



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

March 12, 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-18-02

Attached is the final Project Instruction for EX-18-02, Emerging Technology Demonstration and Mapping, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of March 23 – April 5, 2018. Of the 14 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation and 14 DAS are funded by OAR allocation. This project is estimated to exhibit a High Operational Tempo due to 24-hour-per-day ship and science shakedown operations. Acknowledge receipt of these instructions via e-mail to deputyops.moa@noaa.gov at Marine Operations Center-Atlantic.






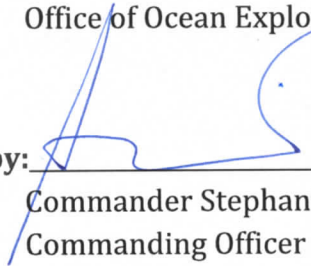
Ocean Exploration and Research

Project Instructions

Date Submitted: March 9, 2018
Platform: NOAA Ship *Okeanos Explorer*
Project Number: EX-18-02
Project Title: Emerging Technology Demonstration and Mapping
Project Dates: March 23 - April 5, 2018

Prepared by: Brian RC Kennedy **Dated:** 3/9/18
Brian Kennedy and Meme Lobecker, NOAA
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by:  **Dated:** 3/8/2018
Craig Russell, NOAA
Program Manager
Office of Ocean Exploration & Research

Approved by:  **Dated:** 13-MAR-2018
Commander Stephanie Koes, NOAA
Commanding Officer
Marine Operations Center - Atlantic

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-18-02. Operations for this cruise will be conducted 24 hours/day and consist of several emerging technology demonstration projects as well as deep sea mapping shakedown and operations. The expedition will commence on March 23, 2018 in Pascagoula, Mississippi (30° 20.355'N, 88° 34.499'W) and conclude on April 5, 2018 in Pascagoula, Mississippi. 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), and XBT casts in support of multibeam sonar mapping operations, and the ship’s high-bandwidth satellite connection for continuous real-time ship-to-shore communications. Operations are planned in the northern Gulf of Mexico. Emerging technologies components of this cruise will be in partnership with the Cooperative Institute for Ocean Exploration Research and Technology (CIOERT) at Florida Atlantic University and the Naval Undersea Warfare Center (NUWC) Newport RI.

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



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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, 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.

B. Days at Sea (DAS)

Of the 14 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation and 14 DAS are funded by OAR allocation. This project is estimated to exhibit a High Operational Tempo due to 24-hour-per-day ship and science shakedown operations.

C. Operating Area

EX-18-02 is a 24 hour a day emerging technologies demonstration and mapping cruise that will focus operations in the U.S. Gulf of Mexico.



