

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

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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		