

BRAVE & EXTRAWING

Fumiaki Araki and Shintaro Kawahara
Earth Simulator Center, JAMSTEC

Special Thanks
Yukiteru Mukai and Hiroki Mizuno
SGI Japan, Ltd.



BRAVE

- * CAVE system of the Earth Simulator Center, JAMSTEC
 - * “BRAVE” is an alias of our CAVE system
 - * “**B**ooth for **R**econstruction, **A**nalysis and **V**isualization of **E**arth environment”
(recently changed ^_^;)
 - * Introduced on March 2003



Specification (current system)

- * Workstation
 - * SGI Asterism Ultra AO532
 - * OS: RHEL Server Release 5.3
 - * CPU: AMD Opteron 8224 SE
3.2GHz x 8 (16 cores)
 - * Memory: 256GB
 - * HDD: 8TB
- * Graphics
 - * NVIDIA Quadro PLEX 1000
Model IV x 2 sets
 - * GPU: NQ FX5600 x 4

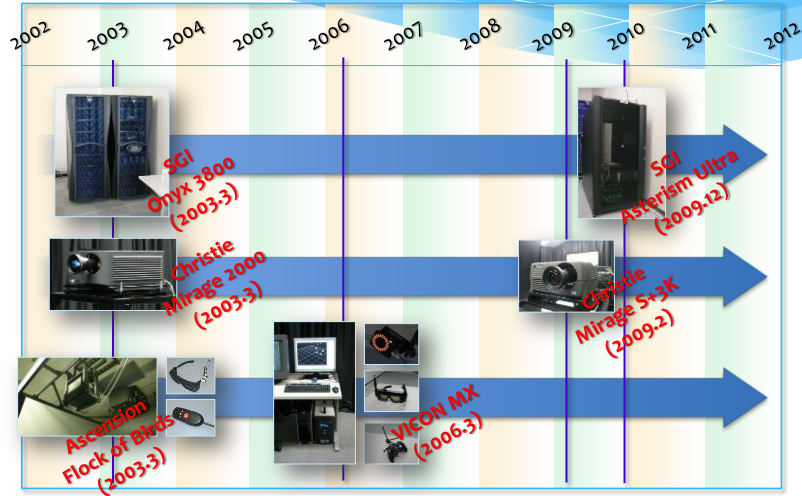


Specification (current system)

- * Projection Technology
 - * Structure:
(3m)³ Cube-type
with 3 walls and a floor
 - * Projector:
Christie Mirage S+3K
(SXGA+, 3000lm) x 4 sets
 - * Stereographics:
time-division, using liquid
crystal shutter glasses
- * Tracking system
 - * Vicon MX (optical)

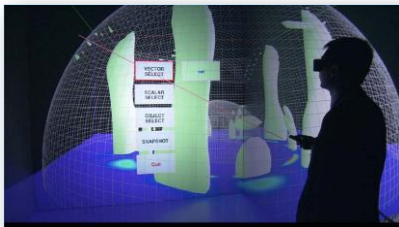


Replacement History



Software

- * VFIVE
 - * Developed by A. Kageyama (Kobe univ.) and N. Ohno (Univ. of Hyogo)
 - * Interactive visualization software for CAVE-type virtual reality systems
 - * Unique visualization functions implemented
- * Other CAVELib™-based programs



Appearance of VFIVE
A user is selecting a visualization method from the menu.



4D VRML Data Viewer (D. Sugiyama, 27th CAVE Study Meeting)

Visualization (1)

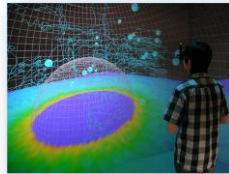
- * Geo-scientific simulations
Climate, Ocean, Earth's core, magnetosphere, ... etc.
- * VFIVE is used in many cases.



Ocean floor topography near the Japan trench



Wind flow analysis, JAMSTEC Summer Science Camp 2010



Geodynamo simulation in the Earth's outer core (T. Miyagoshi & A. Kageyama)

Visual simulation of Multiple light scattering in a cumulus cloud (F. Araki)



MHD simulation of solar flare (S. Inoue)

Visualization (2)

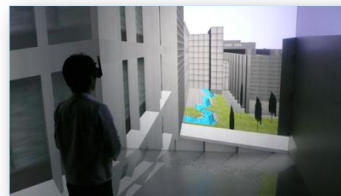
- * Other cases
 - * Dislocations of crack tip,
 - * Structure of polymer,
 - * Quantum mechanics,
 - * 3D modeling, ... etc.



Vibrational excited state of He trimer molecule, using VFIVE (H. Suno, 39th CAVE Study Meeting)



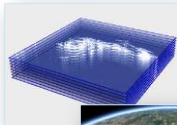
Crack tip dislocation simulation (Hirose & Kawamura)
About 2 hundred thousand particles are visualized.



The view of Yokohama Institute for Earth Science, JAMSTEC using VRML (N. Ohno)

Recent Study

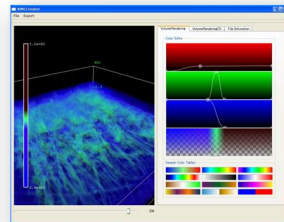
- * EXTRAWING (EXploring and TRAvelling the World INSide Geoscientific data)
- * Project for effective representation of simulation results and transmission it to general public.
- * EXTRAWING takes fully advantage of Google Earth™.



Volume-rendering-like representation (T. Sugimura)



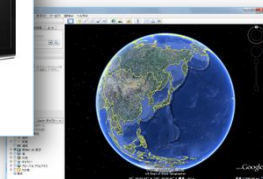
Web application of Ajax framework (F. Araki)



Qt-based contents making program (S. Kawahara)

EXTRAWING 3D-Vis approach

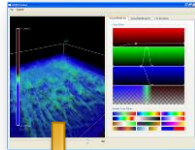
- * To use 3D Vision
 - * NVIDIA GeForce 3D Vision
 - * Effective also for Google Earth
 - * It was very popular at Open House of YES/JAMSTEC 2010



Exhibition of EXTRAWING at Open House of Yokohama Institute of Earth Science 2010, 27th Nov. 2010

EXRAWING in CAVE (1)

- * CAVELib-based program
 - * Applying OpenGL part of the contents making tool
 - * But ... reality not so high by lack of environmental datasets (elevation, textures, buildings, etc.), which are extremely expensive!



Today's
Demonstration



EXRAWING in CAVE (2)

- * Conduit™ for Google Earth (Mechdyne / SGI Japan, Ltd.)
 - * Environmental data sets of Google Earth are available.
 - * But ... it seems to be better to use for Wall-type system than CAVE-type system.

Also today's
Demonstration



EXRAWING x Conduit for Google Earth (47th CAVE Study Meeting)

Summary

- * BRAVE
 - * Introduction
 - * System specification
 - * Software development
 - * Visualization examples
- * Recent study, EXTRAWING
 - * Introduction
 - * EXTRAWING 3D-Vis approach
 - * EXTRAWING in CAVE --> 2 types of Demos
Which is better? (no conclusion)

