



Minutes of the

31st Plenary Meeting of the

Committee on Earth Observation Satellites

(CEOS)

Working Group on Calibration and Validation

(WGCV)

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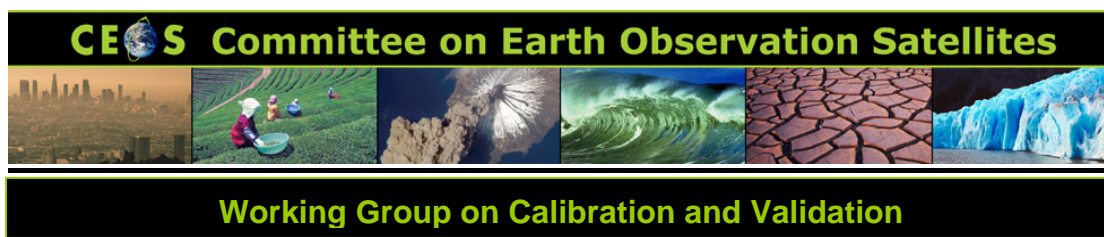
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ACRONYMS

AATSR	Advanced Along-Track Scanning Radiometer
ACSG	Atmospheric Composition Subgroup
ACC	Atmospheric Composition Constellation
ADC	Architecture Data Committee
AERONET	Aerosol Robotic Network
AIRS	Atmospheric Infrared Sounder
ALOS	Advanced Land Observing Satellite
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATSR	Along-Track Scanning Radiometer
AVHRR	Advanced Very High Resolution Radiometer
BELMANIP	Benchmark Land Multisite Analysis and Intercomparison of Products
BelSPO/IASB-	Belgian Science Policy / Belgian Institute for Space Aeronomy
BIRA	
BNSC	British National Space Agency
BOUSSOLE	Buoy for the Acquisition of Long-term Optical Time Series
BRDF	Bidirectional Reflectance Distribution Function
Cal/Val	Calibration and Validation
CAS	Chinese Academy of Sciences
CBERS	China-Brazil Earth Resources Satellite
CEOS	Committee on Earth Observation Satellites
CJRS	Canadian Journal of Remote Sensing
CLARREO	Climate Absolute Radiance and Refractivity Observatory
CNES	Centre National d'Etudes Spatiales
COVE	CEOS Spacecraft Coverage Analysis Visualisation Tool
CRESDA	Center for Resources Satellite Data and Applications
CSA	Canadian Space Agency
CSSAR	Center for Space Science and Applied Research
DEM	Digital Elevation Model
DLR	German Aerospace Center
DMCii	Disaster Management Constellation International Imaging
DST	Data Sharing Team
ECV	Essential Climate Variable
EO	Earth Observation



ERS	Earth Resources Satellite
ESA	European Space Agency
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
fAPAR	Fraction of Absorbed Photosynthetically Active Radiation
FCT	Forest Carbon Tracking
GCOS	Global Climate Observing System
GDEM	Global Digital Elevation Model
GEO	Group on Earth Observations
GEOS	Global Earth Observing System of Systems
GISTDA	Geo-Informatics and Space Technology Development Agency
GMES	Global Monitoring for Environment and Security
GOFC-GOLD	Global Observation of Forest and Land Cover Dynamics
GSICS	Global Space-Based Inter-Calibration System
GTOS	Global Terrestrial Observing System
IASI	Infrared Atmospheric Sounding Interferometer
IEEE	Institute of Electrical and Electronics Engineers
INPE	Instituto Nacional de Pesquisas Espaciais
INRA	French National Institute for Agricultural Research
ISO	International Organization for Standardization
ISRO	Indian Space Research Organisation
IVOS	Infrared and Visible Optical Sensors Subgroup
JAXA	Japan Aerospace Exploration Agency
JRC	Joint Research Council
KML	Keyhole Markup Language
LPV	Land Product Validation Subgroup
LSI	Land Surface Imaging constellation
LTER	Long Term Ecological Research
MERIS	Medium Resolution Imaging Spectrometer
METOP	Meteorological Operational satellite programme
MISR	Multangle Imaging SpectroRadiometer
MODIS	Moderate Resolution Imaging Spectroradiometer
MWS	Microwave Sensors Subgroup
NASA	National Aeronautics and Space Administration
NEON	National Ecological Observing Network
NIST	National Institute of Standards and Technology
NMI	National Metrology Institute
NOAA	National Oceanic and Atmospheric Administration



NPL	National Physical Laboratory
OCR	Ocean Colour Radiometry constellation
OGC	Open Geospatial Consortium
OSVW	Ocean Surface Vector Waves
PC	Precipitation Constellation
QA	Quality Assurance
QA4EO	Quality Assurance Framework for Earth Observation
QC	Quality Control
QI	Quality Indicator
ROSCOSMOS	Russian Federal Space Agency
SAR	Synthetic Aperture Radar
SBSTA	Subsidiary Body for Scientific and Technological Advice
SEC	Secretariat (CEOS)
SEO	Systems Engineering Office (CEOS)
SIT	Strategic Implementation Team (CEOS)
SMOS	Soil Moisture and Ocean Salinity
SOAP	Simple Object Access Protocol
SRTM	Shuttle Radar Topography Mission
SST	Sea Surface Temperature
TRUTHS	Traceable Radiometry Underpinning Terrestrial- and Helio- Studies
TMSG	Terrain Mapping Subgroup
UCL	University College London
USGS	United States Geological Survey
VIIRS	Visible/Infrared Imager Radiometer Suite
VIRS	Visible and Infrared Scanner
VNIIOFI	All-Russian Research Institute for Optical and Physical Measurements
WGCV	Working Group on Calibration and Validation
WGISS	Working Group on Information Systems and Services
WMO	World Metrological Organization



1 WELCOME & INTRODUCTION

Lecomte (ESA; WGCV chair) welcomed everyone to the 31st WGCV plenary meeting and thanked NIST for organising the meeting at the Bolger Center in Potomac, Washington DC, USA.

Lecomte introduced Gerald Fraser, the division chief in the optical technology division at NIST.

1.1 Welcome & Background to NIST's Activities (Fraser)

Fraser provided a background presentation to NIST, its history and activities. Lecomte asked about the environmental data record continuity risk gap analysis. Fraser identified the need for international engagement in this activity to improve the inter-comparability of satellite measures. Once there was greater transparency and more free flow, the data would improve. Using the moon for calibration would improve the measurements. Robust optical models for the sensors are needed so that adjustments can be made accordingly should a problem be identified. Lecomte expressed an interest in receiving the gap analysis report once complete. Fraser announced that this would be available soon.

Lecomte introduced David Allen, a staff scientist in the optical thermometry and spectral methods division, which is headed by Eric Shirley.

1.2 Hyperspectral Image Projection for medical imaging applications (Allen)

Allen talked about medical imaging applications using hyperspectral image projections. These technologies help medicine move towards less invasive surgery methods. Fraser asked about a particular US congressman who had recently died after a fairly routine gall bladder procedure. Allen explained that the surgery the congressman had undergone had injured tissue in the intestine and this had caused the problem. It is often hard for a surgeon to distinguish between tissue types during surgery. In this case damage to intestinal tissue had occurred, infection had set in and the man died. Non-invasive surgery would probably have prevented this and this research would stop or at least drastically reduce this kind of tragic incident.