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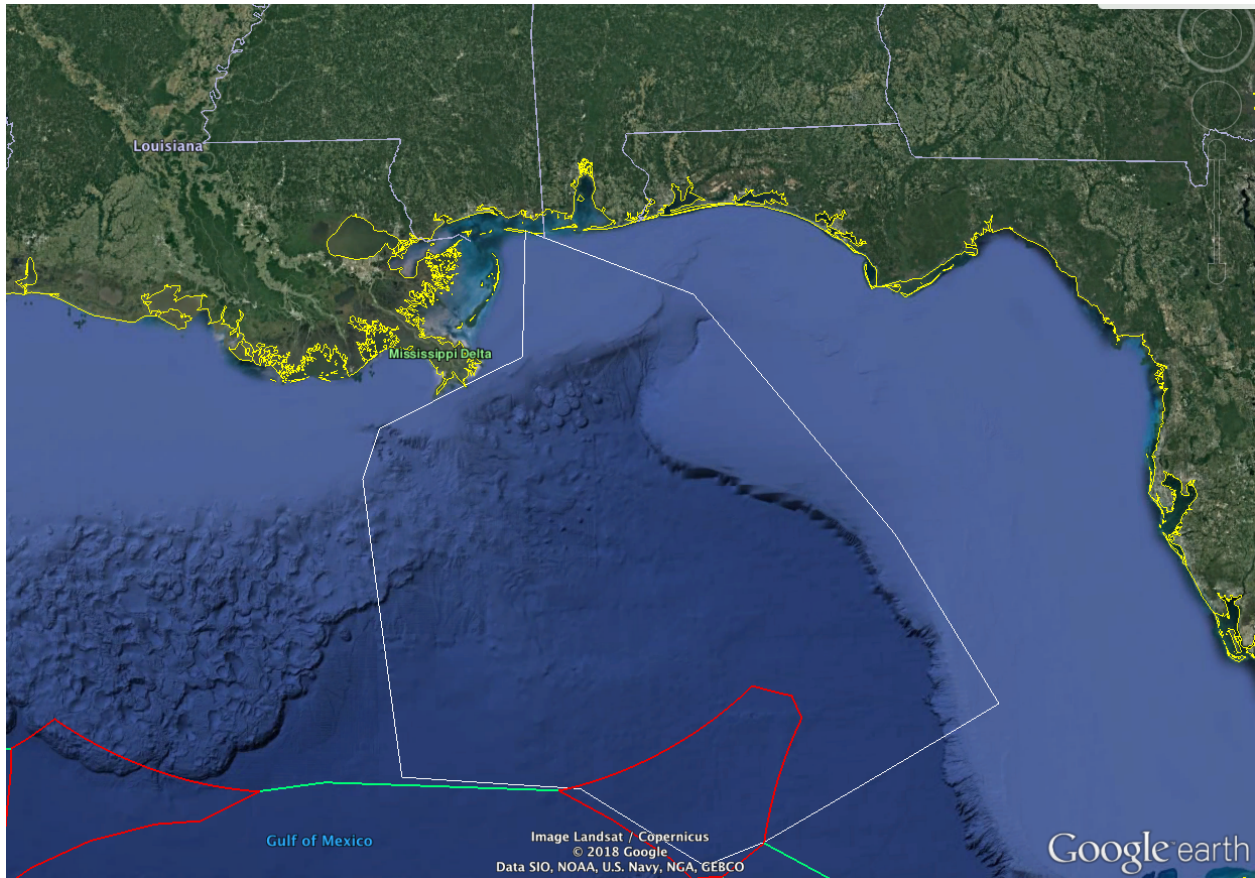


Figure 1: Map showing the general expedition operating area. The white polygon designates the possible working grounds.

Generalized operating area coordinates		
ID	Latitude	Longitude
SW corner	24° 46.7N	90° 36.0'W
SE corner	24° 32.3'N	84° 25.6'W
NE corner	30° 18.9'N	84° 4.0'W
NW corner	29° 59.6'N	90° 37.8'W

Table 1: Bounding coordinates of the EX-18-02 operating area

D. Summary of Objectives

March 23 - April 5, (Pascagoula, MS - Pascagoula, MS.) Telepresence-enabled emerging technology demonstration and mapping cruise



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EX-18-02 operations will occur in the waters of the Gulf of Mexico. This cruise will conduct several emerging technology demonstrations and mapping operations and 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 personnel transfer by small boat
 - c. Support new operations aboard for the emerging technology objectives
 - d. Man overboard / ship handling training
 - e. Additional safety training.
 - f. Support around the clock midwater profiler operation during the first half of the cruise
 - g. Conduct test CTD cast

2. EK 60 Sonar Objectives
 - a. Potentially integrate and conduct EK 80 data collection over active seeps
 - b. Troubleshoot EK 60 interference
 - c. Potentially test new Trigger Jigger with new programming (if available)
 - d. Confirm read/write permissions.
 - e. Conduct sonar calibration if not completed on EX-18-01.

3. EM 302 Sonar Objectives
 - a. Conduct multibeam patch test if not completed on EX-18-01.
 - b. Conduct RPM noise testing.
 - c. Confirm triggering status.
 - d. Confirm read/write permissions.

4. Subbottom profiler sonar objectives
 - a. Confirm navigation and heave inputs are received.
 - b. Confirm triggering status.
 - c. Confirm read/write permissions.

