# Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-5053

Topic # N202-089
Focused Enhanced Acoustic-Driver Technologies (FEAT) for Long Range Non-Lethal Hail and Warn Capabilities
Great Lakes Sound & Vibration, Inc.

## WHO

**SYSCOM:** MCSC

**Sponsoring Program:** Department of Defense Non-Lethal Weapons Program

**Transition Target:** Joint Intermediate Force Capabilities Office

**TPOC:** sbir.admin@usmc.mil

**Other Transition Opportunities:** Other government agencies, such as the Department of Justice (DoJ) and the Department of Homeland Security (DHS) including Customs and Border Patrol use acoustic hailing devices to deliver long range voice command warnings. Local civilian law enforcement uses them to support building entry, clear-a-space, and orderly evacuation.



Photo By: Petty Officer 2nd Class Huey Younger; https://jnlwp.defense.gov/Media/Multimedia/Images/igphoto/2001264079/ The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

**Notes:** In the photo at right, an acoustic hailing device (AHD) is aimed at an incoming boat during a training exercise on board an amphibious assault ship. GLSV has developed a new acoustic hailing device that offers excellent long-range performance in a package that is easy to transport, deploy and operate. GLSV's hailing device will project highly intelligible speech over 2,000 meters in adverse weather conditions and rough terrain that historically made direct communication almost impossible.

## WHAT

**Operational Need and Improvement:** The Joint Requirements Oversight Committee (JROC) has developed a priority for improved performance in the acoustic hailing realm. This comes from a 2009 Initial Capabilities Document (ICD) which identified the need for new acoustic driver technologies capable of projecting highly intelligible speech at greater distances than what is currently fielded. The Navy's Joint Non-Lethal Weapons Directorate has overseen the development of this technology. The Army and Coast Guard also provide paths forward for the integration of improved AHDs.

**Specifications Required:** The objective AHD requires a focused, enhanced acoustic driver capable of producing 123 decibels (dB) or more in a driver/horn package weighing less than three pounds. This requires stronger, lighter magnetic materials and diaphragms to reduce weight and increase reliability. The AHD shall incorporate multiple drivers and adaptive beam forming to increase the peak sound pressure level (SPL) output of the entire system. Maximum system output shall be at least 156 dBA (A-weighted). The goal of the system is to improve voice intelligibility at ranges of 2,000 meters and beyond through increased low-frequency performance. The AHD must output and focus high noise levels as low as 200 hertz (Hz) to better propagate through harsh atmospheric conditions.

**Technology Developed:** GLSV has developed an AHD that will significantly enhance the Navy's hail and warn capability. GLSV has worked with a key supplier to develop a focused, enhanced acoustic driver. This enables our hailing device to meet the requirements for intelligible speech at 2,000 meters in a portable package that is easy to transport, deploy and operate.

**Warfighter Value:** GLSV's AHD will provide our warfighters long range non-lethal hail and warn capabilities to deny access into/out of an area to individuals, move individuals through an area, suppress individuals in open and confined spaces, and stop vehicles and vessels by providing intelligible voice commands to vehicle/vessel operators. This can now all be performed in environmental conditions and distances previously prohibitive of long-range communication with a hailing device that is mobile and easy to deploy.

## WHEN

**Contract Number:** M67854-22-C-6500 **Ending on:** Jul 17, 2024

| Milestone | Risk Level | Measure of Success | Ending TRL | Date |
|---|---|---|---|---|
| Build prototype acoustic hailing device with new driver technology | Low | Acoustic hailing device completely assembled and tested in a lab environment | 4 | 1st QTR FY24 |
| Development, Performance, and Durability Testing | Medium | Demonstrate ability to meet performance objectives | 5 | 2nd QTR FY24 |
| Final design complete and low-rate manufacturing process defined | Low | Full system prototypes built and successfully demonstrated in a relevant environment | 6 | 3rd QTR FY24 |
| Full system demo in operational environment | Medium | Phase II performance requirements met | 7 | 4th QTR FY24 |

## HOW

**Projected Business Model:** GLSV is a Michigan small business established in 1996 to provide complete, customer specific solutions for sound, vibration, and shock problems in the North American defense market. We offer complete turnkey solutions from concept design through engineering, prototype development, integration, qualification, and production manufacturing. To support our position as an industry leader in providing integrated solutions in the field of noise and vibration, we maintain state-of-the-art engineering, testing, prototype fabrication, and production manufacturing capabilities. Our goal is to perform the work in-house allowing better control of results and adding as much value as possible to our solutions and then selling direct to the Government and other end customers. We have been working with several companies on driver development and manufacturing. This will be a key partnership in the production of our high performing AHD.

**Company Objectives:** GLSV would like to meet key customers in the Navy, as well as key stakeholders who can assist with the validation and qualification of the hailing device to the joint requirements for hail and warning. GLSV would also like to meet representatives from ship platforms responsible for non-lethal weapon technology development to discuss applications for our AHD.

**Potential Commercial Applications:** Potential commercial applications for portable AHD's exist in the fire brigade, law enforcement and rescue workers. They are also used in civil defense, bird control operations and campus security. A growth driving force in the AHD market will be increased use for crowd control. Non-lethal weapons are a fast-growing industry in the DoD and commercially as the technological development in directed energy, light and acoustics has made them effective enough to be the first choice in crowd control before physical force is used. A large commercial market exists for the key technology in the AHD, the acoustic driver. The focused, enhanced driver will be a high-end option for most loudspeaker applications, not just hailing devices. The high potential quantities in commercial production of the driver will help keep costs down and availability high for use in our AHD.

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