Lecomte introduced Howard Yoon, a staff scientist in the optical thermometry and spectral methods division.



1.3 Optical metrology at NIST in support of solar energy generation (Yoon)

Yoon talked about optical metrology activities at NIST that support solar energy generation. He presented the work on spectroradiometric characterisation of the NIST Pulsed Solar Simulator. Yoon suggested that the need for solar cell calibrations will increase and that commercial fast PDAs are capable of low uncertainty measurements of pulsed solar simulators.

Lecomte introduced James Whetstone, a division chief in chemistry and currently assigned to the director of NIST.

1.4 Optical Metrology for Greenhouse Gas Measurements and Climate Science at NIST (Whetstone)

Whetstone provided an overview of activities being undertaken at NIST in optical metrology for greenhouse gas measurements and climate science. The climate change measurements being requested today push the standards capabilities. Muller asked about measurements of aerosol particulates and if they included multi-angular measurements. Whetstone explained that the photo-acoustic method provided some sample of the particle distribution but only from those particles that the acoustic signal can excite. Muller asked about whether isotopes of carbon were being explored. Whetstone explained that the present interest in this is small at NIST but there is likely to soon be renewed interest in this topic. Repetition of the isotope CO₂ dilution measurements may well be considered as the technology of doing those measurements has improved by a factor of 4 or 5 since they were done previously.

Lecomte thanked all those from NIST who had presented to the WGCV at the meeting. He stressed the need for the WGCV to tie in their work to fundamental measurements and to link to SI.

A tour de table was undertaken introducing all those present at the meeting.

1.5 WGCV Chair's Report (Lecomte)

Lecomte provided an introduction and background to the WGCV. WGCV-32 will be held in Montreal, hosted by CSA. Lecomte described the organisation of CEOS and its structure and how the WGCV fits within. Lecomte outlined the major events since WGCV-31. He also informed the participants of the new vice-chair election process.



Nominees would be put forward at this meeting and elections would take place at WGCV-32.

1.6 WGCV's action plan, mission statement and group objectives (Lecomte)

Lecomte suggested that a new 5-year work plan should be produced for WGCV-32. Ungar added that the key phrase “climate change” should be included into the mission statement. Goldberg added that there are a lot of actions related to calibration and validation in the GCOS implementation plan and he suggested that the WGCV should focus on those actions and reflect this in the mission statement and/or plan. It was agreed to review the mission statement and objectives (*Action WGCV31-1*). A new 5-year plan would also be compiled (*WGCV31-2*).

1.7 Actions from WGCV-30 (Greening)

Greening listed the action items from WGCV-30 and reported on progress.

Action	Description	Status
WGCV29-6	CRESDA (Xiaolong Dong) potentially providing sample high spectral resolution data HJ-1 A, over select sites: Dome C, Dunhuang and Libyan desert.	Closed
WGCV29-9	WGCV, WGISS and LSI – put together a study to achieve: coordinated quality index for land cover products.	Closed
WGCV30-1	WGCV Subgroups to follow the QA4EO reference standard and the associated IVOS procedure to provide information related to the CEOS World Wide Test Sites. The IVOS procedure should be used, changed or updated as needed to meet subgroup requirements. Cal/Val and test site information should be provided (via the WGCV secretariat) for incorporation into the World Wide Test Site Page.	Open
WGCV30-2	Remind CEOS chair of accepted CEOS plenary recommendations regarding ASTER GDEM data access & redistribution and request their action.	Closed
WGCV30-3	Report on why MERIS fAPAR was not used over the BELMANIP2 sites for work done within GEO task DA-09-01b_1. WGCV Secretariat to ask Baret (task lead).	Closed (at this meeting)



Action	Description	Status
WGCV30-4	Subgroups to consider their specific requirements for data formats (including metadata) and consider proposing a standard format or standard set of processes where appropriate.	Open
WGCV30-5	Stensaas to work (with WGISS) to draft a short summary on the exact nature and background to the request made in action WGCV30-4 for presentation to the subgroup members to assist their response.	Open
WGCV30-6	Discuss with AR-09-01c (GEOSS Best Practices Registry) leads to identify exactly how their catalogue works and to discuss establishing links to QA4EO best practice and Cal/Val related documentation.	Open
WGCV30-7	Compile a statement of WGCV capability and abilities that the constellation communities may use to identify areas where the WGCV could effectively contribute. This should include POCs for each capability or at least each instrument covered by the subgroup.	Open
WGCV30-8	Enhance the proposed QA4EO Governance Structure to ensure inclusion of all relevant parties from both within CEOS and also from the wider GEO community.	Open
WGCV30-9	Draft a proposition for an implementation strategy for QA4EO for presentation to GEO at GEO-VI.	Open
WGCV30-10	Define a list of IVOS instruments and encourage (write a letter to) all agencies to participate in a prototype global intercomparison experiment (Tuz Golu campaign – August 2009) to include all IVOS test sites. Pass this information to the SEO.	Closed
WGCV30-11	WGCV representatives to ensure that their WGCV plenary report includes particular reference to any current CEOS or GEO task issues. For example, the agency / country report may include details on progress towards the goal of making DEM data available for the GEO Global DEM (in response to GEO task DA-09-03d) and/or a report on progress in implementation of QA4EO (in response to GEO task DA-09-01a).	Closed (at this meeting)



2 SUBGROUP REPORTS

2.1 Atmospheric Composition Subgroup Report (Lambert)

Lambert provided the report from the Atmospheric Composition Subgroup (ACSG). Stensaas asked about concerns the atmospheric composition community had with coming up with realistic uncertainties associated with level 3 modelling products. Lambert explained that in data assimilation there needed to be error bars but after this stage the process was not clearly defined. Currently, there is no clear documented process and this makes the definition of uncertainty measurements very hard. This is an important issue and there are the beginnings of progress but efforts do need to be improved.

2.2 Infrared and Visible Optical Sensors Subgroup Report (Fox)

Fox provided the report from the Infrared and Visible Optical Sensors (IVOS) subgroup. Muller asked about the test sites that IVOS had listed. Lecomte explained that the aim within CEOS would be to create a list of sites that cover all domains and could be maintained in the long term (*WGCV31-3*). The plan would be to present these to CEOS plenary and ask the member agencies to be responsible for maintaining these sites in the long-term for the sake of the community. One aspect of this had been covered by IVOS, but the ultimate aim would be to include a list of sites that cover all domains / subgroup activities. Stensaas asked if IVOS would be looking to include vegetated sites. Fox replied that IVOS did plan to cover vegetated sites. Ungar stressed the need to reference relatively stable sites to more stable sites such as the moon. Characterising the site against something more stable would help with detecting drift in dark current measurements.

