## : Can multi-user visual simulations provide real world decision support?

by Dan Power

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The computing technology for creating realistic visual simulations has improved tremendously in the past 20 years. Today, Internet-based multi-user visual simulations like Second Life ( www.secondlife.com) are creating excitement and interest in the possibilities of virtual reality for entertainment, e-business and education. My experiences suggest the possibilities for decision support are also exciting.

An Internet-based, real-time multiuser simulation is not science fiction. The graphic quality at Second Life (SL) is reasonably high, the development environment is powerful, and the new voice capability works. The problem of scalability remains a concern. At any given time approximately 30,000 to 40,000 people are using their SL avatars. The SL simulation engines run on almost 3000 quad core servers with more than 150 servers added each week. Over 1.7 million people from most parts of the world logged into Second Life in the 60 days from May 1, 2007 to June 30, 2007.

Second Life supports an incredible fantasy world where avatars, the representations of the user, can fly, walk through transparent walls, and teleport to imaginary castles, shopping malls and even IBM's robot maze. Marc de Groot (1997) defined an avatar as "a visible and audible representation of the user in the virtual world. It is the 'body' of the user as s/he moves through the virtual space."

Virtual reality is not a new concept, but it is a maturing concept. We have moved beyond MOO (Multi-user dungeon, Object Oriented), paintball world, and Guardians at the Gate. We don't have low cost stereoscopic heads-up displays and 3D mice yet, but we will.

Wade Roush, in the featured article titled "Second Earth" in Technology Review (July/August 2007) published by MIT, suggests we will see an even better immersive 3-D visual environment that combines

a social virtual world like Second Life with tools like Google Earth
to create a realistic duplicate of our earth. You can read his article
on the Web.

Roush traces the Metaverse concept to Neil Stephenson's 1992 novel
"Snow Crash". Metaverse was a virtual city. He also notes Yale
scientist David Gelernter coined the term "mirror world" to describe
accurate simulations of real environments. Roush suggests some
decision support applications in mirror worlds or a metaverse that
I'll summarize as I discuss various types of decision support using
realistic simulations.

Chesher (1994) notes that "On June 7, 1989 the computer-aided design
software company Autodesk and the eclectic computer company VPL
announced a new technology called 'virtual reality'". Virtual reality
(VR) is supposedly an additional reality, while a mirror world is an
extension of reality. Chesher traces the roots of virtual reality to
William Gibson's 1984 novel Neuromancer. He reports the term virtual
reality was coined in 1987 by Jaron Lanier.

Movies like the "Matrix" (1999) and "The Thirteenth Floor" (1999)
also deal with the topic of simulated worlds. In The Matrix, people
are connected using cybernetic implants to a simulated reality created
by sentient machines to pacify, subdue and make use of them. In "The
Thirteenth Floor", computer scientist Hannon Fuller creates a
simulated parallel world with analogs who are controlled like the
avatars of Second Life, but the experience is much more immersive.

My interest in computer simulated worlds traces back to 1965, when as
a 15 year old I read Daniel F. Galouye's novel "Simulacron-3".
Galouye's novel is the basis for Joseph Rusnal's movie "The Thirteenth
Floor". Recently, I watched the movie for the first time on a cable TV
channel. Galouye imagined a simulectronic world that depends "upon the
Gestalt principle for its verisimilitude -- the presence of a
sufficient number of items in a pattern to suggest the entire pattern.
The cognitive whole is greater than the sum of its perceptible parts
(p. 83)."

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Two previous Ask Dan columns (July 6, 2003 and November 6, 2005) have dealt with related topics on simulation and computer games. My focus in this column is to present "right now" possibilities for decision support in a Simulacron.

Communications-driven Decision Support

I have experienced first hand some of the possibilities of creating a shared collaborative workspace in Second Life and for holding meetings and conferences. The tools for decision conferences and business meetings are in place and ready to use. My new Second Life friends, like Tom Samson can help facilitate team building and team meetings at his Teamwork Dynamics facilities. Anthony Adam at Group Vision provides similar services and he has an Alpine Retreat meeting facility in Second Life. Paul Clevett is a principal with Hyperstring.net and his group also supports meetings and conferences. My plan is to showcase communications-driven decision support using Second Life in a future column.

Data-driven Decision Support

Last week, Richard Hackathorn's avatar showed me the real-time 3-D weather map at the U.S. National Oceanic & Atmospheric Administration (NOAA) Island in Second Life. A large 3-D weather map retrieves METAR data from NOAA every eight minutes which is decoded and render into representations like rain or clouds of the appropriate weather phenomenon for an area. You can actually watch the weather as it happens. This weather map demonstrates a visualization tool for real-time data-driven decision support. Imagine walking around simulated factories or gambling floors receiving real-time data. Management by walking around will take on new meaning in a Simulacron or Virtual World.

Roush (2007) also discusses NOAA's weather map. He also mentions the virtual Wimbledon where visitor's can observe matches in real time. He suggests company's like Walmart will be able to use a mirror world to track merchandise from factory to warehouse and explore what-if scenarios. Roush suggests that with a mirror world a person with

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mobile device that is location aware will be able to use the mirror for real-world location relevant decision support.

### Document-driven Decision Support

Reading note cards and PowerPoint slides in Second Life is still a problem. The search engine in Second Life is also weak, but in a more dedicated virtual world one can imagine accessing multimedia content easily. People can replay virtual meetings, examine IM and chat conversations, listen to voice recordings, and walk through and browse in a document library.

### Knowledge-driven Decision Support

Using scripting languages, we can actually create knowbots in a Virtual World that would advise managers. The Linden Scripting Lanaguage will need to be expanded, extended or replaced, but knowledge can be stored and retrieved effectively in a virtual world. Readers can interact with an Ask Dan! knowbots that have been programmed to answer questions about decision support systems. We should be able to interface tools like Exsys Corvid to knowbots in Second Life or a similar Virtual World.

### Model-driven Decision Support

Envisioning the future has always been a goal of computerized decision support. The environment simulator in Simulacron-3 was intended to provide probability-based forecasting. The simulator would answer any question about the behavioral and social reactions of people in the simulation. In a special study in a simulated world, avatars can be hired to shop in a newly designed store or to "try and evaluate" a new product before it is produced. Managers can manipulate visual models to try to improve productivity and can interact with a simulated environment before they encounter a similar situation in real life. During the past 15 years, a major application of virtual reality systems has been training for real-life activities. Games like

Roller Coaster Tycoon suggest that both avatars and robots can be used in model-driven decision support simulations.

The metaverse, virtual reality or the simulacron is more than an entertainment technology. Realistic simulation can be a powerful technology for computerized decision support. PowerEnterprises.net is starting a new website related to realistic simulations for decision support called [DecisionSupportWorld.com](DecisionSupportWorld.com). Watch as the decision support world simulacron develops and matures.

In 1991, Jaron Lanier argued "virtual reality is the first medium to come along which doesn't narrow the human spirit..." He said virtual reality would free the imagination of the masses and "help people to communicate" and bring a new kind of spiritual understanding.

In a September 1988 white paper titled "Through the Looking Glass", Autodesk founder John Walker argued virtual reality was the conclusion for improving human-computer interaction. Walker defined "a cyberspace system as one which provides the user a three-dimensional interaction experience that provides the illusion he is inside a world rather than observing an image."

As always, your comments and suggestions are welcomed.

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