RADCALNET
Radiometric Calibration Network

using Automated instruments

Project Lead: Marc Bouvet ESA

Partners:

IVOS

Who is involved in establishing RADCALNET?

The RADCALNET WG has started:

- ✓ Meeting #1: 13-14 Jan 2014 at ESTEC
- ✓ Round of telecon: end March 2014
- ✓ Meeting #2: 2 June 2014 at Pasadena

Duration: 2 years

RADCALNET WG members:

- AOE (China) (C. Li, L. Ma, L. Tang)
- CNES (P. Henry, A. Meygret)
- ESA (M. Bouvet, P. Goryl)
- NASA (K. Thome) and University of Arizona (J. Czapla-Myers)
- NPL (N. Fox, E. Woolliams)

Why RADCALNET (formerly Landnet) ?

Originally GIANTS (Teillet et al 2001)

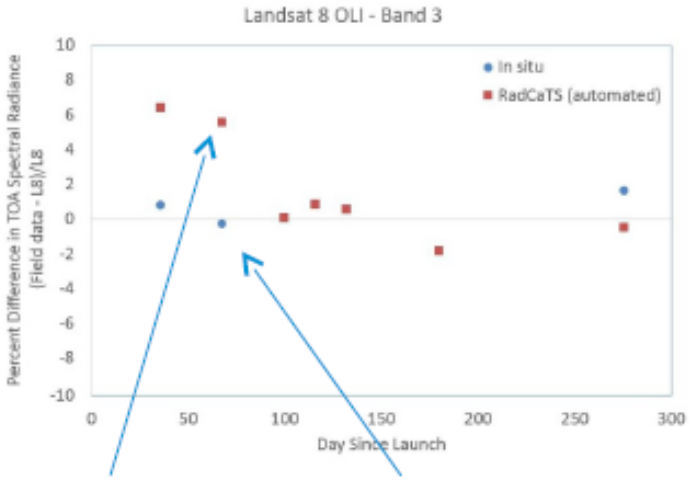
Why a new network of instrumented sites dedicated to the radiometric calibration of EO optical sensors?

- To collect surface and atmospheric data necessary for the simulation of observations by EO optical sensors and thus verify their radiometric calibration
- To increase the number of matchups between in-situ measurements and space sensor observations and reduce the overall uncertainties (and reduce the efforts of individual agencies)
- To ensure traceability of the space sensor radiometry to the "Système International" (SI)
- To support the establishment of the Global Earth Observation System of Systems by providing measurements to verify the radiometric consistency between EO space sensors

RADCALNET WG objectives:

- Define the detailed architecture of RADCALNET
- Demonstrate RADCALNET operational concept with the currently available infrastructure and resources
- Provide recommendations to CEOS/WGCV/IVOS and CEOS/WGCV for evolution of RADCALNET towards an operational network

