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DEPARTMENT OF COMMERCE
RESEARCH PERFORMANCE PROGRESS REPORT (RPPR)

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AWARD INFORMATION	
1. Federal Agency: Department of Commerce / NOAA	2. Federal Award Number: NA19OAR4320072
3. Project Title: Ocean Exploration Cooperative Institute (OECI): Discovering the New America	
4. Award Period of Performance Start Date: 07/01/2019	5. Award Period of Performance End Date: 06/30/2024
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	
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8. Title: Executive Director of the Ocean Exploration Cooperative Institute	
9. Email: adamsoule@uri.edu	10. Phone Number: 508-685-4081
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REPORTING INFORMATION	
Signature of Submitting Official: Franca Cirelli	
16. Submission Date and Time Stamp: 07/30/2021	17. Reporting Period End Date: 03/31/2021
18. Reporting Frequency: (●) Annual ( ) Semi-Annual ( ) Quarterly	19. Report Type: (●) Not Final ( ) Final
RECIPIENT ORGANIZATION	
20. Recipient Name: UNIVERSITY OF RHODE ISLAND	
21. Recipient Address: 75 LOWER COLLEGE, KINGSTON, RI 02881-1974 USA	
22. Recipient UEI: CJDNG9D14MW7	23. Recipient EIN: 223011455

ACCOMPLISHMENTS

24. What were the major goals and objectives of this project?

The Ocean Exploration Cooperative Institute (OECI) aims to advance ocean exploration through the conception and development of new vehicles, sensors, and operational concepts; the execution of field-based ocean exploration utilizing these new technologies; enhancing the approaches and infrastructure to the collection, analysis, and delivery of ocean exploration data; and by inspiring and training a new and more diverse generation of ocean explorers.

University of New Hampshire: UNH's OECI activities over the first two years have focused completely on the acquisition and testing of an uncrewed surface vehicle (USV) that will provide the CI, NOAA, and the nation with a state-of-the art, transportable (i.e., deployable from shore or a range of vessels) USV that will push the envelope of autonomous mapping and characterization capabilities as well as pioneer approaches for collaborative operations with other platforms of exploration.

University of Southern Mississippi: The USM AUV upgrade project intends to provide a suite of modifications and improvements (hardware, software and new sensors) to the USM AUVs ER and MM to carry out the associate at sea engineering tests to evaluate the effectiveness and performance of such work.

The Tuskegee University Internship project proposed to recruit under-represented students to ocean science through a webpage, social media, an on campus presence at Tuskegee University and managing internship opportunities throughout the OECI.

Ocean Exploration Trust: OET and its partners implemented an unconventional, but productive 2020 field season amidst the ongoing COVID-19 pandemic. Eight expeditions occurred between mid-August and early December aboard Nautilus, three of which were part of the OECI Y2 efforts: NA122 Central California Mapping & National Marine Sanctuaries (jointly funded by OECI and ONMS); NA124 Benthic communities across mineral-rich biomes; and NA125 Southern California Borderland EEZ mapping Collectively these OECI expeditions mapped 47,789 km2 of the US EEZ and conducted 17 remotely operated vehicle (ROV) dives for visual and sampling surveys (10 of which were funded by OECI).

University of Rhode Island: The proposed tasks for this project included administration of the OECI project activities including the scheduling and execution of OECI-wide meetings (Executive Council, Council of Fellows), distribution of funds to OECI partners, coordination of education and outreach activities, communications with NOAA Ocean Exploration, and coordination of OECI-wide proposal development and reporting

The goals for the Inner Space Center (ISC) in support of FY21, OECI YR2 were as follows: To provide all aspects of satellite transmission, networking, live streaming, video broadcasting, data archiving, and other technical shore-support coordination, maintenance, and execution tasks for OECI telepresence operations. Provide leadership in the coordination, development and testing of a new Data Management and Implementation Plan, and coordinate, develop, and test ongoing Telepresence 2.0 initiatives.

