Benthic Cover and Bathymetry Determination

Presenter: Wojciech Klonowski, Remote Sensing & Satellite Research Group, Curtin University

The Ningaloo Marine Park, situated in the northwest corner of Western Australia, is Australia's largest and most accessible fringing reef system. The shallow lagoons formed by the reef supports a diverse array of habitats for a multitude of colourful corals and more than 500 species of fish.

In late April 2006, a large aerial survey was conducted, capturing spectral signatures of the Ningaloo Marine Park with spatial resolution between 3 to 5 metres. The main purpose of the survey was to provide the scientific community with accurate and high spatial resolution bathymetry and benthic cover maps covering the Ningaloo Marine Park. At the same time, a field campaign was conducted capturing a variety of *in situ* measurements coincident with several overflights used to validate the image-derived bathymetry and substrate type.

The bathymetry and benthic cover products were determined from the hyperspectral imagery by incorporating a semi-analytical reflectance model. The model includes the spectral signatures of benthic cover, the water column constituents (Chlorophyll-a, Coloured Dissolved Organic Matter and Suspended Sediments) and the bathymetry. Additionally, sunglint and air-water transmission effects are accounted for within the algorithm. The model permits the hyperspectral observations to be formally inverted using a non-linear optimisation scheme to yield a benthic classification, the bathymetry and the concentrations of in-water constituents.

In this presentation we assess the accuracy of the image-derived bathymetry through comparison with historical acoustic depth soundings and measurements undertaken during the survey.