



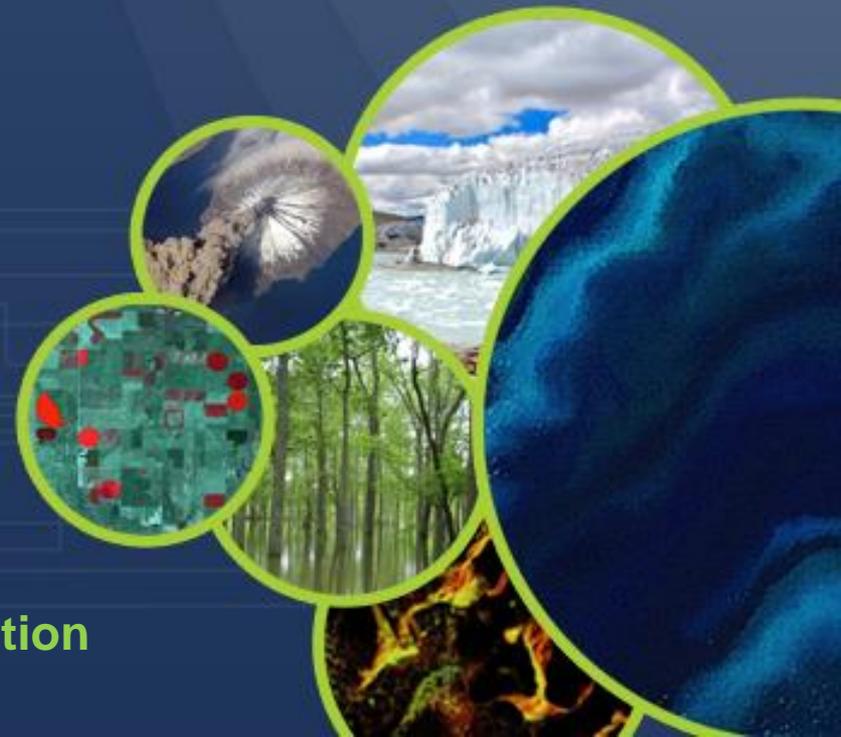
Working Group on Calibration and Validation (WGCV)

Infrared Visible and Optical Sensors (IVOS) subgroup: #30

Nigel Fox

NPL (with UKSA support)

Noordwijk, 2018



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**

Location: Dance Room at ESCAPE, ESTEC, Noordwijk, the Netherlands



Monday, Mar 26

9:00 **RadCalNet WG meeting** (see separate agenda)

AM

13:00 **Lunch**

14:00 **RadCalNet WG meeting** (see separate agenda)

17:30 **Meeting close**

Tuesday, Mar 27

09:00 **MTF workshop**

09:15 **MTF workshop: Meeting Chair Françoise Viallefont-Robinet** (D Helder Co-chair)

09:15 **Introduction and recall of actions taken at previous meeting** Françoise Viallefont-Robinet (ONERA)

09:30 **Spatial Quality of KOMPSAT-3 with the Status of Edge targets (until Feb. 2018)** DongHan Lee (KARI)

9:45 **Edge target in Mongolia** DongHan Lee (KARI)

10:00 **Validation of MTF Measurement method by edge target** DaeSoon Park (KARI)

10:15 **Update of MTF measurements comparison** Françoise Viallefont-Robinet (ONERA)

10:30 **Break**

11:00 **MTF comparison paper** Françoise Viallefont-Robinet (ONERA)

11:30 **Reference data set** Françoise Viallefont-Robinet (ONERA)

12:00 **Roadmap** Françoise Viallefont-Robinet (ONERA)

13:00 **Lunch**

14:00 **PICS workshop (Chair Patrice Henry) (Separate agenda)**

17:30 **Meeting close**

08:15 AM **Registration/Entrance Logistics**

09:00 **Welcome by ESA host:** (Professor Michael Rast, ESA special Advisor EO & past IVOS chair)

