The SLEngineer

Engineering for the Universe Inside the Metaverse

Sculpty Day
at Dr Dobbs

ENEL IN SL

Innovative Power Use and Generation

Engineering Builds in the Metaverse

Grundfos Pumps Promotes Sustainability

Virtual Trade Shows

CONFINED SPACE ENTRY MOBILE TRAINING UNIT

The Texas Engineering Extension Service, a leader in hands-on safety training, now delivers confined space entry training to any location, using a unique, self-contained mobile training unit. Simulated hazards, including smoke, darkness, flashing lights and loud sounds, add to the realism of the training environment. Employees will learn first-hand how to perform confined space entry safely under a variety of scenarios, while complying with OSHA and other safety standards.

Texas Engineering Extension Service

TEEX
TRAIN · SERVE · RESPOND

www.teex.org/eu
800.824.7303
Ad Code: D08MA3

TEXAS A&M SYSTEM

Active Worlds CyberExpo3D at 2S 4W facing S

File Teleport View Options Show Login Avatar Visibility Web Help

STATS TURN_AROUND WAVE JUMP SPIN JOY YES

SHERWIN WILLIAMS. For a Better Finish. Ask Sherwin-Williams.™

Virtual Trade Shows for Engineers

Chat

Rick Ashley: there were some earlier today
P Broviak: nice to meet you Rick – thanks for setting up the show
Rick Ashley: Roger that
Rick Ashley: Yes coco
Rick Ashley: Not sure I understand your question?
Rick Ashley: Right.
Rick Ashley: Do you want directions to regestration?
Rick Ashley: You got one of the 10

Download complete   0.1 K/sec   35.0 frames/sec   1:20:23 AM Tue Oct 16, 2007 VRT   114 meters

start   Inbox - Microsoft Outl...   Downloads   "rick ashley" cybercoa...   Active Worlds - Cyber...   cybercoatings.doc - Mi...

With the launch of Cybercoatings 2007, the coatings industry became one of the first engineering-related industries to hold a virtual trade show in conjunction with their real life trade show. For those who could not make it to the real life conference in Indianapolis, a virtual trade show was available 24/7 from Oct. 15–26. Interested participants could register to attend through a Web site established to promote the show. Attendance to the virtual trade show floor was free while virtual training appeared to be available for a fee.

After registering, participants received a confirmation e-mail and could log in beginning Oct. 15 after downloading the necessary software from the Web site.

The virtual show appeared to have been set up in the Active Worlds 3-D virtual world, although registrants could not leave the trade show site to visit other areas of Active Worlds.

Several of the big-name companies in the industry were represented such as

Sherwin Williams and DuPont. Chat was possible during the show, and a few booths were manned by people represented by avatars. However, one major difference from Second Life was the presence of avatars who did not appear to represent a real person. They continually strolled around the trade floor like mall walkers. Even some of the booths were staffed by these randomly placed avatars.

Although each participant could choose from a list of several different types of avatars, customization of each did not seem possible. There were also very limited profiles available.

The trade show organizer indicated that about 70 registrants showed up during the first day of the show.

Most of the displays consisted of images and text. Audio messages played as an avatar passed or entered each booth.

The interface allowed for launching of Web sites within the software when the avatar clicked certain areas with Web

site links—much in the same way that the new OnRez Second Life software displays Web sites.

Second Life has also been host to several conventions and trade shows over the last several months. Dr. Dobbs Island hosts two conventions each year with many from real life companies and agencies participating.

This year's Second Life Community Convention was held in-world in conjunction with the real life one held in Chicago.

Recently OpenMLS hosted the Real Estate Metaverse Conference and Expo from Oct. 26–28 at Sede di Marte (38,38,38). This expo hosted displays and sessions discussing real estate as it relates to real life and Second Life property.

