Working Group on Calibration and Validation

Minutes of the
38th CEOS WGCV Plenary

Co-Hosted by:

NOAA, USGS and NASA,
at the NOAA Center for Weather and Climate Prediction
College Park, Maryland, USA
Sept. 30th to Oct. 2nd, 2014

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Executive Summary

The 38th Working Group on Calibration and Validation (WGCV) plenary meeting was co-hosted by NOAA, USGS and NASA at the NOAA Center for Weather and Climate Prediction (NCWCP), in College Park, MD, USA, from Sep 30th to Oct 2nd, 2014. There were over 40 delegates representing 22 agencies and institutions internationally. Some participants joined the meeting virtually via web-conferencing.

Along with the WGCV Chair's report and subgroup reports for LPV, IVOS, ACSG, SAR, MSSG, and TMSG; fifteen agencies reported on the status of current missions, future missions as well as on current and planned calibration and validation activities.

Furthermore, focused discussions were held on existing and potential interactions between VCs and WGCV with presentations by SST-VC, ACC-VC, PC-VC and LSI-VC along with discussion on Cal/Val needs from the VC perspective. Also, potential interactions between WGCV and WMO were further explored with GSICS representatives who were invited to talk on topics of inter-calibration.

At the CEOS level, the CEO, Kerry Sawyer, gave an overview of past and upcoming CEOS activities. At the GEO level, Osamu Ochiai from the GEO Secretariat provided an update on GEO activities along with priorities for 2015 and discussions were held on possible areas of collaboration with CEOS.

Special sessions were once again held at this WGCV meeting to discuss topics of interest to many subgroups and agencies (cross-cutting themes) in order to identify potential linkages/collaborations on specific themes. Topics discussed included cloud masking, global DEMs, and also the RADCALNET initiative.

A new WGCV Vice-Chair for the 2014-2016 term was nominated by WGCV. The successful candidate is Dr. Kurtis Thome of NASA. WGCV will recommend Dr. Thome to CEOS for endorsement as the new WGCV Vice-Chair, at the next CEOS-28 plenary occurring in Tromsø, Norway on Oct 29-30, 2014. Also, this was the last WGCV plenary for Dr. Satish K. Srivastava as Chair. WGCV members thanked Satish for his dedication and appreciated his contributions made to CEOS. At the CEOS-28 plenary, Satish will hand over the chairmanship to Dr. Albrecht von Bargen, the current Vice-Chair. Members also thanked Mr. Eric Arsenault for his excellent support as WGCV Secretariat in managing the activities of WGCV for last two years.

Finally, the next 39th WGCV plenary meeting will be hosted by DLR from May 6th to 8th, 2015 in Berlin, Germany.

Tuesday, September 30th, 2014 – Day 1

Welcome, Host Presentations, and WGCV Chair's Report

Chair's Welcome

The WGCV Chair, Dr. Satish Srivastava, welcomed participants to the 38th Working Group on Calibration and Validation Plenary (WGCV-38) at the NOAA Center for Weather and Climate Prediction in College Park Maryland, USA. He also thanked NOAA, USGS and NASA for their support in co-organizing the meeting and was grateful to Dr. Changyong Cao and NOAA for accepting to host the meeting in their facility.

Roll Call

Participants were asked to introduce themselves via a roll call. The complete list of registered attendees for WGCV-38 may be found in Appendix 1.

Adoption of Agenda

The WGCV-Chair presented the proposed meeting agenda to WGCV-38 participants. It was adopted with no further modification. A copy of it may be found in Appendix 2.

Host Presentations and Introductions

NOAA - Center for Satellite Applications and Research (STAR) (Dr. Michael Kalb)

Dr. Michael Kalb, Deputy Director for the Center for Satellite Applications and Research (STAR) at NOAA welcomed participants to WGCV-38. He then gave an overview of STAR including a summary of its roles, responsibilities, and main activities. A copy of Dr. Kalb's presentation is available on the WGCV-38 meeting webpage [PDF].

NOAA – Joint Polar Satellite System (JPSS) Overview (Dr. Mitch Goldberg)

Dr. Mitch Goldberg, JPSS Program Scientist, gave an overview of the JPSS program which is a joint NOAA and NASA initiative to launch and operate a set of three polar orbiting satellites (Suomi NPP, JPSS-1, JPSS-2), to provide global imagery and atmospheric measurements. The JPSS program is set to be operational through 2025. A copy of Dr. Goldberg's presentation is available on the WGCV-38 webpage [PDF].

Questions/Comments:

G. Stensaas (USGS): With regards to the various downlink antennas used around the World to downlink NOAA data, Greg asked if NOAA has a process to ensure that the downlinked information is standardized across all stations.

M. Goldberg (NOAA): At the base, NOAA ensures that the radiance products (Level 1b) products that feed other products (i.e. Level 2 products such as EDRs) are all identical. The NOAA products are generated using a set of standard executables, for processing the downlinked data, which are based on the Algorithm Development Library (ADL). These executables are publicly available and are the same as those used on NOAA's operational systems. All outputs from these executables are therefore produced to a common standard.

J.-P. Muller (UCL): Asked if NOAA has any plans to set up data silos of CLASS data on other continents other than North America due to the rather restrictive bandwidth available to download these large volume data sets from abroad if one wants to download the global data set for the purpose of studying global issues.

M. Goldberg (NOAA): The JPSS program is mainly responsible to provide an interface to CLASS but it is not responsible for the distribution of the data or managing the data servers that handle this task. However, it is willing to raise the concern and also bring it up for discussion at the next Climate Symposium. Direct readout stations are also an option if you are geographically positioned to receive this live data stream.

USGS (Tom Cecere)

Mr. Tom Cecere, International Liaison at USGS, welcomed participants on behalf his agency. An overview of the USGS Land Remote Sensing Program was presented. A copy of Mr. Cecere's presentation is available on the WGCV-38 webpage [PDF].

Questions/Comments:

G. Schaepman (LPV Chair, U. of Zurich): Asked how USGS is relating its ECVs to the original definitions and target requirements of ECV's as defined by the Climate community?

T. Cecere (USGS): Responded that he is not sure how they compare to the original definitions but those that USGS have produced so far (i.e. burned areas, etc.) were those defined through the GEO communities. USGS focused on those ECV's that Landsat had the most potential to contribute some useful information.

M. Román (NASA): Added a comment specifically on the Surface Water Extent variable. It is not an ECV recognized by the international bodies but it does not mean that it cannot become one. LPV is there to help agencies achieve the requirements needed to define critical variables that they deem necessary to do their work. The Land Surface Temperature is an example of this effort where LPV is actively involved.

G. Stensaas (USGS): Further commented that USGS is very interested in continuing to work with LPV and WMO-GCOS on Fundamental Climate Data Records and ECV products. John Dwyer of USGS has been highly integrated in the process, both in LPV and in the WG on Climate. More specifically, USGS has been involved in the surface reflectance and land surface temperature aspects with regards to CDRs. USGS is also active on Land Cover, Burned Area, Snow Cover, LAI and Surface Water ECVs. Also, a new ECV is currently being developed on aboveground biomass (AGB). USGS is always interested in collaboration with CEOS on these.

J.-P. Muller (UCL): Asked if the Landsat-8 orbit was linked to the Terra orbit as was Landsat-7 and the relation to VIIRS in terms of interoperability between moderate and fine resolution.

T. Cecere (USGS): Replied that Landsat-8 is on the exact same orbit as Landsat-7 but 8 days out of phase. VIIRS is on an afternoon orbit unlike L7 and L8 which are on morning orbits.

NASA (Dr. Kurtis Thome)

Dr. Kurtis Thome of NASA welcomed participants to the meeting on behalf of his agency and thanked co-hosts NOAA and USGS for their great effort in organizing and hosting the meeting. He wished everyone a very productive meeting.

WGCV Chair's Report (S. Srivastava)

The WGCV Chair presented his report on the Working Group's activities since WGCV-37. An overview of meetings that he attended was given, including meeting highlights and resulting actions with reports on their status. Meetings attended included the SEC and SIT telecons, the SIT-29 meeting and SIT-Technical Workshop.

He also reported on VC/WG day that was held in conjunction with the SIT-Technical Workshop. WGCV participated and helped to organize some of the sessions for that day and also showcased the SST-VC and WGCV collaboration. In a summary wrap-up of the VC/WG day that was presented at the SIT Workshop 2014, the SST-VC and WGCV collaboration was highlighted by the SIT Team as a leading success story for CEOS WGs and VCs to follow as an example.

A copy of the WGCV Chair's Report is available on the WGCV-38 webpage [PDF].

Questions/Comments:

T. Cecere (USGS): Asked clarification about the reporting paths to be used by VCs within CEOS.

S. Srivastava (WGCV Chair, CSA): The WGCV chair explained that VCs report directly to the SIT Chair who then reports to CEOS Chair (primary reporting). Working Groups on the other hand, report directly to the CEOS Chair.

G. Stensaas (USGS): Asked if there is now a mandatory process to follow in CEOS for the Working Groups to interact with Virtual Constellations. WGCV subgroups work with colleagues from VCs on a regular basis. Is this meant for key large projects?

A. von Bargen (WGCV Vice-Chair, DLR): Responded that there is not a specific process in place but CEOS is now examining more closely the interactions between WGs and VCs. On a working level, the interaction may be happening informally but at the CEOS level, the coordination of efforts will be better consolidated between WGs and VCs. While there are good examples of WG/VC collaborations, there are also some VCs or WGs that are doing the work of Working Groups or Virtual Constellations independently which sometimes can lead to the duplication of efforts. The WG/VC day that was held recently was meant to facilitate the interaction process

between the two entities. There will also be an opportunity to discuss how WGCV can support VCs, or vice-versa, during this current meeting (WGCV-38).

S. Srivastava (WGCV Chair, CSA): Added that WGCV has gone through a major thinking process to define its deliverables within CEOS which is reflected the new CEOS 3-year work plan and many of the WGCV deliverables involve interactions with VCs. Also, through the new CEOS governance structure, there is a process now in place for the submission of new initiatives to facilitate their evaluation by CEOS for approval.

Review of Minutes from WGCV-37

The minutes of the previous WGCV-37 meeting held in Frascati, Italy in February 2014 were reviewed and accepted as produced. The official copy of these minutes is available on the CEOS WGCV website [PDF].

Subgroup Sessions (I) and (II)

Terrain Mapping Subgroup – TMSG (J.-P. Muller)

A copy of the TMSG Chair's Report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

Infrared, Visible and Optical Sensors – IVOS (N. Fox)

A copy of the IVOS Chair's Report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

G. Schaepman (LPV Chair, U. of Zurich): Gabriela commented on a perceived inconsistency in terminology with the terms calibration, validation and inter-calibration.

A. von Bargen (WGCV Vice-Chair, DLR): Replied that the terms calibration and validation are well defined by WGCV (see website) but inter-calibration is not necessarily clearly defined.

N. Fox (IVOS Chair): Suggested that the term inter-calibration should be used rather than inter-comparison. We should talk of inter-comparison in situations where different sensors, which are independently calibrated and have their own uncertainty budget, are compared.

J.-P. Muller (UCL): Asked about the meaning of the term "Fiducial Reference".

N. Fox (IVOS Chair): Responded that it is defined as an independent data set for the validation of satellite products which is traceable, well documented and cost-effective in terms of delivering the measurement requirements.

Atmospheric Composition Subgroup – ACSG (B. Bojkov)

A copy of the ACSG Chair's Report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

CEOS - GEO Interactions

GEO Update and Priorities (O. Ochiai, GEO) – *Remote Presentation*

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

G. Stensaas (USGS): When will the next GEO work plan be created and made available as a follow-up to the current GEO 2012-2015 work plan?

O. Ochiai (GEO): The first step is to develop the IPWG Implementation Plan for acceptance and subsequent endorsement at the next Ministerial Summit (end of 2015). After that, work on updating the GEO Work Plan can go forward (likely in 2016).

Agency Reports (I)

Canadian Space Agency – CSA (S. Srivastava)

A copy of the CSA report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

B. Bojkov (ESA): Asked about the status of the decision on the extension of SCISAT mission.

S. Srivastava (CSA): Currently, the SCISAT mission is continued until March 2015. The extension of the mission beyond March 2015 was recommended after review and external consultation by CSA, but the funding for its operations still requires further evaluation and approval.

