Structure

- Activities
- Risk to CSIRO’s cal-val facilities
- Vicarious calibration – Pinnacles site update
- Highlights
  - CosmOz – Soil moisture network
  - Lucinda Jetty Coastal Observatory
• Current CEOS Chair, CEOS Plenary, Brisbane, early November
  • Leading non-met applications of GEO
• ASCWG
  • Will meet in second week of October:
• Discussion paper:
    o 10 calibration facilities;
    o Activities range from optical, SAR, satellite altimetry
• ISIS TC activity in cal-val (UK and China)
CSIRO sponsored cal-val facilities

- Optical Cal/val
- CosMoz Sensor Network
- Satellite Altimetry Calibration and Validation
- AeroSpan
- Lucinda Jetty Coastal Observatory
- DALEC radiometer on RV Solander
- Calibration laboratories
- Geometric Cal/Val
Threat to CSIRO cal/val facilities

- FSP in Earth Observation Informatics - funded until December 2016
- After this, pan-CSIRO EO activity funded:
  - Will continue some of the existing EOI FSP functions particularly around domestic and international coordination
- Letters of support from CEOS WGCV / NASA and Australian EO community through the AEOCCG
- Has partially kept key calibration facilities and activities going, but future support of these facilities is currently uncertain
- Most facilities still ‘at risk’
Second vicarious cal-val site
Australia

- To build a vicarious calibration site(s) specifically for imaging spectroscopy missions.
- To meet current CEOS endorsed vicarious calibration sites
- Serve multiple purposes for optical sensors beyond just imaging spectroscopy
- Underpinned by NIST traceable calibration facilities
- Field campaign for site characterisation, sample collection, field spectral measurements, trial new instruments
- Potential for automated acquisition of VNIR-SWIR spectral measurements
Cal site – The Pinnacles, WA

- ~ 250 km N of Perth, sealed roads all the way from Perth
- All forms of communication

Permissions
- Department of Parks and Wildlife

Working Group on Calibration and Validation
Progress

- Awaiting planning approvals to site a structure and equipment from Department of Parks and Wildlife

- Current plan is to deploy:
  - Cimel system similar to ESA RadCalNet site in Namibia
  - Met station
  - Cosmos sensor

- Yet to undertake:
  - Complete site characterisation - lab and RS data analysis
  - Design of structure for the radiometer
  - Radiometer for full spectral measurement
Future Satellite Altimetry

JASON-3

SENTINEL-3A

SENTINEL-3B

~ 2 km to the coast

~ 20 km to the coast

2017

100 km

Altimetry site, Bass Strait
Cosmoz

- [http://cosmoz.csiro.au/](http://cosmoz.csiro.au/)

- Satellite link
- Rain gauge
- Solar panel
- Data logger
- Neutron tube
- Pressure, temperature, humidity sensors
- Small concrete pad

Footprint: 600m (40ha)
IMOS validation support at LJCO ongoing 2016-17

Continuous above and in-water optical measurements

Fortnightly water quality sampling
Above-water measurements

**Satlantic**
Spectral irradiance

**Webcams**
Sky and Sea

**Weather Station**
Temperature
Pressure
Humidity
Dew point
Wind speed etc

**SeaPRISM** (7 wavelengths)
Water-leaving radiance
Aerosol optical thickness
Aerosol absorption
Aerosol size distribution
Refractive index
Single scattering albedo
Phase function
Water vapor
Spectral flux
Radiative forcing
In-water optical measurements

- WetStar fluorometer
  - CDOM absorption
  - Chlorophyll-a
  - Uranine
  - Phycoeryhrin

- ACs (80 wavelengths)
  - Total absorption
  - Total attenuation

- DAPCS
  - Network enabled real-time data logger

- ACs switching unit
  - (filtered/unfiltered)

- BB9 (9 wavelengths)
  - Back-scattering

- Automatic winch controller
  - keeps cage at a constant depth

- WQM
  - Temperature
  - Salinity
  - Depth
  - Dissolved oxygen
  - Turbidity
  - Back scattering
  - Chlorophyll fluorescence

Fortnightly servicing and water sampling
Level 2 validation
Focus on radiometric measurements
Lucinda Jetty, Ship borne

Hyperspectral measurements (DALEC) added to Lucinda in May
Funding secured to continue radiometric measurement under IMOS until June 2017
Anticipated +5 years until 2022
Level 2 validation
Focus on radiometric measurements
Lucinda Jetty, Ship borne

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Radiometric Inter-comparison started ...
Dedicated Task Team – incl. lab calibrations and community owned instruments

(Analysis Jenny Lovell)
Continuous ship-borne above-water radiometry QA/QC-ed since 2011 and higher level processing completed (Analysis J. Lovell)

IMOS QC-Summit 7 March 2016, Hobart
DALEC - Continuous above-water radiometry
Satellite match-ups MODIS and VIIRS 24 May 2015 - Beagle Gulf

(Analysis J. Lovell)
IMOS QC-Summit 7 March 2016, Hobart

Working Group on Calibration and Validation
DALEC - Continuous above-water radiometry
Satellite match-ups MODIS and VIIRS 24 May 2015 – Beagle Gulf

The Potential of Autonomous Ship-Borne Hyperspectral Radiometers for the Validation of Ocean Color Radiometry Data

Vittorio E. Brando 1,2,3,*, Jenny L. Lovell 1, Edward A. King 1, David Boadle 4, Roger Scott 1 and Thomas Schroeder 1

(Article)

(Analysis J. Lovell)
IMOS QC-Summit 7 March 2016, Hobart

Working Group on Calibration and Validation
All optical measurements online at:

Planned intercomparison expts

- Laboratory
- Relative
- Field at Lucinda Jetty
Thank you
IMOS activities

- Lucinda Jetty Coastal Observatory – Southern hemisphere vicarious aquatic cal-val site – now fully re-instated
- Ship mounted DALEC radiometers

Dalec v MODIS comparison

Wide FOV sensor

5° FOV sensor
Australian aerosol climatology

- Ross Mitchell, Susan Campbell – CSIRO
- Bruce Forgan – Bureau of Meteorology

Bureau stations:
Aligned with WMO/GAW

CSIRO Stations:
AeroSpan-federated with NASA ‘s AERONET

WMO/GAW: World Meteorological Organisation / Global Atmospheric Watch
AeroSpan: Aerosol characterisation via Sun Photometry: Australian Network
AERONET: Aerosol Robotic Network (NASA/GSFC)
Linking high-frequent satellite obs with continuous in and above water measurements at the IMOS Lucinda Jetty