GSICS REPORT
CGMS-45 WMO-WP-WG II

Mitch Goldberg (GSICS-EP Chair)
Kenneth HOLMLUND (GSICS-EP Vice-Chair)
Toshiyuki KURINO(Secretariat)

Outline

1. **GSICS purpose and organization**
2. Highlights of recent activities
3. Actions/Recommendations, Decisions

Why GSICS?

- Space-based observations from various satellite missions and agencies must be precisely calibrated with similar methods against common references to be reliable and interoperable.
- Poor or inhomogeneous calibration results in degraded performance and lower benefits
- CGMS members are collaborating within GSICS to develop and apply “best practices” for homogeneous calibration
- GSICS provides: references, guidelines, methodologies and tools enabling satellite operators to evaluate and improve their calibration and to deliver intercalibration adjustments (GSICS Corrections).

GSICS Infrared Inter-calibration

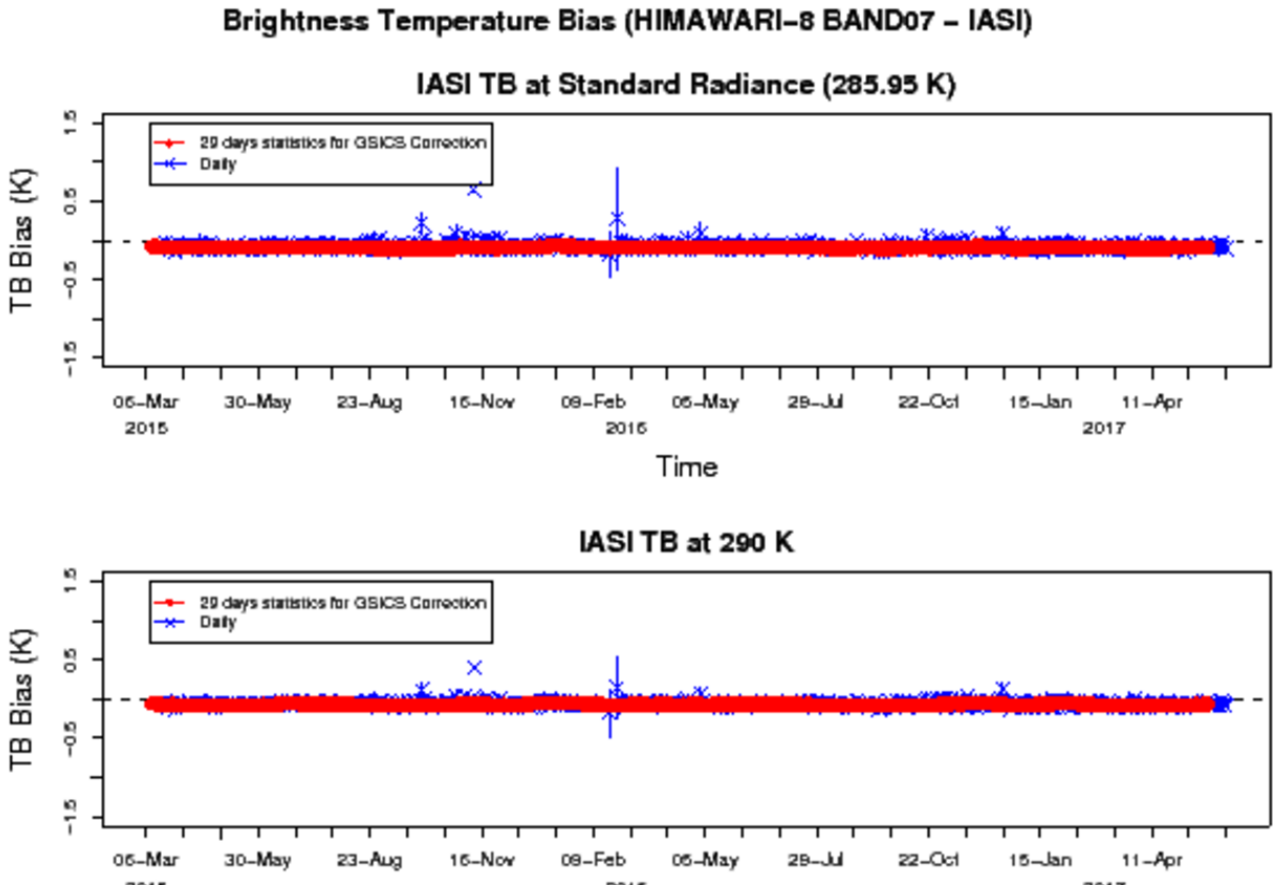
Himawari-8/AHI IR Inter-calibration with AIRS, IASI-A/B and CrIS

