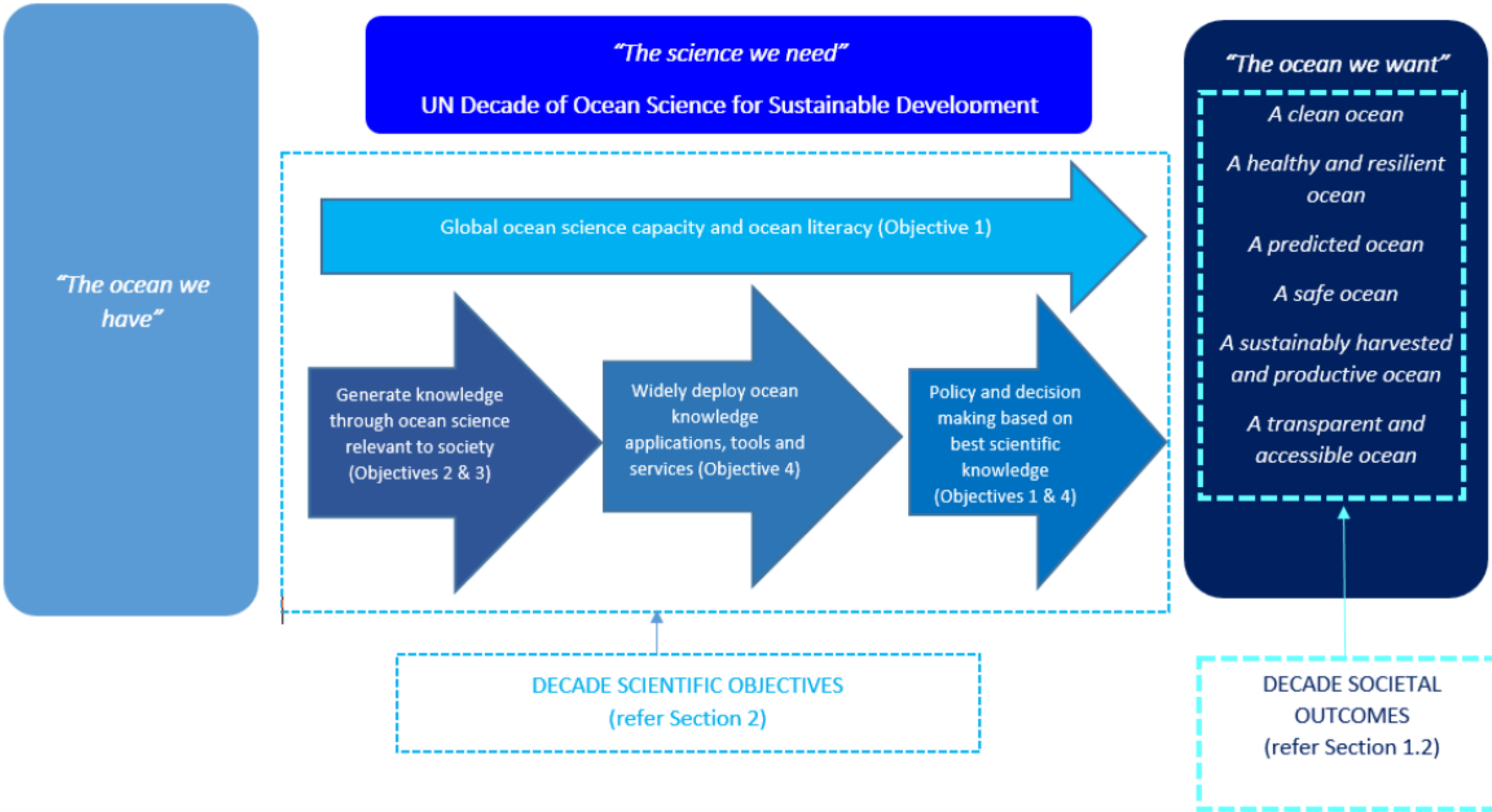

"The ocean we have"
"The science we need"
UN Decade of Ocean Science for Sustainable Development
Global ocean science capacity and ocean literacy (Objective 1)
Generate knowledge through ocean science relevant to society (Objectives 2 & 3)
Widely deploy ocean knowledge applications, tools and services (Objective 4)
Policy and decision making based on best scientific knowledge (Objectives 1 & 4)
"The ocean we want"
A clean ocean
A healthy and resilient ocean
A predicted ocean
A safe ocean
A sustainably harvested and productive ocean
A transparent and accessible ocean
DECADE SCIENTIFIC OBJECTIVES (refer Section 2)
DECADE SOCIETAL OUTCOMES (refer Section 1.2)

Decade Action Hierarchy

Actions will be implemented by a wide range of Decade stakeholders and identified through Calls for Decade Actions. They will map to Challenges & Objectives and fulfil endorsement criteria.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Decade programme

- Global or regional in scale.
- Contributes to one or more of the Challenges.
- Long-term (multi-year), interdisciplinary, multi-partner and typically multi-national.
- Includes component projects, and enabling activities.
- Approx. 50 – 60 programmes operating at any one time.

Decade Project

- Discrete and focused undertaking of a shorter duration.
- Will typically contribute to an identified Decade programme

Decade Activity

- Typically a one-off standalone activity
- Can form part of a programme or project or can relate directly to a Decade challenge.

Decade Contribution

- Supports the Decade through provision of a necessary resource
- Can be either for costs related to the implementation of a Decade Action or for coordination costs.

OceanPredict proposal for a UN decade programme

Making Ocean Prediction Science Impactful and Relevant (MOPSIR)

Motivation

Making Ocean Prediction Science Impactful and Relevant (MOPSIR)

Motivation:

In 2030, an container ship with 30% engine power is over shelf waters headed to port 12 hours away from ports In the coming decade, OceanPredict will advance ocean prediction science and increase the capacity of operational oceanography in an ever-increasing international context. The main goal is to maximise impact of the science and operations to further enable capacity and a global blue economy, maximise societal benefit and improve stewardship of ocean and coastal resources.

.