Shirley asked if there were plans for coordination between CEOS and GSICS for intercomparison work. Lecomte explained that cooperation between the WGCV and GSICS already exists. Presentations had been made by both the WGCV and GSICS at recent CGMS and CEOS plenary meetings emphasising that the two are working together. The work of the two groups is complementary and there is no competition. GSICS aims to maintain calibration in the longer term whereas the WGCV is more involved in setting up methodologies, etc. Goldberg explained that GSICS is concerned with the sustained inter-calibration sensor to sensor and satellite to satellite issues. GSICS endorses and advocates the WGCV's activities and are happy to leave the work involved in ground based calibration campaigns to the WGCV. Shirley asked if GSICS might be useful as a more operational system for the use of test sites was established. Goldberg responded that the agencies already do manage many of these sites well.



GSICS activities are more relevant to sustained satellite to satellite systems and continuous sustaining calibration work. Changyong Cao and NOAA are actively involved in both the WGCV and GSICS and this provides a clear working link between the two.

2.3 Land Product Validation Subgroup Report (Nightingale)

Joanne Nightingale (NASA) is the new Land Product Validation (LPV) subgroup chair and she provided the report from the Land Product Validation subgroup. The position of LPV vice-chair is currently vacant. Lecomte was impressed by the range of activities set up within the LPV.

Lecomte explained that there had been a strong request for the WGCV's help from the Forest Carbon Tracking (FCT) team. FCT is a strong political requirement and there is a big gap between this and the specifics of measurements, intercomparison, etc. FCT is a major issue and there are a lot of open areas to be defined. It would be the LPV's task to coordinate this. Baret highlighted the need to have a clearer definition of the requirements from the FCT team to know how the LPV can answer the requirements. There are many things of interest but these have to be registered and more details provided. The LPV have already sent one letter to GCOS (Global Climate Observing System) to seek clarification on the definitions the communities are using. Nightingale suggested that the LPV could provide the definitions from their perspective. Lecomte agreed that the group be more proactive in saying that unless there is a specific problem with a definition then the LPV subgroup would set the approved definition that should be used. This could also be mentioned to the SIT. Baret suggested also writing a paper in a peer-reviewed journal where those definitions are clearly stated. Stephen Plummer (ESA) will attend the next GTOS (Global Terrestrial Observing System) meeting and will follow this up.

It was agreed to begin to define a preliminary set of CEOS Cal/Val sites that would represent the minimum set of mandatory sites (applicable across all relevant sensor / thematic domains) that should be maintained for the long-term future (**Action WGCV31-3**). This would be a large task but it would be important to begin this now. Lambert reported that this would not be an easy task for the atmospheric composition community. The subgroup is working towards some sites that provide geometry information or generic ideas but the community is uncomfortable providing this information. Lecomte suggested that there is the need to almost invent the concept for atmospheric composition. It may be that a site is not the most appropriate thing, rather a strategy for a measurement. Baret suggested that there are different types of sites, some need to be maintained from year to year, others need to change often. Lecomte suggested that a protocol for Cal/Val be defined to include those sites that should be used, rather than simply a list of sites.



Stensaas recommended the inclusion of the National Ecological Observing Network (NEON), which has around 20 sites across the US. He suggested that the WGCV should be directly involved with them to check the Cal/Val components. Nightingale agreed to follow this up. Stensaas suggested that IVOS may also want to be involved in looking at those. Thome is on the NEON airborne working group and he agreed that it would be worthwhile making a formal connection with them.

2.4 Microwave Sensors Subgroup Report (Dong presented by Lecomte)

Dong could not be present at the meeting. Lecomte presented his slides and the overview report from the Microwave Sensors (MWS) subgroup. Fox clarified that the BIPM do not have standards for microwaves. Standards may come from a standards laboratory under the auspices of BIPM, but not from the BIPM itself. Lecomte requested that any comments or questions on microwave sensors and / or the subgroup activities be directed to Buck or Dong either directly or through Greening.

2.5 Synthetic Aperture Radar Subgroup Report (Srivastava)

Srivastava presented the SAR subgroup's activities and also some recommendations. Muller explained that a DEM of the British Isles had been produced using tandem data – Landmap. Training material had been produced and Andy Southward in the UK had updated it and could provide help with the SAR subgroup site. Muller and Srivastava agreed to create the link between Southward and those developing the SAR website. Srivastava reported that at the next SAR workshop accuracies required for calibration would be discussed. Stensaas asked if any cross-calibration over other sites had been considered using SAR. Srivastava responded that cross-calibration between different SAR sensors was certainly possible, what was not clear was how to cross-calibrate between optical sensors and SAR. DOME-C is the one site where measurements had been acquired from both and so it would potentially be possible to undertake cross-calibration over DOME-C. SAR has its own sites and these meet the requirements, but there may be some accuracy benefits to other instruments through cross-calibration activities with SAR so this should be investigated.

2.6 Terrain Mapping Subgroup Report (Muller)

Muller provided the report from the Terrain Mapping subgroup (TMSG). The TMSG test sites have already been defined. Muller hypothesised that a global DEM would never be produced to the required accuracy unless an agency stepped forward. Stensaas asked about the Cartosat IRS Indian archive and what had been done with this so far. Muller



explained that there had been some contact with them at a meeting, but nothing had happened since. The Indians had shown a project that had produced a DEM of the whole of India from this dataset. The results shown had been very impressive but had relied on the need to have a lot of people sitting at workstations doing QC. Stensaas added that ASTER and SRTM had been compared to Cartosat and the results had been very good. For the future one may wish to investigate what datasets are available from India. Lecomte explained that the next CEOS chair will be Spain, probably followed by India. A WGCV representative from India should certainly be sought; ISRO have a fairly robust spaced programme. Fox added that ISRO are participating in the IVOS intercomparison campaigns and are also participating in the constellations.

3 COUNTY / AGENCY REPORTS (PART 1)

3.1 BelSPO/IASB-BIRA (Lambert)

Lambert provided the agency report from the Belgian Space Agency (BelSPO). He outlined agency's involvement in solar and atmospheric composition missions. Lambert talked about NDACC (Network for the Detection of Atmospheric Composition Change) and its supporting role for satellite EO. Atmospheric services validation protocols in response to QA4EO were also discussed.

3.2 CSA (Srivastava)

Srivastava provided the report from the Canadian Space Agency (CSA). Muller asked about the possible use of RADARSAT-2 for stereo modelling of Antarctica at a higher accuracy than that which had been achieved from RADARSAT-1. Srivastava explained that this had already been done to a very high accuracy and should be available.

3.3 DLR (von Bargaen)

von Bargaen reported on the German Space Agency (DLR)'s activities. Muller asked when the Tandem-X science call would go out. von Bargaen agreed to find out. Muller asked about the formal release of historical SRTM data. von Bargaen explained that a request had been made to the German government and DLR had recommended the release. Since then nothing had happened. Muller suggested that this data would make a significant contribution to a global DEM. von Bargaen agreed to look into this issue again, but it is a political problem.



3.4 INRA (Baret)

Baret provided the report from INRA. He reported on his experience over the last 3-years as LPV subgroup chair and the difficulty in negotiating the complex CEOS / GEO landscapes. Baret addressed outstanding action items. He explained that MERIS fAPAR had not been used over the BELMANIP2 sites for work done within GEO task DA-09-01b_1 mainly due to the difficulty in getting large amounts of MERIS data in a timely manner. However, fAPAR validation is continuing.

