



**UNITED STATES DEPARTMENT OF COMMERCE**

National Oceanic and Atmospheric Administration  
NOAA Marine and Aviation Operations  
Marine Operations Center  
439 W. York Street  
Norfolk, VA 23510-1114

APR 3, 2015

MEMORANDUM FOR: Commander Mark Wetzler, NOAA  
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: *FOR* Captain Anne K. Lynch, NOAA *AKL*  
Commanding Officer, NOAA Marine Operations Center-Atlantic *OP/NOAA*

SUBJECT: Project Instruction for EX-15-02 Leg 3  
Caribbean Exploration (Mapping)

Attached is the final Project Instruction for EX-15-02 Leg 3, Caribbean Exploration (Mapping), which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of April 9 - 30, 2015. Of the 22 DAS scheduled for this project, 22 DAS are Line Office allocation. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to [OpsMgr.MOA@noaa.gov](mailto:OpsMgr.MOA@noaa.gov) at Marine Operations Center-Atlantic.

cc:  
Deputy Director, Office of Ocean Exploration & Research  
Expedition Coordinator, Office of Ocean Exploration & Research





APR 3 2015

### Project Instructions

**Date Submitted:** March 18, 2015

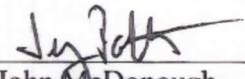
**Platform:** NOAA Ship *Okeanos Explorer*

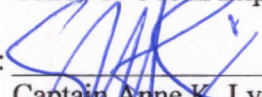
**Project Number:** EX-15-02 Leg III

**Project Title:** *Océano Profundo 2015: Exploring Puerto Rico's Seamounts, Trenches and Troughs (ROV, Mapping, CTD)*

**Project Dates:** April 9 – April 30, 2015

Prepared by: Brian Kennedy, NOAA  
Expedition Coordinator  
Office of Ocean Exploration & Research

Approved by:  Dated: 3/31/2015  
For John McDonough  
Deputy Director  
Office of Ocean Exploration & Research

Approved by:  Dated: 4/3/15  
BR: Captain Anne K. Lynch, NOAA  
Commanding Officer  
Marine Operations Center - Atlantic

## I. OVERVIEW

### A. Brief Summary and Project Period

NOAA's *Okeanos Explorer* systematically explores the ocean every day of every cruise to maximize public benefit from the ship's unique capabilities. With 95% of the ocean unexplored, we pursue every opportunity to map, sample, explore, and survey at planned destinations as well as during transits; "Always Exploring" is a guiding principle. An integral element of *Okeanos Explorer*'s "Always Exploring" model is the ship's seafloor and water column mapping capabilities. All three mapping sonars (EM 302, EK 60, Knudsen sub-bottom) are operational on all transit cruises for 24-hour seabed, water column, and sub-bottom data collection and selected processing.

This document contains project instructions for EX-15-02 Leg III, which is a telepresence-enabled ROV, CTD, and mapping exploration cruise. Operations for Leg III are expected to commence on April 9, 2015 in San Juan, Puerto Rico and conclude on April 30 in San Juan, Puerto Rico. ROV dives will mostly be conducted during the day, while CTD casts, and multibeam, singlebeam, and sub-bottom acoustic mapping will occur when the ROV is on deck. This will be the first *Okeanos Explorer* cruise to plan on conducting ROV operations 12 hours every day. Exploration operations will focus in the US EEZ surrounding Puerto Rico and the US Virgin Islands.

Requests for information on priority exploration areas in 2013 at the Caribbean Basin Workshop resulted in general interest for exploration of the Puerto Rico Trench and nearby areas. Exact locations of discrete ROV dives will be determined during the cruise as more data is acquired and weather and operational constraints are factored in. In general, operations will focus in the areas highlighted in Figure 1. A preliminary set of potential dive targets is shown in figure 2.

A diversity of seafloor features lie just offshore Puerto Rico and the US Virgin Islands that include trenches, seamounts, numerous submarine canyons, valleys, and troughs. These features likely contain valuable and vulnerable ocean resources, but very little is known about them, making this an important area to survey. It is highly likely that new and rare observations of numerous seafloor communities (including [deep-sea corals](#)) will be recorded in the region.

This cruise will also include two demonstration day trips so that guests will get a chance to observe ROV operations from the vessel. Currently planned for April 28<sup>th</sup> and 29<sup>th</sup>, these day trips will allow 3-7 people to sail on the vessel for the day. The ship will meet a small boat near or in San Juan harbor around 0700 ship time then transit to a nearby dive site and conduct a shortened ROV dive. The ship will return to San Juan transfer the guests ashore after the shortened ROV dive is complete.

### B. Days at Sea (DAS)

Of the 22 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 22 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are other agency funded. This project is estimated to exhibit a High Operational Tempo due to daily ROV operations, nighttime mapping, and possible evening CTD work.

### C. Operating Area

The *Océano Profundo 2015: Exploring Puerto Rico's Seamounts, Trenches and Troughs* Expedition will focus on waters surrounding Puerto Rico and the US Virgin Islands. The daily schedule for the cruise will usually be split between daytime ROV operations and nighttime operations. Currently the majority of the nighttime operations will be mapping. However some CTDs will may be requested on an as needed basis. CTD operations will be scheduled around the availability of ship's personnel. ROV operations will focus in depths between 500 and 6,000 meters and will include high-resolution visual surveys.

During this cruise we will be testing extended ROV operations. The ROV will be deployed in the morning before breakfast and then recovered in the evening after dinner. Optimally we will be aiming for the ROV to be in the water for 12 hours a day. This will be a test of the extended operations so the schedule may be modified during the expedition as circumstances require. If 12 hour operations prove to be too ambitious we will scale back to 10 hour dives; deploying the ROV after breakfast approximately 0830 ship time and recovering in the evening.

Mapping operations will include overnight multibeam, water column backscatter, and sub-bottom data collection over key features.

In order to make enough fresh water during the cruise we will plan on conducting every second or third ROV dive outside of 20nm from shore to allow for water making operations. During this cruise we will also avoid night time operations close to shore due to the high density of smaller vessels operating in the area.

