The Panorama

Applications to Science and Heritage Visualisation

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Cyclorama

- In 1787 Robert Baker was awarded the patent for “La Nature a Coup d’Oeil”. (Nature at a Glance)
- What we now call the cyclorama, large paintings often presented on architecture matching the place represented in the painting. Heightens the suspension of belief, the sensation of “being there”.

“... to make observers,
on whatever situation he may choose they should imagine themselves,
feel as if really on the very spot”

Panorama 1453 - Istanbul

Panorama 1453: Capture of Istanbul by the Turks

Panorama 1453 - Istanbul

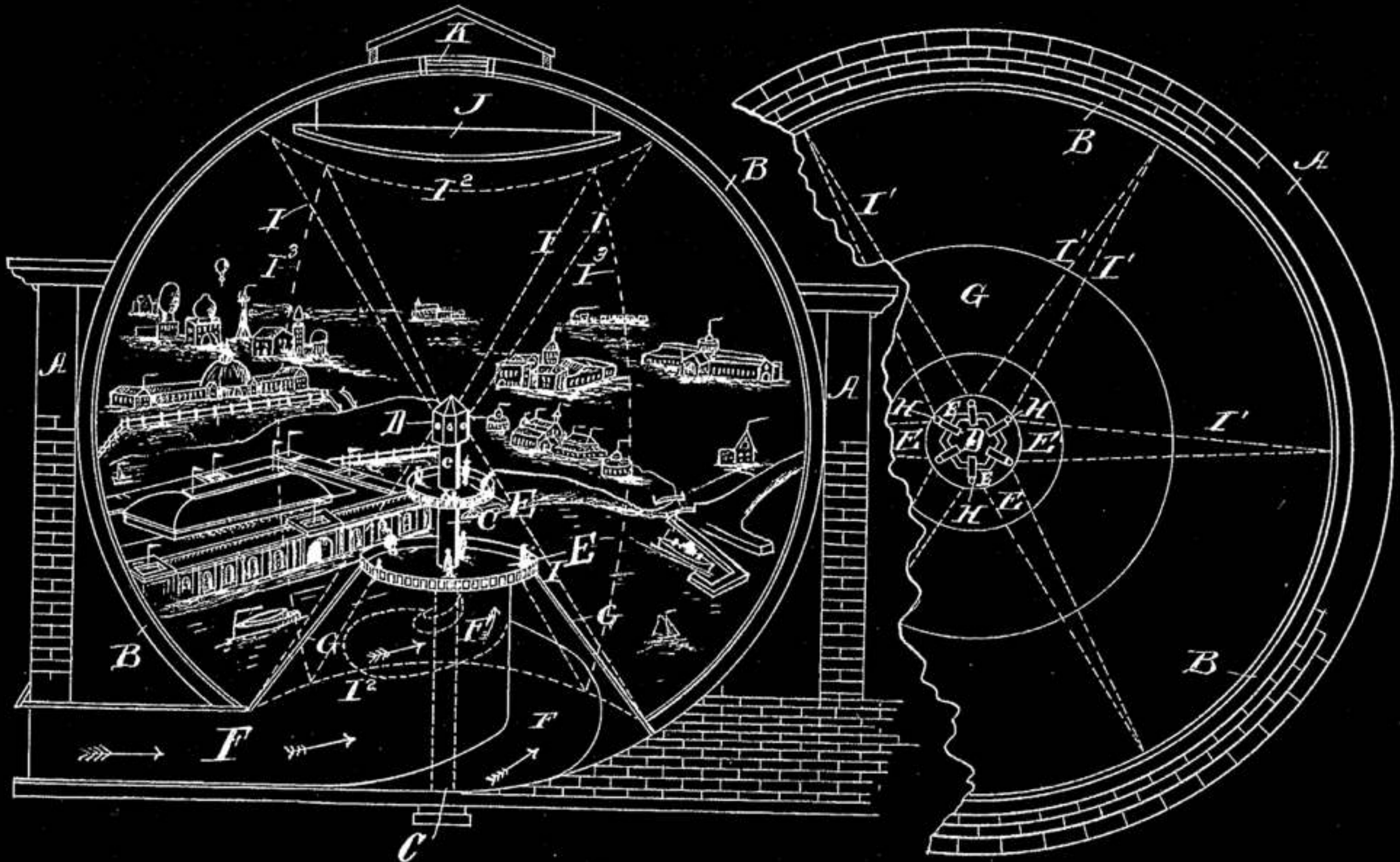
Charles Chase

- In 1896 Charles Chase employed recent advances in photography to create more literal panoramic experiences.

