

**Summary conclusions of Joint Meeting
of the GSICS Research and Data Working Groups
NOAA Science Center, Camp Springs, MD, USA, 19-21 February 2008**

SECTION A: JOINT SESSION

The Global Space-based Inter-Calibration System (GSICS) Data Management Working Group (GDWG) and Research Working Group (GRWG) met at NOAA Science Center, Camp Springs, MD, USA, 19-21 February 2008. The first day was devoted to a joint session to address implementation and operation issues. This was followed on the second day by parallel sessions to discuss separate issues of interest to respective working groups, and was concluded on the third day with a half-day joint session of summary and recommendations. The agenda is attached as Annex 1 and participants are listed in Annex 2. Presentations are available at <http://www.star.nesdis.noaa.gov/smcd/spb/calibration/icvs/GSICS/index.html>.

M. Goldberg welcomed all participants, in particular J. Butler and R. Datla, representatives of NASA and NIST, respectively, which joined GSICS recently. He demonstrated the LEO-LEO inter-calibration activities and results at NESDIS, the centrepiece of GSICS 2007 activities. He reported that the other 2007 goals, including the annual operating plan, GRWG and GDWG meetings, and the AIRS-IASI inter-comparison, have all been met. The centrepiece of GSICS 2008 activities is the commissioning of GEO-LEO inter-calibration, including:

- Routine inter-calibration of SEVIRI and AIRS/IASI at EUMETSAT
- Routine inter-calibration of GOES and AIRS/IASI at NESDIS
- Routine inter-calibration of MTSAT and AIRS/IASI at JMA
- Routine inter-calibration of FY-2C/D and AIRS/IASI at CMA
- Performance report from each GPRC to GCC.

He reminded the participants to assess the progress towards, and the efforts needed to accomplish, these goals, and to start planning for 2009 activities.

J. Lafeuille reported on the Operations Plan agreed by the Executive Panel Meeting of November 2007 and drew a summary status of its implementation. He noted with appreciation the impressive developments made by GSICS partners, however he expressed concern that the common processing algorithm had not yet been implemented as planned and that little progress had been made regarding the precise definition of the GSICS operational deliverables. He expressed the view that a "Commissioning" was necessary for GSICS to reach operational status, and that a pre-requisite for performing such a commissioning was to agree the specifications GSICS had to comply with, including e.g. nature, frequency and format of deliverable, SNO co-location criteria, inter-comparison algorithm, documentation..

J. Lafeuille thus urged the GRWG and GDWG to clarify and to document:

- the proposed deliverables (nature, frequency and format),
- the “acceptance” criteria for algorithm implementation (description of the agreed nominal algorithm, accepted variants, required documentation, provisions for maintenance and configuration control),
- the operational procedures for data exchange and management (nature, description, format, archiving, transfer, public release) .

It was agreed that these issues should be addressed in this session by the two groups in priority, and that the outcome should then be submitted to the Executive Panel for approval. Furthermore, it was agreed to seek feedback from representatives of the climate community on these draft specifications before going to the Executive Panel..

X. Wu and V. Gärtner delivered Chair Reports on recent activities of GRWG and GDWG, respectively. R. Iacovazzi, representing F. Weng, presented Director Report on activities at the GSICS Coordination Center (GCC).

A significant development since the last meeting in June 2007 is the delivery of GSICS algorithm in October 2007 for GEO-AIRS inter-calibration, which has been implemented at NESDIS and JMA. Initial results generated from this algorithm have made positive impact on satellite operation. A similar algorithm was developed and implemented at EUMETSAT for GEO-IASI inter-calibration that has also led to excellent results. This is a major step forward towards this year’s goals for GSICS.

Participants are pleased not only with the great progresses but also the collaborative way by which the progresses were made. After receiving the delivered algorithm, for example, JMA made it independent of McIDAS, which helps those without McIDAS (e.g., CMA and KMA). JMA modularized the software and added a sophisticated module for spectral convolution; GSICS plans to adopt this new architecture that will benefit all GPRCs.

