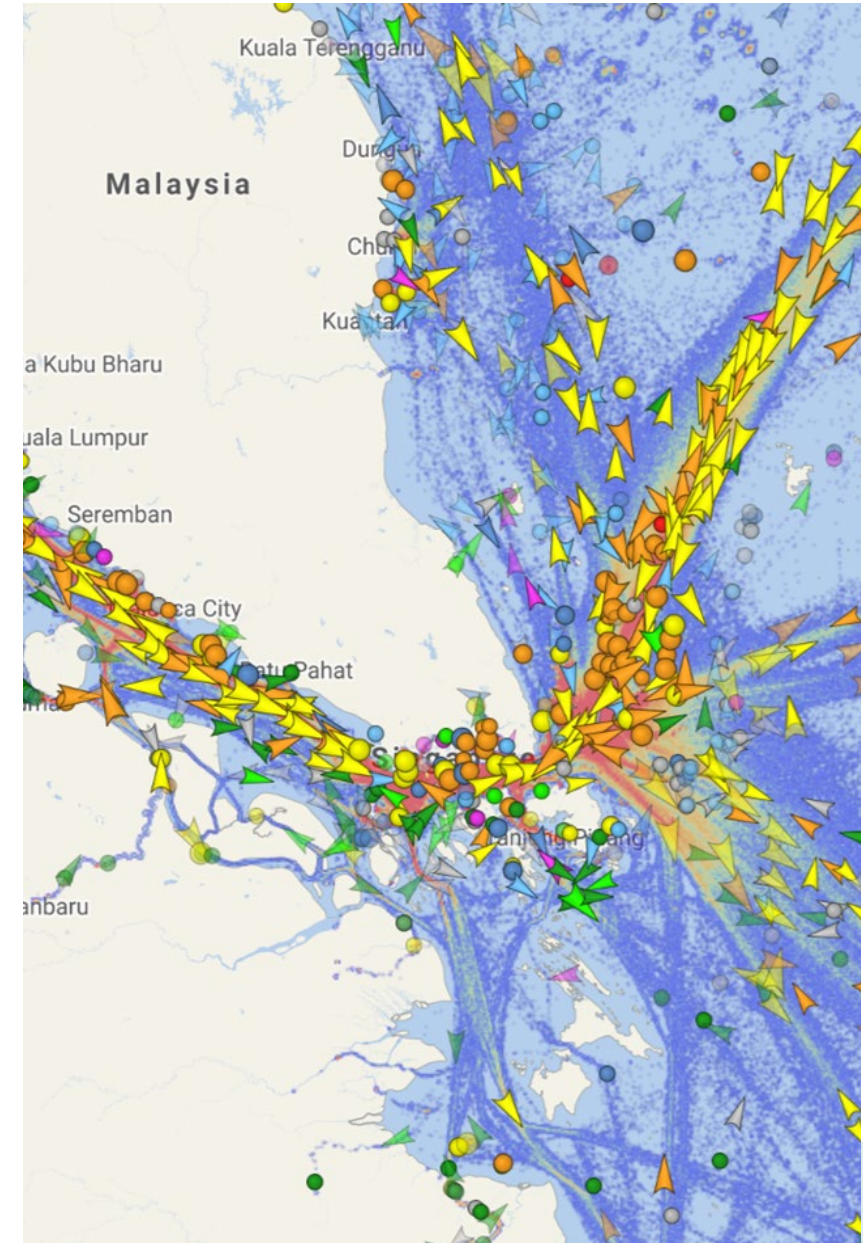
Strait of Gibraltar (demonstration site)

- Strategic Maritime Checkpoint
- Emission Monitoring Environment
- Operational Benefits of Monitoring
- Geopolitical and Enforcement Relevance
- Diverse Data Streams
- Operational Value for Stakeholders



