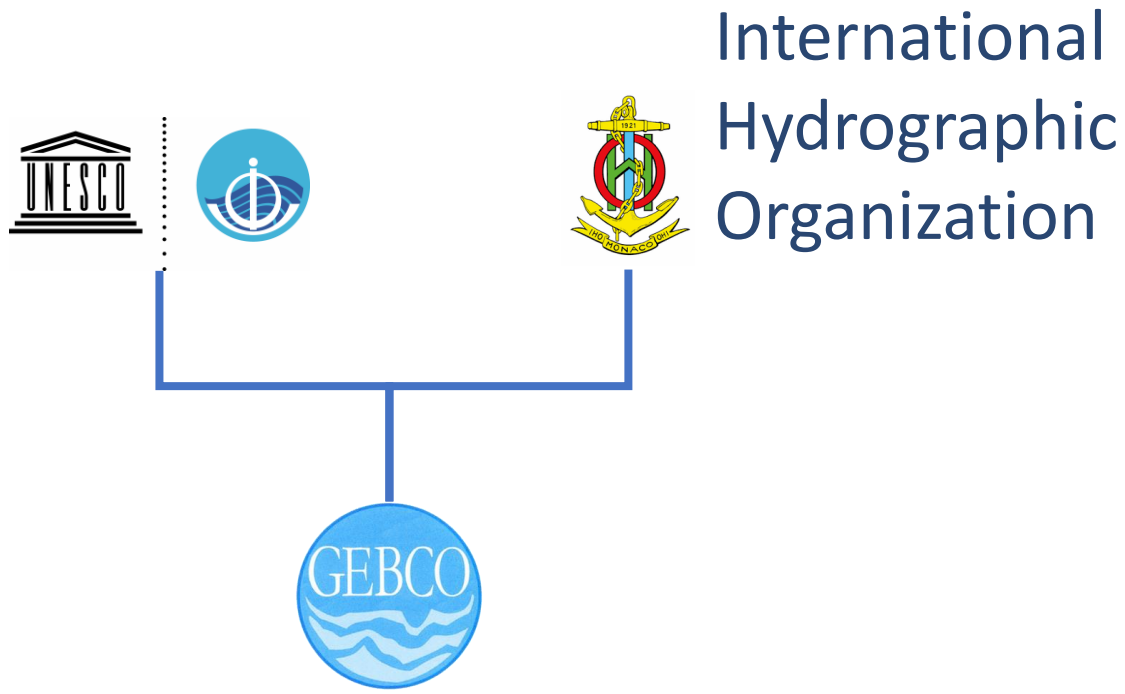
The Nippon Foundation-GEBCO Seabed 2030 Project

Dr Graham Allen, acting Seabed 2030 Director

Topics

- Project Overview
- Motivation & contribution to The Decade
- Project Strategy
- Status Update at end of Year 2

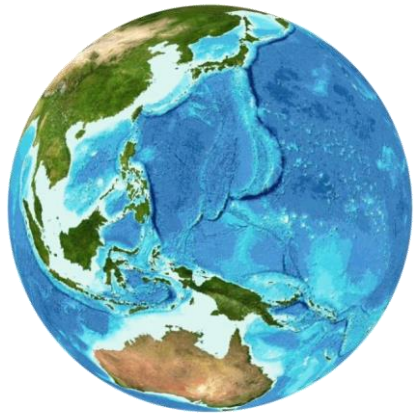
GEBCO Governance



GEneral **B**athymetric **C**hart of the **O**cean

GEBCO Projects

- **GEBCO** Ocean Map (gridded data/chart)
- Gazetteer of Undersea Feature Names
- Grid viewing software
- Printable maps
- Web Map Service (WMS)
- IHO-IOC GEBCO Cook Book
- Capacity Development: **GEBCO-NF Alumni**
  - GEBCO NF Postgraduate Certificate in Ocean Bathymetry, University of New Hampshire, US



- Direct measurements
- Complete world ocean

The Nippon Foundation – GEBCO Seabed 2030 Project

Vision established through Forum for Future Ocean Floor Mapping

Forum for Future Ocean Floor Mapping

June 2016

Project announced at 1st UN Ocean Conference

THE OCEAN CONFERENCE
UNITED NATIONS, NEW YORK, 5-9 JUNE 2017

June 2017

The Nippon Foundation – GEBCO Seabed 2030 Project

Seabed 2030:

a collaborative project between The Nippon Foundation and GEBCO

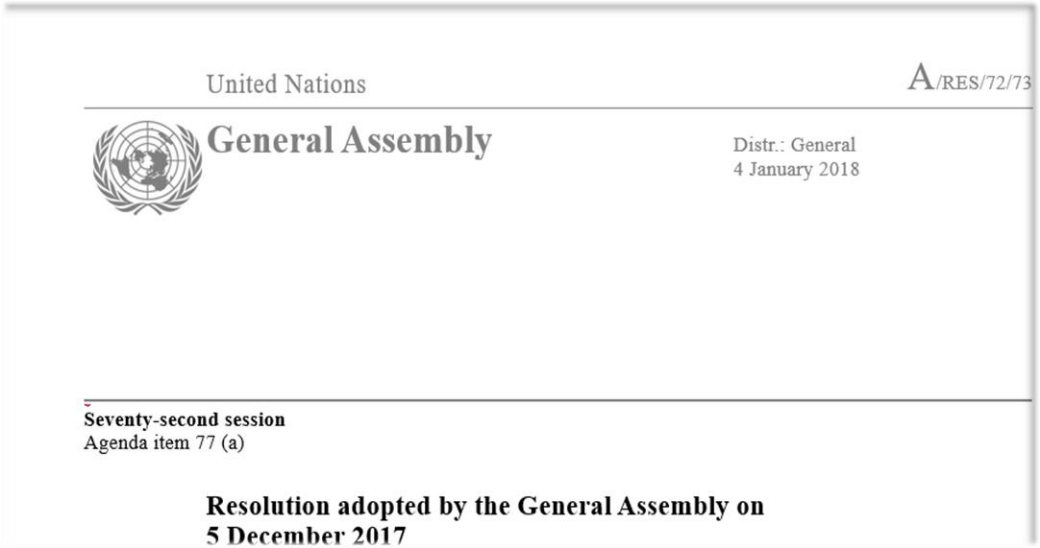
United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Seabed 2030 Vision:

By 2030, the World's oceans are fully mapped and the freely-available GEBCO Ocean Map is a complete map of global ocean bathymetry.