"... everything in view from the point where the photograph is taken will be reproduced exactly as it appears when seen from such point"

- Targeted virtual tourism

"By this manner of reproducing views a person can get a better idea of the different parts of the world without actually going there than in any other manner heretofore devised. In fact he may see such views exactly as they would appear if seen on the ground"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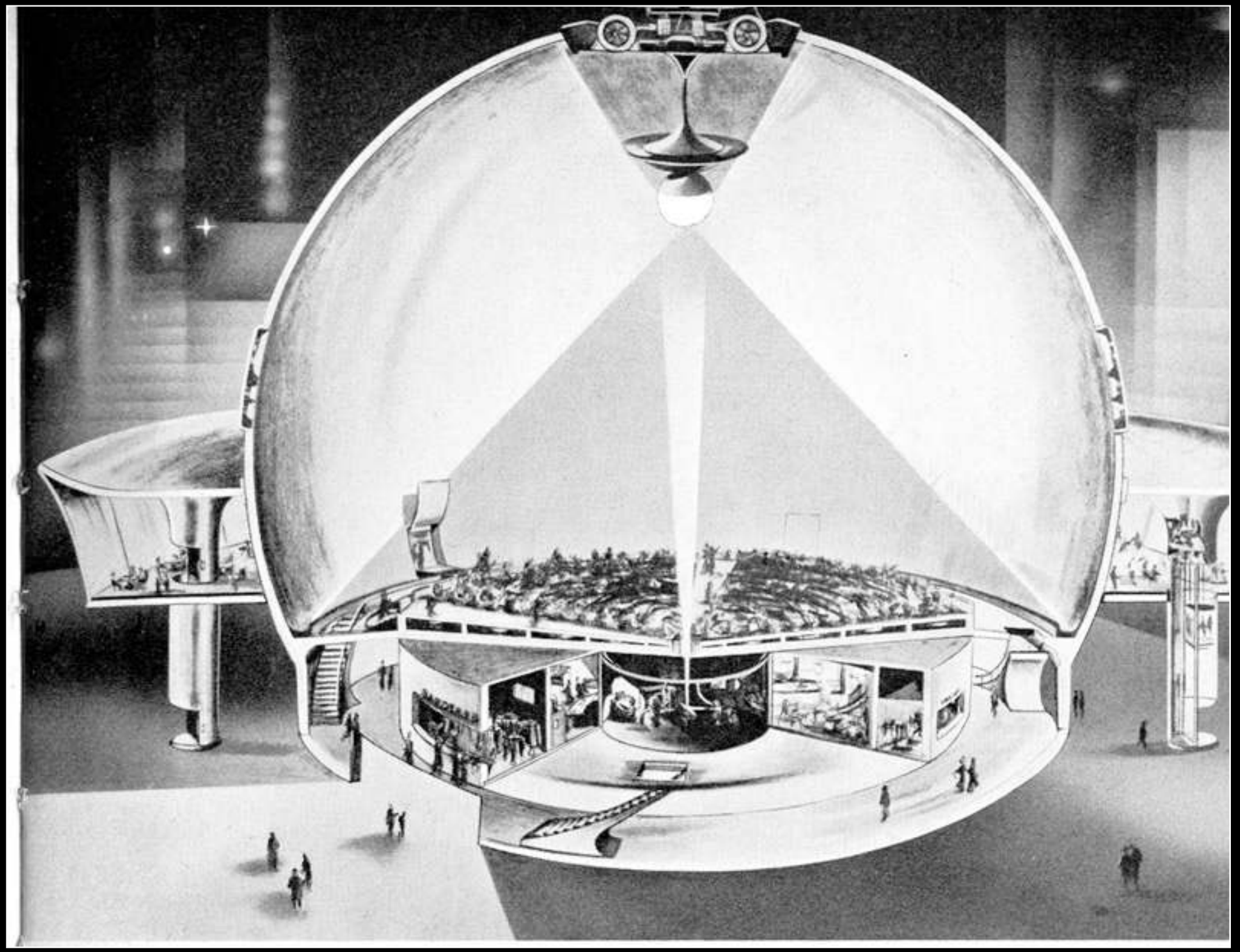
Video Panorama

- The next logical step is video panoramas

- A number of cameras available for this although most are low resolution

- Early (first?) large scale application was in 1957 at the Hamburg planetarium.



Motivation for Visualisation

- Visualisation employs advanced algorithms and computer graphics to provide insights to researchers.

- Value in maximising the capabilities of the human visual system.

