

Minutes
12th Meeting of the Ocean Exploration Advisory Board
Port of Oakland, Oakland, CA
26-27 March 2019

Notification and Availability of Meeting Materials

The twelfth meeting of the Ocean Exploration Advisory Board (OEAB) was announced to the public by Federal Register Notification, and on the OEAB website at www.oeab.noaa.gov. Background material and presentations prepared for this meeting are posted on the OEAB website.

Ocean Exploration Advisory Board Members in Attendance

Mr. John Kreider, Consultant (Chair)
Ambassador Cameron Hume, Consultant (Vice Chair)

Dr. Amanda Demopoulos, U.S. Geological Survey¹
Dr. Jacqueline Dixon, University of South Florida
Dr. Christopher German, Woods Hole Oceanographic Institution
Mr. David Lang, OpenROV
Dr. Darlene Lim, NASA²
Ms. Nicolette Nye, National Ocean Industries Association³
Dr. Richard Rikoski, Hadal, Inc.

NOAA Management and Staff in Attendance

Brandon Elsner, NOAA Policy
Kevin Wheeler, NOAA Deputy Chief of Staff⁴

Office of Ocean Exploration and Research

Dr. Alan Leonardi, Director, OER⁵
Mr. David McKinnie, Designated Federal Officer for the OEAB
Ms. Rachel Medley, Expeditions Division Lead, OER
Dr. Adrienne Copeland, OER
Dr. Amanda Netburn, OER

Invited Briefers

Mr. Rod Hirsch, U.S. Commercial Service
Mr. Mark Gunderson, President and CEO, Marine Advanced Robotics
Mr. Richard Jenkins, CEO, Saildrone
Mr. Bilal Zuberi, Partner, Lux Capital
Mr. Phil Cruver, President and CEO, Catalina Sea Ranch
Dr. Katy Croff Bell, MIT Open Ocean

Observers

Ms. April Tucker
Ms. Allison Fundis

¹ Dr. Demopoulos participated by telephone

² Dr. Lim participated on the first day

³ Ms. Nye participated by telephone

⁴ Mr. Wheeler participated in discussions about reauthorization on the second day by telephone

⁵ Dr. Leonardi participated on the first day

Meeting Summary

- 1. Meeting Opening.** The Designated Federal Officer (DFO) opened the meeting on March 26, 2019 at the Port of Oakland.
- 2. The Port of Oakland and the Blue Economy.** After welcoming remarks from Port of Oakland Executive Director Chris Lytle, Ron Brown provided an overview of the Port's role in the Blue Economy, highlighting the movement of cargo, its role in the Oakland community, and its ties to other Blue Economy sectors.
- 2. Approval of Minutes.** Dr. Dixon made a motion to approve the minutes from the 11th OEAB meeting, held in Washington, D.C. Ambassador Hume seconded, and the Board approved the minutes (see the [OEAB website](#) for Meeting 11 minutes).
- 3. Chairman's Remarks.** The Chair opened his remarks by noting that over 150 years ago the HMS Challenger embarked on its historic voyage of exploration. Today, the Okeanos Explorer conducts similar expeditions, deploying people and equipment on platforms in modes of operation not dissimilar to those employed by the Challenger. He asked the OEAB to consider the contrast with vehicles such as the Boeing Echo Voyager and their ability to collect data autonomously. He noted the widening gap between NOAA and industry to set the stage for a meeting focused on technology and innovation. In discussion that followed, Board members noted various initiatives that promoted public-private partnerships and the importance of collaboration.
- 4. OER Overview.** Dr. Leonardi provided the OEAB with an update on OER activities since the last meeting. He highlighted expedition results, engagement metrics, the importance of OER's partnerships in executing expeditions, and future plans. His presentation is available at oeab.noaa.gov. In discussion and question and answer that followed, Board members asked about differences in modes of operation between the Okeanos Explorer and the Nautilus, how OER works using National Ocean Partnership Program funding, plans for future technology development, and other matters.
- 5. Federal Funding Opportunity Program Review.** Under law, the OEAB is required to conduct an annual review of OER's implementation of its Federal Funding Opportunity (FFO) Program and certify that it is competitive. Dr. Leonardi presented an overview of the process, including metrics to show areas of focus and the grant program's impacts on difference sectors of the ocean exploration community. The OEAB certified OER's conduct of the FFO program.
- 6. Department of Commerce and the Blue Economy.** Mr. Rod Hirsch of the Department of Commerce's Commercial Service described his agency's programs to promote the export of U.S. goods and services through grants programs and other activities intended to help make small, innovative companies competitive in foreign markets. He asked a participant in the Market Cooperator Development Program, Mr. Mark Gunderson of Advanced Marine Robotics to share his experience with the DOC program. In discussion the OEAB noted the importance of ship time to test new technologies and the value of federal support for test-bed support.
- 7. OEAB Visit to Saildrone.** Richard Jenkins, founder and CEO of Saildrone, invited the OEAB to tour the Saildrone facility in Alameda. Mr. Jenkins explained that the company provided high quality data for customers and managed a large fleet of vehicles for that purpose. He described the research and development relationship with NOAA's Pacific Marine Environmental Laboratory and his appreciation for NOAA's role in helping

Saildrone to integrate sensors and refine requirements for data. However, Mr. Jenkins also noted difficulties in contracting with NOAA for oceanographic data since ship time is accounted for as “free.” Saildrone’s programming and data analysis team is focused on providing valued added products as well as data. Mr. Jenkins noted the advantages of the Saildrone technology in conditions that would compromise traditional methods of collecting data, such as in kelp beds and in ice. Saildrone continues to advance sensor integration and to test new platform designs. The OEAB expressed its appreciation for the tour and discussion.

