



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center - Atlantic
Norfolk, Virginia 23510-1114

FEB 1, 2016

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

FROM: Captain Anne K. Lynch, NOAA *Anne K. Lynch CAPSTONE NOAA*
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-16-02
Mission System Shakedown / CAPSTONE Mapping

Attached is the final Project Instruction for EX-16-02, Mission System Shakedown / CAPSTONE Mapping, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of February 12-17, 2016. Of the 6 DAS scheduled for this project, 6 days are funded by Line Office allocation. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to ChiefOps.MOA@noaa.gov at Marine Operations Center-Atlantic.





Project Instructions

Date Submitted: January 28, 2016

Platform: NOAA Ship *Okeanos Explorer*

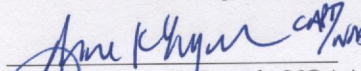
Project Number: EX-16-02

Project Title: Mission System Shakedown/ CAPSTONE Mapping

Project Dates: February 12-17, 2016

Prepared by: Lindsay McKenna and Kasey Cantwell, NOAA
Expedition Co-Coordinator
Office of Ocean Exploration & Research

Approved by: MCDONOUGH.JOH Digitally signed by MCDONOUGH.JOH, DN: cn=US, ou=U.S. Government, ou=DOI, ou=PE, email=MCDONOUGH.JOH@NOAA.gov, c=US N.J.III.1365836678 DN: cn=US, ou=U.S. Government, ou=DOI, ou=PE, email=MCDONOUGH.JOH@NOAA.gov, c=US Dated: _____
John McDonough
Deputy Director
Office of Ocean Exploration & Research

Approved by:  CAPT/NOA Dated: 2 Feb 2016
Captain Anne K. Lynch, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. Overview

A. Brief Summary and Project Period

During the winter repair and drydock period a number of new systems were installed on NOAA Ship *Okeanos Explorer*, including new sonar systems and a new VSAT. From February 12 to February 17th the team will shakedown these new systems, test data work flow and integrations, and prepare for the rest of the field season. EX-16-02 operations will consist of ROV and mapping operations with a primary focus on completing engineering priorities and testing new systems. As time and completion of priority objectives allow, operations will collect data in support of the Campaign to Address Pacific monument Science, Technology, and Ocean NEeds (CAPSTONE).

CAPSTONE is a three year initiative to collect critical baseline NOAA science and management needs in largely unknown areas of US waters in the Pacific. The campaign serves as an opportunity for NOAA and the Nation to highlight the uniqueness and importance of the Pacific Monuments and Sanctuaries, which are national symbols of ocean conservation. Operations conducted during this campaign support NOAA missions to understand and predict changes in climate, weather, oceans and coasts, and share that knowledge and information with others. Much of this work associated with CAPSTONE will contribute to and complement Deep Sea Coral Research and Technology Program's three-year Pacific Islands Regional Initiative.

This document contains project instructions for EX-16-02, the first ROV cruise of the 2016 field season. Operations for this cruise will include ROV, CTD, and mapping system shakedowns and exploration throughout the main Hawaiian Islands as time allows.

The expedition will be staged in and out of Honolulu, HI with operations beginning on February 12th and concluding on February 17th. Operations will use the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, Teledyne RDI Workhorse Mariner and Ocean Surveyor ADCPs), a new Underway CTD system to support mapping, NOAA's two-body 6,000 m remotely operated vehicle (ROVs Deep Discoverer and Seirios) system, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. ROV dives will mostly be conducted during the day, and multibeam, singlebeam, and sub-bottom acoustic mapping will occur when the ROV is on deck. Target areas for operations will be identified prior to the cruise. However, exact locations of discrete ROV dives and mapping activities will be determined during the cruise as results of engineering and shakedown tests are evaluated and once weather and operational constraints are factored in.

B. Days at Sea (DAS)

Of the 6 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 6 DAS are funded by an OAR Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are other agency funded. This project is estimated to exhibit a High Operational Tempo due to daily ROV operations, nighttime mapping, and possible CTD work.

C. Operating Area (include optional map/figure showing op area)

EX-16-02 is a mission system shakedown cruise that will consist of daily ROV dives, mapping, and significant training and testing of new systems. Operations will primarily be based in the main Hawaiian Islands around Oahu. The weather contingent operating area is north of Moloka'i Island, and a secondary contingency shallow operating area is south of Lanai Island. Exact locations will be primarily dictated by engineering and testing needs as the mission team is familiarized with the new

VSAT, sonars, underway CTD, and ROV equipment. The ship will conduct 24 hour operations, likely consisting of daytime ROV dives and mapping operations during the nighttime operations and transits. CTD rosette operations will be scheduled around the availability of ship’s personnel. ROV operations will focus in depths between 300 and 4,000 meters and will include high-resolution visual surveys and limited geological sample collection.

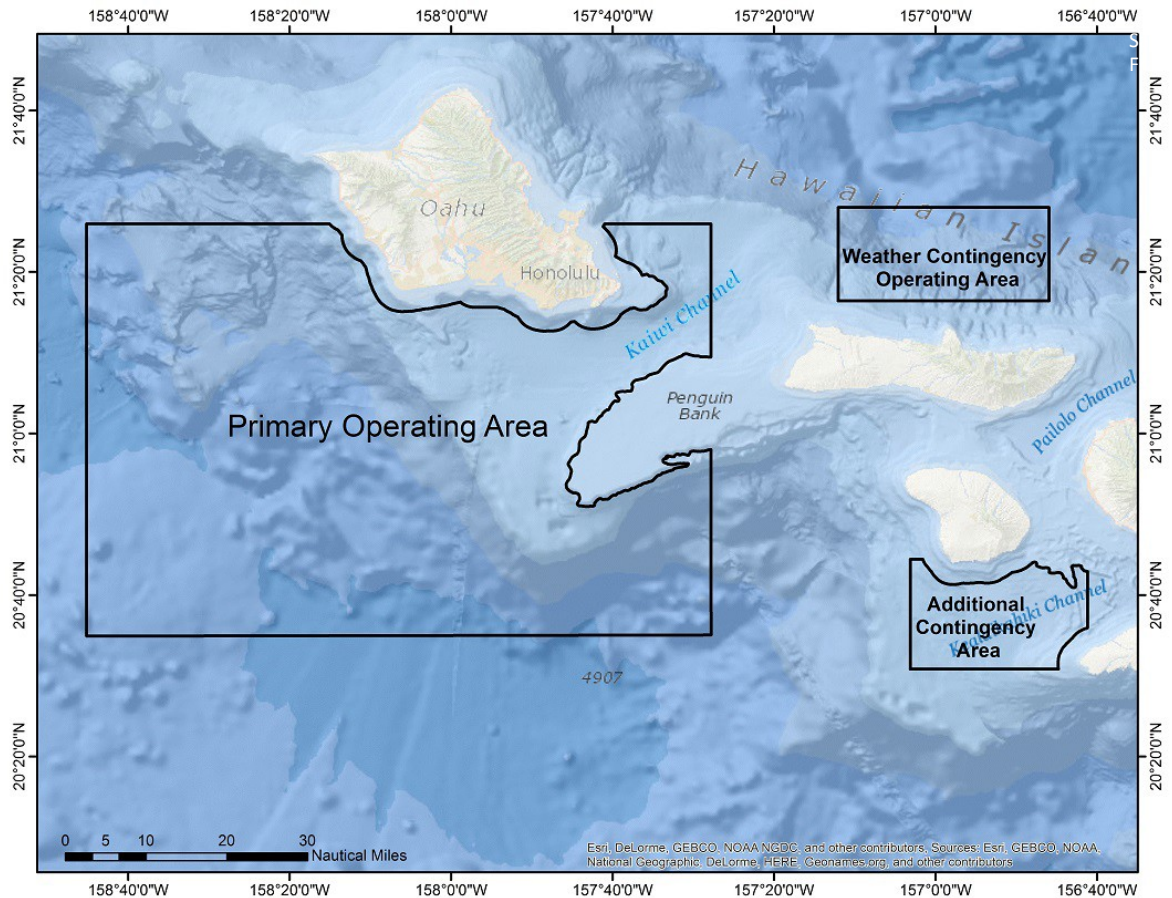


Figure 1: This figure shows the approximate operating area of Okeanos Explorer for EX-16-02. The boxes outline initial planned operating area, outside of the 3nm state boundary and the marine sanctuary boundaries. Planned areas may change underway as engineering and shakedown needs evolve.

During this cruise we will conduct four 8-hour ROV dives with the potential for an occasional 10 or 12 hour dive. Extended dive operations will be planned with consult of the ship’s CO and mission team leads. Figure 2 outlines areas of the four proposed dive locations over the regional seafloor backscatter. Table 1 shows the coordinates of the proposed dive locations.

Table 1. Proposed dive location coordinates. Dive 03 location withheld.

Dive	Longitude (W)	Latitude (N)
01	158° 0'	21°15'
02	158° 10.5'	21°11'
03		
04 a	157°54'	20°40'
04 b	158°36.5'	21°2'

Dive 01 and 02 will be in an area of a flat sandy bottom, benign seafloor. Dive 01 will be at 300 m depth and Dive 02 will be on in 1500 to 2000 m depth.

Dive 03 will be conducted on a sonar anomaly that could potentially be the S-28 wreck. This site warrants protection under the National Historic Preservation Act of 1966. Data collection will follow established *Okeanos Explorer* Underwater Cultural Heritage SOPs, which can be referenced in Appendix 4. Expedition Coordinators will review policies and procedures with each team lead in advance of diving on this target. All non-federal and non-federal contractor staff will sign non-disclosure agreements in accordance with UCH SOPs. Specific position information for this target will be delivered to the CO and OPS to protect the location of this site.

There are two proposed locations for Dive 04, which will be in 4000 m of water. Two sites are proposed because they are further offshore and more subject to weather and stronger currents. Dive 04 a is located on the southern end of the S-trending Waianae gravity anomaly and the tip of Penguin Bank. There are few samples from this region, so it is a higher priority to the scientific community. Dive 04 b location is on the toe of the Waianae Slump deposit. There are more samples from this area. Weather and operational constraints will be the primary factor in determining the location of Dive 04, but input from the scientific community will be considered if possible.

