



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

November 7, 2017

MEMORANDUM FOR: Commander Eric Johnson, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: Commander Stephanie Koes, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-17-10
Canal Transit and Gulf of Mexico Mapping (Mapping)

Attached is the final Project Instruction for EX-17-10, Canal Transit and Gulf of Mexico Mapping (Mapping), which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of November 15 – November 22, 2017. Of the 8 DAS scheduled for this project, 8 DAS are funded by an OAR Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to Deputyops.MOA@noaa.gov at Marine Operations Center-Atlantic.





FINAL Project Instructions


Date Submitted: October 30, 2017

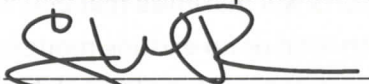
Platform: NOAA Ship *Okeanos Explorer*

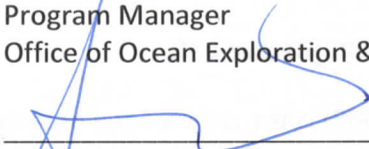
Project Number: EX-17-10

Project Title: Canal Transit and Gulf of Mexico Mapping (Mapping)

Project Dates: November 15, 2017 – November 22, 2017

Prepared by:  **Dated:** 10/30/17
Derek Sowers, NOAA
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by:  **Dated:** 11/02/2017
Craig Russell
Program Manager
Office of Ocean Exploration & Research

Approved by:  **Dated:** 11-8-2017
Commander Stephanie Koes
NOAA Commanding Officer
Marine Operations Center – Atlantic

I. Overview

A. Brief Summary and Project Period

This document contains project instructions for EX-17-10 commencing in Balboa, Panama on November 15, 2017 and concluding in Key West, Florida on November 22, 2017. This is an exploratory mapping expedition – no ROV operations will be conducted. Operational areas for this cruise include transiting through the Panama Canal, exploratory transit mapping through the Caribbean, the Seaflower Marine Protected Area in Colombian waters, and the Gulf of Mexico. Operations will include the use of the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, 300 kHz Acoustic Doppler Current Profiler (ADCP), and Knudsen 3260 chirp sub-bottom profiler sonar), and the ship's high-bandwidth satellite connection for hourly data transfer, real-time ship to shore communications, and real-time video streaming of sonar screens and ship's cameras.

Multibeam and split-beam mapping operations will be conducted 24 hours a day throughout the cruise. Sub-bottom profile mapping will be conducted 24 hours a day at the discretion of the CO. XBT and/or Underway CTD (UCTD) sound velocity casts in support of multibeam sonar mapping operations will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 6 hours. All mapping data will be fully processed according to standard procedures and will be archived with the National Centers for Environmental Information (NCEI).

The transit routes between the starting and ending ports will maximize mapping of discrete geologic features including seamounts and ridges with little or no existing modern sonar data coverage. The routes were chosen based on the most recent version of the global bathymetric compilation dataset compiled by J.J. Becker et al.

(http://topex.ucsd.edu/sandwell/publications/124_MG_Becker.pdf).

NOAA's Office of Ocean Exploration and Research (OER) is the only federal organization dedicated to exploring the global ocean. OER works with partners to identify priority areas for exploration; support innovations in exploration tools and capabilities; and encourage the next generation of ocean explorers, scientists, and engineers to pursue careers in ocean exploration and related fields. The data and information collected during our expeditions and the research we fund gives resource managers, the academic community, and the private sector the



information they need to identify, understand, and manage ocean resources for this and future generations of Americans.

NOAA Ship *Okeanos Explorer* is the only U.S. federal vessel dedicated to exploring our largely unknown ocean for the purpose of discovery and the advancement of knowledge. America's future depends on understanding the ocean. We explore the ocean to make valuable scientific, economic, and cultural discoveries; we explore because ocean health and resilience are vital to our economy and to our lives. Exploration supports NOAA mission priorities and national objectives by providing high-quality scientific information about the deep ocean to anyone who needs it.

In close collaboration with government agencies, academic institutions, and other partners, NOAA Office of Ocean Exploration and Research (OER) conducts deep-ocean expeditions using advanced technologies on the *Okeanos Explorer*. From mapping and characterizing previously unseen seafloor to collecting and disseminating information about ocean depths, this work helps to establish a foundation of information and to fill data gaps. Data collected on the ship follow federal open-access data standards and are publicly available shortly after an expedition ends. This ensures the delivery of reliable scientific data needed to identify, understand, and manage key elements of the ocean environment.

NOAA Ship *Okeanos Explorer* systematically explores the ocean every day of every cruise to maximize public benefit from the ship's unique capabilities. With approximately 90% 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. The sonars, or a subset of the sonars on board, will be operated at all times 24 hours per day throughout the cruise allowing for continued exploration and seabed, water column, and/or sub-bottom data collection and selected processing.

B. Days at Sea (DAS)

Of the 8 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 0 DAS are funded by an NOS Line Office Allocation, 0 DAS are Program Funded, and 8 DAS are funded by an OAR Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo due to 24 hour mapping operations.



C. Operating Area

No mapping data will be collected during the transit of the Panama Canal. After the canal transit mapping operations will take place continuously (as permitted) during the transit to Key West, Florida (Figure 1). Transit mapping will be conducted within the jurisdictional waters of Panama, Colombia, Honduras, Cuba, and the United States. Mapping operations will focus in depths generally between 250 and 5,700 meters.

