



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



AVS/EXPRESS MULTI-PIPE EDITION PROJECT PARTNERS

Advanced Visual Systems (AVS)

-Visualization Software & Solution Vendor



Kubota Graphics Technology, Inc.
Software & Corporate Partner



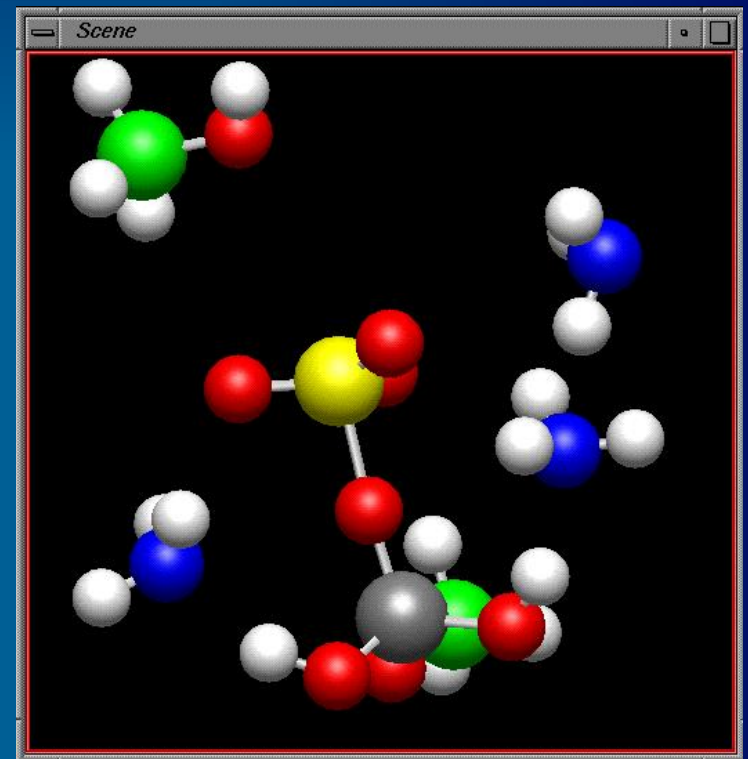
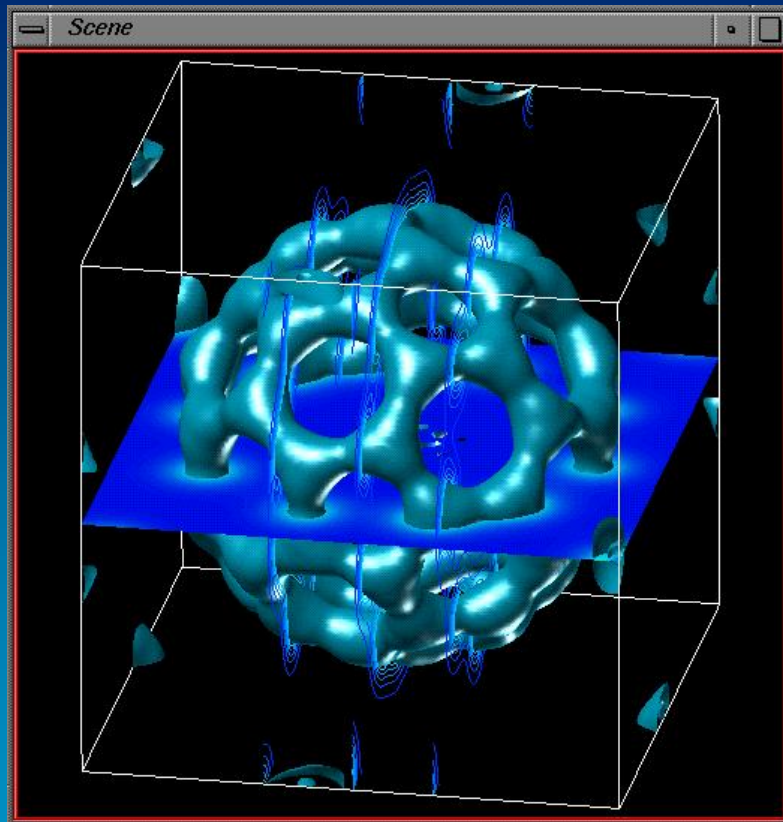
Graphics Technology Partner (MPK)



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



UNIQUE POSITION

- 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

AVS/Express
Multi-Pipe
Edition

*Development
Tool*

VR Systems

Onyx2
Environment



IMMERSIVE ENVIRONMENTS

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



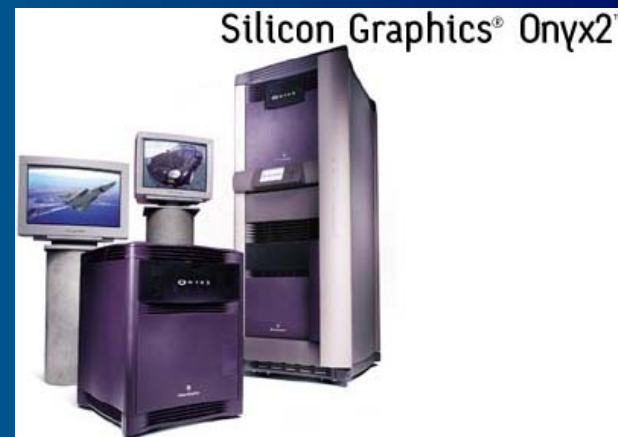
Trimension Systems, 3 channels



MULTI-PIPE EXTENSIONS

Key features :

