Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2019-0537

Topic # N171-044

Cognitive Software Algorithms Techniques for Electronic Warfare

Research Associates of Syracuse

WHO

SYSCOM: NAVSEA

Sponsoring Program: PEO IWS 2.0 Above Water Sensors

Transition Target: AN/SLQ-32 Surface Electronic Warfare Improvement Program (SEWIP) Block 2 and Block 3

TPOC:
(812)854-6217

Other transition opportunities: Signal classification applications for communications and other electronic warfare (EW) systems

Notes: Improved protection of surface ships against modern threats is the primary objective for the Cognitive Reasoner for Electronic Warfare Systems (CREWS) under development by Research Associates of Syracuse (RAS).

Photo courtesy of U.S. Navy, 190525-N-ZM949-1335.JPG

WHAT

Operational Need and Improvement: Modern threat radars employ increasingly more agile transmitted waveforms to defeat electronic warfare (EW) systems. Quick detection and recognition of such highly agile and dynamic threat signals via classification in terms of functional characteristics enables assessment of threat mission, intent, and threat mode as required.

Specifications Required: Processing techniques are realized as platform-independent algorithms. Processing speed and classification accuracy represent key performance metrics to be optimized.

Technology Developed: Artificial Intelligence (AI) and Machine Learning (ML) signal processing techniques are developed within the CREWS hybrid reasoning environment to quickly classify complex, highly agile threat waveforms based on functional characteristics learned from the observed, possibly incomplete, signal data.

Warfighter Value: The capability to detect, classify, and counter newly exhibited threat radar waveforms in the absence of a priori threat library information.

WHEN

Contract Number: N68335-19-C-0186 **Ending on:** December 10, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstrate Machine Learning (ML) classifier feasibility for meaningful labels with limited radar data set	N/A	Accurate performance by ML classifiers	3	February 2019
Base prototype demonstration with more extensive real and synthesized radar data set	Low	Accurate performance by ML classifiers	4	November 2019
If Option 1 is exercised, advanced CREWS prototype demonstration with real and synthesized threat data	Med	Accurate performance by ML classifiers and correct inference of threat function/mode/intent by hybrid reasoner	5	November 2020
If Option 2 is exercised, final CREWS prototype demonstration with SEWIP test system or test data	Med	Accurate performance by ML classifiers and correct inference of threat function/mode/intent by hybrid reasoner	5/6	November 2021

HOW

Projected Business Model: RAS is actively interested in industry, military, and government partners to advance and transition CREWS cognitive EW technology. The sale or licensing of RAS software modules to the Navy and prime contractors for integration and production is also a consideration.

Company Objectives: Develop and apply advanced cognitive algorithms. Continue as a small business technology leader for solving EW signal processing challenges posed by stressing modern and emerging threat environments.

Potential Commercial Applications: Other surface, submarine, and airborne EW systems. Communications signals analysis, characterization, and classification.

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