



Global Space-based Inter-Calibration System



**GLOBAL SPACE-BASED INTERCALIBRATION SYSTEM
EXECUTIVE PANEL**

**FIFTEENTH SESSION
GUANGZHOU, CHINA, 16-17 MAY 2014**

FINAL REPORT



SUMMARY LIST OF CONCLUSIONS

The GSICS Executive Panel (EP):

- Thanked Mitch Goldberg for his leadership as Chair of the EP during 8 years;
- Approved the definition of the role of the EP Chair, unanimously designated Peng Zhang, the former Vice-Chair, as the new Chair, and Kenneth Holmlund as the new Vice-Chair;
- Congratulated the GSICS Coordination Center (GCC) for further developing the GSICS Quarterly Newsletter;
- Clarified that the definition of “GSICS Products”, amendments to GSICS procedures, or promotion of individual GSICS products to pre-operational or operational status, should be endorsed by the EP;
- Stated that GSICS provides tools to be used by applications such as the generation of climate data records, but the actual applications of these tools, for example the generation of these data records and the associated data stewardship are not within the scope of GSICS and not coordinated by GSICS. In this regard, as the generation of FCDRs is not within the scope of “GSICS Products” the MSU/AMSU FCDR product should be removed from the GSICS catalogue despite its scientific value;
- Recommended investigating the possibility to use the GPPA to deliver a GSICS label for the « algorithm specification » used for FCDR generation;
- Recalled that the GCC should submit candidate products for entering into pre-operational or operational phase, with all the elements enabling the EP to approve such promotion; encouraged promoting to pre-operational and ultimately operational stage the core GSICS products such as the GEO-LEO IR corrections from all geostationary satellites;
- Requested the GCC to take action to register the GSICS catalogue as a service in the WMO Information System (WIS) to ensure it is discoverable within the WIS;
- Requested the GCC to prepare, in consultation with GRWG and GDWG, an updated description of GSICS products, indicating how users can access and use these products, to be submitted to the EP for endorsement.
- Invited the GCC to investigate what issues are posed by the GPPA in its present form, and to suggest waivers for third party products if necessary;
- Approved the action plan for GDWG presented by the acting GDWG Chair;
- Urged every GPRC to nominate at least one representative on the GDWG with sufficient time dedicated to advance GDWG actions, and renewed its call to all GSICS Members to propose a GDWG Chair;
- Noted that the respective roles of GDWG and GCC should be further clarified;
- Approved the definition of responsibilities of the GRWG Chair as contained in Annex 4;
- Designated Masaya Takahashi as Vice-Chair of GRWG;
- Recalled that a former GRWG Chair should assist the new Chair as one of the vice-chairs
- Considered that GSICS should assist in the definition and development of the Architecture for climate monitoring from space, with a particular role to: (i) provide methods, best practices or standards for inter-calibration; (ii) ensure the availability on orbit reference standards to provide (absolute) traceability; (iii) ensure availability of reference satellite data sets with

documented uncertainty, and/or contribution to composite reference data sets (e.g. GRUAN-GNSS RO);

- Recommended that a letter of recognition be sent by WMO to acknowledge significant personal contribution to GSICS, for example by reviewers;
- Supported the view that GSICS and the CEOS Working Group on Calibration and Validation (WGCV) should: (i) maintain high-level connection to ensure exchange of information and facilitate mutual consultation towards seamless, complementary activities; (ii) pursue active collaboration at working group levels on matters of interest, including joint activities, sharing of methodology and resources, in their respective work plans;
- Invited CNSA/CRESDA to consider joining GSICS, initially as an observer;
- Encouraged EUMETSAT to organize a GSICS lunar calibration workshop in Dec 2014;
- Welcomed the offer from CMA to host the 6th Users Workshop during AOSMUC-5.

SUMMARY MINUTES

1. Opening of the meeting

The fifteenth session of the GSICS Executive Panel (EP) was held in Guangzhou, China, from 16 to 17 May 2014, in advance of the 42nd CGMS meeting. It was attended by representatives of CMA, CNES, CNSA/CRESDA, EUMETSAT, ISRO (remotely), JAXA, JMA, KMA, NOAA (remotely), NASA, ROSHYDROMET, USGS (remotely), the GCC, GRWG Chair (remotely), and CEOS/WGCV vice-chair (remotely). See the list of participants in Annex 1.

On behalf of CMA, Peng Zhang welcomed the participants in Guangzhou, as well as the members and observers who would participate remotely. On behalf of WMO, Jérôme Lafeuille thanked CMA and welcomed the participants. It was agreed that the meeting would be chaired by P. Zhang, as the EP Vice-Chair, since Mitch Goldberg could only participate remotely. The agenda was approved, as contained in Annex 2.

Note: the present report contains hyperlinks to the presentations which are available on the GSICS-EP-15 web page: <http://www.wmo.int/pages/prog/sat/meetings/GSICS-EP-15.php>

2. Chairman's report by M. Goldberg

In his [Chairman's report](#) given by WebEx, M. Goldberg recalled the origins of GSICS in 2005 and its founding principles, aiming to realize the full benefits of space-based observations. Considering the momentum that had developed, the community of experts brought together by GSICS, the best practices, tools and services now available, he emphasized that GSICS members could be proud of GSICS achievements. M. Goldberg recalled the GSICS Vision adopted as an outcome of EP-14, which sets the high-level objectives and core role of GSICS while highlighting the opportunity of valuable partnerships such as with CEOS WGCV. He also expressed the view that GSICS had an important role to play in the Architecture for Climate Monitoring from Space.