5. Complete mapping systems readiness report for 2018 field season.

6. Mapping Computer/Network Objectives
 - a. Continue testing installation and integration of new mission computers.
 - b. Continue testing installation and integration of new mission network.

7. Mapping Sound Velocity Profiling Objectives
 - a. Collect XBT casts as data quality requires, during mapping operations;
 - b. Integrate new software Sound Speed Manager (part of Pydro) into normal operations for processing XBT casts, converting to .asvp and sending to SIS automatically.



- c. Potentially host technicians from AOML to support AXBT system troubleshooting.
 - d. Potentially host technicians from Teledyne to support UCTD system troubleshooting.
8. Video Engineering (VSAT ~15 mb/sec ship-to-shore; 5 mb/sec shore-to-ship)
- a. Test terrestrial and high-speed satellite links;
 - b. Verify Global Foundation for Ocean Exploration (GFOE)-managed telepresence systems perform as expected
9. 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
 - iii. SBP .segy, .keb, .kea
 - e. Emerging tech projects will be responsible for their own data management
10. Emerging technology demonstration
- a. Deploy and test CIOERT's Midwater profiler system every 6 hours 24 hrs a day March 24-27
 - i. Conduct cast with both profiling bodies
 - ii. Ingrate new profilers with existing EX CTD cable
 - iii. Test rapid change over between profiling packages
 - iv. Characterize the water column down to 500 meters
 - v. Test two wire operation from the Okeanos Explorer
 - b. Deploy and test the Navy Undersea Warfare Center's (NUWC) Instrumented Tow Cable (ITC) March 29-April 4
 - i. Test depths ranging from 100 to 1300 meters
 - ii. Test varying towing speeds from the A-frame

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 Centers for Environmental Information (NCEI), Stennis Space Center MS, 39529 USA



- University Corporation for Atmospheric Research (UCAR) Cooperative Programs for the Advancement of Earth System Science (CPAESS), 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
- US Navy, Naval UnderSea Warfare Center (NUWC)- Newport, 1176 Howell St, Newport, RI 02841
- Florida Atlantic University (FAU), Cooperative Institute for Ocean Exploration and Technology (CIOERT), 5600 US 1 North, Fort Pierce, FL 34946

F. Personnel (Mission Party)

Table 2: Full list of seagoing mission party members and their affiliations March 23-28

#	Name (First, Last)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Elizabeth Meme Lobecker	Co-Expedition Coordinator	Onboard from 1801	4/6	F	OER (ERT)	USA
2	Brian Kennedy	Co-Expedition Coordinator	3/21/18	4/6	M	OER (UCAR)	USA
3	Kevin Jerram	Mapping Watch Lead	Onboard from 1801	4/6	M	UCAR	USA
4	Daniel Freitas	Mapping Watch Lead	Onboard from 1801	4/6	M	UCAR	USA
5	Elizabeth Weidner	EK 60 Expert	Onboard from 1801	4/6	F	UNH	USA
6	If needed	Tech Rep	TBD	TBD	TBD	TBD	USA
7	Derek Bolser	EIT 1	Onboard from 1801	4/6	M	UCAR	USA
8	Mike Twardowski	CIOERT PI	3/21	3/28	M	FAU	USA
9	Jim Sullivan	Technician	3/21	3/28	M	FAU	USA
10	Brandon Russell	Technician	3/21	3/28	M	FAU	USA
11	Alberto Tonizzo	Technician	3/21	3/28	M	FAU	US permanent Resident
12	Chris Strait	Technician	3/21	3/28	M	FAU	USA
13	Fraser Dalgleish	Technician	3/21	3/28	M	FAU	USA



14	Brian Ramos	Technician	3/21	3/28	M	FAU	USA
15	Nicole Stockley	Technician	3/21	3/28	F	FAU	USA
16	Andy O'Brien	GFOE OPS manager	3/14	4/6	M	GFOE	USA
17	Roland Brian	Engineer	3/21	Staying for EX1803	M	GFOE	USA
18	Fernando Aragon	Engineer	3/15	Staying for EX1803	M	GFOE	US permanent Resident
19	Josh Carlson	Engineer	3/21	Staying for EX1803	M	GFOE	USA
20	Andy Lister	Engineer	3/21	Staying for EX1803	M	GFOE	USA
21	Jeff Laning	Engineer	3/21	Staying for EX1803	M	GFOE	USA
22	Amanda Netburn	Scientist	3/22	3/28	F	OER	USA

