

Project description

**1. General Information**

**1.1 Reference ID:**

Application number:  
F2018-041

Project name:  
AR30-06

**1.2 Sponsoring institution(s):**

**Institution**

Woods Hole Oceanographic Institution

**Contact Information**

Woods Hole Oceanographic Institution 38 Water Street, MS #37 Woods Hole,  
MA 02543 Phone: (508) 289-3938 Fax: (508) 457-2185

**1.3 Scientist in charge of the project:**

Name: Robert Pickart  
Affiliation: Woods Hole Oceanographic Institution  
Address:  
Phone: 508-289-2858  
Fax: 508-457-2181  
Email: rpickart@whoi.edu

**1.4 Scientists from coastal states involved in the planning of the project:**

See Section 8 (*Participation*)

**1.5 Submitting officer:**

Name: Kerry Strom  
Affiliation: Woods Hole Oceanographic Institution  
Address:  
Phone: 508-289-3939  
Fax: 000-000-0000  
Email: kstrom@whoi.edu

## **2. Description of Project**

### **2.1 Nature and objectives of the project:**

This research is part of the Overturning in the Subpolar North Atlantic Program (OSNAP), an effort to determine the strength of the meridional overturning circulation and associated heat and freshwater fluxes in the subpolar North Atlantic. It is a collaborative program with scientists from several nations, including the U.K., the Netherlands, Germany, France, Canada, and China.

### **2.2 Relevant previous or future research projects:**

2014 OSNAP cruise, 1016 OSNAP cruise, and 2020 OSNAP cruise

### **2.3 Previously published research data relating to project:**

Data are available through <http://www.o-snap.org/>. Please see the attached CV, Pickart-CV-Armstrong-2018.pdf, for a list of relevant publications.

## **3. Methods and Means to be Used**

### **3.1 Platform:**

Name:	NEIL ARMSTRONG
Nationality (Flag State):	United States
Identification Number (IMO/Lloyds No.):	9688946
Owner:	United States Navy
Operator:	Woods Hole Oceanographic Institution
Overall length:	72.50
Maximum draught (meters):	4.60
Displacement/gross tonnage:	2603.00
Propulsion:	2 Siemens AC Electric Motors, 2350 HP
Call sign:	
Cruising speed:	11.00
Maximum speed:	14.00
Name of captain/master:	Captain Kent Sheasley
Number of crew:	20
Number of scientists on board:	22

### **3.2 Other craft used in the project:**

None

### 3.3 Methods and scientific instruments:

Types of Samples and Data	Methods to be Used	Instruments to be Used
Water column current, temperature, salinity, pressure, chemical properties	taut-wire subsurface moorings; standard CTD/LADCP stations	CTD (Conductivity-temperature-depth); LADCP (Lowered-Acoustic Doppler); Current Meters, Temperature/Salinity/pressure recorders
Bottom topography, underway shipboard velocity profiling	echosounders (single and multibeam), acoustic velocity profiling	12kHz echosounder, Seabeam system, vessel-mounted acoustic Doppler

### 3.4 Will harmful substances be used?

No

### 3.5 Will drilling be carried out?

No

### 3.6 Will explosives be used?

No

### 3.7 Will protected species be studied?

No

## 4. Installations and Equipment

### 4.1 Will there be any installations?

Yes

We will turnaround (recover then re-deploy) 15 subsurface moorings, deploy one new mooring, and perform the final recovery of another mooring. The turnaround will take place in August/September 2018 and the remaining recoveries in August 2020. There is no surface expression on any of the moorings (the shallowest top float resides at 100m below the surface). The moorings will not be serviced at any point during the two year-long deployment.