- The **core of the programme** will consist of
    - advancing the science behind ocean prediction and its connection to the other components of the earth system, including the atmosphere, the land, continental hydrology etc.
    - maximizing benefits of ocean observations for ocean predictions
    - supporting the development of a value-chain for operational oceanography, from observations to end users by using best practice, implementing the ocean prediction component as a central part of the chain

Programed Broad Outcomes

1. Better assessment and prediction of the ocean state (including reliable uncertainty estimates) and its impact on forecasts of other earth system components (e.g., atmosphere, ice, waves, marine ecosystems, estuaries, etc.).
2. An operational ocean information value-chain where verified information and knowledge are exchanged freely enabling all operational oceanographic components integrated from the open ocean to the coastal areas to contribute effectively together.
3. A continuously optimised ocean observing system integrated from the open ocean to the coastal areas that provides maximum information benefit with manageable cost.
4. An ocean information delivery system that provides the right information at the right time for facilitating marine decisions that increases human safety, environmental safety and an efficient and sustainable blue economy.
5. Improved extended range forecasting capabilities for ocean prediction systems.
6. An informed ocean literate society and global economy
7. Coordinated capacity building across all elements of the operational oceanography value chain to sustain production and delivery of ocean prediction.
8. Demonstrated impact and value of predictions for coastal communities.
9. Effective use of ocean prediction technologies for weather and climate predictions

Making Ocean Prediction Science Impactful and Relevant (MOPSIR).

Overarching Goal

A sustained connected international ocean prediction capacity with standards, that enables all countries access to information for a thriving blue economy.

Outcomes

1. Ability to inter-compare and leverage multiple prediction systems provided by various countries
2. International operational structured marine environmental prediction information chain enabling all operational oceanographic components integrated from the open ocean to the coastal areas to contribute effectively together
3. Effective international standards, best practices for qualifying and sharing value and utility of prediction systems used by global and regional ocean prediction systems in all countries
4. *Innovative and sustainable applications for coastal solutions/services.*

developing #OceanDecade programme proposals

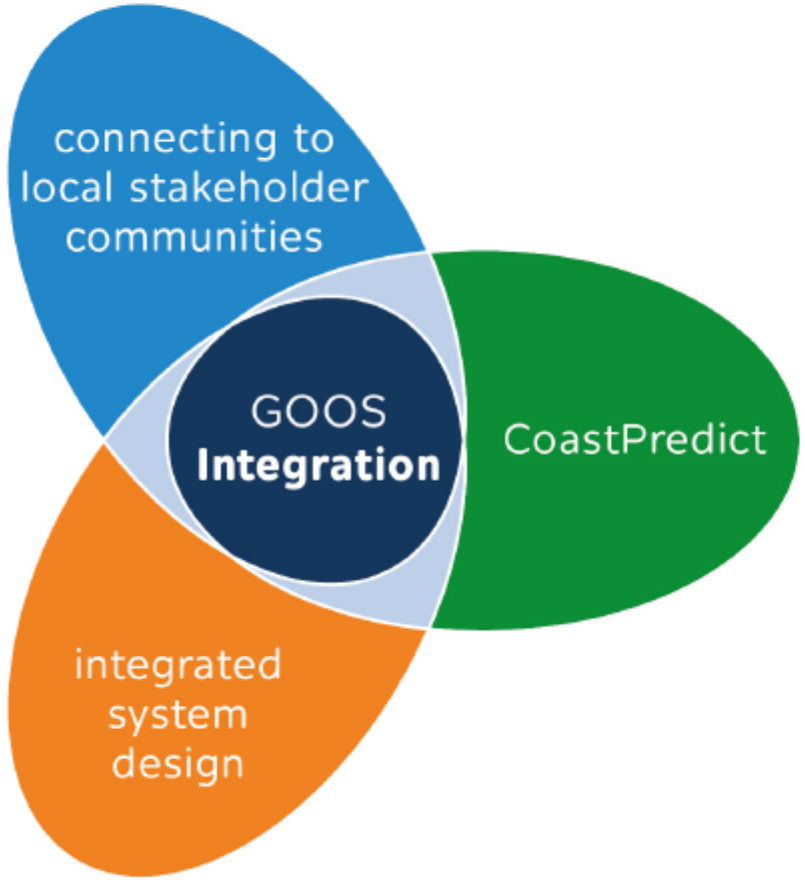
The Global Ocean Observing System

Connecting to many local stakeholder communities as providers and users of ocean observations, deepening engagement and participation in GOOS

lead developers: Molly Powers and Kim Currie

Working across networks and platforms to actively design the system needed to deliver an integrated, responsive, and sustained observing system for climate, forecasts and early warnings, and ocean health

lead developers: David Legler and Sabrina Speich



Integrated observations, forecasting and technology to deliver essential information in coastal applications

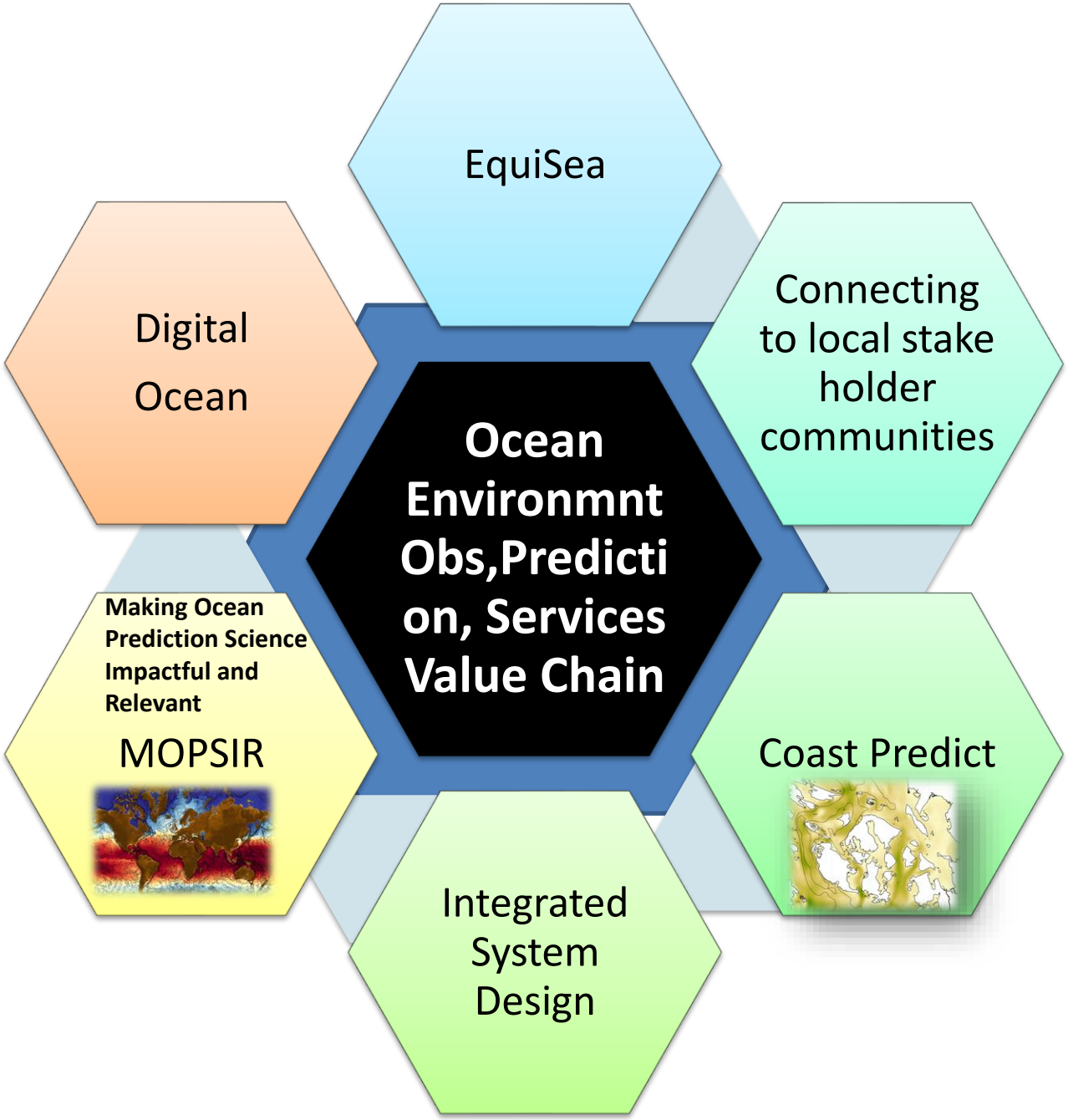
lead developers: Nadia Pinardi, Villy Kourafalou, Joaquín Tintoré

