



Australia – HyspIRI Partnerships

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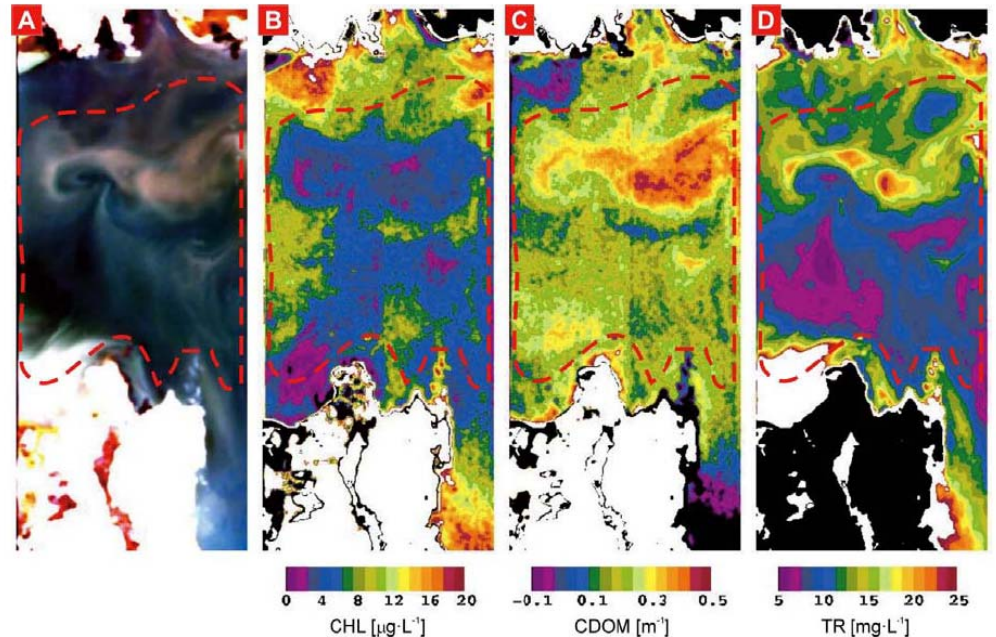
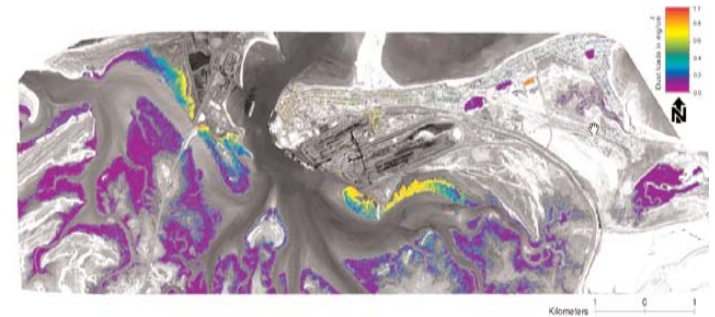
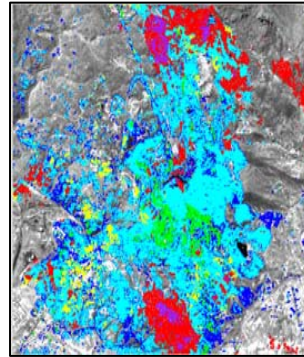
Australia and NASA HypsIRI

Our interests

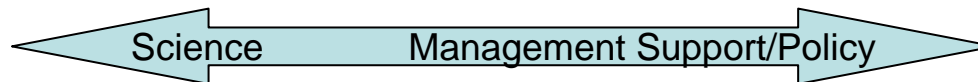
CSIRO and Australian research community have an interest in future use of wall-to-wall, systematic data acquisitions of spaceborne imaging spectroscopy (hyperspectral) data for a wide range of national priority mapping and monitoring applications, which include:

- Geological Mapping and Exploration
- Coastal water quality monitoring
- Agricultural crop and condition monitoring
- Forest degradation monitoring
- Minesite and pollution monitoring
- Fuel type and fuel load mapping

New national programs such as projects under the ASRP, plus the “Terrestrial Ecosystem Research Network - TERN” (like the US NEON) and the “Integrated Marine Observing System – IMOS” provide excellent platforms for collaborations on improving ways to characterise land-surface dynamics and coastal & marine environments over Australian terrestrial and marine areas.