The Decade needs an Ocean Map



United Nations A/RES/72/73

General Assembly

Distr.: General
4 January 2018

Seventy-second session
Agenda item 77 (a)

Resolution adopted by the General Assembly on 5 December 2017

5th December 2017: Resolution A/RES/72/73 of the UN General Assembly declaring The Decade

14 LIFE BELOW WATER

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Seabed 2030 supporting The Decade

December 2017: Resolution A/RES/72/73 of the UN General Assembly

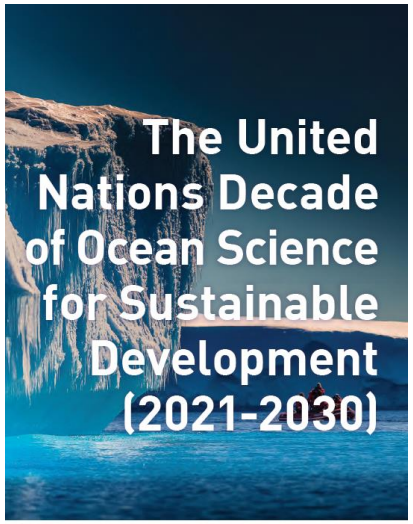
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

‘283. *Notes* that the depth of a **significant percentage of the world’s oceans** ….
has **yet to be measured directly** and that **bathymetric knowledge underpins** the **safe**, **sustainable** and **cost-effective** execution of almost **every human activity** in, on or under the sea;’

‘284. *Welcomes* the work of **GEBCO** …. and the subsequent development of the **Seabed 2030 project** for improving bathymetry globally;’

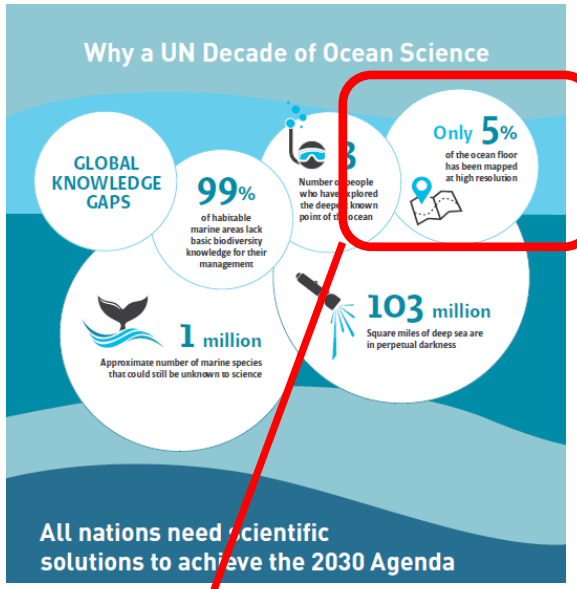
‘285. *Encourages* Member States to consider contributing to mechanisms that encourage the **widest possible availability of all bathymetric data**, so as to support the sustainable development, management and governance of the marine environment;’

Seabed 2030 supporting The Decade



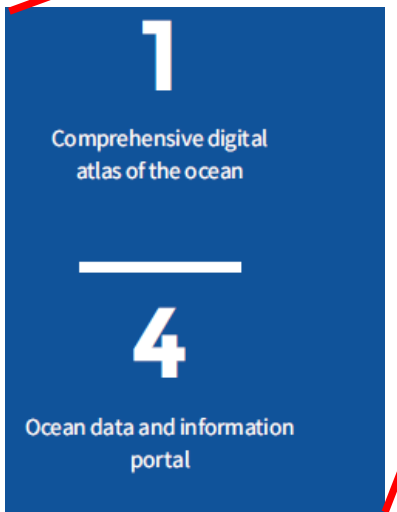
The Ocean We Need for the Future We Want

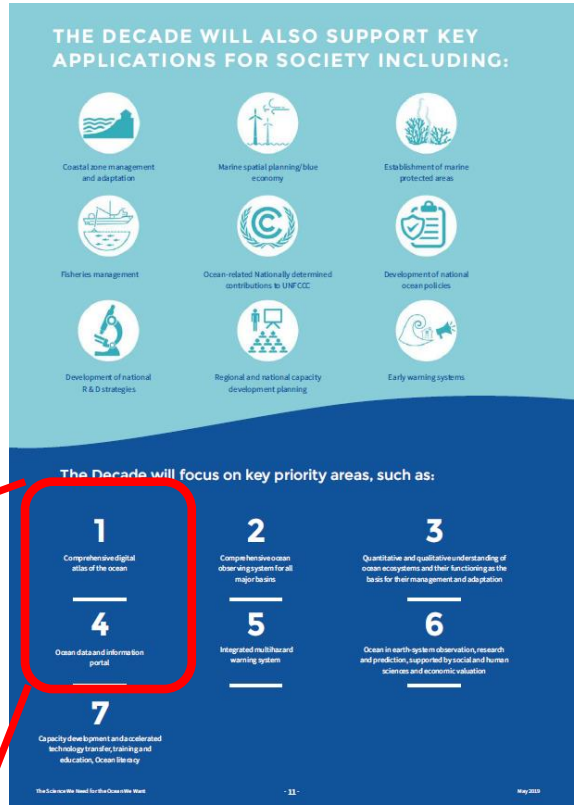
One Planet, One Ocean



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

R&D Priorities 1 & 4

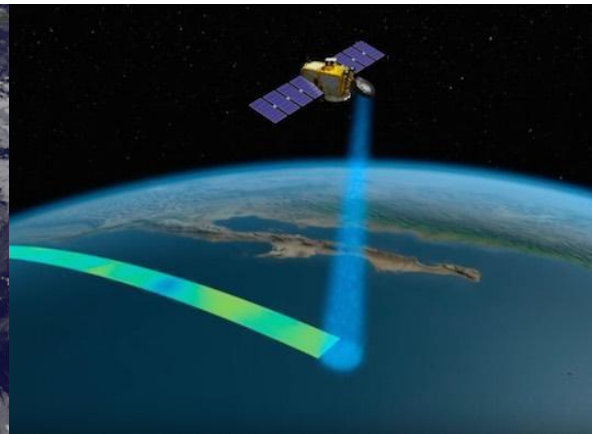




Bathymetry as an enabler

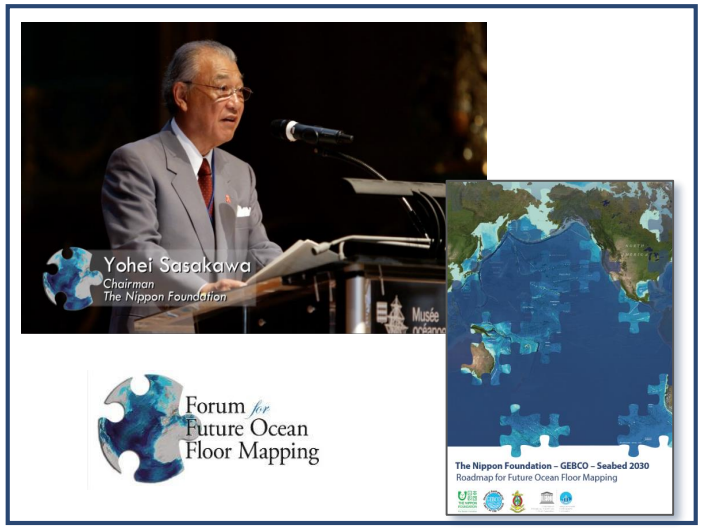
- Storm surge modelling
- Tsunami modelling
- Habitat mapping and management
- Ecosystem identification and management
- Emergency response
- Satellite verification models
- Ocean prediction models
- Coastal/Marine Spatial Planning
- Coastal Hazard Assessment
- Ocean Exploration
- Coastal Change Analysis
- Sea Level Rise Mitigation
- New Energy Siting
- Marine heritage
- Nautical charts