National Aeronautics and Space Administration – NASA (K. Thome)

A copy of the NASA report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

T. Malthus (CSIRO): Asked why the HyspIRI mission was not included on the NASA 2015-2022 flight portfolio list on slide 8.

K. Thome (NASA): Responded that any mission projected beyond the year 2020 is subject to constant revision by NASA. The HyspIRI mission may be re-inserted in the list in the future.

N. Fox (IVOS Chair): Asked a question on slide 11 regarding the Landsat/Sentinel-2 inter-calibration and why the initial radiometric differences were so large (%15) and how they were reduced to less than 5%.

K. Thome (NASA): Replied that Brian Markham would be the person to ask but believes that differences in the FoVs of the instruments were not initially accounted for and could explain the initial large differences.

Commonwealth Scientific and Industrial Research Organization - CSIRO (T. Malthus)

A copy of the CSIRO report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

Geoscience Australia – GA (M. Thankappan)

A copy of the Geoscience Australia report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

S. Srivastava (CSA): Asked if GA compares its measurements with those of the agencies and how well do they compare.

M. Thankappan (GA): Responded that comparisons are in progress with the RISAT satellite and initial results show good correspondence but there are issues with accessing the large data sets due to their current format which is currently being worked out. Also stated that GA is open to working with any agencies that would like to do measurement comparisons with their sensors.

J.-P. Muller (UCL): Asked a question regarding the Terrain Correction work shown on slide 11 and was surprised to see differences between the correction done with the SRTM 1 sec. and the TanDEM-X I-DEM 30 m. The I-DEM 30m products appears to do a better job at correcting for topography than the SRTM, at least visually.

M. Thankappan (GA): Replied that visually, it appears to be the case but further verification to explain this difference is required. He suspects that the TanDEM-X I-DEM 30 m product provides more detailed information than the SRTM which is helping the terrain illumination correction.

National Remote Sensing Centre of China – NRSCC (C.R. Li)

A copy of the NRSCC report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

S. Srivastava (CSA): Referred to the CAS-AOE Unmanned Aerial Vehicle (UAV) program and work that was presented at the WGCV-36 meeting in Shanghai and asked about its status.

C.R. Li (CAS, AOE): Prof. Li replied that the CAS-AOE UAV-based Remote Sensing Payload Comprehensive Validation System is still very active and an on-going program.

Centre national d'études spatiales – CNES (P. Henry)

A copy of the CNES report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

C. Cao (NOAA): Pleased that the next generation IASI-NG sensor will be based on a shorter integration time which should improve the SNR but stated that NOAA also has interest in higher spatial resolutions and asked why this was not considered as part of the requirements for the mission.

P. Henry (CNES): Replied that it was simply not part of the requirements because it was not asked for by the scientific team involved in defining the mission requirements.

C. Cao (NOAA): Asked what will be the wavelength of the MicroCarb satellite.

P. Henry (CNES): Replied that there are several options. Currently, the nominal design is based on the same wavelength as the OCO (NASA) sensor but CNES is also working on a less expensive instrument concept based on single band with an algorithm that would integrate information from other sensors.

United Kingdom Space Agency – UKSA (J.-P. Muller)

A copy of the UKSA report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

R. Eckman (NASA): Asked about the absence of an EO position in the UKSA organizational diagram.

J.-P. Muller (UCL): The function has not disappeared but the person previously in that position, Ruth Boumphrey, has moved on to another posting outside of UKSA. Therefore, the representatives at the CEOS level for UKSA will be David Parker and Beth Greenaway as principal and contact respectively.

European Space Agency – ESA (B. Bojkov)

A copy of the ESA report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

A. von Bargen (WGCV Vice-Chair, DLR): Commented that the SWARM mission was absent from the ESA presentation and that it would be interesting to include it in the ESA report for the next

WGCV plenary. The working group has not had any cal/val experience with this type of mission in the magnetic field domain and it should be addressed in the future as well as for gravity missions.

S. Srivastava (CSA): Was glad to see that QA4EO concepts are being applied in many of the ESA initiatives and it would be good to highlight these at the next CEOS plenary.

B. Bojkov (ESA): Stressed that QA4EO is not that difficult to implement and that ESA often makes it part of the requirements on contracts or in a call for proposals to ensure that the scientific teams follow best practices and document following a methodological step-by-step process to accomplish the work requested.

Brazilian National Institute for Space Research – INPE (L. Fonseca)

A copy of the INPE report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

Norwegian Space Centre – NSC (E. Herland)

A copy of the NSC report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

J.-P. Muller (UCL): Commented that one of the critical missing elements such as in the RADCALNET or AERONET networks is the long-term monitoring of the BRDF albedo, particularly of the sea ice surfaces as it changes. Asked if Norway had any intention of using its current or planned cal/val instrument infrastructure to capture such measurements.

E. Herland (NSC): Replied that the principals involved in these initiatives would have to be contacted on this question and that the activity could certainly be considered in some form or another in the future by the scientific community involved.

Belgian Federal Science Policy Office – BelSPO (J.-C. Lambert)

A copy of the BelSPO report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

Korea Aerospace Research Institute – KARI (DongHan Lee)

A copy of the KARI report is available on the WGCV-38 meeting webpage [PDF].

No questions/comments

Wednesday, October 1st, 2014 – Day 2

Agency Reports (II)

United States Geological Survey – USGS (G. Stensaas)

A copy of the USGS report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

C. Cao (NOAA): Asked who the new point of contact is regarding radiometric analysis at USGS. NOAA is interested in comparing Landsat-8 SWIR2 band with VIIRS.

G. Stensaas (USGS): A fairly well established radiometric analysis team is in place at USGS-EROS for Landsat-7 and Landsat-8 calibration and they support any cross-calibration work required by USGS. USGS can provide a list of points of contact to NOAA.

CEOS Update

CEOS Update (K. Sawyer, CEO)

The CEOS Executive Officer, Kerry Sawyer, presented an update on CEOS activities including achievements and upcoming priorities. A copy of the presentation is available from the WGCV-38 webpage [PDF].

One of the main achievements was the CEOS 2014-16 Work Plan where nine thematic areas were identified as main expected outcomes for CEOS. WGCV has identified 12 objectives/deliverables for this work plan under the theme 'Capacity Building, Data Access, Availability and Quality'. Another highlight was the publication of a set of strategic documents that will guide CEOS in the future. These documents include the: CEOS Terms of Reference (ToR), CEOS Strategic Guidance (SG), CEOS Governance and Process (GP), and Element ToRs for CEOS executive positions.

The CEO also mentioned that with the upcoming re-design of the CEOS website, the 'Actions Tracker' is being discontinued. In the interim, the status of the actions are to be tracked with an Excel spreadsheet that the CEO will be distribute to working group chairs or concerned individuals by e-mail to complete before the end of October 2014 for reporting at the CEOS-28 plenary that will be held on Nov 3rd. WGCV will update the spreadsheet based on the reporting that was done on Sept 17 at the SIT Technical Workshop.

Action WGCV-38-0: WGCV Chair, S. Srivastava, and Technical Secretariat, E. Arsenault, to review the spreadsheet to be provided by the CEO of the CEOS 2014-16 Work Plan deliverables related to WGCV with as much detail as possible to provide a good understanding of progress of the deliverable by Oct 22nd, 2014.

The timelines for the CEOS 2015-2017 Work Plan were also presented and WGCV will be solicited to review the document and provide input by mid-January 2015.

The outcomes of the SIT Technical Workshop and preparation details for the 28th CEOS Plenary and the GEO-XI Plenary were also presented.

Reference was also made to the CEOS Strategy for Carbon Observations from Space which was endorsed at SIT-29 with a study team proposed to take forward the Actions and also identify formal CEOS mechanism to manage the Actions. This study team has been called the Carbon Strategy Implementation Study Team (CSIST). The CEO also announced that CEOS agencies will be asked to nominate members for the upcoming creation of a Water Strategy Implementation Study Team.

Questions/Comments:

S. Srivastava (CSA): Asked the CEO to comment on her impressions of the VC/WG Day held at the SIT Technical Workshop.

K. Sawyer (CEOS, CEO): Thought that the VC/WG day was a great success and it set the stage for the next SIT meeting in April 2015 where the experience should be re-created. Recommends introducing more interactive discussions, but the current format also worked quite well. Stressed the importance of having the two key CEOS mechanisms, working groups and virtual constellations, keep the dialogue going between each other not just through events like the VC/WG day but also by other means.

WGCV and Virtual Constellations Interactions

The WGCV Vice-Chair introduced the WGCV and Virtual Constellation Interactions session which was first done WGCV-36, and repeated at WGCV-37, and proved to be a good discussion forum for both WGCV and the VCs on existing or potential interactions. The objective of this session is also to give the floor to the Virtual Constellations to allow WGCV to learn of their activities and their cal/val needs and provide guidance or assistance where required.

Presentations were done by representatives of three virtual constellations: Atmospheric Composition Constellation (ACC); Sea Surface Constellation (SST); and Precipitation Virtual Constellation (P-VC). A special presentation on LSI was also given to provide an update on its current status and proposed options for its future.

Atmospheric Composition Constellation – ACC (R. Eckman, NASA)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

A. von Bargen (WGCV Vice-Chair, DLR): Mentioned that there will be the ISRSE36 meeting in Berlin (May 11-15, 2015) and the WGCV-39 plenary meeting in the previous week (May 6-8, 2015). It would be worthwhile for ACC and WGCV to attempt to coordinate the ACC-11 meeting around those dates in May to allow attending each other's meetings.

R. Eckman (NASA): Responded that the dates are not yet fixed or announced, therefore it should be possible to arrange something.

A. von Bargen (WGCV Vice-Chair, DLR): Also commented, that there will be a GSICS-ACSG meeting in March 2015 and it may be a good starting point for increased collaboration to have ACC involved in that meeting.

A. von Bargen (WGCV Vice-Chair, DLR): Asked about the CarbonSat mission which was absent from the ACC presentation.

R. Eckman (NASA): Replied that it was accidentally left out but it is an important mission for greenhouse gas monitoring and in fact CarbonSat and MicroCarb have been presented and discussed at past ACC meetings.

J.-P. Muller (UCL): Asked about the lack of limb sounders: is it because of the emphasis of the science and applications nowadays is about the lower troposphere and that limb sounders are of little use in this area?

R. Eckman (NASA): Commented that it is a good observation and believes that while a lot remains to be studied in the upper troposphere/lower stratosphere, the perception is that we've solved many of the critical problems for that domain and the focus has now shifted to the lower troposphere.

Sea Surface Constellation – SST (G. Corlett, U. of Leicester)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

S. Srivastava (CSA): Mentioned that there was an excellent reception by the SIT team at the last SIT Technical Workshop regarding the very good collaboration existing between WGCV and SST-VC and the joint work to improve Fiducial Reference Measurements (FRM) for SST and LST, under funding from ESA.

X. Dong (MWSG Chair, NSSC): Commented that there are issues with the calibration of the C-band of the HY2A microwave data for ocean surface temperature. Therefore the more efforts that can be put towards the improvement of the calibration would be beneficial for the overall mission and the use of data by the SST-VC in that sense would be justified. Data is open and there is no issue in collaborating.

G. Corlett (U. of Leicester): Replied that SST-VC would like to coordinate more interaction in the calibration of these sensors because at the moment, believes that the activities are rather specific to individual agencies.

P. Henry (CNES): Asked if the strong collaboration between WGCV IVOS and SST-VC was unique to these two CEOS entities and if it is a model of collaboration that could universally work well with other VCs.

G. Corlett (U. of Leicester): Replied that it is difficult to answer for other VCs but based on SST-VC's experience, it does help when there is a common purpose which allows the interaction to be greatly facilitated on both sides.

G. Stensaas (USGS): Asked what was SST-VC's opinion on the possible existence of a group to look at validation issues for oceans, similar to what the LPV group is doing for land within WGCV.

G. Corlett (U. of Leicester): Stated that it may be difficult to clearly define a group strictly dealing with validation in the ocean domain. The clear separation of calibration and validation works well for sea surface temperature but not so sure that is that this easily applicable to other ocean domains. For example in ocean colour where much of the comparisons are done vicariously with the help of buoys for example; this may be considered to be calibration by some and validation by others.

G. Schaepman (LPV Chair, U. of Zurich): Commented that it would be important to include the Land Surface group of LPV in the activities of SST-VC should they wish to extend into Land Surface temperature domain.

