The Global Ocean Observing System

Observing Implementation

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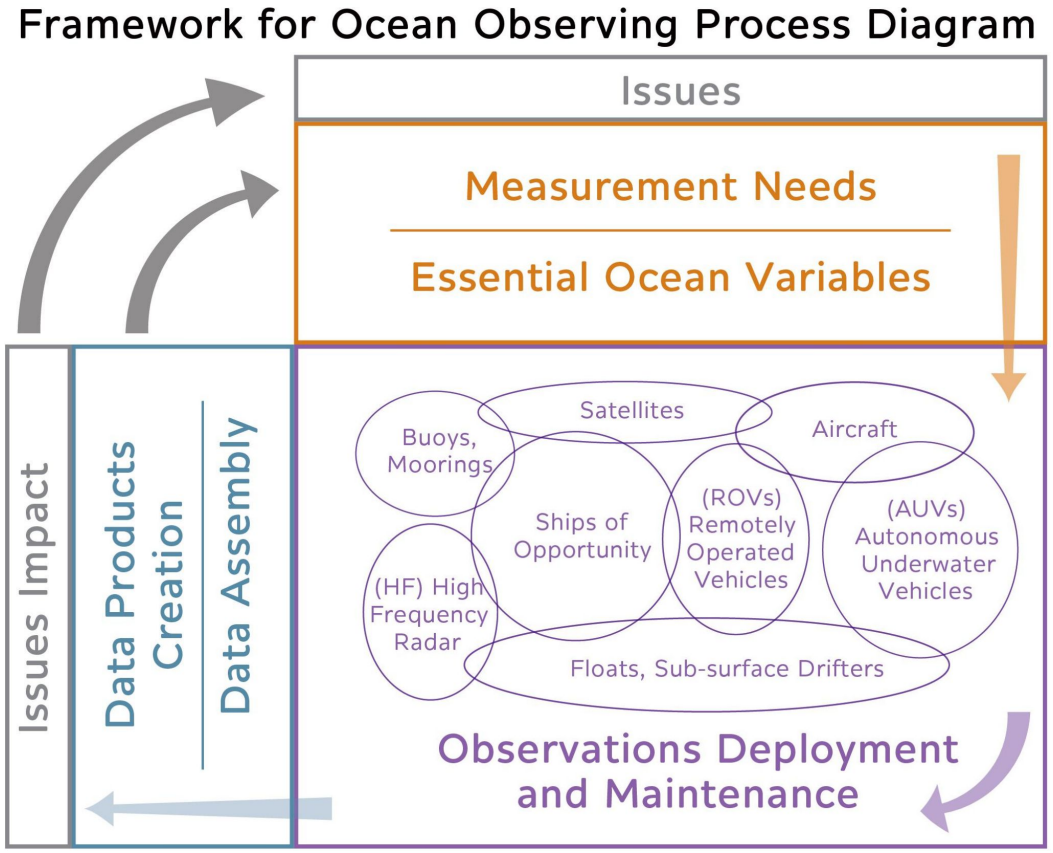
ONC, Victoria, British Columbia, Canada