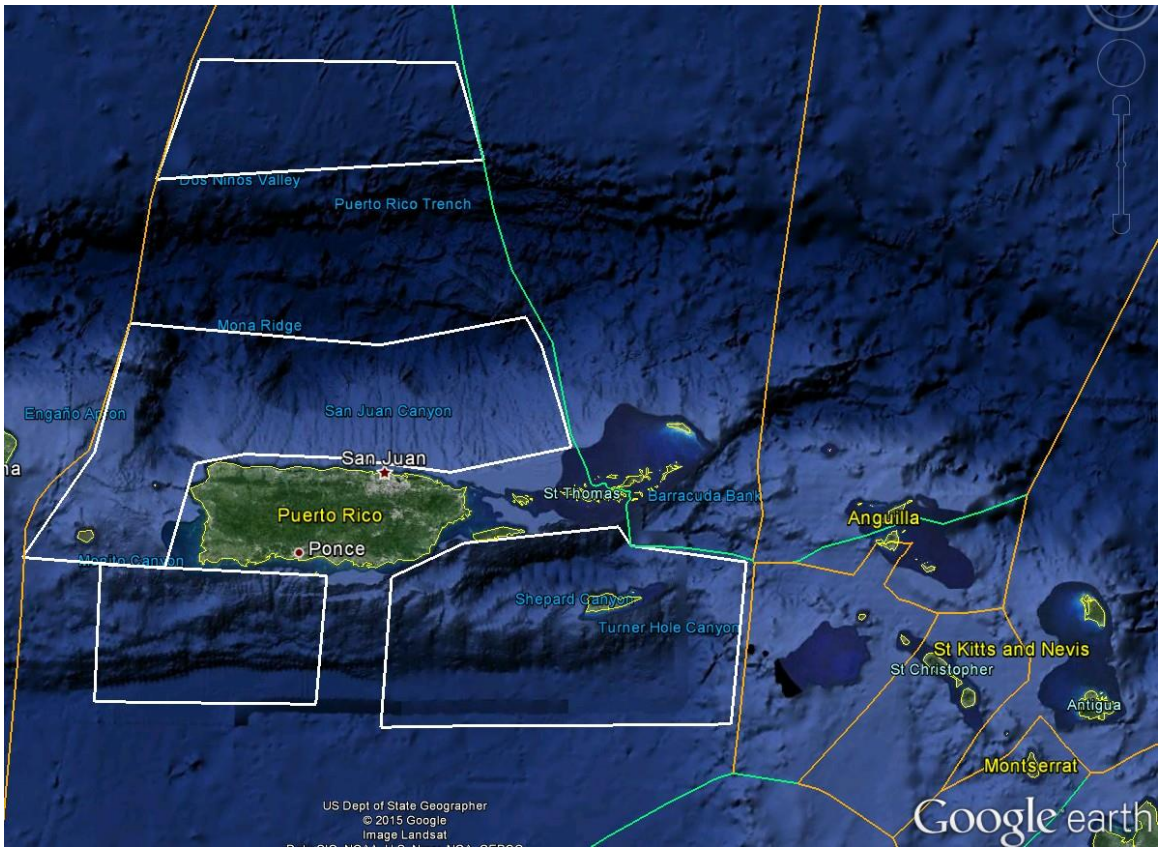


Figure 1: Approximate operating area of *Okeanos Explorer* for EX-15-02-Leg III. The white polygons are the possible operating areas for Leg III. The multi-colored lines denote the approximate locations of the EEZ boundaries. Figure produced in Google Earth Pro.

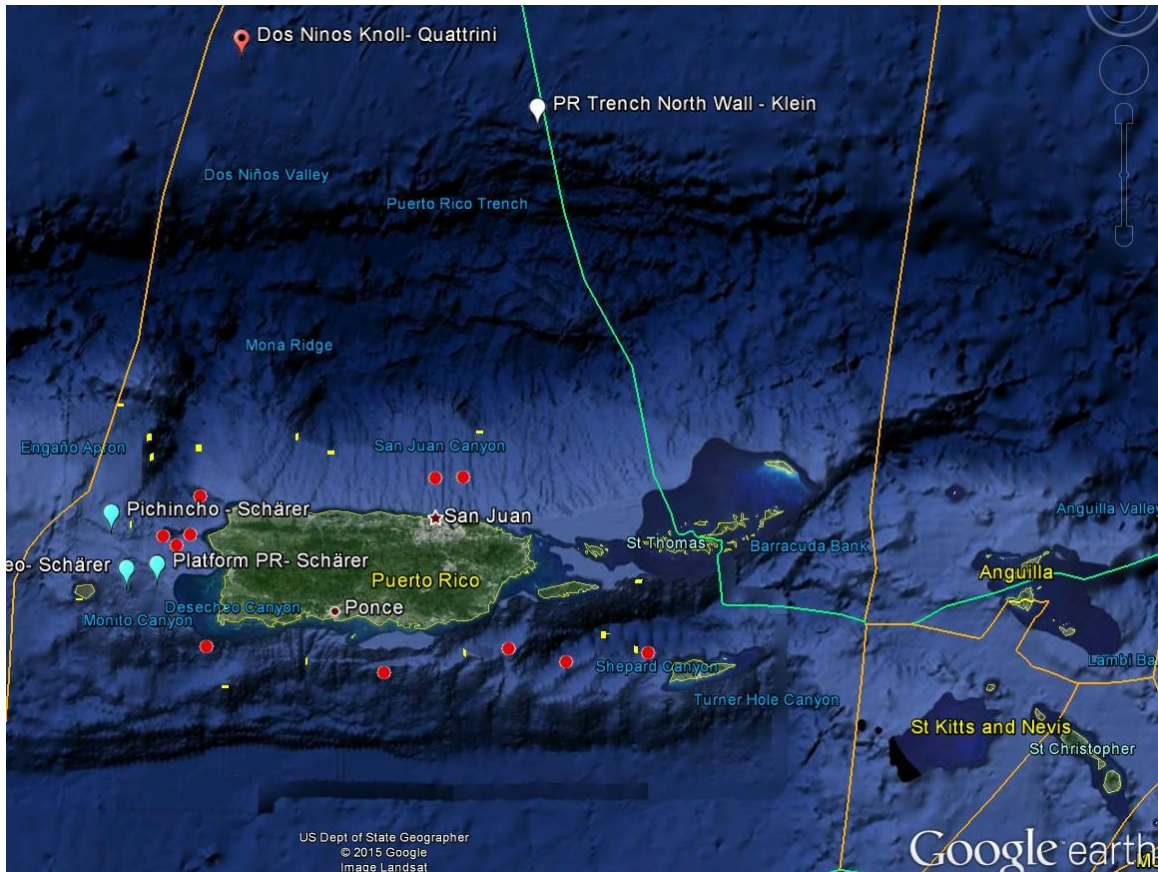


Figure 2: Suggested dive sites as of the time of writing. The potential dive targets are color coded by who submitted them. The multi-colored lines denote the approximate locations of the EEZ boundaries. Figure produced in Google Earth Pro.