## **5. Geographical Area(s)**

### **5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):**

Stations near Greenland: 59 29.92 37 5.20 59 34.29 37 48.88 59 38.18 38 33.52 59 42.70 39 20.46 59 46.77 39 50.60 59 49.38 40 16.15 59 52.44 40 40.37 59 53.43 40 53.70 59 54.13 41 5.74 59 55.11 41 16.47 59 56.14 41 26.17 59 56.26 41 32.47 59 56.88 41 38.57 59 57.57 41 44.25 59 58.15 41 50.06 59 58.73 41 56.75 59 59.42 42 2.85 60 0.11 42 6.37 60 0.37 42 9.84 60 0.65 42 13.06 60 1.10 42 16.94 60 1.45 42 21.38 60 2.28 42 25.71 60 2.30 42 29.58 60 2.68 42 32.42 60 2.93 42 36.83 60 3.39 42 39.40 60 3.75 42 42.97 60 3.99 42 46.48 60 4.15 42 50.12 60 4.59 42 53.71 60 4.92 42 57.39 60 5.59 43 0.34 60 5.56 42 21.42 60 6.09 42 25.45 60 6.28 42 28.77 60 6.42 42 32.51 60 6.64 42 36.23 60 6.94 42 39.81 60 7.15 42 43.79 60 7.34 42 47.66 60 7.51 42 51.40 60 7.84 42 55.17 60 7.95 42 58.45 59 28.43 42 22.98 59 29.56 42 26.07 59 31.03 42 28.81 59 32.37 42 31.27 59 33.55 42 34.41 59 34.69 42 37.22 59 35.81 42 40.05 59 37.12 42 42.78 59 38.35 42 45.61 59 39.50 42 48.28 59 40.73 42 51.06 59 41.81 42 53.59 59 43.26 42 56.89 59 44.48 42 59.70 59 45.74 43 2.42 59 47.04 43 5.42 59 48.07 43 7.86 59 49.39 43 11.07 59 50.79 43 13.90 59 51.62 43 16.81 59 52.78 43 18.41 59 56.57 45 22.25 59 55.52 45 25.04 59 54.19 45 28.10 59 53.18 45 30.78 59 51.83 45 33.67 59 50.77 45 36.43 59 49.28 45 39.83 59 48.21 45 42.39 59 47.07 45 45.01 59 45.63 45 48.54 59 44.68 45 51.53 59 43.31 45 53.49 59 42.12 45 56.41 59 40.96 45 59.74 59 39.74 46 2.21 59 38.50 46 5.18 59 37.02 46 9.32 59 36.14 46 10.75 59 34.68 46 13.19 59 33.50 46 15.93 59 32.83 46 20.20 59 29.86 46 24.64 59 26.80 46 32.39 59 22.71 46 41.21 59 57.77 43 2.49 59 57.10 42 59.41 59 56.41 42 55.68 59 55.80 42 52.04 59 55.06 42 48.44 59 54.33 42 45.07 59 53.69 42 41.39 59 52.79 42 38.27 59 52.15 42 34.70 59 51.44 42 31.28 59 50.71 42 27.83 59 50.01 42 24.19 59 49.30 42 20.77 59 48.55 42 17.30 59 47.86 42 13.78 59 47.09 42 10.27 59 46.34 42 6.85 59 44.95 41 59.82 59 43.72 41 54.06 59 42.50 41 47.99 59 41.90 41 41.89 59 40.01 41 36.14 60 14.28 42 57.67 60 14.69 42 53.91 60 15.01 42 50.17 60 15.39 42 46.29 60 15.80 42 42.67 60 16.26 42 38.96 60 16.61 42 35.26 60 17.08 42 31.72 60 17.24 42 27.75 60 17.59 42 24.07 60 18.00 42 20.33 60 18.06 42 17.04 60 18.04 42 13.77 60 18.04 42 10.52 60 18.00 42 7.26 60 17.96 42 3.96 60 17.98 42 0.76 60 17.98 41 57.53 60 17.91 41 54.18 60 18.02 41 48.77 60 18.01 41 43.24 60 17.83 41 37.89 60 17.85 41 32.34 60 17.96 41 24.27 60 17.95 41 16.14 60 17.94 41 7.83 59 4.86 46 9.46 59 9.74 46 2.67 59 13.70 45 56.34 59 17.88 45 49.78 59 20.81 45 44.92 59 23.40 45 41.28 59 24.83 45 38.97 59 26.01 45 36.13 59 27.69 45 34.18 59 29.21 45 31.82 59 30.64 45 29.89 59 32.12 45 27.08 59 33.59 45 24.66 59 35.09 45 22.23 59 36.66 45 20.10 59 38.04 45 17.78 59 39.52 45 15.28 59 41.03 45 13.01 59 42.48 45 10.72 59 43.92 45 8.39 59 45.41 45 6.04 59 46.84 45 3.71 59 48.29 45 1.41 61 9.39 41 25.24 61 9.91 41 28.90 61 10.41 41 32.72 61 11.01 41 36.40 61 11.55 41 40.24 61 12.05 41 43.94 61 12.56 41 47.67 61 13.04 41 51.41 61 13.53 41 54.94 61 14.07 41 59.01 61 14.56 42 2.69 61 15.21 42 6.39 61 15.67 42 10.43 61 16.30 42 14.01 61 16.40 42 17.91 61 17.29 42 21.23 60 50.61 42 37.29 60 50.54 42 33.55 60 50.44 42 29.59 60 50.36 42 25.90 60 50.28 42 21.81 60 50.25 42 17.94 60 50.04 42 14.10 60 50.05 42 10.28 60 50.46 42 6.53 60 49.88 42 2.49 60 49.84 41 58.60 60 49.78 41 54.74 60 49.66 41 50.89 60 49.59 41 46.96 60 49.55 41 43.08 60 49.41 41 39.23 60 31.34 42 52.75 60 30.99 42 49.28 60 30.82 42 45.76 60 30.62 42 41.74 60 30.57 42 37.83 60 30.25 42 34.11 60 30.03 42 30.57 60 29.72 42 26.32 60 29.57 42 22.71 60 29.40 42 18.86 60 29.15 42 15.18 60 28.91 42 11.24 60 28.68 42 7.76 60 28.46 42 3.54 60 28.23 41 59.72 60 28.05 41 56.05 60 27.93 41 52.12 60 27.83 41 46.66 60 27.84 41 41.15 60 27.96 41 35.71 60 27.83 41 30.19 59 48.42 43 33.65 59 48.06 43 33.46 59 46.17 43 32.75 59 43.95 43 31.82 59 42.24 43 31.20 59 40.58 43 30.30 59 38.83 43 29.57 59 36.97 43 28.93 59 35.19 43 28.06 59 33.28 43 27.34 59 31.39 43



