

Topic: N182-097

Guide Star Engineering, LLC

Low-Cost Approach for Improved Performance of the Upper Section of the Directional Frequency Analysis and Recording Sonobuoy

This project integrates improvements in five major sonobuoy components leading to improved detection capability and increased reliability at lower cost and weight: a smaller, quieter gas generator, adaptable RF comms link, printable antenna technology, greater capacity data link and increased reliability deployment system. GSE experts have over 100 years of combined experience in acoustics, optics and modeling and simulation for remote sensor systems. The programs this technology is targeting include air launched sonobuoys but apply to remote sensor systems based on land, sea, air or space. As GSE focuses on agile innovation we adapt commercial components and teamed with a large system integrator, eliminating production risk. We are looking for additional customers for our SDR and printable antenna technology.

Technology Category Alignment:

Sensors

Advanced Electronics

Command, Control, Communications, Computers, & Intelligence (C4I)

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SYSCOM: NAVAIR

Contract: N68335-20-C-0255

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-20-C-0255

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-860

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Ultra Compact DIFAR Upper
Guide Star Engineering, LLC

WHO

SYSCOM: NAVAIR

Sponsoring Program: PEO(A), PMA-264

Transition Target: PMA-264

TPOC:
(301)342-2116

Other transition opportunities:

Department of Energy (DOE)
US Air Force
US Army
NASA
NNSA

Notes: Next generation sonobuoys will be smart, adaptable, and optimized for more advanced sensors, acoustic and non-acoustic advanced in-buoy processing, and high reliability connectivity



<https://www.nrl.navy.mil/itd/aic/content/human-mimetic-active-sonar-classification>

WHAT

Operational Need and Improvement: The Extended Range DIFAR program describes the baseline for new sonobuoys with greater operational capability that is facilitated by more sensors and in-buoy processing. The new sonobuoys will include more sensors in number, type and capability, including acoustic and non-acoustic modules. This SBIR provides the basic architecture for including the new hardware in the same overall A-size sonobuoy volume by reducing the size of specific non-sensor components and subsystems and making room for the new sensors.

Specifications Required: Reduction of >25% in size weight and power SWaP; 3x improvement in data communications bandwidth; >10x improvement in internal data handling in the buoy

Technology Developed: Miniature software defined radio for high performance high bandwidth RF data link; Light weight fiber optic system for high speed, high bandwidth sensors; Zero-tension suspension for multi-drop sensor modules; Reduced size float assembly; Solid state gas generator system for smaller size, reduced noise, greater flexibility and safety; New sonobuoy production plan

Warfighter Value: The warfighter will realize significantly improved probability of gaining attack criteria in the same amount of time onstation. The new sonobuoys provide acoustic and non-acoustic information that current buoys are incapable of. That is, the new buoy from this SBIR is capable of producing data that can be fused and processed in such a manner that gives a completely new and expanded picture of the tactical environment.

WHEN

Contract Number: N68335-20-C-0255 **Ending on:** December 4, 2020

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Solid-state inflator	Low	Low noise, fast inflation, scalable	5	December 2020
Lightweight float	Low	Ultra compact stowed size and lightweight	5	December 2020
High-performance RF communications	Med	3x data throughput using existing spectrum, Easily modified waveforms	5	December 2020
Zero-tension fiber optic suspension	Low	Highly reliable fiber optic deployment	5	December 2020
High-data rate fiber optic module for sensors	Low	Greater than 1Mbps intra-buoy communications	5	December 2020

HOW

Projected Business Model: Our business model is to establish a royalties agreement for specific IP from major sonobuoy manufacturer.

Company Objectives: Our immediate objective is a production sonobuoy prototype at the completion of the Phase II. In the long run GSE seeks to be an innovator of sonobuoy technology. Our objective is to continue to support a major sonobuoy manufacturer with R&D. We feel that the model of a nimble small high tech business that is able to innovate quickly means rapidly transitioning cutting edge technology to the Navy; 1. future generation sonobuoys will benefit from reduced SWaP + Cost as the commercial world makes advances in sensors and communications technology, 2. gives the major manufacturer the ability to focus on optimizing large scale production that adapts to changes in tactical and strategic needs of the Navy.

Potential Commercial Applications: Innovations from the technologies include a wide range of remote sensors and sensor platforms:

DHS: Ocean monitoring systems that will be deployed at sea and from UAS

NNSA, Sandia National Labs: Hi-altitude balloons that need to incorporate towed/deployed sensor arrays

NASA: Extraplanetary exploration systems will use lighter than air craft to perform geophysics experiments with sensors that will be towed or deployed

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