G. Corlett (U. of Leicester): Stated that it was not explicitly mentioned in the presentation because the talk was focused strictly on the SST-VC activities. However, with the on-going collaboration of SST-VC with the WGCV-IVOS subgroup to improve fiducial reference measurements for SST and LST, there is a strong input from the Land Surface group via Simon Hook and Jose Sobrino on the LST aspect.

Precipitation Virtual Constellation – P-VC (S. Neeck, NASA)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

X. Dong (MWSG Chair, NSSC): Commented on the possible contribution of the MWSG to the activities of the P-VC with regards to cross-calibration of microwave sensors. MWSG would be interested in attending x-calibration workgroup meetings.

Land Surface Imaging – LSI - Update (T. Cecere, USGS)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Presented the various options being considered for the future of LSI and that will be put forward to CEOS at the upcoming CEOS-28 plenary.

Questions/Comments:

B. Bojkov (ESA): Commented that he believes that LSI still has its place within CEOS. Asked if LSI has thought about activities that would be easy to implement across the various CEOS agencies such as, for example, activities related to Landsat and Sentinel-2 on which USGS and ESA already work closely together. He believes that showcasing activities demonstrating international collaboration and usefulness of calibration/validation would be something that LSI could attempt to do.

Also referred to the Polar Satellite Task force group where discussions are being held on acquisition plans, data collections, archives, etc. along with the reprocessing of this data to address certain topical issues related to climate studies. This could be a very nice application for the LSI group that could involve the LPV and ACSG (i.e for atmospheric corrections) working groups to address various cal/val topics but also SBAS, etc. and where not much effort would be required to put together something fairly quickly for demonstration purposes.

T. Cecere (USGS): Responded that he agrees with the comment and that showing success early on helps to build momentum. Also, LSI would need to focus more on demonstrating international collaboration versus strictly just bi-lateral collaboration such as is the case with the USGS and ESA joint work with Landsat and Sentinel-2. Overall, there are many options that could be pursued by involving various working groups, other virtual constellations and agencies and would be glad to discuss these further.

M. Román (NASA): Commented that the two main stakeholders of the LPV working group are the agencies and the science community. LPV has a tendency to cater more to the science community and to define its objectives based on the issues that are of common interest to that community. It would be worthwhile if LSI could look into the gap that exists among the various stakeholders. For land EO issues, there is a significant need for having an agency coordination component, which LPV has attempted to do, but the impact that it has made has been mostly on the science side by working with PIs who are funded by agencies. He believes that a discussion needs to occur on this.

T. Cecere (USGS): Responded that he can see the LSI group working towards that but it may take a long time to achieve. He sees the importance of working with the all of the agencies to define the science requirements but also importantly, to define the operational requirements.

P. Henry (CNES): Commented that there are many activities related to land within CEOS. He also made the parallel with the ocean domain where there are many VCs (i.e. SST-VC, OCR-VC, OST-VC, OSW-VC etc.) and asked why is the land component structured differently with only one VC.

He also made reference to the many small agencies/countries that have their own missions, which are mostly over land and asked why not consider them because land applications are usually their foremost interest.

K. Sawyer (CEOS, CEO): Commented that LSI was one of the original virtual constellations in CEOS created in 2007. The challenge for LSI and CEOS is with regards to all of the ad-hoc teams that have come along (i.e. GEOGLAM, GFOI etc.) that are focusing on one particular discipline. Unlike, LSI, these are not permanent mechanisms and require annual renewal by CEOS.

Unfortunately, there has not been as much support by the CEOS agencies for LSI as with the other ad-hoc initiatives.

T. Cecere (USGS): Referred to the LSI concept paper which is available on the CEOS website for further consultation.

Subgroup Session (III)

Microwave Subgroup – MWSG (X. Dong, NSSC)

A copy of the MWSG Chair's Report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

G. Stensaas (USGS): Asked if the recruitment of new members and support from agencies for the MWSG subgroup is still a challenge and if so what is the proposed strategy.

X. Dong (MWSG Chair, NSSC): Responded that his suggestion is to formulate a task within the working group to look into various options and strategies.

Land Product Validation – LPV (G. Schaepman, U. of Zurich)

A copy of the LPV Chair's Report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

J.-P. Muller (UCL): Asked if LPV is looking into the inter-connections between the snow cover and albedo among its various task groups because it has been a major issue for the global albedo project and remains so for QA4ECV.

G. Schaepman (LPV Chair, U. of Zurich): Responded that Snow Cover task group within LPV is still rather young and is not yet addressing this question in particular.

M. Román (NASA): Also added that from an LPV perspective, the working group is lagging in terms of the advancements required to answer this question. The work is still not at the stage where snow retrieval algorithms are using robust BRDF accounting.

CEOS WGCV-GSICS Interaction Session

GSICS GRWG and CEOS Update, Interactions, UV Subgroup

Dr. Larry Flynn provided an introduction to GSICS and structure, with a specific focus on the GSICS Research Working Group (GRWG) which is one of three entities, along with the GSICS Data Working Group (GDWG) and the GSICS Coordination Centre (GCC), which advises the GSICS Executive Panel.

An overview of the current GSICS and CEOS WGCV interaction was provided which consists mostly, up to this point, of each group keeping each other informed of their activities. For example, WGCV Chair or his

representative is invited as observer to the GSICS Executive Panel meetings and similarly WGCV has invited GSICS at its plenary meetings. Possible future GSICS-WGCV cooperation areas were presented. These possible cooperation areas were initially presented by T. Hewison at WGCV-37. Discussion on these was put aside for further exchange during the 'GSICS activities' discussion in the 'WGCV Internal Reports' session on Wednesday afternoon at WGCV-38.

Dr. Flynn also presented an overview of the activities and work done by the Ultraviolet GRWG UV subgroup (UV GRWG UVSG) for which he is involved with. An overview of potential future research areas that the UV GRWG UVSG could attempt to tackle was also presented.

WGCV members were also invited to contribute the GSICS Quarterly Newsletter.

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

GSICS Procedure for Product Acceptance (GPPA)

Dr. Manik Bali gave a detailed overview of the GSICS Procedure for Product Acceptance (GPPA) along with an analysis of how the GSICS GPPA relates to QA4EO principles. Dr. Bali also provided insight into how GSICS evaluates maturity for GPPA in response to action item WGCV37-3 which consisted of WGCV to learn from GSICS on implementing maturity type systems within their activities. Dr. Bali presented a comparative analysis between GPPA to National Climate Data Center (NCDC) maturity matrix and showed that the NCDC Maturity Matrix is extremely comprehensive and tuned for CDR's and TCDR's while GPPA is more applicable to calibration corrections as input for such CDRs

A copy of the GSISCS GPPA presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

S. Srivastava (CSA): Thanked Dr. Flynn and Dr. Bali for their presentations on GSICS activities. Regarding the GPPA, he was glad to see that it follows many of the CEOS WGCV QA4EO principles.

J.-P. Muller (UCL): Asked about the GPPA and where, within the four product phases required to go from pre-operational to the operational phase, does the on-going validation occur once the product has been declared operational.

L. Flynn and M. Bali (NOAA /GSICS): Responded that GSICS has not fully explored this yet because it does not have many products with a long history where they have gone overly through the operations and are regularly processed. Maintenance is always a weak spot of any product that goes on into the future.

J.-P. Muller (UCL): Asked about how GSICS goes about the validation of the algorithms within GPPA and if numerical simulation is part of it.

L. Flynn and M. Bali (NOAA /GSICS): Responded that GSICS relies mostly on the publication/peer-review process of the algorithms to determine or validate that they, or the products that they produce, are satisfactory to proceed with the acceptance procedure.

J.-P. Muller (UCL): Commented that QA4ECV is exploring the use of simulations to prove that the algorithms do what they claim.

N. Fox (IVOS Chair / NPL): Added that from a QA4EO point of view, we see that there needs to be a process of running test data sets/simulations to ensure that the algorithms are producing expected outputs.

M. Bali (NOAA /GSICS): Responded that all of the GSICS products currently use an algorithm that has been endorsed by GSICS members which should alleviate in part that requirement. These are algorithms that produce products in the IR domain for example, and are using the IASI instrument as the reference for determining the relative accuracy of other sensors.

N. Fox (IVOS Chair / NPL): Commented that the focus of GSICS is about consistency and not necessarily about absolute accuracy, which is perfectly valid, ensuring that it has a harmonious system that is inter-operable into the future and that the uncertainty linked to SI is not necessarily a fundamental driver.

L. Flynn (NOAA /GSICS): Replied that achieving absolute accuracy is also an objective of GSICS but given that it is something very difficult and expensive to attain across all missions, the more pragmatic approach of consistency and relative accuracy is therefore favored.

K. Thome (NASA): Commented that as long as there is a temporal overlap in missions, then consistency and doing relative accuracy is fine. However, if a gap does occur, then he believes that the philosophy should be to do absolute accuracy (linked to SI traceability) in the event of a mission not being available to support the relative accuracy.

WGCV Internal Reports (I)

This session was open to the following WGCV representatives: WGCV Chair; Vice-Chair; Subgroup Chairs and Vice-Chairs; Members and Associates; and CEO. The goal was to do internal CEOS and WGCV reporting on various activities concerning mostly the internal core business of the working group and whereby the presence of the general plenary was not required.

GSICS and WGCV Interaction Activities

The WGCV Vice-Chair reminded the participants of the action item WGCV-37-7 from the last plenary where WGCV subgroup chairs were asked to identify and prioritize specific activity areas for interaction with GSICS.

The list of possible future GSICS-WGCV cooperation items that Tim Hewison had presented was first reviewed to start the discussion. The content of the list is as follows:

- Glossary of calibration terminology
- Best Practice Guidelines
    - e.g. Traceability,
    - Calibration Uncertainty
- Definition of Standards

- Specific interactions with WGCV Sub-Groups: IVOS, MWSG, ACC
    - Need for coordination
- Geolocation/navigation/rectification methodology & metrics
- Inter-comparison Campaigns – aircraft, ground-based support, etc.
    - Data exchange/analysis,
    - Offer to review campaign plans
- Intra-System Comparisons

The IVOS subgroup Chair, Nigel Fox, revisited slide 7 from his subgroup report and listed potential CEOS WGCV (IVOS) interactions with GSICS, following his attendance at GSICS technical workshop (March 14, 2014). Some discussion occurred with regards to this list and the general consensus was to attempt to group these under the interaction themes suggested by GSICS, not just for IVOS interactions but for all other subgroup interactions in order to represent the potential contribution to GSICS at the WGCV working group level rather than the more detailed subgroup level.

Calibration Terminology:

The WGCV Vice-Chair initiated the discussion on this topic by referring to the LPV subgroup presentation and the comment made on inconsistent definitions or use of the cal/val terminology.

Nigel Fox responded that the inconsistency is likely because there is very specific cal/val terminology to in the EO community which is used subtly differently in various domains, aside from the existing, very formal, calibration terminology.

Nigel suggested that there is an existing NIST document that could be a good reference as it does a good job at describing the EO specific calibration terminology. The subgroup chairs asked if a copy could be provided to them and it was proposed to have each subgroup chair review the document to evaluate if it is adequate for their activities within their subgroup.

> **WGCV-38-1:** N. Fox to provide a copy of the NIST document on calibration terminology to WGCV subgroup chairs by Oct 10, 2014.
>
> **WGCV-38-2:** Each WGCV subgroup to review NIST calibration terminology document to determine adequacy in relation to their activities- 1st draft review shall be provided by WGCV-39.

***Best Practice Guidelines*:**

The WGCV Vice-Chair stated that *Best Practice Guidelines* already exist within QA4EO and there is an on-going interaction which has been initiated by Manik Bali of GSICS. Therefore, this topic is already in progress.

There was also some discussion with regards to the potential contribution of the WGCV Microwave subgroup to GSICS in terms of procedures or documentation regarding best practices. The MWSG Chair agreed to initiate this interaction and mentioned that the MWSG group will be having a meeting in May or November 2015 where GSICS would be invited to attend.

WGCV-38-3: MWSG Chair to have a communication with GSICS on how WGCV can offer support on best practices by WGCV-39.

Definition of standards:

Discussion on the exact meaning of the 'Definition of standards' category was held. The general interpretation was that this category was not referring to well established and defined standards such as NIST or SI etc. but rather to other reference standards which for example might be the moon, or a cloud (i.e. what is a deep convective cloud, etc.). The interaction activity should perhaps be renamed to 'Community Specific Standards'.

