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Virtual Immersive Science and Technology Applications (VISTA)

In the midst of your research, have you ever thought "If only I can see it in 3D or through a Walk-in Virtual System"? This is no longer far-fetched; the VISTA is now available at the BA.

What is a CAVE and how is it useful?

Virtual reality is one of the very practical tools of visualization during research. With virtual reality, or immersive visualization, researchers are able to experience simulations of natural or human-engineered phenomena in a way that provides new insights and understanding. Often eliminating the need for physical models, work within virtual environments has been shown to save time and resources in both commercial and scientific research.

In its efforts to serve science and development, the Bibliotheca Alexandrina installed a CAVE (Computer Aided Virtual Environment) system known as VISTA (Virtual Immersive Science and Technology Applications) to meet the digital challenges of today. Managed by ISIS, VISTA is the latest generation of FLEX™ visualization systems. The FLEX™ is the world's first commercial re-configurable visualization solution for those whose viewing, collaboration, and presentation requirements cannot be met within the confines of a single visualization technology. This walk-in virtual reality system enables interactive work within three-dimensional computer-generated models and environments.

The system is ideal in a vast number of applications in fields as diverse as medicine, engineering, architecture, socio-economic analysis, seismic interpretation and well planning, biotechnology research, manufacturing and design, fluid dynamics, and chemistry.

A pioneering endeavor

Bibliotheca Alexandrina is the first in Africa and the Middle East to provide researchers with such advanced visualization tools. Introducing this technology in the region will provide researchers with the infrastructure they need to cooperate and work closely with researchers from all over the world and will pave the road for further future collaboration. R&D environment will thus be enhanced as the strategic means to securing sustainable development and growth in Egypt and the region.

Since its inauguration by H.E. Mrs. Suzan Mubarak on 15 February 2006, VISTA



NEWS

The launch of the Great Sphinx Visualization project

has been visited by various scientific and political VIPs.

VISTA configuration

The VISTA displays 3D stereoscopic images generated by a state-of-the-art PC cluster, on three 10-ft × 10-ft vertical walls and the floor. The system is configured with two vertical walls and a floor to form the corner of a cube, while a third vertical wall moves at the press of a button to change the environment from an immersive room to an L-shaped theater type configuration, enabling viewing by a large audience. Five workstations are linked together to form a powerful data processor and image generator. The four projectors used in the VISTA render 1400 × 1050 pixels each and have a very bright light output rated at 7200 ANSI lumens.

Achievements and projects

VISTA engineers attended a software training course by Virginia Tech in July 2006. Customization of existing demos was completed and several technical updates took place. In addition, two applications were developed and customized. These applications deal with UN Data and Losch theory.

A recently completed project involved Numerical Visualization of Low Speed Wind over the Great Sphinx. This project is a joint project between Bibliotheca Alexandrina and IBM Egypt based on a study conducted by IBM's Center for Advanced Studies in Cairo (CAS). The CAS team is conducting research to study the effect of low speed wind on the erosion of the Great Sphinx. The study involves a huge amount of multi-dimensional data related to wind flow. The VISTA team designed and implemented an application to provide the CAS researchers with efficient means of analyzing and interpreting their numerical results. This involved a group of scientific visualization methods that are displayed on the CAVE system to make use of its virtually immersive nature in obtaining a better perception. The application also involves displaying a model of the Giza Plateau, created by the CAS team, on the CAVE system. The project was launched on 2 July 2007.

The VISTA team is currently working on several other projects as follows:

Medical Visualization: This project aims at studying different methods of medical visualization based on Digital Imagery and Communications in Medicine (DICOM) data. The VISTA team started by obtaining various medical data from different sources. The data involved different parts and organs of the human body together with the results of a sensitive surgery. The next step was designing and implementing a group of applications that provide different methods of visualizing and manipulating this data, thereby demonstrating the potentials of the system in dealing with this type of data.

A highly detailed 3D Model of Bibliotheca Alexandrina is being developed. Using the model, a visitor will be able to virtually tour the entire building and its facilities.

Adapting the VMD (Visual Molecular Dynamics) software to allow its integration in immersive systems using an open source package called DIVERSE (Device Independent Virtual Environments—Reconfigurable, Scalable, Extensible) created by Virginia Tech. The VMD package is the most widely used open source analysis tool for molecular dynamics.

Applications for Pharos Reconstruction are also being planned in cooperation with AlexMed—a research center in Bibliotheca Alexandrina.

Outreach

ISIS is currently defining target groups to utilize the VISTA resources and setting a plan to outreach to both academic and commercial researchers. Further cooperation with IBM is underway to incorporate some of their projects into VISTA. A website for the VISTA project is being developed. The aim of this website is to provide necessary technical information, demos and description of VISTA projects. Online registration, proposal submission forms and mailing lists are planned to be included to facilitate interaction with researchers and project partners. The team is currently working on the documentation and material collection of the website data.



[more](#)

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