doi: 10.25923/srya-9r44

OMAO-5921 Supplemental Instructions

Date Submitted: 2/20/2020

Platform: NOAA Ship *Okeanos Explorer*

Project Number: OMAO-5921

Project Title: EM 304 Sea Acceptance Trials

Project Dates: 03/03/2020 - 03/08/2020

Shannon Hoy Digitally signed by Shannon Hoy Date: 2020.02.19 14:39:56 -05'00'

Prepared by: **Dated:**

Shannon Hoy
Expedition Coordinator
Office of Ocean Exploration & Research

MALIK.MASHKOOR.AHMAD.1387334994 Digitally signed by MALIK.MASHKOOR.AHMAD.1387334994 Date: 2020.02.19 15:34:30 -05'00'

Approved by: **Dated:**

Mashkoor Malik
Acting Operations Chief
NOAA Office of Ocean Exploration & Research

David J Zezula CAPT/NOAA ZEZULA.DAVID.J.1097241836 2020.03.03 18:33:42 -05'00'

Approved by: **Dated:**

Captain David Zezula
Commanding Officer
NOAA Marine Operations Center - Atlantic

I. Overview

A. Brief Summary and Project Period

This document contains project instructions specific to OMAO-5921: the EM 304 Sea Acceptance Trials (SAT), please see the *Okeanos Explorer FY2020 Field Season Instructions* (https://doi.org/10.25923/7tq9-kr82) for the annual, cross-expedition details. This cruise will include a series of tests to ensure the condition of the new EM 304 that was installed over the winter repair period. The expedition will commence on March 3, 2020 in Pascagoula, Mississippi, and conclude on March 8, 2020 in Key West, Florida. Mapping operations will focus on conducting equipment calibration, assessing equipment performance, and transiting to Key West. All operations will occur within the U.S. Exclusive Economic Zone (EEZ).

Any data collected during this SAT and daily logs will be archived with the EX-20-01 Mapping Shakedown. See the EX-20-01 data package and the Mapping Data Report for information pertaining to this cruise.

B. Days at Sea (DAS)

Of the 6 DAS scheduled for this project, all 6 days are funded by OMAO. This project is estimated to exhibit a High Operational Tempo due to testing of new equipment and transit mapping.

C. Operating Area

The EM 304 SAT is a 24-hour-per-day mapping calibration cruise that will focus operations in the Gulf of Mexico and along the Florida Escarpment. Likely calibration and transit areas indicated in Figure 1 Latitude and Longitude vertices for Priority areas and proposed cruise track are included in Appendix B .

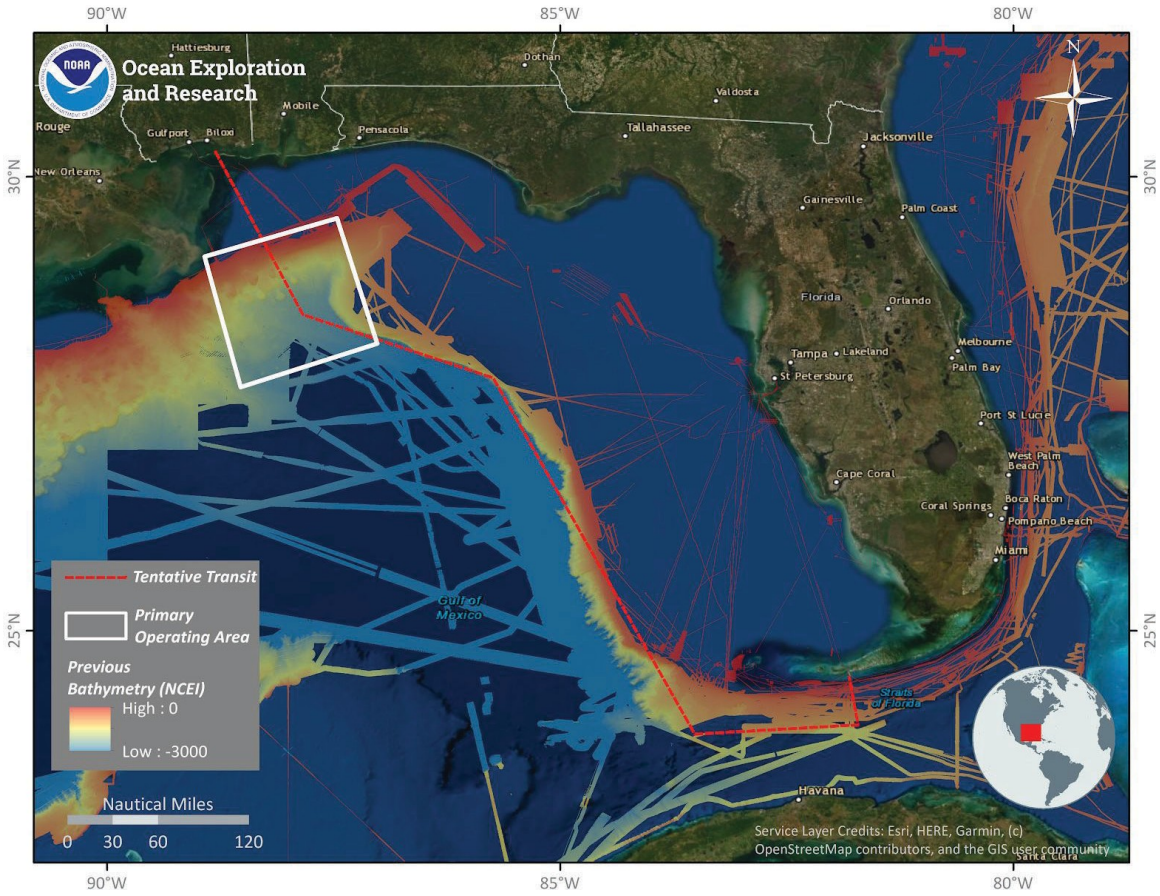

Figure 1: Map showing the general operating area for the 2020 EM 304 SAT. Note that the cruise track is subject to change based on survey results, field conditions, and discretion of the CO.

