

APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH

1. General Information

1.1 Cruise name and/or number:	F2024-012-AR84-03 A&B
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1.2 Sponsoring institution(s):		
Name	Address	Name Of Director
National Science Foundation	bmuz@nsf.gov (703)292-4557	Baris Uz

1.3 Scientist in charge of the project:	
Name:	Robert Pickart
Country:	United States
Affiliation:	Woods Hole Oceanographic Institution
Address:	US
Telephone:	508-289-2858
Email:	rpickart@whoi.edu

1.4 Entity(ies) /Participant(s) from coastal State involved in the planning of the project:	
Name:	See Section 6.2
Country:	
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

1.5 Submitting officer:	
Name:	Kerry Strom
Affiliation:	Woods Hole Oceanographic Institution
Address:	US
Telephone:	508-289-3939
Fax:	000-000-0000
Email:	kstrom@whoi.edu

2. Description of Project

2.1 Nature and objectives of the project:	<p>The goal of the field program is to determine the pathways, amount, and variability of dense water feeding the Faroe Bank Channel, which contributes substantially to the North Atlantic meridional overturning circulation. A mooring array will be deployed on the northern side of the Greenland-Scotland Ridge, and two extensive shipboard hydrographic/velocity surveys will be carried out to map the pathways of dense water. This is a collaborative effort between scientists from the US, Faroe Islands, Norway, and Iceland.</p>
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2.2 Relevant previous or future research projects:	<p>The second cruise of the project will take place in summer/fall 2025 to recover all of the moorings and carry out an extensive shipboard hydrographic survey.</p>
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2.3 Previous publications relating to the project:	<p>Semper S, Pickart RS, Våge K, Larsen KMH, Hátún H, Hansen B. The Iceland-Faroe Slope Jet: a conduit for dense water toward the Faroe Bank Channel overflow. <i>Nat Commun.</i> 2020 Oct 23;11(1):5390. https://doi.org/10.1038/s41467-020-19049-5.</p> <p>Semper, S., Våge, K., Pickart, R. S., Jónsson, S., & Valdimarsson, H. (2022). Evolution and transformation of the North Icelandic Irminger Current along the North Iceland shelf. <i>Journal of Geophysical Research: Oceans</i>, 127, e2021JC017700. https://doi.org/10.1029/2021JC017700.</p>
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3. Geographical Areas

<p>3.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude, including coordinates of cruise track/ way points):</p> <p>During AR84-03 Leg A: To deploy 10 subsurface moorings: 8 funded via the Woods Hole Oceanographic Institution (WHOI), 1 funded via the University of Bergen (UiB), and 1 funded via the Faroe Marine Research Institute (FAMRI). A glider will be operated by UiB on the northern side of the Greenland-Scotland Ridge. The first shipboard hydrographic/velocity survey will be near the moorings, the eastern Icelandic coast, the Shetland Islands/Scotland, and the Faroe Islands. Data collected will be used to provide local context for the mooring deployment.</p> <p>During AR84-03 Leg B: The second shipboard hydrographic/velocity survey will be near the Faroe Islands, the Icelandic coast, the east Greenland coast, the island of Jan Mayan, and the Norwegian coast. Data collected will be used to provide upstream conditions for the mooring array.</p> <p>Will operate within this polygon (waypoint file attached):</p> <p>Lon (W) Lat (N)</p> <p>-14.2771 75.3356</p> <p>-16.9778 73.9219</p> <p>-20.0642 71.4579</p> <p>-20.1285 66.8548</p> <p>-13.8270 66.7281</p> <p>-12.4767 65.1559</p> <p>-12.9268 59.5665</p> <p>-3.9891 59.6316</p> <p>1.2193 63.3983</p> <p>-3.4747 66.0064</p> <p>-3.4747 69.0725</p> <p>8.3566 71.9823</p> <p>8.5495 75.3356</p> <p>-14.2771 75.3356</p>
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<p>3.2 Attach chart(s) at an appropriate scale (1 page, high-resolution) showing the geographical areas of the intended work and, as far as practicable, the location and depth of sampling stations, the tracks of survey lines, and the locations of installations and equipment.</p>
<p>Chart provided - see Section 10.1.</p>

4. Methods and Means to be Used

4.1 Particulars of Vessel:	
Name:	NEIL ARMSTRONG
Type/Class:	Ship : R/V
Nationality (Flag state):	United States
Identification Number/Lloyds #/MMSI #:	9688946
Owner:	United States Navy
Operator:	Woods Hole Oceanographic Institution
Overall length:	72.50 m
Maximum draught:	4.60 m
Displacement/Gross tonnage:	2,603.0
Propulsion:	2 Siemens AC Electric Motors, 2350 HP
Cruising:	11.00 km/h
Maximum speed:	14.00 km/h
Call sign:	
INMARSAT number and method and capability of communication (including emergency frequencies):	INMARSAT C- (IMN#) 436903967
Name of master:	
Number of crew:	20
Number of scientists on board:	22

4.2 Other craft in the project, including its use:
N/A

4.3 Particulars of methods and scientific instruments:		
Types of samples and measurements	Methods to be used	Instruments to be used
Vertical profiles of ocean temperature, salinity, and dissolved oxygen	Lowering a conductivity-temperature-depth (CTD) instrument over the side of the ship	CTD
Water samples	Closing bottles attached to CTD	CTD
Vertical profiles of ocean temperature and salinity	A glider (owned and operated by UiB) will be deployed for one year and will autonomously profile the upper 1000 m of the water column near the mooring array. The glider will be serviced after roughly 6 months by FAMRI and recovered after a year by WHOI.	glider

