Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2021-0420

Topic # N192-117

Undersea Acoustic Risk Analysis Decision Aid for Theater Anti-Submarine Warfare (TASW) Mission Planning

Marine Acoustics, Inc.

WHO

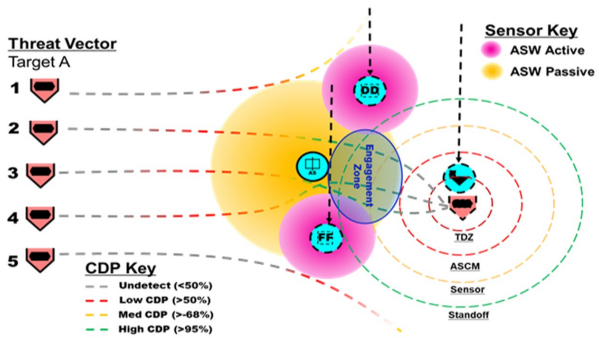
SYSCOM: NAVSEA

Sponsoring Program: PEO IWS-5E

Transition Target: AN/UYQ-100 Undersea Warfare Decision Support System (USW-DSS)

TPOC:
(401)832-3387

Other transition opportunities: NA



Notes: The Risk Analysis Tactical Decision Aid (TDA) calculates both Cumulative Detection Probability (CDP) and Cumulative Engagement Probability (CEP) for multiple theoretical logic-based target tracks en route to a High Value Unit ship or mission waypoint, relative to an assessed target Threat Vector. A separate quantitative evaluation of Anti-Submarine Warfare (ASW) Residual Risk (commensurate with Threat Posture), for both mitigated and unmitigated threats is quantified relative to various ASW zones of interest.

WHAT

Operational Need and Improvement: Theater Anti-Submarine Warfare (TASW) Planners may be overwhelmed by decisions regarding risk to future plans, according to current asset allocation (mitigation) against potential threats. The Undersea Warfare Decision Support System (USW-DSS), a Command and Control (C2) system, was designed to help fuse this data into an ASW tactical picture, however, current USW-DSS lacks risk analysis mission planning capability that captures the full needs of the disparate users in both understanding and assessing risk (relative to existing mitigation measures) to these future plans.

Specifications Required: Develop and deliver a prototype for incorporating acoustic counter-detection risk analysis into the AN/UYQ-100 USW-DSS in support of TASW mission planning.

Technology Developed: The Marine Acoustics, Inc.(MAI) TDA utilizes MAI's logic-based, 4-D Monte-Carlo acoustic modeling and simulation software, as well as acoustic databases and sensor libraries developed as part of the SBIR Phase I effort. The MAI's Java-based TDA software is ideally designed to integrate as an overlay with USW-DSS via existing framework developed by partners L3Harris. Further the TDA, while designed as a standalone overlay during Phase II, will be capable of operating complementary to existing USW-DSS overlays as well as leverage existing acoustic models and databases as part of Phase III transition planning.

Warfighter Value: This technology directly addresses current lack of TASW watchfloor tools tuned to the needs of Future Operations (FUOPS) planners, specifically the ability to visualize, quantify and evaluate acceptable Commander's risk to future operations in order to provide guidance at key decision points in the planning process, as well as formulate appropriate mitigation plans. Further, MAI's approach accommodates the Course Of Action (COA) Development, Wargaming, and COA Decision steps in the Navy Planning Process.

WHEN

Contract Number: N68335-21-C-0218 **Ending on:** February 5, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Performance Analysis Study	Med	Suitable track generation validated by ASW SME's	TRL-4	January 2022
Prototype Demo	Med	Demonstration of Risk Mitigation TDA on USW-DSS surroagate	TRL-5	January 2023
System of System Demo	Med	Demonstration of Risk Mitigation TDA on USW-DSS shore facility	TRL-6	January 2024

HOW

Projected Business Model: Our business model is to directly develop software and associated documentation, as well as provide services to the government. Ultimately, the same software and documentation can be utilized by a Prime Integrator in transition to Navy ASW Programs of Record, Foreign Military Sales (FMS) applications, and/or commercial applications.

Company Objectives: MAI's short term objective is to develop and demonstrate TRL-6 capability for inclusion into the USW-DSS planning process. Our long term goal is to leverage advertisement of a successful SBIR transition (and lessons learned from this SBIR) in order to posture for future similar opportunities across the USW-DSS stakeholder community.

Potential Commercial Applications: Though the TASW Risk Analysis TDA is designed to transition to US Navy TASW Mission Planning capability such as USW-DSS primarily, the underlying capability, including acoustic modeling coupled with a robust 4-D Monte Carlo logic-based simulation and data collection capability has potential application across a multitude of applications both in the international ASW realm as well in applications involving Environmental Risk Analysis.

Contact: Steve Psaras, VP for Virginia Operations, Marine Acoustics Inc.
steve.psaras@marineacoustics.com 703-465-8404