



Global Space-based Inter-calibration System



**GSICS EXECUTIVE PANEL**  
**FOURTEENTH SESSION**

Tokyo, Japan, 15 and 16 July 2013

**FINAL REPORT**



Executive Panel members with JMA staff at JMA Headquarters on July 16, 2013

## FINAL REPORT OF GSICS EP-14

### 1. Opening of the meeting

The fourteenth session of the Global Space-based Inter-calibration System (GSICS) Executive Panel was opened by the Chairman, Mitch Goldberg, who welcomed the participants (See Annex 1). He thanked the Japan Meteorological Agency (JMA) for hosting this meeting in spite of a national holiday, right after co-hosting with JAXA the 41<sup>st</sup> annual meeting of the Coordination Group for Meteorological Satellites (CGMS). Wenjian Zhang, Director of the WMO Space Programme, welcomed the participants on behalf of WMO. The participants introduced themselves and the agenda was adopted (See Annex 2). Working documents and presentations given at the meeting are posted on the GSICS-EP-14 meeting page: <http://www.wmo.int/pages/prog/sat/meetings/GSICS-EP-14.php>

### 2. Chairman's report

The Chair recalled the overarching goal of GSICS and the GSICS principles that were agreed at the twelfth meeting.

He underlined the major contributions of GSICS members to the recent CGMS session and highlighted the role of GSICS in the multi-year CGMS High-Level Priority Plan (HLPP). The HLPP requested to “*Establish within GSICS a fully consistent calibration of relevant satellite instruments across operational CGMS agencies, recognising the importance of collaboration between operational and research CGMS agencies*” in order to enhance product quality, and to “*Extend the use of GSICS and SCOPE-CM frameworks*” as a contribution to the architecture for climate monitoring from space. He considered that GSICS should appear in the ECV product inventory initiated in the context of the climate monitoring architecture.

M. Goldberg also expressed the view that GSICS should take responsibility in generating Fundamental Climate Data Records (FCDRs). 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 GSICS Procedure for Product Acceptance (GPPA), thus ensuring a seamless flow of activities. The Panel discussed whether GSICS should coordinate the actual generation and maintenance of FCDRs. Some Panel members expressed the view that the role of GSICS in this respect should rather be to deliver methodology and tools *in support of reprocessing* for reanalysis. For instance, Jo Schmetz reported that responsibilities at EUMETSAT are clearly distributed whereby the EUMETSAT GSICS team supports the team responsible for the reprocessing with the required calibration (GSICS) expertise. Jérôme Lafeuille reported that SCOPE-CM coordinates some re-processing activities based on GSICS methodology and tools. The Panel agreed it was of utmost importance that the logic of the scope and priorities of GSICS in this respect be clearly formulated in the updated GSICS Implementation Plan (See item 12).

### 3. WMO report

Jérôme Lafeuille, Chief of the Space-based Observing System Division within the Space Programme Office and Secretary of the GSICS Executive Panel, recalled the main events that had occurred since GSICS-EP-13 and their impact on GSICS activities. He noted that satellite intercalibration was an integral element of the CGMS baseline.

Referring to the initiative taken by WMO, with CGMS and CEOS, to define an architecture for climate monitoring from space, he emphasized the role to be played by GSICS in this architecture, since calibration is an essential step in the “logical view” of the architecture. This was recognized in the CGMS HLPP, as pointed out by the Chair, however, in the ECV product inventory, GSICS was only mentioned a few times as “quality control organization”.

J. Lafeuille reported that systematic satellite intercalibration was required in the latest amendment of the Manual on the Global Observing System adopted by the WMO Executive Council (EC-65); furthermore, the Council had urged WMO Members to bring GSICS to an operational status. This implied not only the operational recognition with reference to the GSICS Procedure for Product Acceptance (GPPA) but also the routine availability of products with metadata in compliance with agreed standards, and the dissemination of corrected calibration in near-real time, in parallel with the nominal calibration as part of Level 1 data. Rendering GSICS fully operational would also require further efforts to extend GSICS outreach, and the development of training material on the operational use of GSICS products.

Wenjian Zhang, Director of the WMO Space Programme, reinforced these views and stressed the role of GSICS in ensuring interoperability of the various satellite programmes within the space component of the WMO Integrated Global Observing System (WIGOS). The Vision of GSICS should be integrated in the vision of WIGOS.

#### 4. Report from the GSICS Coordination Centre (GCC)

Larry Flynn (joining the meeting from the US via internet) introduced himself as the new GCC Director in replacement of Fuzhong Weng, and George Ohring as the editor of the GSICS Quarterly newsletter. The Panel thanked Fuzhong for his work leading the GCC during 6 years and welcomed Larry Flynn. Larry then gave a status of GSICS products as summarized in Table 1.