The potential for trade shows in virtual worlds is still being explored and developed. Perhaps someday trade shows in the virtual world will stay in place on a permanent basis creating a type of virtual mall for industries.
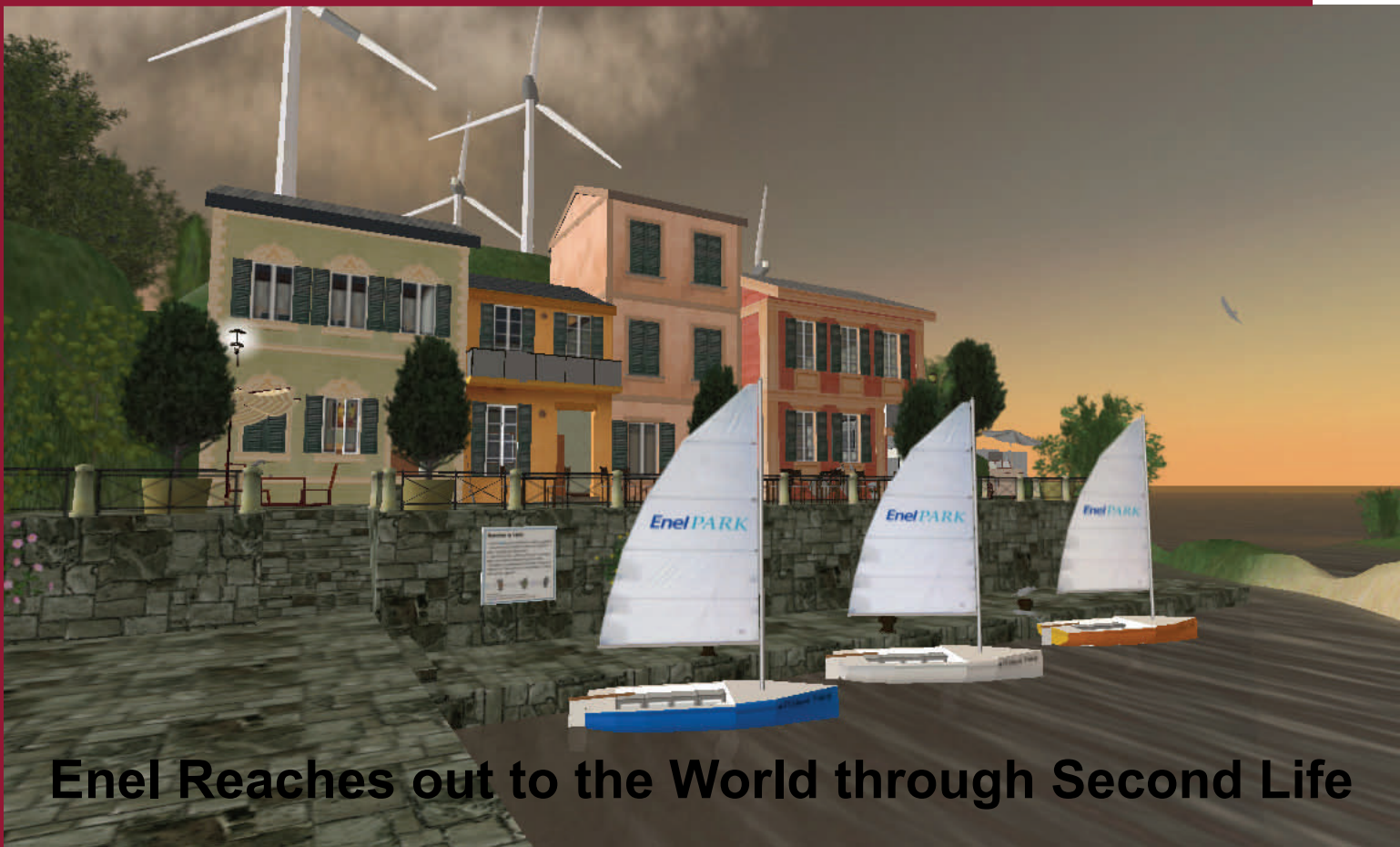
Enel Reaches out to the World through Second Life

In July 2007, Enel, Italy's largest power company and Europe's second largest utility, opened an attractive and informative destination in Second Life that spreads across four sims in the southeast corner of the Second Life (SL) grid. EnelPark 1, 2, 3, and 4 are home to nine specific areas that create a type of learning theme park.

According to the company's Web site, "Each of Enel's projects has been transported and designed to inform, explain, influence, and entertain. There are various levels of information so that each visitor can understand what we are aiming at."

> **"Energy means far more than the electric current which serves our homes and offices. It's a spirit, a force which propels us to go beyond what we've already achieved and onwards to make our dreams come true."**
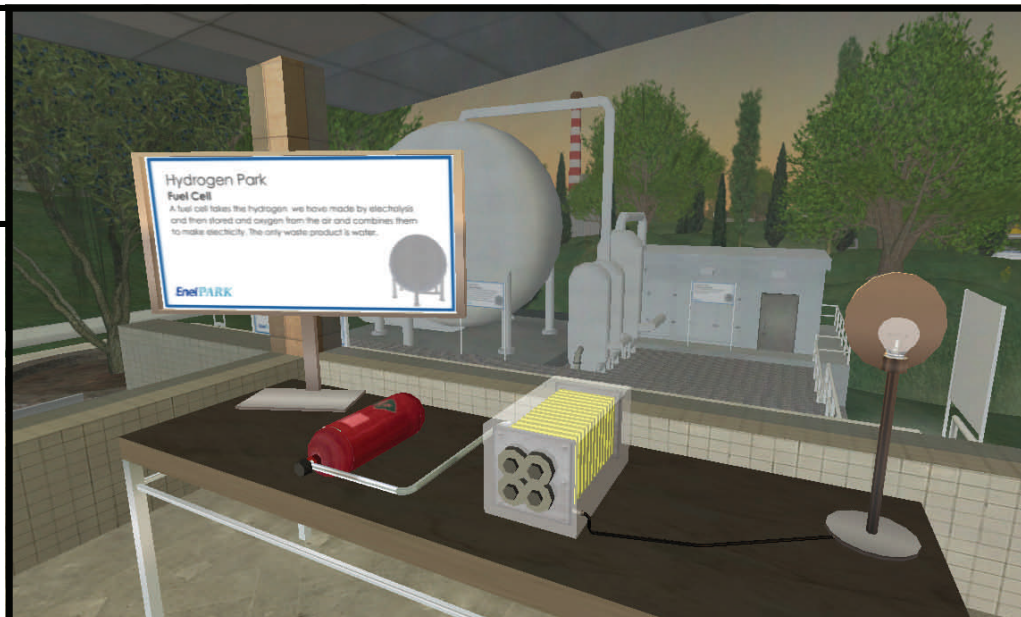>
> **-from Enel's Website**

