COTS Multiscreen Displays

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An immersive multiscreen display (a UT-Cave) may be assembled from common home/office equipment that can be borrowed in most research settings. The simplest design requires two LCD projectors, three personal computers, the corner of a room, and a network hub and cables. The required software is an inexpensive but graphically powerful computer game, Unreal Tournament (UT), and a freeware patch called "CaveUT." Unreal Tournament is partially open source and supports rapid authoring of visually rich virtual worlds, complex animations, and software modifications such as alternative physics or artificial intelligence. PC-based game hardware and game engines such as the one for UT deliver superior real-time graphics at a tiny fraction of the cost for traditional immersive multiscreen displays, such as the CAVE™. While currently having fewer features, the UT-Cave, like the traditional CAVE-like displays, is useful for research in vehicle simulation, human balance, architectural simulation, novel human-computer interfaces and much more.
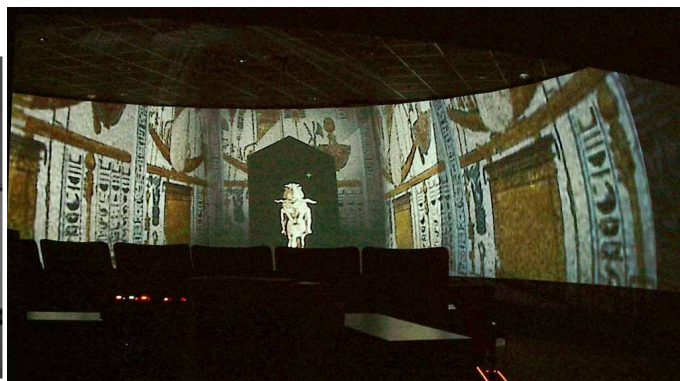
The UT-Cave achieves its remarkable price-performance point by taking advantage of recent dramatic improvements in pc graphics cards and the highly efficient networking code developed for game engines. Because each view is computed independently by its pc and coordinated through its connection to the game server CaveUT scales without appreciable cost allowing resolution and fields of view to be increased as desired simply by adding more commodity priced pc's and projectors. The photographs below show the Temple of Horus VE in it's simplest (corner of a wall) and more complex (Carnegie Museum's 5 screen Earth Theater) form.

UT-Cave was developed as part of an effort to explore the potential of game engines as COTS simulations. In other work we are developing middleware to allow the Unreal engine to interoperate with OneSAF. Open source and detailed instructions for CaveUT can be found at: www.planetjeff.net/ut. Other game engine work is described at: www-2.cs.cmu.edu/~softagents/project_grants_afosr.html

Reference

Lewis, M. & Jacobson, J. (2002) Game Engines in Research. *Communications of the Association for Computing Machinery* (CACM), NY: ACM 45(1), 27-48.

Figure One: The display of a very simple UT-Cave. The