UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk. VA 23510-1114

October 13, 2017

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

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

SUBJECT: Project Instruction for EX-17-09
Eastern Pacific Mapping (Telepresence Mapping)

Attached is the final Project Instruction for EX-17-09, Eastern Pacific Mapping (Telepresence Mapping), which is scheduled aboard NOAA *Ship Okeanos Explorer* during the period of October 16 – November 11, 2017. Of the 27 DAS scheduled for this project, 2 DAS are funded by an OMAO Allocation and 25 DAS are funded by Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to Deputyops.MOA@noaa.gov at Marine Operations Center-Atlantic.

Ocean Exploration and Research

Project Instructions

Date Submitted: October 12, 2017

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-17-09

Project Title: Eastern Pacific Mapping (Telepresence Mapping)

Project Dates: October 16 – November 11, 2017

Prepared by: Elizabeth Lobecker **Dated:** 10/11/17

Elizabeth Lobecker, NOAA
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by: **Dated:** 10/12/2017

Craig Russell
Program Manager
Office of Ocean Exploration & Research

Approved by: STEPHANIE KOES **Dated:** 13-OCT-2017

Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. Overview

A. Brief Summary and Project Period

This document contains project instructions for EX-17-09, planned to depart Honolulu on October 16, 2017 and arrive in Balboa, Panama on November 11, 2017, for a total of 27 days at sea. Operations for this cruise include transit mapping and CTD operations along the Clarion-Clipperton Fracture Zone and the transit track between Honolulu, Hawaii and Balboa, Panama. Operations will include the use of the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Acoustic Doppler Current Profilers (ADCPs), and Knudsen 3260 chirp sub-bottom profiler sonar), and the ship's high-bandwidth satellite connection for hourly data transfer, real-time ship to shore communications, real-time sonar control from shore, and real-time video streaming of sonar screens and ship's cameras. The objective of the CTD operations is to test the operation of a newly developed N_2 sensor and measure biologically produced excess nitrogen (N_2 gas produced as a result of denitrification processes) in the Eastern Tropical North Pacific (ETNP) Oxygen Minimum Zone (OMZ) located in international waters of the eastern Pacific.

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

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

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

NOAA Ship *Okeanos Explorer* systematically explores the ocean every day of every cruise to maximize public benefit from the ship's unique capabilities. With approximately 90-95% of the ocean unexplored, we pursue every opportunity to map, sample, explore, and survey at planned destinations as well as during transits; "Always Exploring" is a guiding principle. An integral element of *Okeanos Explorer*'s "Always Exploring" model is the ship's seafloor and water column mapping capabilities. The sonars, or a subset of the sonars on board, will be operated at all times 24 hours per day throughout the cruise allowing for continued exploration and seabed, water column, and/or sub-bottom data collection and selected processing.

Objectives for the expedition include:

- Conduct preliminary seafloor mapping operations to contribute to geological understanding of remote areas of the Pacific Ocean.
- Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.
- Clarion Clipperton Fracture Zone mapping: Across the Pacific, there are several very large, multi-segment fracture zones (FZs) that indicate the former existence of oceanic transform faults (TFs) that existed for millions of years. These FZs underwent dramatic changes in segmentation as revealed by their structure. Mapping data provides a wealth of information about the structure of these TFs when they formed and the subsequent evolution of their FZs, possibly including information about whether the FZs were weakly or strongly coupled. Weakly coupled FZs can indicate extensive serpentinization, which can alter the production and composition of magma at subduction zones. The

suggested mapping data will result in a long transit swath of mapping data, which will allow a careful analysis of the FZ evolution. The cruise track is planned to focus specifically on the Clarion Fracture Zone.

- Test the operation of a newly developed N_2 sensor that was funded by an OER grant to the University of Washington Applied Physics Laboratory
- Measure biologically produced excess nitrogen (N_2 gas produced as a result of denitrification processes) in the Eastern Tropical North Pacific (ETNP) Oxygen Minimum Zone (OMZ) located in international waters.

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

CTD operations will include approximately 10 CTD stations, plus one or two short test casts, transecting the ETNP OMZ. At each station, a 'slow' hydrocast will be made to maximally 600 m. The cast will require approximately 1 hr of active winch operations to lower/raise the CTD and trigger 12 water samplers at set depths. An additional 10-15 minute wait is required at each trigger depth to fully soak and equilibrate the sensors, taking an additional 2-3 hrs. If the scientists find themselves running short of sample water on deck, or important Niskin bottles did not trigger correctly, and there is sufficient time left on station to perform a second 'fast' cast, we will perform a second cast with no waits to retrieve more sample water. Regardless of whether a second cast is performed, the total time on station will be maximally 4 hrs total. The Niskin bottles will be triggered on the ascent with sampling concentrated in the 100-500 m range.