#### D. Summary of Objectives

##### **Leg III: April 9-30 (San Juan to San Juan, PR) Telepresence-enabled ROV cruise with mapping and CTD operations**

EX-15-02 Leg III operations will cover a wide area of the US EEZ around Puerto Rico and the US Virgin Islands. The primary goals for this cruise include collecting baseline-characterization data of poorly known areas in the US EEZ. This will be the first *Okeanos Explorer* cruise to plan on 12 hour daily ROV operations.

Mission objectives for EX-15-02 Leg III include a combination of operational, science, education, outreach, and data management objectives:

1. Science
  - a. Identify and explore the diversity and distribution of benthic habitats and features in priority areas (e.g., deep corals and related benthic ecosystems, canyons, and seamounts)
  - b. Ground-truth acoustic data using video imagery and characterize associated habitat
  - c. Collect baseline data for the areas visited

- d. Engage a broad spectrum of the scientific community and public in telepresence-based exploration
  - e. Explore and understand some of the underlying geology to help better refine an understanding of the tectonically active region
  - f. Create and provide input into standard science products
2. Remote Science/Exploration Command Centers
- a. Test and refine ship-to-shore communications and operations procedures that engage multiple ECCs and other remote participants
  - b. Test and refine operating procedures and products
  - c. Test and facilitate remote science participation from the new Exploration Command Center at the University of Puerto Rico
3. ROV
- a. Integrate ROV into ship systems
    - i. Connect .68 cable to ROVs
    - ii. Test all ROV systems while alongside
    - iii. Possibly conduct alongside ROV dive on April 8<sup>th</sup> as time allows
    - iv. Conduct ROV launch and recovery training for new crew members
    - v. Test USBL alongside
  - b. Daytime ROV dives on exploration targets
  - c. Ongoing training of pilots
    - i. Train team members on use of ROV manipulator's during operations (no samples will be collected)
  - d. Ongoing system familiarization, documentation, and training
  - e. Test new ROV sub systems
  - f. Assess the feasibility of conducting daily 12 hour ROV dives
  - g. Test the ROVs maximum operating depth (6000m)
4. Telepresence (VSAT 20 mb/sec ship-to-shore; 2 mb/sec shore-to-ship)
- a. Turn on and test terrestrial and high-speed satellite links
  - b. Support telepresence-enabled ROV operations
  - c. Collect/create all standard video products
  - d. Evaluate newly purchased video encoders
  - e. Facilitate live outreach events between ship and shore
  - f. Test new WOWZA servers at the Inner Space Center
  - g. Test the feasibility of using YouTube live to host live video
  - h. Assess the feasibility handling video and staffing of daily 12 hour ROV dives
  - i. Configure VES03 to assist with video compression as needed
  - j. Modify SOPs to use VES 02 and VES03 in parallel to handle increased video data from extended dives
  - k. Work with the NASA xGDS team to improve telepresence software.
5. Mapping

- a. Collect high resolution mapping data from all three sonars
  - b. Support ROV operations with mapping products and expertise
  - c. Conduct mapping operations during transit, with possible further development of exploration targets
  - d. Collect XBT casts at regular intervals no longer than 3-4 hours, as data quality requires, during mapping operations
  - e. Create daily standard mapping products
  - f. Collection of sun photometer measurements as part of survey of opportunity
6. CTD operations
- a. Conduct CTD a cast for comparison to ROV CTDs after first ROV dive if needed
  - b. Conduct CTDs with water sample collection as requested after ROV dives (there are none currently planned but we would like to have the option)
7. Data Management
- a. Train new data engineer
  - b. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities, as detailed in the 2014 post-cruise product list
  - c. Provide daily products to shore for operational decision making purposes, as detailed in the 2014 field products list
  - d. Continue to test the ability to record high definition video footage of a full dive onboard the ship
  - e. Complete engineering test objectives on first ROV dive
8. Outreach
- a. Engage the general public in ocean exploration through live video and timely content (daily updates, topical essays and web logs, highlight videos, video clips, still imagery and mapping products) posted on the Ocean Explorer website
  - b. Test live events with the Smithsonian Museum of Natural History
  - c. Host live events with VIPs
  - d. Host media tour before cruise starts on April 9th
  - e. Conduct in port event at the conclusion of the expedition
  - f. Conduct two demonstration day trips for guests to observe ROV operations at sea
  - g. Host PBS News Hour film crew during demonstration day trip
  - h. Conduct Reddit AMA from the ship
  - i. Take new B-roll shots of the ship from a small boat
  - j. Conduct media tours on April 9<sup>th</sup>

## **E. Participating Institutions**

National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER)—1315 East-West Hwy, Silver Spring, MD 20910 USA



NOAA, National Oceanographic Data Center, National Coastal Data Development Center, Stennis Space Center MS, 39529 USA

NOAA, Office of Coast Survey, Hydrographic Surveys Division, Atlantic Hydrographic Branch, 439 W. York St., Bldg 2, Norfolk, VA 23510 USA

University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307 USA

University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) Jere A. Chase Ocean Engineering Lab, 24 Colovos Rd, Durham, NH 03824 USA

University of Wyoming, 1000 E University Ave, Laramie, WY 82071 USA  
 U.S. Geological Survey, Southeast Ecological Science Center 7920 NW 71st Street  
 Gainesville, FL 32653 USA  
 University of Rhode Island, Graduate School of Oceanography's Inner Space Center, 215 South Ferry Rd. Narragansett, RI 02882 USA

**F. Personnel (Mission Party)**

**Table 1: Leg III—Full list of sea going mission party members and their affiliations**

<b>Name (Last, First)</b>	<b>Title</b>	<b>Date Aboard</b>	<b>Date Disembark</b>	<b>Gender</b>	<b>Affiliation</b>	<b>Nationality</b>
Kennedy, Brian	Expedition Coordinator	4/5/15	5/3/15	M	NOAA OER	USA
Sowers, Derek	Mapping Team Lead	4/7/15	4/30/15	M	NOAA OER (ERT Inc)	USA
Reser, Brendan	Data Lead	4/6/15	5/1/15	M	NOAA NCDDC (DGIT)	USA
Drewniak, Jared	Video Lead	4/6/15	5/2/15	M	NOAA OER (ERT Inc)	USA
Quattrini, Andrea	Science Co-Lead	4/7/15	5/2/15	F	USGS	USA
Cheadle, Mike	Science Co-Lead	4/6/15	5/2/15	M	UWYO	USA
Bingham, Brian	Dive Supervisor	4/5/15	5/2/15	M	UCAR	USA
Wright, Dave	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Newman, Jim	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Mohr, Bobby	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Lanning, Jeff	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA

McLetchie, Karl	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Gregory, Todd	Assistant Dive Supervisor	4/5/15	5/2/15	M	UCAR	USA
Ritter, Chris	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Carlson, Joshua	ROV Engineer	4/5/15	5/2/15	M	UCAR	USA
Rogers, Dan	Video Engineer	4/5/15	5/2/15	M	UCAR	USA
Howard, Art	Video Engineer	4/5/15	5/2/15	M	UCAR	USA
McNichol, Ed	Video Engineer	4/5/15	5/2/15	M	UCAR	USA
Bolan, Daniel	Data Engineer	4/5/15	5/2/15	M	UCAR	USA
Weller, Erin	Mapping Watch Lead	4/7/15	5/1/15	F	AHB	USA

**Table 2: Leg III—Shore-based Operations Team**

Last Name	First Name	Organization	Area of interest or expertise.	Location
Martinez	Catalina	NOAA OER	Shore-side Ops	ISC
Cantwell	Kasey	NOAA OER (20/20)	Web Coordinator	SS ECC
Graddy	Sarah	NOAA OER (20/20)	PR specialist	SS ECC

**Table 3: Leg III -- Shore Based Science Team**

Last Name	First Name	Organization	Area of interest or expertise.	What is your level of intended/desired participation?
Ruppel	Carolyn	USGS	gas emissions, gas hydrates	Occasional participant (Will join for specific dives of interest, or when convenient)
Vecchione	Michael	NMFS National Systematics Lab	nekton, esp. cephalopods	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Watling	Les	University of Hawaii at Manoa	benthic biology, octocorals	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Santiago	Herrera	Woods Hole Oceanographic Institution	biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Leitner	Astrid	University of Hawaii Manoa	Benthic biology and ecology especially fishes	Occasional participant (Will join for specific dives of interest, or when convenient)

Nizinski	Martha	NOAA NMFS	deep sea corals and associated invertebrates	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Auster	Peter	Mystic Aquarium & UConn	ecology of fishes, benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Wilford	Schmidt	UPRM	physical oceanography, Puerto Rico Trench exploration	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Ross	Steve	Univ. of NC	Fishes, deep sea corals, deep reef ecology, deep-sea ecology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Sedberry	George	NOAA	fish, fisheries	Occasional participant (Will join for specific dives of interest, or when convenient)
Cohen	Tamar	NASA		Occasional participant (Will join for specific dives of interest, or when convenient)
White	Scott	University of South Carolina	geomorphology, volcanology, tectonics	Occasional participant (Will join for specific dives of interest, or when convenient)
Robertson	D Ross	Smithsonian Tropical Research Institute	Fish biogeography	Occasional participant (Will join for specific dives of interest, or when convenient)
Lapointe	Abby	University of Hawaii	Benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Garcia-Sais	Jorge	CFMC	benthic biology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Cordes	Erik	Temple University	benthic biology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Baco-Taylor	Amy	Florida State University	Benthic Ecology and Genetics	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Nemeth	Rick	University of the Virgin Islands, Center for Marine and Environmental Studies	reef fish ecology	Occasional participant (Will join for specific dives of interest, or when convenient)
Herter	Jeffrey	NYS Dept of State, Office of Planning & Development	Offshore Planning	Occasional participant (Will join for specific dives of interest, or when convenient)

Carney	Robert	LSU	benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Helm	Rebecca	Brown University	midwater biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Bill	Clancey	Inst. Human & Machine Cognition	Telescience & Robotics	Occasional participant (Will join for specific dives of interest, or when convenient)
Ten Brink	Uri	USGS		Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Reed	John	Florida Atlantic Univ.	benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Shea	Liz	Delaware Museum of Natural History	cephalopods	Occasional participant (Will join for specific dives of interest, or when convenient)
Roark	Brendan	Texas A&M University	Deep sea coral	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Ball	Bernard	Duke University Marine Lab	Vent and seep biology, chemosynthetic ecology	Occasional participant (Will join for specific dives of interest, or when convenient)
Taylor	Michelle	University of Oxford	benthic biology, corals, squat lobsters	Occasional participant (Will join for specific dives of interest, or when convenient)
Shank	Timothy	Woods Hole Oceanographic Institution	benthic biology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
von Hillebrandt-Andrade	Christa	NOAA NWS CTWP	tsunamis and earthquakes	Occasional participant (Will join for specific dives of interest, or when convenient)
McClinton	James	Research Planning, Inc.	deep sea geology, volcanology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Mah	Christopher (Chris)	National Museum of Natural History (Smithsonian)	Asteroidea (sea stars), taxonomy	Occasional participant (Will join for specific dives of interest, or when convenient)
Watlington	Roy	CariCOOS/IOOS-Assn	deep circulation, tsunamigenic sources	Doctor-on-call (Will join only when requested/needed)

Ford	Mike	NOAA Fisheries	gelatinous zooplankton - oceanography	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Schärer	Michelle	Interdisciplinary Center for Coastal Studies, UPR-M	Fish Biology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Morrison	Cheryl	USGS	Corals, squat lobsters	Occasional participant (Will join for specific dives of interest, or when convenient)
Derek	Sutcliffe	Inner Space Center	Telepresence	Occasional participant (Will join for specific dives of interest, or when convenient)
Holly	Morin	URI/ISC	marine biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Reed	John	Harbor Branch Oceanographic Institute- Florida Atlantic Univ.	benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Corredor	Jorge	University of Puerto Rico, Mayaguez, Department of Marine Sciences	Chemical Oceanography	
Cheadle	Mike	University of Wyoming	Geology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)
Sherman	Clark	Univ. of Puerto Rico-Mayaguez	geomorphology, sedimentology	Occasional participant (Will join for specific dives of interest, or when convenient)
Barber	Kimberly	MARCO	General	Occasional participant (Will join for specific dives of interest, or when convenient)
Coleman	Dwight	University of Rhode Island	marine geology, tectonics, telepresence operations	Occasional participant (Will join for specific dives of interest, or when convenient)
Kelley	Christopher	University of Hawaii	benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Irion	Jack	BOEM	archaeology	Doctor-on-call (Will join only when requested/needed)
Cantelas	Frank	NOAA OER	archaeology	Doctor-on-call (Will join only when requested/needed)
Ramos Álvarez	Antares	NOAA	fisheries, benthic biology	Occasional participant (Will join for specific dives of interest, or when convenient)
Hanna	George	College of Charleston/ NOAA	methods of exploration science, biology, chemical oceanography, multibeam	Occasional participant (Will join for specific dives of interest, or when convenient)

Lees	David	NASA Ames	remote telepresence and science operations	Occasional participant (Will join for specific dives of interest, or when convenient)
Lim	Darlene	NASA Ames Research Center	mapping, operations, data management	Occasional participant (Will join for specific dives of interest, or when convenient)
Chaytor	Jason	USGS	geology	Core/daily science participant (Will take part in daily ROV dives and science planning meetings, and contribute to cruise science products as requested)

## G. Administrative

### 1. Points of Contact:

#### *Ship Operations*

Marine Operations Center, Atlantic (MOA)  
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#### *Mission Operations*

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#### *Other Mission Contacts*

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NOAA Ocean Exploration & Research  
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E-mail: John.McDonough@noaa.gov

Kelley Elliott, Acting EX Program Coordinator  
NOAA Ocean Exploration and Research  
Phone: (301) 734-1024  
Kelley.Elliott@noaa.gov

Vessel shipping address:

*Shipments:*

Send an email to the *Okeanos Explorer* Operations Officer at [OPS.Explorer@noaa.gov](mailto:OPS.Explorer@noaa.gov) indicating the size and number of items being shipped.