4.4 Indicate nature and quantity of substances to be released into the marine environment:
No

4.5 Indicate whether drilling will be carried out. If yes, please specify:
No

4.6 Indicate whether explosives will be used. If yes, please specify type and trade name, chemical content, depth of trade class and stowage, size, depth of detonation, frequency of detonation, and position in latitude and longitude:
No

4.7 Indicate whether protected species be studied. If yes, please specify:
No

5. Installations and Equipment

5.1 Details of installations and equipment (including dates of laying, servicing, method and anticipated timeframe for recovery, locations and depth, and measurements):
No

6. Dates

6.1 Estimated overall project start and end dates:
Project Start Date: 8/15/2024
Project End Date: 9/28/2024

6.2 Coastal State-specific details:	
Coastal Area	Iceland
Estimated Entry Date:	8/15/2024
Estimated Departure Date:	9/29/2024
Estimated Research Start Date:	8/15/2024
Estimated Research End Date:	9/26/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm
Extent to which Iceland will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland.
Name, affiliation and contact information for all participants from Iceland:	N/A
Coastal Area	Greenland
Estimated Entry Date:	8/15/2024
Estimated Departure Date:	9/26/2024
Estimated Research Start Date:	8/15/2024
Estimated Research End Date:	9/26/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm

Extent to which Greenland will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland.
Name, affiliation and contact information for all participants from Greenland:	N/A
Coastal Area	Faroe Islands
Estimated Entry Date:	8/15/2024
Estimated Departure Date:	9/26/2024
Estimated Research Start Date:	8/15/2024
Estimated Research End Date:	9/26/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm
Extent to which Faroe Islands will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland. There will be one port stop in Tórshavn, Faroe Islands, 27 – 28 August 2024.
Name, affiliation and contact information for all participants from Faroe Islands:	N/A
Coastal Area	United Kingdom
Estimated Entry Date:	8/15/2024
Estimated Departure Date:	8/27/2024
Estimated Research Start Date:	8/15/2024
Estimated Research End Date:	8/27/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm
Extent to which United Kingdom will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland. There will be a port stop in Tórshavn, Faroe Islands, 27 – 28 August 2024.
Name, affiliation and contact information for all participants from United Kingdom:	N/A
Coastal Area	Norway
Estimated Entry Date:	8/29/2024
Estimated Departure Date:	9/26/2024
Estimated Research Start Date:	8/29/2024
Estimated Research End Date:	9/26/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm
Extent to which Norway will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland. There will be a port stop in Tórshavn, Faroe Islands, 27 – 28 August 2024.
Name, affiliation and contact information for all participants from Norway:	N/A
Coastal Area	Jan Mayen
Estimated Entry Date:	8/29/2024
Estimated Departure Date:	9/26/2024
Estimated Research Start Date:	8/29/2024
Estimated Research End Date:	9/26/2024
Explanation of multiple entries:	Please refer to cruise map.
Research will be performed:	within 12 nm, Between 12-200 nm, Beyond 200 nm
Extent to which Jan Mayen will be enabled to participate or to be represented in the research project:	There is berth space for an observer from each coastal state. The ship departs from and returns to Reykjavík, Iceland. There will be a port stop in Tórshavn, Faroe Islands, 27 – 28 August 2024.
Name, affiliation and contact information for all participants from Jan Mayen:	N/A

7. Port Calls

7.1 List of Port Calls

Port	Arrival Date	End Date	Special Logistical Requirements	Shipping Agent
Reykjavik	8/15/2024	8/19/2024	Loading Science gear, science party, taking ship provisions and possibly changing out crew.	TVG-Zimsen Primary Contact: Johann Bogason (for all confidential) Direct line: 11 354 856 0701 Email: Jóhann Bogason Johann@gara.is
Torshaven	8/27/2024	8/28/2024	Disembark science personnel. Possibly take fuel.	Faroe Ship Eystara Bryggja Postboks 47 FO-110 Tórshavn Tel: + 298 34 90 00 INFO@FAROESHIP.FO
Reykjavik	9/26/2024	9/28/2024	Unloading science gear, scientists, taking ship provisions and crew changes.	TVG-Zimsen Primary Contact: Johann Bogason (for all confidential) Direct line: 11 354 856 0701 Email: Jóhann Bogason Johann@gara.is

8. Participation of the representative of the coastal State

8.1 Modalities of the participation of the representative of the coastal State in the research project:
See Section 6.2

8.2 Proposed dates and ports for embarkation/disembarkation:
See Section 6.2

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary report, which should include the expected dates of submission of the data and research results:
No more than 3 months from the end date of the research as provided in Section 6.1.

9.2 Anticipated dates of submission to the coastal State of the final report:
No more than 2 years from the end date of the research as provided in Section 6.1.

9.3 Proposed means for access by coastal State to data (including format) and samples:
Data will be provided through official channels at no cost to the coastal State(s). Samples will be provided upon request.

9.4 Proposed means to provide coastal State with assessment of data, samples and research results:
Assessment of data, samples and research results will be provided at no cost to the coastal State(s).

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples and research results:
Assistance in further assessment or interpretation will be provided upon request.

9.6 Proposed means of making results internationally available:
All publications resulting from the study will be available via publicly available/open access journals with assigned Digital Object Identifier for permanent and international access. Shipboard data from all US research vessels are publicly available within 1-2 years of acquisition via the Rolling Deck Repository: https://www.rvdata.us/search/vessel/Armstrong . Data collected will be processed and combined with essential metadata for submission to an NSF-sponsored archival facility, where it will receive a Digital Object Identifier for permanent and international access. NSF-sponsored research projects are required to share easily interpretable data products that are publicly available within 2 years of collection.

10. List of Supporting Documentation

10.1 List of attachments, such as additional forms required by the coastal State, etc.:
