

**Joint Meeting of the
GSICS Data Management Working Group (Fourth Session)
and the
GSICS Research Working Group (Fifth Session)**

**CNES, Toulouse, France
9th to 11th February, 2010**

Final Report

The present Final Report includes three parts:

- A. GSICS Data Management Working Group, fourth session (GDWG-4)*
- B. GSICS Research Working Group, fifth session (GRWG-5)*
- C. Joint GDWG-GRWG Session.*



A. GSICS Working Group on Data Management

Fourth session

Participants

V. Gärtner, Outgoing Chairperson (EUMETSAT)
 Aleksandar Jelenak, Incoming Chairperson (NOAA)
 Hiromi Owada, Incoming Deputy Chairperson (JMA)
 Xiuqing Hu (CMA)
 Young Hooi Hwang (KMA)
 Robert Iacovazzi (NOAA) part time
 Jerome Lafeuille (WMO) part time
 Peter Miu (EUMETSAT)
 Harald Rothfuss (EUMETSAT)
 Didier Renault (CNES) part time
 Claire Tinel (CNES) part time

Meeting Report

1 Purpose of the meeting

The purpose of the GDWG breakout meeting was to review specific data management issues. Furthermore it is intended to identify the work achievable by the GDWG in 2010.

1.1 Agenda of the GDWG session

GDWG Session ↑ (Wednesday 10 February 2010)

Start time	Speaker	Topic	Duration
08:30	Aleksandar	Introduction	0:15
08:45	Bob	Refining Product Acceptance Procedure	0:30
09:15	All (Chair: Aleksandar)	Adoption of the netCDF Convention	1:15
10:30	<i>Coffee</i>		
10:45	All (Chair: Aleksandar)	Adoption of the File Naming Convention	1:15
12:00	Pete	Common directory structure for GSICS data servers	0:30
12:30	<i>Lunch</i>		
14:00	All (Chair: Pete)	Outstanding issues on Data and Products Servers	1:00
15:00	Volker	GCC website structure	1:00
16:00	<i>Coffee</i>		
16:20	All (Chair: Volker)	Requirements for document management	0:30
16:50	All (Chair: Volker)	Requirements for helpdesk functionality	0:30
17:20	<i>End</i>		

2 Summary of GDWG Discussions

2.1 Refining GSICS Product Acceptance Procedure (GPAP – Robert Iacovazzi)

The goal of the discussion is to recommend processes to support the GPAP.

Background: The GSICS Executive Panel accepted the Product Acceptance Procedure in principle during their executive meetings 4 and 5, with the proviso that user feedback is essential for the acceptance of a product as a GSICS product.

The initial discussion focused on the distribution modes a GSICS product is labelled during its product acceptance process. The following modes were proposed to support the process:

- Demonstration
 - Product follows the GSICS file naming, netCDF, and any other metadata convention.
 - The product shall be submitted for consideration with a very light product acceptance form indicating that the above criteria are fulfilled as well as a brief summary of the product ATBD and its envisaged use.
 - Initial assessment of all proposed products shall be made by a product acceptance review board. Once assessed, the product is available for users to give feedback.
 - Sufficient positive user feedback is needed before the product can move to the next mode.

- Pre-operational
 - Sufficient positive user feedback has been received. The product owner is invited to provide the full documentation to develop this product to an operational GSICS product (e.g. full ATBD is provided; **GRWG should define the documentation needed to for a product to move to the operational mode**).

- Operational
 - All necessary product documentation has been received and approved by the product acceptance reviewed board.
 - The quality of the product is assured.

Note: A product acceptance review board composed of experts from each GPRC shall perform the reviews for the mode updates described above. It is strongly recommended that time constraints be imposed in between the distribution mode changes to ensure the timeliness of product progression through the review process.

The suggested modes are in line with the expectations of the Executive Panel. User feedback is included in the acceptance processes.

The GDWG next discussed the work flows needed to support the GPAP. The outcome of the discussion is the following:

Recommendation 1: The GSICS Executive Panel is invited to accept the proposed distribution modes (Demonstration, Preoperational, Operational). If so, the GPAP shall be updated to reflect the suggested modes.

Action GDWG04_01: GDWG to define the workflow and request GRWG to define the documentation needed to move a GSICS product between the modes. NOAA to define the workflow (1 month) and put it up for discussion by GDWG/GRWG (1 month). GDWG to submit the draft version to the Executive Panel for review. Timescale: max 3 month. Result is an agreed workflow for the product acceptance procedure.

(Note: This sequence of actions was further discussed at the joint session, reported in Part C of the present report, and the related Action GRWG 5.15 was agreed.)

A Web meeting is needed to agree on the workflow before the next Executive Panel meeting.

Recommendation 2: GDWG recommends considering a database for tracking the status of proposed products and all product characteristics.

Recommendation 3: GDWG also recommends considering a portal site for accessing the database (user's view).

2.2 Adoption of the [netCDF Convention](#) (Aleksandar Jelenak)

The goal of the discussion is to accept the NOAA-proposed netCDF convention available from the GSICS wiki.

Discussion on the 'gsics_' prefix for attribute, variable, or dimension names.

The GSICS data sets shall adopt the CF convention as much as possible. GSICS 'profiles' maybe needed to overcome the CF convention's lack of support for satellite observations data.

The `processing_level` global attribute's value shall describe the GPAP distribution mode of the product: "demonstration", "preoperational", and "operational".

NOAA to discuss whether the GSICS wiki shall be used as GSICS document repository and be referenced in the GPAP documents.

The GDWG should support the GRWG in defining the standard names and units for use in GSICS netCDF files.

The GDWG was informed that netCDF 4.1 was released on 2010-02-05. NOAA and other GSICS collaborators are using IDL which only supports netCDF 3.0. The GDWG has an intention to move all GSICS data sets to use netCDF 4 (classic model), subject to positive user feedback. A forum where this is discussed can be the 2010 GSICS user workshop in Cordoba, Spain.

Organisation of GSICS data sets are currently in a gridded form. Existing netCDF applications are starting to use 1D arrays for storing data. Further investigation is needed to

provide best practice recommendations for the organization of the data. The current organisation for swath data on the GSICS wiki needs to clearly indicate it is just an example.

Action GDWG04_02: EUMETSAT to place in the GSICS user workshop agenda a request for user feedback on which version of netCDF is preferable.

Recommendation 4: The netCDF convention is recommended by the GDWG and will be submitted to the Executive Panel for endorsement.

2.3 Adoption of the [File Naming Convention](#) (Aleksandar Jelenak)

Goal is to accept the NOAA-proposed file naming convention available from the GSICS wiki.

