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Designing of the Estonian Smart Buoy Network "Sea Wolf”

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Background

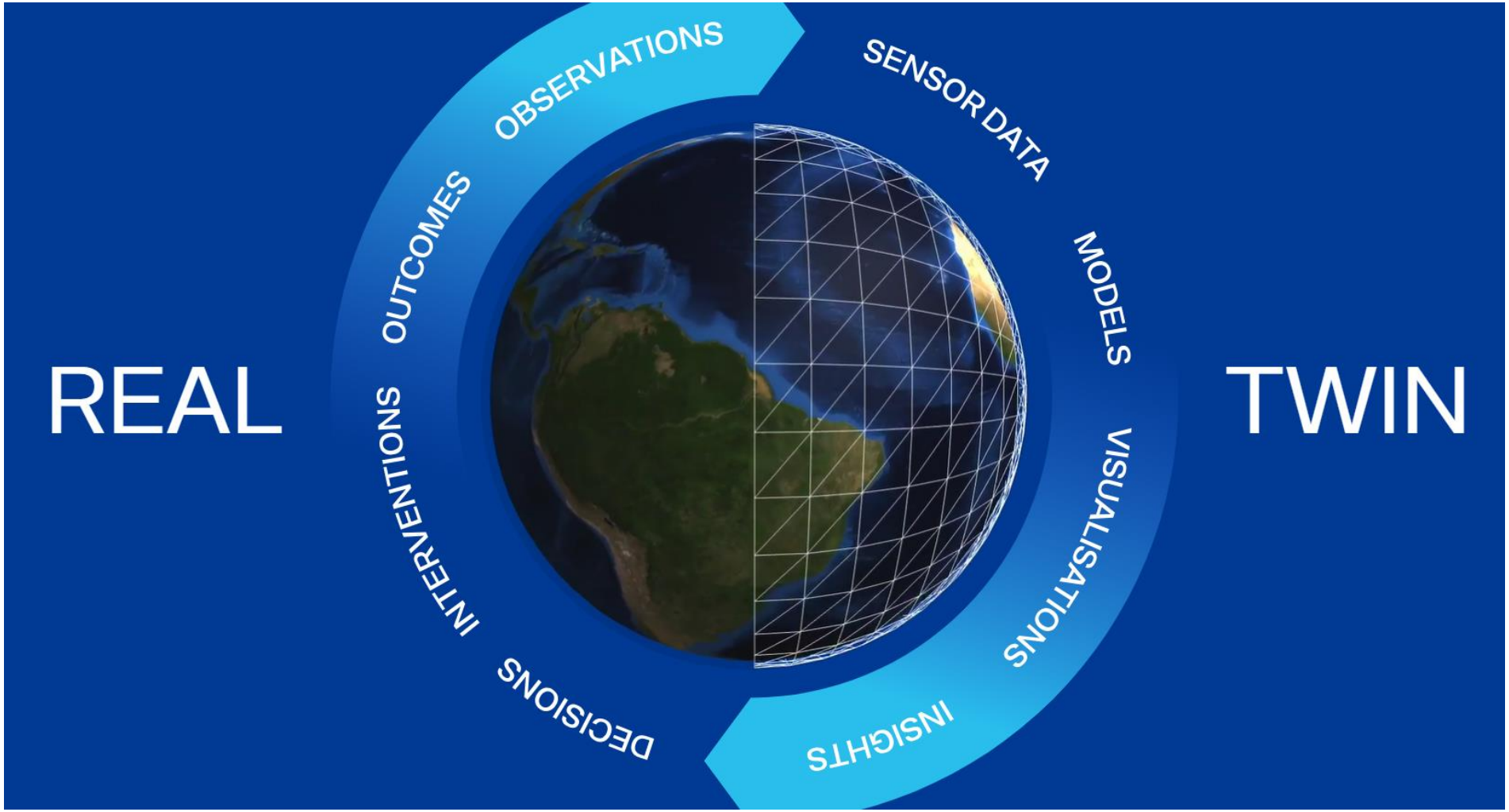
High-quality environmental and navigational information covering the entire marine area is an integral part of the operation of the modern **maritime economy**, the sustainable management of **the marine environment** and ensuring the **security** and **safety** of the sea.

Estonia has thematic/**sectoral monitoring programmes**, but the responsibilities, funding and development of the programmes are **divided between the sectors**, information is mostly received in a **delayed mode**, and information exchange is insufficient both in Estonia and regionally (Baltic Sea).

There is **a lack of operational and up-to-date information** for effective pollution control and the protection of the marine environment (except aerial surveys and remote sensing). We lack infrastructure for automated/real-time maritime surveillance, especially in **offshore areas** and **subsurface layers** of the water column.

The **data** quality is uneven, data are handled by different organizations, databases are not connected, and cross-use of data is difficult.

