



Project Instructions: EX-21-01, 2021 EM 304 Sea Acceptance Testing and Mapping Shakedown (Mapping)

Date Submitted: March 23, 2021

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-21-01

Project Title: 2021 EM 304 Sea Acceptance Testing and Mapping Shakedown

Project Dates: April 16 - May 10, 2021

Prepared by: Shannon Hoy Digitally signed by Shannon Hoy
Date: 2021.03.26 12:52:03 -04'00' **Dated:** 3/26/2021

Shannon Hoy
Expedition Coordinator
NOAA Office of Ocean Exploration and Research

Approved by: CANTWELL.KASEY.LYNN.145981785 Digitally signed by CANTWELL.KASEY.LYNN.145981785
Date: 2021.03.26 13:37:11 -04'00' **Dated:** 3/26/2021

Kasey Cantwell
Operations Chief
NOAA Office of Ocean Exploration and Research

Approved by: MEDLEY.RACHEL.SORARUF.1365833857 Digitally signed by MEDLEY.RACHEL.SORARUF.136583385
Date: 2021.03.26 13:04:04 -04'00' **Dated:** 3/16/2021

Rachel Medley
Expeditions and Exploration, Division Chief
NOAA Office of Ocean Exploration and Research

Approved by: CHROBAK.NICHOLAS.JAMES.1241660199 Digitally signed by CHROBAK.NICHOLAS.JAMES.1241660199
Date: 2021.04.01 11:46:30 -04'00' **Dated:** 4/1/2021

Captain Nicholas Chrobak
Commanding Officer
NOAA Marine Operations Center — Atlantic

I. Overview

A. Brief Summary and Project Period

April 16 - May 10, 2021

Key West, Florida - Port Canaveral, Florida

EX-21-01 2021 EM 304 Sea Acceptance Testing and Mapping Shakedown

This document contains project instructions specific to EX-21-01. For the annual, cross-expedition details, see the [“NOAA Ship *Okeanos Explorer* FY2021 Field Season Instructions.”](#) This expedition will commence on April 16, 2021, in Key West, Florida, and conclude on May 10, 2021, in Port Canaveral, Florida, with crew transfers occurring on April 23 and April 25, 2021 in Key West, Florida, separating the expeditions into three legs. The first leg (April 16 - 23, 2021) will focus on sea acceptance testing (SAT) of the newly installed EM 304 transmit array and the 38 kHz EK 80 transducer in accordance with Kongsberg SAT procedures and under advisement of a sailing Kongsberg representative. The second leg (April 23 - 25, 2021) will focus on calibrating the dynamic positioning system. The third leg (April 25 - May 10, 2021) will include calibrations of the suite of EK 60/80 split-beam sonars, continuation of multibeam calibration and testing, systems readiness, and opportunistic focused mapping operations on the Blake Plateau. See Appendix C for the expedition’s Data Management Plan.

B. Days at Sea

Of the 25 days at sea (DAS) scheduled for this expedition, 11 DAS are funded by OMAO and 14 DAS are funded by OAR. 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-21-01 will focus operations in the vicinity of the Florida Keys and the U.S. Blake Plateau off the U.S. southeast region. Likely calibration and priority mapping areas are indicated in Figure 1. (The waypoints for the general working area and proposed cruise track are in Appendix B.)



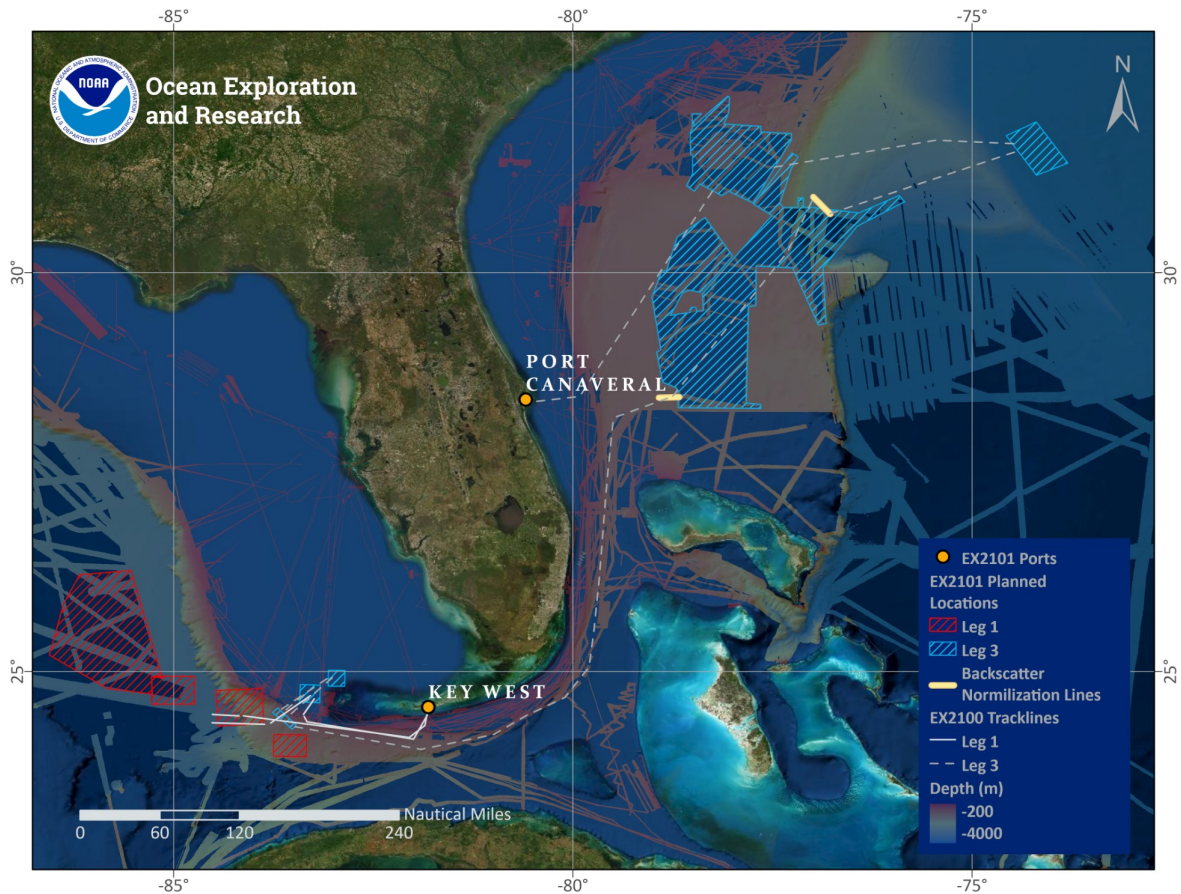


Figure 1. Map showing the general operating area for EX-21-01 Leg 1 and Leg 3. Note that the cruise track, testing locations, and mapping operations are subject to change based on testing results, field conditions, and the discretion of the commanding officer.