WMO confirmed WMO GTS filenames are not case sensitive. WMO GTS systems should handle file names with mixed lowercase and uppercase letters.

During the discussions, CMA and KMA provided their input to the location indicators.

- CN-CMA-NSMC for the location indicator.
- KR-KMA-NMSC for the location indicator.

CMA and KMA were asked to confirm their Originator codes (CCCC).

CMA requested that one international data sub-category be **OBC** for “On-board calibration data”.

Recommendation 5: The free format field shall be used to indicate the product’s acceptance mode e.g. DEMO, PREOP (pre-operational) and removed when it is operational.

Action GDWG04_03: GSICS sub-categories are to be collected and proposed by GDWG with support from GRWG for use in GSICS file names. Accepted proposals are to be submitted to WMO CBS for endorsement. Deadline July 31 (next CBS meeting is in Nov. 2010)

Action GDWG04_04: CMA to confirm its “CCCC” originator codes (BAWX ?) in the file naming convention are correct. Timescale: 1 month.

Action GDWG04_05: KMA to confirm its “CCCC” originator codes (RKSL ?) in the file naming convention are correct. Timescale: 1 month

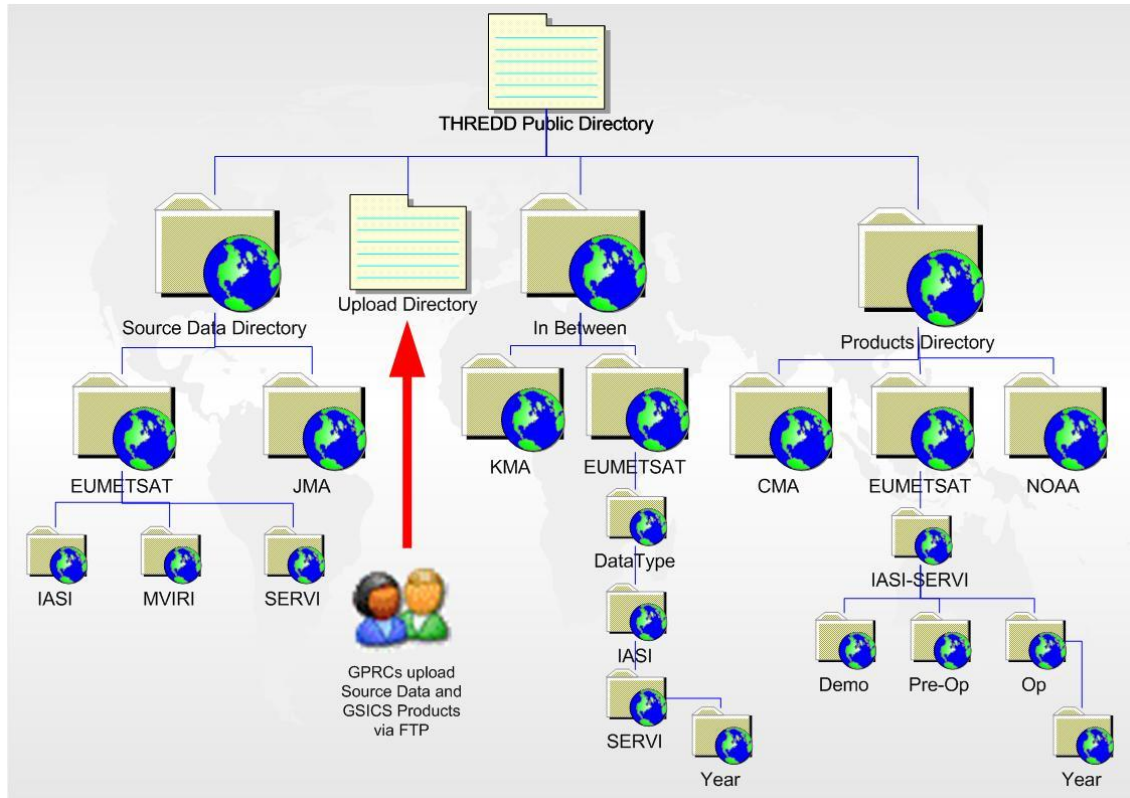
Recommendation 6: The file naming convention is recommended by the GDWG and will be submitted to the Executive Panel for endorsement.

2.4 Common directory structure for GSICS Data Service (Peter Miu)

The goal was to agree on the proposed structure and update documentation if necessary.

A presentation of the EUMETSAT directory structure was made. The group agreed that a common directory structure is needed to ensure all GSICS data and product servers have a common directory layout. This aids the usability and maintainability of the servers.

The group expressed a need to expand the directory structure to take into account additional supporting data sets (e.g. collocation data sets) and product distribution modes. The following structure is proposed:



Action GDWG04_06: Update the directory structure document to take into account the new requirements. Submit the documentation for review by GDWG. Once reviewed, submit to the Executive Panel for endorsement.

Recommendation 7: All collocation data sets shall be kept on GSICS data and products servers as long as possible.

2.5 GCC Website Structure (Volker Gärtner)

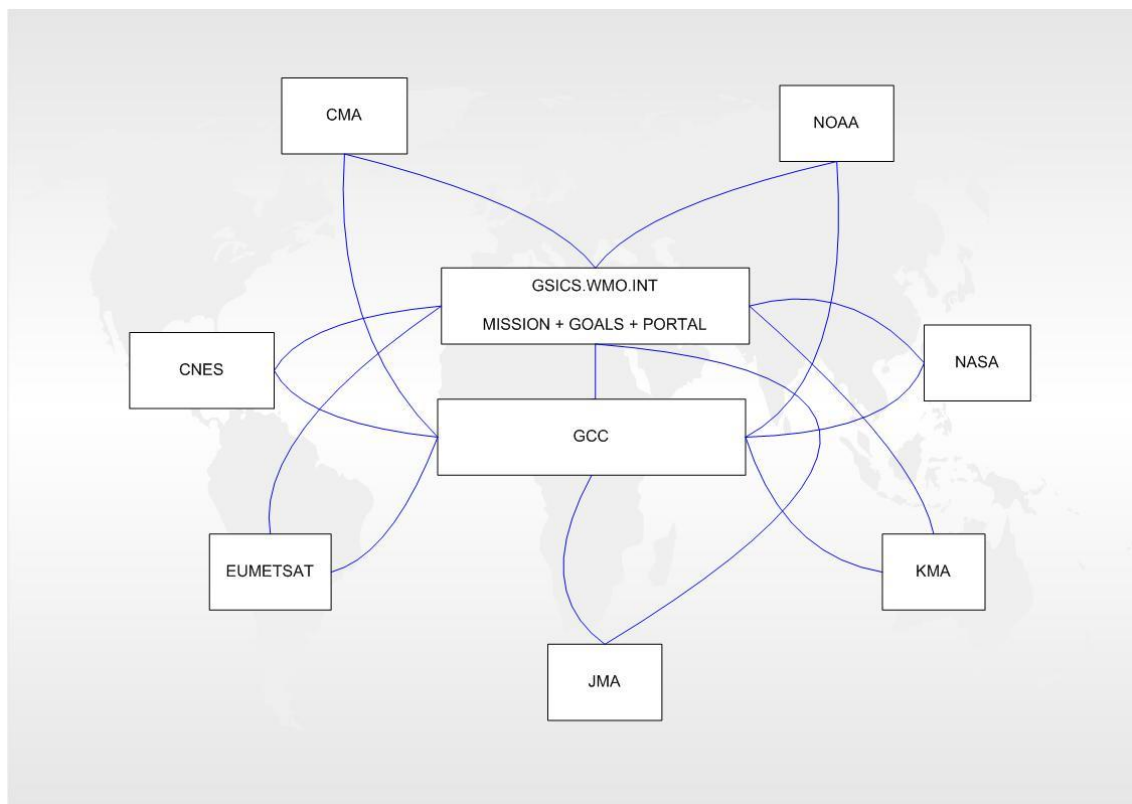
Goal: to make recommendations to improve the GCC Web site.