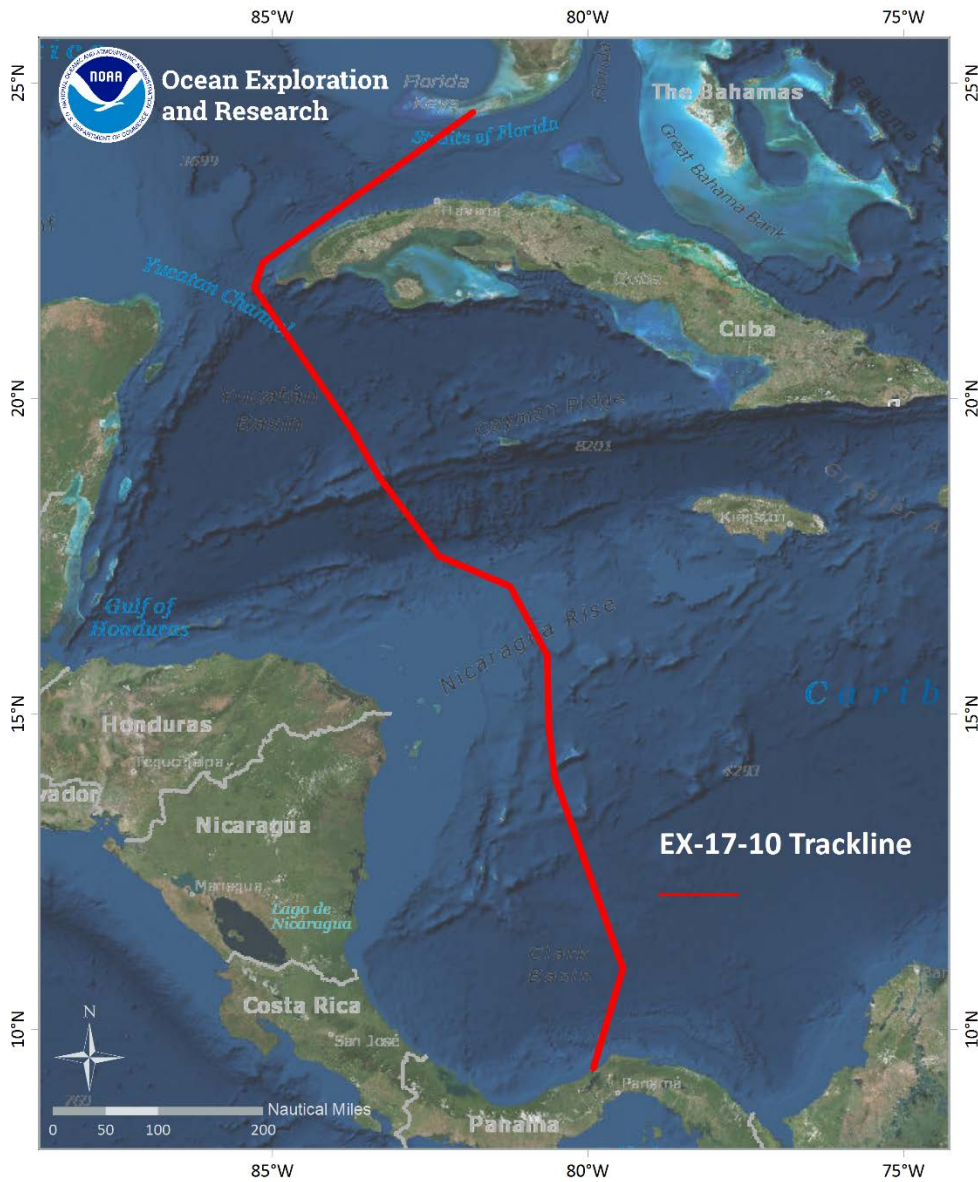


Figure 1. Map indicating the overall operating area of *Okeanos Explorer* for EX-17-10. The transit through the Panama Canal not shown but is part of the cruise. Transit line is approximate and subject to change.

Table 1: EX-17-10 generalized cruise track waypoints.

Waypoint #	Latitude (degrees decimal minutes North)	Longitude (degrees decimal minutes West)
1	9° 23.4' N	79° 55.1' W
2	10° 58.54' N	79° 26.85' W
3	14° 0.8' N	80° 32.1' W
4	14° 48.94' N	80° 37.5' W
5	15° 55.95' N	80° 38.9' W
6	17° 1.44' N	81° 13.9' W
7	17° 30.45' N	82° 22.46' W
8	18° 44.33' N	83° 17.96' W
9	19° 30.2' N	83° 44.17' W
10	21° 41.683' N	85° 04.669' W
11	22° 01.166' N	85° 04.566' W
12	22° 34.438' N	84° 34.177' W
13	24° 19.834' N	81° 50.442' W

D. Summary of Objectives

November 15 – November 22, 2017 (Balboa, Panama to Key West, Florida)

Mission objectives for EX-17-10 include a combination of mapping/operational, science, education, outreach, and data management objectives:

1. Transit through the Panama Canal to move the ship from the Pacific Ocean to the Atlantic Ocean for the rest of FY18 operations.
2. Onboard Mapping Operations
 - a. Conduct 24 hr/day mapping operations for the entirety of the cruise using EM 302 multibeam, EK 60 suite, and subbottom profiler sonars.
 - b. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs.
 - c. Collect high priority mapping data within the Seaflower Marine Protected Area during the transit through Colombian waters (as permitted).
 - d. Collect XBT/UnderwayCTD (if system operational) casts as mapping data quality requires.
 - e. Create daily standard bathymetry mapping products.
 - f. Ensure cruise data is transferred to shoreside repository hourly using automated scripts. Satellite bandwidth for the cruise will be at the capacity normally