3.5 NPL (Fox)

Fox reported on the activities of the UK's National Physical Laboratory (NPL). He explained that currently there is an EU opportunity for National Metrological Institutes (NMIs) and through this there are potential opportunities for influence. A European metrology research programme will be funded for NMIs and this contains many thematic areas. There so far have been calls on such areas as health and the call for the environment is just out. The environment call is for a total of €45 million Euros and EO is a part of that. This would be an opportunity to influence what happens by providing requests on what should be addressed.

4 GEO TASK ACTIONS

4.1 Task DA-09-01: GEOSS Quality Assurance Strategy (Lecomte / Stensaas / Fox)

Lecomte provided the background to task DA-09-01a and gave details of the task, its actions and those contributing.

4.2 Action DA-09-01a_6 – Ground-based Cal/Val Campaign (Fox)

Fox explained that all instruments taking part in the ground-based Cal/Val campaign viewed all the calibration panels used so statistically all the necessary information had been gathered to resolve all issues. The results would be available in the public domain within the next month; the participants would see the results first before publication. Ungar asked what objectives had been borne in mind and what the end conclusion was thought to be. Fox explained that the idea would be to come up with a consensus view on what is best practice to approach this type of campaign.



4.3 Action DA-09-01a_8 – Cal/Val & Post-launch Test Sites (Chander)

Chander reported that a CJRS special issue on QA4EO would be published later in 2010. Lecomte suggested the need to have the capacity to expand the definition of a test site. In the case of IVOS the concept of a site is easy to understand, but in the case of, for example, an atmospheric composition “site” it may not be a fixed place, rather a concept.

Burini presented the new Cal/Val portal. A list of sensors and their capabilities appears on the Cal/Val portal as derived from the CEOS handbook. Any feedback on this list and its content should be sent to Chander / Burini (*Action WGCV31-4*). Igantov asked about the SADE webpage. Fox explained that this was not yet linked to the Cal/Val portal as CNES needed to grant open access to allow this. Burini explained that the Cal/Val portal is currently focused on IVOS sensors but there is a desire to open it to other sensors and there is a need to identify some people to be in charge of defining these others. Fox added that this effectively opens the request to the WGCV. It is the Cal/Val community’s portal and it needs to be broadened outside of IVOS. Srivastava added that these kinds of portals are only good if they are maintained as up-to-date information sources. Lecomte responded that Burini is totally focused on the portal and so is effectively the resource to keep it up to date. Muller asked for a demonstration of the portal and Lecomte proposed that Burini do this demo immediately prior to the afternoon session for those interested. This he agreed to do.

4.4 Action DA-09-01a_11: Reference Test Site Data Collaboration & Comparison (Fox)

Fox announced an IVOS workshop to be held at JRC from 18-22 October 2010. Thome stressed the real need for a set of reference test sites as one site may not be captured by a single sensor. There is a need to demonstrate whether the set of sites is the correct one. The amount of effort involved is not substantial but the value would be enormous. Nickeson asked which sensors had been available over the site at the time of the comparison activity. Fox responded that data acquisition / availability was largely based on who took part. Each time a cross calibration takes place an email is sent out to the CEOS agencies for their engagement. An email about the next campaign had already been sent and Greening agreed to send that email round to those present at the meeting for their information (*Action WGCV31-5*). Baret suggested that the albedo community would be interested in being involved in the campaign and Muller’s group at UCL are involved in the GlobAlbedo activity. Fox suggested that if the process could be harmonised, and the involvement of the albedo community ensured, that would be extremely beneficial.



4.5 Action DA-09-01a_12: DOME-C Multi-sensor Experiment (Fox / Cao / Srivastava)

Cao reported on the activities over DOME C. Ignatov asked about the characterisation of the transponders on the ground at DOME-C. Cao explained that there had been studies in this and they have found differences in the BRDF. Atmospheric effects may well be affecting the measurements and the plan is to look into this. Srivastava informed the meeting that the fact that DOME-C is not at sea level makes a big difference for SAR processing. This is not a limiting issue, there is just the additional need to correct the processor for the geometry.

4.6 Action DA-09-01a_13: QA4EO (Lecomte)

Lecomte presented an outline and background to QA4EO. Stensaas went through a new expanded task team list (and observers) to take QA4EO out into the wider SBA communities. It was suggested that ROSCOSMOS be added to the list and this was agreed. Ungar asked about the role of the observer and the main task team. Stensaas explained that the main task team would be the actual “voting” members to establish the process. The observers would help support by providing ideas and comments. Lecomte added that the GEO ADC, GEO DST and OGC needed to be in a position to comment on and oversee the process, the governance is different. The other observers are users more than data suppliers. They need to be informed of the process but cannot be in the governance part of the process. Really it is up to GEO to comment on this list and make the decision about where exactly each should be placed in the lists. Stensaas suggested putting the GEO observers into a separate box and then asking GEO to make the decision where they fit. Goldberg expressed the view that QA4EO is an extremely important activity and a strategic implementation plan would be important to take the process forwards. Killough reported that the SEO had found that getting the SBAs actively involved had been difficult. Obtaining their active participation would be a challenge, but they do need to be engaged to see that the outcome is beneficial to them. Ungar suggested that one could not wait for everyone to be in agreement and in concurrence otherwise it would take years. The need is to go forwards even though everyone may not be included. Stensaas reported that at CEOS level a QA4EO implementation plan is being working on. This could be used as a starting point but the idea would be that the GEO level strategic implementation plan should be complete by the end August. Goldberg suggested that CIMO should be involved in the process.



4.7 Action CL-06-01a_15: Correction coefficients to intercalibrate historical geostationary infrared imager to AIRS and IASI (Goldberg)

Goldberg outlined the activities related to GEO action CL-06-01a_15. Stensaas explained that the WGCV wanted to place an observer within GSICS and the WGCV would hope for the same in reverse. Muller explained that there had been good agreement with IASI and AIRS and asked what the point of CLARREO there actually was. Goldberg explained that CLARREO is purely a climate mission whereas AIRS meets both weather and climate needs. IASI and AIRS corrections are based on pre-launch data and there are concerns that these may not be applicable post-launch. It is important to have dedicated missions that have on-board traceability. The spatial resolutions do not have to be the same. Chander suggested that it would be good to have someone present from GSICS at the next IVOS workshop. Goldberg agreed.

4.8 Action CL-09-03b_6: Forest Carbon Tracking (Lecomte)

Lecomte provided some insight into the Forest Carbon Tracking (FCT) initiative. Ungar reported that at a recent LSI meeting, a case had been made for adapting Forest Carbon Tracking (FCT) as a pilot project to be worked on. There is the need to standardise products and this would involve a substantial amount of work. An FCT portal also needs to be developed. The LSI already has around 20 participants but the need for WGCV participation was identified. The group looked towards IVOS particularly for calibration between sensors, the SAR subgroup for calibration of SAR systems and the LPV for ground instrumentation support to compare one set of instruments over a site to another site's instruments. Baret asked if the plan was to focus on deforestation or biomass / carbon available in the forest. These are very different and the approach used would necessarily be very different. Lecomte suggested that the first task would be to try to understand the forest cover. Longer term there would be more evaluation of the biomass. Baret asked if the first step would mostly be investigations into land cover and land cover change. Lecomte clarified that was the aim but the second step would come quickly. Nickeson reported that there is currently a biomass group within GOFC-GOLD with LPV connections and this is just starting. Lecomte suggested that the FCT initiative currently could only provide land cover not biomass estimate. However, very quickly they would ask the LPV to provide the biomass.



