



## Metrology Automation

### Project Snapshot



#### Project Lead:

Huntington Ingalls Industries  
– Newport News Shipbuilding

#### Project Dates:

Sept 2019 – Sept 2021

#### Objectives:

- Reduce submarine hull section manufacturing cycle time by automating dimensional inspection services
- Improve manufacturing process by providing real time data to the entire value stream (deck-plate, engineering, etc.)
- Increase automation that will allow the trades to perform dimensional surveys without accuracy control personnel onsite

#### Estimated Savings:

**55% reduction in metrology labor required during NNS pressure hull fabrication**

**\$190K per VCS/CLB Hull**

With increasing production demands and shrinking schedules, Newport News Shipbuilding (NNS) is investigating innovative solutions to aid in meeting VIRGINIA and COLUMBIA Class Submarine build schedules. Recent implementation of critical sophisticated technologies encourage further development of automated metrology processes capable of delivering real-time dimensional data to the trades and engineering.

Submarine hull sections are currently assembled at NNS in the new North Yard Manufacturing Facility using new fixtures. The size and support structure of these massive fixtures present unique challenges for access to conduct typical contact based metrology (laser trackers, photogrammetry, etc.) but offer major opportunities for non-contact instruments (laser scanners, laser projection, etc.). Along with the physical changes of facility and fixturing, new build processes and demand have NNS trades personnel working around the clock, which presents additional challenges for support trades such as Dimensional Control supporting additional operations without significantly increasing manning.

The Metrology Automation project will develop the integrated systems and associated processes to automate the metrology workflow within the new facility. These systems will affect all aspects of the metrology process to include planning, data collection, analysis, and reporting. These new systems will also allow for multi-skilled trades personnel to gather metrology data without metrology technician support and feed that data into automated systems for processing and reporting. Implementation of non-contact metrology sensors, development of robust scripts and algorithms, and development of user interfaces and fixtures are anticipated to bring down the learning curve for use of metrology hardware and software. The development and implementation of this integrated metrology system will aid in the realization of the build process quality and schedule goals within the JMAF.

This 24-month effort will examine automatic extraction and projection of fabrication data to expedite outfitting and final installation processes. This project is expected to result in an estimated savings of \$190K per VIRGINIA and COLUMBIA Class Submarine hulls for an estimated 5-year savings of \$2.29M. The solution technology is expected to be implemented at NNS' Newport News facility early FY22.

**Naval Shipbuilding Advanced Manufacturing** 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>.

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