

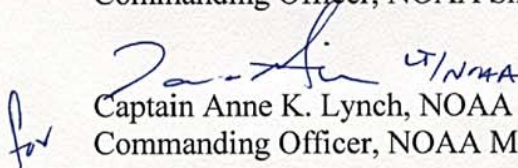


UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

MEMORANDUM FOR: Commander Ricardo Ramos, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM:

 *AKL*
Captain Anne K. Lynch, NOAA

Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-14-04
Northeast Seamounts (Mapping)

Attached is the final Project Instruction for EX-14-04, Northeast Seamounts (Mapping), which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of August 9 – 30, 2014. Of the 22 DAS scheduled for this project, 22 DAS are base funded by OMAO allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to OpsMgr.MOA@noaa.gov at Marine Operations Center-Atlantic.

Attachment

cc:
MOA1





Project Instructions

Date Submitted: Final, August 3, 2014

Platform: NOAA Ship *Okeanos Explorer*

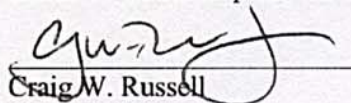
Project Number: EX-14-04 Leg 1

Project Title: Shakedown & Mapping, NE Seamounts

Project Dates: August 9 - 30, 2014

Prepared by: Derek Sowers, NOAA
Expedition Coordinator
Office of Ocean Exploration & Research

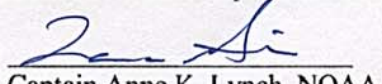
Approved by:


Craig W. Russell
Program Manager
Office of Ocean Exploration & Research

Dated:

8/4/14

Approved by:


Captain Anne K. Lynch, NOAA
Commanding Officer
Marine Operations Center - Atlantic

Dated:

08 AUG 2014

I. OVERVIEW

A. Brief Summary and Project Period

This document contains project instructions for EX-14-04 Leg 1, which is an exploration mapping cruise. Operations are expected to commence on August 9, 2014 in North Kingstown, RI, and conclude on August 30, 2014 in North Kingstown, Rhode Island. Multibeam, singlebeam, and subbottom acoustic mapping operations will be conducted 24 hours a day throughout the cruise. The final decision to operate and collect sub-bottom profiler data will be at the discretion of the Commanding Officer. Exploratory mapping operations will focus on the New England Seamount Chain, extending existing *Okeanos Explorer* data coverage in preparation for EX-14-04 Leg 3.

NOAA's *Okeanos Explorer* systematically explores the ocean every day of every cruise to maximize public benefit from the ship's unique capabilities. "Always Exploring" is a guiding principle. With 95% of the ocean unexplored, we pursue every opportunity to map, sample, explore, and survey at planned destinations as well as during transits. An integral element of *Okeanos Explorer's* "Always Exploring" model is the ship's seafloor and water column mapping capability. All three mapping sonars (EM 302, EK 60, Knudsen subbottom) are staffed on all transit cruises for 24-hour seabed, water column, and subbottom data collection and selected processing.

The first portion of the cruise will include various shakedown items that are necessary after the ship has been alongside for the summer, including further at-sea testing of VSAT and communications networks and systems, mapping software updates, hardware updates, EK60 sonar calibration, and EM302 sonar patch test and calibration. This initial shakedown work is anticipated to take approximately four days total (Aug 9-12). The remainder of the cruise will focus on mapping previously unmapped seamounts in the New England Seamount chain.

During cruise planning, transits are optimized to allow mapping of unexplored or unmapped regions. Input received from ocean science and management communities is reviewed to identify unexplored regions for possible inclusion. Scientists and managers are also consulted to verify that potential targets remain a high priority and were not recently explored. The transit path to the seamounts mapping focus area has been planned by OER to re-map (in higher resolution) selected portions of seamounts covered in Extended Continental Shelf (ECS) mapping data and to fill select datagaps in seamounts mapped during EX-13-03. This transit mapping will provide improved data to prepare for potential ROV dive locations within the seamount chain.

Requests for information on priority exploration areas for 2014 mapping and ROV exploration resulted in general interest for exploration of the New England Seamount chain. The general plan for the mapping leg described by this document is to extend existing EX coverage eastward by directly building upon the areas mapped in 2013 during EX-13-03.

B. Days at Sea (DAS)

Of the 22 DAS scheduled for this project, 22 DAS are funded by an OMAO allocation, 0 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a Medium Operational Tempo due to its general focus on mapping activities.

C. Operating Area

The operating area encompasses an exploration transit path from port in North Kingstown, RI to Veatch Canyon for a multibeam path test at the U.S. Atlantic Continental Shelf Break, a brief return to RI for personnel dropoff, then a transit to the outer New England Seamount chain. EX-14-04 L1 operations will be conducted within the U.S. EEZ and in international waters. Refer to Figure 1 for the Operating Area summary map, and Table 1 for key operating area coordinates. Detailed survey lines within the seamounts mapping focus area will be provided to the ship during the expedition.

