CVN 'Reality Capture' Reduces Production Planning Costs

Status: Implemented

PROBLEM / OBJECTIVE

Newport News Shipbuilding (NNS) evaluated laser scanning technology with the goal of reducing the work planning costs associated with Navy fleet modernizations and repairs. One of the barriers to quality work planning designs related to ship alterations is the lack of accurate as-built configuration data. Traditional shipcheck activities involves significant travel, labor processes and material costs that are prone to human error and results in outdated design processes.

The project's objective was to develop a plan to transition 3D scanning and design technologies into NNS engineering planning production processes. Technologies and processes identified illustrate a potential reduction in shipcheck travel and labor cost while adding capability to accurately develop engineering products within a 3D design environment.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The NNS team evaluated mature laser scanning technologies, successfully demonstrating these new applications on complex Navy ship compartments. The project team assessed the utilization of resulting data, developed laser scan process workflows and validated use of these new tools, replacing the traditional shipcheck manual data capture methods. Compared to preliminary NNS trials, the project team demonstrated a reduction of laser scan capture and data processing time by 48 percent.

Implementation and Technology Transfer:

NNS successfully completed the project and is currently conducting additional technology transfer activities. NNS anticipates the wider use of the laser scanning tools during the next shipcheck evolution, ultimately leading to complete laser scanning use for every shipcheck activity. NNS developed the processes necessary to document various aspects of performing reality capture operations, as well as 3D modeling concepts. The team piloted a hand-held infrared measuring device, to capture scan data in areas not accessible to stationary laser scanners. This effort led to an additional prototype being developed, with NNS testing the technology during the next shipcheck evolution. This project provided NNS with an opportunity to implement technology and develop effective processes, establishing the basis for improving all aspects of shipcheck operations. These new processes affect nearly every phase of engineering and planning processes. This technology, once fully implemented, is expected to reduce ship check travel costs by 32 percent or an estimated $533K per forward deployed CVN repair planning evolution. NNS expects to save $1.4M in labor, increasing the total saved to $1.8M.

Measurable Laser Scan Data

Expected Benefits and Warfighter Impact:

- Improved safety and reduced human error
- Detailed planning and trade preparation access to shipboard reality prior to ship arrival
- Facilitates 3D and 2D design automations
- Improves overall quality of design products
- Extends benefit of reality capture and 3D model data to future hulls
- Utilize 3D composite models for developing improved ship alteration designs

TIME LINE / MILESTONES

Start Date:	November 2013
End Date:	April 2015

FUNDING

Current Navy ManTech Investment: $548K

PARTICIPANTS

PEO Carriers
Huntington Ingalls Industries-Newport News Shipbuilding
Naval Shipbuilding and Advanced Manufacturing Center