Landsat 8 OLI results from RRV Playa for first 6 months



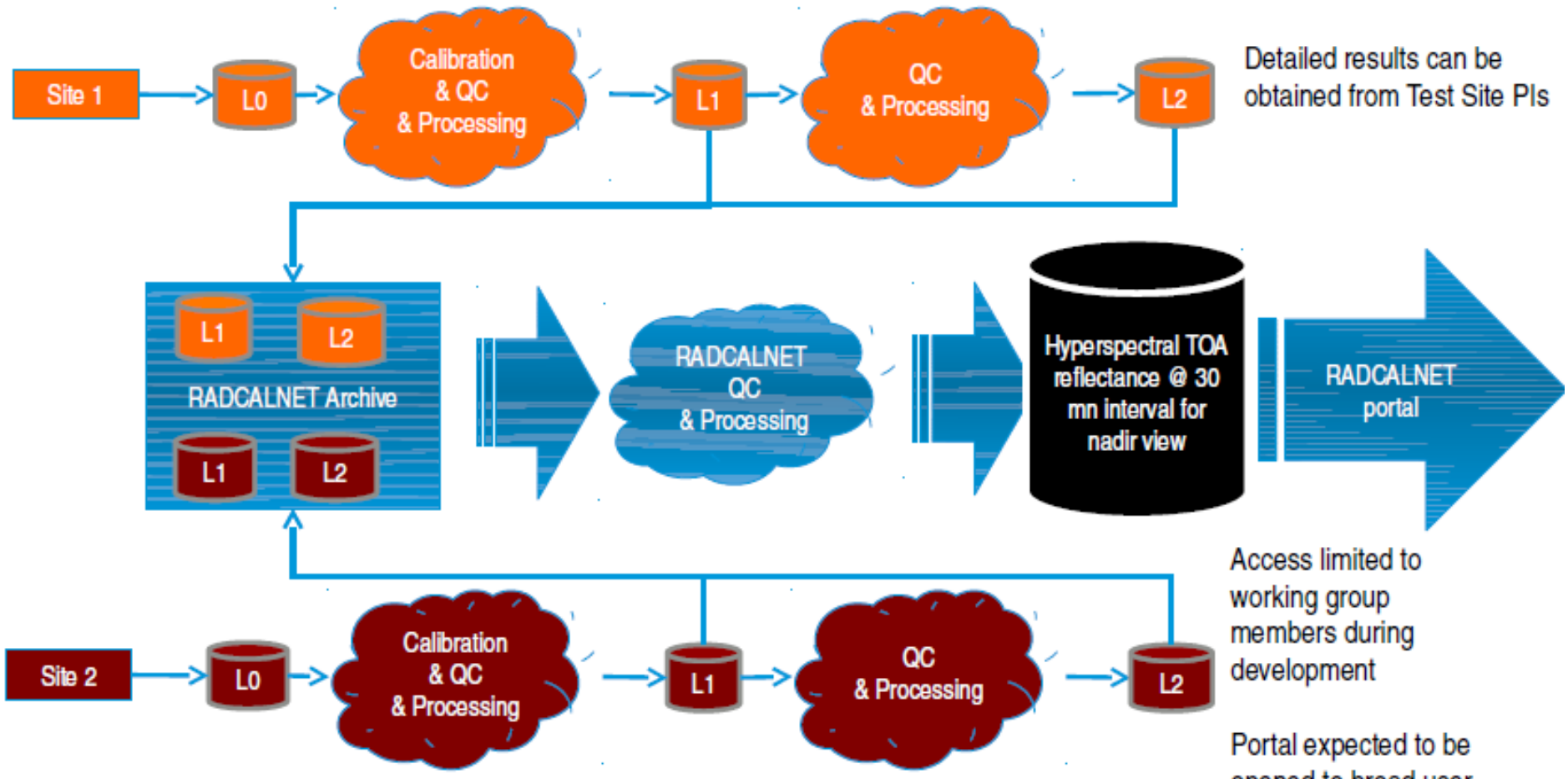
Automated and on-site personnel

Illustrates additional data from automated collections, need for more data, and lessons learned regarding instrument requirements

IVOS

NPL

The shared vision of RADCALNET

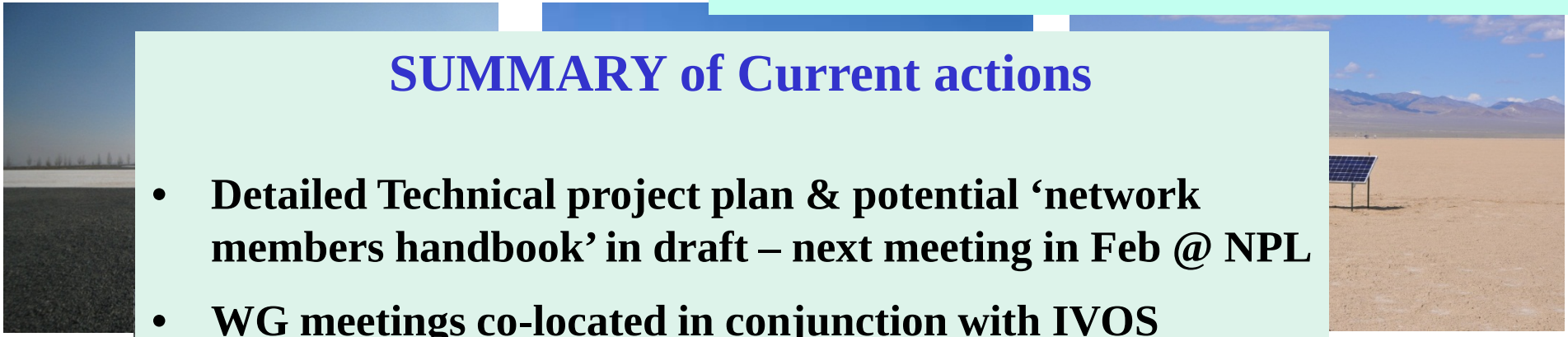


L0: raw instrument data
L1: instrument data in physical unit
L2: surface or atmosphere parameters retrieved from L1

RADCALNET building blocks: 2 yr pilot project

- **Initially 3 instrumented sites will provide data to RADCALNET:**
  - ✓**Baotou (China)**
  - ✓**La Crau (France)**
  - ✓**Railroad Valley Playa (US)**
  - \+ **New ESA/CNES site to be sel**
    - **Global search based on me**

'Service' tested with Landsat 8, Spot 5, Proba V, DMCii, + others TBC also ready for Sent 2
- **include comparisons of methods to**
  - **link in-situ to satellite**
  - **satellite to satellite**
  - **Network to satellite**



SUMMARY of Current actions

- **Detailed Technical project plan & potential 'network members handbook' in draft – next meeting in Feb @ NPL**
- **WG meetings co-located in conjunction with IVOS**
- **During 2 yr pilot phase outputs contained to project team**
- **If pilot successful look towards an 'operational system' in future – more sensors, more sites!**

- **NPL to provide Traceability to site measurements, facilitate harmonisation, uncertainty analysis of network results i.e. QA4EO**

Study to find and establish new ‘European Site’ as contribution to RADCALNET

Partnership project of ESA & CNES

Study team: NPL & Magellium

IVOS

Context of the study

- Test site identification
  1. A study has previously been funded by CNES to develop and implement methods to allow the selection of the test site based on the analysis of objective criteria (Requirements) to characterise the surface and atmosphere.