Vision for the future – a Digital Twin Ocean



Concept by Mercator Ocean International – digitaltwinocean.mercator-ocean.eu

MSFD monitoring programme 2021-2026

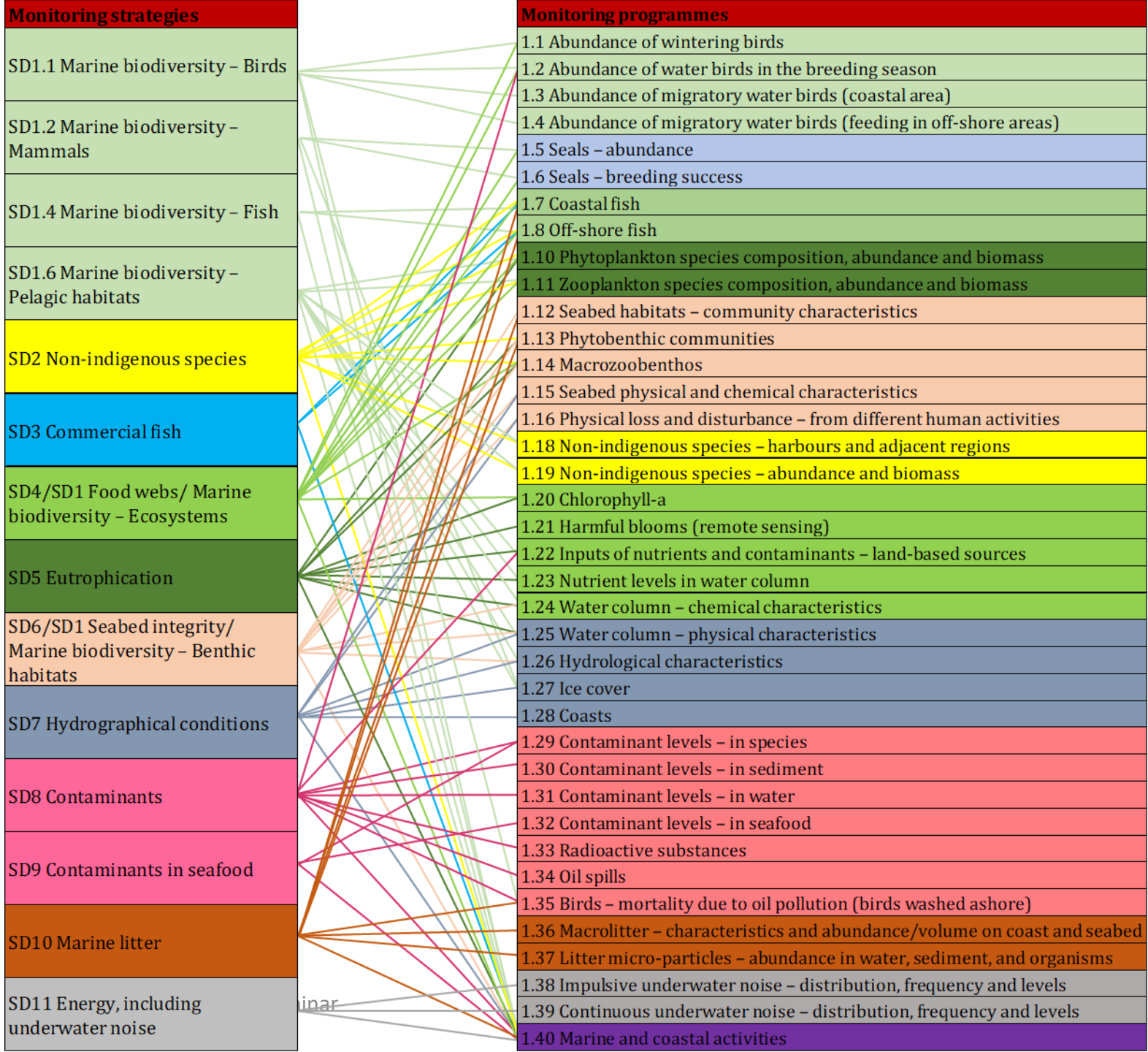
The programme contains 14 strategies grouped by GES descriptors and ecosystem components and 39 thematic programmes that give input for various strategies to assess the status of Estonian marine waters.

In addition to **MSFD** obligations, the programme includes observations for other EU directives and regulations (e.g., **WFD, Habitat and Bird directives, fisheries and hydrographic surveys, food safety**, etc.).

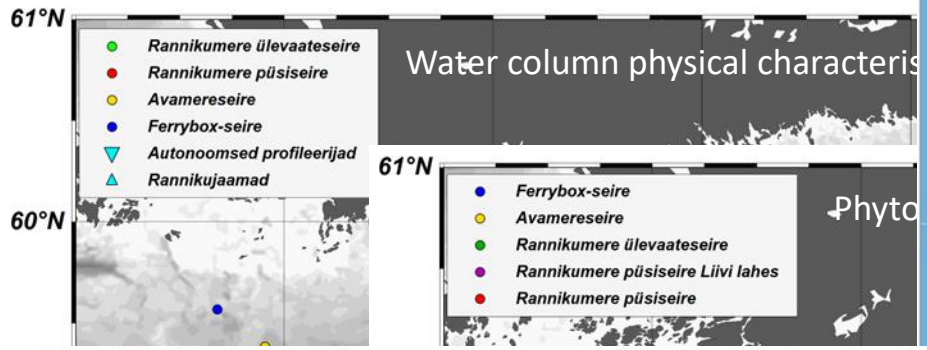
Various ministries and agencies fund the monitoring and data collection programme (e.g., the **Ministry of Climate, Internal Affairs, Regional Affairs and Agriculture**, etc).

