Open Systems and Virtual Reality

Sandy Ressler
Project Leader
Open Virtual Reality Testbed
National Institute of Standards and Technology

OPEN VIRTUAL REALITY TESTBED

Overview of Talk

- Open Systems
- Standards Process
- User Interface
- U.S. Government Activities
  FCCSET — VR Task Group
- Future Scenarios — Markets

OPEN VIRTUAL REALITY TESTBED

Open Systems

- Framework for Interoperable Systems
- Heterogeneous Platforms
- Vendor Neutral

OPEN VIRTUAL REALITY TESTBED

Open System Environment (OSE)

- **Extensibility**

  Based upon an architectural framework which allows an extensible collection of interfaces, services, protocols, and supporting formats to be defined

- **Non-Proprietary**

  Interfaces, services, protocols, and supporting formats are defined in terms of nonproprietary specifications that are available to any vendor for use in developing commercial products.

- **Consensus Based**

  Evolution is controlled by a consensus - based process for decisions regarding definition and specification of interfaces, services, protocols, supporting formats, and other issues relating to the computing environment.

OPEN VIRTUAL REALITY TESTBED

Open System Environments — Benefits

- Increase freedom of choice in selecting vendors
- Reduce integration costs
- Protect software investment
- Enhance availability, quality and variety of complementary products

OPEN VIRTUAL REALITY TESTBED

Profiles

- A suite of specifications which reflect required functions and an organization's view.
- Application profiles should be expressed in terms of user-specified functions.
- A framework and taxonomy must be established to provide discipline to the process of describing user-specified functions.

OPEN VIRTUAL REALITY TESTBED

Application Portability Profile

- **Provides guidance to Federal agencies regarding selection and use of OSE specifications**
- **Is NOT a standard**
- **APP service areas provide the support necessary for a broad range of applications**

  Operating System
  User Interface
  Data Management
  Data Interchange
  Programming
  Graphics
  Network
  Security
  System management

OPEN VIRTUAL REALITY TESTBED

User Interface

- One service area of the APP.
- Oriented toward window system GUIs.
- Inadequate for the additional human interface devices commonly use in VR applications

  Head Mounted Display
  Spatial Sound
  Data Gloves
  3D Position Trackers
  Force feedback
- Beginning to explore the creation of a formal standard for 3D Position Trackers

OPEN VIRTUAL REALITY TESTBED

Formal Standards Development

- **International**
  ISO/IEC, CCITT
- **National**
  ANSI
- **Industry Driven / Open**
  IEEE, ASME
- **Government**
  MIL-STDs
  FIPS

All are consensus building activities among diverse participants. This inevitably takes time.

OPEN VIRTUAL REALITY TESTBED

The Problem with Standards

- **Vendors want — product differentiation**
- **Users want — interoperability**

but

- **Every wants — A MARKET**

OPEN VIRTUAL REALITY TESTBED

FCCSET — HPCC VR Task Group

- **Monthly meetings with representatives of many government agencies:**
- **Part of the HPCC, High Performance Computing and Communications FCCSET.**
- **Identify barriers to the productive exploitation of VR technologies.**

OPEN VIRTUAL REALITY TESTBED

VR Application Domains

- **Health Care**

  Shift delivery toward the patient
  Collaborative consultation
  Intervention planning tool

- **Education and Lifelong Learning**

  Explore virtual worlds — hazardous, inaccessible, team experiences, historical recreations, remote exploration
  Augmented reality
  Science and Math education - visualization and manipulation of abstract concepts.
  Natural access to digital libraries

- **Manufacturing**

  Collaborative design
  Rapid Interactive Prototyping
  Walkthroughs
  Virtual Factory

VIRTUAL REALITY TESTBED

Open Virtual Reality Testbed — Mission

To facilitate the development of standard interfaces, and testing methodologies to the many novel human interface devices which when integrated for a virtual reality system.

NIST will work with a number of private companies, universities and other government agencies to ensure a broad base of functionality and acceptance to evolving standards.

OPEN VIRTUAL REALITY TESTBED

Open Virtual Reality Testbed — Current Activities

- **Signed Memorandum of Agreement with Army Research Institute - to provide facilities and expertise in the study of cognitive issues for VR.**
- **Participant in the VR Task Group of the HPCC FCCSET committee meetings.**
- **In the process of developing a Cooperative Research and Development Agreement with Silicon Graphics to explore long term strategic issues relating to VR.**
- **Initiating the development of a formal standards effort for 3D motion tracking devices, to be led by industry.**

OPEN VIRTUAL REALITY TESTBED

Future Scenarios — Markets

- **Is there a VR market?**
- **Where are the off-the-shelf products?**
- **Cost to develop applications is too high.**
- **Standards can reduce risk, broaden user acceptance, and increase potential market.**
- **VR technologies are still developing, many are premature**

OPEN VIRTUAL REALITY TESTBED

Standards and Markets

- **Do Standards create Markets?**
- **Do Markets demand Standards?**
- **Vendor community must be willing to put forward the resources required to develop standards.**

  but
- **That will only happen if there is the perception of a marketplace.**

- **Federal government can function as a facilitator and stimulus to the development of standards**

  but
- **Rarely develops standards on its own.**

OPEN VIRTUAL REALITY TESTBED