CMA demonstrated their impressive GSICS Web site: (<http://fengyunuds.cma.gov.cn/GSICS/index.html>).

The following observations apply to the WMO’s GSICS site (<http://gsics.wmo.int>).

- Mission statement and goals to be moved from the GCC home page to here; remove that text from the GCC Web site.
- Make sure links to KMA, CMA and other GPRC sites are implemented.
- Once the portal function is available, the link should be shown here.
- NOAA GPRC does not exist at present. NOAA should set up a GPRC Web site.

Proposed web sites diagram:



Action GDWG04_07: EUMETSAT to look at the improvements needed to address the observations on the current WMO's site structure. This includes the legibility of the GSICS logo (coordinate with all the GPRCs on how this can be done). GDWG to review improvements and once approved, submit updates to the Executive Panel for endorsement and then to the WMO for upload. Due date: end October 2010

Action GDWG04_08: EUMETSAT to discuss with the GDWG on what common information shall be shown on the GPRC home pages. Support to action **GDWG04_07**, Due date: Aug 2010.

Action GDWG04_9: NOAA to write the mission statement and the goal of the GCC and put this on the GCC home page. The GCC Web site shall be updated with more up to date information and cleaned out of any extraneous information. Due date: end 2010.

Actions GDWG04_10: Each GPRC shall provide a home page describing what they do (see JMA Web site as the example). They shall ensure the page is easily identified as a GSICS Web page, e.g. apply GSICS standard logo, and look and feel. Compose common text informing the reader about the information on the GPRC (Contribution to GSICS as a GPRC, regularly providing comparable data sets etc. All GPRCs via email. Due date: end 2010.

Recommendation 8: GRWG and GDWG recommend the NOAA GPRC separate its content from the GCC Web site.

Recommendation 9: All GPRCs shall distinguish their GSICS related activities from their other calibration and/or validation activities.

2.6 Outstanding Issues and Help Desk Tool (Peter Miu)

The EUMETSAT help desk tool was presented and the group agreed that such a tool is needed. The tool offers:

- Anomaly tracking
- Action tracking
- Documentation management
- Show case and mailing list tracking.

A tool to support document management and action tracking shall be addressed first as there is an immediate need for that functionality.

Action GDWG04_11: NOAA and EUMETSAT to create an evaluation matrix for documentation and action tracking tools and report back at the next GSICS joint meeting.

Action GDWG04_12: NOAA and EUMETSAT to create an evaluation matrix for help desk tool and report back at the next GSICS joint meeting.

Other outstanding issues are to be discussed in the next teleconference. These are:

- Encourage and support for creation of new GSICS data and product servers.
- What GSICS products and documentation to archive?
- Reporting on the operation service of the data and product servers.
- The GRWG to identify list of documents that shall go into the document management system.

2.7 Common instrument monitoring and visualisation tools (Hiromi Owada)

JMA presented their new GSICS Web site showing the results of their cross calibration. Results are shown as plots following the same approach as other GPRC websites.

The GDWG expressed the view that this subject matter is difficult to provide recommendations for without support from the GRWG. It was noted that the JMA approach is a good example for the presentation of the results. Information on how the results are derived should accompany the plots in order to provide proper interpretation context.

Recommendation 10: The CMA and JMA GSICS websites:

- <http://fengyunuds.cma.gov.cn/GSICS/index.html>
- <http://jmagsics.genkaimura.net/monitoring/calibration.htm>

are excellent examples for presenting ‘GSICS Bias Monitoring’ results. The GPRCs are requested to take note of what, and how, results are displayed on these sites.

Recommendation 11: The GRWG is requested to specify a common content for presenting calibration and validation results across all GPRC Web sites. Sufficient information is required to be presented so that non-calibration experts can still understand what it is being presented.

Recommendation 12: Results shall also be clearly distinguished between GSICS calibration and GPRC nominal calibration.

Recommendation 13: If ‘Instrument Performance Monitoring’ information is available, it should be presented with the ‘GSICS Bias Monitoring’ results.

2.8 Plans for instrument status logs (All)

Instrument status is important to identify when unexpected results are calculated. This ancillary information should be stored and made available for both users and GSICS. The group recognise this is a challenge as this information may not be easily accessible within each GPRC.

Recommendation 14: GPRCs shall make the history of their instrument status for calibration activities available. This information shall be searchable, retained indefinitely (in their archive or data repositories) and in a format that can be easily used by software.

Action GDWG04_13: GPRCs are requested to find out what instrument information is available for their instruments and make this available to the Working Groups. This information can be used to prepare a report for submission to CGMS with a view to issue a CGMS technical guideline defining what relevant instrument information shall be provided by satellite operators to support GSICS activities. This is related to Action GDWG03_05 and CGMS-36 NOAA-WP-14.

2.9 SensorML (Alexandre Robin / Aleksandar Jelenak)

SensorML is an OGC standard for storing sensor information. It is in XML format and is developed for describing any type of sensor and measurement systems.

See CEOS Cal/Val Portal (<http://calvalportal.ceos.org>) for use of SensorML.

SensorML can be used to store and share instrument information. The content can be presented in different forms using XSL ‘style sheets’.

