CSIRO Agency Report

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May 2013

Australia to chair CEOS in 2016

- Via CSIRO, Australia has recently been invited to become Chair of the Committee on Earth Observation System (CEOS (http://www.ceos.org)) for 2016

- Dr Alex Held (tentative Chair)

- Developing budget and forward plan, in close consultation with central government and associated agencies.

- Suggestions welcome from WGCV for areas or activities which could be emphasized during the 2015-2017 term.

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TCP in Earth Observation Informatics

- Transformational Capability Platform
- Recognises that EO is fundamental to Australia and that research across CSIRO and outreach needs to be better coordinated
- ~$10m annual investment in EO research in CSIRO (~$100m national investment)
- Aims to integrate capabilities and to provide a 'capability portal' for national and international engagement
- Key objectives:
  - Develop capability
  - Leverage infrastructure
  - Develop efficient networks
- Investment $1M for 2012-13, $1M+ for 2013-14, growing thereafter

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"Salt Satellites"

- ABC Catalyst programme included CSIRO's work on Satellite calibration using Lake Lefroy in Western Australia
- http://www.abc.net.au/catalyst/vodcast/default.htm

Joint TCP Workshop on Cal/Val

- March 26th 27th 2013
- Run jointly between Earth Observation Informatics and Sensors and Sensor Networks TCPs
- Brought together:
  - Latest thinking about future requirements in the remote sensing community
  - With new developments within the broader sensing community (low-power distributed sensing, robotics, miniaturisation, mobile sensing, signal processing, data management, wireless communications, etc)
- Used to set collaborative research directions for both TCPs in this area

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# Survey of Cal/Val capabilities

- Funded by Space Policy Unit via Australian Satellite Calibration Working Group

- Supporting the recommendation of the NEOS-IP 'That national EOS calibration and validation infrastructure be established'

- Will assess:
  - Current capabilities and infrastructure for Cal/Val in Australia
  - Current activities in Cal/Val
  - Perform a SWOT analysis
  - Make recommendations on the path forward for Cal/Val activities in Australia

- Completed end June 2013

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TCP supported Cal/Val project work