D. Summary of Objectives

EX-21-01 operations will involve a transit southwestward followed by multiple equipment calibration operations that will occur in U.S. waters southwest of Florida, followed by calibration of the dynamic positioning system, and then a transit to the U.S. Blake Plateau where additional calibrations and focused mapping operations will occur, mostly in deep water (>200 m). Equipment calibration will include (but is not limited to) a GNSS Azimuth Measurement System (GAMS) test, a patch test, a speed noise test, multiple reference surveys, backscatter normalization, and EK calibrations (elaborated in Appendix A). Remote watchstanding and integration of Cloud processing procedures will also be tested during this cruise. A Kongsberg Engineer is sailing to perform the SAT, and will provide critical DAS for troubleshooting the newly installed systems.

See Appendix A for an elaboration of procedures/objectives and the “[NOAA Ship Okeanos Explorer FY2021 Field Season Instructions](#)” for more information.

1. Mapping Objectives

Strategic Transit

- Conduct strategic transits to operational areas and Port Canaveral, including overlap with recent EM 304 data and previous EM 302 data for comparison with the EM 304 data equipped with the new transmit array.

EM 304 Sonar Testing

- Update all systems with new vessel offsets from recent survey.
- Confirm functionality of EM 304 and integration with all ancillary systems.
- Conduct GAMS test (elaborated in Appendix A).
- Conduct patch test (elaborated in Appendix A).
- Conduct deep roll verification calibration lines.
- Conduct multiple reference surveys (250 m, 1000 m, 3000 m, and 5000 m).
- Conduct backscatter normalization over lines previously run by FUGRO on the Blake Plateau (elaborated in Appendix A).
- Assess swath coverage:
 - Conduct extinction testing when transiting off of the continental shelf, resulting in swath vs. depth ratios.
 - Build swath vs. coverage look-up table for future survey planning efforts.
- Conduct speed testing to assess receive noise levels at various speeds. This will build team understanding of system performance in different environmental conditions (elaborated in Appendix A).
- Conduct built-in self test (BIST) to assess the vessel, machinery, and flownoise characteristics as perceived by each multibeam echosounder.
- Assess data rates of .kmal and .kmwcd files.
- Assess remote watchstanding potential using new SIS5 and Ocean Insight.
- Test newly installed OMAO workstation.

EK 60/80 Split-beam Sonar Objectives

- Update EK 80 WBT licenses for FY21 (38 and 70 kHz).
- Confirm functionality of all frequencies and integration with all ancillary systems.
- Perform sea acceptance testing of the EK 38 kHz transducer.
- Collect passive data from all frequencies during EM 304 speed-noise test.



- Conduct EK split-beam sonar calibration using automated EK calibration gear to suspend a small calibration sphere below the ship.

Knudsen 3260 Sub-bottom Profiler

- Confirm functionality and integration with all ancillary systems.

Acoustic Doppler Current Profiler Objectives

- Confirm both acoustic Doppler current profilers (ADCPs) are operational after server upgrade conducted by the University of Hawai'i Data Acquisition System (UHDAS) technician over winter inport.
- Run both ADCPs in bottom tracking mode while leaving port.
- Perform synchronization test during transit to Blake Plateau.
- Investigate upload of ADCP data to shore during an expedition.

Sound Speed Profiling Testing

- Conduct comparison sound speed profile casts using standard ship's CTD to at least 800 m, XBT, and CastAway CTD. Launch each system simultaneously for data comparison to confirm accurate data.
- Perform XBT cast with each handheld launcher, and test data pipeline.
- Compare Reson SVP 70 and thermosalinograph data.
- Test CTD in multiple water depths (800-2000 m) to test cable, auxiliary and primary sensors, altimeter, and Niskin bottles. Measure the volume of the Niskin bottles, should be 10 liters, and confirm they do not leak.

K-Sync Synchronization Objectives

- Perform thorough interference testing of all equipped sonars.
- Confirm current operating settings for synchronization of all sonars over a broad range of survey depths and sonar modes to minimize interference across all sonars.
- Evaluate if existing settings for EM 302 successfully carry over to EM 304.

POS IMU Health Analysis

- Collect POSpac data for POS IMU health analysis. This data can be collected with the current POS setup.



Data Processing/Throughput Testing

- Test data processing pipelines and automated transfer to shore for all raw sonar and ancillary data types, including new formats of EM 304 .kmall/.kmwcd and existing formats EK .raw, subbottom .sgy/.kea/.keb, CTD .cnv/.hex, XBT .asvp/.txt/.rdf.
- Test onshore cloud processing capabilities and workflow, develop associated SOPs.
- Test cloud access from the ship.
- Update shore transfer workflow to include daily backscatter mosaic.
- Test ArcOnline usability during an expedition.
- Use checksum to ensure a successful copy of the mapping data package.

Update Documentation for Fiscal Year 2021 Field Season

- Update all survey department standard operating procedures.
- Confirm formatting of all sonar acquisition and processing logs.
- Complete EM 304 annual calibration report.
- Complete 2021 mapping systems readiness report.
- Update and revise the SOP for calibrating the EK sonars using the auto-calibration gear.
- Complete calibration report for 2020 as well as historical outstanding calibration reports from 2011, 2014 (2), 2015, 2016 and 2017.

