Success Story

SGI® Reality Center® at the Vienna Museum of Technology

Creating Virtual Worlds

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– Dr. Otmar Moritsch, Curator of the Exhibition

In the VR Theatre of Vienna's Museum of Technology, 30 visitors are sitting before the 40-foot panorama of a curved, tilted screen, ready to navigate through time and space on an immersive odyssey powered by a SGI® Onyx® 300 visual supercomputer. All the visitors are equipped with Barco® Magic-Y™ laser wands – cordless pointers they will use to guide their three-dimensional journey. Their point of departure is an ancient cave, where the flickering light of an open fire illuminates primitive wall paintings that are the bare beginnings of the virtual worlds we experience today. The lights from 30 lasers are reflected from the screen as the visitors point their magic wands at the wood fire, and the journey begins. It tells the compelling story of the use of visual symbols through the ages to represent worlds unreal or unseen. Ultimately the audience collaborates by creating a totally imaginary world – a powerful demonstration of the way technology is changing our lives today.

The TMW: A Viennese Gem

The Vienna Museum of Technology (known as the TMW) first opened its doors in 1907. The building is a handsome period piece, set off by the magnificence of nearby Schonbrunn Palace. Austria valued TMW enough to close it for five years of renovation in the 1990s, and to close it for another two years while new exhibits were created to fill its 25,000 square feet. It was finally reopened in 1999. Today the public comes to the TMW to experience its new permanent exhibition, Worlds of Media, which opened in March 2003. It uses digital technology to describe the history and future of virtual reality.

Visitors to Worlds of Media can buy smart cards with their tickets. They can take a card to a terminal, put it in a card reader, and create a personal profile (language of preference, favorite color, nickname, and other identifiers) that becomes a digital backpack. They can add images, audio notes, and interesting content from the TMW. As they move through the exhibit, RF antennas sense the smart cards to build a history of their stops. And as they enter the VR Theatre, the system adds an animated 3D show sequence to their profiles.

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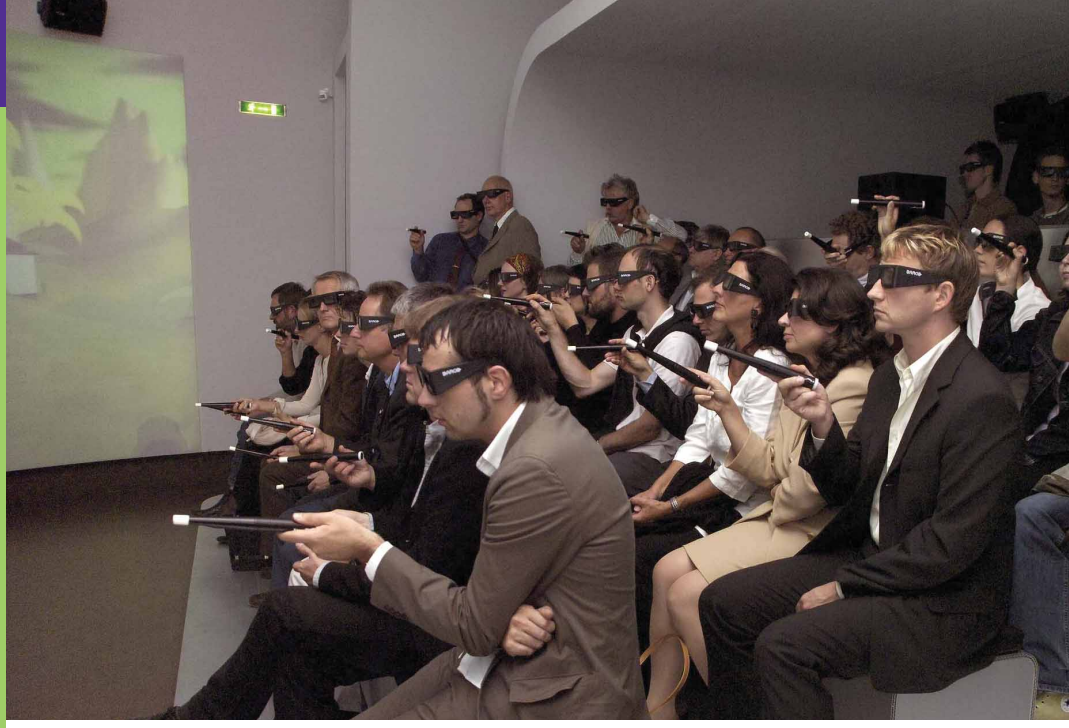

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"The concept behind Worlds of Media is to combine real and virtual space," says Dr. Otmar Moritsch, curator of the exhibition. "We've tried to make it clear where the real space ends and the virtual space begins by letting visitors enter cyberspace to gather information, acquire instructions, and cooperate or compete with other people. In the real-world exhibits, we tell the history of communication, including writing, paintings, photography, and printing. But in Virtual Voyage we start and end with imaginary worlds, and visitors can both cooperate and compete."

An Immersive, Collaborative Experience

In the 30-seat VR Theatre, a 10x40-foot 150° curved screen with a 23-foot diameter tilts 8° away from the audience to create a conical viewing surface. An SGI Onyx 300 visualization supercomputer with two InfiniteReality4™ graphics pipes drives the screen images, drawing from a terabyte of storage on a SGI TP9500 disk array to present interactive real-time graphics on the screen. Three stereo pairs of BarcoReality SIM 6 projectors with 1280x1024 resolution are mounted above and behind the audience. Barco integrated and installed the Theatre's technology, including the SGI visualization system, the sound system, the screen, and the navigation system.