25. What was accomplished under these goals?

Please see attached report for more detailed information: OECI executive office was established; the first OECI workshop was held on December 16-17, 2019; the Executive Council, the Council of Fellows and Working Groups were established. Dr. Dwight Coleman stepped in as interim Executive Director. The Professor of Oceanography position was posted and finalists selected. UNH effort focused on acquisition of a portable Autonomous Surface Vehicle (ASV) system that can be deployed on a variety of platforms. The team looked at the potential of using the DriX for OECI tasks and designing a transportable system that would fit on a variety of platforms of interest. The work with the DriX also led to the recognition that their unique launch and recovery system (DDS) could be modified to launch and recover many different vehicles (making it a "Universal Deployment System", UDS) including the USM Eagle Ray AUV. UNH worked with iXblue on a version of the DriX system that will have a launch/recovery "vehicle" that can adapt to either the DriX or the Eagle Ray so that both systems could be used simultaneously. Proposals for the design of the launch/recovery system were submitted and after working on the details with iXblue and NOAA OER (see approved Change of Scope) a purchase order was developed. The DriX provides the opportunity for the mother ship to be efficiently mapping in the deep water around Pacific Islands while the ASV can simultaneously map the shallower waters for complete coverage of the EEZ. The current maximum depth of the sonar planned for the DriX system is approximately 600 m but over the next year UNH will be exploring approaches to provide deeper capability. The USM Eagle Ray AUV went through a complete overhaul of mechanical systems by the manufacturer and various internal electronic upgrades to existing sensors were completed. The Launch and Recovery System for Eagle Ray was modified to increase efficiency and reliability. In October 2019, an engineering cruise was conducted using both Eagle Ray and Mola Mola. A new multibeam sonar system for Eagle Ray was procured and installation is planned for during Fall/Winter 2020 in preparation for Year 2 activities. A mobile control system was designed to allow control of Eagle Ray from the deck, greatly increasing safety of launch and recovery operations. Planning began for an extended 2 weeks expedition supporting potential expansion of the Flower Garden Banks National Marine Sanctuary (FGBNMS) in June 2020; now scheduled for July 2020 because of the COVID 19 shutdown. MEC staff worked with TU faculty and staff to initiate interaction with potential Ocean Exploration Interns (EI) from several majors at TU. The EI group met in January and February, 2020. Much of WHOI's activity during this reporting period focused on preparing the NUI vehicle and planning for participation in the M/V Corcovado deployment in February/March 2020. WHOI worked with OET and OECI partners, in consultation with OER and the Council of Fellows, to develop alternate plans once the Corcovado cruise was canceled and the field program delayed. The decision to move this work to Nautilus in Fall 2020 reflected an adjustment of plans brought on by the Corcovado cruise cancelation and the inability to complete all the objectives using the USM Point Sur, limited availability of Point Sur ship time for this work and COVID related uncertainty about ship scheduling in June. The approach was recommended by the Council of Fellows to combine efforts onto EV Nautilus. The effort aboard Nautilus will enable WHOI to conduct the tests in tandem with OET's vehicles as planned. Further discussion about the Nautilus cruise and other WHOI vehicle field test cruises will take place under the auspices of the Council of Fellows.

Attach a separate document if more space is needed for #6-10, or #24-50.

ACCOMPLISHMENTS *(cont'd)*

26. What opportunities for training and professional development has the project provided?

From April through December 2020, the ISC produced and/or hosted over 40 virtual and interactive programs, including 17 Ocean Classroom Live episodes in collaboration with URI/GSO. The programs covered topics such as ocean careers, shark behavior and biology, and hurricanes; aired through outlets such as YouTube and Facebook Live; and have been archived to these social media platforms as well as the URI/GSO website with associated resources. As of December 2020, Season 1 videos received nearly 10,000 cumulative views on Facebook and over 1,400 views on YouTube. The program was so successful that Season 2 began in February 2021 (and will wrap in July 2021). The ISC also supported professional development (PD) production efforts with NOAA Ocean Exploration's Education team. In response to a distinct need for new approaches to reach educators with relevant ocean science and exploration content, as well as its commitment to providing PD programming as part of its annual engagement mission, the NOAA Ocean Exploration Education Team partnered with the University of Rhode Island's Inner Space Center (ISC) to pilot an innovative, online mini-series to share ocean exploration content with educators and support them as many transitioned to virtual instruction in response to the COVID-19 pandemic. Informative, high-quality, ocean science videos and newly developed instructional resources were paired with web-based, interactive, conversational-style PD programs with experts from across the globe. Providing educators with direct access to engaging content experts was key to the success of the program. Partner-led, virtual, follow-up events provided additional activities and an opportunity for educators to further discuss teaching connections. From October 2020- May 2021, over 780 educators were engaged across 9 virtual PD events, covering three different topics (underwater robotics, hydrothermal vents, and seafloor mapping). The pilot program was very successful and provided significant insight into new ways of online collaboration and content delivery in the cloud. Even with the return to in-person events, the virtual PD programs developed by the ISC and the NOAA Ocean Exploration Education Team will continue into 2022 and become a permanent part of NOAA Ocean Exploration's education portfolio. Although these virtual PD events were not supported by the OECI in Year 2, continued efforts will be OECI-supported in Year 3.

