Special Notice N00014-21-S-SN12
Amendment 0004

Special Program Announcement for Office of Naval Research
Research Opportunity:
Magnetic and Acoustic Generation Next Unmanned Superconducting Sweep (MAGNUSS)

The purpose of this amendment is to extend the following deadlines:

Event	Date as of Amendment 0003	Date as of Amendment 0004	Time
Deadline for GFI Request	27 August 2021	27 August 2021	5PM EST
Recommended White Paper Submission Date	20 October 2021	20 October 2021	5PM EST
Notification of White Paper Valuation*	06 December 2021	06 December 2021	
Recommended Full Proposal Submission	12 January 2022	**26 January 2022**	5PM EST
Notification of Selection: Full Proposals*	02 February 2022	**23 February 2022**	
Awards*	20 June 2022	**15 July 2022**	

*Note: *These are approximate dates.*

I. INTRODUCTION

This announcement describes a mine countermeasure technology titled Magnetic and Acoustic Generation Next Unmanned Superconducting Sweep (MAGNUSS) Future Naval Capabilities (FNC) program under Ocean Engineering and Marine Systems (ONR Code 32, https://www.onr.navy.mil/Science-Technology/Departments/Code-32/all-programs/ocean-engineering-marine-systems). Participation in this opportunity is available under the N00014-22-S-B001, Long Range Broad Agency Announcement for Navy and Marine Corps Science and Technology which can be found at https://www.onr.navy.mil/work-with-us/funding-opportunities/announcements. The submission of white papers, proposals, their evaluation(s), and the placement of research contracts will be carried out as described in the above Long Range Broad Agency Announcement.

The purpose of this announcement is to focus attention of the scientific community on (1) the technology area to be studied, and (2) the planned timetable for the submission of white papers and full proposals.

II. TOPIC DESCRIPTION

The MAGNUSS program is an Office of Naval Research (ONR) sponsored FNC effort. The proposed topic will develop an advanced minesweeping payload technology composed of a high-temperature superconducting (HTS) magnetic source with an advanced acoustic generator for transition to the Naval Sea Systems Command (NAVSEA) program for the Mine Countermeasure Unmanned Surface Vehicle (MCM-USV). ONR plans to execute the FNC program during fiscal years 2022 – 2024. The focus of this Special Notice is on the development, fabrication, integration, and demonstration of the MAGNUSS payload on the MCM-USV.

Background:

The Navy has been transitioning the MCM mission from traditional legacy systems to the Littoral Combat Ship (LCS) as a suite of mission modules (MM). Among those MMs is the MCM-USV as a deployable system on the LCS to complete the minesweeping mission. While the MCM-USV program has been awarded by the NAVSEA program office, ONR has been developing an advanced closed-loop minesweeping system using an HTS magnet coupled with an acoustic source to generate underwater acoustic energy.

The advantage of using an HTS magnet is the ability of the HTS material to run at very-high electrical currents with near-zero resistance. The high-ampacity of the HTS magnet generates a magnetic dipole moment with suitable performance to effectively sweep magnetic influence mines when coupled to an acoustic generator. In addition to the recent advancement of HTS magnets to provide a non-towed magnetic source, there is a strong desire for a non-towed, underwater acoustic source. This is a challenge, so at a minimum, a low-drag alternative to the legacy acoustic generator still enables additional benefits to the non-towed magnetic source.

The modularity of the HTS magnet and acoustic generator has the advantage of being deployed on any craft of opportunity. The intended craft for this integration and deployment is the MCM-USV, which is the current host craft for the undersea influence mine sweeping payload. The HTS magnet and acoustic generator systems have not yet been integrated together for deployment onboard a small craft. The development of the two systems and integration of those systems with command and control for demonstration aboard the MCM-USV is the focus of this special notice.