Table 1. Status of GSICS GEO-LEO and LEO-LEO Correction Products (June 2013)

Algorithm Type	GPRC	Monitored Instrument	Reference Instrument	GSICS NRT Correction	GSICS Re-Analysis Correction
GEO-LEO IR	EUMETSAT	Meteosat	IASI	Pre-Operation	Pre-Operation
	JMA	MTSAT	IASI (+ AIRS)	Demo (close to Pre-Op)	Demo (close to Pre-Op)
	NOAA	GOES Imager	IASI (+ AIRS)	Pre-Operation	Pre-Operation
		GOES Sounder	IASI (+ AIRS)	In development	In development
	CMA	FY-2X	IASI (+ AIRS)	In development	In development
	KMA	COMS	IASI (+ AIRS)	In development	In development
	EUMETSAT	Meteosat	Aqua MODIS	In development	In development
	JMA	MTSAT		In development	In development

GEO-LEO Vis/NIR DCC	NOAA	GOES Imager		In development	In development
	CMA	FY-2X		In development	In development
	KMA	COMS		In development	In development
LEO-LEO Visible/NIR	NOAA	AVHRR	MODIS	Demonstration	Demonstration
LEO-LEO Microwave	NOAA	MSU, AMSU	MSU, AMSU	Demonstration	Demonstration

The GCC Director mentioned a lack of available experts to review the proposed MW products. He clarified that the “bias monitoring” information was still available for display with the online plotting tool but was no longer presented as a product by itself.

Three particular requests had emerged from the users’ workshop held in April:

- Creating UV and synthetic observation subgroups within GRWG
- Calibration alert system
- Intermediate products such as SNO and GEO-LEO collocation data.

The panel had no objection to the creation of an UV and a synthetic observation subgroup within GRWG. As concerns the two new categories of products or services, the Panel wished to have a recommendation from the GRWG, GDWG and GCC on their feasibility and relevance before making a decision.

Action 14.01	EP	GCC, GDWG and GRWG to evaluate the relevance and implications of adding “calibration alert system” and “SNO and GEO-LEO collocation data” to the GSICS portfolio, and report to the Executive Panel.
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The GCC Director took the opportunity of the GCC report to also inform the Panel on historical data intercalibration activities of the University of Wisconsin (UW), part of the NOAA GPRC activities, concerning GOES satellites. The UW is also starting to intercalibrate retrospectively Meteosat and FY-2 satellites against AIRS.

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

Aleksandar Jelenak, GDWG chair (joining the meeting from the US via internet), noted the low level of participation of GSICS members in the GDWG, although welcoming the nomination of Simon Elliott (EUMETSAT) and Masaya Takahashi (JMA).

The GDWG has worked on organizing GSICS official documentation, promoting the user messaging service, finalizing the plotting tool, maintaining the GSICS product catalogue, generating Spectral Response Function (SRF) data for several GEO imagers in a common format, THREDDS data server configuration, and developing a taxonomy of GSICS products.

GDWG is promoting “datacasting” and contributing to the specification of the satellite instrument event logging system. In this respect, the GDWG chairman has developed a data model that was

accepted by ISO as one of the candidate proposals for the draft revision of the ISO 19115-2 metadata standard, and the group is developing a common controlled vocabulary of event types.

The Panel commended the GDWG Chair and the members for these achievements, recalling that metadata and data management standardization were key issues for GSICS to reach a fully operational status. Referring to the NOAA Climate Data Record Maturity Matrix, the GDWG Chair evaluated that GSICS had reached a major milestone corresponding to maturity “level 3” (research grade) but a large step increase in resources will be needed to reach “level 4” (provenance tracking). The Panel suggested that WMO writes to all participating agencies to communicate the importance of this effort and seek more engagement.

Action 14.02	EP	WMO (W. Zhang) to write to all GSICS participating agencies to communicate the importance of the data management aspects to enable GSICS to reach a fully operational maturity level.
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The panel also noted that the current chair called for a successor, which was addressed under item 14.

## 6. Report from the GSICS Research Working Group (GRWG)

Jo Schmetz introduced the GRWG report on behalf of its Chair, Tim Hewison. He mentioned the ongoing development activities in 2013, in particular intercalibration of solar band sensors (Deep Convective Clouds, Rayleigh scattering, moon, desert targets ), review of the suitability of desert sites, and transfer function from METOP-B to METOP-A through double-difference technique. The GEO-LEO infrared products, although at preoperational stage, suffer from diurnal effects that would require the combined use of both IASI (am orbit) and AIRS (pm orbit).

The Panel discussed the status of the lunar reflectance ROLO model. From a technical viewpoint, it is important for relative calibration but its inherent bias is not negligible. From a policy viewpoint, it was noted that USGS is not in a position to deliver the model itself but can provide results of the model. The model can also be rewritten from the literature, as EUMETSAT did. Action EP 12.6 from the 12<sup>th</sup> Executive Panel is thus kept open.

A remarkable achievement was the special issue of the IEEE TGRS journal on satellite intercalibration.

The GRWG is investigating the feasibility of a “calibration change alert” service suggested by the users’ workshop. It is also preparing two guidelines: one on the choice of a reference instrument and the other on spectral band adjustment factors. The group is working actively through regular web meetings. The Panel commended the GRWG for this active team work.

The GRWG then sought guidance of the Panel on two points: creation of GRWG subgroups and expansion of membership and partnership. As concerns the subgroups, the Panel recalled that at its 13<sup>th</sup> meeting it had already encouraged the GRWG to adopt this structure. Roshydromet proposed Alexei Rublev as a member of the VIS/NIR subgroup. The Panel welcomed Dave Doelling and Isaac Moradi taking responsibility of the VIS/NIR and MW subgroups. The secretary pointed out, however, that the GRWG leads and subgroup leads should be officially GRWG members; they should thus be appointed to GRWG by one of the GSICS member agencies.