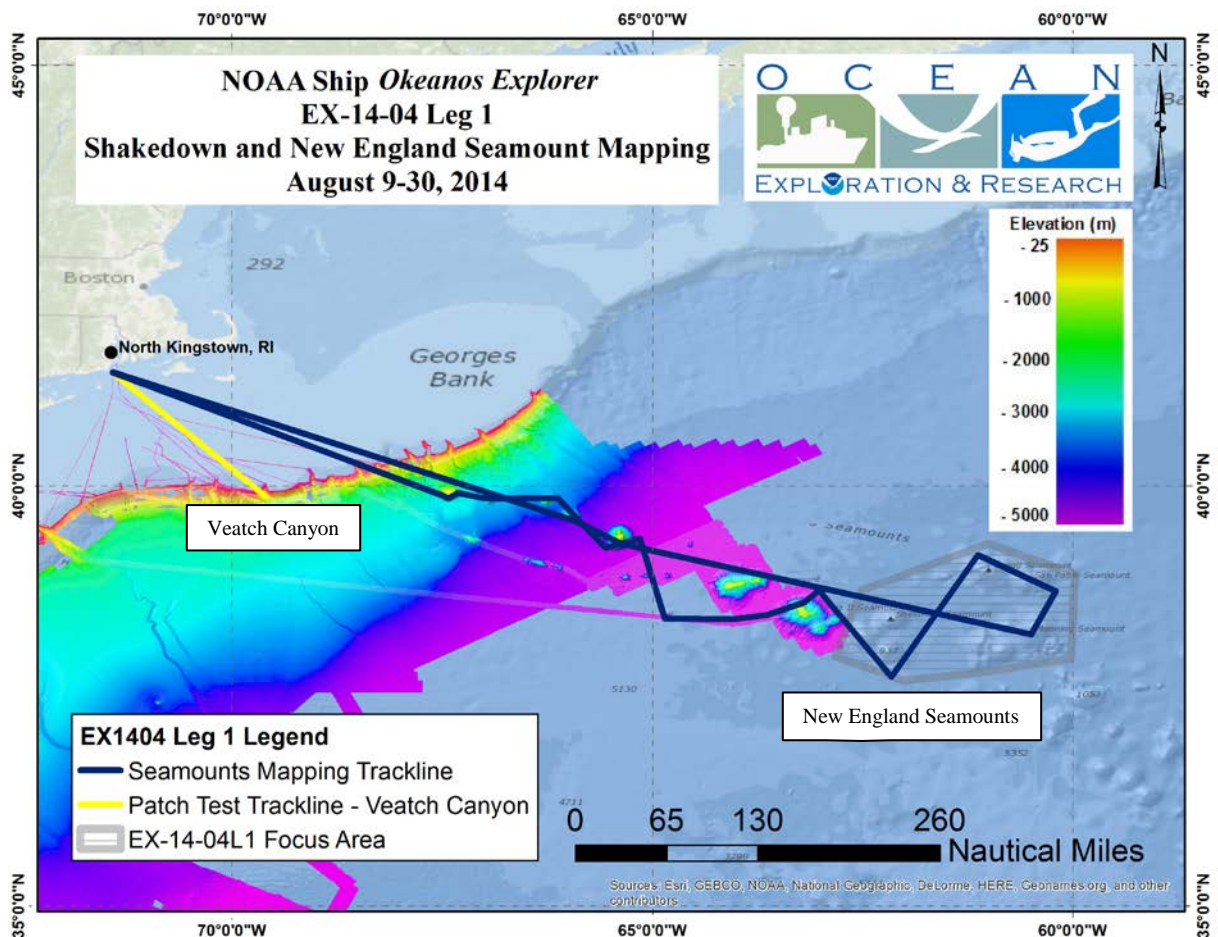


Figure 1: Approximate operating area of the *Okeanos Explorer* for EX-14-04 Leg1. The planned ship track to the multibeam sonar patch test area of Veatch Canyon is shown in yellow. The planned ship track to the New England Seamounts focused mapping area is shown in navy blue, with the focus area located within the cross-hatched polygon. Color-coded bathymetry previously collected by the *Okeanos Explorer* and by the University of New Hampshire’s Center for Coastal and Ocean Mapping UNCLOS expeditions, is shown in the background of the operating area for context. Map produced in ESRI ArcGIS 10.1.

Calibration of the ship's EK 60 split-beam sonar will occur at a site between Narragansett Bay and Veatch Canyon. This work is needed to properly calibrate the EK60 to water conditions in this region, as the last calibration was conducted in the Gulf of Mexico. The calibration can take between 12-48 hours of work depending on conditions. The ship should be drifting free during the calibration, but the calibration can be halted periodically to let the ship maneuver for safety considerations. Deeper water is preferred for the sake of calibrating in water closer in nature to that found in the New England Seamounts region, but water calmness and safety of navigation are more important considerations in determining the exact location of the calibration work. Therefore the best location/timing for completing the EK60 calibration will be determined in the field by the Expedition Coordinator, Operations Officer, and CO in consultation with the visiting Kongsberg technicians.

Table 1: Approximate transit waypoints for EX-14-04-Leg1 in degrees decimal minutes.

The actual cruise track will vary due to prevailing conditions, exploration opportunities, and the discretion of the Commanding Officer. Additional waypoints for survey lines in priority mapping areas will be provided by the Expedition Coordinator during the cruise. Waypoints are ordered from the start of the cruise to the end of the cruise.

Latitude	Longitude	Description
41 05.848 N	71 20.616 W	Exit Narragansett Bay (these coordinates are the navigational entrance to Narragansett Bay)
39 52.356N	69 36.218W	Veatch Canyon
41 05.848 N	71 20.616 W	Small Boat Transfer (these coordinates are the navigational entrance to Narragansett Bay)
39 52.874 N	67 29.353 W	BEAR1
39 50.996 N	67 25.829 W	BEAR2
39 54.847 N	67 18.965 W	BEAR3
39 51.202 N	67 0.516 W	PHYSALIA1
39 50.769 N	66 50.296 W	PHYSALIA2
39 51.258 N	66 22.615 W	RETRIEVER1
39 50.911 N	66 7.428 W	RETRIEVER2
39 44.5 N	66 4.74 W	PICKET1
39 37.953 N	65 49.575 W	PICKET2
39 15.369 N	65 33.671 W	BALANUS1
39 21.947 N	65 9.213 W	BALANUS2
38 25.367 N	64 51.16 W	PANULIRUS1
38 24.621 N	64 2.67 W	TRANSIT_ATL1
38 27.797 N	63 38.125 W	TRANSIT_ATL2
38 36.419 N	63 11.808 W	GAP_FILL
38 45.288 N	63 1.228 W	GOSNALD_START
37 42.338 N	62 10.004 W	GOSNALD_END
39 10.311 N	61 7.97 W	GREGG
38 43.656 N	60 12.687 W	SANPABLO
38 13.029 N	60 30.114 W	MANNING

39 18.728 N	65 22.618 W	GAP_FILL2
39 35.003 N	65 3955.51 W	GAP_FILL3
39 50.897 N	66 20.208 W	RETRIEVER3
39 48.5 N	66 55.02 W	PHYSALIA3
39 56.829 N	67 22.317 W	BEAR4
41 05.848 N	71 20.616 W	Entrance to Narragansett Bay (these coordinates are the navigational entrance to Narragansett Bay)

D. Summary of Objectives

EX-14-04-Leg 1 is a combination system shakedown and exploratory mapping expedition. Multibeam, single beam, and subbottom sonar data will be collected 24 hours a day and XBT casts will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 3-4 hours. The final decision to operate and collect sub-bottom profiler data 24 hours a day will be at the discretion of the Commanding Officer. All multibeam data will be fully processed according to standard onboard procedures and will be archived with the National Geophysical Data Center (NGDC). Subbottom sonar data will be also be archived with NGDC. Split-beam EK60 data and the complete SCS dataset will be archived at the National Oceanographic Data Center.