From an organisational viewpoint, M. Goldberg called for more engagement in the GDWG, expecting complementary roles of GDWG and GCC, wished that all GSICS members will fully engage in GSICS activities in general. From a technical perspective, he stressed the need of several IR reference instruments on different orbital planes to solve possible diurnal artefact in GEO-LEO corrections, and the need of a follow-on reference instrument for VIS and NIR bands.

Finally, recalling that he had reached the end of his second term of office M. Goldberg wished to hand over the chairmanship, whilst assuring the EP of his continuing personal support as the NOAA representative within the panel. The EP expressed warm thanks to M. Goldberg for his competent and enthusiastic leadership as Chair of the EP during 8 years. It also expressed its strong expectation that GSICS will further benefit from his personal expertise as an EP member.

The Panel approved the definition of the role of the EP Chair (See Annex 3) defining a term of office of 2 years, renewable, with the understanding that a rotation among organisations should be systematically encouraged.

The EP unanimously designated Peng Zhang, the former Vice-chair, as the new EP Chair, and Kenneth Holmlund as the new EP Vice-Chair.

It was underlined that, through this hand-over, M. Goldberg and P. Zhang were giving an excellent example of rotation of responsibility, encouraging all members, of any region, to feel fully engaged in GSICS. The new Chair thanked the outgoing Chair and the EP members. He stressed the value of the fundamental concept of GSICS, which is to join efforts in order to derive the best possible calibration, which improves the value of all participating missions. He appreciated the progress made in 2013 and announced that CMA was prepared to host the next GSICS User Workshop during the fifth Asia Oceania Meteorological Satellite User Conference (AOMSUC) in Shanghai in November. The new Vice-chair also thanked the EP members and looked forward to assist the EP and its Chair to meet future challenges.

3. Report from the GSICS Coordination Centre (GCC)

Larry Flynn, GCC Director, (remotely) presented the [GCC activity report](#). He introduced the GCC staff, emphasized the development of the Quarterly Newsletter and the support to various meetings including the annual GDWG/GRWG meeting, sub-group meetings, and the GSICS user workshop.

The Panel congratulated the GCC, in particular Larry Flynn and Manik Bali, for further developing the GSICS Quarterly Newsletter which has evolved into a very effective media to share the progress of GSICS research and build a community of practice.

L. Flynn reported that upon proposal from the GRWG Chair, MW Subgroup Chair, GDWG Chair and EP Chair, the GCC had promoted to pre-operational status a NOAA product consisting of a Fundamental Climate Data Record (FCDR) of MSU/AMSU data. He reported that GCC had established a review panel consisting of highly qualified experts from Europe (EUMETSAT) and several well-known institutions in the USA (South Dakota University, NOAA, University of Maryland and University of Wisconsin), which allowed completing the review process in four weeks time. A memo of record to the EP proposing that they promote this product to the pre-operational stage was sent to EP Chair Mitch Goldberg and Secretary J. Lafeuille on 24 Dec 2013. Flynn further explained that the MW FCDR was considered as a third-party product, and that the GSICS Procedure for Product Acceptance (GPPA) was not directly applicable to such third-party products, therefore "The File-Naming Convention was relaxed and this needs to be addressed."

The Panel appreciated the high scientific value of this product and the work done by the reviewers and the GCC. However, the Panel clarified that, in the Vision of GSICS, the production of FCDRs was beyond the scope of GSICS. GSICS defines methodologies and delivers correction coefficients which are used as inputs for the generation of FCDR for instance. It was recalled that in the past, the EP had approved a "GSICS Roster" maintained by the GCC, defining all categories of "GSICS products". More recently it was agreed that "GSICS Products" would be either "GSICS corrections", or "GSICS bias monitoring", or "Reports or guidelines". The question whether FCDR should be among the "GSICS Products", or not, had been discussed by the EP in several occasions, and answered negatively. The EP however agreed to reopen this discussion under item 7.

The EP underlined that products should be compliant with the acceptance procedure. If some provisions of the GPPA are not relevant, or not applicable to all GSICS products, the GCC is encouraged to propose amendments to the GPPA or to propose relaxing some of its provisions in specific cases. For example the file naming convention might not be mandatory for third-party products that are not in the GSICS catalogue and are not stored on GSICS servers. A proposal for amending the GPPA should explain what needs to be changed and in which cases. The question was discussed further under item 7.

The EP recalled that the GCC should provide the EP with candidate products and all the elements enabling the EP to make a decision to approve entering into pre-operational or operational phase. The respective roles of the EP and the GCC were summarized as indicated below, as concerns the definition and acceptance of GSICS products:

- (i) The EP adopts the definition of GSICS products, taking into account the advice from GCC, GDWG, and the GRWG.
- (ii) The GCC develops and maintains the GPPA, subject to endorsement by the EP.
- (iii) The GCC leads the assessment of candidate products with the help of reviewers and, once compliance with the GPPA is established, proposes candidate products for promotion to pre-operational or operational stage; the GCC may ask for e.g. a web meeting of the EP if a decision needs to be made without waiting for the next annual meeting.
- (iv) The EP gives its approval if relevant in view of the elements provided by the GCC.

Product Operationalization

The GCC Deputy Director, Manik Bali, presented a report on [Product operationalization](#) with two candidate products: the MW FCDR MSU/AMSU and the GOES-IASI Correction product from NOAA.

