



# 2008 Fulldome Summit The Future of Fulldome



**July 3, 2008**

**Chicago, Illinois USA**

**ADLER**  
PLANETARIUM

## Fulldome presentation and content development tools

**Toshiyuki Takahei**

Orihalcon Tech.

Tokyo, Japan

takahei@orihalcon.co.jp

www.orihalcon.jp (← sorry, in Japanese)

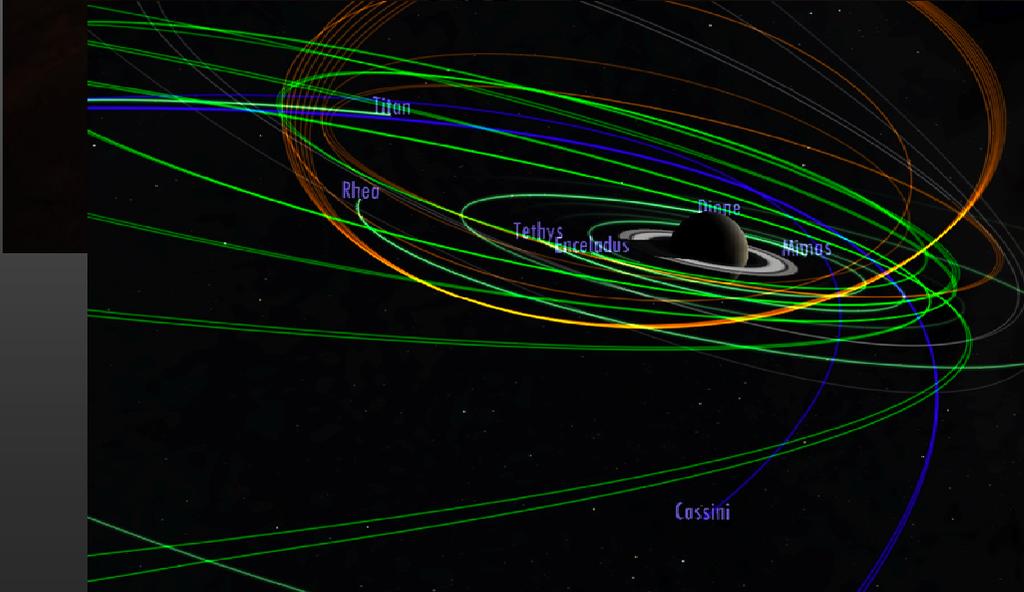
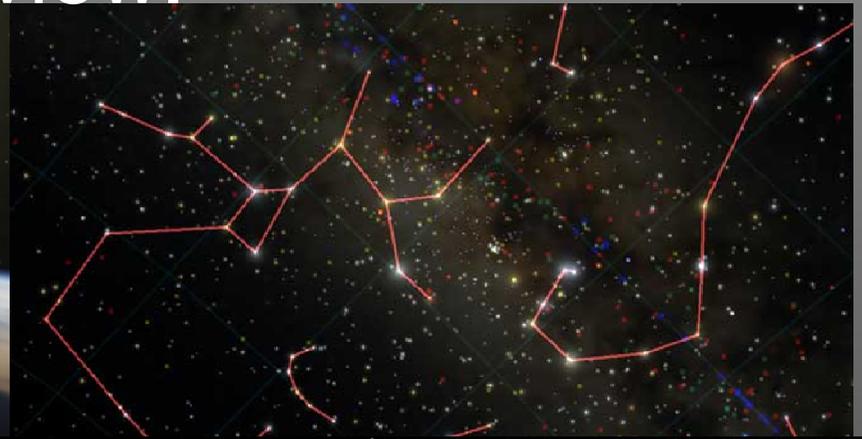
# Synra Dome : The First Public Stereoscopic Dome in Japan



- Synra (shin-ra) means 'everything in universe'
- The first public 'stereo' dome theater in Japan
- 10 meters in diameter, 12 projectors
- From astronomy to wider field of science, art, entertainment, etc.
- Make it place the new things happen in dome.