BACKGROUND

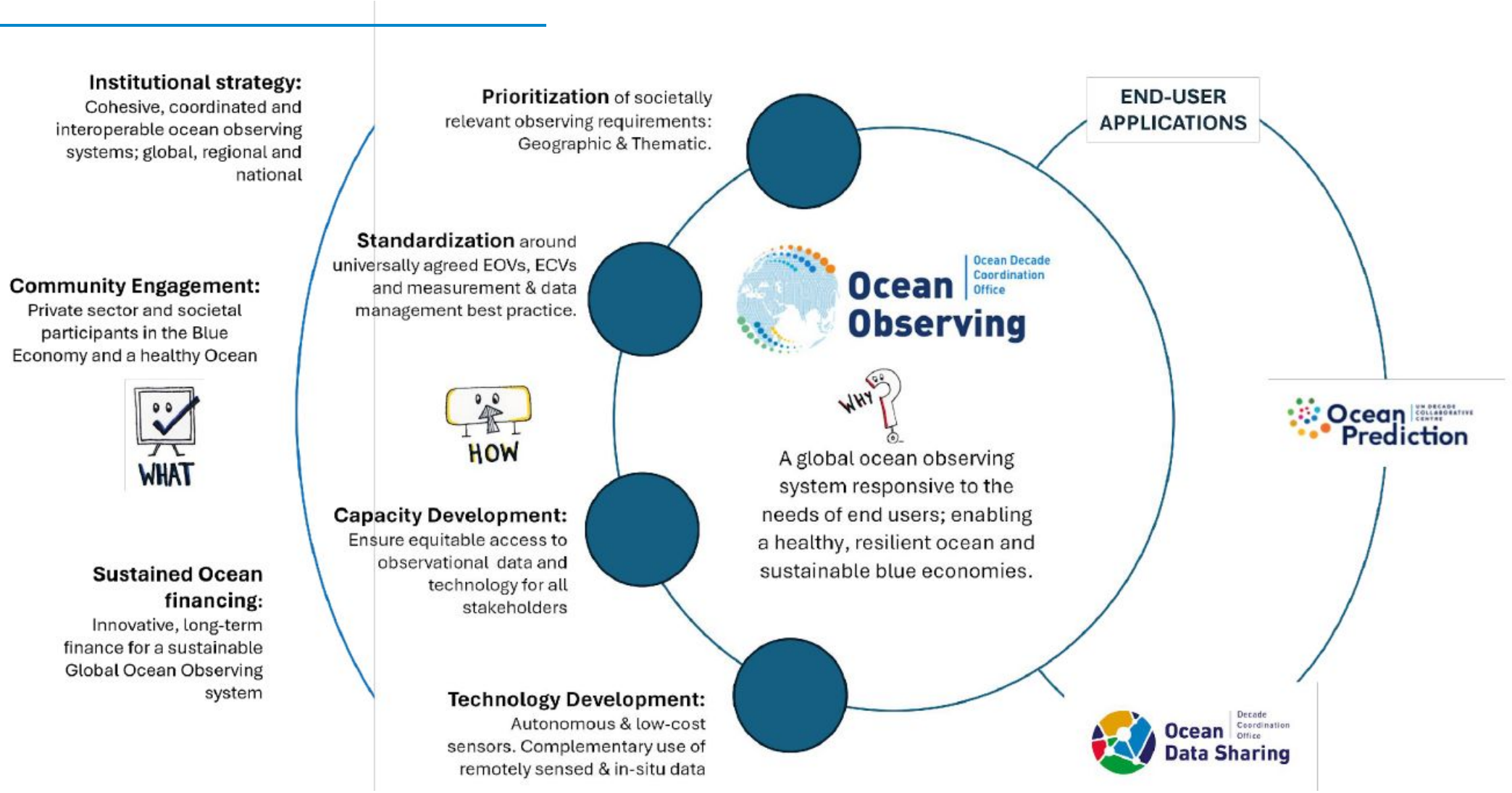
- During the OCG-14 meeting (June 2023) in Cape Town, we discussed progress in developing and meeting observing requirements and challenges of observing implementation against them.
- Noting that we have many requirements development processes (GOOS panels/EOVs, WMO-RRR, GCOS, etc.) and discussions on these in multiple fora, but there is **no consistent process** to integrate requirements and implementation ideas and plans (across networks, GOOS projects, etc)
- Suggested action was to organize a workshop around this intersection and hold the workshop in conjunction with OCG-15.

