

Mid-Frequency Ambient Noise Experiment – 4-21 August 2018

Objective

Observations of the deep-water mid-frequency ambient noise spatial structure and temporal fluctuation characteristics.

Background

The 2D mid-frequency acoustic array consists of 512 hydrophone elements arranged as 8 vertical staves of 64-elements each (Fig. 1). While the data acquisition system is self-contained, the 512-element 2D array will be deployed to ~150 m depth and subsequently tethered to a surface buoy via an umbilical cable that provides control and remote data access (Fig. 2). The physical configuration of the array is shown in Figs. 3-4. The umbilical cable is stored on a winch (Fig. 5). The offboard buoy (Fig. 6) includes both GPS positioning and several communication options including 900 MHz, 2.4 GHz (802.11), and Iridium.

Approach

We will carry out a deep-water mid-frequency ambient noise experiment with a 2D acoustic array over the period 4-21 August 2018. The deployment location is shown in Fig. 8 and is ~300 nm ENE of Iceland in ~3600 m deep water.

In addition to observations of the MF ambient noise, low-level source transmissions (less than 160 dB re μPa) in the 1-9 kHz band also will be carried out in the immediate vicinity of the array for *in situ* calibration purposes and at long-range (1, 2, and 3 convergence zones or ~30 nm, ~60 nm and ~90 nm).

Environmental measurements will include taking two CTDs per day to a depth of ~1000 m. Additional XBT measurements will be made as needed. In addition, we will deploy a ~500 m aperture, freely-drifting, self-recording thermistor string a few kilometers from the array (Fig. 7).

Location

66°45'N, 01°30'W or ~300 nm ENE of Iceland. Water depth is ~3600 m (Fig. 8).

Schedule

Date/Time	
01-03Aug18	
0800L	Load MPL hardware.
04Aug18	
0800L	Depart Reykjavik, Iceland.
07Aug18	
0800L	Arrive experiment location (~300 nm ENE of Iceland). Carry out at least 2 CTD casts per day.
	Note: Days on site - 11
	Deploy thermistor string (2 hrs). Prepare acoustic array for deployment.
08Aug18	Deploy acoustic array (3 hrs).
	Acoustic source transmissions in immediate vicinity of the array for calibration purposes.
09-11Aug18	(1) Acoustic source transmissions in immediate vicinity of the array for calibration purposes. (2) Acoustic source transmissions at long range (~30 nm, ~60 nm, and ~90 nm from array).
12Aug18	Recover acoustic array (3 hrs). Rebattery, download data, prepare for redeployment.
13Aug18	Deploy acoustic array (3 hrs).
	Acoustic source transmissions in immediate vicinity of the array for calibration purposes.
14-16Aug18	(1) Acoustic source transmissions in immediate vicinity of the array for calibration purposes.

	(2) Acoustic source transmissions at long range (~30 nm, ~60 nm, and ~90 nm from array).
17Aug18	Recover acoustic array (3 hrs) and thermistor string (2 hrs).
18Aug18	
0900L	Depart experiment location.
21Aug18	
0800L	Arrive Reykjavik, Iceland. Begin offloading ship.
22-23Aug18	
0800L	Offload MPL hardware.

