Visualisation for Science Research and Public Education

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Featuring
VROOM - The Virtual Room

Centre for Astrophysics and Supercomputing

Swinburne University of Technology

http://astronomy.swin.edu.au/

SWIN BUR NE

CENTRE FOR ASTROPHYSICS AND SUPERCOMPUTING

Conducting research in Astronomy. For example: cosmology, galaxy formation and evolution, globular clusters, pulsars, star and planetary formation.

Online Astronomy Course.

Public Education.

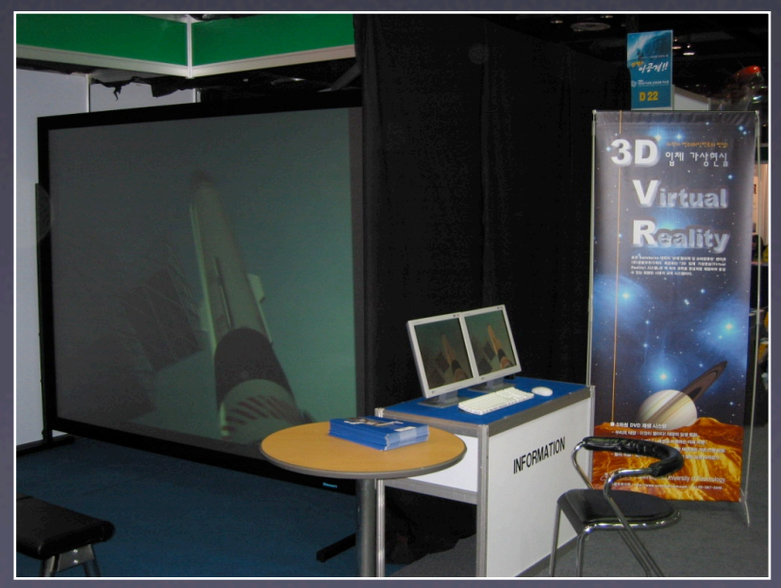
Visualisation and High Performance Computing.

Why are we involved in multimedia, virtual reality, and visualisation?

- Presentation of research data by scientists.
- Analysis of results between researchers.
- Communicating science to the public.
- Engaging science education for children (Enjoyment + Learning).
- Media rich content for the online astronomy course (http://astronomy.swin.edu.au/sao/) .

Stereographics

- Developed our inhouse stereoscopic solutions 5 years ago.
- Based upon commodity hardware.
- Has benefits to scientific visualisation.
- Engages children and adults for our public education activities.
- We develop interactive software and precomputed software inhouse.
- Provide complete hardware and software solution. Installations internationally.



Example from Astronomy Research
http://astronomy.swin.edu.au/~sgill/PVIEW/

- Simulation of a galaxy cluster.
- 5 million particles, takes “weeks” to compute.
- Interactive visualisation (30 fps).
- Software: PVIEW, developed locally.

(Animation follows)

Example from Educational Program

- After Stars, completed July 2004.
- Stereoscopic movie.
- Discusses the fate of stars, using 3 “alien” characters.
- Pulsar or black hole.

(Animation follows)


Alpha Station

Our Goals in Public Education

- Create an exciting/engaging educational experience.
- Providing cost effective projection systems without a lower quality result.
- Ability to imagine and design new forms of content delivery and software.
- Maintain scientific correctness.

(Animation follows)

VROOM "The Virtual Room"