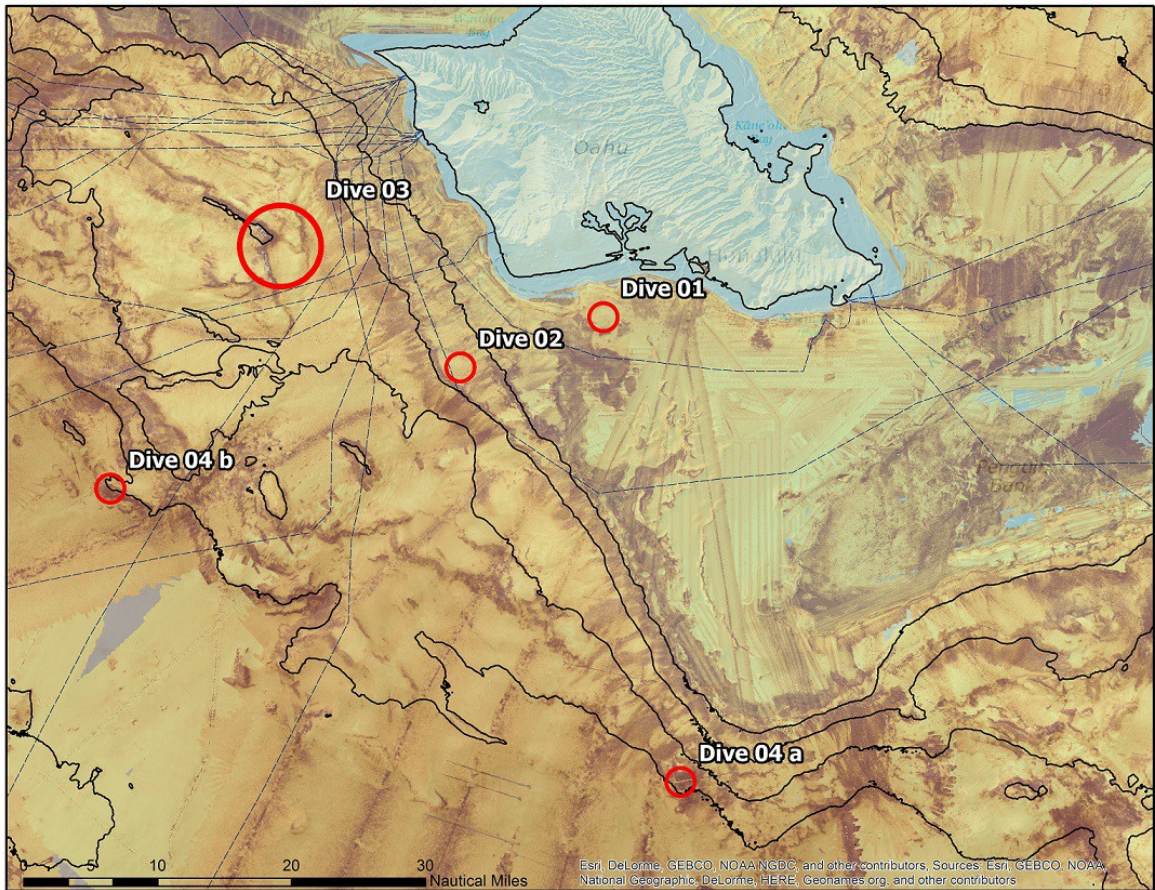


Figure 2: This figure shows the approximate dive locations for EX-16-02. The background layer shows a backscatter compilation compiled by Dr. Chris Kelly of UH, higher backscatter (rocks) is shown in brown, and lower backscatter (sand) is in yellow. Submerged cables are shown as dashed blue lines. All dives are at least 1 nautical mile from submerged cables.

On February 13 the engineering team will conduct a USBL calibration over an area of flat seafloor in 800-1000 m of water. Figure 3 shows the proposed area for USBL calibration work. The calibration will require deploying a mooring using the crane in the morning, and then recovering the mooring three to five hours later.

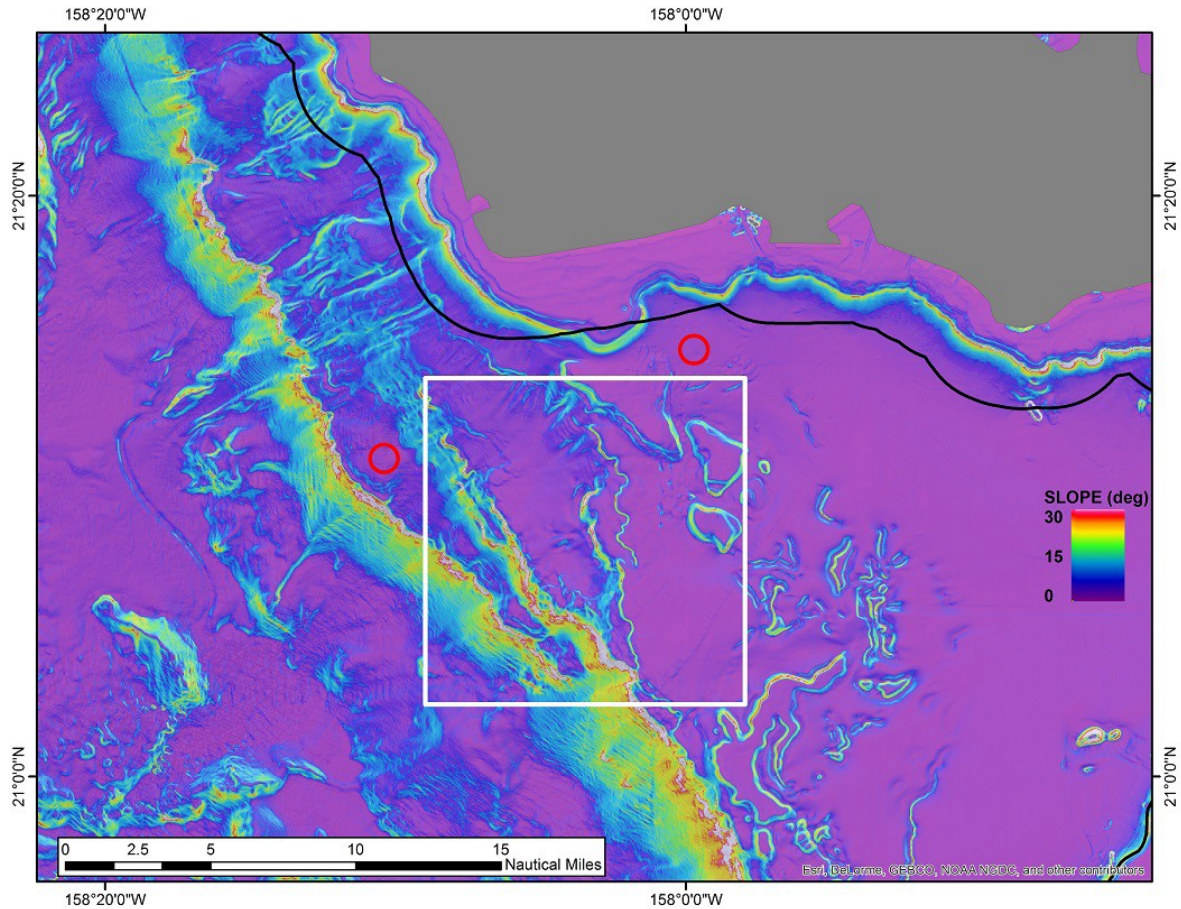


Figure 3: This white box shows the approximate location for the USBL calibration. The proposed locations for Dive 01 and 02 are shown with red circles. The background layer shows derived seafloor slope, purple is flat seafloor.

Mapping operations will include overnight multibeam, split-beam, and sub-bottom data collection en route to dive locations and over key features in the areas outlined in Figure 1. Any mapping objectives defined in the EX1601 Project Instructions that are not accomplished during EX1601 could be carried over to this expedition and will need to be conducted overnight on the same day as the USBL calibration. Specific mapping operations and waypoints for EX-16-02 will be further developed after the conclusion of EX1601.

D. Summary of Objectives

EX-16-02: February 12- 17, 2016 (Honolulu, HI to Honolulu, HI) Telepresence-enabled system shakedown ROV cruise with mapping

EX-16-02 operations will cover an area of the US EEZ around the Hawaiian Island Chain, focusing primarily south/southwest of Oahu. The primary goals for this cruise include shakedown of all mission systems to ensure they are prepared for the rest of the field season, familiarization with newly installed systems, ensuring the data workflow for new systems, and when possible collection of baseline-

characterization data of poorly known and unexplored areas in the US EEZ. Additional objectives for EX-16-02 will also include any objectives from EX1601 that were not accomplished as they relate to shakedown of new systems, including but not limited to EK60 calibrations and ADCP testing and calibration.

Mission objectives for EX-16-02 include a combination of operational, science, mapping, and data management objectives:

1. Science
 - a. There are no direct science objective this cruise, but passive video and environmental data will be collected during all engineering dives
 - b. If geological samples are collected as part of engineering testing, they will be processed and archived according to standard sampling protocol

2. ROV
 - a. Integrate ROV into ship systems
 - i. Connect .68 cable to ROVs
 - ii. Test all ROV systems while alongside, including a test deployment (potentially on Feb. 10th)
 - iii. Conduct ROV launch and recovery training for new crew members (Feb 10th).
 - iv. Practice an emergency recovery of D2. (Feb 10th)
 - b. v. Test USBL alongside Daytime ROV dives on targets identified by engineering needs
 - c. Ongoing training of pilots
 - i. Train team members on use of ROV manipulator's during operations (no samples will be collected, rocks & exceptional biological samples?)
 - d. Ongoing system familiarization, documentation, and training
 - e. Test new ROV systems and pilot sampling protocol (see Appendix D)

3. Telepresence (VSAT 10 mb/sec ship-to-shore; 2 mb/sec shore-to-ship)
 - a. Turn on and test terrestrial and high-speed satellite links
 - b. Support telepresence-enabled operations
 - c. Collect/create all standard video products if time allowsFacilitate live outreach events between ship and shore
 - d. Continue to refine protocols for the new WOWZA servers at the Inner Space Center
 - e. Continue to refine protocols for using YouTube live to host live video
 - f. Install and test new video editing and compression computers and software
 - g. Develop protocols and procedure for using the Telestream video recording suite
 - h. Continue testing new VSAT

4. Mapping
 - a. Complete any mapping system shakedown objectives not completed on EX1601
 - b. Continue to test and shakedown new sonar systems and workflows
 - c. Support ROV operations with mapping products and expertise
 - d. Conduct mapping operations during transits and overnight in priority areas as dictated by operational needs as well as science and management community needs
 - e. Collect XBT or Underway CTD at regular intervals no longer than 6 hours, as data quality requires, during mapping operations
 - f. Create daily standard mapping products
 - g. Collection of sun photometer measurements as part of survey of opportunity
 - h. Test the HMRG Seafloor Mosaic Display software and write an SOP.

