DRAFTProject Instructions

**Date Submitted:** ???????

**Platform:** NOAA Ship *Okeanos Explorer*

**Project Number:** EX-17-05

**Project Title:** American Samoa, Kingman / Palmyra, Jarvis (ROV & Mapping)

**Project Dates:** April 27- May 19, 2017

**Prepared by:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Dated:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 Kasey Cantwell, NOAA
 Expedition Coordinator
 Office of Ocean Exploration & Research

**Approved by:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Dated:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 Craig Russell
 Program Manager
 Office of Ocean Exploration & Research

**Approved by:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Dated:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 Captain Scott M. Sirois, NOAA
 Commanding Officer
 Marine Operations Center - Atlantic

I. Overview

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

*- NOAA Office of Ocean Exploration and Research Strategic Plan*

# A. Brief Summary and Project Period

This document contains project instructions for EX-17-05. Operations for this cruise will be conducted 24 hours/day and consist of daily remotely operated vehicle (ROV), overnight mapping, CTD casts and full shore-based participation via telepresence. Operations will be conducted within several marine protected areas. The expedition will commence on April 27, 2017 in Pago Pago, American Samoa (14° 16.3' S, 170° 41.22'W) and conclude on May 19, 2017 in Honolulu, Hawaii (21° 22' 2.62"N, 157° 57' 51.32"W). Operations will include the use of the ship’s deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, and Teledyne Acoustic Doppler Current Profilers), XBT and Underway CTD casts in support of multibeam sonar mapping operations, OER’s 6000 m two-body ROV Deep Discoverer and Seirios, and the ship’s high-bandwidth satellite connection for continuous real-time ship-to-shore communications. Operations are planned in American Samoa, the Cook Islands, the high seas, Kiribati, Hawaii, and the Pacific Remote Islands Maine National Monument’s (PRIMNM) Jarvis Island and Kingman Reef/Palmyra Atoll Units.

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 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 the sonars (EM 302, EK 60, Knudsen sub-bottom, ADCPs) on board will be operated at all times throughout the cruise when the ROV is not in the water or CTD rosette operations are not being allowing for continued exploration and seabed, water column, and/or sub-bottom data collection and selected processing.

This expedition is part of a three year Campaign to Address Pacific monument Science, Technology, and Ocean Needs ([CAPSTONE](http://oceanexplorer.noaa.gov/okeanos/explorations/capstone/welcome.html)) focused on systematically collecting baseline information to support science and management needs within and around the Monuments and other protected places in the Pacific, and serves as an opportunity for NOAA and the Nation to highlight the uniqueness and importance of these national symbols of ocean conservation. NOAA will work with the scientific and management community to characterize unknown and poorly-known areas through telepresence-based exploration. Baseline information collected during this cruise will support and catalyze further exploration, research and management activities.

Understanding biogeographic patterns between and among the Pacific Monuments and Sanctuaries is a coordinating theme for CAPSTONE science priorities. Themes and objectives for the expedition series include:

* Acquire data to support priority Monument and Sanctuaries science and management needs, including habitat surveys in recently expanded boundary areas;
* Identify and characterize vulnerable marine habitats - particularly potential locations for high density deep sea coral and sponge communities;
* Characterize seamounts within the Prime Crust Zone (PCZ). The PCZ is the area of the Pacific with the highest expected concentration of deep sea minerals, including rare metals and rare earth elements;
* Collect information on the geologic history of Central Pacific Seamounts, including those that are or may be relevant to our understanding of plate tectonics and subduction zone biology and geology; and
* Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.

# B. Days at Sea (DAS)

Of the 23 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 5 DAS are funded OAR Allocation, and 18 DAS are funded by NOAA National Marine Fisheries Service. This project is estimated to exhibit a High Operational Tempo due to 24 hour operations consisting of daily ROV dives, possible CTD rosette casts, overnight mapping operations and continuous shore-side participation via telepresence.

# C. Operating Area

EX-17-05 of the CAPSTONE Expeditions is a combined ROV and mapping cruise that will focus operations in Kingman Reef and Palmyra Atoll and Jarvis Island Units of PRIMNM with some operations in the Cook Islands, Kiribati, American Samoa, and the high seas. Mapping, ROV and CTD rosette operations will focus in depths generally between 250 and 6,000 meters.