8. **Investment in the Blue Economy.** Dr. Bilal Zuberi, a partner in Lux Capital and major investor in Saildrone, provided comments to the OEAB about his perspective on investments in the Blue Economy. Dr. Zuberi first explained that he perceived three “revolutions” underway in the technology sector that were relevant to investors as well as startups and technology users like NOAA. First, the commoditization of high-end sensors; e.g. the “peace dividend of the cell phone wars” is very inexpensive GPS and internal sensors that cost 1% of what they used to and the “peace dividend of the autonomous vehicle wars” is \$5-10 LIDAR systems. Second, moving to an environment where there are many cameras per person—not for photographs but for machines talking to other machines to provide services and direct device-to-device connectivity. Finally, the ability of advanced computing/machine learning/artificial intelligence to extract insight in real-time from huge data sets—like using satellite images of Walmart or Target parking lots to count vehicles and project profits, or counting tankers at sea to assess oil transport.

These three revolutions are driving two new kinds of companies: companies that provide analytics in real time (like Saildrone) and companies that provide automation (like designing robots to work with humans instead of in cages). Lux Capital is investing in ocean, space, and air drones. These drones will become a neural net that will allow for provision of new services that will flip business models from a focus on equipment—like a vehicle—to a service—like personal transportation.

Dr. Zuberi also discussed the challenges of conventional government procurement and its limitations in being able to identify promising startups that could meet requirements in a different way. Saildrone was able to get started because of a relationship where NOAA could express its requirements in an R&D context. The challenge is moving from R&D to commercial viability. Dr. Zuberi advised that NOAA would do well to have more people who knew technology better and could help match requirements, technology and opportunity. Improved contracting approaches are also critical to attract startups and accelerate development of disruptive technologies.

9. **Mariculture and the Blue Economy.** Mr. Phil Cruver, CEO of Catalina Sea Ranch, provided the OEAB with an overview of his aquaculture operation in Southern California and its potential to contribute to seafood supply. He also described the obstacles companies like his can face in the permitting process. He noted further issues with FDA approvals when all west coast FDA-certified laboratories that tested seafood lost their certification for non-conformity. Mr. Cruver explained that not all permitting agencies were difficult but that some effort to rationalize at least federal agency actions would help ensure businesses like his develop and survive. Mr. Cruver’s presentation is posted on the OEAB website.
10. **NOAA Administrator’s Requests of the OEAB.** Assistant Secretary of Commerce for Oceans and Atmosphere Tim Gallaudet requested that the OEAB provide advice to NOAA leadership on reauthorization of the national ocean exploration act legislation of 2009, National Ocean Partnership Program reauthorization, and related issues. Brandon Elsner of the NOAA Policy Office and Kevin Wheeler, NOAA Deputy Chief of Staff, presented the request and led the discussion with the OEAB.

After a lengthy discussion of the issues, including a line-by-line review of the existing statute, the OEAB chair assigned himself and the Vice Chair to prepare the recommendations with drafting assistance from the DFO.

11. **OER Education Review Response.** At its meeting in September 2018, the OEAB requested that OER provide a status report of on its implementation of the OEAB subcommittee on Ocean Exploration Education review recommendations. OER's David McKinnie, who leads the Engagement Division, provided a presentation on OER's response to date and its plans for the coming months. Education team members Susan Haynes and Debi Blaney assisted via telephone. Subcommittee members Allison Fundis and April Tucker were present and participated in the discussion. Mr. McKinnie's presentation is posted on the OEAB website.

The OEAB expressed its satisfaction with the progress to date and agreed to send a letter to RDML Gallaudet on the topic.

12. **National Ocean Exploration Forum 2018 Summary.** Dr. Katy Croff Bell summarized the results of the 2018 National Ocean Exploration Forum for the OEAB. She reviewed participation, demographics, the main themes of Play, Imagine, Immerse, Create, Explore, and Connect and the workshops and speakers that encouraged participants to think of engaging the public in ocean exploration in new ways. She also noted some of the partnerships that have resulted from the event and the potential for continuing to develop concepts put forward that could help change messages about the ocean to ones that focus more on the wonder of the deep and less about the dire state of the ocean.
13. **Next Meeting.** The Board confirmed its next meeting for 31 July-1 August in Washington, DC.
14. **Meeting Close.** The DFO closed the meeting at approximately 1700 on March 27, 2019