

# 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)



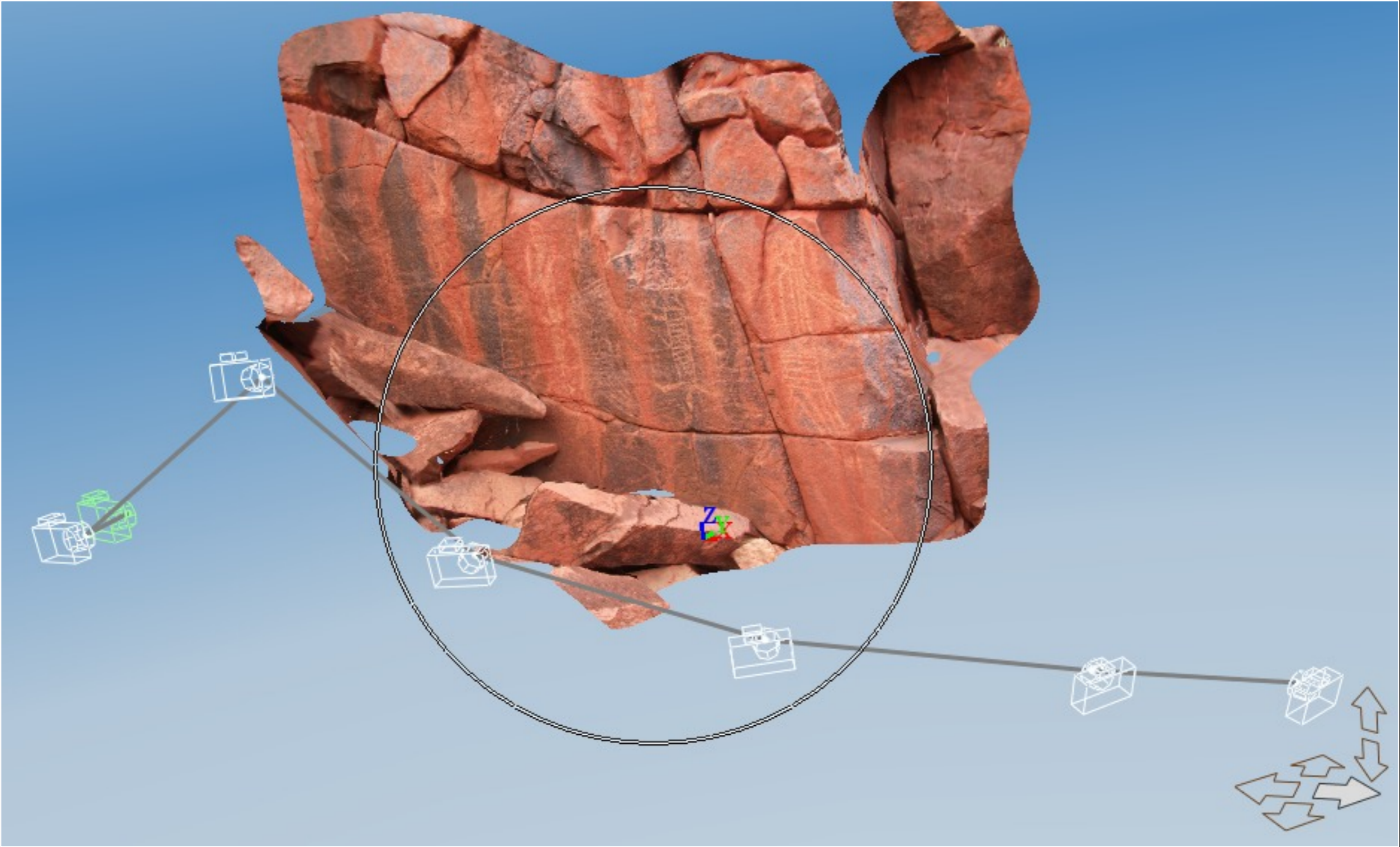
# 3D Reconstruction

- 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.

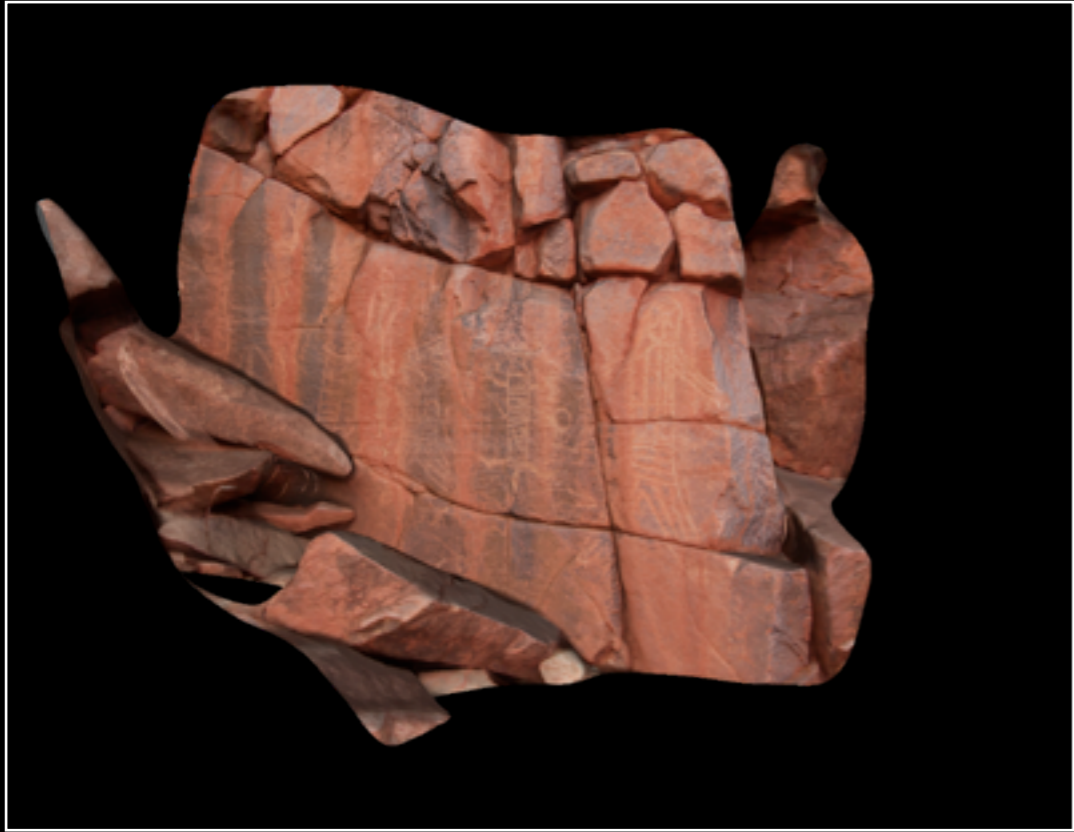
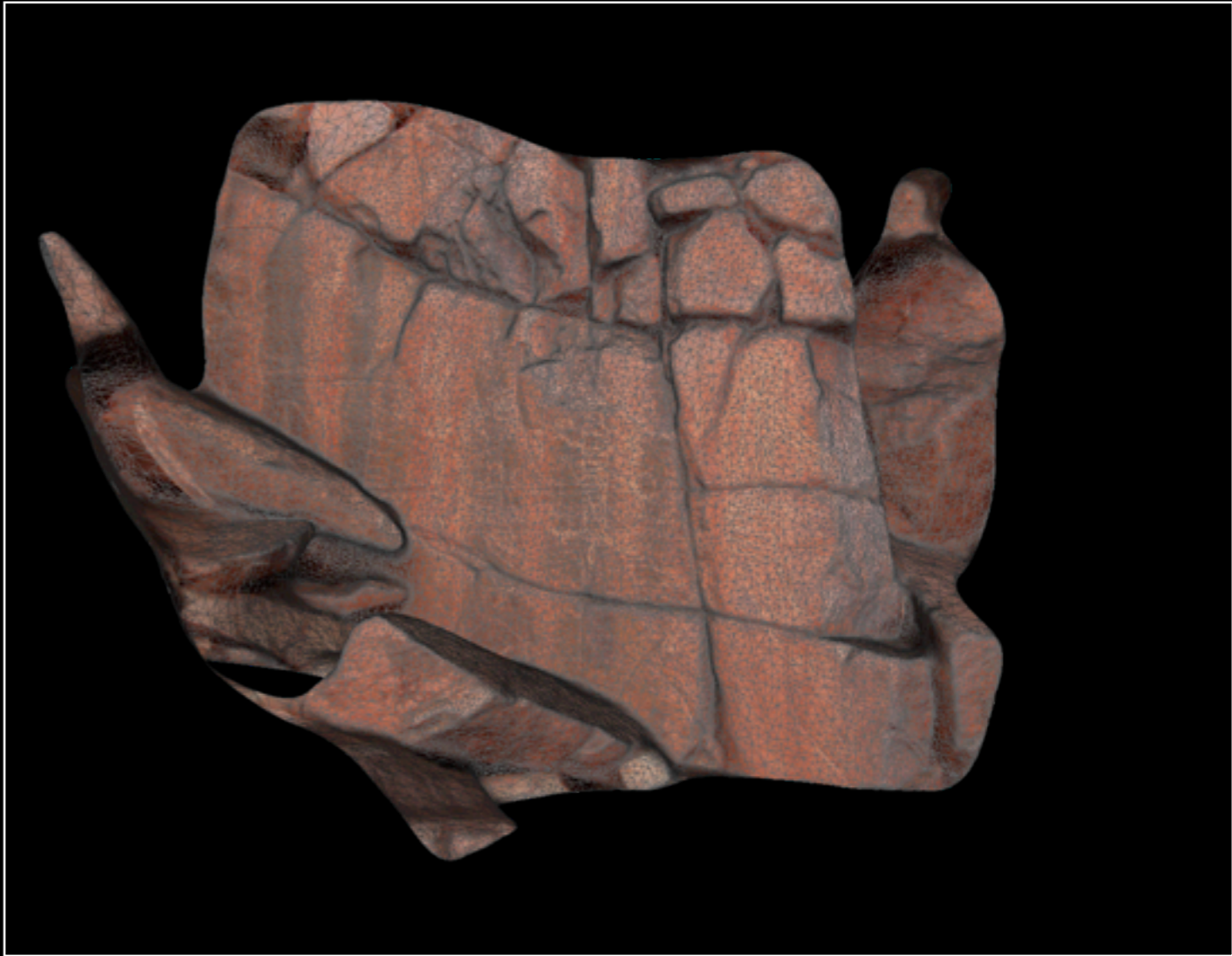
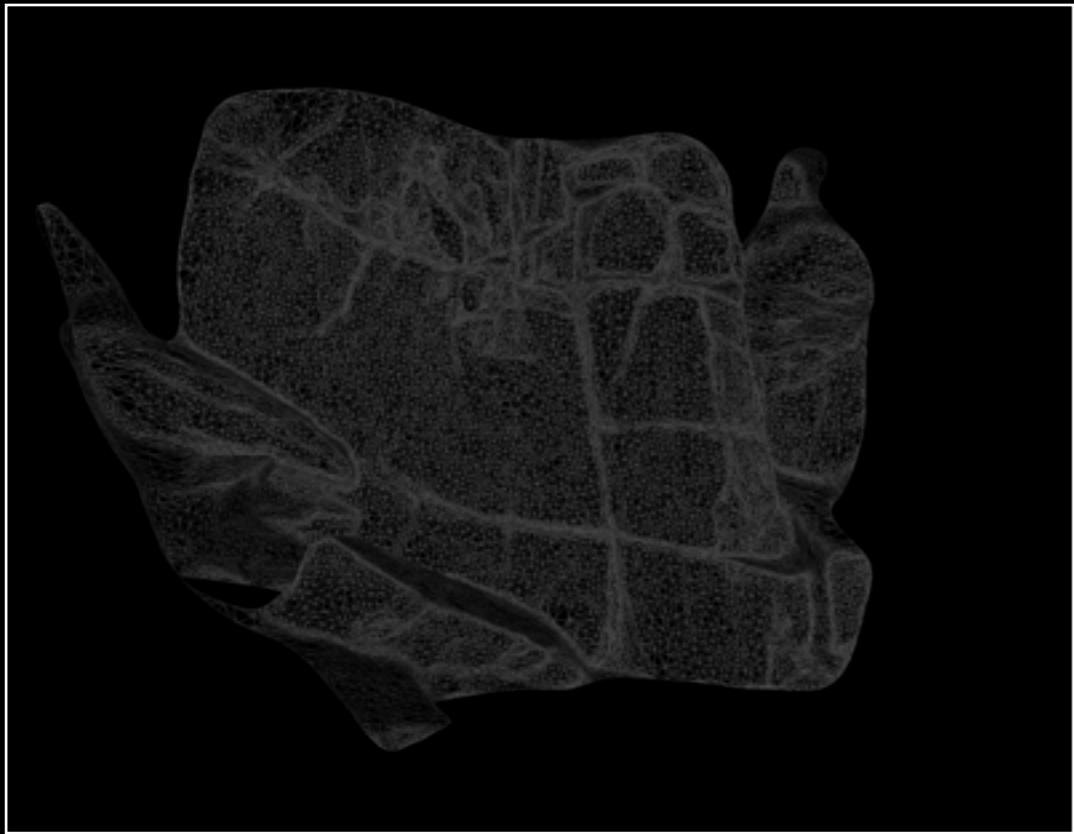
# 3D Reconstruction: Image set