The Nippon Foundation – GEBCO Seabed 2030 Project

Vision established through Forum for Future Ocean Floor Mapping



June 2016

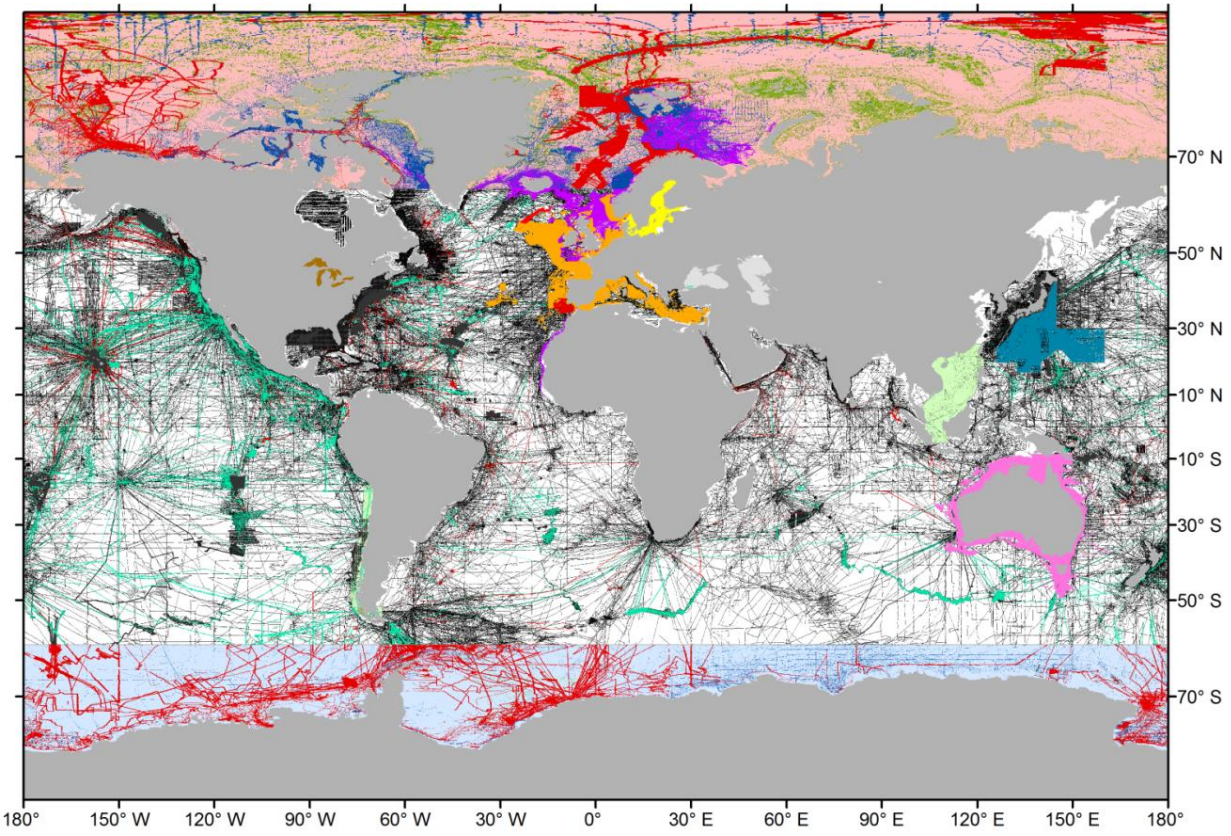
Seabed 2030 announced at UN Ocean Conference

June 2017

Seabed 2030 started

Feb 2018

How much of the ocean is mapped?



- Region taken from IBCAO V3
- Region taken from IBCSO V1
- EMODNet 2013
- Baltic Sea Bathymetry Database
- Geoscience Australia Grid 2009
- JHOD grid
- Olex AS data
- LDEO Global Multi-Resolution Topography Synthesis
- Multibeam bathymetry
- Single beam bathymetry
- Bathymetric contours from charts
- North American Great Lakes bathymetry
- Regions based on pre-prepared grids, (first included in the GEBCO_08 Grid)
- Trackline control information from the SRTM30_plus (v5) base grid
- Region based on interpolation guided by satellite-derived gravity data within the SRTM30_plus (v5) base grid
- Coastal area updated with shallow water soundings

$$X + Y + Z = 100\%$$

X: Data in GEBCO 2014

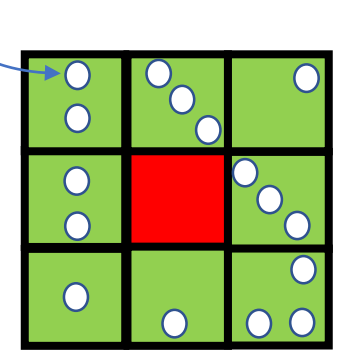
X = 6%

Y: Data that exists but not yet in GEBCO

- Public
- Embargoed

Z: Data that must be measured (map the gaps)

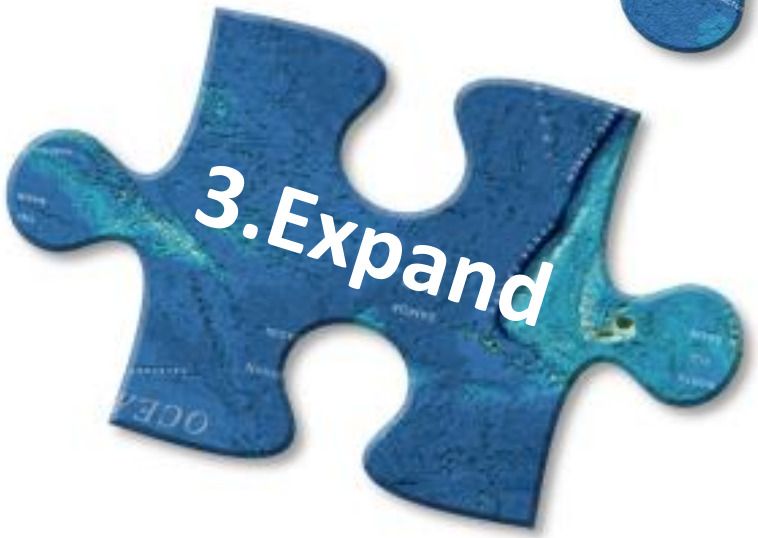
6% of GEBCO 2014 cells have data
94% interpolated data



