

# Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2022-0408

Topic # N192-117

Acoustic Counter-Detection Risk Management (ACDRM) Evolutionary Machine Learning (EML)  
Daniel H. Wagner Associates, Incorporated

## WHO

**SYSCOM:** NAVSEA

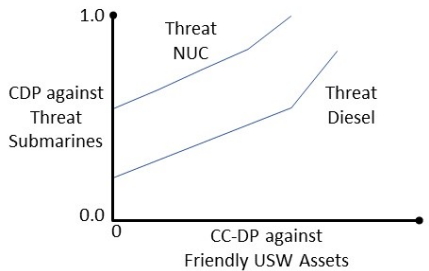
**Sponsoring Program:** NAVSEA IWS 5

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

**TPOC:** (301) 227-5218

**Other Transition Opportunities:** USW-DSS Foreign Military Sales (FMS) and Aircraft Carrier-Tactical Support Center (CV-TSC)  
DDG/CG/FFG (through ACB)  
PEO Sub (through APB)  
MH-60R Acoustic Mission Planner (AMP)

**Notes:** Pareto Optimal Front (POF) for Friendly Cumulative Detection Probability (CDP) versus Threat Cumulative Counter-Detection Probability (CC-DP)



## WHAT

**Operational Need and Improvement:** Improved planning tools that mitigate threat counter-detection capabilities when friendly assets are searching, screening, or maintaining a barrier (with or without acoustic advantage), and when friendly assets are transiting or patrolling are needed considering the increasing numbers of near-peer ASW threats. These tools will enhance existing capabilities, also developed by Wagner Associates, for evaluating and optimizing theater level USW planning and execution. These innovative tools will assist the fleet in mission success with balanced risk.

**Specifications Required:** Mitigation of threat counter-detection capabilities when friendly assets are searching, screening, or maintaining a barrier (with or without acoustic advantage), and when friendly assets are transiting or patrolling.

**Technology Developed:** Acoustic Counter-Detection Risk Management (ACDRM) Evolutionary Machine Learning (EML) will provide innovative algorithms, concepts, and planning tools that mitigate threat counter-detection capabilities when friendly assets are searching, screening, or maintaining a barrier (with or without acoustic advantage), and when friendly assets are transiting or patrolling.

**Warfighter Value:** (1) Reduced risk to friendly USW assets by reducing probability of counter-detection and successful attack by threat units, (2) Improved search effectiveness by accounting for threat sensor capabilities and evasion tactics, and (3) Reduced operator time-on-task.

## WHEN

**Contract Number:** N68335-21-C-0121

**Ending on:** Feb 05, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Prototype ACDRM Components	Low	Successful tests in Wagner lab	5	4th QTR FY22
Prototype ACDRM System	Low	Successful tests in Wagner lab	6	2nd QTR FY23
Full Scale Prototype ACDRM System	Low	Successful demonstration in USW-DSS DevSecOps cloud testbed	6	4th QTR FY23
ACDRM Seminal Transition Event	Low	Successful transition into USW-DSS	7	4th QTR FY24

## 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 components for evaluating and optimizing mine countermeasures (MCM) operations and estimating risk in MINEnet Tactical module within Mine Warfare and Environmental Decision Aids Library (MEDAL)
- 4) Net-Centric Data Fusion (NCDF) for USW-DSS
- 5) Data Fusion Engine (DFEN) in USW-DSS

ACDRM is targeted for direct integration into USW-DSS, although additional transition opportunities include other naval systems that could benefit from ACDRM technology and software components, and other defense applications with intelligent adversaries, such as Marine Corps, Army, and Air Force mission planning.

**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:** ACDRM algorithms and methodology have potential applications to non-defense environments with intelligent adversaries, such as border surveillance and port/facility security.

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