Miscellaneous

- Train new expedition coordinator.
- Train new mapping watch lead.
- Train Knauss fellow.
- Host visiting representatives from OER Science and Technology Division, who will be performing various feasibility assessment objectives.

2. Video Engineering Objectives

- Verify GFOE-managed telepresence systems perform as expected.

3. Network/Onboard Data Objectives

- Verify remobilized network, storage, computing and data infrastructure perform as expected.
- Assist Mapping Team members and designated vendor representatives to gain remote access to shipboard systems.
- Test/evaluate syncing EM 304 .kmall files to shore.
- Verify newly augmented shipboard storage performs as expected.



4. Ship Objectives

Calibrate new Dynamic Positioning (DP) software

- Verify proper communication between upgraded DP hardware and upgraded DP software.
- Perform an auto-control test.
- Verify proper function of load monitoring and blackout prevention systems.
- Verify operational modes (alongship, athwartship, heading control, and auto positioning) with each GPS unit (1, 2, & 3).
- Verify proper joystick operation and perform calibration.
- Perform follow target test.
- Perform any necessary endurance testing of the system.
- Verify proper communication and functionality with cJoy station.
- Confirm proper command to operator terminal transfer.

E. Participating Institutions

- National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER) — 1315 East-West Highway, Silver Spring, MD 20910 USA
- NOAA, National Centers for Environmental Information (NCEI) — Stennis Space Center, MS 39529 USA
- University Corporation for Atmospheric Research (UCAR) Programs for Advancement of Earth System Science — P.O. Box 3000, Boulder, CO 80307 USA
- Global Foundation for Ocean Exploration (GFOE) — P.O. Box 417, Mystic, CT 06355 USA
- KONGSBERG UNDERWATER TECHNOLOGY LLC. — Lynnwood, WA 98036-4707 USA

F. Personnel (Mission Party)

Mission personnel (see Table 1) joining for the first leg will arrive in Key West, Florida by April 6, 2021, and shelter in place for seven days from April 7 to April 13, 2021. Mission personnel will join the ship on April 14, 2021, after the shelter-in-place (SIP) period and two negative COVID-19 tests. The ship will depart Key West, Florida on April 16, 2021. A crew transfer by small boat on April 23, 2021 in Key West, Florida, will offload two mission personnel, and will bring aboard three mission personnel. Another crew transfer will occur on April 25, 2021 in Key West, Florida, to offload the dynamic positioning system technician. Mission personnel will then be on board for the duration of the expedition. The expedition will also be supported by shoreside personnel (see Table 2).



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 | Hoy, Shannon | Expedition Coordinator | 04/14 | 05/11 | F | OER (CNSP ¹) | USA |
| 2 | Candio, Sam | Expedition Coordinator in Training | 04/14 | 05/11 | M | OER (CNSP ¹) | USA |
| 3 | Jerram, Kevin | Watch Lead | 04/14 | 05/11 | M | UCAR | USA |
| 4 | Heffron, Erin | Watch Lead | 04/14 | 05/11 | F | UCAR | USA |
| 5 | Durbin, Mark | GFOE Engineer | 04/14 | 04/23 | M | GFOE | USA |
| 6 | Meyers, Jim | GFOE Engineer | 04/14 | 05/11 | M | GFOE | USA |
| 7 | Lister, Andy | GFOE Engineer | 04/14 | 05/11 | M | GFOE | USA |
| 8 | Knott, Bob | GFOE Engineer | 04/14 | 05/11 | M | GFOE | USA |
| 9 | Hughes-Wooten, Adam | Kongsberg Engineer | 04/14 | 04/23 | M | Kongsberg | USA |
| 10 | Copeland, Adrienne | EK Specialist | 04/23 | 05/11 | F | OER | USA |
| 11 | Wang, Lu | Knauss Fellow | 04/23 | 05/11 | F | OER | USA |
| 12 | Wright, Chris | GFOE Engineer | 04/14 | 05/11 | M | GFOE | USA |
| 13 | Dupre, Matthew | Kongsberg DP Engineer | 04/23 | 04/25 | M | Kongsberg | USA |

¹ Cherokee Nation Strategic Programs

Table 2. Shoreside Support Personnel and Key Contacts

| # | Name (Last, First) | Title | Affiliation | Nationality |
|---|--------------------|------------------------------|-------------|-------------|
| 1 | Lobecker, Meme | Cloud Manager | OER (CNSP) | USA |
| 2 | Peters, Colleen | Cloud Mapping Data Processor | UCAR | USA |
| 3 | Peliks, Marcel | Cloud Intern | UCAR | USA |
| 4 | Takagi-Berry, Anna | Cloud Intern | UCAR | USA |



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 3. 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 Fionna Matheson, 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 <i>Okeanos Explorer</i> (primary) | CDR Nicole Manning, Commanding Officer | NOAA Ship <i>Okeanos Explorer</i> | NOAA Ship <i>Okeanos Explorer</i> Attn: Name or Department 47 Chandler Street Newport, RI 02841 | (401) 439-7848 | CO.Explorer@noaa.gov |
| NOAA Ship <i>Okeanos Explorer</i> (primary) | LT Bryan Pestone, NOAA Operations Officer | NOAA Ship <i>Okeanos Explorer</i> | NOAA Ship <i>Okeanos Explorer</i> Attn: Name or Department 47 Chandler Street Newport, RI 02841 | (808) 659-9179 x221 | ops.explorer@noaa.gov |
| Mission (primary) | Shannon Hoy, Expedition Coordinator | NOAA Office of Ocean Exploration and Research | 24 Colovos Road Durham, NH 03824 | (202) 880-2725 | shannon.hoy@noaa.gov |
| Mission (other) | Kasey Cantwell, Operations Chief | NOAA Office of Ocean Exploration and Research | 1315 East-West Highway, Silver Spring, MD 20910 | (301) 717-7776 | kasey.cantwell@noaa.gov |



| Operations | Name, Title | Office | Address | Phone/Fax | Email |
|-----------------|--|---|---|--|--|
| Mission (other) | Rachel Medley, Chief, Expeditions and Exploration Division | NOAA Office of Ocean Exploration and Research | 1315 East-West Highway, Silver Spring, MD 20910 | (301) 789-3075 | rachel.medley@noaa.gov |
| Mission (other) | Alan Leonardi Director | NOAA Office of Ocean Exploration and Research | 1315 East-West Highway, Silver Spring, MD 20910 | (301) 734-1016 Mobile: (202) 631-1790 | alan.leonardi@noaa.gov |
| Mission (other) | Meme Lobecker, Cloud Manager (onshore) | NOAA Office of Ocean Exploration and Research | 24 Colovos Road Durham, NH 03824 | (240) 429-7023 | elizabeth.lobecker@noaa.gov |

2. Diplomatic Clearances

None required.