Onboard water chemistry operations include O_2 distributions by Winkler titrations and an O_2 sensor on the CTD, and N_2 distributions by the Gas Tension Method. Samples for dissolved argon (Ar) and dissolved nitrogen (N_2) concentrations and isotopic fractionations will be

collected by the rosette sampler in 90 mL glass bottles, preserved with 0.5 mL of HCl 25% and returned to the shore based laboratory for analysis by mass-spectrometry. Samples for nitrous oxide (N_2O) concentrations, stable isotopes and isotopomers will be collected in 165 mL bottles, preserved with 5 mL NaOH 10 N and analyzed on-shore by mass spectrometry. Approximately 8 depths will be sampled at each station/cast. Access to a fumehood will be necessary to add NaOH to the nitrous oxide bottles. Also, benchspace and space under bench will be required to store the five coolers (dimensions: 92 x 44 x 42 cm, 36.5 x 17.6 x 16.8 inches) in the laboratory at room temperature, and for Annie Bourbonnais to install and work on her laptop. The cruise will also be an opportunity to, hopefully, test an in situ sensor in development at APL/UW to measure N_2O, a potent greenhouse gas released from OMZ regions. The prototype N_2O sensor will likely be dipped into seawater samples recovered by the rosette sampler and cross-calibrated against the standard analytical method measurements.

The transit routes between port and the operating areas will maximize mapping of discrete geologic features including seamounts and ridges with little or no existing modern sonar data coverage. The routes were chosen based on the most recent version of the global bathymetric compilation dataset compiled by J.J. Becker et al (http://topex.ucsd.edu/sandwell/publications/124_MG_Becker.pdf).

This expedition will be the eighth cruise to test telepresence enabled mapping operations on *Okeanos Explorer*. *Okeanos* is a leader in this mode of mapping cruise operation, and continues to see success and potential for further development.

The Expedition Coordinator for the cruise (Elizabeth Lobecker) will be based on shore at the Exploration Command Center (ECC) at the University of New Hampshire Center for Coastal and Ocean Mapping/Joint Hydrographic Center (UNH CCOM/JHC) with regular and ongoing communications with the ship (OPS, CO) and onboard Mapping Lead (Amanda Bittinger).

The screens of the mapping acquisition systems (EM 302, EK 60, SBP etc.) will be broadcast 24 hours per day, and will be monitored by both onboard and onshore mapping scientists. A new software configuration provided by OMAO will be used to provide remote access to all the sonar acquisition and data processing machines from shore. This setup will continue to be tested for its reliability and feasibility of controlling the mapping data acquisition and data management from shore. The raw data from all sonars will be transmitted to shore and further

processing will be completed on shore. Automated bathymetric gridding will occur on the ship in order for the onboard team to monitor and ensure adequate seabed coverage. The onboard Mapping Lead will be the primary liaison between ship and OER operations and will attend all the shipboard daily meetings and provide daily situation reports (SITREPS) to the broader OER *Okeanos* operational team.

As telepresence mapping protocols continue to develop during this type of telepresence enabled mapping expedition, possibilities open for OER to conduct operations with nimble teams of mapping personnel onboard and most of data acquisition, processing and quality checks of mapping data being completed on shore. Value gained from this model will continue to expand as the model is tested. Initial predicted benefits include: reduction in travel costs to the ship, participation of a larger number of mapping trainees in expeditions, cruise participation from individuals who are unable to sail, enhanced rapid data processing and archival techniques, enhanced onshore partnership development opportunities, enhanced rapid data report creation, and expanded possibilities for utilizing multiple ECCs during mapping missions.

The onboard ship and mapping team will be provided with all information necessary to successfully conduct the mapping mission should the telepresence component experience significant challenges, such as lack of connectivity due to VSAT or network challenges.

B.Days at Sea (DAS)

Of the 27 DAS scheduled for this project, 2 DAS are funded by an OMAO allocation, 0 DAS are funded by an NOS Line Office Allocation, 0 DAS are Program Funded, and 25 DAS are funded by an OAR Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo due to 24 hour mapping and daytime CTD operations.

C. Operating Area

24-hour per day transit mapping operations will focus in the vicinity of the Clarion-Clipperton Fracture Zone. Mapping operations will focus in depths generally between 250 and 6,000 meters.