5. CTD operations
 - a. CTD rosette operations are not anticipated
 - b. The logistics of using the underway CTD for mapping operations on an ROV cruise will be tested. If the engineering team determines the UCTD is in their way, XBTs will be used in place of the UCTD

6. Data Management
 - a. verify operation of newly integrated Open Vessel Data Management (OpenVDM) software
 - b. verify updated video still export software, including geo-tagging of stills when not diving on restricted sites and embedding of source video name
 - c. verify data management of deck-to-deck video recording system
 - d. verify integration of new video editing workstations
 - e. work with Mapping and Telepresence teams to ensure updated systems are properly integrated

7. Outreach
 - a. Potential ship tours 2/9-2/11. This will likely only be one or two tours, but the exact time in TBD.

E. Participating Institutions

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

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

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

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

University of Hawai'i Manoa- 2500 Campus Rd, Honolulu, HI 96822

University of Rhode Island, Inner Space Center, 215 South Ferry Road, Narragansett, RI 02882

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

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Table 2: EX-16-02—Full list of sea going mission party members and their affiliations

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
McKenna, Lindsay	Expedition Co- Coordinator & Mapping Team Lead	2/10/2016	2/18/2016	F	NOAA OER (ERT, Inc.)	US Citizen
Cantwell, Kasey	Expedition Co- Coordinator	2/9/2016	2/18/2016	F	NOAA OER (CollabraLink Technologies, Inc.)	US Citizen
Freitas, Dan	Mapping Watch Leader	2/10/2016	2/18/2016	M	UCAR	US Citizen
Bittinger, Amanda	Mapping Watch Leader	2/10/2016	2/18/2016	F	UCAR Contractor	US Citizen
Mohr, Bobby	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Unema, Levi	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Brian, Roland	Video Engineer	2/8/16	2/18/16	M	GFOE	US Citizen
Lanning, Jeff	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
McLetchie, Karl	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Gregory, Todd	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Carlson, Joshua	ROV Engineer/ Data Manager	2/8/2016	2/18/2016	M	GFOE	US Citizen
Ritter, Chris	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Lister, Andy	ROV Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen

Durbin, Mike	Satellite Engineer	2/8/2016	2/18/2016	M	GFOE	US Citizen
Rogers, Dan	Video Engineer	2/8/16	2/18/16	M	GFOE	US Citizen
Smithee, Tara	Video Engineer	2/8/16	2/18/16	F	GFOE	US Citizen
McNichol, Ed	Video Engineer	2/8/16	2/18/16	M	GFOE	US Citizen
Pawlenko, Nick	ROV Engineer	2/8/16	2/18/16	M	NOAA OER	US Citizen
Biscotti, Joe	Video Engineer	2/8/16	2/18/16	M	GFOE	US Citizen

Table 2: EX-16-02 - Shore-based Operations Team

Last Name	First Name	Organization	Area of interest or expertise.	Location
Kennedy	Brian	NOAA OER	Shore-side Ops	ISC
Pawlenko	Nikolai	NOAA OER	Shore-side Ops	ISC
Martinez	Catalina	NOAA OER	Shore-side Ops	ISC
Crum	Emily	NOAA OER (ERT)	Outreach Coordinator	Key West
Wagner	Katie	NOAA OER (Collabralink)	Media specialist	SS ECC

G. Administrative

1. Points of Contacts:

Ship Operations

Chief, Operations Division, Atlantic (MOA)
 LCDR Donald Beaucage
 Telephone: (757) 441-6842
 E-mail: chiefops.moa@noaa.gov

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

Mission Operations

Lindsay McKenna
Co-Expedition Coordinator & Mapping Lead
NOAA Office of Ocean Exploration (ERT)
and Research
Office: 603-862-5246
E-mail : lindsay.mckenna@noaa.gov

CDR Mark Wetzler, NOAA
Commanding Officer
NOAA Ship *Okeanos Explorer*
Phone: (401) 378-8284
Email: CO.Explorer@noaa.gov

Kasey Cantwell
Co-Expedition Coordinator
NOAA Office of Ocean Exploration and Research
(CollabraLink)
Office: 301-734-1050
E-mail : kasey.cantwell@noaa.gov

LT Emily Rose, NOAA
Operations Officer
NOAA Ship *Okeanos Explorer*
Phone: (808) 659-9197 (Ship's Iridium)
E-mail: Ops.Explorer@noaa.gov

Dave Lovalvo
Engineering Group Lead
Global Foundation for Ocean Exploration
Phone : (401) 874-6150/ (706) 540-2664
E-mail : david.lovalvo@noaa.gov

Other Mission Contacts

Kelley Elliott
Acting EX Program Manager
NOAA Office of Ocean Exploration
and Research
Phone : (301) 734-1024
Mobile: (703) 927-5449
E-mail : Kelley.Elliott@noaa.gov

John McDonough
Deputy Director
NOAA Ocean Exploration & Research
Phone: (301) 734-1023 / (240) 676-5206
E-mail: John.McDonough@noaa.gov

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

Jeremy Potter
Expeditions Director
NOAA Office of Ocean Exploration and Research
Phone: (301) 734-1145 / (240) 215-7101
E-mail: jeremy.potter@noaa.gov

2. Diplomatic Clearances

None Required. All operations in US and International waters.

3. Licenses and Permits

None Required. See Appendix for Categorical Exclusion documentation.

II. Operations

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

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

We will conduct primarily 8 hour ROV dives, and operate on Hawaii time. CTD casts will be TBD based on the availability of ship personnel and operational constraints.

Table 3: Detailed Itinerary

This is an approximate itinerary and is subject to change

Date	Activity	Notes and Requirements
2/6/16	Mission personnel will start arriving.	ROV team members will begin to arrive.
2/7/16	Crew Rest. ROV mobilization	ROV Team Begins .68 Cable hookup.
2/8/16	ROV mobilization	Load ROV and containers
2/9/16	ROV mobilization	Potential ship tour.
2/10/16	ROV mobilization and mission personnel arriving	ROV test dive and new crew launch/recovery training. Potential ship tour and/or restocking of sampling supplies.
2/11/16	Mission prep and test deployment	Train new mission personnel, test new systems, ROV test deployment (if not completed on the 10 th). Potential ship tour and/or restocking of sampling supplies.
2/12/16	Departure; ROV Dive 01	Engineering ROV Dive in 300 m of water, 6nm offshore of Pearl Harbor; mapping operations at night
2/13/16	USBL calibration and mapping	Mapping operations TBD, dependent on outcome of EX1601
2/14/16	ROV Dive 02	Engineering ROV Dive in 1500 m of water, 14 nm SW of Pearl Harbor; mapping operations at night
2/15/16	ROV Dive 03	Engineering ROV Dive in 2500 m of water, near the S-28 wreck site; mapping operations at night
2/16/16	ROV Dive 04	Engineering ROV Dive in 3500 to 4000 m of water; mapping operations at night
2/17/16	Return to port	Potential shortened ROV dive close to shore depending on what engineering requirements remain. Return to Ford Island.

2/18/16	Demob, Mission personnel start to depart	Mission personnel that will be sailing on EX1603 will stay on the ship through the in-port period, pending ship approval. No significant demob requiring ship personnel is planned at this time.
2/19/16	Preparations for EX1603	

B. Staging and Destaging:

- A. ROV mobilization will take place on February 7 to February 9. ROV loading will take place at the Foxtrot Pier on Ford Island. The max weight of the item being lifted cannot exceed 12,000 lbs at the foxtrot piers, so items will have to be removed from the container and loaded separately if container weight exceeds 12,000 lbs.

ROV personnel will need to board by February 7 (depending on when the ship arrives) to run systems checks and install new sampling equipment. *Seirios* will also need to be moved on to the fantail and the A-frame block will need to be reset once the ship reaches Hawaii.

EX1603 is an ROV cruises, so there will be no significant destaging after EX-16-02. The ROVs will be secured after the final ROV dive for transit and the in port period.

C. Operations to be conducted:

Telepresence Events – No telepresence events are scheduled for this cruise

In-Port Events – During the inport period prior to departure, OER potentially will conduct 1 or 2 ship tours for visiting MPA managers attending the Big Ocean Think Tank meeting in Honolulu. This group is particularly interested in FY16 and FY17 *Okeanos Explorer* activities. The exact timing of this is stil TBD.

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. The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

D. Dive Plan

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

E. Applicable Restrictions

Conditions which preclude normal operations: (1) XBTs, UnderwayCTD casts, and CTDs will not be conducted in very rough sea states or when there is significant risk of lightning. (2) If rough sea state is resulting in very poor data quality, sonar data may not be collected for that period of time. (3) EK 60 and multibeam sonar calibration work cannot be conducted in rough seas.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

- Kongsberg Simrad EM302 MultibeamEchosounder (MBES)
- Kongsberg Simrad EK60DeepwaterEchosounders and GPTs (18, 38, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP
- Teledyne UnderwayCTD
- LHM Sippican XBT (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- NetApps mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech5Mbps ship to shore; 1.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- NOAA OER 6000 m *Deep Discoverer* ROV
- NOAA *Seirios* Camera Platform

B. Equipment and Capabilities provided by the scientists (itemized)

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

- Equipment associated with new sampling protocol (See Appendix D)
- EK60 calibration equipment and spheres

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.

A. Inventory

Item	Use	Aprox. locations
Aqua Shield	Underwater Lubricant	ROV Workshop Fire Cabinet, Pit
Dow Corning 4	Electrical insulating compound	ROV Workshop Fire Cabinet, Pit
Fluid Film Spray	Silicone Lubricant	ROV Workshop Fire Cabinet
Isopropanol Alcohol	Solvent	ROV Workshop Fire cabinet
Scotchkote	Electrical insulating compound	ROV Workshop Fire cabinet
3M Silicone Spray	Silicone Lubricant	ROV Workshop Fire cabinet
Synthetic AW Hydraulic Oil, ISO-22	Amsoil (AWG-05)	Hanger, Pit, Vehicles
Tap Magic Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tap Magic Heavyweight Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tuff Coat M	Marine Lubricant	ROV Workshop Fire cabinet
Dow Corning Molykote 111	Valve Lubricant and Sealant	ROV Workshop Fire cabinet, Pit
WD40	Lubricant	ROV Workshop Fire cabinet
Loktite	Bolt adhesive	ROV Workshop Fire cabinet
Minearl 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

95% Denatured Ethanol	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin	Sample preservation	Wetlab, under the chemical hood

B. Chemical safety and spill response procedures

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

C. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE

V. Additional Projects

A. Supplementary ("Piggyback") Projects

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 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 is stewarded by OER physical scientists. See Appendix C for full Survey of Opportunity Form.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

a. OMAO Data

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.

b. Program Data

- At sea
 - Daily plans of the Day (POD)
 - Daily situation reports (SITREPS)
 - Daily summary bathymetry data files
 - Summary forms for each ROV dive
 - Summary forms for each CTD rosette cast
- Post cruise
 - Refined SOPs for all pertinent operational activities
 - Assessments of all activities
- Science
 - Multibeam and XBT raw and processed data (see appendix B for the formal cruise data management plan)
 - EK 60 raw data
 - Knudsen 3260 sub-bottom profiler raw data
 - Cruise report

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Operations Briefing meetings will be held at 1330 in the forward lounge to review the current day, and define operations, associated requirements, and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX FTP site.

