

**Summary minutes/actions from the CEOS IVOS 24th Meeting,
May 8 – 10, 2012
U. S. Geological Survey (USGS)
Earth Resources Observation and Science (EROS) Center**

IVOS Chair: Dr. Nigel Fox (NPL/UKSA)

Session support: Gyanesh Chander (SGT/USGS) and Philippe Goryl (ESA/ESRIN)

Executive Summary:

The Committee on Earth Observation Satellites (CEOS) Working Group on Calibration and Validation (WGCV) subgroup on Infrared and Visible Optical Systems (IVOS) meeting was held in Sioux Falls, SD from May 8 –10, 2012. The meeting was hosted under the auspices of the U. S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Centre in partnership with the South Dakota State University (SDSU). There were around 30 participants from eight countries for the three day meeting. The IVOS sub-group mission is to ensure high quality calibration and validation of infrared and visible optical data from Earth Observation (EO) satellites and validation of higher level products. The principle objectives of this meeting were to discuss progress on the IVOS work plan and the overarching goal to establish an internationally coordinated Cal/Val system (infrastructure/tools) to facilitate an interoperable global observing system. In particular this meeting focused on finalising the strategy on the establishment of CEOS reference standard test sites, reviewing actions and progress on key comparisons progress from within its technical sub-themes, plan for technical workshop on sensor pre-in- flight calibration, development of recommendations to the CEOS WGCV and agency members and discuss the QA4EO and its implementation to ensure that the processes being established are "fit for purpose" for all stakeholders in all countries and agencies. The agenda also included discussion on existing and potential contributions from and to CEOS Working Group on Climate (WGC) and Land Surface Imaging (LSI) constellation and GEO.



All the presentations can be obtained from the Cal/Val portal and are referenced by numbers indicated in the attached agenda.

Dr. Frank Kelly, USGS EROS Director, welcomed the participants and expressed strong USGS support to the IVOS group. A brief introduction to the USGS EROS

Center was presented and it was brought to the group's attention that after a silent winter, the USGS turned on the Landsat 5 Thematic Mapper (TM) in late April to determine the state of the electronics problem that suspended operations in November, 2011. Unfortunately, several alternate methods of acquisitions did not alleviate the problem, which severely limits any further acquisitions with the TM. Currently, the USGS plans to acquire only a handful of images over the next few weeks as we examine our options. Landsat 5 has a long and storied career, and the data collected are invaluable to the study of our Earth. The Multi-Spectral Scanner (MSS) instrument on Landsat 5 has been reactivated and MSS data are being collected over the United States. The MSS data are being archived but processing and distribution of the data will not be possible until the USGS develops the necessary product generation capabilities.

The session on the Land Surface Reflectance (test-sites) was very productive with a number of excellent presentations and discussion. Some of the key topics presented during this session were the 1) Results of sensor comparison using Tuz Golu test site (2010) 2) Lessons learned from post-Tuz Golu cross-comparison 3) Conclusions from Tuz Golu campaign – surface 4) Mirror based reflectors for radiometric calibration 5) Dome-C surface BRF measurements (2011/12) 6) Modelling of test-sites to reduce variability 7) Absolute Calibration of Optical Sensors Using Pseudo Invariant Calibration Sites 8) Experiences from the Arizona automated site 9) Pléiades over La Crau 10) Towards a comprehensive sensor performance test site (noticeable how this “super site” and the efforts of China can be seen as a model for the future, and the group thanked China for its offer to provide the site for use by CEOS members) and 11) Aster measurements over CEOS test sites. The latter applauded for their efforts to respond to the requests from CEOS IVOS to acquire and provide data over test sites. This illustrates the first steps in the benefits of a coordinated harmonised post launch cal/val system based on common infrastructure.

This session brought to a conclusion many of the activities that have been a strong focus of IVOS in recent years and a flagship for the overall CEOS WGCV strategy i.e. the establishment of CEOS endorsed test-sites to aid in product harmonisation and interoperability. Following a comprehensive discussion led by Dr Thome and his presentation on various costed options for the instrumentation and measurements needed to characterise (monitor) a site used for radiometric gain cal/val in an autonomous manner a minimal instrumentation package for sites of area $\sim 300 \text{ m}^2$ and upwards was agreed.

