Ocean Exploration and Research

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MAPPING DATA ACQUISITION AND PROCESSING SUMMARY REPORT

KR-OER-19-01: FUGRO CONTRACT SURVEY *(Mapping)*

Fugro M/V Fugro Brasilis

October 28 – December 06, 2019

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NOAA Office of Ocean Exploration and Research

May 20, 2020

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1. Introduction

The NOAA Office of Ocean Exploration and Research is the only federal program dedicated to exploring our deep ocean, closing the prominent gap in our basic understanding of U.S. deep waters and seafloor and delivering the ocean information needed to strengthen the economy, health, and security of our nation.

Using the latest tools, technology and various funding mechanisms, OER explores previously unknown areas of our deep ocean, making discoveries of scientific, economic, and cultural value. This survey was conducted in collaboration with FUGRO Inc. and NOAA's Office of Coast Survey (Requisition No: NCNJ3000-19-01123). From this exploration, OER makes the collected data needed to understand our ocean publicly available, so we can maintain the health of our ocean, sustainably manage our marine resources, accelerate our national economy, and build a better appreciation of the value and importance of the ocean in our everyday lives.

2. Report Purpose

This report is developed as a compendium to the overall summary of mapping results and mapping related cruise activities reported in Fugro delivered reports. KR-OER-19-01 was unique since it was not planned and executed by NOAA OER. Detailed reports have been provided by Fugro describing the acoustic seafloor and water-column mapping data collection and processing methods used during the KR-OER-19-01 cruise. The following reports were included in the final deliverables and will be available through the NOAA Central Library as attachments to this Mapping Data Acquisition and Processing Summary Report:

- Attachment I: Mobilization and Calibration Report
    - Attachment_I_02.19031631-MCR-Fugro Brasilis [04].pdf
    - Appendices
    - Appendix A: Dockside Calibration and Verifications
        - A1 Dimensional Control Survey - Inntec August 2017
        - A2 DGNSS Heading and MRU calibrations
        - A3 DGNSS and Gyro Health Checks
    - Appendix B: Infield Calibration and Verifications
        - B1 EM 302 Patch Test and EM302 Backscatter Normalization Report
        - B2 EM 302 BIST Test
    - Appendix C
        - C1 Seabird SBE19+ (Serial # 4260)
        - C2 Seabird SBE19+ (Serial # 7281)
        - C3 AML Smart-X (Serial # 201631 & # 304497)
- Attachment II: Descriptive Report Area 1A
    - KROER1901_Area1A_DR.pdf
- Attachment III: Descriptive Report Area 1B
    - KROER1901_Area1B_DR.pdf

3. Cruise Objectives

A summary of the KR-OER-19-01 cruise objectives are included in the Project Instructions (dated August 1, 2019) and contract Statement of Work (Award Number: EA133C-14-CQ-32, dated August 1, 2019). All tasks identified in the Project Instructions (Appendix I) and Statement of Work (Appendix II) were satisfactorily completed. The Period of Performance for the contract was from August 5, 2019 to August 31, 2020. This hydrographic survey contract was executed

through NOAA Office of Coast Survey contract mechanism. Coast Survey procures and oversees hydrographic surveying and related support services from contractors, in accordance with Federal Acquisition Regulation (FAR). The following personnel provided the necessary support during the planning and execution of the survey:

Contracting Officer: Nicole Lawson
Contracting Officer Representative (COR): Meredith Payne / Christy Fandell
Program Manager (PM): Mashkoor Malik
Fugro Chief of Party: Gilberto Luna Fernandez

4. Summary of Mapping Results

KR-OER-19-01 mapped 31,900 square kilometers around Florida and in the vicinity of the Blake Plateau (Southeastern Atlantic) during the 10 days-at-sea (Figure 1 and Table 1). All of these data were collected within the U.S. Exclusive Economic Zone in depths from ~ 844 m to ~ 3673 m. Multibeam bathymetry data coverage is shown in Figure 1. The dates of the surveys that were completed include:

- 10 /27/2019 - 10/28/2019 (Multibeam patch test)
- 10/27/2019 (Medium-Deep backscatter normalization)
- 10/28/2019 - 11/12/2019 (Survey Area 1A)
- 11/13/2019 - 12/06/2019 (Survey Area 1B)
- 11/25/2019 - 11/26/2019 (Deep-Very deep backscatter normalization)