Items sent to San Juan should arrive at the below address prior to **COB April 7, 2015**. Please note items sent to Puerto Rico may be subject to customs inspection which will delay delivery.

NOAA Ship Okeanos Explorer  
c/o Coast Guard Sector San Juan  
5 Calle La Puntilla  
San Juan, PR 00901

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

See Appendix C for categorical exclusion documentation. No additional Licenses or Permits required

## II. OPERATIONS

The Expedition Coordinator is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. **Project Itinerary** (*All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer*)

**Table 3: Leg III Detailed Itinerary**

<b>Date</b>	<b>Activity</b>	<b>Notes and Requirements</b>
4/3/15	First members of the ROV Team Arrive. Start ROV mobilization	Two members of the ROV team will meet the ship when she pulls into port. Hang A-frame block, move Seirios on to the fantail and connect Seirios to the .68 cable. All planned crane ops should be completed before the weekend.
4/4/15	ROV mobilization	The ROV team will start to unpack ROV equipment and testing equipment. They will require the ability to utilize high voltage, move the ROV sled, and conduct limited hot work.
4/5/15	ROV set up and testing. Some additional mission personnel will start arriving.	ROV team will continue to set up equipment and test systems. They will require the ability to utilize high voltage and conduct limited hot work.
4/6/15	ROV set up and testing and additional mission personal start arriving	ROV team will set up equipment and test systems
4/7/10	ROV set up	ROV team will continue to bring ROV systems online.
4/8/15	Final preparations for departure and practice launch and recovery	Train new mission personnel and conduct alongside ROV launch and recoveries to test systems and train new personnel
4/9/15	Depart San Juan and media tours	Depart and conduct media tours by small boat then depart for sea
4/10/15	Dive 1	Normal ROV Operations followed by CTD and mapping operations.
4/11/15	Dive 2	Normal ROV Operations followed by CTD and mapping operations.
4/12/15	Dive 3	Normal ROV Operations followed by CTD and mapping operations.
4/13/15	Dive 4	Normal ROV Operations followed by CTD and mapping operations.
4/14/15	Dive 5 with Telepresence event	Normal ROV Operations followed by CTD and mapping operations. Live Telepresence interaction with the Inner Space Center
4/15/15	Dive 6	Normal ROV Operations followed by CTD and mapping operations.
4/16/15	Dive 7 with Telepresence event	Normal ROV Operations followed by CTD and mapping operations. Mission party will host a Reddit AMA
4/17/15	Dive 8	Normal ROV Operations followed by CTD and mapping operations.
4/18/15	Dive 9	Normal ROV Operations followed by CTD and mapping operations.



4/19/15	Dive 10	Normal ROV Operations followed by CTD and mapping operations.
4/20/15	Dive 11	Normal ROV Operations followed by CTD and mapping operations.
4/21/15	Dive 12	Normal ROV Operations followed by CTD and mapping operations.
4/22/15	Dive 13 with Telepresence event	Possible Earth Day outreach event. Normal ROV operations followed by transit mapping. Possible live interaction for Earth Day
4/23/15	Dive 14	Normal ROV operations followed by transit mapping.
4/24/15	Dive 15	Normal ROV operations followed by transit mapping.
4/25/15	Dive 16	Normal ROV operations followed by transit mapping.
4/26/15	Dive 17	Normal ROV operations followed by transit mapping.
4/27/15	Dive 18	Normal ROV operations followed by transit mapping.
4/28/15	Dive 19 Demonstration day trip	Demonstration day trip. Pick up VIPs either alongside or small boat transfer then conduct an ROV dive then return them to shore
4/29/15	Dive 20 Demonstration day trip	Demonstration day trip. Pick up VIPs either alongside or small boat transfer then conduct an ROV dive then return them to shore
4/30/15	Arrival San Juan	Arrival. Secure ROVs for transit to the Pacific. Crane support will be required to clear the fantail in preparation for buoy operations on EX1503L2
5/1/15	In port Event Half day inport event and finish Securing ROVs.	Conduct in port event with VIP, School groups, and media touring the ship.
5/2/15	Departure of mission personnel	Conduct tours for educators. Complete any additional wrap up and demobilization

## B. Staging and Destaging

- A. The majority of the mobilization will take place before the ship leaves Rhode Island. The A-frame block and Seirios will be moved on April 3 after the ship pulls into port.
- B. The ROV team will secure the ROV for transit to the pacific before leaving the ship.

## C. Operations to be Conducted

## **Telepresence Events**

- A. Live interaction with the Smithsonian and possibly an Earth Day event is possible.
- B. April 14 the ship will participate in a live interaction with the Inner Space Center and the Boys and Girls Club.
- C. April 16 the Expedition Coordinator and science leads will participate in a Reddit Ask Me Anything.
- D. TBD- there will be additional live events that come up as the cruise progresses. These events will have little to no effect on the ship's operations and will be raised during daily operations briefings.

## **In-Port Events**

- E. April 9<sup>th</sup> – After the ship gets underway from the pier she will hold station in the harbor and a small boat will transfer media to the boat for a tour.
- F. April 30- a two person team will be onboard from PBS News Hour to conduct interviews with some of the mission personnel.
- G. May 1- The ship will host tours between 9-3 local time for teachers, students, and marine scientists. There is a possibility of a national elected official and his staff touring the boat. We will have no more than 30 people on the Coast Guard Base at any one time
- H. May 2- Between 9-12 am we may have a couple smaller groups of educators tour the ship.

## **D. SCUBA Dive Plan**

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (<http://www.ndc.noaa.gov/dr.html>) and require the approval of the ship's Commanding Officer. No SCUBA dives are currently planned for this cruise.

