Department of the Navy SBIR/STTR Transition Program

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

Topic # N193-148
Unmanned Underwater Vehicle (UUV) Technology to Enable Readiness of Navy Ranges
TRITON SYSTEMS, INC.

WHO

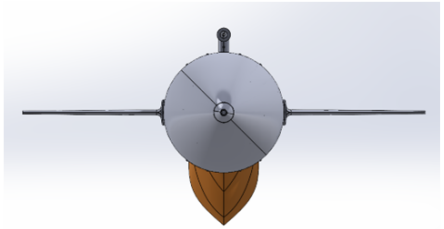
SYSCOM: NAVFAC

Sponsoring Program: NAVFAC

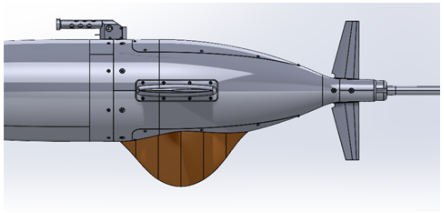
Transition Target: U.S. Navy Marine Species monitoring program.

Other Transition Opportunities: U.S. Navy ASW community; NOAA, BOEM, and DOE marine mammal monitoring programs.

Notes: The DIrectional Cetacean Acoustic Recorder (DICAR) system is comprised of two acoustic arrays to provide directional acoustic recording between 10 Hz - 100 kHz. The figure at right shows the Low Frequency (LF) array mounted to the Seaglider UUV. The High Frequency (HF)) array is mounted to the interior of the vehicle payload.



LF Array Front



LF Array Side

WHAT

Operational Need and Improvement: The U.S. Navy is required to monitor marine mammal populations near training and testing areas. One method used is to conduct passive acoustic monitoring of marine mammal vocalizations. Triton's DICAR system will increase the quality of acoustic data acquired by providing localization capability for marine mammal signals of interest. If localization of signals can be obtained, then marine mammal density estimates can be developed to assess changes in population levels over time. DICAR is designed for low-power consumption which will increase system endurance and the cost-effectiveness of marine mammal population surveys.

Specifications Required: Targeted 3-month deployment and recording endurance.
Determine direction of marine mammal signals with a minimum of 45 degree bearing resolution.
UUV platform must be reliably navigable.
Frequency band of interest: 10 Hz - 100 kHz.
Capability to run onboard detectors and/or classifiers and transmit results in near real-time vie satellite.

Technology Developed: Triton's Directional Cetacean Acoustic Recorder (DICAR) is a dual-frequency directional passive acoustic monitoring system that is vehicle agnostic but targeted initially as an underwater glider payload. The directional localization capability of this system will enable the development of density estimates from passive acoustic monitoring data, instead of relying on traditional visual line-transect survey data. Designing the system for long endurance will also increase the cost-effectiveness of these survey efforts.

Warfighter Value: Improved understanding of distributions of marine mammals will increase the accuracy of the Navy's impact assessments and at-sea environmental compliance documentation. Improvements to the compliance process enables the Navy to obtain the necessary permits to conduct critical training and testing activities while complying with environmental laws and regulations.

WHEN

Contract Number: N68335-22-C-0846 **Ending on:** Dec 13, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete weight and balancing study of arrays integrated with Seaglider.	Low	Establish feasibility of integrating arrays into Seaglider.	3	2nd QTR FY24
Acoustic testing of DICAR integrated with Seaglider at an acoustic test range.	Low	Verify that acoustic arrays can localize signals of interest when mounted in Seaglider payload.	4	3rd QTR FY24

HOW

Projected Business Model: Triton is planning to develop the DICAR acoustic payload system as a platform agnostic low-power directional recording system. We would be interested in working with companies that build relevant platforms (UUVs, buoys) for DICAR to be a selectable option when vendors purchase the platform.

Company Objectives: Triton would like to develop DICAR to include both the physical arrays as well as post-processing software to be included as a selectable option when purchasing different host platforms (UUVs, buoys).

Potential Commercial Applications: The DICAR system could be applied to other use-cases within the Navy such as ASW. We are also looking at utilizing this technology to monitor BOEM wind-lease areas for marine mammal presence.

Contact: Jeffrey Gilbert, Senior Engineer
jgilbert@tritonsys.com (978) 856-4211