



Working Group on Calibration and Validation (WGCV)

Infrared Visible and Optical Sensors (IVOS) subgroup: #29

Nigel Fox

NPL (with UKSA support)

Tucson, 2017



Working Group on Calibration and Validation

20 seconds:

Name

Organisation

Particular specialism / interest



- **Information exchange between agencies**
 - **Up and down through CEOS**
- **Reporting on progress on projects**
- **Interactions/activities in other related groups**
- **Updates on work-plan / new project ideas/collaborations**
- **Communications**
- **Recommend a solar irradiance spectrum**
- **Next IVOS meeting ? (probably Europe)**

CEOS WGCV IVOS-29 Meeting & associated Task Group meetings

13-17 March, 2017

Hosted by the University of Arizona
1630 E University Blvd. Tucson, AZ 85719

DRAFT AGENDA V2.0

Monday, Mar 13

Webex: see page 5

9:00 AM RadCalNet WG Beta testers meeting (see separate agenda)

13:00 Lunch

14:00 RadCalNet WG meeting (see separate agenda)

17:30 Meeting close

Tuesday, Mar 14

Webex: see page 5

09:00 MTF workshop

09:00 Introduction and recall of actions taken at previous meeting Dennis Helder (SDSU)

09:15 Update of MTF measurements comparison Françoise Viallefont-Robinet (ONERA)

9:30 Status of Edge target in worldwide by KOMPSAT-3 DongHan Lee (KARI)

9:45 Telespazio MTF measurement method Sébastien Saunier (TELESPAZIO)

10:00 KARI MTF measurement method DongHan Lee (KARI)

10:15 DIGITAL GLOBE MTF measurement method Amy Newbury (DIGITAL GLOBE)

10:30 Break

10:45 SDSU MTF measurement method Dennis Helder (SDSU)

11:00 ONERA MTF measurement method Françoise Viallefont-Robinet (ONERA)

11:15 Preparation of a paper and Discussion about coming work Françoise Viallefont-Robinet (ONERA) and Dennis Helder (SDSU)

12:30 Lunch

14:00 PICS workshop

17:30 Meeting close



08:00 AM	Registration/Entrance Logistics		
08:30	Welcome by the University of Arizona host (Assistant Dean: Professor Justin Walker)		
08:45	University of Arizona Radiometry group overview		
09:15	IVOS chair Intro	Nigel Fox (NPL)	Meeting intro <ul style="list-style-type: none"> • Brief Introductions • Objectives • Agenda • Actions • Terms of reference • IVOS report to CEOS WGCV 40 •
10:15	Break		
10:45	CEOS WGCV and CEOS initiatives		
10:45	Introduction and discussion on how IVOS can and should contribute	Kurtis Thome (lead, NASA)	CEOS & CEOS WGCV workplan <ul style="list-style-type: none"> - WGCV chair report - Carbon task force actions - Moderate resolution sensor interoperability (Analysis ready data) initiative -
12:00	Lunch		
13:30	Sensor Radiometric Calibration/monitoring methods		
13:30	Lunar	Tom Stone (USGS) Others ?	Update on Lunar Cal Development and update
14:00	Application of SPARC to L8 and S2	Stephen Schiller (Raytheon)	Update on Specular Array Radiometric Calibration (SPARC) method
14:20	Extra terrestrial methods	Aimé Meygret (CNES)	Progress on extra-terrestrial based calibration techniques using PLEIADES-HR Satellites
	Metrology methods		
14:40	The 'Fiduceo' project	Emma Woolliams (NPL)	Applying robust 'forensic' metrological methods to satellite data
15:00	Break		
15:30	Progress on RadCalNet	Marc Bouvet (ESA)	Report and next steps from workshop including discussion
16:30	Report on Picscar workshop	Patrice Henry (CNES)	Presentation and discussion of work plan
17:15 approx	End of day 1		
	DINNER (self-funded)		