The Beginning - FOO

- How are observing requirements (e.g., GCOS, WMO-RRR) impacting use and prioritization of ocean observing?
- What is the common forum to discuss these factors and streamline a process to guide implementation particularly on a global scale?
    - Increased # of separate fora exists on topical or regional scale -> leading to more diffused and confused messaging across GOOS
- **Need: Driver for conversations around requirements / synthesis through the outlet of a responsive observing system**



DCO VISION



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The OCG Shall (from OCG Terms of Reference):

(a) **Coordinate** across the designated OCG global ocean observing and emerging networks, associated pilot projects, and appropriate bodies **to ensure an effective and integrated global ocean observing system**

(b) support the development and implementation of **regular processes for reviewing and evaluating the integrated GOOS**

(c) Provide at minimum **an annual report** to the Global Ocean Observing System Steering Committee (GOOS SC) and the WMO Infrastructure Commission (INFCOM) **on the effectiveness, coordination and operation of GOOS OCG observing networks**, for example on implementation status, performance, progress towards meeting observing system user requirements, implementation of standards and best practices, capacity development, and delivery of data and metadata to designated centers and users.

(d) **Provide advice** to IOC and WMO, for example **on potential innovations, technologies, solutions, and pilot projects towards enhancing earth-system observing**.

(e) **Encourage technical development** within and across existing OCG observing networks and engage with emerging networks and communities of practice, that are the key to better address existing and new requirements and needs;

A PATH FORWARD

Integrated GOOS OCG Observing Activities

Drivers

1. Lack of clarity on how observing requirements and societal needs influence ocean observing activities and designs of the system
2. Increased demands for addressing requirements across OCG networks and panels
3. Need for coherent/unified expression of ocean observing priorities (and associated value propositions)

Integrated Global Ocean Observing Plan(s)

Framing for a plan?

Climate

mitigation and adaptation, seasonal forecasts

Forecasts and warnings

supporting the marine economy and reducing risk

Ocean health

sustainability of ocean ecosystem services

GOOS Delivery Areas are one (attractive) approach to frame an observing plan/identify needs. It would emphasize use.

Potential structure

Climate

mitigation and adaptation, seasonal forecasts

Forecasts and warnings

supporting the marine economy and reducing risk

Ocean health

sustainability of ocean ecosystem services

Observing implementation plan	Observing implementation plan	Observing implementation plan
EOV priorities and plans	EOV priorities and plans	EOV priorities and plans

Process/next steps

- Build on network maturity concept
- Priorities! (not everything can be addressed at once)
- Priorities lead to more robust perspective
- It will be difficult
- It will be imperfect (initially)
- It needs to be assessed and update regularly (co-design)

If not these, then how do we frame the observing plan? Regional? EOV?

REALIZING THE FUTURE?

1st Challenge

- **There are many plans** (e.g. GCOS, TPOS, TAOS, INDOOS, Argo, DBCP-Drifters, etc)... and the number of observing recommendations/plans will likely increase (eg from UN Decade activities).

Question 1: Is there agreement that it's time to work towards an integrated observing plan(s)? That speaks to EOVs?

Question 2: Are the GOOS Delivery Areas the preferred framing? Global vs Regional focus?

2nd Challenge

- **No common forum** (there are many though!) to **integrate and prioritize observing** requirements beyond these or tracking of its implementation in the ocean community
    - Unclear how observing requirements (e.g. GCOS, WMO-RRR), **impacts use** and **prioritization** of ocean observations, research innovation, key metrics, and other drivers of ocean observations are considered in sustaining and evolving the observing system
- Shouldn't users have a strong position is setting priorities? (this is a big missing piece…for global systems in particular)

Question 3: WHO ARE the users of OCG observing networks and EOV information, and how should their needs be incorporated into the plans?

NEXT STEPS

TAKING ACTION

- Host a workshop or series of **workshops** to address the components of relevant processes, eg. developing a **common form/process** for observing system prioritisation, requirements, recommendations, stakeholder engagement

- Potential next steps
  - Engage more with Panels, Steering Committee, UN Decade DCO on this topic
  - Engage in and learn from BGC Panel-led discussion around ocean oxygen
  - Scope out a pilot activity/plan (costs, timeline, aims, etc).
  - Discuss with G7 FSOI - some of the major sponsors of GOOS observing

INITIAL QUESTIONS & DISCUSSION

- **Question 1:** Is there **AGREEMENT** that it's time to work towards an integrated observing plan(s)? That speaks to EOVs?
- **Question 2:** Are the GOOS Delivery Areas the preferred **FRAMING**? Global vs Regional focus?
- **Question 3: WHO ARE** the users of OCG observing networks and EOV information, and how should their needs be incorporated into the plans?