Table 3: Full list of seagoing mission party members and their affiliations March 28-April 5

#	Name (First, Last)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Elizabeth Meme Lobecker	Co-Expedition Coordinator	Onboard from 1801	04/06/	F	OER (ERT)	USA
2	Brian Kennedy	Co-Expedition Coordinator	3/20	4/7/18	M	OER (UCAR)	USA
3	Kevin Jerram	Mapping Watch Lead	Onboard from 1801	04/06	M	UCAR	USA
4	Daniel Freitas	Mapping Watch Lead	Onboard from 1801	04/06	M	UCAR	USA
5	Adrienne Copeland	EK 60 Expert	3/28	04/06	F	OER	USA
6	Elizabeth Weidner	EK 60 Expert	Onboard from 1801	04/06	F	UNH	USA
7	Derek Bolser	EIT 1	Onboard from 1801	04/06	M	UCAR	USA
8	Roland Brian	Engineering	3/21	Staying for EX1803	M	GFOE	USA
9	Fernando Aragon	Engineering	3/21	Staying for EX1803	M	GFOE	US permanent Resident
10	Josh Carlson	Engineering	3/21	Staying for EX1803	M	GFOE	USA
11	Andy Lister	Engineering	3/21	Staying for EX1803	M	GFOE	USA
12	Jeff Laning	Engineering	3/21	Staying for EX1803	M	GFOE	USA



13	Andy O'Brien	GFOE OPS manager	3/21	4/6	M	GFOE	USA
14	Brian Amaral	NUWC project manager	3/28	4/6	M	USN	USA
15	Tyler Pickering	NUWC Technician	3/28	4/6	M	USN	USA
16	Makio Tazawa	NUWC Technician	3/28	4/6	M	USN	USA
17	Thomas Coleman	NUWC Technician	3/28	4/6	M	USN	USA
18	Jeff Coogan	Scientist	3/28	4/5	M	University of Alabama	USA
19							
20							
21							
22							

G. Administrative

1. Points of Contact:

Ship Operations

Chief, Operations Division, Atlantic (MOA)

LT Joe Carrier, NOAA

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Mission Operations

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CDR Eric Johnson, NOAA

Commanding Officer

NOAA Ship *Okeanos Explorer*

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Co-Expedition Coordinator
NOAA Office of Ocean Exploration and Research (UCAR)

LT Aaron Colohan

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NOAA Ship *Okeanos Explorer*

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Alan Leonardi, Director
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Email: alan.leonardi@noaa.gov

Vessel Shipping Address

1. Shipments

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

ATTN: OPS
151 Watts Ave,
NOAA Ship Okeanos Explorer
Pascagoula, MS 39567

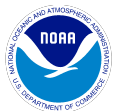
2. Diplomatic Clearances

None required

3. Licenses and Permit

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. An Environmental Review Memorandum memorandum has been completed for this survey, in accordance with Section 4 of the Companion Manual. (Appendix C).

II. Operations



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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

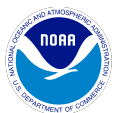
All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer. Locations are approximate. Final dive sites will be delivered to the bridge at night for the next day’s dive.

Date	Activities
3/21	Some EX-18-02 personnel arrive. Load CIOERT equipment
3/22	Integration of CIOERT Equipment on J frame and set up. As well as alongside testing of AXBT, UCTD, new network and mission computers
3/23	Depart for sea continued integration of CIOERT Systems and testing mapping and network equipment
3/24	Commence deployments of CIOERT midwater profiler packages every 6 hours 24 hours a day. Testing mapping systems and network configurations
3/25-3/27	Same operations
3/28	Small boat transfer to off load 8-12 people and pick up 4-7. Set up NUWC ITC
3/29	Commence offshore mapping and possibly EK60 calibration. During mapping operations we will also be towing the NUWC ITC at depths ranging from 100-1300 meters
3/30-4/4	Continue mapping and ITC operations
4/5	Arrive Pascagoula MS demobilization
4/6	Mission Personnel depart

Table 4: Detailed Cruise Itinerary. This is an approximate itinerary and is subject to change based on objective completion.

