

2013—Ocean Exploration 2020: Aquarium of the Pacific, Long Beach

| National Ocean Exploration Program | Ocean Exploration Priorities | Platforms | Technology | Partnerships and Funding | Data and Information | Public Engagement |
|---|--|--|--|---|--|--|
| NOAA should lead the national ocean exploration program | <i>Community Driven:</i> ocean explorers and stakeholders should set national priorities | Take advantage of data from: instrumented marine animals, stationary observing networks and sensors, seafloor observations | Develop mechanisms to fund technologies to enhance and expand exploration capabilities | Look for public and private partnership opportunities | Encourage open data sharing with little to no cost | Promote the use of ocean exploration for STEM education |
| Create a clear national mission statement | <i>Geographic Areas:</i> Arctic, Antarctic, Indo-Pacific, Central Pacific, US EEZ and ECS | Need for dedicated ships of exploration | Explore federal investment in technology | Look for national and international partnership opportunities | Take advantage of all sources of available and relevant data | Use a coordinated and positive approach to engaging the public |
| | <i>Ocean Processes, Phenomena, Resources:</i> Ocean acidification, under-ice communities | Use ships of opportunity | | Think about crowdsourcing for funding | Establish data repository | Increase the use of telepresence |
| | <i>Ocean Features:</i> Water column, trenches, coral ecosystems, methane seeps, marine life, seamounts | Need for AUVs, ROVs, and HOVs with range of capabilities, including low-cost vehicles | | Be more inclusive and nimble as a community | | Expand opportunities for Citizen Science |

2014 – Ocean Exploration and NOAA Mission Requirements: National Aquarium, Baltimore

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| Increase OER visibility and make ocean exploration compelling to NOAA leadership | <i>Geographic Areas:</i> Arctic, Pacific – Territorial Trust Areas, US EEZ and ECS, newly protected areas | Need for more platforms suitable for under-ice exploration | New technology suitable for under-ice exploration | Create new partnerships across government, including U.S. Navy | Encourage open data sharing | Tailor expeditions to meet STEM education |
| Use NOPP working groups, IOOS, and IODP as models for promotion of program | <i>Ocean Processes, Phenomena, Resources</i> Ocean acidification, under-ice exploration, fisheries habitats, ocean resources | | | May need international partners with ice-capable ships | Transfer data management model both inside and outside of NOAA | Increase the visibility of ocean exploration |
| Provide recommendations to the OEAB | Set exploration targets in response to the drivers that are constant | | | Consider crowdsourcing for data and technological development | Collecting new data for baseline characteristics | Engage citizen explorers, indigenous peoples and the public |
| | | | | Build new relationships with oil and gas | Prioritize the importance of data and data interoperability | |
| | | | | Be more expansive in our definition of partners | Provide access to data quickly | |
| | | | | Creative approaches to engage aquaria | | |

2015—Characterizing the Unknown: National Aquarium, Baltimore

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| Build an inclusive community – not-for-profits, academia, private sector, government | <i>Ocean Features</i> Water column, under-ice, mid-ocean ridges & fracture zones, continental shelf, canyons and seamounts, submerged cultural resources, US EEZ | Current exploration vessels need upgrades and eventual replacement | Utilize observation tools – including cable systems that host sensors and AUVs with multibeam, and sensors fitted to marine mammals | Partner with other Federal Agencies (USGS, BOEM, NASA, U.S. Navy, NSF) | Normalize data formats so that observation from different groups can be combined and analyzed together | Facilitate a coordinated approach to public engagement, communicate the importance of exploration |
| Advance the recommendations from previous Forums | <i>Ocean Processes, Phenomena, Resources</i> Acoustic data, ocean chemistry, chemosynthetic communities | Use and stimulate the development of new platforms | Need for innovation and sharing new developments with federal and non-federal partners | Increased partnership with NGOs (OET, SOI, Khaled bin Sultan Living Oceans Foundation, GFOE) | Decide best practices for how data & info are managed, archived, & disseminated | Heroes to convey the value of exploration in human terms |
| Create and reinforce stakeholder relationships | Design ocean exploration expeditions using an “architecture of participation” | Use UAS, AUVs, AUV swarms | Develop visualization techniques | Think creatively about funding models, more diversified sources of support | Share data quickly and widely, time limit of 2 years | Bring educators on board to add value |
| Build support for exploration among decision makers | Hold workshops that bring experts together to identify priorities | Use UNLOS vessels | Create small, inexpensive sensors and platforms | Look for opportunities with the private sector (oil and gas, marine biotechnology) | | Cultivation of young ocean explorers to excite the public |
| Create periodic syntheses to provide summary accomplishments | | | Develop new instruments for passive acoustic monitoring | Identify opportunities for collaboration and participation | | Engage with aquaria to use citizen science & telepresence |
| Need for vocal champions of exploration | | | Extend the range of AUVs and other sensors | Be rooted in a dynamic network of partnerships | | Use social media to expand reach |
| | | | Accelerate technology development | | Expand the role of citizen science | |

2016—Beyond the Ships: Rockefeller University, New York City

| National Ocean Exploration Program | Ocean Exploration Priorities | Platforms | Technology | Partnerships and Funding | Data and Information | Public Engagement |
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| Create campaigns for exploration, have NOAA, OER commitment | <i>Geographic Areas:</i> Arctic, Gulf of Mexico, Southeast Atlantic Bight, U.S. EEZ | Expand use of exploration vehicles as opposed to ships | R&D for broadband multibeam – cut costs | Benefit from different motivations for exploration with other Federal Agencies | Encourage open data/imagery sharing | Develop standardized telepresence package procurement plan |
| Develop measures and indicators to determine if an area is explored, and develop consistency | <i>Ocean Processes, Phenomena, Resources:</i> Acoustics, marine minerals | Leverage ships of opportunity, outfit for exploration and modularize ROV systems for portability | Identify, adapt, and adopt new or yet-to-be-employed technologies, test emerging technologies | Use of prizes and other nontraditional competitive approaches | When campaigns are developed, assemble and synthesize all previous data from region | Design pre-campaign press coverage, solicit interest in campaigns |
| Distinguish consistently between first time and one time | <i>Mapping:</i> Goal should be to map the US EEZ and entire ocean; conduct Global Geological Survey of the Oceans | Long duration AUVs and AUV swarms | Robust AUVs capable of working in ice, smaller/cheaper AUVs, disposable AUVs, sensors, devices | Deepen and rank U.S. diplomatic opportunities associated with ocean exploration | Increase resources to carry data burden | |
| Gain multiyear commitments with lead sponsor and cosponsors – sponsor “owns” campaign | Participate in processes that help prioritize candidate campaign areas | Think and plan beyond the ships | Include emerging technologies in campaign RFPS, require that tech developers join expeditions | Look at potential opportunities to partner with the private sector | Avoid stovepipes within disciplines | |
| Facilitate processes for advice and participate in collaboration | Facilitate processes for advice from science community and get further advice from workshops | Invest in support infrastructure to enable employment of new technology | Use campaigns as proving grounds for emerging ocean exploration technology | Leverage opportunities to partner in exploration of the high seas | | |
| Begin planning for 2020-2025 | Understand better the “demand” for exploration | Continue to use existing ships | Biological sampling – new, nondestructive means | Encourage cross-communication between partners | | |