



WGCV Chair report to IVOS

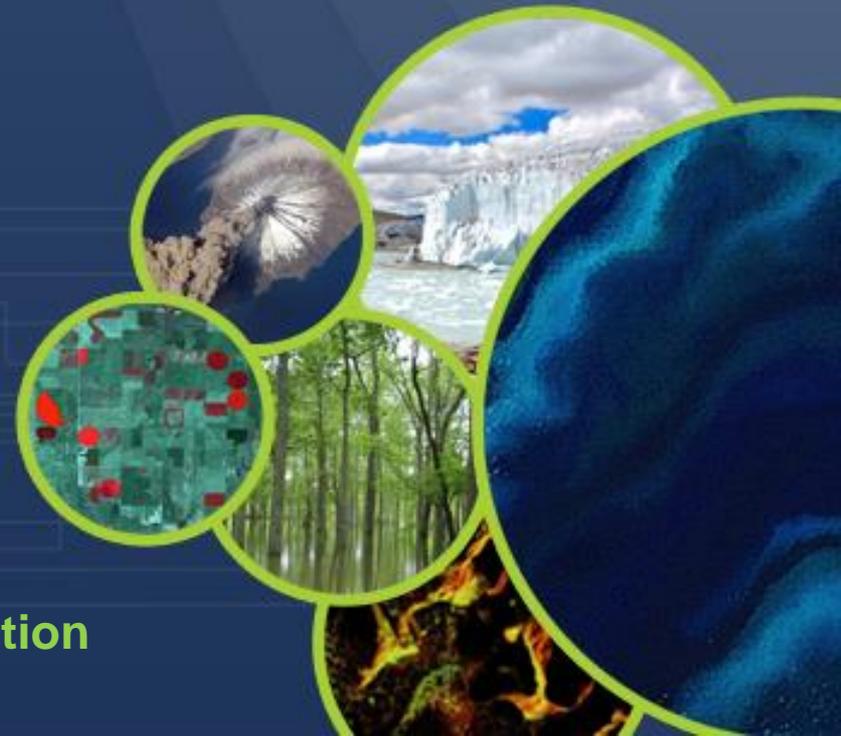
K. Thome

NASA/GSFC

IVOS Meeting

Noordwijk, Netherlands

March 26-29, 2018

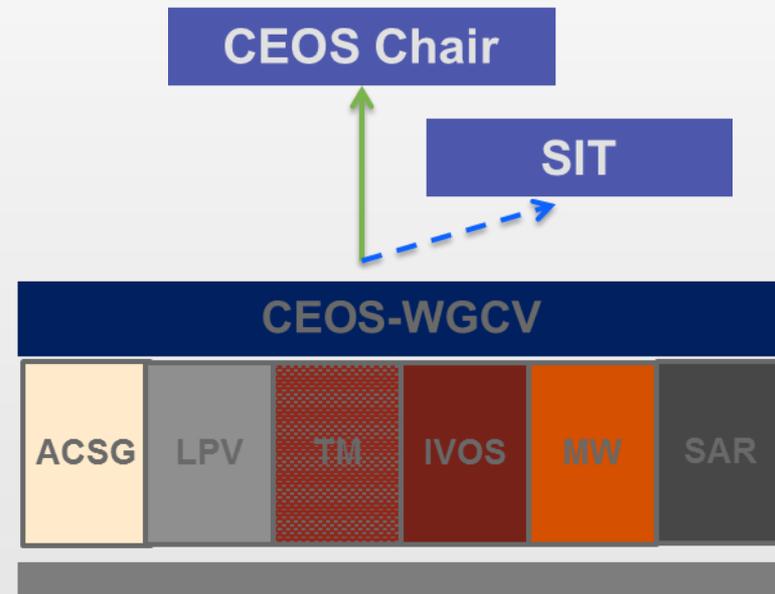
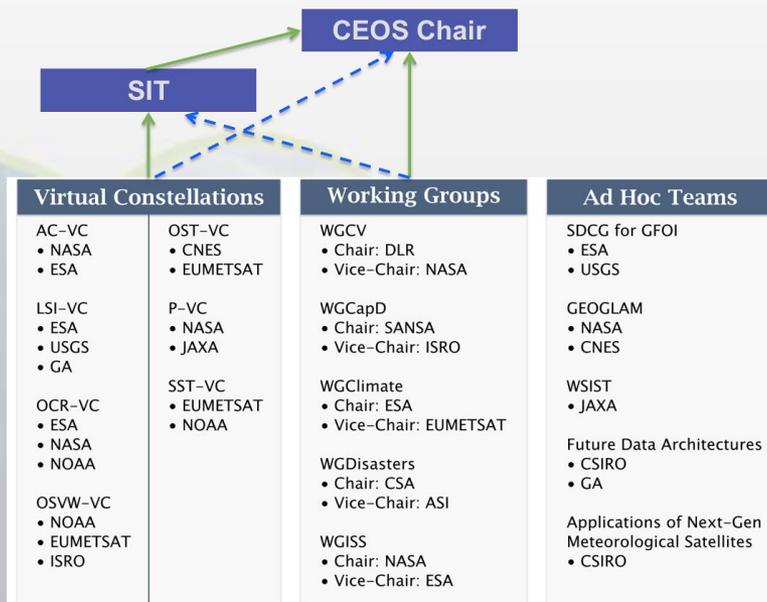


Working Group on Calibration and Validation



IVOS is one of six subgroups that are part of WGCV that reports to the Strategic Implementation Team and CEOS Chair

- Interaction with other CEOS bodies (Virtual Constellations, WGs)
- Interaction with other bodies (example: GSICS)
- Topics which are relevant for several subgroups
- General topics (for example: validation metrics, protocols,...)