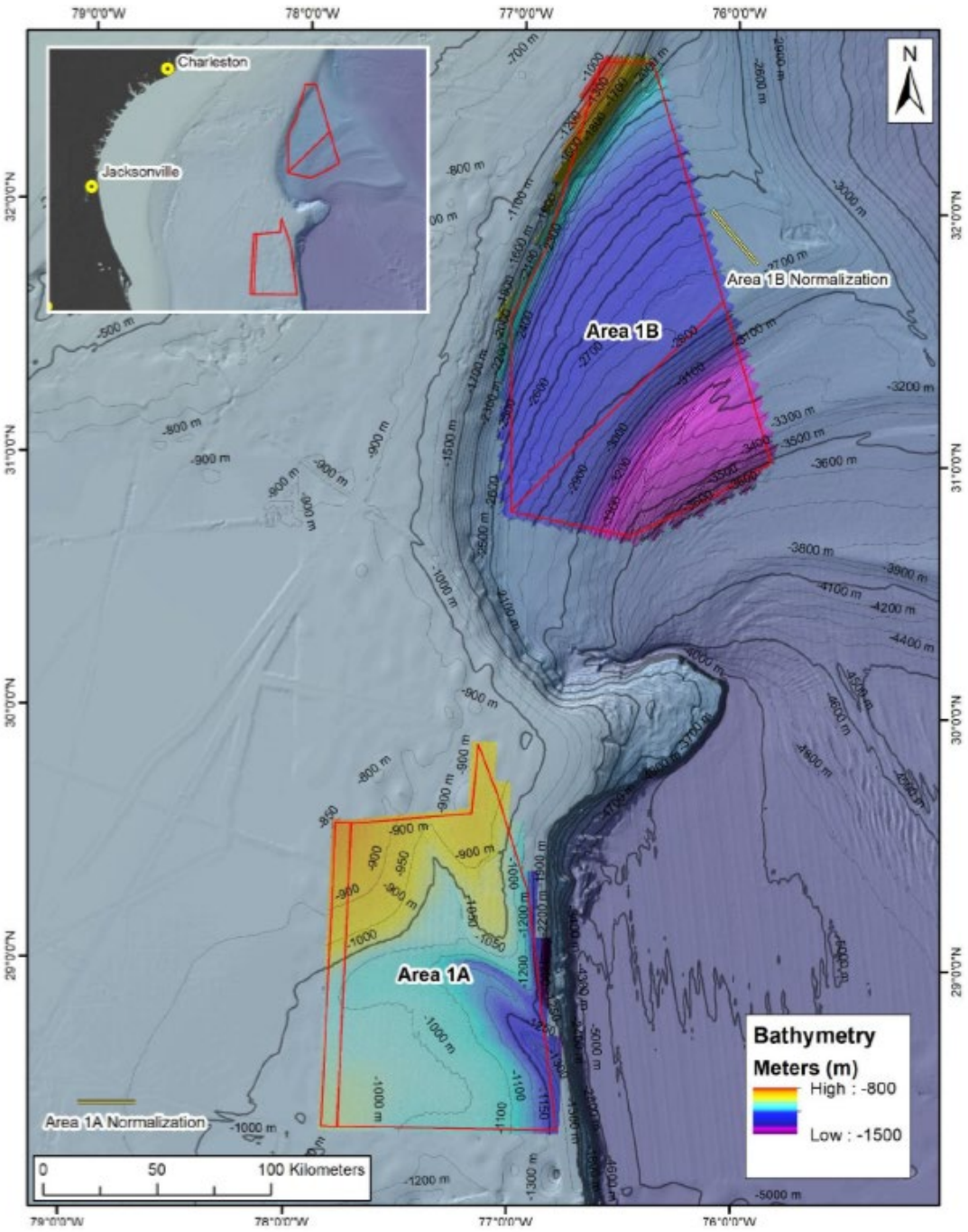


Figure 4.2: Locations of the backscatter normalizations on Blake Plateau

Figure 1: Locations of Fugro surveys in Area 1A, Area 1B and backscatter normalization. Figure from Fugro.

5. Mapping Statistics

Table 1. Summary statistics of ocean mapping work completed during KR-OER-19-01.

Dates of data collection	Oct 28, 2019 – Dec 06, 2018
Linear distance of survey with EM 302	Total: 7892 km (4261.5 Nautical Miles) Area 1A 2166.9 Nautical Miles Area 1B 1961 Nautical Miles Crosslines 133.6 Nautical Miles
Square kilometers mapped with EM 302	31,900
Square kilometers mapped with EM 302 within U.S. EEZ deeper than 200m	31,900
Number / Data Volume of EM 302 raw bathymetric / bottom backscatter multibeam files (.all)	430 files/ 49.9 GB
Number / Data Volume of EM 302 water column multibeam files	404 files / 245 GB
Number / Data Volume of EK60 water column split-beam files (.raw)	Not Collected
Number / Data Volume of sub-bottom sonar files (.segy, .kea, .keb)	SEGY 303 files / 18.6 GB Raw 249 files / 56.2 GB
Number of XBT casts	Total: 114 XBT 108 XSV 6
Number of CTD casts	5

6. Data Archival Procedures

The following mapping data collected during KR-OER-19-01 have been submitted to NOAA archives and will be publicly available in the near future via the National Centers for Environmental Information (NCEI) online archives. Ancillary and supporting files are archived with the sonar datasets. The archived data will include:

- *EM 302 Multibeam bathymetry and bottom backscatter dataset*
- *Knudsen 3260 Sub-bottom Profiler dataset*
- *EM 302 Multibeam water column dataset*
- *Sound speed profiles collected using CTD, XBT and XSV*

All sonar data are permanently discoverable at https://www.ngdc.noaa.gov/ (last accessed April 2020).

At the time of writing this report, EM 302 water column data, supporting data, and informational logs are expected to be available in the NCEI Water Column Sonar Archives: https://www.ngdc.noaa.gov/maps/water_column_sonar/index.html (last accessed April 2020).

Sub-bottom data will be available in the NCEI Data Archives accessible at https://www.ngdc.noaa.gov/. For any challenges accessing SBP data, send an inquiry to ncei.info@noaa.gov requesting access to KR-OER-19-01 Knudsen 3260 sub-bottom raw and processed data.

EM 302 bathymetry data, supporting informational logs, and ancillary files were/will be available in the NCEI Data Archives accessible at https://maps.ngdc.noaa.gov/viewers/bathymetry/ (last accessed April 2020)

7. List of Attachments

Attachment I: Fugro Mobilization and Calibration report

Please see attachment I.

Attachment II: Fugro Descriptive Report Survey Area 1 A

Please see attachment II.

Attachment III: Fugro Descriptive Report Survey Area 1B

Please see attachment III.

7. Appendices

Appendix I: Project Instructions

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Coast Survey
Silver Spring, Maryland 20910-3282

Project Instructions

Date Submitted: August 1, 2019

Contractor: Fugro USA Marine, Inc.

Project Number: KR-OER-19-01

Project Title: GEORGIA—FLORIDA, Vicinity of Blake Plateau

Period of Performance: August 5, 2019 – August 31, 2020

Prepared by: 08/01/2019
Mashkoor Malik, NOAA
Expeditions & Exploration Division
Office of Ocean Exploration and Research

Prepared by: for
HERZOG.MARTHA.C.1365899530
2019.08.01 11:11:09 -04'00'
Corey Allen, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

Approved by: for
ROBIDOUX.LORRAINE.1365893140
2019.08.01 12:35:15 -04'00'
Captain Richard Brennan, NOAA
Chief, Hydrographic Surveys Division
Office of Coast Survey

Hydrographic Survey Project Instructions

Project Name:	GEORGIA—FLORIDA, Vicinity of Blake Plateau
Project Number:	KR-OER-19-01
Assigned Field Unit:	Fugro USA Marine, Inc.
Assigned Processing Branch:	N/A
Signed Date:	8/1/2019
Project Instructions Version:	FINAL
Planned Acquisition Time:	Start Date: 08/2019 End Date: 08/2020
Delivery Dates:	Delivery date is the end of period of performance as indicated on the Task Order

Purpose and Location:
The purpose of this survey is to provide NOAA with modern and accurate hydrographic survey data, to include both multibeam echo sounder and sub-bottom profiler, in the region of the Blake Plateau. These data will be used to update nautical charts in this area as well as provide mapping coverage in the region in support of the NOAA-wide goal of mapping the US EEZ by the year 2030. The Blake Plateau remains one of the only regions along the US East Coast that does not have comprehensive bathymetric coverage data. This survey will significantly improve coverage offshore of Georgia and Florida, providing coverage from approximately 150-200 nm offshore.
Supporting Documents:
Hydrography shall consist of Navigable Area Surveys in accordance with the following support

documents.
NOS Hydrographic Surveys Specifications and Deliverables (HSSD), March 2019
Statement of Work (SOW), 2019

PERSONNEL SAFETY AND DATA QUALITY SHALL ALWAYS BE EMPHASIZED OVER DATA QUANTITY! THE HYDROGRAPHER SHALL NEVER SUBJECT PERSONNEL OR BOATS TO UNDUE RISKS AND HAZARDS.