Barco also worked with Imagination Computer Services, a Vienna company, to develop the Magic-Y infrared laser pointers used by the audience to navigate through the Virtual Voyage experience. Magic-Y is a unique cordless interface that has no buttons, but can be used, with a few easy-to-learn gestures, to manipulate the Virtual Voyage presentation as well as other Worlds of Media exhibits. The infrared spots on the screen are sensed by infrared cameras mounted above the projectors. The results are fed to the Silicon Graphics system and the on-screen scene changes according to the choices made by the majority of the audience.

"It's a purely democratic experience," says Moritsch. "With our interactive multi-user interface, we don't need a demonstrator. We just start up the system and the audience takes over."

The adventure begins with the visitors pointing the lights of their laser pointers at the flame of the cave's wood fire. The light of the flame becomes a cursor that morphs progressively into lanterns and modern light

sources as the audience navigates from the earliest temples to the heavy symbolism of a gothic church and the magic lanterns and zoetropes of the Industrial Age. They move through silent cinema and computer-animated movies to a beachfront paradise, complete with music, cool drinks, and even sharks. The audience uses its laser pointers to change almost everything in this environment. A warning appears: Don't touch the red button. Inevitably, the audience touches the button. The screen image zooms into the beach, into a grain of sand and finally into a single digital bit. The remarkable 22-minute journey is complete.

In addition to its daily scheduled shows, the TMW runs Virtual Voyage for school classes – typically, two a day. The TMW will soon be testing additional content that it receives as part of the Virtual Science Network (VSN). The VSN is made up of organizations in industry, academia, and research that use SGI Reality Center technology. They share visualizations with museums and science centers for educational purposes. The TMW will adapt VSN content to its environment and show it first of all to school classes.

"SGI visualization technology offers a uniquely powerful presentation technique for a variety of content," says Moritsch. "I expect science centers and technology

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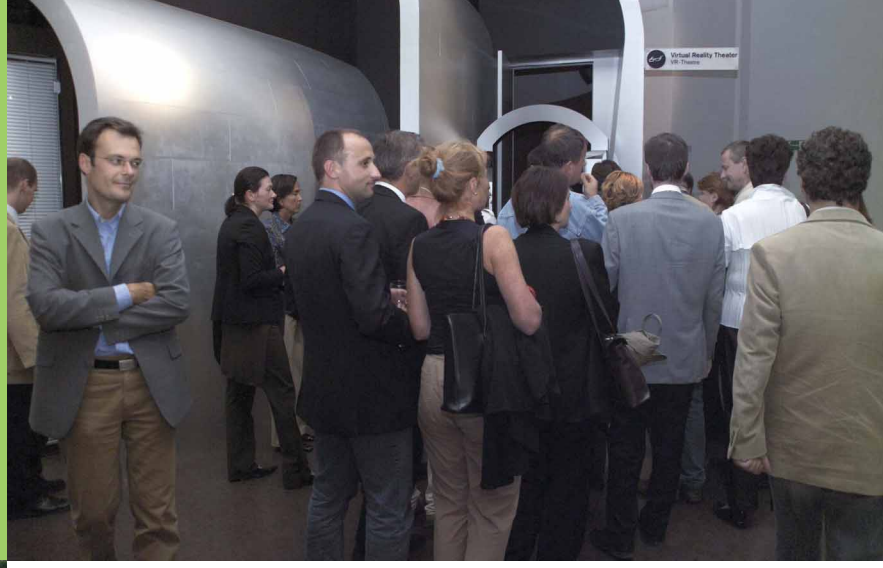

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A Progressive Odyssey

In creating the content for Virtual Voyage, Imagination (www.imagination.at) has used SGI visualization technology to make the journey through worlds of media progressively interactive. It begins in the cave with the three screen zones functioning as a unit. The audience can only navigate laterally. In the ancient temple, they can suddenly interact with on-screen objects and make idols from blocks of stone. When they arrive in the gothic church, they can navigate vertically – up through the steeple and into the Industrial Age, where they can perform several activities in parallel.

In the final scene, the arbitrary virtual paradise, interaction and freedom of choice reach maximum levels. The audience can interact with sharks, sand castles, and other objects in three screen zones at the same time, changing colors, sounds, and shapes.

"As long as these people interact with the virtual paradise," says Moritsch, "the more irrational it will become. The message here is that you can create any world you like today using Silicon Graphics technology in an immersive environment. Tomorrow you may be able to do it in your home. That is one of the primary reasons we decided to invest in a virtual theater. Virtual reality is also a special form of media that we wanted to include in our exhibition. Our consultants recommended SGI visualization technology for these purposes."

"I think that the greatest potential for SGI visualization technology is to allow museums to explore new spaces," says Afshad Mistri of SGI. "They can now take visitors into worlds where they otherwise cannot go —dangerous places, remote places, ancient places that no longer exist, or even imaginary places. We give them the opportunity to extend their horizons, their thinking, their imagination. In a sense we're giving them the power to extend their minds."

sgi

Corporate Office
1500 Crittenden Lane
Mountain View, CA 94043
(650) 960-1980
www.sgi.com

North America +1 800.800.7441
Latin America +55 11.5509.1455
Europe +44 118.925.7500
Japan +81 3.5488.1811
Asia Pacific +1 650.933.3000

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