Holodeck 1.0? Star Trek-style 3-D displays make their debut

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Looking for the holodeck. Photo: © Sergey Drozdov/ Dreamstime.com

True 3-D display technology developed by European researchers offers enormous potential for design, education and collaboration.

Star Trek's holodeck is a famous science fiction concept. Crewmembers could walk through the garden of their childhood home, re-enact famous historical events or watch full, 3-D performances of famous plays. It was a rich source of story lines for the Star Trek writers because the holodeck offered so many opportunities to work, rest and play.

Crewmembers could also learn by using simulations to acquire new skills or execute training drills. They could simulate surgery, flight, and engine repairs in a truly realistic environment.

The holodeck is still science fiction, but last year researchers took the

first, confident steps towards its realisation with the Coherent project. This EU-funded research project, developed a commercial, true 3-D display that could one day be called Holodeck version 1.0. It is called HoloVizio.

Innovation intensive

The HoloVizio is a 3-D screen that will allow designers to visualise true 3-D models of cars, engines or components. Better yet, gesture recognition means that observers can manipulate the models by waving their hands in front of the screen. The function offers enormous scope for collaboration across the globe.

"The aim of the COHERENT project was to create a new networked holographic audio-visual platform to support real-time collaborative 3-D interaction between geographically distributed teams," explains Akos Demeter, spokesperson for the project.

Two applications drove the design of the basic networked audiovisual components – a collaborative visualisation system for the medical sector and a collaborative design review system for the automotive industry.

The researchers based the display component on innovative holographic techniques that can present, at natural human interaction scale, realistic animated 3-D images simultaneously to an unlimited number of freely moving viewers.

No goggles required

The upshot is that users do not need goggles, and the 3-D image is maintained as they move about – both in contrast with early attempts at holographic displays. But the real star of the Coherent project is not

simply the display. The researchers made exciting advances in enabling applications that show the system's real potential.

The COMEDIA application, for example, uses raw data from medical imaging devices to create 3-D models of anatomy. The development, led by Coherent partner CRS4 Visual Computing, demonstrated the system to 50 clinicians in Italy.

"The strength of the COMEDIA system is related to the collaboration, discussion and evaluation of clinical cases, since it provides users with an immediate 3-D understanding of the anatomy shown," explains Demeter.

COMEDIA led to the 'Holo-Heart' series of seminars last year.

Art's hidden secrets

CRS4 also developed rendering and visualisation software that may reveal the artistic secrets of the great masters, like Michelangelo. A scan of his famous David revealed that the eyes diverge.

It is impossible to see this by standing in front of the statue, because of its height and the position of the left forearm. But it becomes clear when viewed through the COHERENT system, and theorists posit that Michelangelo wanted to present two different faces of the same character.

Coherent also led to the development of the COLLAUDA application for collaborative automotive design. The application, developed with CS Systemes d'Information and Peugeot in France, led to a series of demonstrations to potential end users.

The demonstration led to a new project collaboration, named ARIVA, which starts in June 2008.

Oil exploration

Finally, COHERENT's researchers explored the potential for applying holographic systems for oil exploration, using Shell's data. The system displayed real examples of subsurface data. Holografika, the Hungarian research company behind the Holovizio system, developed a lot of the core technology used by the project.

In all, the team developed useful applications for a leading edge, emergent technology, explored excellent commercial opportunities and perfected holographic and allied systems for real-world use. The research also stimulated enormous interest in the area and prompted a wave of activity in the sector. But history, perhaps, will remember the Coherent project as the precursor to a real world holodeck.

Source: ICT Results