The Global Ocean Observing System

Thank you

goosocean.org

unesco
Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment programme

International Science Council

Question 1: HOW MANY observing plans do we need? How (eg through use of EOVs) can more standardized and integrable recommendations/plans be encouraged?

Question 2: WHAT is THE integrated GOOS observing plan(s)? How many do we need?

Question 3: WHO ARE the users of OCG observing networks and how do the networks incorporate user feedback? Assess satisfaction? When was the last time you had a conversation with them?

Question 4: HOW DO OCG networks decide on their design and priorities (amidst all the existing plans)? And their future priorities for implementation?

GETTING IN ACTION

- Is there general **agreement** that a **larger-scale observing plan** and **process** is needed to cut across disciplines and synthesized towards a more integrated observing system plan?
- Host a workshop or series of workshops to address the components of relevant processes, eg. developing a **common form/process** for observing system requirements, recommendations, and plans (eg from GOOS projects)
- Potential next steps
  - Engage more with Panels, Steering Committee, UN Decade DCO on this topic
  - Discuss with G7 FSOI - some of the major sponsors of GOOS observing
  - Scope out a pilot activity/plan (costs, timeline, aims, etc).

3rd Challenge

- **No common forum or process to guide implementation** particularly on a global scale (or set/reflect priorities across observing activities)
    - No current forum exists to streamline a process to guide implementation to best meet user needs

Questi

More Difficult QUESTIONS (to answer later)

- What do our sponsors want from such a Plan? Eg Prioritized set of activities? Integrated observing system plan?
- What elements should such a plan have? How do we prioritize (and factor in user needs into priority setting)
- Are the GOOS Delivery Areas the “right” ones?
- How do we organize to look across networks and determine what observing systems should be considered for each Delivery Area?
    - Stakeholder engagement
    - Impact studies

REQUIREMENTS

- Setting requirements: Panels - BioEco, BGC, OOPC [no consistent way]

- Inconsistent

- 1) Are these considered by the networks? If yes - how? Is there a good understanding of the way the networks follow/fulfill the requirements set by the panels? Do we need to have a better grasp on this?
- 2) If no - do we need to? Is this something we need/want to explore how to better meet requirements?
- Consistently develop design and update requirements and the integration of all of these things?
- EOV not a sufficient framework and need to move into the application space which includes **user engagement**
    - 3) Exemplars are developing thematic requirements - how to best connect networks to these activities?

If we had a template of how to do all of this what would it look like? WMO requirements doesn't drive the design -

REQUIREMENTS

Who are our stakeholders? How do we best engage them? When was the last time you had a conversation?

Exemplar design observing system and network strategies - how is this fused?

How do we make decisions on priority?

Need is to define process of distill needs into a global ocean observing system design (integrated)

- Workshop?

What is the next step to get to global ocean observing system?

Common process?

WIGOS an observing strategy?

REQUIREMENTS

Framework using

- EOV
- GOOS networks
- Application areas

Out of this we want a design with priorities, implementation strategy (global to local)

How do we get there?

