InSight -- An Innovative Multimedia Training Tool

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InSight is an innovative computer-based multimedia training tool that provides a navigable virtual environment and links to related information. This tool can be deployed on Macintosh or Windows-based desktop or notebook computers. It provides training and guidance for touring and observing operations at any facility or site in a realistic virtual environment. InSight becomes a personal information companion that is always available through the use of navigable photo-realistic digital scenes and movies. It also provides three-dimensional objects, narrations, text and graphics in multiple languages.

This presentation identifies the unique attributes of InSight and describes the initial application at Argonne National Laboratory—West (ANL-W). A brief description of the development of this tool, production steps and an onscreen demonstration of its operation are also provided.

InSight is a unique tool that provides many of the features and attributes of a virtual environment without the prohibitive hardware and software demands nor the high content production costs common to this media. Virtual environments typically require artistic renderings of real or imagined spaces that are modeled on the computer, often in three dimensions. These are challenging to produce and effort intensive. They also require high-end graphics workstations, expensive displays and control systems, and are generally not very portable. InSight, on the other hand, is very portable. The data files are extremely small compared to other systems and the hardware and software demands are easily met by today's notebook computers. This provides an opportunity to carry the information into the field and use the tool as a personal information companion.

InSight is employed at ANL-W in several ways. The tool has been used primarily to provide facility-specific training of staff and technicians. This training includes security, nuclear materials control and accountability, and emergency procedures. In addition, the tool's effectiveness has proven to be an asset in other ways. It has been discovered that this electronic media (which has been sanitized of restricted data) can be shown to guests in lieu of touring through restricted access facilities. This eliminates disruption of facility operations and eliminates the necessity of preparing plans and obtaining multiple approvals to tour visitors in restricted areas.

InSight is based on a system software extension called QuickTime® developed by Apple Computer, Inc. The extension enables creation and playback of compressed audio and video, and navigable panoramas called QuickTime® VR (QTVR) files. The number of commercial applications of QTVR is rapidly expanding. In addition to education and training, the tool has received substantial use in sales and marketing in areas such as real estate. Generation of the QTVR scenes and movies requires an Apple Macintosh workstation for composition and production but once composed, the title can be deployed on a Macintosh or Windows-based multimedia computer without any other resources required.

QTVR provides the technical basis for the training tool by enabling the construction of navigable panoramas and objects. These are then combined with digital video and sound, graphics, text and narrations to provide for the complete training experience. The training is more effective since the user is engaged interactively in the virtual environment rather than simply a spectator in a classroom or laboratory. The user directs the activity in the panoramic scene and has easy access to a wide variety of information. The user can change their view of a scene by turning left and right through a full 360 degrees, looking up and down, and zooming in or out. The correct viewing perspective is maintained continuously giving the illusion of looking around the scene. Pixel-accurate "hot spots" allow the user to click on designated areas of the scene and launch various types of media to augment the training. The latter enables a near unlimited connection of

related panoramas. Objects of interest in the scene can be picked up, manipulated, and viewed from all angles while remaining in perspective.

The development process comprises four phases. The first phase consists of detailed planning. Phase two is the gathering of the media; the capturing or rendering of images, video and sound, and obtaining text and narrative. In phase three, the virtual environment scenes are composed, the hot spots are created, and links to multiple locations are made. The fourth and final phase is the development of the user interface.

The current titles at ANL-W were created by photographing views at node locations in twelve orientations to capture the full 360 degrees with overlap between the photographs to enable stitching the views together. The first step upon developing the film was to scan the negatives to obtain digital representations of the views. These are then stitched into a single panoramic scene which uses only about 500K of data space. With multiple nodes, the views are linked to provide the appropriate view directions and zoom level. Hot spots are defined and navigable objects or other media are linked to each spot.

In summary, this new innovative tool has enabled an educational experience comparable to on-the-job training. The navigable exploration of the workplace allows the user to be engaged in the activity rather than simply becoming an observer as in traditional training situations.

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