As concerns the MSU/AMSU FCDR from NOAA, the EP recalled the discussion above, whereby it did not question the scientific value of the product, which had been acknowledged by reviewers, but this dataset was not regarded as a “GSICS Product” since it did not belong to an agreed GSICS product category.

The GEO-LEO Correction product from NOAA (GOES-IASI) was supported, subject to completion of the GPPA, which was not clear in the proposal. It was noted that providing an uncertainty analysis was a fundamental requirement; however the required level of detail of this analysis is not specified and remains a matter of appreciation. The EP noted that in the present case the analysis was complicated by diurnal effects. It invited NOAA to find a way forward to complete the analysis.

In conclusion the EP invited GCC to remove the NOAA MSU/AMSU FCDR from the GSICS catalogue; it encouraged promoting to pre-operational and ultimately operational stage the core GSICS products such as the GEO-LEO IR corrections from all geostationary satellite operators. In particular, it encouraged NOAA to complete the steps necessary to promote the GOES-IASI correction to operational stage. The EP also stressed that GSICS products should be made discoverable and accessible.

Action 15.1: the GCC to register the GSICS catalogue as a service in the WMO Information System (WIS), to ensure it is discoverable in the WIS.

4. Report from the GSICS Data Management Working Group (GDWG)

Manik Bali, as acting GDWG Char, presented the [GDWG progress report](#) on behalf of GDWG. The EP was pleased to see the increasing audience of the GSICS User Messaging Service (GUMS), the activity of the GSICS Development Forum, the coding of Spectral Response

Functions (SRF) in NetCDF format, the data model for an instrument event log, DOI assignment for GSICS products, implementation of plotting tools, calibration change alerts, review of the GPPA, development of harmonized GPRC websites including the provision of GSICS data, harmonization of file names. It was noted that the THREDDS servers, the product catalogue and the Wiki pages were maintained in an operational context.

The issues to be addressed in the near future include:

- Complete the Satellite Instrument Event Logging specification, design and implementation.
- Define a policy and a procedure for archiving GSICS products
- Implementing new capabilities in the GSICS product plotting tool.
- GSICS document management plan definition and associated document templates.
- Doi /Oid numbers for documents and products.
- Address resource crunch
- Assessing “Big Data” tools to analyze instruments compared with stable references

M. Bali pointed out that GDWG currently relied on EUMETSAT, JMA, KMA, NOAA but not all GSICS Members. He recommended that every GPRC nominate at least one representative on the GDWG with sufficient time dedicated to advance GDWG actions.

The EP supported the proposed GDWG action plan. The EP urged every GPRC to nominate at least one representative on the GDWG with sufficient time dedicated to advance GDWG actions, it also renewed its call to all GSICS Members to propose a GDWG Chair.

Action 15.2: every GPRC to nominate at least one representative on the GDWG.

It was noted that the GCC and the GDWG had to deal with a number of similar issues. In this respect, the EP appreciated that M. Bali, from the GCC, could act as interim Chair of GDWG. The EP noted however that the respective roles of GDWG and GCC should be further clarified, emphasizing the complementary work done centrally by the GCC and within the GPRCs by the GDWG members. This was discussed further under item 11.

5. Update from GSICS Members and observers

- [Report from CMA](#): P. Zhang showed the improvement of FY-2 calibration over the years, with the use of GSICS and the Calibration of Inner Black-body corrected by Lunar Emission (CIBLE) . He reported on IR, VIS, and MW calibration activities for the FY-3 series, which is currently the main focus. Information was provided on ground sites and on the various software tools and online services available through the new CMA/NSMC web site.

- [Report from CNSA/CRESDA](#) : Pan Zhiqiang introduced the calibration activities conducted by the China Center for Resource Satellite Data and Application (CRESDA) for China’s land observation satellites including the HJ-1, SJ-9, ZY-1 and GF-1 series. Details were provided on four calibration sites. He reported on cross-calibration of the GF-1 Wide Field of View (WFV) 16m resolution VIS/NIR imager against MODIS.

In view of this significant calibration activity, the EP invited CNSA/CRESDA to consider joining GSICS, initially as an observer.

- [Report from CNES](#): Patrice Henry summarized the cal/val and intercalibration activities of CNES, including the recalibration of POLDER and PARASOL data using several VIS calibration methods

and a multi-method approach, calibration of SPOT/Vegetation instrument, recalibration of historical SPOT data, validation of ENVISAT/MERIS dataset calibration, and improvement of lunar calibration with PLEIADES. He then presented cross-calibration results of IASI-A, IASI-B, AIRS, and CrIS, which showed excellent consistency and stability over time, with IASI-A and B being very close, but further work is needed to improve the absolute radiometric and spectral calibration.

- [Report from EUMETSAT](#): K. Holmlund reported on EUMETSAT GPRC activities contributing to the GRWG and GDWG work plans, and the status of EUMETSAT GSICS products. IASI is flying on METOP-A and METOP-B simultaneously in orbit for a few years, and METOP-C to be launched in 2018. He underlined the progress of the calibration event logging system and the developments conducted on the DCC method and lunar calibration, which can be used to monitor the vicarious calibration. A lunar calibration workshop will be held in December 2014 to compare various model implementations.

- [Report from ISRO](#): Pradeep Thapliyal presented (remotely) the intersatellite calibration of infrared sensors onboard Indian geostationary satellites using LEO hyperspectral observations. Cross-calibration of Kalpana against AIRS and IASI were presented. The intercalibration of INSAT-3D is being developed in accordance with the IR GEO-LEO GSICS correction product definition.

