

Project Instructions: EX-22-04, Voyage to the Ridge 1 (Mapping)

Date Submitted: April 15, 2022

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-22-04

Project Title: Voyage to the Ridge 1 (Mapping)

Project Dates: May 11, 2022 - Jun 7, 2022

Prepared by:  _____ **Dated:** 4/15/2022

Sam Candio
Expedition Coordinator
NOAA Ocean Exploration

Approved by:  _____ **Dated:** _____


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Kasey Cantwell
Operations Chief
NOAA Ocean Exploration

Approved by:  _____ **Dated:** _____

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Rachel Medley
Chief, Expeditions and Exploration Division
NOAA Ocean Exploration

Approved by:  _____ **Dated:** _____

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Date: 2022.04.21 10:23:00 -0400

Captain Nicholas Chrobak
Commanding Officer
NOAA Marine Operations Center — Atlantic

I. Overview

A. Brief Summary and Project Period

May 11 - June 7, 2022

Newport, Rhode Island - St. Johns, Newfoundland

EX-22-04 Voyage to the Ridge 1 (Mapping)

This document contains project instructions specific to EX-22-04. For the annual, cross-expedition details, see the [“NOAA Ship *Okeanos Explorer* FY2022 Field Season Instructions.”](#) This expedition will commence on May 11, 2022 in Newport, Rhode Island, and conclude on June 7, 2022 in St. Johns, Newfoundland.

EX-22-04 is the first of a series of three strategic telepresence expeditions that aim to map and characterize the Mid-Atlantic Ridge (MAR), focusing on poorly understood and largely unknown areas along the Charlie-Gibbs Fracture Zone, Mid-Atlantic Ridge, and the Azores Plateau. This expedition will include 24-hour-a-day acoustic exploration mapping operations focused on areas generally deeper than 200 m. See Appendix C for the expedition’s Data Management Plan.

Mapping operations will include the use of the ship’s deepwater mapping systems (Kongsberg EM 304 multibeam, EK60/EK80 split-beam sonars, Knudsen 3260 Chirp sub-bottom profiler, and Teledyne acoustic Doppler current profilers), expendable bathythermograph (XBTs) in support of multibeam sonar mapping operations; and a high-bandwidth satellite connection for continuous ship-to-shore communications.

B. Days at Sea

All 28 days at sea (DAS) scheduled for this expedition are funded by NOAA Office of Oceanic and Atmospheric Research allocation. While mapping operations are planned 24 hours a day, this expedition will require 12 hours a day of support from the ship's deck and engineering department.

C. Operating Area

EX-22-04 will focus operations on the MAR and the Charlie-Gibbs Fracture Zone. Priority mapping areas are indicated in **Figure 1**. (The waypoints for the general working area and proposed cruise track are in Appendix B.)

