



Seabed Characterization Workshop

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Scientific Objectives



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- Compare collocated geoacoustic characterization of seafloor using passive ambient noise inversions and active source tows
 - Focus on 0.5-5 kHz frequency band
 - Fixed (moored) and drifting vertical receive arrays
- Assess feasibility of predicting long-range transmission loss from short-range geoacoustic inversions
 - Both short-range (~2 km) and long-range (~20 km) source tows
- Impact of water column and sea surface variability on geoacoustic inversion uncertainty



Data Requirements



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- Impact of water column and sea surface variability
 - Spatially separated water column measurements (thermistor strings)
 - Waverider buoy
- Surface generated noise as ensonifying source
 - Noise fathometry and geoacoustic inversion
 - Fixed (moored) and drifting arrays (e.g. 32 elements/each)
 - Frequency band ~0.5-5 kHz
- Source tows
 - Short range (~2 km) source for comparison with noise inversions
 - Long range (~20 km) source tows to assess extrapolation of short range results for long range predictions



Experiment Hardware

MPL Receive Arrays and Towed Sources



Autonomous / Drifting Vertical Receive Arrays (4)

- 32-element VLA with either 0.2, 0.5, or 1.0 m element separations
- Bandwidth 20/500 Hz – 20/30 kHz ($f_s = 25/50/100$ kHz)
- Record duration ~10 days (lithium batteries)
- Autonomous or buoy deployed



Towed Sources

- ITC-2040X in a tow body (4-10 kHz)
- ITC-2015 (1.5-4 kHz)
- J-15-1 / J-15-3 (rental)

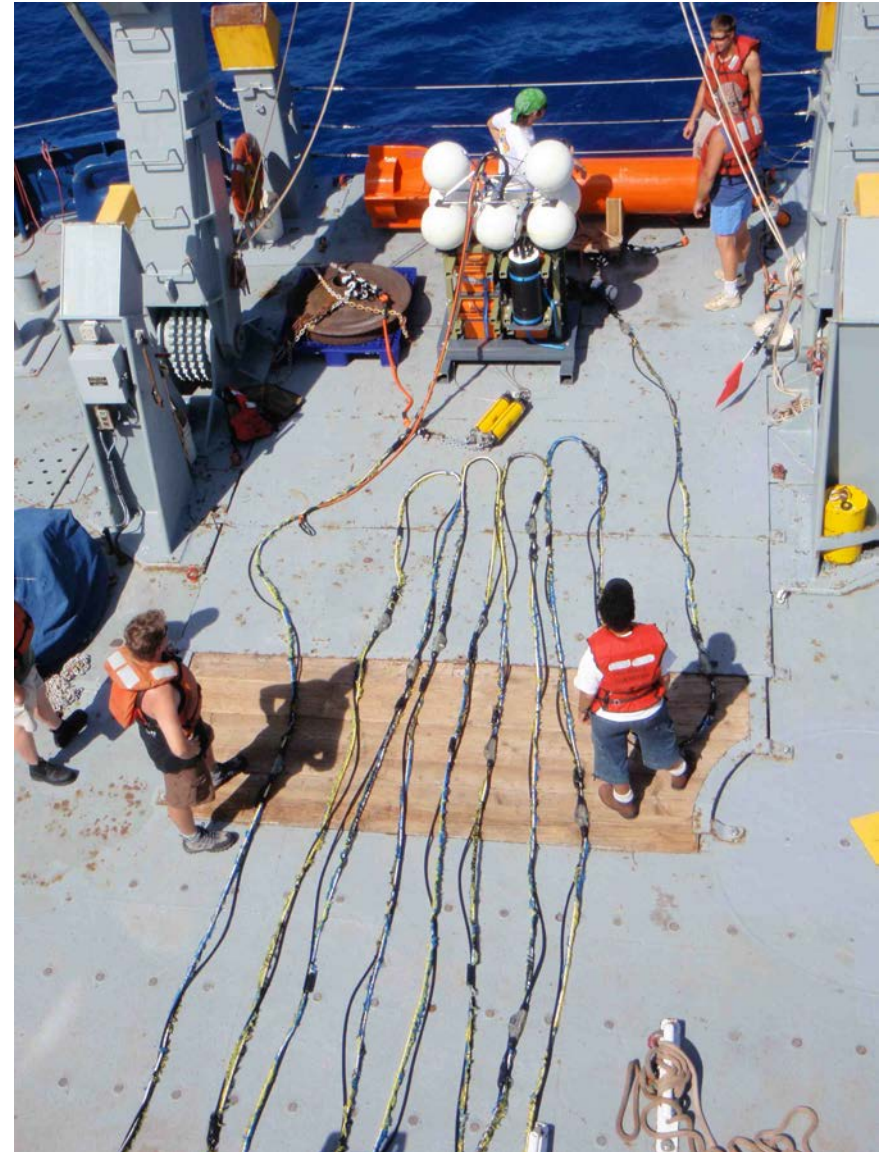
Source Tow System

- Winch
- Monitor phone and depth sensor (both recorded)
- Arbitrary waveform synthesis ($f_s = 100$ kHz)
- Transmit from two sources simultaneously (separate power amplifiers)