The OECI supported a URI-GSO graduate student working on exploration of critical mineral deposits in the Pacific Ocean. In addition, USM continued to partner with Tuskeegee University to provide opportunities for TU undergraduate students to be exposed to ocean science and participate in internships. Undergraduate students at URI-GSO were supported via part-time jobs as watchstanders for Nautilus and Okeanos Explorer cruises. At WHOI, USM, and UNH graduate students participated in OECI activities.

27. How were the results disseminated to communities of interest?

For more details see attached report. The Ocean Exploration Cooperative Institute shares results through four primary methods. The first is the live streaming of our exploration activities which allows anyone in the community to follow along and participate in each expedition. The second is through delivery of ocean exploration data to relevant end-user repositories including NCEI, MGDS, and physical sample repositories. The third is the release of preliminary results through the Oceanography Supplement on Ocean Exploration and conference presentations. The fourth, is the release of final results through peer reviewed publications. All three of these mechanisms aid in getting results out to different audiences but operate on different time scales. The live stream is raw and immediate, the Oceanography Supplement is a yearly publication and represents the previous years expeditions. Finally the peer reviewed publications typically take 2-3 years for results to be validated and submitted to the journals.
To date the OECI has used the expedition live streams and the Oceanography Supplement to share results. Peer reviewed publications based on data collected during OECI activities are expected over the next two years. The publication list in the attached report represents the work of personnel associated with the Cooperative Institute.

ACCOMPLISHMENTS *(cont'd)*

28. What do you plan to do during the next reporting period to accomplish the goals and objectives?

Delayed year 2 activities are planned for the coming months including a technological demonstration utilizing DriX, Mesobot, NUI (Nereid Under Ice) AUV, and Argus ROV. USM will conduct final trials of its upgraded AUVs in a separate expedition. A Tuskegee University student is currently conducting an internship and will participate in USM AUV trials. Several additional delayed programs will be conducted

PRODUCTS

29. Publications, conference papers, and presentations

Ware, C., Mayer, L., Johhnson, P., Jakobsson, M. and Ferrini, V., 2020, A geographic grid system for visualizing bathymetry, Geosci. Instrum. Method. Data Syst., 9, 375–384.
Barker, L.D.L.; Jakuba, M.V.; Bowen, A.D.; German, C.R.; Maksym, T.; Mayer, L.; Boetius, A.; Dutrieux, P.; Whitcomb, L.L. Scientific Challenges and Present Capabilities in Underwater Robotic Vehicle Design and Navigation for Oceanographic Exploration Under-Ice. Remote Sens. 2020, 12, 2588.
Varghese, H.K., Miksis-Olds, J., DiMarzio, N., Lowell, K., Linder, E., Mayer. L.A., and Moretti, D., 2020, The effect of two 12-kHz multibeam mapping surveys on the foraging behavior of Cuvier's beaked whales off Southern California, Jour. Acoustical Society of America, v. 14, no. 6., pp. 3849-3858.
Masetti, G., Smith, M. J., Mayer, L. A., & Kelley, J. G. W., 2020, Applications of the Gulf of Maine Operational Forecast System to Enhance Spatio-Temporal Oceanographic Awareness for Ocean Mapping. Frontiers in Marine Science, v. 6,. Sci., 14 January 2020
Sowers, D., Masetti, G., Mayer, L.A., Johnson, P., Gardner, J.V., and Armstrong, A., 2020, Standardized Geomorphic Classification of Seafloor Within the United States Atlantic Canyons and Continental Margin, Frontiers in Marine Science, v. 7, pp. 9,
Sowers, D., Dijkstra, J. A., Mello, K., Masetti, G., Malik, M., & Mayer, L. A., 2020. Chapter 56 Application of the coastal and marine ecological classification standard to Gosnold Seamount, North Atlantic Ocean. In Seafloor Geomorphology as Benthic Habitat (pp. 903-916).
Yoerger, D., Curran, M., Fujii, J., Gomez-Ibanez, D., Govindarajan, A., Howland, J., ... & Wilkinson, C. J. (2020, February). At-sea testing of the Mesobot midwater robot. In Ocean Sciences Meeting 2020. AGU.
Wilkinson, C. J., Yoerger, D., Adams, A., & Wiebe, P. H. (2020, February). Methods for investigating the effect of ambient light levels on diel vertical migration of midwater animals with the Mesobot AUV. In Ocean Sciences Meeting 2020. AGU.
Bünz, S., Ramirez-Llodra, E., German, C., Ferre, B., Sert, F., Kalenickenko, D., Reeves, E., Hand, K., Dahle, H., Kutti, T., Purser, A., Hilario, A., Ramalho, S., Rapp, H. T., Ribeiro, P., Victorero, L., Hoge, U., Panieri, G., Bowen, A., Jakuba, M., Suman, S., Gomez-Ibanez, D., Judge, C., Curran, M., Nalicki, V., Vagenes, S., Lamar, L., Klesh, A., Dessandier, P. A., Steen, I., Mall, A., Vulcano, F., Meckel, E. M. and Drake, N. (2020) RV Kronprins Håkon (cruise no. 2019708) Longyearbyen – Longyearbyen 19.09. – 16.10.2019.
Bowen, A., Jakuba, M., & German, C. R. (2020, February). Under Ice with the NUI hybrid ROV. In Ocean Sciences Meeting 2020. AGU.
German, C. R., Bowen, A., Jakuba, M., Boetius, A., Schlindwein, V. S., Bünz, S., & Ramirez Llodra, E. (2019, December). Exploring Ice-Covered Oceans, Top to Bottom: Experiences in the Arctic with NUI (5k). In AGU Fall Meeting Abstracts (Vol. 2019, pp. P51B-03).
Shank, T. M., Machado, C., German, C. R., Bowen, A., Leichty, J. M., Klesh, A. T., ... & Hand, K. P. (2019). Development of a New Class of Autonomous Underwater Vehicle (AUV), Orpheus, for the Exploration of Ocean World Analogues. Ocean Worlds 4, 2168, 6021.
Soule, S. A., Heffron, E., Gee, L., Mayer, L., Raineault, N. A., German, C. R., ... & Parcheta, C. (2019). Mapping the Lava Deltas of the 2018 Eruption of Kilauea Volcano. Oceanography, 32(1).