## **Sonar Operations**

EM 302, EK 60, and sub-bottom profiler data acquisition is planned for this cruise. All data acquisition will be conducted in accordance with established standard operating procedures under the direction of the mapping team lead. The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

## **E. Applicable Restrictions**

*NOT APPLICABLE TO THIS CRUISE*

## **III. EQUIPMENT**

### **A. Equipment and capabilities provided by the ship**

- Kongsberg Simrad EM302 MultibeamEchosounder (MBES)
- Kongsberg Simrad EK60DeepwaterEchosounder
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- LHM Sippican XBT (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- NetApps mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech 20Mbps ship to shore; 1.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines
- NOAA OER 6000m *Deep Discoverer* ROV
- NOAA *Seirios* Camera Platform

**B. Equipment and capabilities provided by the scientists**

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.

**IV. HAZARDOUS MATERIALS**

**A. Policy and Compliance**

The Expedition Coordinator is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers,

or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. . Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program’s Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship’s Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO’s designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship’s complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

A. .

## B. Inventory

Item	Use	Aprox. locations
Aqua Shield	Underwater Lubricant	ROV Workshop Fire Cabinet, Pit
Dow Corning 4	Electrical insulating compound	ROV Workshop Fire Cabinet, Pit
Fluid Film Spray	Silicone Lubricant	ROV Workshop Fire Cabinet
Isopropanol Alcohol	Solvent	ROV Workshop Fire cabinet

Scotchkote	Electrical insulating compound	ROV Workshop Fire cabinet
3M Silicone Spray	Silicone Lubricant	ROV Workshop Fire cabinet
Synthetic AW Hydraulic Oil, ISO-22	Amsoil (AWG-05)	Hanger, Pit, Vehicles
Tap Magic Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tap Magic Heavyweight Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tuff Coat M	Marine Lubricant	ROV Workshop Fire cabinet
Dow Corning Molykote 111	Valve Lubricant and Sealant	ROV Workshop Fire cabinet, Pit
WD40	Lubricant	ROV Workshop Fire cabinet
Loktite	Bolt adhesive	ROV Workshop Fire cabinet
Mineral Oil	Vitrea	Hanger, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Univis HVI 13	Hydraulic Fluid	Hanger, ROV D2
Ultratane	Butane fuel	ROV Workshop fire cabinet
Rust-oleum	Protective Enamel	ROV Workshop fire cabinet
Flux-Off	Soldering Flux remover	ROV Workshop fire cabinet
Propane	Torch Fuel	ROV Workshop fire cabinet

C. Chemical safety and spill response procedures

- A. All safety and spill response procedures will be handled according to OMAO guidelines and following the manufacturers MSDS which has been provided to the ship's ECO.

D. Radioactive Materials

*NOT APPLICABLE TO THIS CRUISE*

**V. ADDITIONAL PROJECTS**

**A. Supplementary Projects**

*NASA Maritime Aerosol Network*

During the cruise the marine aerosol layer observations will be collected for the NASA Maritime Aerosol Network (MAN). Observations will be made by mission personnel (mapping interns) with a sun photometer instrument provided by the NASA MAN program. Resulting data will be delivered to

the NASA MAN primary investigator Alexander Smirnov by the expedition coordinator. All collected data will be archived and publically available at:

[http://aeronet.gsfc.nasa.gov/new\\_web/maritime\\_aerosol\\_network.html](http://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html)

Equipment resides on the ship and is stewarded by the Expedition Coordinator.

See Appendix D for full Survey of Opportunity Form.

## **B. NOAA Fleet Ancillary Projects**

No NOAA Fleet Ancillary Projects are planned.

# **VI. DISPOSITION OF DATA AND REPORTS**

## **A. Data Responsibilities**

All data acquired on *Okeanos Explorer* will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information

[[http://www.corporateservices.noaa.gov/ames/administrative\\_orders/chapter\\_212/212-15.html](http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html)].

### *Ship Responsibilities*

The Commanding Officer is responsible for all data collected for missions until those data have been transferred to mission party designees. Data transfers will be documented on NOAA Form 61-29. Reporting and sending copies of project data to NESDIS (ROSCOP form) is the responsibility of OER.

### *NOAA OER Responsibilities*

The Expedition Coordinator will work with the *Okeanos Explorer* Operations Officer to ensure data pipeline protocols are followed for final archive of all data acquired on *Okeanos Explorer* without proprietary rights. See Appendix B for detailed data management plans.

### *Deliverables*

- a. At sea
  - Daily plans of the Day (POD)
  - Daily situation reports (SITREPS)
  - Daily summary bathymetry data files
  - Summary forms for each ROV dive
  - Summary forms for each CTD rosette cast
- b. Post cruise
  - Refined SOPs for all pertinent operational activities
  - Assessments of all activities
- c. Science
  - Multibeam and XBT raw and processed data (see appendix B for the formal cruise data management plan)

- EK 60 raw data
- Knudsen 3260 sub-bottom profiler raw data
- Mapping data report
- Cruise Report

*Archive*

- The Program and ship will work together to ensure documentation and stewardship of acquired data sets in accordance with NAO 212-15. The Cruise Information Management System is the primary tool used to accomplish this activity.

## **VII. Meetings, Vessel Familiarization, and Project Evaluations**

### Shipboard Meetings

Daily Operations Briefing meetings will be held at 1430 in the forward lounge to review the current day, and define operations, associated requirements, and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX FTP site.

- A. Pre-Project Meeting: The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Expedition Coordinator in arranging this meeting.
- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or seven days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Expedition Coordinator, and members of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.
- D. Project Evaluation Report:

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed

by the Expedition Coordinator. The form is available at <http://www.oma.noaa.gov/fleeteval.html> and provides a “Submit” button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

## **VIII. MISCELLANEOUS**

### **A. Meals and Berthing**

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship’s command at least twenty-one days prior to the survey (e.g., Expedition Coordinator is allergic to fin fish).

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Operations Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship’s complement. The Expedition Coordinator is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Expedition Coordinator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

### **B. Medical Forms and Emergency Contacts**

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website <http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.



All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than four weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance ([http://ocio.os.doc.gov/ITPolicyandPrograms/IT\\_Privacy/PROD01\\_008240](http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240)).

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab," after your Accellion account has been established send an email from the associated email account to [accellionAlerts@doc.gov](mailto:accellionAlerts@doc.gov) requesting access to the "Send Tab" function. They will notify you via email, usually within one business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services  
Marine Operations Center – Atlantic  
439 W. York Street  
Norfolk, VA 23510  
Telephone (757) 441.6320  
Fax (757) 441.3760  
E-mail: [MOA.Health.Services@noaa.gov](mailto:MOA.Health.Services@noaa.gov)

Please make sure the [medicalexplorer@noaa.gov](mailto:medicalexplorer@noaa.gov) email address is cc'd on all medical correspondence.