B. Staging and Destaging

Staging will occur on March 21 and crane support will be required. The CIOERT midwater profiler will arrive by truck and come with two components with an approximate weight of 250lbs and 1500lbs. CIOERT will also bringing a deck mounted winch and cable that weighs between 500-1000lbs. The CIOERT winch will require 120 volt AC power. This project will also be providing a mobile davit that will need to be mounted on the Starboard side of the fantail. The midwater profiler project will be reliant on the ship CTD wire so the CTD will need to be disconnected from the wire and placed on the O-2 deck or other



location. The profiling packages will only be using the ship's CTD wire for strength; no electrical power is needed through the cable so the electrical termination can just be capped for this cruise.

The NUWC project will be bringing another winch and cable set (exact weight still TBD but less than 5,000 lbs) and a block. The block will need to be hung from the A-Frame prior to departure on the 3/23. The navy winch requires 210 VAC power so the Navy will be bringing a transformer to step down the ship's 480v power to what the winch requires. Ship's engineering assistance will be required to integrate the transformer. Deck department assistance is also requested to place and secure the Navy winch on the fantail and hang their overboarding block. The winch will be placed centerline in the fantail facing the A-frame while Seirios will be on the port side in between the ROV tracks. We may need to move the tuggers to make room for the Navy winch.

All demobilization activities will take place on the arrival date April 5 if possible all items will be removed the morning of April 6th. Crane support will be required.

C. Operations to be Conducted

1. Telepresence / Outreach Events

- a. No live events are expected

2. In-Port Events

- a. tour for Navy personnel at 1400 on March 21
- b. Tour for NCEI staff at 1600 on March 21
- c. Tour for Daulphin Island Sea Lab Educators at 1030 on March 22
- d. Tour for Nature Conservancy staff at 1500 on March 22

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-18-02, 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



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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
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP – not operable
- 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 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 with satellite corrections 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.
- NOAA OER 6000 m *Deep Discoverer* ROV NOAA *Seirios* Camera Platform
- Teledyne Underway CTD
- IVS Fledermaus Software suite
- SIS Software and Kongsberg acquisition computer
- EK 60 acquisition computer
- EK 80 Wide Band Transceivers
- 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
- CIOERT Midwater Profiler
- NUWC Instrumented tow cable

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.



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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

Item	Use	Approx. locations
95% Denatured Ethanol (20 gallons)	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin (2 gallons)	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (0.5 gallons) (4 M guanidine thiocyanate, 0.5% N-lauroylsarcosine, 25 mMTris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation (genetics)	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
Mineral Oil	Vitrea	Hanger, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Univis HVI 13	Hydraulic Fluid	Hanger, ROV D2
Ultratane	Butane fuel	ROV Workshop fire cabinet
Rust-oleum	Protective Enamel	ROV Workshop fire cabinet
Flux-Off	Soldering Flux remover	ROV Workshop fire cabinet
Propane	Torch Fuel	ROV Workshop fire cabinet
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
Li-ion batteries (14lbs)	Power CIOERT midwater profilers	CTD deck

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

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.

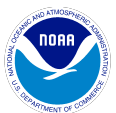
NOAA OER Responsibilities

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)
 - 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



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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. Daily Situation Reports (SITREPS) will be posted as well and shared daily through email.

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.



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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 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.



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- 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 email and the Very Small Aperture Terminal (VSAT) link. VSAT bandwidth at 15Mbps 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

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

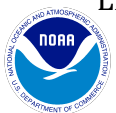
Okeanos Explorer Iridium:(808) 659-9179

OER Mission Iridium (dry lab): (808) 851-3827

EX INMARSAT B

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

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



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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: expeditioncoordinatorexplorer@noaa.gov for dissemination of all hands emails by Expedition Coordinator while onboard. See ET for password.