PRODUCTS *(cont'd)*

30. Technologies or techniques

For a detailed description see the attached report. UNH acquired a state of the art autonomous surface vehicle (ASV), DriX. WHOI developed and upgraded two autonomous underwater vehicles (AUVs), Mesobot and Orpheus. Mesobot is continuing to develop eDNA sampling and light-field sensors for midwater exploration. The Orpheus vehicle transitioned technologies including terrain relative navigation for autonomous exploration of the benthos. USM updated their Eagle Ray and Mola Mola AUVs with new sensors, navigation, and control systems. URI explored new technologies for telepresence including cloud computing and low-earth-orbit satellites. OET repowered its vessel and increased its length in order to accommodate multi-vehicle operations. All of these technological innovations enable OECI to conduct exploration and move towards a future of co-exploration by multiple vehicles in coordination with each other.

31. Inventions, patent applications, and/or licenses

Nothing to Report

PRODUCTS *(cont'd)*

32. Other products

For a detailed description see the attached report. The OECI produced bathymetric data (~48,000 km2), seafloor video (375 hrs), and physical samples (280) that are publicly accessible. The OECI developed a website to engage the scientific community and the public in the ocean exploration enterprise. The OECI also developed a data management plan to guide the collection, processing, and archiving of ocean exploration data that is applicable to the broader ocean science community. The data management plan has been included in the attachment. The URI ISC has produced video content for ocean exploration outreach.

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

33. What individuals have worked on this project?

Dr. Paula Bontempi (PI)
Dr. Adam Soule (Co-PI, Executive Director)
Dr. Robert Ballard (Co-PI)
Dr. Rick Murray (Co-PI)
Dr. Kelly Lucas (Co-PI)
Dr. Larry Mayer (Co-PI)
Andrew Bowen WHOI
Brian Connon USM
Dwight Coleman URI
Jason Fahy URI
Holly Morin URI
Brenda Moyer URI
Leonardo Macelloni USM
Allison Fundis OET
Brian Calder UNH
Val Schmidt UNH
Dana Yoerger WHOI
Tim Shank WHOI

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS *(cont'd)*

34. Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

The OECI in Y2 has undergone a renewal in leadership . Adam Soule has been appointed as the Executive Director of the OECI. Soule replaces interim Director Dwight Coleman, who resumes his role as Director of the Inner Space Center at URI. In addition, Paula Bontempi has taken over as PI of the OECI grant from Dr. Bob Ballard. At USM, Kelly Lucas has taken over as PI from Monty Graham. Dr. Lucas has expertise managing a large research enterprise as VP of Marine Operations at USM. Leo Maccelloni has taken over as USMs Council of Fellows representative from Brian Connon. Dr. Maccelloni has a background in geophysics and manages USMs fleet of autonomous vehicles.

