

HOLOVIZIO – TRUE 3D DISPLAYS

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TITLE OF THE PRESENTATION/DEMO

HoloVizio – True 3D Displays

TOPIC

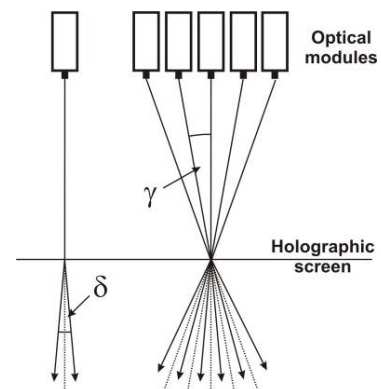
3D Displays

ABSTRACT

Technology

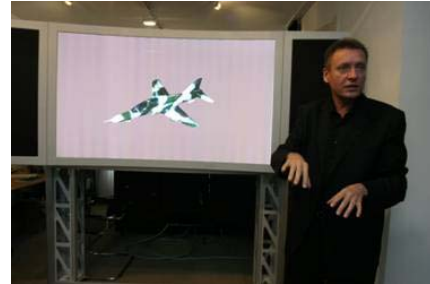
Displaying 3D images is a major step towards realistic visualization. Providing perceivable 3D information can be crucial in applications of many areas including architecture design, biological research, industrial engineering, geological surveying, medical visualization and more. Several technologies addressing this task are available. These include stereoscopic displays with or without tracking, multiview systems, volumetric and holographic systems.

The patented HoloVizio technology uses a different approach. It uses a specially arranged array of optical modules and a holographic screen. Each point of the holographic screen emits light beams of different color and intensity to the various directions. The light beams generated in the optical modules hit the screen points in various angles and the holographic screen makes the necessary optical transformation to compose these beams into a perfectly continuous 3D view. With proper software control, light beams leaving the pixels propagate in multiple directions, as if they were emitted from the points of 3D objects at fixed spatial locations [1][2]. The HoloVizio technology can be used to build both small-scale and large-scale display systems.



Displays

We developed a 50 Mpixel large-scale system [3] with a screen diagonal above 1.8m. The optical system consists of compact projection modules, arranged in horizontal rows. The system has a high angular resolution; approximately 50 independent light beams originate from each pixel. A PC-based render cluster feeds the display with 50 Mpixels in real-time and a sophisticated control system controls the projectors, PCs, the network, power supplies and monitors all system parameters.



With the HoloVizio approach we can build displays that have excellent image resolution of 1920x1080 or beyond, large FOV above 100 degrees, large Field-of-Depth, and at the same time we state the number of pixels being in the range of hundreds of millions.

As of monitor style 3D displays currently we produce 32", 10 Mpixel 16:9 aspect model [4]. This model is in the dimensions of normal TV sets. The image is provided by 128 microdisplays.

Software

We provide several possibilities for displaying 3D data on the HoloVizio. Legacy interactive graphics applications are interfaced to the holographic displays through the HoloVizio OpenGL wrapper. For displaying other content (eg. pre-rendered animations), we provide a video player application. We also provide the necessary plug-ins for 3D content creation and rendering.

Research projects

Holografika is involved in several R&D projects in the frame of the EU FP6, FP7 and national programs, targeting next generation 3D displays and novel 3D applications.

The FP6 project OSIRIS [5] aims to create novel display systems including a high resolution LED based compact display that is capable of real-time playback of live captured natural content. In the same project HoloVizio technology is applied to create a 3D Cinema application.

The FP7 3DPHONE [6] project aims to develop technologies and core applications enabling a new level of mobile 3D experience, by developing an all-3D imaging mobile phone. The aim of the project is to realize all fundamental functions of the phone i.e. media display, user interface (UI), and personal information management (PIM) applications in 3D without stereo glasses.

REFERENCES

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- [2] T. Balogh: *Method and apparatus for displaying 3d images*, U.S. Patent Appl. 20030156077, EP 1 285304, May 19, 2000
- [3] T. Balogh, T. Forgacs, T. Agocs, E. Bouvier, F. Bettio, E. Gobbetti and G. Zanetti: *A Large Scale Interactive Holographic Display*, IEEE VR2006 Conference, Virginia, USA
- [4] T. Balogh et al: *A Scalable Hardware and Software System for the Holographic Display of Interactive Graphic Applications*, EuroGraphics 2005, Dublin
- [5] OSIRIS Project – Original System for Image Rendition via Innovative Screens, EU IST-FP6 Integrated Project OSIRIS (IST-33799 IP), <http://www.osiris-project.eu/>
- [6] 3DPHONE Project – All 3D Imaging Phone, EU IST-FP7 Project 3DPHONE (IST- 213349 STREP), <http://the3dphone.eu>