- [Report from JAXA](#): An update was provided by Keiji Imaoka on the results of MW intercalibration of GCOM-W /AMSR-2 with TRMM/ TMI and AQUA/AMSR-E in slow rotation mode, using double difference technique with global analysis and RTM over forest and ocean area targets.

- [Report from JMA](#): Arata Okuyama presented an update on JMA GPRC activities, including the contributions to GDWG and GRWG actions, the contribution to SOPE-CM projects, and the progress of GSICS GEO-LEO correction product for MTSAT which is nearly pre-operational subject to completion of the uncertainty analysis. VIS calibration is investigated using DCC and lunar methods. An outlook was given on Himawari-8 / AHI calibration plans.

- [Report from KMA](#): Dohyeong Kim presented the progress report from KMA, including developments of VIS calibration using ground targets and lunar calibration, IR calibration against AIRS and IASI, and the GPRC web site. In the context of SCOPE-CM, KMA analyses the impact of GSICS calibration correction on SST products.

- [Report from NASA](#): James Butler provided an update on the status of MODIS, AIRS, and the instruments of SNPP and of the planned JPSS satellites, and the pre-phase-A studies of CLARREO. He reported on the status of intercalibration and consistency studies performed by various NASA teams including JPL, LARC, GSFC, and partners.

- [Report from NOAA](#): In a remote presentation, M. Goldberg reported on the progress of the NOAA GPRC, with a focus on the validation and assessment of Suomi-NPP, in particular CrIS, as a candidate reference instrument for GSICS. Aircraft campaigns show absolute accuracy for CrIS around 0.1 to 0.2 K and SNOs show excellent agreement with IASI, within 0.1 K, over the Arctic but not the Antarctic, which requires further investigation. Results were also presented for VIIRS against MODIS and ATMS. NOAA developed a MW FCDR combining MSU and AMSU datasets.

- [Report from ROSHYDROMET](#): Alexander Uspenskyi presented Russian calibration activities including four ground facilities. ROSHYDROMET is pursuing the implementation of the CAL/VAL system for satellite data and products. First experiments with intercalibration of MSU-GS IR channels (GEO-to-LEO and GEO-to-GEO) have shown operability of the proposed techniques. Methods have been developed for instrument intercalibration of the forthcoming Meteor-M N2 satellite.

- Report from USGS: Greg Stensaas gave (remotely) a brief report on USGS calibration activities of Landsat data, including Landsat-5 (27 years of data), Landsat-7 (over 14 years) and Landsat-8 (launched in 2013). USGS is involved in the GRWG, maintains calibration sites and a cal/val site directory, is developing tools for land product validation and maintains the Robotic Lunar Observatory (ROLO) model for lunar calibration.

6. Report from the GSICS Research Working group (GRWG)

Tim Hewison, GRWG Chair, presented a [report on GRWG activities](#). He summarized the outcome of the annual GRWG-GDWG meeting in Darmstadt, including the progress made by the VIS, MW and UV sub-groups within GRWG, the collaboration with CEOS/WGCV/IVOS, the GSICS-GRUAN-GNSSRO workshop held in Geneva.

T. Hewison requested a decision from the EP to ensure continuity of GRWG chairmanship, and guidance regarding the respective responsibilities of the GRWG chair, vice-chair and subgroup chairs, and the GCC.

The EP also recalled the principle that a former Chair should be considered for becoming one of the vice-chairs to assist the new Chair.

The GRWG Chair also raised other important issues to be addressed by the EP including: action tracking through the operations plan, and overall scope of GSICS, and provided some views on the relevance of FCDR as GSICS products. Incidentally, including the FCDR among GSICS products would have implications on the data management and infrastructure, should they be stored on GSICS servers.

These points were discussed in more depth by the EP under the next agenda item.

7. Discussion on GSICS procedures and scope of GSICS products

GSICS Procedures

The GPPA was established to promote « good practices » in the development of GSICS products. Complying with the GPPA is meant to ensure rigor, maturity, and build confidence based on scientific evidence. The GPPA is often presented as a key achievement of GSICS. It can be compared with the “Maturity Matrix” for climate products. The GPPA does not specify « suitability for climate applications » but should provide quality indicators giving sufficient evidence to allow the user to judge whether the product is suitable for climate or other applications.

The GCC recommended relaxation of the GPPA to accommodate third party products. Moreover, it underlined that several members reported valuable activities including intercalibration products but think they don't have enough resources to submit these products to the GPPA for evaluation/recognition as GSICS products. This raises the question whether the GPPA is imposing too much bureaucracy, unnecessary constraints. On one hand, relaxing too much the GPPA would not guarantee that GSICS products are mature and rigorous enough to support e.g. climate assessment. On the other hand, if constraints are dissuasive, the GPPA would have less impact as there would be fewer products. The EP invited the GCC to investigate what are precisely the issues posed by the GPPA in its present form. If necessary the GCC could suggest waivers for third party products, while noting that the GPPA is a GSICS procedure which is not be driven by the needs of third parties. The EP would then evaluate whether a relaxation is desirable for GSICS products, and/or different levels of products should be considered (in the same way as the Long

Term Data Preservation guidelines indicate a range of measures to be taken, which can be followed to different degrees).

In the case of the MW FCDR product, the GCC reported that the GPPA was not fully relevant for an FCDR product because the GPPA was designed for intercalibration products only. The EP confirmed that the GPPA is, and should be, designed for intercalibration products, which are the scope of GSICS.