Action 14.03	EP	NOAA to consider nominating Dr Isaac Moradi as a member of GRWG
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As regards the conditions for GSICS membership, the Panel confirmed the necessary adherence to the scope of GSICS, to the GSICS principles (including the commitment for free & open exchange, and the GSICS best practices and standards) but also the need to be a member organization of CGMS. The membership eligibility and procedure will be clarified in the updated GSICS Operations Plan (See item 12).

The Panel welcomed the reported interactions of GRWG with CEOS WGCV and other groups. This was further discussed under item 13.

## **7. Update from member and observer agencies**

### **7.1 JMA**

Kotaro Bessho presented the report on JMA GPRC activities. He introduced the other JMA experts participating in GSICS groups: Keita Hosaka, Masaya Takahashi, and Kenji Date. The MTSAT IR corrections against IASI and AIRS are soon in pre-operational phase, pending completion of the uncertainty analysis. The recent developments, including the implementation of the netCDF conventions, allow direct comparison of instrument bias using the GSICS plotting tool developed by EUMETSAT. The vicarious calibration of solar-band channels is under development. JMA is recalibrating historical MTSAT and GMS datasets, to support several SCOPE-CM projects. Himawari-8/9 data sets are simulated on the basis of the planned SRF of the 16 AH1 channels. The near-real time distribution of the GSICS corrected calibration is planned for the new generation Himawari-8/9.

### **7.2 NOAA**

The report on NOAA GPRC activities was presented by Mitch Goldberg, who focused on the latest performance assessment of the Suomi-NPP CrIS, VIIRS and ATMS instruments. The performances of CrIS and VIIRS are excellent, the intercomparison of CrIS with IASI or AIRS revealed however a scene temperature dependence which was explained by an erroneous prelaunch calibration coefficient that will be corrected. This is a clear illustration of the benefit from GSICS. Comparisons of ATMS with AMSU-A showed the importance of re-sampling the ATMS data in order to match the AMSU pixels.

### **7.3 CMA**

Peng Zhang reported on the CMA GPRC activities. He described the new FY-2 calibration approach: Calibration with Inner Blackbody corrected with Lunar Emission (CIBLE) which is implemented now on FY-2D,E,F. He also reported on the range of intercomparisons that are routinely performed between the instruments of FY-3A/B and the relevant references:

- SBUS and TOU with UV diffuser
- SBUS, TOU with SBUV/TOMS
- VIRR, MERSI with AVHRR/MODIS/MERIS
- MWIRI with onboard blackbody with warm mirror correction
- MWRI with AMSR etc.
- VASS (IRAS/MWTS/MWHS) with inboard blackbody
- VASS with ATOVS
- ERM and SIM of with CERES.

The CMA GPRC has redesigned its website (<http://gsics.nsmc.cma.gov.cn>) to make this information more easily accessible.

## 7.4 EUMETSAT

Jo Schmetz reported on the EUMETSAT GPRC activities. During the commissioning phase of MSG-3, systematic intercomparison with IASI revealed a bias on some channels, which is under investigation. Two important developments are conducted in support of GSICS: the calibration event log and the instrument plotting tool. A double-difference technique is developed for the intercomparison of METOP-B/IASI with METOP-A/IASI, since the two satellites are on the same orbit with opposite locations. The differences between IASI-A and IASI-B appear negligible. Developments are ongoing for the solar band calibration, using the DCC method. A version of the lunar reflectance ROLO model was implemented by EUMETSAT, in consultation with USGS. Re-processing activity is conducted for Meteosat using HIRS as a transfer reference, taking advantage of the long, uninterrupted series of HIRS instruments. He recalled experience from the 1<sup>st</sup> generation of Meteosat satellites which had limitations in calibration and characterisation, such as the spectral response functions. This should be considered when striving for accuracy in the reprocessing.

## 7.5 JAXA

Keiji Imaoka reported on the characterization and calibration of GCOM-W1/AMSR-2. Intercomparison of AMSR-2 with TRMM/TMI allows the derivation of correction coefficients to compare GCOM-W1/AMSR-2 with AQUA/AMSR-E by double-difference technique. The intercalibration results can be found at the following URL: [http://suzaku.eorc.jaxa.jp/GCOM\\_W/materials/product/AMSR2\\_XcalResults\\_1-1.pdf](http://suzaku.eorc.jaxa.jp/GCOM_W/materials/product/AMSR2_XcalResults_1-1.pdf)

The Panel encouraged JAXA to submit this MW intercalibration approach to the GPPA.

Action 14.04	EP	JAXA to consider submitting the AMSR-2/AMSR-E intercomparison to the GPPA as a demonstration product.
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Kazuo Umezawa reported on GOSAT calibration activities. GOSAT is planned to be operated over 4 years and acquires fine absorption spectra in SWIR to TIR regions with cloud/aerosol imagery. Radiometric TIR inter-comparison by Simultaneous Nadir Observations (SNOs) with AIRS and IASI has revealed small differences that were explained and corrected, showing once more the benefit of GSICS. For SWIR JAXA uses continuous lunar calibration and solar diffuse. In addition, a vicarious calibration field campaign is planned, with in-situ measurements and aircraft over-flight, in collaboration with the NASA OCO-2 and AMES Research Center.