Seabed 2030 Strategy

Today

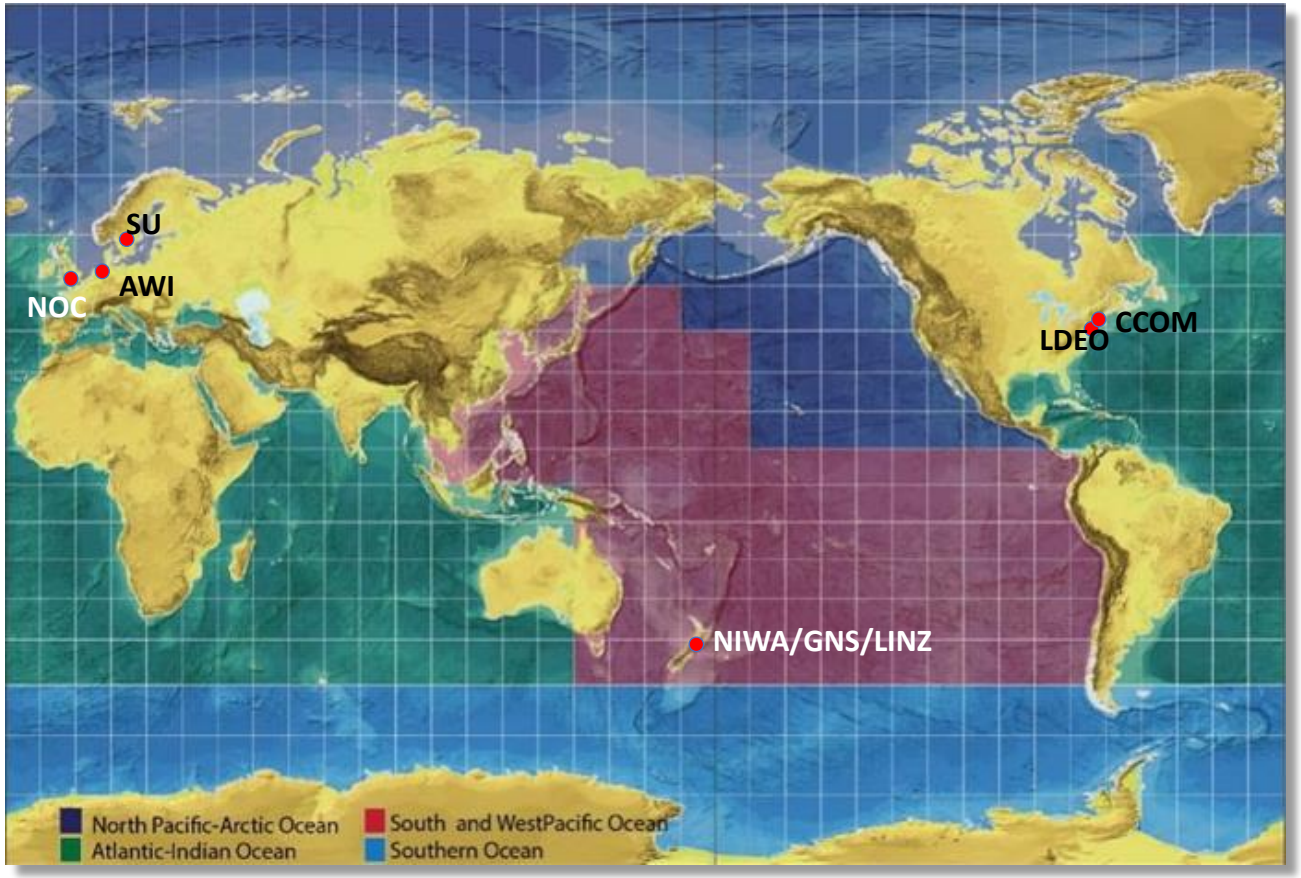
Tomorrow



Seabed 2030 Strategy

- **Existing data**
  - Share data with Seabed 2030
- **Regional mapping initiatives**
  - Share maps with Seabed 2030

Seabed 2030 Network of Centers



REGIONAL CENTERS

1. North Pacific-Arctic Ocean (SU & CCOM)

2. South & West Pacific Ocean (NIWA)

3. Atlantic-Indian Ocean (LDEO)

4. Southern Ocean (AWI)

5. GLOBAL CENTER

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

6. DATA CENTER

IHO DCDB

Seabed 2030 Center roles

IHO Data Center for Digital Bathymetry (IHO DCDB)

- Data center
- Archives data
- Data access

REGIONAL CENTERS (x4)

- Builds data community
- Produces regional maps
- Forwards data to IHO DCDB
- Forwards regional map to Global Center

GLOBAL CENTER

- Merges regional maps into GEBCO
- Distributes GEBCO Ocean Map
- Forwards data to IHO DCDB
- Forwards data to regional centers

Seabed 2030 Strategy

- Regional Centers reaching out to all data collectors

  - National Hydrographic Offices
  - The Public
  - Maritime industry
  - Geotechnical and survey industries
  - Government
  - Research institutes
  - …

CASE STUDY - FUGRO

Industry can make a major contribution

Hand over to Peter Burger, *Fugro, Global Director Safety & Sustainability*

For some words on Fugro's interest in Seabed 2030

CASE STUDY – FUGRO as industry partner

Sustainability and Fugro

- Fugro is the world's leading Geo-data specialist, collecting and analyzing comprehensive information about the Earth and the structures built upon it

"Continuously rethinking what we do and how we do it, aimed at further expanding our contribution to a safe and liveable world, now and in the future."

IOC Assembly 2019 - Seabed 2030

CASE STUDY – FUGRO as industry partner

Benefits to Private Sector

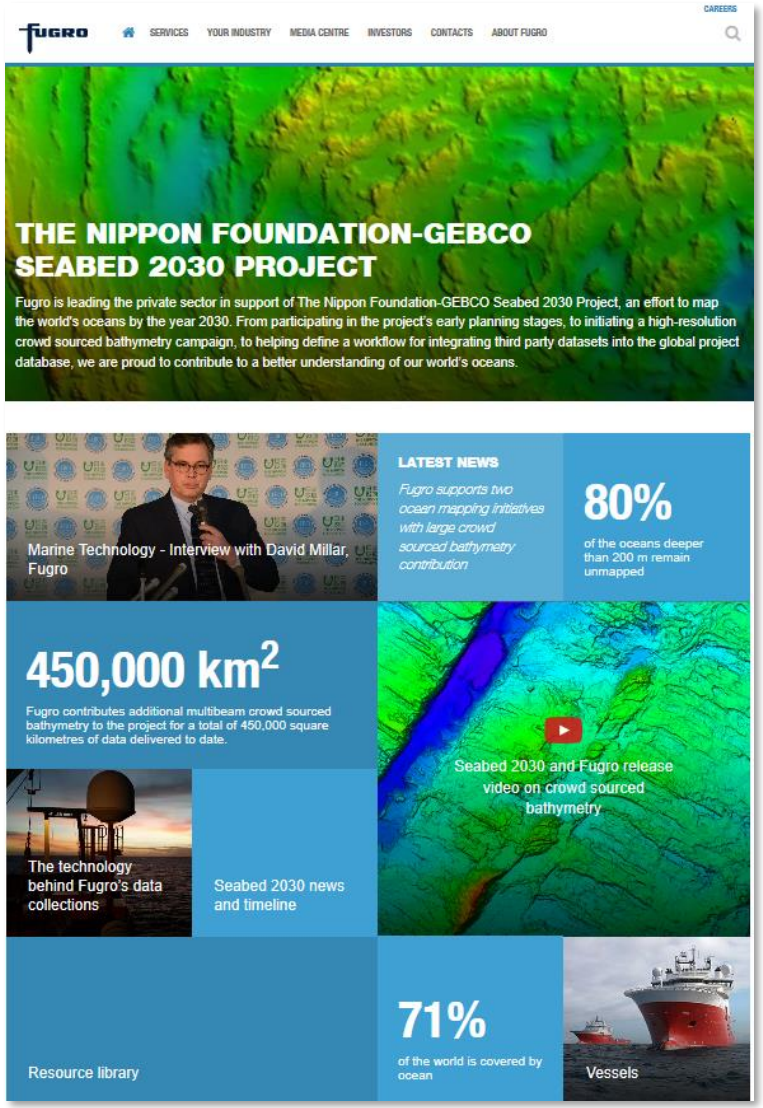
- Contribute to mapping the planet (societal benefits)
  - Enhance global policy decisions
  - Improve ocean sustainability
  - Advance scientific research
- Corporate social responsibility / ocean stewardship
- Employee motivator, contribution to our purpose
- Development of innovative solutions
- Brand promotion / enhancement
- Potential direct and indirect business opportunities
  - Increase demand for ocean mapping
  - Increased desk top study activity
  - Increased marine site characterization activity
- Potential tax credits for charitable contributions of bathymetric data
- Access to a larger, higher resolution GEBCO dataset to support future business interests