Radio Buoys (4)

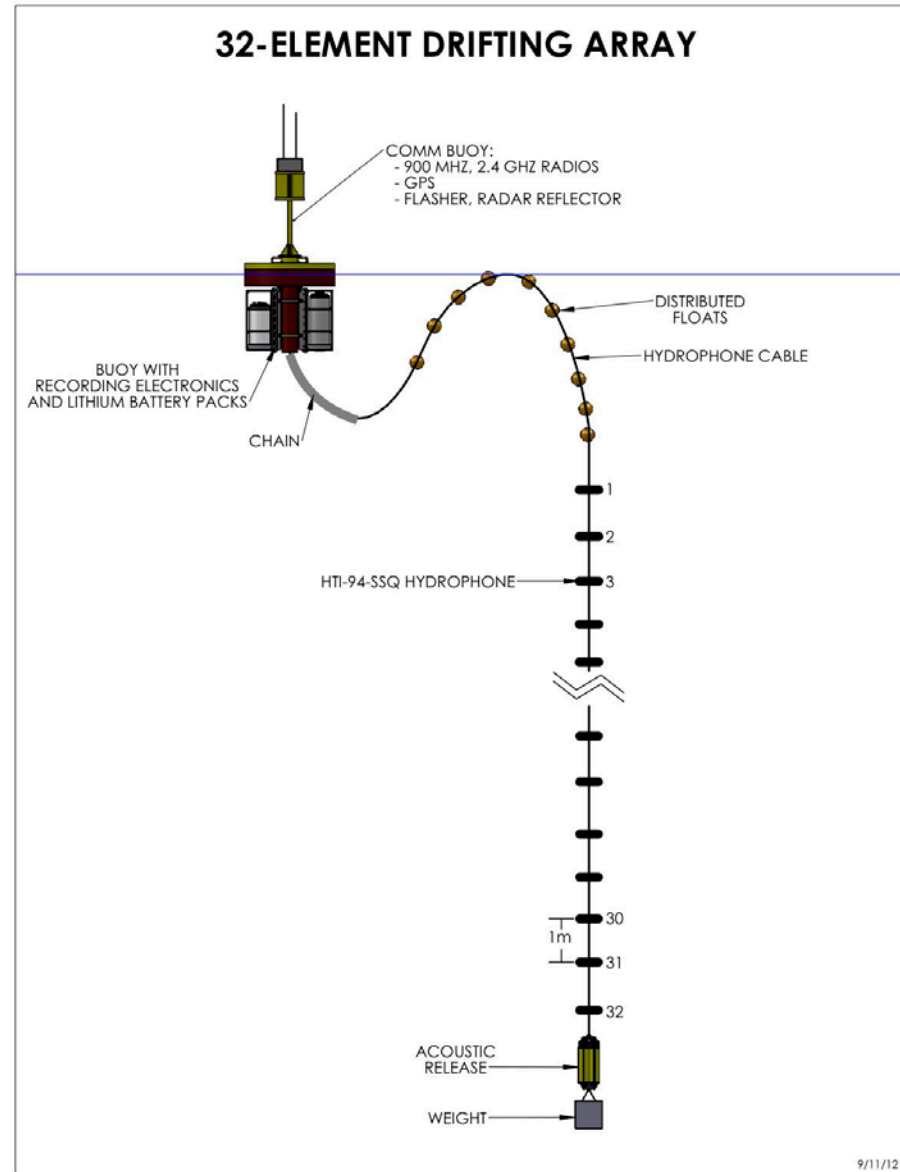
- 802.11 WLAN connectivity to ship
- Monitor data acquisition system status
- Retrieve array data
- Modify data acquisition system parameters