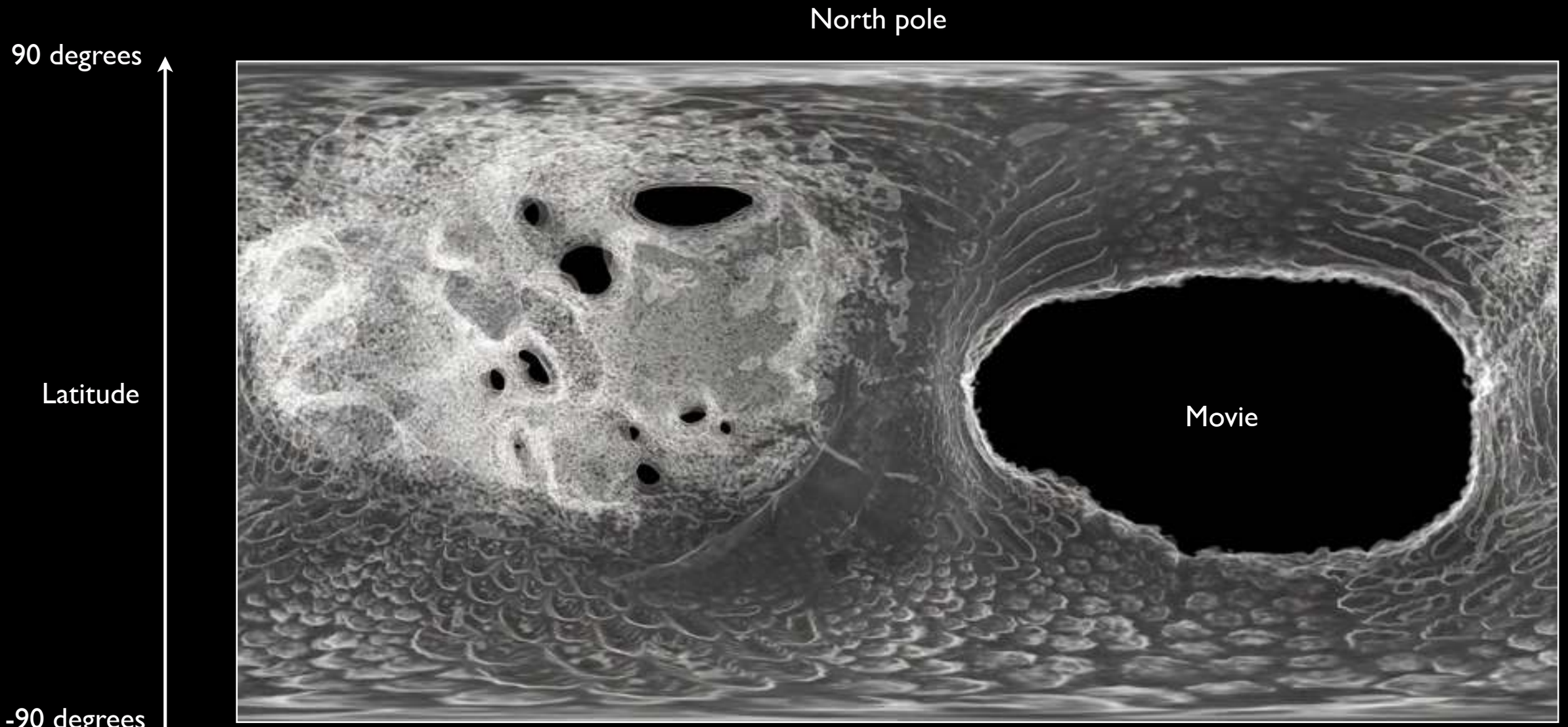
- In the context of the panorama this involves images that

    1. capture everything visible from some position
    2. present the panorama so as to give a sense of immersion
    3. form a convenient format for extremely high resolution digital recordings

- Recurring themes from 200 years ago

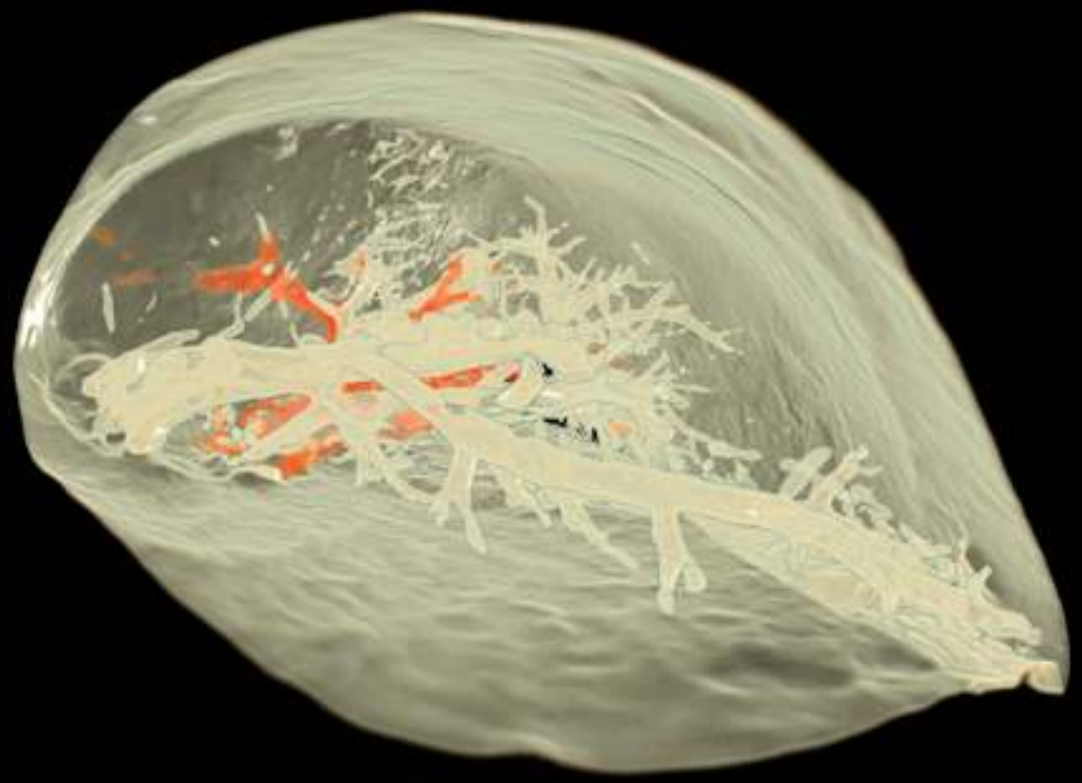
    1. create a sense of immersion, of being in another place
    2. create highly realistic and detailed representations