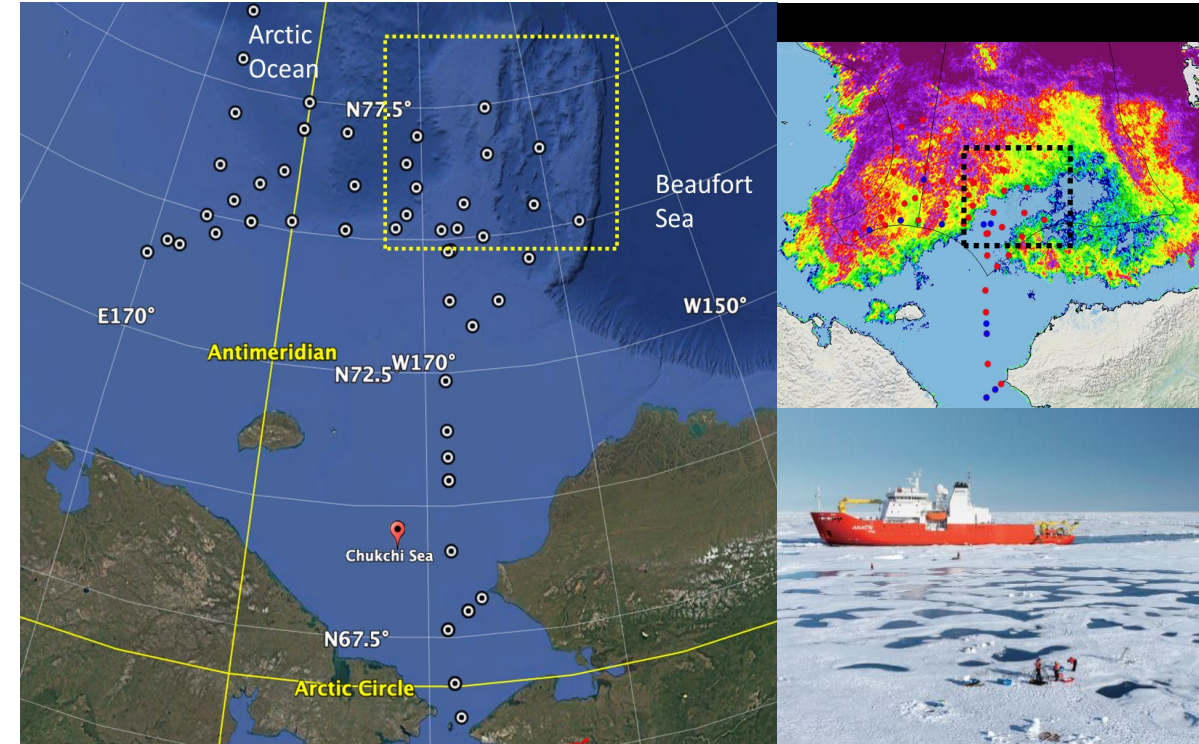
Singapore Strait (demonstration site)

- Global Maritime and Bunkering Hub
- High Intensity Operating Environment
- Strategic Environmental and Economic Importance
- Regional Pollution Response Leadership
- Enhanced Source Attribution and Enforcement
- Operational Value for Maritime Authorities



Arctic Ocean (demonstration site)

- Located between the central Arctic Ocean, Beaufort Sea, and Chukchi Sea
- Diverse ice conditions
- Highly suitable for realistic oil spill detection experiments in operational Arctic settings
- The region is supported by extensive KOPRI field campaigns with the icebreaker Araon and valuable sea ice datasets
- Increasingly important for oil spill response research due to expanding Arctic shipping activity



Business, Communication and Stakeholders

- Develop a sustainable business model
- Define how the project's results will create value, be financially viable
- Ensure long-term sustainability in line with regulatory and industry compliance
- Create a roadmap to market and outline the strategic steps needed to commercialize the project outcomes effectively
- Define and implement a strategy for dissemination/knowledge transfer and communication to relevant/targeted stakeholders
- Engage key stakeholders about the potential of POSEIDON
- Raise awareness and contribute to external EU initiatives on relevant topics, including industry and policy recommendations

THANK YOU!

Find out more:



Contact us

Georgia Karadimou
POSEIDON Project Coordinator
georgia.karadimou@ksat.no

Follow us



@poseidon-horizon-europe-project



@POSEIDONHE2025

<https://www.poseidon-he2025.eu/>