Department of the Navy SBIR/STTR Transition Program

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Topic # N102-154
Intelligent Maritime Planning and execution Services (IMPS)
Daniel H. Wagner, Associates, Incorporated

WHO

SYSCOM: ONR
Sponsoring Program: ONR
Transition Target: Maritime Tactical Command and Control (MTC2)
TPOC:
Mr. Michael Vaccaro
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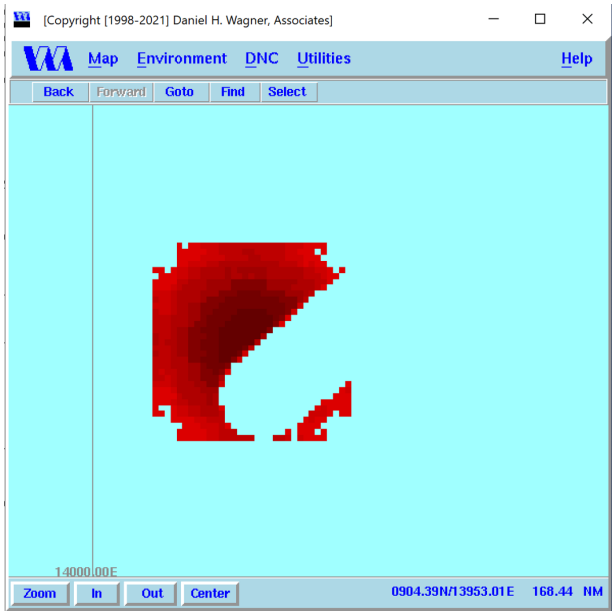
Other transition opportunities:
Integrated Undersea Surveillance System (IUSS)

Undersea Warfare Decision Support System (USW-DSS)

PEO Sub (through APB)

SQQ-89(A)V15 (through ACB)
Notes: Picture Note 1: Target of interest location including negative information from search.
Picture Note 2: Target is most likely to be located in darker red areas.



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WHAT

Operational Need and Improvement: No systems exist that automatically estimate target location as accurately as possible, and make optimal joint use of scarce friendly undersea warfare (USW), surface warfare (SUW), and air warfare (AW) assets. IMPS automatically utilizes all available positive (sensor contact data), negative (lack of sensor contact data), and target tactics information when estimating target location, and uses multiobjective algorithms to jointly optimize the use of USW, SUW, and AW assets — a high priority for the Navy given the increasing capability of near-peer militaries. These services will enhance existing capabilities, also developed by Wagner Associates, for evaluating and optimizing asset allocation. These innovative tools are needed by the fleet and are mission critical.

Specifications Required: Need to estimate target location as accurately as possible, and make optimal use of scarce friendly undersea warfare (USW), surface warfare (SUW), and air warfare (AW) assets.

Technology Developed: IMPS provides target location estimation and mission effectiveness evaluation and optimization services, based on artificial intelligence (AI) and machine learning (ML) algorithms, that: (1) fully utilize the best available environmental data, (2) effectively support U.S. Navy undersea warfare (USW), surface warfare (SUW), and Air Warfare (AW) planners/operators, and (3) significantly improve command and control (C2), planning, and execution systems.

Warfighter Value: The expected benefits of IMPS are to: (1) increase the effectiveness of U.S. Navy undersea warfare (USW), surface warfare (SUW), and Air Warfare (AW) operations, and (2) reduce USW, SUW, and AW planner/operator time on task.

WHEN

Contract Number: N68335-21-C-0073 **Ending on:** May 13, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Prototype IMPS Components	Low	Successful tests in Wagner lab	5	1st QTR FY22
Prototype IMPS Components Embedded in Wagner Search Planning System (WSPS)	Low	Successful tests in Wagner lab	6	3rd QTR FY22

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, e.g.: custom resource optimization, decision support, multi-target tracking, and data fusion. 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
IMPS is targeted for naval systems that could benefit from improved: (1) target location estimates incorporating both positive (sensor detections) and negative (lack of sensor detections) information, and (2) resource allocation algorithms

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: IMPS algorithms and methodology have potential applications to border surveillance and port/facility security.

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