Limits & Coverage:	
Inshore Limit: There is no inshore limit defined for this survey.	
Coverage Requirements:	
Coverage Water Depth	*Coverage Required*
All waters in survey area	Full bottom coverage using multibeam echo sounder and sub-bottom profiling system at line spacing commensurate with multibeam echo sounder survey line spacing.

Assigned Tasks

Acknowledgement:
The COR for this project is Meredith Payne, and the Project Manager is Mashkoor Malik. The field unit shall acknowledge receipt of these instructions and submit any comments or questions via email to the COR and Project Manager. Additionally, the Project Manager shall be included on all discussions or correspondence involving issues concerning the project. Contact information for COR and Project Manager is in user contacts.

Environmental Compliance Requirements
Comply with the marine mammal observation and reporting requirements in HSSD Section

1.5 and all Best Management Practices (BMPs) listed at the end of the Project Instructions. An environmental compliance map detailing critical habitat areas is included with the BMPs. A NEPA Categorical Exclusion was obtained by NOAA Ocean Exploration and Research for this survey and is appended to these Project Instructions.

Aids to Navigation (ATONs):
Any ATONs located within the survey area should be verified so that they serve their intended purpose in accordance with Section 7.3.5 of the HSSD.

Maritime Boundary Points (MBPs):
There are no Maritime Boundary investigation requirements for this project.

Bottom Samples:
There are no Bottom Sample investigation requirements for this project.

Chart Comparison:
There is no Chart Comparison requirement for this project.

Coast Pilot:
There is no Coast Pilot requirement for this project.

Dangers to Navigation (DTONs):
Response: Submit DTON reports in accordance with Section 1.6 of the HSSD to ahb.dton@noaa.gov with a CC to the assigned COR. It is of paramount importance that DTONs be reported as soon as possible.

Historical Consultation Response: State Historic Preservation Officer Not Contacted because survey area is outside state water jurisdiction.

Junctions:
No junctioning surveys have been provided for this project.

Progress reports:
Submit monthly progress reports no later than 5 days from the end of the reported month via TOMIS, Task Order Management and Information System. Prepare progress reports in accordance with HSSD Section 8.1.1.2. The COR will provide a Monthly Progress Report template before the beginning of field operations. Submit a weekly acquisition progress report during field operations in accordance with section 8.1.1.1 of the HSSD.

Survey Outlines:
Generate a survey outline that shows the extent of hydrography for each survey in accordance with the HSSD, Section 8.1.2. Submit survey outlines to survey.outlines@noaa.gov with a CC to the COR.

Horizontal Control Requirements:
There is no Horizontal Control requirement for this project.

Vertical Control Requirements:
There is no Vertical Control requirement for this project.

Shoreline and Nearshore Features:
There are no feature investigation requirements for this project.

Descriptive Report:
The Descriptive Report supplements the survey data with information that cannot be depicted or described in the digital data. The Descriptive Report describes the conditions under which the survey was performed, discusses important factors affecting the survey's adequacy and

accuracy, and focuses upon the results of the survey. It contains required information on certain standard subjects in concise form, and serves to index all other applicable records and reports. A descriptive report is required to accompany the data delivered to COR including but not limited to details of area surveyed including square nautical miles (SNM) and the linear nautical miles (LNM) acquired during the survey, list of survey personnel, equipment used during the survey, sound speed methods, calendar of events, issues with the data quality (if any), data acquisition and processing setup. The report should include a log of daily activities.

An approval sheet shall be included in the DR document. The approval sheet shall contain the following statements:

- Approval of the deliverable files, Descriptive Report, digital data, and all accompanying records. This approval constitutes the assumption of responsibility for the stated accuracy and completeness of the hydrographic survey.
- Indication of the completeness of the survey and adequacy for its intended purpose. Recommendation of additional work is required.
- The amount and degree of personal supervision of the work.
- Additional information or references helpful for verifying and evaluating the survey

Deliverable digital data:

The survey data will be supplied in a digital format. Hard copy plots and hard copy printouts of reports are not required. For both sub-bottom profiler and multibeam data, separate digital deliverables into two data types: raw and processed. Bathymetric multibeam raw data should be uncorrected or with exception of online corrections. Processed bathymetric multibeam data should include the full resolution data in CARIS HDCS format or GSF (Generic Sensor Format) as well as bathymetric grids as CARIS Base surface and / or BAG at highest possible resolution commensurate with depth. Full-resolution echosounding data shall be delivered fully corrected for tides, sound speed, vessel offsets, draft and dynamic draft.

The hydrographer shall submit raw multibeam backscatter data in a format readable by QPS Fledermaus Geocoder Toolbox. The raw multibeam backscatter data shall be delivered in the Preprocess MBES folder (Appendix J). Backscatter mosaics created at the highest possible resolution should also be delivered in Geotiff format.

Sub-bottom profiler raw data shall be delivered in SGY format. Processed data shall be provided in image format.

Contractor shall email a PDF of the Letter Transmitting Data to the Project Manager and COR. Survey data shall be accompanied by NOAA Form 61-29 Letter Transmitting Data, see Appendix I.

Digital data shall be submitted on USB 3.0 compatible hard drives following either the data directory structure in Appendix J, or that used by the NOAA Ship *Okeanos Explorer*. Not all the folders will be relevant for this survey. The folders with no data can be left empty with a text file stating no relevant data available.

Attachment Page

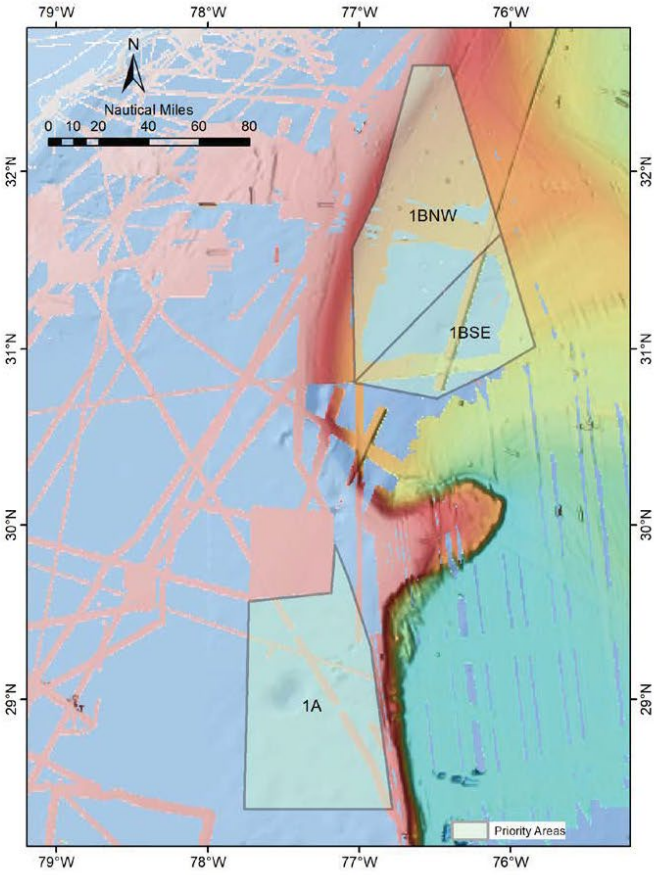


Figure 1. Area of interest - Blake Plateau survey polygons shown in black outlines. Existing publicly available multibeam bathymetry shown in background.