**Figure 1:** Map showing the general expedition operating area. The red line is the rough cruise track from American Samoa to Hawaii during EX-17-05. The yellow polygons represent the boundaries of the Pacific Remote Islands Marine National Monument. The light blue polygon designates Marae Moana (Cook Islands). Planned ROV dives are represented by green markers

|  |
| --- |
| Generalized operating area coordinates |
| ID | **Latitude** | **Longitude** |
| SW corner | 14°17'3.95"S | 170°29'55.21"W |
| SE corner | 16°36'36.25"S | 163°58'24.88"W |
| NE corner | 18°32'39.57"N | 154° 0'52.16"W |
| NW corner | 21° 22' 2.62"N |  157° 57' 51.32"W |

**Table 1:** Bounding coordinates of the EX-17-05 operating area

# D. Summary of Objectives

**April 27 – May 19, 2017 (Pago Pago, American Samoa to Honolulu, HI) Telepresence-enabled ROV, CTD rosette, and mapping Operations.**

EX-17-05 operations will occur in the waters of American Samoa, the Cook Islands, Kiribati, the high seas and the US EEZ around Jarvis Island, Kingman Reef, and Palmyra Atoll. This cruise will collect baseline data and information to support priority NOAA science and management needs including in multiple marine protected areas of the Pacific Ocean.

Mission objectives for EX-17-05 include a combination of mapping/operational, science, education, outreach, and data management objectives:

1. Science
	1. Acquire data to support priority Monument and Sanctuary science and management needs;
	2. Identify and map vulnerable marine habitats – particularly high-density deep-sea coral and sponge communities;
	3. Explore the diversity and distribution of benthic habitats – including bottom fish habitats and deep-sea coral communities;
		1. Collect data on: habitat size and extent, animal diversity and density;
		2. Focus close-up imaging operations on potential new, rare and poorly documented animals as well as dominant members of the communities;
		3. Collect and preserve biological samples of potential new species, new records, dominant community members if not easily recognized, and other animals to aid in site characterization
	4. Investigate biogeographic patterns of deep-sea ecosystems and connectivity across Pacific seamounts and throughout remote Pacific marine protected areas;
	5. Investigate the geology of Pacific seamounts, constraining their morphology, age, and potential relevance to plate tectonic and plume processes;
	6. Collect high-resolution bathymetry in areas with no (or low quality ) sonar data;
	7. Acquire a foundation of sonar and oceanographic data to better understand the characteristics of the water column in remote areas;
	8. Continue to refine specimen collection protocols and processing procedures;
	9. Ground-truth acoustic data using video imagery and characterize associated habitat;
	10. Engage a broad spectrum of the scientific community and public in telepresence-based exploration;
	11. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants;
	12. Create and provide input into standard science products to provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.
2. Remote Science/Exploration Command Centers
	1. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations;
	2. Develop and test best practices for hosting internet-1 based live interactions;
	3. Facilitate outreach and engagement activities and events at the ECCs;
	4. Test and refine ship-to-shore communications procedures that engage multiple ECCs and other remote participants;
	5. Conduct test of new science model in collaboration with the Cooperative Institute for Ocean Exploration, Research, and Technology to increase shore-side collaboration and participation, and to help ensure data are used to the fullest extent, to increase awareness in the marine science community about available data, and to test new science products;
	6. Test and refine operating procedures and products.
3. ROV Engineering
	1. Daytime ROV dives on exploration targets;
	2. Ongoing training of pilots;
	3. Ongoing system familiarization, documentation, and training;
	4. Test and refine new ROV systems and pilot sampling protocol
	5. Prepare for dry dock at the conclusion of the cruise.
4. Video Engineering (VSAT ~15 mb/sec ship-to-shore; 2.5 mb/sec shore-to-ship)
	1. Test terrestrial and high-speed satellite links
	2. Support telepresence-enabled ROV operations;
	3. Collect/create all standard video products;
	4. Continue to refine new highlight video SOPs;
	5. Facilitate live outreach events between ship and shore;
	6. Continue to refine protocols for using YouTube live to host live video;
	7. Test and refine new video compression and editing hardware;
	8. Formalize / Finalize parallel processing of imagery and video compression routines;
	9. Develop protocols and procedure for using the Telestream video recording suite.
5. Mapping
	1. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs;
	2. Support ROV operations with mapping products and expertise;
	3. Conduct mapping operations during transit, with possible further development of exploration targets;
	4. Collect XBT casts as data quality requires, during mapping operations;
	5. Create daily standard mapping products;
	6. Collect sun photometer measurements as part of survey of opportunity;
	7. Continue refining the procedure for conducting XBT casts using the autolauncher system and applying the sound velocity profiles to the multibeam sonar;
	8. Prepare for dry dock at the conclusion of the cruise.
6. Data Management
	1. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
	2. Provide daily products to shore for operational decision making purposes;
	3. Test protocols and procedures for handling the data from the Telestream video recording system;
	4. Refine protocols for digital data associated with physical samples
	5. Cross train existing ROV dedicated personnel;
	6. Formalize Data Management SOPs.
7. Outreach
	1. Engage the general public in ocean exploration through live video and timely content (daily updates, topical essays and web logs, highlight videos, video clips, still imagery and mapping products) posted on the Ocean Explorer website;
	2. Host live events and interactions with shore (final event list TBD)
	3. Conduct ship tours for the public, students, teachers, managers and officials while in port in Pago Pago.
	4. More TBD.
8. Ship
	1. Provide a high quality stable internet connection with the VSAT;
	2. Provide stable and reliable VoIP tele communications;
	3. Continue training new deck department personnel in ROV launch and recovery;
	4. Participate in outreach activities while in Pago Pago;
	5. Train new Survey Technician and familiarize him/her with Okeanos Operations and his/her responsibilities.