CEOS initiatives			
09:00	Solar Spectral Irradiance	Chair to lead (webex)	Results of CEOS / GSICS discussion and move to a recommendation.
10:30 New test sites future (RadCalNet)			
10:30	Shatdzhatmaz test site	Vjacheslav Kovalenko (Roscosmos)	Characteristics of test site as candidature for RadCalNet
10:50 Break			
11:20 New test sites continue			
11:20	Dunhuang testsite	Lin Chen (CMA)	Characteristics as candidature for RadCalNet
11:40	Correction methods of adjacent effect in radiometric Calibration	Lingling Ma (AOE)	Presentation
12:00 Surface Temp			
12:00	SST Validation activities	Dave Smith (for Corlett u of Leicester)	Report from GHRST
12:20	Results of SST/LST comparisons	Nigel Fox (NPL)	CEOS comparison results
12:40 Lunch			
14:00 Ocean Colour			
14:00	Status of comparisons and global infrastructure	Nigel Fox (NPL)	Update on recent international meeting at ESA
14:20 Post Launch sensor Cal/Val			
14:20	Val of S2 and comparisons compaisons with L8, S3 and Modis	Bahjat Alhammoud (Argans)	Results
14:40	Landsat archive reflectance based Cal	Dennis Helder (SDSU)	Presentation
15:00	ASTER data acquisition over RadCalNet	Hirokazu Yamamoto (AIST)	Presentation

15:20	PROBA-V rad cal status	Stefan Adriaensen (VITO)	Presentation
15:40	Break		
16:00	Sentinel 3: OLCI and SLSTR status	Steffen Dransfield (ESA)	presentation
16:20	Sensor Cal		
16:20	S3-SLSTR preflight Cal	Dave Smith (STFC/RAL)	Presentation
17:00	GEO-SPATIAL image quality		
17:00	Summary of MTF workshop	Dennis Helder (SDSU) / Françoise Viallefont-Robinet (ONERA)	Progress on MTF Comparison and next steps etc
17:40 approx	End of Day		

Friday Mar 17

Webex: see page 5

09:00	Atmosphere effects on Radiometric Cal		
09:00	Status on Radiometric correction activities	Kurtis Thome (NASA)	Update on radiometric correction and CEOS WGCV project ASIX
09:15	Complimentary projects/activities		
09:15	Metrology for Earth Observation and climate 3	Nigel Fox (NPL)	Presentation
09:35	Vocabulary	Emma Woolliams (NPL)	Discussion
10:15	Others?	Others?	
11:00	Break		
11:30	WGCV and IVOS General business		
11:30	Discussion	Nigel Fox (NPL)	<ul style="list-style-type: none"> - Review of Actions - Recommendations - Future topics - Next meeting -
12:30	End of Meeting		



- IVOS 28 @ Beijing, China hosted by AOE/CAS Jul 2016
- 24 agency/orgs represented
- 30 attendees + 4 remote
- All themes and topics (work-plan discussed or summarised)
- **2 joint (GSICS) webex on solar irradiance**
- **3 rd MTF workshop (Mar 2017)**
- **WGCV 41 (Tokyo, Sep 2016)**



Special Projects:

- **RadCalNet team met Mar 2017 @Tucson**
- **Beta testing launched**
- **SST/LST comparison (under sponsorship from ESA) took place @NPL (June-July 2016)**
- **New PICSCAR project started (telecons/workshops)**

Working Group on Calibration and Validation

Mission

“To ensure high quality calibration and validation of infrared and visible optical data from Earth observation satellites and validation of higher level products”



- Promote international and national collaboration in the calibration and validation of all IVOS member sensors.**
- Address all sensors (ground based, airborne, and satellite) for which there is a direct link to the calibration and validation of satellite sensors;**
- Identify and agree on calibration and validation requirements and standard specifications for IVOS members;**
- Identify test sites and encourage continuing observations and inter-comparison of data from these sites;**
- Encourage the preservation, unencumbered and timely release of data relating to calibration and validation activities including details of pre-launch and in flight parameters.**
- In the context of calibration and validation encourage the full consideration of “traceability” in all activities involved in the end-to-end development of an EO product including appropriate models and algorithms.**

To facilitate the provision of 'fit for purpose' information through enabling data interoperability and performance assessment through an 'operational' CEOS coordinated & internationally harmonised Cal/Val infrastructure consistent with QA4EO principles.