WGCV-related meetings for past 12 months

- LSI-VC and MRI Framework
March 20-22, Frascati
- WGISS April 3-7, Annapolis,
Maryland USA
- ACIX task team April 11-12 in
Frascati
- CEOS SIT April 24-26 in Paris
- WGCV-42 May 16-19 in Sioux
Falls, South Dakota USA
- CEOS SIT in Frascati, Sept. 11-14
- CEOS Plenary in Rapid City,
South Dakota October 17-20
- LPVE and LPV meetings in
Frascati Feb. 27 – Mar. 1





- Key activities from 2017
 - CEOS Work Plan Deliverables
 - Highlighted with discussions related to ACIX, RADCALNET, Carbon, WGCV subgroups
 - Interactions with other entities
- Meetings / Workshops
- Conclusion

WGCV-42 meeting hosted by
USGS in Sioux Falls, United
States





- Documenting validation framework and protocols
- One example - Land Surface Temperature & Emissivity Focus Area

Provides List of Products with

- Meta-data
- Contacts
- Links to Validation Reports
- Links to Data Centers

- LPV Focus Areas
- LAI
 - Fapar
 - Fire/Burn Area
 - Phenology
 - Vegetation Index
 - Land Cover
 - Snow Cover
 - BRDF/Albedo
 - Soil Moisture
 - LST and Emissivity
 - References
 - Products**
 - Collaboration
 - Biomass

LST/Emissivity Focus Area Products List

Emissivity		
Global Emissivity Climatology, derived from Terra ASTER Contact: Glynis Hulley Institution: JPL Link to validation information	Spatial Coverage: global Temporal Coverage: 2000-2000 Spatial Scale: 100 m Temporal Scale: mean climatology (2000-2008)	
Land Surface Temperature		
Land Surface Temperature (LST) , derived from Terra ASTER Contact: Alan Gillespie Institution: JPL Link to validation information	Spatial Coverage: global Temporal Coverage: 2000-2000 Spatial Scale: 90 m Temporal Scale: 16-day	
Land Surface Temperature , derived from Aqua AIRS Contact: Joel Suskind Institution: NASA Link to validation information	Spatial Coverage: global Temporal Coverage: 2000-2000 Spatial Scale: 50 km Temporal Scale: Daily	
Land Surface Temperature (LST) , derived from ENVISAT AATSR Contact: EO Helpdesk Institution: ESA Link to validation information	Spatial Coverage: global Temporal Coverage: 2000-2000 Spatial Scale: 1000 m Temporal Scale: Daily	
Land Surface Temperature , derived from Meteosat (MSG) SEVIRI Contact: Help Desk Institution: LandSAF Link to validation information	Spatial Coverage: Europe, Africa, S. America Temporal Coverage: 2006-2009 Spatial Scale: 3 km Temporal Scale: 15-min	
Land Surface Temperature, derived from Suomi-NPP VIIRS Contact: Yunqiao Yu Institution: NOAA Link to validation information	Spatial Coverage: global Temporal Coverage: 2012+ Spatial Scale: 750m Temporal Scale: Daily	

EUMETSAT Land Surface Temperature

LSA SAF **EUMETSAT**

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Products and Tools

Products Description

User Tools

Quality Monitoring

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Description

Land Surface Temperature

LST

DSSF

DSL

ALB

Product Documentation

Documents:

- (Product User Manual)
- (Product Output Format)
- (Validation Report)
- (Algorithm Theoretical Basis Document)

Data Policy

Introduction

Product Description

Algorithm Description

Data Characteristics

Product Uncertainties

References

Example of Product

User comments for this product

See the dependency diagram for this product

Algorithms Changes Record (LST)

LST

2008/11/15 - 09:30 UTC

-20 -10 0 10 20 30 40 50 60 °C

Product Documentation

This product has operational status. It is documented in the Algorithm Theoretical Basis Document (ATBD), Product User Manual document (PUM), and Product Output Format document (POF). The validation documentation for this product is available in the (VR) document.

Data Policy

The use of LSA SAF products in publications is kindly requested to be duly acknowledged:
LST was provided by the EUMETSAT Satellite Applications Analysis on Land Surface Analysis (LSA SAF; Trigo et al., 2011)



- CEOS WGCV LPV has established a framework with the aim of independent validation and consistent uncertainty reporting across products as main output

Schaepman-Strub et al., (2017) submitted

1. Validation Good Practice Document



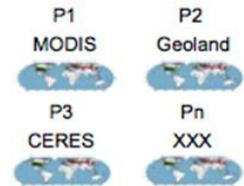
Fernandes et al., (2014). Global LAI Product Validation Good Practices. doi:10.5067/doc/ceoswgcvlpv/lai.002

2. Fiducial Reference Data Sets

Network	Country	Area	Network	Area	Network	Area
AGU	USA	1000	AGU	1000	AGU	1000
AGU	USA	1000	AGU	1000	AGU	1000
AGU	USA	1000	AGU	1000	AGU	1000
AGU	USA	1000	AGU	1000	AGU	1000
AGU	USA	1000	AGU	1000	AGU	1000
AGU	USA	1000	AGU	1000	AGU	1000

Example of fiducial reference data for soil moisture.

3. Global Satellite Product Subsets



Subsets over fiducial reference data sites for each product automatically delivered.



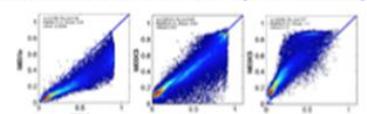
EUMETSAT

4. Online Validation Tool

Example of OLIVE validation tool for LAI and FAPAR [3].