In the future, JAXA plans to develop a long-term inter-comparison of the latest v160 data release with IASI and AIRS, and to investigate the scan angle dependency in conducting Simultaneous *Off-Nadir* Observations (SONOs)

## 7.6 NASA

Jim Butler provided an update on the MODIS (Terra and Aqua), AIRS (Aqua) and VIIRS (Suomi-NPP) instruments and the corresponding dataset collections. Intercomparison of VIIRS and CrIS with IASI and AIRS show excellent agreement in clear sky condition, but some significant differences in cloudy conditions. More detailed studies will be performed to investigate the dependence on scan angle, scene temperature, and solar zenith angle.

He then provided an update on the CLARREO instrument and the evaluation of its radiometric uncertainty.



## 7.7 ROSHYDROMET

Alexander Uspenskyi introduced the surface-based calibration and validation facilities of Voeikovo, Petergof, Zotto, and the overall cal/val network. The Panel agreed to close two old actions regarding the Voeikovo and Petergof sites and gave a new action to ROSHYDROMET to communicate on these sites for possible inclusion on the Catalog of Worldwide Test Sites for Sensor Characterization ([http://calval.cr.usgs.gov/rst-resources/sites\\_catalog/](http://calval.cr.usgs.gov/rst-resources/sites_catalog/)) that is maintained by the USGS.

He reported on calibration intercomparison of the Electro-I/MSU-GS with Meteosat/SEVIRI and with AIRS. The results of the direct GEO-GEO comparison of MSU-GS with SEVIRI are consistent with the double-difference results of MSU-GS with AIRS, and SEVIRI with AIRS. It shows the need for a calibration correction of the order of 2-3 °K.

The Panel found these first intercomparison results very encouraging and recommended refining the intercomparison along the GSICS GEO-LEO practices. The GCC should be able to assist ROSHYDROMET in implementing the necessary software.

Action EP 14.05	Roshydromet to communicate the details of their main cal/val sites (Petergo, Voeikovo and Zotto) to the USGS (Greg Stensaas, <a href="mailto:stensaas@usgs.gov">stensaas@usgs.gov</a> ) for possible inclusion in the Catalog of Worldwide Test Sites for Sensor Characterization ( <a href="http://calval.cr.usgs.gov/rst-resources/sites_catalog/">http://calval.cr.usgs.gov/rst-resources/sites_catalog/</a> )
Action EP 14.06	Roshydromet (A. Uspenskyi) to contact the GCC (Larry Flynn, <a href="mailto:Lawrence.E.Flynn@noaa.gov">Lawrence.E.Flynn@noaa.gov</a> ) for assistance on implementing the GSICS method for Electro-L/MSU-GS GEO-to-LEO IR intercalibration.

## 7.8 GCOS

Adrian Simmons, Chair of the Steering Committee of the Global Climate Observing System (GCOS) and also consultant at ECMWF, who was invited as an observer, delivered a presentation on requirements for utilization of radiance data in climate analysis.

He stressed that the priority is to have uniform calibration (or re-calibration) of records from individual satellites, with metadata and modeling of instrument characteristics to enable mapping from assimilation-model values to what is actually measured. Adjustments for instrumental drifts through intercalibration (e.g. by SNO technique) should be considered only if the instrument inter-satellite differences cannot be modeled.

Re-analysis reveals discontinuities or drifts in data series. It is expected that GSICS will help to understand the root-cause of these anomalies. Simply adjusting the data series to each other would be an artificial way to reduce the bias.

Finally, A. Simmons invited GSICS to think how it could take advantage of GRUAN. The Panel recalled that the following statement on GSICS-GRUAN collaboration had been issued at its 13<sup>th</sup> meeting :

*“The GSICS Executive Panel sees potential for mutual benefits of GRUAN and GSICS activities. The EP wishes to stress that the benefit is clearly mutual. Therefore coordinated activities in specific areas are recommended.*

*For example, GRUAN measurements could provide improved input data for radiative transfer simulations of the high-resolution radiance spectra at the top-of-the-atmosphere, that can then be*

*compared with hyperspectral satellite measurements (e.g. AIRS and IASI). Differences between measured and calculated spectra should in principle be the same for all GRUAN stations under the assumption that the satellite measurements are stable (this is a very valid assumption) and that GRUAN stations have the same bias errors (this is to be shown). Thus, GSICS would provide via the hyperspectral satellite measurements a ‘travelling reference standard’ for GRUAN stations. It is understood that the realisation of such benefits requires coordination between GSICS and GRUAN, for instance the launching of radiosondes sufficiently close to a satellite overpass.”*

Action 14.07	EP	Adrian Simmons (GCOS Steering Committee Chair) to draft a statement discussing the pros and cons of consolidating different instruments of a series in a single FCDR.
Action 14.08	EP	NASA to present a paper about maturity levels of instrument calibration in support of re-processing, taking MODIS as an example, at a future web meeting of the Executive Panel.
Action 14.09	EP	Jo Schmetz and Mitch Goldberg to draft a description of potential collocation criteria for GRUAN and satellite measurements.

## 8. GSICS outreach and user interaction

The Panel appreciated that the fifth GSICS Users’ Workshop had been held in College Park prior to the NOAA Satellite Conference. It recommended holding the sixth workshop at the fifth Asia-Oceania Meteorological Satellite Users Conference (AOSMUC-5) to be held in China in 2014, and suggested extending particular invitations to users from Asia-Oceania.