User Contacts

The following primary offices and persons shall be contacted at or near the beginning and end of the field operations to discuss survey objectives and accomplishment (Mandatory) or are listed for contact at the discretion of the Contractor (Reference).

Project Manager
Mashkoor Malik
NOAA, Office of Ocean Exploration and Research
SSMC#3, Room 10232
Phone: 301-734-1012
Email: mashkoor.malik@noaa.gov
Obligation: Mandatory

COR
Meredith Payne
NOAA, Office of Coast Survey
1315 East-West Hwy, N/CS31
Phone: 240-533-0025
Email: meredith.payne@noaa.gov
Obligation: Mandatory

Contracting Specialist
Nicole Lawson
NOAA, Eastern Region Acquisition Division
Phone: 757-441-6879
Email: nicole.lawson@noaa.gov
Obligation: For Reference

Attachment Page

Form Version: September 2017

Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: 2019 OER KR Survey

Date Review Completed: 5/14/2019

Completed by: Caitlin Adams, Project Coordinator

OAR Functional Area: OER

Worksheet File Name: 2019-05-OER-G3-KR Survey

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?**

   yes

2. **What is the proposed federal action?**
   The proposed federal action is to conduct seafloor sonar mapping operations during a contract hydrographic survey. The survey will be conducted between June 30 – November 30, 2019 on a hydrographic survey vessel contracted through the NOAA Office of Coast Survey. The exact vessel will be determined through the contract award process and will be equipped with a standard suite of survey equipment. The sonar data collected will provide critical baseline information about unknown and poorly understood deepwater areas of the Southeastern United States within the US EEZ off the Atlantic coast between Florida and South Carolina.

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 main cruise objectives are to collect seafloor and water column sonar data, which have cause no permanent physical, chemical, or biological change 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, this action will not result in adverse effects on human health or safety that are not negligible. The contract survey vessel will be operating in deep sea areas 150-200 miles from shore throughout the survey. This action does not involve any procedures or outcomes known to result in impacts to human health and safety more than would be negligible.

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

   Data collection will occur in deep water areas offshore of Florida. The effects will be negligible or less than negligible, as acoustic mapping operations will not cause any permanent impact on the seabed or water column.

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." An ESA letter of concurrence dated August 8, 2018 found that NOAA Ship Okeanos Explorer field work through FY19 was not likely to adversely affected species listed as threatened or endangered or critical habitats under the ESA. The proposed contract survey will use equivalent sonar equipment to the Okeanos Explorer and will be conducted in the same region as all Okeanos Explorer operations and can thus be considered not likely to have any adverse effects as well. The contract survey will adhere to best management practices to minimize any effects from the proposed work. Given the offshore focus area of our work, it is highly improbable that we will encounter marine mammals protected under the MMPA or sea birds protected under the MBTA. If we did encounter any marine mammals or seabirds, our effect would be negligible because of the best management practices to which we adhere to avoid or minimize environmental impacts.

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?**

   The action will not result in the potential to generate, use, store, transport, or dispose of hazardous or toxic substances in a manner that would have significant effect on the

environment as there are no hazardous or toxic substances used to complete these sonar operations.

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?**

   There are no operations planned for this cruise that involve underwater cultural heritage sites.

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)?**

   No, the contract survey vessel will be operating in remote areas of the US Atlantic Ocean. 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 or the environment.

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?**

    No. During the contract survey, the ship will not make landfall in areas other than commercial ports. The ship will comply with all applicable local and federal regulations regarding the prevention or spread 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 any violations of Federal, State, or local law or requirements imposed for protection of the environment. The survey coordinators obtained (or are in the process of obtaining) authorizations and/or consultations pursuant to applicable laws. See responses to questions #4, 5, and 6 for details.

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

No. The sonar mapping activities will be localized and of short duration in any particular area at any given time. Given this project's scope and breadth, no notable or lasting changes or highly controversial effects to the environment will result.

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?

No. 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?

No. The techniques and equipment used are standard for this type of field activity.

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: 2019.05.15 16:45:50 -04'00'

Signed by: Frank Cantelas, OER Deputy Director

Date Signed: May 15, 2019

Summary of Mitigation Measures and Best Management Practices

Protective Measures and Best Management Practices (BMPs) Incorporated into the Action. BMPs are required to be incorporated within project instructions, cruise plans and NEPA documentation including financial assistance awards and environmental review memoranda. All applicable BMPs must be communicated to the science leads, boat operators and field staff, and as necessary between ship's crew (Commanding Officer/Master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Bridge Watchstanders will carefully monitor for the presence of marine protected species, and permitted personnel would follow established best management practices (BMPs) to minimize disturbance.

1. **Minimize Exposure to Elevated Noise Levels**
    a. Maintain watch for the presence of marine protected species. Immediately notify the survey department of the proximity of cetaceans and sea turtles.When marine mammals are able to be identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice.
        i. If a sea turtle is present within 400 m of the ship, the survey department will respond by stopping the pinging of the subbottom sonar. The subbottom shall remain off until the sea turtle has departed the 400 m safety zone.
        ii. If cetaceans are present within 400 m of the ship (460 m/500 yards for North Atlantic Right Whales), the vessel would stop if the animal is in danger of colliding with the ship but the mapping sonars would continue transmitting to avoid startle responses. If an observed animal is unable or unwilling to depart the immediate area, sonars will be secured and the ship will slowly move away from the area if feasible.
        iii. If the cetacean is within 400 m (460 m/500 yards for North Atlantic Right Whales) and is not in danger of collision, reduce speed and seek to avoid the animal as much as possible.
        iv. The Survey Department will respond by stopping the pinging of the sub-bottom sonar and switching the multibeam sonar into "mammal protection" mode (keeps it pinging but at a source level reduced by 20 decibels). No change will occur to the EK 60s. Note: the ADCPs are never run simultaneously with the multibeam and sub-bottom, so they would already be off. The ADCPs are mostly run when the ship is stationary at a dive site and risk to marine mammals is minimal.
    b. Minimize turning all sonar sound sources on and off as a precautionary measure to avoid possible startling of animals.
    c. When the systems have been shut down for any reason, the multibeam mammal protection mode would be used to turn the multibeam back on first. Only after the multibeam has been brought from mammal protection mode to full power would the sub-bottom profiler and EK 60 sonars then be turned back on.

d. If the multibeam sonar is not being used, but other sonar systems are being turned on, they will be started in lower power settings and will gradually (over a 15 minute time period) be adjusted to higher power settings as appropriate for the water depths to essentially mimic the approach of the "mammal protection" mode of the multibeam.
e. We will postpone start-up and operation of the USBL, if porpoises, dolphins or *Koiga* are sighted within 1000 meters of the ship.

