The Future of Stereo 3D Data Analysis and Visualization

Los Alamos
NATIONAL LABORATORY
— EST.1943 —

John Dermer
HPC-DES

NNSA
National Nuclear Security Administration

Current 3D Visualization Systems in HPC

Cave

33 projector visualization system
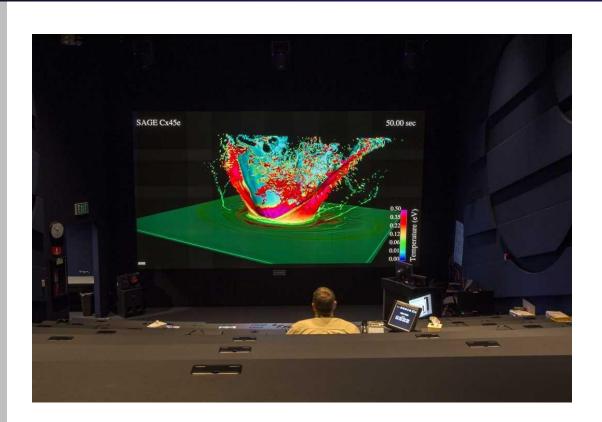
~40 million pixels

5 wall display, 15X12X10 ft.

Stereo 3D

Single user tracking

10 non-tracked viewers

Power Wall Theater

40 projectors

~30 million pixels

21X11 ft.

Stereo 3D

85 person capacity

Desktop Stereo

Single screen display - Office KVM system

Stereo 3D

No new stereo monitors available

What can we do?

Motivation for my work:
Find Alternatives for Office Stereo 3D Data Analysis and Visualization

Head Mounted Display

A potential solution is …

e.g. HTC Vive(www.vive.com/)

Individual user - office system

~same price as desktop solution

Issue - Bluetooth/wireless

Wired Systems and Inside-Out Tracking

Disable Bluetooth/wireless interaction

Replace with wired controllers, e.g. Xbox™ controller

Camera tracking, aka "inside-out"

Hand tracking uses camera tracking
- e.g. Oculus Quest(www.oculus.com/)
- e.g. Leap Motion(www.ultraleap.com/)

ParaView and OpenVR(SteamVR)

ParaView (www.paraview.org/)

- Open-source scientific visualization tool

- In use at LANL

- Added support for OpenVR

OpenVR (github.com/ValveSoftware/openvr)

- Open-source VR SDK

- Created by Valve

- Needs steam to function

Still in development - limited features

Virtalis/HTC Vive Secure HMD

Another potential solution …

Proposed full secure system as a hardware/software package

Collaborative interface

Cross system support

Virtalis is not just VR

In Review

HMD systems

- Wired controllers/Hand Tracking
- Camera Tracking
- ~ same price as current system

Virtalis

- VR hardware and software
- Designed for secure use

ParaView/OpenVR

- Software
- Still in development

Thank You

Back ups

My Research

ParaView and OpenVR(SteamVR)

ParaView

- Open-source scientific visualization tool
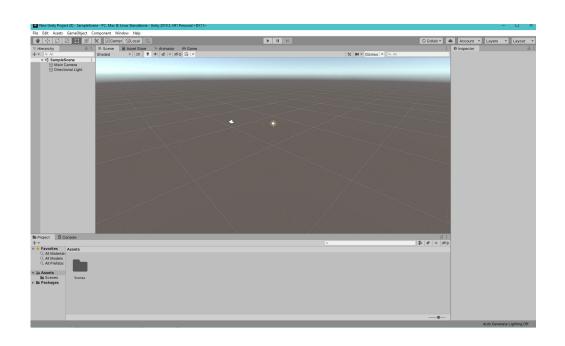- In use at LANL
- Added support for OpenVR

OpenVR

- Open-source VR SDK
- Created by Valve
- Needs steam to function

Still in development - limited features

Unity

Other research facilities

Game engine

Great for VR