- Short term project will:
  - Undertake an up-to-date inventory of suitable vicarious calibration sites in Australia (geographic location physical characterisation, existing spectral characterisation, instrumentation). Evaluation as CEOS reference site.
  - Laboratory facilities for calibration of spectral instruments (calibration and maintenance, protocols, best practice guidelines), to build these into a national calibration facility for EO optical instrumentation
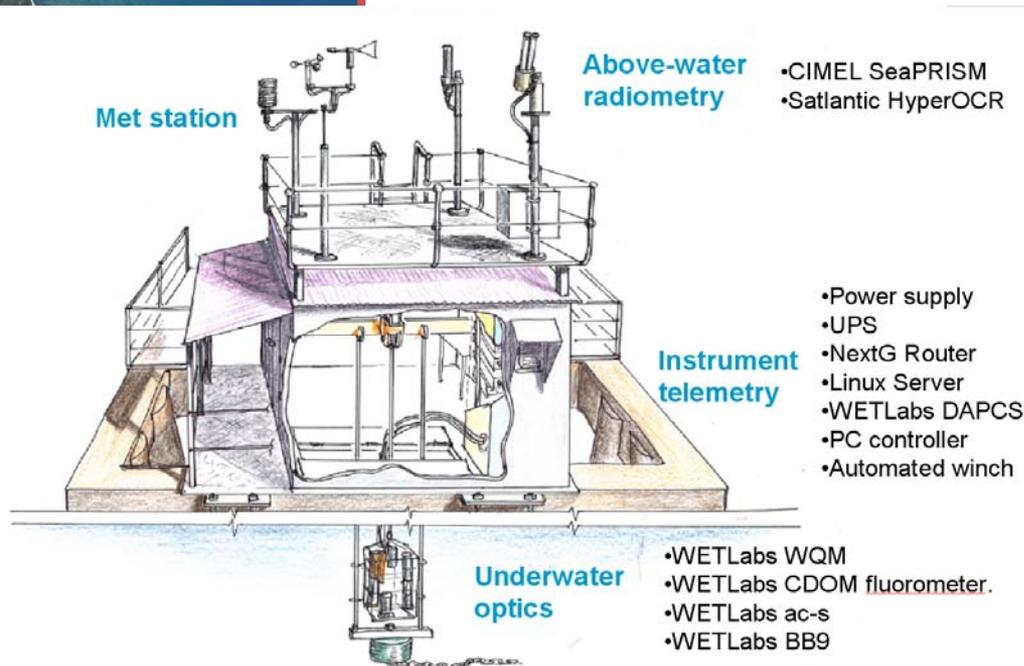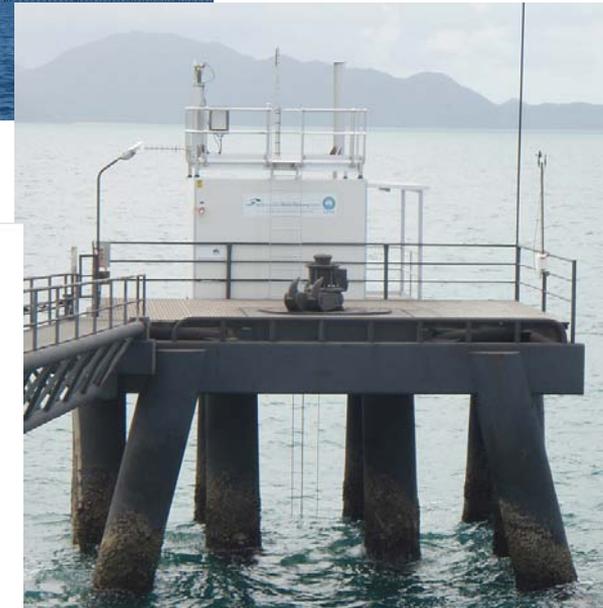
CSIRO
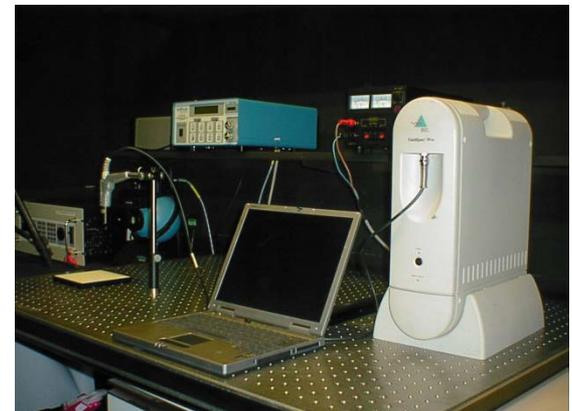
Several Terrestrial and Coastal CaL/Val Sites
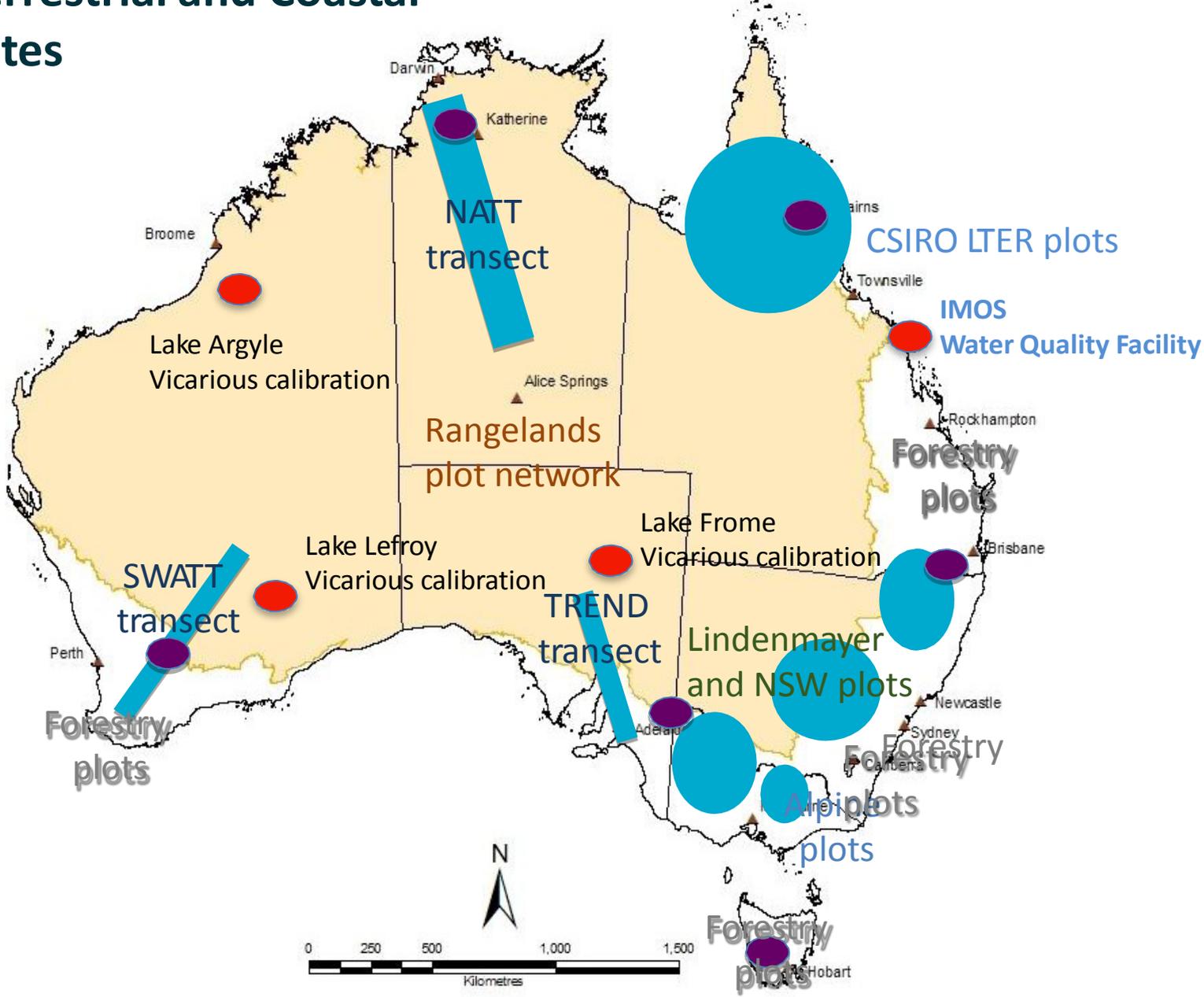
Southern hemisphere vicarious aquatic calibration and validation site LJCO

