



*Application of  
Virtual World Technologies  
to Undersea Warfare Learning*

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20 August, 2009

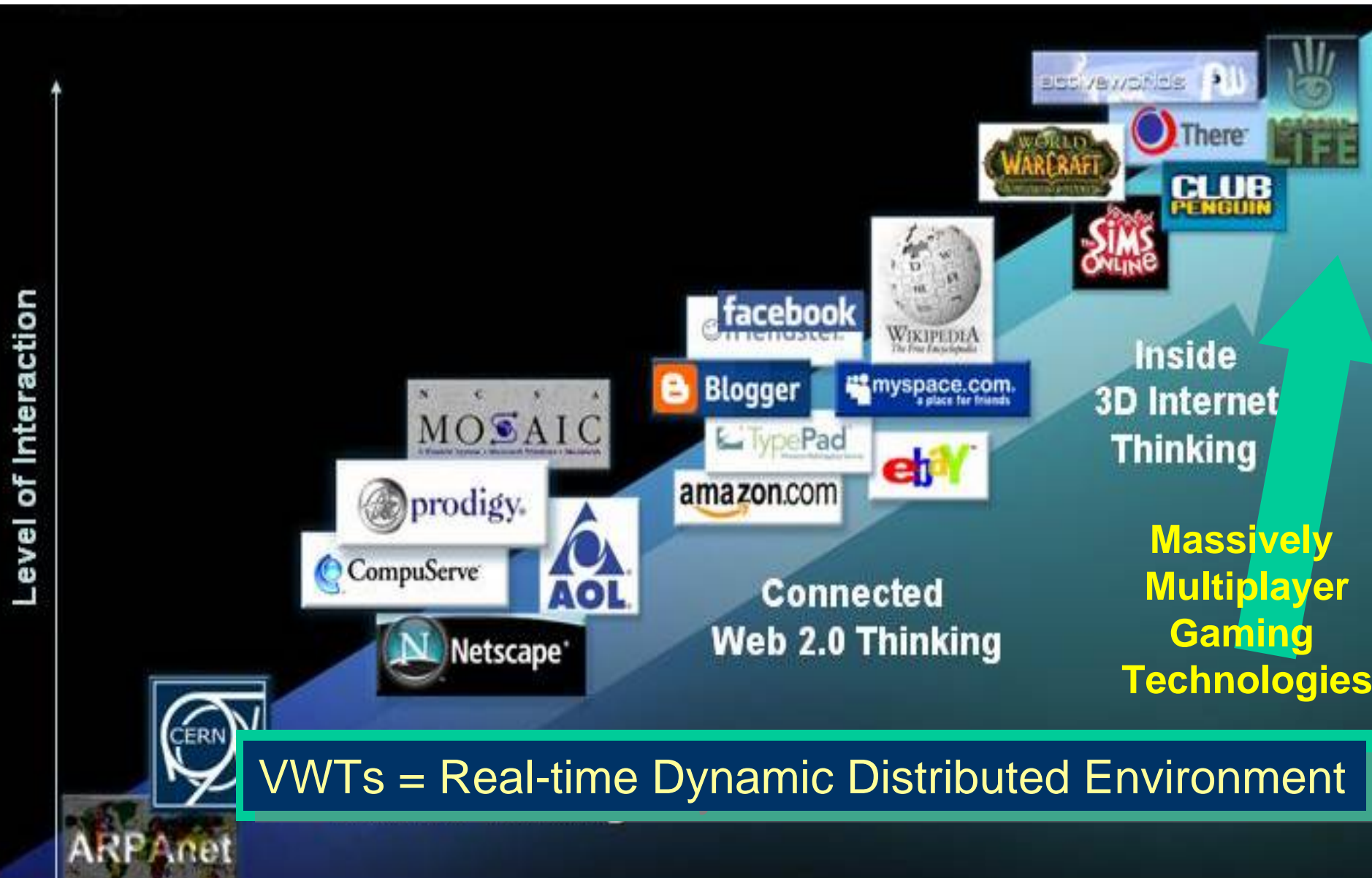
# Report Documentation Page

Form Approved  
OMB No. 0704-0188

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1. REPORT DATE <b>20 AUG 2009</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2009 to 00-00-2009</b>	
4. TITLE AND SUBTITLE <b>Application of Virtual World Technologies to Undersea Warfare Learning</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Naval Undersea Warfare Center, Division Newport, 1176 Howell Street, Newport, RI, 02841-1708</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>ImplementationFest2009, 18-20 Aug 2009</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
<b>unclassified</b>	<b>unclassified</b>	<b>unclassified</b>	<b>Same as Report (SAR)</b>	<b>14</b>	

# Virtual World Technologies (VWTs)



# Virtual World Characteristics



Information arranged in **3-D** and accessed via geo-spatial referencing or teleports

User **immersed** in information with unique representation in common virtual space

Experience is **social** where users interact with each other (visual, chat, voice)