- A. Pre-Project Meeting: The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Expedition Coordinator in arranging this meeting.
- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's

officers, applicable crew, the Expedition Coordinator, and members of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.

- D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Expedition Coordinator. The form is available at <http://www.oma.noaa.gov/fleeteval.html> and provides a “Submit” button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships’, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship’s complement. The Expedition Coordinator is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project 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 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website

<http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

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

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

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

The only secure email process approved by NOAA is [Accellion Secure File Transfer](#) which requires the sender to setup an account. [Accellion's Web Users Guide](#) is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320
Fax 757-441-3760
Email MOA.Health.Services@noaa.gov

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 using the Google Form at

https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ751iIYirTk48G-lv37Am_k/viewform

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. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Expedition Coordinator to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Expedition Coordinator may 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 means of communications, the ship can usually accommodate the Expedition Coordinator. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

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> <http://www.moc.noaa.gov/MOC/phone.html - EX>

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

Phone: (301) 734-1010

Fax: (301) 713-4252

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438

Fax: (603) 862-0839

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

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

EX INMARSAT B
Line 1: 011-870-764-852-328
Line 2: 011-870-764-852-329

Voice Over IP (VoIP) Phone:
301-713-7772 (expect a delay once picked up by directory)

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

expeditioncoordinator.explorer@noaa.gov - For dissemination of all hands emails by Expedition Coordinator while on board. See ET for password.

E. IT Security

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:

- (1) 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 the above 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 3 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 Expedition Coordinator:

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 will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Expedition Coordinator 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 that are subject to Export Administration Regulations (EAR).

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

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 Expedition Coordinator 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 Expedition Coordinator 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 Expedition Coordinator of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Expedition Coordinator can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Expedition Coordinator 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 foreign national's sponsor 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 of the foreign national 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 Appendix C (Certification of Conditions and Responsibilities for a Foreign National)

VIII. Appendices

Appendix 1. Data Management Plan

Okeanos Explorer (EX1602): Mission System Shakedown/CAPSTONE Mapping



OER Data Management Objectives

Integrate new systems into data management pipelines; test deck-to-deck telestream video recording system; train onboard sampling operations assistant to use EX SODA; protect data from marine archaeology dive, if underwater cultural heritage is located; confirm that the new video compression routines (naming, consolidation, push, etc) are working on the new VES stations; verify that the recalibrated ROV environmental sensors are accurate; compare CTD systems and compare vertical profiles from recovery to a ship CTD cast; ensure that ROV navigation is being captured; verify that all cameras on the submersibles have been added to the camera list; add camera angle nmea string transmission to SCS feed;

27-Jan-16

Page 1

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1602): Mission System Shakedown/CAPSTONE Mapping

1.2 Summary description of the data to be collected.

Operations will use the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, Teledyne RDI Workhorse Mariner and Ocean Surveyor ADCPs), NOAA's two-body 6,000 m remotely operated vehicle (ROVs Deep Discoverer and Seirios) system, CTD rosette, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. ROV dives will mostly be conducted during the day, while CTD casts, and multibeam, singlebeam, and sub-bottom acoustic mapping will occur when the ROV is on deck. Exact locations of discrete ROV dives and mapping operations will be determined during the cruise as results of engineering and shakedown tests are evaluated and once weather and operational constraints are factored in.

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

Davisville, expedition, exploration, explorer, Hawaiian Islands, Kaiwi Channel, Kealaikahiki Channel, Lanai Island, mapping survey, marine education, Mission Shakedown, Molokai Fracture Zone, Molokai Island, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, Murray Fracture Zone, noaa, noaa fleet, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, okeanos, okeanos explorer, Penguin Bank, R337, Rhode Island, science, scientific computing system, scientific mission, scientific research, SCS, sea, single beam sonar, singlebeam sonar, single-beam sonar, stewardship, sub-bottom profile, systematic exploration, technology, transformational research, undersea, underwater, Waianae Slump, water column backscatter

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: 2/12/2016 to 2/17/2016

1.6 Planned or actual geographic coverage of the data.

Latitude Boundaries: 20.5 to 21.5

Longitude Boundaries: -158.8 to -156.5

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

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, Bottom Backscatter, CTD (raw), Dive Summaries, EK60 Singlebeam Data, Expedition Cruise Report, Highlight Video, Images, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), NetCDF, Raw Video (digital), Sample Analysis Reports, Sample Logs, 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?

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

2. Point of Contact for this Data Producing Project

Overall POC: Lindsay McKenna, Physical Scientist, NOAA Office of Ocean Exploration and Research, Lindsay.McKenna@noaa.gov

Title: Principal Investigator

Affiliation/Dept: University of New Hampshire

CCOM/JHC E-Mail:lindsay.mckenna@noaa.gov Phone:

603-862-5246

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 NetCDF-4 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 and are not quality controlled. CTDs are processed into profiles for display only on the Okeanos Atlas.

6. Data Documentation

6.1 Does the metadata comply with the Data Documentation Directive?

True

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

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: www.ncddc.noaa.gov/oer-waf/ISO/

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

6.3 Process for producing and maintaining metadata:

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

7. Data Access

7.1 Do the data comply with the Data Access Directive?

True

7.1.1 If the data will not be available to the public, or with limitations, provide a valid reason.

Some data may be subject to the National Historic Preservation Act of 1966. All other data will not be restricted.

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

UR explore.noaa.gov/digitalatlas

L:

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

Hold Time: No, data shall be released as soon as possible except for those data protected under the National Historic Preservation Act

Authority:

7.4 Prepare a Data Access Statement

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

8. Data Preservation and Protection

8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Data Centers. Refer to the Okeanos Explorer FY16 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY16_DMP_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

8.2 If no archive planned, why?

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

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

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

8.5 Prepare a Data Use Statement

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

Appendix 2. Categorical Exclusion



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OCEANIC AND ATMOSPHERIC RESEARCH
Office of Ocean Exploration and Research
Silver Spring, MD 20910

January 21, 2016

MEMORANDUM FOR: The Record

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

SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer*
Cruise EX-16-02

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

Description of the Project

This project is part of the NOAA Office of Ocean Exploration and Research's "Science Program" and entails ocean mapping activities, Remotely Operated Vehicle (ROV) Operations, and water column profiling using CTD casts designed to increase knowledge of the marine environment. This Categorical Exclusion addresses NOAA Ship *Okeanos Explorer* cruise EX-16-02 "Mission System Shakedown/ CAPSTONE Mapping" led by Lindsay McKenna and Kasey Cantwell, Expedition Co-Coordinator for NOAA OER.

EX-16-02 will be conducted from February 12 to 17, 2016 in the Hawaiian Archipelago with operations focused primarily on mid-to-deep water areas (greater than 250m) within 50 nautical miles of the Hawaiian Islands, and outside of the state 3 nm boundary and any National Marine Sanctuary boundary. A tandem 6,000 meter ROV system will be deployed and CTD rosette casts may be conducted during the expedition. ROV and CTD deployments are planned for less than 10 hours at any one site. The Kongsberg EM 302 multibeam (30 kHz), Kongsberg EK 60 splitbeam sonars (18, 38, 70, 120, 200 kHz), a Knudsen 3260 Sub-Bottom Profiler (3.5 kHz), and two Teledyne Acoustic Doppler Current Profilers (ADCP) operating at 38 kHz and 300 kHz will be operated during the project. Additionally, expendable bathythermographs (XBTs), UnderwayCTD casts, and CTD rosette casts will be conducted in conjunction with multibeam data collection. Mapping operations will be conducted primarily in the evening/overnight, and during transits in



water deeper than 50 m. As the ship moves over the surface of the water during mapping operations, negative acoustic impacts from sonar operations on a single target are negligible.

The goal of this expedition is to shakedown the mission systems, and conducting training and testing with new systems. Opportunistic exploration data will be collected where feasible.

Mapping

NOAA Ship *Okeanos Explorer* has nine scientific sonars: a 30 kHz multibeam echosounder (Kongsberg EM 302), 18, 38, 70, 120, and 200 kHz singlebeam echosounders (Kongsberg EK60), a 38 and 300 kHz ADCP (Teledyne RDI Ocean Surveyor and RDI Workhorse Mariner), and a 3.5 kHz sub-bottom profiler (Knudsen Chirp 3260). Sonar operations are planned to occur continuously throughout the day and night except when the ROV is deployed or CTD operations are occurring. Additionally, expendable bathythermographs (XBTs) or the Teledyne UnderwayCTD will be deployed at regular intervals in association with multibeam data collection. The 38, 70, 120 and 200 kHz EK-60s as well as the two ADCPs are new to the ship for the FY16 field season. The other sonars are routinely used on this vessel.

Bridge Officers and Watch Standers will be on watch during all hours and will look for marine mammals and other observable species potentially sensitive to the sound of the sonars. If cetaceans are sighted, knowledgeable personnel would follow established best management practices to minimize disturbance. If cetacean species are present within 400 m of the ship, the vessel will stop until the animals depart the area.

There is the possibility that mapping shakedown objectives from EX-16-01 will get pushed to EX-16-02. These objectives are clearly defined in the EX-16-01 Project Instructions and are covered under the categorical exclusion filed for that expedition.

Expendable bathythermographs (XBT):

XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multi-beam system and ensure accurate bathymetric mapping. During EX-16-02, mapping operations will be conducted mainly at night in transit to the next dive location, resulting in a total of 2 XBT deployments in a 24-hour period, or an estimated 46 XBTs during the duration of the cruise. The very fine wire connecting the XBT probe to the ship is extremely easy to break by hand once the probe reaches maximum depth. The minimal tensile strength of the wire should represent a minimal entanglement risk for marine animals. The expended materials are unlikely to result either in any significant environmental impacts to the sea floor or in a significant degradation of marine water quality. Over a period of years, these materials will degrade, corrode, and become incorporated into the sediments.