2. Minimize Collisions with Vessels

The following guidelines for vessel operation in the presence of marine protected species and other marine wildlife are provided by the Bureau of Ocean Energy Management in a Notice to Lessees and Operators (appendix G), and NOAA Fisheries as part of a Biological Opinion:

a. *Vessel Strike Avoidance*

Vessel operator and crew must maintain a vigilant watch for all marine mammals and sea turtles and slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal. These requirements apply when the vessel is in transit and do not apply in any case where compliance will create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel according to the parameters stated below. Visual observers monitoring the vessel strike avoidance zone can be either third-party visual protected species observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena. Vessel strike avoidance measures shall be followed during sonar surveys and while in transit.

Vessel personnel should do the following in order to avoid causing injury or death to marine mammals and sea turtles:

i. Maintain a vigilant watch for marine mammals and sea turtles and slow down or stop their vessel to avoid striking protected species.
ii. When whales are sighted, maintain a distance of 100 yards (91 meters) or greater from the whale. If the whale is believed to be a North Atlantic right whale, vessel personnel should maintain a minimum distance of 500 yards (460 meters) from the animal (50 CFR 224.103).
iii. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards (45 meters) or greater whenever possible.
iv. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
v. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised.

vi. Whales may surface in unpredictable locations or approach slowly moving vessels. When vessel personnel sight animals in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.

The vessel must maintain a minimum separation distance of 100 m from large whales (i.e. sperm and baleen whales). The following avoidance measures must be taken if a large whale is within 100 m of the vessel.

- The vessel must reduce speed and shift the engine to neutral, and must not engage the engines until the whale has moved outside of the vessel's path and the minimum separation distance has been established.
- If the vessel is stationary, the vessel must not engage engines until the whale(s) has moved out of the vessel's path and beyond 100 m.

b. *Additional Requirements for the North Atlantic Right Whale*

i. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards (457 m) be maintained from the animal (50 CFR 224.103 ©).

ii. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.

iii. Mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard NAVTEX broadcasts, and Notices to Mariners. Commercial mariners calling on United States ports should view the most recent version of the NOAA/USCG produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD).

iv. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

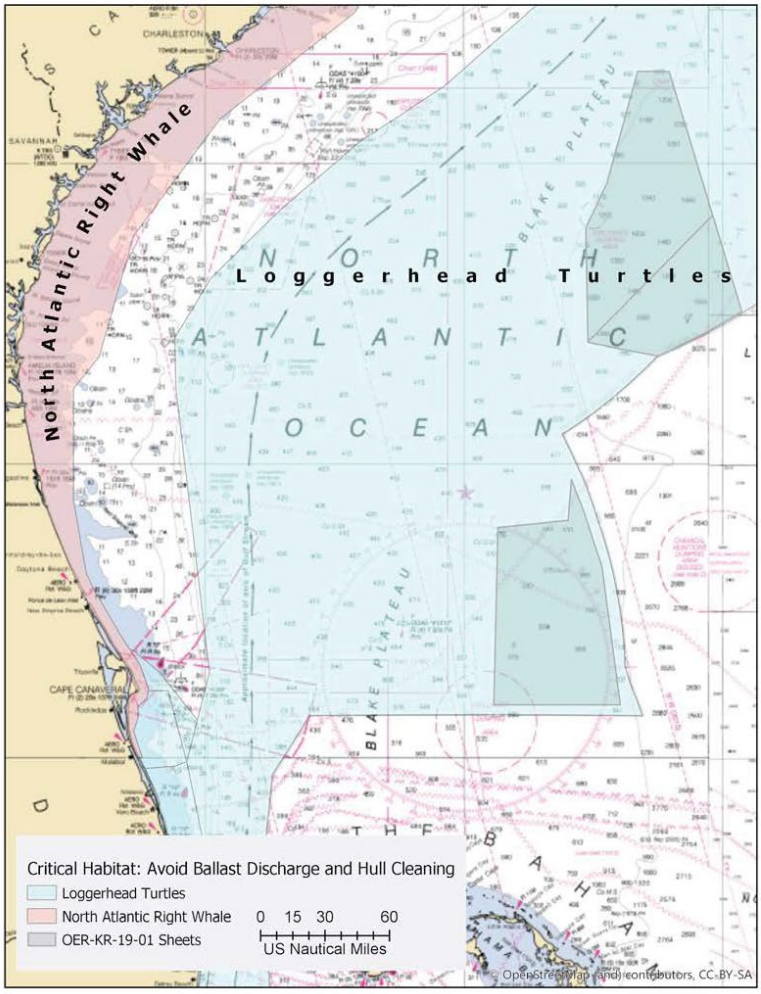
v. Adherence to seasonal vessel speed restrictions of 10 knots or less as designated locations (Appendix H) along the U.S. east coast.

vi. Adherence to NOAA Compliance Guide for Right Whale Ship Strike Reduction Rule (Appendix I)

3. Minimize Vessel Waste and Discharge & Prevent Invasive Species

a. All vessels operating in areas where ESA-listed species are present will continue to follow MARPOL discharge protocols, but will postpone any authorized discharge if any protected species are within 100 yards of the vessel.
b. Meet all EPA Vessel General Permits and Coast Guard requirements.
c. Avoid discharge of ballast water in designated critical habitat.
d. Use anti-fouling coatings.
e. Clean hull regularly to remove aquatic nuisance species.
f. Avoid cleaning of hull in critical habitat.
g. Avoid cleaners with nonylphenols.

KR-OER-19-01 Blake Plateau Project Environmental Compliance



Ocean Exploration and Research

Appendix I: Survey Data Submission

NOAA FORM 61-29
(12-71)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

LETTER TRANSMITTING DATA

REFERENCE NO.

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY (Check)

☐ ORDINARY MAIL ☐ AIR MAIL
☐ REGISTERED MAIL ☐ EXPRESS
☐ GBL (Give number)_____

DATE FORWARDED

NUMBER OF PACKAGES

TO:

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

This package contains [List drive(s) with description (e.g. Seagate 500 GB) and CD number or drive name]
Containing Hydrographic Survey Data Submission "[Type of data (i.e. Field/Raw and Processed Data]":

Checksum

Survey: Hxxxxx
Project: OPR-xxxx-xx-xx
Size (bytes): 000,000,000
Files: 00,000
Name of Checksum File: Hxxxxx.md5

Survey: Hxxxxx
Project: OPR-xxxx-xx-xx
Size (bytes): 000,000,000
Files: 00,000
Name of Checksum File: Hxxxxx.md5

Survey: Hxxxxx
Project: OPR-xxxx-xx-xx
Size (bytes): 000,000,000
Files: 00,000
Name of Checksum File: Hxxxxx.md5

[Add additional comments or notes here]

FROM: (Signature)

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

USDOC NOAA NOS
[Insert field unit address here]

NOAA FORM 61-29 SUPERCEDES FORM C AND GS 413 WHICH MAY BE USED.