CTD operations will include approximately 10 CTD stations transecting the Eastern Tropical North Pacific Oxygen Minimum Zone. Each hydrocast will be to 600 m. Exact locations of CTD casts will be determined during the transit and will be carefully coordinated with the Operations Officer and ship's Department Heads to ensure casts are done during daylight hours and do not interfere with personnel schedule and ship engineering constraints. A table of approximate CTD locations is below.

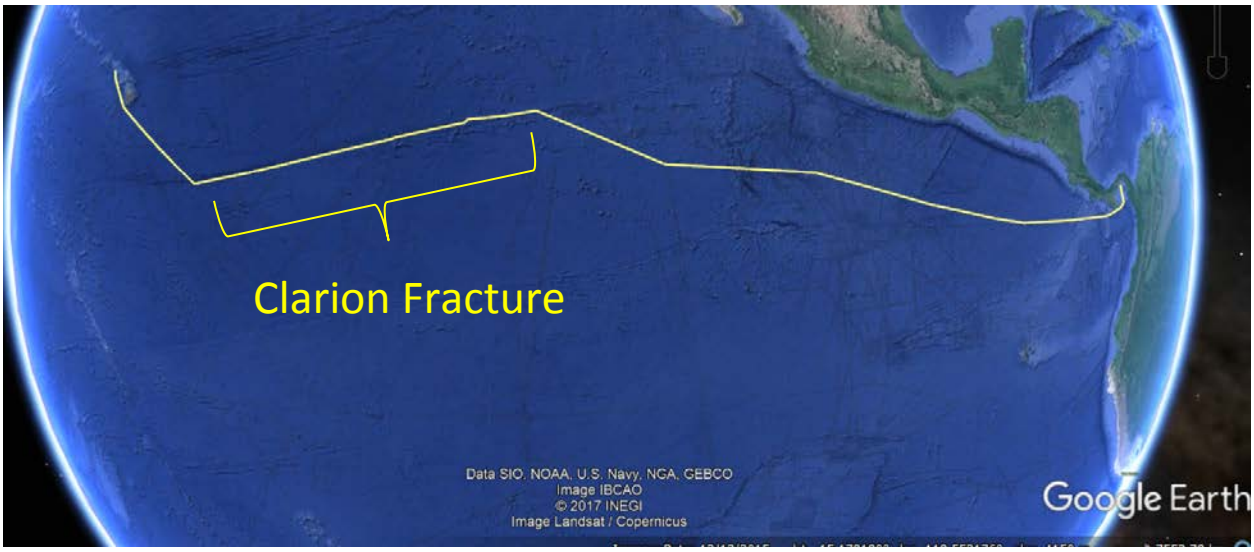

Figure 1. Overall EX1709 cruise track from Honolulu, HI to Balboa, Panama, spanning 4960 nautical miles.

