MIXED-REALITY EVENTS: ENABLING GLOBAL PARTICIPATION IN REAL-WORLD EVENTS WITH VIRTUAL WORLDS TECHNOLOGIES

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Introduction

The NGEC-2 conference was held February 12-15, 2008 at the NASA Ames Research Center and in the NASA CoLab Sun Amphitheater within the virtual world of Second Life.

To connect with a broader audience of those who could not travel to Ames, the event was broadcast via a real-time video/audio stream into the SL environment.

The SL participants attended the presentations via video and contributed to the working group sessions using video, text chat and e-mail.

NGEC-2

The Next Generation Exploration Conference (NGEC) is a "gathering of emerging global space leaders to design the future of space exploration through direct input at NASA's highest levels."

NGEC-2 focused the energies and innovations of this group on "Entrepreneurial Opportunities in Lunar Development," and produced output documents for the NASA Exploration Systems Mission Directorate Commercial Development Policy group and Innovative Partnerships Program Office.

Second Life

Second Life is an interactive, immersive 3d virtual world created by Linden labs.

Second life has been defined as “a 3-D virtual world created by its Residents. Since opening to the public in 2003, it has grown explosively and today is inhabited by millions of Residents from around the globe.”

Mixed Reality

The term “mixed reality” refers to the merging of real and virtual worlds to create a shared environment where people or objects can interact in real-time.

Mixed reality (MR) is created with computer networking and graphics technologies to seamlessly combine and represent real and virtual spaces for people who are not co-located.

MR is typically event-based so people can share information, activities, discussion and ideas.

NASA CoLab

NASA CoLab is a program dedicated to enabling "participatory exploration" of space through online and offline communities and collaboration tools

NASA CoLab's presence in second life is found in the Second Life 'SciLands' and is used, among other things, as "A collaboration tool, as a way to collapse geography."

NASA CoLab is used to connect the ten various NASA centers and people from varying geographic locations.

General implementation

- The basic sequence for getting a video/audio stream into Second Life is:
- configure and setup the hardware and software at the broadcast location,
- capture the video/audio as a digital stream on location,
- encode the stream
- give the encoded stream via the network to a streamhoster,
- access the streamhoster account from Second Life.

Hardware

- an encoding machine (a Mac G5 in this case, but anything suitable can be used)
- a monitoring machine (Needs to only be capable of running the second life client)
- a streamserver (Commonly quicktime)
- appropriate cameras & lighting
- suitable microphones
- audio mixing and video
- switching as needed

Software

- a suitable streamserver
- an encoder (Apple Broadcaster was used in this implementation.)
- appropriate theater constructs in the virtual world
- Second Life client software with operator's “Avatar.”

Personnel

- one person operating the audio mixer and video switcher. This person managed the microphones and lighting.
- one person operating each camera and working with the AV person to ensure good audio feed
- one person in-world operating a presentation slide system, and interacting with the Second Life community. This person also handled the encoding server
- One person in-world for skeeper duties

Selected participant comments

"NASA CoLab's Second Life center is a very promising tool to enhance participation and attendance at NASA meetings. Cost and schedules often preclude qualified individuals from participating. Second Life would allow virtual attendance and participation in ways never before anticipated."

"it was effective for presentations because they [Second Life participants] could watch, follow, and ask questions"

"unprofessional attire even for a workshop. It was distracting to see people in their make believe clothes dancing around."

Selected participant comments

“The brainstorming group, composed of 15 people, actively sought participation of Second Life by speaking through a unique wireless microphone. While this successfully transmitted audio to SL, it was hindering the productivity of the work group.”

“it was distracting to constantly try to follow the text on the screen.”

“one way communication - we tried very hard to broadcast ourselves but we couldn't hear them and the stuff they were typing was not related to the discussion, meaning that most of the time they were not even present during the working time.”

Selected participant comments

"NGEC participants were selected to be at the conference but SL was an open door and we had some counterproductive issues."

"I arrived at the NGEC-2 conference in Second Life with 45 minutes advance notice, not knowing the agenda or topic of the conference … and not knowing who any of the RL attendees would be. This is very similar to what we do in Second Life NASA CoLab all the time."

"we can deal with clearly unruly walk ins, but the rocket Sanjoy referred to was lit on multiple occasions by one of our colab SL staffers, who had no idea it was distracting in the context of a time-short intensive mixed-reality communication stream."

Selected participant comments

“There's no reason why you can't have rules regarding inworld conference attendance. Follow the rules or don't attend. You enter the sim or parcel, a notecard appears on your screen stating the rules of attendance.”

“we [the sim managers] either had no clue about the expectation and no clear requests for the delivery of a product from the avatars. Nor did we realize that other than Buzz's opening speech, that this wasn't an appropriate event to invite the general public to.”

“I really liked the interaction among in-site attendees and virtual ones [especially] on Ken Davidian's speech, asking for feedback from SL time to time.”