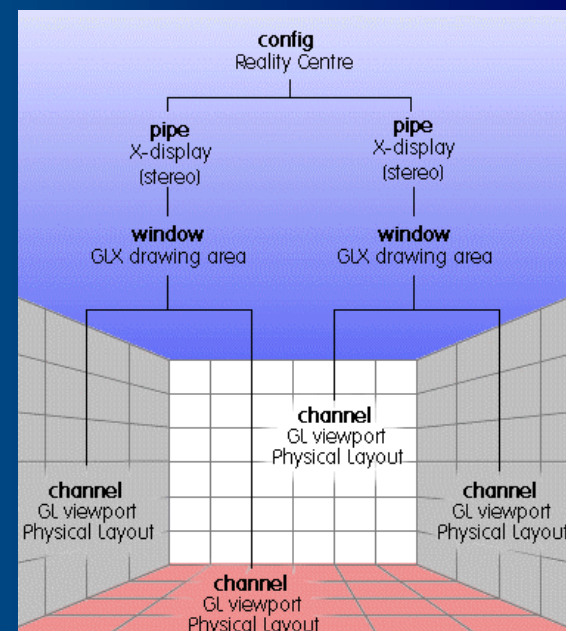
- Flexible pipe, window and channel configuration
- Transparent parallelization of rendering processes





MPK CONFIGURATION BENEFITS

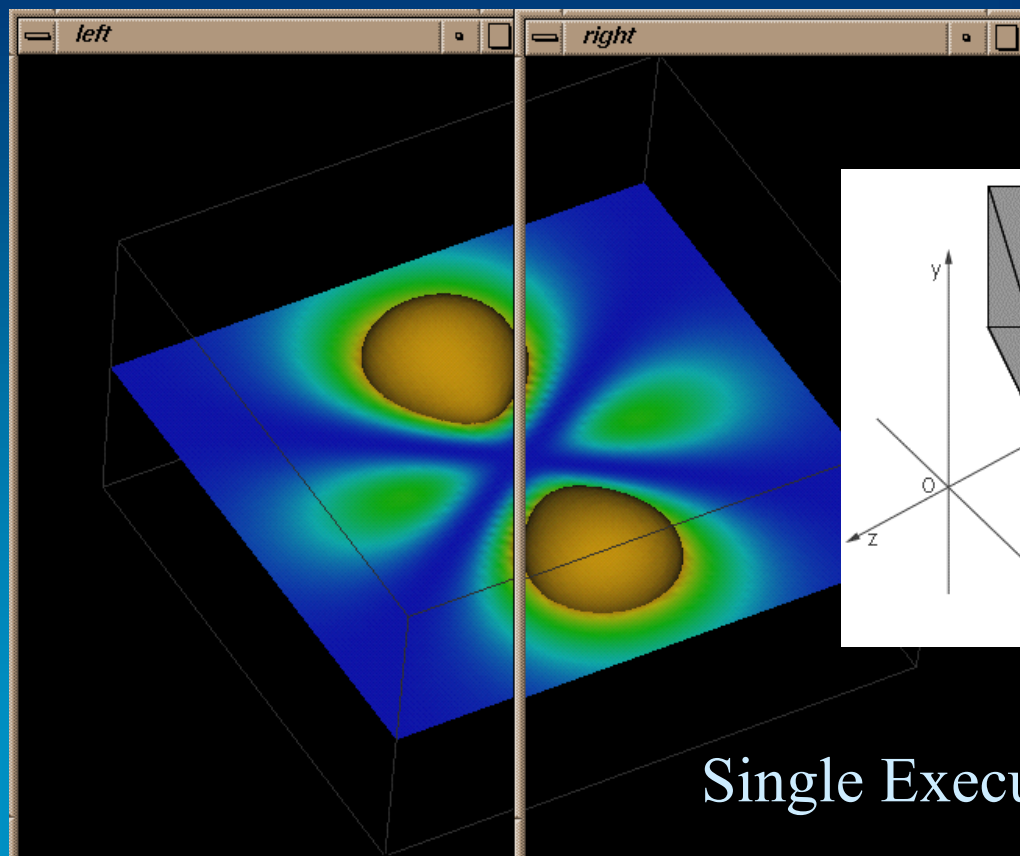
- ASCII configuration file format, provides run-time portability of OpenGL-based applications between single-user and large-scale environments such as
 - CAVE Environments (4/5)
 - RealityCenter™ Curved Screens
 - PowerWall, CADWall, HoloBench
 - ImmersaDesk, BaronBench
- Single Executable Deployment





MPU EXTERNAL CAMERA CONFIG

Multiple Display Channels for Single Scene

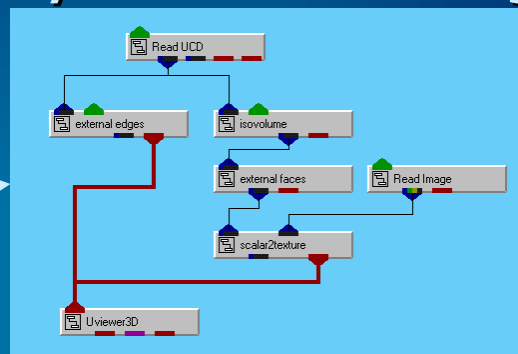
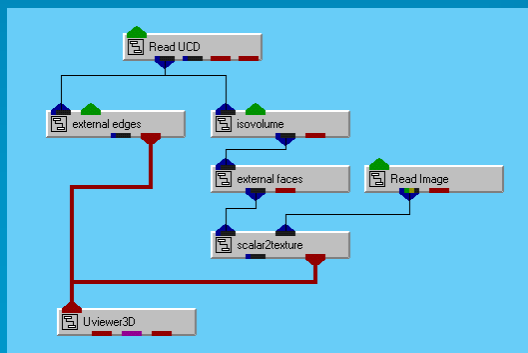
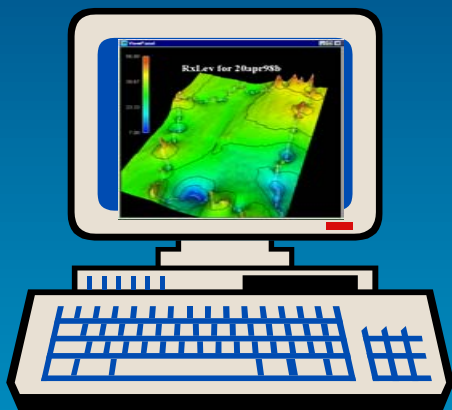