Following this agreement the overall strategy was discussed, and the LANDNET concept previously developed by IVOS, itself based on an earlier vision of Teillet QUASAR was reviewed as the basis of an international strategy to be proposed to CEOS member agencies. A set of ~ 5 minimum Automated sites should be established with a long term commitment of funding as the basis for the network that could be complemented by campaign sites (eg. Tuz Gulu). As an example existing automated sites La Crau France and Railroad valley in the US could be the start of the network. It is believed that the specification and recommendations should help encourage the establishment of new sites, with clear guidance on what is required. To ensure consistency a common calibration strategy/facility and as a minimum a coordinating organisation to review procedures/organise comparisons

etc will be needed in a similar manner to that of AERONET, although smaller in scale and a common matchup database (similar to MERMAID for ocean colour) would facilitate access and usability of the results of the Network.

A small task group will develop a whitepaper on a set of recommendations for presentation to the CEOS Plenary and SIT chair in the near future. The group thanked Kurt Thome for his efforts which have facilitated the IVOS group to move significantly forward with this action and the opportunity to start to build the key infrastructure needed to underpin EO cal/val and in particular the LSI constellation.

The sessions on the Ocean Colour and Surface Temperature (Sea & Land) included presentation on the results from a pilot comparison and activities needed to support OCR-VC, GHRSSST and the virtual constellation on sea surface temperature. These themes also showed significant progress with clear strategies and requirements, linked closely to climate drivers, for both future comparisons and cal/val infrastructure. Recommendations are being developed by small task groups to request long term support for:

- the key Ocean colour test sites e.g. MOBY, Boussole and Aeronet-OC
- Implementation of a mission independent SST validation program
- Comparisons of instruments/techniques for surface validation of OC and SST (“Miami IV”) ,

The progress, highlights, and status from the Radiation transfer Model Intercomparison (RAMI), atmospheric correction sensitivity analysis, Cal/Val Portal, GECA, LTDP, COVE, SADE, DIMITRI were also presented.

The group offered its gratitude to CNES for the the opening of the SADE database. This database provides access to an unprecedented set of information which will facilitate the international community to make major progress in assessing post-launch Cal/val of optical sensors. Some methodologies of its use and tools are being compared as part of a parallel activity on “intercomparison methodologies” (WG4 on the cal/val portal). The data base has formed the heart of CNES operational cal/val strategy and is likely to now become the baseline for an international strategy. . Access and Password can be requested from CNES (Meygret Aime , Aime.Meygret@cnes.fr)

Last year, IVOS formed two thematic focus groups on: Geo/spatial Quality and Geometric Image quality. Helder presented an overview of a potential CEOS Framework for Geo/Spatial Quality and a strategy to to develop a set of guidance and best practises to aid the CEOS community implement in an internationally coordinated manner. It is anticipated that recommendations on – test sites, pre and post launch calibrations and analysis methodologies will be developed. In addition to the presentation made at the meeting (File 28) and addition (File 29) has been included for additional reference. IVOS members are encouraged to join or recommend to others to join this new thematic sub-group led by Denis Helder to support the development of this framework. A number of questionnaires will shortly be circulated to IVOS member and CEOS agencies to solicit input on existing strategies and infrastructure.

Based on the success of previous IVOS workshops at ESA/ESTEC (2004) and JRC (2010), it was decided that IVOS should seek to hold a technical community

workshop on a focused topic on a tri-annual basis. The next workshop will be on pre-flight and on-board radiometric calibration of sensors. It was felt that to ensure maximum attendance from non-traditional IVOS participants and in particular from the commercial sector and instrument manufacturers it would be best to link the workshop (at least geographically and temporally) with an existing meeting e.g. SPIE. Due to the timing of these events it was agreed that an optimum attendance would be to hold it with the European SPIE remote sensing meeting probably in the autumn of 2013 (date and location as yet to be determined by SPIE). It was discussed that it should be a 3 to 4 days workshop, with 2 days on radiometric, 1 day on geometry and spatial and a day of strategy development and conclusion. One of the goals of the workshop should be to capture the results and publish as a reference (similar to ASIC3). To progress, a technical committee is being formed to develop a detailed structure and provided organisation for the event, IVOS members are asked to volunteer themselves or propose members for this technical committee. Note: Non IVOS members are welcome and in particular participation from industry. Please provide nominations to the IVOS chair (nigel.fox@npl.co.uk) by July 31 2012.