Some further discussion was held on how the WGCV subgroups can best summarize their potential interaction activities to provide a working group level response to GSICS in terms of reference terminology for either definitions of these or their application.

Reference was made to QA4EO documentation which is a top level standard from which one can point to more detailed specific standards for particular application fields. The question was asked on how WGCV should respond to GSICS on the interaction topic of 'definition of standards' and it was agreed that, in general terms, WGCV can advise on developing agreed-upon reference standards and that the WGCV subgroups can contribute in terms of standard methods or procedures for particular applications. Also, WGCV would be glad to provide advice on specific meteorological standards that might be developed in GSICS and which would be consistent with QA4EO principles.

The LPV chair asked if GSICS only looks at surface reflectance (Level-1) in terms of products or if higher level products are also addressed. LPV wishes to determine its response, if one is required, regarding the potential interactions with GSICS. Larry Flynn commented that the GSICS domain for products is Level-1. He also added that discussions were held in GSICS to evaluate if ECVs should be GSICS products but it was decided not to pursue this.

J.-P. Muller asked if terrain corrections are done for geostationary products and C. Cao replied that they do apply it in the processing of their products.

In the interest of time, the general discussion was halted and the action WGCV-37-7 was reworded and split into sub-actions WGCV-37-7a and WGCV-37-7b.

WGCV-37-7 a (updated at WGCV-38) WGCV Secretariat, E. Arsenault, to send out the list of potential GSICS-WGCV Cooperation items outlined by GSICS to each subgroup chair by October 3rd, 2014.

WGCV-37-7 b (updated at WGCV-38) WGCV Subgroup Chairs to identify and prioritize specific activity areas for interaction with GSICS by October 31st, 2014.

Interaction with Virtual Constellations Discussion

The WGCV Vice-Chair initiated the discussion by reminding the plenary of the four virtual constellations that presented in the morning session which were the Atmospheric Composition Constellation (ACC);

Sea Surface Constellation (SST); and Precipitation Virtual Constellation (P-VC), including a special presentation on LSI to provide an update on its current status and proposed options for its future.

The WGCV Vice-Chair also mentioned that some natural linkages can be made between the WGCV subgroups and Virtual Constellations. For example, the ACSG can be linked to ACC-VC; IVOS can be linked to SST-VC and LSI-VC; the MWSG can be linked to the PC-VC and the SST-VC; the SAR subgroup can be linked to LSI-VC; the LPV subgroup can be linked to LSI-VC, and; the TMSG can be linked to LSI-VC.

The WGCV Vice-Chair suggested that because multiple linkages between WGCV subgroups and Virtual Constellations, some coordination is required within the working group to interact with the VCs. WGCV shall think about how to proceed with such coordination to be discussed during and after this plenary.

--- interactions with other Working Groups

The CEO, Kerry Sawyer, referred to the recent successful WG/VC day held prior to the SIT Technical Workshop in Sept 2014 and commented that she was glad to see the linkages that WGCV is establishing with the VCs but wondered about the linkages with other CEOS working groups such as WGClimate, WGCapD, and why these were not being discussed.

The WGCV Vice-Chair agreed that the current plenary agenda was not perfect and this was missed. But an interaction with WGCapD should be handled fairly rapidly because of an existing request from them to provide a small example for education and outreach which WGCV should be able to handle outside of the current plenary discussions.

The WGCV IVOS subgroup chair suggested that capacity building should be very important to WGCV. The WGCV should be making use of the services of the WGCapD to help it promote cal/val as it is a necessary activity with the EO community.

The WGCV Chair commented that this was mentioned at the SIT Technical Workshop and efforts are currently underway by the CEOS SEO to promote the activities of the CEOS working groups and virtual constellations by means of promotional videos.

The WGCV Vice-Chair agreed that capacity building and outreach should be an important activity of WGCV and suggested that the WGCapD Chair be invited to attend and participate in the next WGCV plenary meeting to inform the working group on its activities and determine potential interaction areas between the two groups.

With regards to the WGClimate, the CEO commented that there are obvious linkages between that group and WGCV that are required, perhaps more so with the LPV subgroup in terms terrestrial ECVs because the oceans and atmosphere ECVs are already fairly well covered. The WGCV Vice-Chair agreed and mentioned that ocean and atmospheres ECVs are mostly covered by the WGClimate but interaction with WGCV is still required on the cal/val aspect, at least to ensure consistency for all three domains (i.e.: ocean, atmosphere and terrestrial).

Greg Stensaas was in agreement with the CEO's comment about the terrestrial aspect being underrepresented in the WGClimate (i.e.: representation initially was only John Dwyer of USGS) as opposed to the atmosphere and ocean domains having multiple representatives. He believes that in order for WGClimate to conform and meet the requirements of maturity matrices, both calibration and

validation are key components which WGCV should be supporting through LPV and IVOS subgroups which have strong capability in that regard.

The WGCV Vice-Chair agreed and recommended that WGCV can do is to make WGClimate aware of its capabilities in terms of cal/val and then let them approach WGCV for assistance.

The LPV subgroup chair sees an additional perspective, and believes that WGCV on the terrestrial domain has a lot of capacity. For example, at the upcoming Climate Symposium, believes that WGCV should push that validation is important. WGCV requires a good mechanism to inform other groups on what is being done within WGCV.

Greg Stensaas mentioned that WGClimate has stated many times that it would like to see WGCV participation from a cal/val perspective, especially in the terrestrial area, and the fact that the working group is not doing its outreach and capacity building as much as it should is an issue and believes that WGCV should consider the land component within the WGClimate as a key client within WGCV.

The CEO mentioned that there is a CEOS response to the GCOS Implementation Plan, and while the WGClimate have taken this under their umbrella on behalf of CEOS, the response remains a CEOS level one.

LPV Chair also stated that she would like that the WGCV agenda be taken up by the WGClimate as we have concrete collaborations with the climate community that are currently not going through WGClimate. If WGClimate is representing CEOS on issues of climate, then WGCV should also have a say with regards to its needs and also be able to state what it can provide.

Further discussion led to a suggestion for the WGCV Vice-Chair to have direct discussions on potential interactions with the WGClimate Chair, John Bates (NOAA), or Vice-Chair, Pascal Lecomte (ESA), or invite one of them to the coming WGCV plenaries.

---re-focusing the mandate of WGCV

The discussion shifted to the topic of the mandate of CEOS WGCV and Bojan Bojkov stated that it would be worthwhile to re-focus the activities of WGCV and its subgroups and redefine what would be the strategy for the next 5 to 10 years. For example, the Fundamental Climate Data Records (FCDR) and other key cross-cutting activities such as atmospheric correction, DEMs, cloud screening, etc. should be WGCV's focus. He also strongly believes that having concrete projects with tier partners and commitments from member state agencies, along with reporting requirements, would really bring results to the working group. As well, having concrete accountable actions would greatly facilitate the justification of their funding from an agency point of view.

The example of GSICS was brought up and how it could be used as a model because they are very effective mainly due to the fact that they have a clear mandate which is currently missing in WGCV.

WGCV Vice-Chair mentioned that at the subgroup level, having leads on specific tasks/objectives would be welcomed. Also, for the subgroup reports at WGCV plenaries, it would be good to have the tasks/objectives listed with their reporting leads and some reporting with respect to performance or figures on progress. That way it would be much easier for WGCV to summarize and synthesize the activities at the higher working group level. It would also allow WGCV to provide better support but also

help it identify the gaps and determine where it can provide assistance to the subgroup. Having the membership information of active members of each subgroup would also be useful in that sense.

From that discussion, the following two action items were derived:

> **WGCV-38-4:** Each subgroup to identify the active members of their subgroups (with their affiliation) by WGCV-39.
>
> **WGCV-38-5:** Each subgroup to identify a list of small project activities as a starting point for deliverables by WGCV-39.

Cal/Val Portal

Bojan Bojkov of ESA initiated the discussion. He stated that ESA has renewed funding for the CEOS Cal/Val portal for the next two years. The Cal/Val portal team is open to suggestions on changing the layout and it is up to WGCV member to suggest updates and provide content.

The WGCV Vice-Chair mentioned that many of the subgroups are maintaining their own websites, some are hosted on the cal/val portal, and most are linked in some form or another to the CEOS cal/val portal.

It was also noted that some references to the TMSG and MWSG subgroups, in terms of basic definition/information, are missing from the portal and the following actions were proposed:

> **WGCV-38-6:** TMSG Chair to provide definition/information of his subgroup to B. Bojkov and A. Burini for hosting on cal/val portal by WGCV-39.
>
> **WGCV-38-7:** MWSG Chair to provide definition/information of his subgroup to B. Bojkov and A. Burini for hosting on cal/val portal by WGCV-39.

The LPV Chair initiated a discussion the sub-setting tools available on the CEOS cal/val portal, specifically on OLIVE, which would require to be revamped to add functionality to meet some requirements that LPV needs.

It was suggested to LPV to formulate a recommendation to WGCV to add functionality to OLIVE and for B. Bojkov to second the recommendation. After receiving the request, the WGCV Chair will issue a support letter to ESA for them to be able to take action on adding enhanced functionality to OLIVE.

> **WGCV-38-8a:** LPV Chair to formulate a recommendation to WGCV to add functionality to current OLIVE tool on cal/val portal by Oct 31st, 2014.
>
> **WGCV-38-8b:** B. Bojkov to second the recommendation of LPV on adding functionality to OLIVE and will request support from the WGCV by Nov. 15th, 2014.
>
> **WGCV-38-8c:** WGCV Chair to write support letter to ESA for enhanced functionality of OLIVE tool by Dec 15th, 2014.

Various sub-setting approaches were discussed and Bojan Bojkov agreed to discuss further with LPV and formulate a proposal for recommendation to CEOS.

> **WGCV-38-9:** B. Bojkov to formulate an approach for sub-setting via cal/val portal by SIT-30 (Mar 29, 2015) for recommendation to CEOS.

The topic of a WGCV newsletter that could exist in parallel to the CEOS Cal/Val portal, or be hosted on the portal, was brought up by Nigel Fox of the IVOS subgroup in the spirit of outreach to the user community. The idea of a newsletter came from a need to communicate WGCV highlights to GSICS as they commented that the WGCV work is not visible. The GSICS newsletter model was also cited as an effective example. The newsletter would include highlights on specific projects (i.e. RADCALNET, etc.) and would require a champion to coordinate the effort.

WGCV agreed that it is a good idea but it may be something that comes later after the exercise of defining WGCV activities and deliverables is more advanced (see action WGCV-38-5).

The CEO also mentioned that it would not be an issue to have WGCV publish a newsletter. Also, with the re-design of the CEOS website, there will be opportunity for WGCV to publish and host its newsletter.

CSIST (CTF Action Items)

The WGCV Vice-Chair updated the WGCV plenary on the status of the CEOS Strategy for Carbon Observations from Space along with the reporting done by the Carbon Strategy Implementation Study Team (CSIST) at the SIT Technical Workshop in September 2014. Albrecht is the WGCV representative on the CSIST and he also represents his agency, DLR.

He provided some background and history on the carbon strategy:

- *CEOS Strategy for Carbon Observations from Space* – written in response to above, completed in March 2014 – *Wickland et al.*
- Proposed results presented to SIT Workshop and CEOS Plenary in 2013.
- 42 Actions identified in the report for specific response including Action for Carbon Team to manage response via CEOS(/CGMS) Working Group Climate – first discussed at SIT Technical Workshop in September 2013
    - Issue remained open until April 2014,
- At SIT-29:
    - The *CEOS Strategy for Carbon Observations from Space* was endorsed during Plenary session
    - Proposed establishment of a study team to take forward the Actions and also identify formal CEOS mechanism to manage Actions.

More information was provided on the establishment of CSIST:

- SIT-29 suggested further study of report to elucidate concrete way forward because of expressed concern about the nature and wording of the recommended actions, noting that several of the more substantive ones were well beyond the scope of what CEOS can or should do.

- CSIST set up in May 2014: S Briggs (ESA), K Sawyer (CEO), J Bates (WGClimate/NOAA), C Ishida/M Nakajima (JAXA), A von Bargen (WGCV/DLR), Z Zhu (USGS), D Wickland/C Bognar (NASA), J Ometto (INPE), C Deniel (CNES)
- ToR established by CEOS Chair / SIT Chair. Objective to analyze recommendations of Carbon report and propose concrete way forward.
- Team led by S Briggs, K Sawyer met 28 July 2014 at ESA Office, Washington DC.
- Produced draft **spreadsheet of outcomes** distributed before SIT Workshop. Documents distributed: ToR, report of progress, spreadsheet.