Prior to departure, the Expedition Coordinator must provide a listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

Emergency contact form is included as Appendix A.

### **C. Shipboard Safety**

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Operational Risk Management: For every operation to be conducted aboard the ship (NOAA-wide initiative), risk management procedures will be followed. For each operation, risks will be identified and assessed for probability and severity. Risk mitigation strategies/measures will be investigated and implemented where possible. After mitigation, the residual risk will have to be assessed to make Go-No Go decisions for the operations. Particularly with new operations, risk assessment will be ongoing and updated as necessary. This does not only apply to over-the-side operations, but to everyday tasks aboard the vessel that pose risk to personnel and property.

- CTD, ROV (and other pertinent) ORM documents will be followed by all personnel working onboard *Okeanos Explorer*.
- All personnel onboard are in the position of calling a halt to operations/activities in the event of a safety concern.

#### **D. Communications**

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. VSAT bandwidth at 20Mbps will be provided by OER.

Specific information on how to contact NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at <http://www.moc.noaa.gov/MOC/phone.html#EX>

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration:

Phone: (301) 734-1010

Fax: (301) 713-4252

E-mail: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438

Fax: (603) 862-0839

NOAA Ship *Okeanos Explorer* - Telephone methods listed in order of increasing expense:

*Okeanos Explorer* Cellular: (401) 713-4114  
*Okeanos Explorer* Iridium:(808) 659-9179  
OER Mission Iridium (dry lab): (808) 851-3827

**EX INMARSAT B**

Line 1: 011-870-764-852-328  
Line 2: 011-870-764-852-329

Voice Over IP (VoIP) Phone:  
(301) 713-7785  
(301) 713-7791  
(301) 713-7792

E-Mail: [Ops.Explorer@noaa.gov](mailto:Ops.Explorer@noaa.gov) - (mention the person's name in SUBJECT field)

[expeditioncoordinator.explorer@noaa.gov](mailto:expeditioncoordinator.explorer@noaa.gov) For dissemination of all hands emails by Expedition Coordinator while onboard. See ET for password.

**E. IT Security**

1. Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to: Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within three days of embarking.

**F. Foreign National Guests Access to OMAO Facilities and Platforms**

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

## **Appendix A**

### **EMERGENCY DATA SHEET**

#### **NOAA OKEANOS EXPLORER**

Scientists sailing aboard the *Okeanos Explorer* should fill out the form found at the following link location: [https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ7511iIYirTk48G-lv37Am\\_k/viewform](https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ7511iIYirTk48G-lv37Am_k/viewform) with their emergency contact information

## Appendix B:

Data Management Plan  
Okeanos Explorer (EX1502L3): Caribbean  
Exploration (ROV)



### *OER Data Management Objectives*

*QA/QC of submersible data sets following calibration by seabird; participate in engineering dive as first dive; evaluation of rsync procedure from ship to shore in heavy seas; update configuration files as necessary; integrate new rsync routine with new user accounts and shipboard data sets hosted by synology; evaluate new hardware (primary storage device for EVS); train new data management intern; cross-train two ROV team members on data management procedures;*

09-Mar-15

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### **1. General Description of Data to be Managed**

#### **1.1 Name and Purpose of the Data Collection Project**

Okeanos Explorer (EX1502L3): Caribbean Exploration (ROV)

#### **1.2 Summary description of the data to be collected.**

This will be the first cruise to have 12-hour ROV operations. The daily schedule for the cruise cruises will usually be split between daytime ROV operations and nighttime CTD and mapping operations. ROV operations will focus in depths >500m and will include high-resolution visual surveys. Mapping operations will include overnight sub-bottom data collection over key features, multibeam data collection, and water column backscatter data.

#### **1.3 Keywords or phrases that could be used to enable users to find the data.**

expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, oceans, Puerto Rico, US Virgin Islands, Puerto Rico Trench, benthic habitats, benthic ecosystems, habitat characterization

#### **1.4 If this mission is part of a series of missions, what is the series name?**

Okeanos ROV Cruises

#### **1.5 Planned or actual temporal coverage of the data.**

Dates: 4/9/2015 to 4/30/2015

#### **1.6 Planned or actual geographic coverage of the data.**

Latitude Boundaries: 21 to 16.92

Longitude Boundaries: -67.32 to -63.77

#### **1.7 What data types will you be creating or capturing and submitting for archive?**

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, Bottom Backscatter,  
Okeanos Explorer (EX1502L3): Caribbean Exploration (ROV)

CTD (raw), Dive Summaries, EK60 Singlebeam Data, Expedition Cruise Report, GSF, HDCS, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), SCS Output (compressed), SCS Output (native), Sub-Bottom Profile data, Water Column Backscatter, XBT (raw), Selected Raw Video, Raw Video (digital), Raw video inventory logs, Mapping Summary, HL Image captions/credits, HL Video captions/credits

#### 1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer, Deep Discoverer ROV, SEIRIOS Camera Sled

### 2. Point of Contact for this Data Producing Project

Overall POC: Brian Kennedy, Commissioned Officer, NOAA Office of Ocean Exploration and Research, brian.kennedy@noaa.gov  
 Title: Expedition Coordinator  
 Affiliation/Dept: NOAA Office of Ocean Exploration and Research  
 E-Mail: brian.kennedy@noaa.gov  
 Phone: 401-874-6150

### 3. Point of Contact for Managing the Data

Data POC Name: Susan Gottfried  
 Title: Data Management Coordinator  
 E-Mail: susan.gottfried@noaa.gov

### 4. Resources

- 4.1 Have resources for management of these data been identified? True
- 4.2 Approximate percentage of the budget devoted to data management. (specify % or "unknown")  
 unknown

### 5. Data Lineage and Quality

#### 5.1 What is the processing workflow from collection to public release?

SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF-4 format to NODC; multibeam data and metadata will be compressed and delivered in a bagit format to NGDC.

#### 5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM302 is handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format and are not quality controlled. CTDs are processed into profiles for display only on the Okeanos Atlas.

### 6. Data Documentation

- 6.1 Does the metadata comply with the Data Documentation Directive? True
- 6.1.1 If metadata are non-existent or non-compliant, please explain:

Okeanos Explorer (EX1502L3): Caribbean Exploration (ROV)

not applicable

#### 6.2 Where will the metadata be hosted?

Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning

URL: <http://www.ncddc.noaa.gov/oer-waf/ISO/Resolved/discovery> and access. The record will be harvested by data.gov.

Meta Std: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed; a NetCDF-4 standard for oceanographic data will be employed for the SCS data; the Library of Congress standard, MACHine Readable Catalog (MARC), will be employed for NOAA Central Library records.

