
High-resolution high-frequency multibeam systems. These AUVs would serve as excellent complements to the mapping barge for investigating small-scale processes at the seabed. This is today only possible in the deep ocean using AUVs equipped with sub-meter level of detail sometimes needed to optimize their vessel’s tracks between dive sites and collect transit data in previously unmapped areas, which will also be included in the SEABED 2030 grid. SEABED 2030 has supported these efforts by providing mapping experts to operate the on-board sonar systems in transit. A partnership has also been struck with the World Ocean Council, the global blue economy business organization, for joint engagement with the ocean business community to promote the private’s vision and ways in which organizations in the maritime community can collect and contribute bathymetric data to SEABED 2030.

Crowdsourcing data

These partnerships and the collaboration nature of the SEABED 2030 project, and highlight what can be achieved when the international community comes together with the aim of mapping the world’s ocean floor. This is why the concept of crowdsourcing bathymetric data has become ever more appealing to the mission of SEABED 2030. Around the world, thousands of vessels, including cargo vessels, fishing boats, cruise liners, private yachts and surveying ships are equipped with on-board echosounders to ensure the safety of their operations. By utilizing assets already at sea, these craft can effectively become an international fleet of research vessels, collecting and sharing bathymetric data to SEABED 2030 for inclusion in the global grid.

Building new technology and human capacity

In addition to utilizing resources already available through SEABED 2030, The Nippon Foundation and GEBCO are heavily involved in the development and promotion of new technologies, as well as building human capacity by training the next generation of ocean mapping experts. The Nippon Foundation-GEBCO Ph.D. Graduate Training Programme is a twelve-month course at the University of New Hampshire, leading to a Ph.D. Scholarship in Ocean Bathymetry. Since the programme began in 2004, 90 students from 40 countries have graduated from UNH having learned new skills, going on to make significant contributions to the field of bathymetry around the world.

In May 2019, alumni from the postgraduate training programme won the $5 million prize in the Shell Ocean Discovery XPRIZE, a global competition challenging teams to advance deep-sea technologies for autonomous, fast, high-resolution ocean exploration. The Nippon Foundation–GEBCO Alumni Team was made up of more than 70 individuals, including 16 graduates of the postgraduate training programme representing the 13 countries of Russia, Egypt, South Africa, USA, Ukraine, Malaysia, Peru, Ireland, Japan, Philippines, Israel, Poland and Brazil. The team’s concept utilized a purpose-built Kongsberg Maritime Hugin AUV, rated to operate at depths up to 4,500 metres, which includes all of the company’s most up-to-date technologies. The AUV was supported by a SEA-KIT™ unmanned surface vessel, USV Maxlimer. The SEA-KIT™ vessel has become an international leader in providing specialized survey operations, including all of the company’s most up-to-date technologies. The AUV was supported by a SEA-KIT™ unmanned surface vessel, USV Maxlimer. The SEA-KIT™ vessel has become an international leader in providing specialized survey operations.

It was also announced that Seabed 2030 would enter into a new agreement with XPRIZE to deepen cooperation in pursuit of mapping of the world’s ocean floor. Since being used in the GEBCO-NF Alumni Team’s XPRIZE entry, SEA-KIT™ has completed the world’s first international commercial uncrewed transit, successfully traversing the world’s busiest shipping lane to deliver a box of oysters from the UK to Belgium on 7 May 2019. Since being used in the GEBCO-NF Alumni Team’s XPRIZE entry, SEA-KIT™ has completed the world’s first international commercial uncrewed transit, successfully traversing the world’s busiest shipping lane to deliver a box of oysters from the UK to Belgium on 7 May 2019.

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Example 2
measured bathymetry, important quantifiable details of seaﬂoor morphology come into focus. Transects is now modeled based on the combination of measured and predicted bathymetry data. With
from the GEBCO 2019 grid for the same area (right). What was once modeled from a few trans-Atlantic
THIS INFORMATION IS BASED ON THE NIPPON FOUNDATION - GEBCO SEABED 2030 ROADMAP FOR FUTURE OCEAN FLOOR MAPPING
Deep Ambition: How to Map the World

Why is mapping important?
A detailed scientific understanding of the seabed is important in its own right, but a global map showing the
shape and depth of the world’s ocean floor will deliver a flood of tangible benefits. Bathymetric data from the deep
ocean is essential to a variety of scientifi c disciplines, including climate science, geophysics, geology, and geography. Such data is how examples are how data collected by Blanc Hasen and W. Hanck Tharp during the 20th and 50s to
our modern understanding of the deep Earth. Geophysical and biological research is linked to this deep understanding of the
shape of the seafloor and this in turn has important applications. It is a critical tool to understand ocean
patterns, our weather systems and climate, wave, wave, ocean sediment transport, tsunami
propagation, and underwater geohazards. Seafloor mapping also tides for the socio-economic and
the oceans. According to the Organisation for Economic Co-operation and Development (OECD), the ‘Blue Economy’ is valued at $1.5 trillion a
year and creates the equivalent of 31 million full-time
This has now increased to 18% complete and included in the 2014 GEBCO grid. This has now increased
to 15% following the publication of the 2019 GEBCO grid,
and identifying areas where measured observations support the grid. Blue colors in highlighted
images were generated by blacking out areas where predicted bathymetry support the GEBCO grid,
and highlighting areas where measured observations support the grid. Blue colors in highlighted
areas correspond to sea-floor depth.

How was the new grid produced?
This publication of the 2019 GEBCO grid is the product of a truly international effort, pulling together data from
countless organisations and mapping initiatives around the
world. For his purposes of Seabed 2030, the world has been divided into four regions, each overseen by a Regional Regional Centers. These centers are based at
the Alfred Wegener Institute in Germany, covering the
Southern Ocean. Delft University of Technology in Seattle, in partnership with the University of Washington, LIS
for the Arctic, and Netherwich Ocean Science in Southampton, UK.

Hydrographic Organization (IHO) and the Intergovernmental
Geophysical Organisations (EGOs) and the Intergovernmental
Oceanographic Commission (IOC) of UNESCO. GEBCO has also
a century of experience in ocean-floor mapping since
200% of the seafloor was included to an adequate resolution in the
Foundation-GEBCO Seabed 2030 Project, only 6% of the
planet. The oceans cover more than 70% of Earth’s
surface, more than the outermost reaches of the solar system. And yet,
our desire to explore has taken us to remote corners of the
world. The shape of the ocean floor and the bathymetry data collected in these recent expeditions, is now being
mapped to a level of detail previously unimagined. From a single ship, a vast and multidisciplinary team
is now making contributions to map the entire ocean floor to a level of detail that has never been attempted before.

A comparison of data coverage in the Atlantic Ocean in the GEBCO 2014 global grid (top) vs the
GEBCO 2019 grid (bottom), revealing the tremendous progress that has been made. These images were generated by blacking out areas where measured bathymetry support the grid.
Blue colors in highlighted areas correspond to sea-floor depth.