Supports Improved Information Management





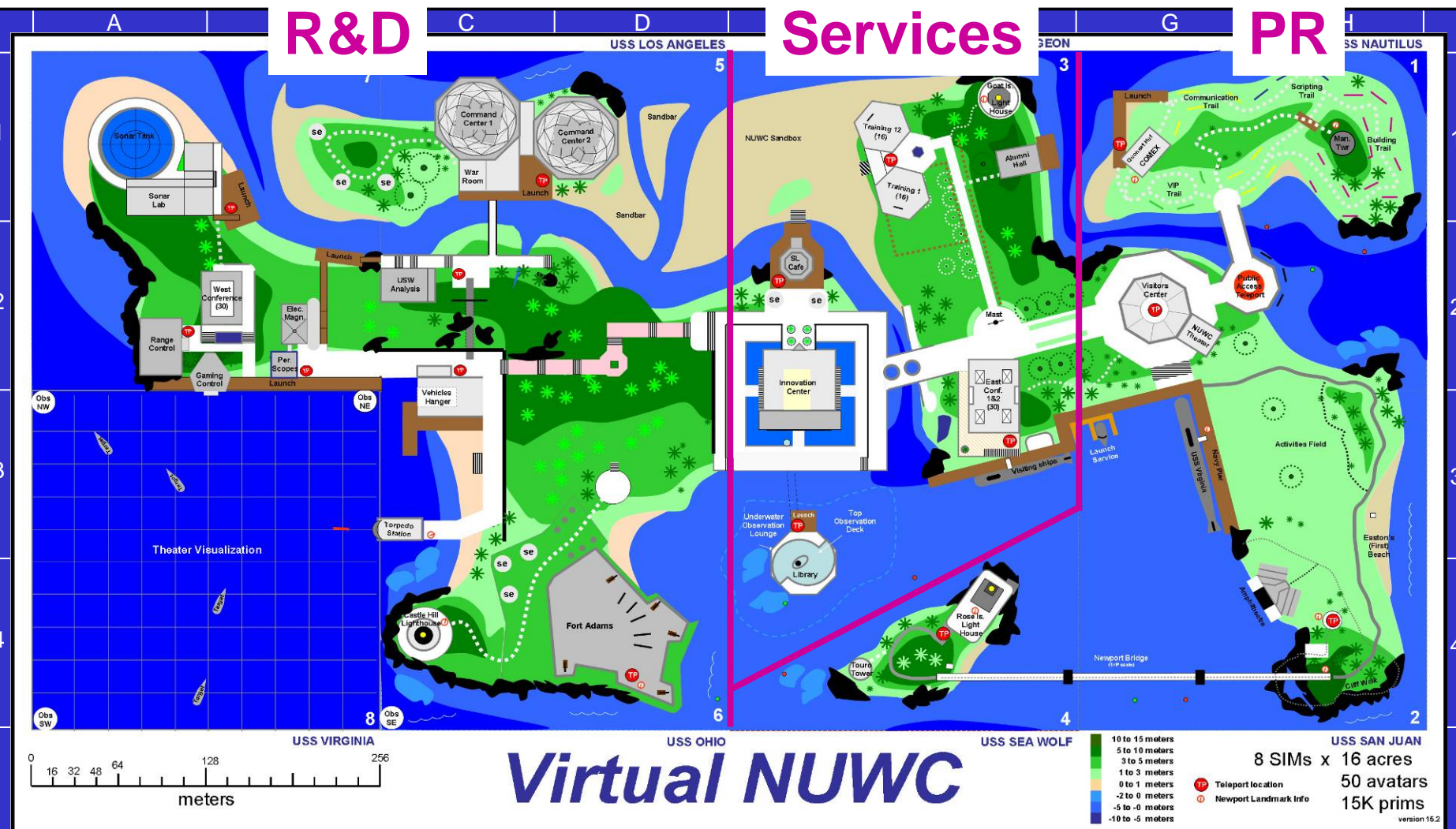
# NUWC Mission Objectives

- NUWCDivNpt recognizes that rapidly evolving gaming and visualization technologies have the potential to radically change the way the Navy approaches **Collaboration & Innovation**
  - The primary FY08 goal was **investigation** of various virtual world technologies (i.e., Second Life, Open Sim , OLIVE and Wonderland) to fully understand their strengths, weaknesses and limitations.
  - The primary FY09 goal is **experimentation** so that NUWC, its customers and sponsors can effectively apply this technology in support of undersea warfare mission areas.

# Virtual Worlds Focus

- Defense Intelligence Agency (DIA) reports over 300 Virtual Worlds in development
  - **Second Life** (Linden Labs) = largest but public access only
  - **OLIVE** (Forterra) = custom scenario trainer
  - **Open Simulation** = open source clone of Second Life
  - **Wonderland** (Sun) = share existing desktop applications
  - **Qwaq Forums** (Qwaq, Inc.)= virtual meeting spaces
  - **eXtensible3D** = open standard formats and architecture
  - **ProtoSphere** (Proton Media) = enterprise solution for collaboration
  - **Real World** (DARPA) = user-definable scenario training