The spreadsheet consisted of 42 actions, based on Table 6.1 of the CEOS Strategy, completed by CSIST. Each action was analyzed for:

- Type of action (mission, cal/val, product, ……..)
- Action description text
- mid/near/long term action (end 2015, end 2017, >2017)
- CEOS lead and contributing entities
- Compatibility with available CEOS Resources (Green/yellow/red)
- Estimated effort (minor, major, significant new entity/activity)
- Linkage to GEO Community of Practice
- Need for partnerships with external agencies

At the SIT Technical Workshop in Sept 2014, WGClimate was asked to evaluate the possibility of leading the coordination the carbon task. WGClimate members are currently being consulted on this matter and WGClimate will report on its way forward at the next CEOS plenary.

WGCV will be responsible for eleven actions of the CEOS Strategy for Carbon Observations from Space report. The remainder of the afternoon discussion focused on reviewing these actions summarized in the spreadsheet mentioned above.

The spreadsheet was later sent by e-mail by the WGCV Secretariat on Oct 1, 2014 to all WGCV Subgroup Chairs and plenary participants present for the CSIST discussion.

The WGCV Vice-Chair concluded the session by mentioning that the next step for WGCV will be to examine the content of these action items and identify what deliverables can be derived from these and formulate and appropriate strategy. This work will occur over the next few months.

Summary of WGCV Internal Reports Session

The WGCV Vice-Chair concluded the 'WGCV Internal Reports Session' by stating that good discussions were held. He believes that the WGCV will be in a better position to react to various CEOS requests (i.e. the Carbon Task Force, Water Strategy, etc.), once it determines how to better organize its activities in the future. The action items taken this afternoon are a step in the right direction.

Thursday, October 2nd, 2014 – Day 3

NOAA Welcome Address (Part 2) (A. Powell)

Following the welcome address by Dr. Michael Kalb held on the first day of the plenary, Dr. Al Powell offered his welcome to the WGCV-38 participants and apologized for the change in schedule of his timeslot due to other commitments that he had previously.

Dr. Powell described NOAA/NESDIS/STAR activities including an overview of the user community of NOAA Data and upcoming new sensors, science products, geophysical retrieval algorithms, calibration accuracy requirements, and opportunities for international collaborations. He briefly described some interesting collaboration with the Japan Meteorological Agency (JMA) on cal/val work using AHI data. Lastly, Dr. Powell concluded by presenting on the Integrated Cal/Val System (ICVS) which is a NOAA NESDIS initiative for near real-time performance monitoring for all NOAA environmental satellite instruments.

A copy of the Dr. Powell's presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

B. Bojkov (ESA): Commented that there is a lot of collaboration on-going between NOAA and European partners and often work meetings are planned at the last minute and it is difficult for US counterparts to travel due to long approval process or budgeting issues. Asked if there was a way to facilitate travel for NOAA partners.

A. Powell (NOAA): US congress has imposed many restrictions on NOAA budgets for hiring, travel, spending rates, etc., and while NOAA does its best to support travel for staff, unfortunately budgets and policies do not always allow this. NOAA will continue to support collaborative international efforts at the best of its capacity.

Subgroup Session (IV)

Synthetic Aperture Radar Subgroup – SAR (M. Zink, DLR) – remote presentation

A copy of the SAR Chair's Report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

G. Stensaas (USGS): Asked if the slides from the EUSAR conference and the dedicated CEOS session will be made available from the SAR subgroup website.

M. Zink (DLR): Responded that there will be a summary report from the special CEOS session that was held at EUSAR which will be posted on the SAR subgroup site. He suggested to Greg to subscribe to the SAR subgroup mailing list to get the announcements when new material is posted to SAR subgroup website. The EUSAR conference material will be summarized in proceedings that can be obtained from the organizers ITG/VDE.

J.-P. Muller (UCL): Asked about the status of ALOS and Sentinel-1 and if they are both global duty cycles; or is there a background mission planned for either satellite to acquire systematic data.

M. Zink (DLR): Could not provide comment on this because the strategy has still has not been announced. Both satellites are either just coming out or still in the commissioning phase and it is too early to comment on this.

Agency Reports (IV)

German Space Agency – DLR (M. Zink and A. von Bargen)

A copy of the DLR report is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

B. Bojkov (ESA): Asked a question on snow detection over Greenland and what type of snow is being detected: dry or wet snow?

M. Zink (DLR): Responded that DLR is just starting work on snow detection and it is still at the testing stage. The goal of the first analysis done over Greenland was to show the capability of the sensor. The figure on slide 8 shows that the outer part of Greenland is more wet snow with various scattering phenomena occurring while the interior is dryer.

J.-P. Muller (UCL): Asked if there is another release planned of the TanDEM-X DEM in the final format as was done with the intermediate DEM.

M. Zink (DLR): Answered that yes, there is currently an Announcement of Opportunity being prepared associated with the release of the FINAL TanDEM-X DEM. The AO may be announced by the end of 2014 or in early 2015.

J.-P. Muller (UCL): Commented that the US government has announced the public release of SRTM-1 arcsecond (30m) data last week, the ASTER GDEM is also being released at 30m, and JAXA is releasing their DEM data at 30m. He asked about the possibility of TanDEM-X releasing a 30m version of its product into the public domain.

M. Zink (DLR): Responded that there are two issues with releasing 30m TanDEM-X data. The first are German legal restrictions which regulate the distribution of TerraSAR-X and TanDEM-X data and the DEM falls under this restriction. The second issue is that DLR is in a Public-Private partnership and while there is an agreement to release the 90m version publicly, there is no agreement in place to release to the 30m version.

J.-P. Muller (UCL): Commented that our colleagues from Geoscience Australia showed a terrain corrected illumination product with TanDEM-X 30m data which appeared to be a superior product to that corrected with the SRTM 1-arcsecond data. Therefore, there is great value in the TanDEM-X product.

M. Thankappan (GA): Asked if any gaps existed with the TanDEM-X coverage over Australia which appeared to be complete from what was shown in the presentation.

M. Zink (DLR): Responded that there might be some very small gaps but it is pretty much complete. He would have to verify the coverage status but whatever gap is remaining, it should be easy to fill.

G. Stensaas (USGS): Asked to comment on the RapidEye continuation and if it will consist of a constellation or a single satellite.

A. von Bargen (DLR): Responded that BlackBridge is aiming for the building of a new RapidEye+ constellation and not just a single satellite.

Cross-cutting themes

The WGCV Vice-Chair introduced the session as being a follow-up to the cross-cutting session that was held at WGCV-37. The objective is to discuss issues common to many subgroups and agencies within WGCV and attempt to come-up with concrete activities for the working group to focus on.

Cloud Masking and DEM (B. Bojkov, ESA)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

Bojan presented a summary of the cross-cutting sessions on Cloud Masking (presented by R. Hollman) and DEM (presented by J.P. Muller) that were held at WGCV-37.

--- Cloud Masking

With regards to Cloud Masking, Bojan asked the working group if this is still an activity of interest to them and if so, which topic should be the initial focus: cloud masking, high or medium resolution sensors, or cloud over snow.

The working group agreed that it is still a very relevant cross-cutting activity for the working group to pursue.

M. Roman and K. Thome brought up the issue of sensor design and that a WGCV cloud masking group could contribute to the decision making in planning future missions, by advising agencies on which channels (i.e. cirrus and thermal channels) are required to do cloud masking at a certain accuracy and resolution.

P. Henry commented that the problem may be more complex and suggested that there are multiple approaches to cloud masking than strictly proper band selection on sensors.

J.-P. Muller commented that cloud masking accuracy is directly related to the cloud optical depth. If the cloud is too thin, then there is too much radiance from below the clouds. All of the current systems have difficulty with this. If it would be possible to get a reliable method for getting cloud optical depth, then it might be possible to get an uncertainty/probability to those parts of the cloud mask that are poor.

---DEM

With regards to DEMs, the WGCV was also very interested in pursuing this cross-cutting activity.

The question of what the minimum specifications of a cross-cutting DEM should be was asked. J.-P. Muller commented that he did attempt to give an answer to that question at WGCV-37 in terms of what is the minimum spacing required for different resolutions but admits that he did not take into account, for example, the different possible look-angles for SAR derived DEMs depending on the sensor used.

A CEOS WGCV designed decision-tree was suggested to help agencies with the selection of an appropriate DEM when designing missions where a DEM is required.

The recent release of the SRTM-30 DEM was also brought up. J.-P. Muller cautioned on endorsing one particular product such as the SRTM-30. For example, NASA is re-processing the entire SRTM data set and filling-in gaps with other sources such as the ASTER data or perhaps the JAXA product and it may be a mix of various products.

The comment was made that there is a need to do a cross-cutting activity specifically across the agencies, and not so much across the entire user community, on what the minimum requirements should be for a DEM to be used by their missions.

The issue of inter-comparison of data was discussed. With different missions using different DEMs that are not at the same accuracy level or resolution, this impacts and often hinders the comparison exercise.

--- Conclusion

With the interest expressed in the topics of cloud masking and DEMs, it was decided to attempt to plan a joint workshop to discuss further with the following action items:

> **WGCV-38-10a**: B.Bojkov to poll (via doodle poll) availability of participants for a 2-3 day workshop in Feb/March 2015 to brainstorm on cloud masking and DEM issues by Nov 15, 2014.
>
> **WGCV-38-10b**: B. Bojkov to prepare and send a list of topics/questions for discussion on cloud masking to WGCV in preparation for future workshop by Nov 15, 2014.
>
> **WGCV-38-10c**: G. Stensaas to send a list of topics/questions for discussion on DEMs to WGCV in preparation for future workshop by Nov 15, 2014.
>
> **WGCV-38-10d**: B. Bojkov to organize a 2-3 day workshop in Feb/March 2015 to brainstorm on cloud masking issues, in conjunction with G. Stensaas on DEMs, and to report outcomes at WGCV-39.

RER and Lunar Calibration (DongHan Lee, USGS / KARI)

A copy of the presentation is available on the WGCV-38 meeting webpage [PDF].

> ***Questions/Comments:***
>
> **P. Henry (CNES)**: Commented that the stability of the Landsat-8 sensor should not be an issue over the long-term but suggested that verifying the stability for a single orbit could be

interesting because of varying thermal effects along the orbit versus simply observing the moon from a relatively fixed position on the orbit.

G. Stensaas (USGS): Commented that USGS appreciates the work done during DongHan's time at their agency. Greg hopes that the recommendations made in this presentation can be brought up within the IVOS subgroup via Dennis Helder to standardize some processes and recommend some quality assurance QA4EO process work.

RADCALNET (N. Fox, UKSA/NPL, and T. Malthus, CSIRO)

Nigel Fox presented an update, since WGCV-37, on the RADCALNET initiative. A copy of his presentation on is available on the WGCV-38 meeting webpage [PDF]. He also presented on the ESA and CNES partnership for of finding and establishing a new RADCALNET site and stated that they are nearing the final selection. There are multiple candidate sites with the probable favorite being the one in Chile but with the Australia, Morocco, Saudi Arabia, and Namibia sites also having a very strong potential for other future RADCALNET sites.

Tim Malthus of CSIRO presented Australia's work on finding sites to suit their own vicarious calibration requirements, but also on their efforts at finding and proposing suitable sites to the RADCALNET initiative. He stated that Australia is keen to contribute to RADCALNET as a means of return to the international community. Tim's presentation is available on the WGCV-38 meeting webpage [PDF].

Questions/Comments:

M. Román (NASA): Commented that there are many areas of possible interaction with the LPV group in terms of the use of tests for homogeneity and scaling. He currently has a post-doc fellow working on writing the albedo protocol and the draft document includes, so far, a very thorough section on how to upscale the coarse resolution albedo to characterize a site.

M. Román (NASA): Asked about the vegetation criteria for sites and if the intent is to try and remove the seasonal trend if it is well characterized or is vegetation something that RADCALNET tries to avoid entirely on their sites.

N. Fox (IVOS Chair / NPL): Responded that the preference is to get vegetation free sites because RADCALNET is mostly focused on radiometric gain. If there is vegetation, RADCALNET prefers it to be homogeneous and relatively stable with time.

