




NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MEMORANDUM FOR: Commander Eric Johnson, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*
KOE.STEPHANIE.A.1249243759 Digitally signed by
E.A.1249243759 Date: 2018.07.06 12:42:38 -04'00'

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

SUBJECT: Project Instruction for EX-18-07
ASMIWG Bermuda Mapping

Attached is the final project instruction for EX-18-07, ASMISWG Bermuda Mapping which is scheduled aboard the NOAA Ship *Okeanos Explorer* during the period of July 12th through August 4th, 2018. Of the 24 DAS scheduled for this project, 24 DAS are funded by line office allocation. This project is estimated to exhibit a *Medium* Operational Tempo. Please acknowledge receipt of these instructions to deputyops.moa@noaa.gov at Marine Operations Center - Atlantic.

Code	Surname	Initial/Sign	Date
MOA1	Chensue		LT Gavin D. Chensue, NOAA 2018.07.05 14:28:15 -04'00'
MOA1 <i>for</i>	Bradfield-Smith		Digitally signed by CARRIER.JOSEPH.KELSO.III.1155 373152 Date: 2018.07.06 10:07:23 -04'00'
MOA1	Carrier		Digitally signed by CARRIER.JOSEPH.KELSO.III.1155 373152 Date: 2018.07.06 10:07:04 -04'00'



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

05-Jul-2018

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-18-07
ASMIWG Bermuda Mapping

KOES.STEPHANIE
E.A.1249243759

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Date: 2018.07.06 12:43:02 -04'00'

Attached is the final project instruction for EX-18-07, ASMISWG Bermuda Mapping which is scheduled aboard the NOAA Ship *Okeanos Explorer* during the period of July 12th through August 4th, 2018. Of the 24 DAS scheduled for this project, 24 DAS are funded by line office allocation. This project is estimated to exhibit a *Medium* Operational Tempo. Please acknowledge receipt of these instructions to deputyops.moa@noaa.gov at Marine Operations Center - Atlantic.





DRAFT Project Instructions

Date Submitted:

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-18-07


Project Title: Galway: ASMIWG Bermuda Mapping

Project Dates: 7/12/18 – 8/4/18

Prepared by: **Michael White**
Michael P. White, NOAA
Expedition Coordinator
Office of Ocean Exploration and Research

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c=US
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Dated: _____

Approved by: 
Craig Russell, NOAA
Program Manager
Office of Ocean Exploration and Research

Dated: 6/25/2018

Approved by: **KOES.STEPHANIE.A.1249243759**
Commander Stephanie Koes, NOAA
Commanding Officer
Marine Operations Center, Atlantic

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Date: 2018.07.06 12:43:29 -04'00'

Dated: 06-Jul-2018

I. Overview

“America’s future depends on understanding the ocean. We explore the ocean because its health and resilience are vital to our economy and to our lives. We depend on the ocean to regulate weather and climate; sustain a diversity of life; for maritime shipping and national defense; and for food, energy, medicine, and other essential services to humankind.”

- NOAA Office of Ocean Exploration and Research Strategic Plan

A. Brief Summary and Project Period

This document contains project instructions for EX-18-07. Operations for this cruise will be conducted 24 hours/day and consist of seafloor mapping operations and telepresence. The expedition will commence on July 12, 2018 in Norfolk, Virginia and conclude on August 4, 2018 in St. George’s, Bermuda. Operations will include the use of the ship’s deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, and Teledyne Acoustic Doppler Current Profiler), XBT and CTD casts in support of multibeam sonar mapping operations, and the ship’s high-bandwidth satellite connection for real-time ship-to-shore communications. Operations are planned south east of Bermuda in the high seas.

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.



**Ocean Exploration
and Research**

In close collaboration with government agencies, academic institutions, and other partners, 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.

EX-18-07, from July 12 to August 4, will be the first dedicated government non-transect survey in support of the Atlantic Ocean Research Alliance/Atlantic Seabed Mapping International Working Group (AORA/ASMIWG). AORA/ASMIWG was established by the Trilateral Galway Statement Implementation Committee to identify steps required to implement a seabed mapping strategy to support the objectives of the Galway Statement. As the first U.S. lead mapping effort in support of [Galway Statement on Atlantic Ocean Cooperation](#), EX-18-07 will include onboard and remote participation from Canadian and European Union students and scientists, pending clearances.

This expedition will map an ASMIWG identified pilot project area south of Bermuda. As part of the Galway initiative, the ASMIWG used a suitability model to identify priority areas in the Atlantic Ocean, factoring in areas of public interest, sensitive marine areas, and areas with marine resource potential. The screens of the mapping acquisition systems (EM 302, EK 60, SBP etc.) will be broadcast 24 hours per day, and will be monitored by both onboard and onshore mapping scientists.

B. Days at Sea (DAS)

Of the 24 DAS scheduled for this project, 24 DAS are funded by OAR. This project is estimated to exhibit a Medium Operational Tempo due to 24-hour operations consisting of 24-hour-per-day mapping and telepresence operations.