Using this standard would make the GSICS calibration information immediately compatible with systems that have implemented the same standard (CEOS/ESA HMA etc.).

Recommendation 15: GPRCs to investigate the use of SensorML to describe one of their instruments.

2.10 Any Other Business

Further actions and recommendations relevant to the GDWG were agreed during the joint session of the meeting and are recorded in Part C of the present report. They are included, however, in the summary of GDWG actions and recommendations below.

3. Summary of GDWG Recommendations

- **Recommendation 1:** The GSICS Executive Panel is invited to accept the proposed distribution modes (Demonstration, Preoperational, Operational). If so, the GPAP shall be updated to reflect the suggested modes.
- **Recommendation 2:** GDWG recommends considering a database for tracking the status of proposed products and all product characteristics.
- **Recommendation 3:** GDWG also recommends considering a portal site for accessing the database (user’s view).
- **Recommendation 4:** The netCDF convention is recommended by the GDWG and will be submitted to the Executive Panel for endorsement.
- **Recommendation 5:** The free format field shall be used to indicate the product’s acceptance mode e.g. DEMO, PREOP (pre-operational) and removed when it is operational.
- **Recommendation 6:** The WMO file naming convention is recommended by the GDWG and will be submitted to the Executive Panel for endorsement
- **Recommendation 7:** All collocation data sets shall be kept on GSICS data and products servers as long as possible.

- **Recommendation 8:** GRWG and GDWG recommend the NOAA GPRC separate its content from the GCC Web site.
- **Recommendation 9:** All GPRCs shall distinguish their GSICS related activities from their other calibration and/or validation activities.
- **Recommendation 10:** The CMA and JMA GSICS websites:
 - <http://fengyunuds.cma.gov.cn/GSICS/index.html>
 - <http://jmagsics.genkaimura.net/monitoring/calibration.htm>
 are excellent examples for presenting product monitoring results. The GPRCs are requested to take note of what, and how, results are displayed on these sites
- **Recommendation 11:** The GRWG is requested to specify a common content for presenting calibration and validation results across all GPRC Web sites. Sufficient information is required to be presented so that non-calibration experts can still understand what it is being presented.
- **Recommendation 12:** Results shall also be clearly distinguished between GSICS calibration and GPRC nominal calibration.
- **Recommendation 13:** If instrument monitoring information is available, it should be presented with the product monitoring results.
- **Recommendation 14:** GPRCs shall make the history of their instrument status for calibration activities available. This information shall be searchable, retained indefinitely (in their archive or data repositories) and in a format that can be easily used by software.
- **Recommendation 15:** GPRCs to investigate the use of SensorML to describe one of their instruments.

4. Summary of New GDWG Actions

Note: The summary list of actions below includes two actions agreed at the Joint Session (GDWG04_14 and GDWG04_15).

Ref. No.	Action	Actionees & due dates
GDWG04_01	GDWG to define the workflow and request GRWG to define the documentation needed to move a GSICS product between the modes. NOAA to define the workflow (1 month) and put it up for discussion by GDWG/GRWG (1 month). GDWG to submit the draft version to the Executive Panel for review. Timescale: max 3 month. Result is an agreed workflow for the product acceptance procedure. (See Action GRWG 5.15)	Aleksandar Jelenak Mid April, 2010
GDWG04_02	EUMETSAT to place in the GSICS user workshop agenda a request for user feedback on which version of netCDF is preferable.	Tim Hewison Volker Gärtner

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		End of August 2010
GDWG04_03	GSICS sub-categories are to be collected and proposed by GDWG with support from GRWG for use in GSICS file names. Accepted proposals are to be submitted to WMO CBS for endorsement. Deadline July 31 (next CBS meeting is in Nov. 2010)	Aleksandar Jelenak Peter Miu End of July 2010
GDWG04_04	CMA to confirm its “CCCC” originator codes (BAWX?) in the file naming convention are correct.	Xiuqing Hu End of March 2010
GDWG04_05	KMA to confirm its “CCCC” originator codes (RKSL?) in the file naming convention are correct.	Young Hooi Hwang End of March 2010
GDWG04_06	Update the directory structure document to take into account the new requirements. Submit the documentation for review by GDWG. Once reviewed, submit to the Executive Panel for endorsement.	Peter Miu End of June 2010
GDWG04_07	EUMETSAT to look at the improvements needed to address the observations on the current WMO’s site structure. This includes the legibility of the GSICS logo (coordinate with all the GPRCs on how this can be done). GDWG to review improvements and once approved, submit updates to the Executive Panel for endorsement and then to the WMO for upload.	Peter Miu End of Oct. 2010
GDWG04_08	EUMETSAT to discuss with the GDWG on what common information shall be shown on the GPRC home pages. Support to action GDWG04_07 .	Peter Miu End of Aug. 2010
GDWG04_09	NOAA to write the mission statement and the goal of the GCC and put this on the GCC home page. The GCC Web site shall be updated with more up to date information and cleaned out of any extraneous information.	Robert Iacovazzi Aleksandar Jelenak End of Aug. 2010
GDWG04_10	Each GPRC shall provide a home page describing what they do (see JMA Web site as the example). They shall ensure the page is easily identified as a GSICS Web page, e.g. apply GSICS standard logo, and look and feel. Compose common text informing the reader about the information on the GPRC (Contribution to GSICS as a GPRC, regularly providing comparable data sets etc. Action: all GPRCs via Email).	All GPRCs End of 2010
GDWG04_11	NOAA and EUMETSAT to create an evaluation matrix for documentation and action tracking tools and report back at the next GSICS joint meeting.	Aleksandar Jelenak Peter Miu End of 2010
GDWG04_12	NOAA and EUMETSAT to create an evaluation matrix for help desk tool and report back at the next GSICS joint meeting.	Aleksandar Jelenak Peter Miu End of 2010
GDWG04_13	GPRCs are requested to find out what instrument information is available for their instruments and make this available to the Working Groups.	GDWG Next GSICS joint

Joint GDWG-4/GRWG-5 Meeting – Part A: GDWG-4 Report

	This information can be used to prepare a report for submission to CGMS with a view to issue a CGMS technical guideline defining what relevant instrument information shall be provided by satellite operators to support GSICS activities. This is related to Action GDWG03_05 and CGMS-36 NOAA-WP-14 (Similar to Action GRWG 5.16)	meeting
GDWG04_14	NOAA was requested to review the Quality Indicators following the CEOS Cal/Val WG guidelines.	Robert Iacovazzi End of 2010
GDWG04_15	NOAA to investigate the feasibility of applying the ISO 19115 metadata standard to processing information. This standard should then be proposed for use on the GSICS wiki pages if applicable.	Aleksandar Jelenak End of 2010

