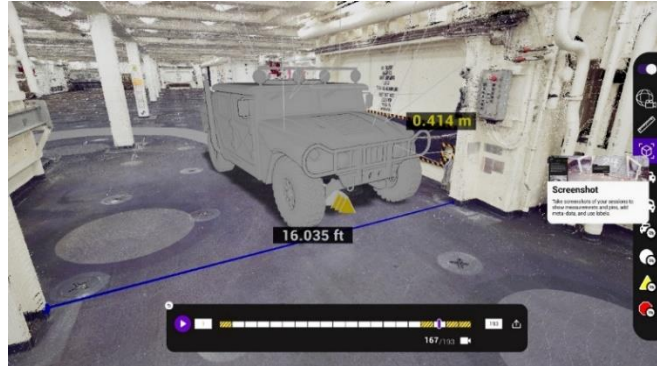


Shipboard Dimensional Analysis Tool (SDAT)



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SYSCOM: Marine Corps Systems
Command (MCSC)
www.marcorssyscom.marines.mil

Program Sponsor: MCSC, Systems
Engineering Acquisition and Logistics
(SEAL)

Other Potential Programs: PEO
Land Systems, NAVSEA, Naval Safety
Command, USTRANSCOM

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Digital Twin, Voxel Collision, Encroachment
Analysis, LIDAR, CAD Vehicle Simulation

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THE CHALLENGE

Marine Corps Ground Vehicle Acquisition Program Management Offices (PMOs) and Navy Amphibious and Prepositioning Ships PMOs do not have a precise way of determining shipboard vehicle transportability constraints early enough in the design process. Current methods of assessing transportability involve vehicle prototyping and taking internal measurements of ships in various locations to include angles at the tops and bases of ramps to ensure clearance and identifying obstacles, including pipes, wire bundles, lighting, and other types of fixtures.

THE INNOVATION

The Shipboard Dimensional Analysis Tool (SDAT) integrates hardware, software, and cloud solutions to enable virtual three-dimensional transportability assessments for vehicle designs. SDAT utilizes Voxelization and Octree methodologies to perform rapid and accurate encroachment and collision analysis of prototype vehicle Computer-Aided Design (CAD) models against real-world point clouds of naval transportation ships, visualized with realistic and legible renderings of the ship and vehicle data in a cloud-hosted viewer. SDAT determines fit results based on user-defined clearance requirements, allowing for transportability assessments across the entire naval Fleet.

THE NAVY BENEFIT

A three-dimensional virtual means of conducting valid shipboard transportability assessments for vehicles and vehicle modifications as early as possible in the acquisitions process will reduce cost and schedule associated with the design of vehicles suitable for deployment aboard amphibious and preposition ships. LIDAR scans of naval ships will allow for as-built analysis, and with CAD designs uploaded into SDAT, prototype vehicles can determine fit pre-production without expensive prototype production.

THE FUTURE

Design Mill seeks to establish a Phase III contract to further develop SDAT as the authoritative data solution for the Digital Twin of Navy assets. Not only is SDAT capable of transportability analysis, with high-resolution rendering of LIDAR scans, SDAT can be utilized for site familiarization, safety training, load planning, vehicle simulations, design review, and historical data capture. Design Mill is developing an entire suite of hardware, software, and services to make this a reality for the Navy throughout the upfront design of systems but also as an operational tool for all aspects of fielding of any asset.