GOOS application areas

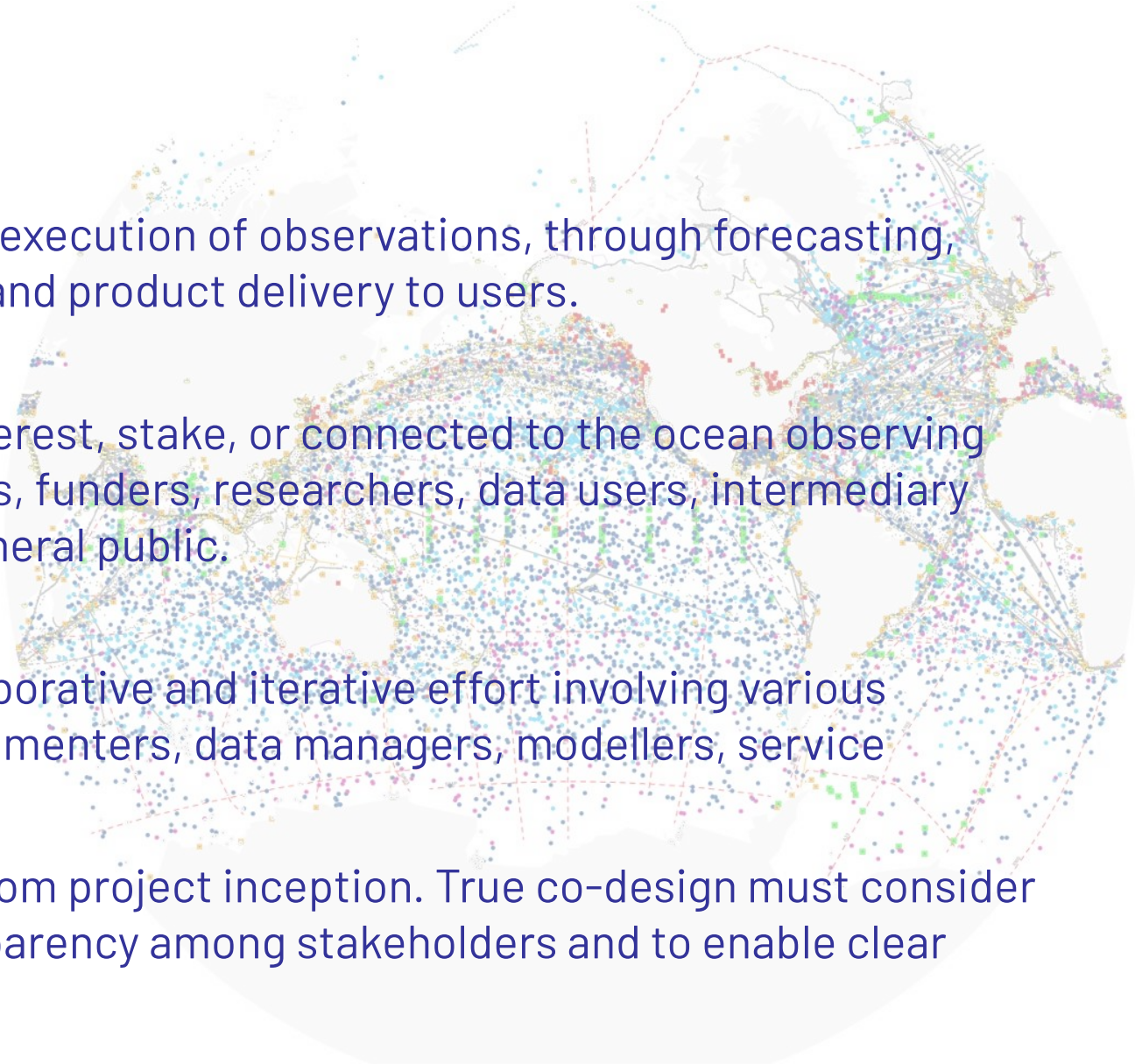
What are the key questions to get us there? Potential actions?

- What are the application areas?
  Map onto application areas, EOV and networks
- Integrated across GOOS across the 3 areas

REQUIREMENTS

- Intersections of Networks, OOPC and GRAs - roles in developing requirements
- How do we assess and look at the requirements? How should we manage the implementation?
- Challenge is - too many requirements - what decides what is the level of implementation? Requirements justify parts of an observing system.
- Impact studies are key to assess the importance.
- cost vs impact
- how do we organize or do we need to organize - processes to look across networks and determine what observing systems should be part of the global system?

DEFINITIONS



OCEAN OBSERVING VALUE CHAIN

An ocean observing value chain represents the execution of observations, through forecasting, assessment, and data management to service and product delivery to users.

STAKEHOLDER

Stakeholders refers to anyone with a vested interest, stake, or connected to the ocean observing value chain, including but not limited to projects, funders, researchers, data users, intermediary users, product and service providers, to the general public.