Most of the thematic programmes are coordinated regionally (via HELCOM).

The main challenge for the coordination (in Estonia and regionally) is that while the programme is adopted, the yearly surveys depend on funding decisions (funding sources vary), procurement processes, etc.



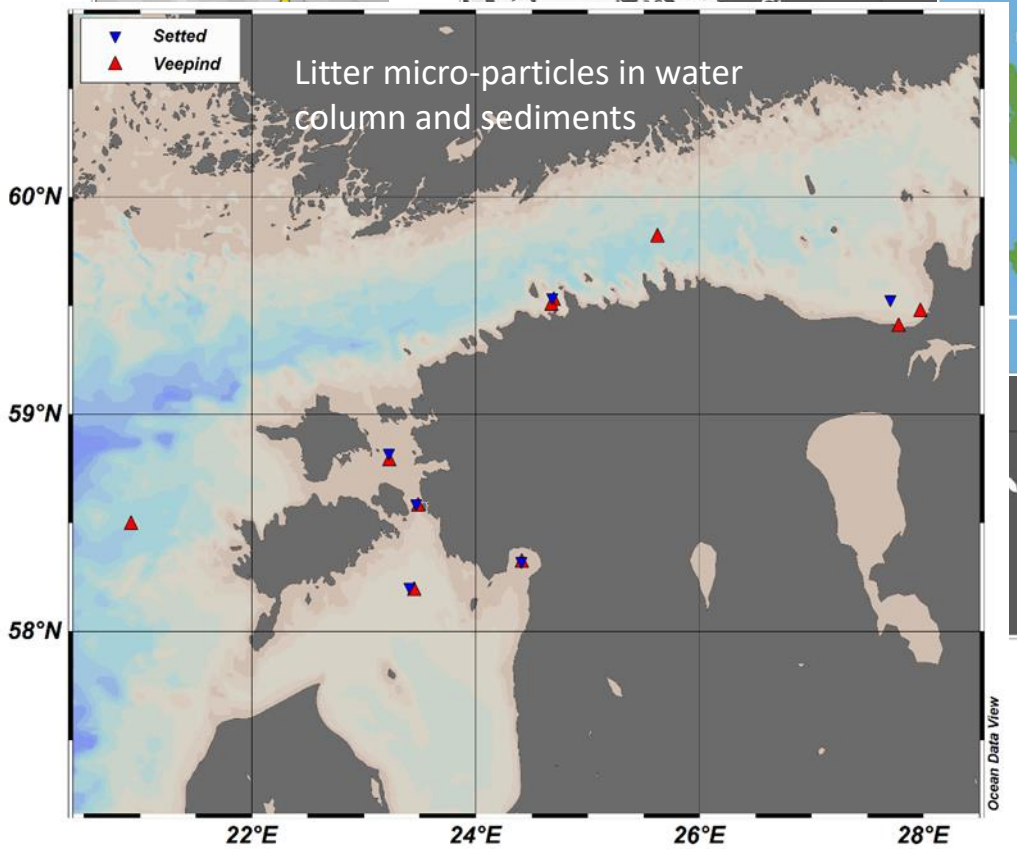
MSFD monitoring programme 2021-2026



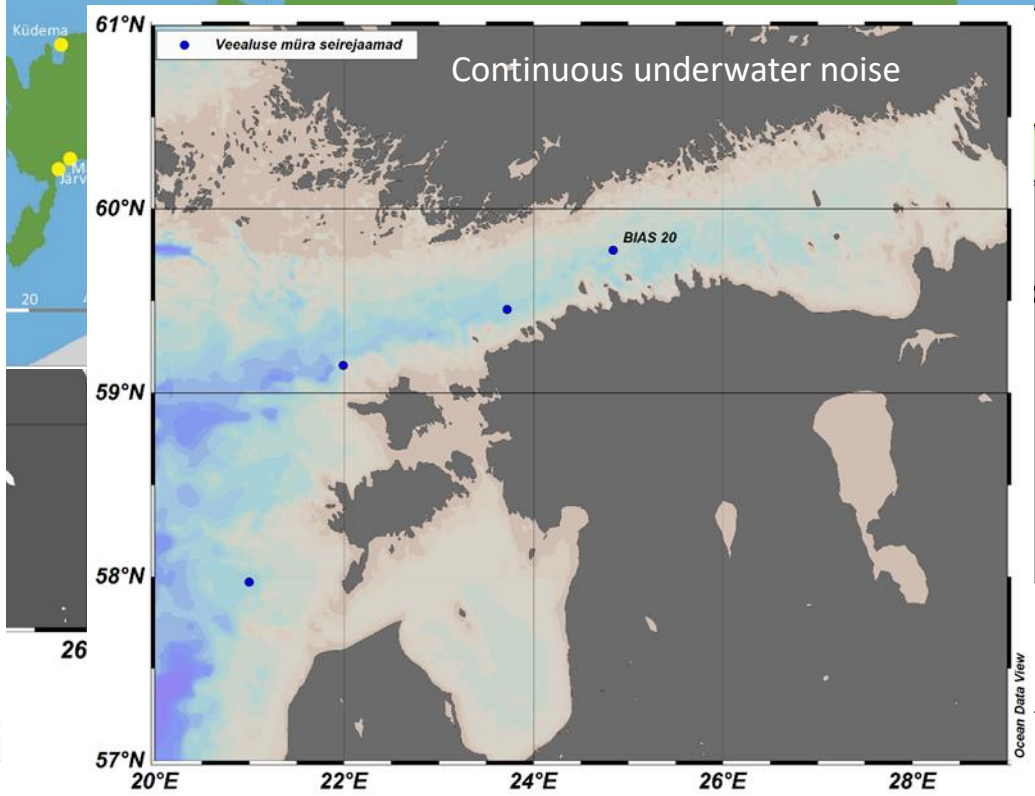
Water column physical characteris

Phyto

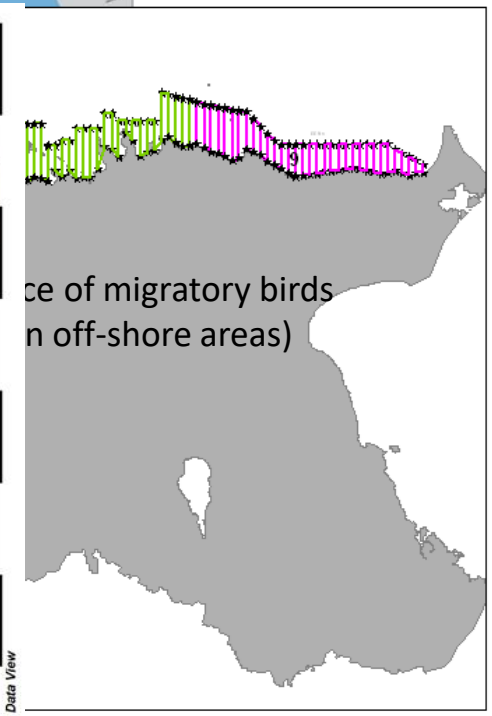