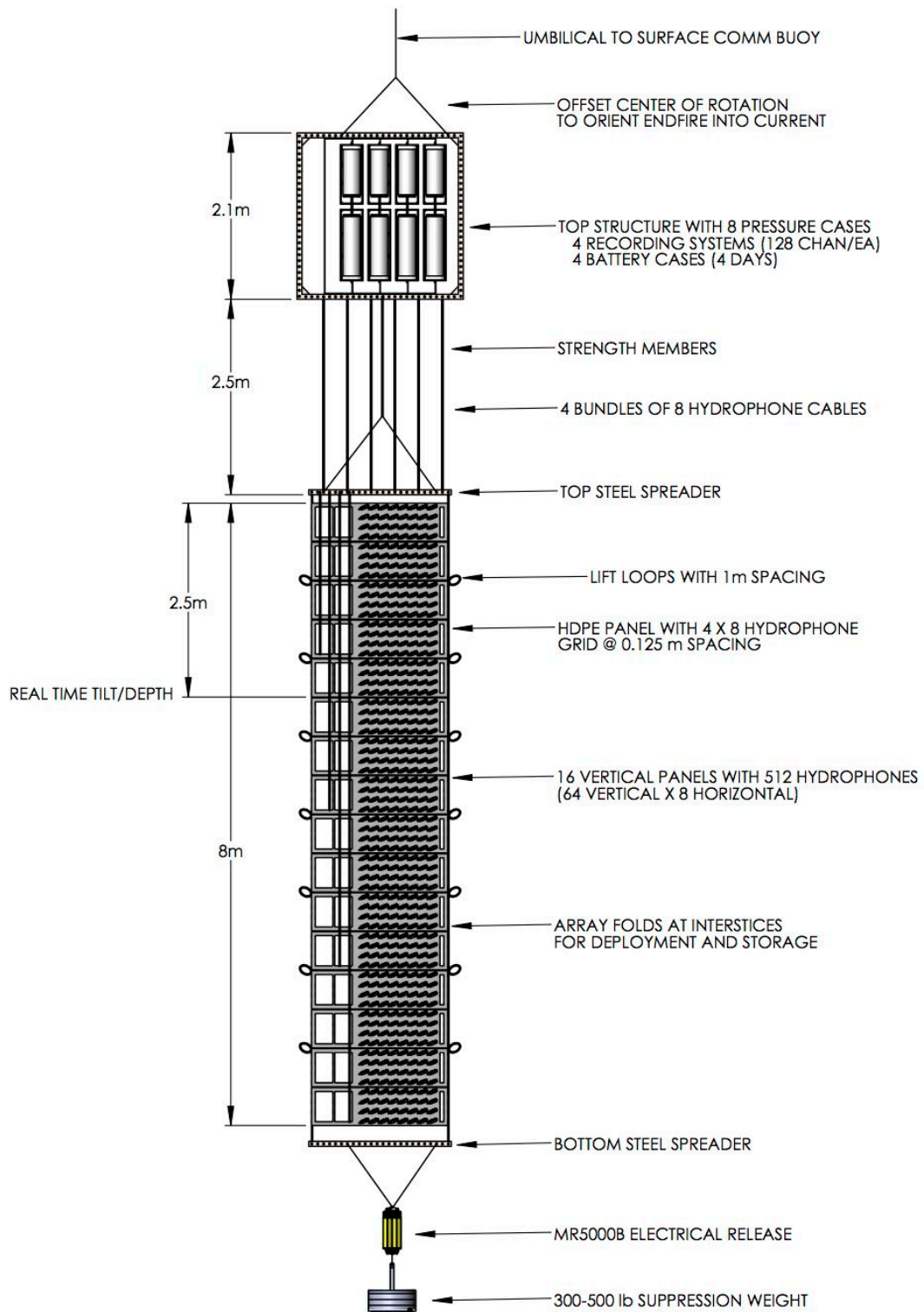