K. Thome (NASA): Commented that one of the goals in RADCALNET is to develop methodologies, whether it is done by LPV or others, to do a proper characterization of the sites. It is the responsibility of the site owner to ensure that the temporal variability, spatial and spectral heterogeneity, have been well characterized and do not impact the calibration. Therefore, the presence of vegetation or water is possible on these sites, as long as they are well accounted for in the site characterization.

M. Román (NASA): Commented on a recent project that deals with scaling where the objective would be to address issues of temporal constraints. He gave the example of collecting 10m resolution data from a UAV platform, with multiple daily collects over a month and over a 5 km^2

area centered over the RADCALNET site – this would provide a strong data set with high density temporal sampling – LPV is really interested in addressing this topic.

N. Fox (IVOS Chair / NPL): Responded that RADCALNET would encourage and be keen to have UAV overflights to monitor these sites in the longer term. However, at the moment, the focus of RADCALNET is to establish local measurements that are automated on a small scale. As RADCALNET builds up that process and more capability is gained, then there might be some overflight work done with AOE and to some extent with the Railroad Valley site.

M. Román (NASA): Commented that if working on a 20cm scale, then the angular effects will not be an issue because much of the artefacts are macroscopic in nature.

N. Fox (IVOS Chair / NPL): Responded that RADCALNET is trying to minimize the impact, and most of the measurements will be done at nadir.

K. Thome (NASA): Commented that the error budgets will show whether it's better to put the effort into high resolution angular measurements, high resolution spatial measurements, more spectral data, or higher temporal sampling, etc. Therefore the first step is to create the sites, do measurements, observe where the biases are, and ensure that proper SI traceable error budgets are done to be able to easily determine where the problems are and address them.

C. Cao (NOAA): Commented that NOAA has a unique situation where they need an active light source at night to calibrate the day/night band and would like to know if RADCALNET would be an option for this.

K. Thome (NASA): Responded that it may difficult to achieve this because the source target would likely be too small to perform absolute calibration.

J.-P. Muller (UCL): Commented on the issue of logistics for RADCALNET sites and asked why the Chilean site was favored in that regard?

N. Fox (IVOS Chair / NPL): Responded that Chili is offering many resources such as the Chilean Air Force, remote sensing calibration experts at the Chilean university who are already working at some of the proposed sites, the European Southern Observatory. Also, the sites are accessible by road, and there is GSM coverage for mobile communications which is required for some of the instruments. Australia is offering much of the same resources for logistics but the Chilean site is more optimal for some of the other criteria for the initial pilot study phase. That being said, after the initial 18 month period for establishing the initial pilot RADCALNET sites, RADCALNET will be welcoming and encouraging other sites to join the network.

P. Henry (CNES): Commented that one of the important objectives of RADCALNET is to provide a core set of sites where data is accessible to all agencies for the calibration of their satellite sensors. The goal is not necessarily to have as many test sites as possible but rather to have sites where there are no restrictions on data and that it can be made available to the entire calibration community. Achieving such a network is the first objective and will be considered a very successful deliverable if achieved. Afterwards, the focus can be put on expanding the network with other sites that can offer a variety of other features to the community.

WGCV Core Business

Selection of New WGCV Vice-Chair

The WGCV Chair introduced the nomination process for the WGCV Vice-Chair position. He stated that he was very pleased to see the interest shown in the WGCV group with two strong candidacies received from NRSCC represented by Prof. Chuanrong Li, and NASA represented by Dr. Kurt Thome. Both candidates had presented their candidacy presentations at the previous WGCV-37 meeting in Frascati, Italy.

The WGCV Secretary then proceeded to review the process for the nomination. A copy of the presentation on the process can be consulted on the WGCV-38 website [PDF].

The nomination exercise was then carried out by the WGCV Secretary with the participation of eligible WGCV members who included the WGCV Chair, the Vice-Chair, the WGCV subgroup representatives, and the eligible agency representatives.

Results

The WGCV Chair announced Dr. Kurt Thome as the new WGCV Vice-Chair based on the results from the nomination exercise carried out by the WGCV plenary. The nomination of Dr. Thome by WGCV as WGCV Vice-Chair will be officially endorsed by CEOS at the upcoming CEOS-28 plenary occurring in Tromso, Norway on October 29-30, 2014.

The WGCV Chair expressed his gratitude to both candidates for their interest and enthusiasm in wanting to be involved in the leadership of the WGCV group. He commented on the very close results between the two candidates which is directly attributable to their strong candidacies.

Transition Ceremony

With the term of the current chairmanship and secretariat ending and the transition to the new WGCV secretariat which will based at DLR, the WGCV Chair expressed his gratitude to the current secretary, Eric Arsenault, for the great work done over the past two years within the WGCV group.

The incoming WGCV Chair, Albrecht von Bargen, then took the opportunity to thank Dr. Satish Srivastava for his dedication to the CEOS WGCV working group over the past two years in the position of Chair. The former WGCV Chair, Greg Stensaas, also acknowledged and thanked Dr. Srivastava for his chairmanship of the current WGCV group. In return, Dr. Srivastava expressed that it has been a great journey for him to be Chair of the WGCV. It was a pleasure for him to work with very professional people within WGCV and within CEOS. He then thanked everyone and wished all the best to the incoming WGCV Chair, Albrecht von Bargen.

WGCV Internal Reports (II)

Review of WGCV Action Items

The action items of the WGCV-37 meeting in Frascati were reviewed and their status was updated.

Appendix 4 has a list of the WGCV-37 action items with their updated status. All action items were disposed except for action items WGCV37-2 and WGCV-13 which remain open along with WGCV-37-7 which was reformulated into two sub action items WGCV37-7a and WGCV37-7b.

Some actions items from WGCV-36 were also left open and these are described in Appendix 5.

Review of the CEOS 2014-2016 Work Plan Deliverables

The status of the CEOS 2014-2016 Work Plan Deliverables for which WGCV is responsible was briefly reviewed. These were updated for, and presented at, the SIT Technical Workshop in Sept 2014 by the WGCV Chair. A copy of this presentation is available from the CEOS SIT Tech WS meeting webpage [PDF]. The information from these slides will be transferred to the CEOS action item tracker spreadsheet as discussed earlier this week in the CEOS Update session (see action item WGCV-38-0, p.10)

Review of Subgroup Recommendations from WGCV-37

At the WGCV-37 meeting in Frascati, Italy, a total of five (5) recommendations were made by either the plenary or subgroup chairs. Due to insufficient time at that meeting, the review of these could not be done by the plenary to determine their eligibility for further consideration at the WGCV or CEOS level.

Therefore, the plenary proceeded to review the five recommendations from WGCV-37 along with an additional recommendation that was proposed by the MWSG subgroup at WGCV-38.

Recommendation 1 from WGCV

Recommendation 1 was formulated by the WGCV plenary during the Maturity Matrix Discussion held during one of the Cross –Cutting themes at WGCV-37. It was targeted for endorsement by WGCV and is defined as follows:

WGCV should investigate use of a ~~common~~ compatible rating system (i.e maturity matrix) across all subgroups for reporting on its cal/val methods and processes.

Discussion/Decision
LPV commented that it already has such a system in place and that it would be difficult to modify it to adapt it to a uniform system across all subgroups. If it is designed in a very generic way, then it may be possible to adapt of find correspondences of the LPV system to such a system but at first view, it seems difficult to achieve.

There was also some discussion around the word “common” in the recommendation which should be changed to “compatible” to account for differences that may exist across subgroups.

IVOS suggested that since no other WGCV subgroup currently has a rating system for scales of maturity of the process such as that of LPV, then looking at the LPV system as a starting point could be a good idea for WGCV to adopt.

The recommendation was endorsed by WGCV and initiated with the following action:

WGCV-38-11: Subgroups to review LPV rating system as a starting point and evaluate its compatibility for use by their subgroup by April 1st, 2015 prior to WGCV-39.

Recommendation 2 from SAR subgroup

Recommendation 2 came for the SAR subgroup (SAR ref.: 2013-1) and is related to the issue of harmonizing the products and data policies of the individual missions in virtual constellations (e.g. TerraSAR-X/TanDEM-X and the Spanish PAZ, Sentinel-1 and Radarsat Constellation Mission). The recommendation is targeted for CEOS plenary level endorsement and is formulated as follows:

Future cooperative missions should harmonize product specifications and definitions. For international cooperative missions the data policies should match this recommendation.

Discussion/Decision
It was determined by the WGCV plenary that recommendation 2 would not be accepted by CEOS agencies at plenary, especially with regards to harmonizing the data policies, as these are very restrictive and sensor-specific. With regards to harmonizing the products, this would also be difficult; perhaps inter-operability would be feasible but not harmonization.

The data policy component of Recommendation 2 was not accepted, and further explanation was deemed required with regards to the product specification component to understand what is meant by in terms of harmonization.

Recommendation 3 from SAR subgroup

Recommendation 3 also came for the SAR subgroup (SAR ref.: 2013-2) and is related to the issue of ensuring that comparable product quality processors (including 3rd party processor) for one mission should be unified and/or certified. The recommendation is targeted for CEOS plenary level endorsement and is formulated as follows:

Mission Operators should ensure product quality by providing necessary instrument information also for licensed third-party processing chains. As an alternative of providing Level 0, range-compressed (corrected for instrument specific characteristics) so-called Level 0b should be provided.

Discussion/Decision
The WGCV-Chair, Satish Srivastava, attempted to clarify the meaning of the recommendation which may come from the fact that certain agencies have their data processed by other countries or third party agencies, and the quality control may not be always enforced evenly.

As with recommendation 2, further clarification was required in the absence of the WGCV SAR subgroup Chair. Therefore, the following action item was proposed:

WGCV-38-12: WGCV Chair to seek clarification with SAR Chair on recommendation 2 (SAR 2013-1) and recommendation 3 (SAR 2013-2) by Oct 17th , 2014.

Recommendation 4 from SAR subgroup

Recommendation 4 came for the SAR subgroup (SAR ref.: 2013-3) and is related to the issue of radio interference becoming a more and more disturbing problem: in case of P- & L-Band due to early warning and air traffic control radars; and, in C-Band Wireless Communication Networks are claiming access to the EO-frequency band. The recommendation is targeted for CEOS plenary level endorsement and is formulated as follows:

To protect EO frequency bands.

Discussion/Decision
The WGCV Chair suggested not pursuing this recommendation as it has now been raised at a high priority at the agency and the GEO level. The WGCV plenary agreed to close this recommendation.

Recommendation 5 from TMSG subgroup

Recommendation 5 came from the TMSG subgroup and is related to the issue of attempting to bring international agencies together to work on the retrieval of bathymetry, as currently, only one space agency is mostly performing this task (i.e. DLR). The objective is to encourage other agencies with SAR capability to work on bathymetric retrieval of the continental shelves. The recommendation is targeted for the CEOS decision-making level and is formulated as follows:

CEOS should encourage its constituent space agencies to provide EO data for TMSG to establish Global test sites for assessing the accuracy and reliability of retrieving continental-shelf bathymetry on 30m grids from EO sensors over sites which are (a) clearwater; (b) turbid water

- *Existing bathymetry is either non-existent or copyright-bound. Bathymetry is required for retrieval of water-leaving radiance and derived products in Case II waters. Bathymetry also required for modelling tsunami landfall*

- *Request that CEOS space agencies supply data (e.g. high resolution multispectral visible/NIR, very high resolution SAR (TSX, Cosmo-SkyMEd, Radarsat-2, NASA-NOAA SHOALS) that could be employed to evaluate different approaches for mapping continental shelves*

Discussion/Decision
After discussion with the plenary, NOAA offered to contribute some help to the TMSG Chair with this activity and DLR may also be able to assist. The WGCV-Chair commented that it will be difficult to bring the recommendation up to the CEOS level in its current state. He mentioned that there is now a CEOS process in place to initiate such activity. The CEO, Kerry Sawyer, elaborated on this process called the 'CEOS New Initiatives Process' which is designed to help CEOS handle the many requests that it receives and better package the information, prioritize the activities, and present them to the CEOS member agencies for endorsement. As a result of the discussion, the following action item was formulated:

WGCV-38-13: TMSG Chair to consult with NOAA and DLR on drafting the proposal of this activity, following guidelines of the 'CEOS New Initiatives Process Paper' by WGCV-39.