AHI Infrared Bands

- (•) Band07 (3.9 μm)
- ( ) Band08 (6.2 μm)
- ( ) Band09 (6.9 μm)
- ( ) Band10 (7.3 μm)
- ( ) Band11 (8.6 μm)
- ( ) Band12 (9.6 μm)
- ( ) Band13 (10.4 μm)
- ( ) Band14 (11.2 μm)
- ( ) Band15 (12.4 μm)
- ( ) Band16 (13.3 μm)

LEO Data

- ( ) AIRS (all)
- ( ) IASI-A (all)
- (•) IASI-B (all)
- ( ) CrIS (all)
- ( ) AIRS (asc,1:30pm)
- ( ) AIRS (des,1:30am)



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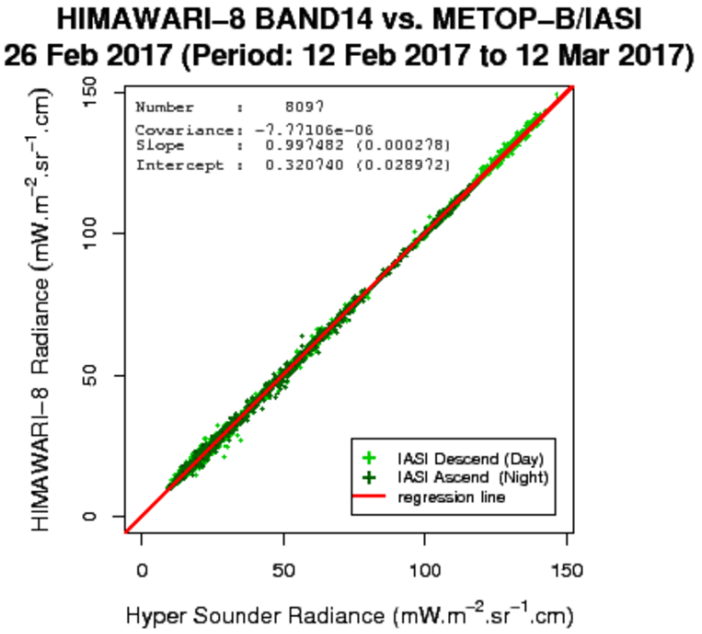
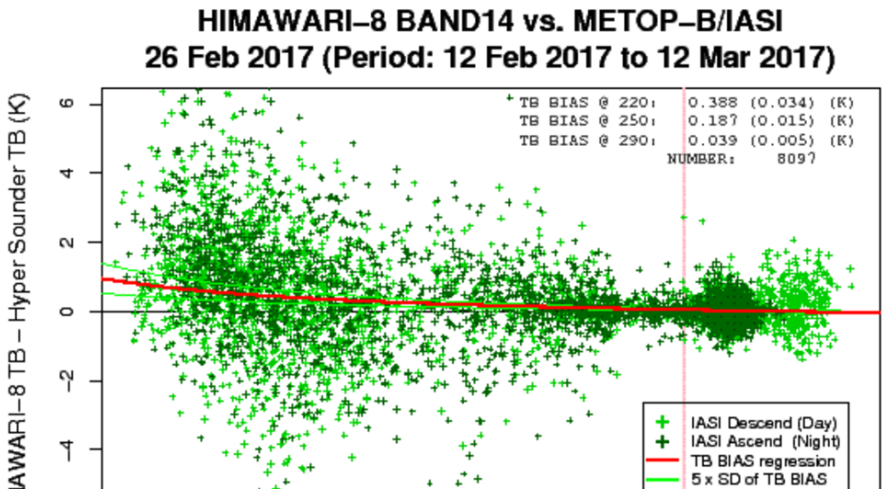
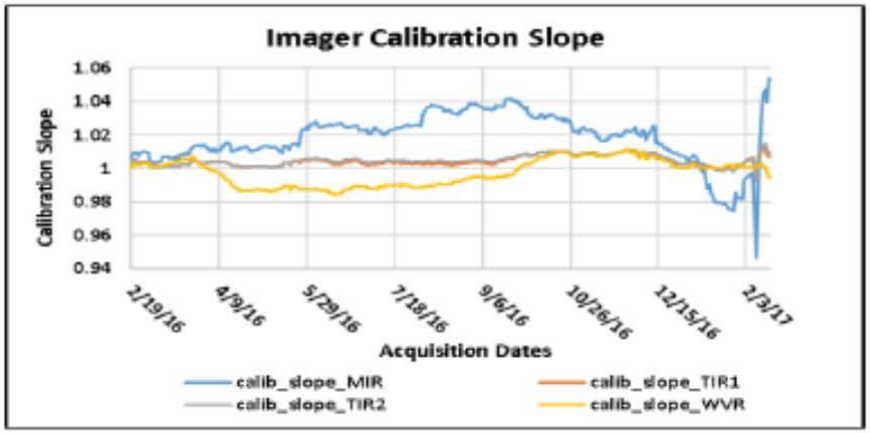
Time Series
- TB difference
- Regression coef.