# 3D Reconstruction: Camera frustum estimation



# 3D Reconstruction





Show further examples using MeshLab

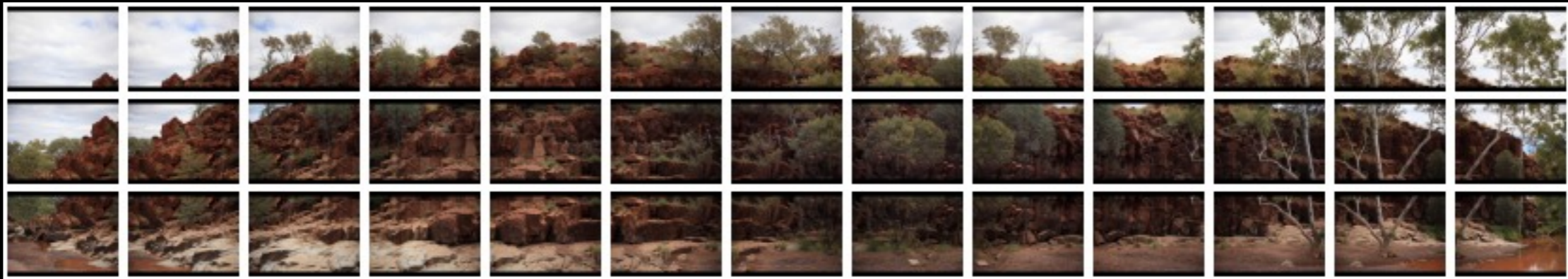
# Gigapixel Images

- 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.



