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# Innovative Technology for Ocean Observing

June 18<sup>th</sup>, 2021  
EC Ocean Observation event,  
Session 1 - Ocean Observing Technology:  
Optimizing European Capability,  
*online*

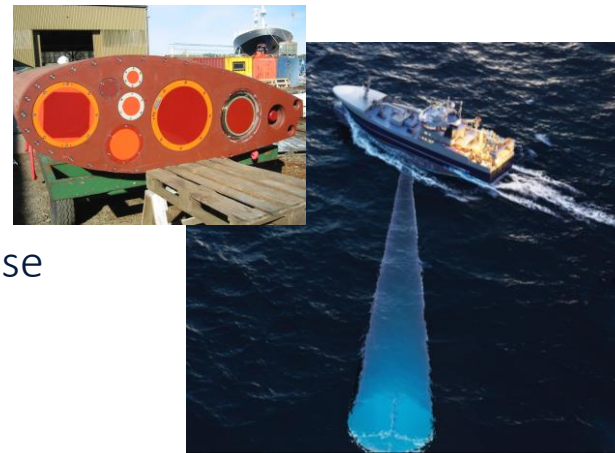
Peer Fietzek, Snr BD Mgr Ocean Science



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# Active Acoustics

>70 years of continuous echo sounder innovation and market expertise



## Sensor technologies:

- Quantitative echo sounders, sonars, multibeam for
  - Organisms (mm – m; plankton, fish, etc.)
  - Gas bubbles
  - Clines, internal waves
  - Bathymetry, seabed characterization
    - Biology and ecosystems EOVs: Fish abundance and distribution, Zooplankton biomass and diversity



- Acoustic Doppler Current Profiler (ADCP)
  - Physics EOVs: Surface currents, subsurface currents

## Features:

- Many frequencies, Continuous wave (cw) and frequency modulation (fm)
- Split beam for position determination in the acoustic beam
- From “any” platform
- Advanced digital solutions: real-time 3D visualization, cloud solutions

Benoit-Bird et al. 2018



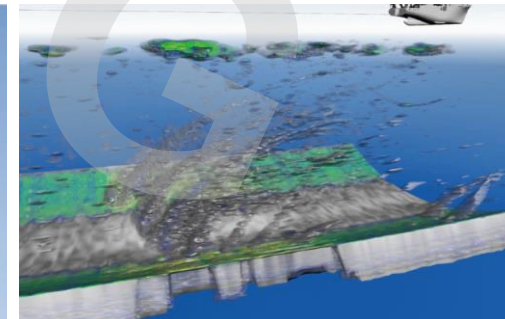
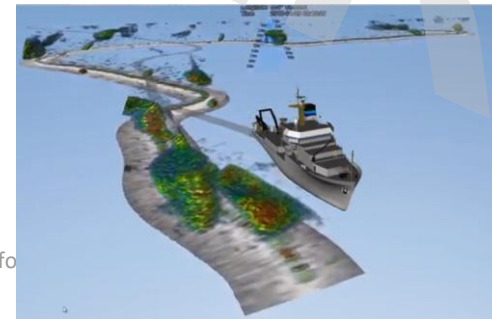
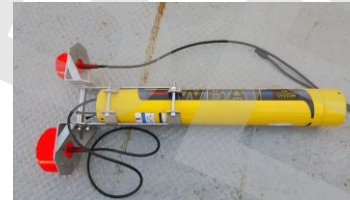
Subsea Glider



Sounder USV



Sailbuoy





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# Benefits of a Mature Ocean Observing Market

*Discussed in whitepaper draft elaborated with Ocean Observing Enterprise / GOOS*

## For Technology Users

Scientists, technicians, researchers, observers

- + Industrialized products specifically **designed** to target certain applications with clear advantages, i.e.
- + drop in cost per data point ratios (linked to lower products prices due to a higher unit number production, longer deployments, higher measuring frequencies)
- + improved ease of operation, user-friendliness and maximized reliability
- + application of common protocols and standardized interfaces
- + Harmonized community could negotiate **favourable conditions** through consolidations of orders/bulk price negotiations.

## Providers

Technology manufacturers

- + Enhanced market clarity/transparency and stability/predictability/**planning reliability**
- + (enhanced) engagement of large industrial companies
- + Is a driver to grow (small and medium) Blue Economy businesses
- + Supports economic stability and eases investments
- + Higher unit number orders
- + Enhanced manufacturing efficiency and **implementation of large-scale industry processes**  
→ cost reduction and better targeted products
- + Increased demand for technological innovation and advancement drives a greater flow of information between manufacturers and users and faster innovation (also from other industrial sectors)
- + Opportunities to offer **added services** to the better organized customer group, i.e., equipment rental, insurance, data processing.