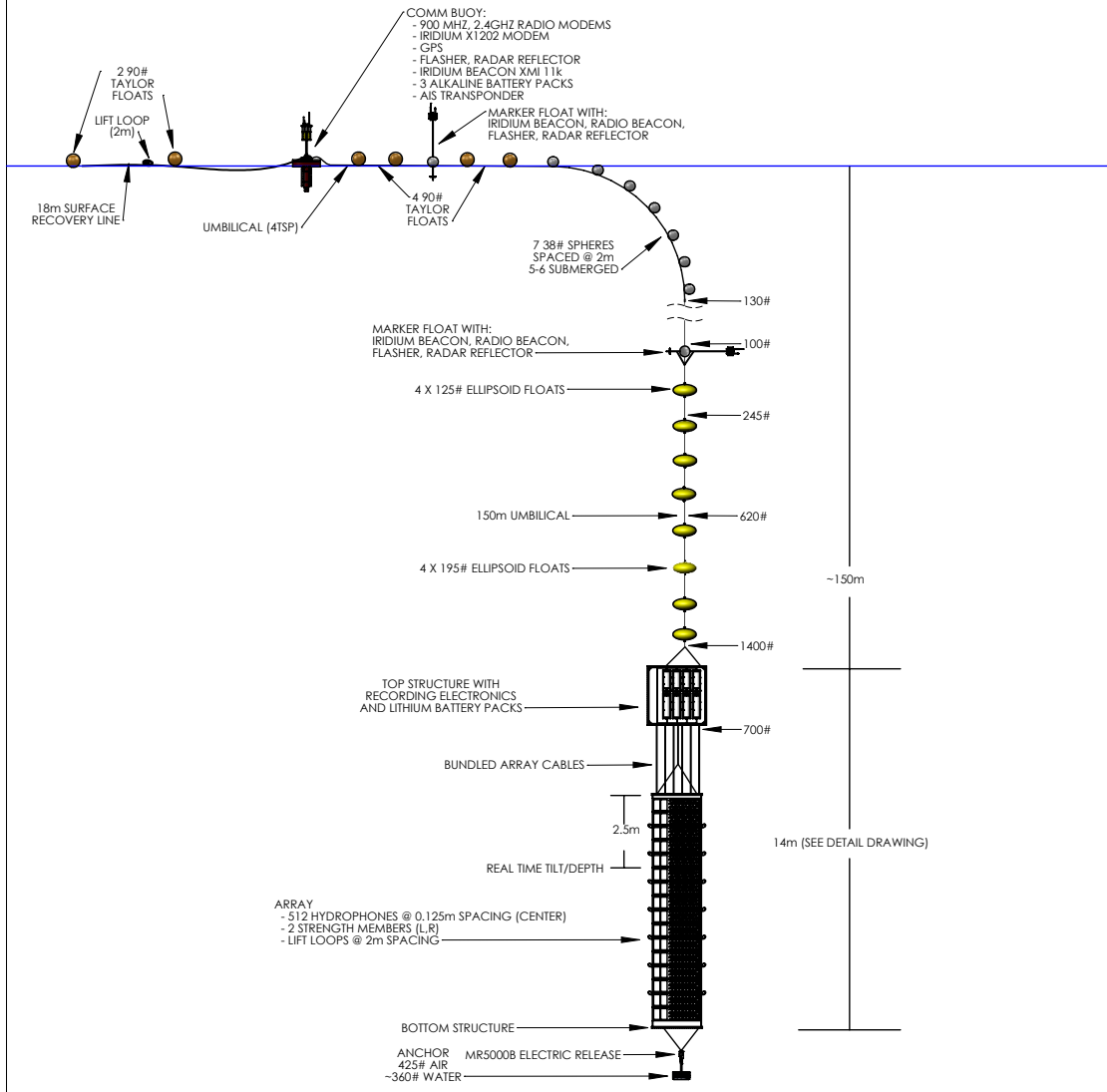


