MARS Projects: Permit Application Information

Applicant and Project Information

- **Project Title**

  Directional Acoustic Sensing

- **Applicant Information**

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- **Project Abstract**

  This work will be a collaborative project between the Monterey Bay Aquarium Research Institute (MBARI) and the Naval Postgraduate School (NPS) to integrate a directional acoustic sensor onto MBARI's Monterey Accelerated Research System (MARS) cabled observatory in Monterey Bay. By integrating the directional acoustic sensor system, the intent is to provide a new capability for researchers in the Monterey Bay area to study some directional characteristics of the acoustic noise-scape. Sources of such ocean sound include biophony (sound generated by marine life), anthrophony (sound generated by human activities), and geophony (sound generated by earth processes). With the addition of directional information, studies may also be able to address the impacts of certain sounds on marine mammal behaviors in the Monterey Bay area. Processed data will include bearing estimates to signals of interest, specifically in the frequency band of 35 – 900 Hz, identified by either the directional sensor itself or by complementary acoustic sensors installed on the MARS system. It is anticipated that the data products and subsequent

reports will help inform researchers and managers within the National Oceanic and Atmospheric Administration on topics related to underwater noise and environmental impacts.

- **Objectives**

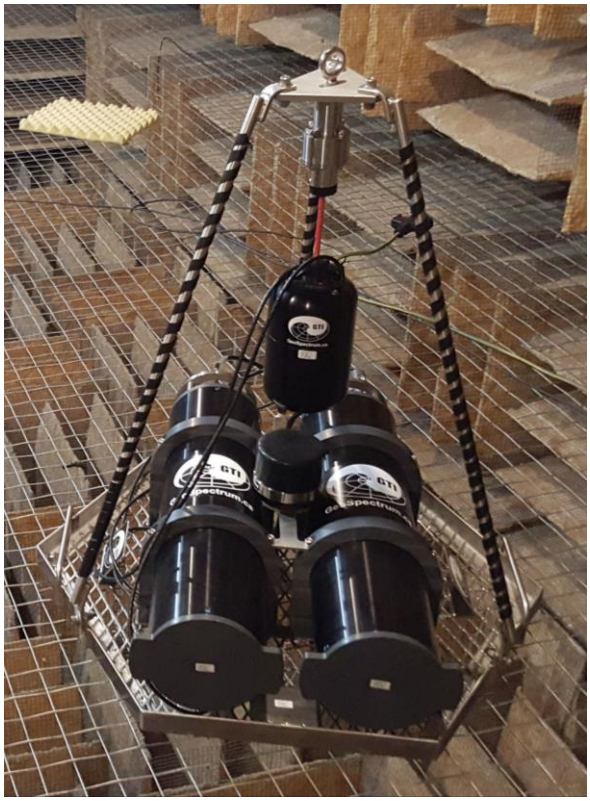
  The main objective of this work is to combine technology capabilities to provide directional acoustic sensing year-round in Monterey Bay. The proposed joint effort reflects the synergy of the technologies and shared research goals of MBARI and NPS.

- **Intended Use of Results**

  Data products will be used in joint research publications that study the directional noise-scape in the Monterey Bay area, and in reports to program managers.

Methods:

- **Procedures** –A Geospectrum Technology, Inc low-frequency vector sensor system will be installed on the MARS system by MBARI. A photo of a similar system is provided below. The system will have a flow shield installed around it to reduce the potential effects of flow noise on the system. This system is expected to be installed and then reside on the MARS system for one year, potentially extending to a 2nd year if agreeable to all parties involved. Removal of the system will also be conducted by MBARI.



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- **Collections** – No physical collections will occur. The system will simply record acoustic data and transfer the data up through the telemetry cable of the MARS system.
- **Schedule** – The estimated start and stop dates of this project are Dec, 2018 through Dec, 2019, but may be extended for an additional year if the system is performing properly and both MBARI and NPS agree to continue the effort. Analysis will be conducted throughout the deployment period with bearing estimates to marine mammal vocalizations of interest provided to MBARI as soon as possible. Calculations of bearing estimates are not expected to take more than 1 week, although there may be an initial start-up period before the processing algorithms have been confirmed.

Funding: The funding for the NPS portion of this work is provided by the Office of Naval Research for the period Oct, 2018 – Dec, 2019. It is anticipated that this work will receive additional funding in FY20.

Environmental Impacts: Because this is a purely passive system, there are no anticipated direct or indirect environmental impacts anticipated. In the unlikely event that the system suffers a catastrophic failure and leaks, electronic components may be exposed to seawater. The environmental impact of this is unknown but expected to be minimal.

Photographs or schematic representations of equipment to be deployed:

When deployed, the system will have a flow shield installed and look similar to the image provided below. The system is approximately 3 1/3 feet in height with a hexagonal base approximately 2 2/3 feet at its widest point. The weight of the system is approximately 150 lbs.