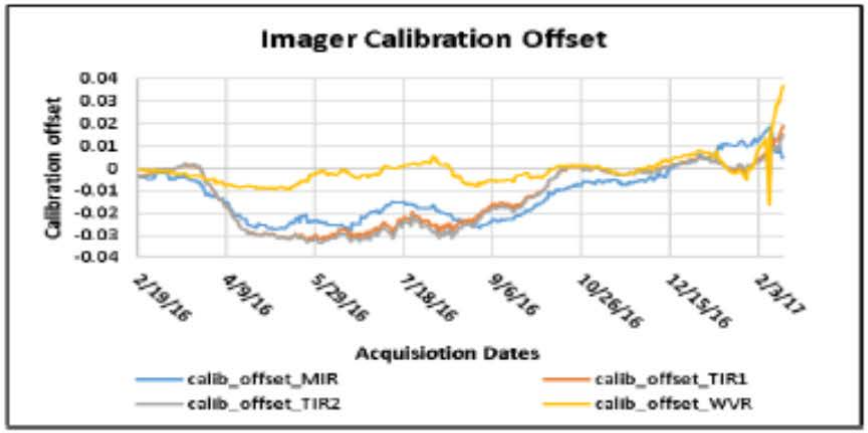
Statistics for GSICS Correction
- (•) Scatter plot

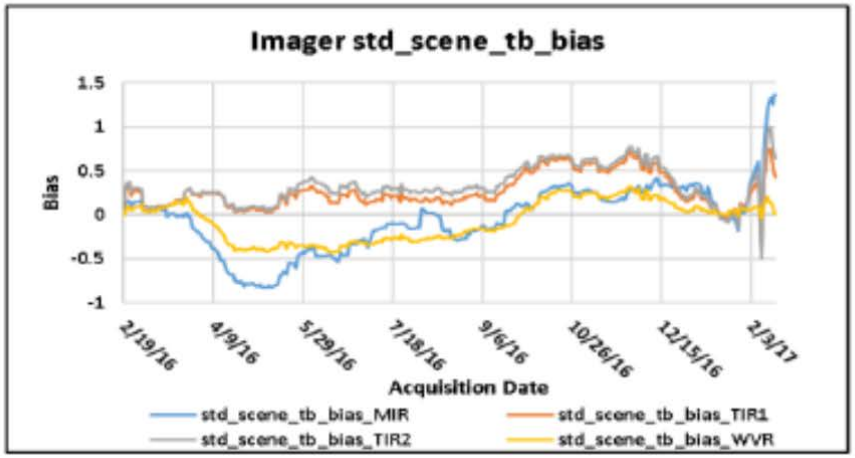
(Month Day Year)











