

# Fulldome activity report 2012

Presented to the APS 2013

Paul Bourke

paul.bourke@uwa.edu.au

iVEC @ The University of Western Australia

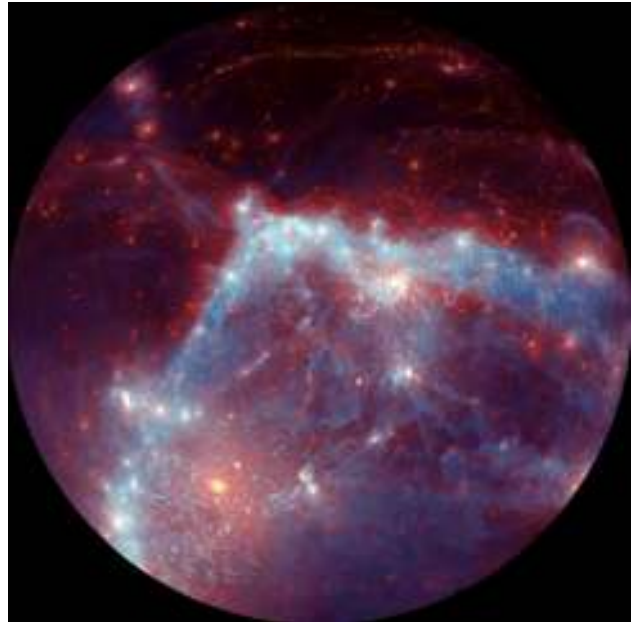
The following are a number of dome related projects completed by the Centre in 2012. Each project will be summarised briefly, if there are questions or further interest don't hesitate to contact the author by email.

## Dark

Dark was originally conceived in 2010 and initially funded by iVEC. The intent was provide a short fulldome piece on some aspect of science from the iVEC research community. With additional support from SciTech and iVEC@UWA the scope was extended to a 20 minute production and the topic selected was Dark Matter, a key component of the simulation work being conducted by Alan Duffy at the time on the new iVEC supercomputer.

"DARK is a fulldome movie that explains and explores the nature of Dark Matter, the missing 80% of the mass of the Universe. The search for Dark Matter is the most pressing astrophysical problem of our time - the solution to which will help us understand why the Universe is as it is, where it came from, and how it has evolved over billions of years - the unimaginable depths of deep time, of which a human life is but a flickering instant."

For more information, see: <http://darkthemovie.info>



*Visualisation of a large scale cosmology simulation.*



*Final beach scene, Dark trailer.*



*Galaxy to Lotus sports car scene.*

## Gascoyne Aboriginal Heritage and Culture Centre

A project in collaboration with Peter Morse. Consists of a 4.2m diameter dome located above the entrance to the newly renovated wing of the Gascoyne Aboriginal Heritage and Culture Centre. The digital projection consists of a folded light path spherical mirror system in a locally designed housing.

The content developed by Peter Morse tells a 20 minute story from local Indigenous Australian astronomy, in this case the story of the seven sisters and the Jangurna (Emu). It also includes stunning time lapse fisheye video, recorded from recognised landscapes of the region.



*Scene from the production on the dome. Entrance on the right, exit to gallery on the left.*



*Entrance to the Gascoyne Aboriginal Heritage Cultural Centre.*

### **Running room: “Zone Dome”**

“Dubbed as an iMax for a treadmill, the Zone Dome by Running Unlimited takes indoor running to a whole other place. The multi-sensory Zone Dome brings the outdoors in, immersing you in the world’s most inspiring locations as you run in your health club or home gym – and all at the touch of a button.

Imagine running past elephants, giraffes and hyenas in Tanzania’s Serengeti, through the awesome structures of America’s Monument Valley and over rolling grasslands of Mongolia’s Himalayan foothills. With the Zone dome, now you can.

Compatible with any brand of treadmill, the free-standing Zone dome features a 1.5 to 2m meter wide hemisphere screen to fill your peripheral vision for a totally immersive experience. Zone domes ship with five running destinations installed as standard, and more destination films are available to purchase for endless destination choices.”



*Promotional image: It’s your world. Run it!*



Launch. <http://www.run247.com/articles/article-3457-imax-for-treadmills.html>

### **Terengganu planetarium, Malaysia**

This is a small 10m dome as part of a larger science centre in Terengganu, located on the east coast of West Malaysia. The planetarium already had a digital projection system, namely a twin projector from SkyScan, but it is relatively old and as such is proving somewhat unreliable. There are additional limitations around being able to convert/modify and play a wider range of full-dome content. The new installed system based up a HD projector and spherical mirror was attractive in that it

was versatile, commodity based and the site felt more in control of their destiny. Despite being a single projector, projector technology has changed significantly so the new system is brighter and of comparable resolution to the existing twin system.