Single Executable App



OFF-LINE PROTOTYPING

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





MULTI-PIPE SETUP PHASE

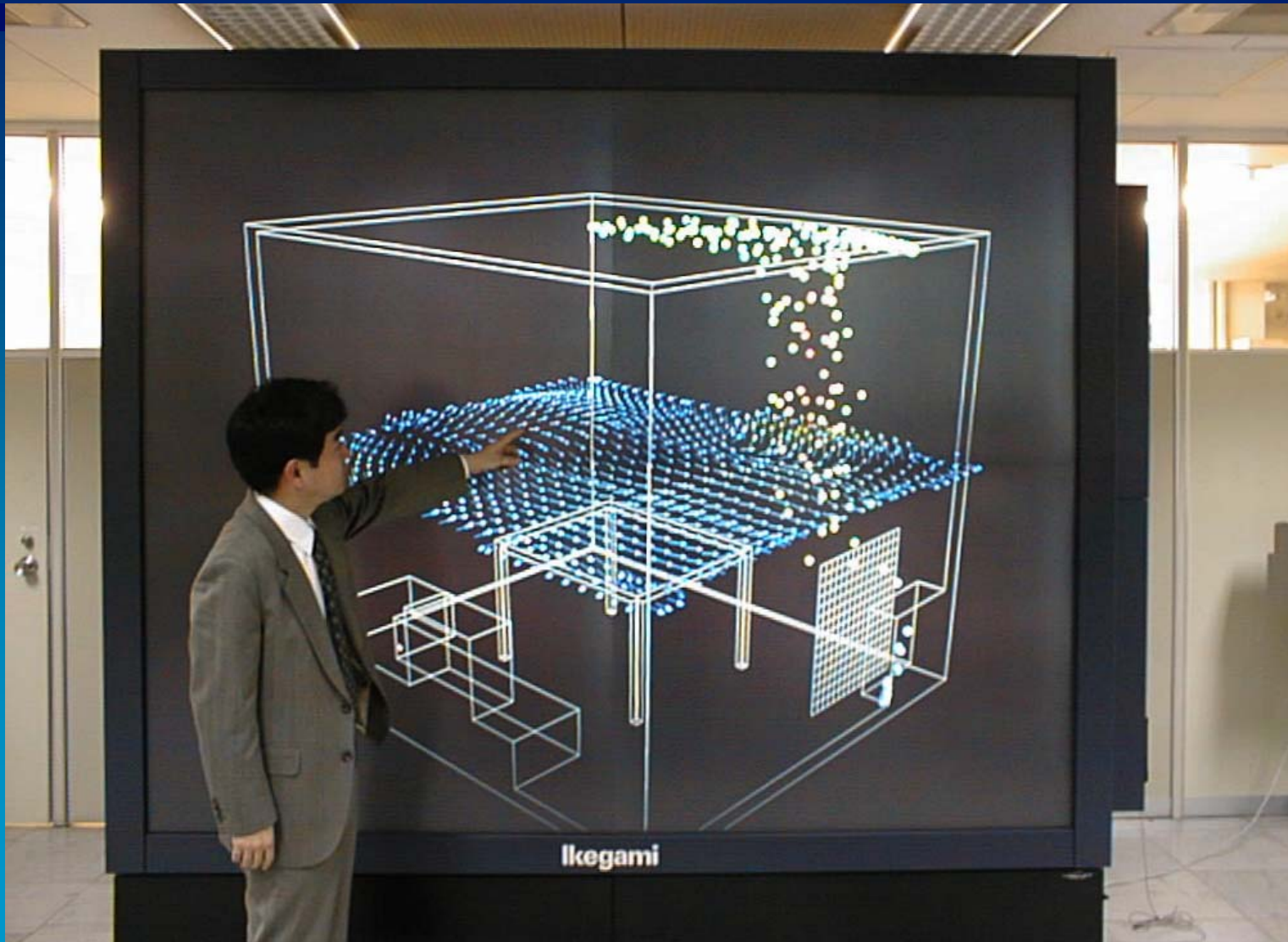
AVS/Express
Network
Editor



4-Pipe Onyx2, Tokyo Institute of Technology



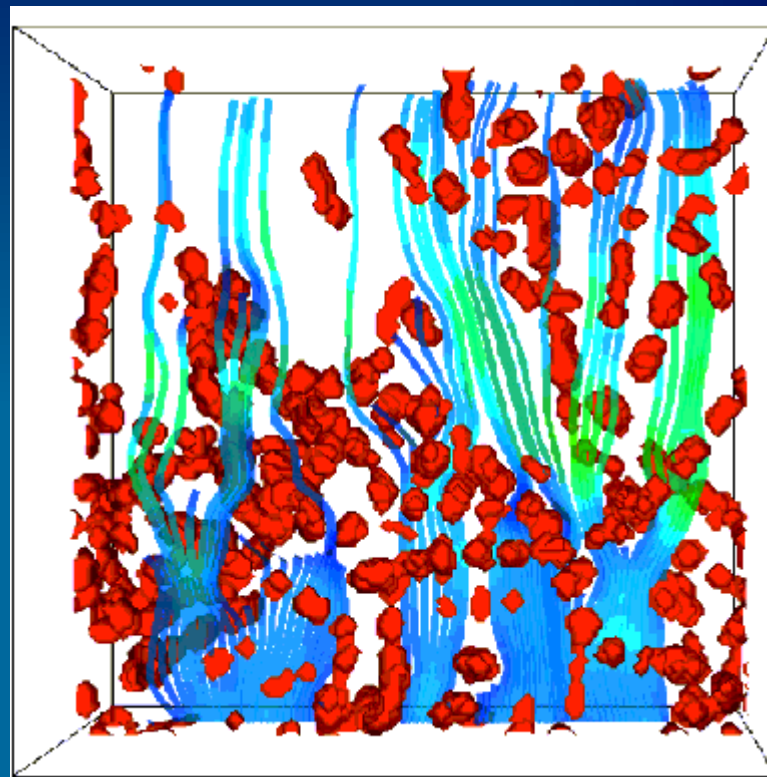
EXAMPLE 4-PIPE POWER WALL DISPLAY



4-Pipe Onyx2, Tokyo Institute of Technology



INDUSTRIAL APPLICATIONS

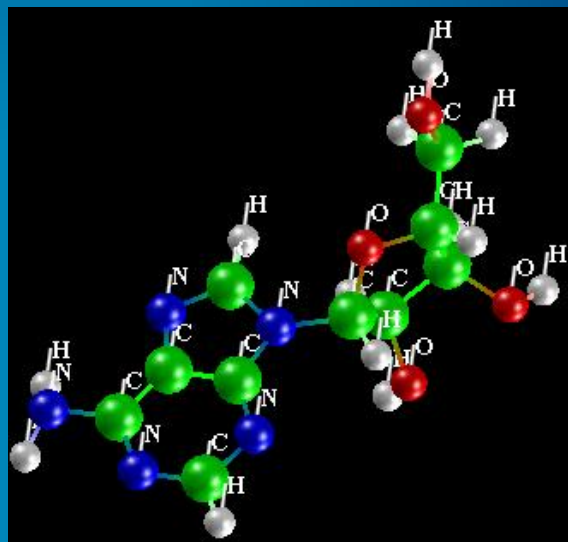


Data Courtesy of Unilever (Dr. Rob Treloar)