Recommendation 6 from MWSG subgroup

Recommendation 6 came from the Microwave Subgroup and is based on numerous issues encountered with obtaining L1 microwave data (i.e QuikSCAT scatterometer data) and sharing among its user community to perform calibration work. The recommendation is targeted for the CEOS decision-making level and is formulated as follows:

Agency support with L1 data for specific cross-calibration/comparison purpose, and improve calibration and validation.

Discussion/Decision
The WGCV Chair suggested that the MWSG Chair should first consult its members and ask them to work with their respective agencies to facilitate this process. For very specific missions, many of them have very particular data policies. WGCV cannot influence data policy of agencies but data sharing agreements could be arranged by involving the various agency members of the MWSG.

The CEO, Kerry Sawyer, also suggested to the MWSG Chair to make connections with the OSVW-VC and one of its co-chairs, Paul Chang, because that virtual constellation has multiple data sharing agreements in place already, including for QuikSCAT data.

Recommendation 6 was therefore not endorsed by the WGCV plenary but suggestions were made to the MWSG Chair to facilitate the process of obtaining better access to L1 microwave data.

ISRSE36 WGCV Presentations

The WGCV Vice-Chair, A. von Bargen, discussed the upcoming ISRSE36 meeting that will occur in Berlin from May 11 to 15, 2015 (www.isrse36.org). (The WGCV-39 meeting will be held in the week prior to ISRSE36.)

He mentioned that there will be a dedicated session for CEOS WGCV where a total of five topics can be presented. He would like WGCV subgroup chairs to recommend topics for this session. There is already an open action on this from a recent WGCV telecon held in August.

He will coordinate the exercise and provide further information to the interested authors on the preparation of their abstracts by e-mail:

> **WGCV-38-14:** A. von Bargen to send an e-mail, to authors identified to present at ISRSE36 WGCV session, with information regarding abstracts to be prepared by Oct. 8th, 2014.

Discussion on Pre-flight and Onboard Calibration of Optical Sensors Workshop

The IVOS Chair discussed current plans to organize a workshop addressing the Pre-flight and Onboard Calibration of Optical Sensors. Potential target audiences were discussed and industry will be involved in some form or another, namely in terms of sponsorship. It was decided to label the workshop as a CEOS WGCV activity with sponsorship from industry. The CEO agreed that this would be acceptable and that a simple notification to CEOS to inform them of the event will be sufficient.

Nigel Fox accepted to proceed with initiating the organization of the workshop and the following action items was formulated:

> **WGCV-38-15:** N. Fox to initiate an open telecon with key players for the planning of a workshop on pre-flight and onboard calibration of optical sensors by Q4 2015 or Q1 2016 by Nov. 30th, 2014.

Meeting Close-Out

The plenary congratulated and thanked the current WGCV Chair, Dr. Satish Srivastava, for his involvement with the WGCV Chairmanship and Vice-Chairmanship over the past 4 years.

Dr. Srivastava addressed the plenary and thanked the co-hosts of the meeting, Changyong Cao of NOAA, Greg Stensaas of USGS and Kurt Thome of NASA, along with the members of the organizing committee at NOAA which included: Frank Padula, Sean Shao, Yan Bai, Jason Choi, Sirish Uprety, Bin Zhang, Wenshui Want, Qiu Shi, and Aaron Pearlman.

He then commented on his time as WGCV Vice-Chair, under the chairmanship of Greg Stensaas, and as WGCV Chair with Albrecht von Bargen by his side as vice-chair; and thanked them for their wonderful support over the past four years. He also thanked, the outgoing secretary, Eric Arsenault, in being instrumental in keeping track of all WGCV activities, helping prepare the many presentations and meeting minutes, and also responding to CEO and other CEOS requests.

Finally, he thanked all of the WGCV members for their great support throughout his term.

The WGCV Chair declared the WGCV-38 meeting officially closed at 4:15 pm.

Appendix 1 – Attendees

(Names with an asterisk and in **blue** are those who participated via GoToMeeting webconferencing.)

Participant	Agency / Organization	Country
Eric Arsenault	Canadian Space Agency	Canada
Manik Bali	NOAA	USA
Bojan Bojkov	European Space Agency	Italy
Petya Campbell	UMBC and NASA/GSFC	USA
Changyong Cao	NOAA/NESDIS	USA
Thomas Cecere	USGS	USA
Xiaolong Dong	NSSC, CAS (also representing NRSCC)	China
Richard Eckman	NASA Langley Research Center	USA
Lawrence (Larry) Flynn	NOAA NESDIS	USA
Leila Fonseca	Brazilian National Institute for Space Research (INPE)	Brazil
Nigel Fox	UKSA / NPL	UK
Patrice Henry	CNES	FRANCE
Einar-Arne Herland	Norwegian Space Centre	Norway
Jean-Christopher Lambert	BELSPO / IASB-BIRA	Belgium
DongHan Lee	USGS EROS / Korea Aerospace Research Institute	USA
Chuanrong LI	NRSCC / CAS-AOE	China
Tim Malthus	CSIRO	Australia
Brian Markham	NASA/GSFC	USA
Jan-Peter Muller	University College London	UK
Jaime Nickeson	NASA GSFC (Sigma Space Corporation)	USA
Steven Neeck*	NASA Headquarters	USA
Francis Padula	NOAA	USA
Miguel Román	NASA's Goddard Space Flight Center	USA
Kerry Sawyer	CEOS CEO / NOAA	USA
Gabriela Schaepman	University of Zurich	CH
Satish Srivastava	Canadian Space Agency	Canada
Greg Stensaas	US Geological Survey (USGS), EROS Center	USA
Lingli Tang	NRSCC / CAS-AOE	China
Medhavy Thankappan	Geoscience Australia	Australia
Kurtis Thome	NASA / Goddard Space Flight Center	USA
Stephen Ungar	NASA / GSFC	USA
Albrecht von Bargen	DLR	Germany
Manfred Zink*	DLR	Germany
Fuzhong Weng	NOAA, STAR, Satellite Meteorology and Climatology Division	USA
Ivan Csiszar	NOAA, STAR, Satellite Meteorology and Climatology Division	USA
Mike Kalb	NOAA, STAR	USA
Al Powell	NOAA, STAR	USA
Mitch Goldberg	NOAA	USA

Osamu Ochiai*	GEO Secretariat	Switzerland
Gary Corlett*	SST-VC/GHRSST/University of Leicester	UK

Appendix 2 – WGCV-38 Agenda

38th CEOS Working Group on Calibration and Validation Plenary (WGCV-38)

AGENDA

Co-Hosted by:
NOAA, USGS and NASA

Location: NOAA Center for Weather and Climate Prediction (NCWCP), College Park, MD, USA
Sep 30th to Oct 2nd , 2014

Rev. 8

Monday 29 Sep 2014
09:00 to 17:00 WGCV Side Meeting (outside of WGCV-38 Plenary) WGCV Executive and Subgroup Chairs (only)

Tuesday 30 Sep 2014		
08:30-9:00 Registration		
Welcome and Host Presentations		
09:00 (10 mins)	Chair's Opening, Logistics, Agenda	**S. Srivastava**
09:10 (20 mins)	NOAA Welcome	**Al Powell / Mike Kalb**
09:30 (10 mins)	USGS Welcome	**T. Cecere**
09:40 (10 mins)	NASA Welcome	(tbc)
09:50 (15 mins)	NOAA JPSS Program Update	**M. Goldberg**
10:05 (20mins)	Chair's Report	**S. Srivastava**
10:25 (5 mins)	Minutes of WGCV-37	**S. Srivastava**
10:30 - 10:45 Coffee Break		
Tour of NOAA Center for Weather and Climate Prediction (NCWCP) 10:45 to 11:25 (40 mins)		

Subgroup session (I)		
11:25 (20 mins)	Terrain Mapping Subgroup	**J.-P. Muller**
11:45 (15 mins)	Infrared & Vis. Opt. Sensors Subgroup	**N. Fox**
Agency Reports (I)		
12:00 (15 mins)	CSA	**S. Srivastava**
GEO Update		
12:15 (15 mins)	GEO Update	**O. Ochiai (remotely)**
12:30 to 13:30 Lunch (non-hosted)		
Agency Reports (II)		
13:30 (15 mins)	NASA	**K. Thome**
13:45 (15 mins)	CSIRO	**T. Malthus**
14:00 (15 mins)	GA	**M. Thankappan**
14:15 (15 mins)	NRSCC	**C.R. Li**
14:30 (15 mins)	CNES	**P. Henry**
14:45 (15 mins)	UKSA	**N. Fox or J.P Muller**

15:00 - 15: 30 Coffee Break		
Subgroup session (II)		
15:30 (15 mins)	Atmospheric Composition Subgroup	**B. Bojkov**
Agency Reports (III)		
15:45(15 mins)	ESA	**B. Bojkov**
16:00 (15 mins)	DLR	**A. von Bargen**
16:15 (15 mins)	INPE	**L. Fonseca**
16:30 (15 mins)	NSC	**E. Herland**
16:45 (15 mins)	BELSPO	**J.-C. Lambert**
17:00 (15 mins)	KARI	**DongHan Lee**
17:15 Adjourn for day		

Tuesday - Evening

Non-hosted Dinner

Wednesday 1 Oct 2014		
09:00-9:10 Day 1 Recap (Chair)		
Agency Reports (IV)		
09:10 (15 mins)	USGS	**G. Stensaas**
CEOS Update		
09:25 (20 mins)	CEOS Update	**K. Sawyer**
WGCV and Virtual Constellations		
09:45 (15 mins)	Presentation ACC-VC	**R. Eckman**
10:00 (15 mins)	Presentation SST-VC (remotely)	**G. Corlett**
10:15 (15 mins)	Presentation P-VC	**S. Neeck**
10:30 (10 mins)	Update on LSI-VC	**T. Cecere**
10:40 - 11: 00 Coffee Break		
Subgroup session (III)		
11:00 (20 mins)	Microwave Subgroup	**X. Dong**
11:20 (20 mins)	Land Product Validation Subgroup	**G. Schaepman-Strub**
CEOS WGCV -GSICS Interaction		
11:40 (50 mins)	Presentations and Discussions	**L. Flynn and M. Bali**
12:30 to 13:30 Lunch (non-hosted)		
WGCV Internal Reports		
13:30 (30 mins)	GSICS Activities	**WGCV** Chair, Vice-Chair, Subgroup Chairs and Vice-Chairs, Members & Associates, CEO Representatives (only)
14:00 (30 mins)	Interactions with Virtual Constellations	
14:30 (30 mins)	Cal/Val Portal	
15:00 - 15:30 Coffee Break		
15:30 (30 mins)	CSIST (CTF Action Items)	**WGCV** Chair, Vice-Chair, Subgroup Chairs and Vice-Chairs, Members & Associates, CEO Representatives (only)
16:00 (90 mins)	Discussion and Wrap-Up of afternoon sessions	
17:30 Adjourn for day		

Thursday2 Oct 2014		
09:00-9:10 Day 2 Recap (Chair)		
09:10 (10 mins)	NOAA Welcome	**Al Powell**
Subgroup session (IV)		
09:20 (20 mins)	SAR Sub-group	**M. Zink (remotely)**
Cross-cutting themes		
09:40 (5 mins)	Introduction	
09:45 (15 mins)	DEM	**B. Bojkov**
10:00 (15 mins)	Cloud Masking	**B. Bojkov**
10:15 (15 mins)	RER and Lunar Cal.	**DongHan Lee (USGS/KARI)**
10:30 - 11: 00 Coffee Break		
11:00 (25 mins)	RADCALNET	**N. Fox**
		Malthus and Thankappan
WGCV Core Business		
11:25 (45 mins)	WGCV Vice Chair Nomination Procedure and Exercise	**WGCV Chair, Secretariat & All**
12:10 (20 mins)	Other Business	
12:30 to 13:30 Lunch (non-hosted)		

WGCV Internal Reports		
13:30 (30 mins)	WGCV Action Items	**WGCV** Chair, Vice-Chair, Subgroup Chairs and Vice-Chairs, Members & Associates, CEO Representatives (only)
14:00 (30 mins)	CEOS Action Items and WGCV (2014-16) deliverables	
14:30 (30 mins)	Subgroup Recommendations	
15:00 - 15:30 Coffee Break		
15:30 (20 mins)	ISRSE2015 WGCV presentations	**WGCV** Chair, Vice-Chair, Subgroup Chairs and Vice-Chairs, Members & Associates, CEO Representatives (only)
15:50 (25 mins)	Discussion on ground-based characterization/ cal workshop	
16:15 (35 mins)	Other business	
16:50 (10 mins)	Meeting Close-out	