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 Key West, Florida, at the start of the expedition, **shipments should arrive no later than April 11, 2021** and be shipped to the following address. If sending a large palletized shipment to Key West, fork lift support for offload must be scheduled in advance with the Operations Officer (ops.explorer@noaa.gov).

NOAA Ship *Okeanos Explorer*
ATT: Name or Department
33 E. Quay Road
Key West, Florida 33040

For shipments to arrive while in port in Port Canaveral, Florida, after the expedition from April 14 - May 08, 2021, **shipments should arrive no later than May 12, 2021**. Contact the Operations Officer (ops.explorer@noaa.gov) to retrieve the mailing address.



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 4 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 4. Expedition Itinerary

| Date | Activities |
|---------------|---|
| 04/01 | Shannon and Sam travel to Key West. Remobilization continues with GFOE. |
| 04/02 - 04/06 | Shannon and Sam begin mapping remobilization, some tasks may occur remotely. Remobilization continues with GFOE. |
| 04/07 - 04/13 | Shelter in place period. |
| 04/14 | Mission personnel arrive to lodge aboard the ship. |
| 04/15 | 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. |
| 04/16 | First day underway. Depart Key West, Florida in the morning. A GAMS test and initial sonar testing will occur as the ship heads southwest to the patch test location. ADCP calibration may occur while transiting to the patch test location. |
| 04/17 | Perform CTD prior to Patch Test. Conduct patch test. Transit to 3000 meter reference survey location. |
| 04/18 | Perform 3000 m reference survey (~24 hours). |
| 04/19 | Conduct speed noise tests. Transit to 1000 meter reference survey. Conduct 1000 meter reference survey (~15 hours). |
| 04/20 | Finish 1000 meter reference survey. Transit to 250 meter reference survey. Perform 250 meter reference survey. Transit to EK SAT location. |
| 04/21 | Perform EK SAT. |
| 04/22 | Continuation of SAT testing. Begin transit to Key West. May perform CTD test cast in the AM. |
| 04/23 | Crew transfer in Key West. DP calibration. |
| 04/24 | DP calibration. |



| Date | Activities |
|---------------|--|
| 04/25 | Crew transfer in Key West. Transit to EK calibration location. Set up auto calibration gear. Overnight mapping objectives. |
| 04/24 | Castaway CTD cast and conduct daytime EK calibration operations (may require aid from ship's force), overnight mapping system testing. |
| 04/25 | Castaway CTD cast and conduct daytime EK calibration operations (may require aid from ship's force), overnight mapping system testing. |
| 04/26 | Castaway CTD cast and conduct daytime EK calibration operations (may require aid from ship's force), overnight mapping system testing. Transit from Key West to shallow (1000 m) backscatter normalization line (Blake Plateau). |
| 04/27 | Continue Transit. |
| 04/28 | Continue Transit. |
| 04/29 | Perform 1000 m CTD during the day, depending on arrival. Collect (1000 m) normalization lines for ~15 hours. |
| 04/30 | Transit to deep backscatter normalization line. |
| 05/01 | Potentially conduct deep CTD Cast (dependant on arrival time). Collect deep (3000 m) normalization lines (~18 hours). Transit to deep (5000 m) reference survey. Conduct a deep reference survey (~24 hours). |
| 05/02 | Transit to deep (5000 m) reference survey. Conduct a deep reference survey (~24 hours). |
| 05/03 - 05/08 | Transit to mapping operational area. Conduct mapping operations in the first priority polygon. |
| 05/09 | Transit to Port Canaveral, Florida. |
| 05/10 | Arrive in Port Canaveral, Florida. Some mission personnel depart. |
| 05/11 | Remaining mission personnel depart the ship. |

B. Staging and De-Staging

Minimal staging and de-staging are anticipated for this mapping expedition.

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.
- Sonar data processing using the NOAA Amazon Cloud space by shore-based personnel will be tested and employed throughout the Fiscal Year 2021 field season. This data processing will be managed and overseen by shore-based personnel. This



requires 24-hour-a-day delivery to shore of near real-time data from the multibeam, split-beam, and sub-bottom sonars.

2. Port Events and Ship Tours

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

3. Special/Unusual Operations or Requests

1. Ship maneuvers / tests required to test EM 304 performance as per manufacturer guidance including but not limited to:
 - a. GAMS calibration (Guidance in Appendix A)
 - b. Patch Test (Guidance in Appendix A)
 - c. Reference Survey (Guidance in Appendix A)
 - d. Speed Noise Test (Guidance in Appendix A)
 - e. EK Calibrations (Guidance in Appendix A)
 - f. Backscatter Correction (Guidance in Appendix A)

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-21-01, 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 is in the ["NOAA Ship Okeanos Explorer FY2021 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 FY2021 Field Season Instructions."](#)



B. Inventory

Table 5. Inventory of Hazardous Materials That Will Be On Board for EX-21-01

| Item | Use | Approximate Locations |
|--|--------------------------------------|------------------------------------|
| 95% denatured ethanol (275 gal) | Sample preservation | Wetlab, ethanol tank |
| Formaldehyde (7 gal) to be buffered into 10% buffered formalin | Sample preservation | Wetlab, under the chemical 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) | Hangar, 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 | Hangar, vehicles |
| Por-15 | Paint kit | ROV workshop fire cabinet |
| Aeroshell 41 | Hydraulic fluid | Hangar, ROV <i>Deep Discoverer</i> |
| 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 |
| 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 |



| Item | Use | Approximate Locations |
|---------------------------|---------------------------------------|-----------------------|
| 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 qt) | Sterilization and sample preservation | Cabinet under sink |