IOC Assembly 2019 - Seabed 2030

CASE STUDY – FUGRO as industry partner

Spread the Word

- Promotion in Fugro's 2017 and 2018 annual reports
- Seabed 2030 prominent on Fugro company website
- Press and news releases, social media posts
- Articles, newsletters
- Interviews
- Presentations to industry associations
- Presentations at conferences, meetings and Fugro events
- Participation in Seabed 2030 planning meetings
- Co-produced video on crowdsourced bathymetry
- Participate in UN Decade of the Ocean planning meetings.
- Participated in the AtlantOS Symposium
- Industry Workshops:
  - IHO CSB WG
  - AORA ASMIWG
  - World Ocean Council SOS (planned)



IOC Assembly 2019 - Seabed 2030

Seabed 2030 Global Call to Action

All bathymetric data *& regional maps to be* ***submitted to the Seabed 2030*** *Network of Centers to be incorporated into the GEBCO Ocean Map and, hence, contribute to the UN Decade.*

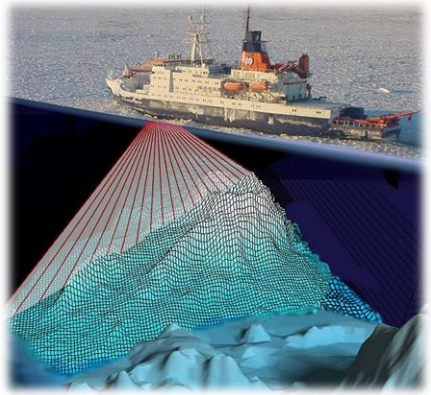
Seabed 2030 also wants to understand what data exists, but can't yet be shared – to avoid duplicate mapping.
Seabed 2030 requests ***information*** *on the location of* ***all existing*** *Bathymetric data, even of it is not shared.*

Seabed 2030 Strategy

Make the most of current capability

- **Optimize and maximize existing equipment**
  - Turn it on & share the data

- **Optimize ship tracks**
  - Route through the gaps (map the gaps)



Seabed 2030 deliverable:
Map of the Gaps – to aid track planning

Seabed 2030 Strategy

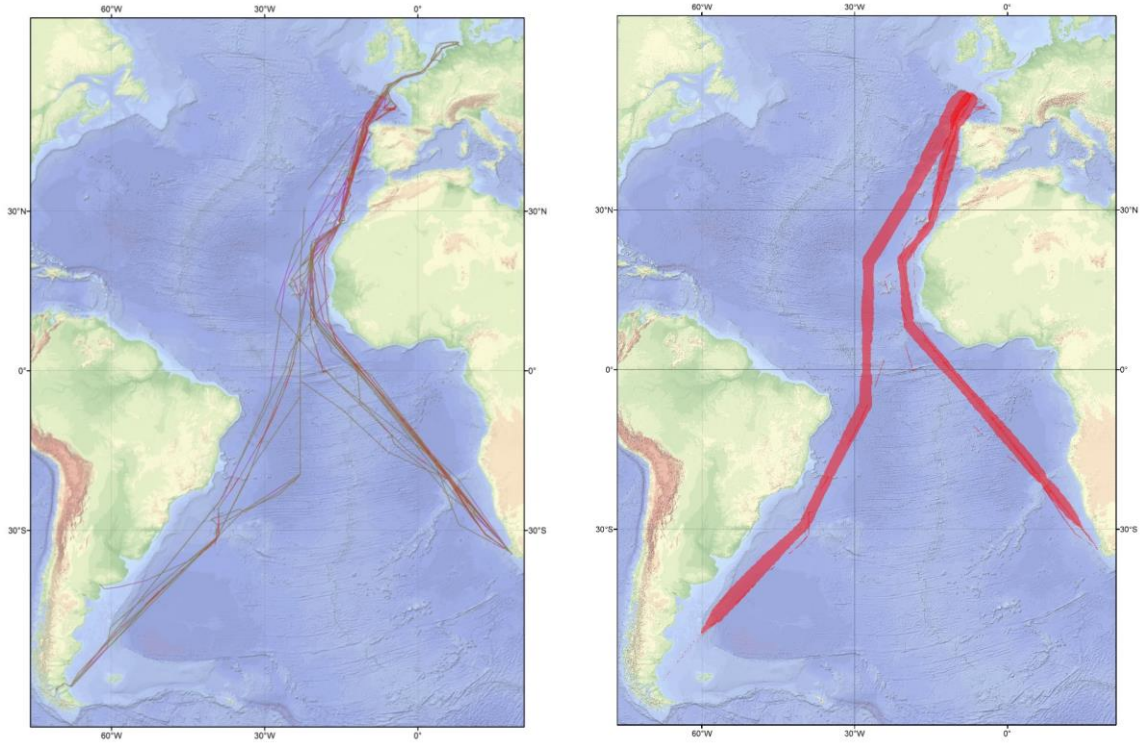
ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Repeated tracks of RV Polarstern

- Collect in-transit data
- Offset to ship track – map the gaps

Potential coverage
26x16km = **416 sq km**

Maximizing transits



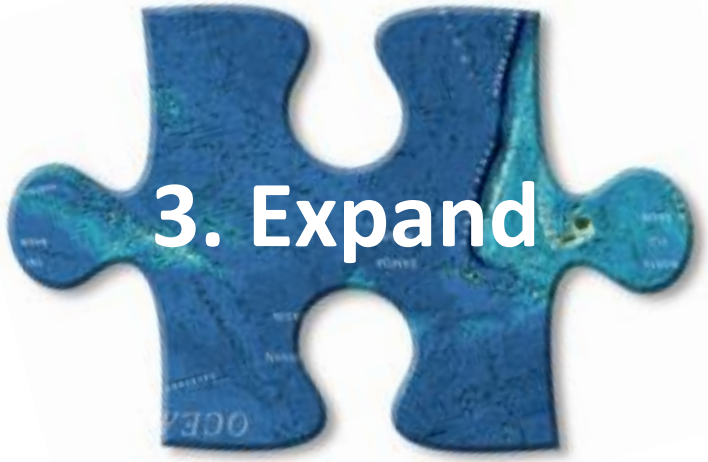
Modest incremental cost → major returns
c.f. investment in ship & equipment

