Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2025-056

Topic # N221-040
Shipboard Laser DED Metal Additive Manufacturing System
Boston Engineering Corporation

WHO

SYSCOM: NAVSEA

Sponsoring Program: NAVSEA

Transition Target: 2028

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Other Transition Opportunities:
Additive Technologies- setting up additive technologies to allows shipboard shock and vibe to exist, and still perform
Subtractive Technologies- similar in a lot of ways, but removal of parts in a shipboard environment.
Unique Implementation- this could include the effort to allow increased speed of deposition, active shock and vibration response.

Notes: The Boston Engineering Laser Directed Energy Deposition (LDED) will allow vessels who encounter a part failure while underway to quickly regain full mission capability. The LDED can organically produce parts on-board, on-demand, thus reducing supply chain and logistics dependence and freeing stowage space of spare parts.

This image shows the current state of the art. The future designs could utilize ground or above ground based systems, allowing capacity in smaller spaces.

The laser directed energy deposition (LDED) provides needed parts for underway vessels. Using a wire and directed energy, the ship can produce its own near net shaped components. No longer forced to sail with limited land-based storage, the LDED provides the Navy with on-demand, on-board parts. The LDED technology will help the Navy to achieve a fully functional, fully autonomous fleet, able to project worldwide.

This effort with the building of shipboard parts in demand, means the part supply chain is no longer the constraint. This effort focuses on the shock and vibration necessary to perform these constructions, with the final goal of part supply chain fleet autonomy, with every system available.

WHAT

Operational Need and Improvement:
Program challenge of shipboard automation and reduction of logistics. The ability to supply components on-demand, as needed, will reduce the logistics supply chain.

Specifications Required:
-5in x 5in x 5in to 5ft x5ft x 5ft part
-316 SS as primary
-MIL-S-901D, Amended with Interim Change #2, Shock Test, H.I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for
-MIL-STD-167-1, Mechanical Vibration for Shipboard Equipment (Type I - Environmental and Type II - Internally Excited)
-MIL-STD-461F, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
-MIL-STD-740-2, Structure-borne Vibration Acceleration Measurements and Acceptance Criteria of Shipboard Equipment

Technology Developed:
This effort will allow the shipboard manufacture of parts and components necessary vital to the maintenance of the ship. Each part can be performed to a near-net shaped object, using a minimum of materials. The wire-based extrusion using focused directed energy will provide a simple solution for just-in time components, without land-based supply.

Warfighter Value:
The ability of the warfighter to quickly overcome broken parts allows utilization of all aspects of the ship. No longer will parts require land-based transportation and logistics, but the components can be made on site.

“You will not find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics.”
– Dwight D. Eisenhower

WHEN

Contract Number: N00024-25-C-S046 **Ending on:** Mar 04, 2028

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Subtractive Technology	Medium	Demonstrating Success for net shape	4	2nd QTR FY27
Additive Technologies	Low	Demonstrating near net shape production of parts for shipboard	5	2nd QTR FY26
Shock and Vibration	High	Point of exercise, to show effectiveness of the system in shipboard environment	5	2nd QTR FY28
Control Scheme	High	Need to utilize shipboard as well as local sensors, and operate in a manner to allow the warfighters easy access	3	2nd QTR FY28
Manuals	Medium	Require manuals to allow for simplicity of operation, with understanding of the system components, will require above efforts	3	2nd QTR FY28

HOW

Projected Business Model:
Advance the Additive Manufacturing model
Advance the Manufacturing process through a part integration
Advance the Subtractive Manufacturing Model

Company Objectives:
Develop a shipboard system that can provide Additive, Subtractive, and finishing applications in one step.
Sailor understanding of the system through ease of implementation and simple instructions.
Customers include the Navy, other commercial shipboard manufactures, and remote locations where virtually all the material can be utilized.

Potential Commercial Applications:
Available to ships in fleets to make just-in-time repairs without requiring supply ships or ship downtime, applicable to commercial shipping as well.
Application to remote areas, providing parts on-demand for locations for which parts/supply chains cannot reach.
Application to develop molding for parts, allowing multiple parts to be made from identical fixtures.

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