SEE THE MOLECULE (STM)

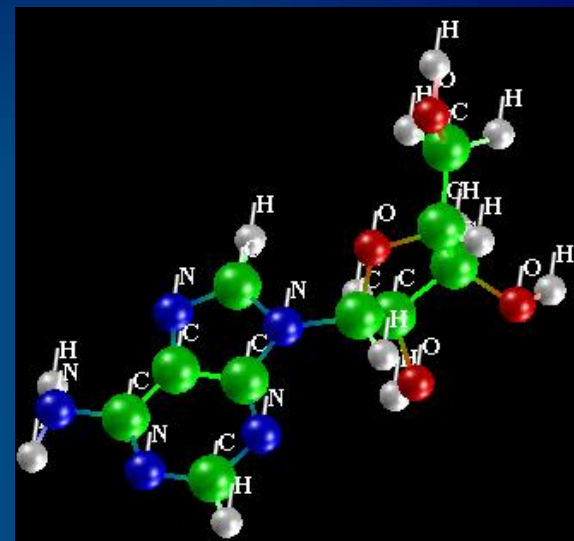
- Ken Flurchick
Ohio Supercomputer Center
- Libero Bartolotti, Mark Reed
North Carolina Supercomputing Center
- Theresa Windus
Environmental Molecular Science Laboratory





SEE THE MOLECULE (STM)

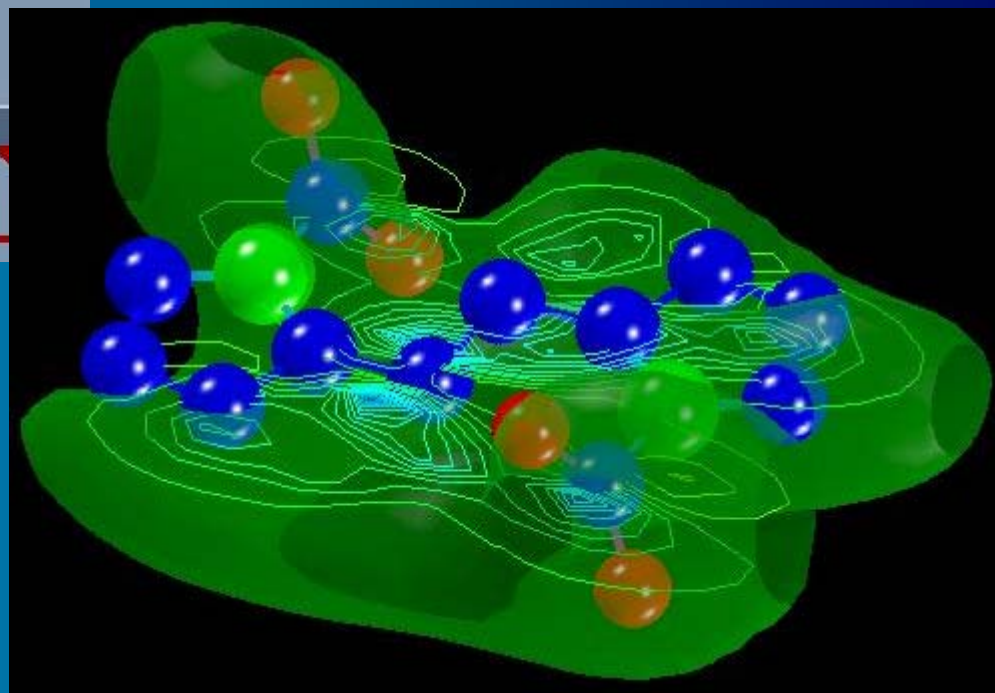
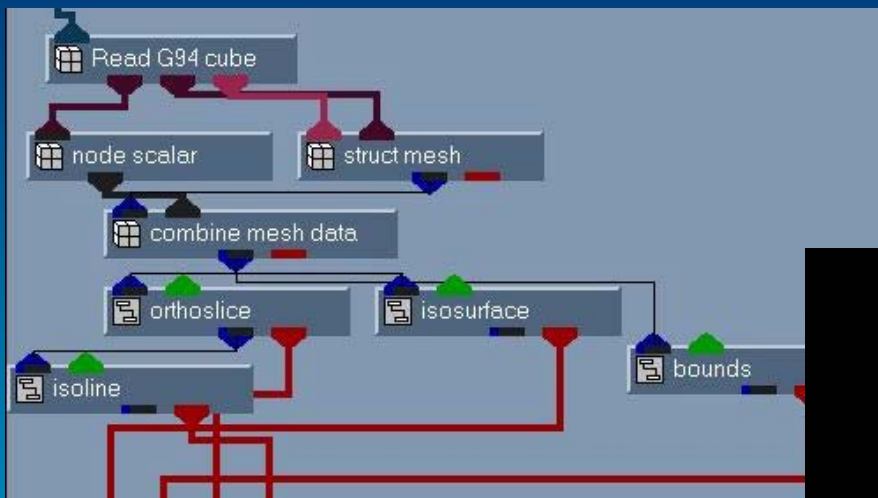
- AVS/Express Add-On Package
- New C++ Modules
- UNIX & Windows
- Reads Many Chemistry Files
- Many Display Options
- Many Visualization Operators





