

Novel image capture for Rock Art Archaeology

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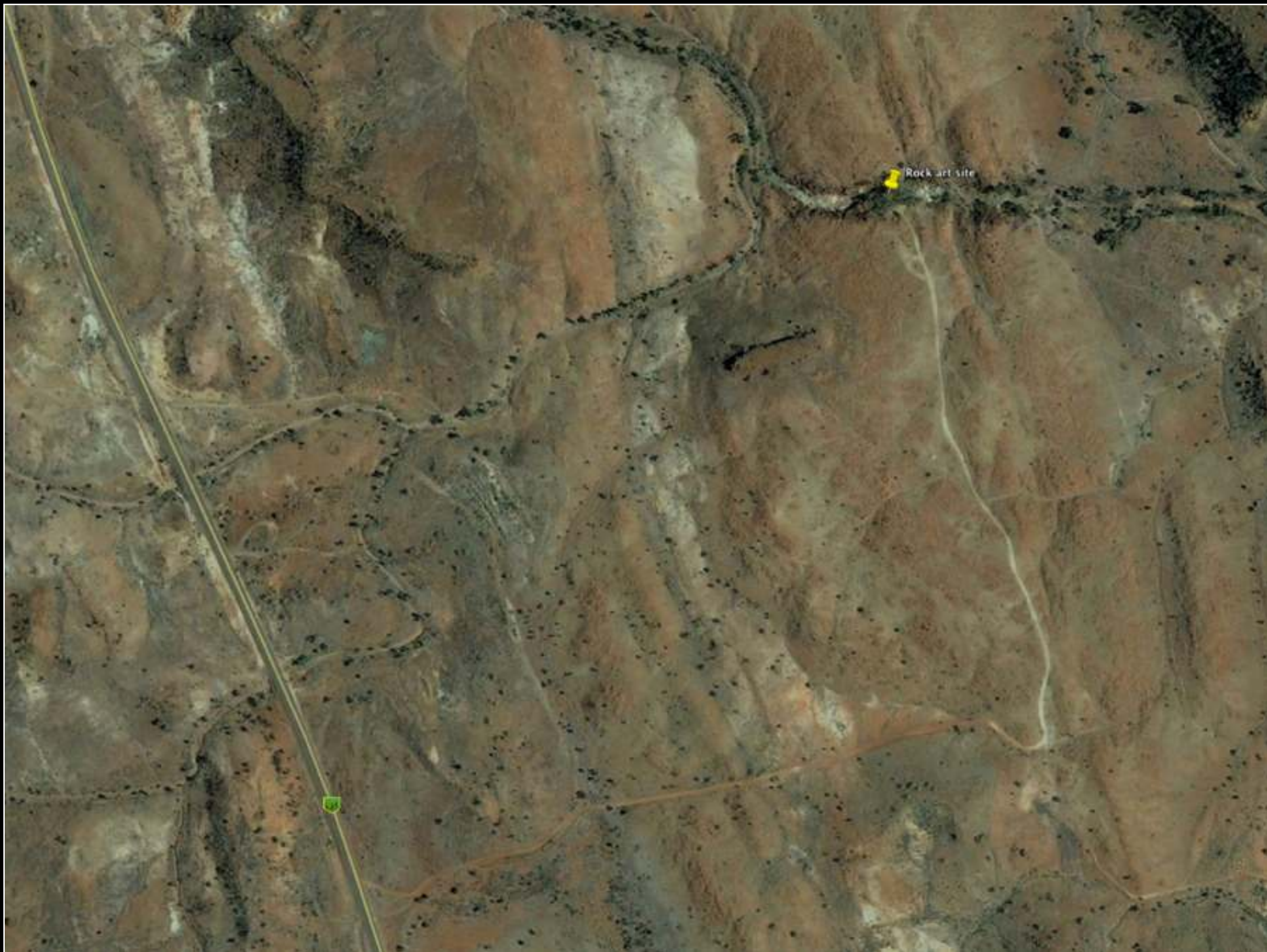
Where?



Where?



Where?



Where?