GSICS Calibration results for INSAT-3D imager for Feb-2016-Feb2017

Channel	MIR	TIR-1	TIR-2	Water Vapor
Minimum Bias	-0.83	-0.07	-0.13	-0.43
Maximum Bias	0.41	0.72	0.78	0.32
Bias Range	1.24	0.79	0.91	0.75
Standard Scene BT (K)	286.09	286.38	285.54	240.67

Who benefits from GSICS ?

- **Satellite operators participating in GSICS**

- Sharing development effort and resources (calibration references, datasets, software tools)
- Capacity building (best practices for instrument monitoring, traceability, sensor comparison and correction)
- Improved instrument assessment, faster identification and correction of anomalies, facilitating commissioning and operation
- Interoperability within the CGMS constellation,

- **Satellite data users**

- Improved calibration
- Interoperability through inter-calibration
- Assessments, reports, for better understanding
- Algorithms enabling to reprocess data records

GSICS leverages the value of individual missions

GSICS membership

GSICS Members:

- China Meteorological Administration (CMA)
- Centre National d'Etudes Spatiales (CNES)
- European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)
- Indian Space Research Organization (ISRO)
- India Meteorological Department (IMD)
- Japan Aerospace Exploration Agency (JAXA)
- Japan Meteorological Agency (JMA)
- Korea Meteorological Agency (KMA)
- National Aeronautics and Space Administration (NASA)
- National Institute of Standards and Technology (NIST)
- National Oceanic and Atmospheric Administration (NOAA)
- Russian Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)
- United States Geological Survey (USGS)
- World Meteorological Organization (WMO)

Anticipated New Member:

- **Roscosmos State Corporation (ROSCOSMOS): New representative to be nominated**

Associate member:

- Inter-satellite Calibration WG of the Global Precipitation Measurement Mission (GPM X-Cal)

Observer:

- European Space Agency (ESA) New representative to be nominated
- Committee on Earth Observation Satellites (CEOS)
- CEOS Working Group on Calibration and Validation (WGCV)

GSICS leadership and Secretariat

Executive Panel:

- Mitch Goldberg (NOAA) elected Chair by EP-18
- Ken Holmlund (EUMETSAT) Vice-Chair

GRWG:

- Dohyeong Kim (KMA) Chair
- Tim Hewison (EUMETSAT) and Scott Hu (CMA) Vice-Chairs

GDWG:

- Takahashi (JMA) elected Chair by EP-18
- Peter Miu (EUMETSAT) elected Co-Chair by EP-18

GSICS Coordination Centre (GCC):

- Larry Flynn (NOAA) Director
- Manik Bali (NOAA) Deputy-Director

Secretariat:

- Toshiyuki Kurino (WMO)