35. What other organizations have been involved as partners?

Tuskegee University is a partner institution in OECI. They work closely with University of Southern Mississippi on the development of the TU internship program. They serve on multiple working groups and contribute to the development of proposals and reports.

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS *(cont'd)*

36. Have other collaborators or contacts been involved?

Yes. The OECI network contains many individuals from the partner institutions. A partial list of collaborators is as follows.
Henry Jones, USM, Software engineer
Jessica Kastler, USM, Education Specialist
Stace Beaulieu, WHOI, Data scientist
Casey Machado, WHOI, Engineer
Tina Haskins, WHOI, Data Scientist
Samantha Wishnak, OET, Outreach
Meghan Cook, OET, Education
Matt Koskela, OET, Data Scientist
Tara Hicks-Johnson, UNH, Outreach and Education
iXblue, France
Saildrone, CA
Holly Morin, URI, Education & Outreach
Nicole Raineault, OET
Lindsay Gee, OET
Jason Fahy, URI
Brenda Moyer, URI
Ramble Ankumah, Tuskegee U
Richard Whittington, Tuskegee U

IMPACT

37. What was the impact on the development of the principal discipline(s) of the project?

For a detailed description please see the attached report. The global ocean and areas within the US EEZ remain largely unexplored. Therefore, OECI activities that have collected mapping exploration such as bathymetric mapping of >47,000 km2, 350 hours of HD and 4K seafloor video, and hundreds of samples of rocks, biological specimens, sediments, and fluids significantly impact our ability to understand the oceans. These data have practical uses for navigation, assessment of biological and mineral resources, and evaluation of ocean health. In addition, these data serve as a foundation for the research community to investigate ocean processes such as ecosystem function, ocean chemical exchange, and anthropogenic impacts to the oceans. The impact of these data extend to filling gaps in global compilations of oceanographic data, supplying critical observations and samples for process studies of deep ocean systems, and fulfilling the needs of policy makers for identifying critical resources and conservation areas. In addition, the OECI has acquired, developed, and advanced a number of observation platforms that will impact the way in which ocean exploration data is collected. For example, the DriX autonomous surface vessel is a new class of long-endurance, stable mapping ASV that will impact the efficiency of bathymetric data collection. The Mesobot autonomous underwater vehicle and accompanying sensors will impact the way in which we explore the mid-water by coupling sensing and imaging in a purpose-built tool for the structured midwater biological systems. The Orpheus autonomous underwater vehicle will impact the research communities ability to routinely access the deepest parts of the ocean (hadal depths) with a small, low-cost vehicle system. This project has also impacted the principal disciplines by engaging with students that represent the future ocean science workforce and aiming to expand the diversity within that group.

IMPACT *(cont'd)*

38. What was the impact on other disciplines?

Nothing to Report

39. What was the impact on the development of human resources?

The OECI impacted Human Resources in a variety of ways. First, the ISC-produced professional development webinars exposed teachers to educational materials that will be conveyed to K-12 students and contribute to their interest and retention in STEM fields. In addition, the OECI fully supported one graduate student, Coralie Rodriguez. The OECI expeditions aboard E/V Nautilus reached thousands of people, improving ocean literacy and exciting the next generation of blue economy workers. The ISC supports URI undergraduate students with part-time jobs as watch standers for Nautilus and Okeanos Explorer, exposing students to potential careers in ocean science. USM along with partner insitution Tuskegee University initiated an Ocean Club as well as a summer internship program that offers TU students multiple ways to engage with ocean exploration professionals. Partner institutions maintain robust outreach and education programs that benefit from OECI activities and materials produced by OECI.

IMPACT *(cont'd)*

40. What was the impact on teaching and educational experiences?

The ISC worked with the NOAA education office to create professionally-produced educator professional development webinars. The approach has proved successful and will be carried forward in the coming years. The materials produced are archived online for later viewing and a process to transition materials into podcast format has been piloted.

