

NPL



Towards an “operational” network of instrumented test-sites: LANDNET (Radiometric Gain)

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Requirement: Post-launch Cal/Val, interoperability, bias evaluation, “data-gaps”



- Large number of potential sites
 - Need ground data from some
 - Effort to collect significant and expensive
 - Number of acquisitions from sensors limited
 - Use for Interoperability
 - Need to reduce uncertainty improve traceability

- CEOS decision to establish a “sub-set” of sites to serve focus for community efforts - (range of characteristics)
 - Incorporate into all acquisition programs
 - Enable coordination and interoperability measures
 - Raise profile and status to facilitate investment
 - For radiometric gain want (~5 to 10)
 - Minimum criteria – regularly instrumented (ideally automated) + basics (uniformity, brightness etc)

- CEOS endorsed test-sites
 - Need to be characterised/monitored in “consistent traceable manner and data accessible & available
 - Maintained
 - Used consistently
 - Ideally treated as an ensemble or network for all.

The image shows two screenshots of web portals related to satellite calibration and validation. The top screenshot is the 'USGS Test Site Catalog' for the 'The USGS Remote Sensing Technologies Project'. It features a world map and a 'Catalog of World-wide Test Sites for Sensor Characterization'. The bottom screenshot is the 'CEOS Cal/Val Portal', which displays a table of 'LANDMET SITES (CEOS Reference Sites)' with columns for Site Name, Location, and Contact Information. The table lists sites such as Algeria 1-5, Australia, Bahrain, China, and Egypt 1. Below the table is a map of the world with markers indicating the locations of these sites.

Towards A Network of Reference Standard Sites for Post-Launch Calibration

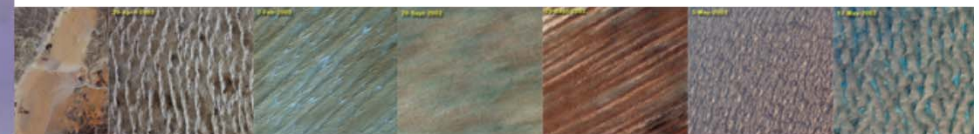
- Establish a global instrumented and automated network of test sites (GIANTS) (Teillet et al., 2001).
- Support a small number of well-characterised benchmark test sites and data sets.
- Standardize a core set of surface sensors, measurements and protocols.
- Process all data sets identically at a central 'secretariat'.
- Supplement other calibration approaches, reduce the effort required, and provide consistency.

Feb 2008 (Phoenix) IVOS identified

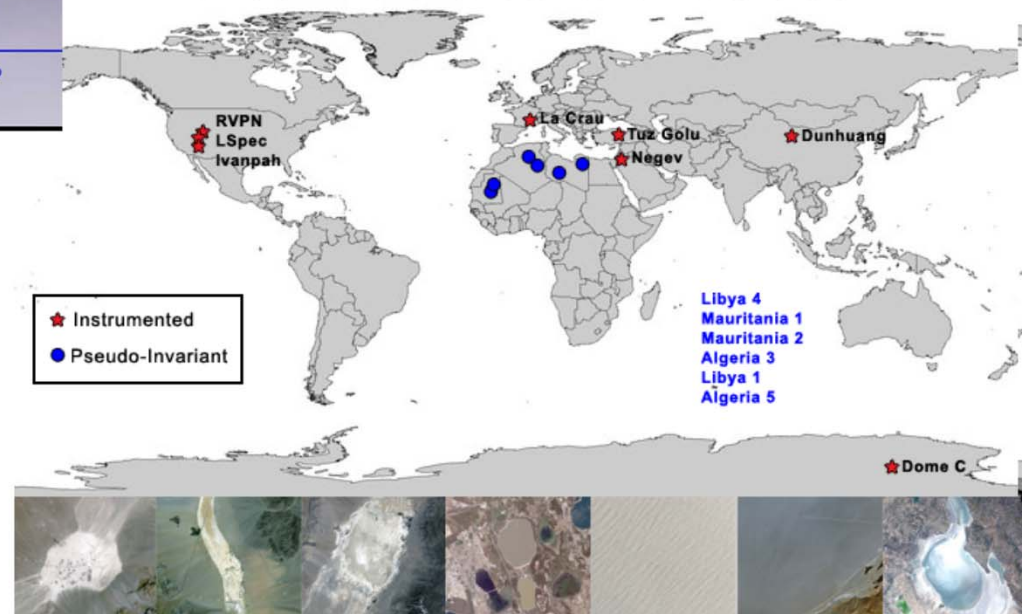
8 Reference standard sites

(3 automated)