D. Summary of Objectives

March 3-8, 2020 (Pascagoula, MS - Key West, FL) EM 304 SAT

The EM 304 SAT will include multiple equipment calibration operations and a transit to Key West, FL that will occur mostly in deep (>200 m) U.S. federal waters in the Gulf of Mexico. Equipment calibration will include (but is not limited to) a GNSS Azimuth Measurement System (GAMS) test, a Patch test, a speed noise test, and a reference survey (see Appendix A for more information about each test). This cruise will provide critical DAS for troubleshooting the software for the newly installed system, with two Kongsberg engineers aboard. It will be critical to maximize the use of Kongsberg Engineers to ensure the system is fully optimized and ready for the upcoming field season.

E. Personnel (Mission Party)

Mission personnel will be arriving two days prior to departure (3/1), to ensure a productive day for necessary team meetings and mobilization on 3/2, as well as room for potential delays in travel. Mission personnel will then be aboard for the duration of the cruise (3/3 - 3/8) and departing by 3/9 (some mission personnel may depart on 3/8).

Table 1: Full list of seagoing mission party members and their affiliations (* marks those that have not yet been confirmed). Note that this list is tentative until travel is booked. Any deviations will be communicated to the OPS Officer by February 24th.

#	Name (First, Last)	Title	Date Aboard	Date Disembark	ender	Affiliation	Nationality
1	Shannon Hoy	Expedition Coordinator/ Mapping Lead	03/01	03/09		OER (CNSP)	USA
2	Kevin Jerram	Watch Lead	03/01	03/09	M	UCAR	USA
3	ank Malcolm	OMAO	03/01	03/09	M	OMAO	USA
4	Chuck Hohing	Tech	03/01	03/09	M	Kongsberg	USA
6	Knut Terje Ulvund	Tech	03/01	03/09	M	Kongsberg	Norway
7	Chris Wright	Data Manager	03/01	03/09	M	OE	USA
8	im Meyers	Data Team	03/01	03/09	M	OE	USA
9	Mike Durbin	Data Team	03/01	03/09	M	OE	USA
10	Andy O'Brien*	Data Team	03/01	03/09	M	OE	USA
11	Zach Barton	Tech	03/01	03/09	M	AOML	USA

1. Foreign National Guests (FNG) Access to OMAO Facilities and Platforms

n total 1 FNG will be participating on the EM 304 SAT. Mr. Knut Terje Ulvund, of Kongsberg Norway, will be sailing aboard NOAA Ship *Okeanos Explorer*. He will arrive aboard March 1st and will depart March 9th, 2020. Hank Malcolm from OMAO will serveas the site sponsor for the FNG.

F. Administrative

1. Points of Contact:

Ship Operations

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

Chief, Operations Division, Atlantic (MOA)
CDR Fionna Matheson, NOAA
Telephone: (757) 441-6842
ax: (757) 441-6776
Email: Chiefops.MOA@noaa.gov

Mission Operations

Shannon Hoy
Expedition Coordinator
NOAA Office of Ocean Exploration and Research (CNSP)
C: (469) 265-2908
Email: shannon.hoy@noaa.gov

LT Bryan Pestone
ncoming Operations Officer
NOAA Ship Okeanos Explorer
Phone: 808-659-9179 x221
Email: ops.explorer@noaa.gov

CDR Nicole Manning, NOAA
Commanding Officer
NOAA Ship *Okeanos Explorer*
Phone: (401) 439-7848
Email: CO.Explorer@noaa.gov

LT Rosemary Abbitt
Outgoing Operations Officer
NOAA Ship Okeanos Explorer
Phone: 808-659-9179 x221
Email: ops.explorer@noaa.gov

Other Mission Contacts

Mashkoor Malik
(Acting) Chief of Operations
NOAA Ocean Exploration & Research
Phone: (301) 734-1012
Email: mashkoor.malik@noaa.gov

Rachel Medley
Chief, Expedition & Exploration Division
NOAA Ocean Exploration & Research
Phone: (301) 789-3075
Email: Rachel.Medley@noaa.gov

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

2. Diplomatic Clearances
The operational areas of this project lie within the EEZ of the U.S.

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

For shipments to arrive while in port in Pascagoula, Mississippi at the start of the expedition, **shipments should arrive no later than March 2, 2020** and be mailed to the following address:

NOAA Ship Okeanos Explorer
Name or Department
151 Watts Avenue
Pascagoula, MS 39567-4102

For shipments to arrive while in port in Key West, Florida after the expedition from March 8-14, 2020, **shipments should arrive no later than March 13, 2020** and should be mailed to the following address:

C/O: LTJG Kathryn Carria
ATT: NOAA Ship Okeanos Explorer, OPS
33 E. Quay Road
Key West, FL 33040

II. Operations

A. Project Itinerary
All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer. Locations are approximate.

Table 2: Cruise Itinerary. This is an approximate itinerary and is subject to change based on objective completion.