Multiple Uses for Imaging Spectroscopy Missions: Australian Context



Science Questions

- VQ1 - Pattern and Spatial Distribution of Ecosystems
 - VQ2 - Ecosystem Function, Physiology and Seasonal Activity
 - VQ3 - Biogeochemical Cycles
 - VQ4 - Ecosystem Response to Disturbance
 - VQ5 - Ecosystems and Human Well-being
 - VQ6 - Surface and Shallow-Water Bottom Composition
 - TQ1 - Volcanoes and Earthquakes
 - TQ2 - Wildfires
 - TQ3 - Water Use and Availability
 - TQ4 - Human Health and Urbanization
 - TQ5 - Earth Surface Composition and Change
 - CQ1 - Coastal, Ocean, and Inland-Aquatic Environments
 - CQ2 - Wildfires
 - CQ3 - Volcanoes
 - CQ4 - Ecosystem Function and Diversity
 - CQ5 - Land Surface Composition and Change
 - CQ6 - Human Health and Urbanization
- Calibration of Multi-spectral missions
•Wall-to-wall mapping every 19 days!

HypIRI
Standard
Level 2, 3
Products

Key Government Needs

Climate Change Monitoring/Modelling:

- Derivation of Key Essential Climate Variables
- Improving Characterisation of Surface Emissivity Dynamics for new generation climate models
- Track changes in plant function and biodiversity

National Priorities

Economic Well-being: eg. Mineral Exploration
Food Security: Climate/Drought Impacts on Agriculture
Water Security: eg. Water Quality Monitoring
National Security
Etc.

Policy-relevant Issues and International Obligations & Treaty Verification:

- UN Climate Convention
- UN Desertification Convention
- UN Biodiversity Convention.

New Australian Space Research Program (\$40+m)

www.csiro.au

Commercial-in-Confidence

- Started July 2009
- Includes a Space Policy Unit
- Funding Stream A: Space Education Development Grants
- Funding Stream B: Space Science and Innovation Project Grants

Among many others in Australia, CSIRO is proposing 3 'hyperspectral' projects:

- 1. Continental-scale hyperspectral terrestrial, coastal mapping and monitoring program**
- 2. Development of a prototype thermal infrared (TIR) spectroscopy sensor**
- 3. Continental Cal/Val Program**



Australia - US Collaborations/Partnerships

What can we offer:

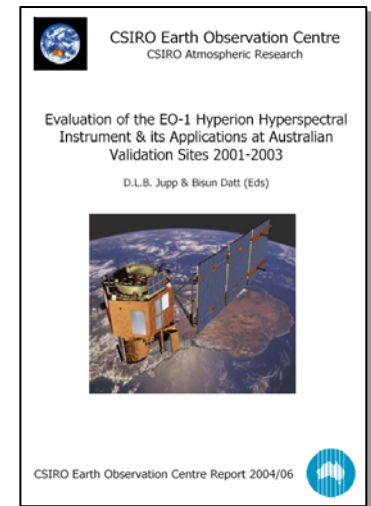
- Extensive experience in Applications Development, as demonstrated during EO-1 Science Validation Team participation, and ongoing use of Hyperion data.

- Radiometric calibration/validation: Part of large research infrastructure programs

