Minutes of the 2015 Annual GSICS Joint Working Groups Meeting

16 – 20 March 2015

New Delhi, India

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Synopsis: GRWG minutes recorded from the discussion of agenda items from the joint meeting.	
Date & Time	18th – 20th March, 2015 from 09:00 till 17:30
Location	India

Plenary Mini Conference Session Day 1 – 18th March, 2015

Chair	Tim Hewison (EUMETSAT)
Minute Taker	Tim Hewison (EUMETSAT)
Attendance	CNES: Denis Jouglet EUMETSAT: Tim Hewison, Peter Miu, Sebastien Wagner, Rob Roebeling IMD: A.K. Sharma, Suman Goyal, Virendra Singh, A.K. Mitra, N. Puviarasan, ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava JMA: Hidehiko Murata, Masaya Takahashi KMA: Hyesook Lee, Jae-Gwan Kim NASA: Xiaoxiong ("Jack") Xiong, David Doelling NCMRWF: V.S. Prasad NOAA: Xiangqian ("Fred") Wu, Manik Bali WMO: Jérôme Lafeuille
Remote Attendance	CMA: Xiuqing ("Scott") Hu, Yong Zhang

Agenda Item: 1b WMO and GSICS – 11:40 (20 minutes)	
Presenter	Jérôme Lafeuille (WMO)
Discussion point, conclusions, Actions, Recommendations	

Jérôme will draft an input for the WIGOS Architecture document, and an outline of a chapter of the future Guide to WIGOS on the overall role, structure, and use of GSICS for review in the Friday session.

Jérôme also requested GSICS to document the key processes by which it contributes to the *Calibration* function of the Architecture for Climate Monitoring from Space, which could be addressed in collaboration with CEOS WGCV. This needs urgent attention to inform the Joint CEOS-CGMS WG Climate Geneva on 24-26 March with at least with some preliminary input.

Jérôme proposed renaming GSICS to remove the term inter-calibration, but keep the acronym GSICS. We will discuss this on Friday.

Jérôme also expressed WMO's support for GSICS, and announced readiness of WMO to fund the WG chair's travel to Exec Panel meetings.

Fred asked about the need for putting GSICS corrections in the header of L1 products. Jérôme clarified that it is an action requested by the EP, as in their view this was desirable for a broader use of GSICS products in near real-time applications (e.g. volcanic ash detection, seamless composite imagery, sea surface temperature).

A.K. Sharma asked about the use of GSICS corrections in NWP data assimilation and discussed whether there would be demonstrable benefits, given that NWP assimilation already performs bias corrections . We agreed it would be highly desirable to work with NWP centres to test the hypothesis that reducing the bias in the L1 data would result in a more linear bias correction process by the model, yielding improved data usage.

Agenda Item: 1c CLARREO update – 12:00 (20 minutes)	
Presenter	B. Wielicki/D. Doelling (NASA)
Discussion point, conclusions, Actions, Recommendations	

Work on CLARREO hyperspectral lunar irradiance observations - will it be globally available - or ITAR restricted?
CLARREO would aim to address that - and Dave will feed back this requirement to the CLARREO team.
Fred: Q on benefit with of single CLARREO spacecraft without the ability to compare with others. We can hope that other agencies follow similar initiatives.

Agenda Item: 1d SI-traceable demo instrument for FY-3 – 12:20 (20 minutes)	
Presenter	Xiuqing ("Scott") Hu (CMA)
Discussion point, conclusions, Actions, Recommendations	

LESIRB - Lunar and Earth Spectral Imager Radiometry Benchmark: Due to no good on-board calibration in solar band currently, CMA are considering to establish the SI-traceable TRUTH-like instrument in the future FY-3 satellite and provide consistent calibration reference of solar bands for other instruments. This demo instrument will cover 350-1000nm with a spectral resolution of 0.5nm and the spatial resolution of 100m in 50 km swath. This SI-traceable instrument will use the Space Cryogenic Radiometer as the primary standard and transfer to hyperspectral imager through a complicated on-board transfer chain.

Not all FY3 satellites will be equipped with this technology and this plan currently is under discussion.

Agenda Item: 1e Inter-calibrating Meteosats-HIRS/AIRS/IASI – 12:40 (20 minutes)	
Presenter	Rob Roebeling (EUMETSAT)
Discussion point, conclusions, Actions, Recommendations	

Rob showed that HIRS/2 provided a better match to the SRF of the water vapour channels of Meteosat First Generation imagers, so it is chosen as a reference, in preference to HIRS/3 or /4. AIRS is then used to fill the gap until IASI is available as a reference for the more recent period.