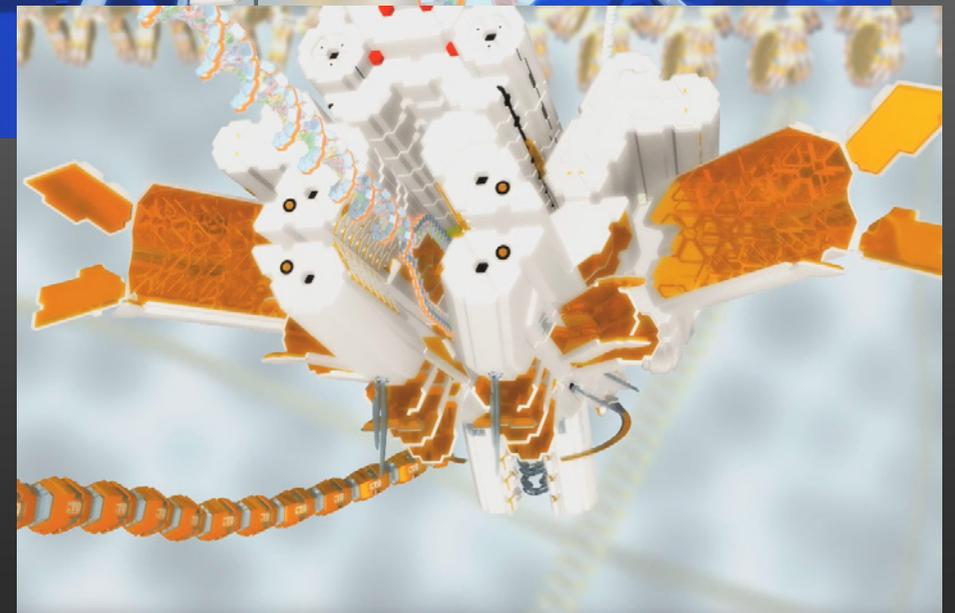
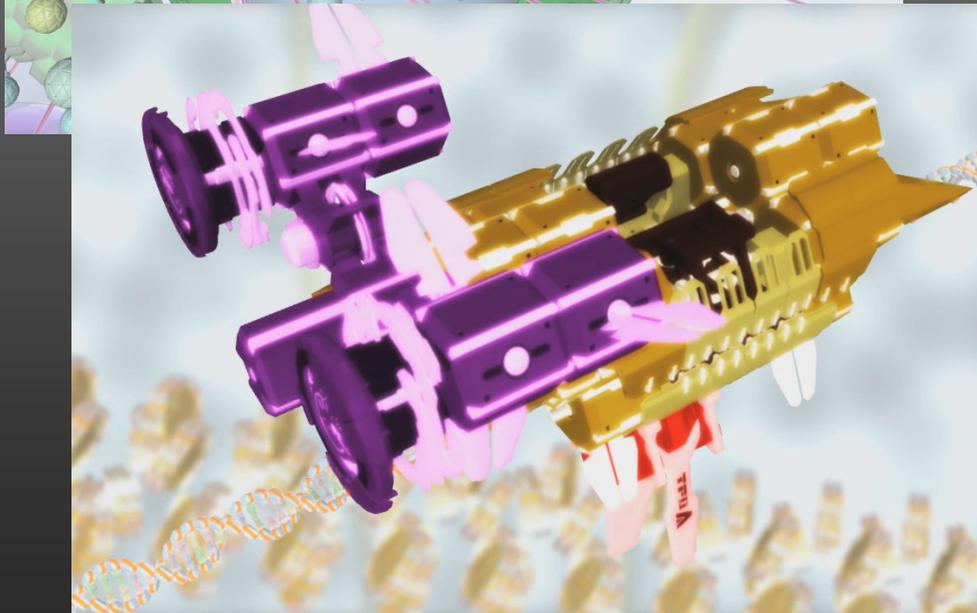
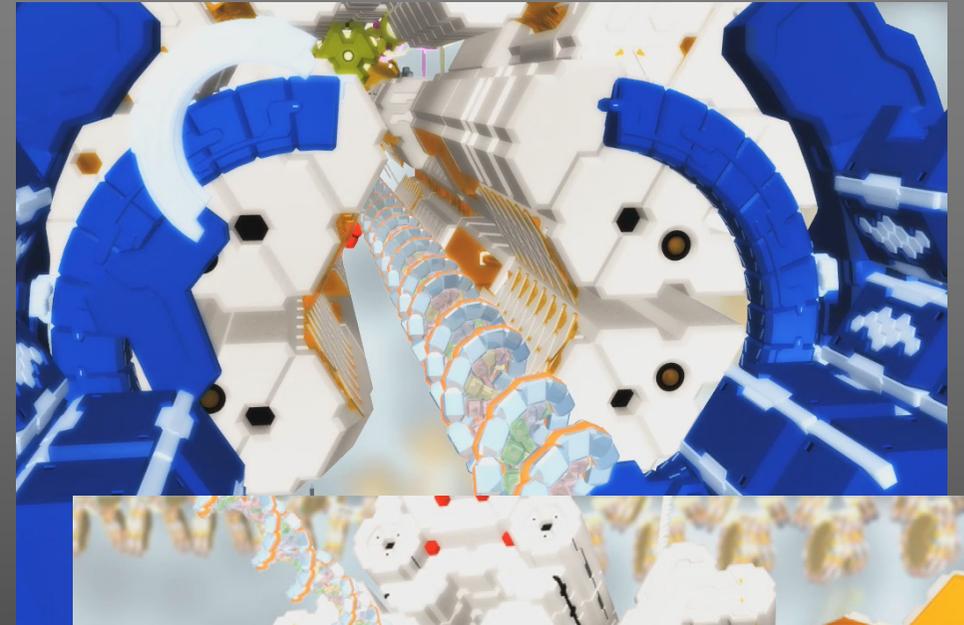
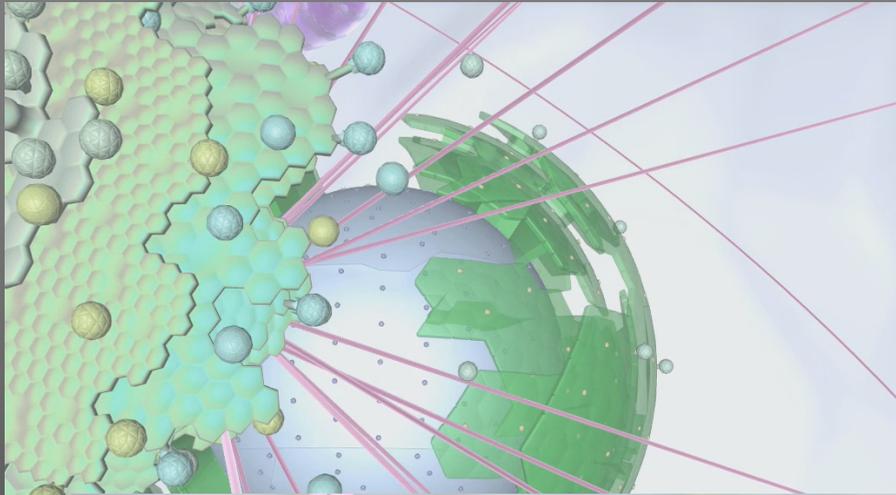
# Stereo Movie: Space Visualization in Real-time

Show the power of the latest real-time technologies in production, based on Uniview.



# Stereo Movie: Central Dogma

Central Dogma sequence in stylish graphics.

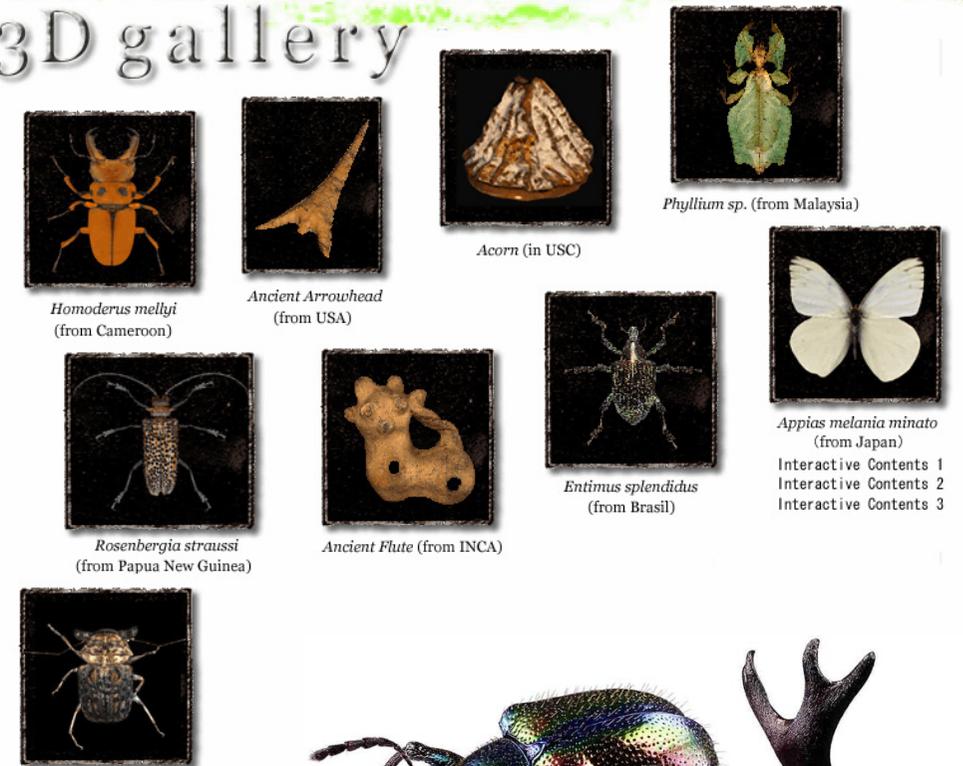


# Stereo Movie: Micro Presence

Super high-resolution photos/models of insects.