• U.S. GOVERNMENT PRINTING OFFICE: 1988 – 554-006-61309

Reset

Figure I.1: Survey Data Submission for NOAA Units

Appendix J: Data Directory Structure

- OPR-X###-XX-##
  - HXXXXX
    - Data
      - Descriptive_Report
        - Appendices
          - I_Water_Levels
          - II_Supplemental_Survey_Records_&_Correspondence
        - Report
      - Preprocess
        - Features
        - MBES
        - Positioning
        - SBES
        - SSS
        - SVP
      - Processed
        - GNSS_Data
          - SBET
        - Multimedia
        - S-57_Files
          - Final_Feature_File
          - Side_Scan_Sonar_Contacts
        - Sonar_Data*
          - Surfaces_&_Mosaics
          - HXXXXX
          - VesselConfig
        - SVP
        - Water_Levels
      - Public_Relations_&_Constituent_Products
      - Separates
        - I_Acquisition_&_Processing_Logs
          - Acquisition_Logs
          - Detached_Positions
          - Processing_Logs
        - II_Digital_Data
          - Checkpoint_Summary_&_Crossline_Comparisons
          - Sound_Speed_Data_Summary
    - Project_Reports
      - Data_Acquisition_&_Processing_Report
        - Report
        - Appendices
      - Horizontal_&_Vertical_Control_Report
        - Digital_A-Vertical_Control_Report
        - Digital_B-Horizontal_Control_Data
          - ATON_Data
          - Base_Station_Data
      - Project_Correspondence

* CARIS users:
Processed/Sonar_Data/Surfaces_&_Mosaics
Processed/Sonar_Data/HDCS_Data/HXXXXX
Processed/Sonar_Data/HDCS_Data/VesselConfig

Figure J.1: NOAA and Contractor Data Director Structure

Appendix II: Statement of Work

STATEMENT OF WORK
HYDROGRAPHIC SURVEY SERVICES
Fugro USA Marine, Inc.
KR-OER-19 -01, GEORGIA—FLORIDA, VICINITY of BLAKE PLATEAU
AWARD NUMBER: EA133C-14-CQ-32
August 1, 2019

1 GENERAL INFORMATION

1.1 Background

NOS is responsible for NOAA's nautical charting program and provides nautical charts and related products for the coastal and adjacent ocean areas of the United States (including possessions and territories), the Great Lakes, and other inland navigable waters. Accurate and reliable charts are essential to the safety of those who go to sea for commerce, defense, or recreation. NOAA is also responsible for the management of bathymetric data acquisition for the U.S. Exclusive Economic Zone (EEZ). Accurate bathymetric data are essential to support the NOAA wide initiative to fully map the US EEZ to modern standards.

1.2 Purpose

The purpose of this contract is to provide NOAA with modern and accurate hydrographic survey data in the vicinity of the Blake Plateau. These data will be used to update nautical charts in this area as well as provide mapping coverage in the region in support of the NOAA-wide goal of mapping the US EEZ by the year 2030.

1.3 Statement of Work

This Statement of Work (SOW) contains requirements specific to the contracted hydrographic services for this effort. For detailed specification refer to the NOS Hydrographic Surveys Specifications and Deliverables (HSSD).

1.4 Technical Specifications

The contractor shall perform all work on this task order in accordance with the requirements described in this SOW and the Project Instructions.

1.5 Area

The Government can issue task orders for surveying within the waters of the United States. This survey will take place in the Exclusive Economic Zone east of Cape Canaveral, FL (Area 1A) on the Blake Plateau, and east of Savannah, GA (Areas 1BNW and 1BSE) off the eastern edge of the Blake Plateau. Survey limits will be provided in the Project Instructions.

2 SCOPE OF WORK

2.1 General Work

Under this contract constitutes a basic fixed price task order assigned by the Government. The Contractor will provide a vessel equipped with a fully functional multibeam echo sounder system capable of providing high resolution bathymetry and backscatter to 4000m depth (e.g. EM 302 or comparable system) as discussed with the COR, and a Chirp (2.5 to 6.5 kHz) sub-bottom profiling system, and all necessary ancillary systems and subsystems needed for full-ocean depth bathymetric and high-resolution sub-bottom profiling surveys in the area described in the Project Instructions. The multibeam and sub-bottom profiling systems and all subsystems shall be operating to manufacturer's specifications and shall be up to date with either the manufacturer's latest firmware and software versions or versions acceptable to the COR.

The Contractor shall provide the vessel, qualified hydrographic survey personnel, and systems for up to 40 calendar days, 24 hours per day to meet survey acquisition requirements. The Contractor shall be responsible for in-port time for mobilization and demobilization to and from the survey area from port(s) in the Blake Plateau region and is not included in the costs of this contract. The Contractor shall provide for transit of the ship to and from the Blake Plateau region; this transit is not included in the up to 30 days of survey acquisition – the Contractor is already transiting near this area will capitalize on current transit operations to meet survey objectives.

The ship shall operate at a speed that provides good quality data in the prevailing oceanographic conditions (sea state, winds, currents, etc.) and deemed safe by the vessel master.

2.1.1 Basic Work Orders

Under this work order, the Contractor shall provide survey capacity as specified in this SOW and the Project Instructions. The price of this task order includes, but is not limited to:

- Surveying throughout the specified area designated by the COR/Project Manager
- Mobilizing, demobilizing, transiting to, and moving between survey areas and tracks within the general survey area
- All equipment maintenance, sensor calibrations and field office cost of the Contractor (if any)
- Downtime due to weather; periods during the embarked days in which weather precludes survey activities are considered part of the agreed services
- The Contractor shall consult with the COR in regard to interruption of survey activities for any reason and providing system specification and configuration reports
- The cruise docking fees, stevedore fees, and other costs associated with vessel operation and port calls
- Networking, recording, storing, and providing access to all survey data within 120 days after the cruise

2.1.2 Special Investigation Task Orders

Special investigation task orders are not anticipated.