The following are cruise objectives for EX-14-04 Leg 1:

1. Conduct additional VSAT testing with MTN technician as needed. The re-built VSAT system is planned to be tested at sea prior to this cruise. However, additional at sea testing may need to be done during the first few day of the cruise. If so, assistance from the ship's ETs may be needed. The ship will perform several aggressive steering maneuvers during GAMS calibration for the POS MV (Objective 3), which should serve as a useful test of the VSAT's tracking capability under strenuous conditions.
2. Kongsberg technician(s) to conduct alongside work on sonar equipment 8/7 and/or 8/8. This work primarily involves updating the Seafloor Information System (SIS) multibeam data acquisition software that is used to operate the EM302.
3. Conduct POS MV GAMS calibration prior to the multibeam patch test.
 - a. Create SOP. The GAMS calibration should be performed when there is good satellite geometry and the vessel is underway where unrestricted maneuvering is possible. During the calibration the vessel performs a series of 'Figure 8' or 'S-turn' maneuvers. Applanix GAMS calibration instructions are provided in Appendix E.
4. Conduct annual multibeam patch test at Veatch Canyon.
5. Conduct EK 60 calibration between Narragansett Bay and Veatch Canyon, exact location TBD dependent on water depth, traffic, and prevailing current conditions.
6. Shakedown items to test:
 - a. Changes to POS MV hardware and update SOP.

- b. New XBT rack unit and update SOP.
 - c. POS MV firmware update and update SOP.
 - d. New version of Hypack installed on "PLANNING" computer and update relevant SOPs.
7. Telepresence Objectives
- a. Evaluate functionality of recording and communication equipment relevant to Telepresence.
 - b. Work with NOC to ensure ship routers are properly configured to support Telepresence.
 - c. Work with MTN to evaluate repairs to VSAT and follow up on any VSAT issues identified during the 2-day VSAT shakedown that will occur prior to EX-14-04 L1.
 - d. Further refine workflow in partnership with Data Management team.
8. Data Management Objectives
- a. Continue acquisition and shoreside push of mapping data and products.
 - b. Confirm data consolidation procedures / automation is still functional following dockside maintenance / updates.
 - c. Continue development of automated full cruise data backup processes.
 - d. Field test / integration of Mac Warehouse systems.
9. Assess SVP Server status. This software program improves EX capability for water column sound speed characterization needed for the EM302 multibeam sonar.
10. Collect deep water multibeam sonar data (MBES)
- a. Conduct 24-hr mapping operations for the duration of the cruise.
 - b. Collect bathymetric, seafloor backscatter, and water column backscatter data.
11. Collect ancillary sonar data
- a. EK60 split-beam sonar (24 hours/day).
 - b. Knudson sub-bottom profiler (up to 24 hours/day, at a minimum from 0800-2000). The final decision to operate and collect sub-bottom profiler data will be at the discretion of the Commanding Officer.
12. Perform baseline characterization mapping (multibeam, split-beam, subbottom) of New England Seamount chain in preparation for EX-14-04-Leg 3, in areas shown in Figure 1.
13. During transit to and from seamounts working grounds, conduct exploration mapping, possibly to include:
- a. focused mapping at certain seamounts with existing ECS data
 - b. transit mapping over poor data quality areas in existing ECS data or gaps in data from EX-13-03.
14. XBT and CTD operations

- a. XBT casts will be collected at regular intervals of no more than 3-4 hours to ensure accurate sound velocity profiles for operating the MBES. These casts will be conducted by the mapping watches.
 - b. A deep water CTD cast is planned to be done during the EM302 patch test for comparison of sound speed profile results with XBT casts. The CTD should be conducted prior to surveying the patch test lines in order to get as accurate a sound velocity profile of the water column as possible. Additional CTD casts are not planned for this cruise, but the equipment should be ready depending on science input.
15. Conduct training of seven (7) mapping interns in all mapping data collection, including sonars and sound velocity profiling sensors and processing procedures (continuous throughout cruise).
 16. Collect standard full suite of SCS data. All SCS data will be sent to NCDDC and will be used in real-time by NCDDC throughout the cruise.
 17. Collect sun photometer measurements as part of ongoing survey-of-opportunity. Details of this objective provided in Appendix D.

E. Participating Institutions

Maryland Sea Grant, 4321 Hartwick Road, Suite 300, College Park, MD 20740

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

National Oceanic and Atmospheric Administration (NOAA) – Office of Coast Survey – Atlantic and Pacific Hydrographic Branches

Oregon State University, College of Earth, Ocean, and Atmospheric Sciences, 104 CEOAS Administration Building, Corvallis, OR 97331-5503

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

University of Louisiana at Lafayette- Biology Department – 300 E St. Mary Blvd., Lafayette, LA 70503 USA

University of New Hampshire (UNH)–Center for Coastal and Ocean Mapping (CCOM)–Jere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824 USA

University of Rhode Island, Graduate School of Oceanography’s Inner Space Center – 215 South Ferry Rd. Narragansett, RI 02882 USA

F. Personnel (Science Party)

A full mapping complement is necessary for this cruise. Required mission personnel include a Mapping Lead/Expedition Coordinator as well as two qualified watchstanders for each of the three eight hour watches. The mapping lead is responsible for facilitating overall mapping operations, including participating in operational meetings, providing guidance for mapping/survey troubleshooting, and communicating status of mapping sensors to personnel on shore.