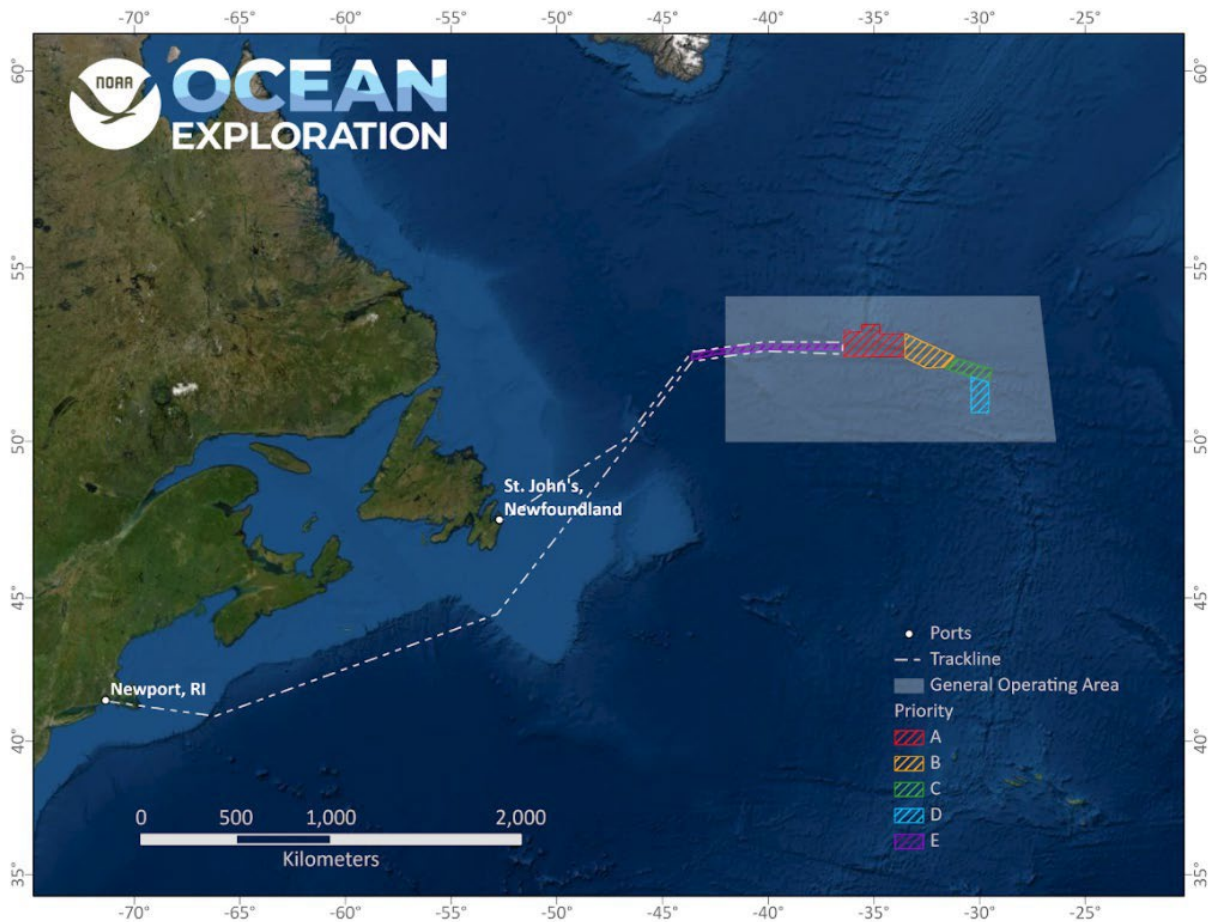


Figure 1. Map showing the general operating area for EX-22-04. Note that the cruise track is subject to change based on survey results, field conditions, and the discretion of the commanding officer.

D. Summary of Objectives

EX-22-04 operations will involve a transit northeastward followed by focused ocean mapping operations that will occur MAR and the Charlie-Gibbs Fracture Zone, mostly in deep water (>200 m). The expedition will include 24-hour-a-day exploratory mapping operations to fill mapping gaps and provide data for remotely operated vehicle (ROV) dive planning for the ensuing EX-22-05 remotely operated vehicle (ROV) expedition. The data collected throughout this expedition series aims to improve knowledge of unexplored areas along the Charlie-Gibbs Fracture Zone, MAR, and Azores Plateau to inform management needs for sensitive habitats, geological features, maritime heritage sites, and potential resources; locate and characterize deep-sea coral, sponge, and hydrothermal communities; extend bathymetric mapping coverage in support of Seabed 2030; ground-

truth existing bathymetric data, habitat suitability models, and inferred vent sites; characterize water column habitats along the MAR using acoustics, visual observations, and emerging technologies; enhance predictive capabilities for vulnerable marine habitats, seafloor composition, island formation, plate tectonics, critical minerals, and submarine geohazards; increase understanding of deep-sea ecosystem connectivity across the Atlantic basin; improve international collaboration and advance deep-sea mapping and exploration efforts pertaining to the Galway Statement on Atlantic Ocean Cooperation, the Atlantic Ocean Research Alliance (AORA), and the Atlantic Seafloor Mapping International Working Group; leverage international partnerships (e.g., iAtlantic, Challenger 150, Mission Atlantic, ATLAS, SPONGES, InterRidge, etc.) to conduct coordinated exploration and mapping of priority high-seas areas of the North Atlantic.

See the [“NOAA Ship Okeanos Explorer FY2022 Field Season Instructions”](#) for more information.