In the northwest section of the build, areas one and two focus on the relationship between energy and the sea and wind. Visitors can investigate renewable energy fuel systems, sail around the entire group of islands, and windsurf. Several shops built along the pier offer free gadgets, clothes, and tools that are related to Enel and energy.

Area three, known as Green Island, is located to the north and is a virtual representation of a small island community dependent only on its own resources for energy. The homes on this island allow those who are invited in to experience ecologically-compatible ways of living, saving energy, and respecting the environment.

As with most SL builds, EnelPark has a beach, bar, and amphitheater that seem to be well populated throughout the day. Located in areas four, five, and six, these attractions offer avatars a place to lounge on the beach, watch sailboats go by, pick up an energy drink at the bar, or attend Enel-sponsored meetings, shows, or events in the amphitheater.

Visitors to EnelPark in SL can also view virtual showrooms or demonstrations of facilities or production processes located in real life in Italy.

The SL build of Enel's facility in Hydrogen Park replicates the creation of electricity using hydrogen and oxygen.

One such facility is located in Fusina, Italy, where Enel is developing the first medium-sized hydrogen plant. This plant site is also close to a large experimental park for energy production from hydrogen known as Hydrogen Park and located in Marghera, Italy.

To illustrate the use of hydrogen as a fuel, Enel has created an exciting car race that begins at the southern tip of EnelPark and routes visitors through tunnels, under the sea, and across all four sims. The race cars represent real life models that are powered by hydrogen.

In the southwest quadrant of EnelPark is a virtual build of a real life "zero emissions" project of Enel's that involves a chimney-free power station. According to the sign at the site, "This is a coal burning power plant that goes beyond removing all dust, nitrous oxides, and sulfur dioxides from its exhaust. After taking and wearing a free hard hat, face mask, and oxygen tank, avatars can travel into the depths of the earth to learn how carbon dioxide is captured and stored underground in order to reduce atmospheric emissions. This method of storage of carbon dioxide has been approved by the National Institute of Geology and Vulcanology.

The Archimede project, virtually represented at the west end of EnelPark, is under construction in real life at Priolo Gargallo, in Sicily. Archimede has been designed to gain maximum energy from solar power. Parabolic mirrors collect sunlight and heat a fluid that produces a vapor which is then used to generate energy in the nearby power station. This plant will be the first application worldwide of the integration of a gas-burned combined cycle power plant and a thermodynamic solar energy system.


The SL representation of Enel's Archimede project includes solar panels that rotate with the SL sun. In real life these panels concentrate solar radiation on pipes containing an auxiliary fluid. The heat raises the temperature of this fluid, storing the heat for use any time of the day or during any weather conditions.

Second Life visitors to EnelPark can descend to the depths of the grid and learn how Enel handles waste products such as carbon dioxide. A free hard hat, face mask, and oxygen tank are provided.

The final location is an office located on top of the southeastern hill where visitors can meet with Enel representatives to learn more about the company and its activities. Enel employees also staff the SL build Monday through Friday from 9:30 a.m. to 3:00 p.m. PST.