Biases estimated from the HIRS/2 on NOAA-14 and -15 as references are very similar. Both track bias drifts and jumps associated with decontaminations of MVIRI.

For the IR channel the trend is continued nicely into IASI record, whereas for the WV channel a difference in bias is observed between the recalibration against observations from HIRS/2 or from IASI. Also checked impact of GSICS Corrections based on IASI confirmed it successfully removed calibration drift in IR channel, but WV channel shows residual cycles and differences between using HIRS/AIRS and IASI as references. However, both confirm the Meteosat calibration was much better after switching to use the on-board blackbody.

AK Sharma asked whether the same procedure could be applied to recalibration of INSAT archive data. EUMETSAT can share code and associated documentation through GSICS once it is ready for release.

The question of how to make the distinction between these inter-calibration products and the existing NRTC/RAC products was raised - and will be followed up in more detail tomorrow.

Agenda Item: 1f Himawari-8 Update – 14:00 (20 minutes)	
Presenter	Hidehiko Murata (JMA)
Discussion point, conclusions, Actions, Recommendations	

Hidehiko provided an overview of the calibration activities for the new Himawari-8/AHI imager being conducted at JMA. JMA expect this to be operational in mid 2015.

IMD is interested in receiving real-time data from Himawari-8. JMA will advise on how to access the data.

Dave asked about the SBAF results from ray-matching with VIIRS, which may be explained by the fact that ocean colour has not been accounted for yet. Hidehiko confirmed the lunar observations will continue after commissioning tests.

Agenda Item: 1g NOAA JMA-NESDIS collaboration on Himawari – 14:20 (20 minutes)	
Presenter	Fred Wu (NOAA)
Discussion point, conclusions, Actions, Recommendations	

Fred reported on a collaboration of NOAA and JMA scientists within GSICS in preparation for the forthcoming launch of GOES-R/ABI. Fred confirmed the superb image quality of AHI, the most advanced imager currently in geostationary orbit. Their work at JMA was able to demonstrate improvement of existing products, and the improve INR, which offers the potential to develop new products, such as volcanic ash.

Fred commented that it usually takes 2 years to fully understand the nuances of a new generation of satellite instruments.
Need for INR tests? JMA use landmark predictions, whereas NOAA uses star trackers.

Agenda Item: 1h CNES Comparison of Hyperspectral TIR sensors – 14:40 (20 minutes)	
Presenter	Denis Jouglet (CNES)
Discussion point, conclusions, Actions, Recommendations	

Denis described 3 different approaches to inter-compare hyperspectral infrared sensors necessary to confirm the stability of the GSICS reference instruments. Same approaches reported last year, but now with more data!

1.   Direct comparison by SNOs
Same pattern as last year - largest biases in IASI-A/B in long-wave band, B1
investigated suggest this may be due to non-linearity. Need to update non-linearity table.
Which is more consistent with AIRS/CrIS? - IASI-B
May also need to update spectral calibration coefficients.
Double Differences with AIRS and CrIS
Same pattern as last year.

2.   Comparison of massive means
These results also show IASI-A/B differences <0.05K, and largest in long-wave band B1
But results for clear and cloudy skies are very different! Probably due to calibration of MetopB/AVHRR, which is used to generate cloud flag.

3.   Obs-Model Double Differences
Algorithm developed at LMD, being made operational at CNES
2014 results based on ECMWF re-analysis background. Will extend later.

Consistent results between CNES and LMD implementation?
IASI complete uncertainty budget (GRWG action 14.13) - will report in future

Fred asked whether the spectral calibration could influence the relative biases - in particular generating features in CO_2 band. It was also suggested that a standard scene radiance spectrum was used to convert the biases from radiances into brightness temperatures.

Denis concluded that CNES recommend IASI-B be considered as the Primary Reference for the GSICS IR band.

Agenda Item: 1i SRF retrieval using AIRS/IASI/CrIS radiances – 15:00 (20 minutes)	
Presenter	Manik Bali (NOAA)
Discussion point, conclusions, Actions, Recommendations	

This is an interesting application of inter-comparisons with hyperspectral references, which could form the basis of future GSICS products.

Manik attributed the differences AATSR-IASI (~0.11K) in the 11µm band to a calibration bias in IASI. But his method of retrieving the SRF, this attribution does not matter. Just need to apply empirical bias correction first.