Objective:

ONR is interested in receiving proposals on the integration of an HTS magnet and a non-towed/low-drag, underwater acoustic generator as a single payload deployable aboard the MCM-USV. The proposed system shall meet the goals of the MAGNUSS program defined in the MAGNUSS Design Requirements Annex while operating in the prescribed environments. The effort shall entail: the procurement of an HTS magnet and an acoustic generator that meet the Navy's requirements; the integration of the two systems' mechanical, electrical, and command and controls (C2) systems with each other; the integration of the complete payload with the MCM-USV and its hull, mechanical, electrical, and C2 interfaces for demonstration purposes; preliminary testing of each sub-system (HTS magnet and acoustic generator); and an at-sea demonstration of the payload (both the HTS magnet and acoustic generator sub-systems concurrently operating) on the Navy's choice of craft, with the MCM-USV as a first choice.

Approach:

ONR Code 32, in partnership with NAVSEA LCS Mission Module Program Office (PMS 420), is seeking proposals for a robust magnetic and acoustic minesweeping payload consisting of a closed-loop HTS magnet and a low-drag/non-towed acoustic generator that fits within the payload bay constraints of the MCM-USV. ONR will divide the effort into a contract Base and Options as described in the below paragraphs.

Base Contract:

During the Base period, each Offeror shall perform research, design, sub-scale test, and at-sea demonstration activities for the development of their proposed MAGNUSS solution. The main goal of the Base period is to develop a MAGNUSS Advanced Development Model (ADM) Prototype Payload to perform an at-sea demonstration aboard the MCM-USV. The prototype design shall encompass installation of software/hardware on the MCM-USV platform. It shall be operational while the MCM-USV is deployed from the host ship (LCS or other vessel of opportunity, (VOO)), while also having the ability to run certain sub-systems onboard the host ship. A demonstration of the MAGNUSS payload aboard the host ship is not required. The Base effort will include a Program Kickoff Meeting; prototype system Preliminary Design Review (PDR) Meetings, Critical Design Review (CDR) Meetings, Test Readiness Review Meetings; and an at-sea demonstration. During the Base Contract period a series of PDR and CDR events will be required for the different sub-systems (magnetic and acoustic). These may take place at the same time to satisfy the various meeting requirements. Base activity will have a

period of performance of **36** months. ONR anticipates making one (1) to three (3) awards of approximately **$12M to $20M** in value.

During the performance period of the Base effort, the Offeror shall provide the following deliverables:

- Detailed execution plan for the contract
  - CDRL Data Item No. A001
  - Data Item Description (DID): DI-MGMT-80507C
- Lab/sub-scale test results of the HTS magnet package using prototype hardware
  - CDRL Data Item No. A002
  - DID: DI-MISC-80508B
- HTS magnet hardware
- Sub-scale test results of the acoustic generator package performed at the Navy's Seneca Lake Sonar Test Facility or other suitable Navy provided test range/facility
  - CDRL Data Item No. A003
  - DID: DI-MISC-80508B
- Acoustic generator hardware
- MAGNUSS Payload -to- MCM-USV Communication and Controls (C2) hardware and software
- Demonstration of the subsystems (HTS magnet and acoustic generator) ability to concurrently operate onboard the host craft (MCM-USV)
- At-sea test results using prototype hardware
  - CDRL Data Item No. A003
  - DID: DI-MISC-80508B
- Periodic technical and financial progress reports (every 6 months)
  - CDRL Data Item No. A004
  - DID: DI-MGMT-81928
- Quarterly Program Review Meetings (may coincide with other scheduled meetings)
- Final report
  - CDRL Data Item No. A005
  - DID: DI-MISC-80711A

Task 1 – The Offeror shall procure an HTS magnet and required sub-systems that will meet the requirements set forth in the MAGNUSS Design Requirements Annex. The Offeror shall work with the HTS magnet vendor to ensure the HTS magnet system will be interoperable with the acoustic generator and the MCM-USV. In addition, the Offeror will complete a PDR, CDR, and lab/sub-scale testing on the HTS magnet system.