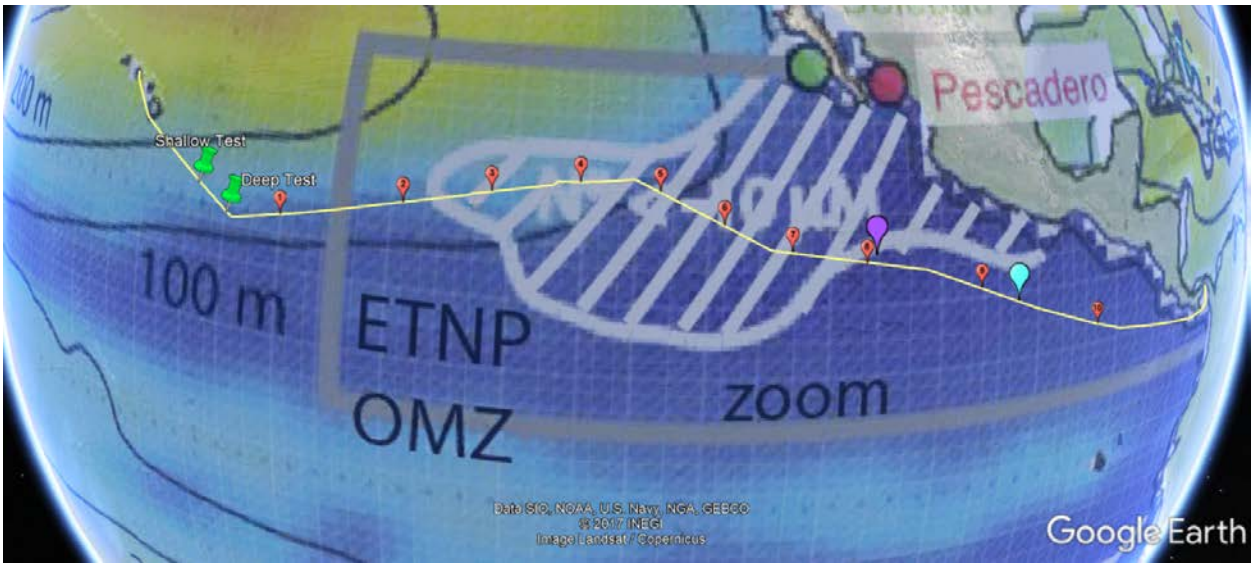

Figure 2. Overall cruise track with Oxygen Minimum Zone shown in white hashed polygon, with overall EX1709 cruise track shown in yellow. Green thumbtacks are locations of test CTD casts, red numbered balloons are locations of operational CTD casts, purple and blue balloons are approximate start and end locations of crossing satellite transition zone..

Table 1. Generalized cruise track waypoints EX1709.

EX-17-09 Generalized Cruise Track		
	Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
1	157 57.008544 W	21 16.858533 N
2	157 48.032919 W	20 50.662848 N
3	155 57.300456 W	18 45.01533 N
4	147 37.930707 W	14 2.290134 N
5	147 17.0983308 W	14 4.8820626 N
6	143 1.9067586 W	14 53.6302224 N
7	140 34.6294686 W	15 24.1609038 N
8	138 9.8197914 W	15 55.3560084 N
9	134 35.9238564 W	16 38.4977448 N
10	132 37.3416156 W	17 0.8427258 N
11	132 31.1664588 W	17 5.0727528 N
12	128 52.4353854 W	17 43.0751946 N

13	127 49.3961748 W	17 53.2379526 N
14	127 37.6191942 W	18 4.2875094 N
15	126 42.5063166 W	18 6.301707 N
16	125 20.8533354 W	18 10.8064776 N
17	123 17.8380684 W	18 24.0676398 N
18	115 32.4562314 W	14 46.5512472 N
19	106 5.0094186 W	13 26.6515698 N
20	98 17.2615422 W	10 33.2671596 N
21	93 21.054192 W	8 56.975283 N
22	90 46.8165756 W	8 13.4400516 N
23	86 14.8652334 W	7 35.5316766 N
24	81 51.3247302 W	7 2.9192304 N
25	81 19.226013 W	7 3.2832762 N
26	79 49.1547936 W	7 12.8230326 N
27	79 14.8926816 W	7 29.3335854 N
28	79 27.381678 W	8 48.1812024 N

Table 2. EX1709 CTD cast locations along mapping transit line.

EX-17-09 CTD Cast Locations		
ID	**Longitude**	**Latitude**
Test shallow	150 27.8287158 W	15 37.1599788 N
Test deep	148 0.7479462 W	14 16.1970618 N
1	144 9.6639924 W	14 41.4872976 N
2	136 26.0163108 W	16 17.4251766 N
3	131 18.6724086 W	17 20.1805824 N
4	126 20.0895426 W	18 8.521071 N
5	121 51.1164726 W	17 48.3704586 N
6	118 13.1432106 W	16 6.284748 N
7	114 19.752549 W	14 41.7847488 N
8	109 53.7533508 W	13 56.7196488 N

9	102 23.840676 W	12 10.8780312 N
10	93. 1.943319 W	8. 52.2899562 N

D. Summary of Objectives

October 16 – November 11, 2017, Honolulu, HI to Balboa, Panama.

EX-17-09 operations will occur in the U.S. EEZ, international waters, Costa Rican EEZ, and Panamanian EEZ.

Mission objectives for EX-17-09 include a combination of mapping/operational, sensor technology development, CTD water chemistry science, education, outreach, and data management objectives:

1. Onboard Mapping
    a. Conduct 24 hr/day mapping operations for the entirety of the cruise using EM 302 multibeam, EK 60 suite, and subbottom profiler sonars.
    b. Execute transit mapping line plan as defined by onshore personnel, with adjustments made in the field as necessary. The mapping transit plan will gather data over approximately 1,400 nm of the Clarion-Clipperton Fracture Zone.
    c. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs.
    d. Collect XBT casts as mapping data quality requires, at least every 6 hours.
    e. Create daily standard bathymetry mapping products.
    f. Ensure all raw data from all sonars is transferred to shoreside repository hourly using automated scripts.
    g. Collect sun photometer measurements as part of Exploration Project of Opportunity (EPO).
    h. Transit speeds of 9-11 kts will be utilized.
    i. Generate daily situation reports.
    j. Host one EiT to further their offshore mapping training.