4.9 Action DI-09-03b_2: Implementation of a fire warning system at global level (Baret)

Baret explained that action DI-09-03b_2 is covered by GOFC-GOLD and there are groups from Canada participating in this. If GOFC-GOLD has already taken the action then the LPV are happy to let them continue on their behalf.

5 CONSTELLATION INTERACTIONS WITH WGCV (STENSAAS)

Steven Neeck joined the meeting online from NASA and provided some background to the Precipitation Constellation (PC), which NASA leads jointly with JAXA. Neeck invited the Microwave subgroup to join the PC team. The Microwave subgroup was not present at the meeting but it was agreed to pass on the invitation (*Action WGCV31-6*).

Lambert outlined the interactions between the ACSI and the Atmospheric Composition Constellation (ACC). The aim is to ensure the continuity of data QA and join in investigations into volcanic eruptions, aviation, etc. Instruments to address this are being developed and tested and ground-based validation programmes need to be developed with ACC and ACSI collaboration.

Stensaas invited and encouraged people to take a look at the constellation web pages and identify areas where support and input could be given. Gutman raised the issue of the lack of Indian and Chinese attendance within the teams. Fonseca clarified that those images currently available from CBERS are from the Brazilian antenna only, nothing is available from the Chinese. Muller added that this is also an issue for Beijing-1 where there data is available for everywhere on the planet except over China. It was agreed to investigate medium resolution satellite data collection from all sensors looking from an LSI perspective, focusing particularly at those sensors where data is not currently freely available (*Action WGCV31-7*).

Muller reported that at an international winds workshop in Tokyo last week the India delegation has presented a new wind scatterometer – OCEANSAT 2. At that meeting the desire to share this data was tabled to try to plug large data gaps from instruments elsewhere. This in particular would have a very big input on weather forecasts. Muller asked why there was no Indian representation on the Ocean Surface Vector Waves (OSVW) constellation (*Action WGCV31-8*).

It was agreed that the WGCV should be actively involved in the constellations and a point of contact from the WGCV to each of the constellations established. Stensaas recommended a list of people and this was agreed in principle.



Stensaas stressed that, at the moment, the constellations are the main mechanism to obtain direct funding. There was some discussion about the importance or otherwise of establishing a new SST constellation. Ignatov explained that the ocean is well covered in the constellations, although SST is as important as ocean wind and colour so it was surprising to see SST missing. Fox explained that the establishment of a constellation is quite well defined. The SST community should put the proposal together and recommend it. A group of agencies would then need to get together and propose it to CEOS. Goldberg added that there would have to be a good recommendation to establish a constellation, e.g. the need to come together to work on particular products. Ignatov agreed to contact David Llewellyn-Jones and look into the issue (*Action WGCV31-12*).

The point of contact from each constellation was asked to provide an update at the next WGCV plenary (*Action WGCV31-13*)

6 CLIMATE, CEOS RESPONSE TO THE GCOS-IP AND GCOS ACTIONS (GOLDBERG)

Goldberg reported that there are currently 53 GCOS actions. The actions had been broken down into domains (ocean colour, climate, etc.) so that they can affectively be addressed. Those responsible for each action would be expected to work with the community to address the actions and achieve consensus. For the WGCV's information, Greening agreed to develop a section of the WGCV website to house relevant documentation and concerning GCOS, the CEOS response to the GCOS Implementation Plan (IP) and the GCOS actions (*Action WGCV31-9*). Goldberg explained that there is the expectation to provide the response to the GCOS IP but the end of the year (and a draft template in a month from this meeting), but not to necessarily have addressed and completed all the actions at this time.

It was suggested that the subgroup chairs use the template presented by Goldberg and complete the details (in first draft form) for each action the WGCV is tasked with according to the GCOS action table by the SIT in a month's time (*Action WGCV31-10*). The opportunity to report to the Subsidiary Body for Scientific and Technological Advice (SBSTA) occurs only once every couple of years and this opportunity should not be missed. The focus should be on the actionable actions and the significance of these. Goldberg suggested that the current list is not exhaustive and any missing actions could be added should gaps be identified. This would also be presented at CEOS plenary so would provide an opportunity to flag any shortfalls should there be any.

The GCOS action list currently details WGCV participation in seven tasks:

- GCOS action T3 Nickeson explained that it would be possibly beneficial to include the Long Term Ecological Research (LTER) sites into the WGCV's list of



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- sites. Lecomte suggested that there were always funding issues with the maintenance of sites and the provision of backup for the sites to ensure they are maintained for the future.
- GCOS action T22 Muller suggested that this activity is part of the ESA GlobAlbedo project and it is something that is being done already. The primary activity of collating and assessing which sites are good or otherwise has already taken place within NASA. They are sharing this with GlobAlbedo in order to intercompare the results. Goldberg asked how many sensors were involved. Muller listed MODIS with 10 years of albedo data, MISR, VEGETATION-1, VEGETATION-2, ATSR-2, AATSR and MERIS. Goldberg asked about any Chinese or Indian involvement. Muller responded that he was not aware of any. He went on to say that even where data is made available to do validation, there is nothing to say that any results will similarly be made available. Goldberg suggested developing the GCOS action T22 further and using it as a mechanism to identify the current resources, what needs to be done and what additional resources would be required to achieve this. It would be important to promote the desired outcome and this should not necessarily be limited to that which is currently achievable. It was agreed that the LPV should cooperate with GlobAlbedo (Muller) for the demonstrator part of the activity. Baret reported that albedo product validation is also being done using VEGETATION-2. The OLIVE platform is being developed and this would be useful for the validation of albedo products. The identification of bright sites would provide another set of sites that could be used to inter-validate and inter-compare against to provide better consistency in validation across the products.
 - GCOS action T24 This is already part of the LPV's activities.
 - GCOS action T25 Baret explained that the validation of GLOB cover map had already been established over a reference network, which goes some way towards addressing this action. Goldberg clarified that the idea was not to re-invent the wheel and highlighted the importance in making sure all activities are logged in the right place so that the information can be sent out to the relevant communities to seek everyone's input and avoid the duplication of effort.
 - GCOS action T28 This is already happening within the LPV.
 - GCOS action T29 This is already happening within the LPV.
 - GCOS action T36 Two focus group leads within the LPV are concerned with fire burnt area and they are writing guidelines on fire validation products and coordinating this activity. However, this will not happen by 2010. Lecomte suggested that a way to present the progress of the action by 2010 should be sought with the idea to then give later deadlines for the rest for the work.
 - GCOS action O18 This is an IVOS activity if it is related to optical ocean sensors (SST with ocean colour). If there are other things like ocean topography or sea state then it would be more related to altimetry or SAR respectively. Lecomte suggested IVOS take the lead as a starting point and then checking with the SAR



community to see if there are any sea state contributions. Srivastava reported that work on ocean winds could contribute. Goldberg stressed the need to address Cal/Val activities for each domain.