Autonomous Vertical Receive Array

Drifting Vertical Receive Array with Communications Buoy

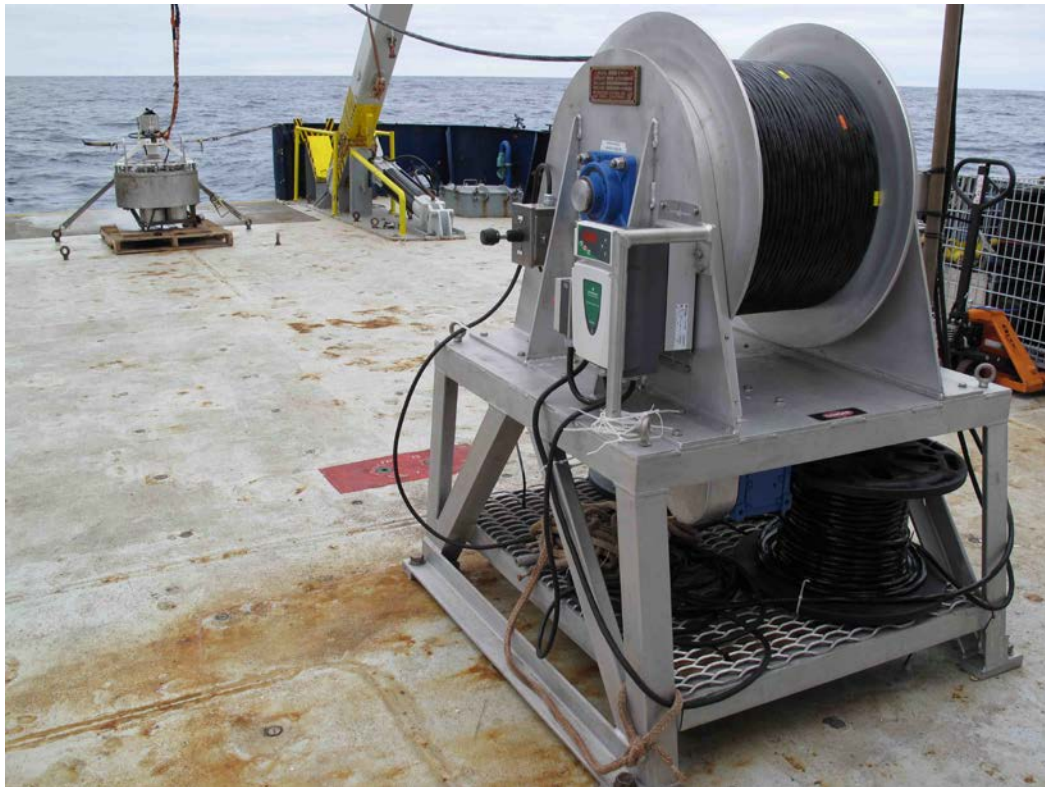
(Element spacing either
0.2, 0.5, or 1.0 m)





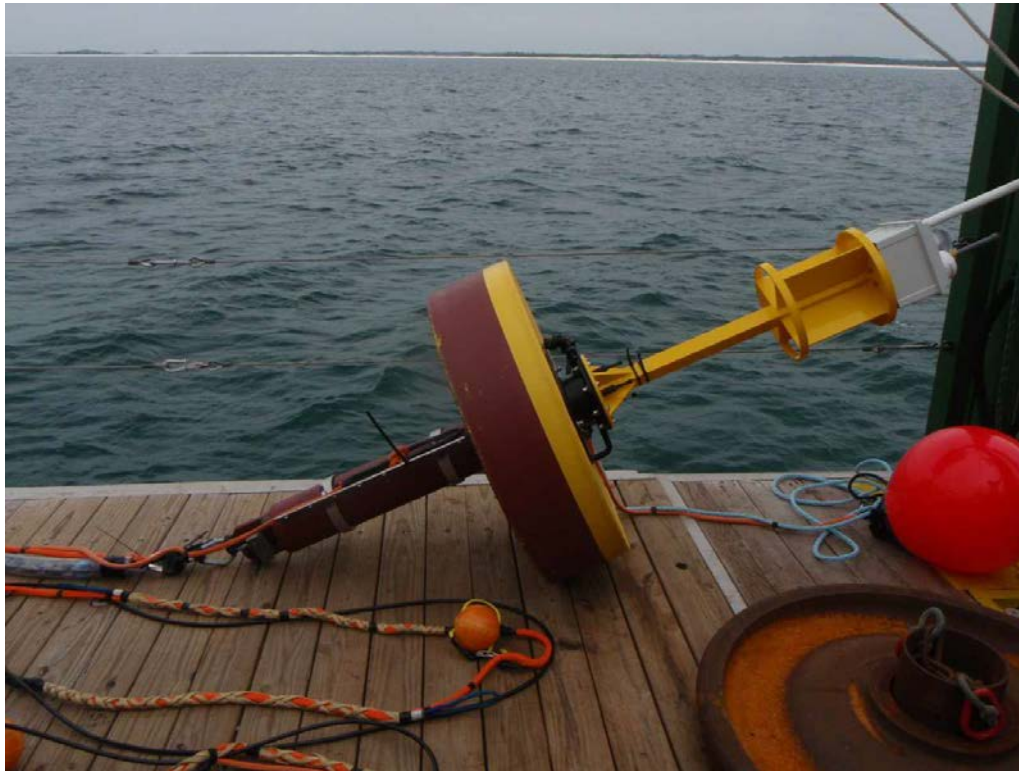
Towed Source System

Winch, Tow Body, and J-15-3 (rental)





Networked Deployment with Communications Buoy



Recording electronics in near-seafloor frame.
802.11g antenna on top of mast.

