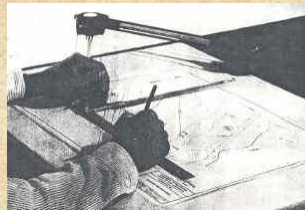




Back to the drawing board in Virtual and Real Worlds



Jeanne Holm, Tom Soderstrom, and Charles White
Jet Propulsion Laboratory
California Institute of Technology

1 April 2008



50 Years of Service

- ◆ Inspiration, Innovation and Discovery has shaped and improved our lives
- ◆ We stand today on the cusp of a new era of exploration, we are ready to take the next step into the future



Earth, Moon, Mars & Beyond



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 It takes more than rockets...

"The future belongs to those who believe in the beauty of their dreams." ~Eleanor Roosevelt



4

A composite image featuring a NASA logo in the top left corner. The main text reads "It takes more than rockets..." followed by a quote from Eleanor Roosevelt: "The future belongs to those who believe in the beauty of their dreams." Below the text is a photograph of an astronaut in a white spacesuit kneeling on the reddish, rocky surface of Mars. The astronaut's helmet is reflective, showing a distorted view of the surroundings. The background shows a hazy, orange-tinted sky. A small number "4" is visible in the bottom right corner of the image frame.



It takes visualized dreams...



“Imagination is more important than knowledge.”

~Albert Einstein

Riding his bike at Caltech

“The scientist merely explores that which exists, while the engineer creates that which never was.”

~Theodore VonKármán, c.a. 1957

Founder of JPL



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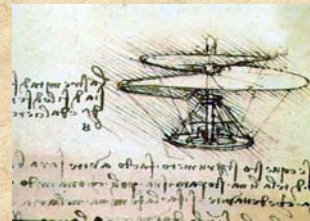
5



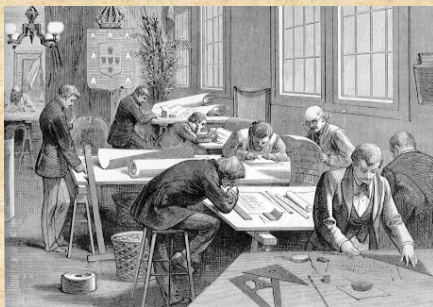
Visualizing space in 2 dimensions...



- ◆ Drafting is the only profession that historically can be documented... as the “oldest profession”. *1



*1 American Design Drafting Association



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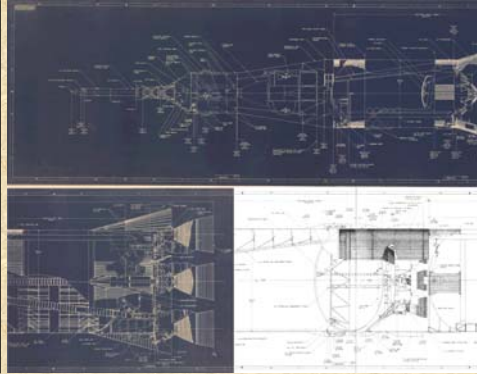


Not much change in centuries...

JPL Drafting Facility 1955



Apollo Blueprints 1960's



"When you are through changing, you are through." ~Bruce Barton

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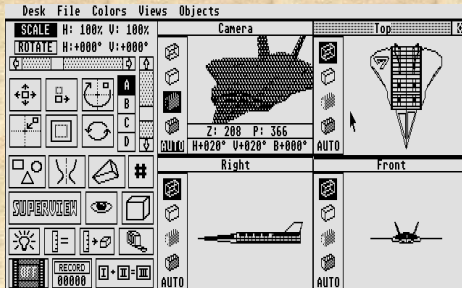


Evolution happens...

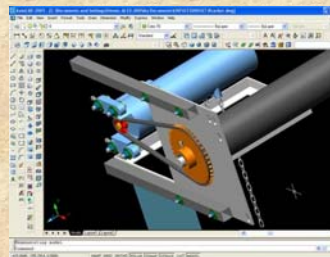
- ◆ Computer Aided Design
- ◆ CAD systems help us visualize 3D space on 2D screens and prints
- ◆ Drafters converted or retired



1990's Early CAD workstation



1987 CAD-3D 2.0 on the Atari ST



2005 CAD software

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New generation of dreamers...

- ◆ Today's university graduates were born with a bottle in one hand, and a mouse in the other
- ◆ They are inspired by space exploration, space movies, and role playing computer games
- ◆ This new generation expects to find new technology in the work place NOW!



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Generations Share Differently

- ◆ 1930-50's era generation
 - Focus on society
 - Friendships are forged through adversity
- ◆ 1960-70's era generation
 - Focus on community
 - Friendships forged through identification with a cause
- ◆ 1980-90's era generation
 - Focus on the individual
 - Friendships forged through individual goal accomplishment
- ◆ 2000's era generation
 - Focus on common interests
 - Friendships are created or thrive virtually...



The small print: In today's workforce, we need to share across generations and communicate in different modalities.

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JPL Project Design Center

- ◆ How will we design missions 5 to 10 years from now?
- ◆ We went from T-squares to mice, the future will be Avatars



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Match the Avatar – Round 1

- ◆ An “Avatar” is a 3D computer representation of a real human being
- ◆ A “Character” is often a computerized artificial intelligence



1



A



2



B



3



C

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Match the Avatar – Round 1

◆ Too easy!

- ◆ 1 is C
- ◆ 2 is B
- ◆ 3 is A



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Match the Avatar – Round 2

◆ Harder...



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Match the Avatar – Round 2

- ◆ Not limited to human forms
- ◆ An Avatar can be a toaster
- ◆ A glowing ball of gas



A “furry”



1



2



3



A



B



C

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People meeting Avatars...

***“Individually we are one drop,
together we are an ocean.”***

~Ryunosuke Satoro

- ◆ Virtual worlds brings together a 3D place for visualization, inside a cybernetic world
- ◆ Relationships, communications and collaboration in a virtual world is very much real
- ◆ Visualization is also real



Actual couples that met in Second Life.