C. Operating Area

EX-18-07 is a 24-hour mapping cruise that will focus operations in a survey area south of Bermuda location in international waters.

In the map below, the yellow polygon indicates the overall area of mapping operations. This area will be refined prior to the cruise, and will likely be focused on the northern and eastern sections.



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Figure 1: Map showing the ASMIWG south of Bermuda pilot survey area.

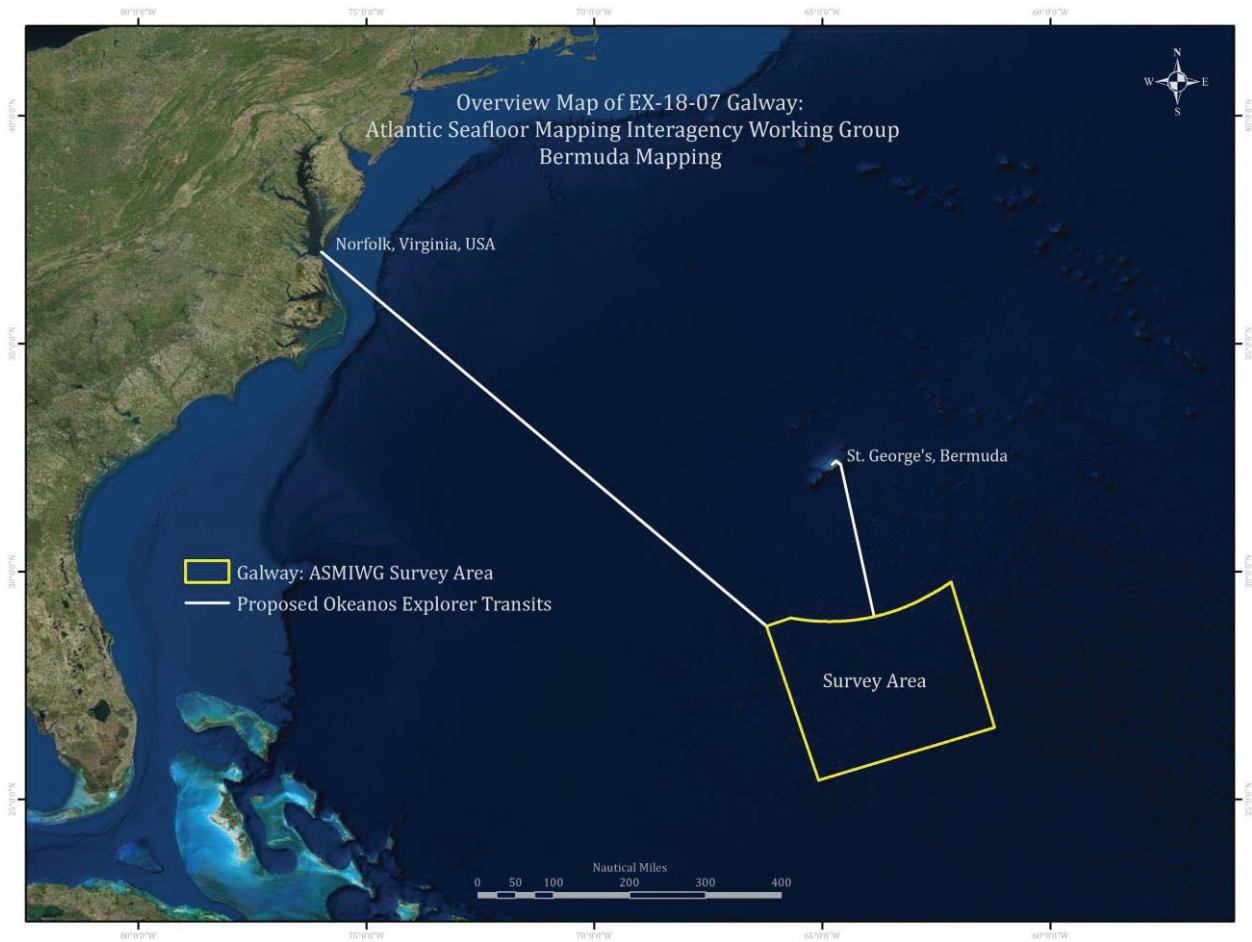


Figure 2: Map showing the approximate focused mapping areas in support of ROV dive during EX0808. Exact location of mapping is being refined currently in discussion with Bermuda.



Bounding Coordinates of EX1807 Survey Area

Location	Latitude	Longitude
Norfolk, Virginia	36.84	-76.286
Northwest Corner	28.795	-66.202
Northeast Corner	29.69	-62.198
Southwest Corner	25.436	-65.058
Southeast Corner	26.591	-61.21



St. George's, Bermuda	32.378	-64.676
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Table 1: Bounding coordinates of the EX-18-07 operating areas.