The session on the Sensor to Sensor Comparisons and Sensor Pre-/in flight calibration included a progress report on the IVOS WG4 methods comparison, USGS/DMCii cross-calibration methods, Stability of VIIRS radiometric response, preliminary Calibration Results of Pléiades. These activities, particularly the major comparison activities such as (DOME-C, Tuz-Gulu, WG4 on pseudo-invariant ...etc...) are making significant progress towards a harmonisation of understanding of methodologies and most importantly the reduction/clarification of uncertainties associated with the measurements made by each sensor. To build on this a special workshop will be convened by CNES to consider sensor to sensor cross-comparison using the pseudo invariant site Libya 4 in the autumn/winter of 2012. An invitation to participate will follow.

There were also additional sessions that included discussion on the Quality Assurance Framework for Earth Observation (QA4EO) and how it is being implemented and what steps need to be taken to broaden its uptake. It was noted that many activities can already be considered to be good examples of QA4EO even if they were carried out before it existed or independent of. IVOS members are encouraged to identify past/current/planned activities that can be considered suitable for badging with QA4EO to improve visibility and momentum please send examples to IVOS chair and where appropriate (i.e. if it follows the QA4EO principles) encourage the use of the QA4EO logo. For example, "the climate maturity classification index" being developed by NOAA should be seen as a guideline of QA4EO, the RAMI comparisons could also have a QA4EO logo. It is expected that the QA4EO website will start to collate and list appropriate activities.

In conclusion, the meeting demonstrated a willingness/desire and most of all clear need to work together as a community with the common goal of establishing a shared infrastructure to support those making observations of the Earth from satellite. It is noticeable how significant progress is being made on all activities: test sites, methodologies etc and in all technical themes: Land and Ocean, and that the group is expanding its remit and scope to take on emerging challenges. .

The IVOS 24 agenda, slides, minutes, seed documentation, and previous meeting reports are all available for review on the IVOS private workspace accessed through the (website) <http://ceoswgcv-ivos.org> or directly <https://sharepoint.npl.co.uk/ivos> the login name is nplivos and the password: oceanic. They are also available from the Calval portal <http://calvalportal.ceos.org>

Note presentation File 3 was the presentation made by CEOS IVOS chair on the groups activities to CEOS WGCV in February.

Readers are encouraged to contact the presenter directly for any queries/further details. The next meeting will be hosted in spring 2013 by ESA in Frascati near Rome Italy. The proposed date is: March 19-21, if there are any issues with that date can potential participants please notify chair urgently (June 30 deadline).

The IVOS 24 meeting concluded with a resounding thank you to USGS and SDSU for hosting the meeting.

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(IVOS chair)
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CEOS IVOS 24 Recommendations

The following are outline “bullets” to scope the writing of detailed recommendations to CEOS WGCV for consideration for submission to CEOS plenary. Small drafting teams for each of these are required. Volunteers please indicate your willingness to help by contacting the IVOS chair with an indication of recommendation(s) that they can help with by August 2012.

1. Need for establishment and long term (20+ years) maintenance of at least 5 (to 10) fully instrumented/automated and traceable land based test sites for radiometric gain.
2. Following agreement from WG-C establish WGCV task group to consider a standardised approach/definition of “stability”.
3. CEOS IVOS has recently formed thematic focus group on: Geo/spatial Quality and Geometric Image quality. Agencies are requested to support with experts and a volunteer to lead the geometric Image quality focus group.
4. Encourage sensor providers to have consistent and adequate set of metadata in header to enable comparisons and interoperability.
5. Encourage pre-flight characterisation and its reporting of sensor PSF/MTF.
6. Agencies to populate comparison data base on Portal.
7. Agencies to identify a Point of Contact (POC) for each sensor.
8. All CEOS endorsed reference standard sites should be incorporated into regular acquisition programmes of all appropriate sensors and the resultant data sets/results made available through the CEOS Cal/Val portal.
9. Agencies to establish plans and provide necessary resource for an OC surface sites pilot comparison followed by a CEOS comparison in the timescale of 2013.
10. Agencies to establish plans and provide necessary resource to continue the series of Brightness temperature comparisons “Miami 4” to ensure that long term climate records can be reliably established. It should include pre-flight/in-flight black bodies + radiometers under operational environmental conditions.
11. Noting the criticality of surface cal/val for satellite based OC measurements agencies are encouraged to provide necessary long term resource to maintain CEOS endorsed open ocean OC Cal/Val test site buoys e.g. MOBY, Boussole and to further develop support network Aeronet-OC
12. Agencies are requested to support the deployment of a set of calibrated Ocean Buoys \$300k to underpin satellite based SST measurements

13. An agency is requested to establish and maintain a website based data base of MTF cal/val infrastructure/test sites similar to the radiometric gain test site data base created by USGS.
14. To facilitate international harmonisation of best practise in geo/spatial quality cal/val agencies are requested to support the collection of the necessary information in a timely manner.

