

OARS – Hyperspectral Surface Mapping Simultaneously with Airborne Geophysics

P. Hausknecht², L.B. Whitbourn¹, P. Connor¹, G. Wells², J. Flack¹, P. Mason¹,
J.F. Huntington¹, R. Hewson¹, S. Batty²

¹CSIRO, Division of Exploration and Mining, PO Box 136 North Ryde, NSW, 1670
Tel: +61 2 9490 8602 Fax: +61 2 9490 8960 e-mail: l.whitbourn@syd.dem.csiro.au

²World Geoscience Corporation Pty Ltd, 65 Brockway Road, Floreat, Perth, WA 6014
Tel: +61 8 9273 6400 Fax: +61 8 9273 6466 e-mail: peterh@perth.wgc.com.au

The Operational Airborne Research Spectrometer (OARS) is a novel hyperspectral profiling reflectance spectrometer developed by CSIRO and World Geoscience Corporation (WGC) to examine alternative means of collecting and delivering exploration data, based on the principles of reflectance spectroscopy. OARS is a component of CSIRO's long-standing "Airborne Mineralogy" Concept.

OARS can be integrated with other geophysical instruments, principally airborne magnetics and radiometrics, and can be flown simultaneously on exactly the same flight lines. It will measure ground reflectance spectra from contiguous 10m pixels from an altitude of 100m.

After data processing, interpolated images of relative surface material abundance will be reconstructed using GPS positioning data to produce a variety of surface material, e.g. mineralogical, maps.

OARS consists of a downward and an upward-looking spectrometer each covering some 190 spectral channels in the visible to short-wave infra-red range, with an average spectral sampling of 10 nm. This wavelength range allows OARS to map most species of phyllosilicates, clays, sulphates, carbonates and iron oxides, such as occur in alteration zones, the regolith and host rocks. Green and dry vegetation are also mapped. A CCD camera allows monitoring of the flight path while flight attitude sensors and GPS are used for geo-location.

Data sets, which were acquired during the airborne trials in 1999, and mapping results from both geological and environmental test sites will be presented.

Key Words: OARS, Mineral Mapping, Hyperspectral, Airborne Geophysics, Optical Remote Sensing, Gamma-ray Spectrometry, Magnetism