D. Summary of Objectives

EX-18-07 Galway: ASMIWG Bermuda Mapping (Norfolk, Virginia – St. George's, Bermuda) Telepresence-enabled 24 hour seafloor and water column mapping.

EX-18-07 operations will begin with a transit through U.S. waters, complete focused survey operations in Bermuda waters and the high seas, and end with transit mapping into port arriving in St. George's, Bermuda with 2-8 hours focused mapping (time permitting) in vicinity of St. George's in support of first ROV dive during the following expedition. This cruise will include a combination of ship operations, mapping/operational, and data management objectives:

1. Ship
 - a. Small boat deployment (weather permitting); Develop and maintain proficiency with small boat operations for new and long term crew;
 - b. Conduct CTD operations as requested and able;
 - c. Man overboard / ship handling training
 - d. Additional safety training.

2. Onboard Mapping
 - a. Execute mapping line plans as defined by onshore personnel, with adjustments made in the field to obtain complete coverage as necessary.
 - 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. Conduct 24 hr/day mapping operations for the entirety of the cruise.
 - d. Collect XBT and AXBT casts as mapping data quality requires.
 - e. Create daily standard bathymetry mapping products.
 - f. Collect sun photometer measurements as part of Exploration Project of Opportunity (EPO).
 - g. Average survey speeds of 8.5-9 kts will be utilized.
 - h. Transit speeds of 10-11 kts are requested to maximize survey time during this short cruise.

3. 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.



4. Science
 - a. Acquire data to support priority science and management needs.
 - b. Build capacity in the scientific community and public in telepresence-based mapping exploration.
 - c. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants.
 - d. Identify and map vulnerable marine habitats
 - e. Acquire a foundation of sonar and oceanographic data to better understand the characteristics of the water column and the fauna that live there.
 - f. Collect high-resolution bathymetry in areas with no (or low quality) sonar data.
5. Mapping Sound Velocity Profiling Objectives
 - a. Collect XBT casts as data quality requires, during mapping operations using handheld and AOML automatic XBT launcher. Maintain CTD capabilities as back up sound velocity profiling method for mapping data requirements.
6. Video Engineering (VSAT ~15 mb/sec ship-to-shore; 5 mb/sec shore-to-ship)
 - a. Provide onboard support for 24 hour mapping and telepresence mapping objectives.
 - b. Test terrestrial and high-speed satellite links;
 - c. Verify Global Foundation for Ocean Exploration (GFOE)-managed telepresence systems perform as expected
7. Data Management
 - a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
 - b. Verify GFOE-managed data systems perform as expected
 - c. Update SOPs to reflect GFOE-managed network changes
 - d. Confirm mapping data file throughput to shoreside FTP.
 - i. EM 302 .all, .wcd
 - ii. EK 60 .raw, .idx
 - iii. SBP .segy, .keb, .kea
8. Training of Onboard Explorers in Training
 - a. Conduct training in the acquisition and processing of sonar data
 - b. Conduct detailed bathymetric data processing
 - c. Generate tracklines of all sonar data types
 - d. Generate cruise map
 - e. Generate cruise statistics
 - f. Process subbottom, EK60, multibeam bottom backscatter and water column backscatter data according to SOPs
 - g. Plan and execute cruise mini-projects



9. Collaboration of Onboard Student Scientists from Canada/European Union
 - a. Conduct training in the acquisition and processing of sonar data
 - b. Conduct detailed bathymetric data processing
 - c. Process subbottom, EK60, multibeam bottom backscatter and water column backscatter data according to SOPs
 - d. Determine during cruise and post-cruise collaborations concerning data collected on EX1807

10. Teacher At Sea
 - a. Inform TAS about life at sea and general research at sea.
 - b. Familiarize TAS with acquisition and processing of acoustic data

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
- University Corporation for Atmospheric Research(UCAR)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
- Global Foundation for Ocean Exploration (GFOE), P.O. Box 417, Mystic, CT 06355
- University of Rhode Island, Inner Space Center, Narragansett, Rhode Island

F. Personnel (Mission Party)

Table 2: Full list of mission party members and their affiliations

#	Name (First, Last)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Michael P. White	Expedition Coordinator	7/9/18	8/6/2018	M	OER (CNSP)	US
2	Amanda Bittinger	Mapping Watch Lead	7/10/18	8/5/18	F	UCAR	US
3	Daniel Freitas	Mapping Watch Lead	7/10/18	8/5/18	M	UCAR	US
4	Meredith Salmon	NOAA Teacher at Sea	7/10/18	8/5/18	F	Peddie School/NOA A TaS	US