UnderwayCTD:

The UnderwayCTD is a piece of equipment used to gather conductivity/temperature/depth (CTD) measurements or sound velocity measurements while the ship is moving. The ship currently obtains sound velocity profiles using expendable probes (XBTs). OER installed the UnderwayCTD in order to minimize the use of XBTs while still gathering essential sound velocity profile data needed in order to accurately collect high quality multibeam sonar data. The

UnderwayCTD was installed on the ship in December 2015 and will continue to be tested on this cruise. When working correctly, UnderwayCTD casts will be used instead of XBTs to obtain water column profile data.

Single Beam and Split Beam Sonar:

Kongsberg EK 60 splitbeam sonars are used to collect information about the water column, such as at gas plume or seep sites, and to obtain information about biomass. The EK60 split-beam sonar is used as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles – providing additional information about water column characteristics and anomalies. Fishery scientists have developed methods to analyze EK60 data to support fish stock assessment (e.g. Atlantic herring, pollock, capelin) and to predict hot spots of large fish in coral reefs. Split-beam sonars are also being used to help develop "acoustic signatures" of different marine species, which will greatly enhance existing efforts to assess abundance, distribution, and behavior using remote sensing methods. Additionally, split beam sonars are being used to estimate gaseous seep flux rates and improve assessments of their contribution to ocean and atmospheric chemistry. The *Okeanos Explorer* has five operational EK60 transducers at the following frequencies: 18 kHz, 38 kHz, 70 kHz, 120 kHz, and 200 kHz. One or more of these sonars will be operated during the majority of the cruise.

Sub Bottom Profiler:

The primary purpose of this Knudsen Chirp 3260 (3.5 kHz) sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the seafloor. The Sub Bottom Profiler is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data in the EX-160-02 operating area will provide improved insights into the geology of the region, and supplement existing geophysical measurements obtained by other vessels.

CTD Rosette Operations:

The CTD rosette instrument does not emit an acoustic signal and is used to obtain conductivity, temperature, depth and other oceanographic data (dissolved oxygen, light scattering, oxygen reduction potential). During operations the system would be lowered to a maximum depth of 6800 m by an embedded scientific winch and wire while the vessel would be stopped and hold station using dynamic positioning. The average time to conduct a CTD cast varies from one to several hours depending on water depth (the CTD is lowered through the water column at 60m/min). CTD casts are not currently planned during this cruise but may be conducted to shakedown the system if this objective is not completed during EX-16-01 or at selected sites including locations where ROV dives are conducted to allow for an improved understanding of the environmental conditions by measuring the physical or chemical properties of the water column overlying or hosting a particular habitat. The CTD would not touch the seafloor and would have limited time and presence in the marine environment

ROV Operations:

The *Okeanos Explorer* is equipped with OER's dedicated, fully integrated, two-body ROV system. ROV operations are conducted primarily during daylight hours while the vessel is stopped and holds station using dynamic positioning. ROV operations will typically take place within several meters of the seafloor, and are conducted in a way to minimize seafloor disturbances. During EX-16-02, four deployments of the ROV are planned, resulting in 32 hours total dive time (~8 hours for each dive). Each dive will take place at a different location thereby limiting impacts on any given area.

ROV operations are critical to collecting baseline characterization data. ROV will be conducted with the primary objective of testing all systems and training new personnel. Engineering objectives will require the ROV to settle on the seafloor to have a controlled environment to test equipment. Bottom targets will be opportunity selected by ROV pilots in an effort to avoid sessile fauna. After the completion of engineering objectives, visual investigation of unknown and little known deep water habitats will occur as time allows. The primary goals of the dives are to shakedown and test new systems, but the dives will enable scientists and managers to have a better understanding of the diversity and distribution of rarely visited deepwater habitats.

During these dives, limited sampling operations are planned to collect very selective geological specimens with the ROV that have the potential to contribute significant scientific discoveries. Selective rock specimens, that have the potential to contribute significant scientific discoveries, could be targeted, however the primary goal of collecting samples would be to train new pilots on proper use of the manipulator arm. 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.

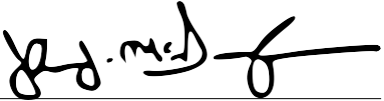
Permits

No permits are required for work in this operating area.

Effects of the Project

As expected for ocean research with limited duration or presence in the marine environment, this project will not have the potential for significant impacts. Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of this project. The potential gains or beneficial effects of the project seem to outweigh any potential adverse effects.

As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude and will not result in individually or cumulatively significant impacts on the quality of the human environment. Specifically, this research cruise would have only short-term effects with the principle goals of natural resource inventories and environmental monitoring over a wide geographic area. Furthermore, this action would not be subject to any of the exceptions for categorical exclusion provided at NAO 216-6 section 5.05c. As such, this project is categorically excluded from the need to prepare a NEPA environmental assessment.

Signed: 
John McDonough, Acting Director

Date: Jan-22-2016

Appendix 3. Survey of Opportunity

NASA Maritime Aerosols Network Survey of Opportunity Survey or Project Name

Maritime Aerosol Network

Points of Contact (POC): Dr. Alexander Smirnov

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.

Appendix 4. NOAA Office of Ocean Exploration and Research Operational Policy and Procedures for Underwater Cultural Heritage Missions Conducted onboard the NOAA Ship *Okeanos Explorer*

I. Purpose

*The purpose of this document is to provide guidance for OER mission activities conducted aboard the NOAA Ship *Okeanos Explorer*, when such mission activities involve either unexpected discovery or targeted exploration of potential Underwater Cultural Heritage sites.*

II. Background

Since the inception of NOAA's ocean exploration program in 2000, OER data management practices have been guided by the 2000 President's Panel Report recommendations, which prioritized rapid and unrestricted data sharing as one of five critical exploration program components. More recently Public law 111-11 [Section XII Subtitle A Part 1 Exploration] reinforced and expanded OER data management objectives, continuing to stress the importance of sharing unique exploration data and information to improve public understanding of the oceans, and for research and management purposes.

OER missions conducted aboard the NOAA Ship *Okeanos Explorer* offer a 'best-case' scenario for meeting Program mission objectives related to data sharing:

- Dedicated shipboard and shore-side teams work in tandem to ensure near-real time data product generation from shipboard and ROV sensors;
- Telepresence is used to share data products and information in real-time with shore-side participants and the public;
- Mission information is publically communicated in real time via Internet access to streamed video and related resources; and
- Data are managed throughout the lifecycle in accordance with all applicable policy directives and community best practices.

The nature of exploration defines the possibility of discovery, including unexpectedly exposing the location of underwater cultural resources; on some occasions, exploration targets are specifically focused on the exploration of suspected underwater cultural heritage (UCH) sites.

The need to protect the location of suspected UCH sites until they are fully understood, whether purposefully explored or fortuitously discovered, is an important statutory responsibility. In the case of OER expeditions aboard the *Okeanos Explorer*, a range of operational procedures must be modified to ensure this protection occurs to the fullest extent possible. The following sections of this document define the methods for ensuring protection of these sensitive data throughout the data lifecycle.

III. Authority

- a. ***Marine Archaeology:*** This document is informed by: the Federal archaeology program; U.S. legislation on the treatment of cultural remains; and the UNESCO Convention for the Protection of the Underwater Cultural Heritage.

The NOAA Office of Ocean Exploration and Research (OER) supports the standards for conducting marine archaeological activities enumerated in the Annex Rules of the UNESCO Convention on the Protection of the Underwater Cultural Heritage. Preservation and protection of prehistoric and historic cultural resources is the policy of the Federal government and OER has a responsibility to consider the effects of its activities on these resources. If data is found to be sensitive because it reveals the location of a historically significant cultural resource, Section 304 of the National Historic Preservation Act provides that the head of a Federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may: cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners. This document will use the term Underwater Cultural Heritage, or UCH, to refer to historic and prehistoric traces of human existence that are totally or partially underwater.

- b. **Data Management:** Geospatial data are considered a national capital asset. National policy and international standards guide data management best practices to ensure timely and broad public accessibility to these data. Within NOAA, data management practices are informed by NOAA Administrative Order (NAO) 212-15 Management of Environmental Data and Information, which states in part:

Environmental data will be visible, accessible and independently understandable to users, except where limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements.

Sensitive UCH data collections require special handling while determinations are made as to whether each location will be nominated and will qualify for protection under the NHPA Section 304. OER considers these data to fall within the scope of the NAO 212-15 exceptions during this period.

IV. Roles and Responsibilities

Particular to the NOAA Ship *Okeanos Explorer*, there are many methods employed to ensure rapid and broad data access. When the goal is to restrict access to precise positional information, several operational scenarios must be considered. Alternate operating procedures are then developed for:

- Real time operations:
 - Routine data transmissions and events that broadcast the ship position
 - Seafloor mapping operations and data production
 - Telepresence-enabled ROV operations
 - Video annotations and production
 - Public broadcast operations via website and maps
- Post-cruise data management

This table summarizes the roles and responsibilities of each Team Lead in implementing the policy through the management approaches described herein and the SOPs as defined in the Appendices.

MISSION PERSONNEL (Coordinated by: Expedition Coordinator)	
Responsible Team	Accountable for these (primary) actions
Expedition Coordinator	Notification of NDA to Mission Personnel ID , communicate and enforce UCH buffer zone Coordinate with Team leads and key personnel / ensure SOP compliance
Seafloor Mapping Team	Segregate raw and processed data into marked files so that restricted data are held separately and are clearly marked
Telepresence Team	Ensure broadcast data is free of any positional information
Video Team	Ensure UCH Dives and dive products are annotated as such; ensure all raw data and products are not geo-referenced
Data Management Team	Ensure all UCH data are appropriately segregated and documented. Follow post cruise and archive procedures as specified.
Communications Team	Ensure all communications are controlled through one primary POC; ensure communications are not geo-referenced.
<i>Okeanos Explorer Operations</i> (Coordinated by: CO or Designee)	
OMAO Operations	Notification to crew of NDA responsibilities Stop SCS events (email notifications) upon entering buffer zone; Start SCS events (email notifications) upon exiting buffer zone

V. Standard Operating Procedures

MAPPING OPERATIONS

The following outlines the process for pre-cruise planning, mapping field operations, post-cruise follow up, and data archival procedures for the following scenarios:

- When UCH is unexpectedly discovered on a standard, non-UCH targeted mapping cruise
- When a cruise is specifically targeted at UCH.
- When an Isolated UCH survey is conducted as part of a broader cruise
- Large survey over UCH area with potential to contain multiple instances of UCH

A. Pre-Cruise Planning

1. Standard Mapping Pre-Cruise Planning

- a. This section does not affect normal pre-cruise or data management processes for standard mapping cruises that are not conducting targeted UCH mapping. During pre-cruise planning the EX Cruise Coordinator is advised to consult with the OER Marine Archaeologist to discuss possible UCH targets in the mission area. The mapping team

may be requested to optimize line planning as necessary to detect UCH and to process data, when possible, to a smaller non-standard grid size to create higher resolution mapping products to provide better images of potential UCH. If so, follow guidance in the UCH Mapping Pre-Cruise Planning section below.

