

The following technical paper abstract information was recently submitted in connection with session DOD107,Inspection/Test

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Paper Title: Great Ideas Competition 2014: Abstract for Hull Contamination Monitor

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Abstract: Great Ideas Competition 2014: Abstract for Hull Contamination Monitor

Title: Hull Contamination Monitor

Summary:

The Hull Contamination Monitor project is sponsored by NAVSEA Program Office Virginia Class Submarine PMS 450. Present technology for detecting the presence of contamination of epoxy painted hulls involves spraying a small white paper with a test solution, contacting the paper to the painted surface for one minute, then visually assessing a purple color change in the paper to indicate the presence of amine bloom contamination. The test consists of 3 chemical swatches, about 2 cm<sup>2</sup> each and is known to provide false negative results. The "Great Idea" behind this technology is based on a simple to use, nondestructive direct measurement of a painted surface obviating the need for sample collection or handling of chemicals for a color change test. The backbone of the system is a lightweight, handheld, point and shoot analyzer that is simply placed against a painted surface and the analysis is completed in one second with the push of a button. This monitor, by replacing the swatch test, will reduce both analysis time and complexity as the sensor can be operated with minimally trained personnel. This presentation will focus on the Phase II project with several validation results that show 100% accuracy in blind tests compared to 71% accuracy for the swatch test.

Participants:

DoD

§ NAVSEA 05

§ VIRGINIA Class Program Office (PMS 450) § [Future plan is to engage with the Depots – Portsmouth, Pearl Harbor, Puget Sound, Norfolk Naval Shipyards – after OEM utilizes technology via Phase II test instruments] Industry § Agiltron, Inc.

§ General Dynamics Electric Boat

§ Ingalls Shipbuilding

§ Newport News Shipbuilding

Feasibility or practicality of the idea:

Equipping today's shipbuilders with tools for real-time, on-site, rapid paint assessment Testing done locally and immediately Measurement performed directly on painted surface Laboratory sample submission and swatch test eliminated Results available in seconds to the operator Advantages What you get with the handheld units Immediate direction to keep or remediate the painted hull section Rapid determination of contaminated area margins Efficient quality control testing No limit on the number of one-second measurements possible Testing on demand so you can check anytime (within one hour of paint application) 100% accuracy compared to 71% accuracy for the swatch test Cost savings/avoidance Business Case under review and assessment with General Dynamics Electric Boat Estimated to save in the areas of throughput schedule, time, labor and materials with regard to in-

process re-work requirements Low cost and time permit on-demand testing as conditions warrant  
Handheld optical surface analyzer for fast and reliable amine bloom detection LED-based inexpensive  
non-destructive inspection tool Less than 1 second detection cycle time Pass/Fail threshold set by user's  
criteria Figure 1. Handheld amine bloom sensor analyzing an epoxy painted steel sample.

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