The IEEE Perspective on *the Value of Standards for Ocean Science and Technology*

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Advancing Technology for Humanity

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OES Standing Committee on Standards (OES SCS)

IEEE Oceanic Engineering Society

Standards

Think of them as a **formula** that describes the best way of doing something -

- Making a product
- Managing a process
- Delivering a service
- Supplying materials

Standards are the **distilled wisdom** of people

https://www.iso.org/standards.html

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How to get from distilled wisdom to a cooking recipe?

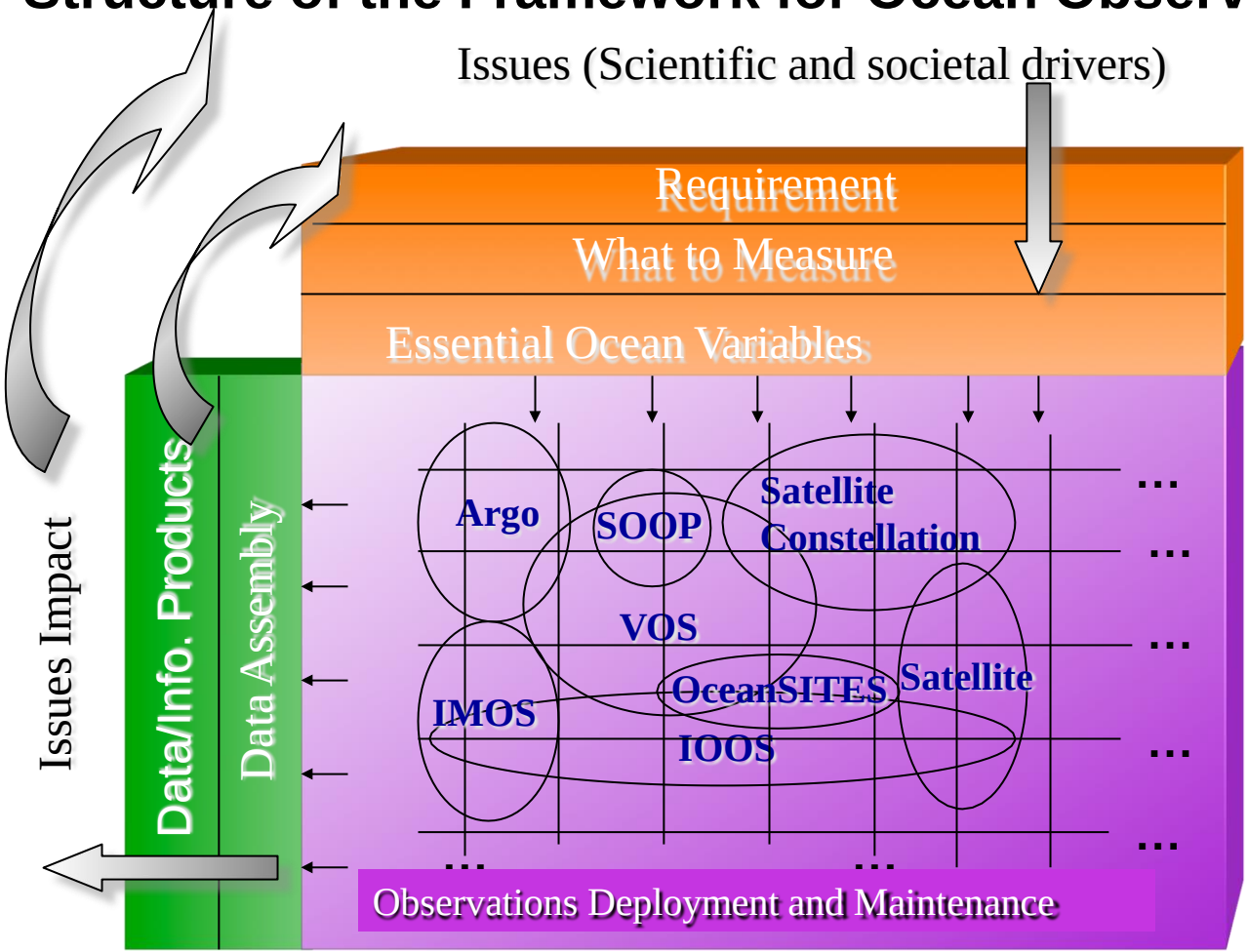
- NEEDS AND REQUIREMENTS HAVE TO BE IDENTIFIED
- AN AGREEMENT BETWEEN ALL INVOLVED EXPERTS HAS TO BE ACHIEVED