Table 2: Full list of the science party members and their affiliation

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Augustyn, Andrew	Intern	8/7/14	8/31/14	M	UCAR	US Citizen
Auner, Lydia	Intern	8/8/14	8/30/14	F	NOAA OED	US Citizen
Barbee, David	Kongsberg Engineer	8/7/14	8/12/14	M	Kongsberg	US Citizen
Drewniak, Jared	Telepresence	8/8/14	8/12/14	M	NOAA OER (ERT Inc)	US Citizen
Grabb, Kalina	Mapping Watch Lead	8/8/14	8/30/14	F	UCAR	US Citizen
Harris, Jared	Kongsberg Engineer	8/7/14	8/12/14	M	Kongsberg	US Citizen
Hodson, Timothy	Intern	8/7/14	8/31/14	M	UCAR	US Citizen
Husted, Rachel	Intern	8/8/14	8/30/14	F	MD Sea Grant	US Citizen
Jones, Meghan	Intern	8/8/14	8/30/14	F	UCAR	US Citizen
Lobecker, Meme	Mapping Team Lead	8/7/14	8/12/14	F	NOAA OER (ERT Inc)	US Citizen
Reser, Brendan	Data Management	8/7/13	8/12/14	M	NOAA OER (General Dynamics, Info. Tech.)	US Citizen
Rodriguez, Rebekah	Intern	8/7/14	8/31/14	F	NOAA EPP	US Citizen
Sowers, Derek	Expedition Coordinator / Mapping Team Lead	8/8/14	8/30/14	M	NOAA OER (ERT Inc)	US Citizen

Weller, Erin	Mapping Watch Lead	8/7/14	8/30/14	F	NOAA AHB	US Citizen
--------------	-----------------------	--------	---------	---	-------------	------------

G. Administrative

1. Points of Contact:

Ship Operations

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

Chief, Operations Division, Atlantic (MOA)
LT Laura Gibson, NOAA
Telephone: (757) 441-6842
E-mail: ChiefOps.MOA@noaa.gov

Mission Operations

Derek Sowers, Expedition Coordinator/
Mapping Team Lead
NOAA Office of Ocean Exploration
and Research (ERT, Inc)
Phone : (714) 321-6084 / (603)862-0369
E-mail : derek.sowers@noaa.gov

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

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

Other Mission Contacts

Craig Russell, EX Program Manager
NOAA Ocean Exploration & Research
Phone: 206-526-4803 / 206-518-1068
E-mail: Craig.Russell@noaa.gov

LCDR Nicola VerPlanck, NOAA
NOAA Ocean Exploration & Research
Phone: 206-526-4801
E-mail: Nicola.Verplanck@noaa.gov

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

Jared Drewniak, Telepresence Lead
NOAA Office of Ocean Exploration & Research
(Acentia)
Phone: (401) 874-6250 (o) / (401) 330-9662 (c)
Email: jared.drewniak@noaa.gov

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. All items should arrive at the below address prior to **COB August 7, 2014.**

ATTN: LT Emily Rose, NOAA
NOAA Ship *Okeanos Explorer*
2578 Davisville Rd.
North Kingstown, RI 02852

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

See Appendix C for categorical exclusion documentation.

II. OPERATIONS

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

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

Thursday, August 7

- Most mission personnel arrive to ship, including Kongsberg technician(s)

Friday, August 8

- Remaining mission personnel arrive to ship, orientation, and preparation for departure

Saturday, August 9

- Depart North Kingstown for Veatch Canyon.

Saturday, August 9 - Monday, August 11

- Conduct GAMS calibration, multibeam patch test, EK 60 calibration.

Tuesday, August 12

- Return five (5) members of the science party to shore via small boat transfer in Narragansett Bay: two Kongsberg engineers, Lobecker, Reser, and Drewniak.
- Commence transit to NE Seamounts via pre-defined exploration transit mapping line filling gaps and improving existing multibeam coverage of seamounts.

Friday, August 15

- Arrive seamounts working grounds, commence focused mapping operations within mapping focus area shown in Figure 1.

Friday, August 15 - Wednesday, August 27

- Conduct focused mapping exploration at New England Seamounts within mapping focus area shown in Figure 1.

Wednesday, August 27

- Commence transit to port via pre-defined exploration transit mapping line.

Saturday, August 30

- Arrive in port at North Kingstown, RI

Saturday, August 30 - Sunday, August 31

- Mission personnel depart ship

B. Telepresence Events

No telepresence events are currently planned.

C. In-Port Events

There are currently no port events scheduled.

D. Staging and De-staging

One ROV container is planned to be loaded prior to the start of EX-14-04 Leg 1, with an optimal date of 8/7/14. If the container cannot be loaded prior to Leg 1, the contingency date is 9/2/14. The Deep Discoverer ROV and Seirios camera sled must be loaded at the end of EX-14-04 Leg 1 immediately following arrival of the ship on 8/30/14. A staging plan with additional details for these transfers will be provided separately by the ROV Team.

E. 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 currently planned to occur during this cruise. However, in preparation for the cruise, OER has requested that within two weeks prior to the start of the cruise there is a dive inspection of the EM302, EK60, and Knudsen subbottom transducers and the Reson sound velocity probe. This pre-cruise dive is scheduled for 8/6/14. The overall sonar gondola should be inspected and gently cleaned as needed to remove any biofouling that may have occurred during the summer in-port period.

F. Sonar Operations

Continuous EM 302, EK 60, and subbottom profiler data acquisition is planned for this cruise. All data acquisition will be conducted in accordance with established standard operating

procedures under the direction of the mapping team lead. The final decision to operate and collect sub-bottom profiler data will be at the discretion of the Commanding Officer.

G. Applicable Restrictions

NOT APPLICABLE TO THIS CRUISE

III. EQUIPMENT

A. Equipment and capabilities provided by the ship

- Kongsberg Simrad EM302 Multibeam Echosounder (MBES)
- Kongsberg Simrad EK60 Deepwater Echosounder
- Knudsen Chirp 3260 Subbottom profiler (SBP)
- LHM Sippican XBT (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- NetApps mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech5Mbps ship to shore; 1.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- EK60 calibration equipment (provided by Kongsberg).

IV. HAZARDOUS MATERIALS

- A. Policy and Compliance
- B. Inventory
- C. Chemical safety and spill response procedures.
- 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 (mapping interns) 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 will be brought to the ship and stewarded by the Expedition Coordinator.

See Appendix D for the full Survey of Opportunity Form describing this project.

B. NOAA Fleet Ancillary Projects

NOT APPLICABLE TO THIS CRUISE

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.

