

Topic: N111-041

Adaptive Methods

Strike Group Active Sonar Exploitation

Adaptive Methods' multi-static sonar processing increases sonar systems probability of detection and overall detection, classification, and localization (DCL) effectiveness. This multi-static capability is unique in that it does not require communications between the active source and receiver. The capability can operate without source-receiver communications or prior knowledge of the transmission scheme. Laboratory prototypes demonstrate effectiveness of multi-static algorithms using recorded data. The initial capability is targeted for integration into the AN/SQQ-89 Combat System on Cruisers and Destroyers. This capability can allow Navy forces to minimize active emissions to protect marine species or avoid active interference.

Technology Category Alignment:

None

None

None

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SYSCOM: NAVSEA

Contract: N00024-16-C-4044

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00024-16-C-4044

Department of the Navy SBIR/STTR Transition Program

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L3 Adaptive Methods

WHO

SYSCOM: NAVSEA

Sponsoring Program: Program Executive Office Integrated Warfare System: Undersea Systems (PEO-IWS 5.0)

Transition Target: AN/SQQ-89 Undersea Warfare Combat System

TPOC:
(202)781-4233

Other transition opportunities: All active and passive sonar systems

- Submarines
- Integrated Undersea Surveillance System (IUSS)
- Air Antisubmarine Warfare (ASW)
- Unmanned underwater vehicles (UUV)



Courtesy U.S. Navy

WHAT

Operational Need and Improvement: Surface strike groups equipped with the AN/SQQ-89 Integrated Undersea Warfare (USW) Combat System operate in an environment where multiple ships are operating their active sonar systems. The ability to leverage the active emissions produced by surrounding forces can provide increased detection opportunities that multi-static active sonar processing can provide. The ability of ships within the strike group to process active emissions from surrounding forces can also allow a strike group to reduce the number of ships emitting. This has the potential to reduce the environmental impact of active sonar employments.

Specifications Required: Adaptive Methods' technology requires knowledge of the applicable active sonar processing chain to adapt their technology to permit multi-static detection and localization.

Technology Developed: While multi-static theory is well-understood, Adaptive Methods has developed technology that allows multi-static processing to occur without a need for communication between ships. Critical parameters can be estimated directly from the received transmissions of other ships.

Warfighter Value: This technology can enable warfighters in a strike group to detect submarines even when active sonar interference avoidance plans (ASIAP) require reduced flexibility to use the entire frequency range available to a lone ship. This technology also allows a group of ships to complete their training or mission with fewer active emissions, conserving the budget of active emissions permitted, a limited resource that must be reported on a daily basis. Finally, a warfighter can now gain additional target detections directly from the acoustic environment without a need to rely on communications from surrounding forces, potentially reducing the detect to engage timeline.

WHEN

Contract Number: N00024-16-C-4044 **Ending on:** March 5, 2018

Milestone	Risk Level	Measure of Success	Ending TRL	Date
SP (Signal Processing) & IP (Information Processing) Integration	Low	Detection & localization based on both SP & IP	6	February 2018
SP & IP Optimization	Med	Demonstrate improved detection and localization accuracy	6	February 2019
Integrate initial features into ACB	Med	Demonstrate initial capability	6	September 2020
Final Integration into ACB	Med	Demonstrate operational capability	7	September 2022

HOW

Projected Business Model: The initial capability is targeted for integration into the AN/SQQ-89 system through the Advanced Capability Build (ACB) program. Adaptive Methods will collaborate with the Navy, the Active Working Group, and other contractors to develop the best possible implementation. The capability will subsequently be offered to other sonar programs, including submarine, surveillance, and unmanned systems.

Company Objectives: Adaptive Methods hopes to integrate this technology in appropriate active systems that receive echoes from other comparable systems. There are no significant technical barriers to adoption by US forces.

Potential Commercial Applications: Acoustic sonar systems in the commercial realm could benefit from this multi-static technology to reduce the impact of active emissions on marine species. Potential commercial capabilities include port security and oceanographic survey. Collaborative fish-finding sonar within a group of fishing boats is also technically feasible, and can leverage capabilities derived from this effort.

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