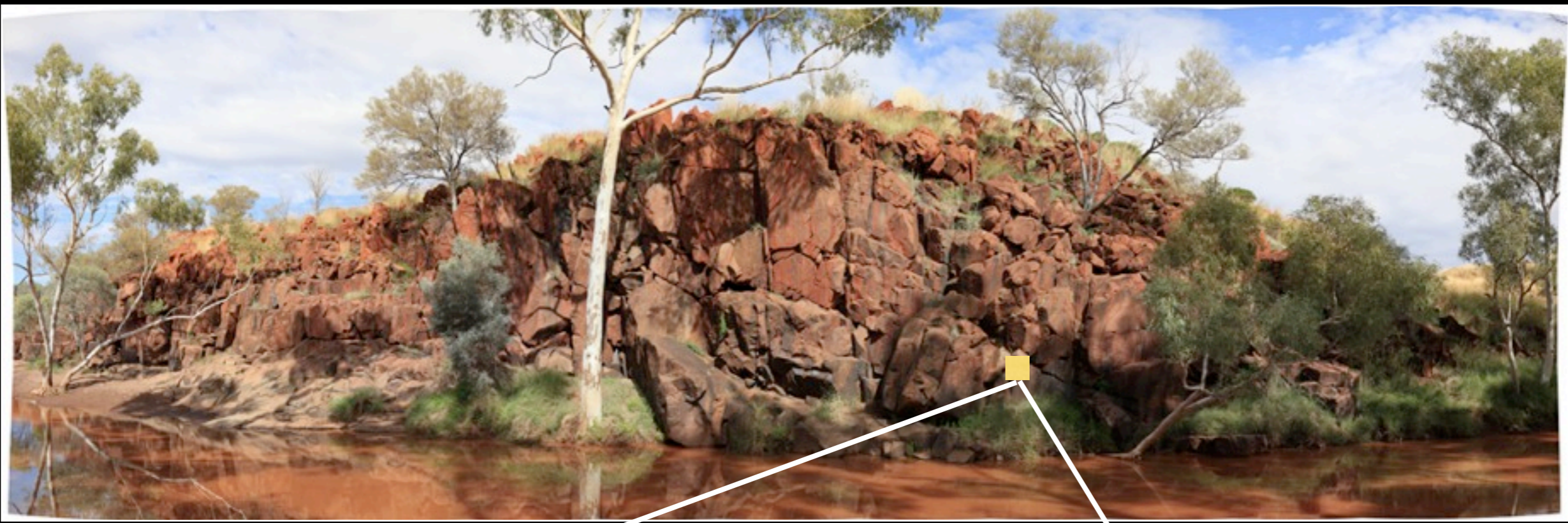
# Gigapixel Images

13 x 3 grid



40,000 x 10,000 pixels

# Gigapixel Images



Single 10MPixel image