Deliverables

- a. At sea
 - Daily plans of the Day (POD)
 - Daily situation reports (SITREPS)
 - Daily summary bathymetry data files
- b. Post cruise
 - Refined SOPs for all pertinent operational activities
 - Assessments of all activities
- c. Science
 - Multibeam and XBT raw and processed data (see appendix B for the formal cruise data management plan)
 - EK 60 raw data
 - Knudsen 3260 sub-bottom profiler raw data
 - Mapping data report

Archive

- The Program 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

Daily Operations Briefing meetings will be held at 1430 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. A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX PLONE site (<http://tethys.gso.uri.edu/OkeanosExplorerPortal>).

Pre-Project Meeting: The Chief Scientist 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 Chief Scientist in arranging this meeting.

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.

Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

B. 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 <http://www.oma.noaa.gov/fleeteval.html> and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. MISCELLANEOUS

A. Meals and Berthing

Meals and berthing are required for 15 scientists for the first 4 DAS of the expedition and 9 scientists for the entire cruise. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. 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 Chief Scientist or the NOAA website <http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

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

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

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

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

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street

Norfolk, VA 23510
Telephone 757.441.6320
Fax 757.441.3760
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 on board *Okeanos Explorer*.
- All personnel on board 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. Standard VSAT bandwidth at 5 Mbps is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required it must be arranged at least 30 days in advance.

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

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

Okeanos Explorer Iridium: (808) 659-9179

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

EX INMARSAT B

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

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

Voice Over IP (VoIP) Phone:

301-713-7785

301-713-7791

301-713-7792

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

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

E. IT Security

Any computer that will be hooked into the ship's network must comply with the NMAO Fleet

IT Security Policy prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

1. Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of 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 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

1. Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

Appendix A

EMERGENCY DATA SHEET

NOAA OKEANOS EXPLORER

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

https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ7511iIYirTk48G-lv37Am_k/viewform with their emergency contact information

Appendix B: EX-14-04 Leg 1 Data Management Plan

Data Management Plan

Okeanos Explorer (EX1404L1): Shakedown and Mapping, NE Seamounts



Data Management Objectives

Test and re-certify established data pipelines. Test new Okeanos Atlas functions with operational data. Test modified workflow for SCS (pulling from tethys instead of hard-drive) and also check on success of new SCS Submit Data functionality taken on by ship's crew. Confirm data consolidation procedures / automation is still functional following dockside maintenance / updates. At-sea data management training. Continue development of automated full cruise data backup processes. Field test / integration of Mac Warehouse systems.

09-Jul-14

Page 1

1. General Description of Data to be Managed

1.1 Name of the Dataset of Data Collection Project

Okeanos Explorer (EX1404L1): Shakedown and Mapping, NE Seamounts

The first portion of the cruise will include various shakedown items that are necessary after the ship has been alongside for summer dockside repairs, including at-sea testing of VSAT and communications networks and systems, mapping software updates, hardware updates, and sonar calibration. The second portion of the cruise will focus on mapping previously unmapped seamounts in the New England Seamount chain.

1.2 If this mission is part of a series of missions, what is the series name?

OKEANOS EXPLORER

1.2 Keywords that could be used to characterize the data.

Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Veatch Canyon, Narragansett Bay, New England Seamounts, oceans

1.4 Summary description of the data to be generated.

Multibeam, single beam, and subbottom sonar data will be collected 24 hours a day and XBT casts will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 3-4 hours. EX1404L1 will perform baseline characterization mapping (multibeam, splitbeam, subbottom) of New England Seamount chain in preparation for EX1404L3. During transiting to and from seamounts, exploration mapping will include areas of poor quality from existing ECS data and gaps in ECS data.

1.5 Anticipated temporal coverage of the data.

Cruise Dates: 8/9/2014 to 8/30/2014

1.6 Anticipated geographic coverage of the data.

Latitude Boundaries: 40 to 35.5

Longitude Boundaries: -72 to -57.5

1.7 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer

1.8 What data types will you be creating or capturing?

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, Bottom Backscatter, EK60 Singlebeam Data, Multibeam (raw), Multibeam (processed), Multibeam (image), SCS Output (native), SCS Output (compressed), Sub-Bottom Profile data, Water Column Backscatter, XBT (raw), Mapping Summary, Multibeam (product)

1.8 What data types will you be submitting for archive?

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, Bottom Backscatter, EK60 Singlebeam Data, Multibeam (raw), Multibeam (processed), Multibeam (image), SCS Output (native), SCS Output (compressed), Sub-Bottom Profile data, Water Column Backscatter, XBT (raw), Mapping Summary, Multibeam (product)

1.9 What volume of data is anticipated to be collected in the Project Time Frame?

160 GB

2. Points of Contact

2.1 Who is the overall point of contact for the data collection?

Derek Sowers, Physical Scientist, NOAA Office of Ocean Exploration and Research, Derek.Sowers@noaa.gov

2.2 Who is responsible for verifying the quality of the data?

Derek Sowers, Physical Scientist, NOAA Office of Ocean Exploration and Research, Derek.Sowers@noaa.gov

2.3 Who is responsible for data documentation and metadata activities?

Susan Gottfried, Data Management Coordinator, NOAA National Coastal Data Development Center, susan.gottfried@noaa.gov

2.4 Who is responsible for data storage and data disaster recovery activities?

NOAA National Data Centers (National Geophysical Data Center, National Oceanographic Data Center, NOAA Central Library)

3. Data Stewardship

3.1 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM302 is handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format and are not quality controlled. CTDs are processed into profiles for display only on the Okeanos Atlas.

4. Data Documentation

4.1 Which metadata repository will be used to document this data collection?

An ISO format collection-level metadata record will be generated during pre-cruise planning and published in an OER catalog and Web Accessible Folder (WAF) hosted at NCDDC for public discovery and access. The record will be harvested by data.gov.

4.2 What additional metadata or other documentation is necessary to fully describe the data and ensure its long-term usefulness?

Additional metadata includes: Multibeam metadata to file level; Scientific Computing System (SCS) metadata; MACHine Readable Catalog (MARC) metadata for Library items.

4.3 What standards will be used to represent data and metadata elements in this data collection?

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

5. Data Sharing

5.1 What date will the data be made available to the public?

All data from this mission is expected to be documented, archived and accessible within 60-90 days post-mission through the NOAA National Data Centers and public access GIS map applications. Meteorological and Oceanographic (METOC) sensor data from the SCS, and CTD data are converted in a post-mission model into archive ready compressed NetCDF-4 format and stored within the NCDDC THREDDS open-access server.