Book: *Alter Ego: Avatars and their Creators* (Hardcover)
by [William Center](#) (Author), [Tony Danahy](#) (Afterword), [John Walker](#) (Introduction)

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Our *Victionary* of new words...

- ◆ “Massively Multiplayer Online Games” (MMOG)
 - E.g. Everquest (Sony), Word of Warcraft (8M, by Blizzard), Lineage II (14M, by NCsoft) (Entertainment)
- ◆ “Mirror Worlds”
 - E.g. Google Earth (>250M downloads), Microsoft Virtual Earth, NASA’s World Wind (open source), Google Moon, Google Mars, SIMS (Non-Fiction)
- ◆ “Virtual Worlds”
 - E.g. Second Life, There, Entropia Universe, Moove, Habbo Hotel, Kaneva (Fiction)
- ◆ “Metaverse”
 - The merger of all of the above... it has begun (e.g. IBM & Linden Lab)

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Elements of Virtual Worlds...

- ◆ Three dimensional space
 - Size and scale is now a variable from galaxies to atoms
- ◆ Training and Education
 - Massive participation in simulated environments
 - Learn by seeing, doing, and participating
- ◆ Social interaction
 - Collaboration, teaming, or project coordination
- ◆ Economy
 - Virtual assets can be owned and licensed
- ◆ Commercial
 - Competitive "edge" is crucial in corporate worlds
 - Opportunity to gauge customer reaction and feedback
 - Businesses no longer compete only in the real world

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Virtual Worlds and Web 2.0

- ◆ Virtual worlds are 3D immersive, persistent environments where people meet, interact, make friends, and accomplish tasks
- ◆ In part, NASA's presence in the Second Life metaverse arose from the President's Commission on Implementation of U.S. Space Exploration Policy
- ◆ Overall impression of Web 2.0 adoption
 - Management wonders why we should do this
 - Young engineers wonder when we will do this
 - Mashups on demand for new insight
 - Software as a service
 - Richer, more interactive sites
 - Emphasis on increased productivity
 - Increased mobility, virtualization, and security questions
 - More and faster sharing and collaboration



Survey of NASA, FFRDCs, aerospace companies, and industry in spring 2007 by Tom Renfrow and Tom Soderstrom (JPL)

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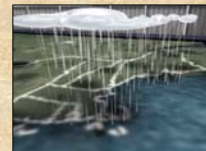
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What Are Others Doing?

- ◆ Real Life Government in Second Life group and activities
 - NOAA, NASA, State Department, Office of Management and Budgets, Swedish Embassy, Centers for Disease Control, National Institutes of Health, Library of Congress, and more
 - Citizen participation and services
- ◆ Aerospace industry (The Aerospace Corporation, International Spaceflight Museum, University space programs, Honeywell)
 - Marketing and sponsor engagement
 - Research and development for immersive collaboration
 - Global engineering teams
- ◆ General industry
 - Support for distributed workforce for meetings and collaborative work (decreased costs, increased employee satisfaction)
 - Marketing and sales



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What is NASA Doing?

- ◆ NASA notes that virtual worlds are an important space for action and has an agency-wide team for “NASA Immersive Synthetic Environments” (includes SL, virtual worlds, and gaming)
- ◆ NASA has four thrusts for virtual worlds
 - Mission support (modeling and simulation, collaboration, proposal development, and more)
 - Outreach (public engagement and participation)
 - Education (K-12 learning)
 - Training (internal)
- ◆ Activities in Second Life
- ◆ Current SL activities include
 - Explorer Island
 - NASA CoLab
 - Launch operations training
 - Modeling and simulation for Constellation Lunar Program
 - Celebrate NASA and Explorer 1 50-year anniversaries
 - Conference/event support and planning



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Let's Enter The Virtual World...

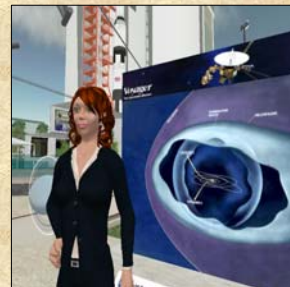
- ◆ Live presentation requires fast network connection
- ◆ Show YouTube NASA Video by Earth Primbe on YouTube.com
- ◆ Show PowerPoint presentation of screen shots



Charles White
(Jet Burns)



Tom Soderstrom
(TomS Soderstrom)



Jeanne Holm
(Devery Barrymore)

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YouTube Video NASA CoLab

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We cannot un-invent this...



- ◆ The Wright brothers could not foresee a 747, or a space shuttle
- ◆ The future of dreams, are engineered by need

- ◆ Virtual worlds will continue to evolve
- ◆ *Will you be ready?*



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Thanks!

- ◆ Many thanks to my colleagues on the NASA Knowledge Management Team
- ◆ Members of the JPL Friends of Second Life
- ◆ If you have any additional questions, contact us:
 - Charles.P.White@jpl.nasa.gov (SL: Jet Burns)
 - Jeanne.Holm@jpl.nasa.gov (SL: Devery Barrymore)
 - Tomas.J.Soderstrom@jpl.nasa.gov (SL: TomS Soderstrom)
- ◆ More information can be found:
 - NASA's KM program: <http://km.nasa.gov>
 - Second Life: Explorer Island
 - YouTube: NASA CoLab