Another example of collaborations is the investigation of the 13.3 μm channel cold bias. UW first identified the bias for GOES-12/13 and proposed a solution. NESDIS, using the newly developed GSICS algorithm, discovered the dependence of this bias on scene temperature, which provided support to and further refinement of the solution proposed by UW. Meanwhile NESDIS has been puzzled that the bias was different in Feb and Nov 2007, until EUMETSAT demonstrated that similar bias for METEOSAT-8 changed with time and, in particular, around a decontamination event in Dec 2007. NESDIS examined its data around GOES-12 decontamination in Jul 2007, confirmed the EUMETSAT results, and further found that the responses to the decontamination are different for different channels. At the meeting, CNES showed IASI data that were recognized to have the potential to explain why the response to decontamination can be different for different channels. Such collaboration is the key to GSICS success.

To capitalize on this new development, the joint session was mostly devoted to issues related to implementation and operation. It was hoped that certain protocols would be established that enable the pre-operation of GSICS. Accordingly, NESDIS, EUMETSAT, and JMA were invited to describe their implementation and operation to the joint session. This was followed

by plenary discussion of a series of issues that must be resolved in order for GCC to collect inter-calibration results from GPRCs and disseminate to the GSICS and the larger community.

JMA reported difficulty obtaining IASI data from EUMETSAT. EUMETSAT was willing to help. Y. Tahara and P. Miu were assigned to resolve this issue.

Participants then discussed algorithm compatibility, since different algorithms have been implemented. Such diversity is encouraged from a scientific point of view, but for the GSICS commissioning in near future, it is also necessary to maintain certain level of compatibility among the algorithms. Several options were discussed, one is to use a common baseline algorithm and another is to only require common deliverables to GCC and a description of the algorithm used. Participants agreed upon a set of common principles for GSICS collocation algorithm, but concluded that before the alternatives are fully investigated it is premature to use a common algorithm or to start the delivery to the GCC.

SECTION B: GSICS RESEARCH WORKING GROUP

Third meeting

During the parallel session, T. Hewison and X. Wu further detailed the EUMETSAT and NESDIS algorithms. Gunshor reported recent results of GEO-AIRS inter-calibration at UW, and some anomalies found in METEOSAT-8 and FY-2C data. D. Doelling gave a thorough overview of the visible channel vicarious calibration based on deep convective clouds (DCC) technique, as well as several other methods. L. Nguyen demonstrated the calibration server and website at NASA Langley, using GEO visible channel calibration as example. A. Okuyama presented JMA re-calibration of GMS-5 visible channel using radiative transfer model and sea, land, and cloud targets. C. Tinel provided a status report of the SADE database and related activities. D. Blumstein reviewed plans and methods for AIRS-IASI inter-calibration at CNES and LMD. N. Pougatchev briefly discussed the nature and a model of error propagation in the context of validation.

At the conclusion of presentations, the participants reviewed the old Actions (Table 1) and agreed that:

- Action 1, 7, 8, 9, and 10 have been completed and closed, albeit some were slightly delayed.
- Action 2 and 5 are open and on track.
- Action 3, 4, and 6 are open and revised.
 - JMA will inter-calibrate with IASI in addition to AIRS
 - EUMETSAT will inter-calibrate with IASI instead of AIRS
 - NESDIS will inter-calibrate GOES-11/12 with both AIRS and IASI, instead of all GEO's with AIRS.
- Action 11 cannot be completed as originally planned. J. Lafeuille informed the participants that detailed characteristics of about one hundred of instruments have been compiled as part of the Gap Analysis performed by B. Bizzarri in 2007, which can be downloaded in Pdf form and that he would make the instrument characteristics more directly accessible through the WMO Space Programme web site http://www.wmo.int/pages/prog/sat/index_en.html. The following alternative strategy is then adopted
 - J. Lafeuille informs the members when instruments web page ready
 - Members review the content and request additional information
 - Members provide information upon request
 - J. Lafeuille ensures that the web pages are updated as appropriate

