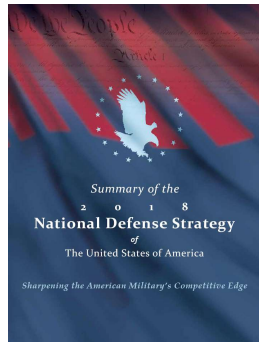# American Society of Naval Engineers
# Technology Enablers for Digital Engineering Strategy

Enabling Web3D Technology For
Model-Based 3D Virtual Environments
&
Enhancing Naval Systems Engineering Collaboration

Informational Overview
October 16, 2018

Setting the Stage for Digital Engineering Strategy

- ➢ Strategic defense priorities requiring accelerated delivery of lethal capacity, increased agility and affordability to compete and win
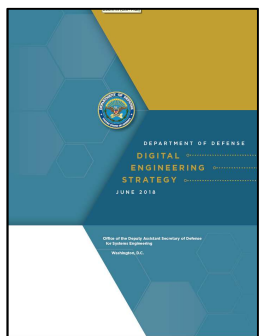
- ➢ DOD Digital Engineering Strategy calls for conducting engineering in more integrated virtual environments

  - ➢ Share 3D models, rapidly & iteratively assess risk through testing decisions and alternative solutions in collaborative 3D Virtual Environments (3DVE)
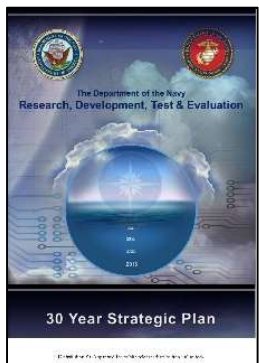
- ➢ The Naval Enterprise must adopt cross-SYSCOM systems engineering practices and culture that creates, shares and repurposes digitized data to the greatest extent possible

  - ➢ Rapid adoption of enabling digital technologies that can increase velocity, adaptability, collaboration, visibility, innovation and learning

Web-based 3D Technology For Virtual Environments

- ➤ Web3D technology is enabling enterprise-scale 3DVE capability

  - ➤ Affordable & scalable transition to shared agility services available DOD-wide

  - ➤ Rapid & iterative 3D coordination across research, acquisition, training, Fleet and lifecycle maintainer communities

  - ➤ Accelerate the pace of 3D communication, discovery, adoption and adaption

  - ➤ Increase cost avoidance opportunities through model-based collaboration

NAVFAC SPIDERS 3D Virtual Naval Installation Environment
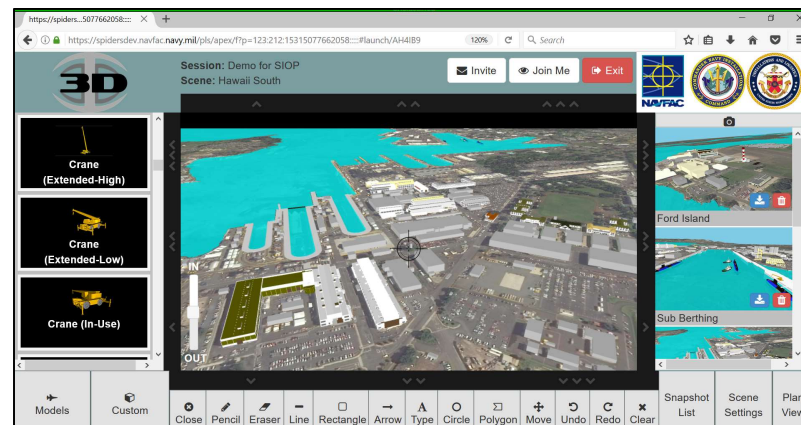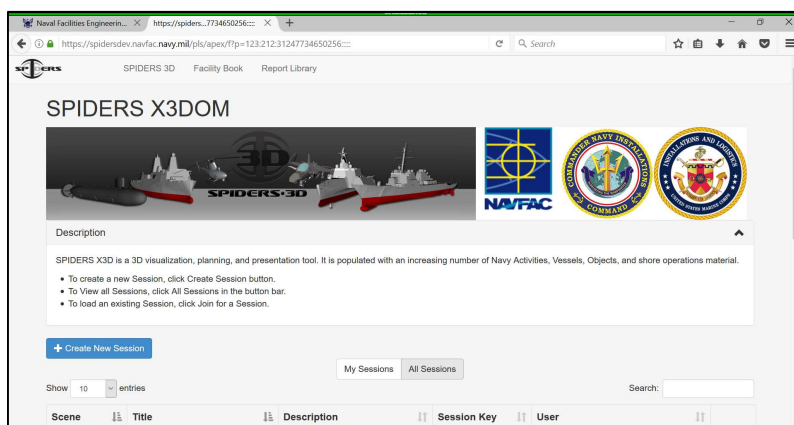
Enterprise capability to share contextualized 3D models from concept to theater engagement planning