# 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 Hawai’i at Manoa- 2500 Campus Rd, Honolulu, HI 96822
* 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
* NOAA National Marine Fisheries Service, Pacific Islands Regional Office, 1845 Wasp Blvd, Honolulu, HI 96818
* NOAA National Marine Fisheries Service, Marine National Monuments Program, 1845 Wasp Blvd, Honolulu, HI 96818
* NOAANational Marine Sanctuary of American Samoa, P.O. Box 4318, Pago Pago, American Samoa 96799
* NOAA National Marine Fisheries Service, Pacific Islands Fisheries Science Center, 1845 Wasp Blvd, Honolulu, HI 96818
* University of Louisiana at Lafayette (ULL), 104 E University Ave, Lafayette, LA 70504
* North Carolina State University (NCSU), Raleigh, NC 27695
* Cooperative Institute for Ocean Exploration, Research, and Technology (CIOERT) at Harbor Branch Oceanographic Institute Foundation, 5600 US-1, Fort Pierce, FL 34946

# F. Personnel (Mission Party)

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| # | Name (First, Last) | Title | Date Aboard | Date Disembark | Gender | Affiliation | Nationality |
| 1 | Kasey Cantwell | Expedition Coordinator | 4/21 | 5/20 | F | OER | USA |
| 2 | Scott France | Biology Science Lead | 4/24 | 5/20 | M | USGS | Canadian/ US Permanent Resident |
| 3 | Del Bohnenstiehl | Geology Science Lead | 4/24 | 5/20 | M | UCAR/NCSU | USA |
| 4 | Amanda Netburn | Sample Data Manager | 4/24 | 5/20 | F | CIOERT/OER | USA |
| 5 | Michael White | Mapping Lead | 4/21 | 4/20 | M | OER | USA |
| 6 | Kevin Jerram | Mapping Watch Lead | 4/24 | 5/20 | M | UCAR | USA |
| 7 | Bobby Mohr | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 8 | Fernando Aragon | Engineering Team | 4/24 | 5/20 | M | GFOE | Columbian/US Permanent Resident |
| 9 | Joshua Carlson | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 10 | Andy Lister | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 11 | Levi Unema | Engineering Team | 4/21 | 5/20 | M | GFOE | USA |
| 12 | Jeffrey Laning | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 13 | Sean Kennison | Engineering Team | 4/21 | 5/20 | M | GFOE | USA |
| 14 | Chris Ritter | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 15 | Don Liberatore | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 16 | Dan Rogers | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 17 | Emily Narrow | Engineering Team | 4/24 | 5/20 | F | GFOE | USA |
| 18 | Caitlin Bailey | Engineering Team | 4/24 | 5/20 | F | GFOE | USA |
| 19 | Roland Brian | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 20 | Annie White | Engineering Team | 4/24 | 5/20 | F | GFOE | USA |
| 21 | Bob Knott | Engineering Team | 4/24 | 5/20 | M | GFOE | USA |
| 22 | Neah Baechler | Mapping Watch Stander | 4/24 | 5/20 | F | OER | USA |
| 23 | Amy Bowman | Web Coordinator | 4/24 | 5/20 | F | OER | USA |