5 pseudo invariant sites + Moon



CEOS Reference Standard Tests Sites



Initiated:

site descriptor template

guide to characterisation

comparison to look at traceability
and variance of methodologies

CEOS WGCV:IVOS “instrumented sites” (LandNet)

Reference stds for radiometric gain (land imagers) Ideally Need Ten!

- Standardised procedures to aid characterisation (and for new sites)
- Comparisons of “field measurement” techniques to ensure consistency



A QUALITY ASSURANCE
FRAMEWORK FOR
EARTH OBSERVATION

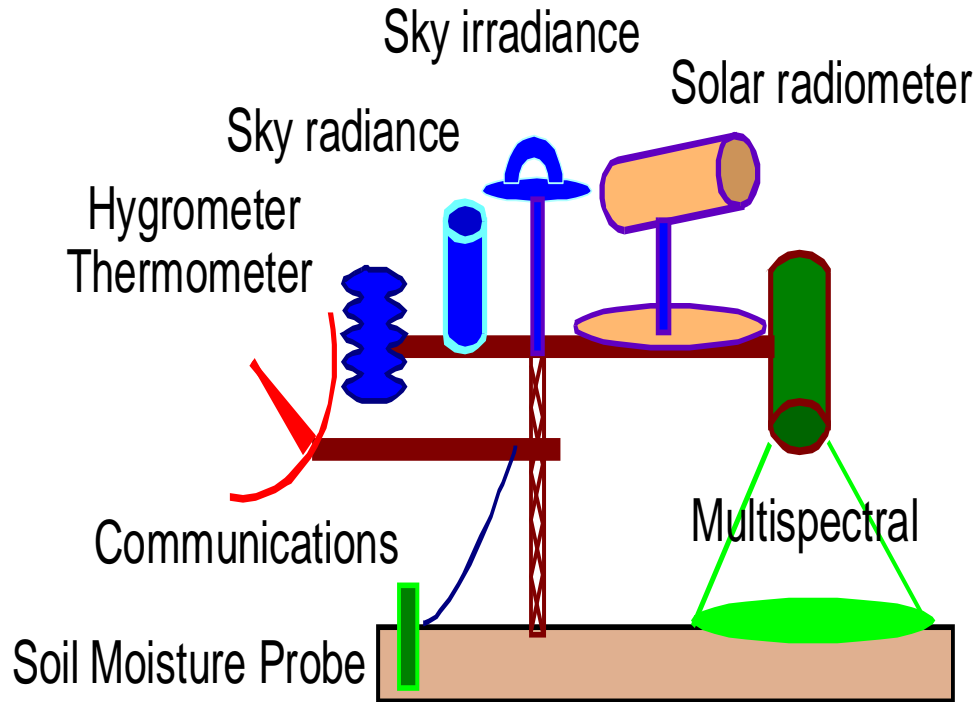




IVOS 24 (Thome) LANDNET:



CEOS autonomous network of 5 (minimum) instrumented (traceable) test-sites



Set up costs ~ \$80k – 500 k

- systems exist others low cost options under development

Need annual long term maintenance ~ 0.5 person year 20+ years

Central coordinating facility
- QA / Data collation /processing
...

Regular traceability and comparisons (appropriate facilities and reference standards)

Minimal specification of equipment on site:

- Master and nodes (1 per ~500 m²)
- May not always need atmosphere measurements
- ~ Min 10 channels

K Thome NASA



CEOS calibration network

Individual sites ideally with



- Documented similar (or better) characterisation methods
- Core set of instruments
- Common data formats
- Autonomous automation