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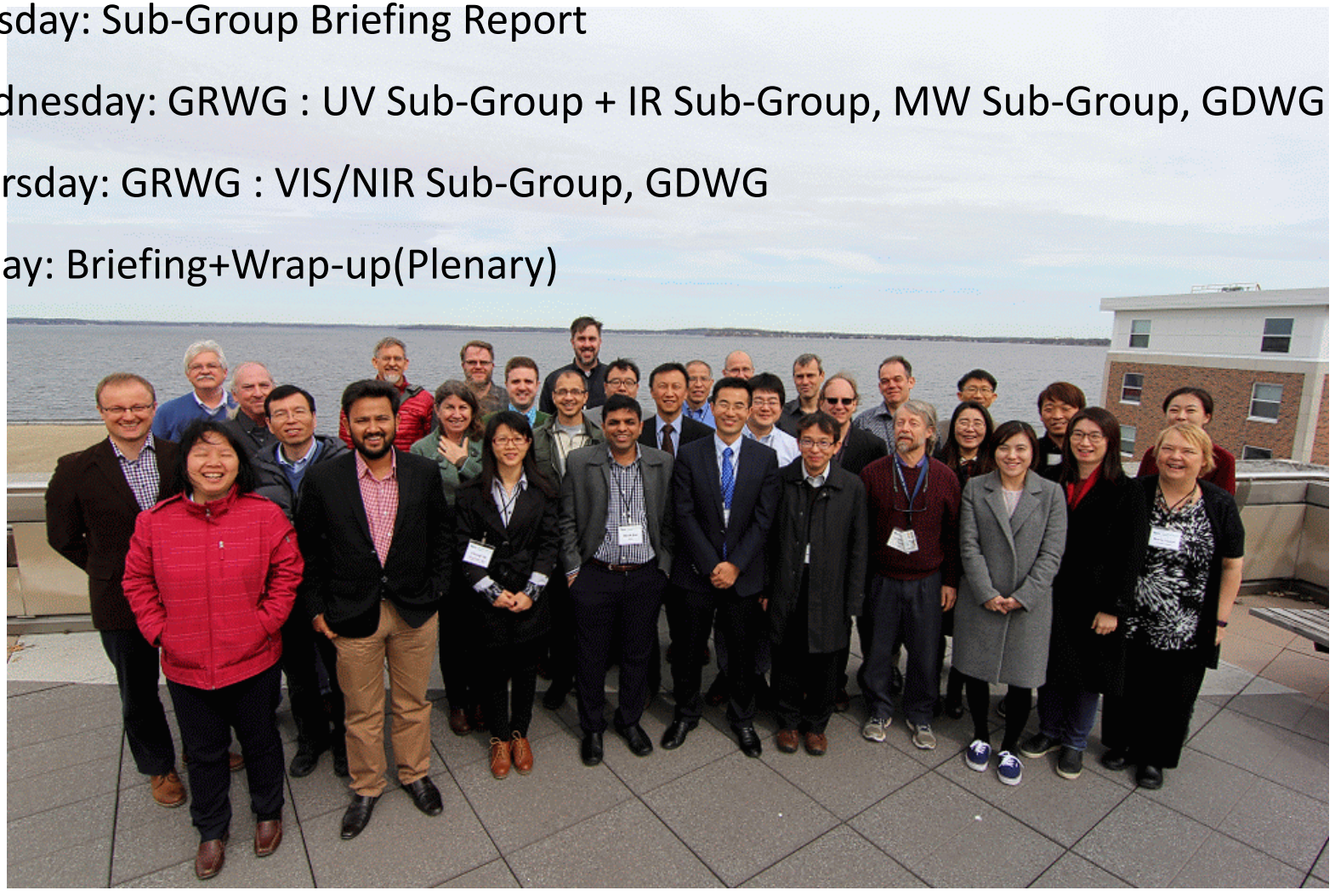
2017 GRWG/GDWG Annual Meeting

- Monday: Mini Conference + Agency Reports(Plenary)
- Tuesday: Sub-Group Briefing Report
- Wednesday: GRWG : UV Sub-Group + IR Sub-Group, MW Sub-Group, GDWG
- Thursday: GRWG : VIS/NIR Sub-Group, GDWG
- Friday: Briefing+Wrap-up(Plenary)



