



Automated Interior Scanning, Blasting and Painting

Project Snapshot



Project Lead:

General Dynamics - Electric Boat/General Dynamics - Bath Iron Works

Project Dates:

Mar 2020 – Mar 2022

Objectives:

- Develop and demonstrate a fully automated system capable of scanning, blasting, cleaning, and painting an as-built complex structure similar to that of the interior of a tank
- Optimize an automated system to create a more uniform (and repeatable) quality
- Reduce the cost, man-hours, and cycle time for performing painting and blasting activities at GDEB and GDBIW

Estimated Savings:

\$500K per VA Hull
 \$650K per VPM Hull
 \$1.05M per CLB Hull
 \$514K per DDG-51 Hull
 Combined VCS /VPM /CLB /DDG-51 5-year savings:
 \$11.6M

S2817 Automated Interior Scanning Blasting & Painting Rev A (0520)
 Distribution Statement A: Approved for public release; distribution is unlimited.
 Approved, DCN# 43-6641-20

For this effort, General Dynamics Electric Boat, in collaboration with General Dynamics Bath Iron Works, has embarked on the *Automated Interior Scanning, Blasting and Painting* project to investigate opportunities to utilize robotics that will combine scanning, blasting, cleaning, and painting into one innovative solution for large scale projects. The current process used for blasting and painting the interior of tanks involves limited access to these areas and requires substantial Personal Protective Equipment (PPE) to ensure safety in confined spaces. Additionally, there is a significant amount of man hours required to complete this process due to the complex shapes of the tanks, lack of visibility in the confined blasting environment, and associated cleanup required.

The *Automated Interior Scanning, Blasting and Painting* project will develop and demonstrate a fully automated system to scan, blast, and paint a complex surface similar to that of the interior of the tank. The system will aid in reducing cycle time for the process and man-hours required to complete the entire evolution. In addition, the proposed automated system will create a more uniform quality product while maintaining safety. Blasting and painting robotics technology has been proven to be a feasible alternative for the manual blasting and painting processes in other industries. Scanning technology has been shown effective on smaller scale initiatives, and will require investigation and adaption for a large scale project demonstration. Ultimately, the scanning technology will create a 3D digital representation of the part and then be used to program a robotic path given the dictated parameters for the robot with respect to offset distance, step size, and translation rate. These inputs, in addition to a digital representation of the part, can be used to manufacture a path for the end effector to blast and paint the complex features of the interior tanks.

This two-phased, 24-month effort will define the desired system functionality, identify the candidate tanks, and develop the system requirements and functional specifications. A small scale representative demonstration will be used to down-select a robot integrator for the large scale demonstration. The large scale test demonstration will be conducted on a representative tank, with test plans created and executed to demonstrate scanning, blasting, cleaning, and painting functions.

The Naval Shipbuilding and Advanced Manufacturing Center is a Navy ManTech Center of Excellence, chartered by the Office of Naval Research (ONR) to develop advanced manufacturing technologies and deploy them in U.S. shipyards and other industrial facilities. NSAM's primary goal is to improve manufacturing processes and ultimately reduce the cost and time required to build and repair Navy ships and other weapons platforms. For additional information on this and other NSAM projects, please visit <http://nsamcenter.org>.