1. Mapping Objectives

Acoustic Mapping Objectives

- Perform standard mapping objectives with the EM 304 multibeam sonar, EK 60/80 split-beam echosounders, Knudsen 3260 sub-bottom profiler, and acoustic doppler current profilers.
- Perform calibrations of the EK60/80 split beam sonars.
- Transit data will aim to address bathymetric gaps or prioritize areas with poor bathymetric or seabed backscatter data quality.
- Collect mapping data in priority areas, as shown in **Figure 1**.
- Collect bathymetry data for ROV dives during EX-22-05.
- Execute mapping line plans as defined by onboard personnel, with real-time adjustments made to obtain complete seabed coverage as necessary.
- Collect expendable bathythermograph casts as data quality requires but not more than 6 hours apart.
- POS/MV data will be monitored in real-time and collected to ensure data quality and watch for potential periodic dropouts that have been reported throughout the fleet.
- Seapath data from the newly installed system will be monitored and utilized as necessary.

2. Video Engineering Objectives

- Provide onboard support for 24-hour mapping objectives

3. Network/Onboard Data Objectives

- Send .GSF files to shore to aid in EX-22-05 dive planning.
- Ensure Global Foundation for Ocean Exploration (GFOE) managed VSAT, network and computing infrastructure operate as required to meet mission objectives.
- Ensure shipboard instruments/teams are producing expected data products at the expected rates according to established conventions
- Ensure data management processes organize, backup, and transmit data to shore as expected.
- Support shore-based personnel to remotely access shipboard resources to better meet mission objectives.
- Improve system documentation.

E. Participating Institutions

- National Oceanic and Atmospheric Administration (NOAA), Ocean Exploration — 1315 East-West Highway, Silver Spring, MD 20910 USA
- NOAA, National Centers for Environmental Information (NCEI) — Stennis Space Center, MS 39529 USA
- NOAA Office of National Marine Sanctuaries (ONMS) — 1305 East-West Highway, Silver Spring, MD 20910 USA
- University Corporation for Atmospheric Research (UCAR) Programs for Advancement of Earth System Science — P.O. Box 3000, Boulder, CO 80307 USA
- University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) — Jere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824 USA
- Global Foundation for Ocean Exploration (GFOE) — P.O. Box 417, Mystic, CT 06355 USA
- University of Rhode Island Inner Space Center (ISC) — 225 South Ferry Road, Narragansett, RI 02882 USA

F. Personnel (Mission Party)

Mission personnel (see **Table 1**) will begin joining the ship on May 9, 2022. Mission personnel will then be aboard for the duration of the expedition (May 11 - June 7, 2022). Some personnel will depart on June 8, 2022, and others will stay aboard for the expedition that follows (EX-22-05).

Table 1. Seagoing mission personnel: This list is tentative until travel is booked. Any deviations will be communicated to the operations officer.

#	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Candio, Sam	Expedition Coordinator	05/09	06/8	M	NOAA Ocean Exploration ¹	USA
2	Takagi-Berry, Anna	Watch Lead	05/10	06/8	F	UCAR	USA
3	Freitas, Daniel	Watch Lead	05/10	06/8	M	UCAR	USA
4	Hanley, Margaret	Explorer-in-Training	05/10	06/8	F	UCAR	USA
5	Hernandez, Gabriel	Explorer-in-Training	05/10	06/8	M	UCAR	USA
6	Rubiano, Catalina	Explorer-in-Training	05/10	06/8	F	UCAR	USA
7	DeNardi, Mia	GIS Specialist	05/10	06/8	F	UCAR	USA
8	Meyers, Jim	Data Manager	05/10	06/8	M	GFOE	USA
9	Wright, Chris	Data Manager	05/10	06/8	M	GFOE	USA
10	Knott, Bob	Video Engineer	05/10	06/8	M	GFOE	USA

¹ Science and Technology Corporation

1. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign national access to *Okeanos Explorer* or other federal facilities will not be required for this expedition.