Spherical panoramas: Science visualisation



Inside the eyeball of a placoderm fish, circa 400 million years old

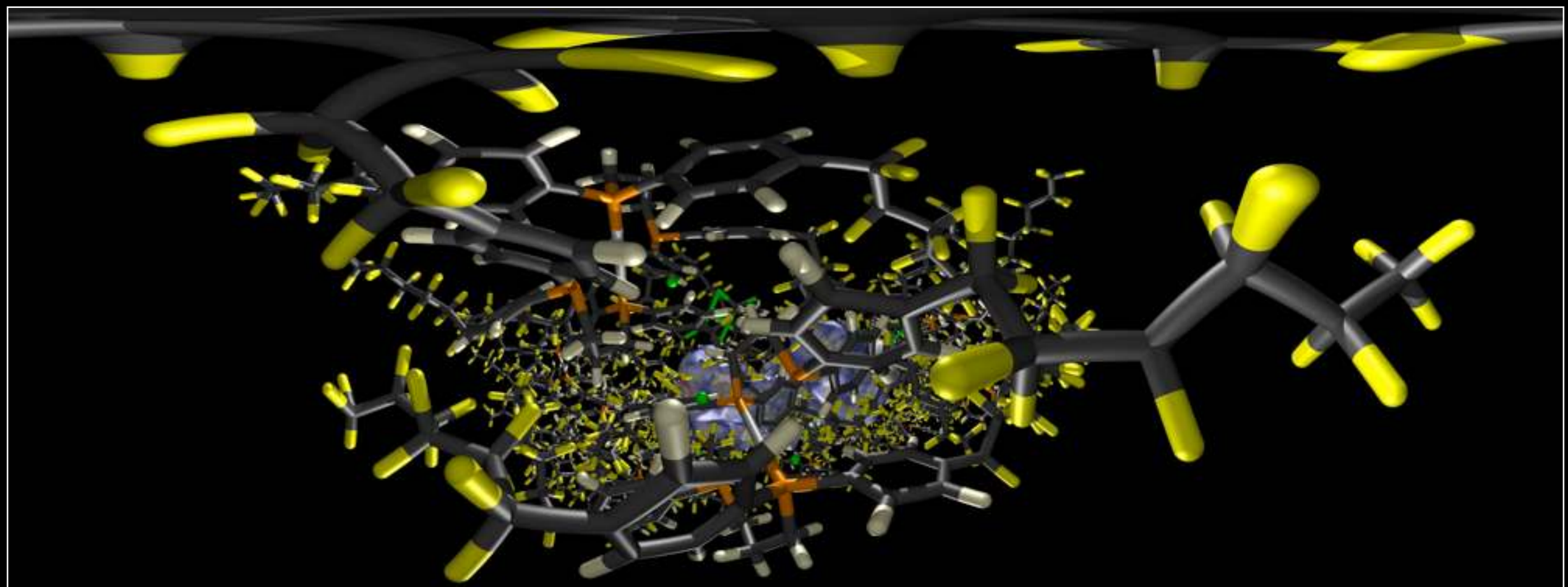
Spherical panoramas: Science visualisation