5.2 If the data are not to be made publicly available, under what authority are the data restricted?

Not Applicable

5.2a Access Constraints Statement?

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

5.2b Use Constraints Statement?

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

6. Initial Data Storage and Protection

6.1 Where and how will the data be stored initially (prior to archive submission)?

Data are recorded and stored on NOAA shipboard systems compliant with NOAA IT procedures. Data are moved from ship to shore using a variety of standard, documented data custody transfer procedures. Data are transferred to NOAA Data Centers using digital and physical data transfer models depending upon the data volume.

6.2 Discuss data back-up, disaster recovery, contingency planning and off-site storage relevant to this data collection.

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

6.3 Describe how the data will be protected from unauthorized access, how permissions will be managed and what process will be followed in the event of unauthorized access.

Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures.

Okeanos Explorer (EX1404L1): Shakedown and Mapping, NE Seamounts

7. Long-Term Archiving and Preservation

7.1 In what NOAA Data Center(s) will the data be archived and preserved?

Data from this mission will be preserved and stewarded through the NOAA National Data Centers. Refer to the Okeanos Explorer FY14 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY14_DMP_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

7.1 a If you do not plan to archive in the NOAA Data Centers, what is your long-term strategy for maintaining, curating, and archiving the data?

Not Applicable

7.2 What transformations or procedures will be necessary to prepare data for preservation or sharing?

SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF-4 format to NODC; multibeam data and metadata will be compressed and delivered in a bagit format to NGDC.

Appendix C: Categorical Exclusion



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

June 23, 2014

MEMORANDUM FOR: The Record John
FROM: John McDonough McDonough
Acting Director NOAA Office of Ocean Exploration
and Research (OER)
SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer*
Cruise EX-14-04 Leg 1

Digitally signed by John McDonough
DN: cn=John McDonough, o=Ocean
Exploration, ou=NOAA/OAR, email=john.
mcdonough@noaa.gov, c=US
Date: 2014.06.19 12:58:33 -0400

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

This project is part of the NOAA Office of Ocean Exploration and Research's "Science Program" and entails multi-disciplinary ocean mapping and exploration activities designed to increase knowledge of the marine environment. This project is entitled "EX-14-04 Leg 1 Shakedown and Mapping NE Seamounts (Mapping)" and will be led by Derek Sowers, Physical Scientist for the *Okeanos Explorer* program within OER. NOAA Ship *Okeanos Explorer* will depart North Kingstown, Rhode Island on August 9, 2014, and return back to port in North Kingstown, Rhode Island on August 30, 2014, and will conduct sonar mapping operations at all times during the cruise. The first portion of the cruise will include various shakedown items that are necessary after the ship has been alongside for the summer, including at-sea testing of VSAT and communications networks and systems, mapping software updates, hardware updates, and sonar calibrations. The second portion of the cruise will focus on mapping previously unmapped seamounts in the New England Seamount chain. Acoustic instruments that will be operational during the project are a 30 kHz multibeam echosounder (Kongsberg EM 302), an 18 kHz singlebeam echosounder (Kongsberg EK 60), and a 3.5 kHz sub-bottom profiler (Knudsen Chirp 3260). Additionally, expendable bathythermographs (XBTs) will be deployed at regular intervals in association with multibeam data collection.



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

This project will not result in any changes to the human environment. As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible. As such, this project is categorically excluded from the need to prepare an environmental assessment.

Appendix D. NASA Maritime Aerosols Network Survey of Opportunity

Survey or Project Name

Maritime Aerosol Network

Points of Contact (POC)

<i>Lead POC or Principle Investigator (PI & Affiliation)</i>	<i>Supporting Team Members ashore</i>
POC: Dr. Alexander Smirnov	<i>Supporting Team Members aboard (if required)</i>

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

<p>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.</p>

Appendix E. GAMS Calibration Procedures from Applanix

GAMS Calibration procedures from the Applanix POS MV-V4 Operating Instruction for both an Auto-Start calibration and a manual calibration are included.

POS MV V4 Installation and Operation Guide

System Configuration

Note: If you do not save any new settings for the installation parameters to non-volatile memory, POS MV will apply the values stored previously (or the factory default values) when you next power-on the system.

Initial GPS Configuration

Applanix supplies POS MV with two GPS receiver cards installed in the PCS and optimally configured for use with the system.

If either of the GPS receivers loses its configuration for any reason, the PCS will reconfigure the receiver cards automatically for its own use. The messages supplied by the GPS receivers are only those required by POS MV.

If you ever need to configure the installed GPS receivers manually, you must select **Tools, Configure GPS** from the menu bar window of the MV-POSView Controller program.

Antenna Installation Calibration

A successful antenna installation calibration depends upon the GPS Azimuth Measurement Subsystem (GAMS) being able to use data from five or more satellites with a Positional Dilution of Precision (PDOP) equal to or less than three. Perform the antenna installation calibration at a time when there is good satellite geometry.

Note: Applanix recommends that the user make use of the GPS mission planning software to identify an optimal time of day during which the PDOP is at a minimum in order to achieve a good GAMS calibration.

Perform the following steps with the vessel under way in an area where unrestricted manoeuvring is possible. You have the option of allowing

POS MV V4 Installation and Operation Guide

System Configuration

POS MV to start the calibration automatically (this is called a calibration auto-start) or to start the calibration manually.

1. Ensure that MV-POSView is **Connected** as indicated in the status bar, refer to Figure 31 on page 5-5.
2. Select **Tools, Configuration** from the MV-POSView menu bar to open the **Navigator Configuration** window, refer to Figure 24.