Date	Activities
02/17 - 02/29	OE / mission mobilization after dry dock
03/01	Mission personnel participating in EM 304 SAT cruise begin to arrive and stay on the ship.
03/02	Final mission personnel arrive. Vessel familiarization for new sailing personnel. Pre-Cruise meeting with wardroom and mission personnel.
03/03	Depart Pascagoula at ~1000 CST. Swing compass in harbor, Satellite TV Testing, load Starboard FRB (EX-1) and adjust sea-painter (~4 hours). Transit to the first patch test location. During the transit, conduct the GAMS calibration. Begin patch test.
03/04	Finish patch test and begin collection of data to establish a reference surface.
03/05	Transit to Key West, FL. Potentially perform Speed-Noise test or any outstanding operations.
03/06	Transit to Key West, FL. Potentially perform Speed-Noise test or any outstanding operations.
03/07	Transit to Key West, FL. Potentially perform Speed-Noise test or any outstanding operations.
03/08	Arrive in Key West, Florida. Begin demobilization, some mission personnel depart.
03/09	inish Demobilization, all mission personnel depart vessel.

B. Staging and Destaging

GFOE and OER will begin remobilizing the control room, wet lab, and dry lab on Feb 17, 2020. During this time, limited impact to the ship's force is anticipated. The remobilization of these spaces is critical to the preparation for this cruise. Minimal additional staging and de-staging are anticipated for this mapping cruise. Eighteen (18) boxes of XBT probes will need to be loaded aboard prior to departure from Pascagoula, MS, and this work will be coordinated with the ship's Senior Survey Technician and Operations Officer.

C. Operations to be Conducted

1. Telepresence / Outreach Events

a. Three live video feeds (depending on status after reintegration period) will be used throughout the cruise to provide situational awareness for onshore personnel and test the reintegration of systems post repair period.

2. In-Port Events

a. No in port public events are planned for this cruise.

3. Special/Unusual Operations or Requests

b. Ship maneuvers / tests required to test EM 304 performance as per manufacturer guidance including but not limited to:
    i. AMS calibration (Guidance in Appendix)
    ii. Patch Test (Guidance in Appendix)
    iii. Reference Survey (Guidance in Appendix)
    iv. Speed Noise Test (Guidance in Appendix)

D. SCUBA Dive Plan

All SCUBA dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program and require the approval of the ship's Commanding Officer. No science dives are planned during the EM 304 SAT, but the ship may plan training, safety drills, or maintenance dives.

E. Applicable Restrictions

Not applicable.

III. Equipment

A detailed list of equipment provided by the ship and OER can be found in the *Okeanos Explorer FY2020 Field Season Instructions*. There are no specific changes relative to this expedition.

IV. Hazardous Materials

A. Policy and Compliance

See the Okeanos Explorer FY2020 Field Season Instructions.

B. Inventory

Table 3: Inventory of hazardous materials that will be onboard for the EM 304 SAT

tem	Use	Approx. locations
95% Denatured Ethanol (17 gal.)	Sample preservation	Paint Locker. Two full 5-gal carboys and two partially full carboys
ormaldehyde (2 gal.) to be buffered into 10% Buffered Formalin	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (325 mL) (4 M guanidine thiocyanate, 0.5% N-laurosylsarcosine, 25 mMTris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation	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
luid Film Spray	Silicone Lubricant	ROV Workshop Fire Cabinet
Isopropanol Alcohol 2 gal.)	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)	angar, Pit, Vehicles
Tap Magic Cutting luid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tap Magic Heavyweight Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tuff Coat M	Marine Lubricant	Winch room
Dow Corning Molykote 111	Valve Lubricant and Sealant	ROV Workshop Fire cabinet, Pit
WD40	Lubricant	ROV Workshop Fire cabinet

Loktite	Bolt adhesive	ROV Workshop Fire cabinet
Shell Diala S2	Vitrea	Hangar, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Aeroshell 41	ydraulic Fluid	angar, ROV *D2*
Ultratane	Butane fuel	ROV Workshop fire cabinet
Rust-oleum	Protective Enamel	ROV Workshop fire cabinet
lux-Off	Soldering Flux remover	ROV Workshop fire cabinet
Propane	Torch Fuel	ROV Workshop fire cabinet
Adhesive Pliobond 25	eneral adhesive	Tool room
AP 120 Metal Prep	Degreaser/cleaner for metal surfaces	Pit
Butane Fuel	Torch refill	Tool Room
PVC cement	Adhesive for PFV plastic piping	Tool Room
Phosphoric Acid	errous metal rust removal	Tool room
Pipetite Paste	Plumbing sealant	Tool room/pit
Spindle Oil 10, ROS PT	Lubricant/compensation oil	Tool room
DC557	Silicon grease	Tool room/pit
Tether Potting Catalyst	Two part epoxy catalyst	Pit
Tether Potting Compound	Two part epoxy ingredient	Pit
ThermaPlex Bearing Grease	Lubricant	Pit
Tritech Seaking	Compensator oil for sonar head	Pit
Bleach (1 Quart)	Sterilization and sample preservation	Cabinet under sink

C. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE

D. Chemical safety and spill response procedures

See the *Okeanos Explorer FY2020 Field Season Instructions.*

V. Appendices:

A. Potential SAT Test Procedures.

1. GAMS Test

The GNSS Azimuth Measurement System (GAMS) test is used to ensure precise positioning of the POS MV's GPS antennas. The ship will need to perform at least 15 minutes of either S-Turns or Figure 8s at the fastest speeds deemed acceptable by the ship. Faster speeds promote quicker convergence on the GAMS solution.