E. IT Security

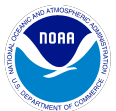
1. Any computer that will be hooked into the ship's network must comply with the OMAO Fleet IT Security Policy 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:
Installation of the latest virus definition (.DAT) file on all 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

There will be no Foreign National Guests on this cruise.



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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/1FAIpQLSfuDrKAdhyvlthnmrZMdL-Qtz-vFT4lff5TnJlagi0PRI9eIQ/viewform?c=0&w=1> with their emergency contact information



**Ocean Exploration
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Appendix B: Data Management Plan

Data Management Plan

Okeanos Explorer (EX1802): Emerging Technology Demonstration and Mapping



Ocean Exploration and Research

OER Data Management Objectives

Data collected by Emerging Technology projects will not be archived. All other data will follow normal data management procedures.

08-Mar-18

Page 1

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1802): Emerging Technology Demonstration and Mapping

1.2 Summary description of the data to be collected.

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), and XBT casts in support of multibeam sonar mapping operations, and the ship's high-bandwidth satellite connection for continuous real-time ship-to-shore communications. Operations are planned in the northern Gulf of Mexico. Emerging technologies components of this cruise will be in partnership with the Cooperative Institute for Ocean Exploration Research and Technology (CIOERT) at Florida Atlantic University and the Naval Undersea Warfare Center (NUWC) Newport RI. These emerging technology data will not be archived.

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

expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, oceans, Gulf of Mexico, Pascagoula, emerging technology, midwater profiler, instrumented tow cable

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: 3/23/2018 to 4/5/2018

1.6 Planned or actual geographic coverage of the data.

Latitude Boundaries: 24.53 to 30.32

Longitude Boundaries: -90.63 to -84.07

Okeanos Explorer (EX1802): Emerging Technology Demonstration and 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, Bottom Backscatter, CTD (processed), CTD (raw), EK60 Singlebeam Data, EK80 Echosounder, Floating Point GeoTIF, GSF, HDCS, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), SCS Output (compressed), SCS Output (native), Sub-Bottom Profile 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: Brian Kennedy
 Title: Expedition Coordinator
 Affiliation/Dept: NOAA Office of Ocean Exploration and Research
 E-Mail: brian.kennedy@noaa.gov
 Phone: 706-540-2664

3. Point of Contact for Managing the Data

Data POC Name: Susan Gottfried, Andy O'Brien
 Title: OER Data Management Coordinator, Onboard and Shoreside Data Manager
 E-Mail: susan.gottfried@noaa.gov, Andrew.obrien@tgfoe.com

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 (EX1802): Emerging Technology Demonstration and Mapping



6.1 Does the metadata comply with the Data Documentation Directive?

True

6.1.1 If metadata are non-existent or non-compliant, please explain:

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/rdn/oer-waf/ISO/Resolved/2018/>

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

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: NOAA National Centers for Environmental Information

URL: <https://data.noaa.gov/datasetsearch/>

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

Hold Time: no

Authority: not applicable

Okeanos Explorer [EX1802]: Emerging Technology Demonstration and Mapping



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_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.

60-90 days

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

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

8.5 Prepare a Data Use Statement

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

Okeanos Explorer [EX1802]: Emerging Technology Demonstration and Mapping

Appendix C: Categorical Exclusion



**Ocean Exploration
and Research**

Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: EX-18-02

Date Review Completed: 3/7/2018

Completed by: Brian Kennedy

OAR Functional Area: OER

Worksheet File Name: 2018-03-OER-CE-EX1802

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?**

no

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

The proposed action is to collect mapping data and test emerging technologies for ocean exploration aboard the NOAA Ship Okeanos Explorer. There new technologies may be tested during this project. The first is a new temperature sensing cable developed by the Naval Undersea Warfare Center(NUWC). The NUWC sensor is built into an oceanographic 0.5-inch steel cable that will be towed behind the Okeanos Explorer at speeds from 3 to 9 knots to depths less than a 1300 meters. This sensor will collect temperature in the water column the length of the cable with a resolution of .5 meters. During the demonstration, the integrated sensor may be deployed with a small depressor weight. This demonstration will provide NUWC with useful data on this applied sensor technology and provide NOAA with exposure to technology that may benefit the marine science community. The second technology is a new midwater profiler system developed by the Cooperative Institute for Ocean Exploration and Technology (CIOERT). This new system uses existing technologies working together to gather more information about the midwater environment and life. The last project will test a software package that can better process the raw sonar data collected by the existing transducers on the Okeanos Explorer. See Project Instructions EX 18-02 for more information about specifics on all equipment and procedures