Table 1: Review of GRWG-II Actions

ACTION No.	ACTION	ACTIONEE	STATUS
GRWG-II 01	Provide test data, Version 1 of GSICS algorithm for GEO-AIRS co-location and spectral convolution (pseudo-code and one working code), and test results for all GEO's.	X. Wu Jul 2007	Complete Oct 2007
GRWG-II 02	Implement inter-calibration of FY-2C/D with AIRS.	P. Zhang Jun 2008	On track
GRWG-II 03	Implement inter-calibration of MTSAT with AIRS/ <i>IASI</i> .	Y. Tahara Jun 2008	Revised/ On track
GRWG-II 04	Implement inter-calibration of METEOSAT-9/8/7 with <i>IASI</i> .	M. König Jun 2008	Revised/ On track
GRWG-II 05	Implement inter-calibration of COMS with AIRS.	S. Chung Dec 2009	On track
GRWG-II 06	Implement inter-calibration of <i>GOES-11/12</i> with AIRS/ <i>IASI</i> at GCC	X. Wu Jun 2008	Revised/ On track
GRWG-II 07	Provide subset of AIRS measurements to members for inter-calibration	X. Wu Sep 2007	Complete Oct 2007
GRWG-II 08	Provide subset of <i>IASI</i> measurements to members for inter-calibration	M. König Jun 2008	Complete
GRWG-II 09	Define the initial content of the output data to GDWG	X. Wu & Members Dec 2007	Complete Oct 2007
GRWG-II 10	Provide HDF5 template based on the content	V. Gärtner Dec 2007	Complete
GRWG-II 11	Provide and maintain the English website (with proper disclaimer) that contains instrument characteristics	X. Wu & Member Dec 2007	Delayed/ Replaced

Based on the two days of presentations and discussions, and in consultation with GDWG-II, the participants agreed upon the following Recommendations and Actions (Table 2):

1. Members report suspected anomalies to GRWG (e.g., via e-mail or GSICS Quarterly) and to the appropriate satellite operator (e.g., via its representative in GRWG).
 - a. Provide timely alert to user and operator when the cause or even the existence of the anomaly is uncertain.
 - b. Document the event and assist further investigation if able.
2. Define bias as difference from the reference, e.g., $\text{Bias} = R_{\text{GEO}} - R_{\text{IASI}}$
3. Express bias in terms of slope and intercept, if applicable. With uncertainty, if available.
4. For operation maneuvers such as station keeping, patch change, decontamination, etc.:
 - a. Operator is encouraged to document and archive all maneuvers.
 - b. GSICS is encouraged to assess and document its calibration impact.
5. CNES/LMD & NESDIS are encouraged to continue AIRS-IASI inter-calibration
 - a. Explore both companion and box channel approach
 - b. Consider relaxing the time window to 80 seconds to eliminate alternating gaps between SP & NP.
 - c. As inter-calibration standard, CNES is encouraged to brief the GSICS on IASI performance (monitoring results, special events, etc.).
6. Intensify the inter-calibration activities between the launch and commission of a satellite

Table 2: GRWG-III Actions

ACTION No.	ACTION	ACTIONEE	STATUS
GRWG-III 01	Implement inter-calibration of FY-2C/D with AIRS.	P. Zhang Jun 2008	
GRWG-III 02	Implement inter-calibration of MTSAT with AIRS/IASI.	Y. Tahara Jun 2008	
GRWG-III 03	Implement inter-calibration of METEOSAT-9/8/7 with IASI.	M. König Jun 2008	
GRWG-III 04	Implement inter-calibration of COMS with AIRS.	S. Chung Dec 2009	
GRWG-III 05	Implement inter-calibration of GOES-11/12 with AIRS/IASI	X. Wu Jun 2008	
GRWG-III 06	<ul style="list-style-type: none"> • Web address sent to members (www.wmo.int/pages/prog/sat/Instruments_and_missions/Instruments.html) • Members review the content, request additional information, and provide information upon request • Maintain the web 	J. Lafeuille & Members Continuing	
GRWG-III 07	Recommend a reference temperature to use for reporting radiance uncertainty	T. Hewison Mar 2008	Completed
GRWG-III 08	Evaluate the feasibility of using HYPERION data to characterize DCC spectrally.	X. Wu May 2008	
GRWG-III 09	Provide water ice absorption spectrum from IASI data to assist investigation of the 13.3 μm channel cold bias	D. Blumstein Apr 2008	Completed by E-mail 8/4/08
GRWG-III 10	Recommend a single “flag file” to be adopted by all AIRS users	M. Gunshor May 2008	