5	Savannah Goode	Mapping Explorer in Training	7/10/18	8/5/18	F	UCAR	US
6	Sally Jarmusz	Mapping Explorer in Training	7/10/18	8/5/18	F	GFOE	US
7	Ryan D. Marr	Mapping Explorer in Training	7/10/18	8/5/18	F	OER (CNSP)	US
8	Prian Vidal	Mapping Explorer in Training	7/10/18	8/5/18	M	NOAA EPP	US
9	Daniel Amirault	Student Scientist	7/10/18	8/5/18	M	Memorial University of Newfoundland	Canada
10	Tatum Miko Laforteza Herrero	Student Scientist	7/10/18	8/5/18	F	Christian-Albrechts-Universität zu Kiel	Philippines
11	Fernando Aragon	Engineer	Onboard from EX1806	8/5/18	M	GFOE	Colombia/US Permanent Resident
12	Levi Unema	Engineer	Onboard from EX1806	Staying for EX1809	M	GFOE	US

G. Administrative

1. Points of Contact:

Ship Operations

Marine Operations Center, Atlantic (MOA)
439 West York Street
Norfolk, VA 23510-1145
Telephone: (757) 441-6776
Fax: (757) 441-6495

Chief, Operations Division, Atlantic (MOA)
LCDR Joe Carrier, NOAA
Telephone: (757) 441-6842
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Mission Operations

Michael P. White
Expedition Coordinator
NOAA Office of Ocean Exploration & Research
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CDR Eric Johnson, NOAA
Commanding Officer
NOAA Ship *Okeanos Explorer*
Phone: (401) 378-8284
Email: CO.Explorer@noaa.gov

LT Rosemary Abbitt
Operations Officer
NOAA Ship *Okeanos Explorer*



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and Research**

Phone: [808-659-9179 x234](tel:808-659-9179)
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Other Mission Contacts

Craig Russell
Program Manager
NOAA Ocean Exploration & Research
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Email: Craig.Russell@noaa.gov

CDR William Mowitt, Deputy Director
NOAA Ocean Exploration & Research
Phone: (301) 734-1023
Email: William.Mowitt@noaa.gov

Alan Leonardi, Director
NOAA Ocean Exploration & Research
Phone: 301-734-1016
Mobile: 202-631-1790
Email: alan.leonardi@noaa.gov

Vessel Shipping Address

1. Shipments

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

For Shipping to Norfolk:
MOC-A
NOAAS *Okeanos Explorer*
ATTN: Name/Dept
439 West York St.
Norfolk, VA 23510

2. Clearances

All mission personnel will need valid passports and *electronic* Country Clearances (eCCs, for Federal employees only) for entry into Bermuda. Expedition Coordinator will supply an 'exit letter' to mission personnel leaving Bermuda by airline. Crew will need valid official passports and eCCs.

Consent has been requested to conduct Marine Scientific Research in Bermuda's Exclusive Economic Zone. Diplomatic clearance for the port call in Hamilton will be requested at least 30 days in advance of arrival. The point of contact is Wendy Bradfield-Smith, NOAA Research Vessel Clearance Officer, Marine Operations, Norfolk, VA, telephone 757.441.6172, email wendy.bradfield-smith@noaa.gov.



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3. Licenses and Permit

NOAA OER will initiate an ESA Section 7 informal consultation with NOAA NMFS Office of Protected Resources (OPR) at NOAA Headquarters for all *Okeanos Explorer* operations in summer 2018 (not covered by the SEDCI environmental compliance) through the 2019 Field Season. A draft of the biological evaluation and determinations have been reviewed by OPR and all best management practices to prevent or minimize any potential adverse impacts on ESA-listed species will be employed during EX-18-07, even if the consultation is still underway. This informal consultation will be completed or underway when EX-18-07 starts. Appendix E details best current best practices.

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 and the discretion of the Commanding Officer. Locations are approximate. Final dive sites will be delivered to the bridge at night for the next day's dive.

Date	Activities
7/10	EX-18-07 personnel arrive
7/12	Depart Dock to transit to survey area
7/15	Arrive survey area, commence focus mapping operations
8/2	Depart survey area, commence transit to Bermuda
8/4	Arrive St. George's, Bermuda
8/5	EX-18-07 mission personnel depart ship.

Table 2: Detailed Cruise Itinerary. This is an approximate itinerary and is subject to change based on objective completion.

B. Staging and Destaging

Minimal staging is expected.

No destaging is anticipated.



C. Operations to be conducted

1. Telepresence / Outreach Events

- a. Three live video feeds will be used throughout the cruise to provide situational awareness for onshore personnel.
- b. No live events are anticipated.

2. In-Port Events

- a. There are no major in-port events anticipated for EX-18-07

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. No science dives are planned during EX-18-05, but the ship may plan training, safety drill, or maintenance dives.