On their Web site, Enel talks about its company's philosophy, "Energy means far more than the electric current which serves our homes and offices. It's a spirit, a force which propels us to go beyond what we've already achieved and onwards to make our dreams come true." Through the use of Second Life, Enel has stayed true to its company's values and has succeeded in using this new virtual technology to promote and illustrate its goals and projects to the entire world.
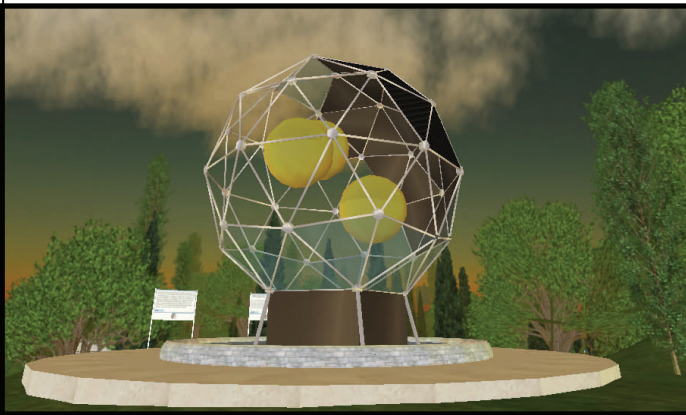
This interesting architecture in EnelPark represents Enel's Diamond project—a power generating system that will meet the energy demands of Sterpaia in San Rossore, Pisa. This system could someday also be used as a trigenerative power system, producing electricity, heating, and cooling.

A Travel Guide for Virtual Bruges

An example of Augmented Virtuality

The *Travel Guide for Virtual Bruges* is now available for free at several kiosks placed at different locations in Virtual Bruges in Second Life (SL). The guide contains facts about real life (RL) houses in Bruges such as type of architecture, shopping, and restaurant information.

To provide information about the reconstruction of Bruges, Belgium, a heads-up-display (HUD) was developed in SL to show information about the houses the avatar is seeing. This HUD takes the place of signs that would have diminished the view of each house.

The HUD calculates for each moment the position at which the avatar is looking and retrieves all information from a remote database. This can be compared to a RL tourist flipping through the pages of a travel guide when looking at a particular building or monument. In RL, the tourist standing beside you might be looking at something else and might consult other pages from his own guide. The same situation is possible with a HUD in SL; two avatars standing side by side, but looking at different buildings, will retrieve different facts.

Together with the launch of the Travel Guide HUD, a Web site is available with more in-depth information about Virtual Bruges at http://www.virtual-bruges.be. The Web site contains more information about RL and SL Bruges, including weekly events that are organized in Virtual Bruges.

ENGINEERING-RELATED BUILDS IN SECOND LIFE

The SLEngineer is exploring the grid looking for engineering-related builds that may interest you. If you have a build that may appeal to our readers, send a brief description and photo to mail@slengineer.org.

Party in the sewer? It may just seem wrong, but you know you have to check it out. Located at Morton Mains (134, 105, 104), you have to stroll through the sewer to get to the music club.
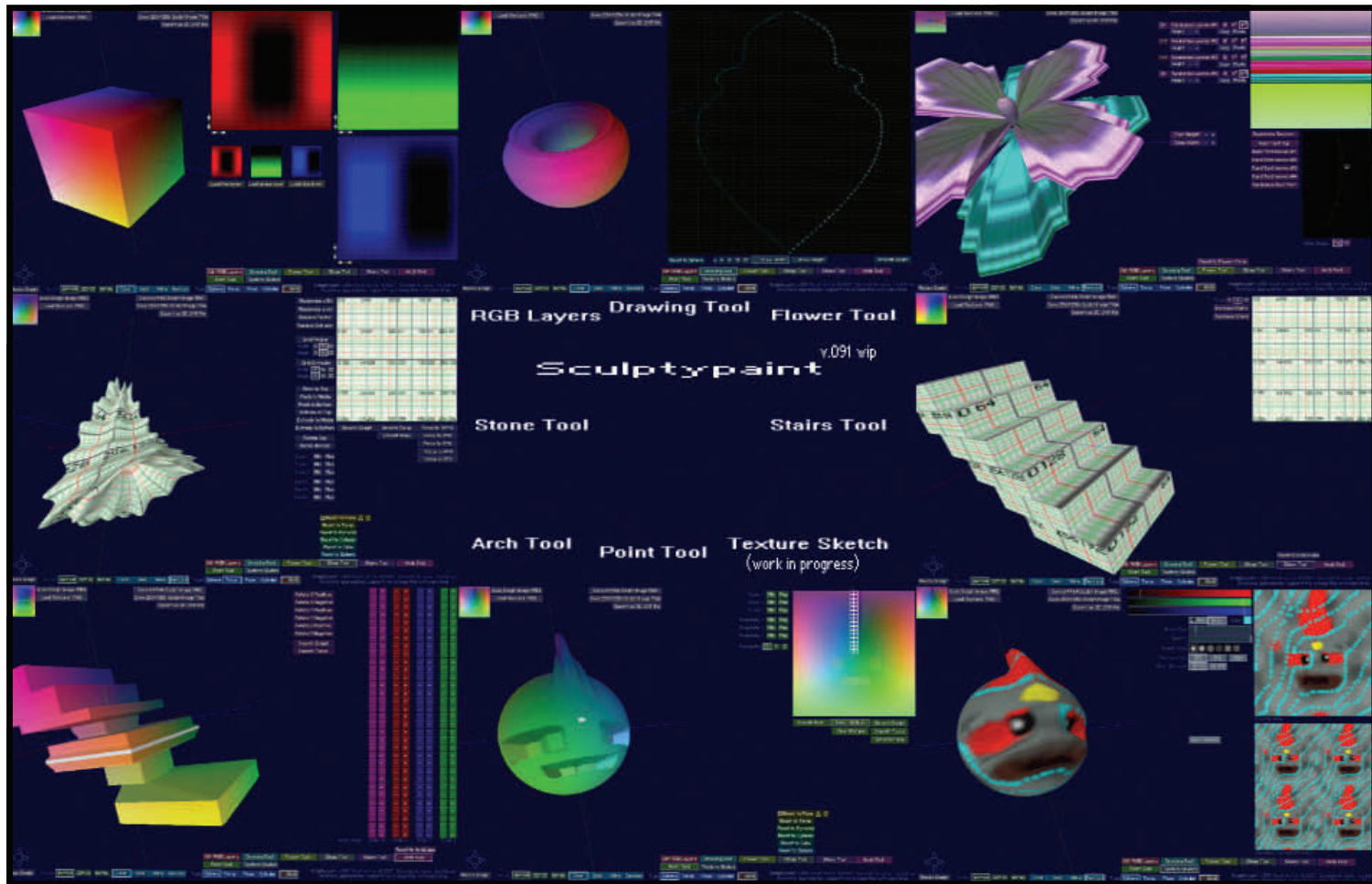
Sculpties in SL

