Artificial Intelligence for Planning

Project Snapshot

Project Lead:
General Dynamiics Electric Boat

Project Dates:
Jun 2020 – March 2022

Objectives:
Develop an AI based planning tool to supplement EB's current multilevel planning approach

Estimated Savings:
$146K per VCS Hull

$236K per CLB Hull

S2877 Artificial Intelligence for Planning
Rev A
Distribution Statement A: Approved for public release; distribution is unlimited.
DCN# 43-8153-21

A current challenge at Electric Boat (EB) is the planning of the ship's construction, which is a complex and costly task. The ship's build schedule spans years and entails millions of labor hours. Although there have been advancements in planning methodologies, the basic planning toolset has not changed in the last 50 years. Typically the construction for the lead ship of a class is substantially more costly than follow on ships. Much of this cost is due to the limitations of current planning tools. Currently there is no way to fully exploit lessons of past planning efforts. The idea behind this project is to use Artificial Intelligence (AI) based on historical VCS data to arrive at an optimized plan prior to the construction of the lead CLB ship.

The Artificial Intelligence for Planning project, managed by the Naval Shipbuilding and Advanced Manufacturing (NSAM) Center will provide an AI based planning tool to supplement EB's current multilevel planning approach. In the current multilevel planning approach the highest level (Master Assembly Plan) defines the major modules. The second level planning scenario entails high level activities. The third level consists of work orders scheduled in an MRP system. The AI for Planning system will introduce a fourth level, which is model based parametric planning. This means that MRP work activities will be associated with the build product model enabling the definition of planning parameters that are computed from the model. AI for Planning will compute planning improvements based on objective cost functions for work duration and for cost, with an emphasis on structural assembly and welding. In addition, the project will include customizations of the Aurora AI software to improve outsource opportunities, out of sequence assemblies, and simulations of the variability of durations.

This project is expected to result in savings of approximately $146K per VIRGINIA Class submarine and approximately $236K per COLUMBIA Class submarine for five-year savings of $2.05M. The AI for Planning technology is expected to be implemented at GDEB's Quonset Point, RI, facility during the first quarter of FY23.

NSAM is a Navy ManTech Center of Excellence, chartered by the Office of Naval Research (ONR) to identify, develop and deploy, in U.S. shipyards, advanced manufacturing technologies that will reduce the cost and time to build and repair Navy ships and aviation assets. For additional information on this and other NSAM projects, please visit http://nsamcenter.org.

This document was prepared under Contract N00014-19-D-7001 to the Office of Naval Research as part of the Navy ManTech Program. NSAM is managed and operated by Advanced Technology International
315 Sigma Drive | Summerville, South Carolina 29486 | 843-760-3283