Key Attributes and Benefits of Web-based 3D Models & Virtual Environments

- ➢ Derived from authoritative model and data sources

  - ➢ "Unlocked" COTS formats into open/neutral standard format for web-based sharing & archiving

  - ➢ Laser scanning sourced models in publishable format

- ➢ Geometrically and geospatially accurate, conveys model metadata

- ➢ Optimized model file sizes for constrained enterprise network bandwidth

  - ➢ Digital file size reduction from terabytes/gigabytes to megabytes/kilobytes

- ➢ Web standards enable sustainable cross-SYSCOM digital engineering processes across full platform/program lifecycles

- ➢ Shareable publication of diverse 3D models enables effective system engineering activities, regardless of original data source

- ➢ Enables comprehensive long-term approach for 3D sharing, collaboration, visualization, printing, scanning, publication and correlation across all pillars of the Digital Engineering Strategy
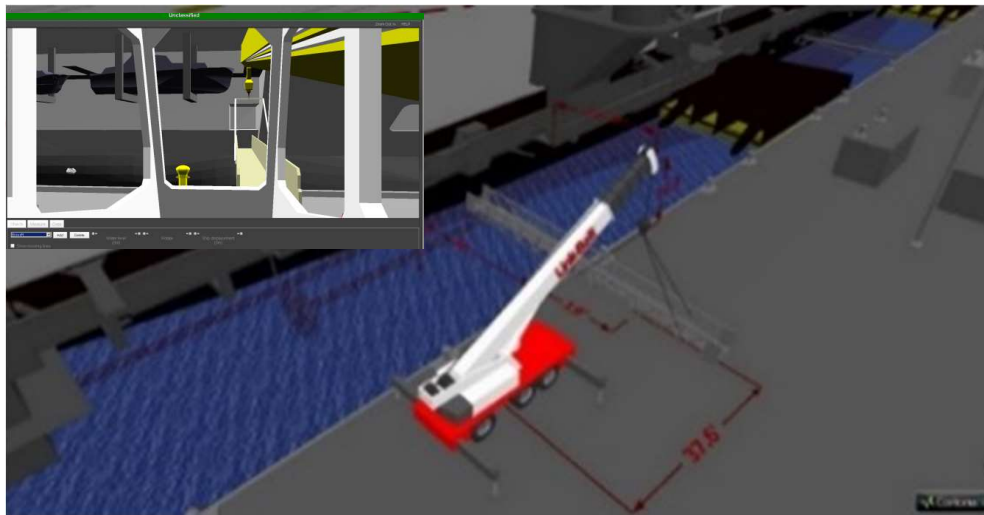
# Use of Models to Inform Enterprise and Program Decision Making

➢ Web-based 3DVE enabling PEOs, Fleet and Shore Enterprise stakeholders to early and iteratively assess risk for platform/shore interface design

   ➢ Normalizing & contextualizing multiple disparate 3D product models

   ➢ Informing early design assessments & enabling early platform introduction planning and cost avoidance opportunities

   ➢ Accelerated technical collaboration, consensus & decision making processes

Use of Models to Inform Enterprise and Program Decision Making
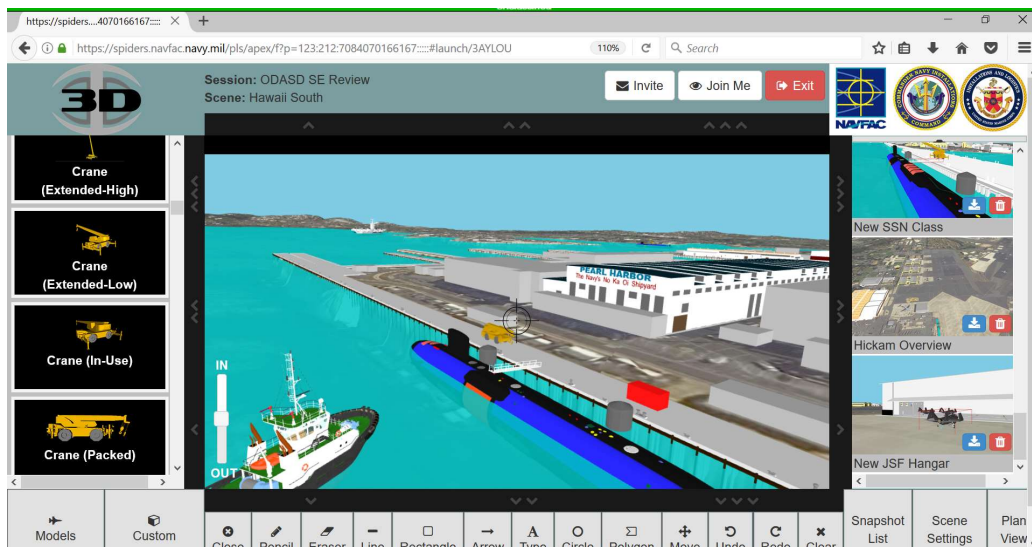