SEE THE MOLECULE (STM) EXAMPLES

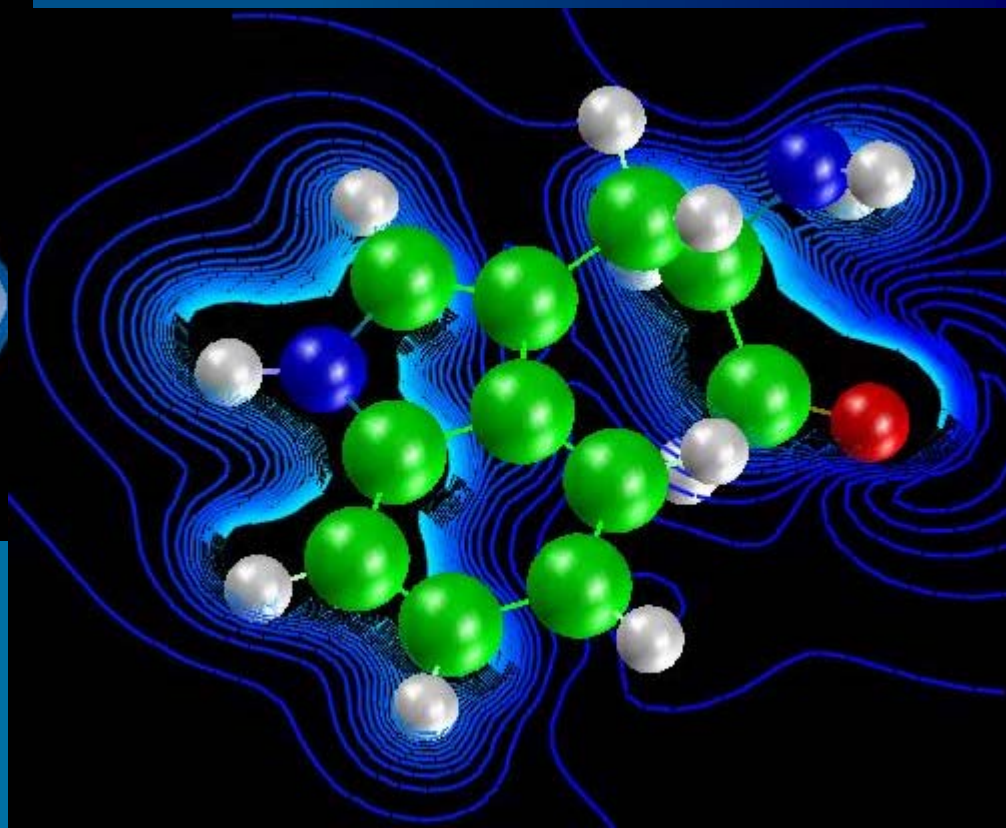
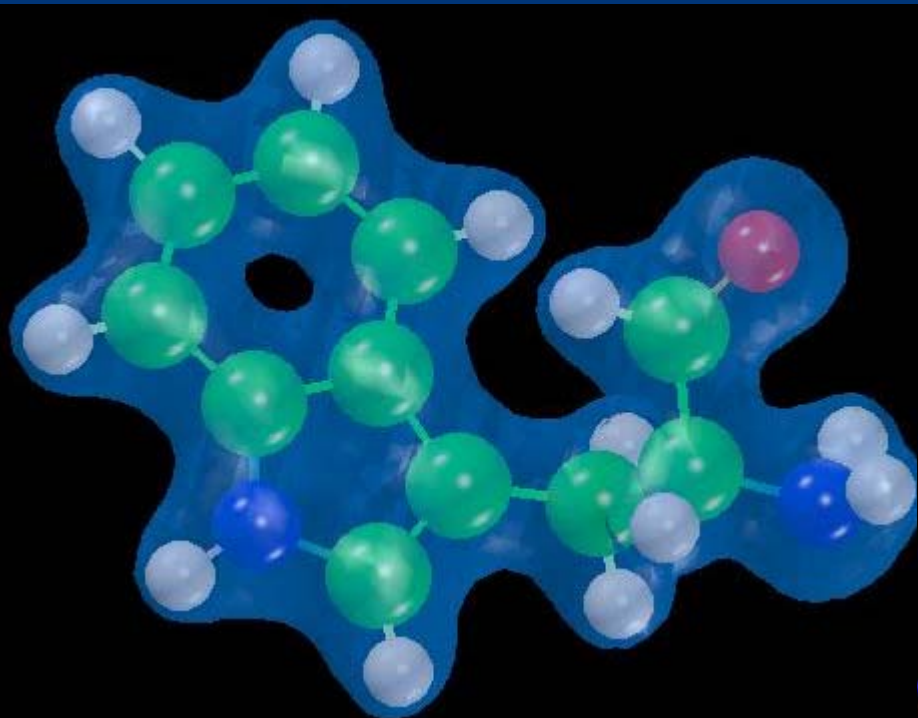
■ Games CUBE Visualization:





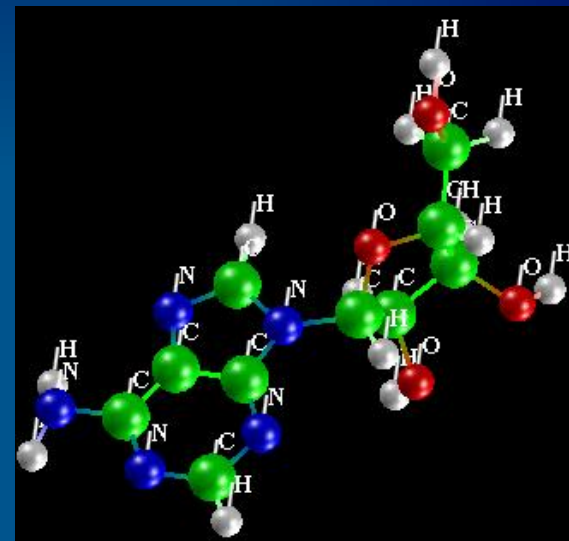
SEE THE MOLECULE (STM) EXAMPLES

■ 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

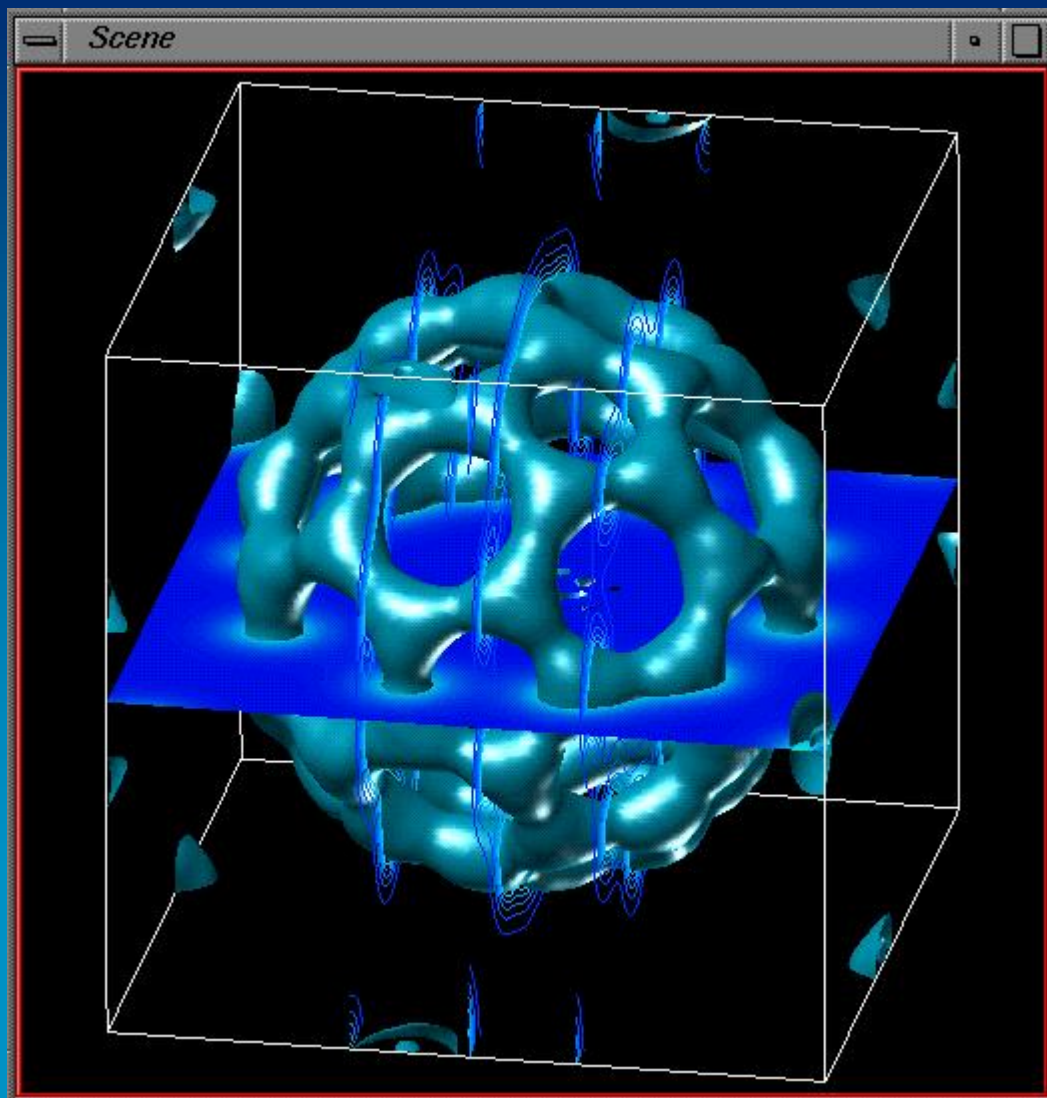


C60 BUCKY BALL

- Electron Distribution Volume Dataset
- Quantum Molecular Dynamics Simulation
- Solid C60 at 1000K

