



DEPARTMENT OF COMMERCE RESEARCH PERFORMANCE PROGRESS REPORT (RPPR)

For instructions, please visit

http://www.osec.doc.gov/oam/grants_management/policy/documents/RPPR%20Instructions%20and%20Privacy%20Statement.pdf

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	
6. Last Name and Suffix: Soule , null	7. First and Middle Name: Adam ,
8. Title: Executive Director of the Ocean Exploration Cooperative Institute	
9. Email: adamsoule@uri.edu	10. Phone Number: 508-685-4081
AUTHORIZING OFFICIAL	
11. Last Name and Suffix: Cirelli , null	12. First and Middle Name: Franca , null
13. Title:	
14. Email: franca@ds.uri.edu	15. Phone Number: 401-874-5891
REPORTING INFORMATION	
Signature of Submitting Official: Franca Cirelli	
16. Submission Date and Time Stamp: 05/28/2020	17. Reporting Period End Date: 03/31/2020
18. Reporting Frequency: <input checked="" type="radio"/> Annual <input type="radio"/> Semi-Annual <input type="radio"/> Quarterly	19. Report Type: <input checked="" type="radio"/> Not Final <input type="radio"/> 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?

During this period, the University of Rhode Island (URI) expected to begin Task I activities, including: hiring key administrative/management positions, establishing administrative procedures, completing all sub awards; implementing governance policies and convening planning meetings; defining OEI branding materials, including logo; and working with OER to establish protocols, policies and action plans. The Inner Space Center (ISC) planned to provide telepresence support for the Ocean Exploration Trust (OET) field program on the Chouest vessel M/V Corcovado in February, 2020.

During this period, the University of New Hampshire (UNH) planned to undertake engineering research and acquire a transportable, mid-water (3-1000m) multibeam mapping capability to be mounted on a vessel of opportunity and thus provide this vessel with multibeam mapping capability to support all of its operations. UNH planned to purchase a mid-water multibeam sonar and ancillary sensors, as well as construct a mounting system for the sonar to be mounted on a chartered vessel as participate in a field program to test this capability in year 2.

During this period, the University of Southern Mississippi (USM) planned to prepare its AUVs and ISIS for operational use. This included upgrades to the Eagle Ray AUV (ER) sensor suite through replacement of the multibeam echosounding system (MBES) and inertial navigation system (INS). Other upgrades included an expected purchase of ancillary equipment to make the ISIS Towed Imaging System functional, and engineering work to ensure that the Mola Mola AUV (MM) was operational. Prior to upgrading the vehicles, an engineering cruise to perform at-sea training of new personnel and verify system operation was planned for October, 2019.

During this period, the USM Education and Outreach (EO) Team planned to begin its work with students at Tuskegee University (TU) to form a student organization, the Ocean Exploration Club (OE Club) for several dozen students. The EO team also planned to initiate a long-term evaluation plan to track OE Club members as they progress in their academic and professional careers.

During this reporting period, WHOI planned to prepare for and participate in a field program aboard the M/V Corcovado in February 2020 to install and deploy the Hybrid vehicle Nereid Under Ice (NUI) for a demonstration of coordinated use of a ROV and AUV in real-time simultaneous operations (SimOps), during which acoustic and new short-range optical communications would be used to establish a high bandwidth link between Little Hercules and NUI for a first use of the subsea optical link to enable high bandwidth communications.

25. What was accomplished under these goals?

Please see attached report for more detailed information: OEI executive office was established; the first OEI 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 OEI 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 OEI 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?

In October 2019, USM undertook an engineering cruise using both Eagle Ray and Mola Mola. One of the purposes of this cruise was to train engineers on the use of these systems in the field.

During this period, 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.

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

N/A

ACCOMPLISHMENTS (cont'd)

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

Working Group meetings will continue to take place to further define science, technology, data management, Branding and Education/Engagement goals and objectives.