Task 2 – The Offeror shall procure an acoustic generator and required sub-systems that will meet the requirements set forth in the MAGNUSS Design Requirements Annex. The Offeror shall work with the acoustic generator vendor to ensure the acoustic system will be interoperable with the HTS magnet system and the MCM-USV. In addition, the Offeror will complete a PDR, CDR, and sub-scale testing on the acoustic generator system at the Navy's Seneca Lake Sonar Facility or other suitable Navy provided test range/facility.

Task 3 – The Offeror shall perform all activities to integrate the HTS magnet system and the acoustic generator into the MCM-USV for demonstration at-sea. This includes, but is not limited to, all hardware and software associated with: mechanical connections, electrical connections, shielding from high magnetic fields to prevent mutual interference, and C2 connections. The Offeror shall work with the MCM-USV vendor to ensure the HTS magnet system and acoustic system will be interoperable and able to concurrently operate onboard the MCM-USV. In addition, the Offeror will complete a PDR, CDR, and lab/sub-scale testing on the integrated payload.

Task 4 – The Offeror shall complete an at-sea demonstration at the Navy's desired location of the integrated MAGNUSS payload. The Navy's first choice of a test site will be the South Florida Ocean Measurement Facility, located in Ft. Lauderdale, FL. If the range is unavailable during the time period set aside for at-sea demonstration, an alternate test site will be provided within the contiguous United States (CONUS). The desired craft for this demonstration is the MCM-USV. If the MCM-USV is unavailable the MAGNUSS payload will need to be tested on any other craft of opportunity with constraints identified for the use of an alternate craft. In addition, the Offeror will conduct a Test Readiness Review prior to the at-sea demonstration.

Task 5 – The Offeror shall participate in review meetings outlined in Tasks 1-4. In addition, the Offeror will submit progress reports (6 month reporting period) and provide program status at quarterly review meetings. A test report and a final report shall also be delivered at the end of the contract.

Contract Option:

During the Option period, The Offeror shall provide additional prototypes to the government for laboratory, shore-based, and ship-based testing. The Offeror shall provide engineering and analysis support to the government during integration, developmental testing, and demonstration. The tasks in the Option period will coincide with the delivery and testing of either additional Advanced Development Model Prototypes (ADMs) identical to the ADM produced in the Base period; or with the delivery and testing of Engineering Development Models (EDMs) that incorporate changes to the ADM following the demonstration in the Base period.

Option 1 – The Offeror shall provide a complete MAGNUSS Payload Prototype identical to the ADM payload developed in the Base period. The MAGNUSS ADM Prototype Payload shall consist of the magnetic, acoustic, and controls and command packages, along with any hardware, or software, associated with the integration of the MAGNUSS payload to the MCM-USV. Option Task 1 activity will have a period of performance of **12** months.

Option 2 – The Offeror shall provide one complete MAGNUSS Payload Prototype with modifications in accordance with upgrades from the ADM to the EDM prototypes. The MAGNUSS EDM Prototype Payload shall consist of the magnetic, acoustic, and controls and command packages, along with any hardware, or software, associated with the integration of the MAGNUSS payload to the MCM-USV. Option Task 2 activity will have a period of performance of **18** months. ** See note at the end of this section regarding Options 2, 3, & 4)**

Option 3 – The Offeror shall provide two (2) complete MAGNUSS Payload Prototype(s) with modifications in accordance with upgrades from the ADM to the EDM prototypes. The MAGNUSS EDM Prototype Payload shall consist of the magnetic, acoustic, and controls and command packages, along with any hardware, or software, associated with the integration of the MAGNUSS payload to the MCM-USV. Option Task 3 activity will have a period of performance of **18** months. **See note at the end of this section regarding Options 2, 3, & 4)**

Option 4 – The Offeror shall provide three (3) complete MAGNUSS Payload Prototype(s) with modifications in accordance with upgrades from the ADM to the EDM prototypes. The MAGNUSS EDM Prototype Payload shall consist of the magnetic, acoustic, and controls and command packages, along with any hardware, or software, associated with the integration of the MAGNUSS payload to the MCM-USV. Option Task 4 activity will have a period of performance of **18** months. **See note at the end of this section regarding Options 2, 3, & 4)**

Option 5 – The Offeror shall provide an HTS magnet payload prototype identical to the HTS magnet payload as a sub-system of the MAGNUSS ADM Prototype Payload. The HTS magnet payload shall consist of any hardware, or software, associated with the integration of the HTS magnet with the MAGNUSS payload. Option Task 5 activity will have a period of performance of **12** months.