Lecomte pointed out the fact that all of these GCOS actions mention protocols so there is a need to link all the activities to QA4EO.

It was agreed to assess the GCOS action list and draft a CEOS response to identify any amendments or additions necessary. This would also include the identification of those areas where the WGCV should be involved but is not currently (*Action WGCV31-11*).

7 ONLINE MONITORING OF SST AND ASSOCIATED RADIANCES FOR CAL/VAL AND CLIMATE (IGNATOV)

Ignatov presented SST monitoring processes and talked about an online near-real time tool that had been developed by NOAA NESDIS - Monitoring of IR Clear-sky Radiances for SST (MICROS; www.star.nesdis.noaa.gov/sod/sst/micros/). The MICROS methodology complements the Simultaneous Nadir Overpasses (SNO) technique. Currently data from N-16, -17, -18, -19, and MetOp-A are monitored for stability, self- and cross-platform consistency using the global ocean as a “calibration site”. Double-differences (DD) are employed to measure cross-platform biases and work is underway to link DD biases to errors in sensor calibration & response functions.

Lecomte suggested that this is a good example of the intercalibration and intercomparison of data, highlighting different types of problems. It was thought that access to this type of tool through the Cal/Val portal would be a valuable asset. Ignatov and Burini agreed to investigate this possibility (*Action WGCV31-14*).

8 COVE (CEOS SPACECRAFT COVERAGE ANALYSIS VISUALISATION TOOL) DEMONSTRATION & DISCUSSION (KILLOUGH)

Killough introduced the COVE tool and Sanjay Gowda whose team developed the tool provided a demonstration. Simplicity had been the main driver. Killough explained that other instruments would be added to the current list. Lecomte identified that no SAR systems appear in the list and this should certainly be addressed. Killough explained that getting the appropriate data is the key. The COVE tool is still in prototype development and a username and password is available on request – <http://www.ceos-cove.org>. A common username and password would be available very soon to allow the WGCV to try it out. UTube videos describing the capabilities and functionality of COVE are available now for viewing online. Nickeson asked about pointable sensors. Killough replied that



this is a harder concept to handle and model. Wielicki explained that this had already been done for CLARREO. Killough explained that the code has a lot of capability and if there are applications for the future and it could be modelled then there is no reason to say it could not be done. The tool has started at the simple level and there is great potential for future development. Ungar reported that for EO-1 the possible predictions had been assessed by imagining that the swath was much wider than it actually was. Killough agreed that this could be a way to get around the problem and Ungar offered to provide a contact from EO-1 to assist.

Srivastava asked about where there are systems with more than one viewing angle, e.g. SAR would come with up to 500 view angles. Killough suggested showing this as a sort of field of regard to cover the whole swath. Srivastava added that GMES are trying to define a common product format. Chander suggested putting forward a recommendation to CEOS to apply a common format to all datasets. Muller also suggested having a unique weblink to each subset of data.

Chander reiterated that the main goal of COVE had been to save time in searching for the data. The hope would be for COVE to be a tool all organisations could use for their cross-calibration activities.

Muller asked about the lat/long specification in the tool. Gowda explained that lat/long and also place names could be input into the locator box. Muller asked about ARC shape files and the possibility of importing them. Burini reported that a lot of tools exist to convert shape files to KML in the public domain. Nickeson added that it would be good to be able to export shape files as well as text or KML. Burini asked how the overpasses were exported and if the incidence angle information was included. Killough explained that the problem is being able to calculate this accurately from the orbit ephemeris. Unless the orbit ephemeris is updated very regularly then the information would not be accurate. Some test cases are needed but the long-term maintenance of COVE and its supporting budget should be borne in mind. One option could be for the orbit ephemeris to be updated only as and when needed. Thome asked about including the solar zenith angle information. Killough explained that this would be possible. Burini suggested that the night overpasses for those sensors where only daytime acquisitions would be of interest could be hidden.

Killough asked for any suggestions of past Cal/Val campaigns that could be used for validation testing for COVE (*Action WGCV31-15*). Srivastava agreed to discuss the tool with the SAR subgroup. He also mentioned the ESA tool for all the satellites involved in the international charter – SAVOIR. This would be useful for the COVE team to look into and he stressed the importance to show each and every viewing angle.



9 **CLARREO: THE CLIMATE CALIBRATION MISSION (WIELICKI)**

Wielicki presented the CLARREO (Climate Absolute Radiance and Refractivity Observatory) mission. Muller asked why CLARREO was being proposed as just a 5-year mission and not a much longer one. Wielicki explained that there was a trade-off between how missions are handled at NASA or NOAA. The one unique thing with CLARREO is that if there is a gap of a year or two, then the accuracy would not be lost, although it would not be possible to anchor data since 2000. Muller suggested that this would be the role of a system like TRUTHS. Wielicki agreed that TRUTHS has a very different role than CLARREO. CLARREO fully supports TRUTHS and sees it only as a benefit. The theory is that all standards laboratories should each be developing their own. Wielicki clarified that the idea is not to try to design the perfect system, just the one that is required. Lecomte agreed that CLARREO and TRUTHS are not in competition but are complementary. This agreement needs to be pushed at CEOS level as this is currently not a clear message.

10 **COUNTY / AGENCY REPORTS (PART 2)**

10.1 **DMCii (Mackin)**

Mackin provided a remote presentation on the DMCii activities. Muller asked about the sources of the water vapour and ozone data for DOME C. Mackin explained that the measurements came from daily radiosondes taken at DOME C and not from MERIS over this site. Muller asked about BRDF over the site and if Chris Proba and/or MISR could address this need. Mackin agreed that the one thing about invariant sites is the inability to collect all the necessary information and this would be a good thing to look at. Stensaas thanked Mackin for providing his presentation remotely.

10.2 **ESA (Lecomte)**

Lecomte reported on ESA's activities. He presented the ESA call to address Essential Climate Variables (ECVs) that would include data from ESA or third part missions or those instruments where there is agreement between ESA and others. There is quite a wide base and the request is for maximum input, but ESA can only guarantee the data that ESA has cooperation with. This started as an ESA initiative and the rest of the world is starting to get interested and to get involved; the idea is not to duplicate effort. CEOS is coordinating a climate advisory committee to ensure awareness and collaboration where possible. Wielicki suggested that there is also a need to have independent analysis. Lecomte reported that this is part of the role of the climate advisory board who will supervise and coordinate. Killough added that one of the tasks for the climate advisory



group would be to pull together a list of what is happening in climate and so see where there is overlap and where people can work together. Lecomte reported that there had been a recent meeting in Geneva that had established the terms of reference for the group. This has been sent to the CEOS SEC for review and would be discussed at the SIT in April 2010. The group would be relatively small, maybe with observers, and would foster coordination between the various agencies for ECV generation.

10.3 GISTDA (Choomnoommanee)

Choomnoommanee provided the report from GISTDA and focused on THEOS (Thailand Earth Observation System) launched in 2008. In 2010 GISTDA planned to participate to the Tuz Gölü Campaign, the SADE Database for absolute calibration and continue cross calibration activities using THEOS and Landsat. Stensaas asked if data would be acquired over the CEOS LANDNET pseudo-invariant sites in 2010. Choomnoommanee responded that it would be acquired and made available through the Cal/Val portal.

