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## *Virtual Environment Software Sandbox*

### *sandbox (n):*

*(also `sandbox, the') Common term for the R&D department at many software and computer companies (where hackers in commercial environments are likely to be found). Half-derisive, but reflects the truth that research is a form of creative play.\**

### **Overview:**

The Virtual Environment Software Sandbox (VESS) is a suite of libraries developed jointly by the Virtual Reality Applications Lab and Networked Virtual Environments Lab at the Institute for Simulation and Training (IST). It is based on lessons learned from the Virtual Environment Library (VEL) previously developed by IST and used to create the software for various virtual reality applications.

The goal of VESS is to provide a useful and functional application base using today's hardware and graphics and audio libraries, extensible to support future hardware and graphics and audio libraries, and easily portable to multiple platforms, graphics and audio systems, and application programming interfaces (API's).

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\* From *The New Hacker's Dictionary (3<sup>rd</sup> Edition)*, compiled by Eric S. Raymond

### **Purpose:**

IST designed VESS to simplify and expedite the development of applications where virtual environments are required. VESS provides a simple interface into the underlying graphics API while integrating support for various input devices, such as joysticks and motion tracking systems, and display devices, such as head-mounted displays and shutter glasses.

VESS provides behaviors and motion models to allow users to manipulate their viewpoint and control and interact with objects in the virtual environment. The user's viewpoint can be independent or attached to any transformable object in the scene.

VESS also provides a seamless audio API that integrates directly into the VESS scene graph, giving developers the ability to easily add sound to the environment (including moving objects). Other useful routines such as collision detection and terrain following are provided as well.

### **Advantages:**

VESS provides a high-level library allowing complex virtual entities (avatars), complete with geometry and motion/articulation

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Mission: ■ Be a focal point for the expanding modeling and simulation community ■ Develop and conduct M&S research and related services ■ Identify M&S directions and trends ■ Facilitate moving M&S into new areas ■ Be a research and development access point to industry for technology transfer ■ Create and participate in partnerships ■ Provide an environment conducive for student and faculty participation in M&S research and development ■ Provide continuing education services.

models, to be generated with a few simple lines of code. This is useful for dynamic networked virtual environments, which may involve many users and/or computer generated forces at once.

VESS provides the developer with the ability to handle avatars at a high level and leave the details of movement, articulations, and behaviors to the system.

IST designed VESS for easy portability. Its multi-layered architecture allows the

developer to focus on the details of the application, without worrying about the specifics of the graphics API or hardware interfaces. Thus, applications built using the VESS libraries will be easily portable to any other supported platform.

VESS currently runs on IRIX and Linux platforms using the SGI Performer API. Other platforms and API's will be supported in the future.

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