Coasts



Litter micro-particles in water column and sediments

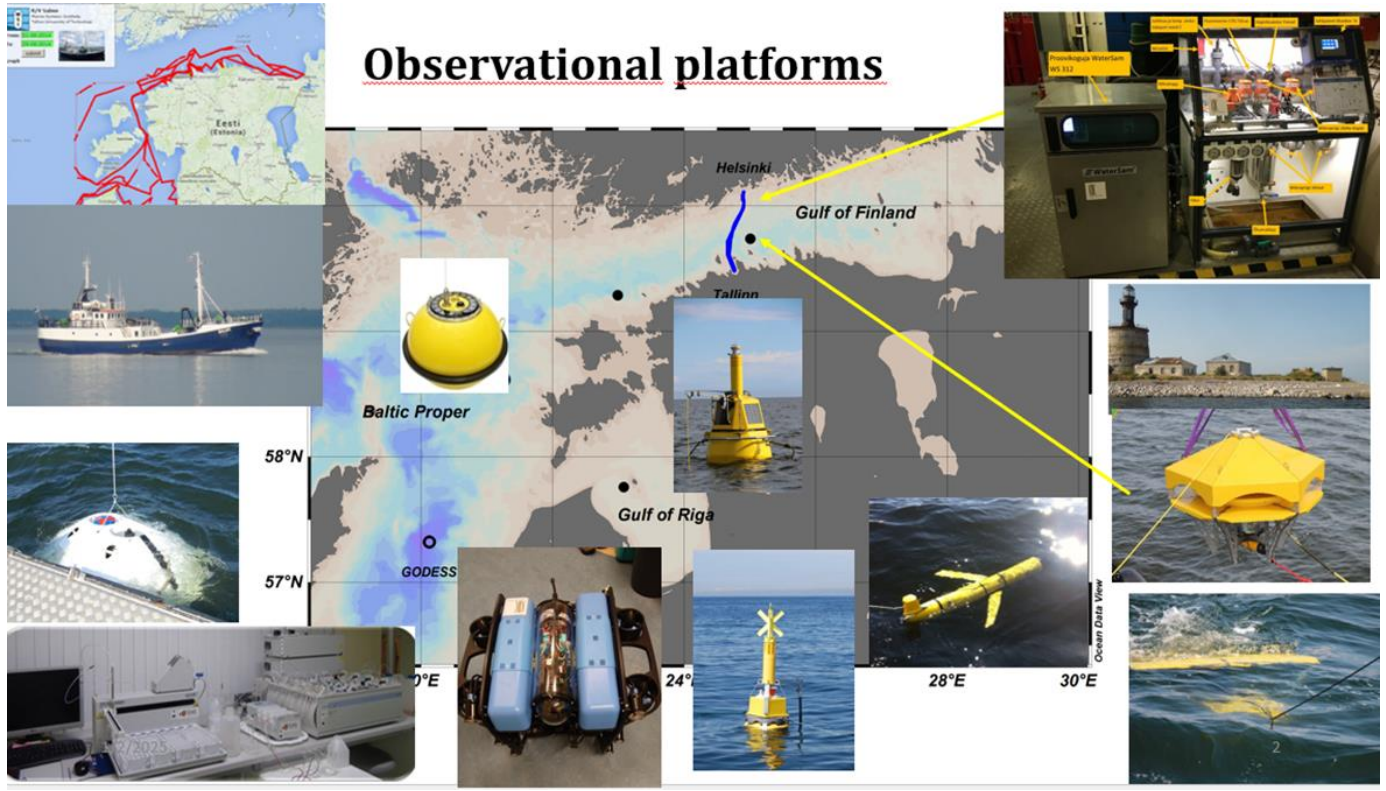


Continuous underwater noise

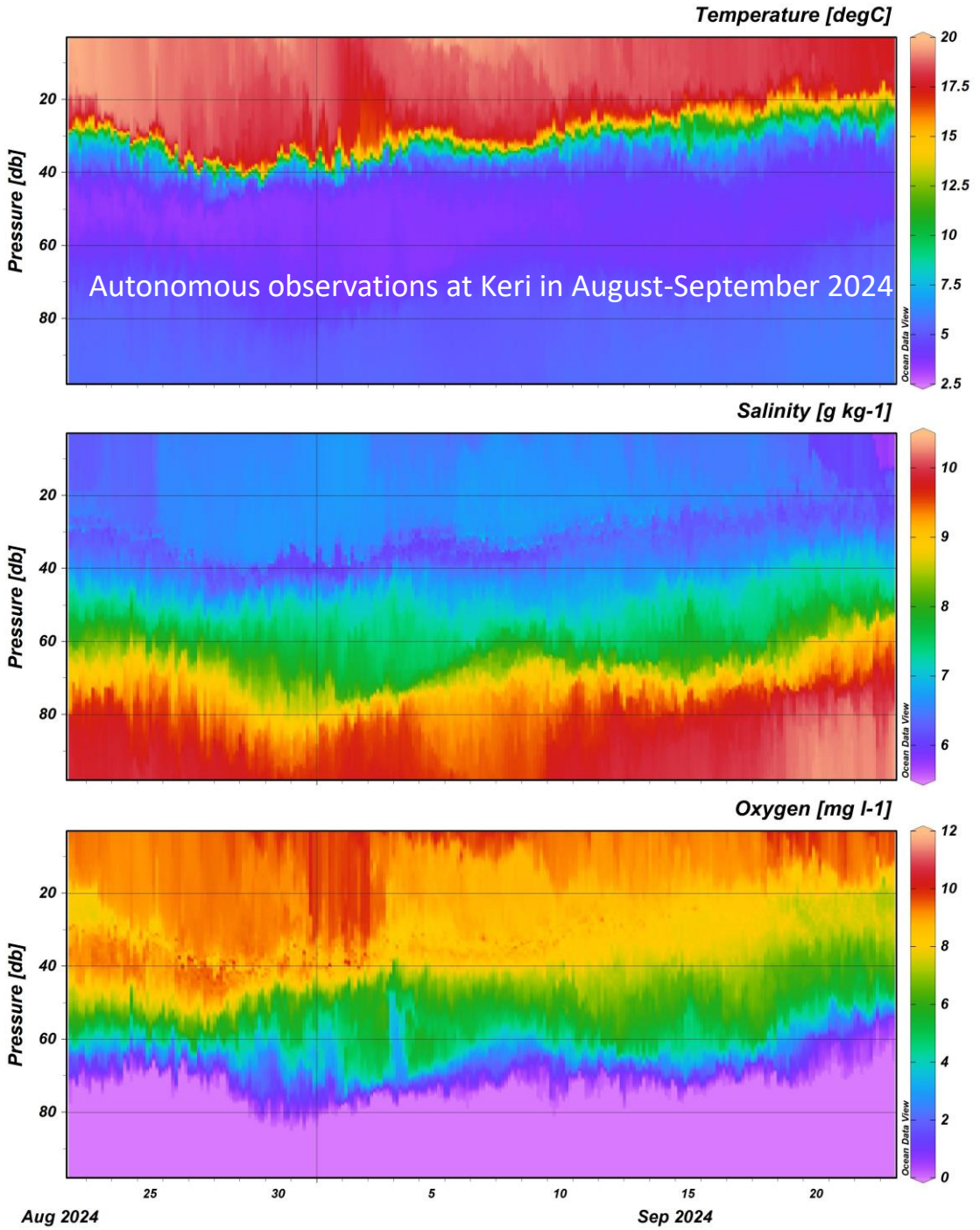


ce of migratory birds
n off-shore areas)