G. Administrative

1. Points of Contact

Table 2. Points of contact

Operations	Name, Title	Office	Address	Phone/Fax	Email
Marine Operations Center, Atlantic	CAPT Nicholas Chrobak, Commanding Officer	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6776/ (757) 441-6495	co.moc.atlantic@noaa.gov
Marine Operations Center, Atlantic	LCDR Steven Barry, Chief of Operations	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6842/ (757) 441-6776	Chiefops.MOA@noaa.gov
NOAA Ship Okeanos Explorer (primary)	CDR Colin Little, Commanding Officer	NOAA Ship <i>Okeanos Explorer</i>	NOAA Ship <i>Okeanos Explorer</i> 47 Chandler Street Newport, RI 02841	(401) 439-7848	CO.Explorer@noaa.gov
NOAA Ship Okeanos Explorer (primary)	LTJG Hunter Brendel, NOAA Operations Officer	NOAA Ship <i>Okeanos Explorer</i>	NOAA Ship <i>Okeanos Explorer</i> 47 Chandler Street Newport, RI 02841	(808) 659-9179 x222	ops.explorer@noaa.gov
Mission (primary)	Sam Candio, Expedition Coordinator	NOAA Ocean Exploration	24 Colovos Road Durham, NH 03824	(732) 546-2232	samuel.candio@noaa.gov
Mission (other)	Kasey Cantwell, Operations Chief	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 717-7776	kasey.cantwell@noaa.gov
Mission (other)	Rachel Medley, Chief, Expeditions and Exploration Division	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 789-3075	rachel.medley@noaa.gov
Mission (other)	Jeremy Weirich	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 452-7366	jeremey.weirich@noaa.gov

2. Diplomatic Clearances

This expedition will involve marine scientific research in waters under the jurisdiction of Canada. Consent from Canada is pending.

3. Licenses and Permits

See Appendix D.

4. Shipments

The *Okeanos Explorer* operations officer should be notified of any shipments to the ship. Send an email describing the shipment (including size and number of items) to

OPS.Explorer@noaa.gov.

For shipments to arrive while in port in Newport, Rhode Island at the start of the expedition, **shipments should arrive no later than May 10, 2022**, and be shipped to the following address:

[insert Name or port recipient's organization]
c/o [insert Name of recipient]
ATTN: NOAA Ship *Okeanos Explorer*
47 Chandler Street
Newport, RI 02841

For shipments to arrive while in port in St. Johns, Newfoundland after the expedition from May 11 - June 7, 2022, **shipments should arrive no later than May 31, 2022**, and should be shipped to the following address:

[insert Name or port recipient's organization]
c/o [insert Name of recipient]
ATTN: NOAA Ship *Okeanos Explorer*
47 Chandler Street
Newport, RI 02841

Due to possible international customs issues and delays, we cannot guarantee that packages will be received on time.

5. COVID-19 Plan for Mission Personnel

In accordance with the "[OMAO COVID-19 Protocols](#)" effective November 24, 2021, shelter-in-place is no longer required for sailing. All sailing personnel are required to follow guidelines written within the documentation. Section 3.3 of the OMAO Protocols requires all sailing personnel to be COVID-19 cleared for sailing using a Rapid Molecular PCR Test (a copy of section 3.3 is below). This policy also requires that all personnel embarking on a NOAA Ship be fully vaccinated for COVID-19, which means 2 weeks after both doses of the Pfizer or Moderna vaccines or 2 weeks after one J&J vaccine. A recent update from NOAA leadership now also

requires that all personnel embarking on a NOAA Ship receive one vaccine booster shot by April 16th, 2022.

3.3 Testing Strategy. To be cleared for sailing an individual must be tested prior to sailing, as follows:

- Upon arrival to the ship, 1 rapid antigen test is conducted.
- The same day of sailing or the night before using 1 Rapid Molecular PCR Test.
- In the event of unanticipated delays, repeat testing may be necessary depending on how long the delay will be. (Additional molecular tests would need to be sent asap). To be reviewed on a case by case basis if timing exceeds 24-48 hours from the original test. All personnel are required to be at the ship for the scheduled testing event.

Any mission personnel who test positive will be disqualified from sailing, and backup personnel will be activated as mission objectives and priorities dictate.

If any mission personnel test positive for COVID-19 during any required testing as dictated by OMAO:

- NOAA Marine Health Services will notify the individuals who test positive that they are not cleared to board the ship. NOAA Ocean Exploration will reimburse the individual for 5 days of shelter-in-place lodging to complete their isolation and for a COVID-19 test to confirm they are negative prior to returning home.
- The expedition coordinator will be notified of any mission personnel who are not cleared to sail.
- The expedition coordinator will notify the NOAA Ocean Exploration operations chief.
- The expedition coordinator will determine, in consultation with the ship's commanding officer, NOAA Ocean Exploration's operations chief, and appropriate parties, whether the mission will continue without the uncleared personnel.