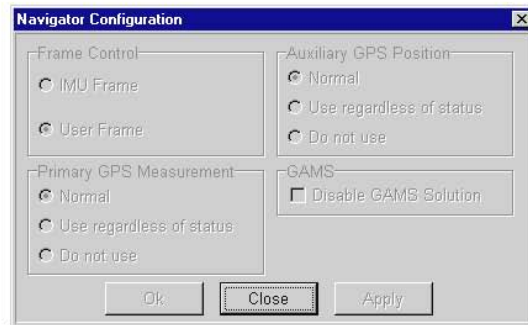


Figure 24: POSView Navigator Configuration

3. In the **GAMS** pane, ensure the **Disable GAMS Solution** option is not selected. This permits POS MV to use GAMS heading aiding in its antenna calibration solution.
4. Select **View, GAMS Solution** from the menu bar to open POS MV **GAMS Solution** window shown in Figure 25.
5. Transition the system to standby mode by selecting the **Standby** icon from the controller tool bar.

POS MV V4 Installation and Operation Guide

System Configuration

6. Select **Settings, Installation, GAMS Parameter Setup** from the menu bar to open the **GAMS Parameter Setup** window shown in Figure 26.
7. In the **GAMS Parameter Setup** window, enter a value between 0.5 and 5.0° in the **Heading Calibration Threshold** field. Select the **OK** button.

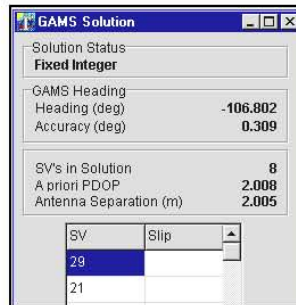


Figure 25: POSView GAMS Solution

When the indicated **Heading Accuracy** (**Attitude** pane on the controller main window) falls below the setting in the **Heading Calibration Threshold** field and the **GAMS** status (main window **Status** pane) reads **Ready Offline**, POS MV will start the antenna installation calibration routine. Choose an easy value for POS MV to achieve as you perform a series of calibration manoeuvres with the vessel:

- Set a lower value (approximately 0.5°) if you can manoeuvre the vessel aggressively.
 - Conversely, set a higher value (approximately 1°) if the most aggressive manoeuvres you can perform are 180° turns followed by a straight run.
8. Perform the following in the **GAMS Parameter Setup** window:
 - a) In most cases, this value is entered as '0'. Only if you are able to measure the antenna separation to 1 mm accuracy should you enter a value here.

POS MV V4 Installation and Operation Guide

System Configuration

Refer to the Installation Checklist on page 2-44 for instructions on how to measure the antenna separation distance.

- b) In each of the component fields in the **Baseline Vector** pane, enter '0'. Select the **Apply** and **OK** buttons.

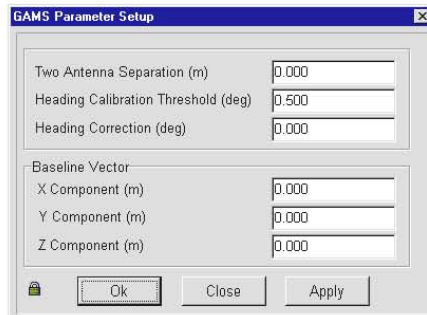


Figure 26: POSView GAMS Parameters Setup

9. Manually transition POS MV to the navigate mode. This also commands GAMS to begin execution of its on-the-fly (OTF) ambiguity resolution algorithm.
10. Next, perform either the auto-start calibration (steps 11 and 12) or the manual calibration procedure (steps 13 and 14).

AUTO-START CALIBRATION PROCEDURE

11. Select **Settings, GAMS Calibration Control, Start** from the MV-POSView menu bar (Figure 27, page 4-30). The **Status** pane for **GAMS** indicates **CAL Requested** (Figure 27, page 4-30).

The **Start** command prepares the system for an automatic start to the calibration process, but does not actually start it. Instead, the

POS MV V4 Installation and Operation Guide

System Configuration

calibration process will start automatically when the POS MV RMS heading error falls below the value that you set for the **Heading Calibration Threshold** field in step 7 above.

12. If possible, when GAMS has resolved the carrier phase ambiguities (**GAMS** on the main window **Status** pane reads **Ready Offline**), perform a series of full turns, 'S-turns' or 'Figure-8' manoeuvres, each lasting approximately one minute.

During these manoeuvres, monitor the POS MV **Heading Accuracy** field on the MV-POSView main window **Attitude** pane (Figure 27, page 4-30). When the value displayed falls below the setting for the **Heading Calibration Threshold** field (Figure 26), finish the turns and manoeuvres and hold the vessel steady on a course and at a fixed speed.

The **Status** pane for **GAMS** now indicates **CAL in Progress** and this condition lasts for approximately 60 seconds. When POS MV has completed the calibration, the displayed **GAMS** status becomes **CAL Completed**. This condition lasts for approximately five seconds and then changes to **Online**.

See Options starting with step 15.

MANUAL CALIBRATION PROCEDURE

Note: Before proceeding ensure the **GAMS Parameters Setup** window displays the values that you entered in step 7 above.

13. When GAMS has resolved the carrier phase ambiguities, the **Status** pane for **GAMS** indicates **Ready Offline** (Figure 27, page 4-30). You can start the calibration manually at any time.

POS MV V4 Installation and Operation Guide

System Configuration

If possible, perform a series of full turns, 'S-turns' or 'Figure-8' manoeuvres, each lasting approximately one minute. During these manoeuvres, monitor the POS MV **Heading Accuracy** on the MV-POSView main window **Attitude** pane (Figure 27, page 4-30). Ideally, the heading accuracy displayed should be as small as possible.

Wait until the heading error becomes as small as possible before starting the calibration. Simple manoeuvres of the vessel, such as a change of course, will cause the heading accuracy to improve.

14. To start the manual calibration, select **Settings, GAMS Calibration Control, Force** from the MV-POSView menu bar (Figure 27, page 4-30). This commands an immediate start of the calibration process.

The **Status** pane for **GAMS** indicates **CAL in Progress** and this condition lasts for approximately 60 seconds. When the POS MV has completed the calibration, the displayed **GAMS** status becomes **CAL Completed**. This condition lasts for approximately five seconds and then changes to **Online**.

See Options starting with step 15.

OPTIONS

15. Suspend calibration while in progress: Select **Settings, GAMS Calibration Control, Suspend**. The displayed **GAMS** status then becomes **CAL Suspended**.

The system suspends the partially completed calibration process until you resume it. To resume the calibration process select **Settings, GAMS Calibration Control, Start**.

