

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



## Introductions



20 seconds:

Name
Organisation
Particular specialism / interest





## **Objectives of meeting**



- 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







14:00

14:20

Application of SPARC to L8 and

Extra terrestrial methods

Wednesday Mar 15 <sup>th</sup> IVOS Plenary Meeting Webex: see page 5			
08:00 AM	Registration/Entra	•	age J
08:30 08:45	Welcome by the University of Arizona host (Assistant Dean: Professor Justin Walker) University of Arizona Radiometry group overview		
09:15	IVOS chair Intro	Nigel Fox (NPL)	Meeting intro  Brief Introductions  Objectives  Agenda  Actions  Terms of reference  IVOS report to CEOS WGCV 40
10:15	Break CEOS WGCV and CEOS initiatives		
10:45			
10:45	Introduction and discussion on how IVOS can and should contribute	Kurtis Thome (lead, NASA)	CEOS & CEOS WGCV workplan  - WGCV chair report  - Carbon task force actions  - Moderate resolution sensor interoperability (Analysis ready data) initiative
12:00		L	unch
13:30	Sensor Radiometric Calibration/monitoring methods		
13:30	Lunar	Tom Stone (USGS)	Update on Lunar Cal Development and

update

Satellites

Update on Specular Array Radiometric

calibration techniques using PLEIADES-HR

Progress on extra-terrestrial based

Calibration (SPARC) method



	Metrology method	ls	
14:40	The 'Fiduceo' project	Emma Woolliams (NPL)	Applying robust 'forensic' metrological methods to satellite data
15:00		В	Break
15:30	Progress on RadCalNet	Marc Bouvet (ESA)	Report and next steps from workshop including discussion
16:30	Report on Picscar	Patrice Henry	Presentation and discussion of work plan
:15 prox		Er	nd of day 1

DINNER

(self-funded)

Others?

(CNES)

(Raytheon)

Stephen Schiller

Aimé Meygret

**Validation** 

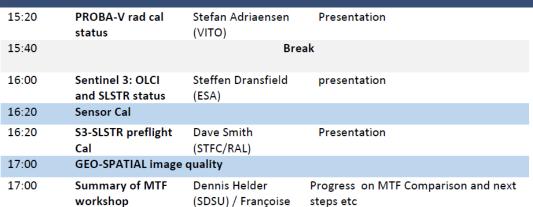


	Thursday 16 March Webex: see page 5			
CEOS initiatives			<b>5</b>	
09:00	Solar Spectral	Chair to lead (webex)	Results of CEOS / GSICS discussion and move to a recommendation.	
10:30	New test sites futur	e (RadCalNet)		
10:30	Shatdzhatmaz test site			
10:50		Brea	k	
11:20	New test sites conti	nue		
11:20	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 GHRSST	
12:20	Results of SST/LST comparisons	Nigel Fox (NPL)	CEOS comparison results	
12:40		Lunc	h	
14:00	14:00 Ocean Colour			
14:00 Status of comparisons a 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	





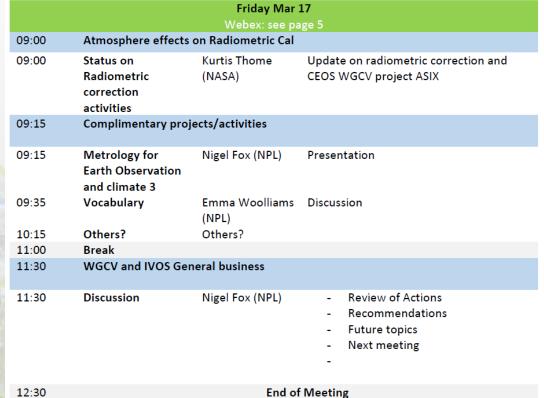
17:40 approx



**End of Day** 

Viallefont-Robinet

(ONERA)





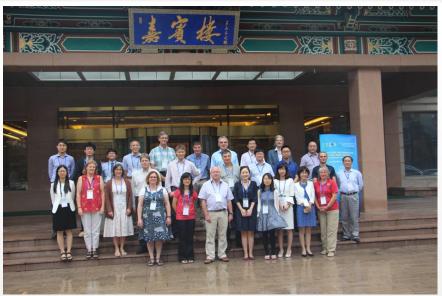
alidation



## Summary of activities



- 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 Statement**



#### **Mission**

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



## **Terms of Reference**



- 1. Promote international and national collaboration in the calibration and validation of all IVOS member sensors.
- 2. Address all sensors (ground based, airborne, and satellite) for which there is a direct link to the calibration and validation of satellite sensors;
- 3. Identify and agree on calibration and validation requirements and standard specifications for IVOS members;
- 4. Identify test sites and encourage continuing observations and inter-comparison of data from these sites;
- 5. Encourage the preservation, unencumbered and timely release of data relating to calibration and validation activities including details of pre-launch and in flight parameters.
- 6. 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. Validation



#### **IVOS: Vision**



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 Working Group on Calibration and Validation



### Work plan



## 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, GHRSST) - 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) - ?
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## Specific projects/cross-cutting

- RadCALNet Bouvet (ESA)
- PICSCAR (with GSICS?) Henry (CNES, F)
- SST/LST cross-comparison (+ VC-SST & LPV Fox (NPL, UK) (instrument Cal for LST)
- 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



# IVOS Recommendations/info to CEOS WGCV



Deci	sion number	Decision
R.20	16-1	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.20	16-2	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.



## Minutes and Actions of IVOS 28

AP.2016-1	<b>Nigel Fox</b> 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	<b>Nigel Fox</b> 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	<b>Everyone</b> 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	<b>Everyone</b> with access to or knows how to access to desert sand (potential PICS) or information on its optical properties to contact Onera ( <b>Françoise Viallefont</b> ) 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 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 × 20 km² and 100 × 100 km² 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

# CESS Minutes and Actions of IVOS 2800

		<b>Everyone</b> 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
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AP.2016-9	<b>Everyone</b> 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	<b>Everyone</b> to make <b>Emma Woolliams</b> aware of existing "official" groups (standardisation organisations) making relevant vocabularies at the moment	Sep-16
AP.2016-11	<b>Emma Woolliams</b> 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	
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	<b>Everyone</b> 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	<b>Dennis Helder</b> and <b>Françoise Viallefont</b> to ask the operators of the checkerboard sites formally about the current status of maintenance of the sites.	Oct-16

## Minutes and Actions of IVOS 28

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 WGCVand to consider including a link from the CEOS CalVal portal to the USGS site catalogue	Mar-17
AP.2016-18	<b>Marc Bouvet</b> 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	<b>Everyone</b> to make suggestions to <b>Nigel Fox</b> for topics for discussion at future CEOS-WGCV-IVOS meetings to ensure new topics are brought in	Mar-17
AP.2016-20	<b>Everyone</b> 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	<b>Nigel Fox</b> and <b>Jeff Czapla-Myers</b> 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	<b>Emma Woolliams</b> and <b>Nigel Fox</b> to ensure that the meeting minutes, photos, action list and presentations are available to the IVOS mailing list	End July

**Working Group on Calibration and Validation**