     This initial study was made without any contraints of site accessibility, security etc

  2. Metrics associated to each criterion have been defined to assess the temporal and spatial properties of the site

  3. Datasets has been found to assess the criteria.

  4. A prioritisation/Hierarchy of the criteria has been developed to select sites

Context of the activity

- **Site identification is performed at global scale**
  - According to Teillet et al. (2007) criteria

Requirement number	Description	Importance
Req.1	The **cloud coverage** should be minimal	High
Req.2	The site has to be **spatially homogeneous** inside the field of view of the instrument (1 ha) and around on a 1 km² scale.	High
Req.3	The **adjacency effects** have to be low.	High
Req.4	The **seasonal effects** have to be limited (seasonal stability of the spatial homogeneity).	High
Req.5	The **atmospheric turbidity** has to be low (knowing that the atmospheric transmission will be measured by the instrument from the Visible part of the solar spectrum to the SWIR part of the solar spectrum)	Moderate
Req.6	The **water vapor content** has to be low.	Moderate
Req.7	The **directional effects** have to be limited.	Moderate Characterization is not a priority since it will be measured by the sun photometer
Req.8	The **site surface reflectance** has to be lowly dependent on the wavelength. The site should appear grey.	Moderate Characterization is not a priority since it will be measured by the sun photometer.
Req. 9	The site has to be **flat**	Moderate
Req. 10	High **altitude** sites should be favoured	Moderate

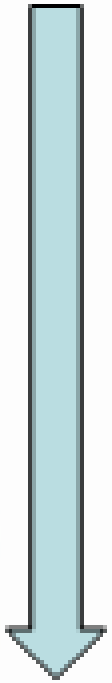
Illustration of the approach

- Analysis organisation
  - Step 1 : Global scale studies

    Aim to identify potential regions
  - Step 2 : Regional scale studies

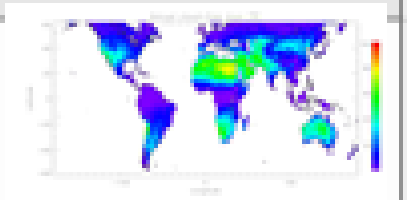
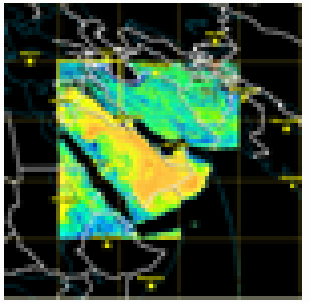
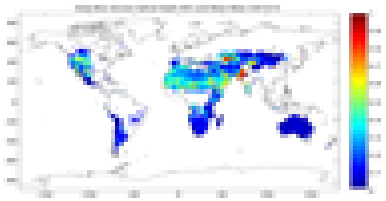
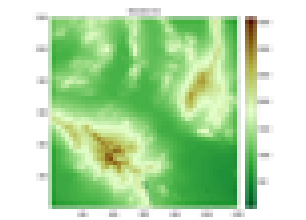
    Aim to provide a list of potential sites
  - Step 3 : Local scale studies

    Aim to decrease the list of potential sites to 5
  - Step 4 : Insitu characterisation



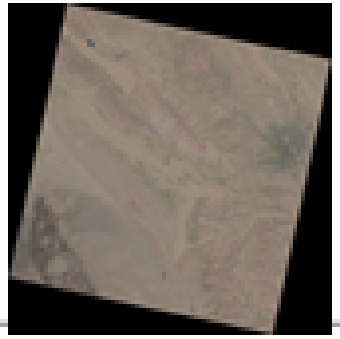
Global scale studies

- Global scale studies are performed to identify the areas of the world/countries that seem favorable for a finer characterization.

Level	Characterization	dataset	Resolution	
Global	Clouds	ECMWF Total Cloud Coverage	0.25°X0.25°	
Global	Spatial homogeneity at Low Resolution Adjacency effect limitation	MODIS Albedo (MCD43A3)	500m	
Global	Aerosol	MODIS AOT_{550nm} (MYD08_D3)	1° x 1°	
Global	Elevation/Flatness	SRTM	90m	

Regional scale study

- The regional analysis carried out among the potential candidates based on results of the analysis of the spatial homogeneity and accessibility.

Level	Characterization	dataset	Resolution	
Regional	Spatial homogeneity at high Resolution	Landsat 8 OLI	30m	
Regional	Accessibility, contact in the country			

Current status

- **Nearing final selection (weeks timescale)**
- **Established a number of sites (varying level of adequacy) across globe priority locations:**
  - **Australia**
  - **Morocco**
  - **Saudi Arabia**
  - **Namibia**
  - **Chile**

- **Established and had discussions with local contacts**
- **Probable Favourite for European site at present – Chile**
- **Encourage establishment of other future RADCALNET sites by local teams, with guidance from Radcalnet WG.**