- assigned to a non-telepresence mapping cruise (5 mbps ship to shore and 1.54 mbps shore to ship)
- g. Transit survey speeds of 8.5-11 kts will be utilized.
 - h. Host two Explorers-in-Training who were trained onshore during EX-17-04 at the UNH Center for Coastal and Ocean Mapping.
 - i. Provide mapping watchstander training for two NOAA Educational Partnership Program (EPP) students.
3. Collect sun photometer measurements as part of long-term Exploration Project of Opportunity (EPO) with NASA.
 4. Data Management
 - a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
 - b. Use daily bathymetric mapping products and SCS mailers to update Okeanos Atlas for onshore situational awareness.
 - c. Monitor network connections to ensure PublicData folder transition from .200 to .201 address is working as expected.
 5. Remote Science/Exploration Command Centers
 - a. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations.
 - b. Facilitate outreach and engagement activities and events at the ECCs.
 - c. Test and refine ship-to-shore communications procedures that engage multiple ECCs and other remote participants.
 - d. Test and refine operating procedures and products.
 6. Outreach. Several live telepresence interactions may happen during the cruise:
 - a. Live telepresence interaction with the Universidad de los Andes, and possibly with other partners in the Caribbean region.
 - b. Live interaction with the Dauphin Island Sea Lab as part of their OER educator training event.
 - c. Potential live interaction with NOAA Silver Spring for “Afloat Town Hall” to enable the Deputy Assistant Administrator for OAR to communicate about life at sea on a NOAA vessel with shore-based NOAA personnel.
 7. Ship
 - a. Possibly conduct full depth test CTD cast to confirm all sensors functional including altimeter.
 - b. Conduct ship safety drills including man overboard and maneuvering.



- c. Provide a high quality stable internet connection with the new VSAT.
 - d. Provide stable and reliable VoIP telecommunications.
8. UnderwayCTD (UCTD) Testing
- a. Set up UCTD on mounting stand and secure to baxter bolts at the center of the fantail close to the railing.
 - b. Conduct testing of repaired UCTD winch using dummy probe while ship is underway
 - c. If dummy probe tests succeed without line problems conduct casts using the sound velocity probe on the UCTD to obtain sound velocity profiles needed as inputs to the EM302 multibeam sonar.
 - d. Test connectivity of CTD probe with Bluetooth receiver.
 - e. Troubleshoot any hardware/software issues that arise.
 - f. Update/modify SOPs as needed.
9. Work with ET Department to test the new second CTD mission computer recently added to the network.
10. Provide orientation and first-hand exposure to *Okeanos Explorer* operations to Deputy Assistant Administrator Ko Barrett of NOAA OAR for increasing awareness of OER-supported field operations and the importance of ocean exploration. Barrett will participate in the entire cruise.

E. Participating Institutions

- Colombian Ministry of Environment, Housing, and Territorial Development, Special Administrative Unit of National Natural Parks, Seaflower Marine Protected Area
- CORALINA (The Corporation for the Sustainable Development of the Archipelago of San Andres, Old Providence, and Santa Catalina)
- Global Foundation for Ocean Exploration, P.O. Box 417, Mystic, CT 06355
- Lehigh University, Bethlehem, PA 18015 USA
- NOAA Educational Partnership Program, NOAA Office of Education, SSMC 3 – 10742, 1315 East-West Highway, Silver Spring, MD 20910
- NOAA National Marine Protected Areas Center, Office of National Marine Sanctuaries, 1305 East-West Highway, 11th Floor, N/NMS, Silver Spring, MD 20910. USA
- NOAA, National Oceanographic Data Center, National Coastal Data Development Center, Stennis Space Center MS, 39529 USA
- NOAA Office of Ocean Exploration and Research (OER)—1315 East-West Hwy, Silver



Spring, MD 20910 USA

- University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307 USA
- Universidad de los Andes, Cra 1 No. 18A-12, Bogotá, Colombia, Postal code 111711
- 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 Rhode Island, Graduate School of Oceanography's Inner Space Center, 215 South Ferry Rd. Narragansett, RI 02882 USA

F. Personnel (Mission Party)

Table 2: List of mission party members and their affiliations



**Ocean Exploration
and Research**

Name (Last, First)	Title	Date Aboard	Date Depart	M/F	Affiliation	Nationality
Sowers, Derek	Expedition Coordinator, Mapping Lead	11/12/17	11/22/17	M	NOAA OER (ERT, Inc)	US Citizen
Freitas, Daniel	Mapping Watch Leader	11/12/17	11/22/17	M	UCAR Contractor	US Citizen
Bittinger, Amanda	Mapping Watch Leader	11/12/17	11/22/17	F	UCAR Contractor	US Citizen
Lane, Kelsey	Mapping Watchstander	11/13/17	11/22/17	F	UCAR (EiT)	US Citizen
Dickey, Victoria	Mapping Watchstander	11/13/17	11/22/17	F	UCAR (EiT)	US Citizen
Rebekah Hernandez	Mapping Watchstander	11/13/17	11/22/17	F	NOAA Educational Partnership Program	US Citizen
Miya McAuliffe	Mapping Watchstander	11/13/17	11/22/17	F	NOAA Educational Partnership Program	US Citizen
Haynes, Susan	Education Program Manager	11/13/17	11/22/17	F	NOAA OER (CollabraLink Technologies, Inc.)	US Citizen
Barrett, Ko	Deputy Assistant Administrator	11/13/17	11/22/17	F	NOAA OAR	US Citizen

G. Administrative

1. Points of Contact:

Ship Operations

Chief, Operations Division, Atlantic (MOA)

LT Joe Carrier, NOAA

Telephone: (757) 441-6842

Marine Operations Center, Atlantic (MOA)

439 West York Street

Norfolk, VA 23510-1145



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Mission Operations

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Derek Sowers

Commanding Officer

Expedition Coordinator / Mapping Lead

NOAA Ship *Okeanos Explorer*

NOAA Office of Ocean Exploration

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and Research (ERT)

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O: (603) 862-0369

C: (714) 321-6084

LT Aaron Colohan, NOAA

E-mail: derek.sowers@noaa.gov

Operations Officer

NOAA Ship *Okeanos Explorer*

Phone: (808) 659-9197 (Ship's Iridium)

E-mail: Ops.Explorer@noaa.gov

Other Mission Contacts

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Craig Russell

NOAA Ocean Exploration & Research

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NOAA Ocean Exploration & Research