27.32 59 29.74 43 26.19 59 27.71 43 25.16 59 25.86 43 24.39 59 24.01 43 23.76 59 22.23 43 23.00 59 20.33 43 22.18 59  
18.45 43 21.47 59 56.66 45 22.07 59 55.55 45 24.85 59 54.28 45 27.86 59 53.10 45 30.66 59 51.91 45 33.53 59 50.72 45  
36.57 59 49.46 45 39.41 59 48.28 45 42.15 59 47.02 45 44.90 59 45.90 45 47.88 59 44.80 45 51.03 59 43.42 45 53.59 59  
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25.79 48 22.91 60 27.48 48 21.43 60 28.92 48 19.96 60 30.73 48 17.53 60 32.28 48 15.50 60 33.90 48 13.70 60 35.64 48  
11.76 60 37.28 48 9.80 60 38.89 48 7.90 60 39.90 48 6.77 59 47.70 44 38.14 59 45.86 44 37.12 59 44.05 44 36.19 59 42.31  
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29.69 44 27.59 59 27.96 44 26.18 59 26.12 44 25.22 59 25.46 44 14.11 59 26.87 44 11.84 59 28.53 44 10.30 59 30.21 44  
8.61 59 31.85 44 6.71 59 33.54 44 4.91 59 35.20 44 3.23 59 36.97 44 1.33 59 38.64 43 59.71 59 40.19 43 57.88 59 41.89  
43 56.16 59 43.33 43 53.09 59 44.60 44 12.86 59 42.82 44 13.32 59 40.90 44 13.91 59 39.13 44 14.53 59 37.23 44 15.11 59  
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6.31 66 20.98 28 0.75 66 19.57 27 54.89 66 18.12 27 49.21 66 16.70 27 43.46 66 15.29 27 37.54 66 13.91 27 31.90 66  
12.49 27 26.24 66 10.94 27 20.39 66 9.46 27 15.02 66 8.02 27 9.21 66 6.21 27 3.29 66 5.19 26 57.96 66 3.90 26 52.40 66  
2.54 26 46.65 66 0.96 26 41.17 65 59.63 26 35.43 65 57.96 26 30.01 65 56.54 26 24.35 65 55.08 26 18.63 65 53.57 26  
13.38 52 54.11 51 30.07 53 0.79 51 15.17 53 5.15 51 4.85 53 12.25 50 47.28 53 18.19 50 33.15 53 27.08 50 11.37 53 35.71  
49 49.60 61 40.80 33 54.00 59 58.76 42 2.06 59 59.21 41 59.04 59 59.27 41 59.50 59 55.12 41 16.45 59 54.93 41 16.53 59  
54.46 41 16.74 59 54.46 41 16.74 59 54.46 41 16.74 Stations near Canada: 52 54.11 51 30.07 53 0.79 51 15.17 53 5.15 51  
4.85 53 12.25 50 47.28 53 18.19 50 33.15 53 27.08 50 11.37 53 35.71 49 49.60 Stations near Iceland: 66 26.66 28 23.32 66  
25.17 28 17.28 66 23.85 28 11.97 66 22.38 28 6.31 66 20.98 28 0.75 66 19.57 27 54.89 66 18.12 27 49.21 66 16.70 27  
43.46 66 15.29 27 37.54 66 13.91 27 31.90 66 12.49 27 26.24 66 10.94 27 20.39 66 9.46 27 15.02 66 8.02 27 9.21 66 6.21  
27 3.29 66 5.19 26 57.96 66 3.90 26 52.40 66 2.54 26 46.65 66 0.96 26 41.17 65 59.63 26 35.43 65 57.96 26 30.01 65  
56.54 26 24.35 65 55.08 26 18.63 65 53.57 26 13.38