If any mission personnel develop COVID-19-like symptoms while underway, OMAO protocols will be strictly followed. The expedition coordinator (or designee if they are unable to fulfill this role) will remain the primary point of contact for all mission personnel. Additional support with onshore logistics for impacted mission personnel will be provided by:

LT Christopher "J" Dunn, NOAA
Acting Deputy Operations Chief, Expeditions and Exploration Division
NOAA Office of Ocean Exploration and Research
215 South Ferry Road
Narragansett, RI 02882

Desk: (401) 874-6478
 Cell: (262) 995-3410

II. Operations

The expedition coordinator is responsible for ensuring mission personnel are trained in planned operations and are knowledgeable about expedition objectives and priorities. The commanding officer is responsible for ensuring all operations conform to the ship’s accepted practices and procedures.

A. Expedition Itinerary

Table 3 summarizes the expedition itinerary. All times and dates are subject to prevailing conditions and the discretion of the commanding officer. This is an approximate itinerary and is subject to change based on objective completion.

Table 3. Expedition Itinerary

Date	Activities
5/9	Expedition mobilization day in Newport, RI. Mission personnel arrive at the ship according to scheduled rapid antigen tests. Pre-expedition meeting in the afternoon with expedition coordinator, operations officer, and commanding officer.
5/10	Expedition mobilization day. Dockside sonar pinging may be requested. Mission personnel orientation meeting. Vessel familiarization meeting with operations officer, executive officer, and safety officer for any new mission personnel. Mapping watch schedule posted.
5/11	First day underway. Depart Newport, RI, in the morning. EK60/80 calibration may occur in the harbor if weather/time permits. Transit mapping as the ship heads east to primary survey grounds on the mid Atlantic Ridge. Safety drills, including donning of survival suits.
5/12 - 5/19	Transit mapping en route to the priority mapping areas.
5/20 - 6/1	Focused mapping operations on priority mapping areas. A calibration of the EK60/80s may occur during a good weather window during this period.
6/2- 6/6	Transit mapping en route to St. Johns, Newfoundland.
6/7	Arrival in St. Johns, Newfoundland.
6/8	Mission personnel depart.

B. Staging and Destaging

Minimal staging and destaging are anticipated for this mapping expedition. Expendable bathythermograph (XBT) probes will need to be loaded on board prior to departure from Newport, Rhode Island. This work will be coordinated with the ship's senior survey technician.

C. Operations To Be Conducted

1. Telepresence/Outreach Events

- Three live video feeds will be used throughout the expedition to provide situational awareness for onshore personnel.

2. Port Events and Ship Tours

No public port events or ship tours are planned for this expedition.

3. Special/Unusual Operations or Requests

There are no special or unusual operations or requests for this expedition.

D. SCUBA Dive Plans

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 EX-22-04, 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 NOAA Ocean Exploration is in the ["NOAA Ship *Okeanos Explorer* FY2022 Field Season Instructions."](#) There are no specific changes relative to this expedition.

IV. Hazardous Materials

A. Policy and Compliance

See the [“NOAA Ship *Okeanos Explorer* FY2022 Field Season Instructions.”](#)

B. Inventory

Table 4. Inventory of hazardous materials that will be aboard for EX-22-04

Item	Use	Approximate Locations
95% UPS denatured ethanol (248 gal)	Sample preservation	02 Deck, port side ethanol storage container
Formaldehyde (20L) to be buffered into 10% buffered formalin	Sample preservation	Wet lab, under the chemical hood
Bleach	Sterilization and sample preservation	Wet lab cabinet under sink
Magnesium chloride	Sample preservation	Wet lab under hood
Sodium phosphate	Sample preservation	Wet lab under hood
AquaShield	Underwater lubricant	ROV workshop fire cabinet, pit
Dow Corning 4	Electrical insulating compound	ROV workshop fire cabinet, pit
Fluid film spray	Silicone lubricant	ROV workshop fire cabinet
Isopropanol alcohol (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)	Hanger, pit, vehicles
Tap Magic cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tap Magic heavyweight cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tuff Coat M	Marine lubricant	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	Hanger, vehicles
Por-15	Paint kit	ROV workshop fire cabinet
Aeroshell 41	Hydraulic fluid	Hanger, ROV Deep Discoverer
Ultratane	Butane fuel	ROV workshop fire cabinet
Rust-oleum	Protective enamel	ROV workshop fire cabinet
Flux-Off	Soldering flux remover	ROV workshop fire cabinet
Propane	Torch fuel	ROV workshop fire cabinet
Adhesive Pliobond 25	General 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	Ferrous 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

Appendix A. Elaboration of Procedures/Objectives

None.