2.2 Contractor Responsibilities

2.2.1 General

The Contractor shall provide all labor, material, and equipment necessary to supply the Government with raw and processed hydrographic data acquired in accordance with the requirements and technical specifications stated herein. The Contractor shall be responsible for the following tasks, although this list is not to be deemed as all inclusive:

- Providing a fully-functional multibeam echo sounding system capable of achieving depths of 4000m and sub-bottom profiling system capable of acquiring all data in accordance with this SOW
- Providing a fully functional, satellite-differential, GNSS-aided inertial positioning and attitude sensor sounding system, capable of acquiring all positioning and attitude data in accordance with this SOW
- Providing fully functional and calibrated fixed and profiling sound speed sensors and an XBT/XSV/XCTD launching and data recording system, interfaced or networked to the multibeam system
- Providing secure data storage capacity sufficient for storing 30 days of data acquisition for all contracted systems
- Providing system technicians for system start-up, configuration management, troubleshooting, data acquisition, and technical support
- Supplying all equipment, spares, and supplies necessary for the conduct of survey operations throughout the contracted period
- Providing pre- and post- survey vessel drafts, system and subsystem offset measurements, and associated documentation on their determination. Offset measurements shall meet the specifications required by the multibeam echo sounder and inertial measurement unit manufacturers for their installed systems.
- All necessary sensor calibrations of equipment needed to conduct the survey work
- Determining that the static offsets of multibeam echo sounder transducer of the vessel has been measured (alignment survey and patch test) and remains properly accounted for throughout the survey
- Providing results of the most recent measurements of sensor alignment and biases
- All required deliverables
- Making all necessary port entry and alongside support arrangements for embarkation, mobilization, demobilization, and disembarkation at the starting and ending port.
- Adhering to requirements detailed in DOC Clause CAR 1352.239.72 (see IT Security Requirements)

2.2.2 IT Security Requirements

For this SOW, the Contractor will not be using government-owned systems. For this SOW, the Certification and Accreditation (C&A) or Assessment and Authentication (A&A) requirements of Clause 48 CFR 1352.239-72 do not apply, and a Security Accreditation Package is not required. For this SOW, the Contractor will not be accessing US government computers or IT systems for this effort. For this

SOW, the Contractor will neither be accessing nor furnishing any information that is not within the public domain for this work.

2.2.3 Personnel

The Contractor shall be responsible for providing technical support personnel experienced in the operation and calibration of the vessel's hydrographic data acquisition systems. During the execution of the work, the Contractor shall provide onboard technical support necessary to start up, configure, shut down and restart as necessary, and maintain the mapping systems and subsystems, including the data transfer and storage system, in working order.

2.2.3.1 Chief Hydrographer and Hydrographic Team
The Contractor shall designate and provide a Chief Hydrographer and watch-standing hydrographers who will be onboard or remotely providing support and acquisition at all times during the conduct of survey operations.

2.2.4 Vessel

The Contractor is responsible for providing and operating a seaworthy vessel(s) that complies with regulations as shown in the table below:

2.2.4.1 Vessel Operation

Applicable Regulations for Contractor Vessel Operations	
Vessels greater than 500 GRT	International SOLAS certificate requirements
Vessels less than 500 GRT and greater than/equal to 300 GRT	46 CFR Subchapter U (Oceanographic Research 300 GRT Vessels)
Vessels less than 300 GRT	46 CFR Subchapter C (Uninspected Vessels)
	46 CFR Subchapter T (Small Passenger Vessels) for Lifesaving and Fire Extinguishing Equipment
	46 CFR Subchapter U - Accommodations (Subpart 190.20)
ALL VESSELS	40 CFR 110 -Federal Water Pollution Control Act. Comply with Vessel Sanitation Program Operations Manual

Table 1. Applicable Regulations for Contractor Vessel Operations

The Contractor is responsible for arranging dockage, fueling, and supplying of vessel(s). The Contractor is responsible for the safety of the crew and passengers and for operating the vessel in a safe and prudent manner. Assignment of survey tasks and designation of survey tracks by the Government does not relieve the Contractor from operating a vessel in a safe and prudent manner. The Contractor is responsible for notifying the COR if work cannot be completed safely.

2.2.4.2 License Requirements
The survey vessel shall be operated 24 hours per day by licensed and qualified personnel meeting applicable international maritime staffing requirements appropriate for the size and mission of the vessel.

2.2.4.3 Nautical Charts
The vessel shall have on board the largest scale official charts (or approved ECDIS and ENCs) of the survey area and any area in which the vessel is operating. These charts (ENCs) shall be fully corrected through the latest weekly Notice to Mariners and the U.S. Coast Guard Local Notice to Mariners.

2.2.5 Survey Equipment and Instrumentation

The Contractor is responsible for maintaining and calibrating all equipment necessary to comply with this Statement of Work. The Contractor shall calibrate equipment requiring annual calibration such as sound speed profilers, Conductivity-Temperature-Depth (CTD) probes, water level measurement systems, and other related instruments and instrumentation systems, no earlier than one year prior to the commencement of survey operations. Copies of the sound speed profiler calibration data shall be included in the document package provided to the COR in advance of the survey work.

2.2.6 Clearances

The Contractor shall be responsible for:

- Obtaining personnel access clearances; permission to enter onto private and public property (if needed)
- All applicable licenses for operation of electronic navigation devices
- All radio-frequency clearances
- Ensuring compliance with all laws, regulations, and ordinances associated with the installation of electronic navigation devices
- Staffing and maintaining shore-based installations as required
- All survey work will be conducted within US EEZ. No state department clearance is required to work in any foreign territory.
- Ensuring all applicable National Environmental Protection Act (NEPA) regulations associated with the use of multibeam echo sounders and sub-bottom profiles are followed. A NEPA Categorical Exclusion has been secured for this project, and Best Management Practices will be transmitted to the Contractor with the Project Instructions.

2.2.7 Keeping the Government Informed

2.2.7.1 Vessel Movement
The Contractor shall inform the COR of survey vessel schedules at least 48 hours in advance.

2.2.7.2 Dangers to Navigation
As soon as practicable after discovery, the Contractor shall notify the COR and the Project Manager about any uncharted or incorrectly charted danger.

2.2.7.3 Identification of Potential Field Examinations
Not applicable

2.2.8 Release of Data

The Contractor shall not release any survey data other than to the COR and the Project Manager without written permission from COR.

2.2.9 Insurance and Liability

Refer to section H of the Hydrographic Surveying and Related Support Services contract.

2.2.10 Regulatory Compliance

The Contractor shall comply with all applicable Federal, State, and local regulations.

2.2.11 Survey Data and Software

The Contractor shall retain a copy of all software versions and survey system configuration for 6 months after completion of the task order.

2.2.12 Accommodations for Government Observers

2.2.12.1 Berthing and Messing
Not applicable.

2.2.12.2 Communications
Not applicable.

2.2.12.3 Internet Access
Not applicable.

2.2.12.4 At Sea Rendezvous
Not applicable.

2.3 Government Responsibilities

2.3.1 Government Observers

No government observers will be present onboard for this survey. Weekly and monthly updates about survey progress will be sent to the Project Manager and the COR.

2.3.2 Survey Registry Numbers and Titles

The Government will provide for and manage the survey registry number and title for each survey in the Project Instructions.