  - **Active Worlds** = small bandwidth, many users
  - **Joint State Response Training System (JSRTS) EM Nexus** (National Guard) = custom scenario trainer
  - **Croquet** = Open source metaverse software foundation
  - **HiPiHi** = Chinese clone of Second Life

No “One Stop Shopping” for Virtual Worlds



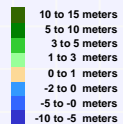
# Virtual NUWC

8 Sims x 16 acres  
50 avatars  
15K prims  
version 15.2

10 Mile Drive	G2 H-4	Electro-Magnetics Lab	B-2	Movie Theater	G-2	Theater Observation Towers	A-3 B-4
Activities Field	G-3 H-3	Fort Adams Weapons Lab	C-4 D-4	Newport Bridge	F-4 H-4	Theater Visualization	A-3 B-4
Alumni Hall	F-1	Game Control	A-2 B-2	Orientation Trails	G-1 H-1	Touro Tower	E-4
Captain's Mast	F-2	Goat Island Light House	F-1	Periscope Tower	B-2	Training Room 1	E-1
Castle Hill Light House	C-4	Guest Dock	F-3	Public Access Teleport	G-2	Training Room 2	E-1
Cliff Walk	H-4	Harbourside Amphitheater	H-4	Ranges Lab	A-2	Torpedo Launching Station	C-3
Commercial Exchange	G-1	Innovation Center	E-2 E-3	R&D Cross Over Path	C-2 D-2	Undersea Obs. Lounge	E-3 E-4
C							
C							
C							
C							
3							
Easton's (First) Beach	H-3 H-4	Miantonomi Tower	H-1	Sonar Laboratory	A-1	War Room	C-1

