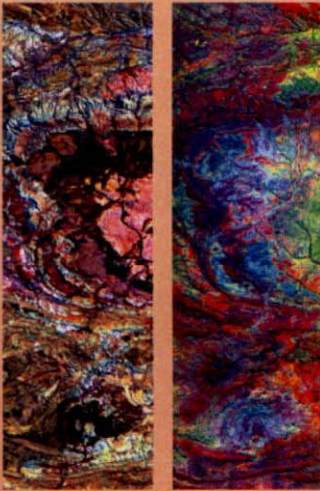


# 'Mineral Mapping — Hyperspectral Thermal IR'

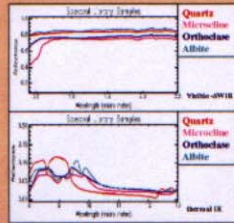
## Surface mineralogy simultaneously with airborne geophysics



Conventional Multi-spectral Remote Sensing over the Jilawarra CERBERUS test site

Left: Landsat 7,4,1, RGB color combination

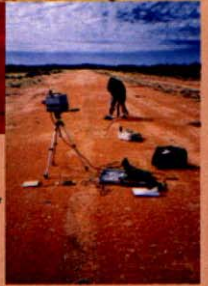
Right: TMS 5,3,1 DC stretch to enhance silica (red) and clay (purple) rich areas



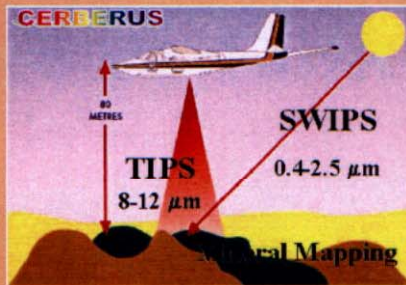
Comparison of Silicate spectral signatures in the SWIR and TIR spectral wavelength region. Clearly in the SWIR the quartz and feldspar can not be differentiated! Hence the need for the TIR to discriminate them.



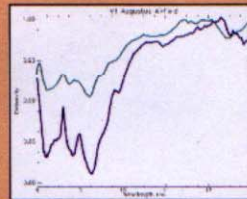
Top: research aircraft at take off  
Left: Experimental Thermal IR airborne profiling spectrometer 'TIPS' installed and ready to go



Right: Ground team taking reference measurements

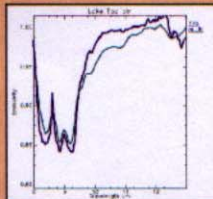


Thermal IR field spectrometer µFTIR built by Designs & Prototypes, USA

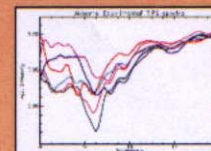


Direct comparison of Airborne (green) and Field spectrometer over +/- the same location. Note the good correlation of spectral features

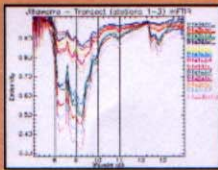
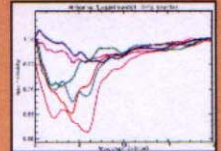
Left: Mt. Augustus airfield (near Jilawarra)



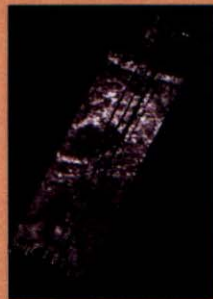
Right: Lake Toolbin - Kaolinite rich soil



Airborne single ground spectra representing a pixel size of 10 m. Different emissivity signatures indicate the additional identification potential in the thermal IR, compared to the VIS and SWIR

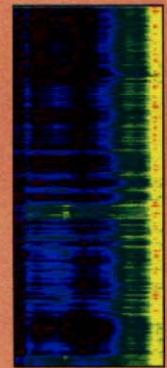
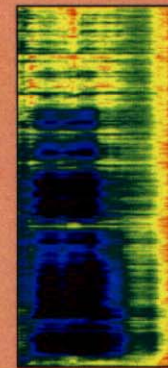


Thermal IR field spectrometer measurements covering a profile in the Jilawarra CERBERUS test site area. Note the variability in spectral signatures.



Mineral Mapping in the thermal IR

Left: Spectral ratio 8.4 micron / 11.8 micrometers Right: Thresholded ratio displayed on Landsat backdrop image



Color coded airborne TIR spectral sequences (apparent emissivity) displayed as pseudo images, range in wavelength from 8 to 12 micrometers from left to right. Dark colors indicate low app. Emissivity e.g quartz or clay spectral features. Along flight path would be from top to bottom.

- **TIPS - THERMAL INFRARED PROFILING SPECTROMETER - A NEW TYPE OF AIRBORNE OPTICAL SENSOR**
- **FULL RANGE HYPERSPECTRAL REMOTE SENSING INTEGRATED WITH AIRBORNE GEOPHYSICS - THE CERBERUS CONCEPT**
- **ADDITIONAL MINERALOGICAL INFORMATION COMPLIMENTARY TO THE VIS AND SWIR SENSORS**
- **MAPPING SILICATES: QUARTZ, FELDSPARS, GARNETS**
- **OPERATION UNDER CLOUDS POSSIBLE**
- **MINERAL MAPPING ON SINGLE SPECTRA**
- **NEW HYPERSPECTRAL PROCESSING METHODS**
- **2-DIMENSIONAL GRIDDING ON DATA PRODUCTS**