Figure 1. Deployment configuration of the 512-element mid-frequency array arranged in a 2-D distribution of elements (8 vertical staves of 64-elements each).

512 ELEMENT MF NOISE ARRAY DEPLOYMENT



DRAWING NOT TO SCALE

6/19/17

Figure 2. Deployment configuration of the 512-element 2D mid-frequency array with surface buoy.



Figure 3. Physical configuration of the 512-element mid-frequency array arranged in a 2D distribution of elements (8 vertical staves of 64-elements each). Data acquisition electronics and battery pressure cases on top.



Figure 4. Cart for positioning of the 2D mid-frequency array on deck prior to deployment.

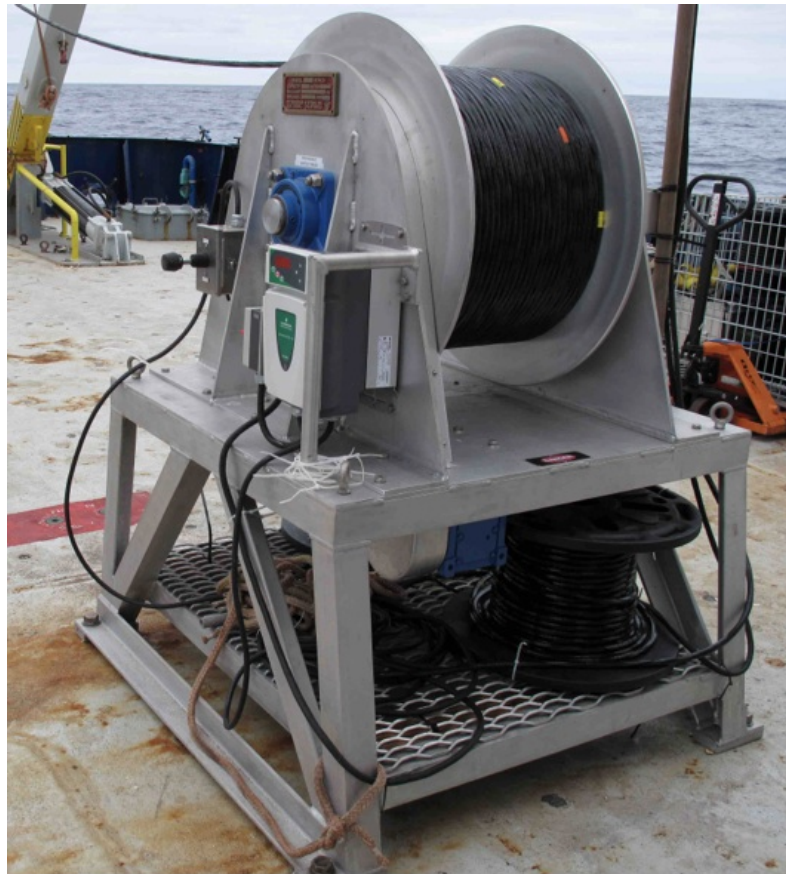


Figure 5. Winch for deploying 2D mid-frequency array umbilical cable.