V. COVID-19 Plan for Mission Personnel

In accordance with [“NOAA OER COVID-19 Field Operations Expectations and Information”](#) (see summary in Appendix E), all mission personnel must have received a negative COVID-19 test prior to travel to the port of call. 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 the OMAO-required shelter-in-place periods:

- NOAA Marine Health Services will notify the individuals who test positive that they are not cleared to board the ship. OER will reimburse the individual for 14 days of shelter-in-place lodging (such as the Key West Marriott Beachside Hotel, 3841 N Roosevelt Blvd, Key West, FL 33040) 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 (but they will not be told why).
- The expedition coordinator will notify the OER operations chief.
- The expedition coordinator will determine, in consultation with the ship’s commanding officer, OER 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 Carl Noblitt, NOAA
Operations Deputy, Expedition and Exploration Division
(240) 507-4437
carl.noblitt@noaa.gov
Silver Spring, Maryland (EST)

Duties of the shore side support person include coordination of further testing, daily well-being check-in & symptom screening, travel, lodging, medical support, and on site support as needed.



Appendix A. Elaboration of Procedures/Objectives

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 A1.

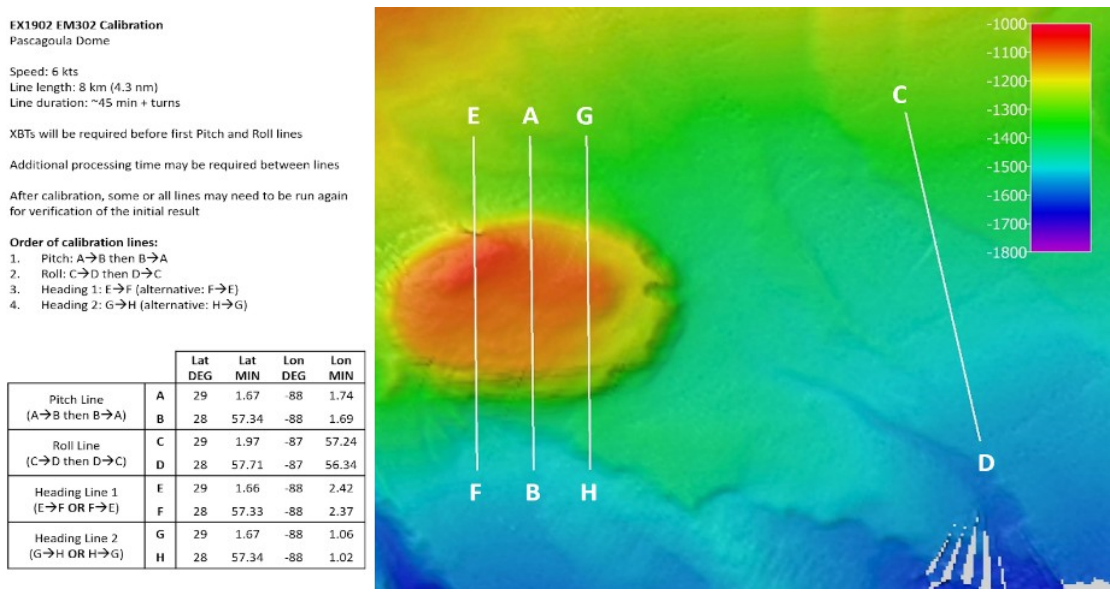


Figure A1: Schematic and map of likely patch test lines for the EM 304 SAT

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 [of] 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.

5. EK Calibrations

Calibration can be conducted while drifting freely for roughly 8-10 hours in an area with low vessel traffic, no navigational hazards, lack of fishing gear and sonar, minimal currents and wind, with a depth of at least 50 m. EK calibration work is planned to take place during daylight hours only, for up to 3 days. For a successful calibration to occur, the ship shall be drifting continuously without the need for repositioning in relatively calm conditions with under 10 knots of wind and under 0.5 knot of current. Visiting OER personnel will provide technical oversight of the calibration process but might request support from deck to ensure the proper placement of the calibration sphere below the hull of the ship. During calibration all systems (e.g. multibeam, sonars, ACDPs, etc.) that emit noise should be secured and shipboard noise producing activities should be limited (e.g. needle gunning etc.).

A Castaway CTD cast will occur (hand-deployed) prior to each day of EK calibrations.

6. Backscatter Normalization

Repeated, reciprocal lines will be run in two different locations and depths while adjusting parameters on the EM 304 to identify and resolve intensity issues between sectors. These lines will overlap those run by FUGRO in 2019, and will aid in establishing a backscatter reference area to help standardize data in the region.