Operational Observing (service) sector will form/grow

## Society

- + Profiteers of the increased knowledge and ocean observing enabled **information products** (related to i.e., hazard warning, weather, fisheries)
- + **Cost savings, greater efficiency, and faster technology** to market

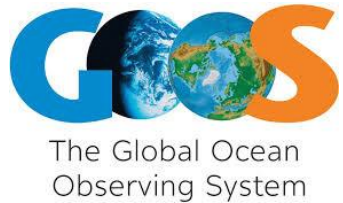


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# Ocean Observing Industry Maturation

## Academia and Science changes

- Consolidation and harmonization
- Structuring and organization (Standards, FAIR data, best practices)



## Industry changes

- focus on technology → information derivation and allocation: data acquisition enablement + data exploitation services
- New Blue Economy



## Common trends

- Societal importance and environmental awareness
- Growing number of platforms in the field



2021-2030 United Nations Decade of Ocean Science for Sustainable Development

## How to mature the market?

- enhanced collaboration between academia and industry
- Ambitious projects (c.f. Argo Program, Seabed 2030 Project)
- Initiatives to improve the communication between users and developers

No competition between academia (societal impact, knowledge generation) and industry (economic success, sustainability aspects);  
 Distinct sectoral strengths  
 → Various options for win-win initiatives!



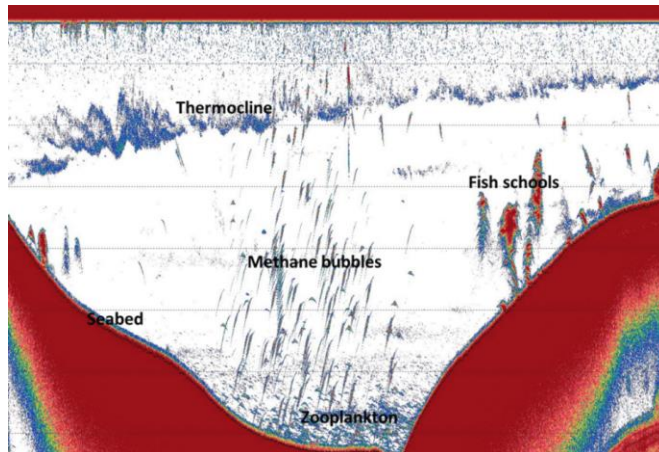
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# Examples

Ambitious Project and Communication Initiative

## Deep MAHALO

- Seabed 2030 as a motivation
- Comparable initiative for acoustic backscatter information
- 3D dynamic Mapping of marine Habitats, biodiversity, and the abundance of Life in the Ocean



WORLD CLASS – Through people, technology and dedication

## Ocean Observing Agora

*Initiative under discussion with Ocean Observing Enterprise / GOOS + MTS*

- A forum or platform to support innovation, advancement and business development in the field of ocean observing to meet the growing and real needs of suppliers and consumers.
- Making observational needs and associated technical demands (and the market potential?) publicly available in a community harmonized fashion
- Information to be transparently available all year for everybody interested and access to not depend on the country, available resources or personal connections etc.
- Addresses the technical demands that can already be met with existing tech (→ market potential) and targets/motivates innovation activities (→ trigger/steer development)