Seabed 2030 Global Call to Action

Seabed 2030 encourages all vessel operators to optimize data collection from existing equipment:

- *Turn it on*
- *Collect it*
- *Share it*

Seabed 2030 Strategy



- **Advocating increased mapping activity**
  - Research expeditions (The Decade)
  - Survey expeditions
  - **Crowd Sourced Bathymetry (CSB)**
    - Fishing fleet, maritime industries, leisure industry, …

Seabed 2030 advocates for increased mapping in support of UN Decade and encourages crowd sourced data collection

IHO Crowdsourced Bathymetry Working Group (CSBWG)

Seabed 2030 Strategy

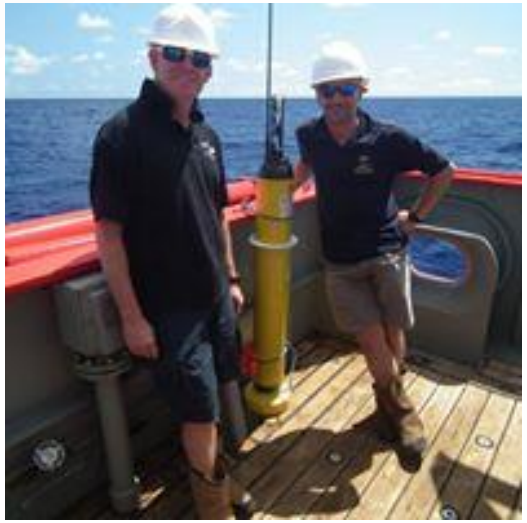
❑ Accelerate technology innovation uptake

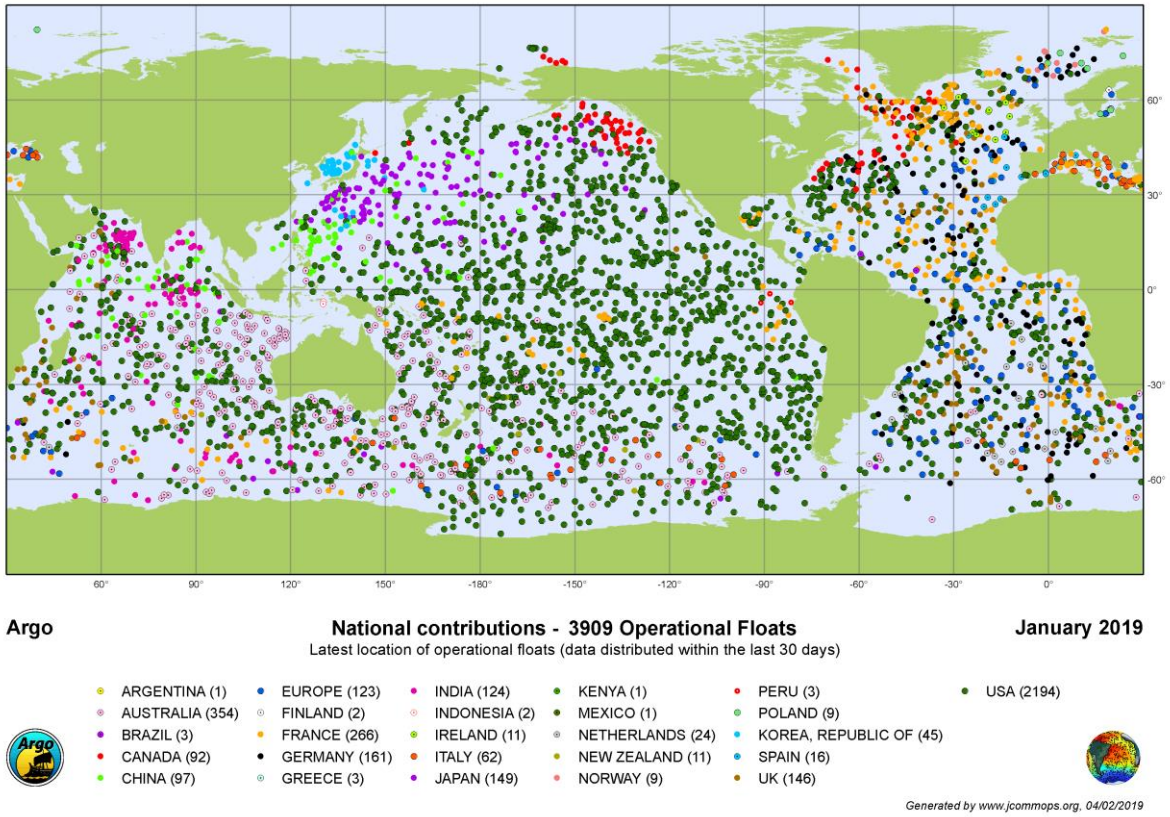
- ➢ The game changer
  - ➢ Autonomous and unmanned vessels

We need to harness the potential of autonomous and unmanned mapping

Seabed 2030 Strategy

Argo floats – a model for Seabed 2030?

