**Minutes of 2013 GSICS Users’ Workshop**

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The 2013 GSICS Users’ workshop was held in the morning of April 8, 2013 from 8:30am-12:00pm in College Park, Maryland, USA, in conjunction with the first NOAA Satellite Conference. The workshop was organized into four sections, 1) Introduction and updates on GSICS, 2) Future satellite inter-calibration, 3) Users’ feedback and requests, and 4) Discussions on the products and requests. More than 50 people from about 15 agencies, universities and private companies attended the workshop.

Dr. Michael Kalb, Deputy Director of NOAA/NESDIS/STAR first welcomed everyone attending the 2013 GSICS Users’ Workshop. He pointed out that NOAA was founding member of GSICS and has played and continues to play leading roles in GSICS. This is the first GSICS users workshop hosted by NOAA. EUMETSAT hosted the users’ workshops in the past four years.

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The first section of Introduction and Updates on GSICS, co-chaired by Dr. Wenjian Zhang (WMO) and Dr. Mitch Goldberg (Chair of GSICS Executive Panel).

*Overview of GSICS*: Mitch Goldberg gave an overview of the WMO GSICS at high-level management, including the GSICS organization, strategy, implementation and benefits.

*GSICS Product development*: Tim Hewison (GRWG Chair) then introduced the GSICS GEO-LEO infrared (IR) correction algorithms, bias monitoring tools, GEO-LEO IR re-analysis and near real-time correction products, and most recent developments and plans including the recent publication of special issue on instrument inter-calibration, GEO-LEO inter-calibration correction products for the solar reflected channels, and the GSICS guidelines to select a reference instrument and specify the Spectral Band Adjustment Factors.

*GSICS data management*: Aleksandar Jelenak (GDWG Chair) reviewed the GSICS data management and explained the GSICS product catalog which is resided at the GSICS Coordination Center (GCC) website. All the GSICS products linked at the product catalog are archived at the GSICS Servers for the public to access and download. Product data can also be accessed with command line. A demonstration of product online bias monitoring with the EUMETSAT bias plotting tool was also displayed during the presentation.

Q: Can we plot time series of bias after correction?

A: Should be zero. Residual uncertainties are plotted.

*GCC Report*: Fangfang Yu reported the GCC activities, including publications of GSICS Quarterlies, end-to-end communications, support of GSCS algorithm and product development and the applications of GPPA to promote GSICS products. The 10 GSICS posters in the NSC were also introduced.

*Retro-processing status*: Mat Gunshor (CIMSS/University of Wisconsin) reported the retro-processing of GEO-LEO IR inter-calibration for the data before NESDIS routine processing. There was an issue with changes in METEOSAT radiance definition. CIMSS plans to investigate the impacts of GEO-LEO IR correction on Level2/3 products, such as Cloud Top Temperature, Cloud Top Pressure and cloud mask etc.

**Action: Tim Hewison sends Mat Gunshor the EUMETSAT documents on the change of METEOSAT radiance definition in 2008**

**Recommendation: SSEC/CIMSS seeks funding from GOES-R project to investigate the impacts of GSICS correction products on the L2/L3 products.**

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Session of Future Satellite Inter-Calibration, chaired by Fuzhong Weng (GCC Director)

*GOES-R ABI Cal/Val*: Bob Iacovazzi presented the importance of independence analysis of pre-launch tests. The algorithms and tools developed in the GSICS project are expected to play an important role in the GOES-R post-launch tests.

**Recommendation: Bob Iacovazzi provides the recommendations of GSICS to help with the GOES-R cal/val project.**

*NPP/VIIRS vs. Aqua/MODIS inter-comparison*: Jack Xiong presented the inter-comparison results between NPP/VIIRS and Aqua/MODIS using SNO and the deserts in North Africa. VIIRS is a potential reference instrument in the solar reflected channels in the future. After the SRF difference correction with Hyperion and MODTRAN simulations, the on-orbit calibration differences between MODIS and VIIRS are generally within 2% for most solar band except for I3 (3% difference). The reprocessed SDR should be considered for consistent calibration. There are also some concerns on the potential impact VIIRS large solar diffuser (SD) degradation on the SD BRF and the VIIRS mirror degradation on the RSR. NASA will provide NOAA updated instrument information to support VIIRS monitoring.

*CrIS vs IASI/AIRS inter-comparisons (By Likun Wang)*: CrIS is a potential inter-calibration transfer reference instrument. Results of both the SNO between IASI and CrIS and the direct inter-calibration between VIIRS and CrIS indicate that the mean Tb difference between CrIS and IASI and VIIRS is less than 0.1-0.2K at most spectral regions. CrIS may have inconsistency SRF correction for Band 3.

Q: concern with in-continuous CrIS spectral coverage.

**Recommendation: future hyperspectral instrument design should consider covering the full spectral coverage, especially those of the broad IR channels.**

**Recommendation: Likun Wang to contribute to GSICS Guideline Document on how to define Spectral Band Adjustment Factor, based on hyperspectral experience.**

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Session of Users’ Feedback and Request, Chaired by Aleksandar Jelenak (GDWG Chair)

*Proba-V project (by Sindy Stercks, VITO)*: The mission of Proba-V is to fill the data gap between SPOT-Vegetation and Sentinel-3. As there is no on-board calibration with Proba-V, it relies on the vicarious and inter-calibration techniques to provide accurate post-launch data.

Q: what GSICS can help with Proba-V?

A: Help with the new methods, especially the lunar calibration.

