

Naval Web-Based Collaboration and Model Exchanges using X3D

Navy Capabilities using Open Standards

<p>Don Brutzman Naval Postgraduate School (NPS) Web3D Consortium X3D Working Group Co-chair</p> <p>brutzman@nps.edu</p>	<p>Alex Viana SPIDERS3D Program Manager Naval Facilities Command (NAVFAC), Navy Yard Washington DC</p> <p>alex.viana@navy.mil</p>	<p>Mike Russalesi Web3D Board of Directors CTO, Synergy Software Design (SSD) Maritime Plaza, Washington DC</p> <p>mike@ssdlc.biz</p>
---	--	---

30 January 2016

Agenda

morning

0900 Welcome, introductions, order lunch!

0915 Emerging Capabilities with Web Standards (Brutzman)

0925 Spiders3D Virtual Naval Installation (Viana, Russalesi)

0940 NIH 3D Print Exchange (Coakley-McCarthy, Hurt)

1000 Navy X3D Model Exchange (Brutzman)

1015 NPS Student Studies and AM/VR Research (Sadagic)

1030 Break

1045 NAVAIR Product Lifecycle Management Contract Data (Gilbert)

1100 NAVFAC EXWC Expeditionary Engineering AM (Reese, Macias)

1120 Web3D Consortium Strategies, Opportunities (Havele, Polys)

1140 Navy 30-Year RDT+E Strategic Plan Initiatives (Moore)

Agenda

extra inning

1200 Lunch (here or nearby)

1300 N41 Perspectives, Around the Room Discussion (Bridges, Brutzman)

1400 Formal program complete

Speaker and Participant Introductions

Name and affiliation please

Abstract: why are we here?

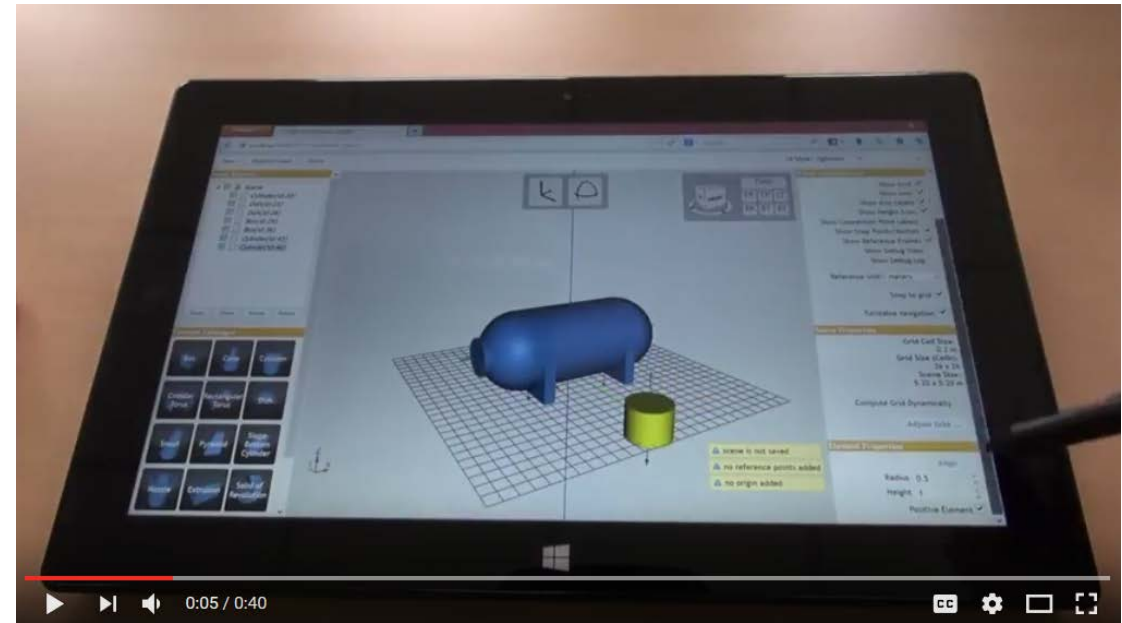
- Multiple opportunities for cooperative Navy and Marine Corps innovation using 3D models are emerging.
- Shared 3D visualization over Web can help naval personnel worldwide via *better insight*, increased *velocity of learning*, and *knowledge sharing*.
- The objective of this information meeting is to raise awareness, and share recent examples showcasing innovation using Web-based 3D graphics.
- Of interest: explore shared strategies for key innovation enablers in the areas of collaboration, model exchanges and additive manufacturing (AM).
- These practical capabilities can have positive effects on system design goals, contracting requirements, logistics, maintenance and operations.