# G. Administrative

**1. Points of Contact:**

|  |
| --- |
| **Ship Operations** |
| Marine Operations Center, Atlantic (MOA)439 West York StreetNorfolk, VA 23510-1145Telephone: (757) 441-6776Fax: (757) 441-6495 | Chief, Operations Division, Atlantic (MOA)LT Joe Carrier, NOAATelephone: (757) 441-6842E-mail: Chiefops.MOA@noaa.gov |
|  |  |
| **Mission Operations** |
| Kasey CantwellExpedition CoordinatorNOAA Office of Ocean Exploration and ResearchO: (301)-734-1050C: (301) 717-7776E-mail: Kasey.cantwell@noaa.gov Mike WhiteMapping LeadNOAA Office of Ocean Exploration and Research (ERT)O: (603) 862-5247C: (631) 561-9802E-mail: Michael.white@noaa.gov  | CAPT Mark Wetzler, NOAACommanding OfficerNOAA Ship *Okeanos Explorer*Phone: (401) 378-8284Email: CO.Explorer@noaa.gov **LT Aaron Colohan, NOAA****Operations Officer** **NOAA Ship Okeanos Explorer****Phone: (808) 659-9197 (Ship’s Iridium)****E-mail:** Ops.Explorer@noaa.gov |
|  |  |
| **Other Mission Contacts** |
| Craig Russell Program Manager NOAA Ocean Exploration & ResearchPhone: (206) 526-4803 / (206) 518-1068E-mail: Craig.Russell@noaa.gov | CDR William Mowitt, Deputy DirectorNOAA Ocean Exploration & ResearchPhone: (301) 734-1023 E-mail: William.Mowitt@noaa.gov |
| Brian KennedyExpedition ManagerNOAA Office of Ocean Exploration and ResearchCell: (706) 540-2664E-mail: Brian.Kennedy@noaa.gov  | Alan Leonardi, DirectorNOAA Ocean Exploration & ResearchPhone: 301-734-1016/ Mobile: 202-631-1790E-mail: alan.leonardi@noaa.gov |
| **Vessel Shipping Address** |
| **1. Shipments**Send an email to the *Okeanos Explorer* Operations Officer at OPS.Explorer@noaa.gov indicating the size and number of items being shipped. |

**2. Diplomatic Clearances**

This project involves Marine Scientific Research in waters of Kiribati and the Cook Islands. Copies of the Diplomatic Notes approving exploration activities can be found in Appendix XX.

**3. Licenses and Permits**

The expedition is being planned and conducted by NOAA as an agency of the U.S. Federal government, in partnership with NOAA NMFS Pacific Islands Regional Office Marine National Monument Program. We do not require a permit to work in the Pacific Remote Islands Marine National Monument.

A request to conduct operations in the National Marine Sanctuary of American Samoa was submitted and received (permit #NMSAS-2017-001). Please see Appendix XX for the full text.

A request to conduct operations and collect samples in the territorial waters of American Samoa was submitted to the Division of Marine and Wildlife Resources. The permit was received on January 19, 2017- full text is included in Appendix XX.

A permit to conduct exploration activities inside of Marae Moana (Cook Islands) has been requested and received (permit # 05/17). Please see Appendix XX for the full text.

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) evaluation memorandum has been completed for this survey, in accordance with Section 4 of the Companion Manual.  This evaluation document memorandum describes EX1704 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 evaluation document 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 (Appendix XX).

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 (Appendix XX).