3D gallery

concept  
technical  
gallery  
3D gallery  
XCTgallery  
movie gallery  
siggraph  
staff  
publications  
link



*Homoderus mellyi*  
(from Cameroon)

*Ancient Arrowhead*  
(from USA)

Acorn (in USC)

*Phyllium sp.* (from Malaysia)

*Rosenbergia straussi*  
(from Papua New Guinea)

*Ancient Flute* (from INCA)

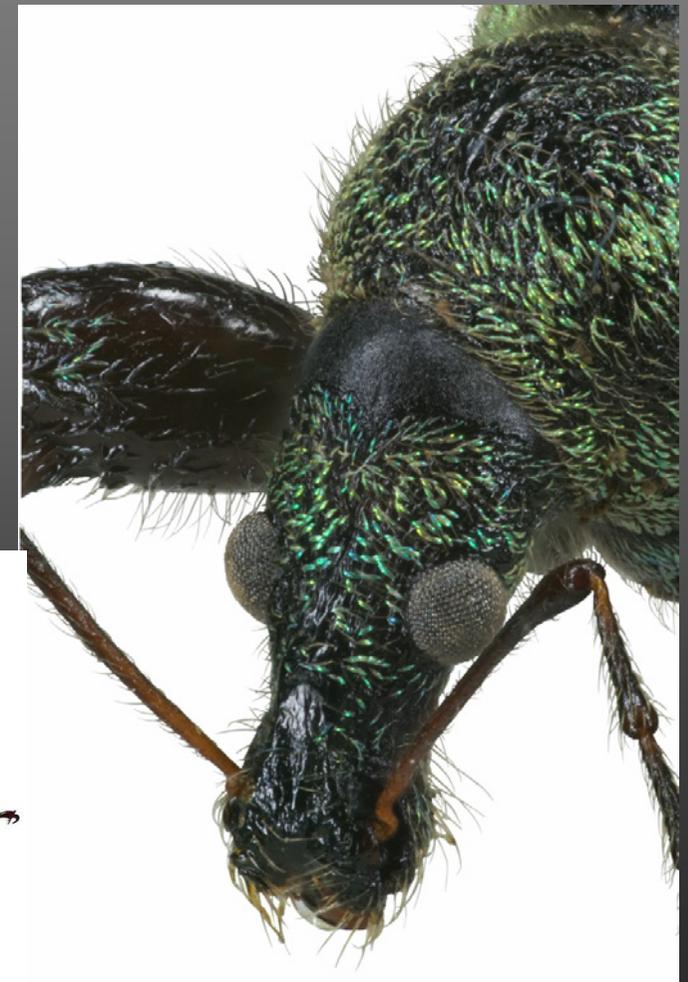
*Entimus splendidus*  
(from Brasil)

*Appias melania minato*  
(from Japan)

Interactive Contents 1  
Interactive Contents 2  
Interactive Contents 3

*Exechosops leucopis*  
(from Japan)

\*Please install Anark Client. ⤴ Rotate : ⤵



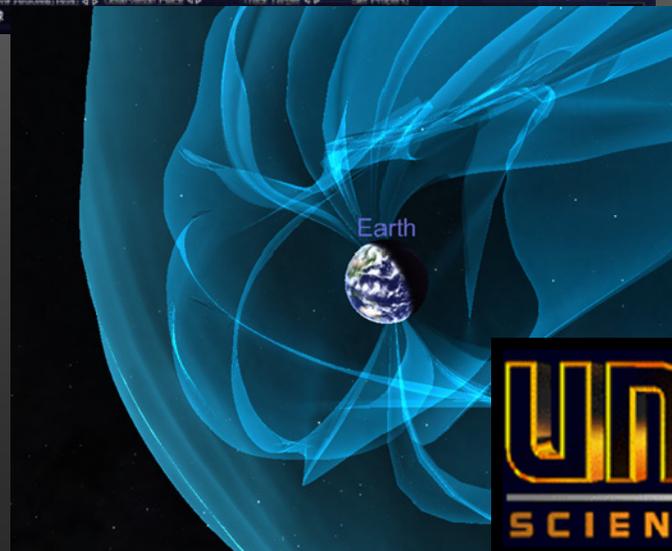
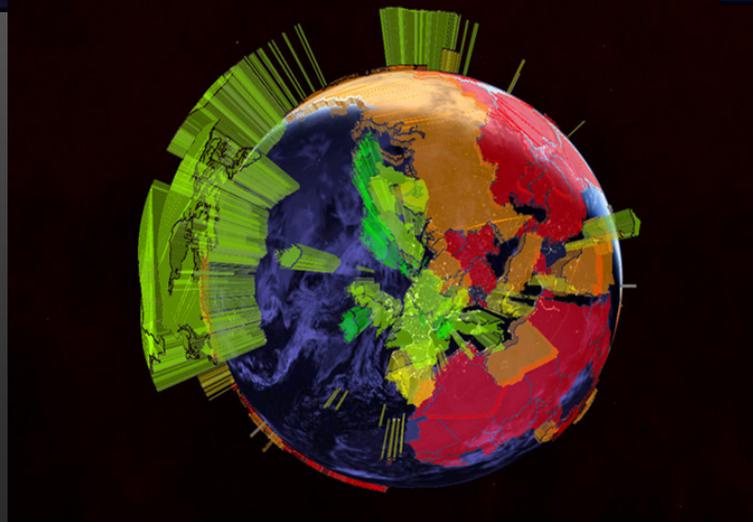
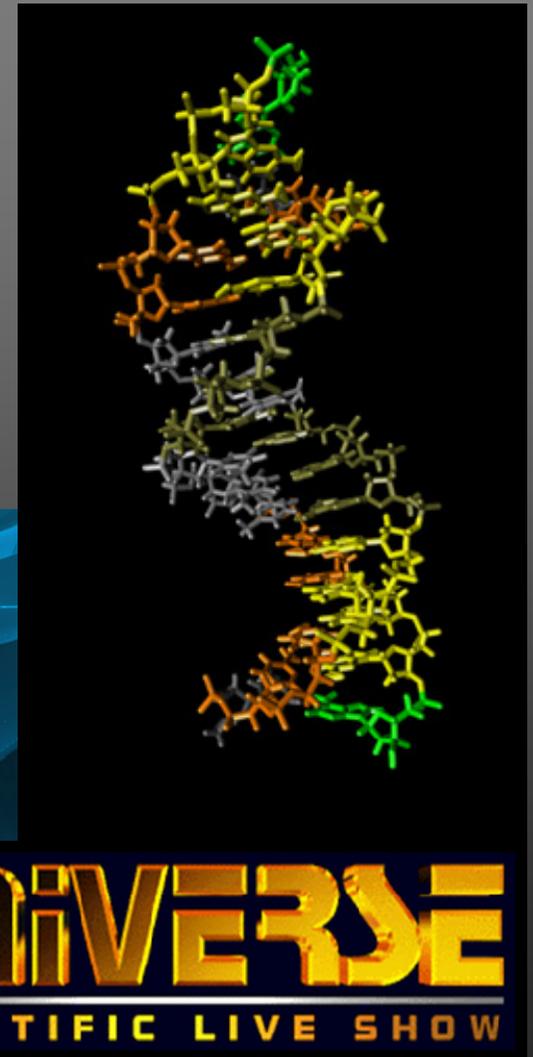
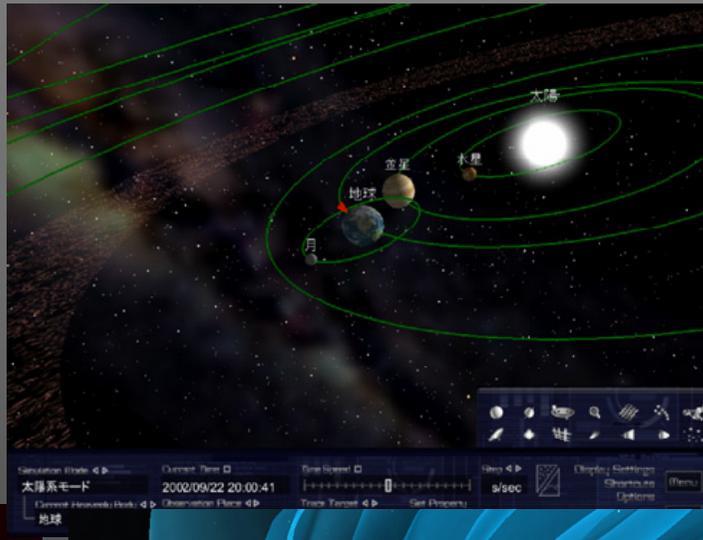
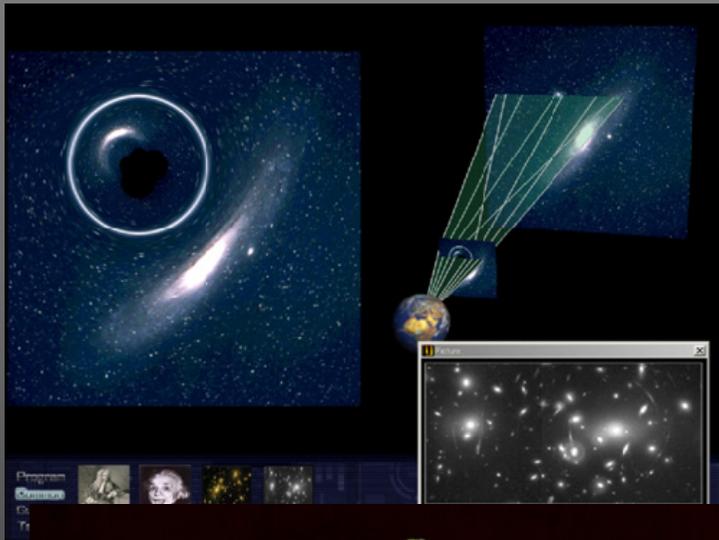
# Stereo Movie: 4D2U Project Astro-visualizations