FCDR and scope of GSICS

An FCDR is defined as “a well-characterized, long-term data record, usually involving a series of instruments, with potentially changing measurement approaches, but with overlaps and calibrations sufficient to allow the generation of products that are accurate and stable in both space and time to support climate applications”. FCDRs need accurate calibration /intercalibration, therefore the generation of FCDRs – and more generally the recalibration of archived datasets - are logical outcomes of GSICS activities.

The question is: how far in the value chain should activities be coordinated within GSICS ? GSICS coordinates the development of “corrections”, including the “reanalysis corrections” to be used for recalibration, but so far the actual generation of FCDR was considered as an application of GSICS, enabled by GSICS but not part of GSICS as illustrated in Figure 1.

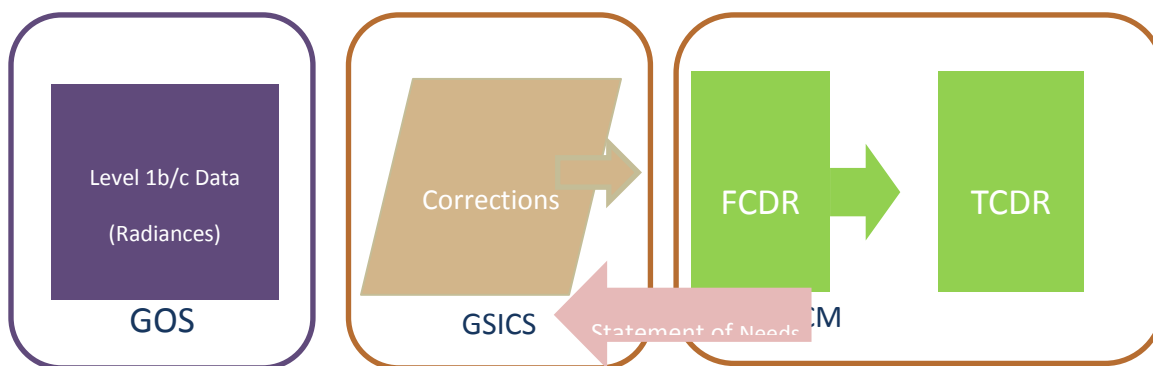


Figure 1. Value chain, from sensing to Thematic Climate Data Record

The EP noted that this view had been discussed and confirmed on several occasions :

- (i) GSICS Implementation Plan (2005) a high-level objective of GSICS is « To provide for the ability to re-calibrate archived satellite data using GSICS intercalibration system to enable the creation of stable, long-term climate data sets ».
- (ii) EP-14 (2013): “There was “general agreement that FCDR generation was a responsibility of satellite operators and that GSICS should enable FCDR generation by defining best practices, and should guide their implementation (including ATBD and software) using the GPPA thus ensuring a seamless flow of activity”.
- (iii) Vision of GSICS (2013): « GSICS should support generation of climate data sets ... The respective roles should be clarified... The role of GSICS is to provide the understanding and community-agreed approach and algorithms that are needed to enable satellite operators to perform the best possible recalibration of historical data sets, in support of reanalysis by processing centres. »

The EP agreed that generating FCDRs was a responsibility of satellite operators –whether members of GSICS or not. GSICS is interested in being informed of these activities, especially when they are conducted by GSICS members or are using GSICS products, but does not view FCDR generation as a GSICS activity. GSICS provides tools to be used by applications such as the generation of climate data records, but the actual applications of these tools, i.e. the generation of these data records and the associated data stewardship, are not within the scope of GSICS, and GSICS is not coordinating them.

In order to give visibility to the high-standard calibration method used to generate FCDRs, the EP recommended investigating the possibility to use the GPPA to deliver a GSICS label for the « algorithm specification » used for FCDR generation.

8. Outstanding actions from previous meetings

A [status of actions](#) from previous meetings was presented. Out of the 25 actions agreed at EP-14, 14 have been completed. Information is missing on other actions before deciding to close them or to keep them open. This should be reviewed in a dedicated teleconference.

9. GSICS in the Architecture for Climate Monitoring from space

With reference to the « logical view » of the Strategy towards an architecture for climate monitoring, the EP noted that the function “Create and maintain long-term climate data records” (See Annex 5) contained activity A33 “*Calibrate and Inter-calibrate Climate Data Records*”, delivering calibration parameters, as an input to activity A31 “*Correct, geolocate and apply calibration parameters*” which generates FCDR. This illustrates the role of GSICS and its utilization by the climate community.

The EP considered that GSICS should assist in the definition and development of the Architecture with a particular role to:

- Provide methods, best practices or standards for inter-calibration
- Ensure the availability of on orbit reference standards to provide (absolute) traceability
- Ensure the availability of reference satellite data sets with documented uncertainty, and/or contribution to composite reference data sets (e.g. GRUAN-GNSS RO).

The EP was on the opinion that this could be done in collaboration with the CEOS Working Group on Calibration and Validation (WGCV).

10. GSICS awards nomination and selection process

M. Bali presented a proposal to give “[GSICS awards](#)” to acknowledge significant personal contributions to GSICS, for example by reviewers who provide an assessment of GSICS products in the context of the GPPA. The aim is to strengthen the motivation of experts to support GSICS when they have other priorities in their day job. The GCC highlighted that the GPPA requires extensive reviews representing several weeks of work, reviewers are also needed for submissions to the GSICS Quarterly Newsletter. M. Bali suggested awards being given either to contributors to GSICS or more generally to any expert providing a major contribution to calibration science. Awards would be given for outstanding research, or for leadership, or for assistance as an expert, either by the EP or by Working Group Chairs or by the GCC.