2. Onshore mapping
    a. Test shoreside operation of sonar computers on the ship using desktop access through NOAA OMAO supplied laptop.
    b. Test telepresence mapping workflow with OER physical scientists at UNH.

c. Support onboard watchstanders by monitoring data collection from shore in realtime
d. Provide data acquisition and processing troubleshooting from shore
e. Possibly collaborate with GEBCO students based at CCOM.

3. Data Management
    a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
    b. Use daily bathymetric mapping products and SCS mailers to update *Okeanos* Atlas for onshore situational awareness.
    c. Transfer all raw sonar data to shore using 10 mb/s bandwidth and automated transfer scripts.

4. Science
    a. Collect geophysical data at sites to aid the understanding of the geologic history of fracture zones.
    b. Build capacity in the scientific community and public in telepresence-based mapping exploration.
    c. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants.
    d. Test the operation of a newly developed N_2 sensor that was funded by an OER grant to the University of Washington Applied Physics Laboratory
    e. Measure biologically produced excess nitrogen (N_2 gas produced as a result of denitrification processes) and nitrous oxide (N_20) concentrations, stable isotopes and isotopomers in the Eastern Tropical North Pacific (ETNP) Oxygen Minimum Zone (OMZ) located in international waters.
    f. Collect ADCP (300 kHz) and EK 60 data (18, 70, 120, 200 kHz) during CTD casts.
    g. Live stream CTD deck camera and CTD acquisition screen during CTD operations.

5. Remote Science/Exploration Command Centers
    a. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations.
    b. Facilitate outreach and engagement activities and events at the ECCs.
    c. Test and refine ship-to-shore communications procedures that engage multiple ECCs and other remote participants.
    d. Test and refine operating procedures and products.

6. Outreach
    a. Onshore EC and EiTs participate in various UNH outreach activities based in the UNH ECC including TBD.

7. Ship
    a. Prior to ship departure, all scientific sonar transducers should be inspected and cleaned as needed to ensure reliable performance. This work requires a SCUBA dive prior to the departure date of the cruise.
    b. Conduct one shallow then full depth test CTD casts to confirm all sensors functional including altimeter, and ship and crew readiness, prior to 10 required stations in or near the OMZ.
    c. Conduct ship safety drills including man overboard and maneuvering.
    d. Provide a high quality stable internet connection with the new VSAT.
    e. Provide stable and reliable VoIP telecommunications.
    f. Successfully transition to the new Atlantic basin Satellite and move the downlink station from Steele Valley Ca to Homedale NJ. With less than a 3 hour interruption to VSAT services

E. Participating Institutions

- National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER)–1315 East-West Hwy, Silver Spring, MD 20910 USA
- NOAA, National Oceanographic Data Center, National Coastal Data Development Center, Stennis Space Center MS, 39529 USA
- University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307 USA
- University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) Jere A. Chase Ocean Engineering Lab, 24 Colovos Rd, Durham, NH 03824 USA
- Global Foundation for Ocean Exploration, P.O. Box 417, Mystic, CT 06355
- University of Washington Applied Physics laboratory, 1013 NE 40th Street, Seattle, WA 98105-6698
- University of Massachusetts Dartmouth, School for Marine Science & Technology, 706 S. Rodney French Blvd, New Bedford, MA
- University of Idaho, Department of Geological Sciences

F. Personnel (Mission Party)

Table 2: Full list of shore based and sea going mission party members and their affiliations

Nationality	Affiliation	Gender	Date Disembark	Date Aboard	Location during cruise	Title	Name (First, Last)	#
ONBOARD MAPPING AND SCIENCE TEAM								
USA	UCAR	F	N/A	10/14/17	Ship	Onboard Mapping Lead	Amanda Bittinger	1
USA	UCAR	M	TBD	10/14/17	Ship	Onboard Mapping Watch Lead	Dan Freitas	2
Canada (Green card holder)	UMass	F	11/12	10/14	Ship	CTD science lead	Annie Bourbonnais	3
USA	UW/APL	M	11/12	10/12	Ship	N2 Sensor development lead	Andrew Reed	4
USA	UCAR	F	TBD	11/15		Mapping watchstander	Sarah Rosenthal	**5**
ONSHORE MAPPING TEAM								
		n/a	n/a	n/a	UNH CCOM/JHC ECC	Expedition Coordinator	Elizabeth 'Meme' Lobecker	1