coastpredict.org

contact point: **decade@goosocean.org**

Structure of Decade Programs around full Value Chain

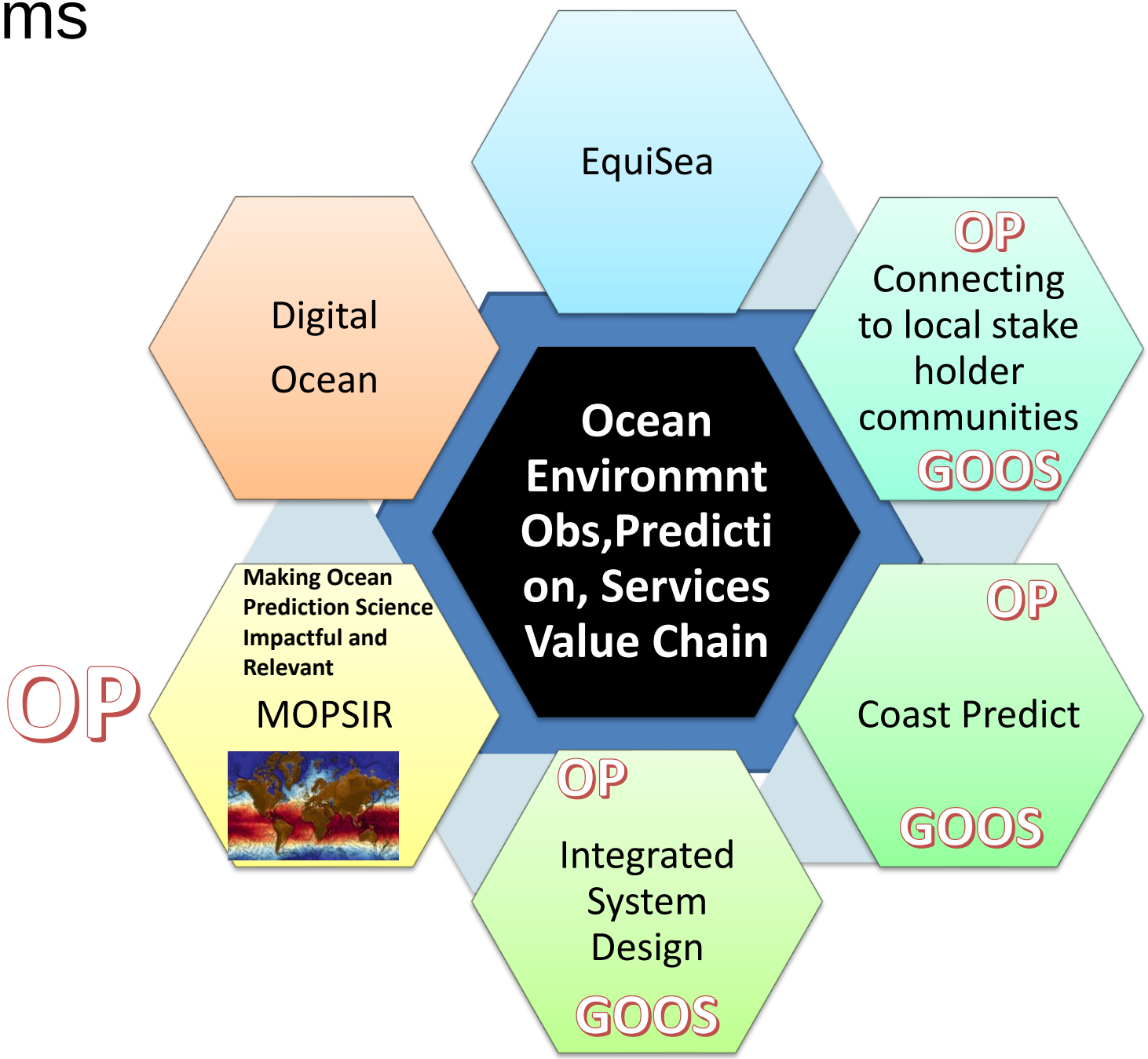
- Colored hexagons = Programs
- Programs contribute to full value chain
- We want strong structured sustained value chain with cyclical review and upgrades
  - i.e. an ocean version of the WMO SGDPFS that is connected/part of the SGDPFS



Structure of Decade Programs around full Value Chain

OP Program led by OceanPredict

OP GOOS Participation in Program by GOOS & OP



Organization

Steering committee (Chairs: ?)

OceanPredict members building on existing task teams
(COSS-TT=>CoastPredict, OS-Val, etc.

Representatives from collaborating programmes
(CoastPredict, EquiSEA, etc.)