Appendix B. Waypoints

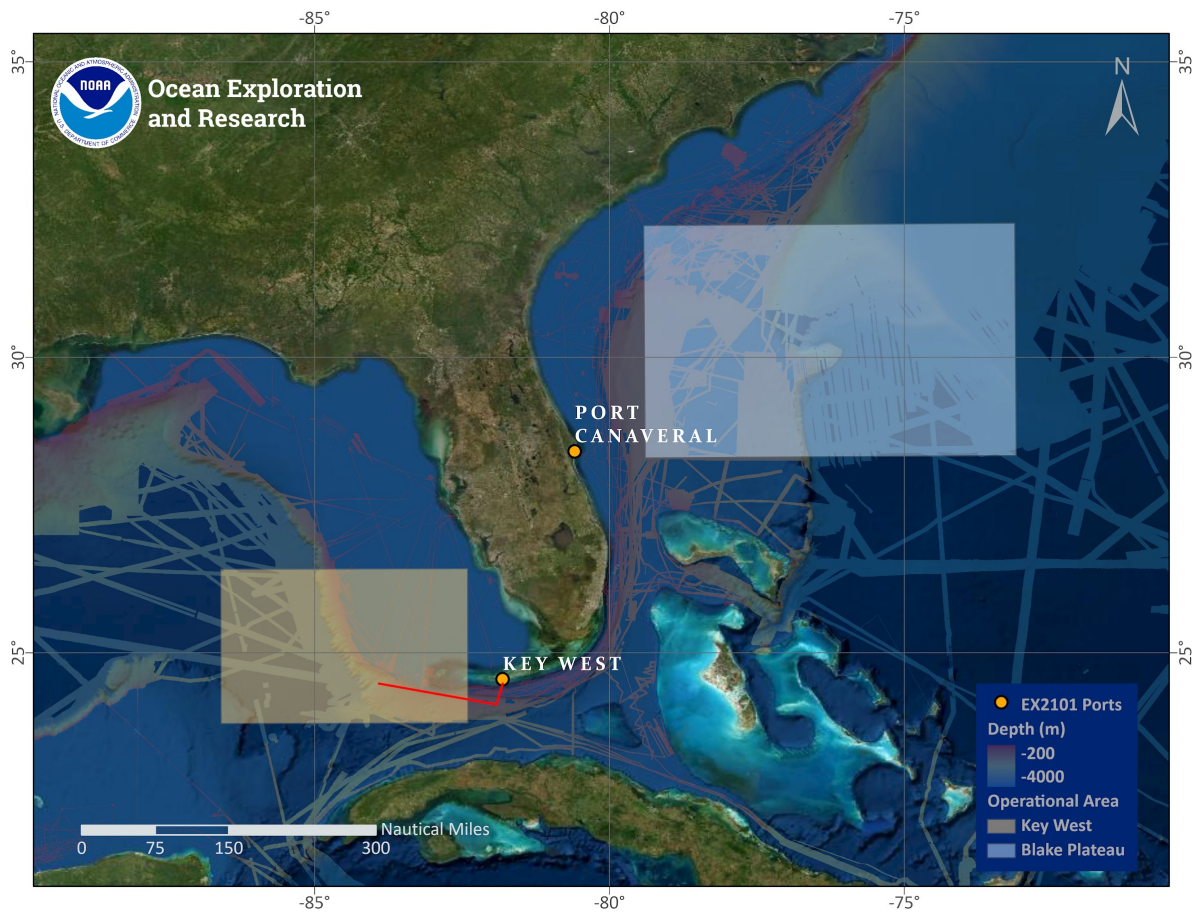


Figure B1. Map showing the general operating areas for EX-21-01. The red line is the general first transit from Key West to the site for the EM 304 patch test.

Table B1. Waypoints for General Working Area - Key West.

| Latitude (D DM) | Longitude (D DM) |
|-----------------|------------------|
| 26° 24.841' N | 086° 35.556' W |
| 26° 25.421' N | 082° 24.353' W |
| 23° 48.682' N | 082° 23.991' W |
| 23° 48.102' N | 086° 35.194' W |

Table B2. Waypoints for General Working Area - Blake Plateau.

| Latitude (D DM) | Longitude (D DM) |
|-----------------|------------------|
| 32° 13.751' N | 079° 25.187' W |
| 32° 16.195' N | 073° 07.665' W |
| 28° 20.305' N | 073° 06.138' W |
| 28° 17.862' N | 079° 23.660' W |

Table B3. Waypoints for potential first transit from Key West, FL to EM 304 patch test location (red line).

| Latitude (D DM) | Longitude (D DM) |
|-----------------|------------------|
| 24° 33.286' N | 81° 48.646' W |
| 24° 10.420' N | 81° 53.383' W |
| 24° 29.968' N | 83° 53.452' W |



Appendix C. Data Management Plan

Okeanos Explorer Mission EX2101 Data Management Plan

Report Date: 2021-02-12

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:

2021 EM 304 Sonar Acceptance Testing

This cruise will include a series of tests to ensure functionality of the new EM 304 transmit (TX) array and the 38 kHz EK60/80 transducer that were installed over the winter dry dock.

1.2 Summary Description of the data to be collected:

Mapping data in and around the Blake Plateau in and around U.S and international waters off of Key West and the East Coast.

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

Blake Plateau, Davisville, EM304, expedition, exploration, explorer, GAMS, GNSS Azimuth Measurement System, Key West, mapping survey, marine education, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa, noaa fleet, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, oceans, OER, okeanos, okeanos explorer, Port Canaveral, R337, Rhode Island, science, scientific computing system, scientific mission, scientific research, SCS, sea, sea acceptance trials, Seabed 2030, single beam sonar, singlebeam sonar, single-beam sonar, site characterization, sonar anomalies, Southeastern US Continental Margin, South Atlantic Bight, Southeast Deep-sea Coral Initiative, stewardship, sub-bottom profile, systematic exploration, technology, transformational research, undersea, underwater, 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: 2021-04-14 and End Date: 2021-05-18

1.6 Actual or Planned Geographic Coverage of the data:

Northernmost Boundary: 33.553 and Southernmost Boundary: 23.220

Westernmost Boundary: -87.423 and Easternmost Boundary: -72.436

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

Bottom Backscatter, Cruise Plan, Cruise Summary, CTD (processed), CTD (product), CTD (raw), Data Management Plan, EK60 Split Beam Data, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), SCS Output (compressed), SCS Output (native), 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: Ms. Shannon Hoy, shannon.hoy@noaa.gov
Title: Expedition Coordinator
Affiliation: NOAA Office of Ocean Exploration and Research
Phone: 202-880-2725

3 Points of Contact for Managing the Data

Data POC: Megan Cromwell, Andy O'Brien
Data POC Title: Stewardship Data Management, Onboard and shoreside data management
Data POC Email: megan.cromwell@noaa.gov, andrew.obrien@tgfoe.org

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; 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 compressed and delivered in a bagit format to NCEI-CO

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. CTDs are post-processed by the data management team as a quality control measure

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 at NCEI-MS for public discovery and access.

URL: https://data.noaa.gov/waf/NOAA/NESDIS/ncei/oer/iso_u/xml/



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), OER is required to include in its planning and decision-making processes appropriate and careful consideration of the potential environmental consequences of actions it proposes to fund, authorize, and/or conduct. 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 OER expeditions on *Okeanos Explorer* in 2021 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. OER is preparing a programmatic environmental assessment to cover future expeditions.