SI-traceability of blackbodies alone does not ensure SI-traceability of the instruments observations on orbit.

Manik suggested this method could also be applied to broadband instruments. Currently developing the math for this. Need to work on real in-orbit examples.

Tim pointed out that the previously suggested variational inversion method could be used to impose constraints, such as smoothing SRFs and not giving negative SRFs as well as yielding uncertainties.

Agenda Item: 1j Diurnal calibration of INSAT-3D Sounder/Imager using AIRS/IASI – 15:20 (20 min)	
Presenter	Munn V Shukla (ISRO)
Discussion point, conclusions, Actions, Recommendations	

Munn highlighted the need to first establish all other calibration bias dependences before combining different reference instruments. Otherwise, double differences will alias other calibration dependencies (e.g. scan dependent bias and different collocation patterns). Incomplete coverage of diurnal cycle using IASI and AIRS - need hyperspectral sounder in another orbit.

Agenda Item: 1m INSAT-3D calibration campaign in Jaisalmer – 16:20 (20 min)	
Presenter	A.K. Mitra (IMD)
Discussion point, conclusions, Actions, Recommendations	

AK Mitra concluded that the site may not be suitable for characterisation of INSAT-3D data due to limited size.

Recommendation: IMD to investigate to use of another test site during the summer. Additionally, IMG to investigate the use of Dunhuang test site.

Agenda Item: 1n Reference site Ground-based Automatic Measurement system for CAL/VAL – 16:40 (20 min)	
Presenter	Yong Zhang (CMA)
Discussion point, conclusions, Actions, Recommendations	

Many automatic observing instruments were tested during 2014 China Radiometric Calibration Sites (CRCS2014) field campaign, including Dunhuang Gobi and Lake Qinghai. A field observing station at CRCS Dunhuang Site is constructing now and will be completed at the end of this year, including house, observing field, instrument platforms, power supply facilities, tower crane, 1.4km road and safeguard facilities. The field observing station will be an open field test and exchange platform for sharing of test data, research and infrastructure, promote exchanges and cooperation between the relevant disciplines and units. All of these continuous, automatic, operational field observing data can be used to validate GSICS correction, achieve level 1 data quality control and validation, and be traceability to absolute calibration standards.

Agenda Item: 1p ARCSTONE Lunar Spectral Calibration Mission – 17:20 (20 min)	
Presenter	C. Lukashin / Dave Doelling (NASA)
Discussion point, conclusions, Actions, Recommendations	

NIST are making traceable observations from Mona Loa from 2016.
Lunar libration cycle introduces 2% peak-peak variations in lunar irradiance. Can be sampled in a 3 year mission, compatible with NASA's SmallSat program.

Action: S. Wagner (EUMETSAT) to draft letter of support from GSICS for ARCSTONE proposal to send to Jérôme by end April 2015. [Post-meeting note: This action has already been closed by ARCSTONE team.]

Plenary GRWG+GDWG Session Day 2 – 19th March, 2015

Chair	Tim Hewison
Minute Taker	Sebastien Wagner
Attendance	CNES: Denis Jouglet
	EUMETSAT: Tim Hewison, Peter Miu, Sebastien Wagner, Rob Roebeling
	IMD: A.K. Sharma, Suman Goyal, Virendra Singh, A.K. Mitra, N. Puviarasan
	ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava
	JMA: Hidehiko Murata, Masaya Takahashi
	KMA: Hyesook Lee, Jae-Gwan Kim
	NASA: Xiaoxiong ("Jack") Xiong, David Doelling
	NOAA: Xiangqian ("Fred") Wu, Manik Bali
	WMO: Jérôme Lafeuille
Remote Attendance	ISRO: Yodgeep Desai
	JAXA: Keiji Imaoko
	JMA: Arata Okuyama
	EUMETSAT: Bart Viticchie, Viju John, Pablo Benedicto
	CMA: Zhe Xu, Li Yuan, Xiuqing ("Scott") Hu, Yong Zhang, Lin Chen
	NOAA: Larry Flynn
Part Time	

Agenda Item: 2b GRWG Briefing Report and MW sub-group report – 09:10 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT (Chair GRWG)
Discussion point, conclusions, Actions, Recommendations	

Question about how to define roles and responsibilities between UV and VIS/NIR group to avoid duplication.

Recommendation: collaboration and interactions between the VIS/NIR and UV sub-groups should be in place as there are overlaps in interests, skills and expertise.