On Sept. 16, 2007, CMP hosted Sculpty Day as part of their Life 2.0 Fall Conference. Throughout the conference that weekend, about 70 to 80 avatars packed each session, and the ones on Sculpties were no exception.

Anjin Meili started out the day with an explanation of sculpties. "Each pixel of an image file is encoded with the X,Y,Z off-set from the center of the object—the encoding is done using simply 8-bit RGB values. The color defines the location. Red is X, green is Y, Z is blue," said Meili, "so a value of 128,128,128 would be exactly in the center of the object."

For those who have opened up a sculpty texture, this explanation will help to make sense of the funky colored image that pops up. Each color on each pixel of a sculpty texture actually represents a measurement or distance from the center of the object. When applied to a prim, the object is transformed according to these colors, moving the prim to the dimensions encoded in the image.

At this time, the sculpty is restricted by the size of the 32x32 mesh overlying the object so not a lot of detail can be en-coded. Meili indicated that while the default sculpty is based on a sphere, there are other types that can be created such as a plane, torus, and cylinder type. However, these must be made using LSL scripting. A full 3-D model can also be used but because this model will still be limited by the mesh size, modelers suggest that those using these models begin with the right size mesh and only work with the corresponding division points.

"For those with Maya, and the ability to drive it well, you can export an entire model complete, but the process re-quires some understanding and knowl-edge of what is happening," said Meili. "Qarl Linden has some awesome im-ported pieces. His current exporter tool for Maya works on entire scenes, reduc-ing the parts into sculpty mesh-sized hunks and baking the UV maps at the same time, and then creating a 'texture package' for you to upload, and then assign to a set of prims. He also pro-vides an assembler for the parts."

For those who either cannot afford to purchase the Maya soft-ware or do not want to invest that sum of money, Mieli sug-gested starting with Wings or a similar software program, reading the sculpty wiki, and investigating the other modeler choices that are available. "Picking one is the first step," said

Mieli. "If you have never modeled, read lots of tutorials on how to use the modeler you pick before tackling sculpties in the modeler."

Once you have chosen the type of modeler, Mieli said, "You can convert data from nearly any data set; I've modeled hurricanes, MRI scans, CT scans, DEM, and STL."

As for texturing a sculpty, Mieli said, "You would use your modeler, one that supports baking on a texture, to make a UV map for your image. Then apply that over the sculpted prim, and you can use that grid to hand paint the UV map."

Cel Edman Makes Sculpting Fun

Cel Edman entered Second Life in May of this year and by the end of the month, he was on his way to creating Sculptypaint—one of the easiest and least expensive modelers for creating sculpties. Edman said, "The Sculptypaint program that I have written is a sort of personal experiment that got out of hand."

