

Topic: N141-039

Daniel H. Wagner, Associates, Incorporated

Active Sonar Interference Avoidance Planning

Automated active Sonar Interference Avoidance algorithms (ASIA) accounts for active acoustic mutual interference when automatically generating optimized theater level asset allocations and strike group and platform level search plans that significantly: (1) Improve passive and active search effectiveness (i.e., reduced time to detect and classify a submarine target of interest), (2) Improve situational awareness and threat assessment, and (3) Reduce operator time-on-task. Daniel H. Wagner Associates has over 57 years of experience in developing and transitioning complex software components to prime contractors and Department of Defense customers, and developed many of the U.S. Navy's Anti-Submarine Warfare systems, including the Operational Route Planner (ORP) in USW-DSS (ASIA's first planned transition) and MH-60R Acoustic Mission Planner (AMP). Have working prototype and looking for additional transition partners.

Technology Category Alignment:

Command, Control, Communications, Computers, & Intelligence (C4I)

Autonomy

Modeling and Simulation Technology

Contact:

Dr. W. Reynolds Monach

reynolds@va.wagner.com

(757) 727-7700

<http://www.wagner.com/>

SYSCOM: NAVSEA

Contract: N68335-19-C-0329

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-19-C-0329

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2020-0405

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Enhanced Active Sonar Interference Avoidance (ASIA)

Daniel H. Wagner, Associates, Incorporated

WHO

SYSCOM: NAVSEA

Sponsoring Program: PEO IWS 5E

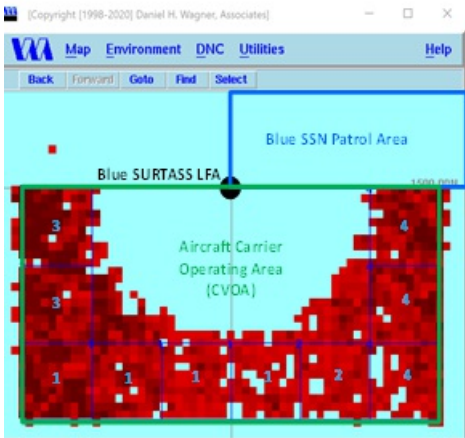
Transition Target: Undersea Warfare Decision Support System (USW-DSS)

TPOC:
(301)227-5218

Other transition opportunities:

Aircraft Carrier Tactical Support System (CV-TSC), Undersea Surveillance Systems, Next Generation Naval Mission Planning System (NGNMPS)

Notes: Red heat map (darker red is higher threat density) showing estimated position (after 96 hours) of THREAT2 (which is transiting into the aircraft carrier operating area (CVOA) from the north) and THREAT1 (which starts in the CVOA), including negative information from assuming they are not detected by Blue undersea warfare (USW) assets. Overall Cumulative Detection Probability (CDP): 0.883 against THREAT2 and 0.566 against THREAT1. Optimized multistatic active search locations outlined in blue for first 96 hours (with # of sorties in center of search box). This optimized search plan assumes that two P-8 sorties, with approximate flight times of 5.1 hours to the western portion of the CVOA and 3.64 hours to the eastern portion of the CVOA (out of a total sortie time of 10 hours), are available during each 8-hour epoch covering the 96-hour period (a total of 24 sorties).



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WHAT

Operational Need and Improvement: ASIA is developing mission planning services for optimizing undersea warfare (USW) effectiveness—a high priority for the Navy given the increasingly large number of near-peer submarines. These services will enhance existing capabilities, also developed by Wagner Associates, by making them more accurate and more relevant to theater level USW planning and execution. These innovative tools are needed by the fleet and are mission critical.

Specifications Required: Need open architecture efficient and effective USW mission planning and execution services that integrate with existing Navy mission planning systems and databases and accurately account for mutual interference from friendly active sources.

Technology Developed: Automated active Sonar Interference Avoidance algorithms (ASIA) is a set of software services for optimizing undersea warfare (USW) effectiveness, in particular for: (1) Optimally assigning theater level USW assets to areas and missions in order to optimize overall warfighting capability, and (2) accurately accounting for mutual interference from friendly active sources. When integrated into Undersea Warfare - Decision Support System (USW-DSS), ASIA services will improve USW operations at all levels: theater, carrier strike group (CSG), surface action group (SAG), and individual platform (e.g., surface ship, unmanned surface vessel (USV), submarine, and unmanned undersea vessel (UUV)).

Warfighter Value: The expected benefits of ASIA are: (1) More efficient and effective use of scarce USW assets, (2) More accurate assessment of actual USW mission effectiveness, (3) Significantly reduced risk to friendly platforms, (4) Enhanced situational awareness (SA) and threat assessment, and (5) Reduced planner/operator time-on-task.

WHEN

Contract Number: N68335-19-C-0329 **Ending on:** February 20, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Prototype ASIA Components	Low	Successful tests in Wagner lab	TRL 5	March 2020
Prototype ASIA System	Low	Successful tests in Wagner lab	TRL 6	September 2020
Full Scale Prototype ASIA System	Low	Successful demonstration in USW-DSS DevSecOps cloud testbed	TRL 6	March 2021
Seminal Transition Event	Low	Successful demonstration of operational capability in USW-DSS DevSecOps cloud testbed	TRL 7	June 2022

HOW

Projected Business Model: Since 1963 Daniel H. Wagner, Associates, has provided innovative and cost-effective technical solutions to complex problems in Naval Operations Analysis and commercial/government applications. We design, develop, market, implement, and provide scientific software, training, and support for custom resource optimization, decision support, multi-target tracking, and data fusion systems. Examples of successful transitions and deployments include:

- 1) Mission Optimization Configuration Item (MOCI) Web Service in Undersea Warfare Decision Support System (USW-DSS)
- 2) Acoustic Mission Planner (AMP) in MH-60R avionics system and shipboard Joint Mission Planning System (JMPS)
- 3) Computational modules for evaluating and optimizing mine countermeasures (MCM) operations and estimating risk in MINEnet Tactical
- 4) Net-Centric Data Fusion (NCDF) for USW-DSS
- 5) Data Fusion Engine (DFEN) in USW-DSS

ASIA is targeted for direct integration into USW-DSS, although additional marketing opportunities include other naval systems that could benefit from ASIA technology and software components.

Company Objectives: To use our operational experience and technical skills to address challenging problems in defense analyses and provide solutions and computational components that enable warfighters to reduce their vulnerability and conduct successful and operationally effective military operations.

Potential Commercial Applications: ASIA algorithms and methodology have potential applications to border surveillance and port/facility security.

Contact: Dr. W. Reynolds Monach, Vice President
reynolds@va.wagner.com 757-727-7700