WMO indicated that the extraordinary session of the WMO Commission for Basic Systems (CBS-Ext.) would be held in September 2014 in South America, with a short Technical Conference on WIGOS implementation. Special information should be prepared by then on the operational use of GSICS.

The Panel recalled the IEEE TGRS special issue on satellite instrument calibration. It is important that the GSICS best practices are published in such peer-reviewed scientific literature. The Panel commended Tim, Fred Wu and the other GRWG members who had coordinated this publication. It thanked WMO for considering funding the open accessibility of five papers, which contributes to capacity building, but was concerned about the delay in implementing this funding.

The Panel noted the joint EUMETSAT-WCRP Symposium on Climate Research and Earth Observation from Space (Darmstadt, 13-17 Oct. 2014) as an important venue to present GSICS.

Action 14.10	EP	GCC, GDWG and GRWG to prepare information material on the operational use of GSICS, for use at CBS-Ext.(14)
Action 14.11	EP	WMO (W. Zhang) to confirm and implement as soon as possible the funding of open accessibility of the five papers selected by WMO in the IEEE TGRS special issue published in March 2013.
Action 14.12	EP	Jo Schmetz and Mitch Goldberg, as members of the scientific committee, to propose an invited talk at the joint WCRP-EUMETSAT

**9. Vision of GSICS for the next 5 to 10 years**

The Executive Panel had an open exchange of views on the vision of GSICS for the next 5 to 10 years, along the following questions:

- What shall be the role of GSICS in the future space-based WIGOS?
- How will your agency relate to and rely on the services from GSICS?
- What trends in satellite and instrument technology, information technology are likely to affect the role of GSICS in raising new challenges, or providing new opportunities?
- What trends in user applications are likely to affect the role of GSICS in raising new needs or changing user priorities?
- What efforts are needed by GSICS to best benefit your organization near term, mid term and long term?
- What particular points would you suggest for GSICS in 5 -10 years? Would you expect the scope of GSICS to evolve beyond the operational monitoring of passive radiometric sensors and the inter-calibration of Level 1 data? Would you recommend a change in institutional linkages of GSICS, or in the way it is interacting with users?

The Panel recalled the scope of GSICS and the GSICS principles that were agreed at the twelfth meeting. It emphasized that developing best practices within GSICS helped the GSICS member agencies in the Plan-Do-Check-Act quality improvement cycle. It anticipated that in the future there would be more opportunities for inter-calibration with high-quality instruments, but GSICS would need to address new instrument types, to respond to more demanding requirements, and to ensure traceability to absolute references. GSICS will need to strike a balance between expanding its scope of activity and fostering partnerships and interaction with adjacent communities such as those concerned with Radiative Transfer Modeling or thematic application.

The outcome of this exchange of views will be compiled and used to develop a white paper to be used first internally and, once agreed, for discussion with GSICS partners and stakeholders.

Action 14.13	EP	WMO (Jérôme Lafeuille) to consolidate the outcome of the Executive Panel discussion on the GSICS vision in a draft "Vision of GSICS", for review by EP members
Action 14.14	EP	EP members to review the draft vision of GSICS to be circulated by WMO.

**10. Transitioning GSICS production to operations**

The Panel recalled the discussion of previous agenda items about:

- GSICS products needing to reach the operational stage in the GPPA;
- remaining efforts to bring data management (including metadata, formats, standards) to a fully operational maturity level;
- regular dissemination of GSICS correction, once operational, with the Level 1 data;

- user awareness and training on how to use GSICS corrections.

## 11. GSICS methodology and tools

### 11.1 Controlled vocabulary, terminology issues

The GDWG is addressing the taxonomy of satellite/instrument events in the context of the netCDF CF convention. The need of a “Controlled vocabulary” for calibration and uncertainty, as a complement to the Guide on Uncertainty of Measurements (GUM) will be re-assessed by the Chair with NIST. The former action 12.15 is then closed and replaced by a new one.

The list of data to be produced during the pre-launch instrument characterization is not defined in current guidelines, and should thus be developed to supplement the guidelines.

Action 14.15	EP	The Chair (Mitch Goldberg) will discuss with NIST (Eric Shirley) to review the status and need of developing a draft vocabulary, as part of a guide on uncertainty for GSICS.
Action 14.16	EP	NASA to develop a list of data that need to be produced during the pre-launch instrument characterization; this list shall be appended to the guidelines on best practice for pre-launch characterization.

## 12. GSICS implementation plan

Jérôme Lafeuille recalled that the Executive Panel had discussed a GSICS Documentation Plan and the proposed outline of a new Implementation Plan at its twelfth session ([http://www.wmo.int/pages/prog/sat/documents/GSICS-EP-12\\_Final-Report.pdf](http://www.wmo.int/pages/prog/sat/documents/GSICS-EP-12_Final-Report.pdf)).

He highlighted that the current Implementation Plan was combining three aspects: (i) the description of the GSICS system; (ii) the roadmap to implement this system; and (iii) the description of underlying science issues. Since these three aspects have typically different “life cycles” he proposed to address these aspects in three separate documents, and proposed the draft outline of a possible “Concept of Operations”.