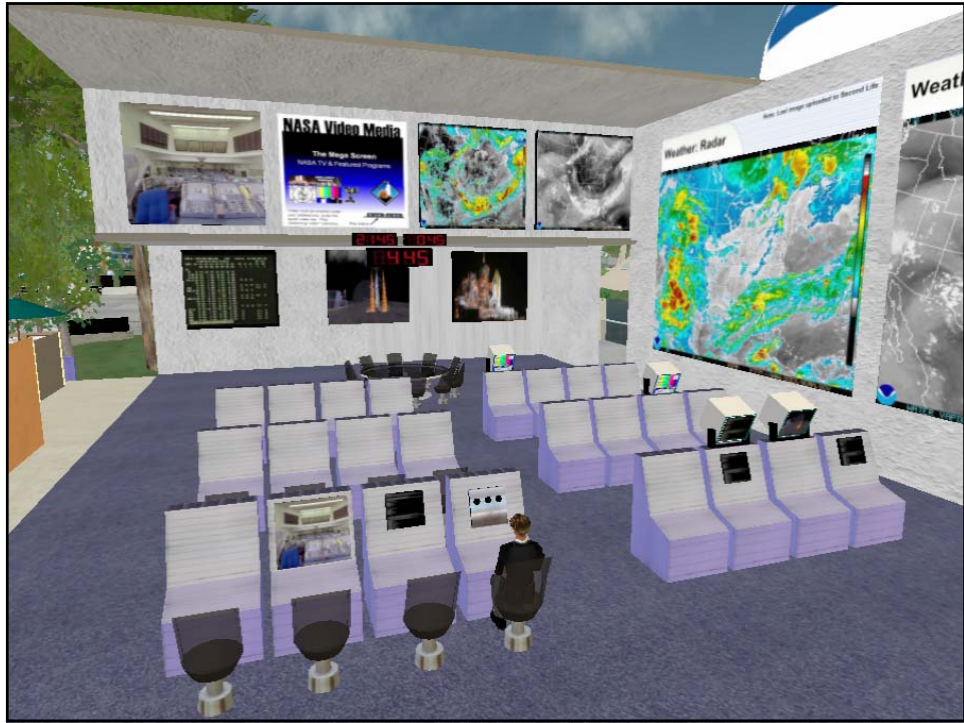


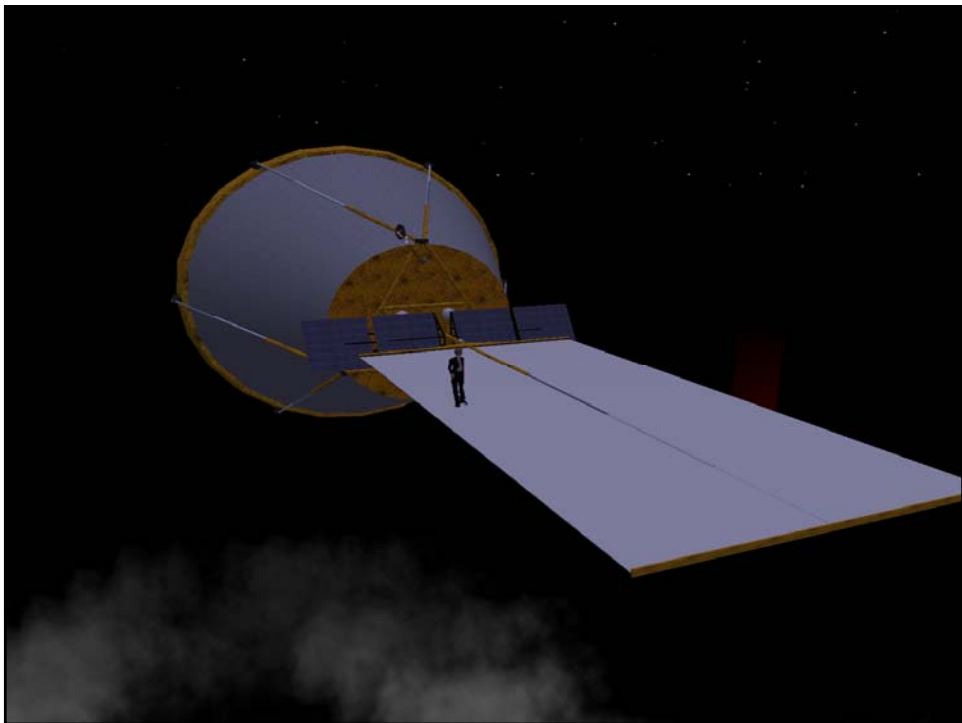
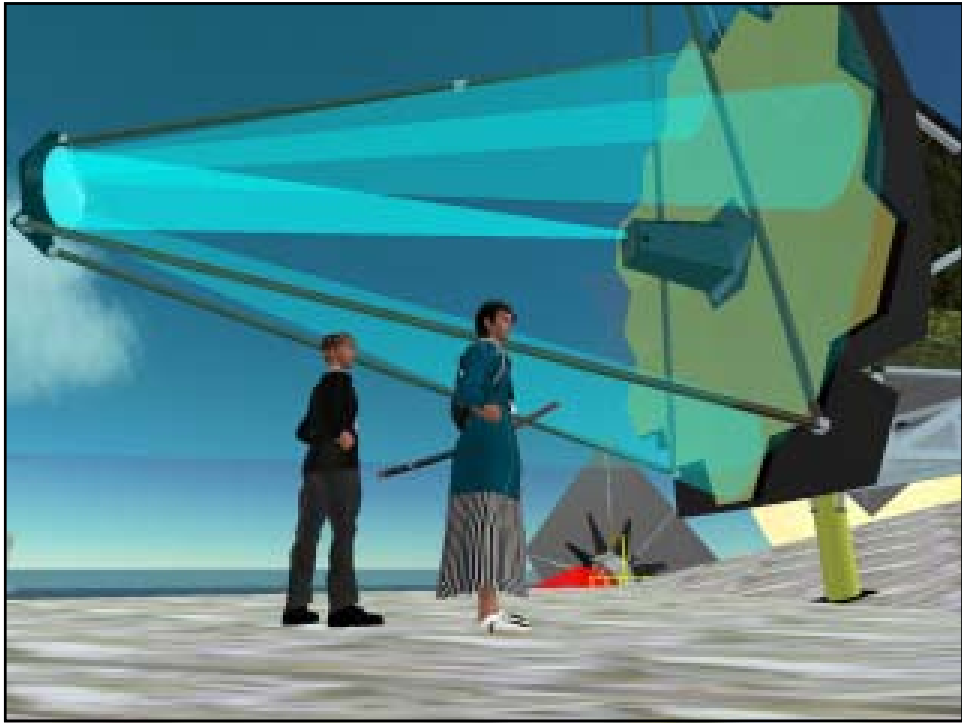
2D captures of a 3D world