Option 6 – The Offeror shall provide an acoustic payload prototype identical to the acoustic payload as a sub-system of the MAGNUSS ADM Prototype Payload. The acoustic payload shall consist of any hardware, or software, associated with the integration of the acoustic payload with the MAGNUSS payload. Option Task 6 activity will have a period of performance of **12** months.

Option 7 – The Offeror shall provide a complete command and control package prototype identical to the command and control package prototype as a sub-system of the MAGNUSS ADM Prototype Payload. The command and controls package shall consist of any hardware, or software, associated with the integration of the command and controls package with the MAGNUSS payload. Option Task 7 activity will have a period of performance of **12** months.

Option 8 – The Offeror shall provide support to the Navy for at-sea demonstrations at the Navy's desired location of the integrated MAGNUSS payload. The location of the testing will be decided at the time for testing; however, this option will be for testing within the contiguous United States (CONUS) along the East Coast or similar vicinity (i.e., Ft Lauderdale, FL, or Panama City Beach, FL). The desired craft for this demonstration is the MCM-USV. If the MCM-USV is unavailable the MAGNUSS payload will need to be tested on any other craft of opportunity with constraints identified for the use of an alternate craft. Option Task 8 activity will have a period of performance of **12** months.

Option 9 – The Offeror shall provide support to the Navy for at-sea demonstrations at the Navy's desired location of the integrated MAGNUSS payload. The location of the testing will be decided at the time for testing; however, this option will be for testing within the contiguous United States (CONUS) along the West Coast or similar vicinity (i.e., San Diego, CA). The desired craft for this demonstration is the MCM-USV. If the MCM-USV is unavailable the

MAGNUSS payload will need to be tested on any other craft of opportunity with constraints identified for the use of an alternate craft. Option Task 9 activity will have a period of performance of **12** months.

Option 10– The Offeror shall provide support to the Navy for regular maintenance and upgrades various parts of the MAGNUSS payload. This shall include any spare hardware associated with the upgrades. This shall be in the form of labor hours and other direct cost (ODC) for the hardware. Option Task 10 activity will have a period of performance of **12** months.

Regarding Options 2, 3, & 4: Options 2 through 4 are structured in order to provide the Government with the ability to purchase up to three (3) additional complete MAGNUSS Payload Prototype(s) with modifications in accordance with upgrades from the ADM to the EDM prototypes.

The Government will not know the exact number of additional prototypes required at the time of contract award. Once a determination regarding the number of prototypes has been made during the performance of the effort, one and **only one** of the three (3) options in question (Options 2, 3, & 4) will be exercised.

Please note that Options 5 through 10 do not share this restriction and shall be exercised, if needed.

III. DISTRIBUTION OF GOVERNMENT FURNISHED INFORMATION – WORKSHOP - INDUSTRY DAY

ONR does not plan to hold workshops, industry days, or webinars, etc, in support of this announcement.

IV. MAGNUSS DESIGN REQUIREMENTS ANNEX

Prior to submitting a proposal, potential Offerors should review the MAGNUSS Design Requirements Annex, which is available upon request to companies with the proper security and handling classifications. The Annex will include the interface control document for the MCM-USV. It will also include technical requirements for the HTS magnet system, such as magnetic dipole moment; and for the acoustic generator, such as frequency and noise level. Finally, operational environmental conditions, military specifications or standards, and size, weight, and power (SWAP) requirements for the MAGNUSS payload will be provided.

All requests for the Annex shall be on company letterhead and shall include the company name, CAGE Code, mailing address, and the contract information for the Joint Certification Program POC. ONR will use this information to verify eligibility to receive information associated with Security Classification Guidance.