B. GSICS Research Working Group

Fifth Session

1 Participants in GRWG05

For CNES: Denis Blumstein, Patrice Henry, Claire Tinel, Didier Renaut, Bertrand Fougne (guest), Sophie Lacherade (guest), Pascale Lafitte (guest)

For CMA: Jingjing Liu, Xiuqing Hu

For EUMETSAT: Tim Hewison (incoming chair), Marianne Koenig

For LMD: Noelle Scott (guest), R. Armante (guest)

For NASA: Dave Doelling

For NOAA: Fred Wu (outgoing chair), Fangfang Yu (by teleconference), Andy Heidinger (guest), Bob Iacovazzi (part-time)

For JMA: Arata Okuyama (by teleconference)

For KMA: Dohyeong Kim (vice-chair), Seung-Hee Ham

For RAL: Dave Smith (guest)

2 Agenda and Presentations

The agenda and presentations from the meeting are available on the GSICS Wiki at: <https://cs.star.nesdis.noaa.gov/GSICS/20100209>

3 Summary of GRWG Discussions

3.1 Work Plan for Solar Channels

3.1.1 Products

It was first agreed that GSICS should aim to develop products for solar channels following the model already established for infrared channels: a GSICS Correction function to recalibrate the lowest level 1 data issued by the satellite operators to be consistent with that of the selected reference instrument or model and visualizations to monitor their relative biases. GPRCs are free to include additional data in the products they supply, such as calibration coefficients to replace the nominal ones or counts to radiance look-up-tables.

The GSICS Correction itself should be expressed in the same units as the original level 1 data – i.e. radiance or reflectance, depending on the instrument. Any conversion between these should be performed using the function provided with the original data where available. In all other cases the CEOS reference solar constant and Thullier method should be used to perform these conversions. It was further noted that there is a need to refine the definition of the solar radiance spectrum used as a reference.

It was also agreed that GSICS should first concentrate on developing bias monitoring and GSICS Corrections for the solar channels of the current operational geostationary imagers. Users had identified a strong need to these products as these instruments currently lack solar diffusers or lamps to provide references for on-board calibration, subsequently there calibration is often deficient and subject to large short- and long-term drifts. Such a product would also complement the GSICS products for the infrared channels of these instruments.

GSICS aims to extend the developed methods for application to LEO-LEO inter-calibration later.

3.1.2 General Strategy

As each of these methods has significant disadvantages and cannot cover the full range of conditions for all solar channels of all instruments, the GRWG plans to combine several methods. Different combinations are foreseen to inter-calibrate each instrument. This strategy has the advantage of extending the range of validity of the inter-calibration (geographically, geometrically, temporally, spectrally and radiometrically), improving its robustness and ensuring consistency between different channels and instruments. It is likely that some methods will be reserved for validation of the inter-calibration products.

In order to combine the results of different methods, it is necessary to fully understand the benefits and limitations of each one and quantify their uncertainties. A qualitative evaluation should also be done against the following criteria for each method: Independence, Stability, Traceability, Precision, Availability, Latency, Cost. Availability includes spatial, temporal, geometric, spectral and radiometric coverage.

Action GRWG 5.1: Fred Wu to propose details for each criteria by email by 2010-03-31.

Action GRWG 5.2: Fred Wu to continue his investigations into methods of combining the results of the different methods and report at the next GSICS meeting in early 2011.

3.1.3 Nomination of Principle Investigators

It was agreed that a Principle Investigator (PI) be assigned to coordinate the research and development of each method. These are identified in the list of methods below. Their role is to liaise with other GSICS members to define the method in detail, describe its potential application to GEO imagers, to evaluate the above criteria and perform a full error propagation to estimate the likely uncertainties for the method. This should include both systematic and random errors to assess the method's accuracy – both absolute and relative to adjacent time, date and space intervals, other channels and instruments.

Action GRWG 5.3: Patrice Henry to circulate report including an assessment and full error propagation to all GRWG members and other PIs by 2010-02-28. This will provide an example of how such an assessment can be performed following the relevant CEOS guidelines.

Action GRWG 5.4: All GRWG members and PIs to review this example and consider how it could apply to their method. PIs to report findings at dedicated web meeting by 2010-04-30.

Action GRWG 5.5: PIs to report full assessment at the next GSICS meeting in early 2011.

3.1.4 Datasets

It became clear that most methods require a lot of observational data to assist in their development to produce robust statistics, remove seasonal trends and select the best views of invariant targets. This should be extracted automatically and routinely. GRWG recommended that, in general, data should be archived using loose selection criteria, with the intention of refining these criteria during the development of the method.

Action GRWG 5.6: PIs and GDWG to identify suitable databases to archive GEO data for each method by 2010-09-30.

The aim is to produce a common dataset allowing comparison of the results of different combinations of methods and for all GEO solar channels in 2011 after the review phase. This will allow the development of the optimum method of integrating different combinations of methods.

3.2 Overview of potential methods for inter-calibration of Solar Channels

The following provides a bullet point summary of each method, together with the main issues discussed during the session. For more details of each method, please refer to the presentations, which are available on the GSICS Wiki: <https://es.star.nesdis.noaa.gov/GSICS/20100209>.

Many of these issues are common to multiple methods. To optimize the consistency between their results, investigators should liaise to develop common algorithms to handle them, where possible. For example, methods requiring correction for atmospheric water vapour should use retrievals from the same source.

Action GRWG 5.7: Fred Wu to request Hyperion data through CEOS over various invariant targets including Deep Convective Clouds, liquid water cloud, deserts, pristine ocean and sun glint areas to characterize their spectral variation.

3.2.1 Deep Convective Cloud (DCC) – PI: Dave Doelling (NASA)

The main issues here at the identification of DCC targets according to chosen thresholds of infrared radiance, viewing and solar geometry and scene variance, seasonal and geographic changes in the distribution of DCCs, the validation of their BRDF and CERES ADM, weak SRF dependence and calculation of mode of the obtained radiance distribution. There is also an ongoing discussion on the impact of the shape of the ice particles in the cloud and the choice of PDF metric (mode, median ...).

Seung-Hee Ham (KMA) is continuing to investigate the possibility of combining radiative transfer and cloud models to use this as an absolute calibration method. Dave Doelling (NASA) plans to compare different DCC algorithms. Patrice Henry (CNES) plans to extract BRDFs derived from PARASOL data from the SADE database. Fred Wu (NOAA) plans to continue to characterize DCCs using MODIS data. Arata Okuyama (JMA) is also investigating DCCs.