Reviewed outstanding actions on GRWG chair:
GRWG06_08: Action about desert ATBD should be kept open as it is still of interest. De-prioritised. Fred Wu will follow up on this.

GRWG06_17 (identify time overlaps between geostationary satellites): Tim proposed to nominate a member of the GRWG to coordinate this action.
Modify Action (GRWG06_17): Jérôme will support this action through OSCAR.
Modify Action (GRWG06_17): GCC to check the available info (Masaya mentioned that the info was communicated to Fangfang some years ago). GCC should forward the available info to Jérôme.
Recommendation GPRCs: to investigate available info and usefulness.

Simplifying GSICS product: for new users, a web interface with a front-end guide to prompt users to the correct product could be put in place. WMO stressed importance of providing such an interface.
Action: GCC (Manik Bali) to write a prototype guide to product selection as part of GSICS Product Guide and circulate for review by 2015 GUW.
From WMO point of view, this is a very important action. The GSICS product catalogue should be ultimately registered on the WIS (WMO Information System) portal as a "service".
Pete mentioned that GDWG has some ideas already to address the issue of guiding users through the catalogue and enhancing the product format.

Mini survey: Manik Bali asked if the participants to the survey were representative of the whole GSICS members as the results may be biased by the needs of a few agency only.
Pete mentioned that member commitment should be addressed during the meeting as it must be understood that GSICS is a collaborative effort and as such all members should commit.

Tim would like a vice-chair to be nominated during the meeting or very soon after. Currently vice-chairs are Fred Wu (NOAA), as former Chair, and Dohyeong (KMA). Jérôme would like every GSICS member to feel engaged and consider the opportunity to step forward, since the chair/vice-chair positions should be open for rotation among GSICS members.

Action: GRWG Chair to add a meeting on NWP in the agenda of the next GSICS web meetings in 2015/2016.

Agenda Item: 2c GDWG Report – 09:40 (20 minutes)	
Presenter	Peter Miu – EUMETSAT (co-chair GDWG)
Discussion point, conclusions, Actions, Recommendations	

Dave Doelling (NASA) acknowledged the benefits of having the plotting tool available and thanked the Data Working Group for developing and maintaining this tool.

Fred Wu thanked Pete for mentioned the need to address agencies limitations when using common tools. There is clearly a need to interact more face to face to define tools that can be used by all GPRCs.

Agenda Item: 2d GCC Report – 10:00 (20 minutes)	
Presenter	Manik Bali - NOAA (GCC)
Discussion point, conclusions, Actions, Recommendations	

GPPA ready to review candidate DCC demonstration products.

Review of GSICS Products currently in Demo and Pre-Operational phase.

EUMETSAT : GRWG/GDWG assessment of product quality/maturity + User feedback
NOAA: Diurnal uncertainties

Need for defining a GSICS Data Use and Sharing Policy. Full credit should be given to code and algorithm developers where used by others.

Action: GCC to prepare policy on GSICS data and code use and sharing based on Lunar Data Policy as a draft for by 2015 GUW.

WMO commended the GCC for coordinating the efforts on GSICS Quarterly and considered that top priorities for the GCC should be: promoting products through the GPPA, maintaining catalogue of GSICS products with explanations and access information, maintaining repository of tools and procedures, and user outreach in general.

Agenda Item: 2e IMD Agency Report – 10:20 (20 minutes)	
Presenter	A.K. Sharma - IMD
Discussion point, conclusions, Actions, Recommendations	

A.K. Sharma provided a review of the history of India's geostationary satellites

INSAT-3D and Kalpana-1 are close in orbit (~80°E) and are now configured as an integrated system to provide full disk images every 15 minutes, each with a 30-min repeat cycle (staggered acquisition starts).

Data reprocessing – previous attempted inter-calibration with NOAA/AVHRR using brightness temperature scatterplots

Now joined IOGEO – will follow same methodology (HIRS/AIRS/IASI).

ISRO are planning further cooperation with IMD in the inter-calibration. Will report division of processing at next meeting.

IMD are investigating new test site in Runn of Kutch (salt desert in Gujurat) instead of Jaisalmer desert. However, the site is difficult to reach due to the nature of the site (salt marsh). EUMETSAT is interested by following up the outcome of this activity as there is a need for the calibration of the current Meteosat IODC mission. NOAA and NASA also mentioned their interest in following the outcome of the work done by IMD and ISRO.