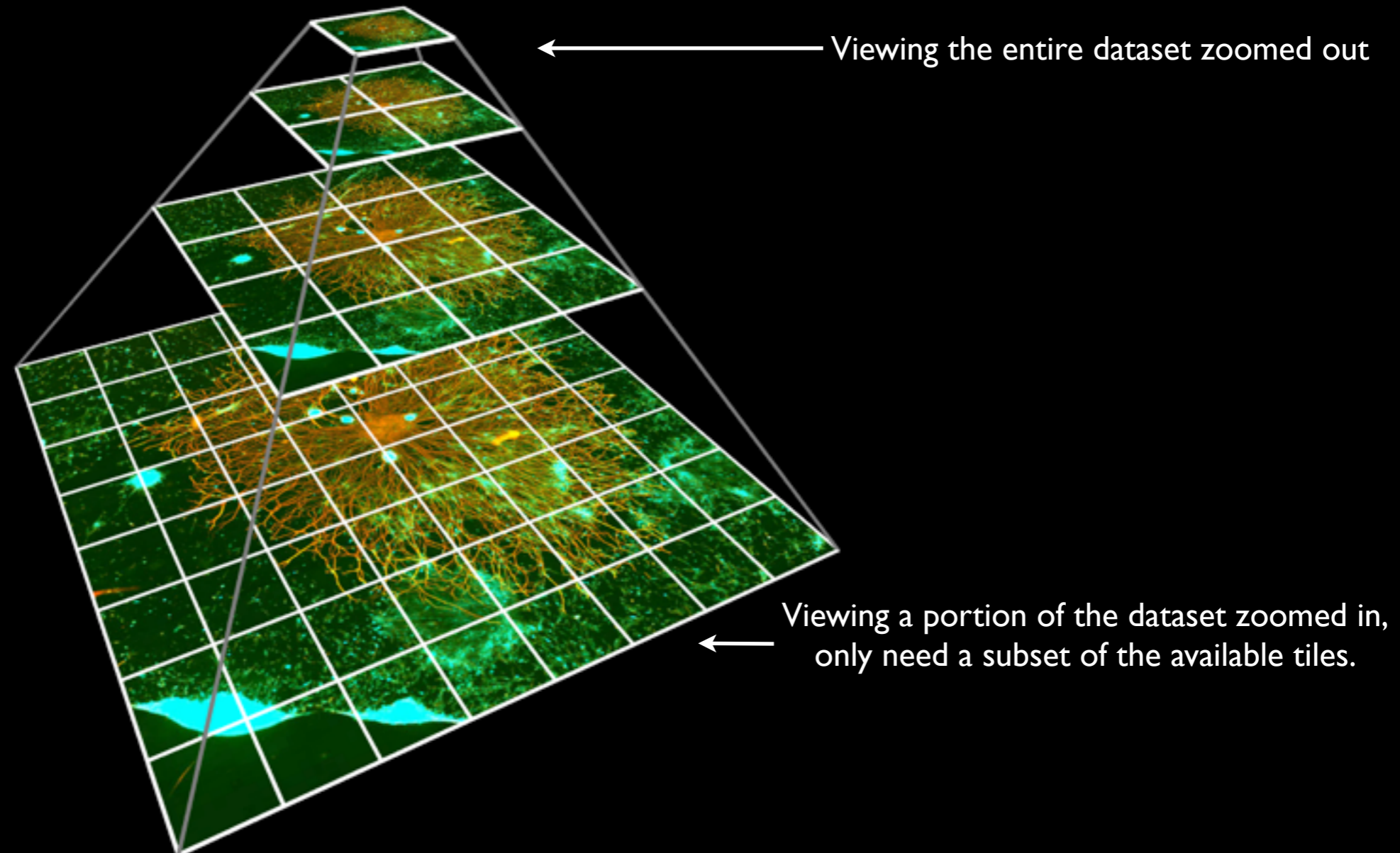
15 x 4 grid





# 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.