Actions Webpage

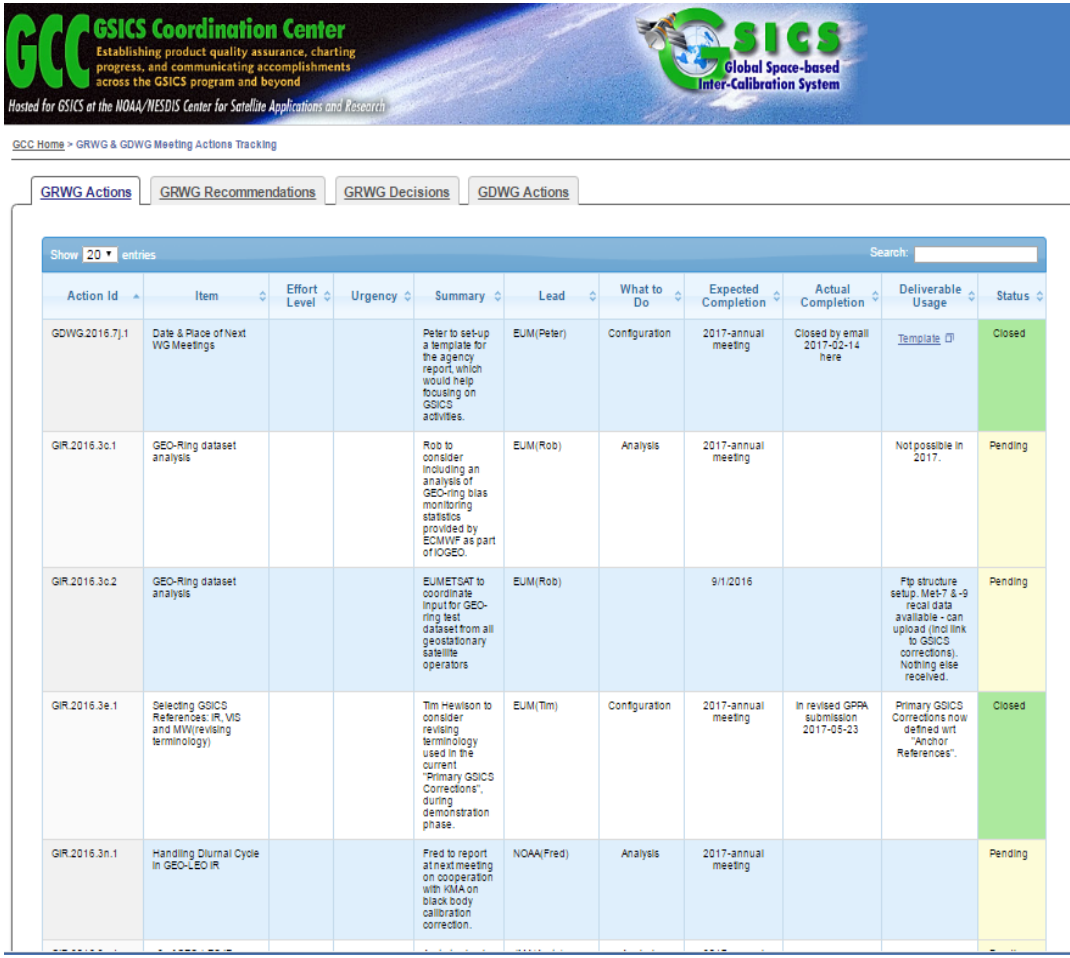
A new actions page is online

Replaces the wiki actions page.

- Actions are entered directly on google sheets instead of wiki.
- **These would be immediately visible on the Actions Webpage.**

Features

- **Fast Search.**
- **Chairs groups/subgroups and Co-Chairs can directly key in and update the actions.**
- Extract Actions/ Recommendation/ Decision from Minute Document (Capability can be offered to WMO and Agencies)
- Significant reduction in overhead on Chairs and GCC.