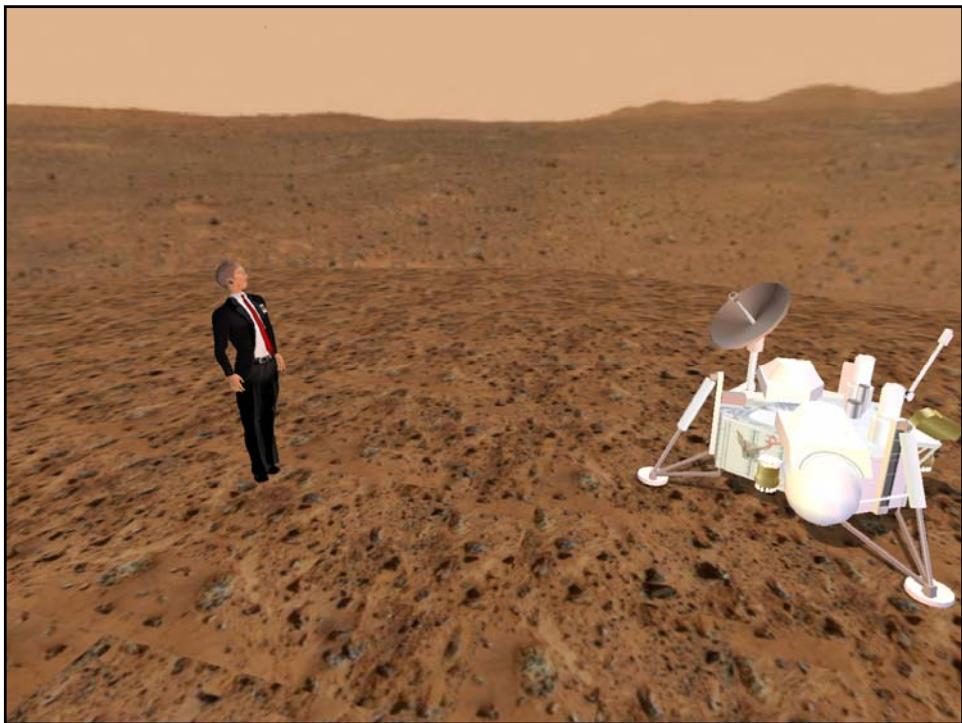
Screen captures of Second Life
Charles P. White

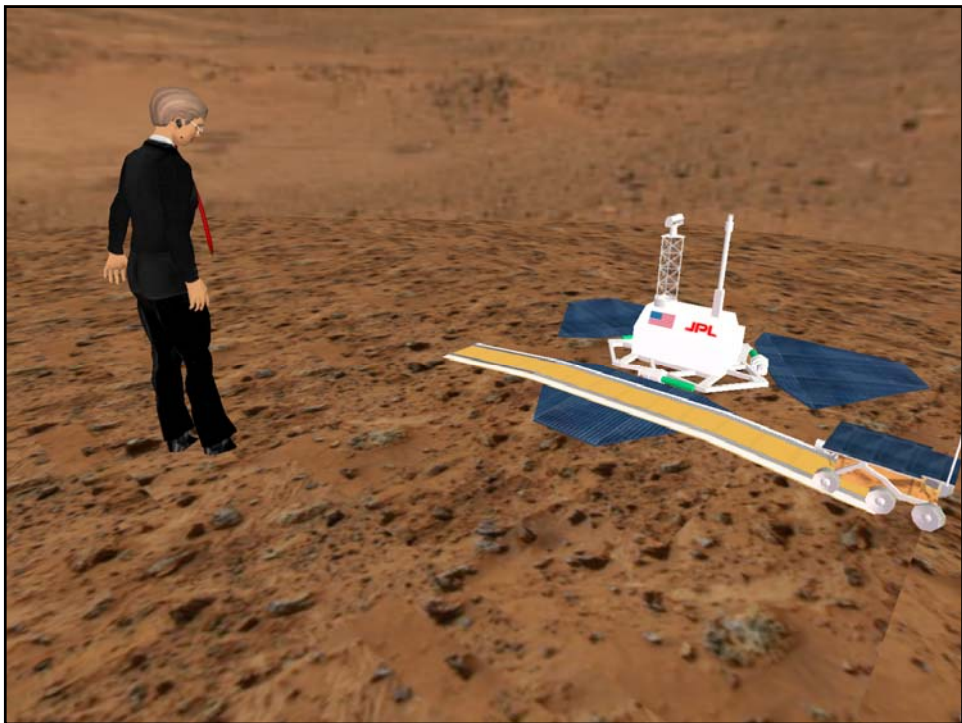
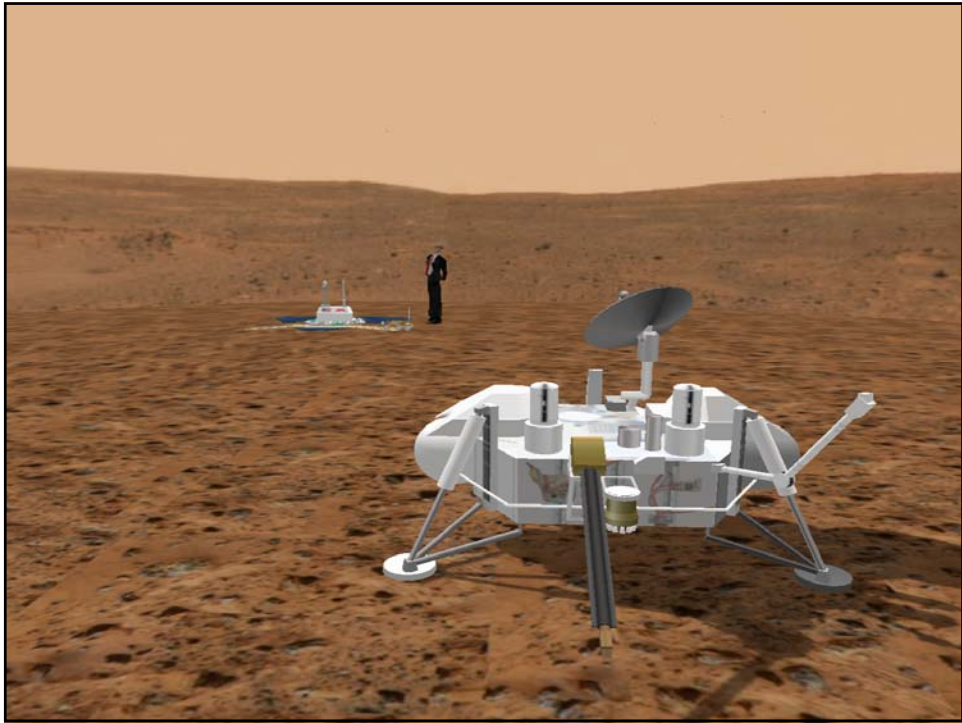


