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REDUCING THE COST AND TIME TO BUILD & REPAIR **NAVY** PLATFORMS

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Guided-missile destroyer USS Arleigh Burke (DDG 51)
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new NSAM seal
Graphic courtesy NSAM

Virginia-class attack submarine Pre-Commissioning Unit (PCU) Missouri (SSN 780)
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PCU USS Gerald R. Ford (CVN-78)
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Photos courtesy of SCRA

Drawn arc welded stud
Photo courtesy of EWI

Workflow tracking system technology
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DMC 2014 Announcement.
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SCRA Wins NSAM Center of Excellence

This past August was a milestone for SCRA Applied R&D, as SCRA was selected to lead the newest Office of Naval Research Manufacturing Technology (Navy ManTech) Center of Excellence, the 'Naval Shipbuilding & Advanced Manufacturing Center' (NSAM Center). The NSAM Center replaces the highly successful Center for Naval Shipbuilding Technology (CNST), where CNST executed over 50 projects, leading to more than $460M in savings across several US Navy acquisition programs.

SCRA Applied R&D will operate and provide technical oversight for the new center, which will develop and manage projects that support the Navy ManTech program. The Center will also execute special projects as may be directed by the Navy to meet new, emerging objectives. Previously limited to shipbuilding, the scope of the NSAM Center has been expanded to include all Navy platforms, including the F-35 Joint Strike Fighter and CH-53K Heavy Lift Helicopter. SCRA Vice President Kevin Carpentier will serve as the Director of the new Center. He spent the last seven years as the CNST Director. "SCRA Applied R&D is proud to continue its support to the Navy's Manufacturing Technology program through the Navy Shipbuilding and Advanced Manufacturing Center of Excellence," said Carpentier. "We will support the Navy and its warfighters by teaming with the industry's best technology providers to reduce acquisition and life-cycle costs, improve capabilities and deliver exceptional value to the Navy."

GDEB Evaluating 'Trade Friendly' Metrology Systems

Virginia-class attack submarine Pre-Commissioning Unit (PCU) Missouri (SSN 780) conducts sea trials July 2, 2010, Atlantic Ocean.

Metrology technologies have dramatically increased their functionality and purpose for modern manufacturing. General Dynamics Electric Boat (GDEB) like many other companies, has capitalized on this technology by acquiring and using modern metrology systems for various VIRGINIA Class submarine (VCS) alignments and inspections. However, the technologies of choice are currently limited to use by certified and highly trained tradesmen and engineers. The GDEB VCS modular construction practice requires the tradesman's ability to quickly and accurately obtain metrology coordinate placement data during manufacturing operations, not post-manufacturing inspection and alignments. This project is looking to determine the feasibility and cost-effectiveness of GDEB "trade personnel" friendly dimensional locating metrology technology for immediate incorporation into the VCS manufacturing processes. The project team is working this project in two distinct phases, executed similarly to many other GDEB successfully completed standard process improvement efforts, where a comprehensive investigation of alignment inspection processes is first conducted to identify the time and quality drivers, obtaining a quality metrology alignment, and compiling assembly data points as required. The team is focusing on both the physical requirements as well as the information requirements to prepare a tradesman to perform all work elements regardless of activity. Upon completion of the initial investigation (Phase I) of the current hull section assembly processes, the project team will study new technology solutions, ultimately to identify the optimal technologies to increase project alignment productivity in Phase II. Phase II will focus on targeted testing of the identified alternative improvement technologies. While the primary focus of this project is the VCS program, it also offers opportunities to improve manufacturing processes for the Ohio Replacement Program (OR). The project team expects to save as much as $860K for each VCS and OR hull, further increasing ManTech's contribution to the overall submarine acquisition program cost savings.

NNS Assessing Material Logistics Cost Savings

Creating an adaptive simulation tool capable of adjusting the material lay down layout and delivery path to allow the decision makers to rapidly adapt to the dynamics of ship construction.

Huntington Ingalls Industries – Newport News Shipbuilding (NNS) is creating the ability to quickly and easily analyze material impact on build strategy decisions, with the goal to reduce costs associated with material handling and placement. Naval ship construction is an immensely complex logistical activity involving large quantities of highly specialized material, equipment and personnel. All material that ultimately resides in an aircraft carrier (CVN) must be pulled from inventory, staged within a limited footprint and moved to the production work site along pre-determined material paths. Material availability in the right location at the right time is a key element in NNS's drive to lower CVN construction costs.

The primary objective of the 'Synchronizing Material Logistics with CVN Pier & Dry Dock Build Strategies' project is to deliver a planning tool that allows material logistic controllers to manage the adjacent lay down areas in an optimal manner. The NNS team is developing a prototype simulation-based material logistics planning tool employing 'discrete event simulation' techniques to create a library-based re-usable application to optimize material logistic scenarios and improve the efficiency of CVN construction. The simulation tool will permit the NNS ship construction production control managers to quickly link a proposed build strategy (likely developed that day because of an unforeseen delay) to those material delivery logistics associated with the involved CVN tasks. Once the project is completed and the planning tool is implemented, NNS expects to eliminate over 33,000 logistics-related labor hours and reduce CVN acquisition costs by an estimated $1.28M per CVN hull.