IMOS Integrated **Marine Observing** System

Lucinda Jetty Coastal Observatory (LJCO)
imos.org.au/ljco.html

Above-water radiometry
•CIMEL SeaPRISM
•Satlantic HyperOCR

Met station

Instrument telemetry
•Power supply
•UPS
•NextG Router
•Linux Server
•WETLabs DAPCS
•PC controller
•Automated winch

Underwater optics
•WETLabs WQM
•WETLabs CDOM fluorometer.
•WETLabs ac-s
•WETLabs BB9

http://aeronet.gsfc.nasa.gov/

Vicarious Calibration at Lake Lefroy

Figure 1

- Location
  - 60 km S of Kalgoorlie-Boulder and 550 km E of Perth), elevation ~350 m 31.2662° 121.716°

- Landscape
  - Salt lake (50 km X 10 km), crust comprised of predominantly sodium chloride and lesser amounts of gypsum and other salts, thickness of the salt crust is variable, from 2-3 cm (close to the lake edges) to 20-30 cm and potentially deeper (other parts)
  - Numerous smaller lake beds of clay-sand and aeolian sands dunes and mine dumps around the lake edge - could be used as spectrally differing calibration targets, could thus provide "brighter" targets for SWIR calibration

- Access
  - Kalgoorlie-Boulder ~25,000 people and has major air, rail and road links to capital cities in Australia. A bitumen road exists between Kalgoorlie-Boulder and the township of Kambalda on the northern edge of Lake Lefroy. Accommodation is available at Kambalda.
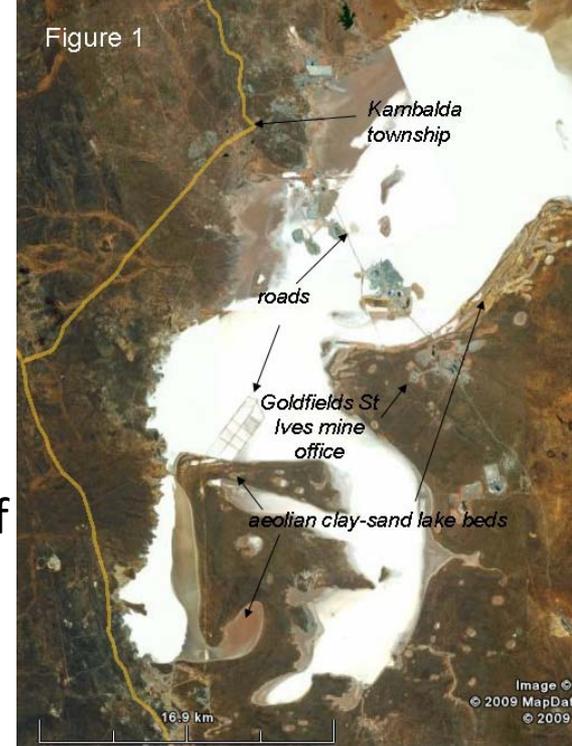
Lake Lefroy

- CIMEL permanently co-located
  - Beta Island (31^0 15' 18.54" S and 121^0 42' 19.2096" E), fenced off together with other existing St Ives instrumentation (weather station);
  - Part of AERONET network
- Main spectrometer
  - ASD Field Spec 3
  - Measurement of invariant target at set intervals (CSIRO, GFZ);
  - Constant measurement of invariant targets along transects (AIST);
- Other field instruments
  - Microtops
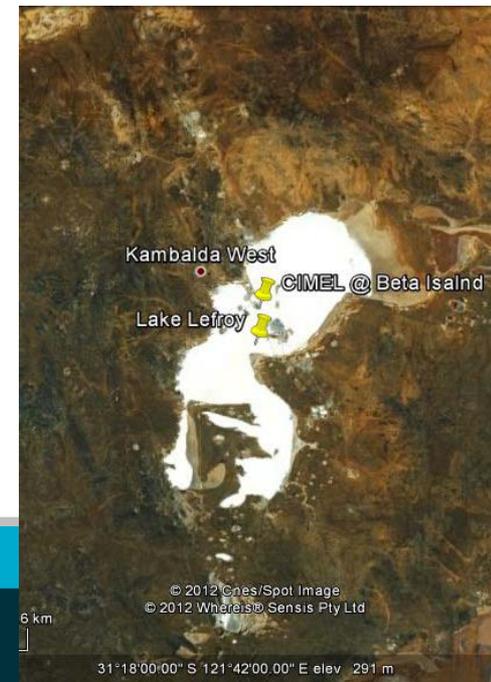
New Vicarious Calibration and Validation Investments by CSIRO:

Across VIS_NIR_SWIR_MIR_TIR and passive and active microwave:

- Miniaturisation: fast and cheap (UAV deployment!)
- Robotics: terrestrial and marine
- Sensor and sensor networks sophistication
- Laboratory: absolute calibration of field sensors.

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