Standards in Metrology

Establishment of Regional Marine Instrument Centers (RMICs) to facilitate and transparently describe the quality assured dataflow from instruments to end-users

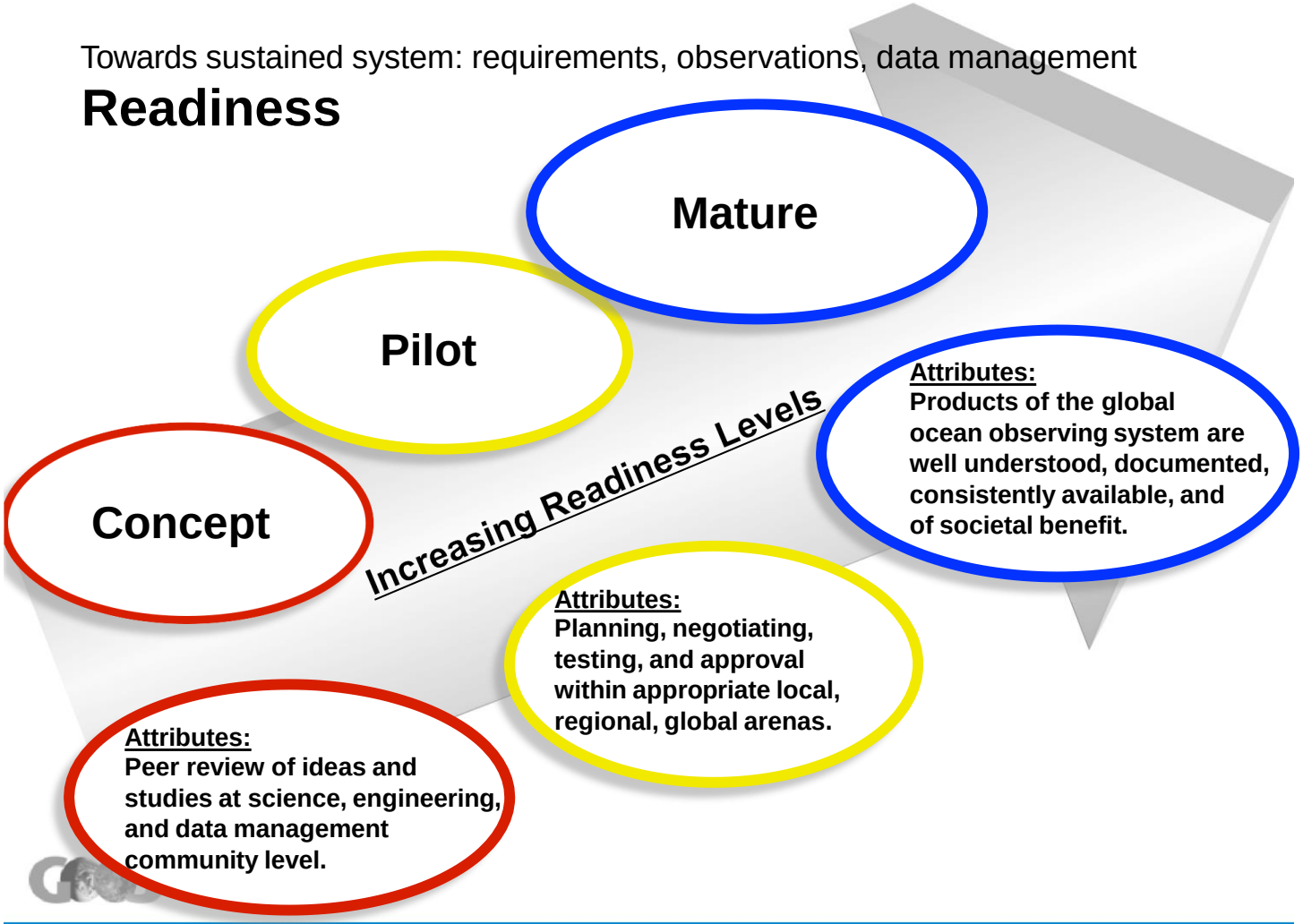
(National Center of Ocean Standards and Metrology, China ,NCOSM)