New Naval Shipbuilding & Advanced Manufacturing Center Briefs Joint Panel

The Navy's newest Center of Excellence, the Naval Shipbuilding and Advanced Manufacturing Center (NSAM), recently provided a comprehensive overview of several current ManTech projects to the Metals Subpanel of the Joint Defense Manufacturing Technology Panel (JDMTP). The JDMTP Metals Subpanel evaluated NSAM's projects and offered feedback to improve project performance and to increase efficiency and effectiveness.

NSAM Director Kevin Carpentier addresses the JDMTP Metals Subpanel.

The JDMTP and its Subpanels include ManTech representatives across all military branches and relevant industry representatives. Each year, the Metals Subpanel reviews the projects within its technology portfolio, identifies opportunities for transition and collaboration and provides input back to the JDMTP on opportunities for future investment areas.

The briefings took place on September 18-19 at the SCRA facilities in North Charleston, SC. Members of the Metals Subpanel were briefed on some of the Center's 22 ongoing projects, highlighting projects that were of interest to that group. "This is the first time we've participated in the Metals Subpanel project review meetings and it reaffirmed our objective to share shipbuilding technologies with other DoD organizations. We look forward to engaging with this group at every opportunity" said Mr. Kevin Carpentier, NSAM Center Director and SCRA Applied R&D Vice President. "We were very pleased by Subpanel members' complimentary comments regarding our Center's technology and implementation successes over the past 11 years that address the Navy's affordability objectives for both acquisition and lifecycle sustainment."

Improved Stud Fixturing Processes Will Reduce Acquisition Costs

Huntington Ingalls Industries (Ingalls) recently completed a ManTech project that established the framework to reduce shipbuilding acquisition costs through improved stud mounting processes and potential component re-designs. While the project focused specifically on improvements benefiting the DDG-51 class ships, the benefits are applicable to the full range of Navy ship acquisition programs—the estimated cost savings are $2.86M for each DDG-51 hull built at the Ingalls shipyard in Pascagoula, MS.

Drawn arc welded stud

The U.S. Navy shipbuilding industry is required to attach tremendous quantities of equipment with a wide variety of configurations, sizes, and weights in the process of ship construction. Traditional practice has been to mount equipment through the use of welded structural foundations that are then drilled for bolting of the equipment. Extensive engineering resources are expended to design these foundations. Significant costs are associated with construction, installation, and equipment mounting of these foundations. In many cases, installation of equipment in this fashion consumes a lot of space and weight. Additionally, engineering cost savings, installation cost savings, and material cost savings could be captured. Reductions in weight and work in process, welding-associated distortion, and time to complete each installation benefits could also be realized.

The Ingalls team, along with the Edison Welding Institute, executed this two-phased project to prove the feasibility of transitioning, to the greatest degree possible, from a welded foundation structure with bolted equipment mounting to stud mounting of shipboard equipment /hardware. The team considered current limitations of stud sizes, shipboard configuration requirements and all applicable Navy ship specification requirements. The stud welding process was analyzed and tested to minimize stud size and maximize mechanical performance relative to identified mounting applications. The project developed a plan to expand stud welding applications in the DDG-51 ship design and construction process. Ingalls has validated the performance of the stud welding process though shock testing and analysis. The successful identification and verification of welding equipment and consumable requirements necessary to implement project results, along with research showing productive efficiency and cost benefit, supports May 2016 full implementation.

Ingalls Pursuing 'Digitally Agile' Data Strategy with Work Flow Tracking System Technology

Huntington Ingalls Industries - Ingalls Shipbuilding (Ingalls) is developing a modular tracking system and process that will allow for better accuracy of tracking and statusing of individual pipe details while in the pipe shop. The project will focus on the pipe shop production area and will automate the status and tracking activity for each pipe detail on a work bill. Pipe details are assembled in the Pipe Shop and the duration the pipe details spend in the Pipe Shop varies from a few days to a few weeks. Currently there is low visibility of the completion status associated to the pipe detail while it is in the shop and shop foremen spend several hours per week manually tracking and generating reports for pipe details committed and completed. Another time-related impact is that each foreman also manually records man-hours per employee per pipe detail per shift, requiring significant supervisory time and frequently produces incorrect data, further compounding the problem.

Ingalls' is creating an automated process that captures actual time expenditure for 100% of all Pipe Details and process steps.

The 'Work Flow Tracking' project will improve current processes and equipment that Ingalls uses to track and provide pipe detail fabrication status during shop construction. The Ingalls project team will develop an automated process to run on handheld computers, with data updates enabled by these computers located at or near each work station in the pipe shop. The project team will be piloting the technology through the use of a bar code sticker affixed to each pipe detail when work is first commenced. The handheld computer application will be used to scan the bar code on the pipe detail. The capability to gather status, completion, and labor information for the pipe detail will be enabled through the use of the handheld computer and tracking application, with no additional steps required of the shop worker than those listed above. This technology, once implemented, is expected to improve reporting capabilities for overall throughput of the Pipe Shop, with an increased pipe details throughput of 4% and improve visibility of pipe detail status. Once fully implemented in the pipe shop, the project team expects to save at least $1.1M annually, with additional savings anticipated by expanding the technology use to other ship construction disciplines.

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