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E-mail: Craig.Russell@noaa.gov



**Ocean Exploration
and Research**

Dr. Alan Leonardi, Director

NOAA Ocean Exploration & Research

Phone: 301-734-1016/ Cell: 202-631-1790

E-mail: alan.leonardi@noaa.gov

Vessel Shipping Address

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

Items sent to Panama should arrive at the following address prior to COB 11/10/17:

Consign

Master MV_OKEANOS EXPLORER

Ships Spares In Transit, C/o

Air Sea Express Cargo

Bldg 791X Balboa La Boca

Panama Rep of Panama

Phone [\(507\) 232 0356](tel:(507)2320356)

Notify Party

Norton Lilly Panama

Howard Panama Pacifico

Bldg 3825, 2nd floor, office 204

Phone [\(507\) 304 4600](tel:(507)3044600)

Poc Ernesto Mock (507) 6614 0292

Fernando Lay (507) 6616 7942

Documens



**Ocean Exploration
and Research**

Invoice & packing list, awb nbr and flight details
Clearance time 1 day or less depending on carrier.

2. Diplomatic Clearances

This project involves Marine Scientific Research in waters of Panama, Colombia, Nicaragua, Honduras, and Cuba. Diplomatic Notes approving exploration activities within the maritime jurisdictions of these countries are pending. In the case that clearances are not obtained by the time the ship enters these waters, no scientific sonar data will be collected and the ship will transit through the area under the normal innocent passage rules.

3. Licenses and Permits

The expedition is being planned and conducted by NOAA as an agency of the U.S. Federal government.

Conducting mapping operations within the Colombian Seaflower Marine Protected Area may be subject to additional constraints. This request is being reviewed as part of the MSR request to Colombia and permission is pending.

Pursuant to the National Environmental Policy Act (NEPA), NOAA OER is required to include in its planning and decision-making processes appropriate and careful consideration of the potential environmental consequences of actions it proposes to fund, authorize and/or conduct. NOAA's Administrative Order (NAO) 216-6A Companion Manual describes the agency's specific procedures for NEPA compliance. Among these is the need to review all proposed NOAA-supported field projects for their environmental effects. A categorical exclusion (CE) worksheet has been completed for this survey, in accordance with Section 4 of the Companion Manual. This worksheet describes EX-17-10 and explains how it is consistent with one or more of the CE categories listed/described in Appendix E of the Companion Manual. The completed worksheet also summarizes the review conducted to determine that no extraordinary circumstances exist that would preclude the use of a CE or require preparation of an environmental assessment or environmental impact statement. Refer to Appendix II to read the CE worksheet.



II. Operations

The Expedition Coordinator is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives, priorities and environmental compliance procedures. 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, the discretion of the Commanding Officer, and alterations that may be necessary depending on when the ship is able to transit through the Panama Canal.)

Date	Operation	Notes
11/12/17	Lead mission personnel arrive	EC Sowers arrives, Dan Freitas and Amanda Bittinger will already be onboard from EX1709.
11/13/17	Remaining mission personnel arrive. Pre-cruise meeting between EC, OPS, CO, and Department Heads.	Mapping watchstanders arrive
11/14/17	Pre-cruise preparations. Mission personnel safety meeting/orientation.	
11/15/17	Departure from Balboa for transit of the Panama Canal. Transit mapping within Panamanian waters.	This is to be determined by the pilot and is unknown at the time of finalizing this PI.
11/16/17	Transit mapping within Colombian waters and the Seaflower Marine Protected Area. Ship safety drills.	
11/17/17	Finish mapping within Colombian waters, brief transit through (contested) Nicaraguan waters, and start transit mapping within Honduran waters.	
11/18/17	Transit mapping in Honduran waters	
11/19/17	Transit mapping in Honduran and Cuban waters	



11/20/17	Transit mapping in Cuban waters	
11/21/17	Finish mapping in Cuban waters, move into US waters in the Straits of Florida Transit mapping toward port in Key West, Florida	
11/22/17	Early morning arrival (0800) to port in Key West, Florida at the Navy Mole Pier. End of cruise. Most mission personnel depart in the evening.	It is expected that personnel that are able to travel home for Thanksgiving will depart as soon as feasible.
11/23/17	Any remaining mission personnel depart.	

B. Staging and Destaging

Minimal staging is expected at the start of the cruise as all mission equipment will be onboard already.

The UW-APL CTD system and water samples stored onboard from the previous EX-17-09 cruise will be destaged and removed from the ship Wednesday, November 22 after the ship arrives to the pier in Key West, Florida. Three pallets loaded with the UW CTD equipment, supplies, and waste containers will be moved from the ship using a forklift operated by an operator from either the Navy or the Florida Keys National Marine Sanctuary (FKNMS). The pallets will be stored at the FKNMS shop until being sent back to UW.

C. Operations to be Conducted

Sonar Operations

Multibeam and singlebeam mapping operations will be conducted 24 hours a day throughout the cruise except during the transit of the Panama Canal and in waters of any sovereign nation that have not provide the necessary permits for marine scientific data collection. ADCP data (300 kHz) may be collected while transiting through the Panama Canal to evaluate bottom tracking performance and transducer alignment offsets.

CTD/UCTD Operations

XBT and/or UnderwayCTD (U sound velocity casts in support of multibeam sonar mapping operations will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 6 hours.



D. SCUBA Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the [NOAA Diving Program](#) and require the approval of the ship's Commanding Officer.