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. These operating procedures will include protection measures when operating in the vicinity of marine mammals, sea turtles or Endangered Species Act-listed species as described in appendices of this document. 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

- Kongsberg Simrad EM302 Multibeam Echosounder (MBES)
- Kongsberg Simrad EK60 Deepwater Echosounders and GPTs (18, 38, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler and GPTs(SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP - not operable until dry dock repairs



- Teledyne RDI Ocean Surveyor (38 kHz) ADCP – currently operable but have been provided guidance unit may fail at any time
- Teledyne Underway CTD
- LHM Sippican XBT Mark21 System(Deep Blue probes)
- AOML Automated XBT Launcher (Deep Blue probes)
- Seabird SBE 911Plus CTD and deck box
- Seabird SBE 32 Carousel and 12 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- MarineStar GPS serial data feeds provided for GFOE network
- POS/MV with serial data feeds provided for the GFOE network
- Seabird SBE-45 (Micro TSG) data feeds provided for GFOE network
- Kongsberg Dynamic Positioning-1 System
- ECDIS
- Met/Wx Sensor Package with serial data feeds provided for GFOE network
- Three VoIP telephone lines
- 1 functioning and seaworthy SOLAS approved fast rescue boat
- 1 functioning and seaworthy work boat to support ROV operations and personnel transfers

B. Equipment and capabilities provided by the OER and partners

- Microtops II Ozone Monitor Sun photometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- QPS Fledermaus Software suite
- SIS Software and Kongsberg acquisition computer
- EK 60 acquisition computer
- Sub bottom profiler acquisition computer
- CTD acquisition computer
- Hypack Software
- GFOE provided VSAT High-Speed link (15 Mbps ship to shore; 5 Mbps shore to ship)
- Backscatter Mosaic computer
- GFOE exploration operations networking infrastructure
- Scientific Computing System (SCS)
- Telepresence System
- NCEI Cruise Information Management System (CIMS)
- GFOE VOIP system



- GFOE provided data storage

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 to be updated after EX1803

Item	Use	Approx. locations
95% Denatured Ethanol (12 gallons)	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin (2 L)	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (0.5 gallons) (4 M guanidine thiocyanate, 0.5% N-lauroylsarcosine, 25 mM Tris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation (genetics)	Wetlab, under the chemical hood
Formaldehyde (6 L)	Sample preservation	Wetlab, under the chemical hood
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 (35 gallons)	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	Winch room
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
Shell Diala S2	Mineral oil	Hanger, Vehicles



Por-15	Paint Kit	ROV Workshop Fire cabinet
Aeroshell 41	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
Adhesive Pliobond 25	General adhesive	Tool room
AP 120 Metal Prep	Degreaser/cleaner for metal surfaces	Pit
Butane Fuel	Torch refill	Tool Room
PVC cement	Adhesive for PFV plastic piping	Tool Room
Phosphoric Acid	Ferrous metal rust removal	Tool room
Pipetite Paste	Plumbing sealant	Tool room/pit
Spindle Oil 10, ROS PT	Lubricant/compensation oil	Tool room
DC557	Silicon grease	Tool room/pit
Tether Potting Catalyst	Two part epoxy catalyst	Pit
Tether Potting Compound	Two part epoxy ingredient	Pit
ThermaPlex Bearing Grease	Lubricant	Pit
Tritech Seaking	Compensator oil for sonar head	Pit

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. Supplementary Projects

NASA Maritime Aerosol Network



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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 G 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 B for detailed data management plans.

Deliverables

1. At sea
 - a. Daily plans of the Day (POD)



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- b. Daily situation reports (SITREPS)
- c. Summary forms for each CTD rosette cast
- d. Daily summary bathymetry data files
- e. Raw sonar files (EM 302, EK 60, Subbottom, ADCP)
- 2. Post cruise
 - a. Refined SOPs for all pertinent operational activities
 - b. Assessments of all activities
- 3. Science
 - a. Multibeam raw and processed data (see appendix B 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
 - g. Cruise report

Archive

OER 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.



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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. Daily Operations Briefing meetings will be held at a time and location determined by Operations Officer based on watch schedule, 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. OER Daily Situation Reports (SITREPS) will be produced by onboard Expedition Coordinator (EC). OMAO related information in SITREPS will be discussed during either safety or operations meetings. Additionally, EC and OPS will be meet as needed to discuss OMAO related information in SITREPS. The OPS Officer will be cc'd on SITREPS sent to shore to provide additional clarification as needed.

1. 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.

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-Project 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 success, challenges, and shortcomings 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 applicable 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.

4. 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 https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqblp9g/viewform 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 ship, 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 30 days in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website <http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted 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).

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 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
Email: MOA.Health.Services@noaa.gov

Please make sure the 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



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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 applies to over-the-side operations and 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 OER 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 email and the Very Small Aperture Terminal (VSAT) link.

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

Email: 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



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EX INMARSAT B

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

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

Voice Over IP (VoIP) Phone:

(541) 867-8932

(541) 867-8933

(541) 867-8934

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

Email: 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

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). National Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Line Office Deemed Export point of contact to assist with the process.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:



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1. Provide the Commanding Officer with the email generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this email will be transmitted by FNRS.) This email will identify the guest's DSN and Designated Escorts (if any) and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.
4. Export Control - Ensure that approved controls are in place for any technologies subject to Export Administration Regulations (EAR) that will be brought aboard the ship. .