2. Patch Test

The geometric calibration or 'Patch Test' is used to determine angular offsets between the multibeam and the POS MV. To conduct the patch test the ship will need to drive specific lines, in a specific order, and at specific speeds which will be communicated by the Mapping Watch to the Bridge. A likely patch test scheme that will be performed this year is shown in Figure 2.

EX1902 EM302 Calibration
Pascagoula Dome

Speed: 6 kts
Line length: 8 km (4.3 nm)
Line duration: ~45 min + turns

XBTs will be required before first Pitch and Roll lines

Additional processing time may be required between lines

After calibration, some or all lines may need to be run again for verification of the initial result

Order of calibration lines:
1. Pitch: A→B then B→A
2. Roll: C→D then D→C
3. Heading 1: E→F (alternative: F→E)
4. Heading 2: G→H (alternative: H→G)

		Lat DEG	Lat MIN	Lon DEG	Lon MIN
Pitch Line (A→B then B→A)	A	29	1.67	-88	1.74
	B	28	57.34	-88	1.69
Roll Line (C→D then D→C)	C	29	1.97	-87	57.24
	D	28	57.71	-87	56.34
Heading Line 1 (E→F OR F→E)	E	29	1.66	-88	2.42
	F	28	57.33	-88	2.37
Heading Line 2 (G→H OR H→G)	G	29	1.67	-88	1.06
	H	28	57.34	-88	1.02

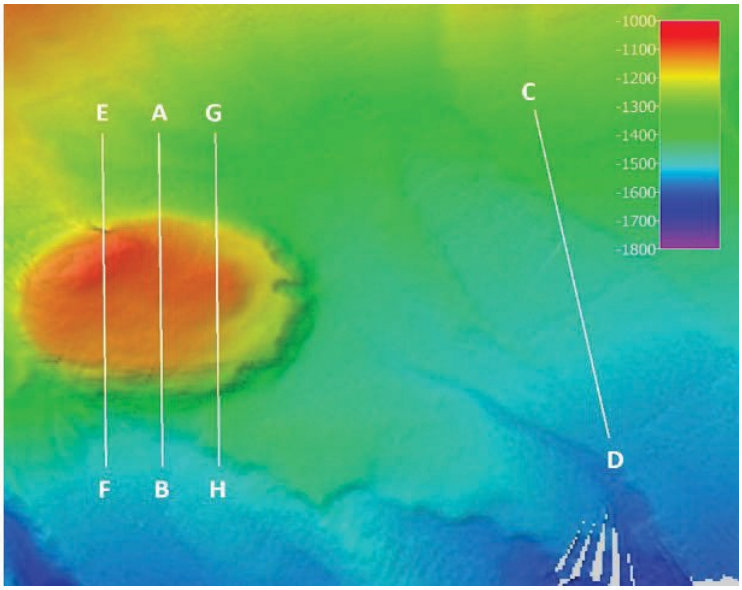

Figure 2: Schematic and map of likely patch test lines for the EM 304 SAT

3. Reference Survey

A reference survey will be conducted to test the performance of the new EM 304. The design for this survey is as follows (language provided by Kongsberg):

The area used for the sea trials should consist at least partly of a relatively flat bottom and partly of a significant slope as required for a calibration. In case this is not possible, the calibration of the various sensors must be run in separate areas while the final assessment survey should be run in the flat part used for roll calibration. The depth should then ideally be in the 1000-2000 m range (not critical).

Five parallel lines should be run with line spacing equal to about one quarter of the achieved coverage in the actual area. Neighboring lines should be run in opposite directions. The line length should be in the order of twice the achieved coverage. A sixth line should be run perpendicular to and across the five previous lines.

4. Speed-Noise Test

The speed-noise test will be used to determine the noise-floor for the new EM 304 topside unit. To perform this test, passive acoustic data will be collected at specific speeds (likely speeds desired (in kts) are: 0, 2, 4, 6, 8, 10, max), maintained for approximately 10 minutes.

B. Waypoints

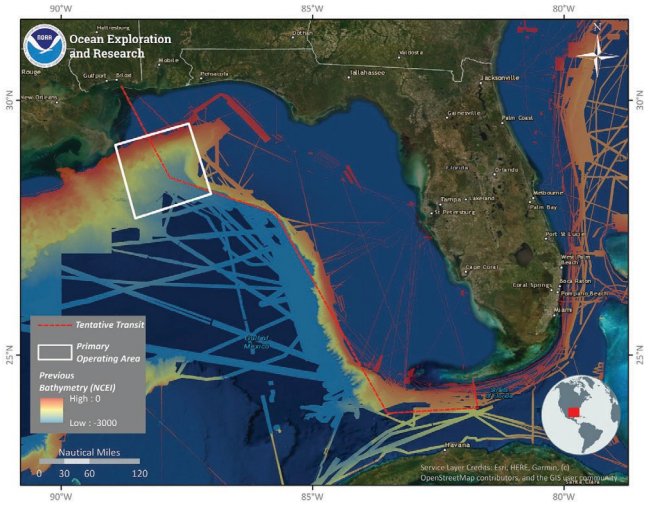

Figure 1 (for Reference): Map showing the general operating area for the 2020 EM 304 SAT.