# Virtual Worlds Collaborative Environment (VWCE)

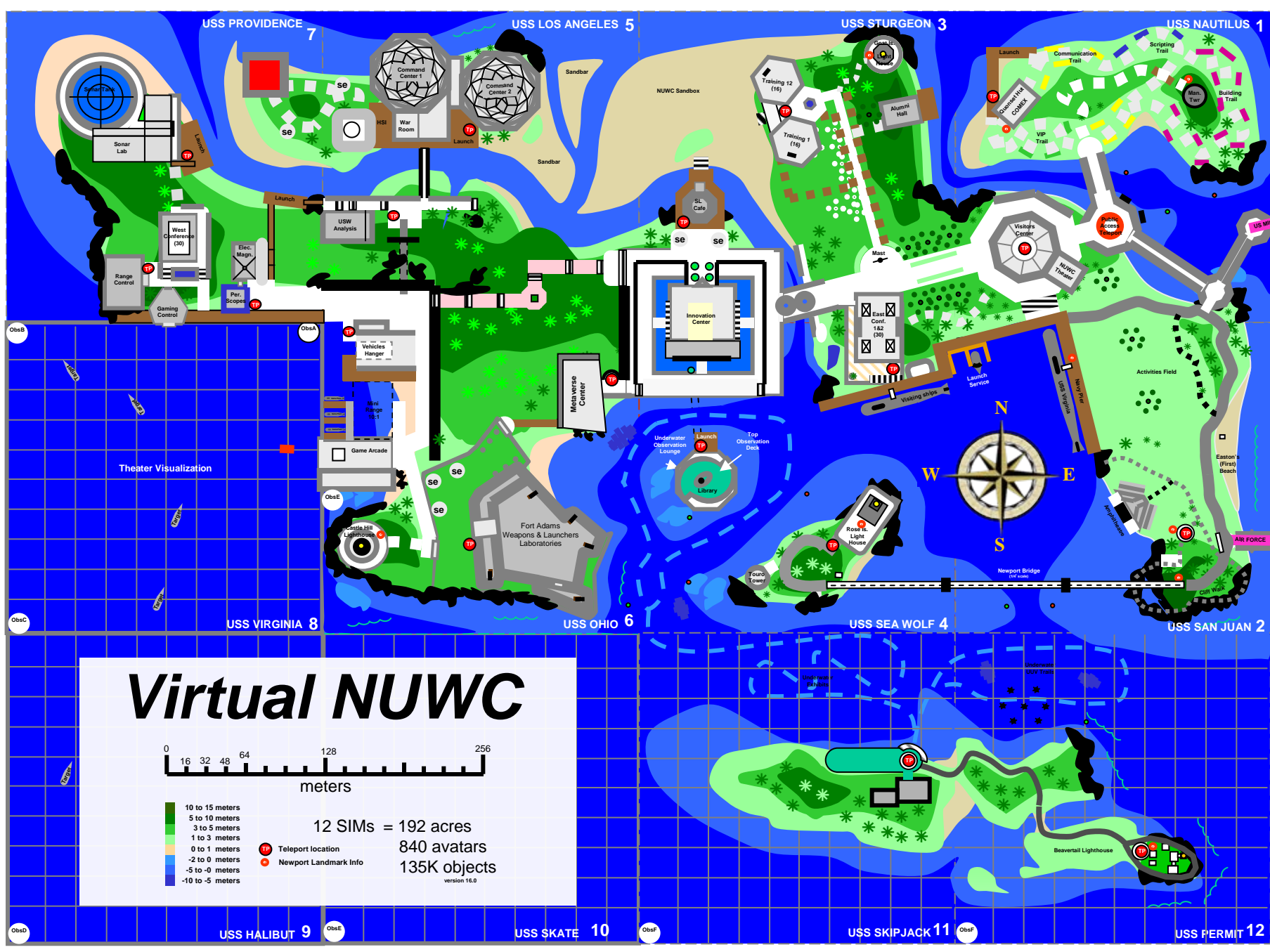
# Virtual NUWC



12 SIMs = 192 acres

840 avatars

● Teleport location  
● Newport Landmark Info  
 135K objects  
version 16.0





# Coordinated Military Presence

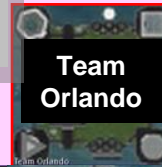
## MARINES & OTHER

- **NUWC is organizing a coordinated military coalition presence into Second Life**
  - Linden Lab provides a *Coalition Hub* to act as a central information and access point
  - Provides greater visibility and sharing of resources as new agencies set up presence