41. What was the impact on physical, institutional, and information resources that form infrastructure?

The acquisition and development of ocean exploration vehicles represents a significant impact on the physical infrastructure of the OECI, partner institutions, and NOAA. The UNH DriX is a new class of seaworthy, long-endurance, surveying ASVs that are expected to become an important component of NOAAs fleet in the future. The WHOI Orpheus is a new class of small AUV aimed at exploration at hadal depths. The WHOI Mesobot is a new class of mid-water exploration AUV. The USM Eagle Ray and Mola Mola are critical workhorse AUVs that will augment OECI activities.

IMPACT *(cont'd)*

42. What was the impact on technology transfer?

We consider the demonstration of the Orpheus AUVs along with the piloting of seafloor terrain relative navigation and the deployment of ISEA-X chemical sensors as technology transitions. In addition, the delivery of the first DriX ASV in the US is another technology transition. In each case, the technologies were transitioning from prototype to operational asset. The terrain relative navigation, developed by JPL, was also transitioning from use in spacecraft to use in subsea vehicles.

43. What was the impact on society beyond science and technology?

The OECI is committed to communicating the science, practice, and outcomes of ocean exploration to the science community, students, and the public. To that end, cruises on E/V Nautilus live stream video data and commentary to an audience that routinely numbers in the tens of thousands per cruise. We feel that this has a significant impact on the science literacy of the public as well attitudes towards the oceans. In addition, the OECI has made an effort to diversify the ocean science community by providing direct connections with students at Tuskegee University, an HBCU, and providing those students with opportunities to engage in ocean exploration through internships. Given the poor state of diversity within the field, any progress on this front represents a significant impact. As stated above, the ocean exploration data we collect will impact regulatory decision makers in the assessment of marine resources and the need for conservation within the US EEZ.

IMPACT *(cont'd)*

44. What percentage of the award's budget was spent in foreign country(ies)?

6 , Funds were allocated to complete the acquisition of the DriX ASV and associated systems (e.g., universal delivery system, crane). These funds were delivered to iXblue, a French company that invented the DriX system.

CHANGES/PROBLEMS

45. Changes in approach and reasons for change

Although there are changes in timing of planned activities due to COVID delays, the approach remains the same.

Attach a separate document if more space is needed for #6-10, or #24-50.

CHANGES/PROBLEMS *(cont'd)*

46. Actual or anticipated problems or delays and actions or plans to resolve them

The second year of the OECI was overshadowed by the COVID-19 pandemic that significantly limited at-sea operations as well as laboratory work. Many of the planned Y2 activities, as a result, were delayed including some planned technology demonstrations and internship programs. Many of the Year 2 activities that were postponed will be executed in the coming months and will fulfill a key Y2 objective of operationalizing the new and improved tools that make up the stable of OECI vehicle systems. This positions OECI for key Y3 activities that will increase ocean exploration capacity by developing operational concepts for multi-vehicle, cooperative exploration and telepresence that will move scientific, engineering, and operational tasks to shore.

47. Changes that had a significant impact on expenditures

COVID has caused significant delays on expenditures, especially those related to cruise activities. This includes shipping, supply chain issues, extended lab work on systems unable to be fielded, travel costs.

Attach a separate document if more space is needed for #6-10, or #24-50.

CHANGES/PROBLEMS *(cont'd)*

48. Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to Report

49. Change of primary performance site location from that originally proposed

Nothing to Report

Attach a separate document if more space is needed for #6-10, or #24-50.

PROJECT OUTCOMES

50. What were the outcomes of the award?

During the project period, OECI was formally established and progress was made on all of the Year 1 goals and objectives.

DEMOGRAPHIC INFORMATION FOR SIGNIFICANT CONTRIBUTORS (VOLUNTARY)

Gender:

- ◯ Male
- ◯ Female
- ◯ Do not wish to provide

Ethnicity:

- ◯ Hispanic or Latina/o Not
- ◯ Hispanic or Latina/o Do not
- ◯ wish to provide

Race:

- ◯ American Indian or Alaska Native Asian
- ◯ Black or African American
- ◯ Native Hawaiian or other Pacific Islander
- ◯ White
- ◯ Do not wish to provide

Disability Status:

- ◯ Yes
  - [ ] Deaf or serious difficulty hearing
  - [ ] Blind or serious difficulty seeing even when wearing glasses
  - [ ] Serious difficulty walking or climbing stairs
  - [ ] Other serious disability related to a physical, mental, or emotional condition
- ◯ No
- ◯ Do not wish to provide

Attach a separate document if more space is needed for #6-10, or #24-50.