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

|  |  |
| --- | --- |
| Date | Activities |
| 4/21 | Some EX1705 personnel arrive  |
| 4/22 | Festival of Sites in Pago Pago |
| 4/23 | No activities planned |
| 4/24 | Full day of public tours, remaining mission personnel arrive. |
| 4/25 | Mission prep, VIP tours and some public/school group tours. |
| 4/26 | Mission prep |
| 4/27 | Depart Pago Pago, AS 0900. Transit to Aunu’u Unit of NMSAS for Dive 1. Short (~5 hour) dive, recover by 1630 and begin transit north. |
| 4/28 | Transit day |
| 4/29 | Transit day |
| 4/30 | Dive 2: Northern Manahiki Plateau |
| 5/1 | Dive 3: Northern Manahiki Seamount |
| 5/2 | Dive 4: Abyssal site. Extended (10 hour) dive. |
| 5/3 | Transit Day. Argo float deployment. |
| 5/4 | Dive 5: South Jarvis Seamount |
| 5/5 | Dive 6: Jarvis Island |
| 5/6 | Dive 7: Jarvis A |
| 5/7 | Dive 8: Jarvis B + water column transects. Extended (10 hours) dive. |
| 5/8 | Dive 9: Jarvis C |
| 5/9 | Transit Day. Argo Float deployment.  |
| 5/10 | Dive 10: Palmyra SW |
| 5/11 | Dive 11: Palmyra. Potential small boat transfer from Palmyra Field Station. |
| 5/12 | Dive 12: Kingman |
| 5/13 | Dive 13: Kingman 2 + water column transects. Extended (10 hour) dive |
| 5/14 | Dive 14: North EEZ Seamount |
| 5/15 | Dive 15: Carole Seamount |
| 5/16 | Transit. Argo float deployment(s). |
| 5/17 | Transit. Argo float deployment. |
| 5/18 | Transit. |
| 5/19 | Arrive in Honolulu, HI. De- Mobilization and preparation for dry dock. Meme Lobecker arrives to prep mapping systems for dry dock. |
| 5/20 | EX1705 Mission personnel depart. EX transits to dry dock.  |

**Table 2:** Detailed Cruise Itinerary. This is an approximate itinerary and is subject to change based on community input, survey results, field conditions, and discretion of the CO.

# B. Staging and Destaging

Minimal staging is expected as all mission equipment will be onboard already. Standard preparation for ROV expeditions is anticipated, which includes hydraulic use and high voltage operations.

 In preparation for dry dock at the conclusion of EX1705…

# C. Operations to be Conducted

1. **Telepresence / Outreach Events**
	1. Three live video feeds will be used throughout the cruise to provide situational awareness for onshore personnel.
	2. At least three live interactions are planned during the cruise with OER teacher professional development workshops
	3. 2-3 interactions are planned with the Cook Islands
	4. 2-3 NOAA VIP interactions with Silver Spring ECC
	5. Additional live events are likely but TBD

1. **In-Port Events**
	1. Public ship tours are planned for the full day on 4/24 with a small group of OER/GFOE personnel. This event is anticipated to be low impact on the ship with the request for 1 person to conduct the safety briefing at the beginning of the tour as well as the bridge overview throughout the day, and a second person to be a tour guide for a few hours in the morning while new OER personnel are trained.
	2. VIP tours and select public tours 4/25 and 4/26 OR 4/24 and 4/25. Tours will be handled primarily by OER personnel with assistance from the ship requested on the bridge and for VIP greetings.
	3. NOAA Sanctuaries will be hosting a Festival of Sites to highlight American Samoa culture on 4/22. Mission personnel will be participating, but there is no request from the ship’s crew. The invitation to the event is extending to EX for those who are interested.

# D. SCUBA 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 during EX1705.

# E. Applicable Restrictions

**Sonar Operations**

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

III. Equipment

# A. Equipment and capabilities provided by the ship

* Kongsberg Simrad EM302 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 20 Mbps ship to shore; 2 Mbps shore to ship)
* Cruise Information Management System (CIMS)
* Three VoIP telephone lines
* 1 functioning and seaworthy SOLAS approved fast rescue boat
* 1 functioning and seaworthy work boat to support ROV operations and personnel transfers

# B. Equipment and capabilities provided by the scientists

* Microtops II Ozone Monitor Sun photometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
* NOAA OER 6000 m *Deep Discoverer* ROV
* NOAA *Seirios* Camera Platform

IV. Hazardous Materials

# A. Policy and Compliance

The Expedition Coordinator is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). The Expedition Coordinator and Science Team Lead will be responsible for transporting all samples and HAZMAT on and off the ship. By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

* List of chemicals by name with anticipated quantity
* List of spill response materials, including neutralizing agents, buffers, and absorbents
* Chemical safety and spill response procedures, such as excerpts of the program’s Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
* For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship’s Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