Edman's primary objective was to create a tool that would allow him to make certain sculpties easily. "Most 3-D software is too complicated for ´normal´ people and to be honest, making 3-D sculpties in Second Life is almost pixel painting sprites in 3-D; so Sculptypaint is kind of a ´fun experiment.´"

The Sculptypaint program has several tools to allow for the creation of different types of sculpties. Edman said, "First was the RGB layer tool, to figure out how sculpties were working RGB-wise. Next I created a drawing tool; a little bit inspirated by Rokuro, but a bit different. Third, I created a random flower generator. The Stone tool is for making random stuff like stones— you can bend and change forms. The stair tool I created at the time when there were only two other sculpt stair creators in SL. The arch tool can be used to scale individual rings. The point tool is somehow like zbrush. The last tool is a work in progress—a texture sketch tool that I am working on. And at the same time a seamless texture generator." (Over the last month Edman did incorporate this texture tool, and a new version of his software is available at his Web site: http://www.xs4all.nl/~elout/sculptpaint/.)

Edman also advised that aggressive texturing can be used to enhance the look of a sculpty as it is viewed up close or from a distance. He suggested using high quality textures to provide added depth and realism to the low detail mesh. "Textures really point out parts of the sculpty."

Efficient Sculpties

Although sculpties are often used as a tool to increase prim efficiency, it turns out that there is a need to further increase the efficiency of an overall build by properly designing the sculpties used. Aminom Marvin, master sculptomancer and content creator, presented the attendees of Sculpty Day with some tips for creating efficient sculpties. "Sculpted prims are still in their infancy, compared to what is possible with them. It will take some time for content creators and tool developers to fully realize the potential of sculpts. However, even now there are methods available to do much with them.

Marvin spoke of sculpt limitations that become apparent when viewing high-sculpt areas. "If you have an average computer, you have experienced one of the limitations of sculpts—one will encounter client-side limitations in ability to render polygons far before running out of prims. What this means is that often extensive sculpts can turn a build into a lag monster. To work with sculpts to their fullest, every vertex should be used to its maximum potential."

The proper placement of vertices is critical to ensuring the correct shape. If an area or face of the prim does not need to be sculpted, vertices should not be concentrated in that area. Also, multiple elements should be sculpted on the same prim. "This is accomplished by making various segments all end at the same point," said Marvin.

Proper texturing is also critical to pulling the entire sculpt together. "Texturing such high-efficiency sculpts is not easy; often the polygons are not uniform in size," said Marvin. "However, they are texturable as long as one pays attention to which regions are stretched more than others."

In order to prepare a texture for a particular sculpt design, reference grids can be used. But this can be a challenge when a particular sculpt has a high level of detail. "When one moves away from a sculpt or prim in Second Life, it will switch to a lower-detailed model," said Marvin. "This is known as level of detail, or LoD. Thankfully, with sculpts, LoD can be adjusted completely because the distance at which LoD changes is proportional to the size of the prim. One can scale the mesh itself so that given the prim size, it will appear smaller, allowing one to scale the prim size back up to get a higher LoD.

Yuzuru Jewell introduced Tokoroten, a new tool that allows users to make intricate sculpties. This product is one of a family of products that also includes Rokuro and Rokuro Pro.
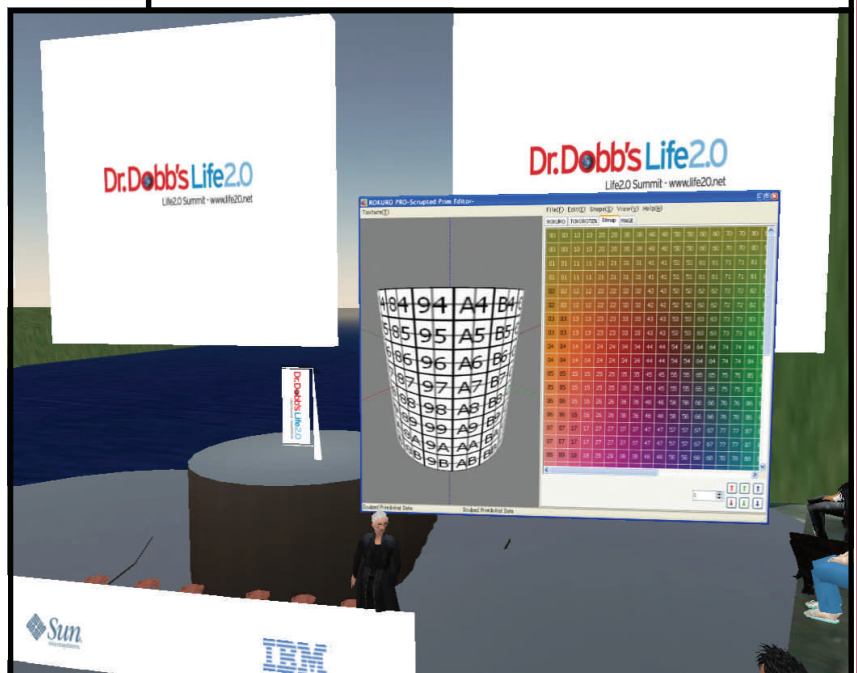
Achieving this higher LoD is very simple using photoshop. Simply open the sculpt in photoshop, and use the color curves tool. You can either scale all axes at once, or just one, such as the Z (blue) axis. As a reference, values of 0 to 64 and 255 to 191 will scale the mesh to half size, 0 to 96 and 256 to 159 gives quarter size, and 0 to 112 and 255 to 143 gives eighth size." However, Marvin said, "Care must be used for this method; it makes the collision box much larger than the sculpt, and if abused can introduce unneeded render lag into a build."