Appendix B. Waypoints

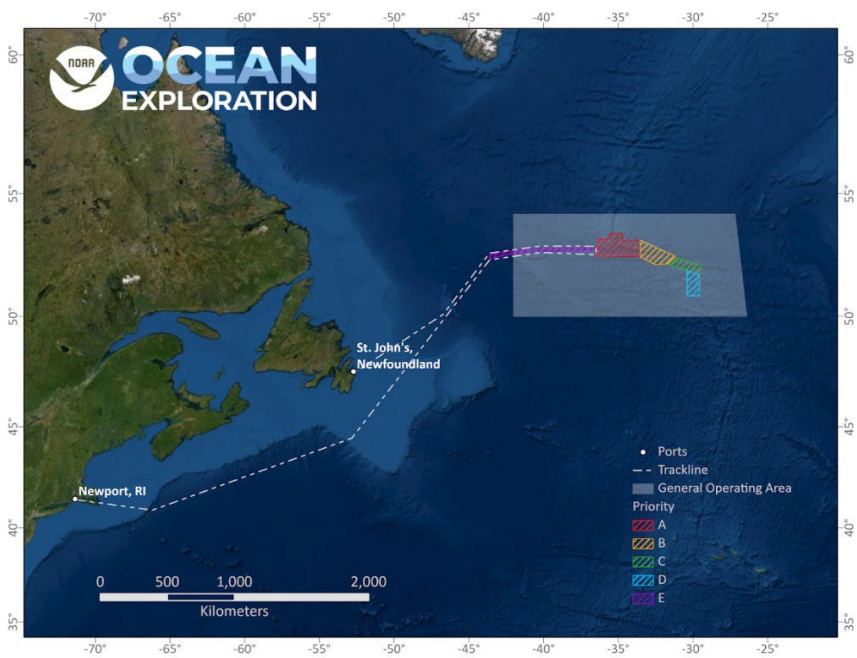


Figure B1 (for reference). Map showing the general operating area for EX-22-04

Table B1. Waypoints for general working area (white square)

Latitude (D DM)	Longitude (D DM)
54° 12.026'N	41° 59.97'W
54° 12.297'N	27° 11.706'W
50° 0.178'N	26° 24.33'W
50° 0.337'N	41° 59.994'W
54° 12.026'N	41° 59.97'W

Table B2. Waypoints for proposed cruise track (red line)

Latitude (D DM)	Longitude (D DM)
41° 26.246'N	71° 16.782'W
40° 54.49'N	66° 10.926'W
44° 27.371'N	52° 50.022'W
52° 22.669'N	43° 36.12'W

52° 40.512'N	40° 10.998'W
52° 35.223'N	36° 29.886'W
52° 55.558'N	36° 27.72'W
52° 56.288'N	40° 10.398'W
52° 39.185'N	43° 36.618'W
50° 5.197'N	46° 43.032'W
47° 32.526'N	52° 34.86'W

Appendix C. Data Management Plan

Okeanos Explorer Mission EX2204 Data Management Plan

Report Date: 2022-03-15

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:

EX-22-04, Voyage to the Ridge 1 (Mapping)

EX-22-04 is the first of a series of three strategic telepresence expeditions that aim to map and characterize the Mid-Atlantic Ridge (MAR), focusing on poorly understood and largely unknown areas along the Charlie-Gibbs Fracture Zone, Mid-Atlantic Ridge, and the Azores Plateau.

1.2 Summary Description of the data to be collected:

Mapping operations will include the use of the ship's deepwater mapping systems (Kongsberg EM 304 multibeam, EK60/EK80 split-beam sonars, Knudsen 3260 Chirp sub-bottom profiler, and Teledyne acoustic Doppler current profilers), expendable bathythermograph (XBTs) in support of multibeam sonar mapping operations; and a high-bandwidth satellite connection for continuous ship-to-shore communications.