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

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

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

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

# B. Inventory

|  |  |  |
| --- | --- | --- |
| Item | Use | Approx. locations |
| 95% Denatured Ethanol (35 gallons) | Sample preservation | Wetlab, under the chemical hood |
| 10% Buffered Formalin (3 gallons) | Sample preservation | Wetlab, under the chemical hood |
| Chaos Buffer (0.5 gallons)(4 M guanidine thiocyanate, 0.5% N-laurosylsarcosine, 25 mMTris pH 8.0, 0.1 M beta-mercaptoethanol) | Sample preservation (genetics) | Wetlab, under the chemical hood |
| Aqua Shield | Underwater Lubricant | ROV Workshop Fire Cabinet, Pit |
| Dow Corning 4 | Electrical insulating compound | ROV Workshop Fire Cabinet, Pit |
| Fluid Film Spray | Silicone Lubricant | ROV Workshop Fire Cabinet |
| Isopropanol Alcohol | 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 |
| Mineral Oil | Vitrea | Hanger, Vehicles |
| Por-15 | Paint Kit | ROV Workshop Fire cabinet |
| Univis HVI 13 | Hydraulic Fluid | Hanger, ROV *D2* |
| Ultratane | Butane fuel | ROV Workshop fire cabinet |
| Rust-oleum | Protective Enamel | ROV Workshop fire cabinet |
| Flux-Off | Soldering Flux remover | ROV Workshop fire cabinet |
| Propane | Torch Fuel | ROV Workshop fire cabinet |

# 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. Supplementary Projects

**NASA Maritime Aerosol Network**

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

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

See Appendix F for full Survey of Opportunity Form.

**ARGO Floats**

# 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](http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html)

**Ship Responsibilities**

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

**NOAA OER Responsibilities**

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

**Deliverables**

1. At sea
	1. Daily plans of the Day (POD)
	2. Daily situation reports (SITREPS)
	3. Daily summary bathymetry data files
	4. Raw sonar files (EM 302, EK 60, Subbottom, ADCP)
	5. Refined SOPs for all pertinent operational activities
	6. Assessments of all activities
2. Science
	1. Multibeam raw and processed data (see appendix B for the formal cruise data management plan)
	2. XBT raw and processed data
	3. EK 60 raw data
	4. Knudsen 3260 sub-bottom profiler raw data
	5. ADCP raw data
	6. Mapping data report

**Archive**

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

VII. Meetings, Vessel Familiarization, and Project Evaluations

# A. Shipboard Meetings

A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Operations Briefing meetings will be held at 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.

**1. Pre-Project Meeting:**

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

**2. Vessel Familiarization Meeting:**

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

**3. Post-Project Meeting:**

The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or seven 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.

**4. Project Evaluation Report:**

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Expedition Coordinator. The form is available at <http://www.omao.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 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 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 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 Expedition Coordinator 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](http://www.moc.noaa.gov/all-ships/NOAA%20Form%2057-10-02%20%281-14%29%20Tuberculosis%20Screening%20Document.pdf) in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

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

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

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

**Contact Information:**

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

Please make sure the medical.explorer@noaa.gov email address is cc’d on all medical correspondence.

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

Emergency contact form is included as Appendix A.

# C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

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

* 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 15Mbps will be paid by OER and provided by OMAO.

Specific information on how to contact NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at [http://www.moc.noaa.gov/MOC/phone.html#EX](http://www.moc.noaa.gov/MOC/phone.html%23EX)

**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: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

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

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

*Okeanos Explorer* Cellular: (401) 713-4114
*OkeanosExplorer*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:
(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

There are no foreign national guests sailing on EX1705. Scott France (Canadian) and Fernando Aragon (Colombian) are both US Legal Permanent Residents though and will require assistance with attaining “OK to Board” letters to enter American Samoa.

Appendix A

**EMERGENCY CONTACT DATA SHEET–NOAA SHIP*OKEANOS EXPLORER***

Scientists sailing aboard *Okeanos Explorer* should fill out the form found at the following link location: <https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ75l1iIYirTk48G-lv37Am_k/viewform> with their emergency contact information

Appendix B: Data Management Plan

Appendix C: Categorical Exclusion

Appendix D: ESA Section Letter of Concurrence

Appendix E: EFH Consultation Letter

Appendix F: Diplomatic Clearances

Appendix G: Permits

Appendix G: NASA Maritime Aerosols Network Survey of Opportunity

# Survey or Project Name

Maritime Aerosol Network

# Lead POC or Principle Investigator (PI & Affiliation)

POC: Dr. Alexander Smirnov

# Supporting Team Members Ashore

# Supporting Team Members Aboard (if required)

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

The Maritime Aerosol Network (MAN) component of AERONET provides ship-borne aerosol optical depth measurements from the Microtops II sun photometers. These data provide an alternative to observations from islands as well as establish validation points for satellite and aerosol transport models. Since 2004, these instruments have been deployed periodically on ships of opportunity and research vessels to monitor aerosol properties over the World Oceans.