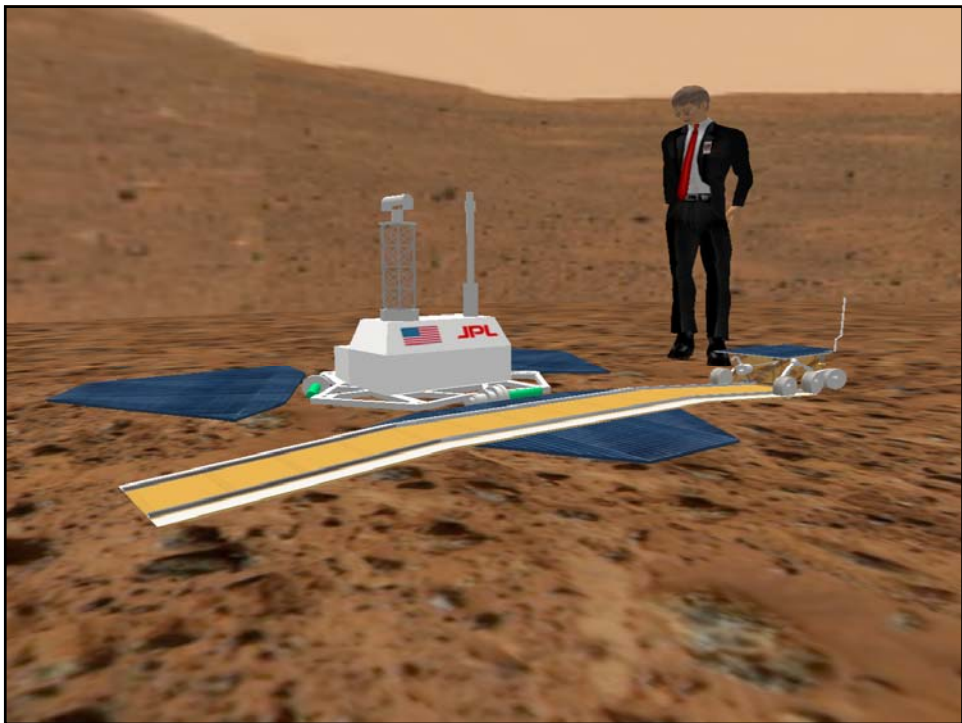
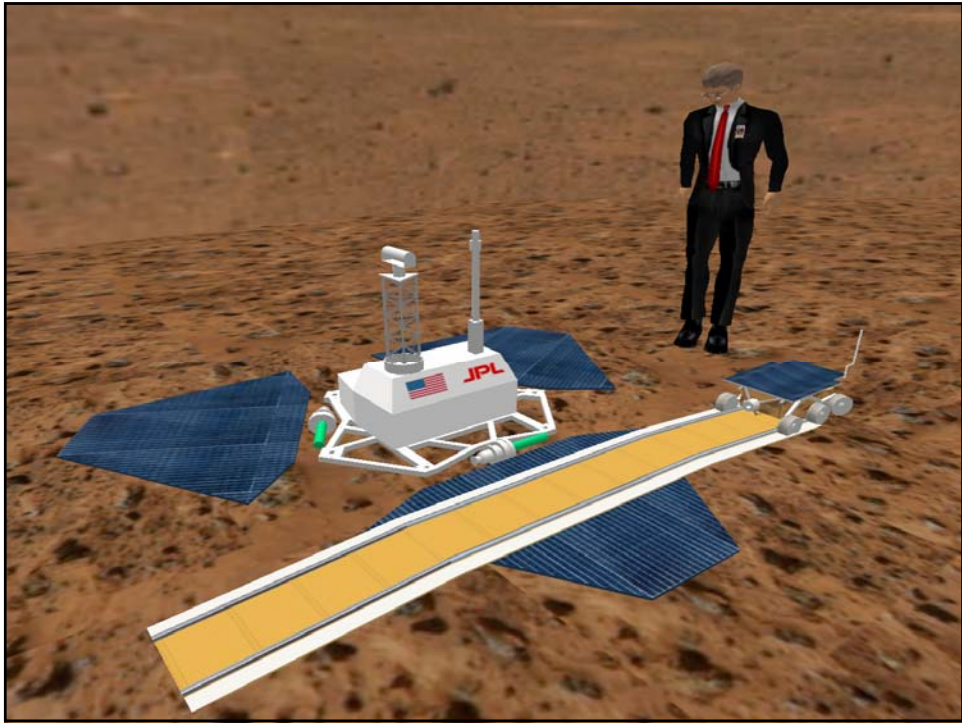