Movie

Rabbits liver - Cancer research

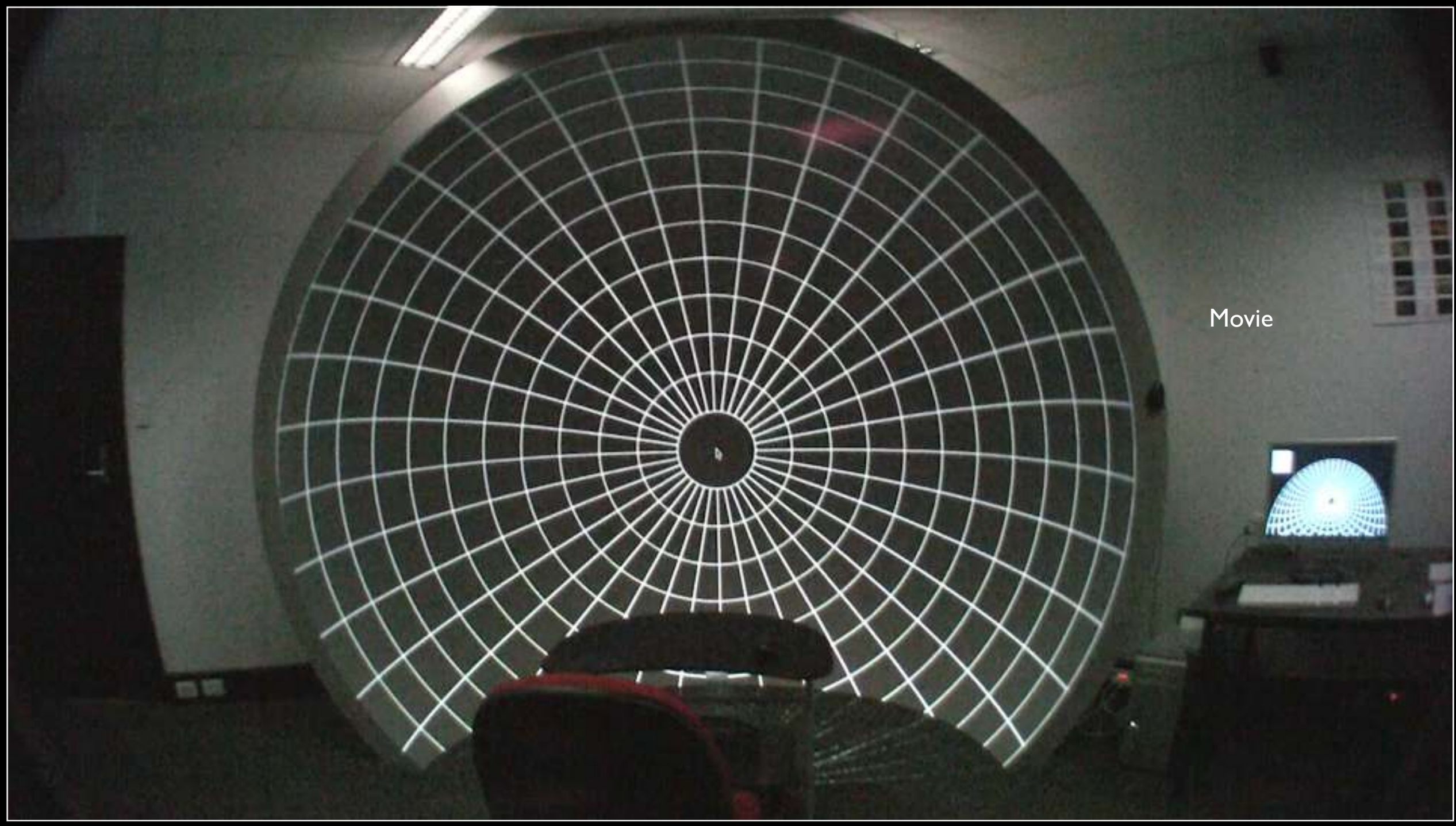
Spherical panoramas: Science visualisation



Movie

Synthetic crystal

iDome



Spherical panorama video: Cultural heritage

- A number of cameras have been built that can capture spherical panorama video.

- Employed in visualisation in cultural heritage: providing insight into a different culture.

Hashbecktashi Dancers

Kardeslik Semahi & Aliyar Semahi (Hacibektas Veli Museum)
Bektasi Semahi (Hacibektas Veli Museum performers)