Table 4: List of Waypoints

General Working Area (white Square)	
Lat (D DM)	*Long (D DM)*
28° 24.472'N	87° 17.738'W
28° 2.347'N	88° 27.278'W
29° 8.727'N	88° 45.717'W
29° 28.217'N	87° 38.286'W
28° 24.472'N	87° 17.738'W

Potential Transit (Red line)	
Lat (D DM)	*Long (D DM)*
30° 6.683'N	88° 25.731'W
28° 24.701'N	87° 47.917'W
27° 45.252'N	85° 44.651'W
24° 9.417'N	84° 8.41'W
24° 8.612'N	81° 48.154'W
24° 28.191'N	81° 50.915'W

C. Data Management Plan

Okeanos Explorer Mission EX2000 (OMAO-5921) Data Management Plan

Report Date: 2020-04-02

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:
Okeanos Explorer EX2000 (OMAO-5921): EM 304 Sea Acceptance Trials
This cruise will include a series of tests to ensure the condition of the new EM304 that was installed over the winter repair period. The cruise will commence on March 3, 2020 in Pascagoula, Mississippi, and conclude on March 8, 2020 in Key West, Florida. Mapping operations will focus on conducting equipment calibration, assessing equipment performance, and transiting to Key West.

1.2 Summary Description of the data to be collected:
Kongsberg EM304 calibration will include a GNSS Azimuth Measurement System (GAMS) test, a

patch test, a speed noise test, and a reference survey.

1.3 Keywords or phrases that could be used to discover the data:
expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, OMAO, 5921, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, oceans

1.4 If this mission is part of a series of missions, what is the series name?
Okeanos Mapping Cruises

1.5 Planned or Actual Temporal Coverage of the data:
Start Date: 2020-03-03 and End Date: 2020-03-08

1.6 Actual or Planned Geographic Coverage of the data:
Northernmost Boundary: 30 and Southernmost Boundary: 27.5
Westernmost Boundary: -89 and Easternmost Boundary: -87

1.7 What data types will be created or captured and submitted for archive?
Cruise Plan, Cruise Summary, Data Management Plan, EK60 Split Beam Data, Highlight Images, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), Quick Look Report, Temperature data, Water Column Backscatter, XBT (raw)

1.8 What platforms will be employed?
NOAA Ship Okeanos Explorer

2 Points of Contact for this Data Producing Project

Overall POC: Ms. Shannon Hoy, Physical Scientist, NOAA Office of Ocean Exploration and Research, shannon.hoy@noaa.gov
Title: Expedition Coordinator/Mapping Lead
Affiliation: Office of Ocean Exploration and Research
Phone: 603-862-0836

3 Points of Contact for Managing the Data

Data POC: Megan Cromwell
Data POC Title: Okeanos Explorer Data Manager
Data POC Email: megan.cromwell@noaa.gov

4 Resources

4.1 Have resources for management of these data been identified?
Yes

4.2 Approximate percentage of the budget devoted to data management. (specify % or unknown)
Unknown

5 Data Lineage and Quality

5.1 What is the processing workflow from collection to public release?
SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF3 format to NCEI-MD; Acoustic data and metadata will be compressed and delivered in a bagit format to NCEI-CO; Video data shall be delivered via hard-drive to NCEI-MD, where they will be post-processed, documented, and archived then made discoverable and accessible through the OER Video Portal.

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

6 Data Documentation

6.1 Does the metadata comply with the Data Documentation Directive?
Yes

6.1.1 If metadata are non-existant or non-compliant, please explain:
Not Applicable

6.2 Where will the metadata be hosted?
Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning and published in the NOAA OneStop catalog and an OER Web Accessible Folder (WAF) hosted at NCEI-MS for public discovery and access.
URL: www.ncei.noaa.gov
Metadata Standard: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed.

6.3 Process for producing and maintaining metadata:
Metadata will be generated via xml editors or metadata generation tools.

7 Data Access

7.1 Do the data comply with the Data Access Directive?
Yes

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

7.1.2 If there are limitations, describe how data are protected from unauthorized access.
Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures.

7.2 Name and URL of organization or facility providing data access.
Organization: NOAA National Centers for Environmental Information (NCEI)
URL: https://www.ncei.noaa.gov

7.3 Approximate delay between data collection and dissemination. By what authority?
Hold time: Data are considered immediately publicly accessible as soon as possible after the mission, unless there are documented restrictions.
Hold authority: not applicable

7.4 Prepare a Data Access Statement
No data access constraints, unless data are protected under the National Historic Preservation Act of 1966.