E. Applicable Restrictions

Sonar Operations

EM 302, EK 60, ADCP, 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. Conditions which preclude normal operations:

- (1) handheld XBTs, UnderwayCTD casts, and CTDs will not be conducted in very rough sea states or when there is significant risk of lightning.
- (2) If rough sea state is resulting in very poor data quality, sonar data may not be collected for that period of time.
- (3) The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

III. Equipment

A. Equipment and capabilities provided by the ship

- 2 working small boats in seaworthy and reliable working condition for mission operations and fast rescue
- Kongsberg Simrad EM302 MultibeamEchosounder (MBES)
- Kongsberg Simrad EK60DeepwaterEchosounders and GPTs (18, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP
- Teledyne UnderwayCTD
- LHM Sippican XBT Mark21 System(Deep Blue probes)
- AOML Automated XBT Launcher (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
- MarineStar GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- Netshares mapping storage system
- QPS Fledermaus/Qimera/FM Midwater Software suite
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech 9 Mbps ship to shore; 2 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- University of Washington CTD and experimental nitrogen sensor equipment/supplies. This equipment will not be used on EX1710, but is still onboard following EX1709. It will be removed from the ship prior to EX1711.

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). The Expedition Coordinator and Science Team Lead will be



responsible for transporting all samples and HAZMAT on and off the ship. 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.



B. Inventory

Table 1. Standard OER furnished chemicals for physical sample preservation.

Approx. locations	Use	Item
Wetlab, under the chemical hood	Sample preservation	95% Denatured Ethanol (22.5 gallons)
Wetlab, under the chemical	Sample preservation	10% Buffered Formalin (1 gallon)
Wetlab, under chemical hood	Sample preservation	1 gallon Clorox bleach
Wetlab, under chemical hood	Sample preservation	3.5 liters formaldehyde

Table 2. Inventory of chemicals for use on Okeanos during Oct/Nov, 2017 supplied by Craig McNeil for Nitrogen sensor CTD project. MSDS provided as separate 53 page PDF attachment.

#	Description	Unit weight (solid)	Quantity	Total weight	Volume (liquid)	Container type
1	sodium hydroxide (8 M)				0.5L	glass bottle
2	manganous chloride (3 M)				1.0 L	glass bottle
3	sulfuric acid (5 M)				2 L	glass bottle
4	sodium iodide (4 M)				0.5 L	glass bottle
5	sodium thiosulfate (0.01 N)				2 L	glass bottle
6	potassium iodate (0.01 N)				4 L	glass bottle
7	sodium sulfite	500 g	1	500 g		plastic bottle
8	nitric acid (10%)				200 mL	glass bottle

Table 3. Inventory of chemicals supplied by Mark Altabet and Annie Bourbonnais to collect N₂/Ar and N₂O samples.

Description	Quantity and volume	Container type



1) Hydrochloric acid, 25% v/v	1 x 500 mL	plastic bottle
2) Sodium hydroxide 10 N	3 x 500 mL	Plastic bottle

Table 4. Inventory of chemicals maintained by ROV team.

Product	Manufacturer	Location	Qty	Labelled	MSDS Located?	
Adhesive Pliobond 25	Ruscoe Company	Tool Room	0	Yes	Yes	
Fluid Film	Eureka Chemical Company	Tool Room	3	Yes	Yes	
AP 120 Metal Prep	POR 15	Pit	1	Yes	Yes	
AquaShield	AOG Aviation Spares Inc	Tool Room/Pit	10	Yes	Yes	
Butane Fuel	Master Appliance	Tool Room	2	Yes	Yes	
Cut-Ease Lube	AGS	Pit	1	Yes	Yes	
DC 4	Dow Corning	Tool Room/Pit	12	Yes	Yes	1
Rust-oleum	Rust-oleum	Tool Room	2	Yes	Yes	
Flux Off	Chemtronics	Tool Room	1	Yes	Yes	
Gloss	Rustoleum	Tool Room	1	Yes	Yes	
Hydraulic Oil in Tank	Exxon	Hangar	65	Yes	Yes	1
Isopropanol	PTI Process Chemicals	Tool Room/pit	2	Yes	Yes	
Loctite 242	Loctite	Tool Room	3	Yes	Yes	
PVC Cement	Oatey	Tool Room	0	Yes	Yes	
Vitrea 13 Mineral Oil	Shell	Hangar	10 gal	Yes	Yes	
Vitrea 13 Mineral Oil in Tank	Shell	Hangar	32	Yes	Yes	
Phosphoric Acid		Tool Room	1	Yes	Yes	
Pipetite Paste	La-Co	Tool Room/Pit	1	Yes	Yes	
Primer	Rustoleum	Tool Room	2	Yes	Yes	
Propane Bottles		Tool Room	2	Yes	Yes	
Spindle Oil 10, ROS PT	Motor Oil Inc	Tool Room/Pit	14	Yes	Yes	1
Scotchkote 43906	3M	Tool Room/Pit	7	Yes	Yes	
Molykote 316	Dow Corning	Hangar	2	Yes	Yes	



Silicone Spray	3M	Tool Room	6	Yes	Yes	1
DC 557	Dow Corning	Tool Room/Pit	1	Yes	Yes	
Synthetic Hydraulic Oil	Amsoil	Pit	50	Yes	Yes	1
Cutting Fluid	Tap Magic	Tool Room	1	Yes	Yes	
Xtra-thick Cutting Fluid	Tap Magic	Tool Room	1	Yes	Yes	
Tether Potting Catalyst	Phillystran	Pit	8	Yes	Yes	
Tether Potting Compound	Phillystran	Pit	8	Yes	Yes	
ThermaPlex Bearing Grease	LPS	Pit	1	Yes	Yes	
Tritech Seaking	Diala Oil	Pit	1	Yes	Yes	1
Tuff Coat M Marine Lubricant	Dynacon	Winch Room	20	Yes	Yes	
DC 111	Dow Corning	Tool Room/Pit	11	Yes	Yes	1
WD-40	WD-40 Company	Tool Room/Pit	3	Yes	Yes	

C. Chemical safety and spill response procedures

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

D. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE



V. Additional Projects

A. Exploration Projects of Opportunity

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 (as time allows) 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

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

See Appendix 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](#)

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 section for detailed data management plans.

