

Ingalls Shipbuilding Implements DDG 51 Sonar Dome Manufacturing Improvements

Status: Implemented

PROBLEM / OBJECTIVE

This Navy Metalworking Center (NMC) project has implemented several solutions that streamline the processes and procedures to fabricate the Aegis Destroyer (DDG 51 class) sonar dome, which has a complex geometry and is challenging to construct. NMC implemented metrology solutions as well as mechanized material removal technologies, which will improve the current manual processes. The project results reduce the time, labor, and rework associated with fabricating the sonar dome sub-assembly at Ingalls Shipbuilding (Ingalls).

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The Integrated Project Team (IPT) assessed the sonar dome fabrication process, developed concepts, and downselected several concepts to prototype. The IPT developed, enhanced and tested several material removal technologies that increased the efficiency of this labor-intensive operation. Specifically, the IPT developed and pilot tested a portable grinding station consisting of a mechanical arm and versatile mounts for various conditions. In addition, the IPT demonstrated a plasma gouging system as a rapid material removal solution and developed a template to improve the current stem bar fairing process. For metrology, the IPT investigated and recommended implementation of a laser scanner system to perform plate check verification to reduce or eliminate rework prior to installation. In January 2016, the IPT demonstrated a specialized measurement plan that automated the post-processing of scanned data.

Implementation and Technology Transfer:

Due to the successful demonstration and tool validation, Ingalls is implementing the following tools and technologies:

- Portable grinding station featuring 3arm[®] and zeroG[®] mechanical arms with optimized gimbal and mounting hardware provisions
- Hypertherm Powermax[®] 125 air plasma cutting / gouging system
- Stem bar gauge
- Surphaser[®] laser scanner with custom measurement plan

Ingalls is procuring additional tools based on the project's success. The project results are also being used in other process areas and platforms at Ingalls, namely LHA, LPD and National Security Cutter (NSC). Bath Iron Works, Portsmouth Naval Shipyard and BAE Systems-York also expressed interest in the project results.



The project results reduce time, labor, and rework associated with sonar dome fabrication. Ingalls photo

Expected Benefits and Warfighter Impact:

- Reduced labor by an average 16% to fit and assemble DDG sonar dome components, and other structures across DDG, LPD, and LHA process areas
- \$7.6 million reduction in labor over five years on platforms constructed at Ingalls
- Improved environmental, health and safety conditions for employees (reduced worker fatigue and improved ergonomic benefit)
- Benefits to construction of NSC hulls

TIME LINE / MILESTONE

Start Date:	October 2013
End Date:	February 2016

FUNDING

Navy ManTech Investment:	\$2.1M
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PARTICIPANTS

DDG 51 Class Program Office (PMS 400D)
Naval Surface Warfare Center, Carderock Division
Ingalls
Material Removal and Metrology Industry Partners
NMC
ONR Navy ManTech

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