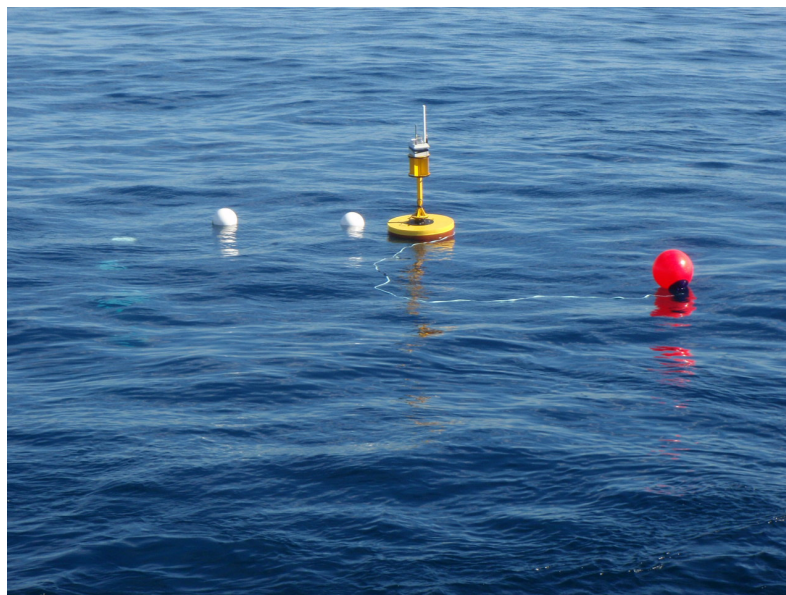
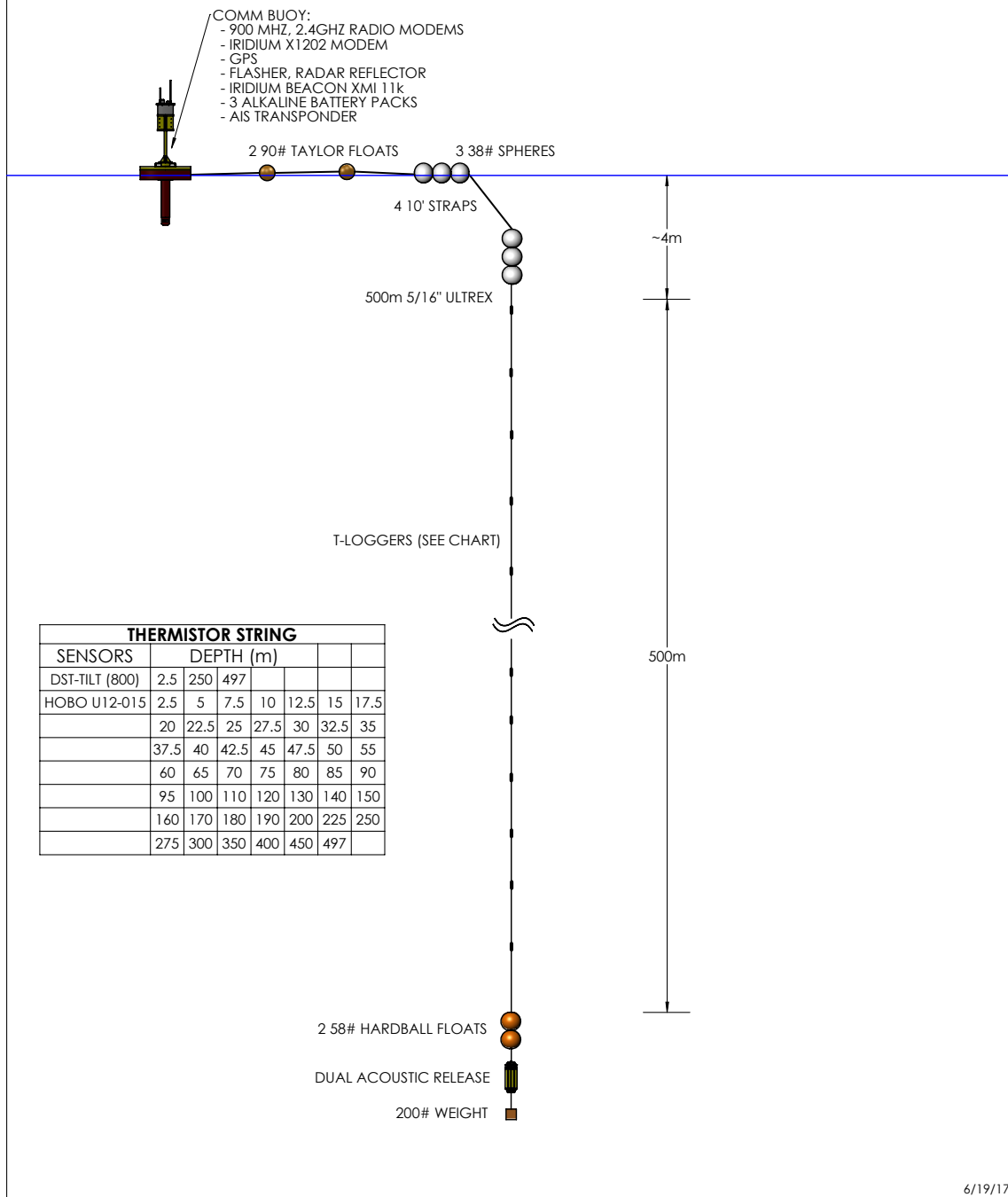


Figure 6. Surface buoy with GPS, 900 MHz, 2.4 GHz (802.11), and Iridium antennas.

MFN4 DRIFTING THERMISTOR STRING



6/19/17

Figure 7. Freely-drifting, self-recording thermistor string.