Authors recommendations

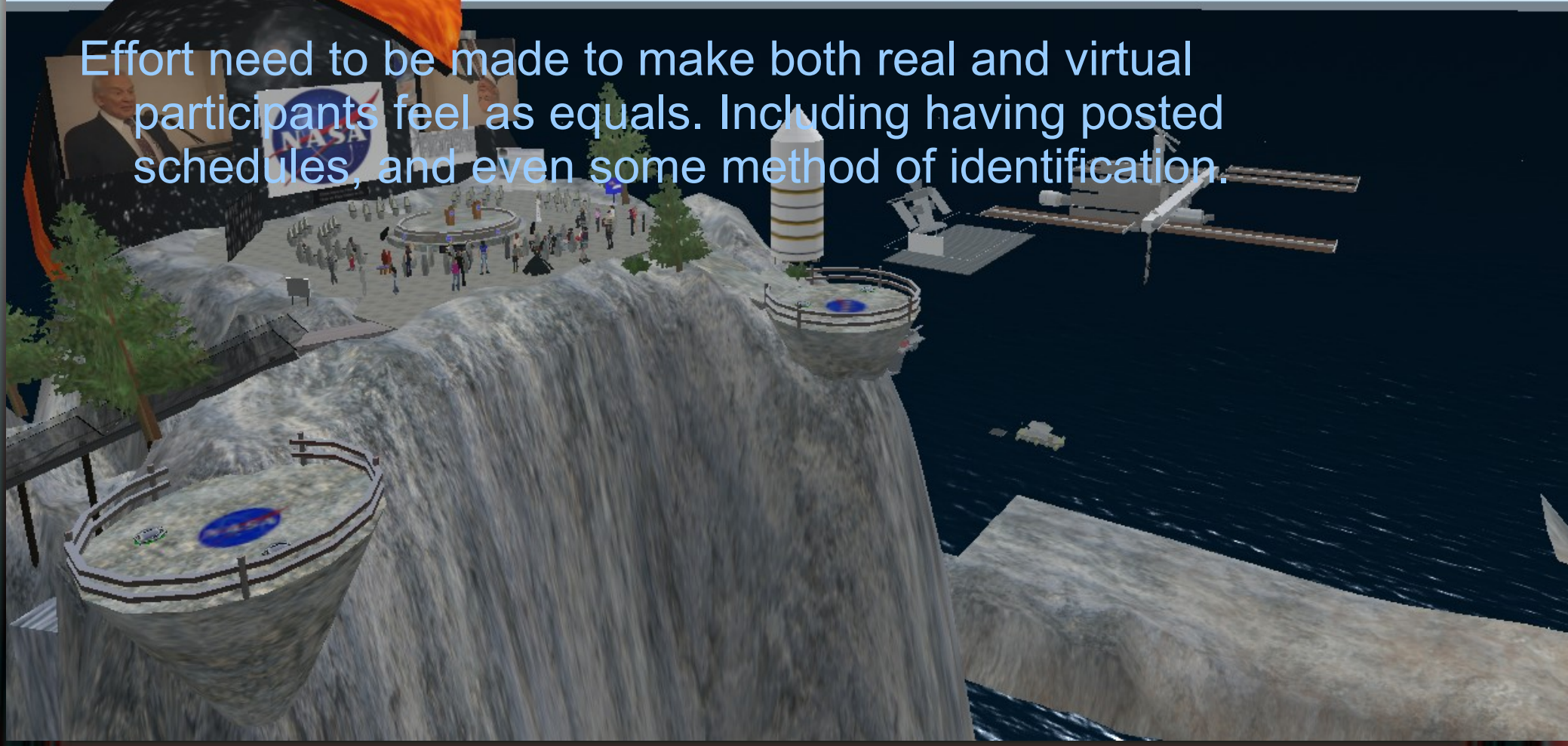
When planning an event such as this understanding the way in which the two groups will interact with each other, what their expectations of each other is

Set clear and well defined boundaries as to what is acceptable behavior, apparel, work expectations, and deliverables

Special considerations should be given to behavior of actions that are distracting or counterproductive. (Even operational issues)

Authors recommendations (cont.)

- These codes of conduct need to be clearly published both in-world and out
- Effort need to be made to make both real and virtual participants feel as equals. Including having posted schedules, and even some method of identification.



Further technical development

Primarily, work needs to be done to simplify the generation and experience of such an event, such as:

simplified encoding system (a single machine to encode from a webcam for portability, or a single system that can be sent to a location for an untrained operator to use.)

higher quality sound system, more voice feedback rather than text

an "on demand" record of non-interactive presentations for later in-world viewing

An easy way of transferring files in the group, in-world or otherwise

Conclusions

This event came off very well, few of the technical issues were directly visible to the event participants, and 565 people who otherwise would not have been able to participate were able to attend the event.

Many people learned about NASA CoLab for the first time, and perhaps most importantly, many people, in both Real Life, and Second Life discovered the unique value of Mixed Reality as an effective telepresence medium for this and other types of Human to Human or Human to Machine interaction.

As a side benefit of reducing cost, further perfecting environments such as this will reduce our daily needs for travel, with all of the resultant benefits that come with these savings, environmental or otherwise.