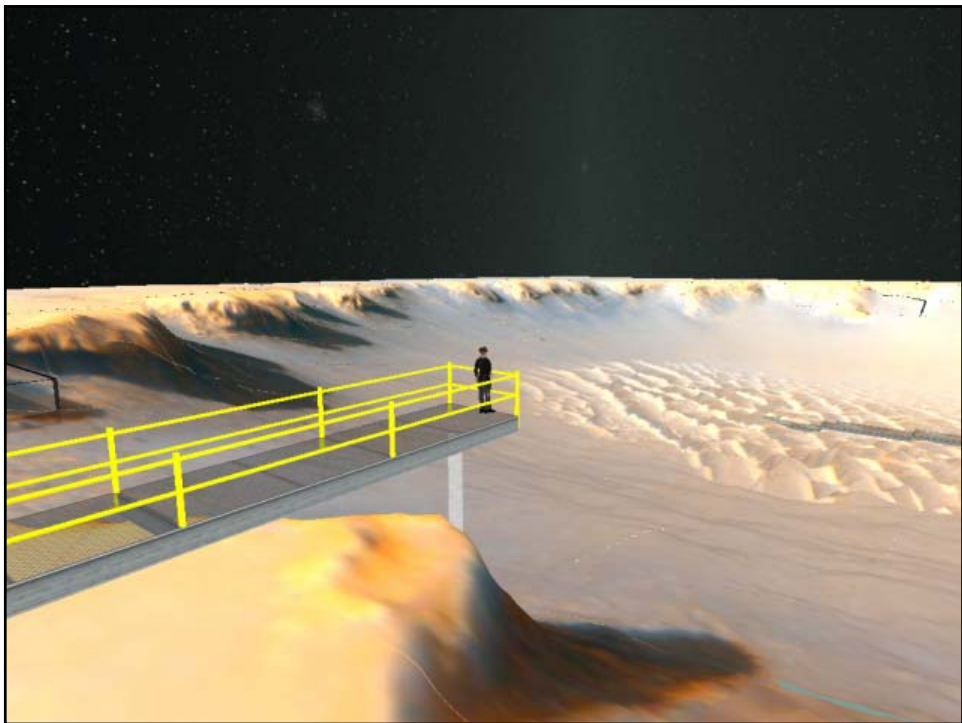
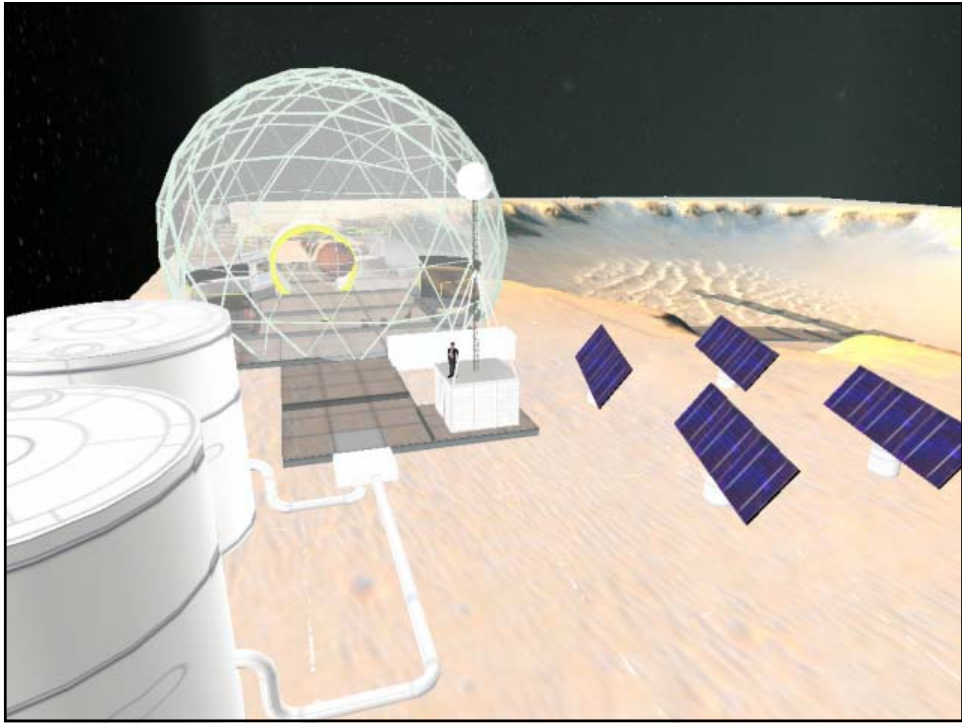