As required under Section 7 of the Endangered Species Act (ESA), OER conducted an informal consultation with NOAA's National Marine Fisheries Service (NMFS) Office of Protected Resources to request their concurrence with OER's biological evaluation determining that OER's operations on *Okeanos Explorer* conducted 2021 may affect, but are not likely to adversely affect, ESA-listed marine species. In a Letter of Concurrence dated February 3, 2021, the chief of the ESA Interagency Cooperation Division in the NMFS Office of Protected Resources wrote that NMFS concurs with OER's determination.

In addition, OER consulted with the NMFS Greater Atlantic Fisheries Office (GARFO) on potential impacts of operations to essential fish habitat (EFH) in the greater Atlantic region under the Magnuson-Stevens Fishery Conservation and Management Act. OER received a letter of acknowledgement from GARFO on March 10, 2021, that covers expedition activities from April 1, 2021 until September 31, 2021.

Following is a copy of the NEPA Categorical Exclusion. The Endangered Species Act (ESA) Section 7 Letter of Concurrence and a Letter of Acknowledgement from the Greater Atlantic Regional Fisheries Office (GARFO) are in the ["NOAA Ship *Okeanos Explorer* FY2021 Field Season Instructions."](#)



1. Categorical Exclusion



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

MEMORANDUM FOR: THE RECORD
FROM: Genevieve Fisher, PhD, Deputy Director NOAA OER
THROUGH: Amanda Maxon, Environmental Compliance Specialist,
Contractor
SUBJECT: Amendment to CE applicability determination for EX-21-01

SOSSA.GENENE: Digitally signed by
SOSSA.GENENE.2548811403
FISHER.1403930
306
Date: 2021.03.23 12:47:48
-0400

The National Oceanic and Atmospheric Administration's (NOAA) Environmental Review Procedures for Implementing the National Environmental Policy Act, NOAA Administrative Order (NAO) 216-6A, dated May 03, 2019, and Council on Environmental Quality regulations require all proposed projects to be reviewed with respect to environmental consequences on the human environment. The assessment of the applicability of a CE to the EX-21-01 was conducted which resulted in a determination that the action is categorically excluded from the need to prepare an Environmental Assessment or an Environmental Impact Statement. The assessment was documented in the attached worksheet, February 24, 2021.

The original CE assessment was for the cruise beginning on April 14, 2021 from Key West, Florida and ending on May 8, 2021 in Port Canaveral, Florida. The revised cruise schedule will start on April 16, 2021 from Key West, Florida and will conclude around May 10, 2021 in Port Canaveral, Florida. The minor changes to the start and end dates for the cruise does not change the manner in which the cruise will impact the environment or the applicability of a CE as it was assessed in the attached worksheet.

Acknowledged by:



Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: EX2101MappingShakedown

Date Review Completed: 2/19/2021

Completed by: Amanda Maxon, Environmental Compliance Specialist, Contractor

OAR Functional Area: OER

Worksheet File Name: 2021-2-OER-G3-EX2101MappingShakedown

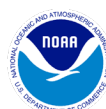
Step 1. CE applicability

- 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?**

The proposed action is the NOAA's Office of Exploration and Research to collect field season Shakedown and Mapping expedition using the NOAA Ship Okeanos Explorer's scientific sonar systems (Kongsberg EM304 multibeam, Simrad EK60 and EK80 split-beam, Knudsen 3260 chirp sub-bottom profiler, and Teledyne Acoustic Doppler Current Profiler). During expedition EX2101: 2021 EM304 SAT + Mapping Shakedown, the proposed actions of the cruise included equipment calibration including but not limited to a GNSS Azimuth Measurement System (GAMS) test, patch test, speed test, and a reference survey, assessing equipment performance, and typical EX-21-01 requirements. Equipment calibration will include but is not limited to a GAMS test, a patch test, a speed noise test, and a reference survey. Remote watch standing and integration of cloud processing procedures will also be tested during this cruise. Mapping operations will focus on areas generally deeper than 200 meters in the Gulf of Mexico along the West Florida Escarpment and off the U.S. East Coast primarily focused on the Blake Plateau in the U.S. water. The expedition will start from on April 14, 2021 in Key West, Florida and will conclude around May 8, 2021 in Port Canaveral, Florida. During this expedition, the EM304 multibeam sonar that was installed during the 2020/2021 winter repair period will be tested as well as annual shakedown items on the vessel.



All mission personnel are either on contract with OER or are funded through OER's grant. These actions demonstrate independent utility and are not connected action. See EX-21-01 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 for this action is consistent with the 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 disturbance and involve no permanent physical, chemical, or biological change to the environment. These expeditions will conduct calibrations of sonars which will involve no permanent physical, chemical, or biological changes to the environment in areas deeper than 200 meters in depth.

Step 2. Extraordinary Circumstances Consideration

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

This action will not result in adverse effects on human health or safety. NOAA Ship Okeanos Explorer will be operating in offshore, deep-sea (>200 m) areas in the Gulf of Mexico and Southeast United States during EX-21-01. All operations areas are underwater and therefore have no human presence. The vessel will transit through different depths as it moves from the ports of call to the areas of operations in deeper waters. These actions do 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?

Data collection will primarily focus offshore in deep waters (greater than 200 meters), including areas in and around the West Florida Escarpment and within Blake Plateau as the vessel transits from shallower depths near Key West, Florida to its proposed activities sites. The effects will be negligible, as acoustic mapping and ROV operations are transient and will not cause any permanent impact on the seabed or water column since OER's operations are well-documented following accepted best management practices. The expedition is being planned to meet



readiness objectives of scientific systems, in particular the mapping systems, onboard the Okeanos Explorer. Secondary scientific objectives will be planned in coordination in partnership with NOAA National Marine Fisheries Service (NMFS), NOAA Deep Sea Coral Research and Technology Program (DSCRTP), NOAA National Centers for Coastal Ocean Science (NCCOS), U.S. Geological Survey, U.S. Fish and Wildlife Service, and other Management agencies of the region. OER will use input from these management authorities that are familiar with these areas in order to ensure no more than negligible effects on any areas with potentially unique environmental characteristics.