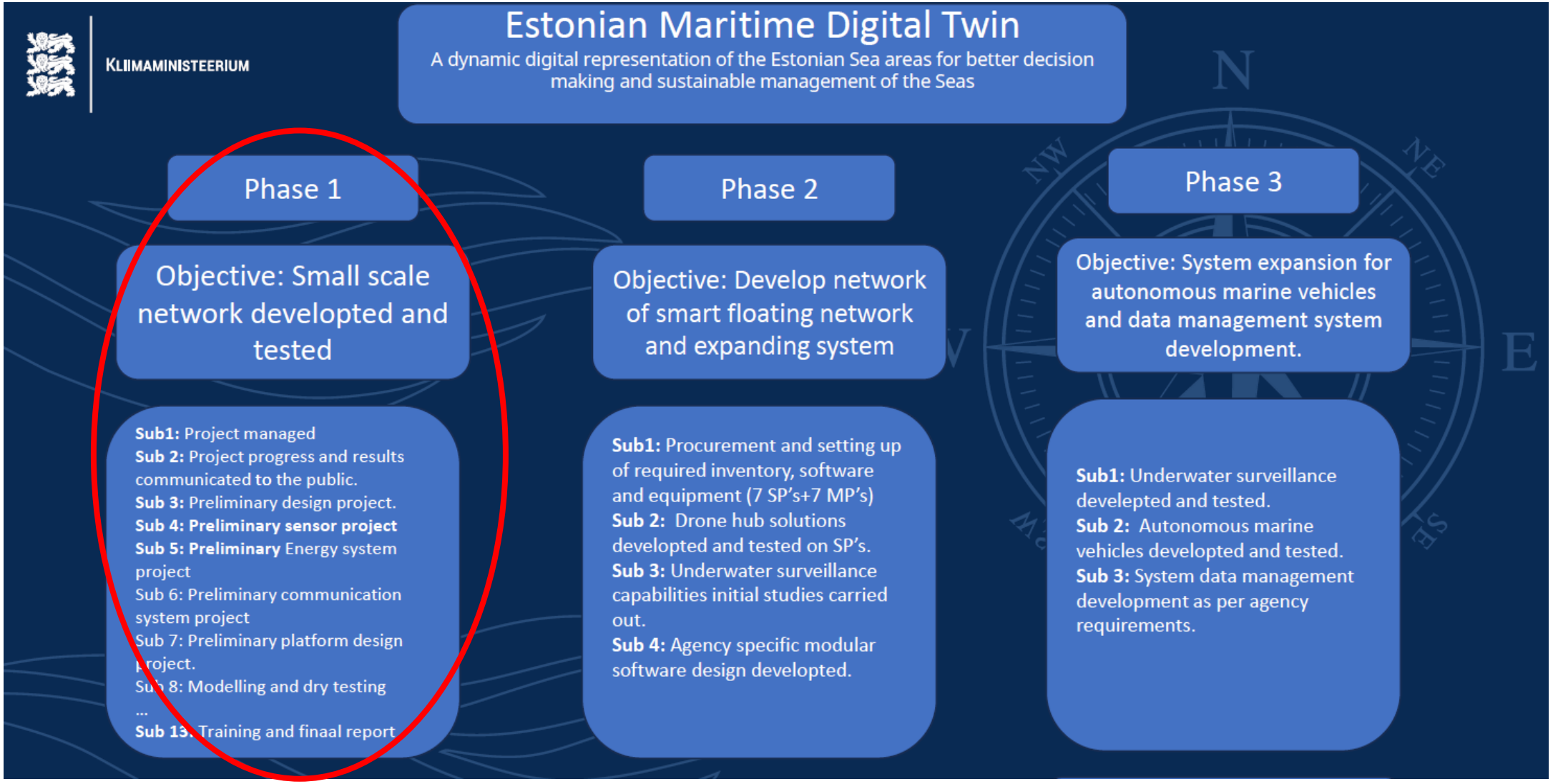
Research infrastructures and observational programmes



Scientific research is funded via project application calls
Related observational programmes are usually not coordinated with other marine observational programmes