**5.2 Attach chart(s) showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment:**

See Section 10 (Attachments)

## 6. Dates

### 6.1 Expected dates:

Project Start Date: Aug 15, 2018  
Project End Date: Oct 15, 2018

Coastal Area	Estimated Entry Date	Estimated Departure Date
Canada	Sep 25, 2018	Sep 28, 2018
<b>Explanation of multiple entries:</b> N/A		
<b>Research will be performed:</b> within 12 nm		
<b>Extent to which Canada will be enabled to participate or to be represented in the research project:</b> Canadian collaborators are not scheduled to be on board but will be participating from shore.		
<b>Current participants from Canada: YES</b> Provided name, affiliation and contact information for all participants from Canada: Brad de Young - Memorial University of Newfoundland Department of Physics and Physical Oceanography Memorial University St. John's, Newfoundland, Canada A1B 3X7 Office: Chemistry Physics 3000 Telephone: 709.864.8738 Fax: 709.864.8739 E-Mail: bdeyoung@mun.ca Blair Greenan - Bedford Institute of Oceanography 1 Challenger Drive, Dartmouth, NS B2Y 4A2 CANADA		
Coastal Area	Estimated Entry Date	Estimated Departure Date
Greenland	Aug 28, 2018	Sep 24, 2018
<b>Explanation of multiple entries:</b> N/A		
<b>Research will be performed:</b> within 12 nm		
<b>Extent to which Greenland will be enabled to participate or to be represented in the research project:</b> Danish collaborators are not scheduled to be on board but will be participating from shore.		
<b>Current participants from Greenland: YES</b> Provided name, affiliation and contact information for all participants from Greenland: Erik Buch - Danish Meteorological Institute Phone: +45 39 15 73 00 E-mail: ebu@dmi.dk Mads Ribergaard - Danish Meteorological Institute Phone: +45 39 15 72 07 E-mail: mhri@dmi.dk		
Coastal Area	Estimated Entry Date	Estimated Departure Date
Iceland	Sep 30, 2018	Oct 03, 2018
<b>Explanation of multiple entries:</b> N/A		
<b>Research will be performed:</b> within 12 nm		
<b>Extent to which Iceland will be enabled to participate or to be represented in the research project:</b> Icelandic collaborators are not scheduled to be on board but will be participating from shore.		

**Current participants from Iceland: YES**

Provided name, affiliation and contact information for all participants from Iceland:

Hedinn Valdimarsson - Marine and Freshwater Research Institute of Reykjavik Phone: +354 5752063 / 8997795 Email: hedinn.valdimarsson@hafogvatn.is

**7. Port Call(s)**

Port	Arrival Date	End Date	Special Logistical Requirements	Shipp
ykjavik	8/15/2018	8/15/2018	crane, forklift, bunkers	TVG-Zimsen Primary Contact: Johann Bogason Direct line: 11 354 856 0701 t Jóhann Bogason - JOB Johann@gara.is
ykjavik	10/3/2018	10/15/2018	Crane, forklift & bunkers	TVG-Zimsen Primary Contact: Johann Bogason Direct line: 11 354 856 0701 t Jóhann Bogason JOB Johann@gara.is Email: gara@gara.is

**8. Participation**

**8.1 Extent to which coastal state(s) will be able to participate or to be represented in the research project:**

See Section 6 (*Dates*)

**8.2 Proposal dates and ports for embarkation/disembarkation:**

See Section 7 (*Port Call(s)*)

**9. Access to Data, Samples and Research Results**

**9.1 Expected dates of submission to coastal State of preliminary reports, which should include the expected dates of submission of the final results:**

No more than 30 days from the end date of the research.