3.2.2 Liquid Water Cloud – PI: Seung-Hee Ham (KMA)

The main limitations are the accuracy of the radiative transfer models used, including the cloud's BRDF, the instruments' SRF, the knowledge of the atmospheric state above the cloud (particularly humidity and aerosol). Other issues to address include the thresholds used to select the targets.

Arata Okuyama (JMA) and Andy Heidinger (NOAA) are also planning to investigate this method.

3.2.3 Desert and Bright Land Surfaces – PI: Patrice Henry (CNES)

The main problems here are the non-uniform global distribution of good candidate targets, the characterization of their spectral variation and BRDF, which can show strong season variation, necessitating time series of at least 3 years, and the knowledge of the atmospheric state above the cloud (particularly humidity and aerosol).

Other members of CNES, KMA, CMA, NOAA and RAL intend to investigate this method.

Action GRWG 5.8: CMA, KMA, NOAA, EUMETSAT and CNES to investigate the possibility to supply GEO data over desert sites to the SADE database and report by email by 2010-06-30.

Action GRWG 5.9: Patrice Henry to liaise with Dave Smith to obtain ATSR and MERIS data from the CEOS-EO [Cal/Val portal](#).

Recommendation GRWG 5.1: All GPRCs are encouraged to investigate the use of the CEOS Cal/Val portal (<http://calvalportal.ceos.org>), which GRWG strongly recommends.

Recommendation GRWG 5.2: GSICS supports proposal to install sun photometers in the vicinity of desert site to characterize atmospheric aerosol and humidity burdens to validate satellite retrievals of these products on an ongoing basis.

3.2.4 Rayleigh scattering – PI: Patrice Henry (CNES)

The main issues with the use of Rayleigh scattering models over pristine ocean are the confirmation of clear sky, atmospheric and SRF correction.

Action GRWG 5.10: Tim Hewison to send SEVIRI pristine sea surface data to Patrice Henry for analysis.

3.2.5 Sun glint – PI: Andy Heidinger (NOAA)

The main issues with the use of sun glint models over pristine ocean are the confirmation of clear sky, sea state assessment, atmospheric and SRF correction, extreme sensitivity to SRF errors and, most importantly, the application requires multiple channels in the solar band to provide a relative calibration.

3.2.6 Moon – PI: Fred Wu (NOAA)

Although the moon provides a highly stable invariant target that is independent of the Earth's atmosphere to use it as an absolute calibration reference relies on accurate navigation and identification of the pixels in the image, accurate reference measurements of the moon's reflectance distribution and geometric modelling. CNES also plan to investigate the use of lunar calibration for Pléiades.

Action GRWG 5.11: Fred Wu to review existing quantitative assessment of this method produced for CERES.

Recommendation GRWG 5.3: All GPRCs were encouraged by Tom Stone (through Fred Wu) to take and archive measures of the moon on an ongoing basis. The GRWG welcomed Tom's offer to process any such measurements that can be sent to him.

Recommendation GRWG 5.4: The GRWG also welcomed plans to include NIST-traceable observations of the moon in the Robotic Lunar Observatory (ROLO) model and supported proposals for funding applications to achieve this.

3.2.7 Stars – PI: Fred Wu (NOAA)

The main problems with using stars as invariant targets is the sensitivity of their response to the instruments' PSF and geometric alignment, absolute knowledge of their radiance, and the fact that they are not continuously visible from GEO orbit during the full annual cycle.

3.2.8 Ray-matching – PI: Dave Doelling (NASA)

This provides a method of inter-calibrating to a reference instrument, which is currently assumed to be MODIS, independently of the above invariant target methods. The main problems of this method to be addressed are the collocation criteria and method of accounting for SRF differences between the instruments and the choice of reference instruments. A presentation on the latter subject was postponed. NOAA, CMA and KMA also plan to pursue the ray-matching method during 2010.

Action GRWG 5.12: Fred Wu to invite Jack Xiong to give the presentation on the choice of reference instruments at a web meeting by 2010-06-30.

3.3 AVHRR and ATSR

Dave Smith (RAL) presented an overview of the ATSR calibration. Re-calibration products had been developed after first correcting for instrument drift in the solar channels. However, this had been based on extrapolating an observed trend to the future, which did not turn out to be accurate. This highlights the short-comings of this correction methodology. RAL has since developed an improved drift correction that doesn't rely on empirical models and is available to users to apply to existing data products, and when applied to the AATSR solar channels, gives very good agreement with the corresponding channels on MERIS.

Andy Heidinger (NOAA) described the production of the PATMOS-X climatology, which aims to inter-calibrate all 14 AVHRR instruments to re-generate level 3 products, including

cloud and aerosol climatologies for ISCCP and SCOPE-CM through the CM-SAF. Given the number of instrumental difficulties, it was agreed that GSICS should wait until a full dataset of re-calibrated AVHRR data is issued before attempting to develop GSICS products for it.

It was agreed that GSICS products for the solar channels of LEO-LEO satellites would be developed once GEO-LEO products have been established.

SNO is an obvious option for the inter-calibration of the IR channels of AATSR and AVHRR, but Dave's experience indicates that SRF differences may make it hard to interpret the results. An hyperspectral sounder (IASI) is preferred as a common reference instrument for GSICS infrared products. AATSR-IASI comparison has been done (e.g. [Illingworth et al., \[2009\]](#)). AVHRR-IASI has also been compared by Mittaz and Harris – also [[Wang and Cao, 2008](#)]. D. Smith (?) will perform "double differencing" to deduce AATSR-AVHRR difference.

Action GRWG 5.13: GRWG to define a strategy for the inter-calibration of the IR channels of other LEO-LEO satellites by March 2011.

3.4 Reference Instruments

Dave Tobin (SSEC) is continuing to investigate the impact of the sampling strategies proposed for CLARREO on the inter-calibration of both GEO and LEO sensors.

Recommendation GRWG 5.5: All GRWG members to monitor developments with CLARREO during Phase A and raise any concerns through Fred Wu (NOAA).

3.5 Other Items

NOAA GPRC has now produced inter-calibration monitoring plots for the IR channels of all currently operational GOES, Meteosat, MTSAT and FY-2 GEO imagers. These are based on a common baseline algorithm referenced to IASI and AIRS.

Recommendation GRWG 5.6: NOAA GPRC to consider back-processing the IR GEO-LEO products using AIRS back to 2002.

Action GRWG 5.14: Tim Hewison to review GRWG Work Plan and present it to Executive Panel in April 2010.