POS MV V4 Installation and Operation Guide

System Configuration

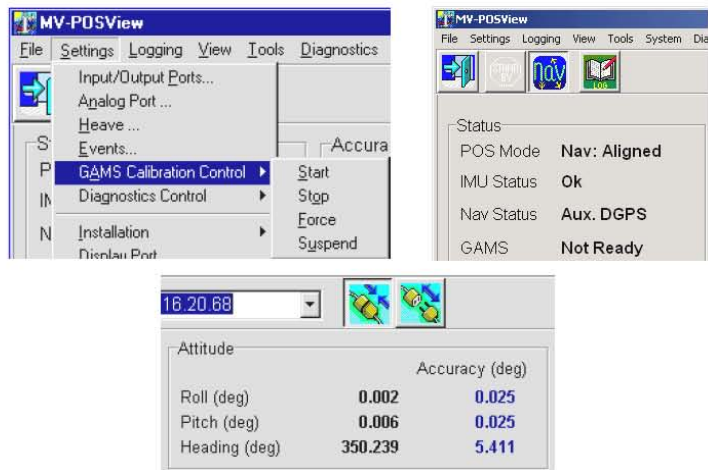


Figure 27: POSView Settings Menu, Status and Attitude Panes

16. **Stop calibration while in progress:** Select **Settings, GAMS Calibration Control, Stop**. The displayed **GAMS** status then becomes **Ready Offline**. The system cancels the partially completed calibration process.
17. **Save calibration data:** Select **Settings, Save Settings**. Wait until the MV-POSView Controller program displays the **Settings Saved** message panel. Select the **OK** button to close the message panel.
18. **Monitor system operation:** Indications of a successful calibration appear in the main window of the MV-POSView Controller program:
 - The **Status** pane for **GAMS** indicates **Online**.

POS MV V4 Installation and Operation Guide

System Configuration

- The **Altitude** pane **Heading Accuracy** field drops slowly to less than 0.15° and eventually settles to a value of 0.02° in a low multipath environment. The actual value that it settles to depends on the current setting for the multipath environment.

If the calibration was successful and no GPS dropouts occurred, POS MV should settle into a steady-state operation using the GAMS heading aiding, as indicated by the **Online** status.

If the calibration was not successful, GAMS will reject the carrier phase ambiguities repeatedly and will eventually reject the installation parameters. If this occurs, repeat the calibration process.

19. **Record data:** If the installation parameters appear to be correct, select **Settings, Installation, GAMS Parameter Setup** from the menu bar (Figure 26, page 4-27) and write down the displayed parameters. Keep the written record in a safe place for future reference.

Refer to the Operation with GAMS topic on page 5-20 for a description of how GAMS uses the GAMS installation parameters to aid the OTF ambiguity search.

Installation Parameter Correction

The surveyed antenna baseline vector may include the following errors:

- The length of the vector may not be correct if there were large multipath errors during the calibration process. This may affect the reliability of the GAMS ambiguity resolution during future POS MV initialisation sequences.
- There may be an azimuth error similar in size to the displayed heading accuracy that existed during the calibration process. This

POS MV V4 Installation and Operation Guide

System Configuration

results in a constant offset in the displayed heading during normal operation of the POS MV with GAMS heading aiding.

Correct these errors by:

1. If the displayed antenna separation differs by more than 5 mm (~¼ in) from the value that you measured after you installed the antennas, clear the installation parameters and then re-enter the measured separation distance in the **GAMS Parameter Setup** window, see Figure 26 on page 4-27. Select the **OK** button to install the new antenna separation distance.

Begin a new calibration procedure, see Antenna Installation Calibration on page 4-24.

The 5 mm (~¼ in) allowance accounts for differences that may exist between the antenna phase centres and their geometric centres.

2. If you can identify a heading offset then enter this value in the **Heading Correction** field of the **GAMS Parameter Setup** window, see Figure 26 on page 4-27. Select the **OK** button to install the new correction value.

POS MV will then compute new components of the surveyed antenna baseline vector having a corrected azimuth.

3. Select **Settings, Save Settings** from the MV-POSView menu bar to save the new values to the PCS non-volatile memory.

Note: The **Heading Correction** field in the **GAMS Parameter Setup** window allows you to correct an inaccurately surveyed baseline vector. You can use this method to obtain a more accurate vector.

Appendix F: Memo for the Record on Sonars



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
Office of Ocean Exploration and Research
1315 East-West Hwy, SSMC3
Silver Spring, MD 20910 USA

March 7, 2014

MEMORANDUM FOR: The Record
NOAA Office of Ocean Exploration and Research

FROM: Craig W. Russell, Program Manager
NOAA/OAR/OER

SUBJECT: Revised Guidance and Standard Operating Procedure for
OER Sonar operations on NOAA Ship *Okeanos Explorer* in
the vicinity of marine mammals and sea turtles

This memorandum document and sets forth revised guidance for OER sonar operations on the NOAA Ship *Okeanos Explorer* in the vicinity of marine mammals and sea turtles.

In 2011, NOAA's Southwest Fisheries Science Center provided guidance to the Office of Ocean Exploration and Research (OER) on multibeam, splitbeam, and subbottom sonar use on the NOAA Ship *Okeanos Explorer* specific to OER expeditions within and in the vicinity of National Marine Sanctuaries and endangered whales in California for March 16-April 1, 2011.

OER continued to use that guidance as basis for mapping Standard Operating Procedures since the guidance was not operationally prohibitive. Since mid-2011, OER has conducted *Okeanos Explorer* sonar operations in the Atlantic basin, including the Gulf of Mexico. Although OER sought but never received additional guidance from the National Marine Fisheries Northeast Regional Office, we consulted NOAA's existing acoustic threshold guidance and determined, based on the best information available, that the EX's sonar surveys and mapping activities are not likely to have significant impacts on marine mammals or sea turtles of a direct or cumulative nature. Currently, OER operates mission systems on the *Okeanos Explorer* under a signed Categorical Exclusion.

With consideration given to best management practices that ensure encounters and impacts with marine mammals and sea turtles are minimized, OER will implement its *Okeanos Explorer* sonar mapping standard operating procedure as follows: sonars will be secured if (1) encountered marine mammals or sea turtles appear disturbed or (2) it is operationally efficient, or legally required to do so by permit, guidance, policy, or law. This SOP will be revisited as new information, guidance, or policy is obtained or provided.