**9.2 Propose means for access by coastal state to data and samples:**

Data will be provided through official channels at no cost to the coastal State(s). Samples will be provided upon request.

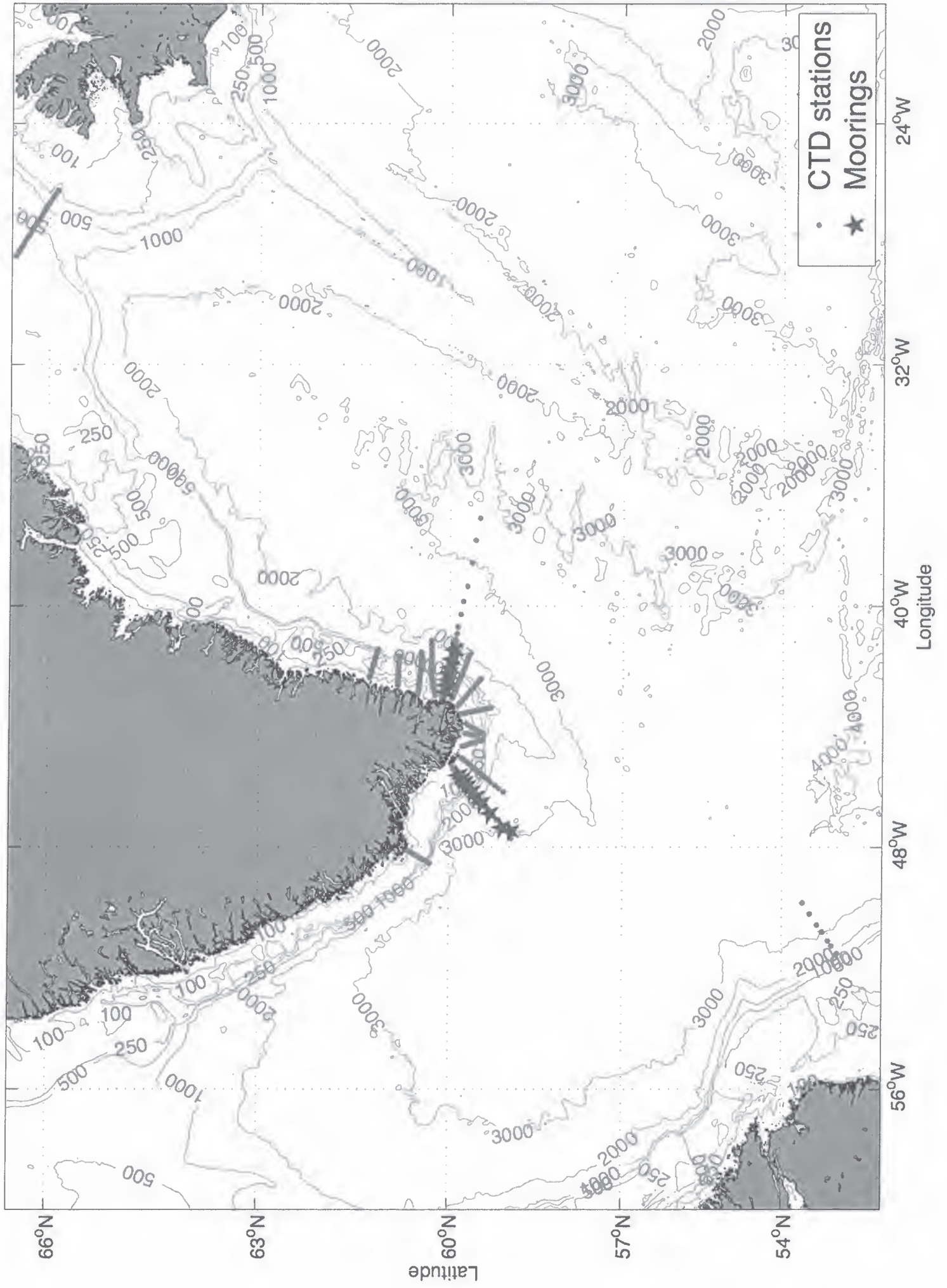
**9.3 Propose means to provide coastal State with assessment of data, samples and research results or provide assistance in their assessment or interpretation:**

Assessment of data, samples, and research results will be provided at no cost to the coastal State(s). Assistance in further assessment or interpretation will be provided upon request.

**9.4 Propose means of making results internationally available:**

Data will continue to be available through <http://www.o-snap.org/>.