2. UCH Mapping Pre-Cruise Planning

- a.** Background information - The EX mapping team should be supplied with information about targets in the survey area that will help in their detection and identification. This information will be supplied by OER's marine archaeologist and collaborating archaeologists.
- b.** Data processing and data products - Archaeologists involved with the survey will consult with the mapping team to discuss data processing and data products that will increase the potential to discover UCH. The cruise coordinator and mapping team lead will work with OER's marine archaeologist to coordinate this activity.
- c.** Consultation and data sensitivities - Cruise planning must also include a discussion on data sensitivity and data management/archiving. It is the appropriate time to collaborate with other Federal and state agencies that may have a legal or management interest in potential UCH in the survey area. The risks to the resources should be weighed to inform a post-cruise decision on whether or not UCH with potential historical or cultural significance should have information about their location restricted from public release. This should be a collaborative discussion that includes OER's marine archaeologist, cruise coordinator and cruise data manager along with cultural resource managers and archaeologists from other agencies with an interest in the UCH. Agencies that may have an interest include the Office of National Marine Sanctuaries (ONMS) Maritime Heritage Program, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement, U.S. Navy History and Heritage Command, National Park Service, State Historic Preservation Officers, and others. While planning expeditions in any foreign country the host government should be made aware of the potential to discover UCH.
- d.** In survey areas where an agency has responsibility for UCH, the data management team should carry out a consultation process with the agency to identify any special protocols that should be put in place to conform with the policies of the agency and these should be incorporated into the data management plan. The expedition coordinator is responsible for the overall execution of the data management plan.
- e.** On mapping missions within the National Marine Sanctuary System, pre-cruise discussions between the EX Cruise Coordinator and ONMS should include the ONMS Director of the Maritime Heritage Program (MHP) and the maritime heritage coordinator at the sanctuary site. They will help determine the sensitivity of data and data products.

B. Mapping Field Operations

1. Standard Mapping Field Operations

- a.** While standard mapping field operations are not affected by the marine archaeology SOP, any features which appear to be of cultural or historical significance, and appear anthropogenic in origin, do require special consideration. Cultural features include wrecks of ships or aircraft, the recognizable debris from wrecks, evidence of previous human settlements, or other items which may appear anthropogenic in origin and have some associated cultural or historical significance.
- b.** The EX Cruise Coordinator will consult with OER's marine archaeologist immediately on the discovery of UCH in the field. The Cruise Coordinator should provide an image

and location information by email. The OER marine archaeologist may request special data products that have higher resolutions than standard data products to aid in characterizing UCH.

- c.** If UCH is determined not to be historically or culturally significant or it is determined that no harm will result by disclosing position information, no change to standard mapping field procedures is required.
- d.** If UCH is historically significant or potential to be historically significant, data and data products should be held from public release until reviewed for sensitivity as applicable under the National Historic Preservation Act and other pertinent legislation and regulations, prior to releasing data to a public archive.
- e.** The expedition coordinator is responsible for the overall execution of the data management plan.
- f.** When appropriate, OER's marine archaeologist will contact relevant entities to notify them of the discovery and consult with them regarding the significance of the UCH.

2. UCH Targeted Mapping Field Operations

- a.** No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook, Twitter or personal blogs. Mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- b.** A five-mile buffer zone shall be created around the UCH isolated survey box. The following steps will be taken just prior to entering the buffer zone in order to stop broadcasting the ship's location while the survey is conducted:
 - i. NOAA Shiptracker: Disable the SCS feed from the ship going to Shiptracker
 - ii. Automated Information System (AIS): NOAA requires that the AIS feed which broadcasts information about the ship, including position, course and speed, must remain on at all times for collision avoidance and other safety reasons. Although the [International Maritime Organization's](#) (IMO) Maritime Safety Committee condemns the Internet publication of AIS data, it is easily available for viewing. During the cruise planning phase the Expedition Coordinator will provide the AIS broadcast range on the EX to the chief scientist and science team. The Chief scientist, the science team, or other parties involved in a UCH mapping cruise should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed.
 - iii. Telepresence Video Feeds: Do not stream any feeds that include a visible ship location, for example the multi-beam acquisition screen does not high enough resolution over the video feed to see ship position. Streams include but not limited to the SCS data screen, or any active mapping data acquisition screens, or video feeds. It is acceptable to stream video feeds that do not include the ship's location.
 - iv. The Cruise Coordinator will ensure the survey department takes steps to distinguish and separate UCH mapping data from non-UCH mapping data as appropriate.
 - v. Raw Multibeam Data Acquisition: Raw data will be logged in the standard folder structure on the multibeam acquisition computer. Raw data will be copied into a "Restricted" folder in the RAW data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
 - vi. Multibeam Data Field Processing: Restricted files will be processed and gridded separately from other non-restricted data and will be clearly labeled as such in projects and filenames. The products will be created according to normal field

- quality-control procedures, but will not be sent to shore with the daily products, in order to not become publicly available via normal channels (FTP / Digital Atlas).
- vii. Raw EK 60 and Subbottom Data Acquisition: Raw data will be logged in the standard folder structure on the acquisition computers. Raw data will be copied into a 'Restricted' folder on the RAW and CRUISE DATA data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
 - viii. Cruise Data Transfer (EX to UNH) Package: In the Cruise Data Package carried from the ship by the Mapping Team Lead, a "Restricted" top-level directory will be added in the cruise data folder. Within the "Restricted" folder the same directory structure as the unrestricted folder will be repeated (i.e. SCS, CTD, Multibeam, Imagery, etc).
 - ix. CTD and XBT operations conducted within the buffer zone do not need to be isolated from non-UCH data, or repressed from the Okeanos Atlas. CTD and XBT files should follow the normal unrestricted processing procedures and archiving.
 - x. Daily updates are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position shall be provided. If a position is required, the position should be posted as it makes sense, 5 miles outside of the extent of the survey area.
- c.** Normal transmissions from the ship shall resume after the EX finishes UCH survey operations and exits the 5-mile buffer zone. Exiting the buffer zone should occur at approximately the same location as entry to prevent obvious data location gaps pointing to UCH location.

C. Post-Cruise Follow Up

1. Information Release

- a.** No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.

2. Standard Mapping Cruise follow-up where UCH is discovered

- a.** The mapping team will provide a brief summary of the survey and target that includes a description of the survey, water depth, site location, site dimensions, bottom type, and images of the target at the best available resolution.
- b.** The EX Cruise Coordinator and the OER Marine Archaeologist have an initial consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.
- c.** If UCH is determined not to be historically significant no change to standard data management procedures is required.
- d.** If UCH has the potential for historical significance but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
- e.** If UCH has potential historical significance and disclosing information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management decisions outlined in Data Archiving section of this document. The EX cruise Coordinator, a representative from the data management team, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management or other legal ties to the resource

shall meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

3. UCH Targeted Mapping Cruise Follow-Up

- a.** The mapping team will create a survey report that provides technical details on the survey, data processing and data products. It should contain a list of targets that includes site location, water depth, site dimensions, bottom type/topography, and images of the target at the best available resolution. Other helpful products include SD and kmz files.
- b.** The EX cruise coordinator, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management or other legal ties to the resource shall meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the National Historic Preservation Act.
- c.** The outcome of this meeting will determine if it is necessary to protect site location information from public release.
- d.** When data can be released
 - i.** If the findings determine that releasing information and data on UCH is not a threat, development of products and data management should follow the guidelines for a standard mapping cruise.
- e.** When data should be protected
 - i.** If it is determined that a site is or has potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.
 - ii.** Data products that contain position information will be forwarded to the EX data management team where data and products will be stored in an archive with restricted access.
 - iii.** Cruise plans, cruise reports, situation reports, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA shall not provide location information for UCH or survey areas. In certain circumstances the lead archaeologist for the cruise may request that certain UCH sites are not mentioned in the public reports.

4. UCH mapping follow-up for National Marine Sanctuaries

- a.** When the EX conducts UCH work inside a National Marine Sanctuary the EX Cruise Coordinator shall inform the OER Marine Archaeologist, ONMS Maritime Heritage Program Director, Sanctuary Superintendent and Sanctuary Maritime Heritage Coordinator on the availability of data products and initial results of the survey. ONMS shall determine the sensitivity of the data and whether or not it can be disclosed to the public. Published metadata shall indicate the point of contact to access UCH data within the NMS system is the Director of the Office of National Marine Sanctuaries.

D. Data Archiving – See Post Cruise Data Management section below

TELEPRESENCE-ENABLED ROV OPERATIONS

The following outlines the process for pre-cruise planning, field operations, post-cruise follow up, and

data archival procedures for the following scenarios:

- When a cruise conducts ROV operations specifically targeted at UCH.
- When UCH is unexpectedly discovered on non-archaeological operation

A. Unexpected UCH Discovery

- During the Cruise: If UCH is unexpectedly discovered during an ROV dive, the onboard Expedition Coordinator should immediately contact OER's Lead Maritime Archaeologist, and the Archaeology Doctors-on-Call identified for that expedition. Those archaeologists should be engaged in the site investigation as soon as possible to provide information to help assess the site discovered. No changes to the data, video or onboard data acquisition processes should be made. A post-dive and post-cruise discussion will be held with the OER archaeologist to determine whether any datasets should be withheld from archive. (Section 2.D.II).
- **Follow-up when UCH is unexpectedly discovered**
 - a. The EX Cruise Coordinator and the OER Marine Archaeologist will have an initial consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.
 - b. If UCH is determined not to be historically significant no change to standard data management procedures is required.
 - c. If UCH has the potential for historical significance but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
 - d. If UCH is or has potential historical significance and disclosing location information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management decisions outlined in the Data Archiving section of this document. The EX cruise Coordinator, a representative from the data management team, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management or other legal ties to the resource shall meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

B. Cruises conducted with ROV operations specifically targeted at UCH.

1. Pre-Cruise Planning: ROV Exploration

a. Notifying the Team of their Responsibility to Protect Sensitive UCH Resources

Expedition members and OER personnel to have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release.

For a planned UCH cruise, the EC shall notify the CO and each shall have responsibility for ensuring personnel are aware of this responsibility. The EC shall provide an archaeology background document to familiarize personnel with the particular mission and requirements.