09:30	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 41
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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 - WGCV governance group (RadCalNet) -
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11:30	Validation of L2 Surface reflectance, IVOS?	Cody Anderson (USGS)	Discussion on if this should be in scope of IVOS or WGCV cross project? LPV sub-group consider it not their priority
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12:00	Pre-flight/on-board Cal workshop planning	Fox/Thome to lead	Discussion
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12:30 **Lunch**

14:00 **Sensor Radiometric Calibration/monitoring methods**

14:00	Measuring Lunar spectral irradiance	Marc Bouvet (ESA)	Update on Lunar Cal project of ESA
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14:20	Status on GSICS/CEOS project on Lunar calibration	Sebastien Wagner (Eumetsat)	
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14:40	Pleiades high resolution optical sensors calibration based on stars	Aimé Meygret (CNES)	
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- 15:00 **Requirements for accurate radiative transfer simulation to support vicarious calibration** Yves Govaerts/Vincent Leroy (Rayference)
- 15:20 **New China project on 'space radiometric transmit calibration and ground-based validation technology'** Ling Ling Ma (AOE)



15:400 Break

16:000 Metrology methods

- 16:00 **FIDUCEO Harmonisation of Historic Sensor Series** Sam Hunt (NPL)

16:20 WGCV Task groups

- 16:20 **Uncertainties and terminology task group** Emma Woolliams (NPL)
- 16:40 **Progress on RadCalNet** Marc Bouvet (ESA) Report and next steps from workshop including discussion/operationalisation

17:10

17:20. End of day 1
Non-Host DINNER TBD ~19:30

Thursday 29 March

Sensor Cal/Val status/New missions

- 09:00 **JAXA GCOM-C** Murakami (Jaxa) (webex)
- 09:20 **Sentinel 3 (OLCI & SLSTR) Cal Status** Steffen Dransfield (ESA)
- 09:40 **Low Cost High Resolution imaging payloads** Juan Fernandez (SSTL)
- 10:00 **Aster: Lunar calibration, inter-band calibration and data acquisition over RadCalNet sites** Hirokazu Yamamoto (AIST)