With National Astronomical Observatory Japan



# Science Live Show 'UNIVERSE'

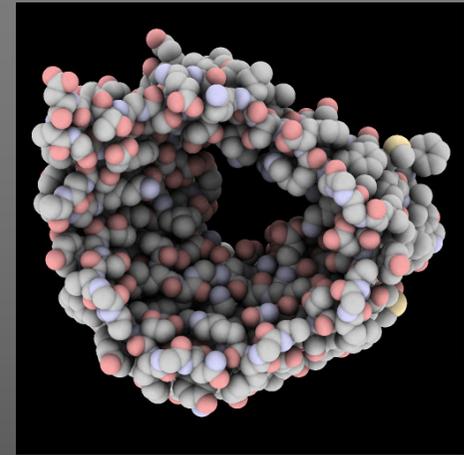
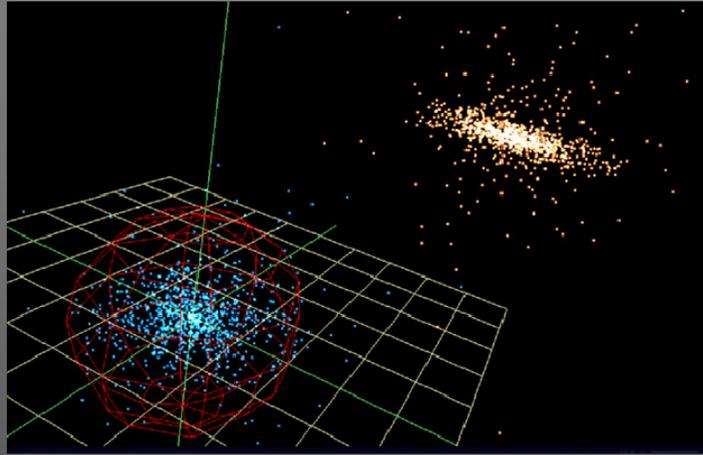
Weekly interactive presentation show by  
scientists / researchers



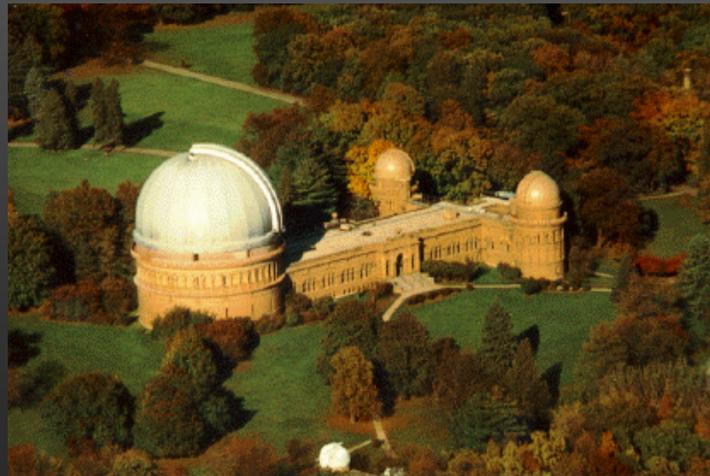
**UNIVERSE**  
SCIENTIFIC LIVE SHOW

# Science Live Show 'UNIVERSE' – cont.

- Use MDM: Special purpose super computer cluster for real-time simulation in dome