Structure of the Framework for Ocean Observing



Towards sustained system: requirements, observations, data management

Readiness



Essential Ocean Variables

are identified by the GOOS Expert Panels, based on the following criteria:

- **Relevance:** The variable is effective in addressing the overall GOOS Themes – Climate, Operational Ocean Services, and Ocean Health.
- **Feasibility:** Observing or deriving the variable on a global scale is technically feasible using proven, scientifically understood methods.
- **Cost effectiveness:** Generating and archiving data on the variable is affordable, mainly relying on coordinated observing systems using proven technology, taking advantage where possible of historical datasets.

Essential Climate Variables (ECV) are

physical, chemical or biological variable or a group of linked variables that critically contributes to the characterization of Earth’ s climate.

ECV are identified based on the following criteria:

Relevance: The variable is critical for characterizing the climate system and its changes.

Feasibility: Observing or deriving the variable on a global scale is technically feasible using proven, scientifically understood methods.

Cost effectiveness: Generating and archiving data on the variable is affordable, mainly relying on coordinated observing systems using proven technology, taking advantage where possible of historical datasets.

Agreement

- The **quality and homogeneity of data** should be regularly assessed as a part of routine operations.
- **Long-term requirements**, including appropriate sampling frequencies, should be specified to network designers, operators and instrument engineers at the outset of system design and implementation.
- The conversion of **research observing systems to long-term operations** in a carefully-planned manner should be promoted.
- **Data management systems** that facilitate access, use and interpretation of data and products should be included as essential elements of climate monitoring systems.

Extract GCOS Climate Monitoring Principles

Agreement

Use of existing WMO/IOC and IODE/GOOS panels and committees to discuss and reach agreement on how to

- ensure data quality
- raise trust in collected data and information
- harmonize practices and procedures

Based on this agreement standards can be developed and will allow for a better use of the collected data.

WMO procedures maybe used as a model

The OES SCS Standards Strategy

Standards shall serve to:

- ensure that products and services are **comparable in their functional scope** and that they have been **qualified in a similar manner**. As an example, manufacturers can only claim the same accuracy for their instrument when they had been **tested with equivalent methods**

- **facilitate interoperability and interchangeability** of product and services. This will be necessary if ocean observations in different parts of the world shall be made compatible

- **overcome disparate operating procedures** that often can be observed within different ocean observing networks

Challenges that come with Standards

- Some standards may have **startup cost and "overhead"** in the form of software development or operations costs

- Standards may become **obsolete with technology advances** or when technologies age and seldom used,

  e.g., Simplified Object Access Protocol (SOAP) internet protocol is no longer widely used for new systems which use more modern compact protocols such as JSON

- Manufacturers may see financial advantages to **proprietary protocols and formats**, reluctant to adopt standards

Conclusions

- The OES Standing Committee on Standards is defining its role in this framework as a **coordinating body to bring the different stakeholders** together and motivate the development of standards

- As part of the discussion on the impact of climate variability and changes standards appears to be a necessary step towards achieving **trustworthy information** on the condition of the world oceans

- It appears to be the right moment to discuss the value of standards and **broaden the membership** within the committee in regard to the number of members and countries involved

Thank you for your attention

OES Standing Committee on Standards

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