## APPLICATION FOR DIPLOMATIC CLEARANCE OF GOVERNMENT SHIP

<b>Visit to:</b> Iceland, Greenland, Canada
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<b>Applicant:</b> Robert S. Pickart, WHOI	<b>Date:</b> 13 April 2018
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1	Nationality and type of ship	R/V Neil Armstrong, USA
2	Name and registration number of the ship	Lloyd's numer: 9688946, INMARSAT C- (IMN#) 436903967
3	Dimensions: Length(o.a.)/ Breadth (extreme)/ Draught (max)/Displacement	Length 72.50m, draught 4.60m, displacement 2603.00.
4	International Call-sign	WARL
5	Name of Captain/ master/commanding officer and number of crew and number of scientific personel	Captain Kent Sheasely, 20 crew, 22 scientists
6	Last port of departure before arrival	Reykjavik, Iceland
7	Date, estimated time (GMT) and point of entry into territorial waters	0900 August 15 <sup>th</sup> , 2018
8	Port of destination, estimated duration of stay in port (anchorage)	Aug 15 to Aug 27 – Reykjavik, Iceland; Oct 3 to Oct 15, 2018– Reykjavik, Iceland
9	Route within territorial waters	Somewhat random as operations are weather dependent. Please see attached station listing for more detailed route.
10	Estimated time of departure and point of exit from territorial waters	Aug 27 – Reykjavik, Iceland , and Oct 15, 2018– Reykjavik, Iceland
11	Next port of destination after departure	Reykjavik, Iceland
12	Purpose of visit	The purpose of our visit to Iceland is to refuel, load supplies, and load Scientific personel prior to the cruise. This cruise is part of the Overturning in the Subpolar North Atlantic Program (OSNAP), an effort to determine the strength of the meridional overturning circulation and associated heat and freshwater fluxes in the subpolar North Atlantic. It is a collaborative program with scientists from several nations, including the U.K., the Netherlands, Germany, France, Canada and China.
13	Additional permits	None.
14	Point of contact	Dr. Robert S. Pickart Department of Physical Oceanography

		Woods Hole Oceanographic Institution Woods Hole, MA 02543 USA rpickart@whoi.edu
15	Additional information	All information on the field campaign, including information on previous cruises can be found at <a href="http://www.o-snap.org/">http://www.o-snap.org/</a> .
16	Signature	<i>Robert L. Pickart</i>

Please Print

Section A - Applicant Information			
A.1 FIN: <b>US Navy &amp; Woods Hole Oceanographic Institution</b>			
A.2 Last Name:	<b>Pickart</b>	A.3 First Name:	<b>Robert</b>
A.4 Mailing Address:	<b>266 Woods Hole Rd. #04, Woods Hole, MA</b>		
A.5 Postal Code:	<b>02543</b>	A.6 Telephone #:	<b>+1 508-289-3938</b>
Section B - Vessel Information			
B.1 SIDECV VRN Number:	<b>Call Sign: WARL</b>	B.2 MOT Registration Number/IMO#:	<b>9688946</b>
B.3 Vessel Name:	<b>R/V Neil Armstrong</b>		
B.4 Length (ft):	<b>238 ft</b>	B.5 Breadth (ft):	<b>50 ft</b>
B.6 Depth (ft):	<b>15 ft</b>	B.7 Cubic Number (Cu ft):	<b>3204 LT</b>
B.8 Gross Tons:	<b>2641</b>	B.9 Engine Brake Horsepower:	<b>2350 Hp</b>
B.10 New Vessel:	<b>Yes</b>	B.11 Year Built:	<b>2014</b>
B.12 Was this vessel previously modified?	<b>No</b>	B.13 If Yes, when was it modified?	<b>No</b>
Section C - Previous Registered Owner			
C.1 Name of previous Registered Owner:	<b>N/A</b>		
C.2 Date acquired by Applicant:	<b>September 23rd, 2015</b>		
Section D - Surveyor Information			
D.1 Surveyor's Name:	<b>Jason Brooks</b>		
D.2 Company Name:	<b>American Bureau of Shipping (ABS)</b>		
Section E - Applicant's Signature			
<i>I do solemnly declare that the information given on this application is true and correct and I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act.</i>			
<i>kstrom</i>		<b>April 13, 2018</b>	
Signature		Date	
Note: This application is not valid unless signed by applicant.			
Section F - Internal Use Only - Status of Application			
<input type="checkbox"/> Approved		<input type="checkbox"/> Denied	
Signature of DFO Officer		Date	

Canada