CO-DESIGN

Understood to be a continuous process, a collaborative and iterative effort involving various stakeholders, including observing system implementers, data managers, modellers, service providers, and end-users.

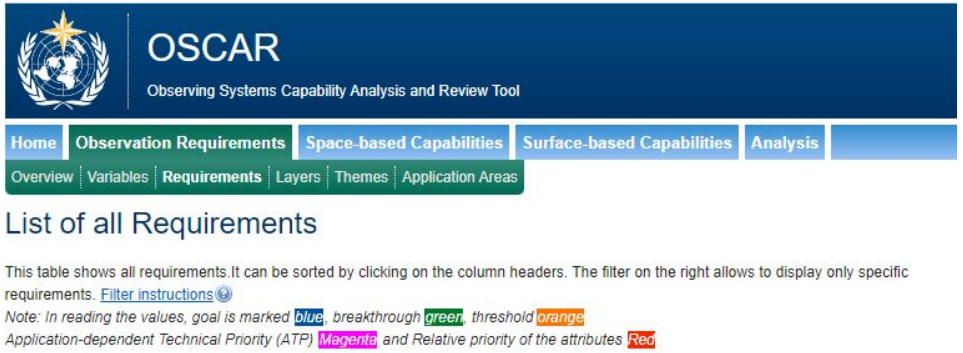
Co-design must be considered and practised from project inception. True co-design must consider what the processes should be to achieve transparency among stakeholders and to enable clear decision making.

OBSERVING REQUIREMENTS - AN OVERVIEW

WMO - ROLLING REVIEW OF REQUIREMENTS

WORLD METEOROLOGICAL ORGANIZATION

- The RRR is the process to **collect, vet** and **record** user requirements and match them against observational capabilities
- Revised RRR includes the recognition of space, atmosphere, Oceans, Hydrosphere, terrestrial, Cryosphere



- The high-level guidance document **summarizes gaps** in the observing system and **list priorities** for actions for next 5 years
- Document relies on information gathered through the RRR
- Target audience: **WMO members**
- **Two relevant Application areas:** 9. Ocean applications & 12. Climate monitoring (currently under revision by GCOS and WCRP)