8 Data Preservation and Protection

8.1 Actual or planned long-term data archive location:
Data from this mission will be preserved and stewarded through the NOAA National Centers for Environmental Information. Refer to the Okeanos Explorer Data Management Plan at NOAA's EDMC DMP Repository for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

8.2 If no archive planned, why?
Not Applicable

8.3 If any delay between data collection and submission to an archive facility, please explain.
90-120 days

8.4 How will data be protected from accidental or malicious modification or deletion?
Data management standard operating procedures minimizing accidental or malicious modification or deletion are in place aboard the Okeanos Explorer and will be enforced.

8.5 Prepare a Data Use Statement
Data use shall be credited to NOAA Office of Ocean Exploration and Research.

D. List of Licenses, Permits, and Environmental compliance

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 conduct. NOAA's Administrative Order (NAO) 216-6A Companion Manual describes the agency's specific procedures for NEPA compliance. Among these is the need to review all proposed NOAA-supported field projects for their environmental effects. An environmental review analysis has been completed for this expedition in accordance with Section 4 of the Companion Manual. Based on this review we determined that a categorical exclusion is the appropriate level of NEPA analysis for this expedition and that no extraordinary circumstances exist that would require preparation of an environmental assessment or environmental impact statement (Appendix D.1).

Information about OER's Section 7 of the Endangered Species Act (ESA) consultation and consultation with NOAA's Habitat Conservation Division on potential impacts of our operations to Essential Fish Habitat (EFH) in the Greater Atlantic Region, including the Caribbean Sea, can be found in the *Okeanos Explorer FY2020 Field Season Instructions*.

Additionally, a request for a letter of acknowledgement (LOA) from the NOAA South East Regional Office (SERO) covering all activities to be conducted as part of this expedition was submitted on April 4, 2019. A signed LOA from the SERO stating that expedition activities are all in accordance with NMFS regulations was received on April 24, 2019 (Appendix D.2).

1. Categorical Exclusion

Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: EM304SAT

Date Review Completed: 1/30/2020

Completed by: Amanda Maxon, Contractor

OAR Functional Area: OER

Worksheet File Name: 2020-01-OER-G3-EM304SAT

Step 1. CE applicability

1. **Is this federal financial assistance, including via grants, cooperative agreements, loans, loan guarantees, interest subsidies, insurance, food commodities, direct appropriations, and transfers of property in place of money?**

   no

2. **What is the proposed federal action?**
   NOAA OER is scheduled to perform multiple calibration procedures of NOAA Ship Okeanos Explorer's systems to start the fiscal year 2020 season. The cruise will be entirely funded by the Office of Marine and Aviation Operations (OMAO). The proposed actions of the cruise included equipment calibration including but not limited to a GAMS test, patch test, speed test, and a reference survey, and assessing equipment performance while transiting to Key West, Florida. EM304 Sea Acceptance Trials (SAT) cruise will include a series of tests to ensure the condition of the new EM304 that was installed during the repair period. The cruise will conduct operations in the U.S. Exclusive Economic Zone (EEZ) in the Gulf of Mexico beginning on March 3rd, 2020 in Pascagoula, Mississippi and concluding in Key West, Florida on March 8th, 2020 performing calibration procedures. All mission personnel are either on contract with OER or are funded through an OER grant. This action demonstrates independent utility and is not a connected action. See EM304 SAT project instructions for more details.

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

a. G3: Topographic, bathymetric, land use and land cover, geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbance and involve no permanent physical, chemical, or biological change to the environment.

b. The topical scope of this section is consistent with CE number G3 in Appendix E of the Companion Manual to NOAA Administrative Order (NAO) 216-6A: Topographic, bathymetric, land use and land cover. Geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbances and involve no permanent physical, chemical, or biological change to the environment. The expedition will conduct calibrations of the EM304 SAT sonars which will involve no permanent physical, chemical, or biological changes to the environment.

Step 2. Extraordinary Circumstances Consideration

4. Would the action result in adverse effects on human health or safety that are not negligible?

No. The NOAA Ship Okeanos Explorer will be operating in remote deep-sea (>200m) areas in the Gulf of Mexico and along the Florida Escarpment ending in Key West, Florida.
This action does not involve any procedures or outcomes known to result in impacts on human health and safety.

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

This expedition will occur in the Gulf of Mexico which has unique environmental characteristics such as sanctuary boundaries or within historically or culturally significant areas. Data collection will primarily occur offshore and in deep water (greater than 200 meters), which the effects will be negligible. The expedition is being planned to meet its objectives of calibration of equipment used on operations which will include (but not limited to) a GAMS test, a Patch test, a speed noise test, and a reference survey and will also troubleshoot and update the software installed on the Kongsberg Engineer sail, which is critical to the already installed Kongsberg equipment installed on the Okeanos Explorer. These calibration tests have been conducted each year to help set up and tune the Okeanos Explorer mapping systems for its cruises each fiscal year produce high quality images and data collection. The actions of each calibration is reasonably known and tested to have no adverse effects

6. Would the action result in adverse effects on species or habitats protected by the ESA, MMPA, MSA, NMSA, or MBTA that are not negligible?

OER has taken measures to ensure that any effects on species or habitats protected by the ESA, MMPA, MSA, or NMSA meet the definition of negligible because the likelihood of encountering individuals is low given the area of research based on marine mammal populations and their known habitats. In 2018, an informal consultation with initiated under section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence without biological evaluation determining that NOAA Ship Okeanos Explorer operations conducted during the 2019-2020 field seasons, including those to be undertaken during the 2020 field season, are not likely to adversely affect ESA-listed marine species. Re-initiation of section 7 of the Endangered Species Act (ESA) for the 2020 season is in development and will be attached in the EM304 SAT project instructions when received.

Given the offshore focus of most of our proposed work, it is improbable that we will encounter marine mammals protected under the MMPA, or sea birds protected under the MBTA. If we did encounter any such protected animals, our impacts would be negligible because of the best management practices to which we adhere to avoid or minimize environmental impacts. These best management practices are all outlined in the appendices of the in the EM304 SAT project instructions. OER also initiated a request for an abbreviated Essential Fish Habitat (EFH) consultation for expeditions by NOAA Ship Okeanos Explorer in 2018-2020 to the Greater Atlantic Region. Additionally, OER is in the process of receiving a Letter of Acknowledgement (LOA) from NMFS pursuant to the provisions of the Magnuson-Stevens Act for operations in the Southeast and areas deemed as a Habitat Areas of Particular Concern (HAPCs).

7. **Would the action result in the potential to generate, use, store, transport, or dispose of hazardous or toxic substances, in a manner that may have a significant effect on the environment?**

   No. The cruise operations will be in the compliance with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties(or the OMAO procedure that supersedes it) to ensure generation, use, storage, transport, and disposal of such substances will not result in significant impacts.

8. **Would the action result in adverse effects on properties listed or eligible for listing on the National Register of Historic Places authorized by the National Historic Preservation Act of 1966, National Historic Landmarks designated by the Secretary of the Interior, or National Monuments designated through the Antiquities Act of 1906; Federally recognized Tribal and Native Alaskan lands, cultural or natural resources, or religious or cultural sites that cannot be resolved through applicable regulatory processes?**

The proposed action will not result in adverse effects that cannot be resolved through applicable regulatory processes since we will not be operating within listed or eligible properties, lands, resources or sites coming under the umbrella of protection referenced above.

9. Would the action result in a disproportionately high and adverse effect on the health or the environment of minority or low-income communities, compared to the impacts on other communities (EO 12898)?

The NOAA Ship Okeanos Explorer will be operating in the remote and offshore areas of the Gulf of Mexico during EM304 SAT. There are no communities within or near the geographic scope of the cruise and the cruise does not involve actions known or likely to result in adverse impacts on human health.

10. Would the action contribute to the introduction, continued existence, or spread of noxious weeds or nonnative invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of the species?

During EM304 SAT, NOAA Okeanos Explorer will leave from Pascagoula, Mississippi and travel to Key West, Florida. The ship and OER vessel personnel will comply with all applicable local and federal regulations regarding the prevention or spread of invasive species. At the completion of every ROV dive or CTD cast, the equipment will be thoroughly rinsed with fresh water and completely dried to prevent spreading organisms from one site to another. Also the Engineering Department aboard the NOAA Ship Okeanos Explorer attends yearly Ballast Management Training in accordance with NOAA Form 57-07-13 NPDES VGP Annual Inspection and Report to prevent the introduction of invasive species

11. Would the action result in a potential violation of Federal, State, or local law or requirements imposed for protection of the environment?

The proposed action will not result in a potential violation of Federal, State, or local law or requirements imposed for protection of the environment. The expedition coordinator obtained authorizations for this expedition via several consultations on ESA Section-7 and EFH outlined in sections 4-7 above.

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

The exploration activities will be localized in particular areas identified in previous studies. Time in these areas will be short in duration. Given the project's scope and breath, no notable or lasting changes or highly controversial effects to the environment will result from the proposed

actions. Potential impacts will be similar to that of the previous equipment of EM 302 which has been used for several years in different marine communities.

13. Does the action have the potential to establish a precedent for future action or an action that represents a decision in principle about future actions with potentially significant environmental effects?

While each cruise contributes to the overarching goal of exploring, mapping, and sampling the ocean, every cruise is independently useful and not connected to subsequent cruises.

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

The techniques and equipment used are standard for this type of field study, and the effects are well known.

15. Does the action have the potential for significant cumulative impacts when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves?

By definition, actions that a federal agency classifies as a categorical exclusion have no potential, individually or cumulatively, to significantly affect the environment. This cruise is consistent with a class of CE established by NOAA and there are no extraordinary circumstances for this action that may otherwise result in potentially significant impacts.

CE Determination

☑I have determined that a Categorical Exclusion is the appropriate level of NEPA analysis for this action and that no extraordinary circumstances exist that would require preparation of an environmental assessment or environmental impact statement.

☐I have determined that an environmental assessment or environmental impact statement is required for this action.