The Commanding Officer and the Chief Scientist will keep each other informed of controlled technologies belonging to the ship and to the scientific party and will work together to implement any access controls necessary to ensure no unlicensed export occurs.

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology.



The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

1. Export Control - The DSN is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN, if not sailing for the project, shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of 207-12 Appendix C (Certification of Conditions and Responsibilities for a Foreign National) within three days of the FN's arrival onboard the ship.



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Appendix A

EMERGENCY CONTACT DATA SHEET—NOAA SHIP *OKEANOS EXPLORER*

Scientists sailing aboard *Okeanos Explorer* shall fill out the form found at the following link location:

https://docs.google.com/forms/d/e/1FAIpQLSe0spa6ORrLrUXvl0bttA50tQNeCKmNpq2_VKnFh0_BHlhN1g/viewform with their emergency contact information



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Appendix B: Data Management Plan



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Data Management Plan

Okeanos Explorer (EX1807): ASMIWG Bermuda Mapping



OER Data Management Objectives

Continue to quality check the data pipelines following the network update aboard the NOAA Ship Okeanos Explorer.

20-Jun-18

Page 1

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1807): ASMIWG Bermuda Mapping

1.2 Summary description of the data to be collected.

Multibeam, Singlebeam, and Sub-bottom Profile data are the main data outputs.

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, Atlantic Ocean Research Alliance, AORA, Atlantic Seabed Mapping International Working Group, ASMIWG, Galway Statement, Bermuda, Atlantic Ocean

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: 7/12/2018 to 8/4/2018

1.6 Planned or actual geographic coverage of the data.

Latitude Boundaries: 25.436 to 36.84

Longitude Boundaries: -76.286 to -61.21

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

Sub-Bottom Profile data, Water Column Backscatter, XBT (raw), Cruise Plan, CTD (processed), CTD (product), CTD (raw), EK60 Singlebeam Data, Expedition Cruise Report, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), NetCDF, SCS Output (compressed), SCS Output (native)

1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer

2. Point of Contact for this Data Producing Project

Okeanos Explorer (EX1807): ASMIWG Bermuda Mapping



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Overall POC: Michael White, Physical Scientist, OER, michael.white@noaa.gov
 Title: Expedition Coordinator
 Affiliation/Dept: CCOM/JHC, OER
 E-Mail: michael.white@noaa.gov
 Phone: 301-938-8460

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

True

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/2018/>
 Meta Std: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the

Okeanos Explorer (EX1807): ASMIWG Bermuda Mapping



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

True

7.1 Do the data comply with the Data Access Directive?

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 (NCEI)

URL: www.ncei.noaa.gov

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 Centers for Environmental Information. Refer to the Okeanos Explorer FY18 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY18_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.

Okeanos Explorer (EX1807): ASMIWG Bermuda Mapping



Appendix C: Categorical Exclusion



**Ocean Exploration
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Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: EX-18-07

Date Review Completed: 6/11/2018

Completed by: Michael P. White

OAR Functional Area: OER

Worksheet File Name: 2018-07-OER-CE-EX1807

Step 1. CE applicability

- 1. Is this federal financial assistance, including via grants, cooperative agreements, loans, loan guarantees, interest subsidies, insurance, food commodities, direct appropriations, and transfers of property in place of money?**

yes

- 2. What is the proposed federal action?**

The proposed federal action is to conduct seafloor and water column sonar mapping operations during a dedicated mapping ocean exploration expedition on NOAA Ship Okeanos Explorer. The sonar data collected will provide critical baseline information about un-mapped and poorly understood deep-water areas 200 nautical miles south, south east of Bermuda in international waters in the middle of the Atlantic Ocean. Transit mapping will occur with the U.S. EEZ as the ship departs Norfolk, Virginia for survey area.

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

- a.** G3: 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.** b. The main cruise objectives are to collect seafloor and water column sonar data.



Step 2. Extraordinary Circumstances Consideration

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

No. The NOAA Ship Okeanos Explorer will generally be operating in the high-seas, more than 200 nautical miles from the closest point of land. Its actions and/or the actions of the scientists and crew aboard will not involve procedures or outcomes known to result in impacts on human health and safety more than would be negligible.

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

No. Data collection will primarily occur offshore, at a distance greater than 200 nautical miles from land, and deeper than 4,000 meters in waters south-southeast of Bermuda. As these are not areas with unique environmental characteristics, adverse effects will not be factors about which we need to be concerned.

6. 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.' An ESA letter of concurrence data August 17, 2017 is provided in the appendix of the EX-18-07 project instructions demonstrating no anticipated impacts on Okeanos field work through FY19 as currently planned. Given the offshore focus area of our work, it is highly improbable that we will encounter marine mammals protected under the MMPA or sea birds protected under the MBTA. If we did encounter any marine mammals or seabirds, our effect would be negligible because of the best management practices to which we adhere to avoid or minimize environmental impacts. An Essential Fish Habitat (EFH) consultation for this same time period has resulted in the determination that the proposed cruises will not reduce the quality and/or quantity of EFH, provided there is adherence to the OER proposed procedures. The EFH consultation is provided in the project instructions of EX-18-07. Operations will not occur in any sanctuaries and therefore NMSA does not apply.