#### 6.3 Process for producing and maintaining metadata:

Metadata will be generated via xml editors or metadata generation tools.

### 7. Data Access

#### 7.1 Do the data comply with the Data Access Directive?

True

##### 7.1.1 If the data are not to be made available to the public at all, or with limitations, provide a valid reason.

Not Applicable

##### 7.1.2 If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure.

Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures.

#### 7.2 Name and URL of organization or facility providing data access.

Org: NOAA National Centers for Environmental Information (NCEI)

URL: [explore.noaa.gov/digitalatlas](http://explore.noaa.gov/digitalatlas)

#### 7.3 Approximate delay between data collection and dissemination. By what authority?

Hold Time: no

Authority: not applicable

#### 7.4 Prepare a Data Access Statement

No data access constraints, unless data are protected under the National Historic Preservation Act of 1966.

### 8. Data Preservation and Protection

#### 8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Data Centers. Refer to the Okeanos Explorer FY15 Data Management Plan at NOAA's EDMC DMP Repository (EX\_FY14\_DMP\_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

#### 8.2 If no archive planned, why?

#### 8.3 If any delay between data collection and submission to an archive facility, please explain.

Okeanos Explorer (EX1502L3): Caribbean Exploration (ROV)

30-90 days

**8.4 How will data be protected from accidental or malicious modification or deletion?**

Data management standard operating procedures minimizing accidental or malicious modification or deletion are in place aboard the Okeanos Explorer and will be enforced.

**8.5 Prepare a Data Use Statement**

Data use shall be credited to NOAA Office of Ocean Exploration and Research.



## **Appendix C: Categorical Exclusion**

March 18, 2015

MEMORANDUM FOR: The Record

FROM: John McDonough  
Deputy Director NOAA Office of Ocean Exploration and  
Research (OER)

SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer* cruise  
EX-15-02 Leg 3

NAO 216-6, Environmental Review Procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses the NOAA Ship *Okeanos Explorer's* scientific sensors possible affect on the human environment.

### **Description of Projects**

This project is part of the Office of Ocean Exploration and Research's "Science Program." It will conduct remotely operated vehicle (ROV) operations and ocean mapping activities designed to increase knowledge of the marine environment. This project is entitled EX-15-02 Leg 3 and will be led by Brian Kennedy, an Expedition Manager for NOAA OER. The work will be conducted in April at various locations around Puerto Rico and the US Virgin Islands. A tandem 6,000 meter ROV system will be deployed and CTD rosette casts may be conducted during the expedition. The Kongsberg EM 302 multibeam (30 kHz), Kongsberg EK 60 singlebeam (18 kHz), and Knudsen 3260 Sub-Bottom Profiler (3.5 kHz) will be operated during the project. Additionally, expendable bathythermographs (XBTs) will be conducted in conjunction with multibeam data collection. Multibeam mapping operations will be conducted at all times during the transit.

### **Effect of Projects**

As expected with ocean research with limited time or presence in the marine environment, this project will not have the potential for significant impacts. Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of this project.

### **Categorical Exclusion**

This project would not result in any changes to the human environment. As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude or with only short-term effects on the environment and for which any cumulative effects are

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negligible. As such, this project is categorically excluded from the need to prepare an environmental assessment.

Signed: **John**  
**McDonough**  
John McDonough, Acting Director

Digitally signed by John McDonough  
DN: cn=John McDonough, ou=Ocean  
Exploration, ou=NOMA/OAR,  
email=john.mcdonough@noaa.gov,  
c=US  
Date: 2015.03.19 09:50:00 -04'00'

Date: \_\_\_\_\_

## **Appendix D. NASA Maritime Aerosols Network Survey of Opportunity**

### **Survey or Project Name**

Maritime Aerosol Network
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### **Points of Contact (POC)**

<i>Lead POC or Principle Investigator (PI &amp; Affiliation)</i>	<i>Supporting Team Members ashore</i>
<b>POC: Dr. Alexander Smirnov</b>	<i>Supporting Team Members aboard (if required)</i>

### **Activities Description(s)***(Include goals, objectives and tasks)*

<p><b>The Maritime Aerosol Network (MAN) component of AERONET provides ship-borne aerosol optical depth measurements from the Microtops II sun photometers. These data provide an alternative to observations from islands as well as establish validation points for satellite and aerosol transport models. Since 2004, these instruments have been deployed periodically on ships of opportunity and research vessels to monitor aerosol properties over the World Oceans.</b></p>
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## Appendix E: Memo for the Record on Sonars



U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Office of Oceanic and Atmospheric Research  
Office of Ocean Exploration and Research  
1315 East-West Hwy, SSMC3  
Silver Spring, MD 20910 USA

March 7, 2014

MEMORANDUM FOR: The Record  
NOAA Office of Ocean Exploration and Research

FROM: Craig W. Russell, Program Manager  
NOAA/OAR/OER

SUBJECT: Revised Guidance and Standard Operating Procedure for  
OER Sonar operations on NOAA Ship *Okeanos Explorer* in  
the vicinity of marine mammals and sea turtles

This memorandum document and sets forth revised guidance for OER sonar operations on the NOAA Ship *Okeanos Explorer* in the vicinity of marine mammals and sea turtles.

In 2011, NOAA's Southwest Fisheries Science Center provided guidance to the Office of Ocean Exploration and Research (OER) on multibeam, splitbeam, and subbottom sonar use on the NOAA Ship *Okeanos Explorer* specific to OER expeditions within and in the vicinity of National Marine Sanctuaries and endangered whales in California for March 16-April 1, 2011.

OER continued to use that guidance as basis for mapping Standard Operating Procedures since the guidance was not operationally prohibitive. Since mid-2011, OER has conducted *Okeanos Explorer* sonar operations in the Atlantic basin, including the Gulf of Mexico. Although OER sought but never received additional guidance from the National Marine Fisheries Northeast Regional Office, we consulted NOAA's existing acoustic threshold guidance and determined, based on the best information available, that the EX's sonar surveys and mapping activities are not likely to have significant impacts on marine mammals or sea turtles of a direct or cumulative nature. Currently, OER operates mission systems on the *Okeanos Explorer* under a signed Categorical Exclusion.

With consideration given to best management practices that ensure encounters and impacts with marine mammals and sea turtles are minimized, OER will implement its *Okeanos Explorer* sonar mapping standard operating procedure as follows: sonars will be secured if (1) encountered marine mammals or sea turtles appear disturbed or (2) it is operationally efficient, or legally required to do so by permit, guidance, policy, or law. This SOP will be revisited as new information, guidance, or policy is obtained or provided.