CEOS IVOS 24
Action Items

#	Action	Actionee	Due Date
1	Use one dataset to compare the differences in model and input for inter-comparison of absolute vicarious calibration techniques using TUZ GÖLÜ as a reference standard	Leigh/Ozen	IVOS 25
2	Provide Algeria site BRDF model to the group?	CNES	IVOS 25
3	Check with the in-Situ operators if they can add the surface reflectance measurement instruments to their network	Stensaas	IVOS 25
4	Work with the NASA SEO to get additional information on how COVE outputs the solar and view angles.	Chander	IVOS 25
5	Prepare a white paper on recommendation for establishing strategy for long-term maintenance of CEOS test-sites e.g. cost and benefit.	Fox/Thome/Chander	Oct 2012
6	Present to the CEOS Plenary with resources (optimum instrumentation specification) and funding needed to support the instrumented CEOS reference test sites	Stensaas	Oct, 2012
7	Volunteers to help drafting of recommendations	All	August 2012
8	Using COVE, generate a list of overpass dates over the CEOS reference sites and compile a calendar of events and put-together a list of on-going and future field campaigns on the Cal/Val portal	Burini	IVOS 25
9	Compile a list of MTF targets and put them on the test site catalog	SDSU/USGS	IVOS 25
10	Encourage the use of wiki and blog on the Cal/Val portal and contribute to the newsletter	All	IVOS 25
11	Move the IVOS webpages from NPL site to the CEOS website hosted by NASA SEO	Fox	IVOS 25
12	Need help for planning the IVOS workshop (technical committee, session topics, session chair, speakers, etc.)	All	July 2012
13	Finalize the dates and venue for the next IVOS workshop.	Fox	Oct 2012
14	Nominations to IVOS chair for workshop technical committee	All	July 2012
15	Test site owners to provide Burini of calval portal dates when ground calibration campaigns are likely to take place as early as possible in advance	All but particularly (Li)	Ideally minimum of 2 months in advance
16	Potential issues with date for IVOS 25	All	June 2012

CEOS IVOS 24
Attendees

Last	First	Organization	Phone	E-mail
Blonski	Slawomir	NOAA/NESDIS/STAR	301-405-9985	Slawomir.Blonski@noaa.gov
Brindle	Laura	DMCii	+44 1483 804214	l.brindle@dmcii.com
Chander,	Gyanesh	SGT, USGS/EROS	605-594-2554	gchander@usgs.gov
Choomnoommanee	Tanapati	GISTDA	66-84-640-7114	tanapati@eoc.gistda.or.th
Coburn	Craig	University of Lethbridge	403-593-8443	craig.coburn@uleth.ca
Corlett	Gary	University of Leicester	+44 116 229 7712	gkc1@le.ac.uk
Czapla-Myers	Jeff	University of Arizona	1-520-621-4242	j.czapla-myers@optics.arizona.edu
Fox	Nigel	NPL	+44 208-943-6825	nigel.fox@npl.co.uk
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Hongying	Zhao	Peking University	703-388-6526	zhaohy@pku.edu.cn
Jucht	Carrie	SGT, USGS/EROS	605-594-6800	cjucht@usgs.gov
Kaewmanee	Morakot	SDSU	605-651-4528	morakot.kaewmanee@sdstate.edu
Kuester	Michele	SDSU	605-688-5212	michele.kuester@sdstate.edu
Leigh	Larry	SDSU	605-688-5818	Larry.Leigh@sdstate.edu
Li	Chuan Rong	Academy of Opto-Electronics, CAS	86-10-82178616	chi@aoe.ac.cn and zyliau@aoe.ac.cn
Li	Zi Yang	Academy of Opto-Electronics, CAS	86-10-82178636	zuli@aoe.ac.cn and zyliau@aoe.ac.cn
Mackin	Steve	DMCii	+44 1483 804214	s.mackin@dmcii.com
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Musana	Chaichat	GISTDA	66-80-608-3609	cjaichat@eoc.gistda.or.th
Nakamura	Ryosuke	National Institute of Advanced Industrial Science and Technology (AIST)	81-29-862-6702 Fax: 81-29-862-6601	r.nakamura@aist.go.jp
Schiller	Stephen	Raytheon Space and Airborne Systems	310-615-7951	stephen_j_schiller@raytheon.com
Stensaas	Gregory	USGS/EROS	605-594-2569	stensaas@usgs.gov
Tang	LingLi	Academy of Opto-Electronics, CAS	86-10-82178633	lltang@aoe.ac.cn and zyliau@aoe.ac.cn
Teillet,	Phil	University of Lethbridge	1-905-591-2089	p.teillet@uleth.ca
Thome	Kurt	NASA/GSFC	301-614-6671	thome@nasa.gov
Wei	Chen	Peking University	202-480-7972	chenweibru@126.com or wchen@pku.edu.cn
INTERMITTENT ATTENDEES/PRESENTERS				
Holm	Tom	USGS/EROS		
Dwyer	John	USGS/EROS		
Christopherson	Jon	SGT, USGS/EROS		