http://www.vroom.org.au/

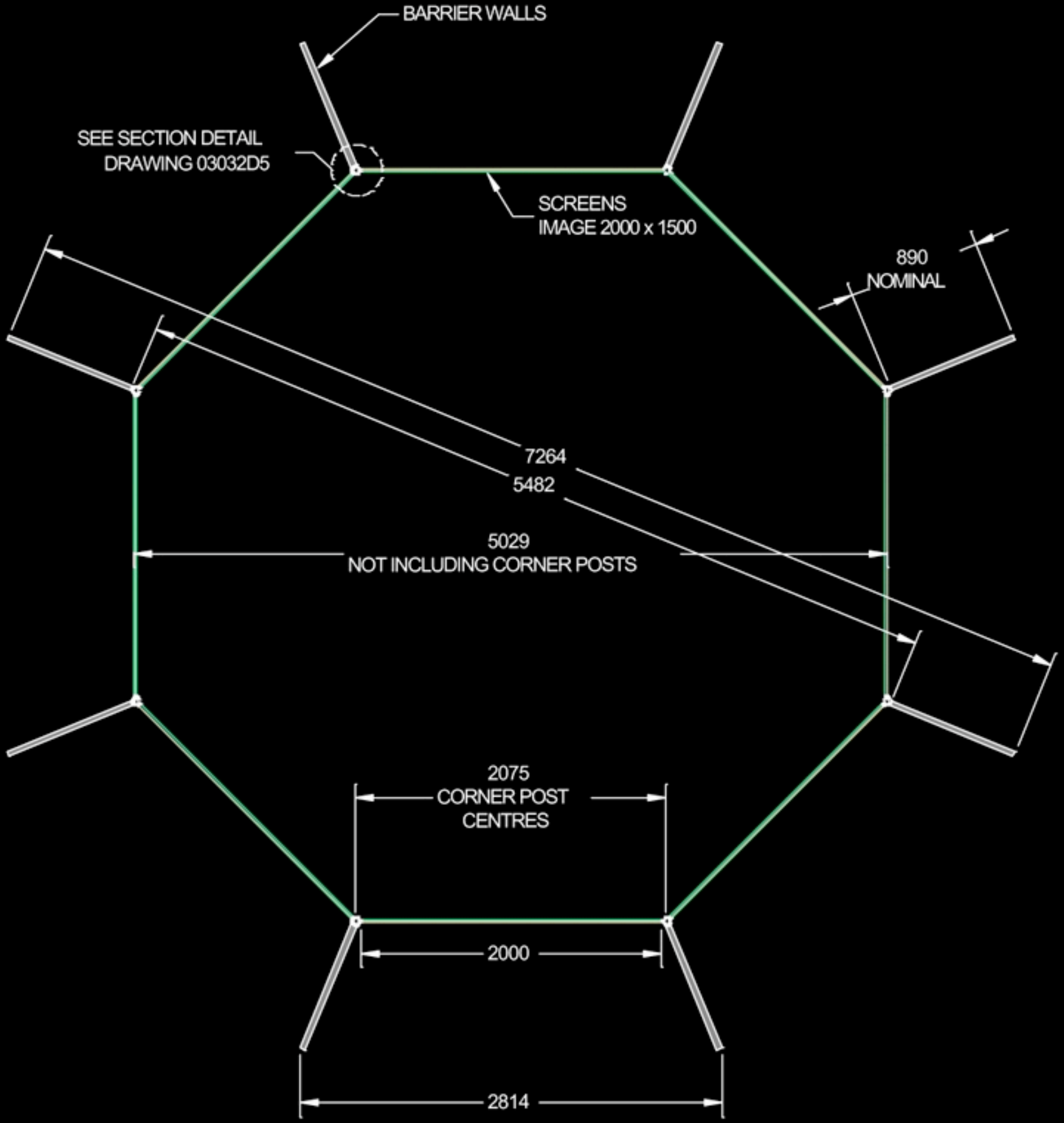
http://astronomy.swin.edu.au/~pbourke/vroom/

- Concept my David Barnes and myself in 2001.
- Technology and content methodology developed by myself during 2002.
- Consortium formed between Swinburne University, Museum Victoria, RMIT, Monash University, and Melbourne University.
- Opened at Melbourne Museum 2004.

Concept - VCV
Virtual Containment Vessel

- Inverted CAVE. VROOM is more suited to scientific data compared to immersive environments.
- Everyone looking into the same environment, users walk around to explore the environment from different positions.
- Ability to design the stereoscopic settings so that the virtual environment appears correctly within the physical environment.