The Black Box—An In-world Sculpty Tool

TheBlack Box demonstrated his invention, perhaps the only in-world sculpty creation tool available, that he appropriately named the Black Box—Sculpt Studio. Although some of his talk focused on the scripting and programming details related to his invention, Box said, "The whole process consists of two basic steps; the first being rezzing and modifying a spine. The second part is what I call a 'slice-shaper.' SL users can simply edit the slice-shape by editing the object (edit linked parts)."

The slicer moves along the spine adjusting its position rotation and size and when the slicer has moved all the way through the spine, a URL is given to the owner of the tool. Box said, "All position of the vertices are sent to an server." The user can access the image at the URL given by the tool and then upload it to SL or take it into another program such as photoshop or GIMP for further editing.

Making Jelly

Yuzuru Jewell offers software to make sculpties through the following Web site: http://kanae.net/secondlife. Each of the three programs offered through the site were demonstrated as part of Jewell's Sculpty Day presentation. Tokoroten, named for Japanese extruded jelly, is the newest product of the three and works together with the other two as a total software package. A trial version of the sculpty software offered by Jewell can be downloaded from the Web site and then a permanent license purchased in-world for $2980L.

**Protecting your Sculpty Textures**

According to Anjin Meili, "The sculpt texture is only 24 bits, 8 bits per channel, so there is room to add another 8 bits, 32 bit image, for the alpha. The preview window displays alphas; the sculpted prim doesn't care. You can place an alpha channel that blocks viewer access to the sculpt texture. If you do not do this, they can be copied using screen shots from the object editor window."

More Sculpty Resources

Sculpty Wiki: http://wiki.secondlife.com/wiki/Sculpted_Prims

Metaverse Solutions Sculpty Software: http://www.metaversesolutions.com

The Black Box, developed by TheBlack Box, is the only in-world tool at this time that can be used within Second Life to create numerous sculpted prims.
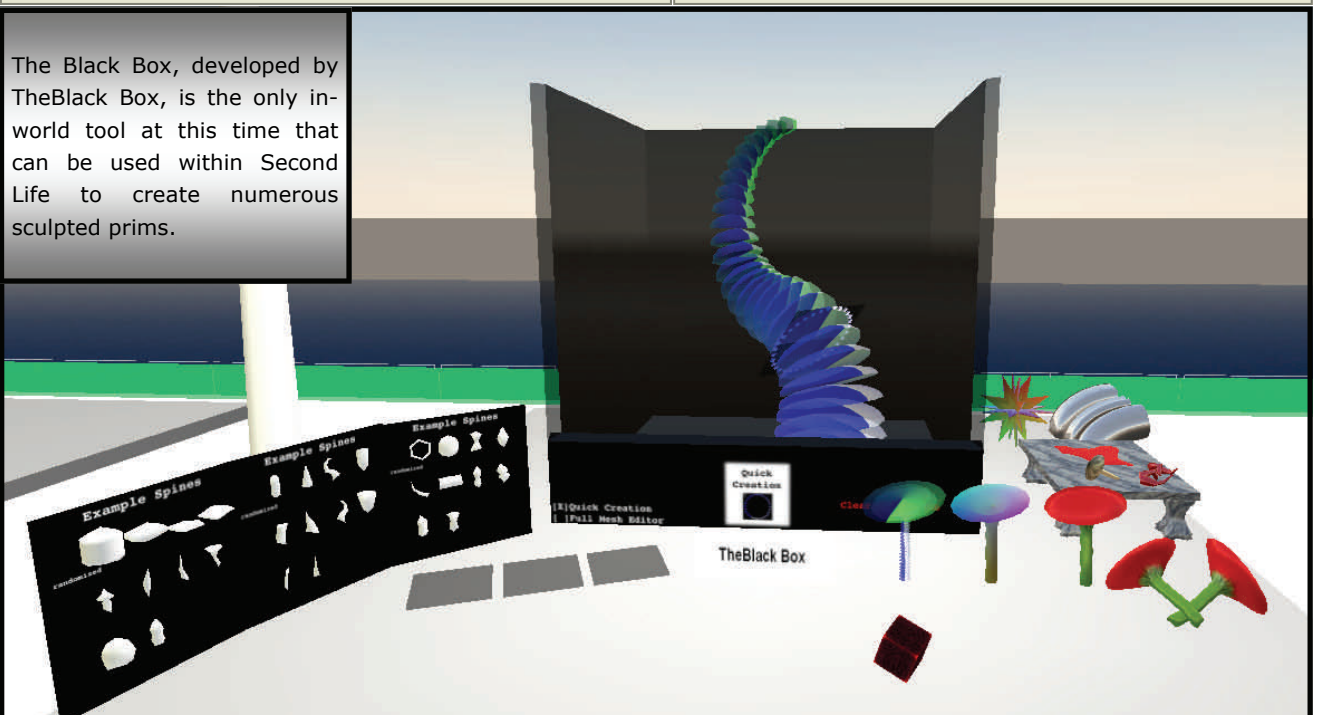
GRUNDFOS FOCUSES ON SUSTAINABILITY