*Example of one of many rigs for spherical mirror projection in a fixed dome. Designed on site.*



*Scene from Dark on the Terengganu dome, the first dome in the world where the full production was played during my visit and installation.*

### **Kuching planetarium, Malaysia**

The Kuching planetarium along with the Bangalore planetarium were the two first fixed planetariums in the world to install a spherical mirror system. Kuching have upgraded their projector twice over the years, first to HD and more recently to a brighter unit. I regularly visit to facilitate these upgrades and invariably present to the public on visualisation in astronomy. In addition to the spherical mirror system they have a retractable Zeiss star projector.



*The Kuching planetarium next to the City Civic Centre.*



*No shortage of designs for the spherical mirror projector rack.*

### **Manipal planetarium, India**

Manipal is a small town that can be found on the west coast of India, an hours drive from Mangalore. It is a University town renowned for its medicine and nursing degrees. The planetarium is 8m in diameter and features a small Zeiss star projector. While a folded light projection is common for other spherical system integrators, this was my first use of the Newtonian rig.



*View of the Manipal planetarium from the entrance gate.*





*Local heritage sites presented on the new Manipal digital system. Canon 5D MkII and Canon 8-15mm fisheye lens.*

### **Sri Sathya Sai Space Theatre, India**

This planetarium is located just to the north of Bangalore and is 15m in diameter. As with the other two Indian installations this also includes a dedicated star projector but in this case a Spitz 512 model.



*Perhaps the most colourful planetarium in the world.*



*An ideal dome for the spherical mirror since it has always had directional seating and projection hardware in the rear.*

### **Bangalore planetarium, India**

Bangalore can lay claim to the first spherical mirror installation in the world (2004). The original system was while I was staying in Bangalore to provide stereoscopic 3D production training to a local animation house. Soon after this installation they produced their own full dome show on Satyendra Nath Bose, a renowned Indian physicist. This year saw them upgrade to a brighter (7500 ansi lumen) and higher quality projector. They will soon be releasing their second full dome production intended for local consumption. In the last trip in 2012 I also run a workshop for animators on full dome production.



*View of the planetarium in the gardens.*



*Interior showing Zeiss star projector and spherical mirror; the spring line for the digital projection slightly raised to avoid a shadow from the Zeiss.*

### Fisheye filming with the Red Scarlet

Dark was filmed with the LadyBug-3 camera. Since it captures 360 by about 150 degrees it provides the powerful ability to arbitrarily orient the fisheye in post production. However even though it can achieve a 2K fisheye, there is considerable compression occurring and it only captures at a maximum frame rate of 16fps. 2012 saw us experimenting with the Red range of cameras, in particular the more affordable Red Scarlet. With a Canon mount this allows one to use Canon mount fisheye lenses, the lenses tested include

- Sigma 4.5mm fisheye
- Sunex 5.6mm fisheye
- Canon zoomable 8-15mm fisheye
- Coastal Optics 4.88mm fisheye



*Red Scarlet and Sigma 4.5mm fisheye lens.*

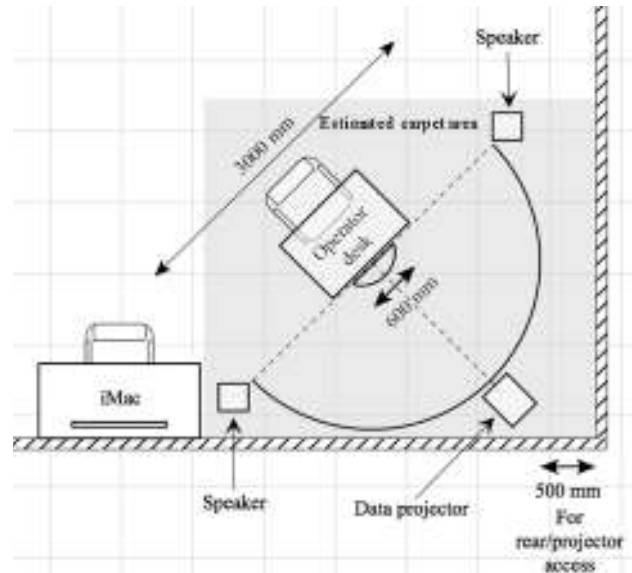


*Camera rig for Running Room video capture.*

### iDome

The iDome continues to be an attractive personal dome solution. 2012 saw an iDome installed at Curtin University in the Design School. Another iDome has been purchased for Edith Cowan University and will be installed

by May 2013. And finally a larger 4m “upright” dome will be installed in the John Curtin Gallery as part of a larger visualisation initiative. Rather than using a spherical mirror it will use the relatively new Elumenati supplied fisheye on the Projection Design F35 high resolution (2560x1600) projector.



*Wanmanna rock art site explored in the iDome using a realtime game engine, namely Unity3D.*



*Proposed dome and fisheye projection for the John Curtin gallery. (Photograph courtesy Elumenati).*