Look Ma, No Glasses! Varrier Tiled Display Offers 3D Visualization Minus 3D Glasses

March 16, 2007 -- The creators of a large, tiled 105-million-pixel display wall that permits 3D viewing without 3D glasses won a Best Paper Award at VR2007, one of the top conferences in the burgeoning field of virtual reality and visualization.

The winning team was drawn from the UC San Diego division of the California Institute for Telecommunications and Information Technology (Calit2), where the large Varrier display is located in the Immersive Visualization Laboratory, and the Electronic Visualization Lab (EVL) at the University of Illinois at Chicago, where the technology originated.

Their paper described the Varrier Dynallax technology, which uses a solid-state, dynamic parallax barrier. (A parallax barrier occludes certain regions of an image on a display as seen from each of a person's two eyes, permitting the viewer to see an image in 3D without using 3D glasses.)

The team developing and testing the Dynallax included Tom Peterka, Robert Kooima, Jinghua Ge, Andrew Johnson and Jason Leigh (all at EVL), as well as Javier Girado, Tom DeFanti and Jurgen Schulze at Calit2, as well as Dan Sandin, who currently splits his time be, plus Tom DeFanti and Dan Sandin (at left, with Mars fly-over).

The Dynallax technology goes beyond the EVL-developed Varrier™, a static barrier display system. It has been built in single-monitor (Personal Varrier) as well as 65-panel Cylindrical Varrier versions (which currently wows visitors to Calit2). "The Varrier technology has a limited range, so the viewer must remain in a 2-by-2-foot 'sweet spot' to get the full 3D effect without wearing glasses," explained Dan Sandin, who pioneered the technique. "By switching to a dynamic barrier, we should be able to increase substantially the range of movement, so you could really walk around in a CAVE-type environment and continue to see everything in 3D without the burden of wearing 3D glasses.

According to lead author and Dynallax inventor Peterka, "Dynallax affords more advantages than expanded view distance and two independent tracked viewers. It provides optimal viewing at a variety of view ranges, ameliorates sensitivity to system latency, and switches between 2D and 3D mode on a per-pixel basis, meaning that any combination of mono and stereo content can be arranged on the screen. And these are just the features we have demonstrated so far. With a little imagination, one can foresee multiple modes simultaneously active on a large tiled display composed of Dynallax screens. These can include text documents and powerpoints, 3D monoscopic mode scenes, 3D autostereo single viewer mode scenes, two users interacting with their own perspective of the same scene, two users viewing entirely different scenes in the same screen region (in mono or autostereo), and untracked multiview panoramagrams. The combinations are virtually infinite."

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