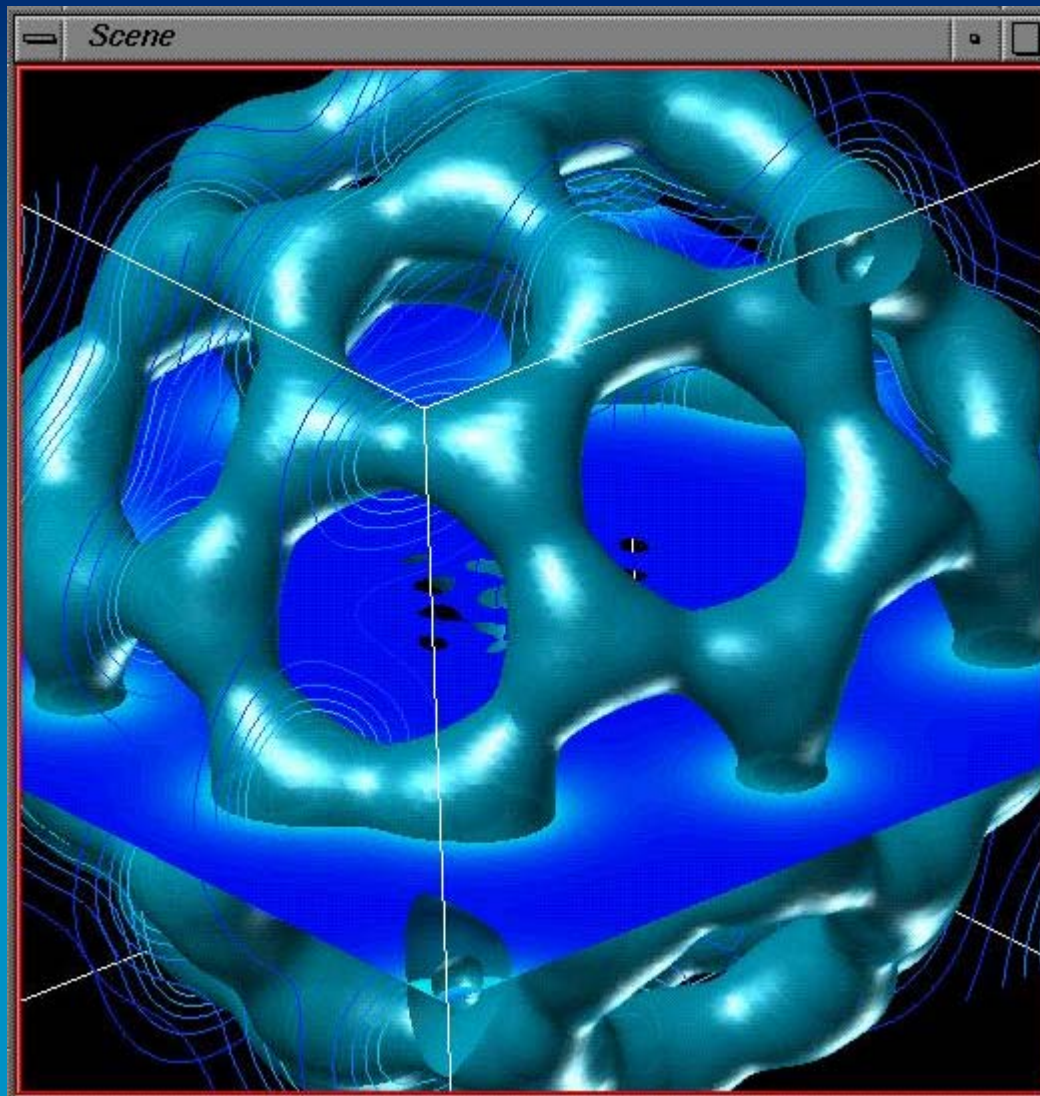


C60 BUCKY BALL



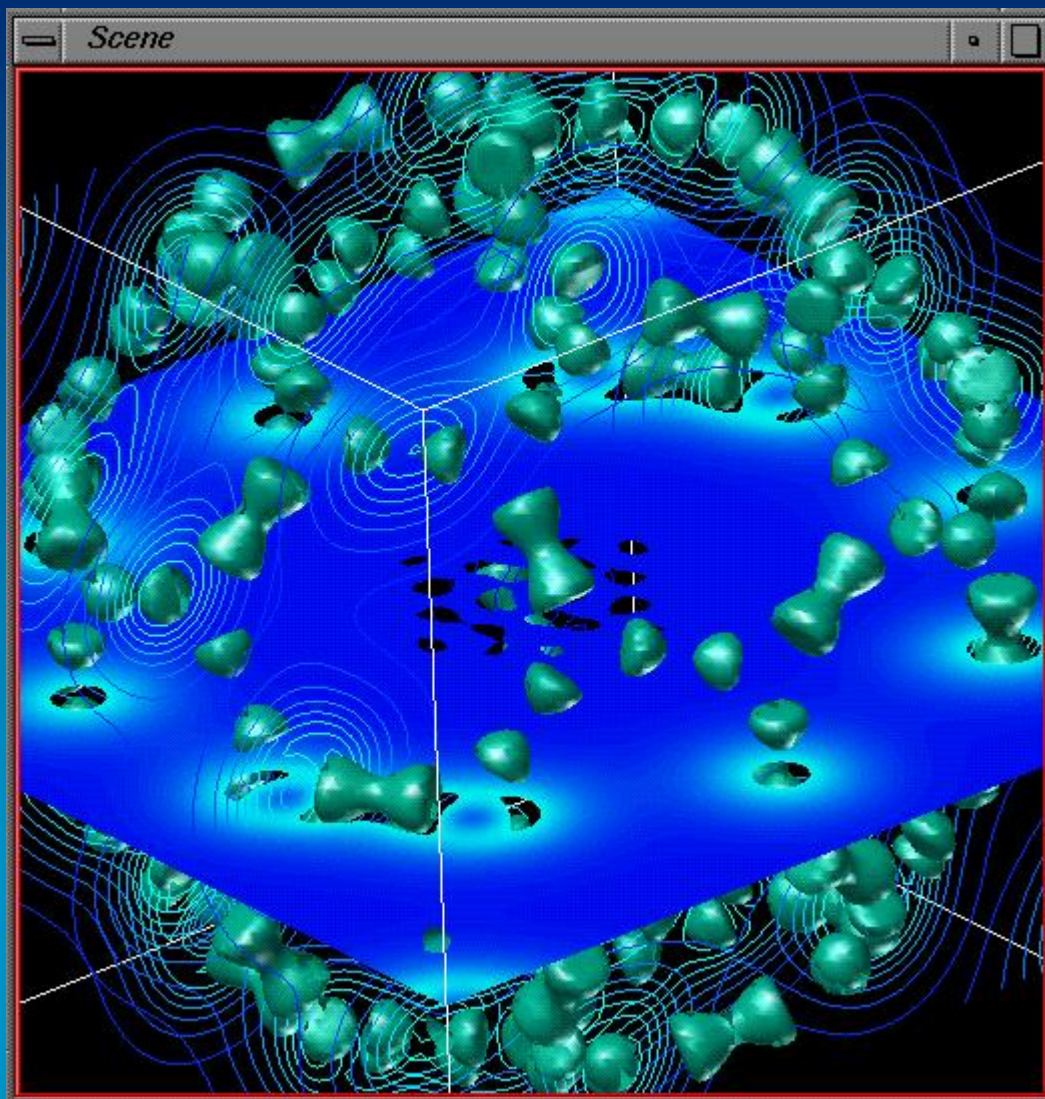


C60 BUCKY BALL





C60 ISOSURFACES AND ISOLINES



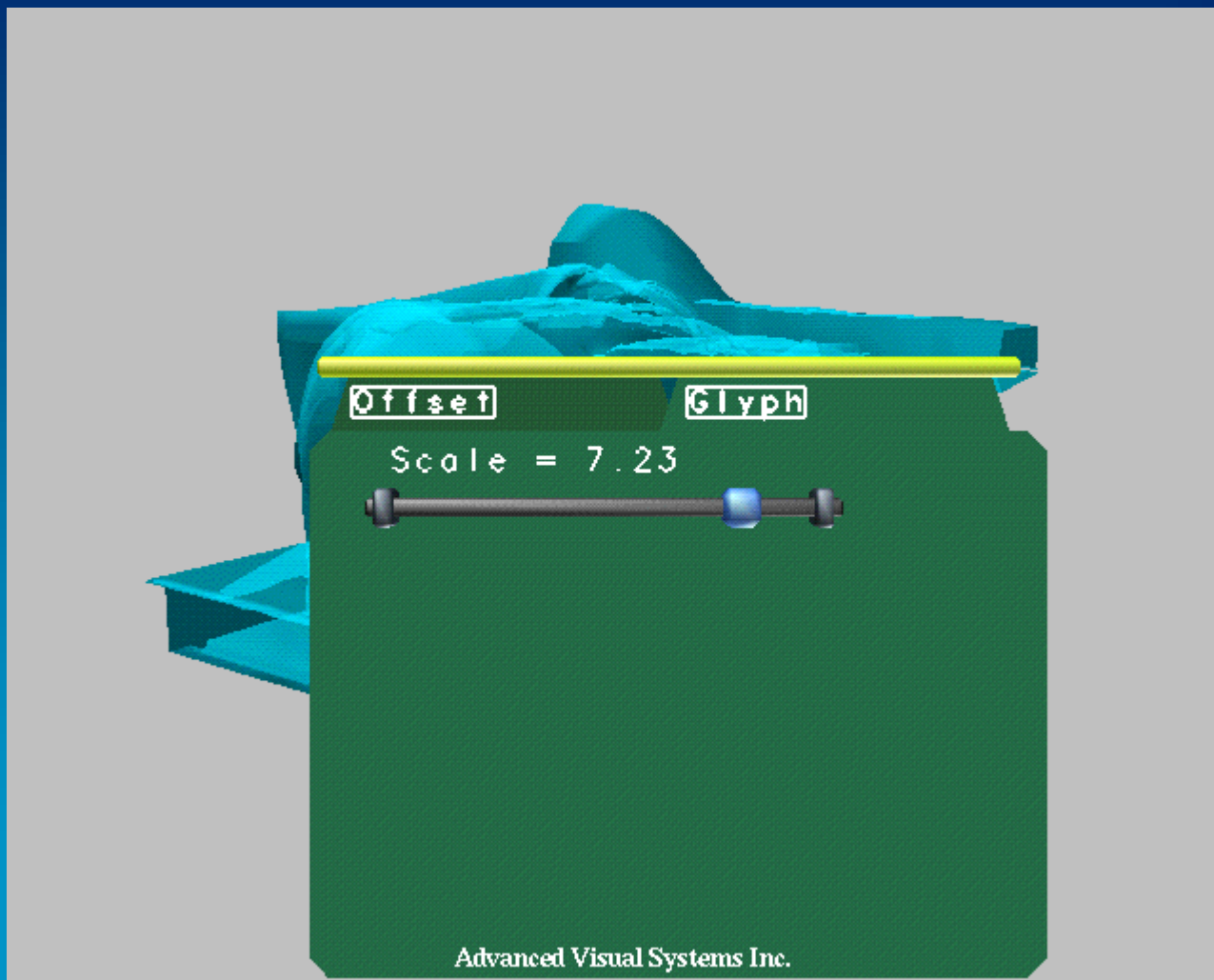


FEATURES OF CURRENT VERSION

- 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





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**



NEXT RELEASE - DECEMBER 2001

- 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.avsc.com/software/soft_t/avsxps.html

■ Demo Version documentation & download via

- <http://www.avsc.com/mpe>
- http://download.avsc.com/Express/mpe_demos_rt_8june01.tar.gz