SECTION C:
GSICS WORKING GROUP ON DATA MANAGEMENT
Second Meeting

1. Purpose of the meeting

The purpose of the meeting was to identify the work achievable in the near and medium term future of the GSICS project. The group focused on the operational aspects of the data management issues and investigated the following subjects:

- Design of a collaboration data management server.
- Discussion of a generic data flow definition.
- Types of operational documents required.
- Presentation of initial results.
- Organisation and updates of the GSICS web presence.
 - What should go on the GSICS central website ?
 - Which GPRCs have their local GSICS sites. Are those linked from the central web site?
- Initiation of a GSICS service specification (GSS) document, outlining the list of deliverables for the users with the intention to trigger their feedback on the GSS.

The meeting started by several presentations summarized below. The presentations are available on the GCC web site reporting on GDWG 2.

2. Data Management Server Presentation (Mr. Peter Miu, EUMETSAT)

- A positive response was received on the presentation concepts from the group.
- EUMETSAT was encouraged to implement a collaboration data management server by the 4th quarter of 2008.
- NOAA discussed security issues on developing their implementation. The group was informed that this required further discussions internal to NOAA.
- JMA do not have the resources yet to create such a server but can provide JMA MTSAT data sets in the source data format. JMA is keen in using the data from the collaboration data management servers.

3. Data used by JMA; AIRS and IASI Presentation (Mr. Koji Kato, JMA)

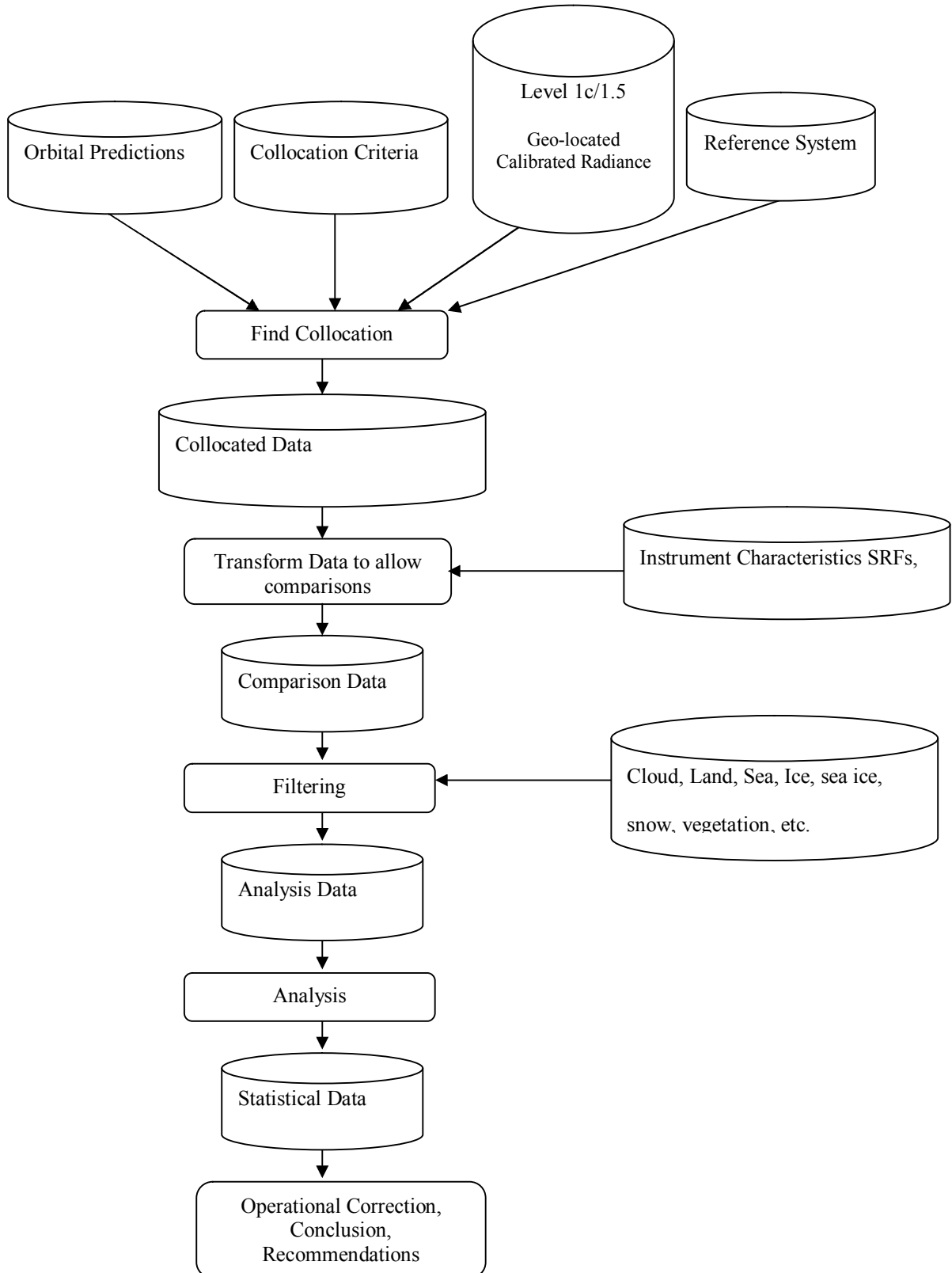
JMA reported problems in getting IASI data (currently getting it from NOAA, but would also like to investigate to get it from EUMETSAT). Presentation outlined the data needs of JMA. After the presentation, it was recognized that the IASI data in the NOAA server is the same as that in the EUMETSAT server, and there is no problem accessing the data from the NOAA server.

