COMMITTEE ON
SCIENCE, SPACE AND TECHNOLOGY
CHAIRMAN BRIAN BABIN

SUBCOMMITTEE ON ENVIRONMENT

HEARING CHARTER

"To the Depths, and Beyond: Examining Blue Economy Technologies"

Wednesday, March 26, 2025
10:00 a.m.
2318 Rayburn House Office Building

Purpose
The purpose of this hearing is to discuss the advancements of technology in the ocean industry with an emphasis on the importance of collaboration through private-public partnerships. The hearing will examine the environmental, economic, and national security impacts of ocean research and technological innovations, including mapping, surveying, and the future of the field.

Witnesses
- **Mr. Earl Childress,** SVP and Chief Commercial Officer, Oceaneering International, Inc.
- **Mr. Shepard Smith, RDML, NOAA (ret),** Chief Technology Officer, XOcean
- **Dr. Margaret Leinen,** Director of Scripps Institution of Oceanography, University of California San Diego
- **Dr. Tim Janssen,** CEO, Sofar Ocean

Overarching Questions
- How does ocean technology benefit the American economy?
- What steps should be taken to ensure strong partnerships between the federal government and non-governmental entities?
- How can advancements in Blue Economy technology benefit coastal communities across the United States?
- How can ocean technologies address national security concerns across ports of the United States in relation to infrastructure and data?

Background

This hearing will include testimony from individuals in the ocean communities to enhance sustainability and advance private-public partnership within this industry. As the Committee looks toward its role in bolstering the Blue Economy, this conversation will include insight into what data is currently accessible; how people like port operators, the energy industry, the Army Corps of Engineers and the general public understand and use the data; and what technological gaps need to be filled in the short and long term.

A thriving blue economy benefits all Americans, regardless of geography. Over 127 million Americans live in coastal communities which is about 40% of the population.[1] The population density is over five times greater in coastal shoreline counties than the national average.[2] The ocean connected economy supports over 2.4 million jobs and contributes nearly $400 billion to the national GDP through tourism, recreation, shipping, fishing and power generation[3]. These numbers are growing every year.

NOAA

Established by Congress though the Ocean Exploration Act, the NOAA Office of Ocean Exploration and Research (OER) is the only federal organization dedicated to ocean exploration. It is run under the auspices of the Office of Oceanic and Atmospheric Research.

Partnerships with federal and state agencies, academic institutions, non-profit organizations, and private industry play a critical role in all the work within OER. These partnerships leverage complementary expertise and produce innovations in exploration tools and capabilities. By working with institutions with a range of experience, expertise, and creativity, OER can enhance the potential for significant new advances in discovery, understanding, and action.

With priority placed on exploration of deep waters and the waters of the U.S. Exclusive Economic Zone, OER executes its mission to explore the ocean for national benefit by using the latest tools and technology to explore unknown or poorly known areas of our ocean, making discoveries of scientific and economic value. By establishing public, private, and academic partnerships, OER works to leverage complementary expertise, produce innovations in exploration tools and capabilities, and enhance the potential for significant new advances in discovery, understanding, action, and inspiration.[4]

Since its commissioning in 2008, the *Okeanos Explorer*, NOAA's ship assigned to exploration, has mapped over a million square kilometers of the seafloor at high resolution.[5] Data collected from ocean exploration expeditions have been critical for science-based decisions on issues like deep

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[1] *What percentage of the American population lives near the coast?* (n.d.). https://oceanservice.noaa.gov/facts/population.html

[2] *What percentage of the American population lives near the coast?* (n.d.-b). https://oceanservice.noaa.gov/facts/population.html

[3] *New blue economy*. (n.d.). National Oceanic and Atmospheric Administration. https://www.noaa.gov/blue-economy

[4] *About NOAA ocean exploration*. About: NOAA Ocean Exploration. (n.d.). https://oceanexplorer.noaa.gov/about/welcome.html

[5] *NOAA Ship Okeanos Explorer: Technology: Vessels: NOAA Office of Ocean Exploration and Research*. (n.d.). https://oceanexplorer.noaa.gov/technology/vessels/okeanos/okeanos.html

water fisheries management, potential oil and gas development or deep-sea mining, marine protected area establishment and management, determination of the U.S. Extended Continental Shelf, and nautical charting.

Sofar Ocean

The Bristlemouth initiative is an open-source marine hardware connectivity standard revolutionizing ocean sensing by establishing an open standard for underwater connectivity, akin to the USB or Bluetooth of the sea. By enabling modular, plug-and-play integration of ocean sensors, Bristlemouth accelerates innovation and expands access to critical ocean data. Preserving progress in Bristlemouth ensures continued development of a collaborative, interoperable network of ocean technologies, reducing cost barriers and fostering a more resilient and data-rich understanding of the ocean.[6]

Building a "digital twin" of the ocean—a real-time, data-driven simulation of ocean conditions—provides an unprecedented opportunity to predict and manage oceanic changes with precision. By integrating live sensor data with advanced modeling, digital twins enable more accurate forecasting of storms, sea-level rise, and marine ecosystem shifts. Federal agencies can use these models to enhance disaster preparedness, improve fisheries management, and safeguard coastal infrastructure. Continued investment ensures the development of an increasingly refined virtual ocean, supporting better-informed policies and operational strategies that protect both economic and environmental interests.