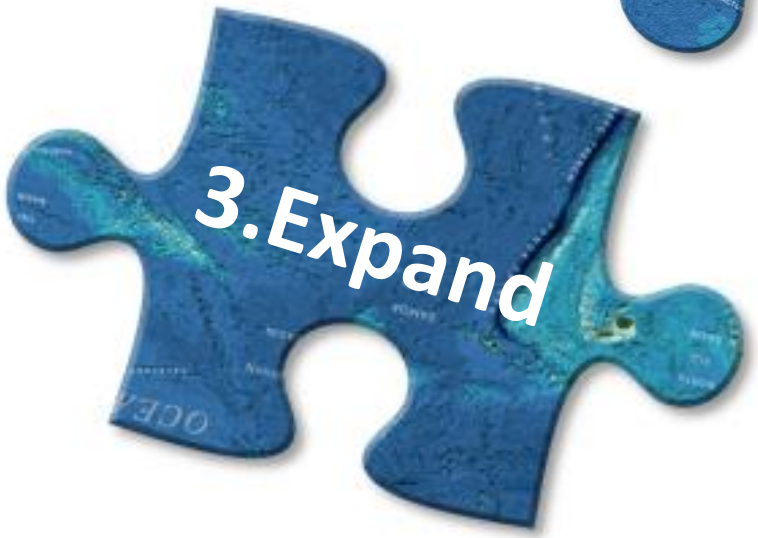




Seabed 2030 Strategy

Today

Tomorrow



Seabed 2030 Progress to date

- GEBCO 2019 release
- Technology innovation

Progress to date – GEBCO 2019

$$X + Y + Z = 100\%$$

X: In GEBCO

Y: Exists, not in GEBCO

Z: The gaps

X+Y = mapped

GEBCO 2014

X = 6%

32,000,000 square kilometres

GEBCO 2019

X = 15%

https://www.gebco.net/data_and_products/gridded_bathymetry_data/

Progress to data - Technology Innovation

Shell OCEAN DISCOVERY XPRIZE®

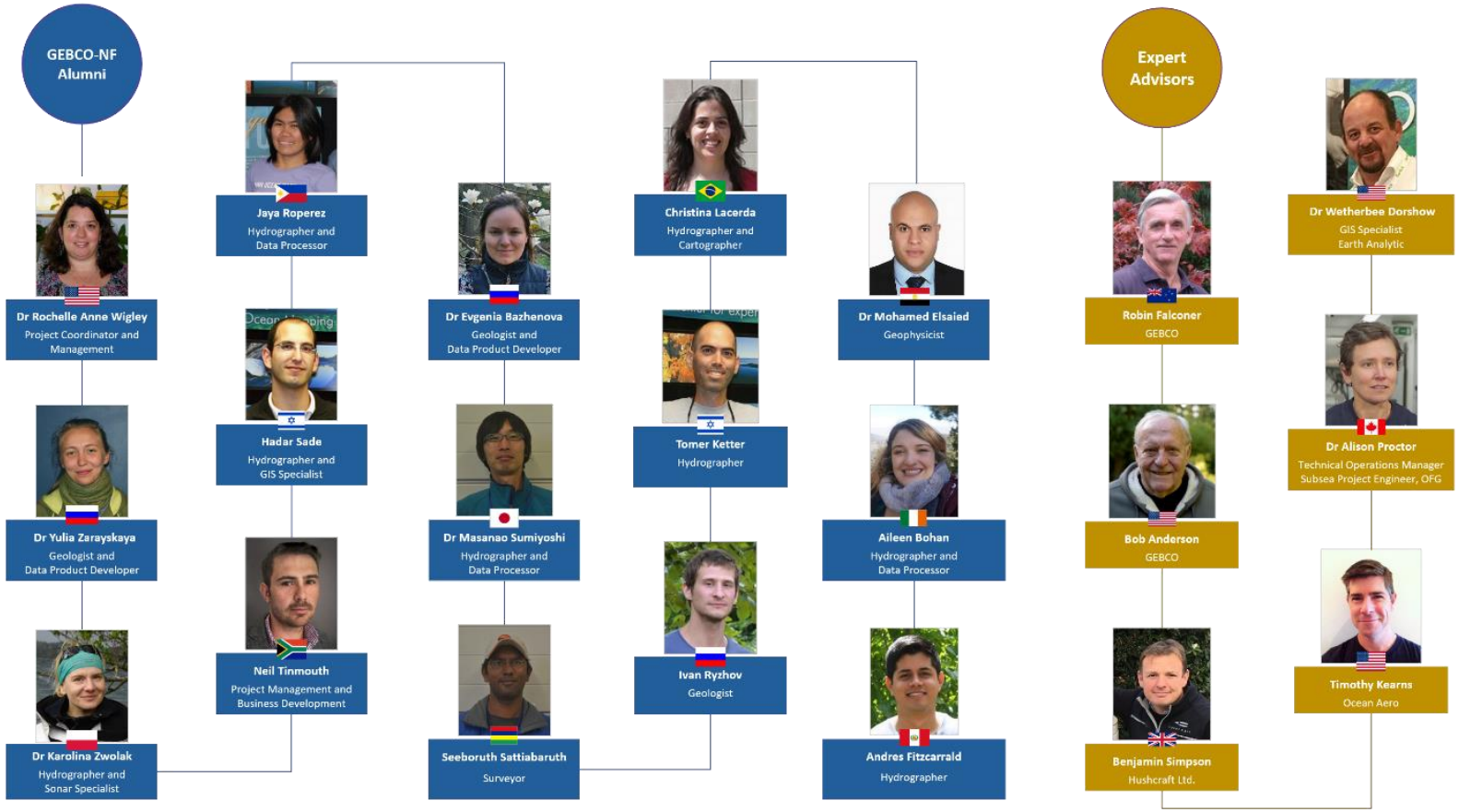
A $7 million global competition which challenged teams to advance deep sea technologies for autonomous, ocean mapping.

Seabed 2030 interest in XPRIZE:

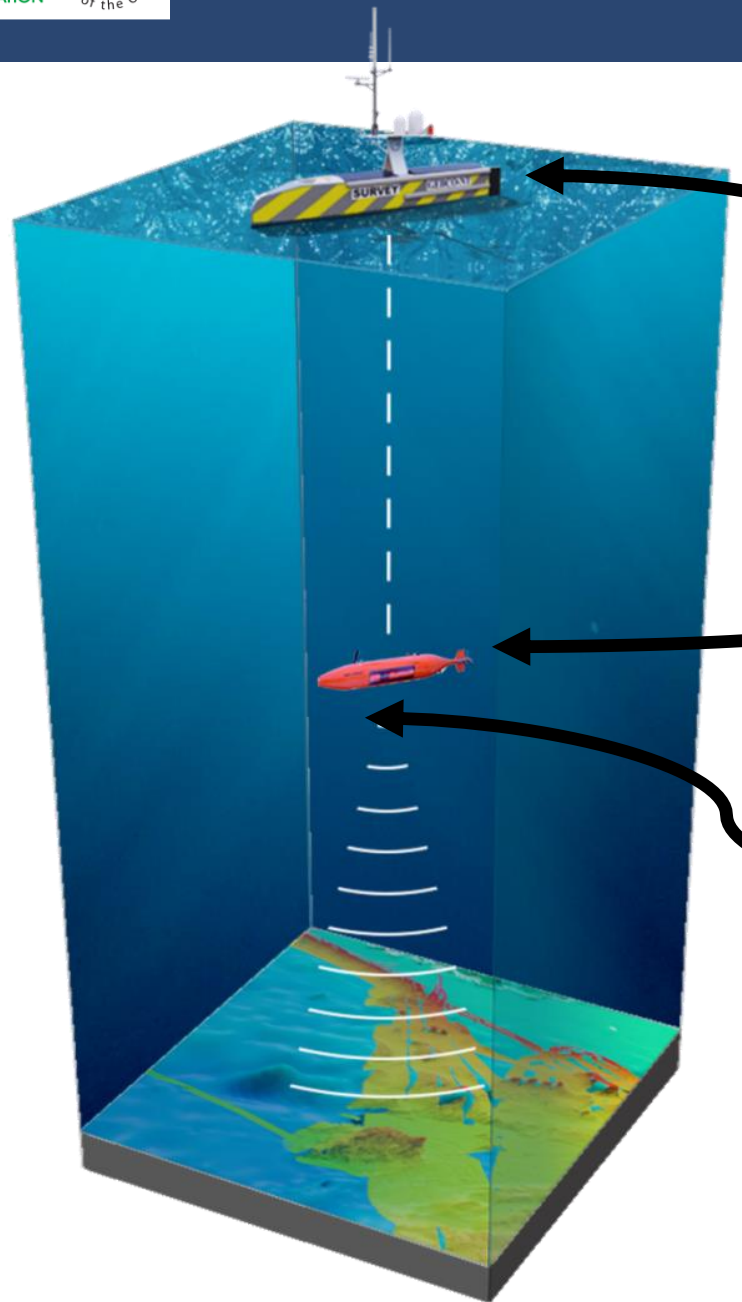
- ✓ Aligned with Seabed 2030 Strategy: accelerate innovation
- ✓ Opportunity to demonstrate the use of unmanned mapping
- ✓ Opportunity for capacity development of the GEBCO NF alumni

GEBCO-NF Alumni Team

> 50 team members from 15 countries



GEBCO-NF Alumni Team Concept



1. Unmanned surface vessel

- Hushcraft Limited SEA-KIT *USV Maxlimer* with KM HiPAP
- Remote and Autonomous operations facilitated by Kongsberg Maritime K-MATE.