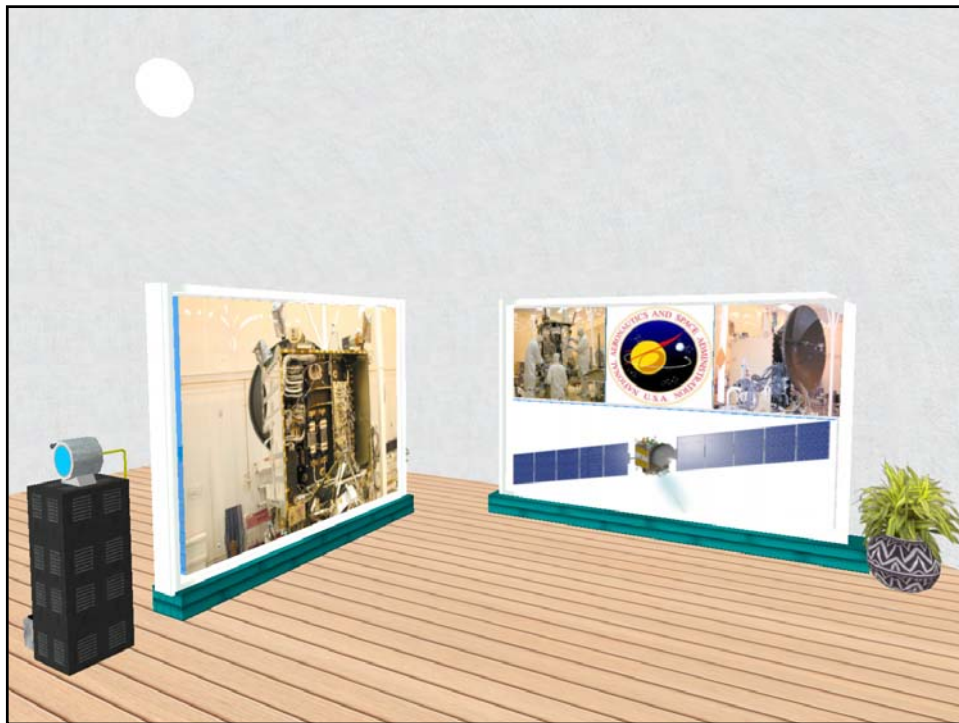


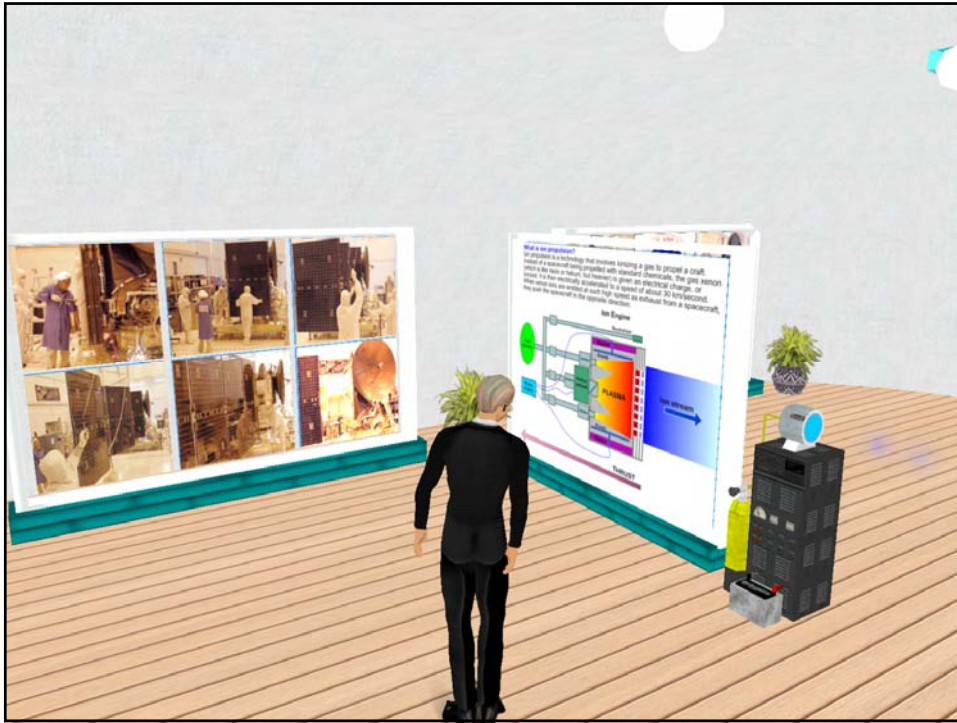


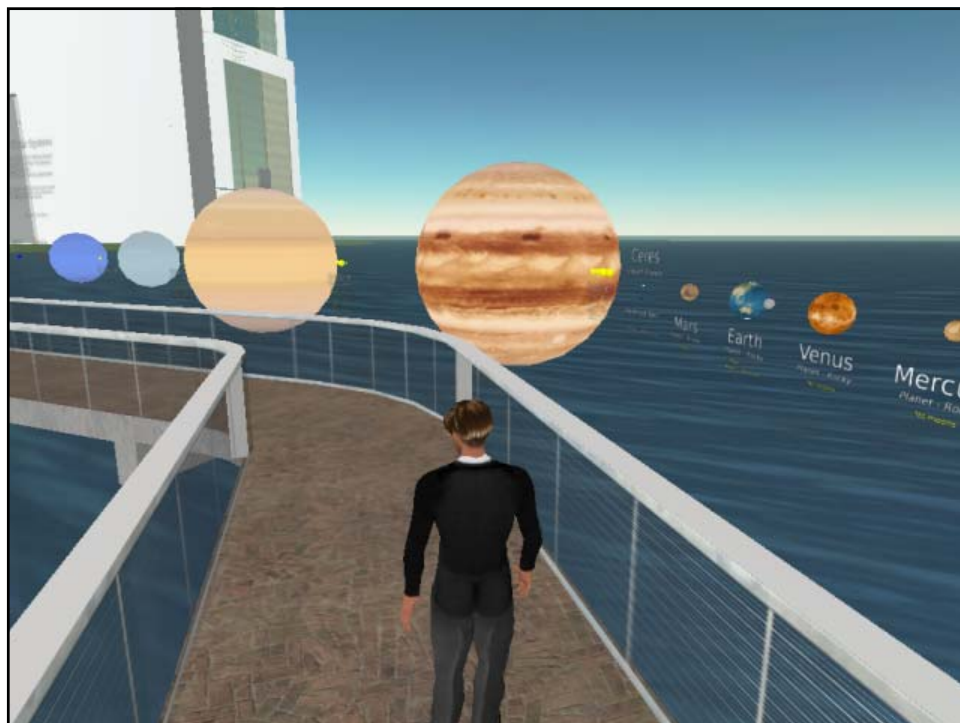


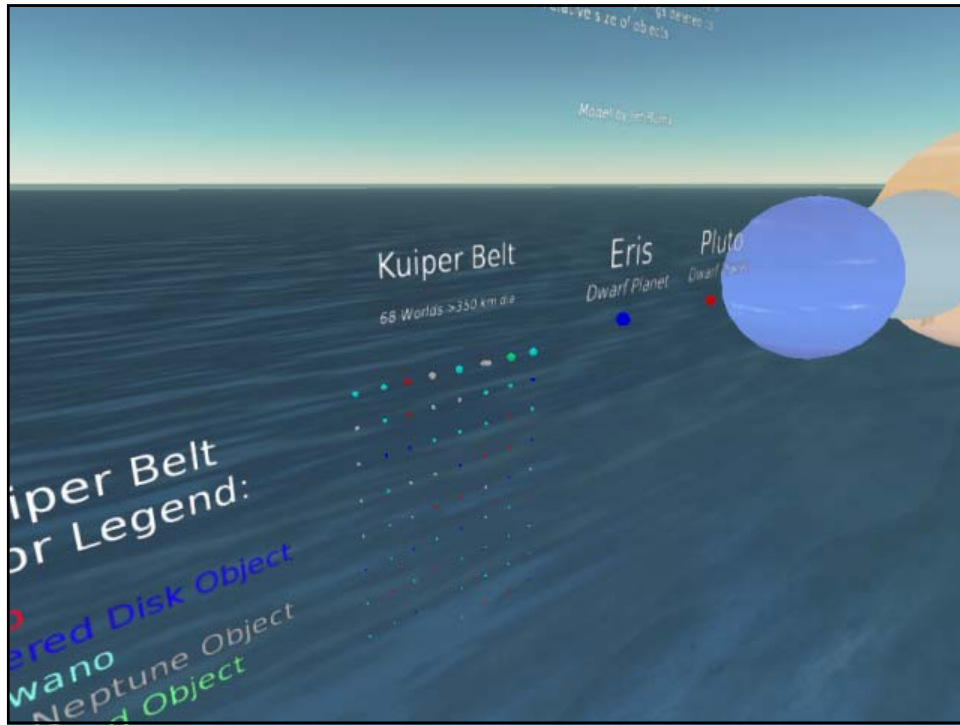