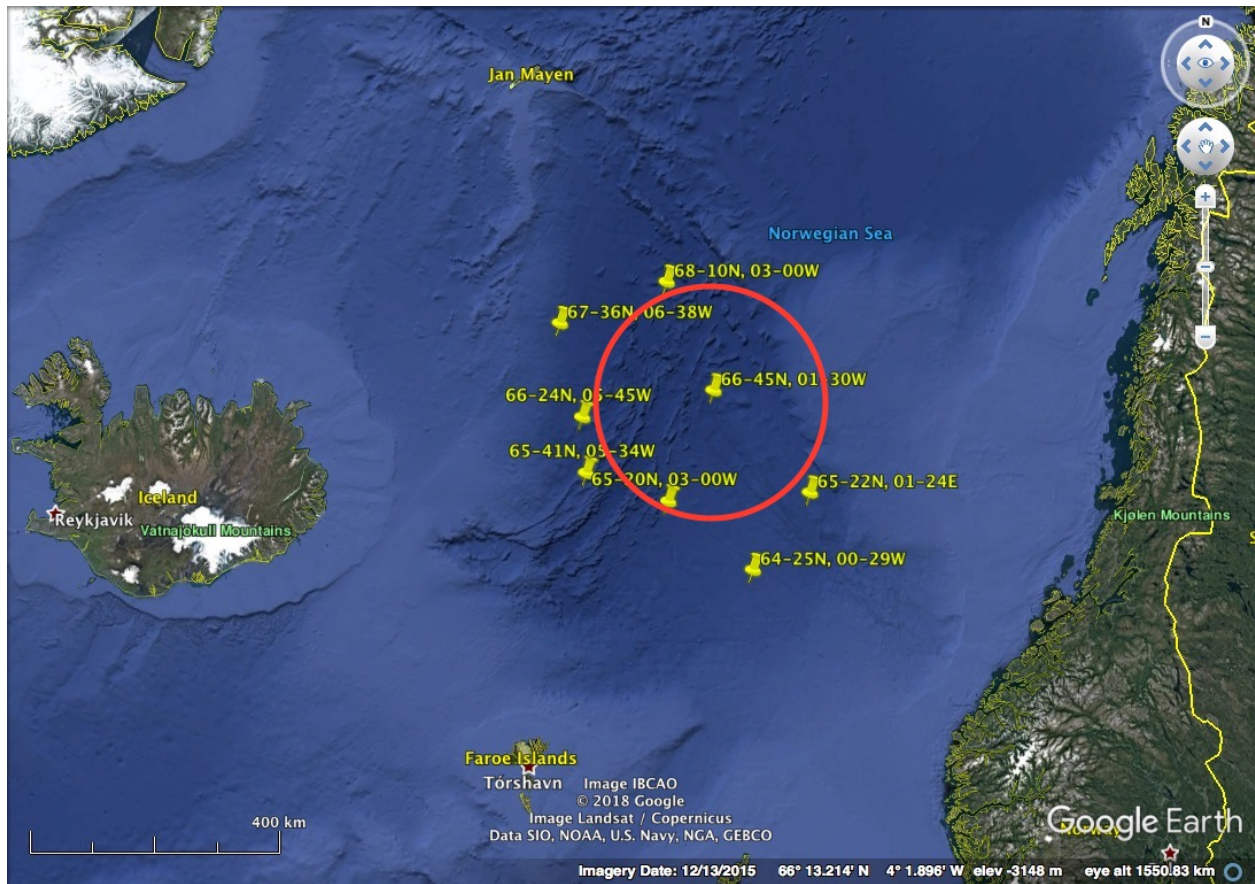


Figure 8. Location of mid-frequency ambient noise experiment in international waters ~300 nm ENE of Iceland in ~3600 m deep water (66°45'N, 01°30'W). Source operations will be within a ~100 nm radius circle centered on array. The pins outside the circle mark the international waters boundary.