CEOS IVOS-24 Meeting Agenda
May 8-10, 2012
U. S. Geological Survey (USGS)
Earth Resources Observation and Science (EROS) Center
in partnership with
South Dakota State University (SDSU)

AGENDA

(bolded numbers refer to presentation File reference)

TUESDAY, MAY 8, 2012

Location: EROS Main Conference Room (MCR)

8:30 AM Registration/Entrance Logistics

8:50 AM Welcome Dr. Frank Kelly EROS Director (1)

9:05 AM General EROS Information EROS Staff

9:25 AM IVOS chair Fox **Meeting Introduction (2)(3)**

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

9:55 AM Break (*provided by SDSU*)

10:15AM CEOS WGCV chair (USGS) Stensaas **CEOS-WGCV & GEO (4)**
Introduction to activities
Discussion of IVOS (agency/member) existing and potential contributions

10:40 AM CEOS WG-Climate (USGS) Dwyer **CEOS-WG-climate and IVOS**
Introduction to activities
Discussion of IVOS (agency/member) existing and potential contributions

11:05AM CEOS LSI co-chair (USGS) Holm **CEOS LSI constellation & IVOS (5)**
Introduction to activities
Discussion of IVOS (agency/member) existing and potential contributions

11:30 PM Lunch (*on your own, please have cash*)

12:30AM EROS Center Tour Holm and Christopherson **EROS Center Lobby**

1:30 PM		Fox	IVOS Work-plan Progress Introduction
1:40 PM	Land surface reflectance lead (USGS)	Chander to chair Multi-contributions	Land Surface Reflectance (test-sites) <ul style="list-style-type: none"> • Conclusions from Tuz Golu campaign – surface (Fox et al) (6) • Results of sensor comparison using Tuz Golu test site (2010) (Ozen, Leigh) (7) • Lessons learned from post-Tuz Golu cross-comparisons (Helder/Thome) (8) • Mirror based reflectors for radiometric calibration (Schiller) (9) • Dome-C surface BRF measurements (2011/12) (King et al) (10) • Terra Aster over the CEOS test sites (Nakamura) (11) • Modeling of test-sites to reduce variability (Mackin) (12) • Absolute Calibration of Optical Sensors Using Pseudo Invariant Calibration Sites (Helder) (13)
3:15 PM	Break <i>(provided by SDSU)</i>		
3:40 PM	Land surface reflectance lead (USGS)	Chander to chair discussion leading to recommendation	Land Surface Reflectance (continued) <ul style="list-style-type: none"> • Experiences from the Arizona automated site (Czapla-Myers) (14) • Pléiades over La Crau (Henry) (15) • Towards a comprehensive sensor performance test site (Li) (16) • Instrumentation (and associated performance) needed for test-sites (Thome discussion) (17) • Optimal characteristics for test-sites-criteria for each range of sensor type (discussion) • Establishing strategy for long-term maintenance of CEOS test-sites e.g. cost and benefit (discussion)
4:45	DMCii	Brindle	New Member Introduction DMCii an introduction (18)
5:00 PM	Departure	All	
6:15 PM	Evening no-host event	Prairie Star (Native American Gallery) http://www.prairiestar.com/	Meet in Holiday Lobby Walking distance ~ 4 blocks Wine/cheese at Prairie Star
7:30PM	Evening no-host Dinner	Crawfords http://www.crawfordssf.com/	Across the street from Prairie Star

WEDNESDAY, MAY 9, 2012

Location: EROS MCR (a.m. only), SDSU (p.m.)

