

# GDEB 'Trade-Friendly Locating Dimensional Techniques' Effort Advances Metrology Technologies for Shipbuilders

Status: **Implementation Pending**

## PROBLEM / OBJECTIVE

Metrology technologies have dramatically increased their functionality and purpose for modern manufacturing. General Dynamics-Electric Boat (GDEB) has capitalized on this technology by acquiring and using modern metrology systems for various VIRGINIA Class submarine (VCS) alignments and inspections, though the technologies of choice are currently limited to certified and highly trained tradesmen and engineers. GDEB VCS modular construction (hull sections and hull decks) requires the tradesman's ability to quickly and accurately obtain metrology coordinate placement data during manufacturing operations, not post-manufacturing inspection and alignments. The goal was to determine the feasibility and cost-effectiveness of GDEB "trade personnel" friendly dimensional locating metrology technology for immediate incorporation into the VCS manufacturing processes.

## ACCOMPLISHMENTS / PAYOFF

### Process Improvement:

Phase I was successfully executed, conducting a comprehensive investigation of alignment inspection processes, identifying the time and quality drivers to obtain a quality metrology alignment and the required assembly data points. The GDEB project team focused on both the physical requirements and the information requirements to prepare a tradesman to perform their work. In Phase II, GDEB tested the technologies identified and qualified based upon requirements obtained during the Phase I investigation.

The tested system performed exceedingly well, above and beyond the initially identified Phase I requirements. The technology was thoroughly tested in several use cases, with production personnel expressing desire to use the equipment immediately, offering additional opportunities. The GDEB team completed planned and impromptu pilots, demonstrating the equipment during production work, even conducting familiarization sessions on the shop floor. Shipyard evaluations have shown that the projected savings could double from the initial cost savings estimated. Additionally, findings from this project can be applicable and beneficial to construction activities for the OHIO Replacement Program (OR) and at other major shipyards.

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Dimensional Techniques Rev A May16

### Implementation and Technology Transfer:

Implementation of this technology is in process pending the arrival of the first purchased system. Funding for additional systems is being pursued to support the VCS build rate and OR construction.



Trade friendly system will provide digital readout locations within a grid system on curved and planar surfaces

### Expected Benefits and Warfighter Impact:

- Reduce time to layout components
- Reduce repetitive measurement
- Replace steel wire installation to form reference lines
- Improve first time quality
- Estimated cost savings: \$1.72M/VCS & OR Hulls

## TIME LINE / MILESTONES

Start Date:	May 2014
End Date:	Mar 2016

## FUNDING

Navy ManTech Investment:	\$450K
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## PARTICIPANTS

ONR Navy ManTech  
PEO Submarines (PMS 450)  
General Dynamics Electric Boat  
Naval Shipbuilding and Advanced Manufacturing Center  
Institute for Manufacturing and Sustainable Technologies

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