



# Working Group on Calibration and Validation (WGCV)

## Infrared Visible and Optical Sensors (IVOS) subgroup: #35

Nigel Fox

NPL (with UKSA support)

DLR, Oberpfaffenhofen 2023



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**
- **Responses to WGCV: CEOS solar Spectral Irradiance impact, CEOS-FRM, Uncertainty/traceability, TIRCaNet**

Tuesday 26th Sep

IVOS Plenary

[Click here to join the meeting](#)



08:30 Registration

09:00 Welcome/Logistics by DLR (Host)

09:15: Fox (Chair) Meeting intro

- Brief Introductions
  - Objectives
  - Agenda
  - Actions
- Terms of reference

09:45 CEOS level initiatives

10:15 CEOS + WGCV Anderson

10:40 CEOS-FRM Fox

11:00 Break

11:20 CEOS/GSICS Preflight workshop Fox

11:40 JACIE/VH Rhoda Anderson

Quality initiatives

12:00 SITSat task group Fox

12:20 Discussion (all topics)

12:30 Lunch

13:30 Uncertainty Assessment and delivery

Anderson, Hunt, Woolliams

Discussion

15:30 Break



16:00 Sensor status

16:00 Lunar calibration/comparison of NOAA NPP 20 & 21 (VIIRS) Xiong

16:20 Sentinel 3 status Dransfield

16:40 Copernicus optical sensors L1 validation Alhammoud

17:00 Cal/Val methodology for the ~~SatVu~~ HotSat-1 McMillan

MWIR thermal imager

17:20 Recalibration of HJ-1B Wang

thermal infrared historical image using ERAS reanalysis data

17:40 END of DAY2

Wed 27th Sep

[Click here to join the meeting](#)

09:00 **Hyperspectral**

09:00 DLR Host (EnMAP, DESIS activities etc) Bachman + DLR Colleagues

10:30 Validation of Enmap Brell

10:50 CEOS guidance to hyperspectral Ong

11:10 **Break**

11:30 **Hyperspectral continued**

11:30 CNES activities for Hyperspectral Meygret

12:00 **Cal/Val services**

12:00 Hypernets De Vis

12:20 Eradiate a community RT code Leroy

12:40 Validating RT code Leroy

13:00 **LUNCH**

14:00 **Impact of solar irradiance spectrum**

14:00 CEOS reference solar irradiance spectrum web page  
  
Potential impact on perceived sensor performance  
  
Consequences for interoperability  
  
How to advise customers!

15:30 **Networking/Munich facilities visit?**

17:30 - **No HOST DINNER**

Thurs 28th Sep

[Click here to join the meeting](#)

09:00 Comparison tools / New space services

09:00 Dimitri evolutions Alhammoud

09:20 Sensor performance assessment Hunt

9:40 Site selection for newspace Anderson

10:00 L1 Cal Method capability database Fox

10:20 DLR facilities Tour

11:15 Break

11:30 Test sites/national activities

11:30 Modelling of TOA reflectance for stable field in northwest China and it's calibration application Ma

11:50 Australia Ong/Lau

12:20 Israel Ben-Dor

12:40 Lunch

14:00 (TIRCALNet) TIR/LST Cal/Val network discussion Dransfield/Meygret (led)

16:00 Break

16:20 Radiometer for IR cal.val Smith

16:40 CEOS IR radiometer comparison Yamada

17:00 New space IR sensor: Ororatech Seifert

17:30 End Day



Friday 29 Sep

[Click here to join the meeting](#)

09:00	<u>RadCalnet</u>	Bouvet
09:30	Lunar calibration activities at Vito	<u>Adriaensen</u>
09:50	STAR Sat Pre-flight Cal facility	Green

**10:10 communications**

10:10	Cal Val Portal	Castracane
	Case studies	
	Discussion	

11:00 Break

**Actions /AOB**

11:15 Actions /recommendations /AOB

12:00 Lunch and Meeting close

## Mission

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



- 1. Promote international and national collaboration in the calibration and validation of all IVOS member sensors, Level 1.**
- 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.**

***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 Practises***
- ❖ ***Interchangeable/readable formats***
- ❖ ***Results/metadata - databases***
- ❖ ***Shared learning***
- ❖ ***Recommendations as appropriate***

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

## Structured into themes and led by ‘champions’ (Plus specific projects)

Land surface reflectance - Czapler Myers (U of Arizona USA)

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

Surface Temperature (link to VC-SST, GHRSSST) - Corlett (Eumetsat)

Geo spatial image quality - Helder (SDSU, USA) & Viallefont (ONERA)  
**NEED TO REPLACE + hold meeting to define scope**