Appendix D details the range of existing accountability mechanisms already in place.

2. Pre-dive planning

- a. Archaeologists will develop a dive plan based on the best available knowledge of the site that will maximize data recovery and minimize any potential impact to the site. The archaeology team will work closely with the cruise coordinator and deep submergence vehicle manager to develop and implement the plan. The plan should include:
 - I. Objectives (cultural/interdisciplinary science)
 - II. The types of sensors needed and data to be generated
- b. As a rule ROV dives will not disturb or touch the shipwreck or cultural feature. Exceptions

- to this rule must discuss the rationale behind such a decision and incorporate it into the dive plan (collection of diagnostic artifacts or samples is sometimes conducted if the activity leads to better baseline characterization).
- c. Prior to the cruise any permitting requirements should be identified and if required, permits must be procured.
 - d. Automated Information System (AIS): NOAA requires that the AIS feed which broadcasts information about the ship, including position, course and speed, must remain on at all times for collision avoidance and other safety reasons. Although the [International Maritime Organization](#)'s (IMO) Maritime Safety Committee condemns the Internet publication of AIS data, it is easily available for viewing. During the cruise planning phase the Expedition Coordinator will provide the AIS broadcast range on the EX to the chief scientist and science team. The science team, chief scientist, or other parties involved in a UCH mapping cruise should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed. A Go/No-Go decision will be made based on this information.

C. Field Operations

- I. Exploration dives by ROV should be planned to collect optical and acoustic images without causing physical disturbance to the UCH. Representatives and leads from operational groups including the ROV, data/video, and telepresence teams, and ship operations should meet to discuss ROV operations and data collection.
 - a. The guidelines for mapping operations should be followed to ensure site locations are not disclosed during field operations. SOPs with full operational details are available on the ship.
 - b. A three-mile buffer zone shall be created around the UCH target or isolated survey box. The time at which the ship enters, and departs the three-mile buffer zone needs to be recorded and provided to the Data Team Lead for post-processing use. Following work at the site, the ship will return to the site where it first entered the three-mile buffer zone to continue operations.
 - c. The following steps will be taken just prior to entering the five-mile buffer zone in order to stop broadcasting the ship's location while the survey is conducted:
 - I. NOAA email events will be stopped (OMAO/ET)
 - NOAA Shiptracker: Disable/stop the e-mail updates from the ship going to OMAO / Shiptracker
 - *Okeanos Atlas*: Disable/stop the e-mail updates to NCDDC
 - SAMOS: Disable/stop the e-mail update to FSU containing METOC and flow-through data, etc.
 - II. Telepresence Video Feeds (OER Telepresence team lead): Do not stream any feeds that include the ship's location, including but not limited to the SCS data screen, or any active mapping data acquisition screens, or video feeds. It is acceptable to stream video feeds that do not include the ship's location.
 - III. Redirect Live Feed as needed (OER EC or CO): If highly sensitive features (human remains, evidence of human remain such as shoes or other accoutrements, highly valuable items, etc.) are going to be investigated or are unexpectedly encountered during the course of our seafloor investigation, the lead archaeologist, ROV Team Leader, Expedition Coordinator or Commanding Officer has authority to immediately switch the live feed from the ROV and Seirios camera sled to another camera on the ship.
 - d. Daily updates on the *Okeanos Atlas* are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position shall be provided. If a position is required, the position should be posted as it makes sense, 3 miles outside of the extent of the site or survey area.
 - e. Normal transmissions from the ship shall resume after the EX finishes UCH survey

- operations and exits the 3-mile buffer zone. The point of exit should be as near to the point of entry as is feasible to minimize location data gaps pointing to the location of the UCH.
- f.* No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook, Twitter or personal blogs. Images, video and information on UCH will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
 - g.* In addition to the items listed, the ship sends out automated weather (autoIMET) observations every hour and manual weather observations every 6 hours with positions as a voluntary ship observer. These observations are pulled onto public sites by several different websites and Google Map apps. One example is sailwx.info. This is only accurate to the nearest decimal degree (6 nm). This level of accuracy is not of concern.

D. Post-Cruise Data Management – Appendix 1 for detail

Following completion of the expedition, the Expedition Coordinator should have a follow-up call with the Data Management Team & OER lead archaeologist to review the datasets collected, confirm those that need to be withheld from public archive, and provide information to the data management team for associated metadata records.

E. Post-Cruise Follow-Up

1. Information Release

- a.* No informal information about UCH should be released to the general public by the ship or personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Images, video, and mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- b.* Determination of whether UCH is potentially eligible for nomination to the National Register of Historic Places, or eligible for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act, will take some time following completion of the cruise. Sensitive or potentially sensitive information about the UCH is to remain restricted until determination is complete. Following completion of the cruise, the lead Archaeologist will work with others to analyze the UCH data and conduct historical research to determine whether the UCH is eligible for nomination to the National Register of Historic Places.
 - I.* If the UCH is determined to be eligible, the lead Archaeologist will prepare the nomination for the NRHP process.
 - II.* If the UCH is determined to NOT be eligible, and protection of the site does not fall under other legislation, the Lead archaeologist will notify the data management team that site information can be made publicly available.

2. UCH Targeted Cruise Follow-Up

- a.* The EX cruise coordinator, OER's marine archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management or other legal ties to the resource shall meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the National Historic Preservation Act. The outcome of this meeting will determine if it is necessary to protect site location information from public release.
 - I.* When location data can be released:
 - a.* If the findings determine that releasing information and data on UCH is not a threat, development of products and data management should follow the guidelines

for a standard ROV cruise.

- II.** When location data should be protected:
 - a.** If it is determined that a site is or has potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.
- III.** Data products that contain position information will be forwarded to the EX data management team where data and products will be stored in an archive with restricted access.
- IV.** Cruise plans, cruise reports, situation reports, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA shall not provide location information for UCH or survey areas. In certain circumstances the lead archaeologist for the cruise may request that certain UCH sites are not mentioned in the public reports.

Post-Cruise Data Management

Data collected by OER that is considered sensitive will be protected from direct public release until such time as a final determination can be made as to permanent protection. Data in this state will be:

- Fully documented, so as to be independently understandable to users;
- Visible through publication of metadata records by OER;
- Accessible upon request to OER (controlled access by permission);
- Preserved in NOAA archives as ‘restricted’ (not available for direct public access).

These data will not be available for direct public access unless and until they are eliminated from consideration for nomination to the National Register of Historic Places (NHPA Section 304), or for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act.

If data are nominated and accepted for any official protection, then the exceptional status will be made permanent, and all documentation updated and finalized as such.

Data generated by the *Okeanos Explorer* Program is archived under a data management agreement with NGDC. Only data that has potential to reveal the nature and location of UCH shall be restricted from public access. In accordance with the data management agreement, sensitive data from the EX will have restricted access at NCEI. To assist researchers in discovering sensitive data NGDC will publish a metadata record (but not the data) that identifies a point of contact for access. Requests to access the data will be made to the Director of OER who may delegate to the OER marine archaeologist. In lieu of the OER marine archaeologist, the OER Director may delegate to the Director of the ONMS Maritime Heritage Program.

If data is found to be sensitive because it reveals the location of a historically significant cultural resource, Section 304 of the National Historic Preservation Act provides that the head of a Federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy; risk harm to the historic property; or impede the use of a traditional religious site by practitioners. Data collected by the EX that is considered sensitive will be archived in a location where it can be withheld from public disclosure.

Data sets and associated products are housed in the appropriate NOAA archive; National Oceanographic

Data Center, National Geophysical Data Center, National Coastal Data Development Center, National Climate Data Center, and the NOAA Central Library.

- Digital Atlas: NCEI will develop appropriate metadata records to post on the digital atlas.
- CTD and XBT data collected during mapping operations conducted within the buffer zone will not be repressed from the *Okeanos Atlas* and will be held in a public archive.
- Cruise reports, cruise plans, mapping summary reports and other documents that are publically available outside NOAA or freely accessible within NOAA should not provide location information for UCH or survey areas.

Start and end times for the 3-mile buffer zone surrounding a UCH site need to be provided to the data management team. Datasets containing sensitive location information will be restricted in their entirety, unless other parsing arrangements have been made. The following datasets may contain sensitive UCH location information and need to be reviewed, post-processed as appropriate, made restricted and pertinent metadata records created and made available.

- Multibeam, sub-bottom and single beam sonar data
- SCS Data Logs are to be restricted
- All ROV dive products (including associated sensor data) need to be restricted
- CTD rosette and *in situ* sensor datasets collected in relation to the UCH, and within the 3 nm buffer zone, need to be restricted.
- All imagery needs to be reviewed and geospatial imagery removed before being made public. Imagery with geospatial information should be restricted.
- Ship track and any other datasets

NDA References

Expedition members and OER personnel to have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release. The following summarizes the types of personnel who might be engaged in an *Okeanos Explorer* Expedition, where their responsibility to protect sensitive location information about UCH lies, and whether this responsibility has already been addressed or signature of a Non-Disclosure Agreement (NDA) is required to allow their participation in an expedition with planned UCH operations.

- If they are federally-employed scientists, they agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government.
- The crew onboard the ship are under the CO's purview. On *Okeanos Explorer*, all crew are federal employees, and thus agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government.
- All other members of the Mission team who are not federal employees and are engaged at-sea or ashore (including technicians, vehicle operators, students, etc.) are required to sign a non-disclosure agreement to protect sensitive cultural heritage information as part of their contract agreement.
- Other OER personnel who have access to data and information on the FTP site are either federal employees or contractors and need to be similarly reminded of their responsibilities. OER contractors signed an NDA as condition of employment with the federal government (this should be confirmed annually).

At the beginning of the expedition, all personnel need to be notified of their responsibilities:

MISSION PERSONNEL
(Notified by: Expedition Coordinator)

Employee	Accountability Mechanism for With-holding Sensitive Data	Action
NOAA Federal Employees	NOAA and Federal Contract	Reminder of contract, and provide archaeology background document.
Mission Contractors (UCAR, ERT Inc., 2020 Company LLC)	Non-Disclosure Agreement	Confirm all contractors signed NDA. Send reminder of contract and provide archaeology background document.
NOAA/Federal Scientists	NOAA and Federal Contract	Reminder of Contract, and provide Archaeology background document
Other Federal Scientists (BOEM, Navy, NPS, etc.)	Federal Contract	Reminder of Contract, and provide Archaeology background document
Other Mission Personnel and Scientists	Non-Disclosure Agreement	Get NDA Signed
Okeanos Explorer Crew (Notified by: CO or Designee)		
NOAA Federal Employees	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document
Other Federal Employees (e.g. Public Health Service)	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document
Wage Mariners	Subject to NOAA and the ship's communications plans and protocols for sensitive data	CO sends out reminder of contract to ship via All Hands, and provides Archaeology background document

Appendix 5a. Sampling Protocol

The following documents outline the sampling protocol followed in 2015, this cruise will follow the same protocol, using cruise ID: EX1602. Only geological samples will be collected, no more than two rocks on any single dive, no rocks with biological organisms attached will be collected, and no rocks will be collected from areas that require permits.