G. Administrative

1. Points of Contact:

Ship Operations

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Operations Officer

NOAA Ship *Okeanos Explorer*

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NOAA Ocean Exploration & Research

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Vessel Shipping Address

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

Items sent to Honolulu should arrive at the following address prior to COB 10/13/17.
NOAA Ship *Okeanos Explorer*
c/o LT Aaron Colohan
1897 Ranger Loop Road BLDG 184
Honolulu, HI 96818

2. Diplomatic Clearances

Requests to conduct marine scientific research to acquire mapping and CTD data in the waters under the jurisdiction of Costa Rica, Panama and France (Clipperton Island) were submitted to the U.S. State Department via their online RATS system on July 26th – application F2017-082. Consent from Panama was received on September 18, 2017. The approval letter from Panama is in the appendix of this project instructions. Consent is pending for Costa Rica and France. France is not likely necessary as cruise track no longer transits through French waters near Clipperton Island.

3. Licenses and Permits

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

Pursuant to the National Environmental Policy Act (NEPA), NOAA OER is required to include in its planning and decision-making processes appropriate and careful consideration of the potential environmental consequences of actions it proposes to fund, authorize and/or conduct. NOAA's Administrative Order (NAO) 216-6A Companion Manual describes the agency's specific procedures for NEPA compliance. Among these is the need to review all proposed NOAA-supported field projects for their environmental effects. A categorical exclusion (CE) worksheet has been completed for this survey, in accordance with Section 4 of the Companion Manual. This worksheet describes EX1709 and explains how it is consistent with one or more of the CE categories listed/described in Appendix E of the Companion

Manual. The completed worksheet also summarizes the review conducted to determine that no extraordinary circumstances exist that would preclude the use of a CE or require preparation of an environmental assessment or environmental impact statement.

Informal consultation was initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our biological evaluation determining that 2016 Marianas Expedition and all other planned *Okeanos Explorer* operations during the 2016-17 field season, may affect, but are not likely to adversely affect, ESA-listed marine species. The informal consultation was completed on February 3, 2016 when NOAA OER received a signed letter from the Regional Administrator of NMFS Pacific Islands Regional Office, stating that NMFS concurs with OER's determination that conducting proposed *Okeanos Explorer* cruises are not likely to adversely affect ESA-listed marine species. Documentation is provided in appendix of this PI.

OER has completed consultation with NOAA's Habitat Conservation Division on potential impacts of our operations to Essential Fish Habitat (EFH). They concurred that our operations would not adversely affect EFH provided adherence to our proposed procedures and their guidance stated in the letter. Documentation is provided in the appendix of this PI.

II. Operations

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

A. Project Itinerary

(All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer)

Activities	Approx Operations Time (hrs)	Date
Pre-departure staging of CTD equipment dockside		10/5
Onboard mission personnel arrive to ship	-	10/12-10/15
Load CTD equipment onto ship (forklift and sling)	-	10/10, 10/11 with 10/12 as contingency
Depart port 0900 from Ford Island pier	-	10/16
Transit mapping to Clarion-Clipperton Fracture Zone	~4 days	10/16 – 10/19
Test CTD cast on first or second day of cruise	Up to 4 hrs	10/17 or 10/18
Clarion-Clipperton FZ mapping	~ 6.5 days	10/20-10/27
Conduct approximately 10 CTDs once per day @ 4 hrs each	40 hrs	10/21-10/31
Enter OMZ		10/21
Satellite transition to occur between 109°W and 99°W	3 hours or less(no impact to vessel track, noted for awareness)	~11/1 or 11/2

Strategic mapping transit to Balboa, Panama	12 days including contingency	10/31-11/11
Approximate date of entry into Costa Rica EEZ	-	11/8
Approximate date of entry into Panama EEZ	-	11/10
Arrive sea buoy Balboa		11/11, late arrival OK prior to sunset.

Table 4: Detailed Cruise Itinerary. This is an approximate itinerary and is subject to change based on survey results, field conditions, and discretion of the CO.

B. Staging and Destaging

Staging of the UW-APL supplied CTD system is requested to occur October 10-11.