The expedition will conduct operations in the US Exclusive Economic Zone (EEZ) in the Gulf of Mexico and potentially in international waters of the Gulf of Mexico, commencing on March 23, 2018 in Pascagoula MS, (30° 20.36'NN, 88° 34.50'W) and concluding on April 5, 2017 in Pascagoula MS, (30° 20.36'NN, 88° 34.50'W). See Project Instructions EX-18-02 for more details.

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

- a. E3: Activities to collect aquatic, terrestrial, and atmospheric data in a non-destructive manner.
- b. This expedition will involve the use of a towed Water Column Temperature Sensor providing valuable temperature data, midwater profiling system and new sonar processing system while demonstrating a new technology application in areas of the Gulf of Mexico

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 be operating in deep sea areas of the Gulf of Mexico during EX-18-02, (see Table 1 of EX-18-02 Project Instructions: Bounding coordinates of the EX-18-02 operating area) This action does not involve any procedures or outcomes known to result in impacts on human health and safety will be less than negligible.

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

This survey/expedition will conduct operations near the Mississippi Bight and not within sanctuary boundaries or within historically or culturally significant areas.

The expedition is being planned and conducted in partnership with NOAA National Marine Fisheries Service (NMFS), National Centers for Coastal Ocean Science (NCCOS), Deep Sea Coral Research and Technology Program (DSCRTP), Florida Keys NMS and Flower Gardens Banks NMS, Gulf of Mexico Fisheries Management Council and the Bureau of Ocean Energy Management (BOEM). OER will use input from these management authorities who are familiar with these



areas to ensure no more than negligible effects on these areas.

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?

There is no reason to believe that the new technologies being tested on this cruise will have anything that could even be considered a negligible impact because while these technologies are new they are very similar to well established technologies such as CTD casts and sample equipment that is towed behind a ship, that are used widely.

Given the offshore focus area of our work, it is 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 effects. In addition, the bridge will have a lookout stationed to further minimize environmental effects.

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. 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 on the environment.

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?

The proposed action will not result in adverse effects that cannot be resolved through applicable regulatory processes, because, during EX-18-02, we will not be operating within listed or eligible properties, lands, resources or sites coming under the umbrella of protections referenced



above.

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 in deep sea areas of the Gulf of Mexico (see Table 1, EX 18-02 Project Instructions). There are no human communities within the geographic scope of the cruise, and when nearshore, operations will be conducted several miles offshore. 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-18-02 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 scientific instrumentation deployment, the systems will be thoroughly rinsed with fresh water, completely dried and checked for the presence of biological organisms to prevent spreading organisms from one site to another. Also, the Engineering Department aboard the NOAA Ship Okeanos Explorer attends yearly Ballast Management Training in accordance with NOAA Form 57-07-13 NPDES 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 expedition coordinator obtained (or are in the process of obtaining) authorizations and/or consultations pursuant to applicable laws. See responses to questions #4, 5, 6, and 7 for details.

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



No. The emerging technology 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. Any impacts to the environment will be less than negligible.

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, mapping, and sampling the ocean, every cruise is independently useful and not connected to subsequent cruises. Though, within the context of this survey, some new technologies will be tested, we do not consider this precedent setting due to their resemblance to existing technologies that are widely used in the industry.

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

No. While some of the technologies to be demonstrated on this cruise are new they are similar enough to widely used existing technologies that there will be no uncertain or unique impacts to the environment.

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 one of several classes 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 Russell

Date Signed: 3/6/2018

