

NAVY Transition Assistance Program

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NEED & CUSTOMER REQUIREMENT

Need: Underwater acoustic sensing capability for use in a deep water surveillance array to detect and track submerged threat adversaries located in relatively shallow water.

Value to the Warfighter: Early detection of submerged threat adversaries prior to engagement by tactical platforms (i.e., surface ships, submarines, etc.)

Operational Gap: This new sensing system concept is in its second development step. APS developed the first-generation sensor, which was a relatively large vector sensor in an array that was deployed over the side of a ship for use in large-scale proof-of-concept experiment. The new device has a substantially reduced form factor relative to its predecessor, yet meets all of the same performance requirements.

Customer Specifications: The device must be sufficiently small so that a small number of them can be packaged inside a Mk. 46 torpedo or a C-Size sonobuoy form factor. Submergence depth rating of at least 6 km and ultra-low electronic noise floor.

Technology Description: The device measures the acoustic pressure and three orthogonal components of the acoustic pressure-gradient at a single point. It contains a pressure hydrophone, triaxial pressure-gradient hydrophone, and an electronics housing contained within a metal frame. Key to the design is the use of single crystal piezoelectric accelerometers coupled with a ultra-low noise preamplifier by the pressure gradient hydrophone. This has enabled a volume reduction of about 30X relative to the first-generation device.

TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Design vector sensor with reduced form factor	3	Moderate	Work shows form factor reductions of at least a factor of ten are possible	1/2009
Validate vector sensor design with prototype test	5	High	Sensor meets submergence depth and noise floor specification	3/2010
Perform field test on vector sensor array	6	High	Array meets performance objectives	9/2011
Develop and demonstrate packaging, deployment, signal processing, and telemetry concept for array	7	High	Successful deployment and operation of array in realistic environment	9/2012
Qualify entire surveillance system during a field test	8	High	Surveillance system meets performance objectives	9/2014

Open contract: N00014-09-C-0175 ending March 31, 2010

N07-070 - Applied Physical Sciences Corp.

Vector Sensors for Reliable Acoustic Path Applications

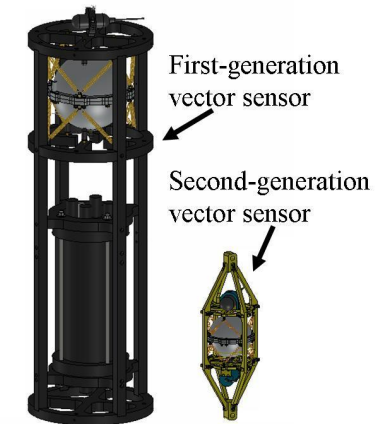
SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: ONR SBIR

Transition Target: Reliable Acoustic Path Vertical Line Array

Original Sponsoring Program: NAVSEA PEO-IWS-5 and PMS485

TPOC Phone Number: 703-696-4112



TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications:

Geophysical prospecting, seismic sensing, coastal security, air-deployed sonobuoys

Business Model:

Device production and teaming with a DoD prime contractor/ large-scale systems integrator.

Objective:

Business relationships between LMCO and GD-AIS are already in place under separate, but related work funded in connection with NAVSEA PEO-IWS-5. APS plans to work with these business entities to transition the SBIR technology to a fully integrated surveillance system.