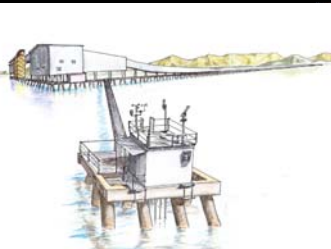
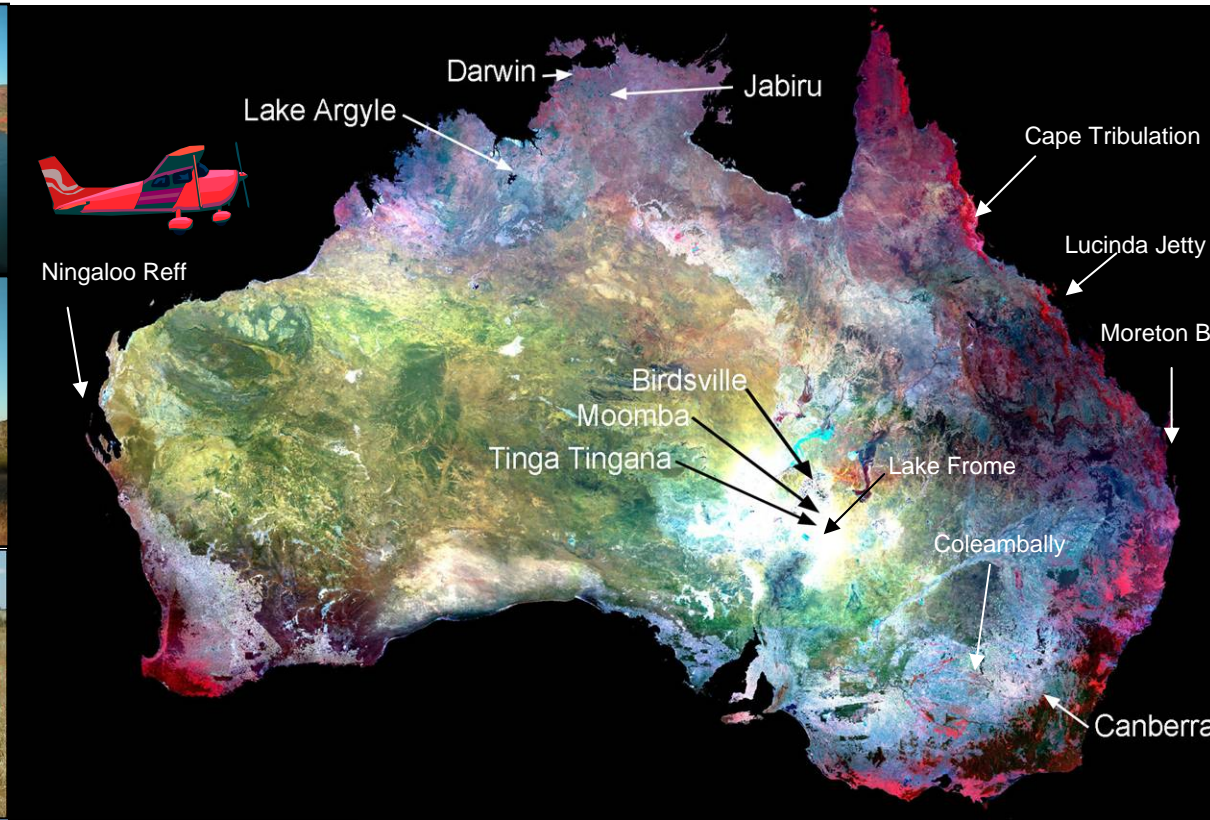
Lake Frome, Lake Fefroy, Lake Argyle

- Access to airborne data from Hymap and other imaging spectrometer data sensors

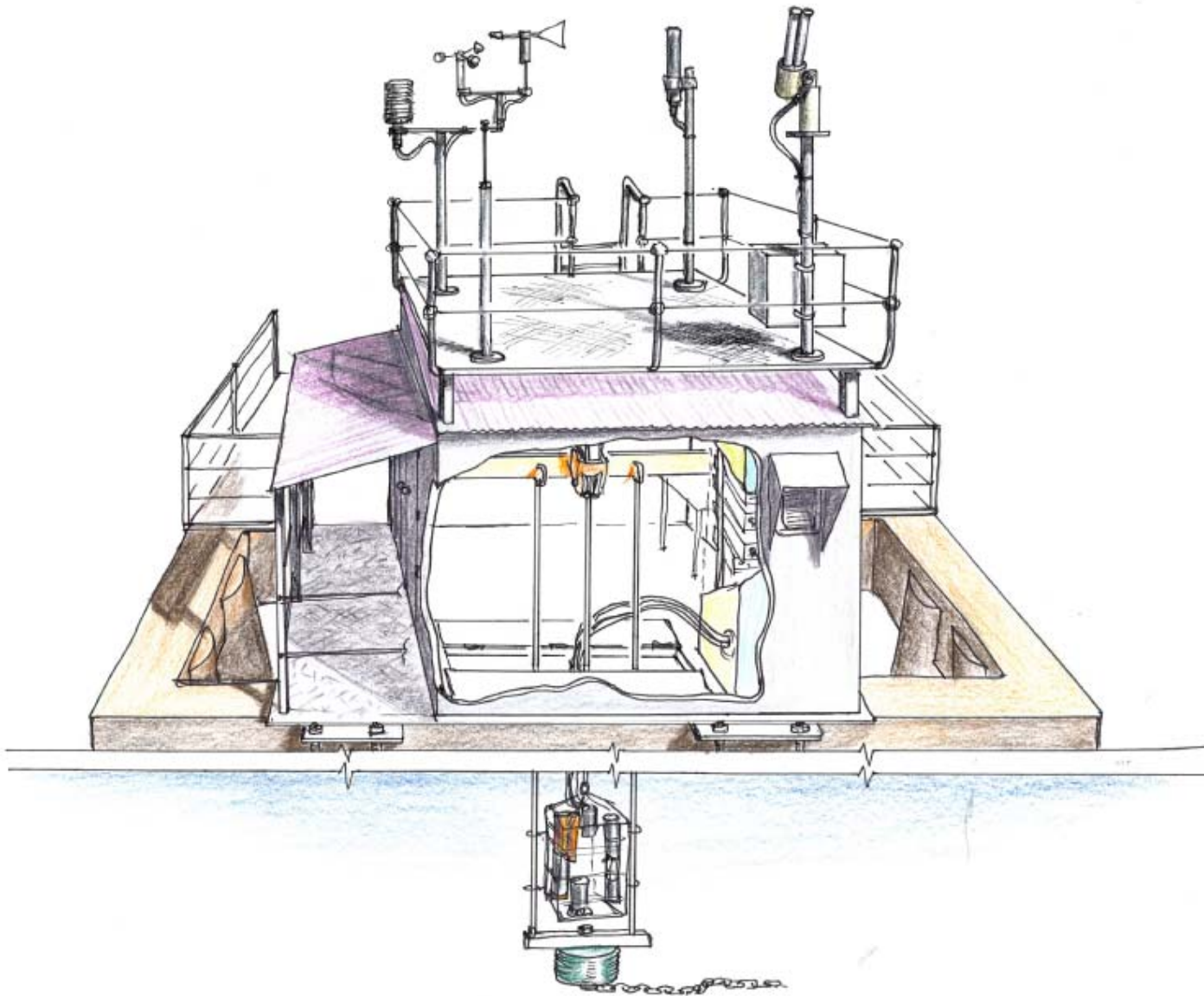
- Future direct-readout capabilities, and processing via X-, Ka-band stations (Hobart & Darwin)