5. Standardized Intercomparison Report

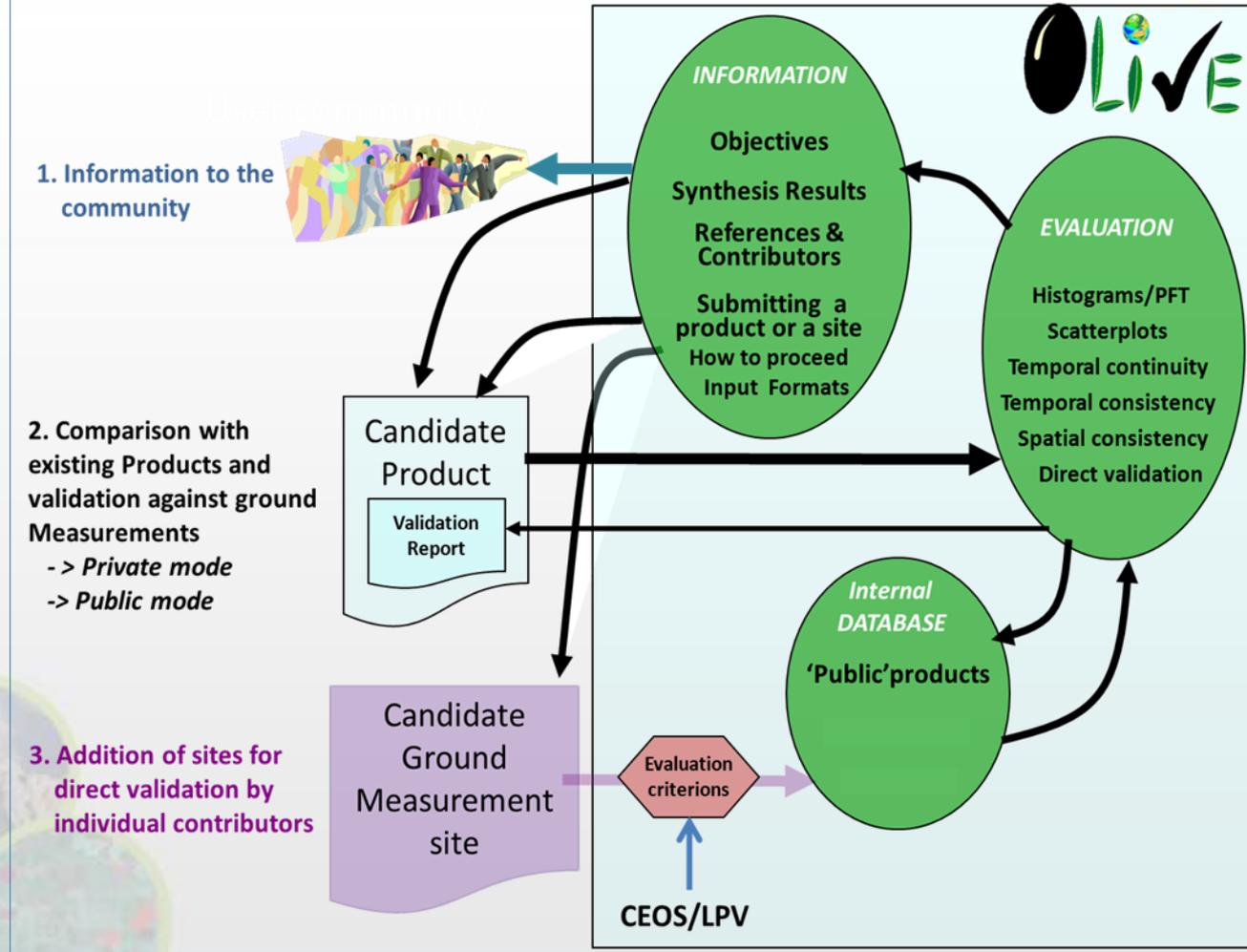


Standardized Validation Report





- Online Platform for Intercomparison - OnLine Validation Exercise (OLIVE)
- Guidance for online platform for intercomparison of terrestrial carbon products.



Results of LPV efforts being formalized to allow closure of CARB-19 and likely closure of Carbon Task Force's Action #08



Processors		Sensors
1	ACOLITE [Belgium]	
2	ATCOR [Germany]	
3	Brockmann [Germany]	
4	FORCE [Germany]	
5	GA-PABT [Australia]	
6	LaSRC [USA]	
7	LAC [France]	
8	MACCS [France]	
9	OPERA [Belgium]	
10	SCAPE-M [Germany]	
11	SeaDAS [USA]	
12	Sen2Cor [France&Germany]	