10.4 INPE (Fonseca)

Fonseca provided the report from INPE. There is the hope that the spectral response for CBERS-3 and -4 would be improved over that of CBERS-1 and -2 as new contractors are in charge. Fonseca explained that INPE would do the processing in house. Stensaas asked about data INPE are receiving from ISRO. Fonseca clarified that this data is being paid for and accessed through a dedicated Brazilian ground station. Srivastava asked about the Brazilian SAR mission. Fonseca reported that they have MAPSAR with Germany and in 2009 it was agreed to collaborate on something with China. The current SAR programme is under discussion at the moment.

10.5 NASA (Gutman)

Gutman provided the NASA report and suggested that all agencies should be working together towards one goal to ensure long-term data continuity. If everyone worked together this would be a valuable asset. Muller asked how other agencies could be encouraged to share the vision. Gutman suggested showing by example and by prototype studies to show that quasi-daily coverage is possible and should not be just a single country effort but an international CEOS initiative. Lecomte agreed that, although strong cooperation does exist, there is still a lot of progress to be made. Ungar agreed with the principle but saw a few obstacles both nationally and internationally.



10.6 NIST (Datla)

Datla presented the report from NIST. Muller asked about the sample sizes using for the goniometer. If one is interested in albedo from space one would be interested in samples sizes of hundreds of metres. Patrick replied that the system uses transfer standards for diffuse reflectance. There is currently no intention to go beyond 30x30cm plaques and it would be hard to increase the size past this whilst retaining the required accuracies. Stensaas asked Datla to provide a link to an online version of the *Best practice guidelines for pre-launch characterization and calibration of instruments for passive optical remote sensing* (Datla, R.U., et al, 2009, NIST) for inclusion in the Cal/Val portal.

10.7 NOAA (Cao)

Cao provided the report from NOAA. Since WGCV-30 there had been some changes to the satellite programmes and in particular to NPOESS (JPSS). GOES-14 had been successfully launched in June 2009. Calibration research and development is continuing and NOAA plays an active role in both the WGCV and GSICS.

10.8 USGS (Stensaas)

Stensaas reported on the USGS's activities. Ungar asked about band to band registration and suggested that characterising this for future sensors would be challenging. This is not an inherent requirement of the instrument and band-to-band registration would be altitude dependent. Stensaas responded that a lot of work is being done on this using OLI data compared to advanced land imager data.

10.9 ROSCOSMOS (Emelyanov)

Emelyanov thanked the WGCV for the opportunity to present and welcomed the opportunity to collaborate from Russia. The idea of Russian involvement on the QA4EO task team was also welcomed. Emelyanov reported that there had been no pre-launch calibration of Russian satellites, therefore, there is a need to urgently undertake post-launch calibration of the data. Stensaas welcomed the presentation and in particular the information related to the Russian test sites. He suggested benefits in using the test sites for some cross-calibration efforts and invited ROSCOSMOS to provide data over the CEOS recommended sites. This collaborative work would provide some insight into cross-calibration of the Russian systems.



11 FUTURE TASKS & CONCLUDING BUSINESS

11.1 Concluding Discussions

Lecomte led a discussion on the WGCV's mission and objectives. Ungar reiterated that climate change should feature in the mission statement and/or objectives somewhere. Stensaas added that some reference to the SBAs should also be included.

Lecomte informed the meeting that vice-chair elections would take place in Montreal at WGCV-32 and the results would then be proposed to CEOS plenary in October 2010. One candidate had stepped forward – Satish Srivastava – and Lecomte invited him to present himself and give details on his plans for the WGCV.

Srivastava reported that the Canadian Space Agency (CSA) wanted to show that it is committed to CEOS and wanted to contribute. Srivastava had three main goals:

- 1) to know more about optical sensors
- 2) to work closely with the WGCV “team” *and*
- 3) to promote the WGCV's activities and help find resources to respond to the group's CEOS obligations.

Muller asked about the future of the SAR subgroup should Srivastava take on the WGCV chair. Srivastava explained that the next SAR meeting is planned for August and the issue of finding a new SAR subgroup chair would be raised then, although preliminary investigations would of course be made beforehand. There is no current vice-chair for the SAR subgroup.

Stensaas thanked CSA for their nomination and asked that everyone consider potential hosting opportunities for the upcoming WGCV meetings in 2011 and beyond.

Lecomte went through the recommendations to plenary from the subgroups and it was agreed to work on these further before being able to submit them to CEOS as full recommendations.

11.2 Actions (Greening)

Greening presented the actions from the meeting and the open actions from previous WGCV meetings.



Action	Description	Responsible	Due Date
WGCV30-1	WGCV Subgroups to follow the QA4EO reference standard and the associated IVOS procedure to provide information related to the CEOS World Wide Test Sites. The IVOS procedure should be used, changed or updated as needed to meet subgroup requirements. Cal/Val and test site information should be provided (via the WGCV secretariat) for incorporation into the World Wide Test Site Page.	WGCV subgroup chairs	WGCV-32
WGCV30-4	Subgroups to consider their specific requirements for data formats (including metadata) and consider proposing a standard format or standard set of processes where appropriate.	WGCV subgroup chairs	WGCV-32
WGCV30-5	Stensaas to work (with WGISS) to draft a short summary on the exact nature and background to the request made in action WGCV30-4 for presentation to the subgroup members to assist their response.	Stensaas	01 June 10
WGCV30-6	Discuss with AR-09-01c (GEOSS Best Practices Registry) leads to identify exactly how their catalogue works and to discuss establishing links to QA4EO best practice and Cal/Val related documentation.	Lecomte / Stensaas	SIT-24
WGCV30-7	Compile a statement of WGCV capability and abilities that the constellation communities may use to identify areas where the WGCV could effectively contribute. This should include POCs for each capability or at least each instrument covered by the subgroup.	Stensaas / Subgroup Chairs / WGCV Secretariat	SIT-24
WGCV30-8	Enhance the proposed QA4EO Governance Structure to ensure inclusion of all relevant parties from both within CEOS and also from the wider GEO community.	Lecomte / Stensaas / QA4EO Secretariat	GEO VI
WGCV30-9	Draft a proposition for an implementation strategy for QA4EO for presentation to GEO at GEO-VI.	Lecomte / Stensaas / Ungar / QA4EO Sec	GEO-VI