GCOS REQUIREMENTS

- GCOS published a 2022 GCOS Implementation Plan and the 2022 ECV Requirements
- Provides recommendations for a sustained and fit for purpose Global Climate Observing System
- Identifies six themes, each of them including several actions that if undertaken in the next 5-10 years
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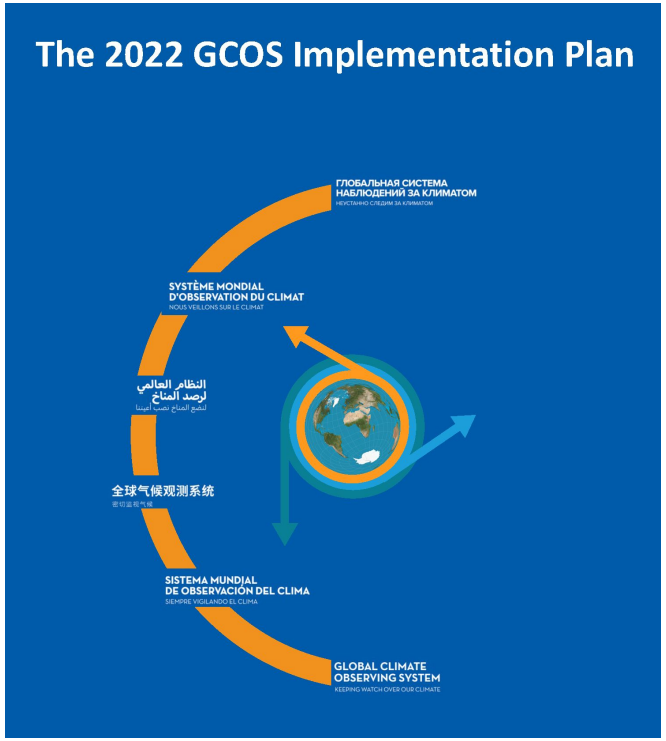
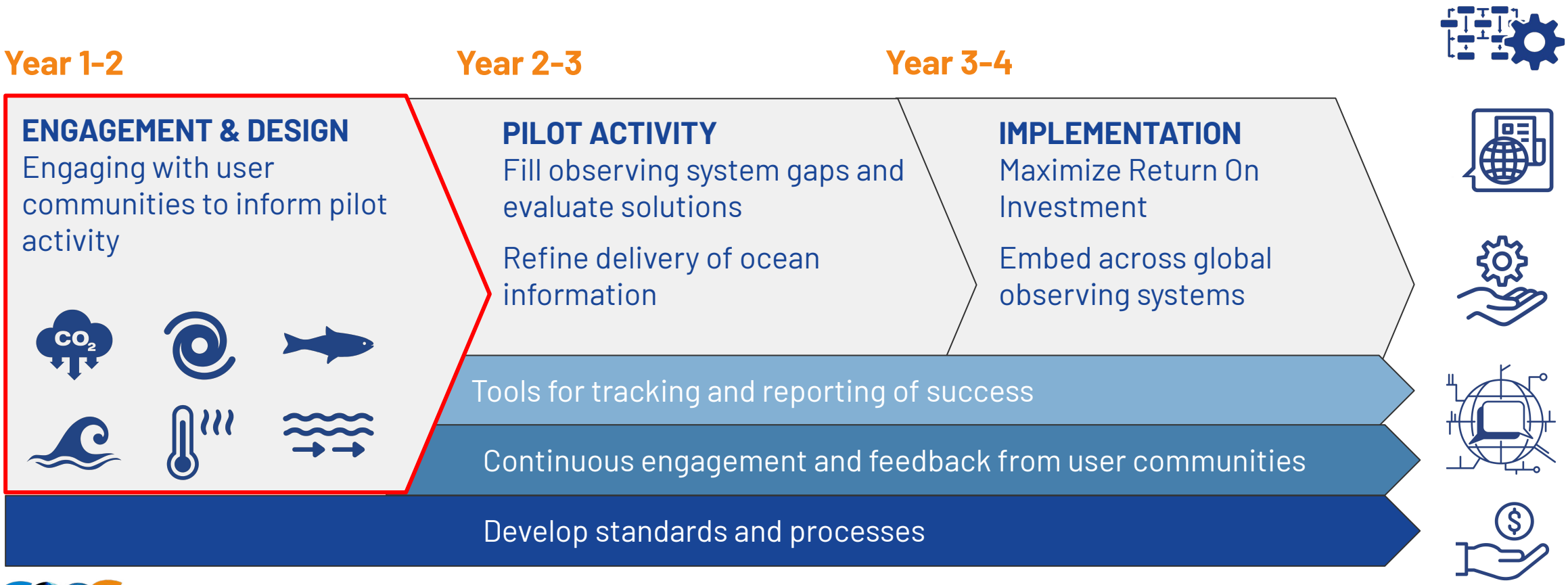


The GCOS 2022 Implementation Plan is available here

The 2022 ECVs Requirements is available here

OCEAN OBSERVING CO-DESIGN PROGRAMME

The Programme will evolve the ocean observing system so that it is **co-designed with end-users and responds to their needs.**