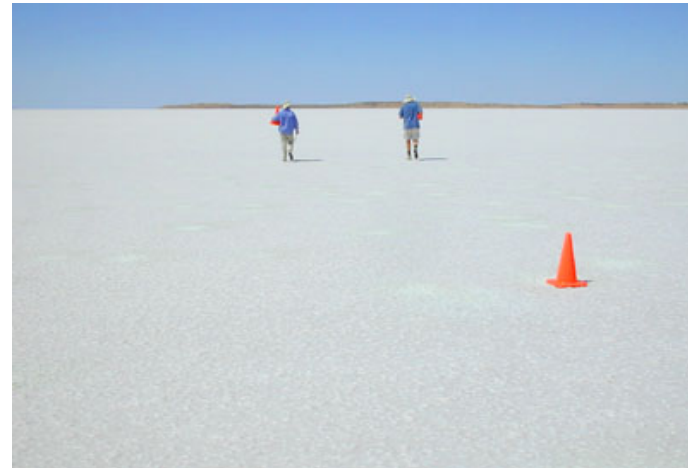
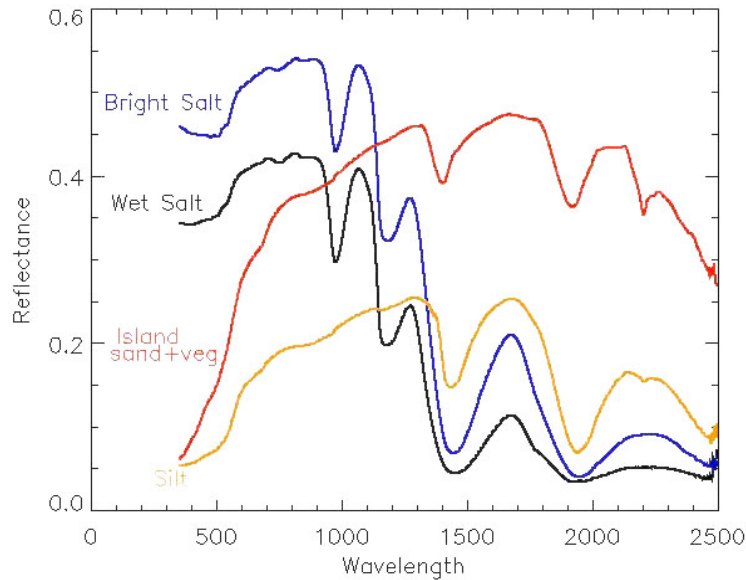
Australia hosts a large variety of sites and surface types for use in Vicarious Radiometric Calibration and for Level 2, 3 Product Validation



Sketch of LJCO facility



Establishment of Key Post-launch Spectroscopy Instrument Calibration & Validation Sites



Upgrading Satellite Reception Facilities & National Data Networks



- Upgrading current facilities in Darwin & Hobart to dual-pol X-band and Ka-band downlink
- Science program on satellite – ground lidar communications
- Interconnected national broadband to international data centres
- Mass-data processing R&D