While most engineers are familiar with the Grundfos name as a manufacturer of pumps, visitors to the Grunfos sim in Second Life (SL) won't find any pump curves, cut sheets, or hydraulic information although they may find a few virtual representations of pumps scattered throughout the build.

Instead of opening an island to promote their products and provide sales service, the company approached their SL build with a different goal in mind. "New ideas, the chance to invite users to take part, dialogue across national borders, innovation power, and a large amount of curiosity are the reasons why Grundfos is going to open a new and completely different island in Second Life, " said Mr. Thomas Koldbæk from Grundfos eBusiness.

The island hosts regular events that promote sustainability including such topics as climate changes, sustainability and alternative power generation in Africa, responsible water use, and other issues related to the environment.

The island has an area dedicated to reduction of carbon dioxide. Visitors are shown steps to take to decrease the generation of carbon dioxide in their homes. Grundfos also has a few displays to demonstrate steps the company is taking to improve the environment through product development.

Grundfos has also created the opportunity to enhance real life communities by establishing a program in which a tree is planted in real life for every tree purchased and planted on their island by an avatar in Second Life. To date, 49 trees have been planted. Another program involves the purchase of virtual SQFlex pumps in Second Life for $500L. When 1000 pumps have been purchased, the company will donate a real SQFlex pump to a country in Africa at a value of about $10,000 USD.

"The virtual universes are right now in a phase of experimenting. Our approach is focusing strongly on sustainability and on our corporate values. Grundfos' primary aim is learning, and then analyzing what use we can make of the virtual universes," said Thomas Koldbæk.

Gateway Technical College offers
**engineering and technical training
in their new Engineering Tech Wing in
Second Life**

Located in Cecil (213,63,238)

The Abyss is Back!

The Abyss Museum of Ocean Science celebrates its grand opening on Saturday, Nov. 10, 2007. Created by Second Life artists Rezago Kokorin and Sunn Thunders, the Abyss is a multi-sensory and multi-dimensional exhibition of the planet's oceans that combines art, science, and education. The exhibit occupies more than 10,000 square meters both above and below water level in the southwest corner of the Gun sim.

Following the successful summer run of the first Abyss in Blekinge Sculpture Park, Kokorin and Thunders set out to expand the exhibit into a more permanent and realistic ocean setting. The new Abyss features a variety of displays and experiences in a natural setting (both above and below sea level) for visitors to tour at their own pace.

On the surface there are numerous displays about various aspects of oceanography, from scale models of ocean research vessels such as the Turtle, Trieste, and Beebe bathysphere to informational exhibits about coral reefs, sea level risks, and beach pollution. Additionally, an art gallery on the observation deck overlooking the Abyss harbor provides a place to relax and take in the view.

The central feature of the Abyss is a system of interconnected observation pods that transport the visitor from the surface to the extreme abyssal depths more than 11,000 meters below sea level. Within each pod, visitors can learn about the different zones of the ocean and view the some of the fascinating and sometimes strange life that inhabits those zones.

Beyond the relative safety and security of the observation pods, there are numerous wide-open, undersea areas to explore, including the hydrothermal vents, an imagination garden, a pollution display, and the sculpture garden within the shallows.

More information about the Abyss can be found at http://abyss-secondlife.blogspot.com/.

Nothing to do in Second Life?

Get involved in one of the many engineering-related Second Life groups:

- **Civil Engineering Group**
- **RL Engineers**
- **Society of Women Engineers (SWE)**
- **Construction Group**
- **Geotechnical Engineering Group**
- **Public Works Group**
- **Engineers**

Attend the weekly meeting of engineers and other technical professionals on Public Works every Tuesday at 4:00 p.m. PST.

Become an engineering mentor—real life engineers in SL have started a mentoring project. If you are interested, contact Jeff Brody in Second Life.