The EP thanked the GCC for this proposal and supported the view that significant personal contributions to GSICS should be acknowledged. It considered however that distributing numerous awards would make them less valuable, and that the proposed scheme would be heavy to implement, noting the need to perform an objective selection. Such a scheme was felt premature. The EP considered instead that a simple letter of recognition sent by could acknowledge significant personal contribution to GSICS, for example in the case of reviewers.

Action 15.3: GCC and WMO Secretariat to coordinate with a view to send a letter of recognition from WMO to acknowledge significant personal contributions to GSICS.

11. Implementing GSICS Vision

11.1- Strategic goals

The GSICS Vision defines the scope and priorities of GSICS for the near future.

11.2- Partnership

GSICS-WGCV interaction :

Albrecht von Bergen, vice-chair of the CEOS WGCV, gave (remotely) a report on the [WGCV-GSICS interactions](#). He recalled that WGCV had 6 standing sub-groups and has just adopted the principle of a 3-year work plan. He proposed that the respective chairs of GSICS and CEOS/WGCV jointly define areas of interactions with priorities, concrete activities, timelines, and a way forward to identify the missed opportunities. The main upcoming milestones for WGCV are the WGCV plenary meetings in September 2014, May 2015, early 2016 and September 2016.

The EP thanked the WGCV Vice-Chair, and confirmed the willingness of GSICS to continue and strengthen the cooperation which already exists through cross-participation in GSICS and WGCV meetings. It was noted that some activities of GSICS and WGCV should supplement each other, while other subjects, such as agreeing on common standards, may require a joint work.

The EP supported the view that GSICS and WGCV should :

- a. maintain high-level connection to ensure exchange of information and facilitate mutual consultation towards seamless, complementary activities,
- b. pursue active collaboration at working group levels on matters of interest, including joint activities, sharing of methodology and resources, in their respective work plans.

The EP recommended that either the GRWG Chair or the GCC Director attend the next WGCV meeting to continue the dialogue on this matter.

GSICS-GRUAN:

The EP further considered that GSICS and GRUAN should collaborate closely for mutual benefits. GSICS benefits from GRUAN atmospheric profiles, and GRUAN can benefit from intercalibrated, consistent satellite measurements to evaluate GRUAN in situ observations.

11.3- GSICS leadership and resources : Respective roles of GDWG and GCC

The responsibilities of the GSICS Coordination Center (GCC) had been discussed at the joint GRWG-GDWG meeting, which had proposed the following:

- Support the establishment of GSICS product and services definitions, and product evaluation processes, including product theoretical basis, quality assurance, data protocols, and associated documentation;
- Run baseline algorithm for GEO-LEO and LEO-LEO inter-calibration for all operation weather satellite instruments for the purpose of product quality assurance;
- Make recommendations to, and facilitate communication between, GRWG and GDWG during their efforts to develop, implement, organize, and direct GSICS research and data management projects;
- Support GSICS end-to-end demonstration activities;
- Track and make updates to GSICS Operations Plan;
- Design and maintain the GCC web site;
- Publish *GSICS Quarterly* newsletter, and support development of other GSICS publications;
- Support Executive Panel in finding GSICS data and information users, and attracting new GSICS Members.
- Interface with GSICS Users: Organise GSICS Users Workshops, Operate GSICS User Messaging service

The EP confirmed these proposed GCC responsibilities, while noting that the GSICS Implementation Plan also contained specific provisions on the GCC role to coordinate technical specifications, which should be considered as well (e.g. “archiving strategy, data exchange formats and modalities, development of common software tools”).

The EP recognized that the role of GDWG was not fully symmetrical to the GRWG. The GDWG has a fundamental role to ensure that data management practices are shared, agreed, and implemented in a consistent way across all GSICS members, therefore a close relationship should exist between GCC and GDWG.

Without identifying any substantial change needed in the Terms of Reference of the GDWG, the Panel wished to clarify and emphasize the complementary roles of GDWG and GCC.

12. GSICS operations plan /implementation plan

The EP considered it was important that the list and type of GSICS deliverables be clearly documented. It was recalled that EP- 4 had endorsed the principle of establishing a list of potential and current products and services called the “GSICS Products and Services Roster”. Then EP-5 noted that the Roster shall be used: (i) by the EP to confirm the commitments of GSICS and to provide guidance to GCC and GPRCs for future developments; (ii) by the GCC and GPRC as a reference for their developments; and (iii) by GSICS users to provide feedback on product specifications. The Products/Services Roster was approved in 2008.

In recent years, the description of GSICS Products we were referring to was comprising 3 types of products:

- GSICS Bias Monitoring, which consists of routine comparisons of satellite radiances against reference (this is however in discussion within GDWG/GRWG)
- GSICS Correction, which is a function to be used by a GSICS user to correct issued radiances, to make the calibration consistent with a reference, either in near real-time or for archived products
- GSICS Reports & Guidelines, which can be recommendations to improve some data calibration practices, or for the design and operation of future satellite instruments.

The EP requested that the description of GSICS products be reviewed and properly documented and publicized.

Action 15.4: the GCC to prepare, in consultation with GRWG and GDWG, an updated description of GSICS products, indicating how users can access and use these products, to be submitted to the EP for endorsement.

13. Other issues raised by the Working Groups or EP members

GSICS workshops

GSICS underscored the value of using the moon as a transfer standard for visible /SWIR calibration. It also recognized that there was scope for improvement of lunar calibration methods through further scientific development. The EP thus strongly recommended that the community join efforts and share results and experience to tackle these issues.

