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SBIR INVESTMENT: \$3,732,342

PHASE III FUNDING: \$110,702,016

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY



SURFACE SHIP UNDERSEA WARFARE (USW) SONAR DATA FUSION

Adaptive Methods leveraged its sensor processing and sonar expertise to help create clearer and more concise tactical pictures in the USW environment.

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THE CHALLENGE

Creating an integrated picture of the tactical environment is a necessity in the undersea environment. Sonar analysts must combine information coming in from various data sources, therefore reliable data fusion processes are essential to manage operator workload. Fusing active and passive sensor data from the hull-mounted array, towed array, and sonobuoys, with new data sources is essential in order to realize the full potential of future undersea warfare sensors.

THE TECHNOLOGY

Adaptive Methods, through the SBIR program, developed a multi-sensor, multi-target automatic feature detection, tracking and data fusion processing and display system. The system processes contact measurements from multiple sonar and radar sensors and produces an integrated real-time geographical picture of the multi-contact USW environment, optimizing sonar operator tactical situation awareness. The company also developed advanced concepts for hull array beamforming that significantly contributed to improved sensor performance, contributing to the overall goal of a clearer tactical picture.

THE TRANSITION

This SBIR technology transitioned via a Phase III (RIF) contract from NAVSEA's PEO IWS 5 for development, integration, test and delivery of integrated AN/SQQ-89A(V)15 combat system software and also for system integration and qualification test support, and element certification. Navy transition targets include surface ship USW combat systems and anti-submarine warfare (ASW) programs that employ multiple sensors and/or active/passive processing functions. This technology provides a full range of USW functions including active and passive sensors, underwater fire control, the onboard trainer, and a highly evolved display subsystem. In tandem, another Phase III SBIR contract was awarded, "Tactical Sonar Data Fusion", which included engineering services to develop and integrate improved algorithms into the USW Decision Support System (USW-DSS).

THE NAVAL BENEFIT

Advanced data fusion algorithms increase probability of target detection, reduce kinematic and signal classification uncertainty, and reduce false alarm rates. Benefits include reduced operator workload, better reporting timeliness, and higher quality reports. Reliable data fusion processing is an undeniable advantage, especially when USW operator workstations and watch team manning is limited.

THE FUTURE

The capability to integrate new sensors and modalities is advantageous across Navy platforms since future systems require fusion of collaborating sonar, radar, and multi-modal sensor contact measurements to produce an integrated real-time common picture of the USW environment. This technology provides a drill-down graphical user interface that supports the display of individual and fused data sources while providing a real-time processing infrastructure to acquire newly defined sensor data from an operational USW combat system, robust sensor registration, fusion, multi-sensor tracking, and threat assessment technologies. Potential civil and commercial markets for mixed modality data fusion include air traffic control, radar, geoscience remote sensing, satellite sensing, and medical imaging applications.

"TO REALIZE THE FULL POTENTIAL OF FUTURE UNDERSEA WARFARE SENSORS, SONAR DATA FUSION TECHNOLOGY LIKE THIS SBIR-SPONSORED EFFORT, ENABLES THE SONAR ANALYST TO EFFICIENTLY MANAGE A HUGE INCREASE IN INFORMATION. "

Meg Stout

Science and Technology Director

Naval Sea Systems Command/NAVSEA HQ/PEO-IWS5A/SQQ-89