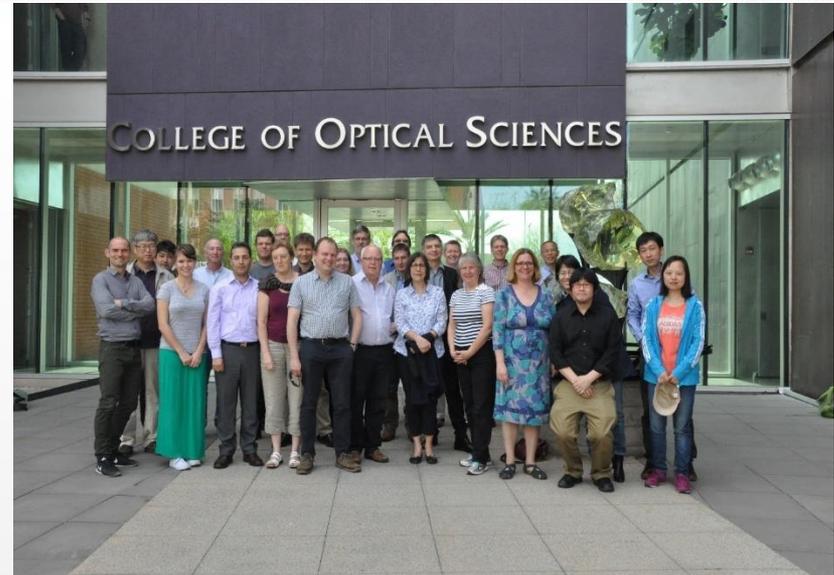


10:20	USGS EROS CalVal Update (Landsat collection processing including Landsat 1-5 MSS and Landsat 4-5 TM No-PCD)	Cody Anderson (USGS)	
10:40	Break		
11:10	IVOS Projects (task groups)		
11:100	PISCAR project progress	Patrice Henry (CNES))	Summary of activities and discussion on roadmap and next steps etc
11:40	Sensor to Sensor to surface cross-comparison/Validation		
11:40	BRDF validation of MODIS data over Railroad Valley	Carol Bruegge (JPL)	
12:00	Intercomparison of Sentinel-2, Landsat-8, and others using the Radiometric Calibration Test Site	Jeff Czapl Myers (UoA)	
12:20	Sentinel 2/MSI and Sentinel 3/OLCI radiometry Validation status	Bahjat Alhammoud (Argans)	
12:40	Lunch		
14:00	IVOS Projects (task groups): Geo spatial Image Quality		
14:00	MTF Project summary	Francoise Viallefont-Robinet (ONERA))	Presentation and Discussion
14:30	Pre-flight Cal		
14:30	TNO Satellite pre-flight Calibration facilities: Overview and outlook	Ralph Snel (TNO)	
14:50	Workshops		
14:50	Conclusions & recommendations from CEOS WGCV workshops on Surface Temp and sensor harmonisation	Nigel Fox (NPL)	
15:10	WGCV and IVOS General business		
15:10	Discussion	Nigel Fox (NPL)	<ul style="list-style-type: none"> - Review of Actions - Recommendations - Future topics - Work plan - Next meeting
16:00	End of Meeting		





- IVOS 29 @ Tucson, Arizona, USA hosted by Uni of Arizona Mar 2017
- 26 agency/orgs represented
- 30 attendees + 10 remote
- All themes and topics (work-plan discussed or summarised)
- **3 joint (GSICS) webex on solar irradiance**
- **4 th MTF workshop (Mar 2018)**
- **4? PICSCAR webex (Joint GSICS)**
 - 2nd Meeting (4th inc pre-cursors)
- **Surface Temp Val workshop (Oct 17)**
- **Rad cal workshop (Europe focus) Aug 17)**



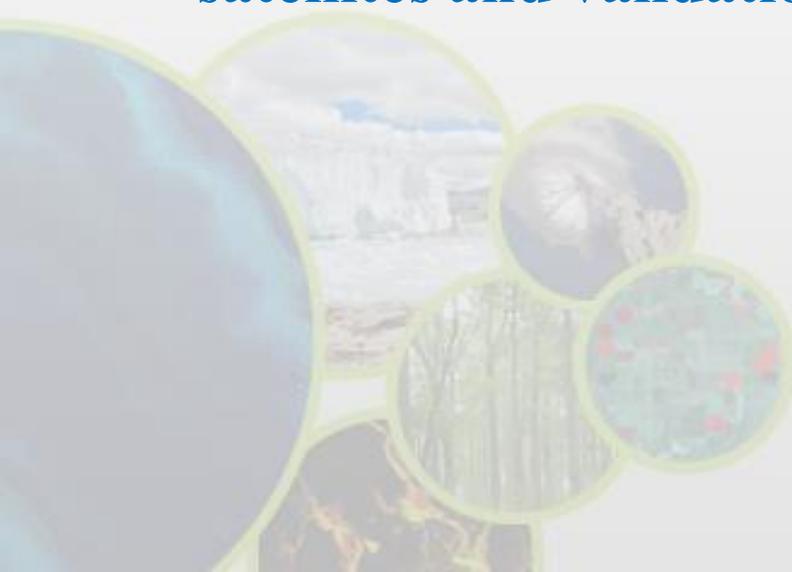
Special Projects:

- **RadCalNet team met Mar 2018 Various telecons**
- **O-colour vicarious Cal comparisons started April 2017 (continue)**
- **Terminology task team established**



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 Good Practices*
- *Interchangeable/readable formats*
- *Results/metadata - databases*

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

Work plan

The logo for the Committee on Earth Observing Satellites (CEOS), featuring the letters 'CEOS' in green with a small globe of the Earth integrated into the letter 'O'.

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

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

Land surface reflectance	- Czapler 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)**
- **O-Colour Vicarious Cal comparisons** - **Fox (NPL, UK)**
- **Others in progress/development/related**
 - **Establishing a CEOS Reference and method of use for L1 radiometric interoperability (with GSICS) (including potential 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**
 - **Vocabulary**



R.2017-1

Following the successful Beta Testing of RadCalNet, IVOS is looking for CEOS-WGCV endorsement for opening as an operational network (once the remaining tasks listed in the RadCalNet WG minutes are complete). IVOS asks WGCV to set up the necessary governance structure to approve RadCalNet sites.