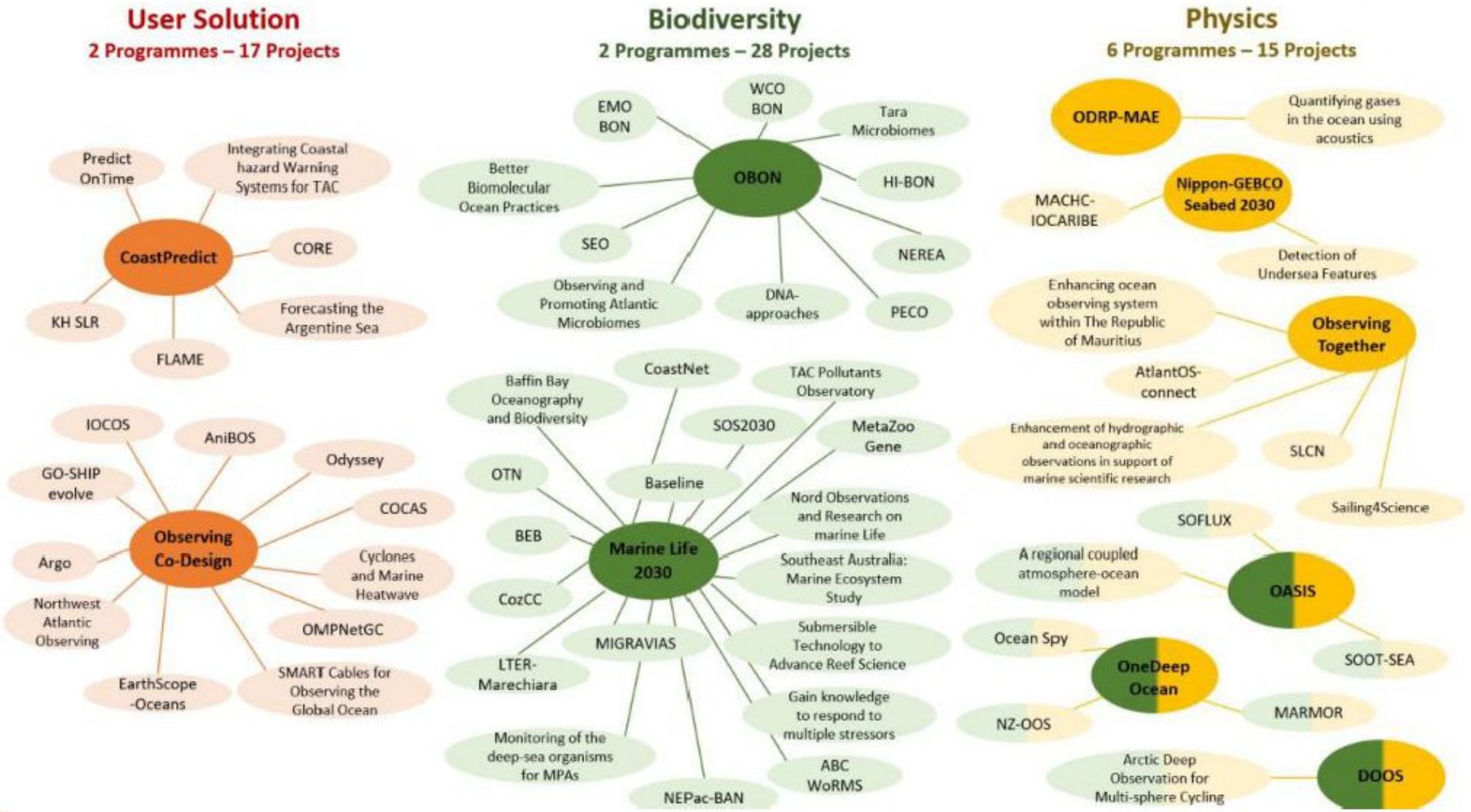
THE QUESTIONS

- Need a guide to implement and what the obs system should look like?
  - Currently done within the networks
  - Satisfaction in the networks but not for the people needing specific information i.e. codesign
- How do you decide amongst the networks what to use?
- Driven by requirements and user needs

THE QUESTIONS

- Session outcome:
  - 2) Set of processes to prioritizes requirements against a minimal number of mission areas through workshops - how do we get there?? How do we organize or do we need to organize - processes to look across networks and determine what observing systems should be part of the global system? [Asking this group for feedback/comments]
    - Stakeholders / People at the meeting
    - Implementation/design - FOO orange and purple
    - Impact assessment / economic / quantitative OSE/OSSE / KPI
    - What goes into it?
    - Implementation?
    - Impact studies? KPI?

PROGRAMMES AND AFFILIATED PROJECTS



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