Action Id	Item	Effort Level	Urgency	Summary	Lead	What to Do	Expected Completion	Actual Completion	Deliverable Usage	Status
GDWG.2016.7j.1	Date & Place of Next WG Meetings			Peter to set-up a template for the agency report, which would help focusing on GSICS activities.	EUM(Peter)	Configuration	2017-annual meeting	Closed by email 2017-02-14 here	Template	Closed
GIR.2016.3c.1	GEO-Ring dataset analysis			Rob to consider including an analysis of GEO-ring bias monitoring statistics provided by ECMWF as part of IOGEO.	EUM(Rob)	Analysis	2017-annual meeting		Not possible in 2017.	Pending
GIR.2016.3c.2	GEO-Ring dataset analysis			EUMETSAT to coordinate input for GEO-ring test dataset from all geostationary satellite operators	EUM(Rob)		9/1/2016		Ftp structure setup. Met-7 & -9 recal data available - can upload (incl link to GSICS corrections). Nothing else received.	Pending
GIR.2016.3e.1	Selecting GSICS References: IR, VIS and MW(revising terminology)			Tim Hewison to consider revising terminology used in the current "Primary GSICS Corrections", during demonstration phase.	EUM(Tim)	Configuration	2017-annual meeting	In revised GPPA submission 2017-05-23	Primary GSICS Corrections now defined wrt "Anchor References".	Closed
GIR.2016.3n.1	Handling Diurnal Cycle in GEO-LEO IR			Fred to report at next meeting on cooperation with KMA on black body calibration correction.	NOAA(Fred)	Analysis	2017-annual meeting			Pending

Actions webpage : https://www.star.nesdis.noaa.gov/smcd/GCC/MeetingActions.php

GSICS Products Status

Nine New Products were Accepted into the GSICS Demonstration Phase

New Products that were accepted:

EUMETSAT: SEVIRI – IASI-A (Transfer: IASI –B) IR Prime Products (4)
EUMETSAT: SEVIRI – MODIS (Transfer: DCC) VIS Products (2)
ISRO: INSAT-3D – IASI-A (Imager & Sounder) IR Products (2)
KMA: COMS – IASI-A IR Product (1)

Product Summary

Operational 4 product [4 EUMETSAT]
Preoperational 4 products [4 NOAA]
Demonstration 34 products [14 EUMETSAT, 13 NOAA, 6 JMA, 2 ISRO, 1 KMA]

GSICS Newsletter

https://www.star.nesdis.noaa.gov/smcd/GCC/newsletters.php

Four new Issues of the GSICS Newsletter over the last year

- Over 22 Research Articles and15 Topics of News to which
- Over 70 Scientists contributed as Authors & Co-Authors.
- Reviewed contemporary journal policy on content sharing.
- Contributions from non-GSICS members have increased.
- Replaced mailchimp with NOAA-Email for distribution.

News Letter included in SCOPUS and extensively cited by agencies and friends of GSICS (google scholar, twitter facebook).

2016 Users' Workshop Report

User's Workshop was conducted as an all-day session at the STAR JPSS Annual meeting in College Park MD.

Over 50 researchers and users met to exchange information on advances, applications and requirements for calibration products.

The following were among the key take-away messages:

(1) GSICS activities have matured to the point where they are providing the foundation for a truly Global System of Infrared instrument measurements including Polar and Geostationary satellites,

(2) Methods for Visible, Microwave and Ultraviolet instruments are progressing and are addressing differences in the reference measurements, sensor technologies and Earth signatures in their different spectral regions, and

(3) The ICVS is an important asset in the NOAA participation in GSICS activities.

