Department of the Navy SBIR/STTR Transition Program

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Topic # N181-082

Multi-Dimensional Ambient Noise Model

ARiA

WHO

SYSCOM: ONR

Sponsoring Program: Code 32

Transition Target: AN/BQH-9(V)1 Signal Data Recording Set (SDRS)

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Other transition opportunities: Sonar Tactical Decision Aids (STDAs) and related TDAs developed by Naval Surface Warfare Center Carderock Division (NSWCCD) including Sonar Performance Prediction Functional Segment (SPPFS); Submarine Multi-Mission Team Trainer (SMMTT) and related simulated stimulation (SIM/STIM) trainers developed by NSWCCD including Surface Antisubmarine Warfare (ASW) Synthetic Trainer (SAST); NAVAIR ASPECT/MPACT TDA and acoustic-processor weapons tactics trainers (WTTs) using the Common Acoustic Simulation Environment (CASE)

Image courtesy of U.S. Navy, 130320-N-FG395-130.jpg

WHAT

Operational Need and Improvement: Databases and computational models for ambient noise play a critical role in the operation of TDAs used by all Navy sonar systems. MDANM improves the fleets ability to update/add additional database sources and computational models. These improvements will allow the Navy to continually improve the noise models utilized for TDAs, continually maintaining a tactical advantage. In addition to TDAs, MDANM will also support SIM/STIM tactical trainers build on the same baseline. Additional enabling algorithms will enhance the tactical utility of MDANM in forward-deployed and school house scenarios.

Specifications Required: The Navy requires a noise model that can be used in forward deployed scenarios with real time performance.

Technology Developed: MDANM will be built using a modular system-oriented architecture that will allow different source power, source distribution and propagation models to be used. The software architecture will allow these models to be used modularly and be incrementally upgraded. Enabling algorithms include soundscape scene analysis for detecting noise sources present in sonar data; multi-dimensional data representation for compressive encoding and sparse measurements; and directional-noise array-gain prediction-and-simulation toolset for estimating array-gain based on spatial noise distribution.

Warfighter Value: MDANM will provider the Navy with a noise model that can be continually updated with the latest data sources and computational models. Enabling algorithms will allow the Navy to forward-deploy MDANM and improve training.

WHEN

Contract Number: N68335-19-C-0675 **Ending on:** August 31, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
MDANM developed and enabling algorithms developed	Low	MDANM and enabling algorithms demonstrated and evaluated	4	3rd QTR FY21
Algorithms integrated iwth OAML models used by TDAs	Low	Software successfully deployed on OAML systems	5	4th QTR FY22
Integration with TDAs	Low	Software successfully integrated with STDA/SPPFS/STDA-I systems	6	4th QTR FY23
Integration with trainers	Low	Software successfully integrated with SMMTT/SAST and related trainers	6	4th QTR FY23

HOW

Projected Business Model: ARiA plans to retain the SBIR data rights for the developed noise model and enabling algorithms. ARiA will work with the Navy and large primes to integrate the target-scattering model with TDAs and training tools for NAVSEA and NAVAIR ASW programs.

Company Objectives: Our goal is to integrate MDANM with submarine, surface-ship and IUSS TDA and related school-house and on-board SIM/STIM trainers. These products share a common software baseline developed by NSWCCD and thus our technology can be integrated within both without significant extra effort.

Potential Commercial Applications: Our primary commercialization target is integration of MDANM in STDA and other sonar TDAs developed by NSWCCD using the same common baseline to include SPPFS-STDA and STDA-I. Our second focus is on SMMTT and related SIM/STIM trainers developed by NSWCCD. Future commercialization will target NAVAIR and the ASPECT/MPACT TDA and acoustic-processor WTTs using CASE. The first application of MDANM will be as an enhancement to AN/BQH-9(V)1 SDRS developed by NSWCCD.

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