AVS/Express MPE

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Scope of Presentation

• Introduce AVS Express MPE
• Illustrate Sample Applications
• Current and Future Developments
AVS/Express Multi-Pipe Edition

- High Performance Multi-Channel Data Display Visualization for Immersive (VR) Systems
- Based on AVS/Express
- MPE = AVS/Express + MPK
Advanced Visual Systems (AVS)
-Visualization Software & Solution Vendor

Kubota Graphics Technology, Inc.
Software & Corporate Partner

Graphics Technology Partner (MPK)

Manchester Visualisation Centre, IAC:
International AVS Centre (Research Partner)
Paul Lever, George Leaver, James Perrin et. Al.
Motivation: High-End Visualization - Graphically Demanding Applications
Software Tool Adds Value

- Software to Drive VR is **COMPLEX**!
- MPE Provides Deployment Toolkit
- Save Time & Money
- First Rapid-Prototyping tool available in Market
- Re-use existing Express Expertise
AVS/Express Multi-Pipe Edition is the only full visualization tool-kit system on Multi-Pipe. All other systems are vertical product solutions, or research experiments.

Any AVS/Express user or OEM Developer can “Multi-Pipe Enable” applications for resale.

Prototype Viz on Laptop, load V file into Reality Center!
Application Areas

- **Computational Chemistry**
  - PDB, Gaussian, Mopac, MM3

- **GeoSciences (Oil & Gas)**
  - GOCAD, GeoQuest

- **Medical 3D Reconstruction**
  - DICOM Image Stacks

- **CFD**
  - Plot3D, CFX, Fluent

- **FEA**
  - Autodyn3D, Goodyear

- **GIS**
  - Arc/Info, Oracle Spatial

- **Data Mining**
  - Oracle, Informix, ODBC

...
Immersive Environments

- Reality Center™
- PowerWall
- CADWall
- VisDome
- HoloBench
- BaronBench
- CAVE
- .....

Trimension Systems, 3 channels
Multi-Pipe Extensions

Key features:

• Flexible pipe, window and channel configuration

• Transparent parallelization of rendering processes
MPK Configuration
Benefits

- ASCII configuration file format, provides run-time portability of OpenGL-based applications between single-user and large-scale environments such as
  - CAVE Environments (4/5)
  - RealityCenter™ Curved Screens
  - PowerWall, CADWall, HoloBench
  - ImmersaDesk, BaronBench

- Single Executable Deployment
Multiple Display Channels for Single Scene

SingleExecutableApp
Off-line prototyping

- Develop visualization on PC, remote location
- Using High-Level Visual Programming
- Move to Multi-Pipe System unchanged
Multi-Pipe setup phase

AVS/Express Network Editor

4-Pipe Onyx2, Tokyo Institute of Technology
Example 4-pipe Power Wall Display

4-Pipe Onyx2, Tokyo Institute of Technology
Data Courtesy of Unilever (Dr. Rob Treloar)
See The Molecule (STM)

• Ken Flurchick
  Ohio Supercomputer Center
• Libero Bartolotti, Mark Reed
  North Carolina Supercomputing Center
• Theresa Windus
  Environmental Molecular Science Laboratory
See The Molecule (STM)

- AVS/Express Add-On Package
- New C++ Modules
- UNIX & Windows
- Reads Many Chemistry Files
- Many Display Options
- Many Visualization Operators
See The Molecule (STM) Examples

- Gamess CUBE Visualization:
See The Molecule (STM) Examples

- Gaussian Visualization:
SEE THE MOLECULE (STM)

- At IAC (www.iavsc.org)
- FREE Downloads (Windows Zip - 5 Mbytes) from:
  http://www.osc.edu/~kenf/Visualization/STM_doc/STM-frame.html
C60 Bucky Ball

- Electron Distribution Volume Dataset
- Quantum Molecular Dynamics Simulation
- Solid C60 at 1000K
C60 Bucky Ball
C60 Bucky Ball
C60 Isosurfaces and Isolines
Features of Current Version

- Version 5.1.1 (Based on AVS/Express 5.1)
- Multi-Pipe Onyx2 and/or Multi-Channel Display Projections
- Uses Multipipe SDK (MPK) rather than MPU
- Using efficient Pthreads parallelism
- 2-pass transparency now default for viewer
- New VRMenu provides immersive GUI
VRMenu Demonstration

Offset

Glyph

Scale = 7.23

Advanced Visual Systems Inc.
More Features of Current Version

- New Wand Viewer
- New demos http://www.avsuk.com/mpe
- Robust DPLEX mode
- Better support for locked objects (Text, Legends)
- Picking and Head tracking supported
- Orthographic rendering mode
Supported Systems & Platforms

- SGI IRIX 6.5 Both N32 and N64
- Any SGI 02 to Onyx-2

- Support for Trackd based camera tracking devices and controllers/interactors such as:
  - Wanda
  - Polyhemus
Based on Express 6.0
- 3D Picking
- FMP Wand decoupling
- Own License Features
Future Releases

- Add addition platform support using VRCO’s CAVELib library
  - PC Windows
  - Linux
  - Possibly other unix versions
    - Solaris
    - HP
- New release of MPE for SGI using MPK
- Ongoing development of Viz techniques for Immersive Environments
Conclusions

■ Summary
  – MPE is highly configurable for VR environments
  – MPE is built upon AVS/Express
  – MPE will be Cross-Platform

■ Further information at
  – http://www.avs.com/software/soft_t/avsxps.html

■ Demo Version documentation & download via
  – http://www.avsuk.com/mpe
  – http://download.avs.com/Express/mpe_demos_rt_8june01.tar.gz