- Remote observation between Tokyo and Yerkes



# More challenges

- Stereoscopic movies from the deepest sea



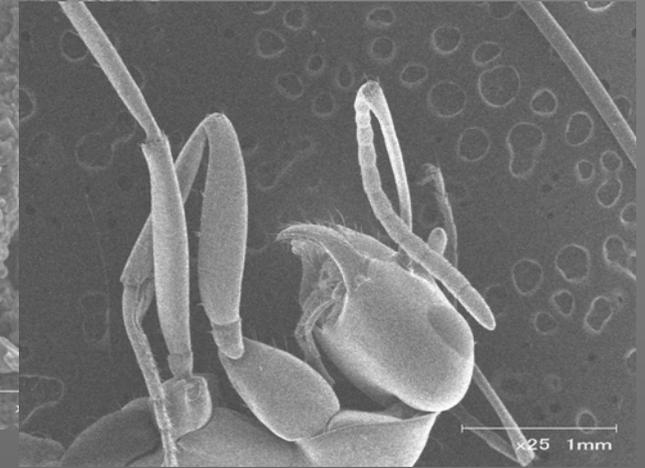
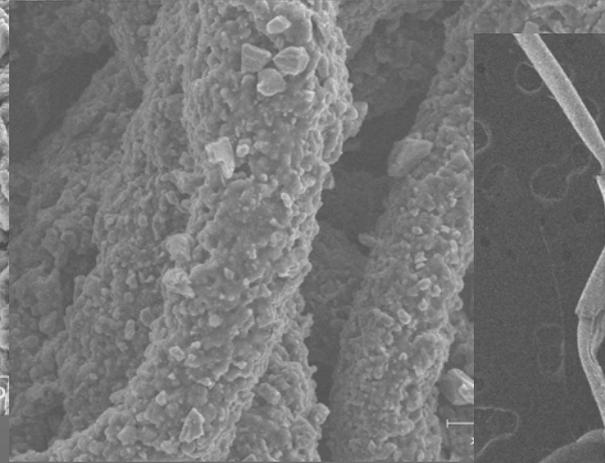
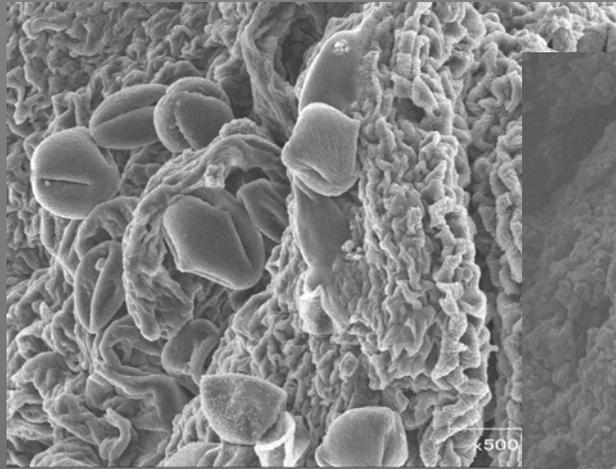
from JAMSTEC

- Space Exploration Project reports

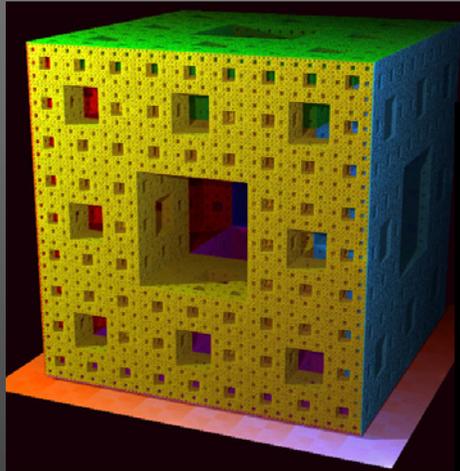


from JAXA

# More challenges – cont.



Hands on SEM observation



Visualize Mathematics

Stereoscopic Aquarium in Dome  
From Shin-Enoshima Aquarium

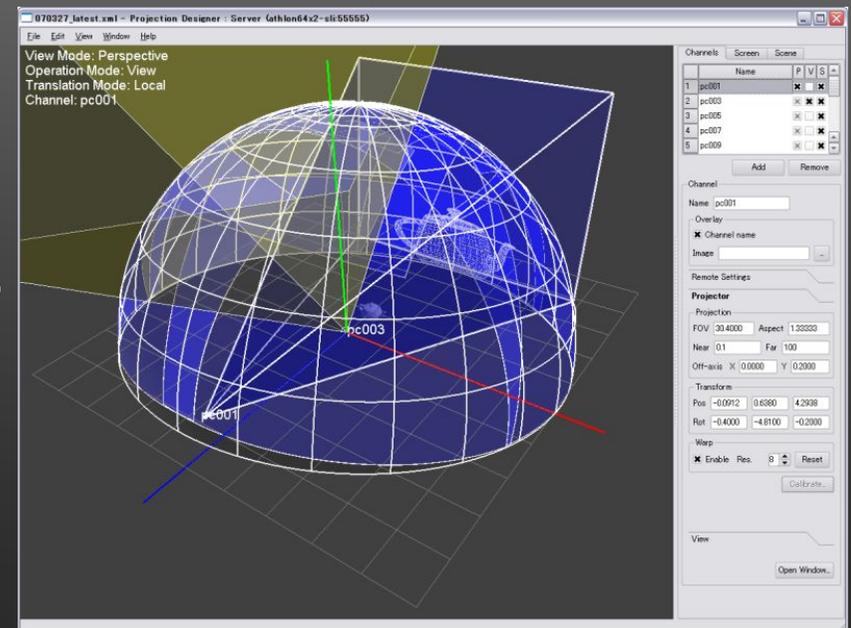


# Applications for the Synra Dome Theater

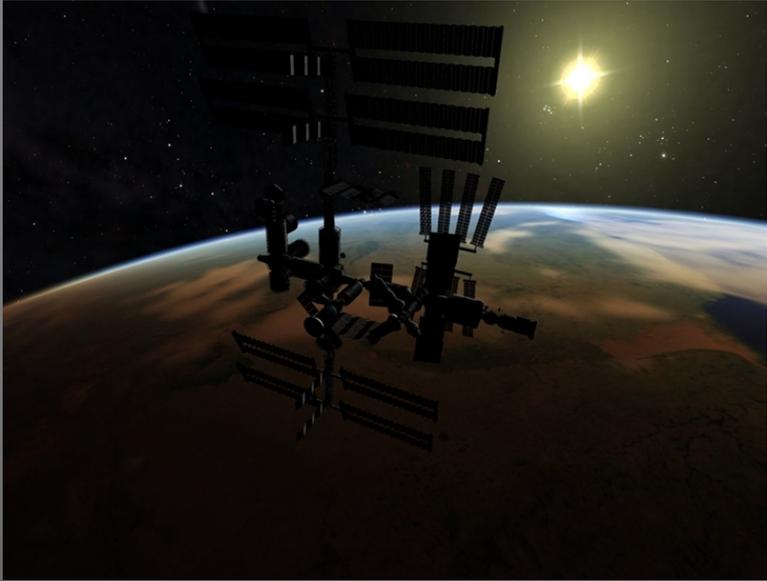
- Dome distortion correction / edge blending
  - Projection Designer (Open Source Tool)  
Automatic Correction by Camera Feedback
- For pre-rendered stereoscopic dome movie
  - AllSkyViewer (for dome preview / conversion)  
OpenNBR (for rendering massive particles)
- For interactive live shows
  - Uniview (Space Simulator)  
Mitaka Pro (Space Simulator)  
Quadratura (a.k.a Full-dome PowerPoint)  
and more Interactive simulations