7. 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. There are chemical stores onboard used during our cruise for ROV maintenance and preservation of biological samples, but these operations will not occur during this cruise. Additionally, cruise operations will be in compliance with 45 CFR 101 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

- 8. 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 underwater cultural heritage sites.

- 9. 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 NOAA Ship Okeanos Explorer will be operating remote areas in the mid-Atlantic Ocean (see figure 1, EX-18-07 cruise Project Instructions). There are no communities within or near the geographic scope of the cruise and the cruise does not involve actions known or likely to result in adverse impacts on human health.

- 10. 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-18-07, 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. At the completion of every CTD cast, the CTD will be thoroughly rinsed with fresh water and completely dried to prevent spreading organisms from one site to another. Additionally, the Engineering Department aboard the NOAA Ship Okeanos Explorer attends yearly Ballast Management Training in accordance with the NOAA Form 57-07-13NPDES VGP Annual Inspection and Report to prevent the introduction of invasive species.



11. 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.

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

No. The acoustic mapping activities are ephemeral and localized in any particular area at any particular time. Given this project's scope and breadth, no notable or lasting changes or highly controversial effects to the environment will result.

13. 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 and mapping the ocean, this cruise is independently useful and not connected to any subsequent cruises.

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

No. The environmental effects are not uncertain, unique or unknown. The techniques and equipment used are standard for this type of field activity.

15. 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: Michael White Digital signed by Michael White
DN: cn=Michael White, o=NOAA, email=Michael.White@noaa.gov,
c=US
Date: 2018.06.11 10:50:04-0600

Signed by: Michael White

Date Signed: June 11, 2018



Appendix D: NASA Maritime Aerosols Network Survey of Opportunity

Survey or Project Name

Maritime Aerosol Network

Lead POC or Principle Investigator (PI & Affiliation)

POC: Dr. Alexander Smirnov

Supporting Team Members Ashore

Supporting Team Members Aboard (if required)

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.



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Appendix E:

NOAA Ship *Okeanos Explorer*: SOPs for Environmental Compliance

Summary of Mitigation Measures and Best Management Practices

Protective Measures and Best Management Practices (BMPs) Incorporated into the Action. BMPs are required to be incorporated within project instructions, cruise plans and NEPA documentation including financial assistance awards and environmental review memoranda. All applicable BMPs must be communicated to the science leads, boat operators and field staff, and as necessary between ship's crew (Commanding Officer/Master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Bridge Watchstanders on the *Okeanos Explorer*'s bridge will carefully monitor for the presence of marine protected species, and permitted personnel would follow established best management practices (BMPs) to minimize disturbance.

1. Minimize Exposure to Elevated Noise Levels

- a. Maintain watch for the presence of marine protected species. Immediately notify the survey department of the proximity of cetaceans. When marine mammals are able to be identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice.
 - i. If cetaceans are present within 400 m of the ship (460 m/500 yards for North Atlantic Right Whales), the vessel would stop if the animal is in danger of colliding with the ship but the mapping sonars would continue transmitting to avoid startle responses. If an observed animal is unable or unwilling to depart the immediate area, sonars will be secured and the ship will slowly move away from the area if feasible.
 - ii. If the cetacean is within 400 m (460 m/500 yards for North Atlantic Right Whales) and is not in danger of collision, reduce speed and seek to avoid the animal as much as possible.
 - iii. The Survey Department will respond by stopping the pinging of the sub-bottom sonar and switching the multibeam sonar into "mammal protection" mode (keeps it pinging but at a source level reduced by 20 decibels). No change will occur to the EK 60s. Note: the ADCPs are never run simultaneously with the multibeam and sub-bottom, so they would already be off. The ADCPs are mostly run when the ship is stationary at a dive site and risk to marine mammals is minimal.



- b. Minimize turning all sonar sound sources on and off as a precautionary measure to avoid possible startling of animals.
- c. When the systems have been shut down for any reason, the multibeam mammal protection mode would be used to turn the multibeam back on first. Only after the multibeam has been brought from mammal protection mode to full power would the sub-bottom profiler and EK 60 sonars then be turned back on.
- d. If the multibeam sonar is not being used, but other sonar systems are being turned on, they will be started in lower power settings and will gradually (over a 15 minute time period) be adjusted to higher power settings as appropriate for the water depths to essentially mimic the approach of the “mammal protection” mode of the multibeam.

2. Minimize Temporary Disturbance from Human Activity

- a. All in-water work will be postponed when whales are within 100 yards, or other protected species are within 50 yards;
- b. Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and
- c. No attempts will be made to feed, touch, ride, or otherwise intentionally interact with any marine protected species.