Deliverables

1. At sea
 - a. Daily plans of the Day (POD)
 - b. Daily situation reports (SITREPS)
 - c. Daily summary bathymetry data files
 - d. Raw sonar files (EM 302, EK 60, Subbottom, ADCP)
 - e. Refined SOPs for all pertinent operational activities
 - f. Assessments of all activities
2. Science
 - a. Multibeam raw and processed data (see Appendix section for the formal cruise data management plan)
 - b. XBT raw and processed data



- c. EK 60 raw data
- d. Knudsen 3260 sub-bottom profiler raw data
- e. ADCP raw data
- f. Mapping data report

Archive

OER and *Okeanos Explorer* 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

A. Shipboard Meetings

A safety brief and overview of POD will occur on the Bridge each morning at 0800. As necessary, Operations Briefing meetings will be held at a time convenient for OPS officer and the Expedition Coordinator to review the current day, and define operations, associated requirements, and staffing needs for the following day. Meetings will be held as needed in agreement with Command and EC. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail.

1. Pre-Cruise 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.

2. 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.

3. Post-Cruise Meeting:

The Commanding Officer is responsible for conducting a meeting no earlier than 24 hours before or seven days after the completion of a project to discuss the overall project outcomes. During this meeting the following will be discussed; concerns regarding safety and efficiency;



challenges encountered and suggestions for future improvements (all mitigation ideas will be documented for future projects); as well as successes during the project. This meeting shall be attended by ship's officers, applicable crew, the Expedition Coordinator, and representatives of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.

4. Project Evaluation Report:

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at <https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey> and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. 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 makeup 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 Chief Scientist or the NOAA website <http://www.corporateservices.noaa.gov/noaaforms/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 4 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).

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 requesting access to the "Send Tab" function. They will notify you via email usually within 1 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

Please make sure the medical.explorer@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.

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.



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 **5 mbps ship to shore and 1.54 mbps shore to ship** will be paid by OER and provided by OMAO.

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: craig.russell@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping



**Ocean Exploration
and Research**

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 Internet Protocol (VoIP) Phone:

(541) 867-8932

(541) 867-8933

(541) 867-8934

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

E-mail: 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.



**Ocean Exploration
and Research**

F. Foreign National Guests Access to OMAO Facilities and Platforms

Not applicable to this cruise.

VIII. Appendices

Appendix 1. Data Management Plan



**Ocean Exploration
and Research**

Data Management Plan

Okeanos Explorer (EX1710): Canal Transit and Gulf of Mexico Mapping

OER Data Management Objectives

The OER Data Stewardship Team will ensure that the full complement of data is documented and archived within a timely manner.

05-Oct-17

Page 1

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1710): Canal Transit and Gulf of Mexico Mapping

1.2 Summary description of the data to be collected.

Multibeam and splitbeam mapping operations will be conducted 24 hours a day throughout the cruise. Sub-bottom profile mapping will be conducted 24 hours a day at the discretion of the CO. XBT and/or Underway CTD sound velocity casts in support of multibeam sonar mapping operations will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 6 hours. All mapping data will be fully processed according to standard procedures and will be archived with the National Centers for Environmental Information (NCEI).

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, Balboa, Panama Canal, Nicaragua Rise, Yucatan Channel, Gulf of Mexico, Florida Keys, Honduras, Panama, Columbia, Cuba, Seaflower Marine Protected Area, oceans

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

Okeanos Mapping Cruises

1.5 Planned or actual temporal coverage of the data.

Dates: 11/15/2017 to 11/22/2017

1.6 Planned or actual geographic coverage of the data.

Latitude Boundaries: 8 to 25

Longitude Boundaries: -85 to -80

Okeanos Explorer (EX1710): Canal Transit and Gulf of Mexico Mapping



Ocean Exploration
and Research

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, ADCP, Bottom Backscatter, CTD (processed), CTD (product), CTD (raw), EK60 Singlebeam Data, Expedition Cruise Report, Floating Point GeoTIF, HDCS, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), NetCDF, SCS Output (compressed), SCS Output (native), Side Scan Sonar (raw), Sub- Bottom Profile data, Temperature data, Water Column Backscatter, XBT (raw)

1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer

2. Point of Contact for this Data Producing Project

Overall POC: Derek Sowers, Physical Scientist
 Title: Expedition Coordinator and Mapping Lead
 Affiliation/Dept: NOAA Office of Ocean Exploration and Research
 E-Mail: derek.sowers@noaa.gov
 Phone: 603-862-0369

3. Point of Contact for Managing the Data

Data POC Name: Susan Gottfried
 Title: OER 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 NetCDF3 format to NCEI-MD; multibeam data and metadata will be compressed and delivered in a bagit format to NCEI-CO

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. CTDs are post-processed by the data management team as a quality control measure and customized CTD profiles are generated for display on the Okeanos Atlas (explore.noaa.gov/okeanosatlas).

6. Data Documentation

Okeanos Explorer (EX1710): Canal Transit and Gulf of Mexico Mapping



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

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 and published in an OER catalog and Web Accessible Folder (WAF) hosted at NCEI-MS for public discovery and access. The record will be harvested by data.gov.

URL: <https://www.ncddc.noaa.gov/oer-waf/ISO/Resolved/2017/>

Meta Std: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed; a NetCDF3 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 will not be available to the public, or with limitations, provide a valid reason.

Not Applicable

7.1.2 If there are limitations, describe how data are protected from unauthorized access.

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: National Centers for Environmental Information

URL: <https://www.ncei.noaa.gov>

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

Hold Time: none

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 Centers for Environmental Information. Refer to the Okeanos Explorer FY17 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY17_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.