UW- APL will supply a CTD system which includes the SBE11 deckbox and SBE9 CTD and General Oceanic rosette. Two people from APL (Craig McNeil and Jesse Dosher), will fly to Hawaii on 9 October to load the CTD on the ship and set it up and test it working closely with ships personnel. Request use of forklift and crane sling to load the heavy CTD equipment onto the ship early morning of October 10. Use the winch and hydrowire supplied by the NOAA Ship *Okeanos Explorer* will be required as well as ship technician support to connect the deck box to the winch and the CTD to the wire. During this same time, UW PhD student (Andrew Reed) will also load and setup the Winkler titration kit. UMass scientist (Annie Bourbonnais) will load her sampling gear on October 14.

The UW-APL CTD system, UMass water samples, and any remaining HazMat will be destaged and removed from the ship during the Key West inport by UW personnel (Ray Hollingsworth) flying in for this purpose following EX1710 (another mapping cruise), approximately November 23-24 (depending on Thanksgiving holiday).

C. Operations to be Conducted

1. Telepresence / Outreach Events
    a. Two live video feeds will be used throughout the cruise to provide situational awareness for onshore personnel.
    b. The live feeds will show either sonar acquisition screens or the CTD camera and CTD acquisition screen, depending on operations.
2. In-Port Events
    a. There are no in-port events planned for this cruise.

D. SCUBA Dive Plan

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

E. Applicable Restrictions

Sonar Operations

EM 302, EK 60, ADCP, and sub-bottom profiler data acquisition is planned for this cruise. All data acquisition will be conducted in accordance with established standard operating procedures under the direction of the mapping team lead. These operating procedures will include protection measures when operating in the vicinity of marine mammals, sea turtles or Endangered Species Act-listed species as described in appendices of this document. The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

III. Equipment

A. Equipment and capabilities provided by the ship

- 2 working small boats in seaworthy and reliable working condition for mission operations and fast rescue
- ~~NOAA OER 6000 m *Deep Discoverer* ROV~~
- ~~NOAA *Seirios* Camera Platform~~

- Kongsberg Simrad EM302 MultibeamEchosounder (MBES)
- Kongsberg Simrad EK60DeepwaterEchosounders and GPTs (18, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP
- Teledyne UnderwayCTD
- LHM Sippican XBT Mark21 System(Deep Blue probes)
- AOML Automated XBT Launcher (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- MarineStar GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- Netshares mapping storage system
- IVS Fledermaus Software suite
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech 9 Mbps ship to shore; 1.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines
- CTD winch and hydrowire
- SCS shipboard data feed
- Refrigerated storage for water samples

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- CTD system, including laptop with Seasoft software, SBE11 deckbox, rosette, bottles, carousel, SBE911, and sensors
- Chemical titration equipment for Winklers

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
    - *(Note: HazMat for McNeil sampling provided, we will provide up to two 5 gallon tub HazMat cleanup kits containing gloves, dust masks, pans, broom, bags, acid neutralizing agent, etc.)*
- 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.

- ***(****Note: Andrew Reed will collect titration waste in 5 gallon waste disposal containers for return to APL/UW, or, as is typically done and preferable, the titration waste can be diluted and send down an overboard sink without collection, with ship's permission. If not going overboard, we expect to collect approximately 5-15 gallons of titration waste during the cruise. We will provide these HazMat plastic collection containers and all labels. We request distilled – ideally MilliQ - water source if available onboard, expecting to use approximately 1 gallon per station. If not available, we will need to purchase some in Hawaii pharmacy and bring aboard for the cruise. We request an 8' by 3' benchtop space for the Winkler titration kit situated near or ideally beside a sink to rinse sample bottles after they have been acid washed, these rinse waters should flow overboard via overboard sink. Samples will be temporarily stored in ship's laboratory refrigerator prior to running them through the Winkler titrator system. We request another workstation for Andrew to sit at for data analysis and processing, with access to a networked printer.).*

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

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

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

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

B. Inventory

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

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

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

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

Table 3. Inventory of chemicals supplied by Mark Altabet and Annie Bourbonnais to collect N_2/Ar and N_2O samples.

Description	Quantity and volume	Container type

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

Table 4. Inventory of chemicals maintained by ROV team.