In particular GSICS EP encouraged EUMETSAT to organize a GSICS lunar calibration workshop in December 2014 and invite participation of the CEOS/WGCV. The EP further strongly recommended that GSICS members prepare for this workshop and plan the required resources accordingly

The GSICS EP welcomed CMA's offer to host the 6th GSICS Users Workshop during the 5th Asia Oceania Meteorological Satellite Users Conference in Shanghai in October 2014.

14. Next meetings

Web meetings should be held in September 2014 and early 2015, the next annual meeting before CGMS-43

ANNEX 1: LIST OF PARTICIPANTS**FIFTEENTH MEETING OF THE GSICS EXECUTIVE PANEL
Guangzhou, China, 16-17 May 2014**

| INSTITUTION | FIRST NAME | LAST NAME | Status |
|----------------------------|-------------|-------------|----------------------------------|
| CMA | Peng | Zhang | Chair (Incoming) |
| CNES | Patrice | Henry | Representing P. Veyre |
| CMA/NSMC | Qiang | Guo | CMA adviser |
| CMA/NSMC | Xiuqing | Hu | CMA adviser |
| CNSA | Jun | Gao | Invited |
| CNSA | Yong | Xie | Invited |
| CNSA/CRESDA | Zhi Qiang | Pan | Invited |
| EUMETSAT | Kenneth | Holmlund | Member |
| ISRO | Pradeep | Thapliyal | Representing A.S.Kiran Kumar |
| JAXA | Keiji | Imaoka | Member |
| JAXA | Kazuo | Umezawa | Member |
| JMA | Toshiyuki | Kurino | JMA adviser |
| JMA | Arata | Okuyama | Member |
| KMA | Dohyeong | Kim | Member |
| NASA | James | Butler | Member |
| NASA | Jack | Xiong | NASA adviser |
| NOAA | Manik | Bali | GDWG Acting Chair, GCC Dep. Dir. |
| ROSHYDROMET | Alexander | Uspensky | Member |
| ROSHYDROMET | Vasily | Asmus | Roshydromet adviser |
| ROSHYDROMET | Alexey | Rublev | Roshydromet adviser |
| ROSHYDROMET | Zoya | Andreeva | Roshydromet adviser |
| WMO | Jerome | Lafeuille | Member, Secretariat |
| REMOTE PARTICIPANTS | | | |
| NOAA | Mitch | Goldberg | Chair (outgoing) |
| NOAA | Lawrence E. | Flynn | GCC Director |
| EUMETSAT | Tim | Hewison | GRWG Chair |
| USGS | Gregory L. | Stensaas | Member |
| DLR | Albrecht | Von Bargaen | CEOS/WGCV Observer |

ANNEX 2: PROVISIONAL AGENDA (Rev.1)

| DAY 1 | | <i>Tentative timing</i> |
|--------------|---|-------------------------|
| 1. | Opening of the meeting Welcome by WMO and CMA Introduction of participants and agenda | 0900 |
| 2. | Chairman's report by M. Goldberg (remotely) | 0915 |
| 3. | Report from the GSICS Coordination Centre (GCC) | 0930 |
| 4. | Report from the GSICS Data Management Working Group (GDWG) | 1000 |
| 5. | Update from GSICS Members and observers - CMA, NOAA, CNSA/CRESDA , CNES, EUMETSAT, JAXA, JMA - KMA, NASA, ROSHYDROMET, IMD, ISRO, NIST, USGS, ESA | 1100 1400 |
| 6. | Report from the GSICS Research Working group (GRWG) | 1600 |
| 7. | Discussion | 1645 |
| DAY 2 | | |
| 8. | Outstanding actions from previous meetings | 0900 |
| 9. | GSICS in the Architecture for Climate Monitoring from space (Outcome of the Joint CEOS-CGMS WG on Climate on 5-7 March) | 0915 |
| 10. | GSICS awards nomination and selection process | 1000 |
| 11. | Implementing GSICS Vision | 1100 |
| 11.1 | - Strategic goals | |
| 11.2 | - GSICS-WGCV interaction | (1630, Day 1) |
| 11.3 | - GSICS leadership and resources Respective roles of GDWG and GCC | |
| 12. | GSICS operations plan /implementation plan - GSICS Product Roster (shall FCDR be included in GSICS deliverables) | 1400 |
| 13. | Other issues raised by the Working Groups or EP members | 1500 |
| 14. | Summary of actions and conclusions | 1530 |
| | <i>Adjourn 1600</i> | |

Annex 3: Role of Executive Panel Chair and Vice-Chair

The EP Chair is designated for a term of two years, renewable, with a primary role to chair the sessions of the panel, to lead the progress of GSICS between sessions and to represent GSICS when necessary.

More specifically, the role of the EP Chair includes:

- To conduct the work of the panel, defining the schedule and agenda, acting as moderator of the sessions, drawing conclusions with actions and recommendations reflecting the opinion of the Panel members, with the support of the WMO Secretariat;
- To stimulate progress in implementing the agreed action plan, through regular intersession virtual meetings;
- To lead the definition and update of the high-level objectives of GSICS, and to promote them, seeking the engagement of all members;
- To represent GSICS with external parties as necessary, coordinate with relevant projects to identify and implement collaborative activities;
- To report to CGMS on the progress, the challenges and the plans of GSICS.

The Chair is assisted by a Vice-Chair, nominated for the same period, who can replace the Chair in case of unavailability, and is expected to ultimately become the next Chair.