Rock Art Archaeology



Rock Art Archaeology



The Plan

- Augment current data capture with “new” digital imaging techniques.
- Capture the site to supplement the detailed archaeology capture.
- Intended asset capture
 - Gigapixel images (Canon 5D and Gigapan motorised mount)
 - LadyBug-3
 - 360 degree panoramas (Canon5D and 8-15mm zoomable fisheye)
 - 3D reconstructions from photographs
 - Timelapse and video of the archaeological process (Canon5D + GoPro)

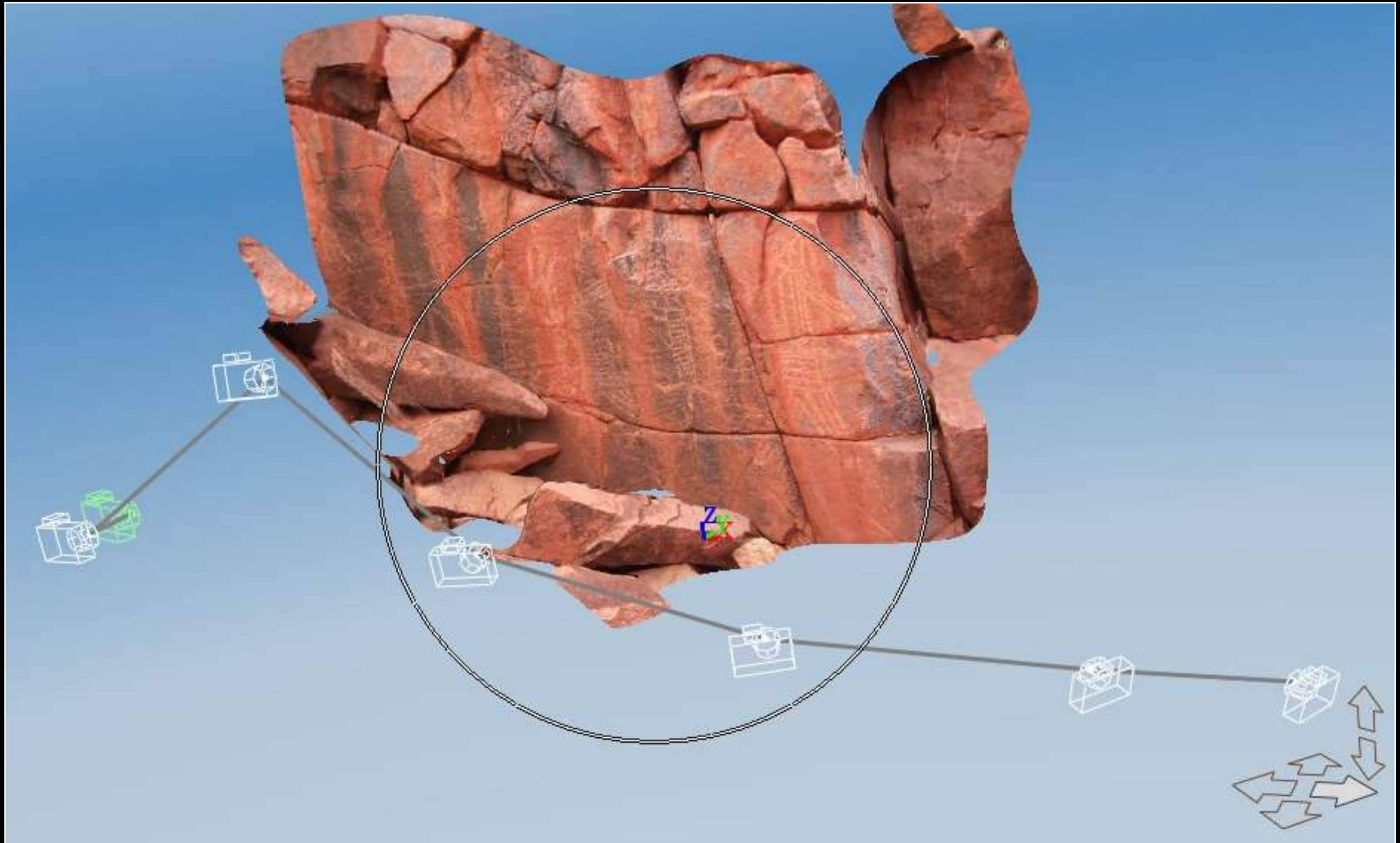
3D Reconstruction

- Automatic reconstruction from multiple photographs.
- Typically involves
 - feature point detection
 - camera frustum estimation
 - point cloud generation
 - mesh generation
- A number of software solutions available.
 - Photosynth
 - PhotoScan
 - 123D Catch
 - Visual SFM
- Comparison of software and techniques investigated by 2011-2012 intern student project.

