Department of the Navy SBIR/STTR Transition Program

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NAVSEA #17-527

Topic # N121-055

Affordable Scalable Acoustic Panel Arrays
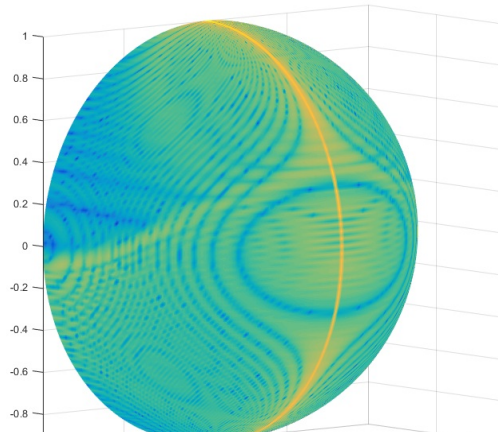
ASSETT, Incorporated

WHO

SYSCOM: NAVSEA

Sponsoring Program: Submarine Acoustic Systems Program Office (PMS 401)

Transition Target: Navy Columbia Class (Ohio Replacement) Ballistic Missile Submarine (SSBN[X])

TPOC:
(202)781-3562

Other transition opportunities: Possible transition opportunities include: NAVAIR Anti-Submarine Warfare (ASW) Sonobouys, NAVAIR Acoustics and Signal Processing Lab, future non-planar arrays.

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WHAT

Operational Need and Improvement: Cost-effective acoustic sensor array and process improvements and improved sonar target detection and localization, provide a strategic acoustic advantage, enabling the US Navy capability to project power from the sea. ASSETT, Inc.'s Acoustic Array Assessment Tool (A4T) employs reverse far-field processing (RFFP) to provide the ability to accurately simulate the impacts of the real ocean environment, on candidate array designs. A4T enables array design optimization/trade-off analysis prior to prototype implementation and sea trial experimentation. To address monitoring, maintenance and repair costs, A4T through multi-dimensional interpolation, provides the ability to model virtual sensors that replace failed sensors, reducing or eliminating the need to dry-dock and replace failed array components. A4T provides the Navy the ability to fully measure and test a sonar system's performance prior to developing an engineering development model (EDM) or performing sea trials.

Specifications Required: An advanced high performance computing environment is required to host the A4T toolset.

Technology Developed: The development of the ASSETT Acoustic Array Assessment Tool has yielded significant improvements in methods to simulate correlated ocean noise, created new visualization techniques for 3 dimensional beam-patterns and volumetric data; it has made vast improvements in computational efficiency leveraging general-purpose computing on graphics processing units (GPU); innovative scenario generation gives the customer the capability to create synthetic contacts; A4T also allows the customer to perform dockside testing, training, and evaluation.

Warfighter Value: A4T allows the Navy to evaluate performance of an array before field test and evaluation, saving significant amounts of time and money. The value to the warfighter lies in the ability to find problems sooner, and the reduced time and money it costs to test at sea. New array evaluation processes and sea trials are costly and time consuming. A4T's value is realized in the lab where months of tests and millions of dollars of expenditures are reduced by orders of magnitude.

WHEN

Contract Number: N00024-16-C-4534   **Ending on:** March 21, 2018

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Protoype validation in Lab	Med	Software interfaces with end user hardware and performs to specifications	TRL-5	November 2017
Prototype adapted for use on wider ranger of arrays	Med	Software environment functions to support arrays of nearly any size and most curvatures	TRL-7	April 2018

HOW

Projected Business Model: ASSETT plans to leverage A4T to support the design, development, and optimization of an open systems scalable acoustic panel array architecture for the Ohio Replacement Program and Virginia Class submarines. A4T's requisite capabilities support the creation of production design packages for acoustic array panels that demonstrate compliance to performance requirements, functionality, and manufacturability in an engineering development model.

Company Objectives: Sonar performance is highly dependent on the performance and positional accuracy of its acoustic sensors. Today"s arrays are populated with sensors built to strict tolerances to minimize channel to channel differences and precision mounted to enable the exact location, speed, direction of motion, and classification of a contact. Knowing the precise location of each sensor and its performance characteristics is key to sonar performance. The lack of precision or performance within a tolerance range can result in severely degraded performance. Once the platform is deployed, mechanical stress, hull dynamics, pressure loading variations, element electronics variability, and element failures all tend to degrade performance. Manual replacement, re-calibration, and installation of array sensors due to failure or degradation involves significant cost. ASSETT's objective is to provide a total system solution that models both sensor technology and mounting requirements as well as the application of signal processing to allow for a wider tolerance in the sensor performance while maintaining or increasing system performance. ASSETT is targeting a generalized design fully capable of creating engineering development models and supporting in-service evaluation across the complete spectrum of currently deployed and future acoustic array configurations.

Potential Commercial Applications: A4T can be applied commercially through training program tools, as well as the delivery of enhanced performance across the acoustic sensor community.

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