Proposals for the design of the launch/recovery system were submitted and after working on the details with iXblue, UNH is in communications with NOAA OER on the revised scope of work for years 1 and 2 and is ready to issue a purchase order.

Planning will continue for the extended 2 weeks expedition supporting potential expansion of the Flower Garden Banks National Marine Sanctuary (FGBNMS) in June 2020; now scheduled for July 2020.

PRODUCTS

29. Publications, conference papers, and presentations

Nothing to Report

PRODUCTS (cont'd)

30. Technologies or techniques

USM, UNH, and WHOI undertook engineering planning, design, and/or execution of planned upgrades to vehicles.

31. Inventions, patent applications, and/or licenses

Nothing to Report

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

PRODUCTS (cont'd)

32. Other products

Nothing to Report

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

33. What individuals have worked on this project?

Dr. Robert Ballard PI no change
Dr. Mark Abbott co-PI no change
Dr. Monty Graham co-PI no change
Dr. Larry Mayer co-PI no change
Andrew Bowen WHOI Engineer no change
Brian Connon USM Engineer no change
Dwight Coleman ISC Director/OECI Interim Executive Director

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

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?

Dr. Dwight Coleman ISC Director was asked to be the OECl Interim Executive Director.
Dr. Richard Murray is scheduled to replace Dr. Mark Abbott during the next project period.

35. What other organizations have been involved as partners?

Nothing to Report

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS (cont'd)

36. Have other collaborators or contacts been involved?

Nothing to Report

IMPACT

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

Nothing to Report

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?

Nothing to Report

IMPACT (cont'd)

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

Nothing to Report

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

Nothing to Report

IMPACT (cont'd)

42. What was the impact on technology transfer?

Nothing to Report

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

Nothing to Report

IMPACT (cont'd)

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

0 , null

CHANGES/PROBLEMS

45. Changes in approach and reasons for change

Nothing to Report

CHANGES/PROBLEMS (cont'd)

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

Change in M/V Corcovado Field Program

After several months of preparation and field operations planning, OET received the final quote from Edison Chouest for use of the M/V Corcovado. The final costs associated with the using the ship, especially the substantial mobilization/demobilization engineering required (e.g., planning and installing an A-frame, winch, vans, etc.) to make the platform usable, were prohibitively large. The decision had to be made to delay this cruise until later in 2020. After considerable effort to find an alternate similar platform, OET and WHOI determined that the best alternative for the NUI/ROV test would be the E/V Nautilus in fall 2020 in the EEZ along the west coast.

ISC had intended to provide telepresence operations and satellite service provisioning in support of this effort. At this point, ISC is planning to support telepresence onboard the R/V Point Sur during USM's field program at FGBNMS, through which tele-engineering tests can take place and live broadcasting for education outreach can be conducted, especially to involve and interact with underserved and underrepresented audiences along the Gulf coast (and at Tuskegee University).

Impact of COVID19 on Project Period

We started to see the impact of COVID19 as URI closed its campus beginning on March 16, and partner institutions began their own changes in operations. This changed the nature of OEI administrative and programmatic activities as each of the participating institutions began assessing the ability to get education, engineering and field work planning accomplished.

47. Changes that had a significant impact on expenditures

The cost-prohibitive quote from Edison Chouest for use of the M/V Corcovado, which resulted in cancellation of the 7-day field program in February, also resulted in a delay in expenditures for WHOI and ISC. WHOI had budgeted \$357,313 for this field program. ISC had budgeted approximately \$170,000 for this field program. Although USM was scheduled to send its ISIIS vehicle on this field program, there were no costs to OEI for their participation.

Currently, WHOI plans to undertake the field program aboard OET's E/V Nautilus in fall 2020.

ISC is looking at providing telepresence support for USM's FGBNMS field program in addition to working with NOAA OER and OEI partners on other opportunities for the use of telepresence.

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

PROJECT OUTCOMES

50. What were the outcomes of the award?

During the project period, OEI 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.