KIMBERLEY FROM SPACE: ART IN SCIENCE

On 5 April 2006, Dr Richard Langford gave a PowerPoint presentation on satellite images of the Kimberley. Richard works for the Geological Survey of Western Australia in the Department of Industry and Resources as a geologist. He has previously worked in Hong Kong and the Solomon Islands, but the nearest he has been to the Kimberley is the Tanami! However he has visited the area using images from space and this was the basis of his talk. His focus was on images as nature's works of art but it included enough technical background to allow the audience to fully appreciate the effort expended on the space program over many years.

After a warm up with some hand-held photographs taken by astronauts on the Space Shuttle, Richard cooled down the tempo with some technical stuff on satellites. He then took the audience through the history of a few satellites of interest, focusing on the Landsat series. Then it was time to sit up again as images from around the Kimberley were shown, ranging in scale from hundreds of kilometres down to just tens of metres. The talk ended with a reminder that all the images could be freely downloaded over the internet.

Beginning with the Mercury missions in the early 1960s, astronauts have taken photographs of the Earth. The *Gateway to Astronaut Photography of Earth* (**http://eol.jsc.nasa.gov/**) hosts the best and most complete online collection of astronaut photographs of the Earth. More than 632,000 views of the Earth are made accessible on this website.

There are many Earth Resource Satellites operating in the optical spectrum, including Quickbird, IKONOS-2, Spot-5 and Landsat. In 1967, the Earth Resources Technology Satellites (ERTS) program was a planned sequence of six satellites. In 1975, ERTS was renamed by NASA "Landsat". Landsat is the longest-running project for the acquisition of moderate resolution imagery of the Earth from space.

Landsat 1 satellite was launched in 1972, and the most recent, Landsat 7, was launched in 1999. With a more than 25-year history there are now millions of Landsat images of the Earth. These have given scientists a unique resource for global change research, with applications in agriculture, geology, forestry, regional planning, education and national security.

Some of the images from around the Kimberley came from sources that we all know about such as *Google Earth* (**http://earth.google.com/**), and less well known sources such as Geoscience Australia, who have an excellent *Mosaic of Australia* (**http://www.ga.gov.au/map/images.jsp**). Simple views of the landscape of the

Kimberley took on a new dimension with data from the Shuttle Radar Topography Mission (SRTM) – is this the map that changed the World?

SRTM data was acquired by the Space Shuttle Endeavour, launched on 11 February 2000 for an 11-day mission to produce digital topographic data for 80% of the Earth's land surface. SRTM made use of a technique called radar interferometry.

Two radar images are taken from slightly different locations, and differences between these images allow for the calculation of surface elevation.

The ultimate tour of the Kimberley came from NASA's *WorldWind* (**http://worldwind.arc.nasa.gov/index.html**). *WorldWind* lets you zoom from satellite altitude into any place on Earth, using Landsat satellite imagery and SRTM data for a three-dimensional effect.

The pictures from space of the Kimberley were fascinating – as Richard said, we see it from a totally new perspective. As technology improves, he posed (in jest): do we really need to visit it? Alas, we can't reproduce the pictures here but you can access them using the Internet (in some cases you may have to download enabling software).

There were lots of pictures and possibly not enough time. Anyone wanting to explore the Kimberley from space should therefore continue the search for themselves at the following sites:

Astronaut photographs – **http://eol.jsc.nasa.gov/**
Google Earth – **http://earth.google.com/**
Geoscience Australia – **http://www.ga.gov.au/map/images.jsp**
SRTM – **http://srtm.usgs.gov/index.html**
NASA *WorldWind* – **http://worldwind.arc.nasa.gov/index.html**
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