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 2. Categorical Exclusion

Form Version: June 2017

Categorical Exclusion (CE) Evaluation Worksheet

Project Title: EX-17-10, Canal Transit and Gulf of Mexico Mapping

Date Review Completed: 10/26/2017

Completed by: Craig Russell, Program Manager, OER Okeanos Explorer Operations

Worksheet File Name: 2017_10_OER_CE_EX1710

Step 1. CE applicability

1. What is the proposed federal action?

The proposed action is to collect baseline mapping data using the NOAA Ship *Okeanos Explorer's* sonar systems and sound velocity profiling equipment while the ship is on a simple transit from port in Panama to port in Florida. OAR/OER is undertaking this action. The primary purpose of the action is to move the vessel from the Pacific Ocean to the Atlantic Ocean and move it up into the planned area of operations for the 2018 fiscal year. Mapping data collection is planned during this transit in order to collect data of scientific value

The expedition will commence on November 15, 2017 in Balboa, Panama (8° 57.31'N, 79° 34.25'W) and conclude on November 22, 2017 in Key West, Florida (24° 32.3'N, 81° 49.31'W). Pending receipt of all pertinent diplomatic clearances, the cruise will conduct operations within the waters of Panama, Colombia, Nicaragua, Honduras, Cuba, and the United States. See Project Instructions EX-17-10 for more details.

2. Which class of CE in Appendix E of the NAO 216-6A Companion Manual is applicable to this action and why?

- a. G-3: Topographic, bathymetric, land use and land cover, geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbance and involve no permanent physical, chemical, or biological change to the environment.
- b. The primary activity under the planned action is bathymetric mapping using sonars that involve no permanent physical, chemical, or biological change to the environment. This work does not involve collecting physical samples of water, organisms, or the seabed and involves no major surface or subsurface disturbance of the seabed. Bathymetric mapping is planned for any maritime jurisdiction for which diplomatic clearances have been secured by the time of the cruise. If permits have not been granted by the time of entry into the sovereign waters of any nation, no sonar data will be collected and the ship will merely be transiting as innocent passage under international maritime law.



Every 4-6 hours (as permitted) the ship will be gathering sound velocity profiles of the upper 760 meters of the water column through which the ship is transiting. The data will be collected using standard expendable bathythermograph (XBT) probes or an UnderwayCTD re-usable probe. The collection of these water column sound velocity measurements fall under the E-3 categorical exclusion category (use of conductivity, temperature, and depth instruments or a moving vessel profiler from a platform). This work is done while the ship is underway mapping/transiting and is a minor component of the expedition.

Step 2. Extraordinary Circumstances Consideration

3. Would the action result in adverse effects on human health or safety that are not negligible?

No. Outside of port calls at the start and end of the cruise, NOAA Ship *Okeanos Explorer* will be operating in deep sea areas of the Caribbean and Straits of Florida. The track line planned for expedition EX-17-10 transits far away from coastlines and islands. All operation areas are underwater and therefore have no human presence, (see *Figure 1 of EX-17-10 Project Instructions for a map of the generalized cruise track*) and additionally do not involve any procedures or outcomes known to result in impacts on human health and safety more than would be negligible.

4. Would the action result in adverse effects on an area with unique environmental characteristics that are not negligible?

This survey/expedition overlaps with the following areas with unique environmental characteristics: the Seaflower Marine Protected Area in Colombia, a very small portion of the Cayman Trench, and the Straits of Florida. However, the survey effects will be negligible or less than negligible, as acoustic mapping operations are not anticipated to cause adverse effects to the seabed or living marine resources close to the seabed or in the water column.

5. Would the action result in adverse effects on species or habitats protected by the ESA, MMPA, MSA, NMSA, or MBTA that are not negligible?

OER has taken measures to ensure that any effects on species or habitats protected by the ESA, MMPA, MSA or NMSA meet the definition of "negligible".

Exploration cruises of the *Okeanos Explorer* in fiscal year 2018 largely focus on areas within the U.S. EEZ in the Gulf of Mexico and adjacent to the Southeastern U.S. NOAA OER is partnering closely on these missions with NOAA National Centers for Coastal Ocean Science (NCCOS) on the



Southeast Deep Coral Initiative (SEDCI): Exploring Deep-sea Coral Ecosystems off the Southeast US (NCCOS project #729). NCCOS provided an Environmental Review Memorandum dated August 9, 2017 determining that there was no need for additional analysis under NEPA for federal actions associated with implementation of SEDCI activities, including the operation of NOAA vessel *Okeanos Explorer's* multibeam and single-beam sonar systems. NCCOS based this determination on the analytical comparison between the activities proposed for SEDCI and the activities covered in the Office of Coast Survey's Programmatic Environmental Assessment (OCS PEA) and, with the exception of the coral collections and ROV use (normally a categorically excluded activity), all other activities were covered in the OCS PEA. In addition, NCCOS requested two informal consultations. The first pursuant to Section 305b of the Magnuson-Stevens Fishery and Conservation Act (EFH provision) and the second for a Section 7(a)(1) informal consultation under the Endangered Species Act.

NCCOS received the EFH Letter of Concurrence (LOC) from NMFS Southeast Region Office (SERO), June 15, 2017. As specified in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), EFH consultation is required for federal actions which may adversely affect EFH. The Habitat Conservation Division (HCD) reviewed the proposed activities as well as the protective measures and best management practices incorporated into the action. Following assessment of overall activity including the experimental design, nature of the collection, and limited scope of subject activity, the HCD had no EFH conservation recommendations to provide pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act. Further EFH consultation on this action was determined not to be necessary. The concurrence letter is available through NMFS' consultation tracking system: <https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts>. A complete record of this consultation is on file at NOAA Fisheries Office of Protected Resources in Silver Spring, Maryland NMFS No:FPR-2017-9223.