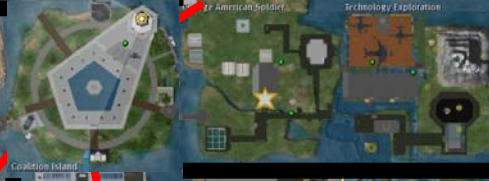
ARMY



US Army



Team Orlando



MyBase



Virtual NUWC

NAVY

AIR FORCE



# Use of Virtual Worlds for Training and Education

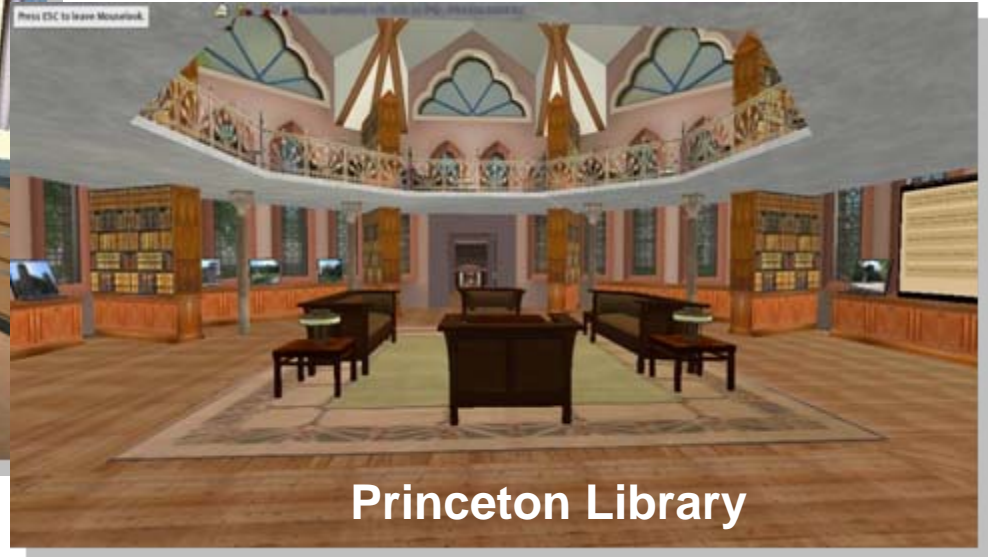
- Virtual Worlds are being used by many organizations and academic institutions to educate and train in new ways
  1. Remote access learning in a traditional classroom setting
  2. Remote access training of specialized skill sets or tools
  3. Scenario training requiring mass participants
  4. Immersive Learning via virtual immersion into information space

18 of top 20 US Universities Have Second Life Land –  
CEO, Linden Labs, Mark Kingdon

# Class Room Training



Ohio University Chemistry Lab



Princeton Library

- Virtual Worlds support remote access for students / instructors to traditional classroom training with immersion, spatial voice, IM, Power Point, streaming video, text/movie recording
- Over 300 educational institutions have set up virtual campuses for remote learning including the 18 of top 20 US universities (e.g., Harvard Law School)
- Complete current list of resources in Second Life at: <http://simteach.com/>

# Skill Training

- Virtual Worlds can provide remote, collaborative access to specialized tools (**real or simulated**) and situations requiring unique skills
  - Provides greater time-on-asset, removes inherent risks/dangers, and provides greater control over information presentation
- Submarine example: operators and instructors remotely log into high fidelity virtual representation of 688i / Virginia attack center in Wonderland™ VW
  - Operators have interaction with each other and **full VNC access to actual CBOT displays** running on actual remote hardware
  - Demonstrates ability to conduct remote team training, COOPEX planning, distributed testing.