Signature: CANTELAS.FRANK.J.1365855087 Digitally signed by CANTELAS.FRANK.J.1365855087 Date: 2020.02.07 15:41:08 -05'00'

Signed by: Frank Cantelas

Date Signed: 2/7/2020

2. Letter of Acknowledgement

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

02/12/2020

F/SER28:SS

Ms. Amanda Maxon
NOAA Office of Ocean Exploration and Research
Silver Spring, MD 20910
Amanda.Maxon@noaa.gov

Dear Ms. Maxon:

This letter of acknowledgement (LOA) recognizes the sampling activities outlined in your February 3, 2020, request as scientific research conducted by a scientific research vessel in accordance with the definitions and guidance at 50 CFR 600.10 and 600.745(a). As such, the proposed activities are not subject to fishing regulations at 50 CFR Part 622 or other fishing regulations promulgated in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

NOAA Fisheries understands that the purpose of the project is to conduct deep-sea research and exploration activities in U.S. federal waters, among other areas, during upcoming expeditions aboard NOAA Ship *Okeanos Explorer* (R337). Activities are currently scheduled to start in Pascagoula, Mississippi, on March 3, 2020, and end in Horta, Azores, on June 25, 2020 (see Table 1), before returning to its final destination of Newport, Rhode Island, September 12, 2020. The geographic areas to be targeted during the expedition include deep-water (>200 meters [m]) areas in the Gulf of Mexico, South Atlantic, and U.S. Caribbean exclusive economic zones (EEZ) and include, but are not limited to, unexplored areas that are predicted to be suitable habitat for deep sea corals and sponges, inter-canyon areas, and gas seeps.

Specifically, these efforts would use deep-water mapping, water column characterization systems, and remotely operated vehicles (ROV) to explore and characterize deep-water areas. This LOA recognizes the ROV operations (detailed below) as scientific research conducted by a scientific research vessel, and thus outside the scope of the fishing regulations described above.

The *Okeanos Explorer* is equipped with a two-body ROV system capable of diving to 6,000 m depth. The first body, the ROV *Deep Discoverer*, captures high-definition video and is equipped with two manipulator arms capable of collecting biological and geological samples. The second body, the ROV *Seirios*, provides additional lighting and an aerial viewpoint. During ROV operations, the two ROVs are connected to each other by a 30 m long tether and the *Seirios* ROV is attached to the ship by an 8,200 m armored fiber-optic cable providing power and telemetry to the two vehicles. ROV operations would be conducted only during daylight hours, while the *Okeanos Explorer* is stopped and holding station using dynamic positioning (no anchoring). ROV operations would typically take place within several meters of the seafloor, and would be conducted in a manner that minimizes seafloor disturbance. Seven ROV dives are anticipated to

occur during the EX20-02 cruise in federal waters, resulting in approximately 70 hours total dive time (~10 hours per dive).

Limited sampling operations will be conducted during the *Okeanos Explorer* ROV expeditions. Coral samples would only be collected during ROV operations, which would occur in the EX20-02 and EX20-04 segments of the 2020 field cruise season (Table 1). Most of the samples will be collected during the EX20-04 cruise, after the *Okeanos Explorer* departs the U.S. Caribbean EEZ; thus most samples will be collected in the high seas or in Canadian waters. The ROV *Deep Discoverer* would be used for collecting samples (biological and geological) during ROV dives. Samples collected during the entire 2020 cruise field season are likely to be on the order of 10 to 30 individuals of Antipatharians (Black Corals) and Scleractinians (Stony Corals). It is understood that sample collection may include coral species for which harvest is prohibited in U.S. Caribbean federal waters (50 CFR 622.472; *id.* 622.2 defining Caribbean prohibited coral).

This LOA is separate and distinct from any permits, authorizations, and/or consultations required by the Marine Mammal Protection Act, the Endangered Species Act, or any other applicable law, and from any authorizations that may be necessary to sample in protected waters such as national parks and monuments. Under 50 C.F.R. § 600.745(a), we are required to inform you that such permits may be required and should be obtained from the appropriate agency prior to embarking on the activity.

Copies of this LOA and the scientific research plan for the project should be onboard the vessel during all sampling activities.

Please send a copy of any cruise report or other publications resulting from the scientific research activity to the Director, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149-1003.

Sincerely,

STRELCHECK.ANDREW.J.1365863152 Digitally signed by STRELCHECK.ANDREW.J.1365863152 Date: 2020.02.12 13:18:07 -05'00'

for Roy E. Crabtree, Ph.D.
Regional Administrator

cc: F/SEFSC, F/EN3

Table 1. Scheduled start and end dates and ports of call for the *Okeanos Explorer* 2020 deep-water mapping expeditions.

Cruise	Start Port	Start Date	End Port	End Date	Cruise Objectives	Samples Collected
EM 304 SAT	Pascagoula, MS	3/3/2020	Key West, FL	3/8/2020	Shakedown* and Patch test	No
EX 20-01	Key West, FL	3/25/2020	San Juan, PR	4/10/2020	Mapping and Network Shakedown	No
EX 20-02	San Juan, PR	4/18/2020	San Juan, PR	4/24/2020	ROV Shakedown	Yes
EX 20-03	San Juan, PR	5/4/2020	Charlotte Amalie, USVI	5/24/2020	Caribbean Mapping	No
EX 20-04	Charlotte Amalie, USVI	5/31/2020	Horta, Azores	6/25/2020	Voyage to the Ridge 1 (ROV and Mapping)	Yes

* Every *Okeanos Explorer* operating season starts with an at-sea "shakedown," when all of the ship's mission systems undergo rigorous tests to ensure everything is performing properly and that the ship is fully ready for the field season and will collect the highest-quality data possible.

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 Programs for Advancement of Earth System Science (CPAESS), P.O. Box 3000, Boulder, CO 80307 USA
- University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) ere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, N 03824 USA
- Global Foundation for Ocean Exploration, P.O. Box 417, Mystic, CT 06355 USA
- University of Rhode Island Inner Space Center, 215 South Ferry Road, Narragansett, RI 02882 USA