### PROJECTS

**PICSCAR**

**RadCalNet**

**SST & OC Comparisons**

**Vocabulary**

**Sensor pre-flight workshop**

**Uncertainty/traceability**

**TIRCalNet**

**P Henry (CNES)**

**M Bouvet (ESA)**

**N Fox (NPL)**

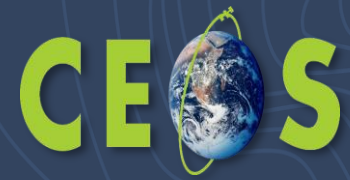
**E Woolliams (NPL)**

**N Fox (NPL)**

**S Hunt (NPL)**

**S Dransfeld (ESA) & A Meygret (CNES)**

# Summary of activities



- IVOS 34 @ Reston, USA  
hosted by USGS Aug/Sep 2022  
(next meeting DLR Oberpfaffenhofen, Germany  
Sep 25-30 2023)

- 24 agency/orgs represented
- 34 attendees + 32 on-line +31 OC topic
- Most themes and topics (work-plan  
discussed or summarised)

## Interim virtual discussions:

- SITSCOS workshop Sep 2019)
- Solar spec irradiance 2021
- Calval portal 2021
- ARD/Interoperability 2021
- PISCAR virtual 2021



## Special Projects:

- RadCalNet team met Mar 2019/Aug 22  
Various telecons p
- Terminology task team established and active  
with WGCV
- FRM4Veg Comparison (LPV) SRIX Jul 22
- FRM4STS comparison Jun 22
- TIRCalNet (Various)



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*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**

# Actions of IVOS 34



Action number	Activity	Date
AP.2019-2 Carried over AP.2018-1	<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	To be done after the completion of the template AP 2019-17/18
AP.2019-5 carried over AP.2018-4	<b>Steffen Dransfeld</b> and <b>Nigel Fox</b> to explore prospect of an end-to-end benefit of Cal/Val for SST (Linking FRM4STS and SLSTR/ATSR+ series)	We should try to do this
AP.2019-6 carried over AP.2018-19	<b>Patrice Henry</b> to work with <b>Nigel Fox</b> to create a "news story" on PICSCAR that shows the link to WGCV priorities.	Perhaps we should still try to do something here
AP.2022-1	<b>Nigel Fox</b> to email the mailing list to encourage a volunteer for leadership of the geo spatial image quality task group and to appoint a leader before the next meeting. And for the <b>new chair</b> to organise a teleconference to define the scope and strategy for the task group.	Next IVOS
AP.2022-2	<b>Anyone</b> interested in participating in the vocabulary working group to contact Emma Woolliams	Next IVOS
AP.2022-3	<b>Anyone</b> with recommendations for the BIPM-WMO joint workshop "Metrology for Climate Action" to contact Emma	26th September

# Actions of IVOS 34



AP.2022-4 (Reformatted AP.2019-17)	Nigel Fox and Emma Woolliams to review the template that was developed in 2019 on presenting the different methods, and to produce a fresh table template, alongside a workflow of how the table is filled in, <u>reviewed</u> and published.	Next IVOS
AP.2022-5	NOAA VIIRS team (Jason Choi) will talk to NOAA management ( <u>Changyong Cao</u> ) on this PICSCAR future action on VIIRS data.	Next IVOS DONE
AP.2022-6	Patrice Henry and Rajendra Bhatt to discuss ways that PICSCAR can relink to the ongoing GSICS activities in a time efficient manner (link to Dave Doelling and Fred Wu)	Next IVOS
AP.2022-7	Patrice Henry to organise a PICSCAR online workshop and publicise it to bring in new participants.	End 2022
AP.2022-8	Steffen Dransfeld to check whether Sentinel-3 should be included in the list for self-assessment of the synergy SDR products for CARD4L and to discuss with Cody Anderson	End 2022
AP.2022-9	Emma Woolliams to compare the intrinsic interpolation method her team has used in comparison to the results <u>Mary Pagnutti</u> and Bob Ryan presented on per pixel uncertainty for Landsat. And to include Esad Micijevic in those discussions.	End 2022



# Actions of IVOS 34



AP.2022-10	<b>Nigel Fox</b> to set up a half day discussion group either online or at the next IVOS meeting to consider Sentinel and Landsat per pixel uncertainty efforts	Next IVOS
AP.2022-11	<b>Nigel Fox</b> and <b>Cody Anderson</b> to set up a discussion on the curation and dissemination of uncertainty data information (volume / formats) to link WGCV and WGISS, particularly for imaging sensors.	Early 2023
AP.2022-12	<b>Nigel Fox</b> and <b>Odele Coddington</b> to discuss getting solar irradiance spectrum onto the <u>CaVal</u> portal with notes to users about encouraging the use and being clear about the use. <u>Also</u> to consider how to get it into tools like MODTRAN and into level 2 data products (especially radiance to reflectance).	End 2022
AP.2022-13	<b>Nigel Fox</b> and <b>Odele Coddington</b> to organise a working meeting and then a wider virtual meeting specifically about using the solar irradiance spectra and the impact of the choice / change of spectrum on communities and operational sensors.	Early 2023
AP.2022-14	<b>Steffen Dransfeld</b> and <u><b>Aimé Meygret</b></u> to produce a draft roadmap and a summary of the topics for discussion to work towards a CEOS reference network for LST to be shared by those interested in this work.	End 2022