# Projection Designer

- Tool to setup distortion correction and edge blending manually.
- Work for any # of projectors, any screen shapes.
- GLRC library for using the setup result for real-time and off-line slicing.
- Open Source Project.
- I'm happy to hear that some projects and vendors using these days ;-)



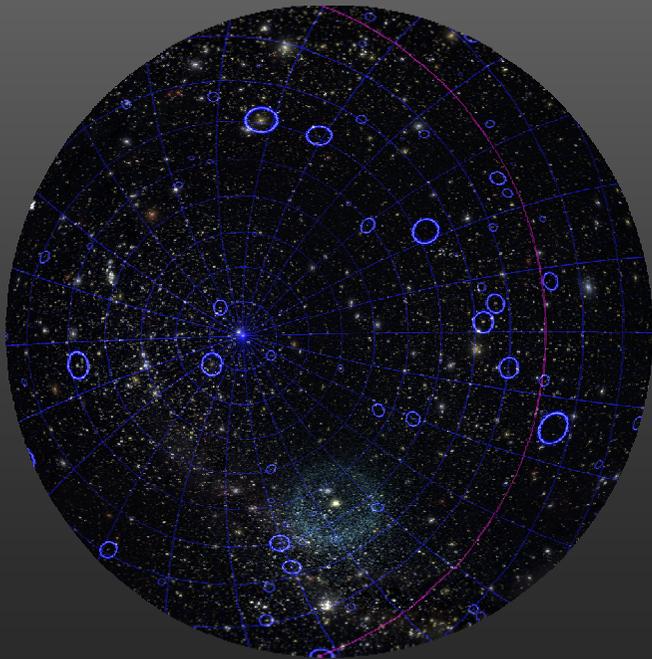
# Workflow of dome movies with real-time apps.



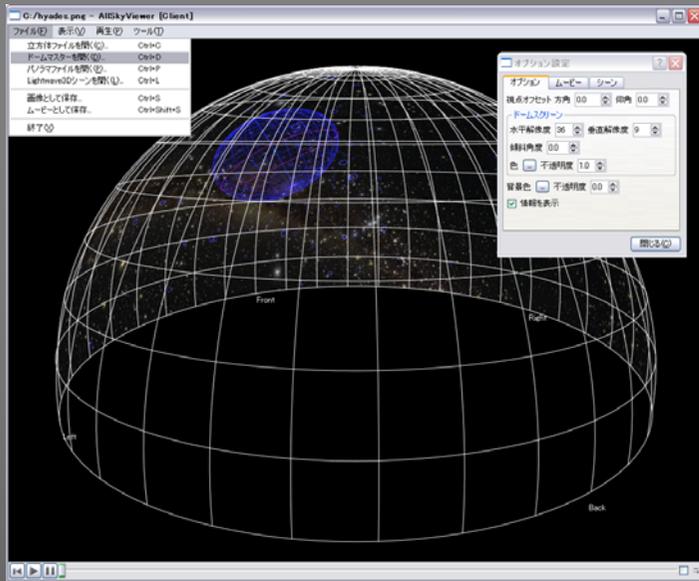
Recording camera path by real-time application such as Uniview in Dome. It's highly heuristic approach for brainstorming, early sketch, motion design, framing and color design, etc.



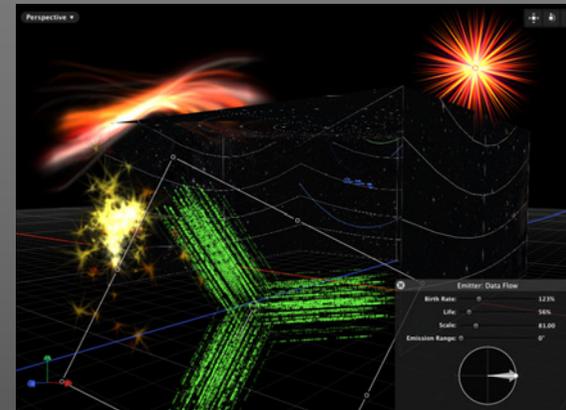
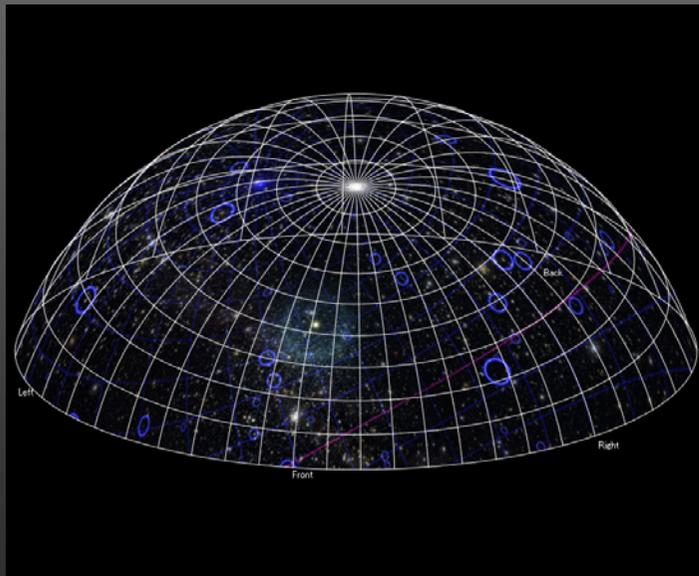
Render out the fulldome scene as sequential dome master images. Uniview now supports stereoscopic dome master rendering.