Spherical panorama video: Cultural heritage

Movie

North pole

90 degrees

Latitude

-50 degrees

-90 degrees

South pole

-180 degrees

Longitude

180 degrees

Hashibektashi performance, Turkiye

iDome

Movie

Hashibektashi performance, Turkiye

Camera

Mah Meri tribal healing ritual, West Malaysia

Spherical panorama video: Cultural heritage

Movie

Mah Meri tribal dance, West Malaysia

Spherical panorama video: Cultural heritage

Movie

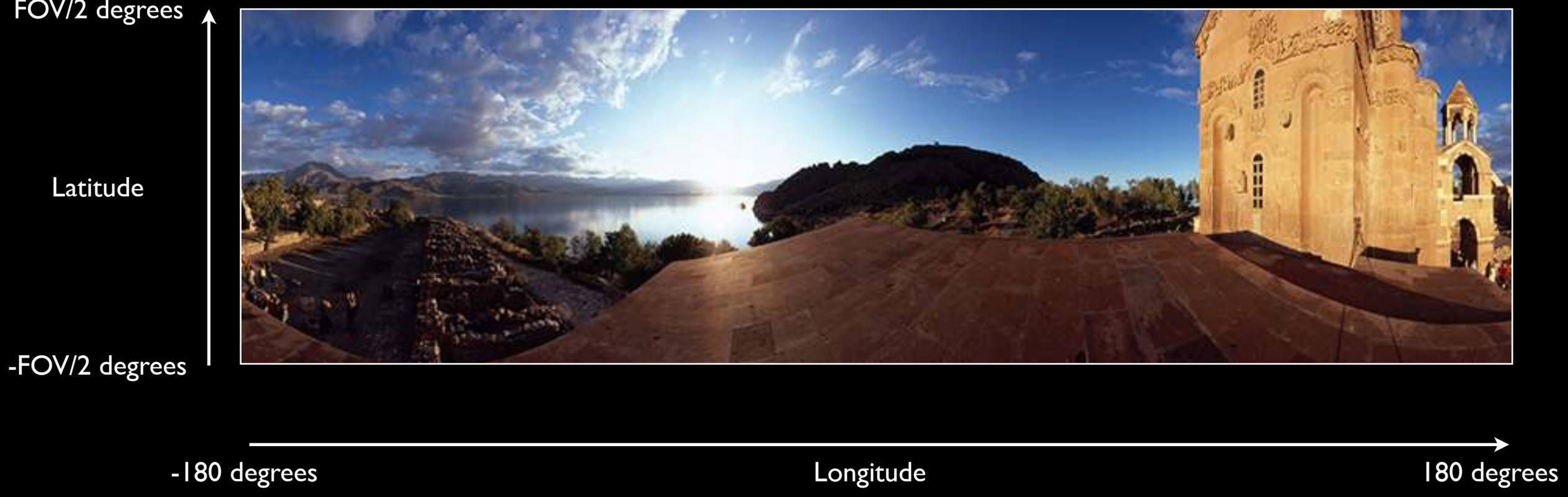
Ngintaka story

iDome

Movie

Cylindrical panoramas: Virtual heritage

- If the vertical field of view is limited then referred to as a cylindrical panorama.
- “Cylindrical” refers to the fact the image wraps around in longitude,
  left and right edge join seamlessly.



Place Turkiye

Cylindrical panoramas: Virtual heritage

Place Turkiye

AVIE

Advanced Visualisation and Interaction Environment

AVIE: Stereoscopic 3D

Right eye

Left eye

Place Hampi

Camera

Roundshot camera

Cylindrical panoramas: Augmented

Right eye

Movie

Left eye

Place Hampi

Cylindrical panoramas: Augmented

Right eye

Movie

Left eye

Place Hampi

Gigapixel panoramas: Recordings in archaology

- Gigapixel refers to the number of pixels in the image.
  A good SLR camera may capture 20+ Megapixels, how to photograph at 1,000 Megapixels?

- Cannot buy arbitrary high resolution sensor, solution is to stitch large numbers of images together.

- Capture detail and the context in one image.
  May or may not be a full cylindrical panorama.

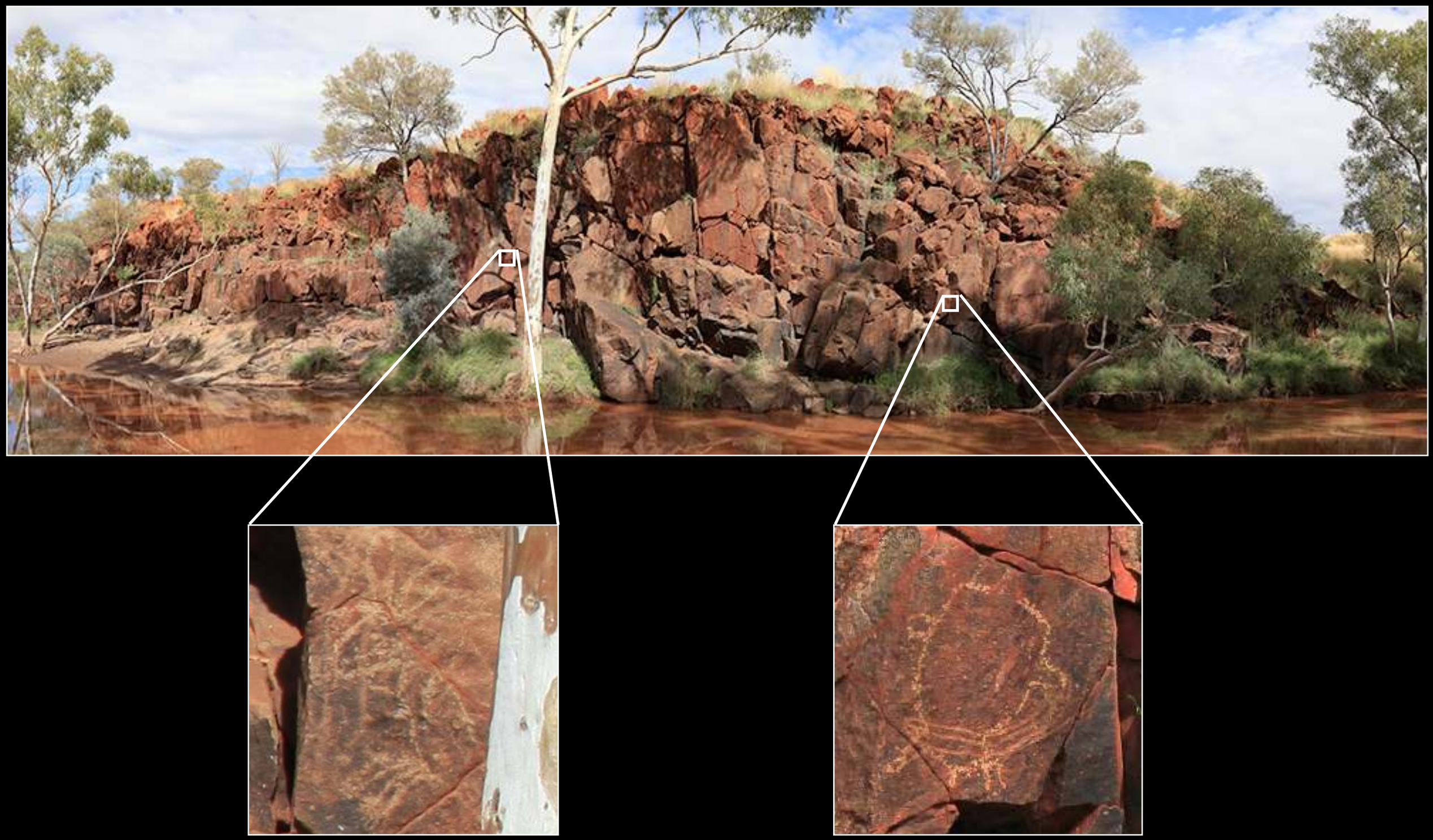
- Results in a much richer digital recording than
  - single image of the extended area but no ability to zoom
  - lots of single images of small parts of the scene