2. Autonomous Underwater Vehicle (AUV)

- Kongsberg Maritime HUGIN: 4,500 m

3. AUV-mounted sensors

- Multibeam echoscounders (EM2040 & EM304 MBES)
- Synthetic aperture side-scan sonar (HISAS)

Shell Ocean Discovery XPRIZE timeline

Preliminary PHASE

FEBRUARY 2017:
32 Teams from 25 countries

Round 1

NOVEMBER 2017:
21 Teams from 13 countries

Round 2: Finals

NOVEMBER 2018:
9 Teams in Final Round

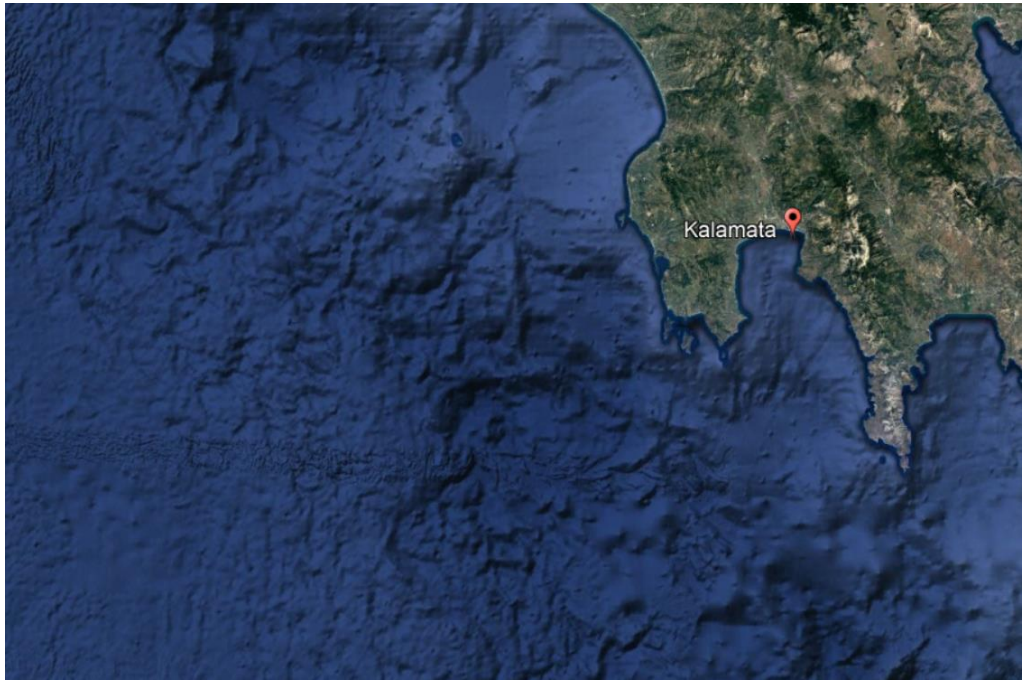
Award Ceremony

31 MAY 2019

Shell Ocean Discovery XPRIZE Final

Round 2
Greece, November 2018

- Map 500 km2
- Site at depths down to 4,000 meters
- Launch from shore and travel to the competition site with restricted human intervention
- Map at least 50 percent of the area – 250 km2
- Map at five meters resolution.
- Complete mapping in 24 hours.



Site:
Kalamata, southern coast of Greece

GEBCO-NF Alumni Team: rounds 1 & 2

GEBCO-NF Alumni Team wins XPRIZE

Shell OCEAN DISCOVERY XPRIZE

XPRIZE Award Ceremony, 31st May 2019

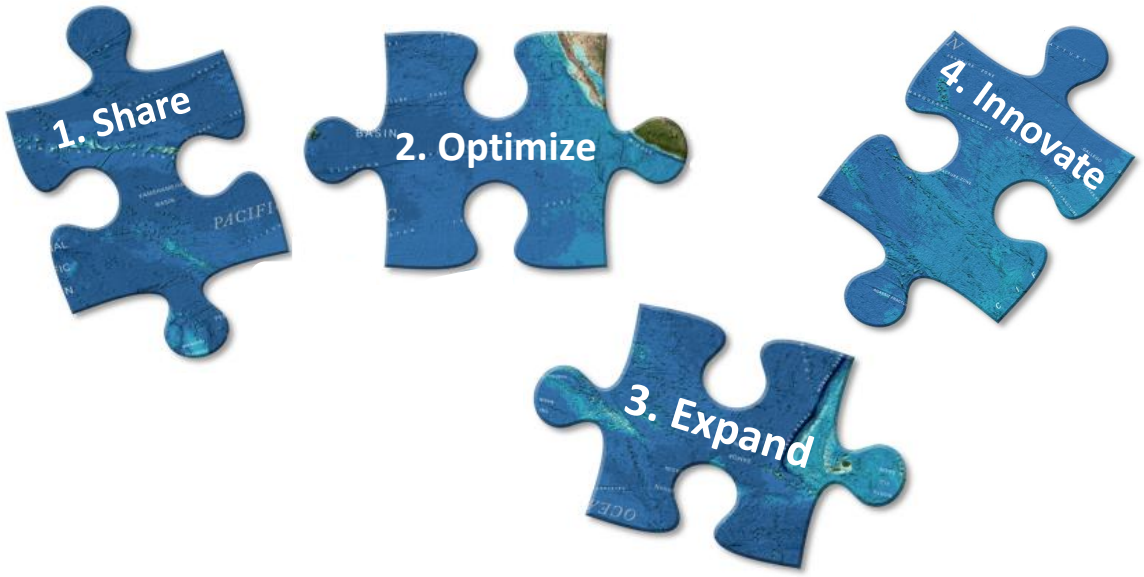
Seabed 2030 – XPRIZE Partnership

XPRIZE and Seabed 2030 Partnership to explore how all of the technology solutions entered into The Shell Ocean Discovery XPRIZE can drive impact and contribute to Seabed 2030

Seabed 2030 Recap

Vision: GEBCO Ocean Map 100% complete by 2030

Strategy:



Status **15% complete**

Parting words

Seabed 2030 provides Member States with a mechanism to respond to

UN General Assembly Resolution A/RES/72/73

‘285. *Encourages* Member States to consider contributing to mechanisms that encourage the **widest possible availability of all bathymetric data**, so as to support the sustainable development, management and governance of the marine environment;’

Seabed 2030 allows Member States to make a cost-effective contribution to:

- ✓ UN Decade activities
- ✓ completing the GEBCO Ocean Map,
- ✓ producing the ‘comprehensive digital atlas of the ocean’ (R&D Priority 1)

Seabed 2030 acknowledgements

Sponsors

THE NIPPON FOUNDATION
For Social Innovation

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

Seabed 2030 Center hosts

University of New Hampshire

Stockholm University

IHO DCDB

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

NIWA
Taihoro Nukurangi

Land Information New Zealand

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