The Panel supported the principle of a documentation plan including:

- The “Vision” as an overarching document.
- The “Operations Plan” (document name still to be confirmed, given the need to avoid confusion with the “Operations Plan” maintained by the GCC) that would describe the high-level characteristics of GSICS as a system (goal, expected benefits, objectives, services delivered, functional components with terms of reference, governance, membership) in accordance with the Vision.
- A brief “Implementation Plan” would be the roadmap with milestones towards the full implementation of GSICS. This Implementation Plan would be updated as the implementation progresses.
- The “Science plan”, maintained by the GRWG.

The existing text of the Implementation Plan, which had been partly updated by Fed Wu and Bob Iacovazzi, would be mapped to the new documentation structure.

Action 14.17	EP	WMO (Jérôme Lafeuille) to circulate a draft outline of the future GSICS Operations Plan (document name still to be confirmed), populated with relevant contents of the current Implementation Plan, for review by EP members.
Action 14.18	EP	Executive Panel members to review and comment the draft Operations Plan that will be circulated by WMO

### 13. GSICS membership and partnerships

#### **CEOS WGCV and IVOS** (See GRWG report, item 6)

The Panel supported the suggestion to invite the WGCV/IVOS Chair, Nigel Fox, to a future EP meeting. It also noted that the WGCV Chair, to be invited regularly as an observer in the EP, is now Satish Srivastava from CSA ([satish.srivastava@asc-csa.gc.ca](mailto:satish.srivastava@asc-csa.gc.ca)). Both Nigel Fox and Satish Srivastava are heavily involved in the QA4EO.

Action 14.19	EP	The Chair (Mitch Goldberg) to invite Nigel Fox, Chair WGCV/IVOS, at a next EP meeting.
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#### **GCOS / GRUAN**

(See discussion under item 7.8)

#### **WCRP / ISCCP**

The Panel recalled that early feedback from ISCCP had pointed out the lack of visibility and accessibility of GSICS products. A remedial action had been taken to develop the GSICS online catalogue.

Action 14.20	EP	WMO (W. Zhang) to send a letter to WCRP/ISCCP to inform them of development including the GSICS catalogue, and invite feedback
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#### **NIST Membership**

Action 14.21	EP	Action WMO to remind NIST, with the report of this EP-14 meeting, to notify their new representative in GSICS.
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#### **Architecture for Climate Monitoring from Space**

The Panel discussed the relation with the architecture for climate monitoring from space. The role of GSICS should be clarified with reference to the “logical view” of the architecture, which identifies calibration as one essential step in the generation of FCDRs. The new CEOS-CGMS working group on climate should be kept informed on the activities and role of GSICS. It was noted that there is currently no “oversight board” for the architecture, but the CGMS, CEOS and WMO Space Programme. The Panel agreed to discuss this matter further at its next annual meeting.

Action 14.22	EP	WMO (Jérôme Lafeuille) to put the “architecture for climate monitoring from space” on the agenda of EP-15 with a view to discuss the role of GSICS in the architecture.
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#### 14. GSICS Management

The meeting discussed the role of the Executive Panel and Working Groups, their Chairs and Vice-chairs, and operating modes, with a view to ensure broader and stronger international participation in GSICS activities and leadership.

##### **GDWG**

The current Chair, A. Jelenak, will continue for a year. The vice-chair works side by side with the chair, sharing leadership of the group, and is expected to become ultimately the chair, upon approval by the Executive Panel. The former vice-chair, from JMA, was replaced in GDWG by Masaya Takahashi. The panel was happy to nominate Masaya Takahashi as vice-chair of GDWG.

##### **GRWG**

The current Chair, Tim Hewison, can continue for a year. There are two vice-chairs (Fred Wu, the previous chair, and Dohyeong Kim, possible future Chair). It was pointed out that the role of a Chair is mainly to be a moderator of the group, facilitating the expression of each member, enabling the group to reach a common opinion, and elevating and communicating issues to the Executive Panel or other appropriate parties. The function of GRWG Chair should be written down.

The Panel recalled that it already encouraged GRWG to establish the proposed sub-groups. Acknowledging that the participation in GRWG activities was very open, the Panel requested that Working Group and subgroup leads be designated among officially nominated GRWG members. It noted the tentative nomination of Dave Doelling (Visible/Near-infrared), Isaac Moradi ( MW), provided that the latter is nominated as a GRWG member by NOAA.

##### **Executive Panel**

The Panel needs a vice-chair, among regular participants in Executive Panel meetings. Rotation is recommended. Here again, a description of the EP Chair function would help.

Action 14.23	EP	The GRWG Chair to describe the role of chair, emphasizing the moderator role, enabling, elevating/communicating issues to the appropriate parties.
Action 14.24	EP	EP Chair and Secretariat to draft a description of the role of the EP Chair and circulate it to GSICS member organizations in order to call for nominations by fall 2013.

#### 15. Summary of open actions

The Panel reviewed the list of outstanding actions from previous meetings, and the list of new actions from this meeting. See Annex 3.

#### 16. Closure of the meeting

Jo Schmetz formally announced that he stepped back as EUMETSAT member of the GSICS Executive Panel, in view of taking new commitments. He stated that it had been very interesting, enjoyable and rewarding to work with and for GSICS. His involvement started already at CGMS-25 in St. Petersburg, in 1997. Jo was very happy to inform the Panel that Kenneth Holmlund would be the new EUMETSAT representative on the Executive Panel. On behalf of the Panel, the Chair

expressed his high appreciation to Jo Schmetz for his longstanding contribution to GSICS throughout the years, including his personal involvement in promoting satellite intercalibration within CGMS, paving the way for the establishment of GSICS, and for the overall support of EUMETSAT that he represented.