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. In 2018, an informal consultation was initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our Biological Evaluation determining that NOAA Ship Okeanos Explorer operations conducted during the 2018-2019 field seasons are not likely to adversely affect ESA-listed marine species. The informal consultation was completed on August 8, 2018 when OER received a signed letter from the Chief ESA Interagency Cooperation Division in the NOAA Office of Protected Species, stating that NMFS concurs with OER's determination that operations conducted during NOAA Ship Okeanos Explorer 2018-2019 field seasons are not likely to adversely affect ESA-listed marine species. A Re-initiation of ESA Section 7 Letter of Concurrence was completed for the FY20 cruise season. ESA Section 7 Letter of Concurrence was received for the Okeanos Explorer's FY21 field season on February 4, 2021 which incorporated the usage of new technologies and regions of interest. Which will be provided as an appendix in the 2021 Project Instructions.

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 EX-21-01 project instructions. OER also initiated a request for an abbreviated Essential Fish Habitat (EFH) consultation for expeditions by NOAA Ship Okeanos Explorer in 2021 to the Greater Atlantic Region. OER is currently in the process of requesting a Letter of Acknowledgement from the Assistant Regional Administrator for the NOAA Office of Habitat Conservation stating that these expeditions will not adversely impact EFH. This letter will be provided in appendices of the EX FY21 Project Instructions.

Additionally, OER is in the process of receiving a Letter of Acknowledgement (LOA) from NMFS for operations for the Southeast Regional Office. Permits and compliance for each expedition will be included in the appendices of the project instructions and final report. For areas less than 200 meters in depth that the vessel may transit through additional guidance was requested to



the National Marine Sanctuaries for operations potentially near the Florida Keys National Marine Sanctuary (FKNMS) and/or Areas To Be Avoided (ATBA) that surround the Florida Keys.

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 operations of the expedition will be in 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)?

NOAA Ship Okeanos Explorer will be operating in remote and offshore areas of the West Florida Escarpment and Blake Plateau located off the Southeast Coast of the United States. There are no communities within or near the geographic scope of the expedition, and the mission 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 EX-21-01, NOAA Ship Okeanos Explorer will not make landfall in areas other than commercial ports. The ship and OER mission team will comply with all applicable local and federal regulations regarding the prevention or spread of invasive species. At the completion of every CTD cast and ROV dive, the equipment will be thoroughly rinsed with freshwater 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 any violations of Federal, State, or local law or requirements imposed for protection of the environment. OER engaged in the requisite consultations on ESA Section-7 EFH, and MMPA for this expedition as outlined in questions 4-6 above.

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

No, the exploration activities will be localized and of short duration in any particular area at any given time with no notable or lasting changes to the environment. Given the project's scope and breath, 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?

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: SOSSA.GENENE.FISHER.1403930306 Digitally signed by SOSSA.GENENE.FISHER.1403930306
Date: 2021.02.24 11:33:49 -05'00'

Signed by: Genee Fisher, OER Deputy Director

Date Signed: 02/24/2021



Appendix E. Summary of OER COVID-19 Guidelines and Expectations



Ocean Exploration
and Research

COVID-19 Guidance and Expectations for OER Mission Personnel

Required Reading

Mission personnel must familiarize themselves with all the protocols in the required documents prior to traveling.

- OMAO COVID-19 Guidance (Phase VI)*
- NOAA Ship Okeanos Explorer Standing Orders*
- NOAA COVID-19 Safety Orientation Course*
- NOAA OER COVID-19 Field Operations Guidelines and Expectations
- OMAO COVID-19 Shipboard Safety Briefing for Marine Operations*

Summary of Guidance and Expectations

This summarizes what is required from mission personnel participating in NOAA Office of Ocean Exploration and Research (OER) field operations. For more detailed information, see the required documents above.

- At least 30 days before travel, mission personnel must take the *NOAA COVID-19 Safety Orientation Course*, review the Office of Marine and Aviation Operations (OMAO) *COVID-19 Shipboard Safety Briefing for Marine Operations*, and complete the OER Sailing Contact Form to provide a shipping address and to request a KN95 mask and/or a post-travel COVID-19 test kit.
- Prior to travel, OER recommends that mission personnel **shelter in place for seven days**. Four days before traveling to the port, mission personnel must test themselves using an **OER-supplied COVID-19 test kit**. OER requires that mission personnel receive a negative COVID-19 test prior to travel. For instructions regarding how to request, administer, and send the self-administered COVID-19 tests, refer to the OER COVID-19 Testing Fact Sheet.
- The **closest weekday prior to traveling (Monday-Friday, 0800-1600 ET)** mission personnel must submit the OMAO Reporting Risk Assessment Form to moa.health.services@noaa.gov and copy the medical officer, LCDR Peter Choi (byungvong.choi@noaa.gov) for awareness.
- Mission personnel must follow the [Centers for Disease Control and Prevention's COVID-19 best practices](#), including using risk avoidance measures while traveling. Mission personnel are required to wear a two-layer cloth and/or KN95 mask during the entirety of travel. OER will provide mission personnel with a KN95 mask upon request. Individuals are also encouraged to consider current CDC recommendations to wear more than one mask for added protection.
- After mission personnel complete their travel and before they join the ship, they must **shelter in place for seven days near the ship's port of call** to enable daily medical screenings. While sheltering in place, mission personnel must take **two (95% accuracy) COVID-19 tests provided by OMAO**. Mission personnel may join the ship once they have sheltered in place for seven days and receive two negative (95% accuracy) COVID-19 tests.
- While on the ship, mission personnel must follow the OMAO guidelines and the commanding officer's standing orders.
- At the conclusion of post-cruise/post-project travel, OER will provide mission personnel with a COVID-19 test kit upon request.

*Copies of the OMAO documents can be requested through the Marine Operations Center-Atlantic

Last Updated: 02/2/2021



Ocean Exploration
and Research