- ✓ Interactive 3D Models in Geospatial Context
- ✓ High Velocity Group Learning Environment
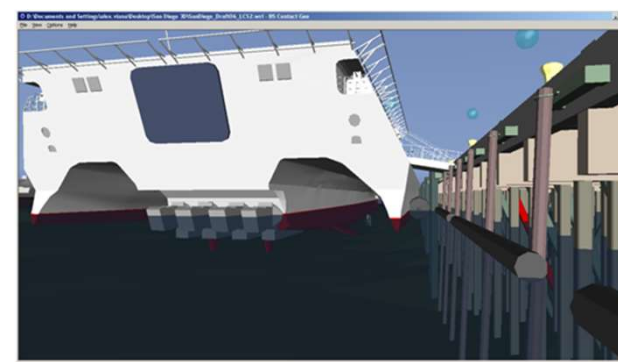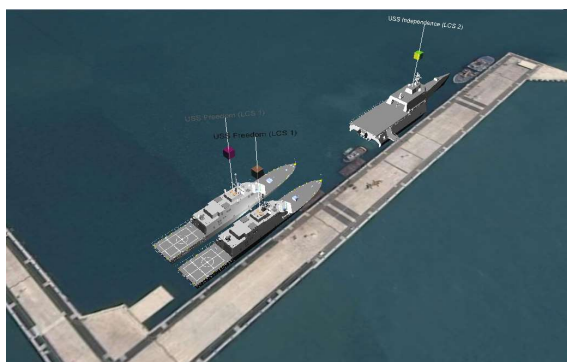
Provide an Enduring and Authoritative Source of Truth

- ➢ NAVFAC's 3DVE visualizes authoritative mission-critical shore infrastructure model data
  - ➢ Component-level system configurations, capacity, condition data supporting platform/shore interface design & systems engineering
- ➢ Repository of sharable Web3D-based models derived from authoritative sources
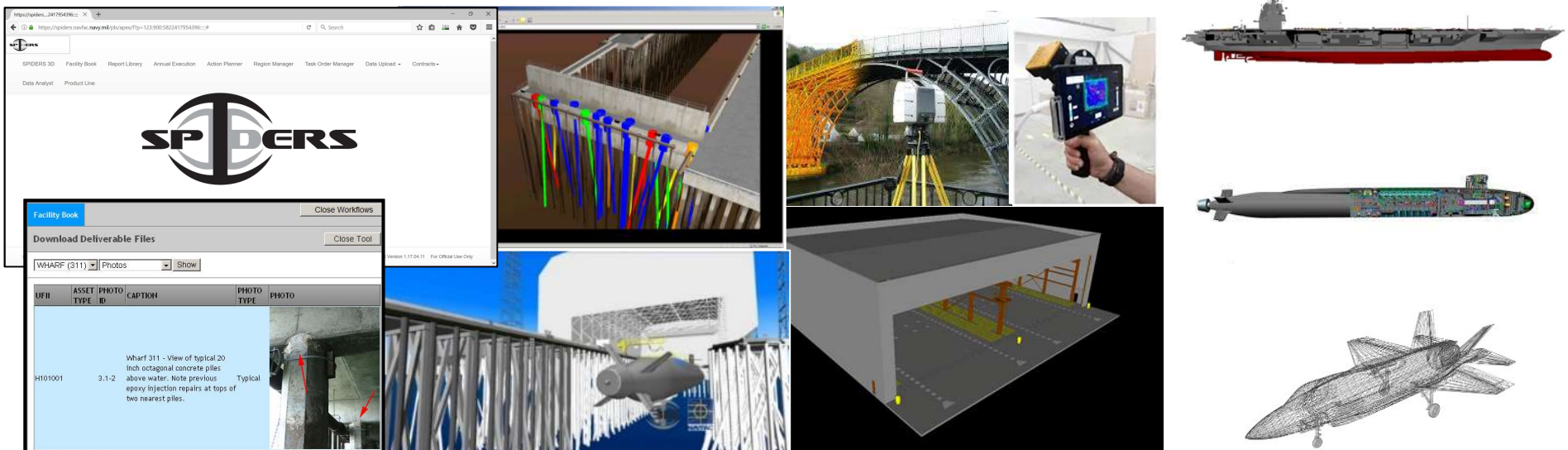
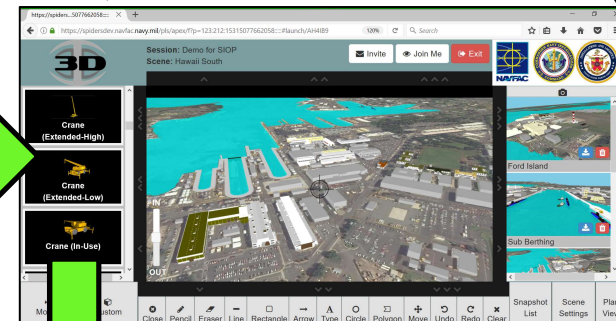# Technological Innovation to Improve Engineering Practice