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

		Room/Pit				
Scotchkote 43906	3M	Tool Room/Pit	7	Yes	Yes	
Molykote 316	Dow Corning	Hangar	2	Yes	Yes	
Silicone Spray	3M	Tool Room	6	Yes	Yes	1
DC 557	Dow Corning	Tool Room/Pit	1	Yes	Yes	
Synthetic Hydraulic Oil	Amsoil	Pit	50	Yes	Yes	1
Cutting Fluid	Tap Magic	Tool Room	1	Yes	Yes	
Xtra-thick Cutting Fluid	Tap Magic	Tool Room	1	Yes	Yes	
Tether Potting Catalyst	Phillystran	Pit	8	Yes	Yes	
Tether Potting Compound	Phillystran	Pit	8	Yes	Yes	
ThermaPlex Bearing Grease	LPS	Pit	1	Yes	Yes	
Tritech Seaking	Diala Oil	Pit	1	Yes	Yes	1
Tuff Coat M Marine Lubricant	Dynacon	Winch Room	20	Yes	Yes	
DC 111	Dow Corning	Tool Room/Pit	11	Yes	Yes	1
WD-40	WD-40 Company	Tool Room/Pit	3	Yes	Yes	

C. Chemical safety and spill response procedures

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

D. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE

V. Additional Projects

A. Exploration Projects of Opportunity

See Appendix for full Exploration Projects of Opportunity Forms.

1) NASA Maritime Aerosol Network

During the cruise the marine aerosol layer observations will be collected for the NASA Maritime Aerosol Network (MAN). Observations will be made by mission personnel (as time allows) with a sun photometer instrument provided by the NASA MAN program. Resulting data will be delivered to the NASA MAN primary investigator Alexander Smirnov by the expedition coordinator. All collected data will be archived and publically available at: http://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html

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

2) Two visiting scientists will sail to conduct ten opportunistic CTD casts in or near the oxygen minimum zone in international waters near Mexico.
The CTD rosette will carry a newly developed, OER FFO funded Nitrogen sensor which measures biologically produced excess nitrogen (N2 gas produced as a result of denitrification processes) in the Eastern Tropical North Pacific (ETNP) Oxygen Minimum Zone (OMZ) located in international waters. To ensure successful operation of the new sensor, and to provide hands-on training to shipboard technicians in its use at sea, we propose to send along two people on the cruise. Andrew Reed is knowledgeable on the setup and operation of the new sensor. Annie Bourbonnais is an expert rosette sampler who will take and store seawater samples for calibration and validation of the new sensor.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

A. Data Responsibilities

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

Ship Responsibilities

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

NOAA OER Responsibilities

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

Deliverables

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

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

Archive

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

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Shipboard Meetings

A safety brief and overview of POD will occur on the Bridge each morning at 0800. As necessary and no less than every third day, daily Operations Briefing meetings will be held at a time convenient for OPS officer and onboard mapping lead 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.

1. Pre-Cruise Meeting:

The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Expedition Coordinator in arranging this meeting.

2. Vessel Familiarization Meeting:

The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols; e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

3. Post-Cruise Meeting:

The Commanding Officer is responsible for conducting a meeting no earlier than 24 hours

before or seven days after the completion of a project to discuss the overall project outcomes. During this meeting the following will be discussed; concerns regarding safety and efficiency; challenges encountered and suggestions for future improvements (all mitigation ideas will be documented for future projects); as well as successes during the project. This meeting shall be attended by ship's officers, applicable crew, the Expedition Coordinator, and representatives of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.

4. Project Evaluation Report:

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

Berthing requirements, including number and gender of the scientific party, will be provided to

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

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

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

B. Medical Forms and Emergency Contacts

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

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

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

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

The only secure email process approved by NOAA is Accellion Secure File Transferwhich requires the sender to setup an account.Accellion's Web Users Guideis 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 toaccellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact Information:

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

Please make sure the medical.explorer@noaa.govemail address is cc'd on all medical correspondence.

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

Emergency contact form can be accessed at https://docs.google.com/a/noaa.gov/forms/d/e/1FAIpQLSfses6_kyQu-BFdAuldWHZdc6apyU4G5wQzRLwlUY84ykKfcg/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. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots.

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

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

D. Communications

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. VSAT bandwidth at **9 Mbps** will be paid by OER and provided by OMAO.

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

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration
Phone: (301) 734-1010
Fax: (301) 713-4252
E-mail: craig.russell@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438
Fax: (603) 862-0839

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

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

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

Voice Over Internet Protocol (VoIP) Phone:
(541) 867-8932
(541) 867-8933
(541) 867-8934

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

E-mail: expeditioncoordinator.explorer@noaa.gov for dissemination of all hands emails by Expedition Coordinator while onboard. See ET for password.

E. IT Security

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

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

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

F. Foreign National Guests Access to OMAO Facilities and Platforms

Not applicable to this cruise.