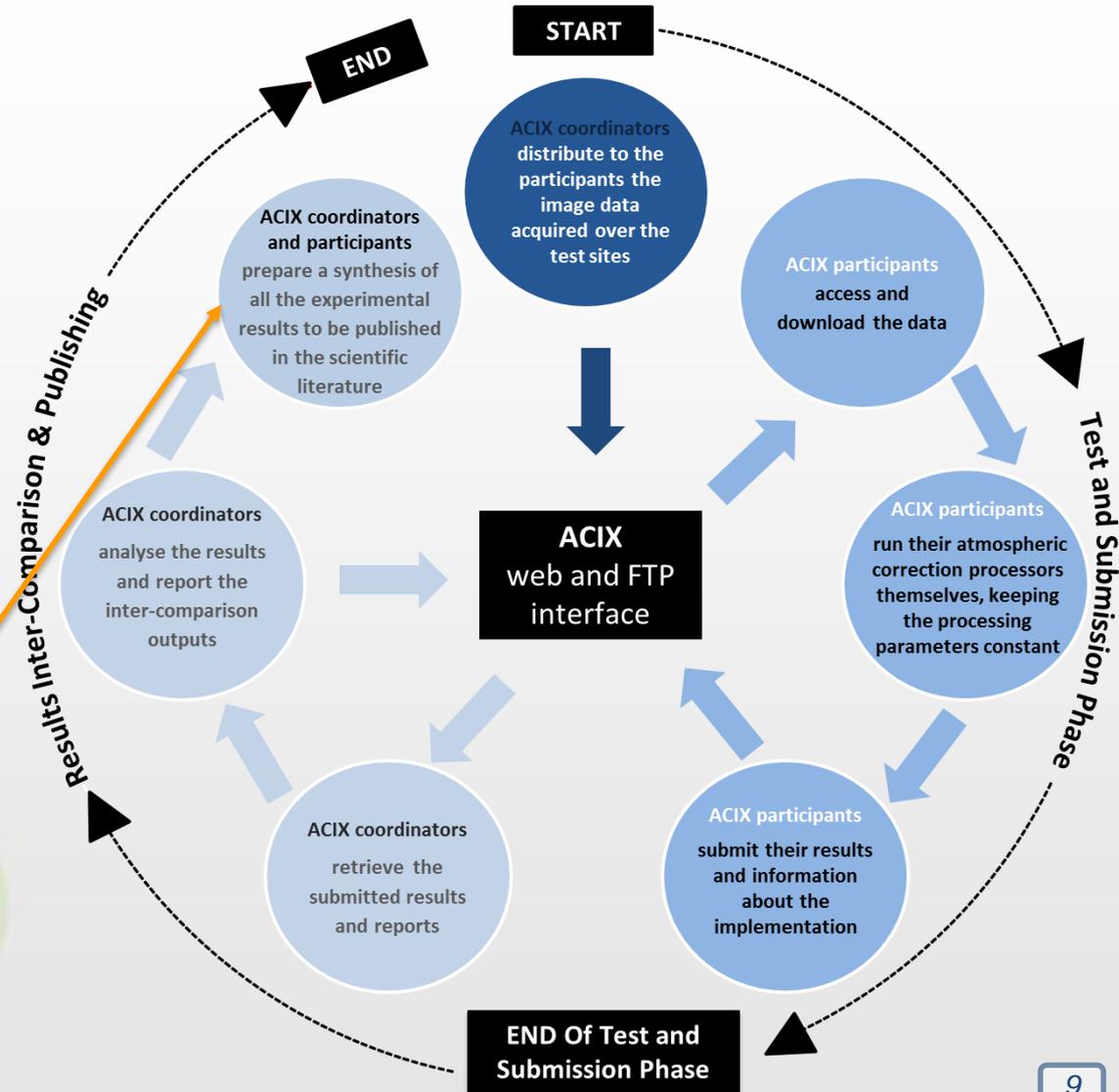
- **CV-13: Intercomparison of atmospheric correction models**
- Better understanding of the different uncertainty contributors and help in improving the AC processors
- Definition of the inter-comparison protocol - discussed at first workshop
- Application of the AC processors - Participants applied their AC schemes for test sites keeping processing parameters constant
- Analysis of the results - ACIX coordinators processed the results submitted by all participants in early 2017





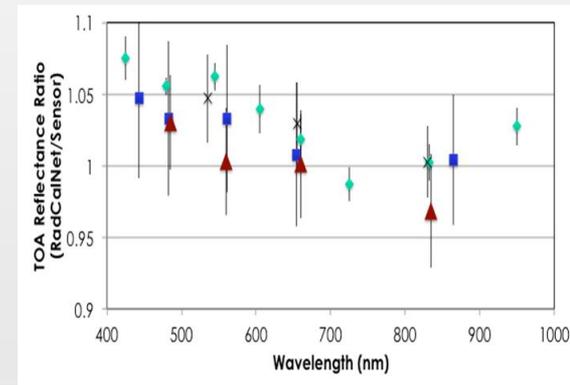
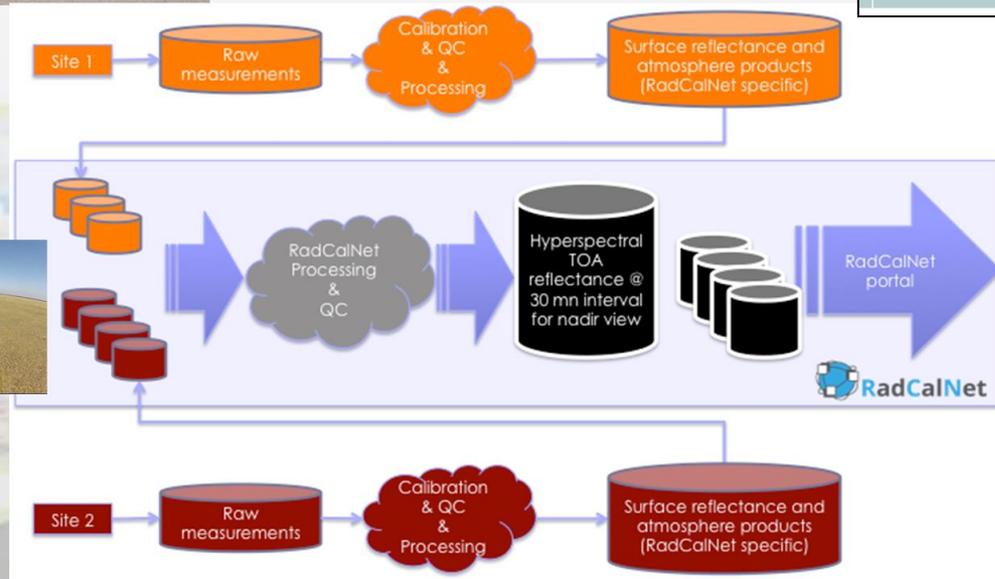
- Results presented during 2nd ACIX workshop held in April 2017
- Lessons learned on how to improve atmospheric correction schemes
- Results pointed to the importance of per-pixel quality flags to ensure accurate atmospheric correction