Representatives from GOOS, IOC, GEO BluePlanet,
ETOOFS

Specific actions/projects

1.Global 1 km forecasts with significantly improved forecast skills
2.Integrated forecasts of ocean hazards with socioeconomic forecasts to quantify impacts and guide policy and management for preparedness, mitigation and restoration
3.Community description of historical ocean conditions (i.e. Reanalysis) at high resolution
4.Improved descriptions of surface and near surface ocean conditions
•Improved forecasts for extreme events (Tropical Cyclones, marine heat waves, oil spills, etc.) to address “safety of life at sea” considerations.
1.Ecological forecast as area for transformative progress
2.Maximising the impact and value of observations
3.Guiding the evolution of ocean observing systems based on scientific assessment of their impacts and efficiency in ocean predictions
4.Advancing use of ocean prediction technologies in weather and climate predictions, including use of coupled atmosphere-ocean model and coupled data assimilation techniques
5.Integrated short-term, sub-seasonal to seasonal predictions in the coastal zones (including probabilistic products) that can assist institutional and private services towards sustainable management of marine resources, preparedness and response to hazards, marine safety and search & rescue operations
6.Development of Limited Area Earth System models with appropriate coupling between the meteorological, hydrological and oceanographic compartments, to serve as test-beds to address the above issues, to improve model predictability and provide more reliable forecasts in the ocean compartment
7.Contributing to a digital ocean
    •Optimising user value
    •Coordinated approach for digital ocean and digital atmosphere
8.Coupling of open ocean systems with coastal/land systems (partnership with CoastPredict) (KPI: number of coastal systems operationally interfaced with OP systems)
9.Development of an integrated description of the 4D BGC state of the ocean based on satellite and in situ observations that informs society on key issues related to ocean health and the management of marine resources (to be carried out jointly with the development of a global BGC Argo array)
10.Extending the forecast range and ensemble approaches
•Capacity building and training

DECADE SUBMISSION FORM

Details for Decade Program: Overview of Proponent and Proposed Decade Program

1. Lead Institution: OceanPredict
2. Lead Institution type: International Expert Group
3. Lead institution physical address
4. Contact Person: TBD
5. Contact Details: TBD
6. Partner Details: TBD
    1. List of groups in OceanPredict with National leads
    2. List of task teams in OceanPredict with TT leads
7. Title: **Making Ocean Prediction Science Impactful and Relevant (draft)**
8. Acronym: MOPSIR (draft)
9. Summary Description of proposed Decade Program
    1. **(see "summary")**
10. Start and End date: 2020-2030
11. Estimated total budget: $$$
12. Percentage of estimated total budget secured: 0
13. Secured funding sources:
14. Do you require support to find additional resources for your Decade Programme? (YES)
15. Would you like to be put in touch with partners working on similar issues … (YES)
16. Countries in which the proposed Decade Programme will be implemented:
    14. All Ocean Predict Countries
    15. Potentialy emerging OceanPredict Countries (South Africa)
17. Ocean Basins in which the proposed Decade Programme will be implemented: ALL

Details for Decade Program: Description of the proposed Decade Program

18. What is the high-level objective(s) of your proposed Decade Programme?

* 19. What are the key expected outcomes of your proposed Decade Programme?

* 20. Please describe the activities that will be implemented as part of the proposed Decade Programme

(600 words or less)

* 21. Please describe the theory of change that underpins your proposed Decade Programme i.e. how will the activities being carried out achieve the outcomes and objectives that you envisage

(400 words or less)

*

22. Will your proposed Decade Programme enhance the sustainability of ocean science initiatives, including infrastructure or individual / institutional capacity, in light of the current Covid-19 pandemic?

Yes / No

23. If yes, how will your proposed Decade Programme enhance the sustainability of ocean science initiatives, including infrastructure or individual / institutional capacity, in light of the current Covid-19 pandemic ?

(200 words or less)

* 24. Please describe the coordination / management structure for the proposed Decade Programme

(400 words or less)

Contribution of Proposed Decade Programme to the UN Decade of Ocean Science for Sustainable Development (refer to the Ocean Decade Implementation Plan for details)

25. To which Sustainable Development Goal(s) (SDG) will your proposed Decade Programme contribute? Please select a maximum of three SDGs

GOAL 1: No Poverty.
GOAL 2: Zero Hunger
GOAL 3: Good Health and Well-being
GOAL 4: Quality Education
GOAL 5: Gender Equality
GOAL 6: Clean Water and Sanitation
GOAL 7: Affordable and Clean Energy
GOAL 8: Decent Work and Economic Growth
GOAL 9: Industry, Innovation and Infrastructure
GOAL 10: Reduced Inequality
GOAL 11: Sustainable Cities and Communities
GOAL 12: Responsible Consumption and Production
GOAL 13: Climate Action
GOAL 14: Life Below Water
GOAL 15: Life on Land
GOAL 16: Peace and Justice Strong Institutions
GOAL 17: Partnerships to achieve the Goal

* 26. How will your proposed Decade programme will contribute to the SDGs selected? Please Explain *(200 words)*

* 27. How will your proposed Decade Programme contribute to the vision and mission of the Decade (400 words)?

Link to Decade Outcomes:

28. To which Decade outcome(s) will your proposed Decade Programme contribute ?

Outcome 1: A clean ocean where sources of pollution are identified and reduced or removed.
Outcome 2: A healthy and resilient ocean where marine ecosystems are understood, protected, restored and managed.
Outcome 3: A productive ocean supporting sustainable food supply and a sustainable ocean economy.

Outcome 4: A predicted ocean where society understands and can respond to changing ocean conditions.
Outcome 5: A safe ocean where life and livelihoods are protected from ocean-related hazards.

Outcome 6: An accessible ocean with open and equitable access to data, information and technology and innovation.
Outcome 7: An inspiring and engaging ocean where society understands and values the ocean in relation to human wellbeing and sustainable development.

* 29. How will your proposed Decade Programme contribute to the Decade outcomes selected *(200 words)*?

