

Topic: N121-058

Materials Sciences LLC

Surface Combatant Composite Mid-Frequency Sonar Dome (MSC P4192)

The low cost, mid-frequency, composite sonar dome being designed for the DDG-1000 class ship is fabricated using state of the art, out-of-autoclave composite from a material system qualified for Navy Structures. The design and qualification of the dome will be done in accordance with Navy approved procedures by the Materials Sciences Corporation, a composites development company with capabilities in design, analysis, and testing of high-performance structures for military and civilian use. MSC's manufacturing partner, Seemann Composites Inc, has a proven track record of delivering large-scale Naval components fabricated using the Seemann Composites Resin Infusion Molding Process (SCRIMP). A phase 3 SBIR project is being considered to have the MSC / SCI team produce a sonar dome to be used on the DDG-1002 with a potential option to produce spares for DDG-1000 and 1001. When completed, the product will outperform hand-layup composite.

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SYSCOM: NAVSEA

Contract: N00024-14-C-4586

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00024-14-C-4586

WHO

SYSCOM: NAVSEA

Sponsoring Program: Team Ships, PMS-500

Transition Target: Zumwalt Class

TPOC:

(401) 832-8767

Other transition opportunities:

The material technology is applicable to submarine bow domes, sensor fairings, and other surface ship sonar domes where robust structure is needed to protect acoustic sensors with limited acoustic insertion loss compared to steel.

Notes: Image Description: DDG 1000, USS Zumwalt, leaving dry dock. The existing Mid-Frequency Sonar Dome is incorporated into the forward hull. The subject of this program will be available for DDG 1002.



Navy Image 131028-O-ZZ999-101, BATH, Maine (Oct. 28, 2013), (U.S. Navy photo courtesy of General Dynamics/Released)

WHAT

Operational Need and Improvement: In order to meet requirements to improve performance and lower acquisition and maintenance costs of sonar domes, the Navy is seeking new materials and fabrication techniques for sonar domes that will be installed on future combatants. The material needs to be mechanically robust and must allow transmission of sonar signals.

Specifications Required: The Sonar Dome must meet the mechanical and acoustic requirements of the current technology while reducing acquisition cost. Also, additional mechanical requirements identified by the Navy must be met in order to enhance survivability.

Technology Developed: Materials Sciences Corporation (MSC) and its manufacturing partner, Seemann Composites Inc. (SCI), are developing a high-fiber content, low void composite dome fabricated using a low-cost, out-of-autoclave material system and process.

Warfighter Value: This technology will have better survivability than the existing technology, which protects the warfighter in both extreme weather and combat scenarios, allowing the ship to perform its mission to it s maximum potential.

WHEN

Contract Number: N00024-14-C-4586 **Ending on:** September 16, 2016

| Milestone | Risk Level | Measure of Success | Ending TRL | Date |
|-----------------------------------|------------|--|------------|--------------|
| Material System Development | N/A | Test Report Submitted to NSWC-CD | 7 | May 2015 |
| Composite Design Complete | Low | Design Qualified per Analysis Plan | 5 | January 2016 |
| Tooling Fabrication Complete | Low | Completion of Mold | 7 | January 2016 |
| Demonstration Article Fabrication | Low | Mechanical Testing of Attachment Joint | 6 | July 2016 |

HOW

Projected Business Model: The MSC dome design will be fabricated by SCI using the approved material system under contract by the Navy and will become Government Furnished Equipment.

Company Objectives: The object of MSC and SCI is to become a key supplier to the fleet of large-scale navy composite shell structures, having demonstrated that we can affordably engineer a material and fabrication system to a variety of shapes and in accordance with extreme service requirements.

Potential Commercial Applications: These types of structures may be applicable to any industrial application needing a large composite which meets extreme performance requirements including chemical/petroleum refinement, pressure vessels, and various watercraft.