Thursday - Evening

Alternative Option for Non-hosted Dinner

Friday Oct 3 2014

09:00 to 12:00 WGCV Side Meeting (outside of WGCV-38 Plenary)

WGCV Executive (only)
Secretariat Transition Planning

Appendix 3 – New action items from WGCV-38 (College Park, MD, USA)

WGCV38 Action Items	Assigned to:	Due Date	Status
CEOS Update (Day2 – Wed Oct 1)			
WGCV-38-0: WGCV Chair and Technical Secretariat to review the spreadsheet to be provided by the CEO of the CEOS 2014-16 Work Plan deliverables related to WGCV with as much detail as possible to provide a good understanding of progress of the deliverable.	S.Srivastava, E.Arsenault	Oct 22, 2014	To be CLOSED - Completed on Oct. 21st.
GSICS Activities, Internal Discussions (Day 2 – Wed Oct 1)			
Calibration Terminology: **WGCV-38-1:** N. Fox to provide a copy of the NIST document on calibration terminology to WGCV subgroup chairs.	N. Fox	Oct 10, 2014	Open
WGCV-38-2: Each WGCV subgroup to review NIST calibration terminology document to determine adequacy in relation to their activities- 1st draft review shall be provided by WGCV-39.	Subgroup Chairs	WGCV-39	Open
Best practices: **WGCV-38-3:** MWSG Chair to have a communication with GSICS on how WGCV can offer support on best practices.	X. Dong	WGCV-39	Open
WGCV-37-7 a (updated at WGCV-38) WGCV Secretariat to send out the list of potential GSICS-WGCV Cooperation items outlined by GSICS to each subgroup chair.	E. Arsenault	Oct 3rd, 2014	To be CLOSED - Completed on Oct. 3rd.
WGCV-37-7 b (updated at WGCV-38) WGCV Subgroup Chairs to identify and prioritize specific activity areas for interaction with GSICS.	Subgroup Chairs	Oct 31st, 2014	Open
Internal Discussions (Day 2 – Wed Oct 1) *Discussion on defining available WGCV subgroup resources and identifying activities that can be transformed into deliverables at the working group level.*			

WGCV-38-4: Each subgroup to identify the active members of their subgroups (with their affiliation).	Subgroup Chairs	WGCV-39	Open
WGCV-38-5: Each subgroup to identify a list of small project activities as a starting point for deliverables.	Subgroup Chairs	WGCV-39	Open
CEOS Cal/Val Portal Discussion (Day 2 – Wed Oct 1)			
WGCV-38-6: TMSG Chair to provide definition/information of his subgroup to B. Bojkov and A. Burini for hosting on cal/val portal.	J.P. Muller	WGCV-39	Open
WGCV-38-7: MWSG Chair to provide definition/information of his subgroup to B. Bojkov and A. Burini for hosting on cal/val portal	X. Dong	WGCV-39	Open
WGCV-38-8a: LPV Chair to formulate a recommendation to WGCV to add functionality to current OLIVE tool on cal/val portal.	G. Schaepman	Oct 31st, 2014	Open
WGCV-38-8b: B. Bojkov to second the recommendation of LPV on adding functionality to OLIVE and will request support from the WGCV .	B. Bojkov	Nov 15, 2014	Open
WGCV-38-8c: WGCV Chair to write support letter to ESA for enhanced functionality of OLIVE tool.	A. von Bargen	Dec 15, 2014	Open
WGCV-38-9: B. Bojkov to formulate an approach for sub-setting via cal/val portal by SIT-30 for recommendation to CEOS.	B. Bojkov	SIT-30 (Mar 29, 2015)	Open
Cross-Cutting: Cloud Masking and DEMS (Day 3 – Thu Oct 2)			
WGCV-38-10a: B.Bojkov to poll (via doodle poll) availability of participants for a 2-3 day workshop in Feb/March 2015 to brainstorm on cloud masking and DEM issues.	B. Bojkov	Nov 15, 2014	Open

WGCV-38-10b: B. Bojkov to prepare and send a list of topics/questions for discussion on cloud masking to WGCV in preparation for future workshop.	B. Bojkov	Nov 15, 2014	Open
WGCV-38-10c: G. Stensaas to send a list of topics/questions for discussion on DEMs to WGCV in preparation for future workshop.	G. Stensaas	Nov 15, 2014	Open
WGCV-38-10d: B. Bojkov to organize a 2-3 day workshop in Feb/March 2015 to brainstorm on cloud masking issues, in conjunction with G. Stensaas on DEMs, and to report outcomes at WGCV-39.	B. Bojkov and G.Stensaas	WGCV-39	Open
Review of Recommendations from WGCV-37 (Day 3 – Thu Oct 2)			
Recommendation 1: "WGCV should investigate use of a *compatible* rating system (i.e maturity matrix) across all subgroups for reporting on its cal/val methods and processes.			
WGCV-38-11: Subgroups to review LPV rating system as a starting point and evaluate its compatibility for use by their subgroup.	Subgroup Chairs	1 month prior to WGCV-39 (April 1st,2015)	Open
Recommendation 2 and 3 from SAR subgroup:			
WGCV-38-12: WGCV Chair to seek clarification with SAR Chair on recommendation 2 (SAR 2013-1) and recommendation 3 (SAR 2013-2).	S. Srivastava	Oct 17, 2014	Open
Recommendation 5 from TMSG subgroup:			
EO data to establish Global test sites for assessing the accuracy and reliability of retrieving continental-shelf bathymetry **WGCV-38-13:** TMSG Chair to consult with NOAA and DLR on drafting the proposal of this activity, following guidelines of the 'CEOS New Initiatives Process Paper'**.**	J.P. Muller	WGCV-39	Open
ISRSE36 WGCV session (Day 3 – Thu Oct 2)			
WGCV-38-14: A. von Bargen to send an e-mail, to authors identified to present at ISRSE36 WGCV session, with information regarding abstracts to be prepared.	A. von Bargen	Oct. 8, 2014	Open

Workshop on Pre-flight and Onboard Calibration Discussion (Day 3 – Thu Oct 2)			
WGCV-38-15: N. Fox to initiate an open telecon with key players for the planning of a workshop on pre-flight and onboard calibration of optical sensors by Q4 2015 or Q1 2016.	N. Fox	Nov 30, 2014	Open

Appendix 4 – Past action items from WGCV-37 (Frascati, Italy) and Updated Status

WGCV37 Action Items	Assigned to:	Due Date	Status
WGCV-37-1: Greg Stensaas (USGS) to poll (via doodle poll) WGCV Chair, Vice-Chair and Subgroup Chairs to determine optimal dates for WGCV-38 plenary meeting in USA, and confirm plenary dates by March 1st, 2014.	Greg Stensaas (USGS)	March 1st, 2014	**Closed**
WGCV-37-2: IVOS Chair to setup a doodle poll regarding availability of participants for a follow-up telecon to the October 2013 WebEX session with user community on the development of best practices for use of External Solar Irradiance Spectrum.	IVOS chair (N.Fox)	March 1st, 2014 **New due date is Dec 31,2014**	**Left Open** (2014-10-02-WGCV38)
WGCV-37-3: WGCV to follow-up with GSICS (Tim Hewison) to learn from their experience with implementing maturity matrix type systems within their activities.	Greg Stensaas (USGS)	WGCV-38	**Closed.** See GSICS presentation at WGCV-38 by Manik Bali.
WGCV-37-4: All subgroups to formulate/identify 1 specific topic/example to implement in QA4EO for the next WGCV plenary. ***Voluntary action:*** *for agencies to inventory activities where QA4EO principles are or could be applied.*	Subgroup Chairs	WGCV-38	**Closed.** On-going work. Subgroups should consider including in their reports to WGCV.
WGCV-37-5: Subgroup Chairs to identify areas where WGCV can contribute to cal/val activities of Virtual Constellations, and other WGs.	Subgroup Chairs	~~WGCV-38~~ Updated. Now due Friday Aug 29 in preparation for SIT VC day.	**Closed.**
WGCV-37-6: WGCV to review the CEOS Carbon Task Force Report and have a telecon meeting by mid-March 2014 to discuss a strategy to respond to action items outlined in the report, in preparation for the SIT-29 meeting.	WGCV Chair, Vice-Chair and Subgroup Chairs	March 14, 2014	**Closed.** Telecon was done and a strategy was agreed.

WGCV-37-7: WGCV subgroup Chairs to identify and prioritize specific activity areas for interaction with GSICS. ** ***updated at WGCV-38 to*: **WGCV-37-7a:** WGCV Secretariat to send out the list of potential GSICS-WGCV Cooperation items outlined by GSICS to each subgroup chair (by October 3rd). **WGCV-37-7b:** WGCV subgroup Chairs to identify and prioritize specific activity areas for interaction with GSICS (by October 31st).	WGCV Subgroup Chairs	WGCV-38	**Left Open** (2014-10-02-WGCV38)
WGCV-37-8 : WGCV Chair, Vice-Chair, and Subgroup Chairs to have a discussion on how to coordinate the WGCV participation in GSICS meetings.	WGCV Chair, Vice-Chair, and Subgroup Chairs	WGCV-38	**Closed.** Coordination is occurring.
WGCV-37-9: WGCV Chair to send CEOS 3-year work plan draft to subgroup chairs, for them to review and return their comments by March 10 for discussion at WGCV telecon to be held mid to late March, 2014	WGCV Chair	March 10, 2014	**Closed.** WGCV input to CEOS 3-year work plan was discussed at the telecon and then provided to CEO. CEO and SEO felt the number of tasks was very large. On the instructions of SIT-29, WGCV task list was condensed by merging and keeping it at high level.
WGCV-37-10: MWSG Chair (X. Dong) to request NRSCC to confirm that he may act as a NRSCC WGCV member.	MWSG Chair	WGCV-38	**Closed.** Approval received from NRSCC on Sep 22, 2014.
WGCV-37-11: Implement edits recommended by WGCV plenary to the membership list and publish revised list to WGCV web site.	WGCV Secretariat	June 30	**Closed.** Membership list updated by Secretariat and published to CEOS WGCV website.
WGCV-37-12: Implement edits to WGCV Work Plan (2011-2016) that were presented and agreed upon at WGCV-37 and publish as version 5.5. to WGCV website. Note: Section 4.5 'Participating Delegations' – leave out following text "including agencies nominating vice-chair candidates"	WGCV Secretariat	June 30	**Closed.** Work Plan updated by Secretariat and published to CEOS WGCV website.
WGCV-37-13: A. Burini will implement a connection between CWIC and CEOS cal\val data portal (OpenSearch format).	A. Burini	WGCV-38	**Left Open** (2014-10-02-WGCV38)

Appendix 5 – Remaining action items from WGCV-36 (Shanghai, China) with 'Open' status

WGCV36 Action Items	Assigned to:	Due Date	Status
WGCV-36-6: WGCV Vice-Chair to develop reporting templates for agency and subgroup reports to be presented at WGCV-37 for discussion.	WGCV Vice-chair	WGCV 37	**Left Open** (2014-10-02-WGCV38) **Left Open** (2014-02-20-WGCV37) A. von Bargen to distribute sample templates to Subgroup Chairs and Agencies by WGCV-37 for review. Objective is to receive comments on the template and have some agencies and subgroups test it for the next plenary) (Left Open -2014-10-02-WGCV38)
WGCV-36-9: WG on Climate is searching for support in assessment of the FCDR and ECVs. WGCV is willing to support the assessment based on their ToR and expertise. Two clarifications have to be carried out in cooperation with WGCV and SIT/plenary: (1) In principle, WGCV should be the only responsible body (or body first to be asked) in CEOS for CAL/VAL related issues of satellite products, i.e. sensor calibration and higher level (e.g. 2/3) product validations; (2) If for higher level product (2/3) evaluation/assessment/validation will be carried out by other (CEOS or others) bodies, this should be first coordinated with WGCV to allow cooperation.	WGCV Chair and Vice-Chair	WGCV 37	**Left Open** (2014-10-02-WGCV38) **Left Open** (2014-02-20-WGCV37) WGCV Vice-Chair, as PoC to WG Climate, will discuss at upcoming telecon/meeting