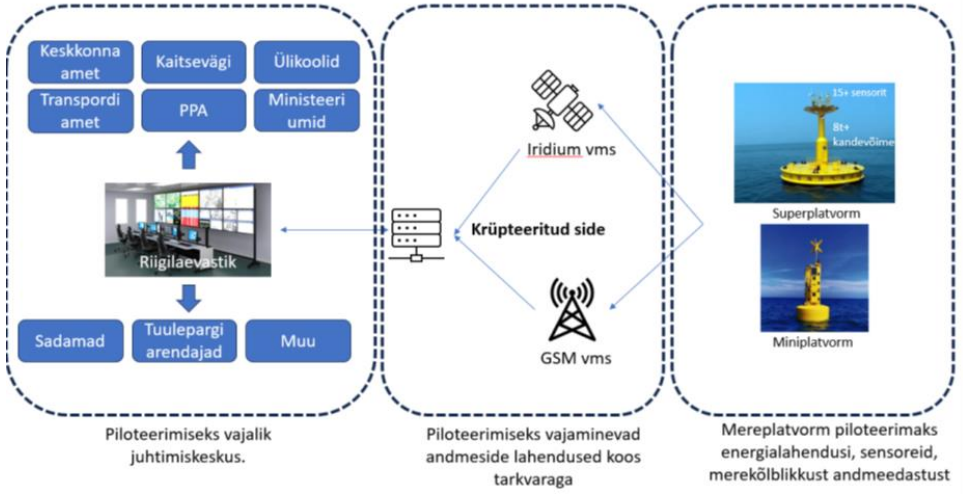
Phases of the development

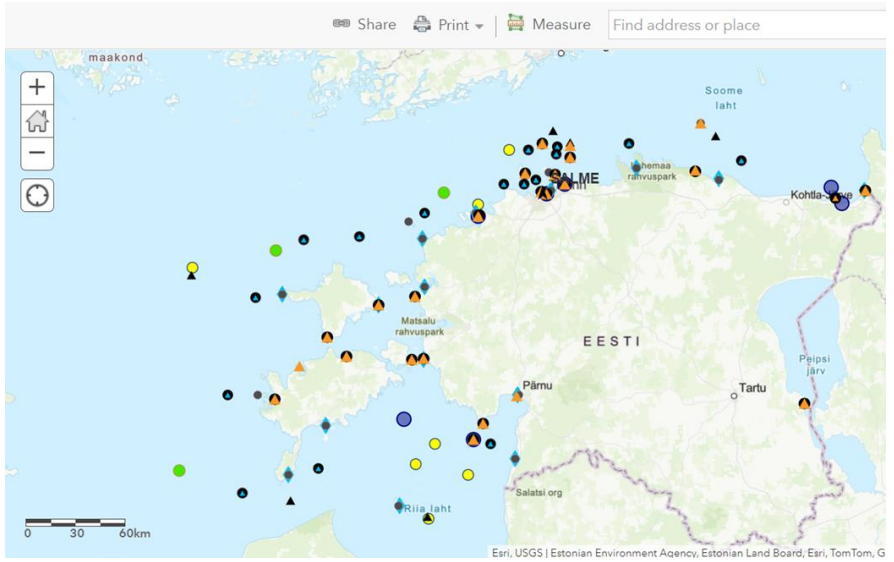


Purpose of the „Sea Wolf“ first phase

The aim is to create **working prototypes of smart platforms** and **a prototype of the data management platform** that supports them. The desired result of the project would be the piloting of a network of smart buoys, which would help to develop a reliable and functional network as a whole in the future.

Th consortium of the **first step (Jan-July 2025)** in the project first phase: **TalTech, Flydog Solutions and Nortal.** We aim to conduct a study on the user needs and technologies and suggest the design of the system (including technical descriptions of the prototypes).



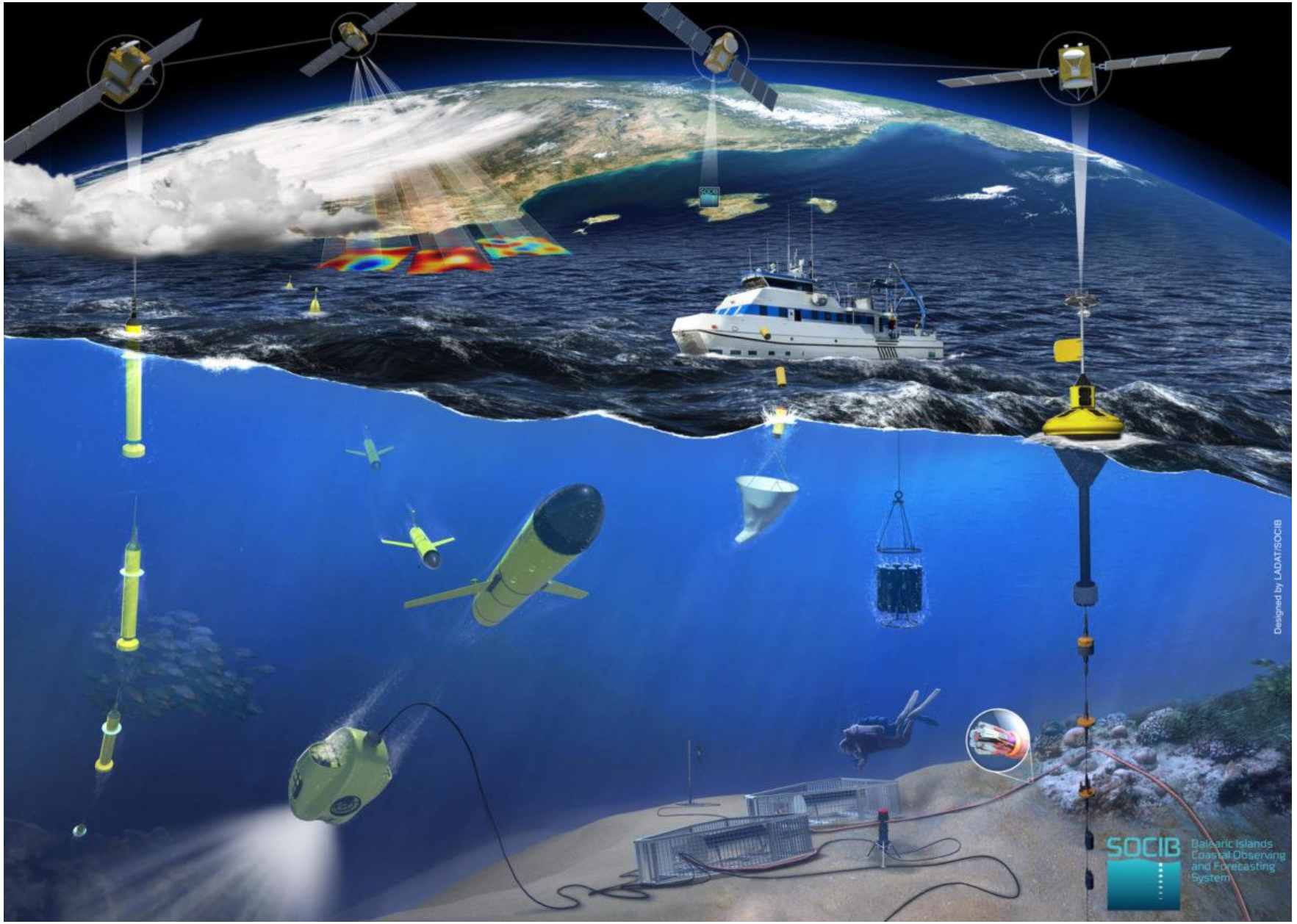


COSYNA

COSYNA – Coastal Observing System for Northern and Arctic Seas – provides quality-controlled, science-based, near real-time environmental information derived from integrated observations and model results.