- *Pre-flight characterisation & calibration*
- *Test – sites*
- *Comparisons*
- *Agreed methodologies*
- *Community Best Practices*
- *Interchangeable/readable formats*
- *Results/metadata - databases*

Key Infrastructure to be established and maintained independent of sensor specific projects and/or agencies

Work plan

CEOS



Structured into themes and led by 'champions' (Plus specific projects)
(all 'Vice chairs')

- Look to develop community good practises
- Organise comparisons
- Shared learning (research activities)
- Shared infrastructure / tools / Methods
- Recommendations as needed

Land surface reflectance

- Czapla-Myers (U of Arizona USA)

Ocean colour (link to IOCCG, VC-OCR etc)

- Zibordi (JRC, EU) & Murakami (JAXA JPN)

Surface Temperature (link to VC-SST, GHRSSST) - Corlett (U of Leicester, UK)

Geo spatial image quality

- Helder (SDSU, USA) & Viallefont (ONERA F)

Atmospheric Correction (Link to AC subgroup)

- Thome (NASA, USA)

RT codes (context of IVOS use in calibration)

- ?

Working Group on Calibration and Validation

- **RadCALNet** - **Bouvet (ESA)**
- **PICSCAR (with GSICS?)** - **Henry (CNES, F)**
- **SST/LST cross-comparison (+ VC-SST & LPV (instrument Cal for LST))** - **Fox (NPL, UK)**
- **Others in progress/development/related**
 - **Analysis of comparisons/Uncertainties/establishing and presenting harmonised biases for sensor to sensor comparisons (with GSICS) (including tools/databases)**
 - **Good practise for convolving spectral data sets (solar/surface/sensor bandwidth) Selection of Reference Solar irradiance spectrum(CEOS WGCV (sub-groups) & GSICS)**
 - **Comparison of Rayleigh and Sun-Glint methods**
 - **Ocean colour System Vicarious Cal comparison of infrastructure**

Decision number	Decision
R.2016-1	IVOS shares a vision on the need to establish a community reference for sensor Level 1 TOA interoperability. It will create an umbrella project (in collaboration with appropriate GSICS sub-groups) and set of related sub-projects/activities to achieve that goal.
R.2016-2	IVOS values a central CEOS-WGCV webportal that is independent of individual organisations for the sharing of results, reports and to collate information. We recommend that the CalVal portal be optimised and redeveloped.



AP.2016-1	Nigel Fox to ask WGCV if they are willing to help with identification of user needs for sensor L1 interoperability and the value of a common reference (s) method (s) that might be needed to achieve it.	Oct-16
AP.2016-2	Nigel Fox to ensure we hold a half to one day workshop to evaluate state-of-the-art on sensor L1 interoperability and the different methods used for comparisons to prioritise a work plan	Mar-17
AP.2016-3	Everyone to review template spreadsheet as a basis for a database to collect info on comparison results and/or propose edits as appropriate.	Nov-16
AP.2016-4	Everyone with access to or knows how to access to desert sand (potential PICS) or information on its optical properties to contact Onera (Françoise Viallefont) as part of ESA contribution to PICS TG study along with any best practice on BRDF measurement techniques of sand samples	Nov-16
AP.2016-5	Patrice Henry to get the PICS questionnaire circulated to the community particularly IVOS and GSICS (with additional questions about how we focus the work of the working group and reworded introduction - speak to Nigel Fox) by early Aug 16 and then to share the results of this survey. Also repeat the request for AP.2016-7 for Libya-4 data series with the questionnaire..	Oct-16
AP.2016-6	Patrice Henry to propose a "way forward" for the PICS group (a bullet point list of timeline) and to define a date for a webex meeting	Oct-16
AP.2016-7	Everyone with access to satellite data over Libya-4 to provide to Patrice Henry an extract of the mean and standard deviation of that mean of the different pixels within the $20 \times 20 \text{ km}^2$ and $100 \times 100 \text{ km}^2$ defined area (see invite AP2016-5) as a time series. Ideally For TOA reflectance, but radiance acceptable. The data set should, where possible, be screened for cloud and corrected for seasonality/sun angle etc in the normal way of the data provider.	Sep-16