3. Minimize Entanglement

- a. Maintain watch for and avoid the presence of marine protected species. Notify the department heads of the proximity of animals;
- b. All in-water work will be postponed when whales are within 100 yards, or other protected species are within 50 yards of the vessel;
- c. Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and
- d. Individuals participating in the activity will closely monitor the instrument cables at all times while they are deployed.

4. Minimize Collisions with Vessels

The [following guidelines](#) for vessel operation in the presence of marine protected species and other marine wildlife are provided by the Bureau of Ocean Energy Management in a Notice to Lessees and Operators (appendix G), and NOAA Fisheries as part of a Biological Opinion:

a. Vessel Strike Avoidance

Vessel operator and crew must maintain a vigilant watch for all marine mammals and sea turtles and slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal. These requirements apply when the vessel is in transit and do not apply in any case where compliance will create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the



vessel according to the parameters stated below. Visual observers monitoring the vessel strike avoidance zone can be either third-party visual protected species observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena. Vessel strike avoidance measures shall be followed during sonar surveys and while in transit.

Vessel personnel should do the following in order to avoid causing injury or death to marine mammals and sea turtles:

- i. Maintain a vigilant watch for marine mammals and sea turtles and slow down or stop their vessel to avoid striking protected species.
- ii. When whales are sighted, maintain a distance of 100 yards (91 meters) or greater from the whale. If the whale is believed to be a North Atlantic right whale, vessel personnel should maintain a minimum distance of 500 yards (460 meters) from the animal (50 CFR 224.103).
- iii. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards (45 meters) or greater whenever possible.
- iv. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
- v. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised.
- vi. Whales may surface in unpredictable locations or approach slowly moving vessels. When vessel personnel sight animals in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

The vessel must maintain a minimum separation distance of 100 m (328.1 ft) from large whales (i.e. sperm and baleen whales). The following avoidance measures must be taken if a large whale is within 100 m (328.1 ft) of the vessel.

- The vessel must reduce speed and shift the engine to neutral, and must not engage the engines until the whale has moved outside of the vessel's path and the minimum separation distance has been established.
- If the vessel is stationary, the vessel must not engage engines until the whale(s) has moved out of the vessel's path and beyond 100 m (328.1 ft).

b. Additional Requirements for the North Atlantic Right Whale

- i. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards be maintained from the animal (50 CFR 224.103 ©).
- ii. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.



- iii. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled “A Prudent Mariner’s Guide to Right Whale Protection” (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).
- iv. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.
- v. Adherence to seasonal vessel speed restrictions of 10 knots or less as [designated locations](#) (Appendix H) along the U.S. east coast.
- vi. Adherence to NOAA Compliance Guide for Right Whale Ship Strike Reduction Rule (Appendix I)

5. Minimize Vessel Waste and Discharge & Prevent Invasive Species

- a. All vessels operating in areas where ESA-listed species are present will continue to follow MARPOL discharge protocols, but will postpone any authorized discharge if any protected species are within 100 yards of the vessel.
- b. Meet all EPA Vessel General Permits and Coast Guard requirements.
- c. Avoid discharge of ballast water in designated critical habitat.
- d. Use anti-fouling coatings.
- e. Clean hull regularly to remove aquatic nuisance species.
- f. Avoid cleaning of hull in critical habitat.
- g. Avoid cleaners with nonylphenols.

6. Avoid or Minimize Impacts to Essential Fish Habitat

- a. The vessel would employ the use of dynamic positioning during ROV dives (no anchoring);
- b. ROVs would be operated in a manner to avoid seafloor disturbance, and setting the ROV on the seafloor will be held to a minimum. For those situations when the ROV does make contact with the seafloor, visual observations will be made to confirm that the area the ROV is set down on does not include corals or other fragile animals that can reasonably be avoided;
- c. Sample collections would be limited (typically 4 - 6 total rocks and primary biological specimens per dive) that represent new species, new records, the dominant morphotype animal in a community, or species to support connectivity studies. These specimens would be collected using the ROV’s manipulator arms or scoop. Whenever possible, sample collections will be made using the cutting implementation tool on the ROV, and only portions of organisms (<50 cm) will be collected to avoid mortality. Clonal biological specimens (corals, sponges) would be subsampled;
- d. When possible, rock samples will be selected in a way to minimize disturbance to the surrounding environment and to minimize the take of attached organisms.;



- e. After each ROV dive, the vehicles are brought back onboard and thoroughly sprayed with freshwater and allowed to air dry before the next dive. Though marine organisms should not survive this process, the ROV is thoroughly inspected prior to every dive and checked for the presence of biological organisms to prevent the spread of invasive or non-endemic species from one location to another;
- f. Instruments deployed to collect water samples and current data (except for expendable instruments) would not be allowed to contact the seafloor;
- g. The use of detergents and other pollutants which may be washed into the marine environment will be avoided or held to a minimum;
- h. The vessel will adhere to MARPOL discharge regulations at all times during the proposed cruises;
- i. Except in an emergency, the vessel will not anchor while at sea.