4. Future Web Meetings, and review of actions and recommendations

4.1 Actions agreed during the Joint Session

Actions GRWG 5.15 to GRWG 5.20, which were agreed during the joint session, are recorded in Part C of this report.

4.2 Future Web Meetings

It was not possible to give some presentations scheduled for agenda of this meeting. These were postponed to future web meetings. Several other topics for web meetings were agreed as follows:

GRWG	Review of CNES Error Analysis and assessment criteria	before 2010-04-30
GDWG+GRWG	Work flow for migration from Demo to Operational status	before 2010-04-30
GRWG	Report of Microwave meetings	before 2010-05-31
GRWG	Reference Instruments and their traceability	before 2010-06-30
GRWG	Product Consistency	before 2010-07-31
GDWG+GRWG	Preparation for Users' Conference	before 2010-08-31

Action GRWG 5.21: Tim Hewison to organize GRWG web meetings by at least 2 weeks beforehand.

Action GRWG 5.22: CNES to investigate technical difficulties for its participation in web meetings

4.3 Review Outcome of Actions from Previous Meetings

The status of actions from previous meetings was reviewed. Outstanding actions were confirmed.

4.4 Summary of new GRWG actions (including actions from the Joint Session)

Ref. No.	Action	Actionees & Due Dates	Status at 2010-02-28
GRWG5_1	Fred Wu to propose details for each of criteria by email by 2010-03-31.	Fred Wu 2010-03-31	
GRWG5_2	Fred Wu to continue his investigations into methods of combining the results of the different methods and report at the next GSICS meeting in early 2011.	Fred Wu early 2011	
GRWG5_3	Patrice Henry to circulate report including an assessment and full error propagation to all GRWG members and other PIs by 2010-02-28. This will provide an example of how such as assessment can be performed following the relevant CEOS guidelines.	Patrice Henry 2010-02-28	
GRWG5_4	All GRWG members and PIs to review this example and consider how it could apply to their method. PIs to report findings at dedicated web meeting by 2010-04-30.	All GRWG members and PIs 2010-04-30	
GRWG5_5	PIs to report full assessment at the next GSICS meeting in early 2011.	PIs early 2011	
GRWG5_6	PIs and GDWG to identify suitable databases to archive GEO data for each method by 2010-09-30.	PIs and GDWG 2010-09-30	
GRWG5_7	Fred Wu to request Hyperion data through CEOS over various invariant targets including DCCs, liquid water cloud, deserts, pristine ocean and sun glint areas to characterize their spectral variation.	Fred Wu	
GRWG5_8	CMA, KMA, NOAA, EUMETSAT and CNES to investigate the possibility to supply GEO data over desert sites to the SADE database and report by email by 2010-06-30.	CMA, KMA, NOAA, EUMETSAT and CNES 2010-06-30	
GRWG5_9	Patrice Henry to liaise with Dave Smith to obtain ATSR and MERIS data from the CEOS-EO Cal/Val portal.	Patrice Henry	

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GRWG5_10	Tim Hewison to send SEVIRI pristine sea surface data to Patrice Henry for analysis.	Tim Hewison	
GRWG5_11	Fred Wu to review existing quantitative assessment of this method produced for CERES.	Fred Wu	
GRWG5_12	Fred Wu to invite Jack Xiong to give the presentation on the choice of reference instruments at a web meeting by 2010-06-30.	Fred Wu 2010-06-30	
GRWG5_13	GRWG to define a strategy for the inter-calibration of the IR channels of other LEO-LEO satellites by March 2011.	GRWG March 2011	
GRWG5_14	Tim Hewison to review GRWG Work Plan and present to Exec Panel in April 2010.	Tim Hewison April 2010	
GRWG5_15	All GPRCs to review NOAA's proposed work flow and documentation needed to migrate GSICS products between Demo, Pre-Operational and Operation status. This is relates to Action GDWG04_01. NOAA will setup a web meeting which will be held to discuss this before 2010-04-15.	All GPRCs	
GRWG5_16	All GPRCs are requested to find out what instrument information is available for their instruments and make this available to the working groups by 2010-03-31. This information can be used to prepare a paper for submission to CGMS with a view to issue a technical guideline defining what relevant instrument information shall be provided by satellite operators to support GSICS activities. (Similar Action GDWG04_13.)	All GPRCs 2010-03-31	
GRWG5_17	Tim Hewison and Fuzhong Weng to recommend a microwave expert to Exec Panel to give a presentation at the Users' Workshop in September 2010 by 2010-05-31.	Tim Hewison and Fuzhong Weng 2010-05-31	
GRWG5_18	Dave Smith to provide Exec Panel with contact at GHRSSST by 2010-03-31.	Dave Smith 2010-03-31	
GRWG5_19	Volker Gärtner and Tim Hewison to solicit users' preferences on netCDF versions and	Volker Gärtner and Tim Hewison	

	report at Users' Workshop.	Users' Workshop	
GRWG5_20	GRWG Chairs to consider extending the next meeting to 4 days and/or hold parallel tracks for the solar and microwave channels. Decision needed by 2010-10-31.	GRWG Chairs 2010-10-31	
GRWG5_21	Tim Hewison to organize GRWG web meetings by at least 2 weeks beforehand.	Tim Hewison	
GRWG5_22	CNES to investigate technical difficulties for its participation in web meetings	CNES	

4.5 Summary of GRWG Recommendations

Recommendation GRWG 5.1: All GPRCs are encouraged to investigate use of the CEOS Cal/Val portal (<http://calvalportal.ceos.org>), which GRWG strongly recommends.

Recommendation GRWG 5.2: GSICS supports proposal to install sun photometers in the vicinity of desert site to characterize atmospheric aerosol and humidity burdens to validate satellite retrievals of these products on an ongoing basis.

Recommendation GRWG 5.3: All GPRCs were encouraged by Tom Stone (through Fred Wu) to take and archive measures of the moon on an ongoing basis. The GRWG welcomed Tom's offer to process any such measurements that can be sent to him.

Recommendation GRWG 5.4: The GRWG also welcomed plans to include NIST-traceable observations of the moon in the Robotic Lunar Observatory (ROLO) model and supported proposals for funding applications to achieve this.

Recommendation GRWG 5.5: All GRWG members to monitor developments with CLARREO during Phase A and raise any concerns through Fred Wu (NOAA).

Recommendation GRWG 5.6: NOAA GPRC to consider back processing the IR GEO-LEO products using AIRS back to 2002.