# Workflow of dome movies with real-time apps. – cont.



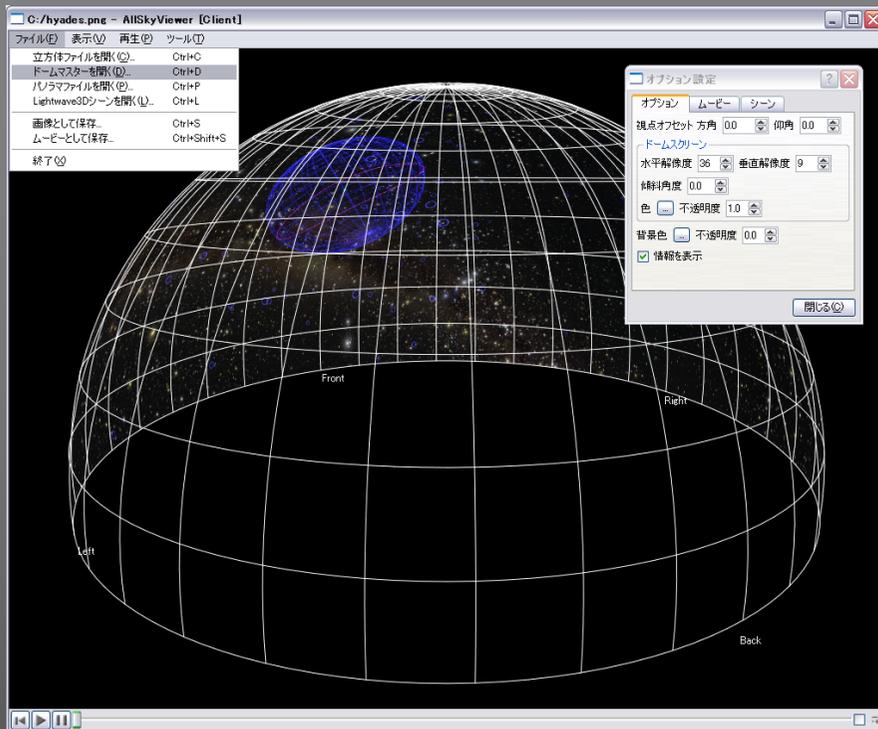
Custom made dome previewing tool AllSkyViewer to check the result without domes.



Convert between dome master and cubic files for post effects editing in AfterEffects, Apple Motion, etc.

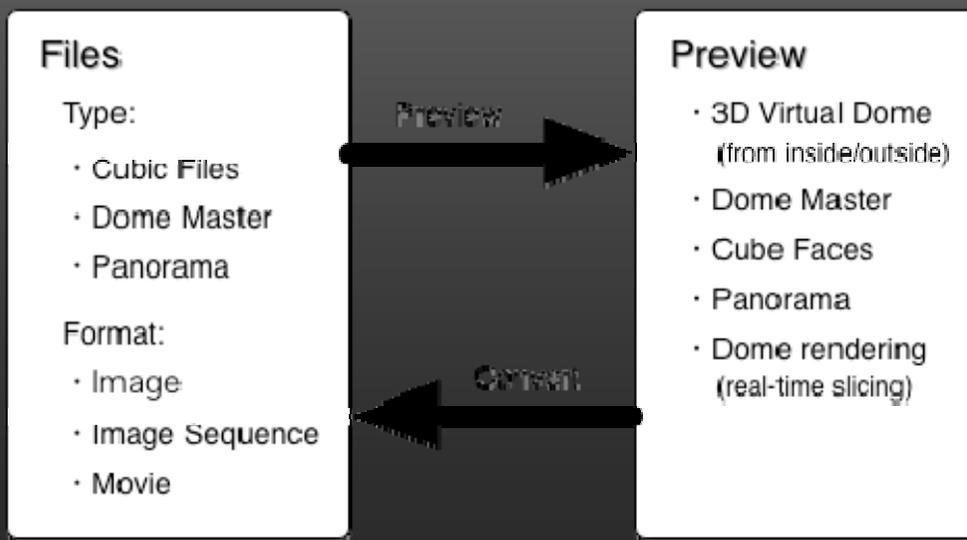
Add BGM and narrations to finish.

# AllSkyViewer



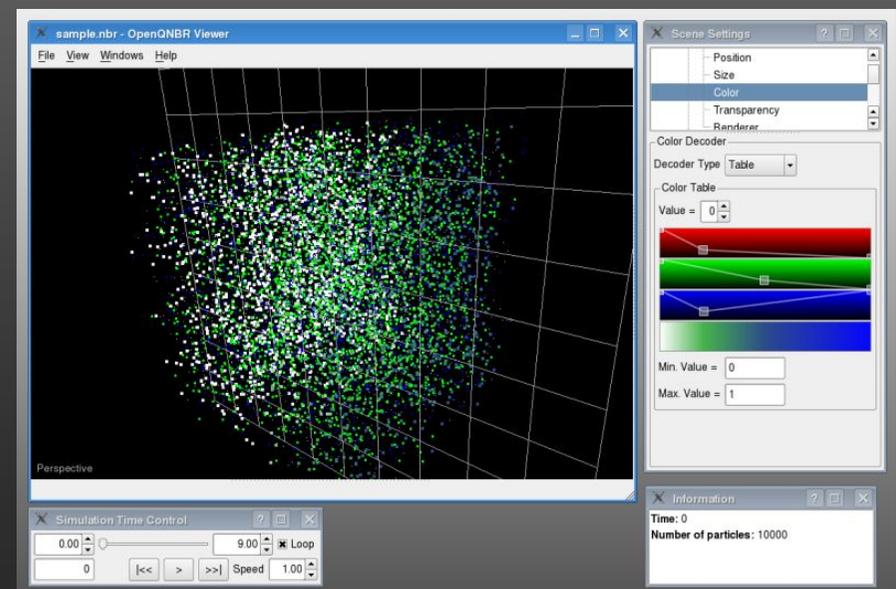
- Dome previewing tool to project dome master/panorama / cubic files on virtual dome environment. You can check it from any viewpoint.

- It also works as a real-time slicer software. Installed on PC clusters, you can display dome master movies in dome without pre-slicing.