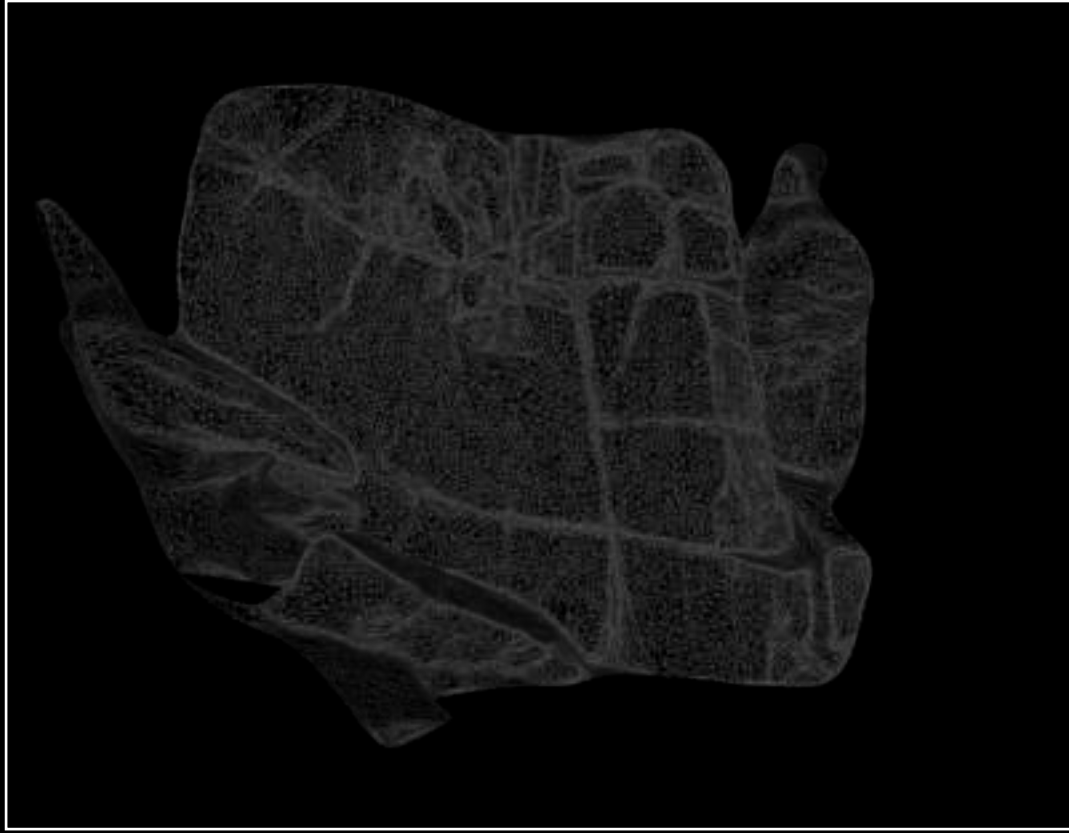
3D Reconstruction: Image set



3D Reconstruction: Camera frustum estimation



3D Reconstruction





Show further examples using MeshLab

Gigapixel Images

- Realise that camera sensor resolutions are increasing only slowly.
- Solution for higher resolution capture is to take multiple photographs and stitch together.
- A widely used technique from astronomy to microscopy.
- Feature point matching between photos and blending to give a large seamless image.
- AutoPanoPro software one of the leading solutions.
- GigaPan motorised mount. Program in field of view of camera, and top left - bottom right corner of image.