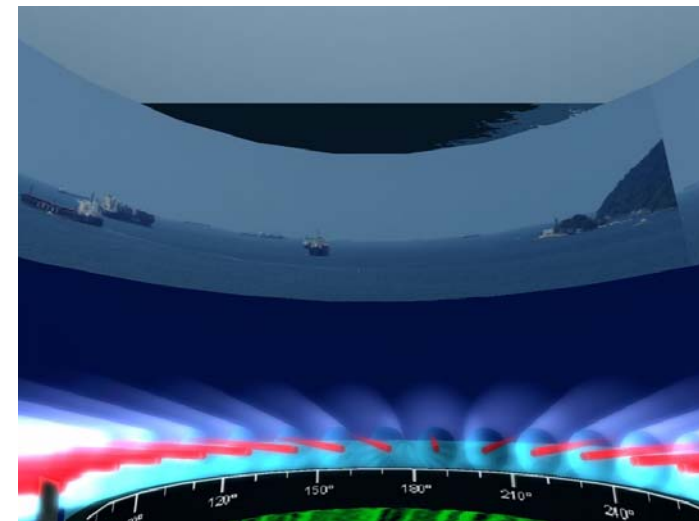


**“Trucking companies, for instance, are teaching drivers how to parallel park their vehicles using simulations built in Second Life” – McKinsey & Co. 2008**

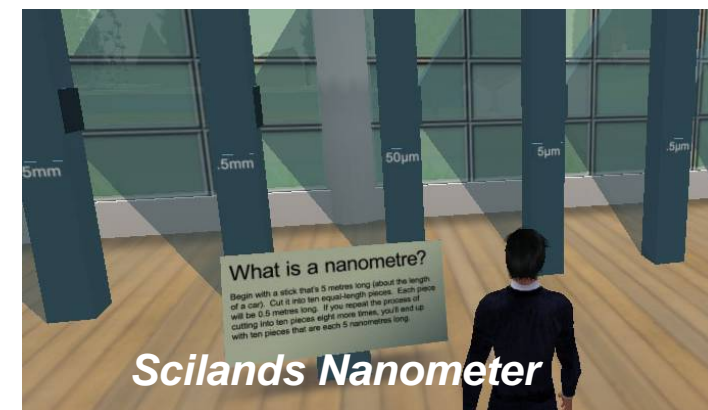


# Immersive Learning

- An optimized blend of simulation and game that leads to the learner being motivated by, and immersed into, the purpose and goals of a learning interaction.
- Immersive Learning simulations work
  - Over 93% of (1100) respondents who have created an ILS report that their efforts produce results that are better than other forms of rich-skill practice (source: eLearning Guild)



**Acoustic Detection  
Exhibit at vNUWC**



**Scilands Nanometer**

“A school history class could, for example, spend a lesson wandering around the ruins of Pompeii or Petra, going into buildings and seeing what they would see if they were actually there, providing a much livelier form of education in a form that can be exported around the world.”

“ - Smart Services CEO Warren Bradey

# Project Bluejacket

**Objective:** Explore the use of Virtual World Technology to teach basic submarine tactical skills such as Target Motion Analysis (TMA), contact management and weapon presetting

**Requirements:**

Intuitive / Interactive / Engaging / Fun  
Multi-player access supporting team building  
Supports student evaluation via metrics  
Mission focused scalability to more complex problems/goals  
Stand-alone and/or centralized with remote access

**Approach:**

- 1) Map out initial game storyboard integrating learning objectives into game goals (using Mind Map tool)
- 2) Investigate basic gaming environment and infrastructure components using Second Life™\* virtual world
- 3) Prototype game for evaluation by Submarine Learning Center (March 2009)





# Conclusion



## IMMERSIVE LEARNING TRAIL

- With over 300 VWTs in development it is a challenge to keep abreast of their evolving capabilities and match a particular VWT with enough maturity to an appropriate military application.
- No one world meets all our requirements!
- Second Life is proving to be a flexible, extremely capable VWT earning our continued focus as we strive to bring this technology to fruition in support of today and tomorrow's war fighter.