You are here



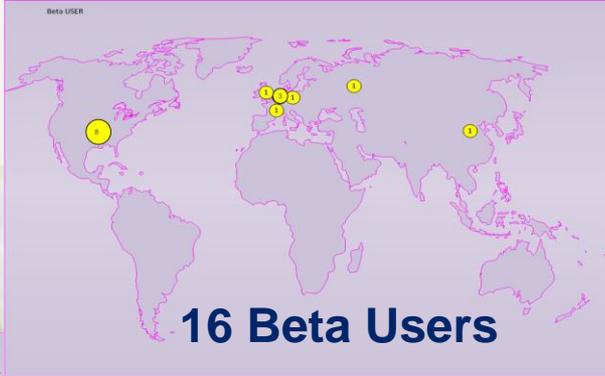


- Network of instrumented sites dedicated to the Radiometric Calibration of EO optical sensors developed in IVOS Subgroup
- Automated processing including quality control
- Traceability vs. SI standard





- RadCalNet is in Beta Testing and scheduled for opening of its website to the public in early 2018
- WGCV in process of developing process to accept test sites into RadCalNet



Committee on Earth Observation Satellites
magellium

Railroad Valley Playa

[return to site list](#)

Access data

[Access data display and daily data download](#)

Geolocation

The portal

Site description

Railroad Valley Playa	Google earth site location : RVUS.kmz
Latitude	38.497
Longitude	-115.69
Altitude	1435m
Characteristics	The RadCalNet top-of-atmosphere reflectance spectra are representative of a square of 1km x 1km

Data by month

Last available data from site

RVUS00_2017_017_v00.00.output

Data file version

[Download version list](#)

Documentation

Site Documentation

Files

[QA4EO-WGCV-IVO-CSP-002_RVUS.pdf](#)

[Contact Admin](#)



- WGCV activities cover a range of topics all related to understanding sensor-to-sensor differences
 - Fiducial Reference Measurements (FRMs)
 - Collaborations with other organizations such as GSICS
 - Impacts of cloud masks and DEMs on Level 2 data production
 - Solar irradiance spectrum
- These activities also relate directly to CEOS Work Plan
 - **Completion of CV-12** - Evaluation of validation supersites and new validation approaches
 - **CV-15:** L1 top-of-atmosphere interoperability
 - **VC-30:** Interoperability case study for Landsat and Sentinel-2
 - **VC-29:** Framework for moderate resolution land sensor interoperability
 - **VC-27:** Develop a roadmap for the routine production of intercomparable CARD4L

- **CV-12 WGCV** - Evaluation of validation supersites and new validation approaches
- Well-characterized supersites with data continuity prospects for validation purposes that allow for testing of products, algorithms, and validation strategies through radiative transfer modeling
- A Supersite should be fully characterized (3D canopy structure, plus key land variables) to allow a RT model parameterization, whereas a core site refers typically to the same variable
- A Supersite should be useful for the validation of several land products (> 3)
- Availability of data
- Spatial representativeness

Overall, 61 Supersites selected out of:

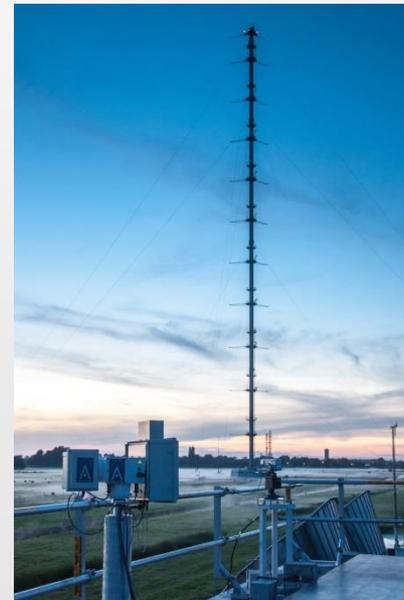
- TERN : 18 nodes in 10 Supersites
- ICOS: 71 sites
- NEON: 47 sites
- LPV : 13 sites



- **CV-15** to help define Level 1 top-of-atmosphere interoperability
- Develop an initial recommendation of a community reference in collaboration with GSICS
 - Introduced at WGCV-42 as a means to provide input to the MRI team
 - Develop an initial recommendation of a community reference in collaboration with GSICS
- Makes use of ongoing and newly instituted activities
 - RadCalNet
 - Solar irradiance spectrum
 - Fiducial reference measurements
 - SI-traceability and good practices