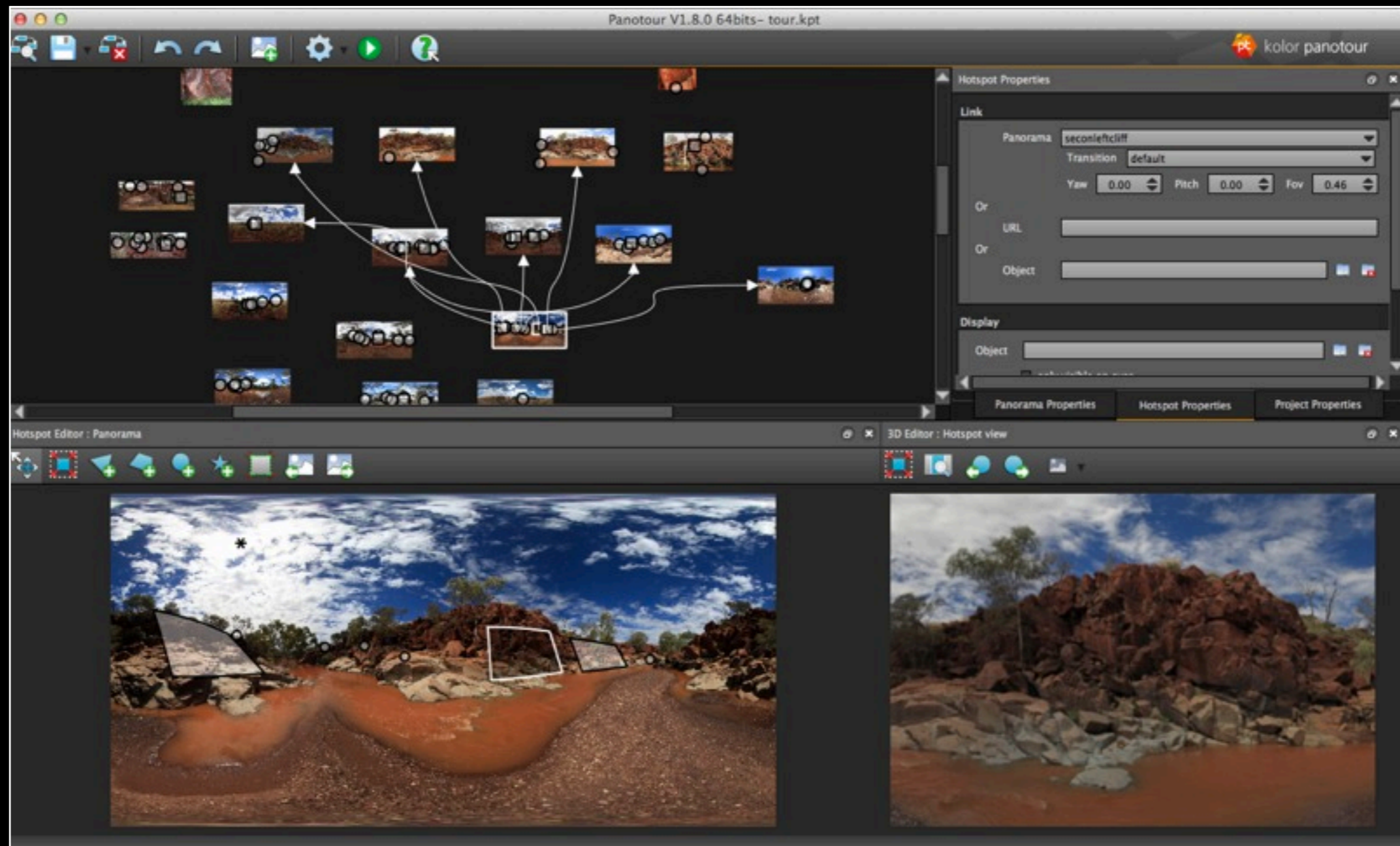
# Gigapixel Images



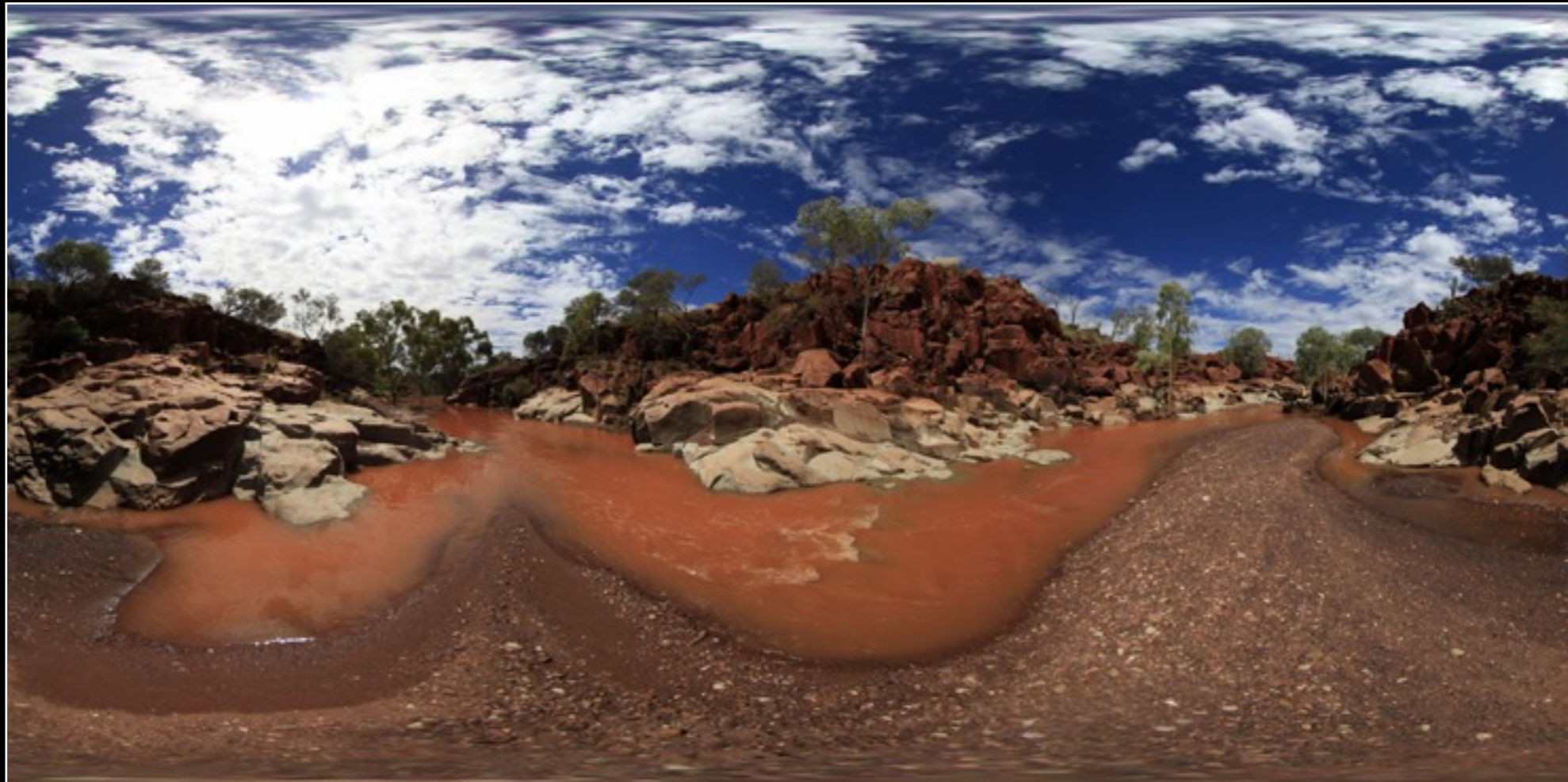
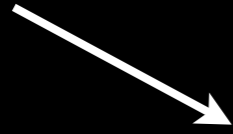
Show examples.