1.3 Keywords or phrases that could be used to discover the data:

Atlantic Ocean Research Alliance, AORA, Azores Plateau, bathymetric gaps, benthic habitats, Charlie-Gibbs Fracture Zone, CTD, critical minerals, deep-sea ecosystem connectivity, EM304, expedition, exploration, explorer, Galway Statement on Atlantic Ocean Cooperation, inferred vent sites, island formation, mapping survey, marine education, Mid-Atlantic Ridge, MAR, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, Newfoundland, Newport, noaa, noaa fleet, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, oceans, OER, okeanos, okeanos explorer, plate tectonics, R337, Rhode Island, science, scientific computing system, scientific mission, scientific research, SCS, sea, Seabed 2030, seafloor composition, single beam sonar, singlebeam sonar, single-beam sonar, site characterization, sonar anomalies, split beam sonar, St. John's, stewardship, sub-bottom profile, submarine geohazards, systematic exploration, technology, undersea, underwater, vulnerable marine habitats, water column backscatter

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: 2022-05-11 and End Date: 2022-06-07

1.6 Actual or Planned Geographic Coverage of the data:

Northernmost Boundary: 55 and Southernmost Boundary: 40
Westernmost Boundary: -71 and Easternmost Boundary: -25

1.7 What data types will be created or captured and submitted for archive?

Bottom Backscatter, Cruise Plan, Cruise Summary, EK60 Split Beam Data, EK80 Split Beam Data, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), Navigational Data, SCS Output (compressed), SCS Output (native), Seafloor Imagery, Sound Velocity Profile, Sub-Bottom Profile data, 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: Sam Candio, samuel.candio@noaa.gov

Title: Expedition Coordinator

Affiliation: NOAA Office of Ocean Exploration and Research

Phone: (732) 546-2232

3 Points of Contact for Managing the Data

Data POC: Megan Cromwell

Data POC Title: Stewardship Data Management

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 to NCEI-MD (oceanographic archive); the data are then converted to an archive-ready, documented, and compressed NetCDF3 format which is made available for download through the Ocean Exploration Digital Atlas; water column profile data and navigation data will be delivered in ASCII format to NCEI-MD; EM304 and EK60/80 output data and metadata along with water column profiles used for calibration will be delivered to NCEI-CO (geophysical archive).

5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM304 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.

6 Data Documentation

6.1 Does the metadata comply with the Data Documentation Directive?

Yes

6.1.1 If metadata are non-existent 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 for public discovery and access at:

URL: <https://data.noaa.gov/waf/NOAA/NESDIS/ncei/oer/iso/>

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.

The EM304 output data is a new format not currently read by NCEI archive systems. The new file format is being added to the system capability. There will be an unknown delay for the archive of these .kml files. All other data will be archived within 60-90 days of receipt.

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.

Appendix D. Licenses, Permits, and Environmental Compliance

Pursuant to the National Environmental Policy Act (NEPA), NOAA Ocean Exploration is required to include in its planning and decision-making processes appropriate and careful consideration of the potential environmental consequences of actions it proposes to fund, authorize, and/or conduct. The companion manual for NOAA Administrative Order 216-6A describes the agency's specific procedures for NEPA compliance.

An environmental review memorandum was completed for NOAA Ocean Exploration expeditions on NOAA Ship *Okeanos Explorer* in 2022 in accordance with Section 4 of the companion manual in the form of a categorical exclusion worksheet. Based on this review, a categorical exclusion was determined to be the appropriate level of NEPA analysis necessary, as no extraordinary circumstances exist that require the preparation of an environmental assessment or environmental impact statement. This document is on file with NOAA Ocean Exploration and can be provided upon request. NOAA Ocean Exploration is preparing a programmatic environmental assessment to cover future expeditions.

Marine Scientific Research clearances for deepwater mapping operations are planned inside the waters of the United States and Canada. Diplomatic clearances have been requested.

See the "[NOAA Ship *Okeanos Explorer* FY22 Field Season Instructions](#)" for additional information regarding environmental compliance that applies to the entire field season (e.g., Endangered Species Act Section 7 consultation and potential impacts to essential fish habitat).

Appendix D. Emergency Contact Data Sheet

Mission personnel sailing aboard NOAA Ship *Okeanos Explorer* must fill out a [Sailing Contact Form](#) that collects emergency contact information for each person. This information is available to the operations officer to fulfill safety requirements to sail.