

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-848

Topic # N181-012

Low Cost Persistent Environmental Measurement System

MRV Systems, LLC

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-264, Air Anti-Submarine Warfare Systems

Transition Target: The ALAMO-2 is intended as a payload for any type of aircraft launching sonobuoys including Maritime Patrol & Reconnaissance Aircraft and H-60 Multi-Mission Helicopters.

TPOC:
(301)342-2034

Other transition opportunities: Other groups are interested in the ALAMO platform for various purposes, including use as an air-launched expendable tide-gauge (NAVOCEANO NP22).

Notes: Buoyancy-driven profilers are already in wide use by NAVOCEANO and the scientific community for monitoring physical ocean properties. This project adds specific sensors for the ASW community and adapts this particular MRV profiling platform to aircraft that use pressurized Sonobuoy Launch Canister systems.



Photo of current ALAMO floats with parachute & sensors inside cardboard at top, plus inset of ALAMO-2 design model. (Copyright 2020, MRV Systems, LLC)

WHAT

Operational Need and Improvement: An air-certified, A-sized, persistent environmental monitoring device with the ability to continuously measure multiple ocean properties from surface to 1500 feet for several months will fill a capability gap that exists beyond the relatively short-duration sonobuoys in use today. Designed for launch specifically from Sonobuoy Launch Canister systems, this version of the MRV Systems ALAMO-2 will meet both current and future Navy needs. Understanding the ocean environment as it evolves over time, whether as a basis for subsequent direct observations (e.g., LIDAR imaging, active acoustics), or for improving predictive battle-space preparation, is a high priority.

Specifications Required: The overall system must include an optical diffuse attenuation coefficient sensor, an acoustic ambient noise sensor system, and temperature, pressure, and salinity sensors. It must telemeter data ashore and accept mission modifications via Iridium satellite, and persist in the environment for weeks to months.

Technology Developed: The existing MRV Systems ALAMO is enhanced by multiple improvements for modularity and ease of launch, and the addition of two new sensor systems. Additional design considerations were incorporated for increased production rate.

Warfighter Value: The power of ALAMO-2 for the warfighter is providing tactically important measurements (sound velocity profiles, optical properties, and ambient acoustic noise) in areas of interest for weeks or months at low cost. With only one or two flights a month, data density will increase enormously over the current single-profile snapshots, and the increase in tactical value will be as dramatic.

WHEN

Contract Number: N68335-20-C-0078 **Ending on:** November 18, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Mechanical Redesign of existing ALAMO	Low	Critical design and assembly review.	7	July 2020
Revision of CPU and communication electronics	Low	Board designs complete and submitted to fabrication house.	7	August 2020
Integration of optical and acoustic sensor systems	Med	Optical and acoustic sensors can collect valid data.	7	November 2020
Software enhancements for additional sensor integration	Med	Working software delivered on prototype hardware.	7	October 2020
In-situ field testing with fully-functional floats.	Low	Completion of tests, data returned.	7	February 2021
Final Report and 4 prototypes complete & delivered.	Med	Report submitted and prototypes delivered to NAVAIR.	7	November 2021

HOW

Projected Business Model: In follow-on Phase-II.5 SBIR, support air certification for ALAMO-2 and demonstrate operations from appropriate Navy aircraft. Become a standard air-launched environmental measurement device. Adapt modular sensor section to emerging Navy needs. Scale manufacturing to meet Navy needs, and identify a partner for large-scale orders.

Company Objectives: Produce oceanographic sensing systems that are high-quality, low-cost, energy-efficient, long-lasting, and useful to the Navy and broader scientific community. Design and manufacture a full-range of buoyancy-driven profilers to meet a variety of customer requirements and mission profiles. Be the preferred provider for buoyancy-driven profilers for the U.S. Navy.

Potential Commercial Applications: Ocean environmental monitoring in all regions, particularly those where air-deployment is the only feasible option. The ALAMO-2 will be particularly useful in marine protected zones, open-ocean commercial fisheries, and for hazardous weather forecasting (e.g., hurricanes, typhoons, etc.). The addition of acoustic ambient noise measurements will be useful in the offshore industry where monitoring of man-made noise is increasingly required.

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