Gigapixel Images

13 x 3 grid



40,000 x 10,000 pixels

Gigapixel Images



Single 10MPixel image

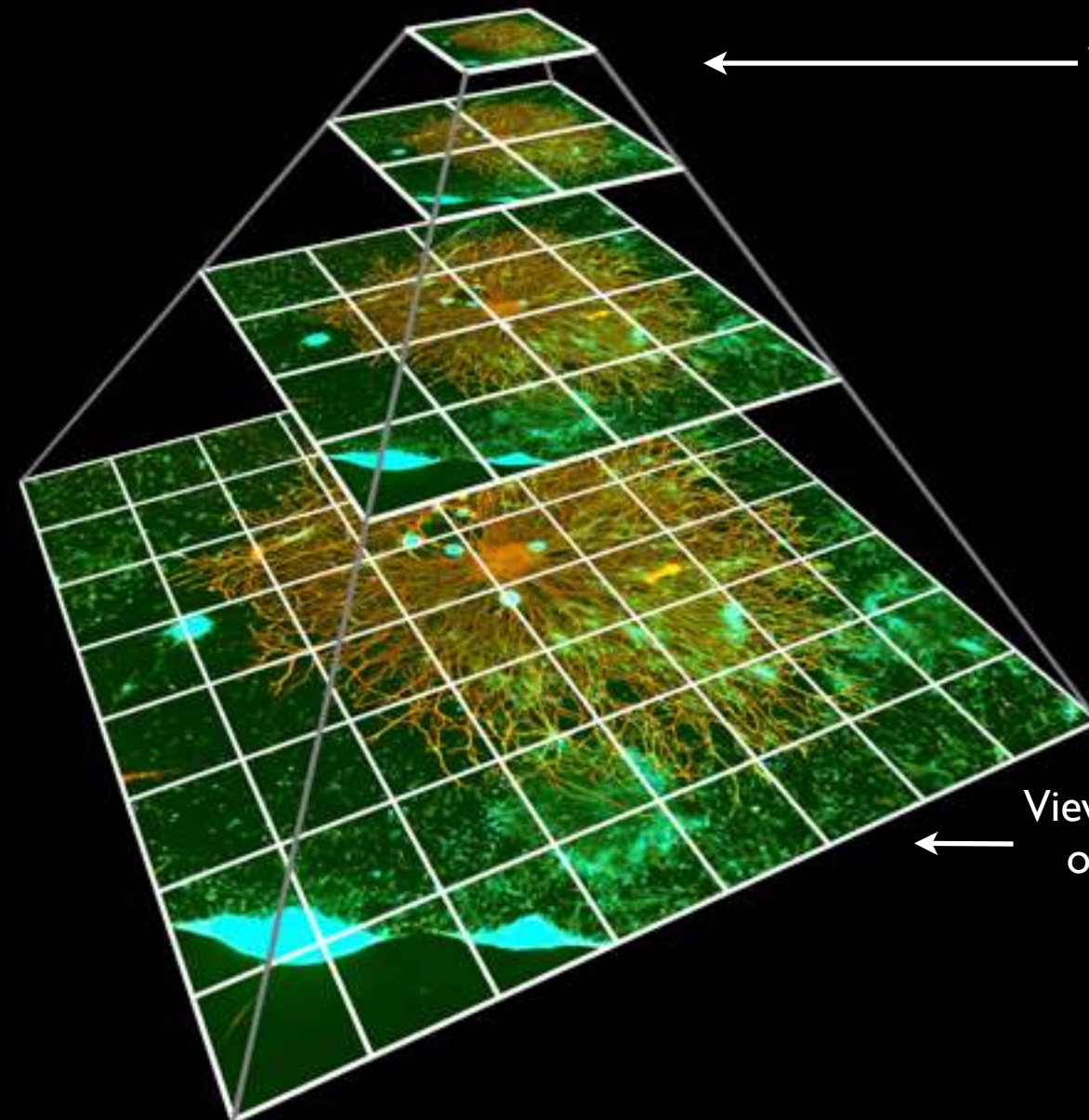


15 x 4 grid



Gigapixel Images

- Issue: most image formats are limited to 32,000 pixels maximum width or height.
- Some are limited to 2GB maximum file size, others 4GB (eg: tiff).
- “Large image formats” options are
 - Adobe large image format (.psb)
 - Dicom
 - TIFF (limited)
 - Raw
 - jpeg2000
- Pyramidal tiff.



← Viewing the entire dataset zoomed out

← Viewing a portion of the dataset zoomed in,
only need a subset of the available tiles.