The request shall be sent to the following ONR points of contact:

ONR Security POC: Ms. Kizuwanda Byrd, ONR.NCR.054.list.Security-Division@navy.mil
ONR Technical POC: Mr. Brian Almquist (Code 321), brian.almquist@navy.mil, (703) 696-3351

The deadline to request the Government Furnished Information (GFI) is 27 August 2021 at 5 PM Eastern Standard Time (EST).

V. WHITE PAPER SUBMISSION

Although not required, white papers are strongly encouraged for all Offerors seeking funding. Each white paper will be evaluated by the Government to determine whether the technology advancement proposed appears to be of particular value to the Department of the Navy. Initial Government evaluations and feedback will be issued via e-mail notification from the Technical Point of Contact. The initial white paper appraisal is intended to give entities a sense of whether their concepts are likely to be funded.

Detailed Full Proposal (Technical and Cost volumes) will be subsequently encouraged from those Offerors whose proposed technologies have been identified through the above referenced e-mail as being of "particular value" to the Government. However, any such encouragement does not assure a subsequent award. Full Proposals may also be submitted by any Offeror whose white paper was not identified as being of particular value to the Government or any Offeror who did not submit a white paper.

For white papers that propose efforts that are considered of particular value to the Navy but either exceed available budgets or contain certain tasks or applications that are not desired by the Navy, ONR may suggest a full proposal with reduced effort to fit within expected available budgets or an effort that refocuses the tasks or application of the technology to maximize the benefit to the Navy.

White papers must be submitted in accordance with Section II, Subsection D. of ONR BAA N00014-22-S-B001.

To ensure full, timely consideration for funding, white papers should be submitted no later than 20 October 2021 at 5 PM Eastern Standard Time (EST). White papers received after that date will be considered as time and availability of funding permit.

The planned date for completing the review of white papers is 06 December 2021.

VI. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under N00014-22-S-B001 by **26 January 2022** at 5PM Eastern Standard Time (EST). Full Proposals received after that date will be considered as time and availability of funding permit.

ONR anticipates contracts will be issued for this effort.

Full proposals for contracts should be submitted in accordance with Section II, Subsection D. of ONR BAA N00014-22-S-B001.

Although ONR expects the above described program plan to be executed, ONR reserves the right to make changes.

Funding decisions should be made by **23 February 2022**. Selected projects will have an estimated award date of **15 July 2022**.

VII. SIGNIFICANT DATES AND TIMES

Event	Date	Time
Deadline for GFI Request	27 August 2021	5PM EST
Recommended White Paper Submission Date	20 October 2021	5PM EST
Notification of White Paper Valuation*	06 December 2021	
Recommended Full Proposal Submission	**26 January 2022**	5PM EST
Notification of Selection: Full Proposals*	**23 February 2022**	
Awards*	**15 July 2022**	

Note: *These are approximate dates.

VIII. POINTS OF CONTACT

In addition to the points of contact listed in N00014-22-S-B001, the specific points of contact for this announcement are listed below:

Technical Point of Contact:
Brian Almquist
Program Officer, Ocean Battlespace and Expeditionary Access, ONR Code 321
brian.almquist@navy.mil

Business Point of Contact/Contracting Officer:
Matthew Murray
Contracting Officer, Branch 252
matthew.murray1@navy.mil

IX. Submission of Questions

Any questions regarding this announcement must be provided to the Technical Points of Contact and/or the Business Point of Contact listed above. All questions shall be submitted in writing by electronic mail.

Answers to questions submitted in response to this Special Notice will be addressed in the form of an Amendment and will be posted to the following web pages:

- Beta.sam.gov Webpage –Contract Opportunities – https://beta.sam.gov/
- ONR Special Notice Webpage - http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Special-Notices.aspx

Questions regarding **White Papers or Full Proposals** should be submitted NLT two weeks before the dates recommended for receipt of White Papers and/or Full Proposals. Questions after those dates may not be answered.