4. Metadata Standards Presentation (Mr. Bruce Barkstrom, NESDIS/NCDC)

The group was informed about the various standards. Most relevant for GSICS seemed to be the recommendations of the Federal Meta Data Committee to adopt the ISO 19115 standard, with its remote sensing extensions. These can be used as a generic standard which can be translated to become the GSICS specific standards. More specifically, the group was invited to consider the WMO metadata profile defined within the ISO 19115 standard by relevant WMO expert bodies.

5. Generic Data Flows definition for the GSICS.

The following generic data and processes were identified by NESDIS/NCDC:



6. Servers and Data Formats

It was recommended that a prototype data server for GSICS should be set up by EUMETSAT. The data formats should be defined as a joint action by NOAA, JMA and EUMETSAT.

File naming conventions were discussed but no recommendation was agreed. It was agreed that this is important, but could be placed at a lower priority for further investigation at a later stage. WMO recalled that the WIS filename convention had been defined within WMO members and should be considered as the overall framework to be used, with the understanding that GSICS could propose amendments to this filename convention if such amendments appeared necessary to accommodate particular GSICS needs.

7. Documentation

The documentation types were discussed and what should be placed onto the GSICS central website. A key candidate document was identified as the Operations Service Specification. For document exchange the PDF format should be used.

8. Website content discussions

A discussion on the improvement of the central GSICS website followed. It was outlined how the partners could support this process.

9. Conclusions and Recommendations

As an outcome of the data management group discussion a set of recommendations and actions were identified which were proposed to the GSICS plenary meeting for approval.

9.1.1 Recommendations

During the working group discussion, the group focused the discussions on items which will help to bring GSICS into routine operations. Resulting from these discussions the following set of recommendations and actions were suggested to the final plenary joint meeting on 21 February:

GDWG2-R1. EUMETSAT will take the lead in implementing a prototype collaboration data management server, according to their presentation of the concepts for such a server.

GDWG2-R2. The generic data flow diagram should be taken as a basis for the definition of source and product formats. The group recommended that the GSICS data format should be NetCDF-4.

GDWG2-R3. The members of the GDWG should create data format templates in accordance with the generic data flow diagram. The GSICS partners should use these formats in generating their data and products.