Gigapixel Images



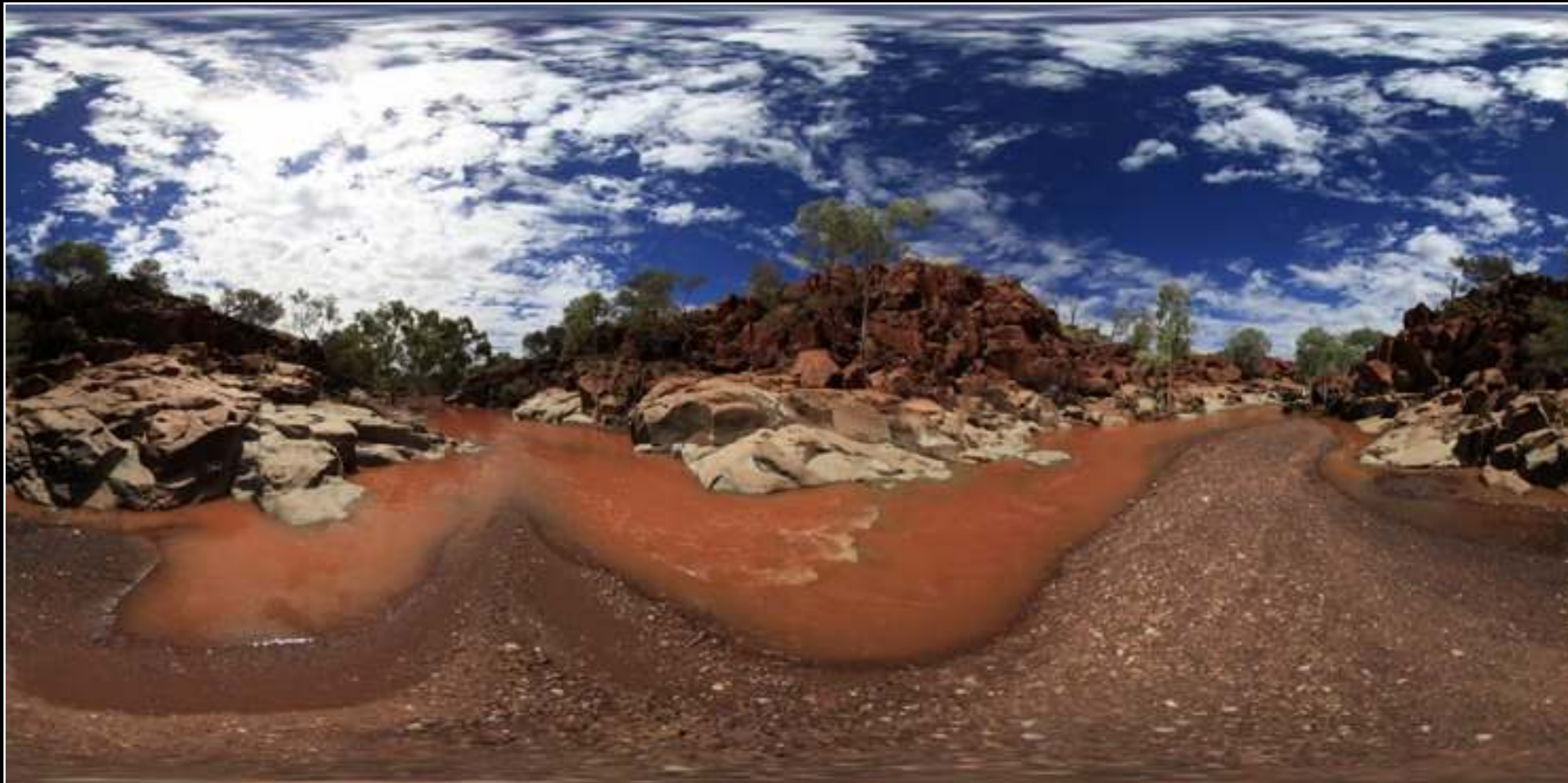
Show examples.

Virtual Tour

- Assets accessed through an online virtual gallery of the site
 - 360 degree panorama bubbles
 - High resolution images
 - Links to web pages (database)
- PanoTour software.