(Animation follows)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SEE SECTION DETAIL
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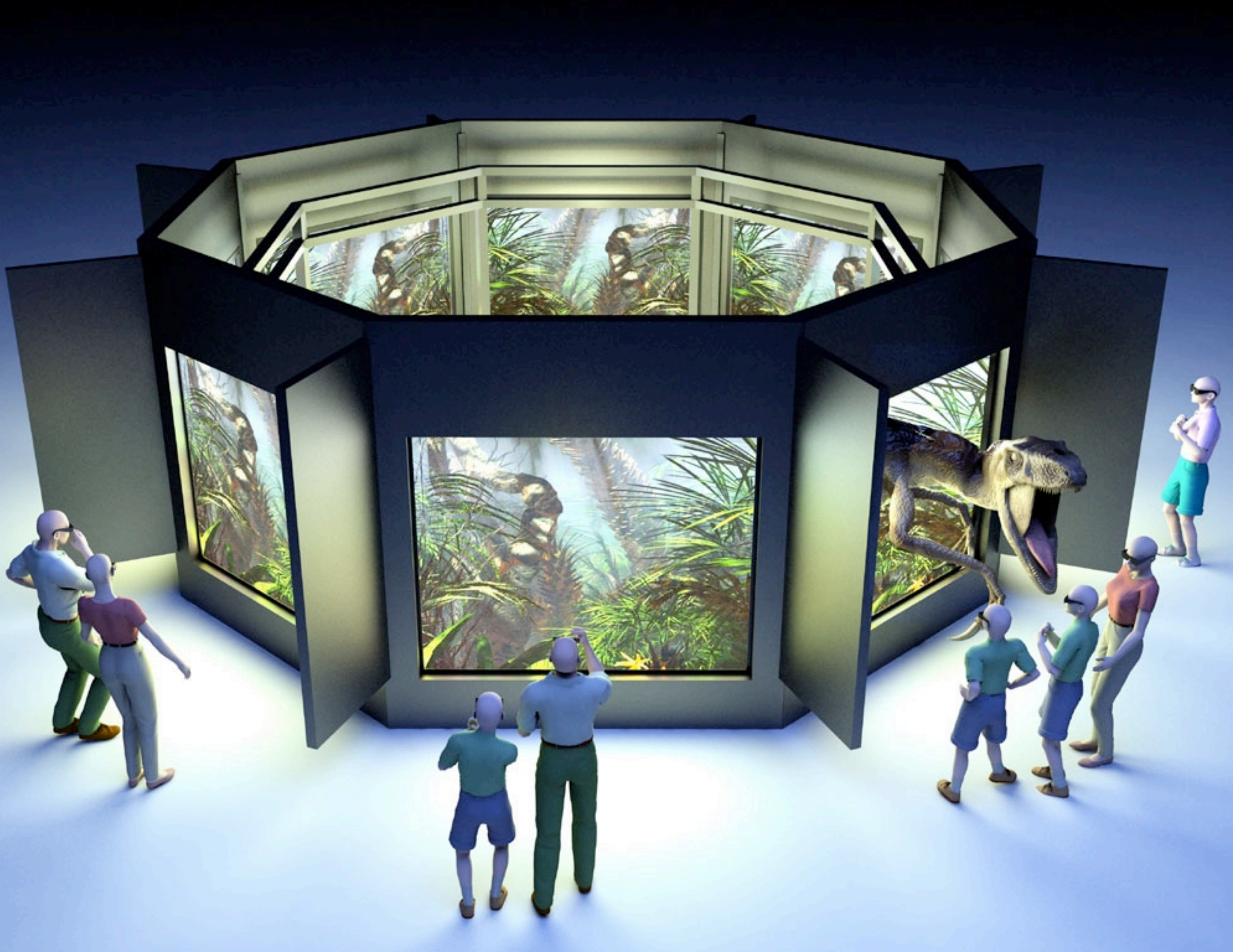
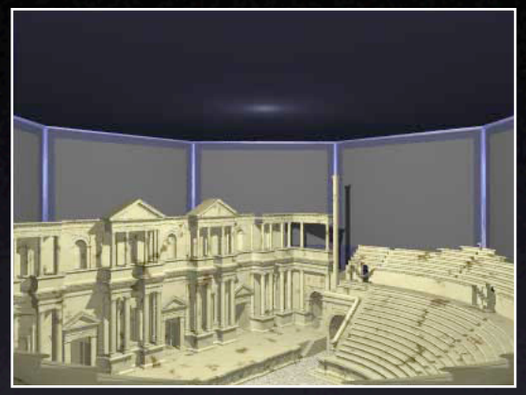
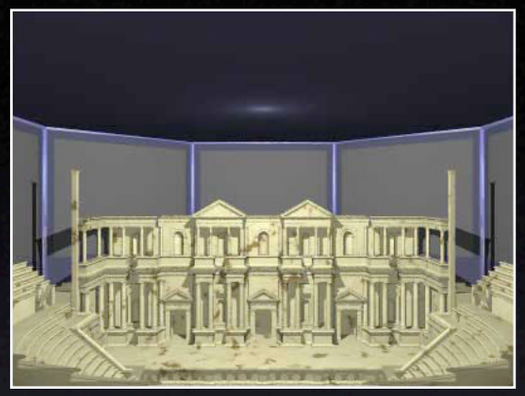
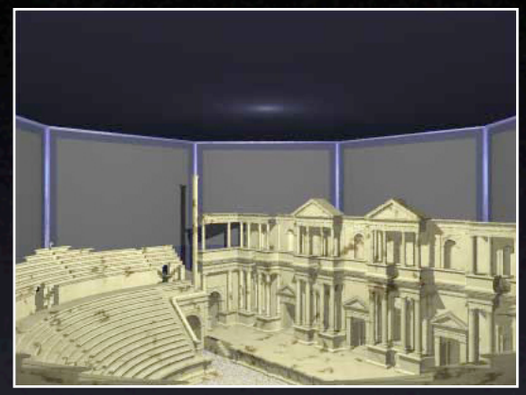


