Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2020-0354

Topic # N181-039

Common Unmanned Underwater Vehicle (UUV) Stern Launch and Recovery System

Great Lakes Sound & Vibration, Inc.

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 420, LCS Mission Modules Program Office

Transition Target: Launch and Recovery (L&R) device that can accommodate a variety of Unmanned Underwater Vehicles (UUVs) when installed aboard Littoral Combat Ship (LCS)

TPOC:
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Photo courtesy of U.S. Navy, 190903-N-NL576-006

Other transition opportunities: The L&R device is not limited to the LCS ship class as it can be installed on any ship class with a well deck or crane capable of deploying and retrieving the recovery device. Other platforms include the Expeditionary Transfer Docks (ESD) / Expeditionary Sea Base (ESB)(PMS 385), America class Amphibious Assault Ship (LHA (R))(PMS 377), and San Antonio class Amphibious Transport Dock (PMS 317).

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. GLSV would manufacture in-house our UUV L&R device for small and medium production volumes, and sell it directly to the US Navy or to the applicable LCS shipbuilders. An alternative, secondary approach is to license our solution to a large DoD prime for manufacturing of higher production volumes, if required.

WHAT

Operational Need and Improvement: The Navy is looking for a common solution to launch and recover a variety of UUVs from large to small, and that can operate from near the waterline (Freedom variant Littoral Combat Ship (LCS)) to high above the waterline (Independence variant LCS). The Navy needs a system for launching and recovering UUVs that are of a variety of sizes, weights, and shapes from a variety of ship platforms and waterline heights. Both variants of the LCS as well as the Expeditionary Fast Transport (EPF) ship utilize stern launch and recovery of watercraft, versus using a moon pool or side mounted launch and recovery system.

Specifications Required: The Navy has an objective to launch and recover UUVs in sea states through sea state 3 in accordance with STANAG 4194:1983. Supported platforms potentially could have a freeboard anywhere from near the waterline to as high as 15' above the waterline. The L&R device will also need to avoid damaging sensitive areas on the UUVs.

Technology Developed: The GLSV team has developed a modular, adaptable L&R system that is capable of fast-tempo L&R of various UUVs from various ship classes in sea states through sea state 3. The L&R device is deployed or recovered from a well deck or crane and remotely maneuvered for UUV L&R. The recovery device is equipped with a electronic propulsion system and a vision system for the operator to successfully retrieve the various UUVs remotely. A 1/4 scale model has been successfully testing in a wave tank and open water conditions.

Warfighter Value: With a common, modular L&R device, the Navy will benefit from reduced life cycle costs by having multiple ships perform multiple functions and also a cost savings due to standardization of a system. The common L&R device can also be used to improve any logistical challenges by providing a solution for high-tempo L&R of a wide range of UUVs.

WHEN

Contract Number: N68335-19-C-0623 **Ending on:** July 16, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Scale Model Prototype Build and Testing.	Med	Testing of scale model prototype in wave tank to verify design concept.	4	March 2020
Dynamic Simulation Modeling	Med	Conducting multi-domain dynamic simulation modeling to demonstrate feasibility	4	July 2020
Controls Development and Testing	Med	Testing the remote control system using a full scale surrogate L&R device in a relevant environment	5	October 2020
Build and test of simplified Full Scale Prototype	Med	Testing a full scale model to verify sub-systems in a relevant environment	6	July 2021
If Option exercised, Build, test, and deliver a Full Scale Prototype	Med	Field testing a full scale prototype UUV Recovery Device in an operational environment	7	July 2022

HOW

Projected Business Model: GLSV Inc. is a small business established in 1996 to provide complete turnkey solutions to solve problems for the North American defense market. GLSV is a full-service engineering and manufacturing company with a strong background in marine and naval systems, defense ground vehicles, and off-highway markets. Our experience includes structural design and analysis of a L&R crane, stern door ramp design and analysis, and development of shipboard components and subsystems to meet MIL-S-901D requirements for Navy shock. GLSV maintains a strong analytical skill set complemented by our practical engineering know-how to develop solutions and products that we manufacture and field for US Navy and Army applications.

Company Objectives: GLSV would like to meet key customers in the Navy, as well as key stakeholders who can assist us with qualification and integration issues. GLSV would also like to meet Navy representatives from the LCS program office and other ship platforms to discuss potential applications. In addition, the National Oceanic and Atmospheric Administration (NOAA) utilize UUVs on several of their exploration ships; consequently, GLSV would like to explore opportunities with them and potentially enable them to operate said UUVs in higher Sea States.

Potential Commercial Applications: A lucrative market currently exists for at-sea launch and recovery of Autonomous/Underwater Unmanned Vehicles. Current commercial launch and recovery systems are often ship-specific and UUV/AUV-specific. Institutions such as WHOI and private industries supporting the petroleum industry all use UUVs/AUVs and conduct numerous launch and recovery operations every year. The ability to operate multiple systems from a common platform is seen as an advantage since it affords the operators flexibility of both ship design and AUV/UUV capability. There are multiple commercial markets that use UUVs and would benefit from a modular L&R device. Some of the commercial applications are offshore oil and gas, environmental monitoring, hydrography, and search and rescue.

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