8:30 AM	Registration/Entrance Logistics		
8:50 AM	TDB	Murakami/(Zibordi)	Ocean Colour (19) (20) Results of pilot comparison Activities needs of OCR-VC Future activities
9:10 AM	Theme lead and GHRSSST (University of Leicester)	Corlett	Surface Temperature (Sea & Land) (21) GHRSSST progress Virtual constellation on sea surface temperature Developing a long term international strategy (ISSI) Cal/Val needs for a climate data set
10:10 AM	Break (<i>provided by SDSU</i>)		
10:30 AM	Theme lead (JRC)	(Widlowski)	Radiative Transfer Code (22) Rami status Testing of codes
11:00 AM	Leave for SDSU on bus from EROS		
12:30 PM	Lunch and Welcome (<i>provided by SDSU</i>) Student Union, Gallery Lounge (2 nd floor)		Dr. Lewis Brown, SDSU Dean of Engineering (23)
1:30 PM	Theme lead (NASA)	Thome	Atmospheric Correction (24) Sensitivity analysis Comparison plans
2:30 PM	Theme lead (ESA)	Goryl	Cal/Val Portal and Coordination of International "Infrastructure" <ul style="list-style-type: none"> • Portal (Goryl) (25) • GECA (25) • LTDP (25) • DIMITRI (Bouvet/Goryl) (25) • COVE (Chander) (26) • SADE (Henry) (27) • Discussion on coordination strategies
4:00 PM	Tours by SDSU	All	SDSU Image Processing Lab http://iplab2out.sdstate.edu/ , SDSU Geographic Information Science Center of Excellence (GIScCE) http://globalmonitoring.sdstate.edu/ , Agricultural Museum http://www.sdstate.edu/agmuseum/
6:00 PM	Reception, (<i>provided by SDSU</i>) Student Union, Campanile Room		Dr. Kevin Kephart, SDSU Vice President of Research
8:15 PM	Depart SDSU, Return to EROS Center and proceed to Sioux Falls Holiday Inn		

THURSDAY, MAY 10, 2012

Location: EROS MCR

8:30 AM Registration/Entrance Logistics

8:50 AM Theme lead Helder
 SDSU

9:30 AM IVOS chair Fox
 (NPL/UKSA)

10:10 AM Break (*provided by SDSU*)

10:30 AM Theme lead Fox
 NPL

12:30 PM Lunch (*on your own*)

1:30 PM IVOS chair Fox

3:00 PM Break (*provided by SDSU*)

3:20 PM Sensor pre-/in- flight TBD
 calibration strategies

3:40 PM Recommendations Fox

4:30 PM Discussion, actions, Fox
 and wrap-up.
 Meeting closure.

5:00 PM Departure

Geo/spatial quality (28) (29)

Terms of reference

Strategy

progress

IVOS workshop: pre and on-board calibration & validation

Topics

Chairs

Location

Speakers

Sensor to Sensor Comparisons

- WG4 methods comparison- progress (Goryl 4 Bouvet +others) (25)
- USGS/DMCii cross-calibration methods (Mackin/Chander) (30)
- Others (TBD)
- Plans for the future

QA4EO Progress and Plans

- CEOS/GEO priorities (Stensaas) (31)
- Agency progress/activities (Goryl 4 ESA)
- Progress towards implementation (Mackin)
- Others? (32)
- Best practices – priorities (discussion) (Fox)
- Case studies (discussion) (Fox)

Sensor Pre-/in- Flight Calibration Plans

- Stability of VIIRS radiometric response (Blonski) (33)
- Preliminary Calibration Results of Pléiades (Henry) (34)
- Calibration facilities - academy of optoelectronics, China (LI) (16)

Recommendations/formal CEOS Actions (35)

Identify priorities for IVOS

Outline recommendations for CEOS

Outline potential CEOS SIT actions or GEO tasks

Next IVOS Working Group Meeting decision

(Volunteers needed to host the Spring 2012 meeting)