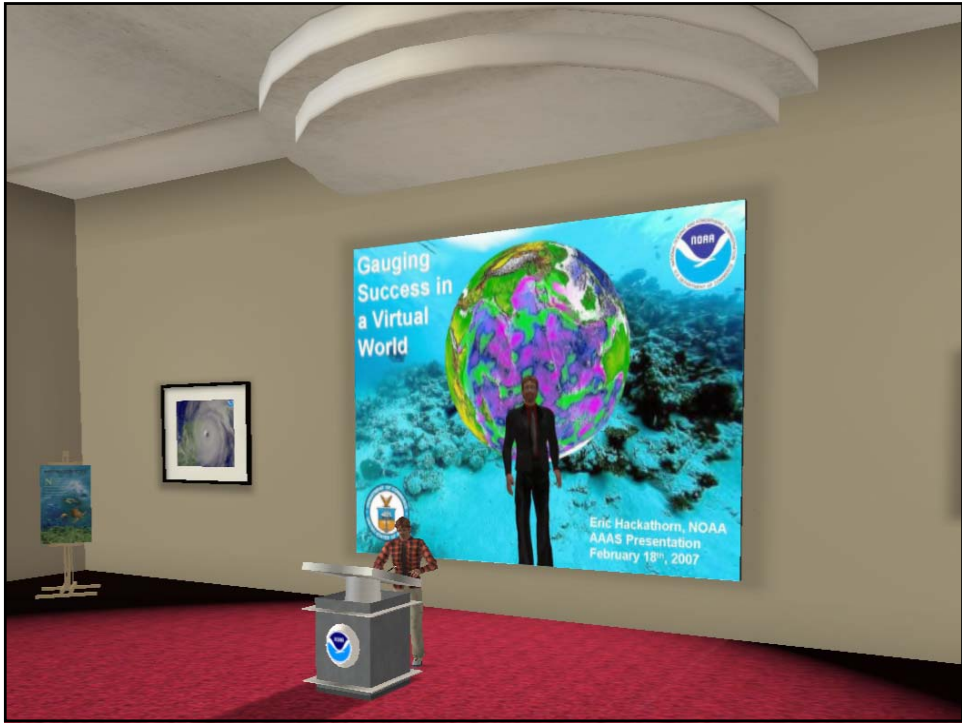


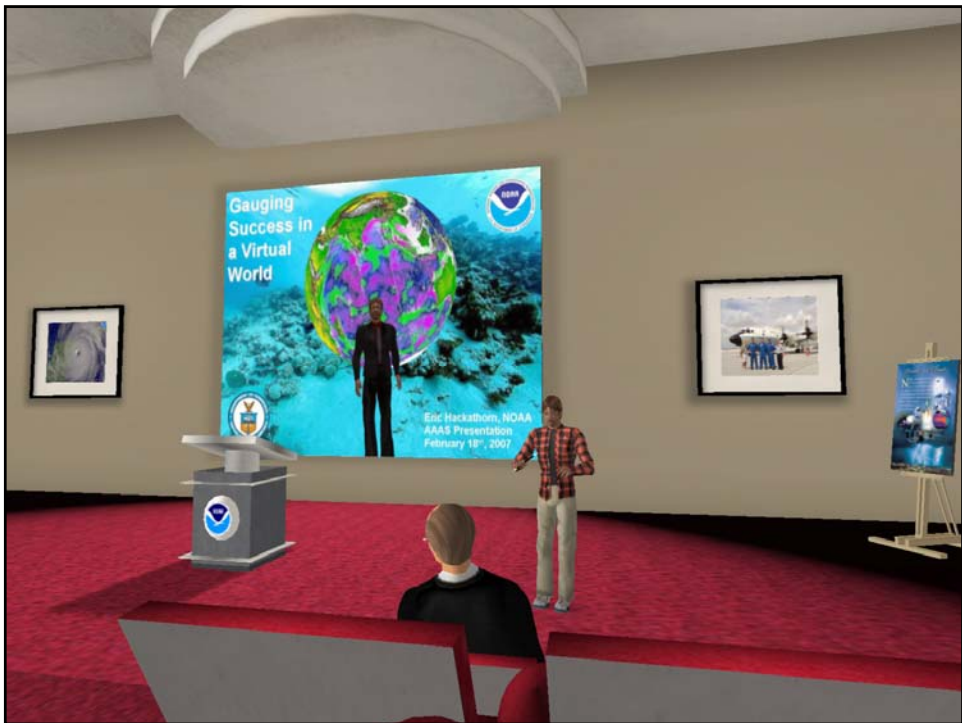














Informal Meetings



Meeting in the park