Instrumented Sites Radiometric Gain

+ SADE (CNES)
+ Dimitri / USGS

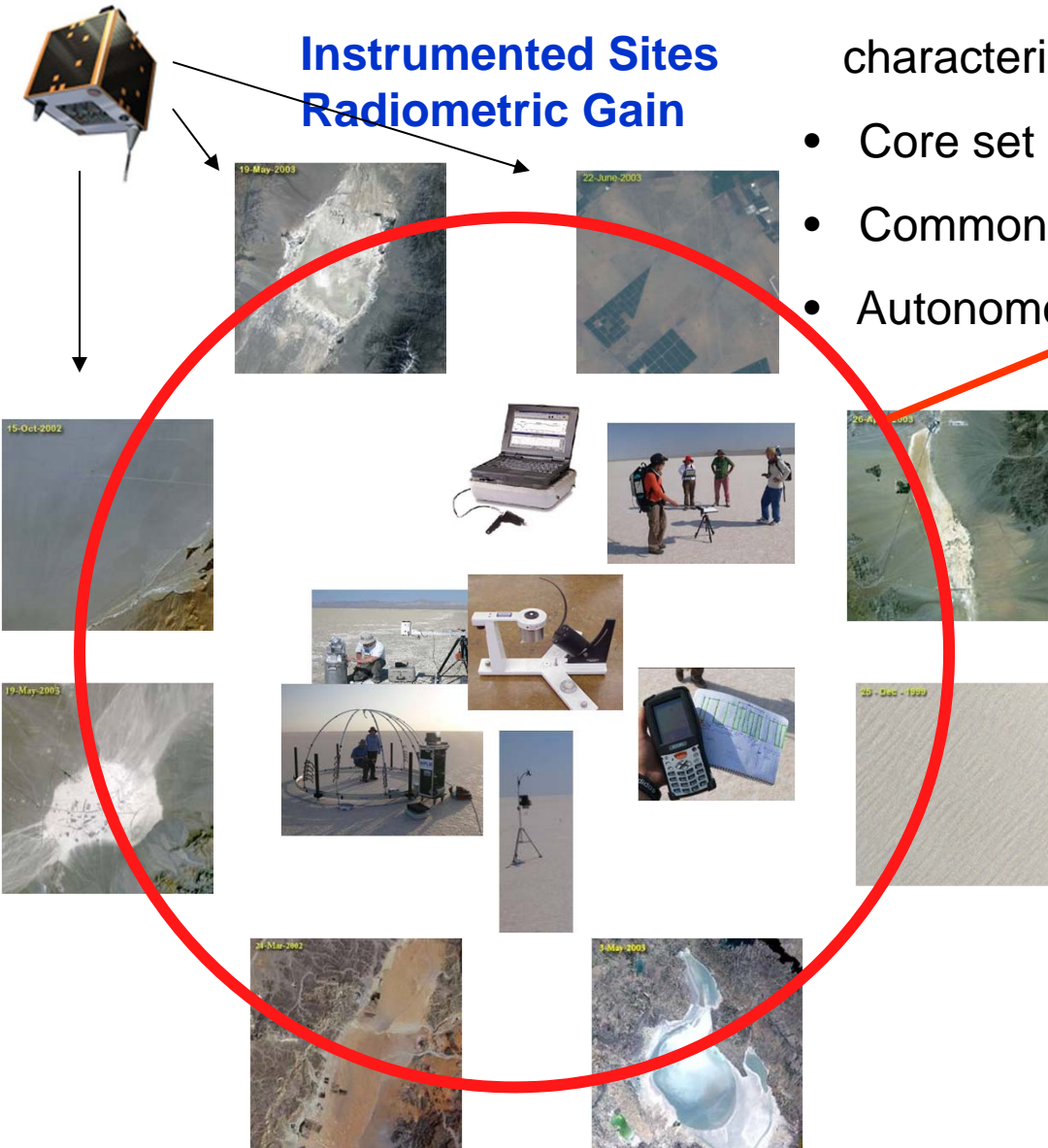
Linked by Network of sites satellites

- ground data to portal
- satellites can identify issues
- ensemble of data from multiple sites reduce uncertainty
- need open data policy
- sites need to be funded for consistency