Oceaneering International

Founded in 1964 by two divers in the Gulf of Mexico, Oceaneering International, Inc. has expanded to a global provider of engineered products and services for use throughout the lifecycle of an offshore oilfield, from drilling to decommissioning.[7] Based in Houston, Texas, they operate the world's largest fleet of remotely operated vehicles (ROVs) and are a leader in offshore oilfield maintenance services, umbilicals, subsea hardware, and tooling. Additionally, their work in ocean products led to the development of a separate branch providing space services, specifically space suits.[8]

Oceaneering estimated 80% of their business is tied to deep water activity and ROVs. According to their numbers, Oceaneering's ROVs boast the least downtime in the industry.[9] An oil rig with an ROV not in operation can cost a company nearly $1 million a day.[10]

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[6] *Press release: Bristlemouth announces accelerator program for emerging ocean Technology*. (n.d.). https://www.sofarocean.com/posts/bristlemouth-announces-accelerator-program-ocean-technology

[7] Oceaneering, *The Oceaneering Story*, OCEANEERING.COM, https://www.oceaneering.com/about/#OurStory.

[8] Oceaneering, *Space Suit and Liquid Thermal Garments*, OCEANEERING.COM, https://www.oceaneering.com/space-systems/human-space-flight-systems/space-suits-and-liquid-thermal-garments/

[9] Project Management Network, *Deep Dive*, PMI.ORG (Nov. 2018), *available at* http://www.pmnetwork-digital.com/pmnetwork/november_2018/MobilePagedReplica.action?pm=2&folio=18#pg23.

[10] Teresa Rivas, *Take the Plunge with Oceaneering International*, BARRON'S (Nov. 21, 2012), https://www.barrons.com/articles/SB50001424052748703961304578133151610918538?tesla=y.

XOcean

Using Uncrewed Surface Vessels (USVs), XOcean provides turnkey ocean data. From mapping the seabed to environmental monitoring, XOcean offers a safe, economic and carbon neutral solution to ocean data delivery.[11]

USVs can remain offshore for extended periods, harvesting large volumes of ocean data. Operators and data analysts remain safely located onshore, connected to the vessels over a satellite link. This smarter and highly scalable approach to ocean data delivery is safer, cost-effective and ultra-low impact.

In addition to USVs, XOcean has developed CyberDeck, providing a highly secure cloud-based environment to monitor and control each USV. The CyberDeck also allows XOcean's team of data analysts to monitor the quality of the data being collected and to adjust both the USV and sensor parameters in real-time.[12]

Legislative History

Ocean and Coastal Mapping Integration Act (2009)
Calls for coordinated and comprehensive ocean and coastal mapping across the federal government; gives NOAA a lead role in integrating mapping efforts with federal, state and local governments, and private sector partners.[13]

Integrated Ocean Observing System (IOOS)
Established under Omnibus Public Lands Management Act of 2009 (Pub. L. 111–11), U.S. IOOS is a tool for tracking, predicting, managing, and adapting to changes in our ocean, coastal and Great Lakes environment.

Weather Research and Forecasting Act of 2017

Integrates additional coastal and ocean observations, and other data and research, from the Integrated Ocean Observing System (IOOS) into regional weather forecasts to improve weather forecasts and forecasting decision support systems.

Supports the development of real-time data sharing products and forecast products in collaboration with the regional associations of such system, including contributions from the private sector, academia, and research institutions to ensure timely and accurate use of ocean and coastal data in regional forecasts.[14]

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[11] XOCEAN. (2023, July 10). *XOCEAN | leading provider of uncrewed ocean data collection services*. https://xocean.com/
[12] Admin. (2025, March 4). *Technology*. XOCEAN. https://xocean.com/technology/
[13] United States. (2009). Ocean and Coastal Mapping Integration Act. In *PUBLIC LAW* (pp. 1421–1423). https://iocm.noaa.gov/reports/2009_PL111-11_SubtitleB_OCMIA.pdf
[14] Pub. L. No. 115-25

Global Ocean Monitoring and Observing (GOMO)

Provides and supports high quality global ocean observations and research to improve our scientific understanding and inform society about the ocean's role in environmental change. NOAA's Global Ocean Monitoring and Observing Program (GOMO) is responsible for approximately one million ocean data observations every single day that are used in weather forecasts and help to understand how our planet is changing. In GOMO's 2024 fiscal year (FY2024), they continued to provide highly impactful ocean observations, advance new technologies, and expand our capabilities and community engagement that will shape the ocean observing system of the future.[15]

[15] National Oceanic and Atmospheric Administration. (n.d.). *NOAA Global Ocean Monitoring and Observing*. https://globalocean.noaa.gov/