AP.2016-8	Everyone to consult with their Agencies to determine their priorities and resourcing possibilities to deliver the Carbon Strategy Actions (once Actions are published after the WGCV meeting) ready to discuss who will do what at the next IVOS meeting.	Mar-17
AP.2016-9	Everyone who has existing work that is for "carbon" to send information on this to Nigel Fox so that we can gather a list of such people.	Mar-17
AP.2016-10	Everyone to make Emma Woolliams aware of existing "official" groups (standardisation organisations) making relevant vocabularies at the moment	Sep-16
AP.2016-11	Emma Woolliams to email IVOS to (a) obtain a list of existing vocabularies to bring together and (b) to obtain a group of people from different geographic regions who will assist on establishing an initial vocabulary	Sep-16
AP.2016-12	Emma Woolliams to set up a website where vocabulary choices and definitions of key vocabulary terms can be discussed	Mar-17
AP.2016-13	Those working in imaging spectrometry to continue to participate in this meeting and with this community and to find ways to strengthen the links between their community and ours. CEOS WGCV IVOS provides the means to link the existing imaging spectrometry (cal/Val) groups to CEOS..	Mar-17
AP.2016-14	All to identify where possible simple examples at the application level (typically 3 or higher) where the impact of Cal/Val (at Level 1) can be demonstrated particularly quantitatively	Mar-17
AP.2016-15	Everyone to review (or to ask experts within their organisations to review) the MTF test site catalogue hosted by USGS EROS at http://calval.cr.usgs.gov/rst-resources/sites_catalog/spatial-sites/ and to provide Dennis Helder with information about any additional sites (the aim is to make an exhaustive list)	Oct-16
AP.2016-16	Dennis Helder and Françoise Viallefont to ask the operators of the checkerboard sites formally about the current status of maintenance of the sites.	Oct-16



AP.2016-17	Dennis Helder and Françoise Viallefont to come up with the criteria for sites to be CEOS reference sites as a basis for discussion within the TG and subsequently CEOS WGCV and to consider including a link from the CEOS CalVal portal to the USGS site catalogue..	Mar-17
AP.2016-18	Marc Bouvet to ensure the RadCalNet WG has worked out how to deal with data from candidate sites during the test phase of while they are assessed	Mar-17
AP.2016-19	Marc Bouvet to invite Beta users and interested CEOS WGCV members to a workshop to discuss their findings/recommendations	Mar 17 (workshop)
AP.2016-19	Everyone to make suggestions to Nigel Fox for topics for discussion at future CEOS-WGCV-IVOS meetings to ensure new topics are brought in	Mar-17
AP.2016-20	Everyone to provide a list of (a) what you have used the CalVal portal for in the last 6 months and (b) what you consider it should offer (key information that should be there and is unavailable or available elsewhere) as a list of bullet points and to send this list to Steffen Dransfeld and Nigel Fox in advance of the WGCV meeting.	End August
AP.2016-22	Nigel Fox and Jeff Czapla-Myers to organise the next meeting of CEOS-WGCV-IVOS providing sufficient detail at least four months before the meeting (by end October) for people to obtain travel visas	Oct-17
AP.2016-23	Emma Woolliams and Nigel Fox to ensure that the meeting minutes, photos, action list and presentations are available to the IVOS mailing list	End July