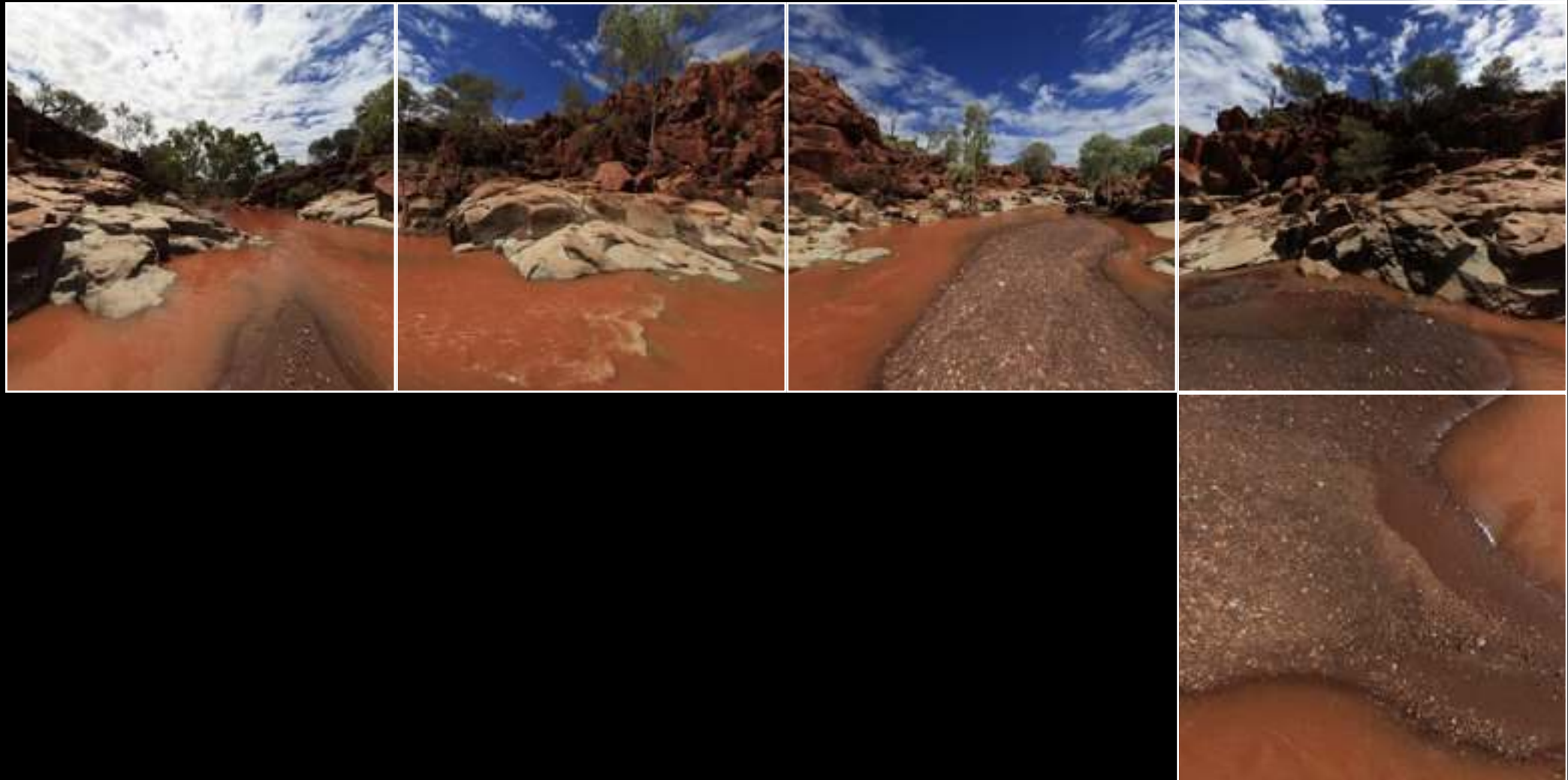


Virtual Tour



Virtual Tour

- Certainly not a new idea, been around since the the 80's and popularised by the early versions of QuickTime.
- Now possible to capture higher resolution given a good SLR camera and improved fisheye lens quality.
- Just requires 3 photos.



Virtual Tour



Show live example.

Questions