NCCOS received a Section 7(a)(1) LOC from NMFS on August 17, 2017 concurring with the NCCOS determination of 'not likely to adversely affect', for this project's activities. Based on their analysis, NMFS concurred with NCCOS' determination that all effects of the proposed action are not likely to adversely affect the subject ESA-listed species and/or designated critical habitats.

Operations will not occur in any sanctuaries and therefore NMSA does not apply. The MBTA also does not apply since no gear is deployed or activities are done that would impact birds.

6. Would the action result in the potential to generate, use, store, transport, or dispose of hazardous or toxic substances, in a manner that may have a significant effect on the environment?

No. The cruise operations will be in compliance with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or superseding OMAO procedures) to ensure generation, use, storage, transport, and disposal of such substances will not result in significant impacts.



7. **Would the action result in adverse effects on properties listed or eligible for listing on the National Register of Historic Places authorized by the National Historic Preservation Act of 1966, National Historic Landmarks designated by the Secretary of the Interior, or National Monuments designated through the Antiquities Act of 1906; Federally recognized Tribal and Native Alaskan lands, cultural or natural resources, or religious or cultural sites that cannot be resolved through applicable regulatory processes?**

There are no operations planned for this cruise that involve known underwater cultural heritage sites, Historic Landmarks, National Monuments, or Tribal lands. The ship is merely transiting through the Panama Canal and will have no adverse impacts on this waterway not resolved through other regulatory mechanisms.

8. **Would the action result in a disproportionately high and adverse effect on the health or the environment of minority or low-income communities, compared to the impacts on other communities (EO 12898)?**

No, the only time the ship will be near communities is in the Panama Canal and Key West – both of which are ports that have vessel traffic normally. The presence of NOAA Ship *Okeanos Explorer* is negligible compared to the rest of the volume of traffic in these ports. The cruise does not involve actions known or likely to result in adverse impacts on human health.

9. **Would the action contribute to the introduction, continued existence, or spread of noxious weeds or nonnative invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of the species?**

No. During EX-17-10, the ship will not make landfall in areas other than commercial ports. The ship and OER mission team will comply with all applicable local and federal regulations regarding the prevention or spread of invasive species. The Engineering Department aboard the NOAA Ship *Okeanos Explorer* attends yearly Ballast Management Training in accordance with NOAA Form 57-07-13NPDES VGP Annual Inspection and Report to prevent the introduction of invasive species.

10. **Would the action result in a potential violation of Federal, State, or local law or requirements imposed for protection of the environment?**



The proposed action **will not** result in any violations of Federal, State, or local law or requirements imposed for protection of the environment. The survey coordinators obtained (or are in the process of obtaining) authorizations and/or consultations pursuant to applicable laws. See responses to questions #4, 5, and 6 for details.

11. Would the action result in highly controversial environmental effects?

No. The exploration activities will be localized and of short duration in any particular area at any given time. Given this project's scope and breadth, no notable or lasting changes or highly controversial effects to the environment will result.

12. Does the action have the potential to establish a precedent for future action or an action that represents a decision in principle about future actions with potentially significant environmental effects?

No. While each cruise contributes to the overarching goal of exploring, mapping, and sampling the ocean, every cruise is independently useful and not connected to subsequent cruises.

13. Would the action result in environmental effects that are uncertain, unique, or unknown?

No. The techniques and equipment used are standard for this type of field activity.

14. Does the action have the potential for significant cumulative impacts when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves?

By definition, actions that a federal agency classifies as a categorical exclusion have no potential, individually or cumulatively, to significantly affect the environment. This cruise is consistent with a class of CE established by NOAA, and there are no extraordinary circumstances for this action that may otherwise result in potentially significant impacts.



CE Determination

I have determined that a Categorical Exclusion is the appropriate level of NEPA analysis for this action and that no extraordinary circumstances exist that would require preparation of an environmental assessment or environmental impact statement.

I have determined that an environmental assessment or environmental impact statement is required for this action.

Signature: 

Signed by: Craig W Russell, Program Manager

Date Signed: 10/30/2017



Appendix 3: Survey of Opportunity Form: NASA Marine Aerosols Project

SURVEYS OF OPPORTUNITY - INITIAL REQUEST FORM

A surveys of opportunity is a small, exploratory expedition that takes advantage of the elastic schedules of ocean-going, research vessels, - in this case, the Okeanos Explorer - by maximizing transit times between ports or projects, or by filling small gaps in the ship's calendar.

Given the ship's unique technology and capabilities, NOAA's Office of Ocean Exploration and Research (OER) invites regional researchers to help acquire additional data within the vessel's operating areas to assess specific but poorly known sites, adding to an inventory of submerged resources. In circumstances where individuals cannot serve on a "survey of opportunity", then OER ensures that acquired data and any other pertinent information are transferred to the appropriate researchers after the expedition. Previously successful surveys of opportunity have included mapping geological features, locating and characterizing shipwrecks, and defining marine protected areas. Some surveys are completed in only a few hours, while others last a couple days.

Although exploration potential and scientific merit plays a role in which opportunistic surveys are conducted, they are not chosen through a peer-reviewed process. Rather, their selection is based more on the vessel operating in the right place with the right equipment at the right time, and the ship's calendar and on-board resources allow for the added work. All requests for a survey of opportunity are archived with OER and the ship, and expire only when the survey work is completed. There is no guarantee that any request for a survey will be accomplished, nor is there any system of prioritization or ranking. Keep in mind that this proposal may be available to the public upon request except for privileged information and material that is personal, proprietary or otherwise exempt from disclosure under law.

Survey or Project Name

Maritime Aerosol Network

Points of Contact (POC)

Lead POC or Principle Investigator (PI & Affiliation)

Supporting Team Members ashore



**Ocean Exploration
and Research**

POC: Dr. Alexander Smirnov	
	<i>Supporting Team Members aboard (if required)</i>

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

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.