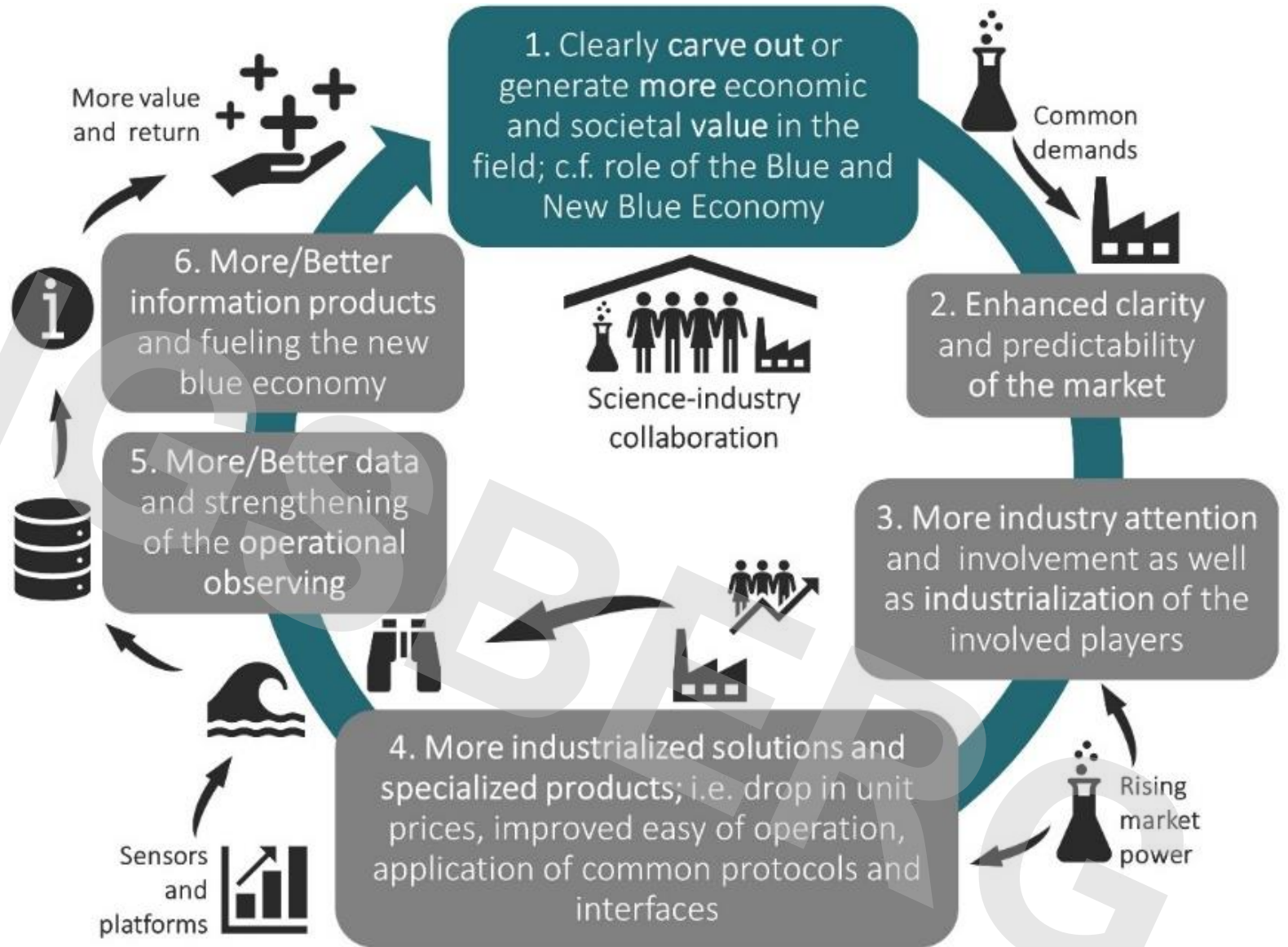
Anc. Greek: "assembly" or "gathering place"

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# Achieving a more industrialized Ocean Observing Environment

A common goal for collaboration.





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# Thank you!

[www.kongsberg.com/maritime](http://www.kongsberg.com/maritime)  
[peer.fietzek@km.kongsberg.com](mailto:peer.fietzek@km.kongsberg.com)

## References:

- Benoit- Bird, K.J. et al. Equipping an underwater glider with a new echosounder to explore ocean ecosystems. *Limnol Oceanogr Methods*. **16**, 734-749, <https://doi.org/10.1002/lom3.10278> (2018).
- Fietzek, P. (2020, February 17). *Science-Industry Collaboration in the Maritime Sector – Analytical Reflections and Experiences from Sensor Innovation Initiatives*. 2020 Ocean Sciences Meeting, 16-21 February 2020, San Diego, CA USA. doi: <https://dx.doi.org/10.1002/essoar.10502302.1>
- Fietzek, P. (2021). *Op/Ed: Enhancing Ocean Observing Through Collaborations* in 'Preparing a Workforce for the New Blue Economy', Liesl Hotaling, Richard W. Spinrad (Eds.), Elsevier, Pages 377-384, ISBN 9780128214312, <https://doi.org/10.1016/B978-0-12-821431-2.02022-9>

Also:

- Fietzek, P. (26.03.2019) Making Sensor Innovation stick in the Maritime Sector –Reflections on Science-Industry Collaboration, First International AtlantOS Symposium, 25.-28.03.2019, UNESCO Headquarters, Paris, France; <https://www.atlant-os-h2020.eu/first-international-atlant-os-symposium/agenda/>