30. To which Ocean Decade Challenge(s) will your proposed Decade Programme contribute?

Challenge 1: Understand and map land and sea-based sources of pollutants and contaminants and their potential impacts on human health and ocean ecosystems, and develop solutions to remove or mitigate them.
Challenge 2: Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to monitor, protect, manage and restore ecosystems and their biodiversity under changing environmental, social and climate conditions.
Challenge 3: Generate knowledge, support innovation, and develop solutions to optimise the role of the ocean in sustainably feeding the world's population under changing environmental, social and climate conditions.
Challenge 4: Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.
Challenge 5: Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.
Challenge 6: Enhance multi-hazard early warning services for all geophysical, ecological, biological, weather, climate and anthropogenic related ocean and coastal hazards, and mainstream community preparedness and resilience.
Challenge 7: Ensure a sustainable ocean observing system across all ocean basins that delivers accessible, timely, and actionable data and information to all users.
Challenge 8: Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering, and visualizing past, current, and future ocean conditions in a manner relevant to diverse stakeholders.
Challenge 9: Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.
Challenge 10: Ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood, and identify and overcome barriers to behaviour change required for a step change in humanity's relationship with the ocean.

31. How will your proposed Decade Programme contribute to the Decade Challenges selected *(200 words)*?

Which Decade Challenges will we contribute:
Ourselves, enabling others, NA

1. Understand and Beat Marine Pollution
2. Protect and Restore Ecosystems and Biodiversity
3. Sustainably Feed the Global Population
4. Develop a Sustainable and Equitable Ocean Economy
5. Unlock ocean-based solutions to Climate Change
6. Increase community resilience to ocean hazards
7. Expand the Global Ocean Observing System
8. Create a digital representation of the Ocean
9. Deliver Data, Knowledge and Technology to All
10. Change Humanity's Relationship with the Ocean

34 With respect to the Decade Objectives selected above, to which Decade Sub-Objective(s) will your proposed Decade Programme contribute?

1.1: Provide the scientific basis for regular integrated assessments of the state of the ocean and identify priority gaps at different scales and in different geographies to frame efforts in exploration, observations and experimentation.
1.2: Promote new technology development and enhance access to technology to generate ocean data, information and knowledge.
1.3: Enhance and expand existing ocean observing systems across all ocean basins to deliver information on standardized essential ocean variables including social and economic, geological, physical, chemical, bathymetric, biological, ecological parameters, and observations on human interactions with the ocean.
1.4: Develop mechanisms that support community-led science initiatives and the recognition and inclusion of local and indigenous knowledge as a fundamental source of knowledge.
1.5: Undertake regular assessments of the state of ocean science capacity to identify and overcome barriers to generational, gender and geographic diversity, and promote sufficient and sustainable investment.
2.1: Generate a comprehensive inventory, mapping, and understanding of the role and function of ocean components including their human interactions and interactions with the atmosphere, cryosphere and the land sea interface.
2.2: Generate a comprehensive understanding of thresholds and tipping points for ocean components, including human interactions.
2.3: Innovate and expand the use of historical ocean knowledge to support sustainable development solutions.
2.4: Improve existing, and develop new generation ocean models for improved understanding of the past, current and future states of the ocean, including human interactions.
2.4: Improve prediction services and increase predictive capability for oceanic hazards or events including extreme weather and climate.
2.5: Expand cooperation in ocean-related education, training, capacity development and transfer of marine technology.
3.1: Broadly communicate and promote the role of ocean science for sustainable development across diverse stakeholder groups including through formal and information education and an expansion of ocean literacy approaches across stakeholder groups.
3.2: Develop interoperable, open access platforms and applications to share data, information and knowledge in a format that connects knowledge generators and users.
3.3: Undertake interdisciplinary, multi-stakeholder co-design and co-delivery of ocean solutions including policy, decision making, integrated ocean management frameworks, applications and services, and technology and innovation.
3.4: Expand and enhance spatial planning processes to contribute to sustainable development across regions and scales.
3.5: Expand and enhance inclusive and integrated management frameworks and tools, including nature-based solutions, to maintain ecosystem functioning, provide for adaptive processes under changing ocean conditions, and incorporate community values and needs.
3.6: Expand and enhance services, applications and management tools for building and mainstreaming preparedness and adaptive responses to multiple stressors and hazards.
3.7: Expand and enhance tools, applications and services that integrate and facilitate use of data, information, and knowledge on ocean-related natural capital including the social, cultural, environmental, and economic characteristics of the ocean.

*** 35. How will your proposed Decade Programme contribute to the Decade sub-objectives selected (200 words)?**

4. Communications

38. Please describe how you plan to communicate about your proposed Decade Programme including the main target audiences and methods of communications *(400 words or less)*.

* 39. Have you developed a communications strategy or plan as part of your proposed Decade Programme? If so, please attach it as part of the supporting documentation.