➢ Extensible 3D (X3D) data standard provides digital data interoperable between model-based 3DVE and Additive Manufacturing 3D print models

➢ Innovating the management, optimization, delivery and physical realization of 3D digitally engineered assets across the .mil network

Visualize & Share 3D Models (.edu)

Visualize, Share & Contextualize 3D Models (.mil)

Transitioning 3D Model Exchange capability from Navy .edu to .mil

(Near Future) Print 3D Models from .mil Web

X3D is a 3D Print File Format

Infrastructure & Environments to Perform Activities, Collaborate & Communicate

- ➤ Cloud ready environment & cyber secure capable data standard to scale & accelerate enterprise 3D model-based collaboration activities via web enabled devices

- ➤ X3D is a royalty-free open standard that conveys metadata conventions for 3D interoperability, composability, and reuse

  - ➤ X3D is backwards + forwards data compatible with no software license lock-in & no contractual timeouts for sustainable digital engineering collaboration

Enabling evolution of standards-based, interoperable and networked 3D model-based ecosystem
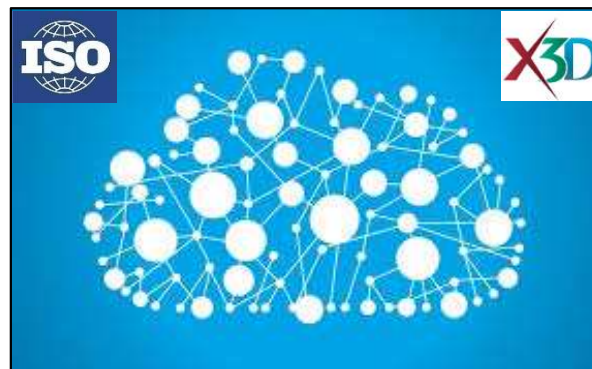
- ➤ Web3D provides unparalleled ubiquitous model-based 3DVE tool access across the .mil network to accelerate transition from 2D to 3D systems engineering and model-based business practices

- ➤ Real-time 3D communication enables collaborative presentation of 3D products, enabling meaningful information sharing and early risk identification across disciplines and with industry

  - ➤ Enabling high velocity learning and collective cross-domain insights

- ➤ Web3D for viewing, printing and scanning as a practical, everyday first-class media type permeating all business practices & use cases

Digital Engineering
Enabling Technology Summary

- ➤ The web is an enabling platform for evolving & sustaining Naval cross-SYSCOM digital engineering processes

- ➤ Sharing 3D models is the key for effective Naval system engineering activities

- ➤ 3D Virtual Environments provide the risk-free medium for model-based collaboration/coordination over the DOD's networks

- ➤ Web3D technology enables disparate 3D models to be interoperable, in geospatial context & accessible across all web enabled devices

- ➤ Web3D is a royalty-free data standard enabling affordable and sustainable use/reuse/archiving of digitally engineered 3D models across platform lifecycles

www.web3d.org

Thank You

Points of Contact

Alex Viana
NAVFAC HQ
Alex.viana@navy.mil
202.685.9259

Don Brutzman
NPS MOVES
Brutzman@nps.edu
831.656.2149