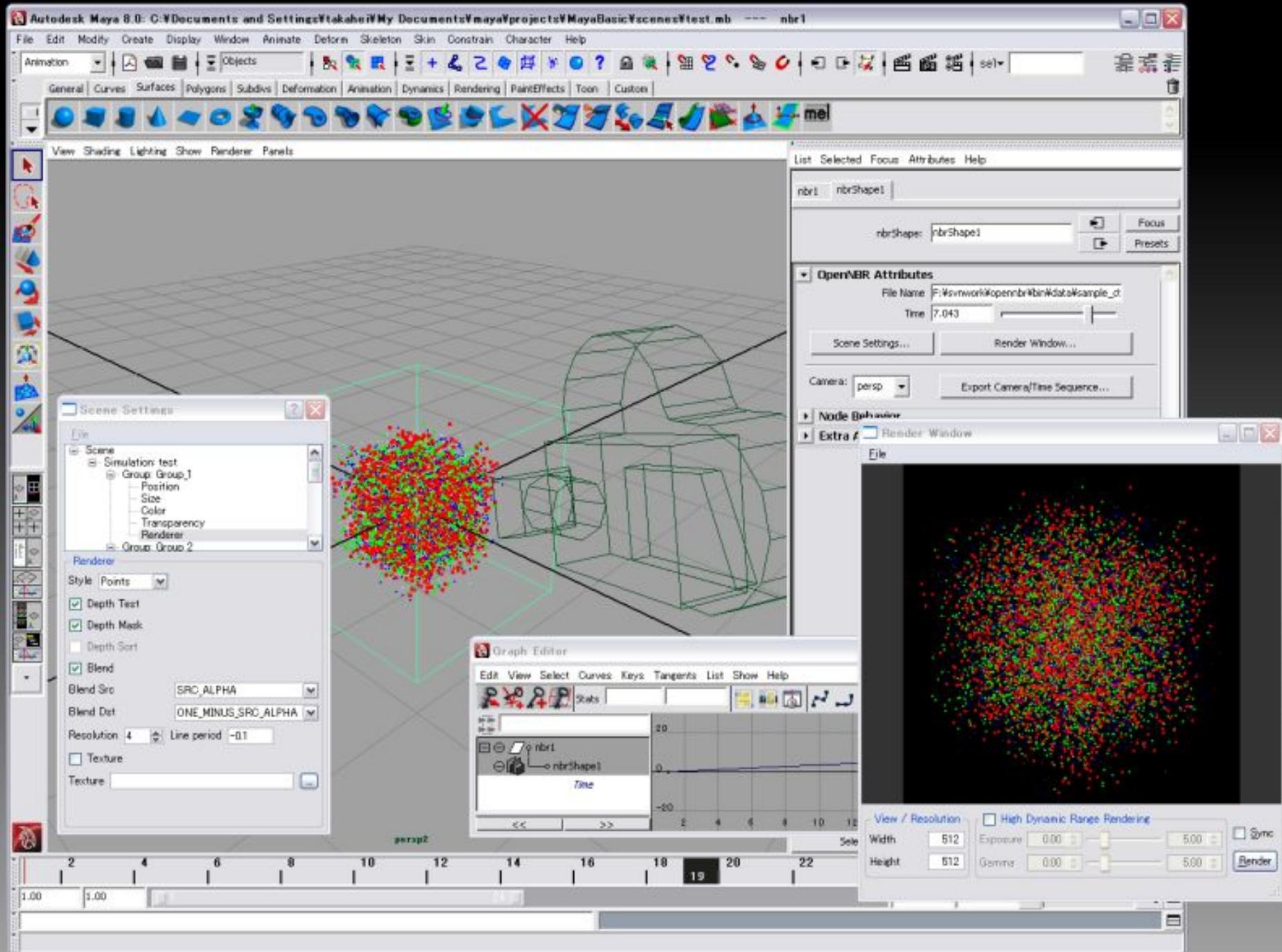


# Open N-Body Renderer

- Real-time previewing of massive particles
- Mapping Data to appearances by GUIs
- High Dynamic Rendering supported
- Dome Master Rendering Supported.
- Also works in Maya for editing camera path with the familiar tool.
- Open Source Project



# Open N-Body Renderer – cont.



# Quadratura (Full-dome, embeddable presentation tool)

- Fulldome (and any immersive environment) Interactive Presentation Tool.
- Use Fulldome, easy as the PowerPoint.
- Many media types supported: Images, Movies, FITS, Texts, All-Sky Images/Movies, 3D Models, etc.
- Extensible for more media types such as: Live Cam, Web Browser, Particle Effects,...
- Presentation Assistance: Free drawing, All-sky cursor, Slide and object transitions, etc.
- Quick change to 1<sup>st</sup>, 3<sup>rd</sup> person and dome views.
- Integrated Distortion / Edge blending corrections.
- Embeddable to Space Simulator, Uniview.

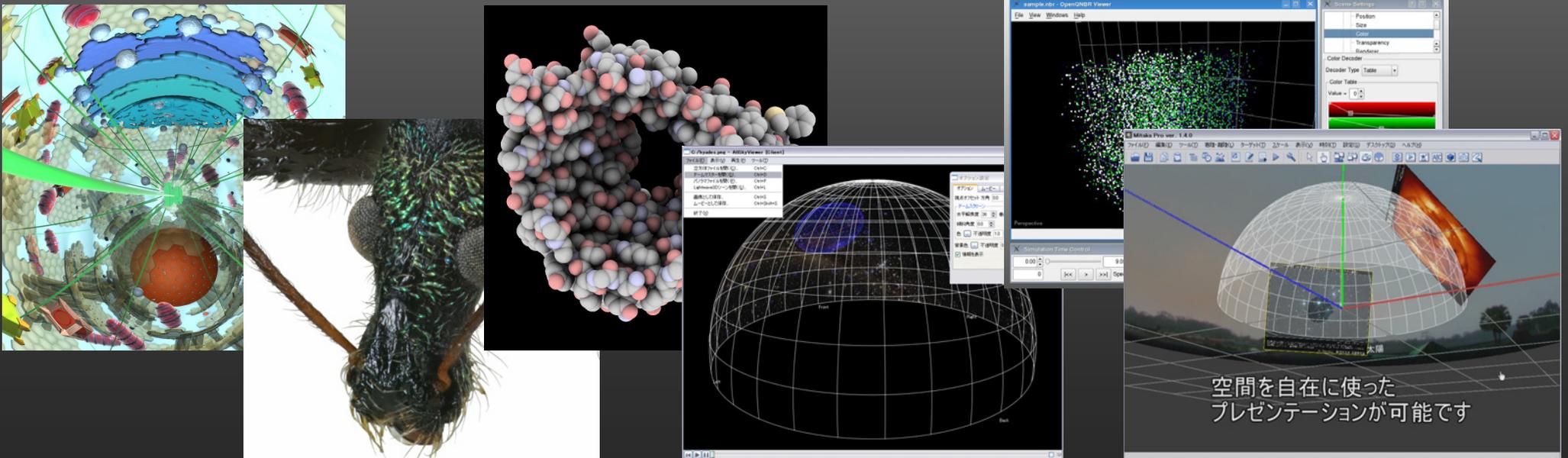
# Quadratura (Full-dome, embeddable presentation tool)

## Demo

- Working in Mitaka Pro, a 3D space simulator.
- Drag and drop object manipulation like PowerPoint.
- Available in Dome, Cylindrical and Flat screens.
- 1<sup>st</sup> and 3<sup>rd</sup> Person View and Dome Master View.
- Object Types: Images, Movies, Texts, FITS, 3D Models, AllSkies, Particles, ...
- Assistance for presentation: slides, free drawing, virtual cursor and dual screen mode.
- Scriptable for Macro, GUI, record and replay.
- Projection correction directly on the screen.

# Summary

- Synra Dome Theater, the first public ‘stereo’ dome theater in Japan will open at the end of the August.
- I’ve made stereoscopic dome movies, workflows, visualization tools and presentation tool.
- Currently no English websites or press releases, so please ask me directly about the details.





# 2008 Fulldome Summit The Future of Fulldome

July 3, 2008

Chicago, Illinois USA



ADLER  
PLANETARIUM

## Thank You!

Toshiyuki Takahei

Orihalcon Tech.

Tokyo, Japan

takahei@orihalcon.co.jp

[www.orihalcon.jp](http://www.orihalcon.jp) (← sorry, in Japanese)