Yes / No

40. If yes, please attach the communications documents requested.

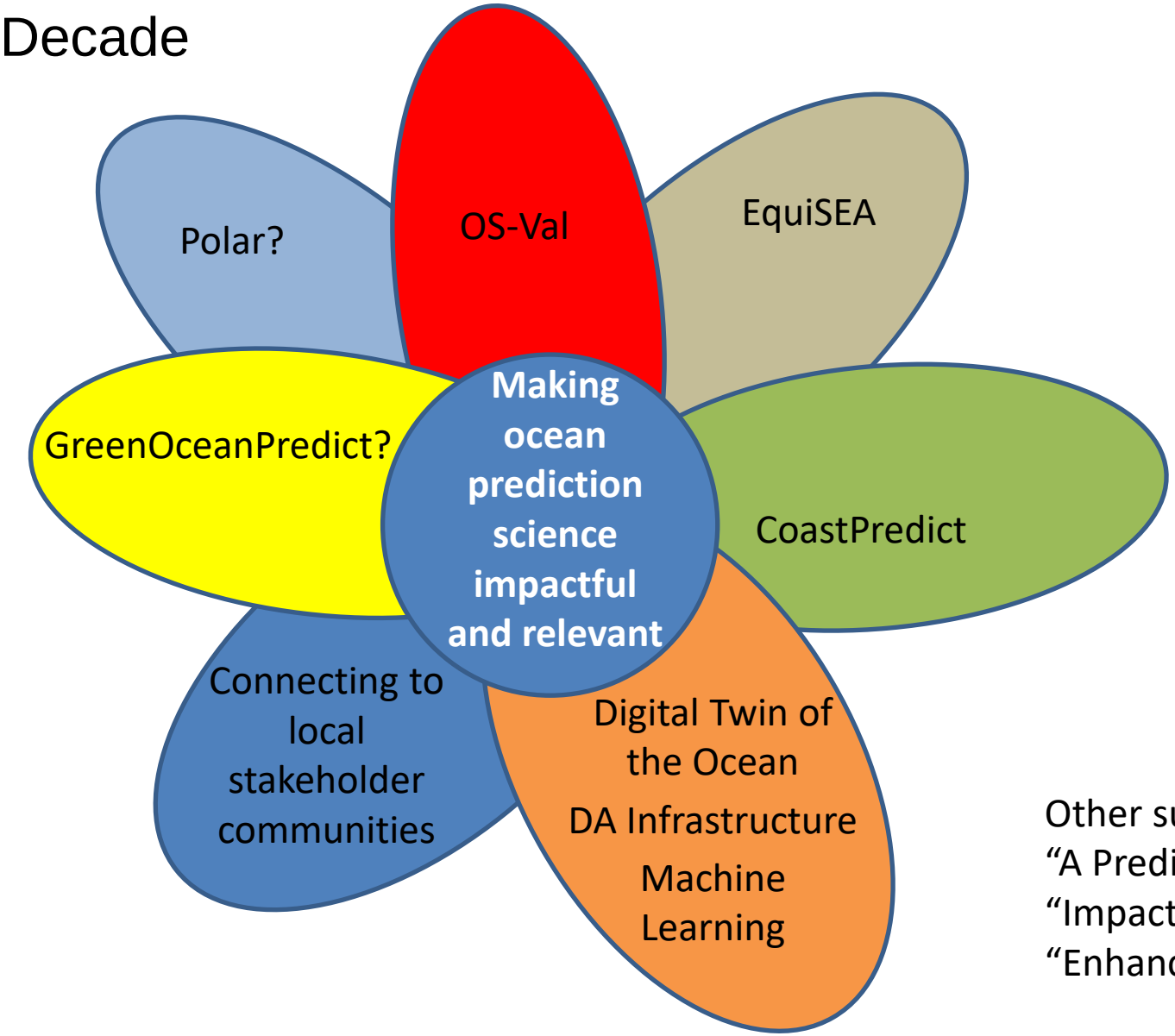
5. Supporting Documentation

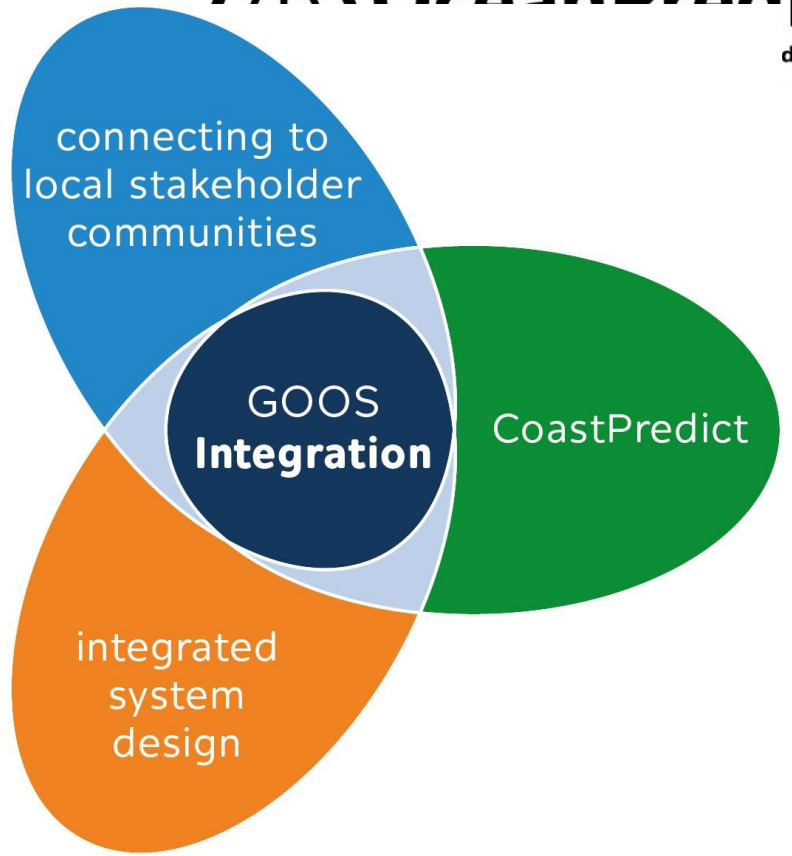
41. Please attach any relevant supporting documents to your submission that will aid in its evaluation e.g. project log frame, research proposal, high-level budget, data management plan, communications strategy, or letters of support. Please note that none of these documents are obligatory, but can be provided at the discretion of the proponent if they feel it will help in the understanding of their request.