C. Report from the Joint Session

The joint session reviewed the recommendations and actions prepared by the parallel sessions of GDWG and GRWG as well as the outstanding actions assigned by the Executive Panel. New actions were agreed, and were recorded under either GDWG or GRWG, or both, depending on the actionees. The joint session also formulated four new recommendations that will be brought to the attention of the Executive Panel.

1 Quality Assurance Framework for Earth Observations (QA4EO)

Jérôme Lafeuille (WMO) provided a brief on the QA4EO initiative of CEOS and GEO (<http://www.qa4eo.org/>). This not only provides a wealth of useful guidelines directly applicable to GSICS, but also an example of how the documentation can be supplied in an hierarchy, from a one page summary showing the key principles to detailed guidelines and best practices. Conformance with these may be self assessed using a checklist. However, this will be implicitly achieved by completing the GSICS Product Acceptance Form – GPRCs will not need to complete both.

Action GDWG04_14: NOAA was requested to review the Quality Indicators following the CEOS Cal/Val WG guidelines.

2 GSICS Product Acceptance Procedure

The sequence of actions to update the GPAP, as proposed by GDWG, was discussed and approved (See GDWG04_01). The following new action was recorded as a GRWG action:

Action GRWG 5.15: All GPRCs to review NOAA's proposed work flow and documentation needed to migrate GSICS products between Demo, Pre-Operational and Operation status.

It was agreed that NOAA would set up a web meeting to discuss this before 2010-04-15.

The Joint session furthermore recognized that some products should now be mature enough to be implemented in accordance with the GPAP, as requested by the Executive Panel, and agreed the following recommendation:

Recommendation: All GPRCs to submit their GSICS Correction for IR GEO channels for GPAP as Demonstration status by end March 2010. GCC should coordinate the review and report the progress to the Executive Panel.

3 Data Management Issues

It is required to define a GSICS Documentation system in order to ensure that all documentation produced by the different GPRCs follow the same numbering/referencing conventions, and can thus be identified and accessed in an unambiguous manner within the GSICS community. This issue shall be addressed as part of action **GDWG04_11**.

Action GDWG04_15: NOAA to investigate the feasibility of applying the ISO 19115 metadata standard to processing information. This standard should then be proposed for use on the GSICS wiki pages if applicable.

4 Plans for Instrument Logs

The joint session approved Action GDWG04_13 from GDWG and a similar action was recorded by GRWG as GRWG 5.16.

Action GRWG 5.16: All GPRCs are requested to find out what instrument information is available for their instruments and make this available to the working groups by 2010-03-31. This information can be used to prepare a paper for submission to CGMS with a view to issue a CGMS technical guideline defining what relevant instrument information shall be provided by satellite operators to support GSICS activities.

5 Interaction with Users

5.1 Feedback from Users

Tim Hewison (EUMETSAT) provided a summary of feedback and lessons learnt from the first beta tester of EUMETSATs prototype GSICS Correction for the IR channels of Meteosat-9 using IASI as a reference. These emphasized the need for GPRCs to test the products in the same format supplied to users and provide a brief Users' Guide with every product.

This led to discussion of how to keep users informed of any changes to issued GSICS products. It was agreed that access to GSICS Bias Monitoring Products and Reports should be free. However, two options were foreseen for users wanting access to any quantitative data, such as GSICS Correction coefficients:

- Compulsory registration
- Voluntary registration

The majority of the GSICS developers present favoured the former option with the proviso that registration only requested the user's name, affiliation and email address.

Recommendation: Executive Panel to consider requirement for users to register before gaining access to quantitative data (such as GSICS Correction coefficients).

5.2 Users Workshop

Action GRWG 5.17: Tim Hewison and Fuzhong Weng to recommend a microwave expert to Exec Panel to give a presentation at the Users' Workshop in September 2010 by 2010-05-31.

Recommendation: Executive Panel to invite all SCOPE-CM pilot projects to give presentations at Users' Workshop by 2010-05-31.

Action GRWG 5.18: Dave Smith to provide Exec Panel with contact at GHRSSST by 2010-03-31.

Recommendation: Executive Panel to invite a representative of GHRSSST to give presentations at Users' Workshop by 2010-05-31.

Action GRWG 5.19: Volker Gärtner and Tim Hewison to solicit users' preferences on netCDF versions and report at Users' Workshop.

6 Next Meetings

The theme of the next GRWG meeting will again be dominated by the development of GSICS products for the solar channels of GEO imagers. However, it is also possible that we will be able to start a review process for microwave instruments similar to that conducted at this meeting for the solar channels.

Action GRWG 5.20: GRWG Chairs to consider extending the next meeting to 4 days and/or hold parallel tracks for the solar and microwave channels. Decision needed by 2010-10-31.

In summary, the following topics were identified for the next GRWG/GDWG meeting :

- Report from PIs on their solar channel calibration methods (GRWG)
- Microwave calibration, with participation of invited microwave experts (GRWG).
- Standard names and directory structure (GDWG).
- Potential use of SensorML (GDWG)
- Suggested tools for the GSICS Helpdesk (GDWG).
- Web site updates
- Harmonisation of the product representation.

It was agreed that the next joint GDWG/GRWG meeting should be held towards the end of March 2011 to minimize risk of disruption due to Chinese New Year, Japanese financial year and bad weather. It was also agreed that the next meeting should be held in Asia on the basis that only one GSICS meeting so far has been hosted there (compared with two each in Europe and America). Both CMA and KMA generously offered to host the next meeting. The group found these two venues equally suitable, and agreed that the choice between these two

venues would best be discussed by the Executive Panel taking into account the various other meetings scheduled in 2011 within the satellite community.

Recommendation: Executive Panel to select from candidate venues (CMA or KMA) to host the next GRWG/GDWG meeting by 2010-05-31.

7 Summary of the Recommendations from the Joint Session

Recommendation: All GPRCs to submit their GSICS Correction for IR GEO channels for GPAP as Demonstration status by end March 2010. GCC should coordinate the review and report the progress to the Executive Panel.

Recommendation: Executive Panel to consider requirement for users to register before gaining access to quantitative data (such as GSICS Correction coefficients).

Recommendation: Executive Panel to invite all SCOPE-CM pilot projects to give presentations

Recommendation: Executive Panel to invite a representative of GHRSSST to give presentations at Users' Workshop by 2010-05-31.

Recommendation: Executive Panel to select from candidate venues (CMA or KMA) to host the next GRWG/GDWG meeting by 2010-05-31.

8 Closure of the meeting

All working group members found that the joint meeting had been very successful as a substantial amount of co-operative GSICS activities had been identified and significant achievements proposed for endorsement.

The members expressed their appreciation to CNES for the great organisation of this Joint GSICS Working Group Meeting.