Action	Description	Responsible	Due Date
WGCV31-1	Review WGCV mission statement and objectives	WGCV-31 participants	04 Mar 10
WGCV31-2	Draft a 5-year plan for WGCV	WGCV secretariat / WGCV members	WGCV-32
WGCV31-3	Define a preliminary set of CEOS Cal/Val sites that would represent the minimum set of mandatory sites (applicable across all relevant sensor / thematic domains) that should be maintained for the long-term future.	WGCV subgroups	WGCV-32
WGCV31-4	Check the list of sensors and their attributes on the Cal/Val portal and feed back anything that is missing or needs updating to Alessandro Burini (ESA), the portal administrator.	WGCV members	WGCV-32
WGCV31-5	Forward email asking for participation to the 2010 CEOS intercomparison campaigns to the participants to WGCV-31.	WGCV secretariat	03 Mar 10
WGCV31-6	Pass on request from the CEOS Precipitation Constellation for involvement from the WGCV Microwave Subgroup.	WGCV secretariat	04 Mar 10
WGCV31-7	Investigate medium resolution satellite data collection from all sensors looking from an LSI perspective, focusing particularly at those sensors where data is not currently freely available.	Stensaas	WGCV-32
WGCV31-8	Investigate options for bringing Indian representation into the OSVW constellation.	Stensaas	WGCV-32
WGCV31-9	Create a webpage on the WGCV website focusing on GCOS and the response to their IP. Include the action list and relevant documentation on the page.	WGCV secretariat	12 Mar 10
WGCV31-10	Using template presented at WGCV-31 by Goldberg, complete details for each action WGCV tasked with according to the GCOS action table.	WGCV subgroup chairs	31 Mar 10



Action	Description	Responsible	Due Date
WGCV31-11	Assess the GCOS action list and draft a CEOS response to identify any amendments or additions necessary. Also identify those areas where the WGCV should be involved but is not currently.	WGCV subgroup chairs	31 Mar10
WGCV31-12	Investigate the need or otherwise for an Ocean SST constellation.	Ignatov / LLewelyn-Jones	WGCV-32
WGCV31-13	Each WGCV point of contact to provide a report from their respective constellation at WGCV-32.	WGCV PoCs to the constellations	WGCV-32
WGCV31-14	Investigate options to include the online SST monitoring tool as presented at WGCV-31 by Ignatov, into the Cal/Val portal.	Burini / Ignatov	WGCV-32
WGCV31-15	Look at COVE tool and suggest any missing missions or capabilities. Also feed any information to Killough on past Cal/Val campaigns that could be used in the validation of the tool.	WGCV members	WGCV-32

The 32nd WGCV plenary meeting will be hosted by CSA in Montreal, Canada from 13-17 September 2010.



ANNEX A: WGCV-31 MEETING AGENDA



Tuesday 2 March 2010

08:30 Registration & Coffee

09:00 Introduction & adoption of agenda (Lecomte)

Host presentations

09:05 Welcome and background to NIST's activities (Fraser)

09:20 Hyperspectral Image Projection for medical imaging applications (Allen)

09:40 Optical metrology at NIST in support of solar energy generation (Yoon)

10:00 Optical Metrology for Greenhouse Gas Measurements and Climate Science at NIST (Whetstone)

10:20 Chair's report (Lecomte)

10:50 WGCV's action plan, mission statement and group objectives (Lecomte)

11:00 WGCV-30 Action items (Greening)

11:10 – 11:30 Coffee

Subgroup reports

11:30 Atmospheric Chemistry subgroup report (Lambert)

12:00 Infrared & Visible Optical Sensors subgroup report (Fox)

12:30 Land Product Validation subgroup report (Nightingale)

13:00 – 14:00 Lunch

14:00 Microwave subgroup report (Dong (presented by Lecomte))

14:30 SAR subgroup report (Srivastava)

15:00 Terrain Mapping subgroup report (Muller)

15:30 – 15:50 Coffee

Country & agency reports

15:50 BelSPO/IASB-BIRA (Lambert)

16:10 CSA (Srivastava)

16:30 DLR (von Bargaen)

16:50 INRA (Baret)

17:10 NPL (Fox)

17:30 Close



Wednesday 3 March 2010

GEO task DA-09-01a & action items

- 09:00 Task DA-09-01: GEOSS Quality Assurance Strategy (Lecomte / Stensaas / Fox)
- 09:20 Action DA-09-01a_6: Ground-based Cal/Val Campaign (Fox)
- 09:40 Action DA-09-01a_8: Cal/Val & Post-launch Test Sites (Chander / Burini)
- 10:00 Action DA-09-01a_11: Reference Test Site Data Collaboration & Comparison (Fox / Chander / Cao)
- 10:20 Action DA-09-01a_12: DOME-C Multi-sensor Experiment (Fox / Cao / Srivastava)

10:40 – 11:00 Coffee

- 11:00 Action DA-09-01a_13: QA4EO (Lecomte / Stensaas)

Other GEO task actions with WGCV involvement

- 12:00 Action CL-06-01a_15: Correction coefficients to intercalibrate historical geostationary infrared imager to AIRS and IASI (Cao)
- 12:20 Action CL-09-03b_6: Forest Carbon Tracking (Lecomte)
- 12:40 Action DI-09-03b_2: Implementation of a fire warning system at global level (Baret)

13:00 – 14:00 Lunch

Constellations

- 14:00 Constellation interactions with WGCV (Stensaas)

Climate & GCOS

- 15:00 Climate, CEOS response to the GCOS-IP and GCOS actions (Goldberg)

15:30 – 16:00 Coffee

- 16:00 Round-up discussion on GEO task commitments, Constellation interactions and GCOS action response
- 17:00 Online monitoring of SST and associated radiances for Cal/Val and climate (Ignatov)

17:30 Close



Thursday 4 March 2010

Special interest presentations / discussions

- 09:00 COVE demonstration and discussion (Killough)
- 10:00 CLARREO: The Climate Calibration Mission (Wielicki)
- 10:30 GEO Forest Carbon Tracking Portal (Killough)

11:00 – 11:20 Coffee

Country & agency reports (continued)

- 11:20 DMCii (Mackin)
- 11:40 ESA (Lecomte)
- 12:00 GISTDA (Tanapati)
- 12:20 INPE (Fonseca)
- 12:40 NASA (Gutman)

13:00 – 14:00 lunch

- 14:00 NIST (Datla)
- 14:20 NOAA (Cao)
- 14:40 USGS (Stensaas)
- 15:00 ROSCOSMOS (Emelyanov)

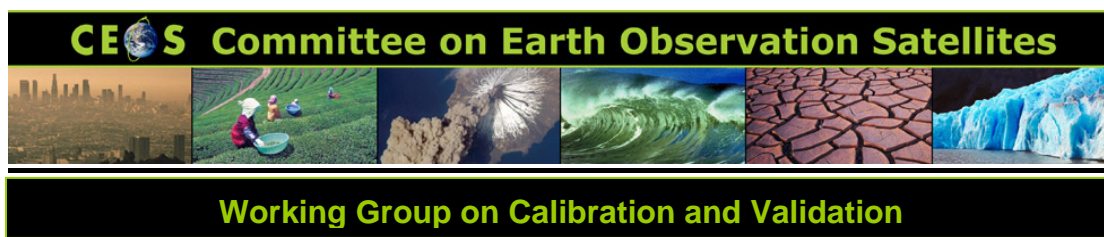
15:20 – 15:40 Coffee

- 15:40 WGCV future tasks discussion / committee requirements
- 16:10 Presentations from WGCV vice-chair nominees
- 16:30 Concluding business / discussion, including recommendations to CEOS plenary
- 17:00 Action items from this meeting (Greening)
- 17:20 Dates and place for WGCV-32 and future WGCV meeting / activities planning

17:30 Close



ANNEX B: WGCV-31 PARTICIPANTS



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