On behalf of all the participants, the Chair expressed his gratitude to JMA and all the JMA staff who had supported the meeting during these two days and made this meeting successful. He was pleased that holding the meeting at JMA headquarters had allowed a broad participation of JMA experts.

It was agreed that future Executive Panel sessions could be held on an annual basis, tentatively over two days in the week preceding the CGMS plenary, with at least two web meetings between the annual face-to-face sessions. The next annual session would thus be collocated with CGMS-42, to be held around May 2014 in China.

Action 14.25	EP	Chair, WMO and CMA to determine the date of next face-to-face Executive Panel meeting, tentatively in the week preceding CGMS-42.
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## LIST OF PARTICIPANTS

CMA	Peng	ZHANG	
EUMETSAT	Johannes	SCHMETZ	
JAXA	Kazuo	UMEZAWA	
JAXA	Keijii	IMAOKA	
JMA	Toshiyuki	KURINO	
JMA	Kotaro	BESSHO	
JMA	Masaya	TAKAHASHI	(GDWG )
JMA	Keita	HOSAKA	(GRWG )
NASA	James	BUTLER	
NASA	Jack Xiaoxiong	Xiong	(GRWG)
NOAA	Mitch	GOLDBERG	(Chair)
NOAA	Aleksandar	JELENAK	(remotely)
NOAA	Lawrence	FLYNN	(remotely)
Roshydromet	Vasily	ASMUS	
Roshydromet	Alexey	RUBLEV	(GRWG)
Roshydromet	Alexander	USPENSKYI	
Roshydromet	Zoya	ANDREEVA	
WMO	Wenjian	ZHANG	
WMO	Jérôme	LAFEUILLE	(Secretary)
GCOS	Adrian	SIMMONS	(Observer)



**PROVISIONAL AGENDA**

1. Opening of the meeting
2. Chairman's report
3. WMO report
4. Report from the GSICS Coordination Centre (GCC)
5. Report from the GSICS Data Management Working Group (GDWG)
6. Report from the GSICS Research Working Group (GRWG)
7. Update from member and observer agencies
8. GSICS outreach and user interaction
9. Vision of GSICS for the next 5 to 10 years
10. Transitioning GSICS production to operations
11. GSICS methodology and tools
12. GSICS implementation plan
13. GSICS membership and partnerships
14. GSICS Management
15. Summary of open actions
16. Closure of the meeting

## LIST OF ACTIONS FROM EP-14

## I. New actions from EP-14

Action EP 14.01	GCC, GDWG and GRWG to evaluate the relevance and implications of adding “calibration alert system” and “SNO and GEO-LEO collocation data” to the GSICS portfolio, and report to the Executive Panel.	EP-15
Action EP 14.02	WMO (W. Zhang) to write to all GSICS participating agencies to communicate the importance of the data management aspects to enable GSICS to reach a fully operational maturity level.	Oct 2013
Action EP 14.03	NOAA to consider nominating Dr Isaac Moradi as a member of GRWG	Aug 2013
Action EP 14.04	JAXA to consider submitting the AMSR-2/AMSR-E intercomparison to the GPPA as a demonstration product.	Jan 2014
Action EP 14.05	Roshydromet to communicate the details of their 2 cal/val sites (Petergof and Voeikovo) to the USGS for inclusion in the USGS list of cal/val sites.	Oct 2013
Action EP 14.06	Roshydromet to contact the GCC (Larry Flynn, <a href="mailto:Lawrence.E.Flynn@noaa.gov">Lawrence.E.Flynn@noaa.gov</a> ) for assistance on implementing the GSICS method for Electro-L/MSU-GS GEO-to-LEO IR intercalibration.	Sept 2013
Action EP 14.07	Adrian Simmons (GCOS Steering Committee Chair) to draft a statement discussing the pros and cons of consolidating different instruments of a series in a single FCDR.	Sept 2013
Action EP 14.08	NASA to present a paper about maturity levels of instrument calibration in support of re-processing, taking MODIS as an example, at a future web meeting of the Executive Panel	EP-15
Action EP 14.09	Jo Schmetz and Mitch Goldberg to draft a description of potential collocation criteria for GRUAN and satellite measurements	Dec 2013
Action EP 14.10	GCC, GDWG and GRWG to prepare information material on the operational use of GSICS, for use at CBS-Ext.(14)	Feb 2014
Action EP 14.11	WMO (W. Zhang) to confirm and implement as soon as possible the funding of open accessibility of the five papers selected by WMO in the IEEE TGRS special issue published in March 2013.	Aug 2013
Action EP 14.12	Jo Schmetz and Mitch Goldberg, as members of the scientific committee, to propose an invited talk at the joint WCRP-EUMETSAT Symposium on Climate Research and Earth Observation from Space	Sept 2013
Action EP 14.13	WMO (Jérôme Lafeuille) to consolidate the outcome of the Executive Panel discussion on the GSICS vision in a draft “Vision of GSICS”, for	Aug 2013