# 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.

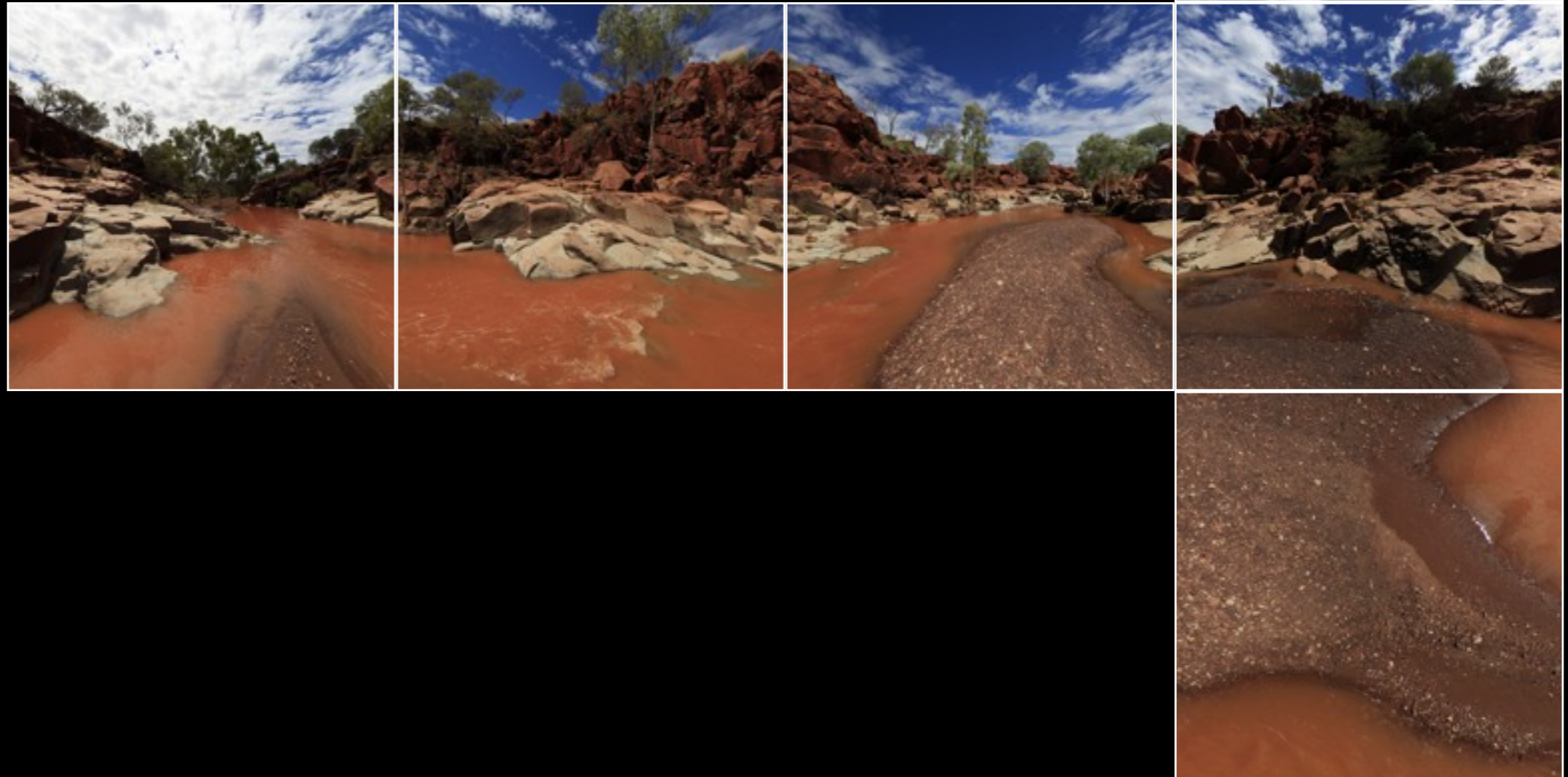


# Virtual Tour



# 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