Annex 4: Role of the GRWG Chair

The Chair of the GSICS Research Working Group (GRWG) is designated for three years (renewable) with a primary role of organisation, coordination, moderation and communication to ensure the GRWG fulfils its role as defined in its Terms of Reference.

Specifically, the GRWG Chair shall:

- Coordinate the development of inter-calibration products and methodologies, and related scientific issues, with delegation to Sub-Groups as appropriate, with a view to promote common standards and best practices ensuring comparability of satellite measurements;
- Schedule and chair the GRWG session and plenary session of the annual GRWG-GDWG meeting and monthly web meetings, acting as moderator. In coordination with GDWG and Sub-Group Chairs, define agenda, approve invitation of non-members, agree conclusions, actions and recommendations from the meetings, and organize their follow up;
- Represent the GRWG with external parties as necessary, coordinate with relevant projects to identify & implement collaborative activities;
- Report to Executive Panel.

The Chair is assisted by a Vice-Chair who can replace the Chair in cases of unavailability, and will ultimately become the next Chair.

ANNEX 5: Calibration in the Strategy towards an Architecture for Climate Monitoring

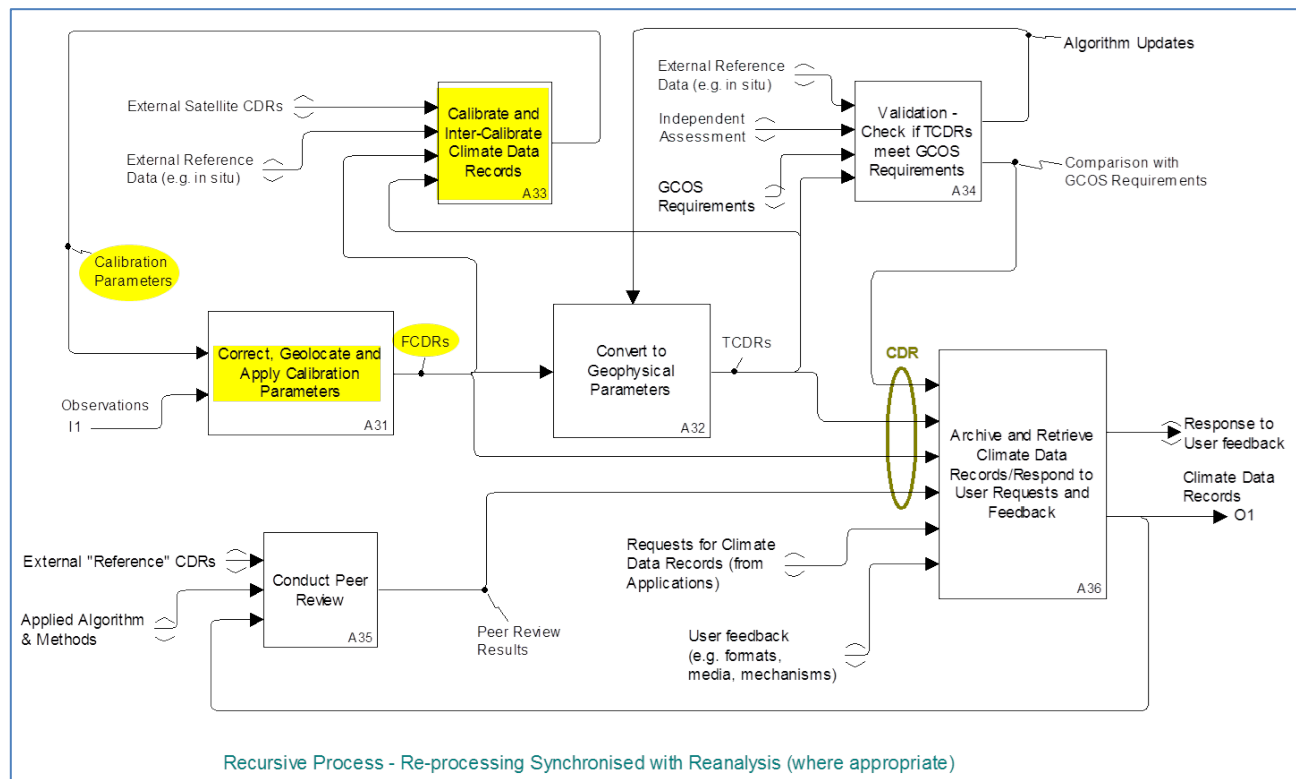


Figure 6.3: Decomposition of "Create and Maintain Long-term Climate Data Records"

Extracted from:

M. Dowell, P. Lecomte, R. Husband, J. Schulz, T. Mohr, Y. Tahara, R. Eckman, E. Lindstrom, C. Wooldridge, S. Hilding, J. Bates, B. Ryan, J. Lafeuille, and S. Bojinski, 2013: Strategy Towards an Architecture for Climate Monitoring from Space.

(http://www.wmo.int/pages/prog/sat/documents/ARCH_strategy-climate-architecture-space.pdf)

Annex 6: List of new actions from GSICS EP-15

Action 15.1: the GCC to register the GSICS catalogue as a service in the WMO Information System (WIS), to ensure it is discoverable in the WIS.

Action 15.2: every GPRC to nominate at least one representative on the GDWG.

Action 15.3: GCC and WMO Secretariat to coordinate with a view to send a letter of recognition from WMO to acknowledge significant personal contributions to GSICS.

Action 15.4: the GCC to prepare, in consultation with GRWG and GDWG, an updated description of GSICS products, indicating how users can access and use these products, to be submitted to the EP for endorsement.