Gigapixel panoramas: Recordings in archaology

13 x 3 grid

60,000 x 15,000 pixels

Gigapixel panoramas: Recordings in archaology



Wanmanna

Gigapixel panoramas: Recordings in archaology

Beacon Island

Gigapixel panoramas: Recordings in archaology

Bubbles = Spherical panorama

North pole

90 degrees

Latitude

-90 degrees

South pole

-180 degrees

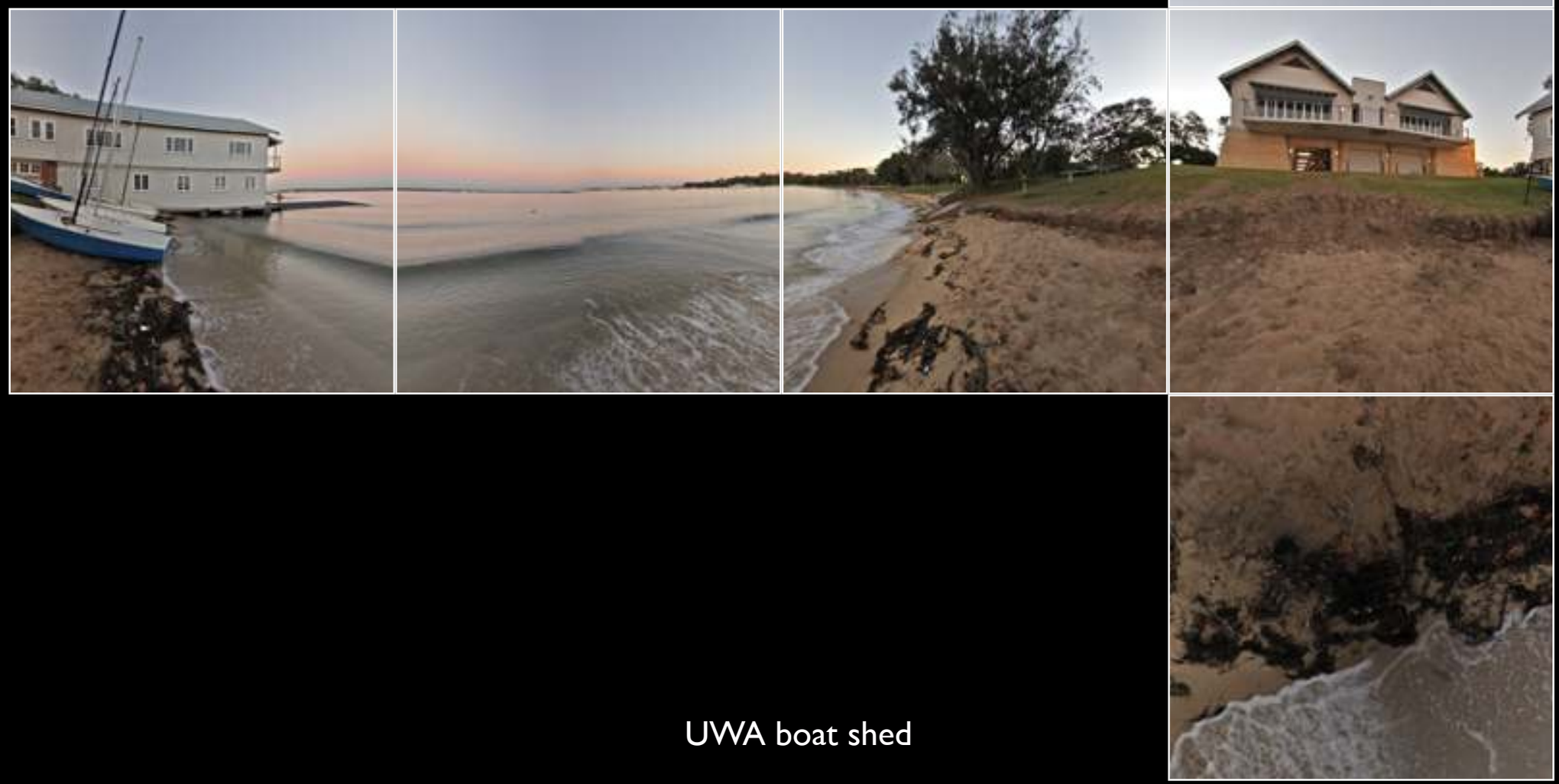
Longitude

180 degrees

UWA boat shed

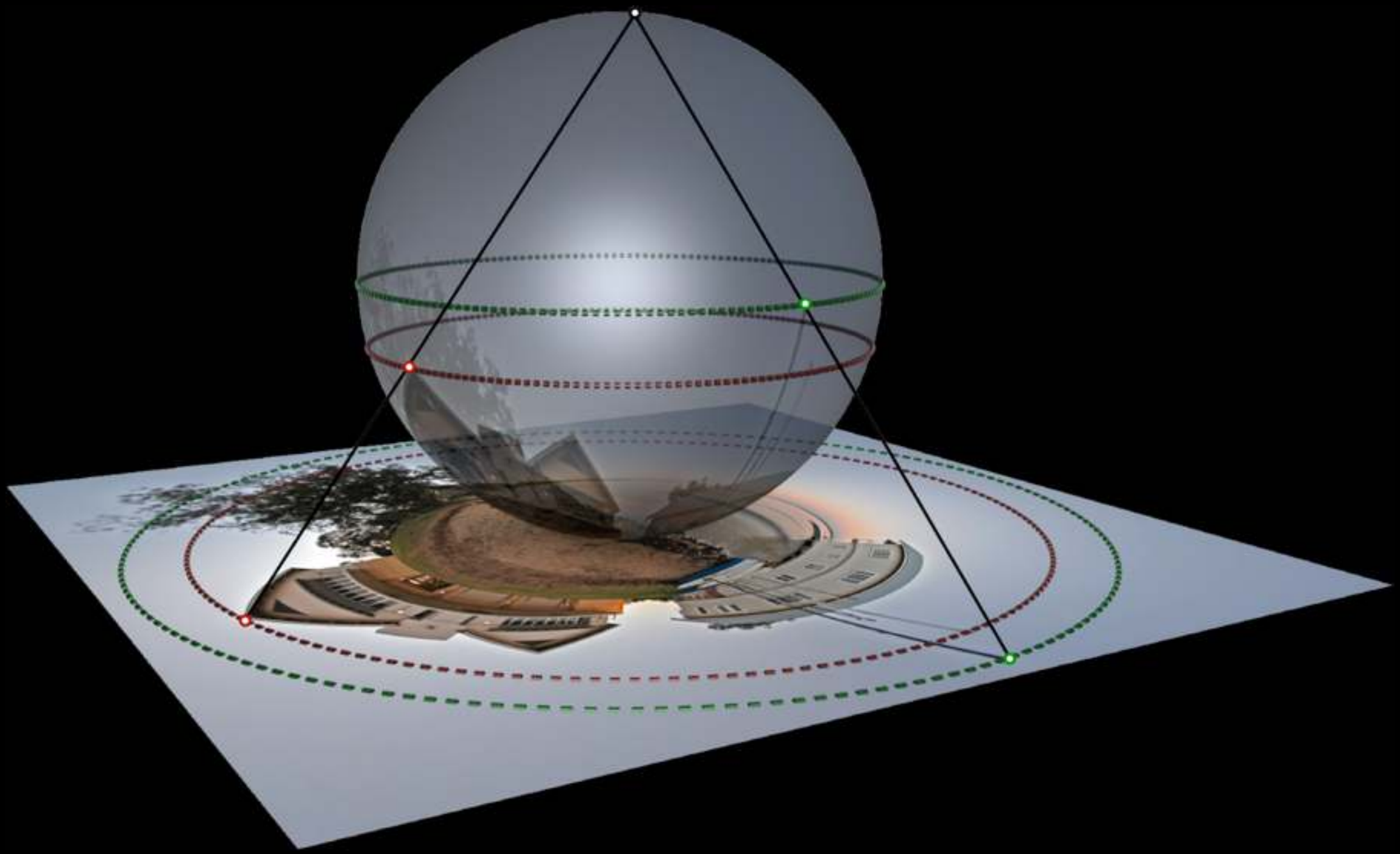
Cube maps

- Everything is recorded about the camera point.
- Means we can recreate ANY other projection.



UWA boat shed

Stereographic projection



Little planet photographs

UWA boat shed

... and just for fun

Movie

Coming and going