3 SURVEY REQUIREMENTS

3.1 Hydrographic Survey Data

The Contractor shall provide the echo sounding and profiling systems and subsystems necessary to acquire hydrographic survey data according to the coverage and equipment requirements in this SOW and the Project Instructions. The Contractor shall provide COR and Project Manager with digital raw files for all acquired survey and ancillary data within thirty (30) days after completion of survey.

3.2 Data Format

Multibeam files shall be provided in the standard raw formats for the multibeam used during the survey. The multibeam data acquired, and provided in raw data format shall include depth and seafloor backscatter and shall have water column backscatter data logged in a separate file to maintain the file sizes manageable. , Raw unedited multibeam data shall be delivered in a manner so that all runtime and installation parameters such as sensor offsets, vessel draft, biases, dynamic attitude, sound velocity, and vertical datum reducers are stored in the .all file. Sub-bottom profiler data files shall be provided in non-proprietary SEG-Y format. Ancillary system data shall be provided in a file format(s) as agreed by the Contractor and the COR.

3.3 Quality Control

The Contractor shall make available to the COR, any quality control/quality assurance tools and products used by the Contractor in the course of the survey. The Contractor shall perform and record any Built In Self Tests (BIST) if available for the multibeam used during mobilization and will provide results to the COR to confirm basic system operation before commencing survey. A second BIST test shall be completed and provided after completion of survey to reconfirm system status. The hydrographer shall regard all significant uncertainties which affect soundings, to ensure that the net vertical error in the delivered bathymetry does not exceed 2.3% of water depth, 95% confidence level.

3.4 Positioning System

The vessel shall be equipped with a Satellite Differential Service (Fugro MarineStar or equivalent)-corrected GNSS-aided inertial motion unit (POS MV Version 5 or equivalent) integrated into the data acquisition system for multibeam and sub-bottom profiler positioning and attitude measurement. Position included in delivered data should be referenced to ITRF or WGS 84.

3.5 Water Level Systems Checks and Verification

Not Applicable

3.6 Single Beam Echo Sounder Data

Not Applicable

3.7 Multibeam Confidence Checks

3.7.1. The contract will run at least one cross line to cross over the main survey lines as perpendicularly as possible.

3.7.2. The contractor will repeat ~ 30 - 45 minutes survey line with different depth modes in an effort to establish a deep water backscatter reference area. The survey line should be run over a flat area and the location of the line will be selected in consultation with the PM and COR to facilitate the running of the same line by other multibeam echo sounder equipped ships.

3.8 Speed of Sound Measurement and Correction

3.8.1 Sound Speed Sensors

The vessel shall be equipped with fixed sound speed sensing systems for measuring sound speed at transducer depth, a profiling sound speed system (CTD or SVP), and a fixed or portable launching and data recording system compatible with Lockheed Martin Sippican XBTs / XCTDs, or XSVs. The contractor will provide XBTs/XCTDs or XSVs, for regular measurement of sound speed profiles throughout the cruise. Following an initial demonstration of the system that shall be provided by the onboard Contractor technician, expendable probes will be launched at an interval (4-6 hrs) in accordance with the prevailing oceanographic conditions and whenever sound speed variations warrant between regular launches. Consistent with safety and operational constraints, the Contractor shall be prepared to support these launches with approval by the ship's watch officer.

3.8.2 Sound Speed Profiles and Corrections

The multibeam system shall be configured so that sound speed profiles may be created, edited, and entered on-the-fly to the multibeam data acquisition system.

3.8.3. Sound Speed Confidence Check

Prior to conducting the survey, the Contractor technicians. A hydrographer will conduct a comparison between the fixed transducer-depth sound speed sensor, the shipboard sound speed profiling system, and expendable probes (XBT or XSV).

3.9 Side Scan Sonar Confidence Checks

Not Applicable

4 TIDE AND WATER LEVEL DATA

Tide and water level data are not required or applicable. All soundings in the survey shall be referenced to instantaneous sea level at the time of acquisition. The resulting bathymetry shall be considered to be on the vertical datum of Mean Sea Level (MSL) with negligible error related to tide correction.

5 OTHER DATA

5.1 Bottom Sediment Samples

No bottom sediment samples are required

5.2 Aids to Navigation

Not Applicable

5.3 Shoreline Features and AWOIS Items

Not Applicable

5.4 Drilling Structures

The Contractor shall notify the Project Manager and COR should the vessel bridge watch encounter any drilling structures, production platforms, well heads, or seafloor mining installations within the survey limits.

6 DELIVERABLES

6.1 Descriptive Report (DR)

A Descriptive Report is required to accompany the data delivered to the Project Manager and COR, including but not limited to, survey limits, details of survey personnel, calendar of events, issues with the data quality (if any), and system setup. The DR should be compiled in accordance with instructions included in the project instructions.

6.2 Data and System Configuration Report in lieu of Data Acquisition and Processing Report (DAPR)

A DAPR is not required. The Contractor shall submit a data and system configuration report to the Project Manager and COR at the beginning of the survey, and an updated version of the report at the end of the survey, reflecting any changes made during the course of the survey. The System and Data Configuration Report shall include documentation of the data acquisition (for both principal and ancillary systems), and data storage systems and software used and the hardware, firmware and software versions in effect. The report shall include vessel draft values, system and sensor offset and bias values and

surveyor's report and documentation of how they were determined, and calibration certificates for fixed and profiling sound speed sensors.

6.3 Horizontal and Vertical Control Report (HVCR)

An HVCR is not required.

6.4 Digital Data Files

The contractor shall provide digital data in accordance with this SOW.

6.4.1 Bathymetric Attributed Grid (BAG)

The Contractor is responsible for a BAG and any final survey products.

6.4.2 Side Scan Sonar Data

Side Scan Sonar data will not be acquired on this task order.

6.4.3 S-57 Feature File

A Feature File is not required on this task order

6.5 Progress Reports

Submit a weekly acquisition progress report during field operations in accordance with section 8.1.1.1 of the HSSD.

Submit a monthly progress report in accordance with section 8.1.1.2 of the HSSD.

6.6 Survey Outlines

Provide final survey outlines to COR and Project Manager in advance of the processed survey via .shp file format.

7 DELIVERY INSTRUCTIONS

7.1 Packaging Instructions

Provide data on external hard drive.

7.2 Delivery Address

Mashkoor Malik
Office of Ocean Exploration and Research
SSMC#3, Room 10232
1315 East West Highway Silver Spring
MD 20910

Phone: 1-301-734-1012

8 INVOICING AND PAYMENT

Invoicing and payment will conform to guidelines set forth in Contract EA133C-14-CQ-0032. Invoices will be submitted to hsdinvoicesubmission@noaa.gov with a cc to the COR and Project Manager. 90% of award may be invoiced upon full data submission, with the remaining 10% to be paid upon data review and acceptance by the Project Manager and COR.