- GDWG2-R4. A draft GSICS service specification document, including a list of deliverables, should be written by GCC for review by the GSICS members and approval by the GSICS executive panel.
- GDWG2-R5. GSICS should seek feedback from the user communities (e.g. RSSC, NWP) on the list of deliverables defined in the service specification.
- GDWG2-R6. GCC should display the generic data flow diagram on the GSICS web site showing the data organisation and related processes. A description of archive data format(s) should be provided here as well.
- GDWG2-R7. The GCC web site should have samples of all satellite comparison results from GSICS members.
- GDWG2-R8. GSICS members should host on their Web sites their GSICS specific pages. These will be linked to via the GCC central website.
- GDWG2-R9. It was recommended to upgrade the central GSICS Web site at GCC into a GSICS portal in the medium term future (end of 2009 ?)
- GDWG2-R10. A GSICS Wiki should be installed on the GCC central GSICS web site that allows GSICS partners to regularly provide input to.
- GDWG2-R11. All GSICS partners are invited to support GCC to keep the central GSICS pages up to date.
- GDWG2-R12. The GPRCs should create Algorithm Theoretical Basis Documents (ATBD) explaining the processes and algorithms applied in their product generation processes.
- GDWG2-R13. The GPRCs are invited to create a common style/template for presenting their graphs and tables.
- GDWG2-R14. Documentation exchange should be in PDF format.
- GDWG2-R15. The WMO is invited to investigate the registration of the GSICS web site domain, www.gsics.int. If this would not be possible, EUMETSAT should investigate this. *(After the meeting the information was obtained that it would most likely not be permissible to register GSICS as such, as only international organisations were entitled the domain name 'int'; the registration 'gsics.wmo.int' might be possibl. As an alternative, web-forwarding from a domain name, such as www.gsics.org is allowable and easy to set-up)*
The group expressed their appreciation and thanks to NOAA for hosting the current GSICS website.

9.2 Actions

In relation to the above recommendations the following list of actions were established:

ACTION No.	ACTION	ACTIONEE
WG 2 / 01	Development of a GSICS data management server	Peter Miu 4th Quarter 2008
WG 2 / 02	Using the generic data flow definition; specify the set of data formats needed to support GSICS. Specification to be distributed to GPRCs for implementation.	Bruce Barkstrom Aleksandar Jelenak Peter Miu End April 2008
WG 2 / 03	Creation of the first set of source data sets.	EUMETSAT, JMA, NOAA End July 2008
WG 2 / 04	Investigate the registration of the official GSICS domain name www.gsics.int.	Jerome Lafeuille 4th Quarter 2008
WG 2 / 05	GSICS central server (GCC) Updates: <ul style="list-style-type: none"> • Documentation: <ul style="list-style-type: none"> ○ Operation Service Specification. ○ Generic Data Flow Diagram ○ Links to the GPRC web sites • Presentation of Results. • Installation of a Wiki application. 	Robert Iacovazzi End July 2008
WG 2 / 06	GPRCs shall create common style/tables for graphs and tables. Supply this common style to GCC.	GPRCs End July 2008
WG 2 / 07	GPRC shall create their GSICS web pages.	EUMETSAT, JMA, 4th Quarter 2008
WG 2 / 08	GCC investigate necessary steps to develop the central GSICS Web site into a GSICS portal.	GCC End 2009

SECTION D:
CONCLUSIONS OF THE JOINT SESSION

The actions and recommendations of both working groups were reviewed in a joint meeting.

It was agreed to recommend that the next GDWG meeting be held together with GRWG 4 around January 2009. The final decision of the date and place will be left to the GSICS Executive Panel meeting in July 2008.

Appendix A: Meeting Agenda

DAY 1 Tuesday 19 February 2008

09:00 – 09:15	Introduction to the Agenda	X. Wu
09:15 – 09:45	GSICS Update – Achievements and Future Direction	M. Goldberg
09:45 – 10:00	GSICS Executive Panel Meeting – Operation Plan	J. Lafeuille
10:00 – 10:30	GRWG Chair Report	X. Wu

10:30 – 11:00 Coffee Break / Continued Discussion

11:00 – 11:30	GDWG Chair Report	V. Gärtner
11:30 – 12:00	GCC Director Report	F. Weng R. Iacovazzi

12:00 – 13:00 Lunch / Discussion on Chairs and Director Reports

13:00 – 13:45	Implementation at NESDIS	X. Wu, Y. Li, S. Sohn
13:45 – 14:30	Implementation at EUMETSAT	T. Hewison M. König
14:30 – 15:15	Implementation at JMA	A. Okuyama K. Kato