The complete agenda with links to the talks is available at www.star.nesdis.noaa.gov/star/meeting_2016JPSSAnnual_agenda.php

Collaboration with ISCCP

GRWG	WGII/4	A44.05	GRWG to discuss with ISCCP (SCOPE-CM Project 9) a detailed project proposal for the use of GSICS methodologies to produce a GSICS-compliant ISCCP dataset for evaluation	CGMS-45	OPEN	5.1 (HLPP ref)

- Review the history of ISCCP activities(phase I : 1983-2009) and discuss collaboration between ISCCP and GSICS
  - Phase II will cover extended period (1982-1983, 2010-2015)
  - Cloud products uncertainties are limited by atmospheric correction rather than calibration
- ISCCP calibration three stages(Nominal, Normal, Absolute (temporally stable))
  - VIS is based on vicarious terrestrial targets while IR based on the CDFs
  - ISCCP data cannot be used for temperature trends, but can trend some cloud products (e.g. cloudiness)

- ISCCP could evaluate the impact of GSICS Corrections for GEO imagers on ISCCP cloud products, based on case studies → GCC to coordinate
  - ✓ GPRC to provide tables that map ***IR (11µm)*** counts to radiance and/or TB
  - ✓ GPRC to produce/provide a table mapping ***VIS (0.6µm)*** counts to radiance/scaled radiance if possible
  - ✓ Updated tables for the month of Dec 2009 are the target (other months are also available)

GSICS Reference Documents

- GSICS Documentation Plan (approved at EP-18 and will be published)
- Introduction to GSICS (approved at EP-18 and will be published)
- Vision of GSICS (published)
- Guide to GSICS Products and Services (approved at EP-18 and will be published)
- Terms of Reference (published: updates approved at EP-18)
- GSICS User Requirements replaced by GSICS Services Specification
  - will be discussed and published
- GIRO and GLOD Dataset Usage Policy (approved at EP-18 and will be published)

- To promote shared vision among GSICS members
- For more visibility, and external recognition of GSICS, GSICS Reference documents will be referred in the WIGOS document titled "Initial Guide to WIGOS”

Issue raised by GSICS Data Working Group (GDWG)

The activities of the GDWG are not adequately supported by CGMS agencies.

- new GDWG fact sheet developed to emphasize the benefits of GDWG

Intercalibration data management services, like those provided by the GDWG, are often not explicitly defined in the requirements of the satellite program and therefore are not properly resourced.

E.G: Instrument performance monitoring is a clear requirement of any satellite agency. But part of instrument performance monitoring needs to include intercomparisons with other sensors - which has its own additional data management needs – which are well defined by GDWG and carried out through GSICS. But GSICS has no funding. It leverages funding from satellite programs.

GSICS will develop a best practices and guidelines for instrument performance monitoring so that they can be considered in all satellite programs.

New actions

- GRWG to prepare specifications and methodologies for CGMS agency development of operational instrument performance monitoring systems.
- GRWG to assess the utilization RO for microwave instrument monitoring purposes
- GDWG and GRWG to develop an approach for an Annual GSICS report on the State of the Observing System with respect to Instrument Performance and Intercomparisons with GSICS Reference Instruments (from presentations given at the GRWG meeting)
- GRWG to assess the value of GEO-to-GEO intercalibration for GSICS
- GRWG to develop GSICS Service Specification Document
- EP members to nominate PoC for GDWG
- EP to review maturity criteria for product status
- Recommendation: The GSICS Members are urged to apply the process from development to operations in a quick and efficient manner in order to ensure appropriate visibility to their data and products
- Decision GSICS to support OSCAR/Space Science and Technical Advisory Team

Considerations

- GSICS and Space Weather activities
  - Discussion with Space Weather Task Force on Space Weather Intercalibration Framework
  - One option is an adoption of a GSICS like structure
  - The Maturity of SW intercalibration activities need to be assessed
  - GSICS to consider participation in relevant SW Workshops to demonstrate the GSICS model

- GSICS User Workshop at AOMSUC-8 , Vladivostok, Russia, 16-21, October, 2017

Decisions

- Mitch Goldberg (NOAA) was elected EP Chair
- Kenneth Holmlund (EUMETSAT) continues as EP vice-chair
- GDWG ToRs approved
- Masaya Takahashi (NOAA) elected GDWG Chair
- Approach for electing GDWG vice-Chair was agreed
- GSICS to participate in Oscar Space User Workshop

GSICS
Global Space-based Inter-Calibration System

THANK YOU