Appendix 5b. Sampling Protocols [Cont.]

2015 Hohonu Moana Expedition ROV Sample Protocols

Note: Need to assign, e.g. a letter, to each sample box partition on the ROV to facilitate tracking the storage of each sample. Label four buckets to correspond to these sample box partitions.

Video Naming Convention

- EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type

Topside Image Naming Convention

- EX1504L#_2015MMDDT#UTC#_D2_DIVE##_SPEC##[TYPE]_C01

Specimen Naming Convention

- Primary Specimen: EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type
- Commensal Specimen: EX1504L#_2015MMDDT#UTC#_D2_DIVE##_SPEC##[GEO/BIO]_C01
- Sub-Sample of Clonal Specimen: EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type_S01

Operational Sampling: During the Dive

- **Ship:** Ensure all ship computer time zones and stamps are up-to-date
 - o **Brendan:** Ensure all shipboard computers are sync'd to NTP server
- **Scientist:**
 - o Identify the sample to be collected
 - o Ensure lasers are on
 - o Notate sample ID in eventlog
 - o Have the scientist drop an event in the SCS client to capture data
 - o Enter data into database
 - Lat, long, depth, altitude, CTD, exact UTC time.
 - Field ID (best guess on the animal ID)
 - What Box on the ROV the specimen is deposited into.
 - Sample ID
 - Vehicle, dive number, specimen number starting each dive
 - CruiseID_YYYYMMDDT#UTC#_DiveID_D2_Sample#Type
 - (Pre-print sample labels:
CruiseID_YYYYMMDD(UTC)_DiveID_D2_Sample#Type
 - o Still images – will have same appendix
(..._DiveID_D2_Sample#Type)
- **ROV Navigator:**
 - o When the ROV is sitting or stationary on target for sample collection: Drop a sample Hypack target: add in the camera associated with the capture, and the sample identification number.
 - List sample ID
- **Videographer:** Create a new video clips when the decision is made to collect a sample.
 - o When decision is made to sample – the video engineer switches the three EVS feeds to capture 3 cameras
 - o Imaging:

- 1. Approach video needs to be save to capture the environmental view around the sample
 - 2. An area shot showing the micro-scale environment
 - 3. A close-up of the coral morphology and associates, recorded using the Zeus Plus
- Sample ID will be listed in the image clip
- **ROV Pilot/Co-Pilot:** Need to have the lasers on to get a size of the organism, so turn these on.
 - If the specimen is a rock sample, once collected, rotate the rock in front of the camera before it is dropped into the box.
 - Similarly – get video of the clipped bio sample in the manipulator arm before placing into the box.
 - A single coral specimen can be placed together in the same partition as a single sponge specimen however whenever possible, corals should not be mixed with other corals and sponges not mixed with other sponges. If corals or sponges are going to be placed into the same partition as a rock, the rock should be on the bottom and the biologics on top to minimize damage when the ROV is at the surface awaiting recovery.

Operational Sampling: After the Dive

- **Videographer – still image processing:**
 - Frame grabs needed from the sample clips. It's critical to notate the sample ID in the name (Brendan to advise)
 1. Still image of the whole colony or organism sampled – for corals, scientists want to see the branching patterns (this would be used to describe a new species).
 2. Image of close-up of any zooms (e.g. on the polyps of corals) to see the living tissue close-up.
 3. For rocks, still image of the rock in situ with local environment. Do not need a close-up in situ.
 4. Still image of the rock in the manipulator arm as it is being rotated in front of the camera before being deposited.

Appendix 5c. Sampling Protocol [Cont.]

2015 Hohonu Moana Expedition General Sampling Protocols

Note: Need to assign, e.g. a letter, to each sample box partition on the ROV to facilitate tracking the storage of each sample. Label four buckets to correspond to these sample box partitions.

- Add sample entry to ROV Dive summary form

Video Naming Convention

- EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type

Topside Image Naming Convention

- EX1504L#_2015MMDDT#UTC#_D2_DIVE##_SPEC##[TYPE]_C01

Specimen Naming Convention

- Primary Specimen: EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type
- Commensal Specimen: EX1504L#_2015MMDDT#UTC#_D2_DIVE##_SPEC##[GEO/BIO]_C01
- Sub-Sample of Clonal Specimen: EX1504L#_2015MMDDT#UTC#_D2_Dive##_SPEC##Type_S01

Operational Sampling: During the Dive

- **Ship:** Ensure all ship computer time zones and stamps are up-to-date
 - **Brendan/Data Manager:** Ensure all shipboard computers are sync'd to NTP server
- **Scientist:**
 - Identify the sample to be collected
 - Ensure lasers are on
 - Notate sample ID in eventlog
 - Have the scientist drop an event in the SCS client to capture data
 - Enter data into database
 - Lat, long, depth, altitude, CTD, exact UTC time.
 - Field ID (best guess on the animal ID)
 - What Box on the ROV the specimen is deposited into.
 - Sample ID
 - Vehicle, dive number, specimen number starting each dive
 - CruiseID_YYYYMMDDT#UTC#_DiveID_D2_Sample#Type
 - (Pre-print sample labels:
CruiseID_YYYYMMDD(UTC)_DiveID_D2_Sample#Type
 - Still images – will have same appendix
(..._DiveID_D2_Sample#Type)
- **ROV Navigator:**
 - When the ROV is sitting or stationary on target for sample collection: Drop a sample Hypack target: add in the camera associated with the capture, and the sample identification number.
 - List sample ID
- **Videographer:** Create a new video clips when the decision is made to collect a sample.
 - When decision is made to sample – the video engineer switches the three EVS feeds to capture 3 cameras
 - Imaging:

- 1. Approach video needs to be save to capture the environmental view around the sample
 - 2. An area shot showing the micro-scale environment
 - 3. A close-up of the coral morphology and associates, recorded using the Zeus Plus
- Sample ID will be listed in the image clip
- **ROV Pilot/Co-Pilot:** Need to have the lasers on to get a size of the organism, so turn these on.
 - If the specimen is a rock sample, once collected, rotate the rock in front of the camera before it is dropped into the box.
 - Similarly – get video of the clipped bio sample in the manipulator arm before placing into the box.
 - A single coral specimen can be placed together in the same partition as a single sponge specimen however whenever possible, corals should not be mixed with other corals and sponges not mixed with other sponges. If corals or sponges are going to be placed into the same partition as a rock, the rock should be on the bottom and the biologics on top to minimize damage when the ROV is at the surface awaiting recovery.

Operational Sampling: After the Dive

- **Videographer – still image processing:**
 - Frame grabs needed from the sample clips. It's critical to notate the sample ID in the name (Brendan to advise)
 1. Still image of the whole colony or organism sampled – for corals, scientists want to see the branching patterns (this would be used to describe a new species).
 2. Image of close-up of any zooms (e.g. on the polyps of corals) to see the living tissue close-up.
 3. For rocks, still image of the rock in situ with local environment. Do not need a close-up in situ.
 4. Still image of the rock in the manipulator arm as it is being rotated in front of the camera before being deposited.

Once onboard: Science preservation SOPs

Ensure shipboard camera data and time-stamp is up-to-date

Parent Samples

- Preserve most sensitive/likely to degrade samples first
- Photograph
 - o Color chip cards for white balancing
 - o Ruler
 - o Label
 - o White paper
- Get snippet
- Put into alcohol and Ocean Genome Legacy (OGL) preservative
- Prepare OGL snippet

Commensal/Daughter Samples

- If they are small enough, they can be preserve along with the sample itself, and then pull it off (if possible) to preserve it separately.
- Separate commensal section of data base that includes the Parent ID

Rock Samples

- Sit in the tray until they dry, with the label.
- Once dry, they go in a label in a back.

Rock Samples: Commensals

- If a commensal, photograph the commensal on the rock, then photograph and preserve them separately.
- Photographs have to get linked separately in a database.

Server Structure:

- **Summary of new products**
 - o SCS Events:
 - Sample Stations and Sample IDs
 - o Sample database
 - Final at end of cruise
 - Daily .csv file of samples per dive
 - Summary .csv file of all sample records from cruise
 - o Sample summary form
 - o Topside still images of samples
 - Hand-held camera
 - raw
 - jpg
 - Microscope images
 - o Underwater still images of sample collection
 - Critical to notate sample ID in name
 - o Underwater video from both CPHD and ROVHD and ROVHD2

Cruise Directory Discussion - Products to include

- SCS Events: Sample Stations and Sample IDs
 - o Cross post in both the ROV Products folder AND sample directory
- Sample database
 - o Final at end of cruise
 - o Daily .csv file of samples per dive

- o Summary .csv file of all sample records from cruise
- Sample summary form
- Topside still images of samples
 - o Hand-held camera
 - raw
 - jpg
 - o Microscope images
- Underwater still images of sample collection
 - o Critical to notate sample ID in name
- Underwater video from both CPHD and ROVHD and ROVHD2
- Video annotation coming post-cruise?
 - o Would go to Denise at a later date

Cruise Directory Structure

- Cruise ID
 - Products/Samples
 - Sample database summary of cruise (.csv)
 - Final sample database (Access .accdb)
 - SampleSummaryForms
 - Products/ROV
 - SCS events of sample stations and locations (.kml)
 - Hypack targets (the sample stations and collections would be part of this existing dataset)
 - Sample
 - EX1504L2_Dive##_2015MMDD (UTC or GMT)
 - SCS Events
 - geospatial output
 - Sample Database
 - Daily .csv export by dive
 - Imagery
 - Sample ID
 - Specimen Images
 - Video
 - Sample ID
 - Low res video clips of sample collection clip
 - High res video clips of sample collection clip

Back in port: Samples to Chris' lab for additional prep

- Ensure the sample alcohol has been switched out
- Possibly do a quick bleach prep
- Fill out Deed of Gift form for samples going to the Smithsonian
- Prep samples for sending. Send at the beginning of the week
- Final Repositories:
 - o Anthony Koppers, OSU
 - o Smithsonian
 - Takes a long time to get accession and cataloguing number. Funding an individual to speed this up.
 - Provide accession numbers to OER.
 - Provide access numbers to OGL.
 - o Send OGL folks their samples