Pseudo-Invariant Sites

Long term funded

Stability Monitoring



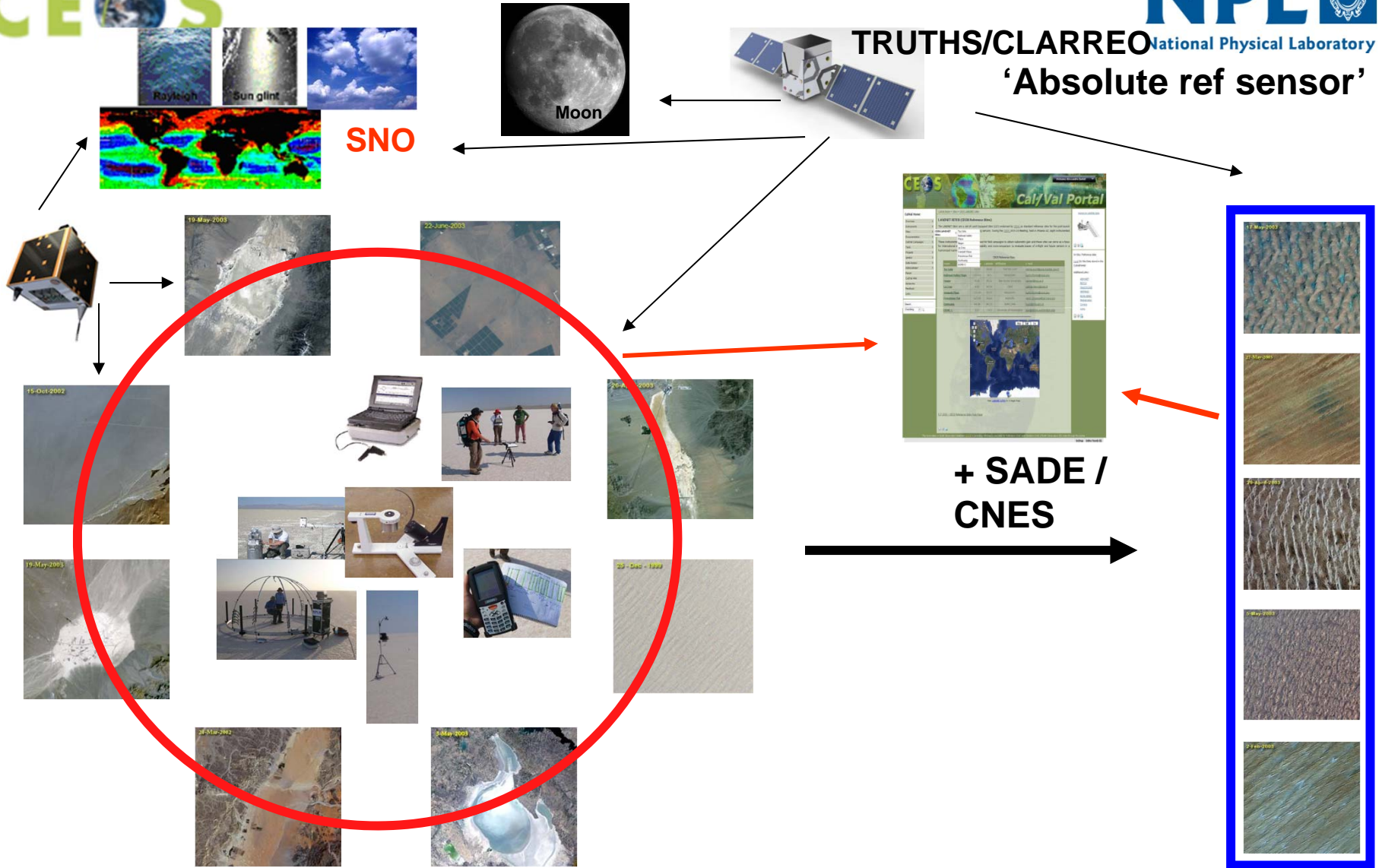
Optimum operational cal infrastructure

CEOS

NPL

National Physical Laboratory

TRUTHS/CLARREO
'Absolute ref sensor'



Instrumented Sites
Radiometric Gain

Pseudo-Invariant Sites
Long term trends
Stability Monitoring



Next steps:



- Establish agreed procedure for use of test sites
- Best practise for atmospheric correction
- Core instrumentation / automation (refine specification)
- Detailed site selection criteria per application (sensor resn
(facilitate new sites))
- Test-sites in regular Satellite acquisition programmes
- Collect satellite data sets (SADE)
- Data policy
- Long-term funding
- Data base for ground data
- Prototype network (2/3 sites)
- Establish a 'coordinating organisation'