Approach and Advance

- Data standards provide archival stability for long-term re-use even as software capabilities continue to advance rapidly.
- Multiple speakers providing fast-paced briefings that together show a "bigger space" emerging. All presentations are going online.
- Participants can discuss their reactions "around the room" together to share ideas, opportunities. What potential synergies can advance "art of the possible" for Navy/USMC ?
- Thank you for joining us to share ideas and consider new innovation possibilities for 2017 and beyond.

SIGGRAPH 2016: X3D Fast Forward Video

X3D is the International Standard for interactive 3D graphics and real-time communication on the Web.



1. Multiple scenes showing Animation, supported by multiple players.
2. Interactive 3D graphics on mobile and immersive device platforms.
3. Presentation of Geospatial Data, graphs and text description.
4. Embedded in HTML, embedded in a web page, no need for external plugins.
5. Stereoscopic TV or presented on auto-stereoscopic TV.
6. CAD models, applications include visualization in Computer Aided Engineering.
7. Human Animation (H-Anim) includes dynamic and interactive human figures.
8. Volumetric rendering for Medical Imaging.
9. Urban modelling and animated city-scapes for urban modelling and planning.

What is Extensible 3D (X3D) Graphics?



X3D is a royalty-free open-standard file format

- Communicate animated 3D scenes using XML, in Web pages or separate
- Run-time architecture for consistent user interaction
- ISO-ratified standard for storage, retrieval and playback of real-time 3D graphics content
- Enables network communication of 3D data across applications, and provides archival publishing format for 3D models on the Web
- Rich set of componentized features for engineering and scientific visualization, CAD and architecture, medical visualization, training and simulation, multimedia, entertainment, education, and more

Publish and share 3D models using Web

X3D design rationale: *platform independence*

- 3D content defined in device-neutral, language-neutral fashion
 - Example: “selection” rather than button/point+click/activate/gesture/etc.
 - Those modalities can each be applied coherently, rather than uniquely
- Aligned with Web architecture
 - Declarative, augmented by Scripts for imperative activity
 - URL for anchors, files, streams, etc.
 - Media types, protocols, etc.
- Adaptation and reuse, rather than compilation/version dependencies



X3D Profile for 3D Printing and Scanning

- New work by Web3D Consortium has commenced
 - Initial drafting stage, now determining requirements
 - Preparing X3D Profile 3D Printing and Scanning
- Recognize 3D printers are a “vertical” capability domain of end users, tool developers, hardware systems, workflows
- Recognition that 3D scanning is a rapidly emerging complement with overlapping technical requirements
- How big an overlap?
 - 3D printing is *bits into atoms*
 - 3D scanning is *atoms into bits*



Interoperability - what's the difference?

Multiple paths, but often confused as equal

- **Standard:** proven process for content interoperability, scalability, compatibility, licensing, growth, success
- **Specification:** Algorithm descriptions, necessary detail
 - But might hide royalty problems such as GIF imagery debacle

Open source software: pile of (maybe repeatable) code

- But: usage licensing is not same as source-code licensing

Market share dominance: biggest competitor wins?

- Companies (or at least investors) hope to “own” 3D
- But: many defunct companies, dead-end technologies
- Everyone ends up with much smaller market than the Web



How Important is Stability?

- 3D graphics authors create wonderful content, but it tends to “time out” and break after 2-3 years, simply becoming no longer usable due to software changes, company acquisitions/shutdowns, etc.
- Creating quality 3D content is expensive, both time & software costs
- Something just as expensive: recreating identical quality 3D content when underlying software/hardware technology might no longer work
- X3D provides an accessible archival approach for publishing 3D content

Discussion: lots of important next steps!

- Feedback form to share your thoughts
- Key enablers and roadblocks to collaboration progress
- Tell us what else you need
- Tell us what you think should happen next

Looking forward: what else?

People accomplish more when working together

Questions and suggestions are always welcome

Contact

Don Brutzman, Ph.D.

brutzman@nps.edu

<http://faculty.nps.edu/brutzman>

Code USW/Br, Naval Postgraduate School
Monterey California 93943-5000 USA
1.831.656.2149 work