Example 1

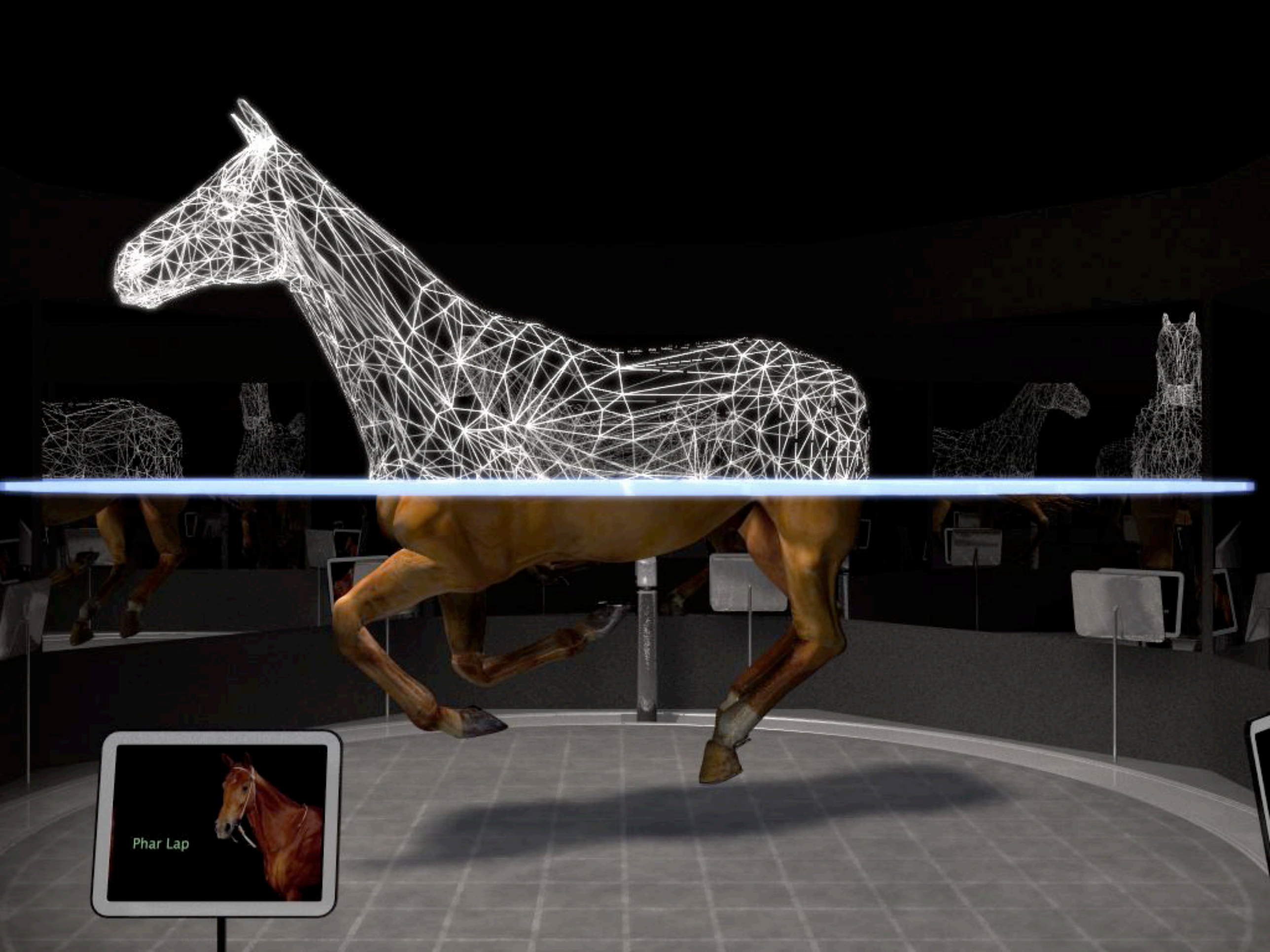



Example 2



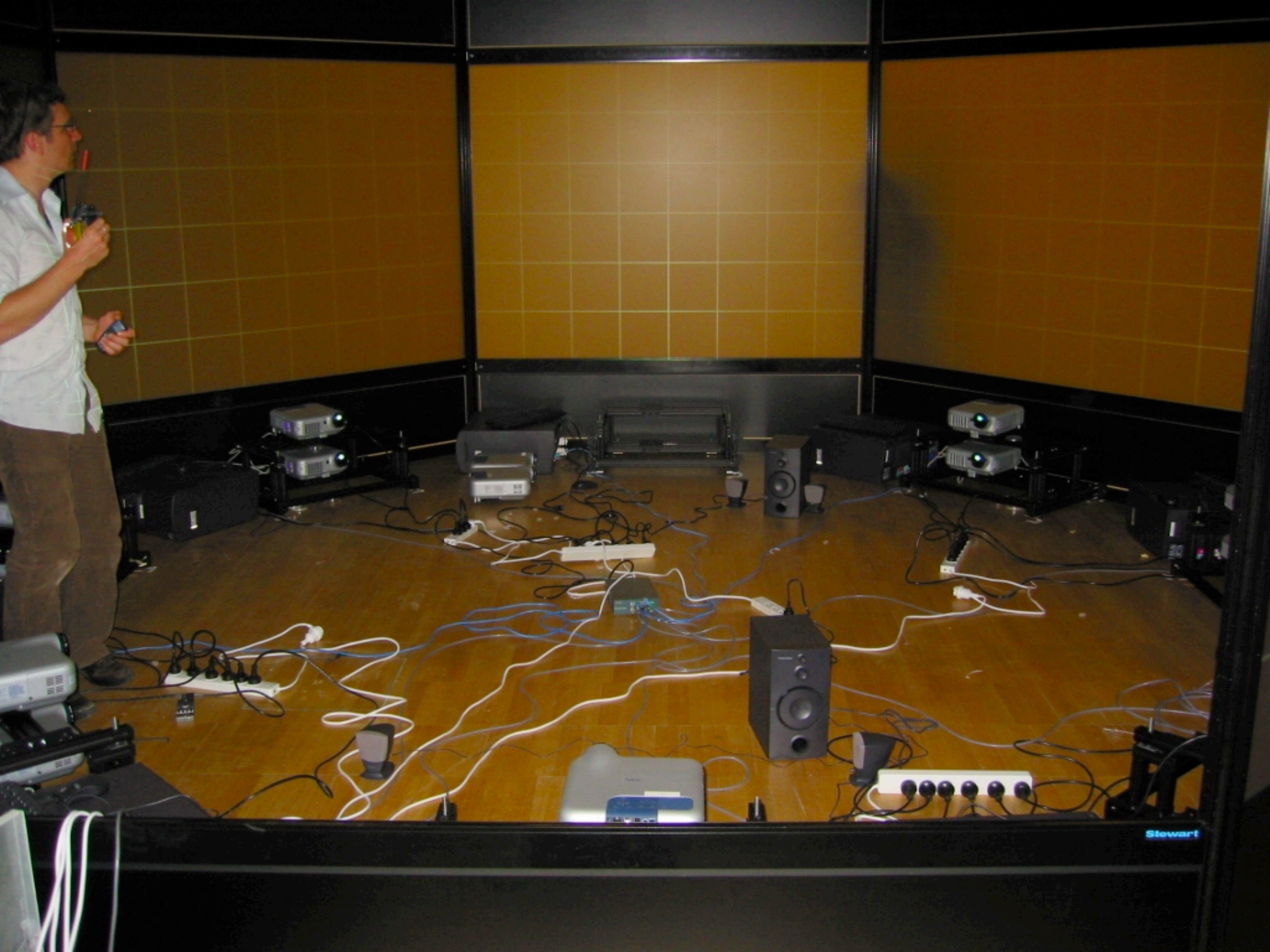


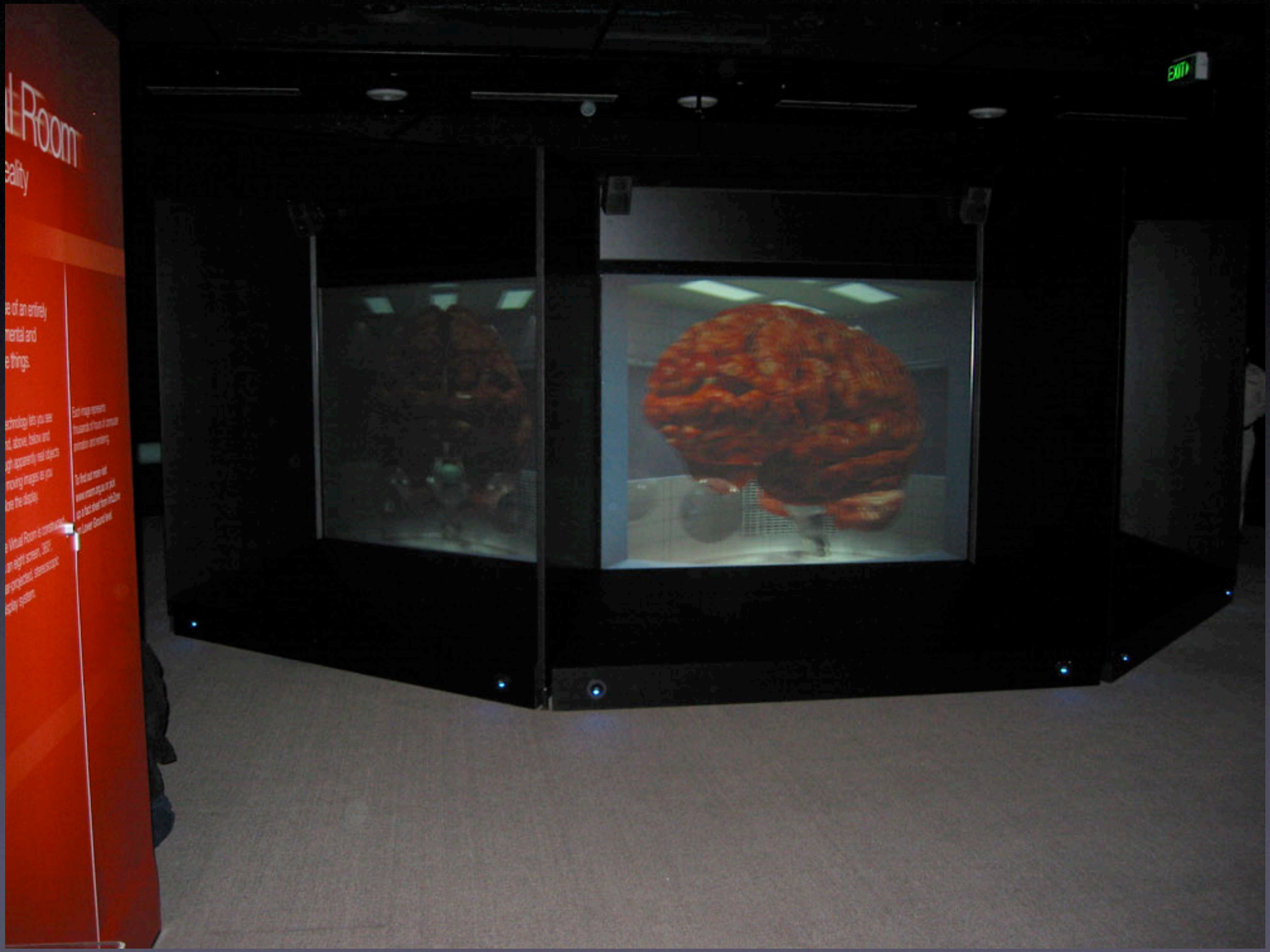




Phar Lap

Content creation and technical issues

- 8 walls, 16 projectors, 8 computers.
- Synchronised movie player 1024x768x2 delivering high quality lossless graphics.
- Render 25x2x8 frames per second = 24000 frames per minute. (or, 16min of normal animation = 1 minute of VROOM animation).
- Render farm (Lightwave, 3DStudioMax, etc).
- Stereoscopic settings so objects appear at the correct scale and at the correct depth.


Stewart


Room
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EXIT

Content, current and in progress.

- Think Big (Human brain)
- The Future of Visualisation
- Mars explorer
- Australian Polar Dinosaurs
- The Deep
- Angkor (Cambodia)
- The Thylacine

(Animation follows)

The end

Please contact me if you are in planning to visit Melbourne and would like to discuss any of these activities in more detail.

http://astronomy.swin.edu.au/~pbourke/