15:15 – 15:45 Coffee Break / Continued Discussion

15:45 – 16:30	Input from Members	Member
16:30 – 17:30	Open Discussion	All

Evening: Social Event

DAY 2 Wednesday 20 February 2008

09:00 – 09:20 Guidance to the two Working Groups

V. Gärtner/X. Wu

GRWG-III Breakout Session**GDWG-II breakout session****10:45 - 11:15 Coffee Break / Continued Discussion****12:30 – 13:30 Lunch / Discussion on Action Items****GRWG-III Breakout Session****GDWG-II breakout session****14:50 – 15:30 Coffee Break / Continued Discussion**

16:30 Drafting Working Group Reports

17:30 Adjourn

DAY 3 Thursday 21 February 2008

09:00 – 09:45 Summary of the GDWG-II Outcomes

V. Gärtner

09:45 – 10:30 Summary of the GRWG-III Outcomes

X. Wu

10:30 – 11:00 Coffee Break / Continued Discussion11:00 – 12:15 Review and consolidate action plans
Recommendations to GSICS Executive Panel

All

12:15 – 12:30 Any Other Businesses

All

12:30 – 12:45 Closing Remarks

V. Gärtner

12:45 Meeting Adjourns

GRWG-III Breakout Session (Rm. 707)

09:30 – 09:55	METEOSAT-IASI inter-calibration algorithm	T. Hewison
09:55 – 10:20	GEO-AIRS inter-calibration algorithm	X. Wu
10:20 – 10:45	Recent AIRS-GEO inter-calibration at UW-CIMSS	M. Gunshor

10:45 – 11:15 Coffee Break / Continued Discussion

11:15 – 11:40	Lessons learned with DCC calibration for visible channel	D. Doeling
11:40 – 12:05	Visible calibration strategy using MODIS as reference	L. Nguyen

12:30 – 13:30 Lunch / Discussion on Action Items

13:30 – 13:55	Visible channel calibration with RTM at JMA	K. Kato
13:55 – 14:20	Current Status of the SADE database	C. Tinel
14:20 – 14:45	Plans and methods for AIRS/IASI inter-calibration	D. Blumstein

14:45 – 15:15 Coffee Break / Continued Discussion

15:15 – 17:15	Discussion: Visible calibration strategy and algorithm accuracy	All
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GDWG-II Breakout Session (Rm. 712)

09:30 – 09:55	Meta data standards	B. Barkstrom
09:55 – 10:20	LEO data acquisition at JMA	A. Okuyama
10:20 – 10:45	GSICS collaboration server design	P. Miu

10:45 – 11:15 Coffee Break / Continued Discussion

Appendix B: List of Participants

Last Name	First Name	Affiliation	GRWG	GDWG
Blumstein	Denis	CNES	X	
Tinel	Claire	CNES	X	
Iacovazzi	Robert	ERT		X
Yu	Fangfang	ERT	X	
Gärtner	Volker	EUMETSAT		X
Hewison	Tim	EUMETSAT	X	
König	Marianne	EUMETSAT	X	
Miu	Peter	EUMETSAT		X
Li	Yaping	IMSG	X	
Kato	Koji	JMA	X	
Okuyama	Arata	JMA		X
Tahara	Yoshihiko	JMA	X	
Chung	Sung-Rae	KMA	X	
Sohn	Seung-Hee	KMA	X	
Butler	Jim	NASA/GSFC	X	
Xiong	Jack	NASA/GSFC	X	
Avey	Lance	NASA/Langley	X	
Doelling	David	NASA/Langley	X	
Nguyen	Louis	NASA/Langley	X	
Barkstrom	Bruce	NESDIS/NCDC		X
Cao	Changyong	NESDIS/STAR	X	
Flynn	Larry	NESDIS/STAR	X	
Goldberg	Mitch	NESDIS/STAR	X	
Kleespies	Thomas	NESDIS/STAR	X	
Wu	Xiangqian	NESDIS/STAR	X	
Beck	Trevor	NESDIS/STAR	X	
Datla	Raju	NIST	X	
Wang	Likun	QSS	X	
Wu	Aisheng	SSAI	X	
Jelenak	Aleksander	UCAR		X
Bingham	Gail	USU/SDL	X	
Scott	Deron	USU/SDL	X	
Pougatchev	Nikita	USU/SDL	X	
Gunshor	Mat	UW/CIMSS	X	
Lafeuille	Jerome	WMO		X