

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2021-0400

Topic # N191-023

Efficient 3-inch Acoustic Device Countermeasure (ADC) Depth Control System

Technology

Great Lakes Sound & Vibration, Inc.

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 415, Undersea Defensive Warfare Systems Program Office

Transition Target: MK2 Acoustic Device Countermeasures (ADC)

TPOC:
(401)832-3838

Other transition opportunities: The MK3 and MK4 are other potential Navy applications. In addition small UUVs, acoustic decoys, and sonobuoys are other promising applications.

Notes: Our manufacturing plant is currently in production on several product lines for the US Navy LCS; the Multi-Mission Surface Combatant ship; the Joint Light Tactical Vehicle; and the Stryker armored vehicle, among others.



<https://media.defense.gov/2021/Mar/01/2002590804/-1/-1/0/190301-N-KC128-0072.JPG>

WHAT

Operational Need and Improvement: Current 3-inch Mk 2 devices utilize an electric motor and a small, ducted propeller for depth control. The motor runs off the existing Eagle-Picher lithium aluminum/iron disulfide (LiAl/FeS₂) thermal battery (EAP-12189), which also provides power to the acoustics of the device. Improved acoustic performance in terms of increased duration and increased acoustic sound pressure levels is needed to counter ever-improving adversarial torpedoes. Reducing, or eliminating, the need for the depth control system to require power from the battery would leave increased power for enhancement of the acoustic output or duration of the device. Available power for the depth control varies depending on the launch depth and the acoustic mode.

Specifications Required: The technical challenge in designing the selectable depth control system is fitting it within the existing volume of approximately 70 inch squared and making it robust enough to survive and operate following exposure to accelerations and forces experienced by the device when it gets launched out of the internal countermeasure launcher aboard all current U.S. Navy submarines, at potentially all submarine operational depths. The maximum Peak Device Acceleration (G's) that could be encountered is approximately 1/2 SINE Wave 120 g's for 30ms, and the maximum Hull Exit Velocity is 105 fps. By fitting it into the existing volume and surviving launch transients, the system could be utilized for both current and future devices.

Technology Developed: GLSV has developed a more efficient depth control system that conserves battery power for increased acoustic performance and/or operational range, is autonomous, and allows depth settings to be programmed prior to launch.

Warfighter Value: An efficient depth control mechanism capable of being implemented into both existing and future 3-inch diameter Acoustic Device Countermeasures (ADC) would allow for increased amount of power for improved (i.e., greater source level and/or longer duration) acoustic performance.

WHEN

Contract Number: N68335-21-C-0033 **Ending on:** January 20, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Initial Prototype Build and Hydrodynamic Pressure and Shallow Water Controllability Testing	Low	Device ability to maintain target depth and maintain sealing during pressure testing	5	December 2021
Prototype Full Launch, Acoustic Directivity and Max Depth Testing (if Option I exercised)	Med	Device survivability and ability to maintain target depth	6	December 2022
Build and Delivery of 5 units to the Navy for Qualification Testing (if Option II exercised)	Med	Device delivery and successful qualification	7	December 2023

HOW

Projected Business Model: GLSV Inc. is a small business established in 1996 to offer engineering services with a focus on noise and vibration. GLSV has since expanded our capabilities to offer complete turnkey solutions as a full-service engineering and manufacturing company with a strong background in defense, marine, automotive, off-highway, and recreational markets.

Our experience includes structural design and analysis of a launch handling and recovery crane, stern door and ramp design and analysis, and design and analysis of shipboard components to meet MIL-S901D shock requirements. GLSV performs preliminary concept design, prototype development, detailed design and analysis, integration, validation testing, and manufacturing services.

Currently our plan is to sell our technology to the prime contractor who produces and supplies the MK2 countermeasure to the Navy. They have committed to supporting us and we currently have them under subcontract to provide us with representative components that will go into our prototypes.

Company Objectives: GLSV would like to meet with those involved with NOAA and other ocean-monitoring deployed sensors in addition to Undersea Defensive Warfare Systems Program Office (PMS 415), Anti-Submarine Warfare Systems Program (PMA-264), Unmanned Maritime Systems Program Office (PMS 406), and other Navy program offices that may be able to utilize this technology.

Potential Commercial Applications: An example of a dual-use commercial application would be the launch of environmental measurement devices utilizing the efficient depth control system from Autonomous Undersea Vehicles (AUVs), or ships of opportunity, given the volume optimization of the launch mechanism.

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