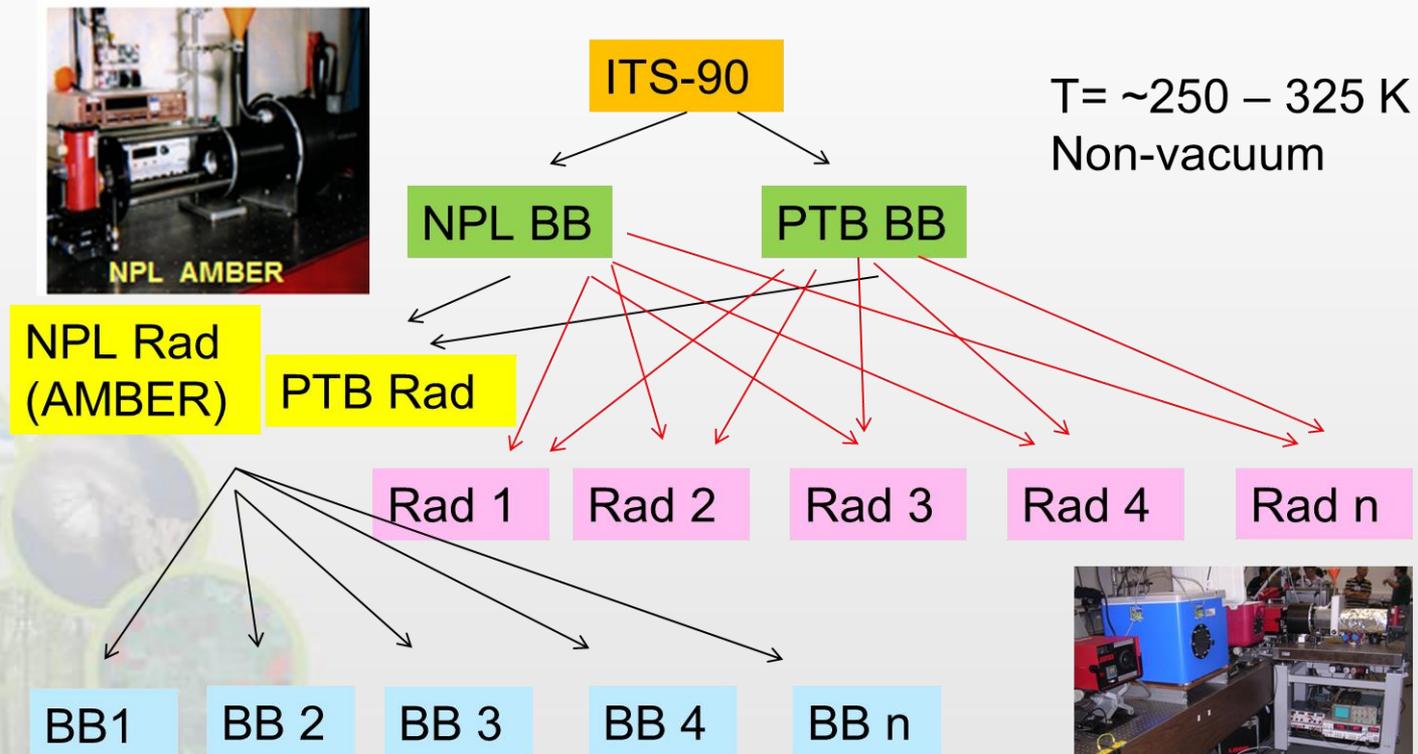


- FRM4GHG Campaign
 - CO₂, CH₄, CO + other GHGs
 - S-5p, GOSAT, OCO-2
 - Test of new low cost instruments
 - ESA, national agencies
- CINDI-II Campaign
 - OMI, GOME-2A/B
 - Validation of NO₂, HCHO, SO₂...
 - NSO, ESA FRM4DOAS, EU QA4ECV





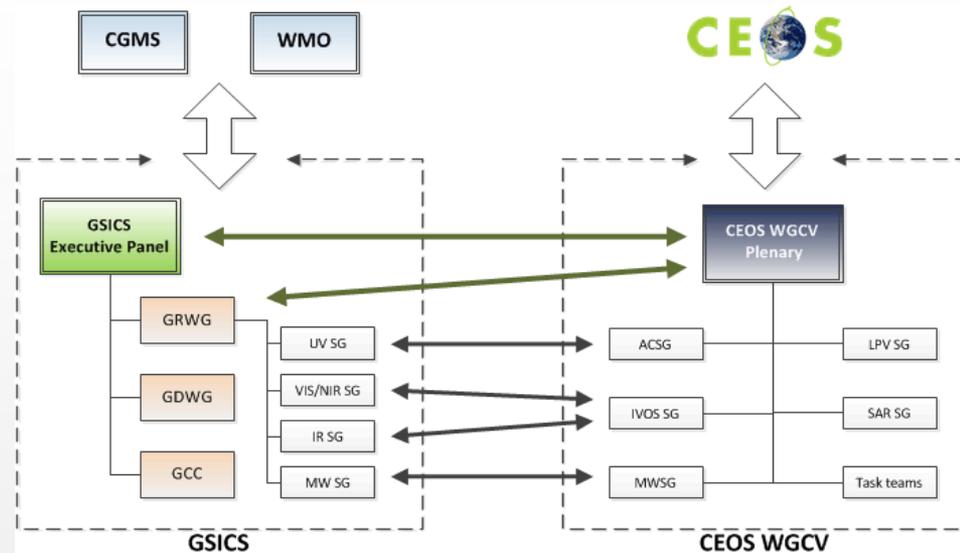
- Work within all subgroups (AC, IVOS, LPV, Microwave, and SAR) developing good practice approaches to ensure laboratory and field measurements are interoperable
- Lead towards Level 1 and higher product agreement