	review by EP members	
Action EP 14.14	EP members to review the draft "Vision of GSICS" to be circulated by WMO	Sept 2013
Action EP 14.15	The Chair (Mitch Goldberg) will discuss with NIST (Eric Shirley) to review the status and need of developing a draft vocabulary, as part of a guide on uncertainty for GSICS.	Sept 2013
Action EP 14.16	NASA to develop a list of data that need to be produced during the pre-launch instrument characterization; this list shall be appended to the guidelines on best practice for pre-launch characterization.	Dec 2013
Action EP 14.17	WMO (Jérôme Lafeuille) to circulate a draft outline of the future GSICS Operations Plan (document name still to be confirmed), populated with relevant contents of the current Implementation Plan, for review by EP members	Dec 2013
Action EP 14.18	Executive Panel members to review and comment the draft Operations Plan that will be circulated by WMO	Jan 2014
Action EP 14.19	The Chair (Mitch Goldberg) to invite Nigel Fox, Chair WGCV/IVOS, at a next EP meeting.	Feb 2014
Action EP 14.20	WMO letter to WCRP/ISCCP to inform them of development including the GSICS catalogue and invite feedback	Sept 2013
Action EP 14.21	WMO to remind NIST, with the report of this EP-14 meeting, to notify their new representative in GSICS.	Aug 2013
Action EP 14.22	WMO (Jérôme Lafeuille) to put the "architecture for climate monitoring from space" on the agenda of EP-15 with a view to discuss the role of GSICS in the architecture.	Feb 2014
Action EP 14.23	The GRWG Chair to describe the role of chair, emphasizing the moderator role, enabling, elevating/communicating issues to the appropriate parties.	Sept 2013
Action EP 14.24	EP Chair and Secretariat to draft a description of the role of the EP Chair and circulate it to GSICS member organizations in order to call for nominations by fall 2013.	Sept 2013
Action EP 14.25	Chair, WMO and CMA to determine the date of next face-to-face Executive Panel meeting, tentatively in the week preceding CGMS-42.	Feb 2014

## II. Outstanding actions from GSICS EP-13

Action or decision	Action due date	Action status
<b>Action 12.1:</b> EP Chair to establish a Task Force to review issues and propose actions towards improving accessibility of in-situ observations of test sites	(2012-11-01)	<b>OPEN</b>
<b>Action 12.3:</b> EUMETSAT, NOAA and JMA are urged to complete the necessary steps to submit their LEO-GEO IR product to the GPPA for pre-operational status in advance of the fourth GSICS Users' Workshop and WMO CBS.	(2012-09-01)	Now completed for EUMETSAT and NOAA, in progress for JMA
<b>Action 12.5:</b> Each GPRC to consider implementing the near real time distribution of <i>both</i> the operational calibration information <i>and</i> the corrected calibration information, as part of the L1 data formats.	(2012-09-01)	In Progress:  EUMETSAT: Done for MSG  JMA: considered for Himawari-8,9  NOAA: is looking at alternative options and will report at EP-15
<b>Action 12.6:</b> WMO to convey to USGS the appreciation of GSICS regarding the provision of a lunar irradiance computation service based on the ROLO model and the expectation that this service will be maintained, will be documented in accordance with GSICS principles, and that the possibility be explored of providing the updated ROLO model itself to the community.	(2013-11-01)	<b>OPEN</b>  Letter to be signed by D/SAT and Chair EP
<b>Action 12.7:</b> NIST (Eric Shirley) to report on discussions on interagency R&D effort to improve the lunar model to meet the SI traceable absolute calibration accuracy goal, which should ultimately lead to an upgraded version of the ROLO lunar irradiance model.	(2012-11-01)	<b>OPEN</b>
<b>Action 12.18:</b> ESA (Bojan Bojkov ) to report at GRWG on its survey on the state of the art for geolocation issues, and on ESA activity on this subject	(2013-03-01)	OPEN
<b>Action 12.22:</b> GDWG and EUMETSAT/CDWG to define a	(2012-11-	On-going

controlled vocabulary for instruments events	01)	Web meeting to discuss in Fall 2013
<b>Action EP-8.15:</b> The Chairman (M. Goldberg) and Secretariat (J. Lafeuille) to set-up a bi-monthly Executive Panel teleconference. (The WEBEX system is available with WMO. Recommended time slot is 11:00 UTC (Summer) or 11:30 UTC (Winter), starting on 1/08/2012)	1/08/2012	One meeting was held Use doodle- end September/early October
<b>Action EP-9.1:</b> ISRO and the GCC to coordinate for the implementation of GEO-to-LEO algorithms by ISRO. (ISRO to contact Fred Wu and Fangfang Yu on NOAA side)	End 2012	Open.
<b>Action EP-10.01:</b> IMD (A.K. Sharma) with the assistance of GCC (Fangfang Yu) to get hold of the technical information on the GSICS Correction ATBD for GEO-LEO Infrared channels, and implement it for Kalpana.	End of 2012	Open
<b>Action EP-10.13:</b> NASA to designate an expert from the NASA/JPL AIRS team to participate in GRWG activities on traceability.	August 2012	Open
<b>Action: EP-10.18:</b> NOAA (Mitch Goldberg) and EUMETSAT (Tim Hewison) to liaise with the SCOPE-CM Pilot Projects (1), (3) and (5) respectively, in order to better understand their needs and facilitate the finalization of the Statement of Needs.	August 2012	Open. Invite SCOPE-CM to meeting in 2013.
<b>Action EP-10.27:</b> WMO (J. Lafeuille) to circulate the proposed GSICS fact sheet to Executive Panel members for comments.	October 2012	Open.