SOCIB

The Balearic Islands Coastal Observing and Forecasting System (SOCIB) is a Unique Scientific and Technical Infrastructure (ICTS) that operates a coastal ocean observing and forecasting system, a scientific and technological infrastructure providing free, open, quality-controlled, validated, and timely streams of oceanographic data, as well as data stewardship and long-term preservation.

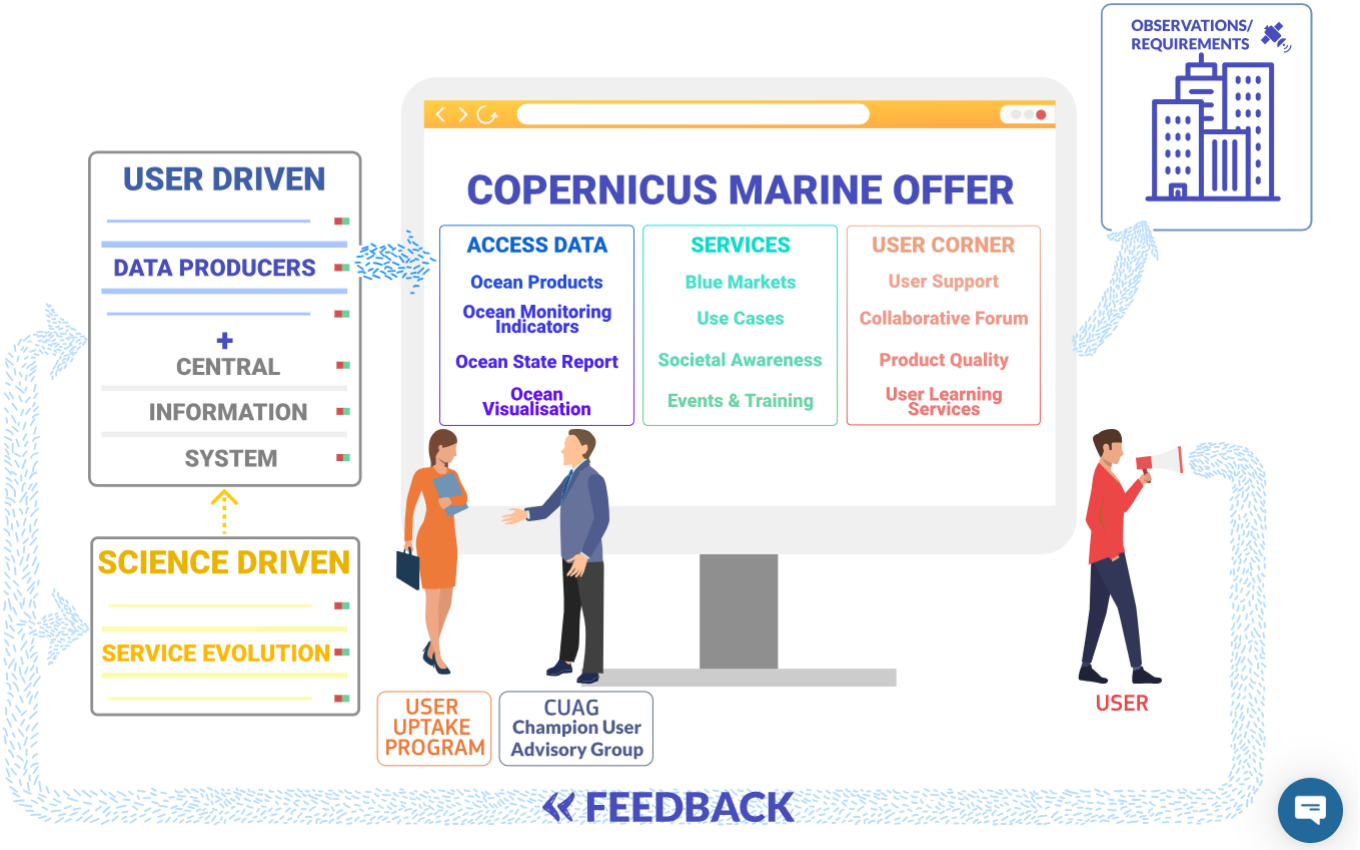


User needs

The study is conducted in the form of **surveys/interviews** and by analyzing written sources, including existing reports and summaries in the field, regulatory requirements and described (best) practices.

Interviews are conducted either as site visits or online. The interviewees are selected from the interest groups, including the **main users, the operators of marine measurements and the data managers**.

An online survey will be prepared and distributed to all **potential users**, institutions and companies **carrying out measurements** at sea, **data aggregation and management agencies** and potential **system operators** and the **public**.



https://marine.copernicus.eu/about/how-we-work

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If you wish to participate in the survey, mapping users in the project ’Sea Wolf’, please fill out the form accessible using the QR code below.

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Thank you for your attention!

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