Cooperation with GSICS

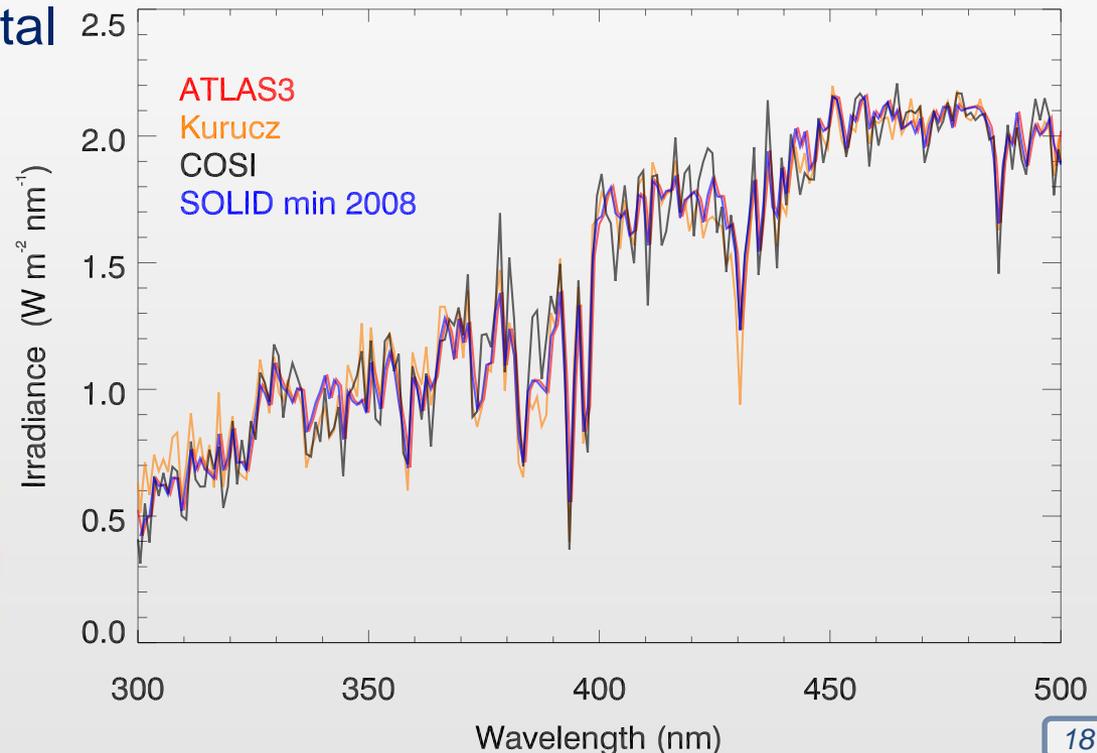
- Identification of cooperation priorities and concluded (cf **CV-03** and **CV-15**)
- Cooperation on subgroup level & working group level which includes joint meetings of sub-groups
- WGCV chair observer @ GSICS-EP
- GRWG chair observer @ WGCV



Others

- Interaction with IOCCG wrt Cal/Val ocean color
- Participation on LSI VC telecons
- Combined meeting with WGISS

- Description of proposed GSICS/WGCV IVOS solar irradiance spectrum is being evaluated by WGCV membership for approval
 - Solar spectrum choice can lead to differences in comparisons between sensors
 - WGCV accepted solar irradiance spectrum will be distributed on the CEOS Cal/Val Portal
- **CV-16** - Report on outcomes from GSICS/CEOS reference Solar Spectrum evaluation

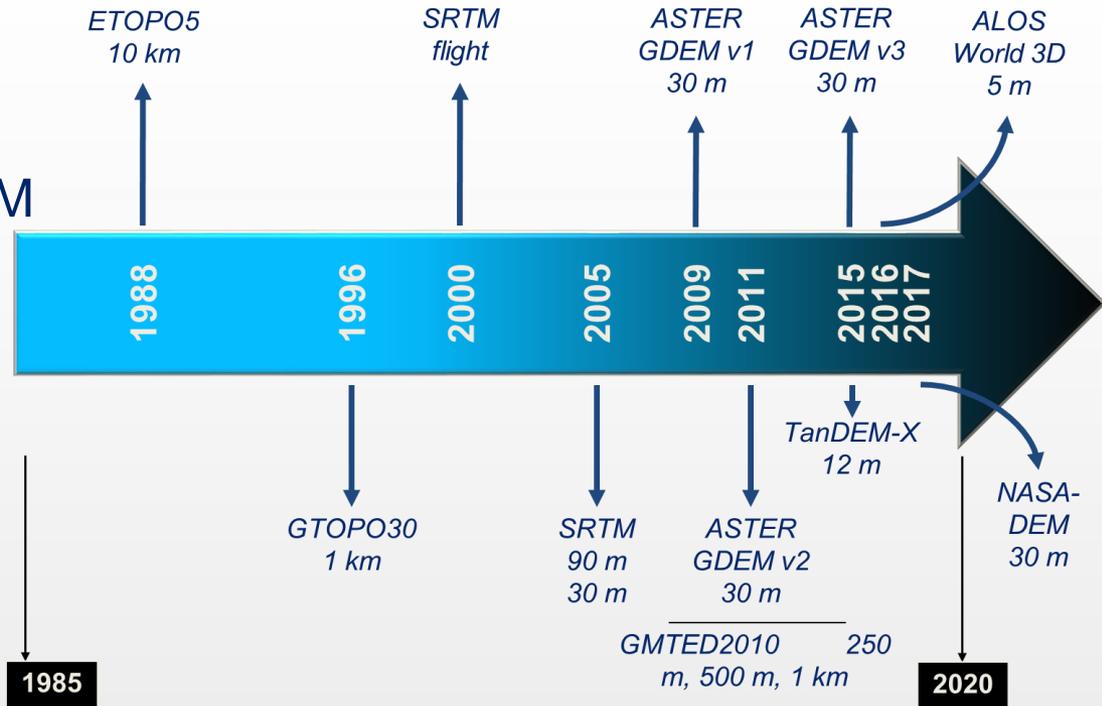




- WGCV / Terrain Mapping Subgroup
- GEO Global DEM Task
- ISPRS WG IV/3 – Global DEM Interoperability

Activities:

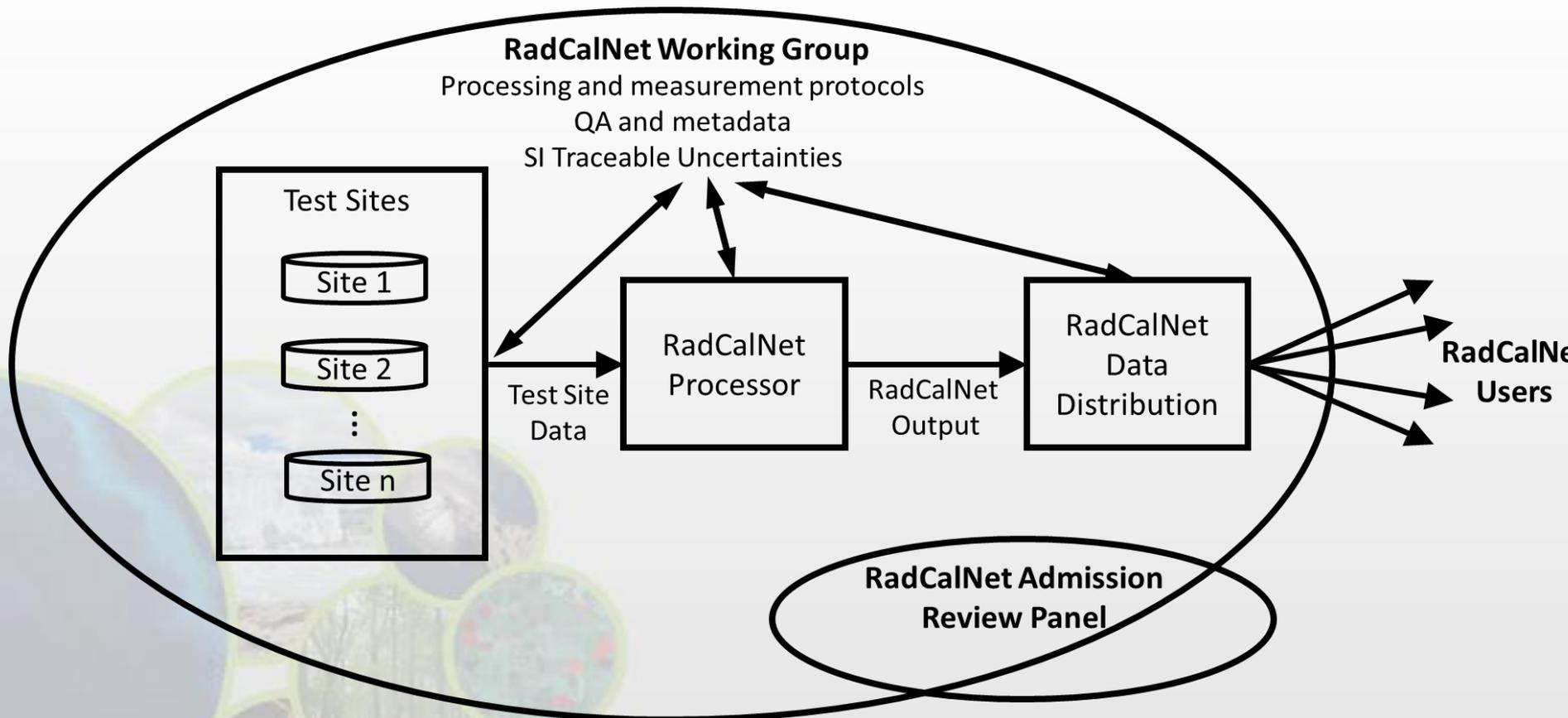
- SRTM workshop / PE&RS special issue
- ASTER GDEM evaluation / IGARSS session
- ISPRS sessions (2008, 2010, 2012, 2014, 2016)



DEM	Grid spacing (m)	Absolute vertical accuracy specification (m)		
		RMSE	LE90	LE95
SRTM	30	9.7	16	19.07
ASTER GDEM	30	10.2	16.78	20
TanDEM-X (WorldDEM)	12	6.08	10	11.92
PRISM (AW3D)	5	5	8.22	9.8



- Presented the following view to WGCV



- 1) Prospective site manager documents that they meet requirements for membership
 - RadCalNet group will provide advice and guidance to prospective sites
 - 2) Submission of documentation to a RadCalNet Admission Review Panel
 - Panel made up of five WGCV members
 - Panel members distributed geographically
- Panel formulates a recommendation to be carried forward to the WGCV membership
- A recommendation for approval requires concurrence by majority of panel
 - Much of the evaluation process can take place via telecon/email
- 4) WGCV plenary acts on the recommendation either via email or at a WGCV meeting
 - Recommendation is accepted at a WGCV meeting unless three members that are present indicate disapproval
 - To act on the recommendation outside a WGCV meeting
 - Panel recommendation forwarded to full WGCV membership with at least one month for evaluation
 - Recommendation is accepted unless five members register disapproval by email
- Panel membership
 - Panel Lead – is representative from RadCalNet WG
 - Two members from IVOS
 - Chair
 - Member at large
 - Two members from WGCV at large

- WGCV subgroups are still the best opportunity for those not part of a CEOS Space Agency to impact CEOS
- IVOS is playing a key role in advancing WGCV's progress on CEOS Work Plan activities
- CARD4L, Interoperability, and Carbon Actions are near-term activities requiring help from IVOS members
- Subgroups are an excellent means to improve international collaborations on an array of topics
 - Some of these topics can have relevance only to the subgroup
 - Some must still have relevance to WGCV and at some point an impact on CEOS itself
- Continue to do the work that is of interest to IVOS while periodically considering how the activity can help the broader CEOS community