R.2017-2

IVOS recommends the selection of a high spectral resolution solar spectrum to become a reference spectrum that is based on the SOLID approach linking the Thuillier and COSI spectra giving both an extension into the IR and providing higher spectral resolution (target 0.005 nm), along with a technical note on how to interpret and use this model.

R.2017-3

IVOS recommends that the test sites in the MTF catalogue should be made available as CEOS recommended sites.

R.2017-4

IVOS recommends that a CEOS-recommended reference dataset is provided for the community to test their MTF estimation methodologies



Action number	Activity	Date
AP.2017-1	Nigel Fox to edit the IVOS vision statement (in presentations and online) to change the phrasing "community best practices" into "community good practices". Similarly Kurt Thome to update similar wording on the WGCV workplan related to IVOS	Next meeting
AP.2017-2 carried over 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	Next meeting
AP.2017-3	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.	Next meeting
AP.2017-4	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. Nigel Fox to liaise with Steffen Dransfeld to get an appropriate location in the CalVal wiki to store these "stories"	Next meeting
AP.2017-5	Nigel Fox to keep IVOS informed of potential actions on the IVOS membership of the LSI-VC on the MRI case study on interoperability of Landsat and Sentinel-2 for Analysis Ready Data	Next meeting



AP.2017-6	Marc Bouvet to liaise with IVOS and WGCV chairs to be ready to open RadCalNet to be announced at CEOS-SIT meeting	Sep-17
AP.2017-7	Marc Bouvet to ensure that there are operational links in both directions between the CalVal Portal and the RadCalNet Portal	When RadCalNet goes public
AP.2017-8	IVOS members to consider possibilities for new RadCalNet sites, following the public opening of RadCalNet. IVOS will provide guidance on this process through the RadCalNet WG and the RadCalNet portal	When RadCalNet goes public
AP.2017-9	Patrice Henry to set up a teleconference discussion about the PICS BRDF (and atmospheric/spectral) modelling comparison approaches.	Next meeting
AP.2017-10	Patrice Henry to prepare a way to summarise the studies of PICS that have already been performed and to encourage people to provide information for this	Next meeting
AP.2017-11	Patrice Henry and Beatrice Berthelot to produce a mock-up of the webportal for PICSCAR and share this at a teleconference with IVOS members and (where helpful) in discussion with the administrator of the CalVal portal.	Next meeting
AP.2017-12	Emma Woolliams and Patrice Henry to explore requirements for the uncertainty analysis for modelling-related case studies (BRDF or spectral modelling of PICS).	Next meeting

AP.2017-13	Nigel Fox to discuss with Margrit Haberreiter and create a small task group (also including Tom Stone) to select a high spectral resolution solar spectrum and develop notes to guide users, to be presented to WGCV in May. Jack Xiong and Tom Stone to discuss this with GSICS and invite them into the task group.	End April
AP.2017-14	Nigel Fox and Carol Bruegge to discuss in advance of the CEOS WGCV meeting what the needs and requirements might be for a comparison of surface reflectance radiometers (field and/or preflight calibration), so that Nigel can bring this to CEOS WGCV. [could also be part of preflight workshop - check!]	End April
AP.2017-15	Dennis Helder and Steffen Dransfeld to discuss the migration of the USGS test site catalog to the CalVal portal. And also discuss with PICSCAR about harmonising this with the PICS catalogue	Next meeting
AP.2017-16	Emma Woolliams to contact IVOS about creating a small task group to work together on establishing an initial vocabulary and collation of training materials about key concepts. Also to discuss with Steffen Dransfeld hosting this discussion on the CalVal Portal (in an initially restricted area)	Next meeting
AP.2017-17	Emma Woolliams to complete the minutes and Nigel Fox to send these to IVOS along with a link to all presentations onto the CalVal portal.	End March
AP.2017-18	Nigel Fox and Marc Bouvet to organise dates and practicalities for the next IVOS meeting.	Next meeting
AP.2017-19	Everyone to consider possible alternative candidates for chairing IVOS if desired.	Next meeting