Q: GSICS are developing ATBD for lunar inter-calibration to ROLO. Suggest also working with CEOS/IOVS progress for vicarious methods, which Proba-V is already a member

**Recommendation: Encourage VITO to pursue vicarious calibration ATBDs via CEOS/IOVS and contact CNES in regard of lunar inter-calibration to ROLO.**

*Debates of Climate trends from SSU (by Cheng-zhi Zou)*: One of the key issues of SSU calibration is the correction of CO2 modulation cell pressure loss. The current debate on the stratospheric temperature trends from SSU highlights the need to include uncertainties in overlap periods, especially in handling cell pressure correction in time-series. Use of L1C data can help to build more confidence of trending.

**Recommendation: All GSICS calibration correction documentation and ancillary data should be properly archived and all the GSICS corrections should be traceable to satellite raw data**.

*Updates on MICROS (by Xingming Liang and Sasha Ignatov)*: MICROS is a powerful potential tool for satellite inter-calibration. It has been successfully used to detect and identify the problems of changes to CRTM.

Q: Can we consolidate results with direct differences from other GSICS products – e.g. GEO-LEO IR?

Q: NOAA-16/AVHRR bias is temperature dependent.

*AATSR-IASI inter-calibration (by Manik Bali and Jon Mittaz)*: This work is to address the question of whether AVHRR/AATSR can be made *climate ready*. The AASTR and IASI SNO inter-calibration analysis showed that AATSR 11µm channel is very close to IASI and IASI captures some of its pre-launch features. Strong scene radiance dependence bias between AASTR and IASI is observed at 12µm channel and this Tb bias dependence cannot be removed with SRF shift. Stable and unstable months of AATSR-IASI bias were identified, depending on ENVISAT orbit. AATSR can be used as stable reference until 2011 only. A potential to retrieve SRF by inverting spectral convolution from the AATSR-IASI inter-comparison was also mentioned in this report.

*PATMOS-X Update (by Andy Heidinger)*: PATMOS-X is the GSICS 3rd party product. Recent updates include the change to MODIS Collection 6 data, use of L2b subset data for SNO analysis, and implementation of near real-time reflectance monitoring. Sun-glint calibration developed for GOES appears to also add benefit for AVHRR.

**Recommendation: Andy Heidinger considers reporting the progress of the sun-glint method on webmeeting**.

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Questions and Discussions of Future Potential Products, Chaired by Tin Hewison

*Potential GEO Products/Users (by Tim Schmit)*: The GSICS SRF corrections/shifts successfully improve the GOES-14/15 Imager IR data quality. It is expected that the GSICS will play an important role for GOES-R on-orbit cal/val during both the post-launch test and the GOES-R series lifetime. The examples of beta testing of GSICS correction products improved some Sounder products and MTSAT cloud pressure product. Based on the test experience, it is suggested that the GSICS corrections need to be done in near real-time and relatively easy for outsiders of GSICS community to implement.

**Recommendation: NOAA GRPC considers generating the GOES Sounder GEO-LEO correction products at both near real-time and re-analysis versions.**

**Recommendation: NOAA GPRC, GOES-R CWG and other NOAA satellite operational support organizations (OSPO, PLT, CCT) consider best way to monitor the GOES-R calibration during the post-launch test and entire GOES-R series lifetime.**

Tim also gave an example of GOES-15 Imager calibration anomaly on March 12, 2012 which was first reported by users. Tim pointed out that ideally calibration anomaly should be first reported by satellite providers. This raised a discussion on how GSICS can help to set-up the satellite operational calibration anomaly alerting system, which should integrate the ICVS, GEO-LEO, GEO-GEO and GEO/LEO-Simulation inter-comparison systems.

**Action: Executive Panel to discuss if the GSICS scope should be expanded to include the operational calibration alerting system.**

**Recommendation: GRWG Chair (Tim Hewison) considers formatting a new GSICS subgroup of Synthetic observation and discussing in web meeting.**

Tim also provided a list of feedbacks on the GSICS products, including:

*- A simple output format such as ASCII*

A: it may be possible to generate from bias plotting tool

*- Option of Tb biased correction*

A: it is also possible from bias plotting tool

*- Name convention*

A: it is already implemented

*- GSICS product includes the average correction*

A: also possible from the bias plotting tool.

**Recommendation: The GSICS products should meet the GSICS name convention for the implementing of EUMETSAT bias plotting tool.**

*- Correction coefficients at detector level?*

A: Detector-level correction coefficients can be available only when the detector information can be distinguished in the L1b/C data. This decision was made in the 2013 GSICS annual meeting in Williamsburg, VA.

Users also expressed the desire of formation of a GSICS UV sub-group.

**Action: GRWG Chair (Tim Hewison) considers formation of new UV GSICS subgroup with input from NASA Langley TEMPO group.**

Users also express the requests for intermediate datasets, including collocated hyperspectral radiances and convolved pseudo channels and SNO records.

**Recommendation: GSICS may consider providing the intermediate datasets in the GSICS server as rolling archive, although resources may not allow development of clean data format.**

Outcomes of 2013 GSICS Users’ Workshop

 **Action: Tim Hewison to send Mat Gunshor the EUMETSAT documents on the change of METEOSAT radiance definition in 2008.**

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**Action: Executive Panel to discuss if the GSICS scope should be expanded to include the operational calibration alerting system.**

**Recommendation: SSEC/CIMSS to seek funding from GOES-R project to investigate the impacts of GSICS correction products on the L2/L3 products (cloud top temperature, cloud top pressure and cloud mask etc).**

**Recommendation: Bob Iacovazzi provides the recommendation lists which GSICS helps in the GOES-R cal/val project.**

**Recommendation: Future hyperspectral instrument design to cover the full spectral coverage, especially those of the broad IR band spectral ranges.**

**Recommendation: Likun Wang to contribute to GSICS Guideline Document on how to define Spectral Band Adjustment Factor, based on hyperspectral experience.**

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