* 42. Please confirm that you have completed your form submission

BACK POCKET SLIDES

#OceanDecade



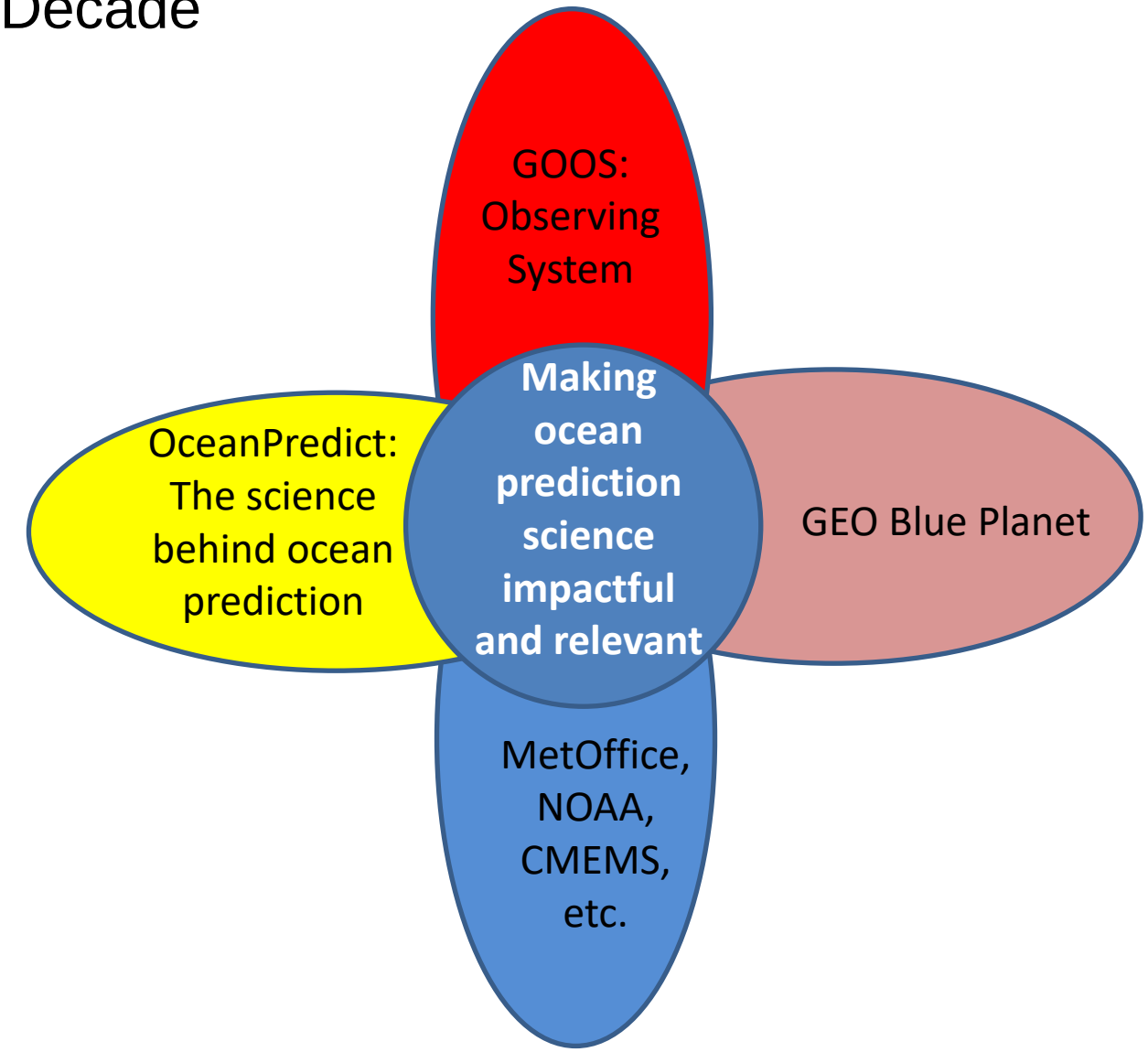


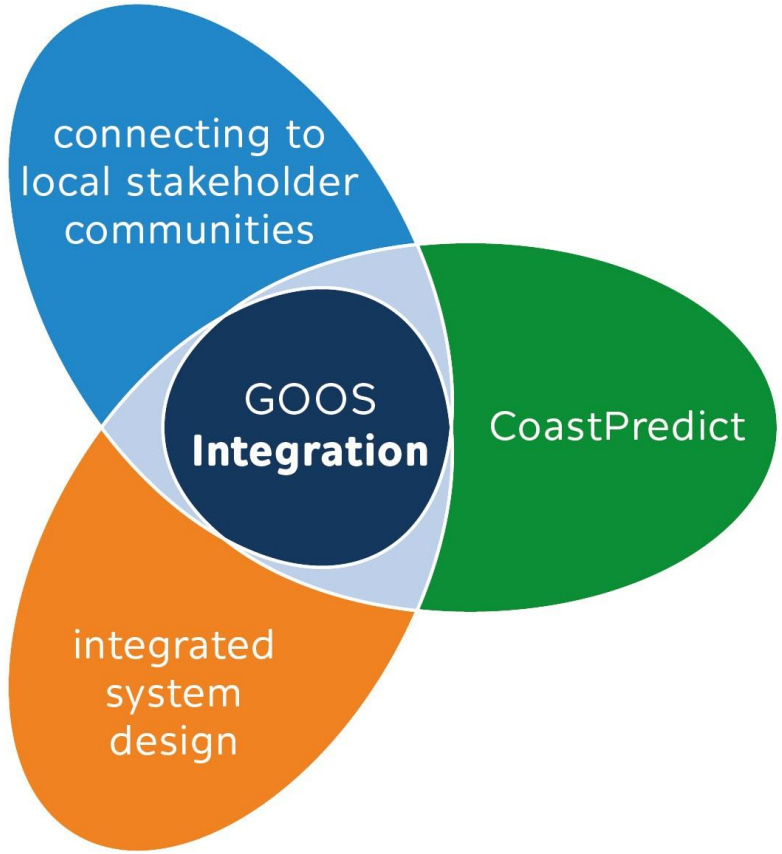
Other suggestions
“A Predictable Ocean with Impact”
“Impact-based Forecasting and Prediction”
“Enhancing the impact of ocean prediction science”

Connections with other programmes

#OceanDecade

OceanPredict
Advancing the science of ocean prediction





Partnership

The basic concept of a Global Coastal Ocean has been defined about a decade ago in five Volumes of The Sea (Vol. 10 to 14, Harvard Univ. Press)

Coastpredict will redefine the "coastal ocean"

PROPOSED STARTING DEFINITION:

*the coastal ocean - that area, extending **inshore** from the estuarine mouths to river catchments affected by saltwater, to the urban settlements on the one side and on the other to the **offshore,** from the surf zone to the continental shelf and slope where waters of continental origins meet open ocean currents.*

CoastPredict Overaching Goal and Main Decade OUTCOMES

MAIN Overaching Goal:

A predicted coastal ocean where society understands and can respond to changing ocean conditions

Outcomes:

1. Integrated knowledge of the global coastal ocean from **events** to **CLIMATE**;
2. Integration of coastal and open ocean **observing and modelling** systems;
3. Improved, **multidisciplinary and extended range predictive capabilities for the coastal zone;**
4. *Innovative and sustainable applications for coastal solutions/services.*

THE FUTURE OF FORECASTS:

IMPACT-BASED FORECASTING

FOR EARLY ACTION

ARRCC · Met Office · Climate Centre · UKaid · Anticipation Hub · REAP

Title: A transparent & accessible ocean: Towards a Digital Twin of the Ocean

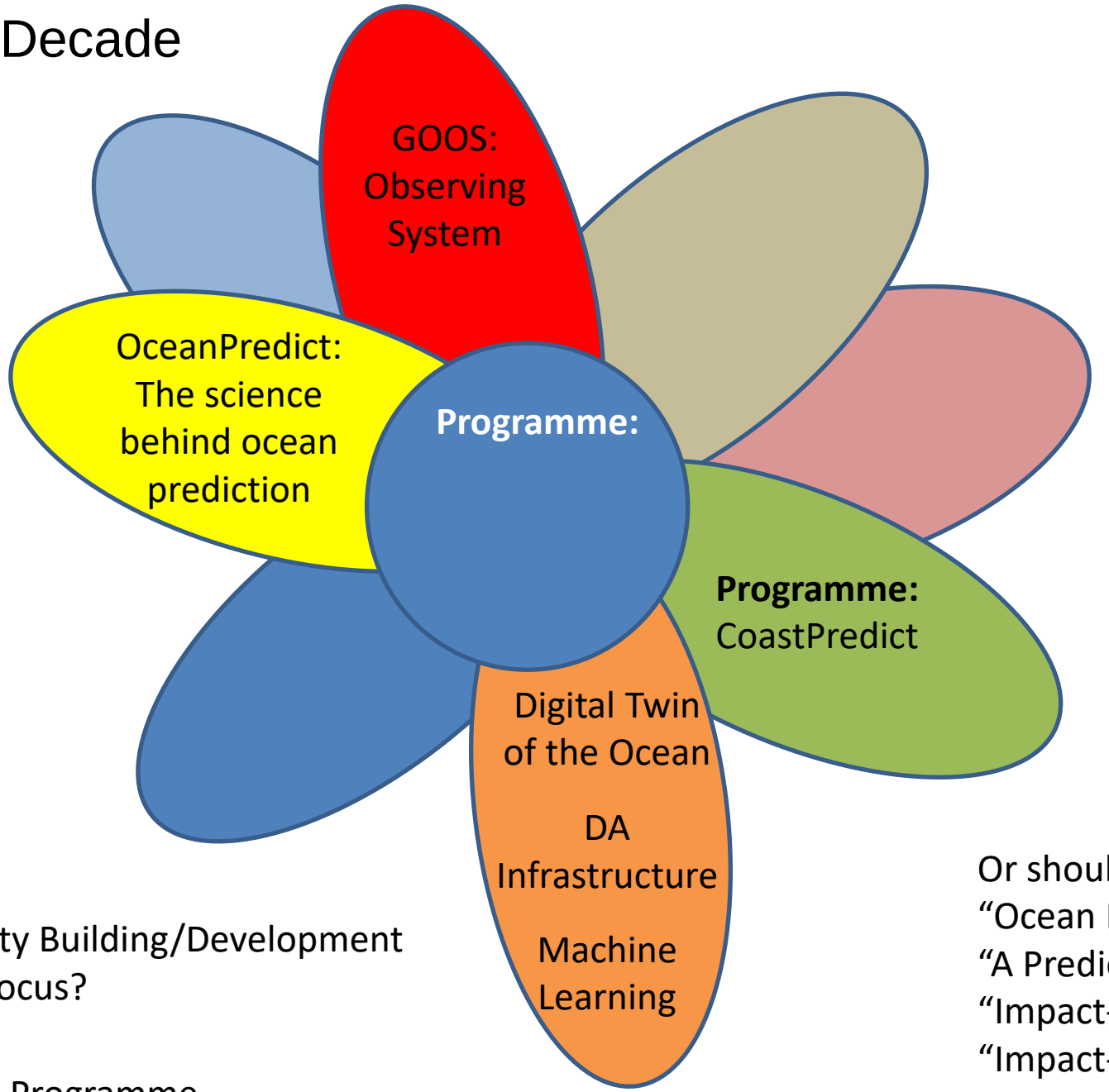
Specific Challenge

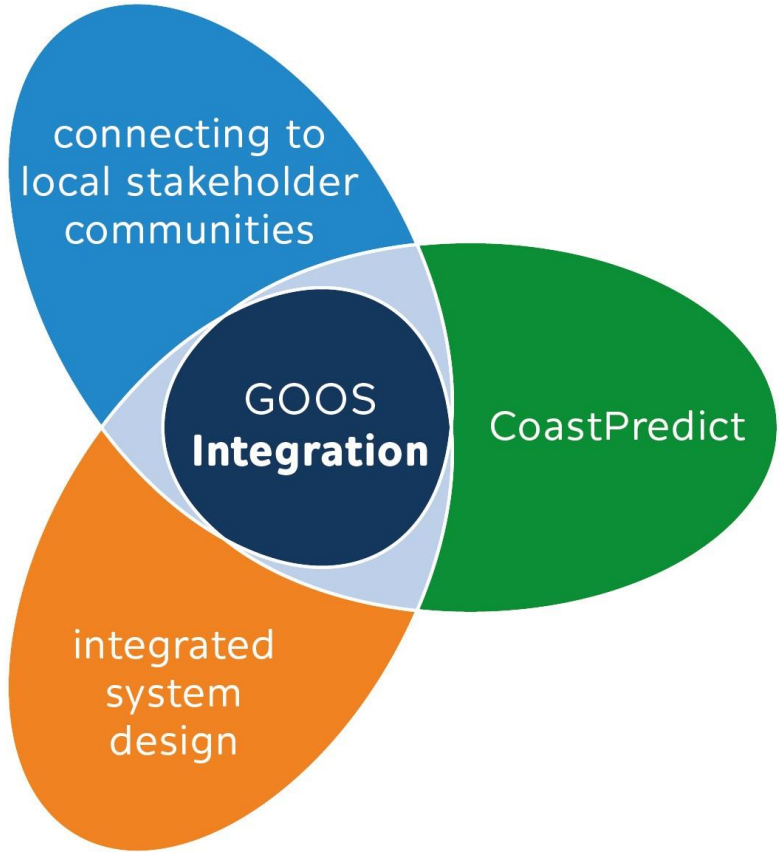
Fit for purpose and sustained ocean observations are an essential part of worldwide efforts to understand and protect marine social-ecological systems whilst benefiting from their ecosystem services. Observations can be samples collected on ships, measurements from instruments on fixed platforms, autonomous and drifting systems, submersible platforms, ships at sea or remote observing systems such as satellites and aircrafts.

10-20 years ago, marine data from these observations were difficult to find, only accessible through long and sometimes costly negotiations and hard to put together to create a complete picture because of different standards, nomenclature and baselines. Ocean forecasting was a research activity. In two decades, the European Union invested in policies and infrastructures to make knowledge of the ocean central to environmental and climate policies as well as the blue economy. Its Member States, together with neighbours, have created an unrivalled marine data and forecasting infrastructure. Working together and the principles of free and open access, interoperability, and “measure once, use many times”, largely promoted through, Copernicus,

#OceanDecade

OceanPredict
Advancing the science of ocean prediction





Capacity Building/Development
Polar focus?

Programme

Or should it be “A Predicted Ocean with Impact”
“Ocean Prediction with Impact”?
“A Predictable Ocean with Impact”?
“Impact-based Global Ocean Prediction”?
“Impact-based Forecasting and Prediction”?
“Ocean and Coastal Prediction for Sustained Benefit”?
Or something else?