Action: IMD to report on results of investigation into suitability of Runn of Kutch as a test site for INSAT-3D calibration, following ground characterisation, and share details with GSICS by email.

Recommendation: ISRO and IMD to clarify the split of the activities in the calibration of INSAT-3D and report on the organisation of the various activities (role and responsibilities).

Agenda Item: 2f CMA Agency Report – 11:00 (20 minutes)	
Presenter	Xiuqing (Scott) Hu - CMA
Discussion point, conclusions, Actions, Recommendations	

Three new members from CMA joined GSICS activities.

FY-3C is the first operational satellite among the FY3 series and the performance and stability is better than previous experiment instruments onboard FY-3A/3B. But the heavy nonlinearity in solar bands of FY-3C/MERSI is found and obtained from the combined calibration method based on the integration of MODIS xcal, GOME-2 Xcal, Lunar, multi-sites.

The visible band of FY-2D, 2E and 2F have large biases with respect to MODIS using the DCC method. FY-2F is the most stable one. The operational calibration coefficient of them was updated based on DCC and vicarious calibration at Dunhuang site. After applying the DCC method, the operational calibration shows good agreement with collocated observations (Ray-matching).

The development of FY-2-IASI GSICS demo products is done and its ATBD is ready to be reviewed. The development of FY-3C/MERSI, VIRR, IRAS LEO-LEO IR demo products and ATBD are also in the same situation.

Scott presented the Chinese 863 project on lunar calibration, approved from Chinese MOST. He also mentioned that some field campaign will be conducted in June 2015 (spectrometer + hyper-spectral)

for the validation of current Lunar model and collect more data for lunar model establishment.

Scott emphasised the importance of the GSICS activities to improve instrument calibration and monitoring at CMA.

CMA is observing non–linear behaviour for FY-3C/MERSI when using various methods for the calibration.

Recommendation: Scott to report at a further meeting on the progress made on the lunar calibration project (next Lunar Calibration WS or GSICS annual meeting).

Scott mentioned that once the data quality is ensured, data could be shared within the community.

Agenda Item: 2g CNES Agency Report – 11:20 (20 minutes)	
Presenter	Denis Jouglet - CNES
Discussion point, conclusions, Actions, Recommendations	

Denis also reported the result of tests on the IASI by stopping the Compensation Device, which did not show any negative performance effects, and improved some aspects of noise.

He also reported the prospects for IASI-NG, which promises improved performance in many aspects. He confirmed that all instruments in this series will be built and tested in one batch, then put into storage.

CNES are preparing uncertainty analysis for desert cross-calibration method.

The Pleiades Orbital Lunar Observations are now available in the SADE database.

Action: D. Jouglet to investigate the availability of POLO in SADE database and report to GSICS.

A.K. Sharma asked about software to read the IASI data. Tim invited IMD to contact the EUMETSAT helpdesk to submit an inquiring.

Agenda Item: 2h EUMETSAT Agency Report – 11:40 (20 minutes)	
Presenter	Sébastien Wagner - EUMETSAT
Overview	The progress made by EUMETSAT since last year meeting were presented. After recalling the current list of people involved in GSICS activities, a overview of the current and future missions was given, with a particular interest on the on-going discussions regarding the replacement of Meteosat-7 IODC mission. Then the presentation focused on the actions: first the ones that were closed in the last year, and then the list of remaining actions. Finally, a series of slides summarised for each GRWG sub-group the latest achievements, the on-going activities (including the ones that are not strictly speaking GSICS but still of interest) and their future plans.
Purpose	
Discussion point, conclusions, Actions, Recommendations	

Sebastien reported EUMETSAT's plans to move Meteosat-8 to 40°E, which could place in 2016, subject to final approval by council, depending on successful launch of Meteosat-11 and continued good performance of Meteosat-9 and -10. **Compliments 0° service and INSAT-3D/Kalpana.**

Action: GRWG05_08 - move to CNES
Action GWG_13.25 - can be closed.

Action: KMA to present the use BJ Sohn's DCC algorithm to build a BRDF model.

Action (GWG_13.30): Transfer responsibility to GCC to coordinate

Dave Doelling (NASA) commented on the difficulty of obtaining information on Metop/AVHRR from EUMETSAT. Fred confirmed that NOAA have this information and should put it on the web CPID

Action: Fred to follow up on the availability of information on Metop/AVHRR instruments, for which NOAA is responsible.

Masaya Takahashi (JMA) expressed his thanks to EUMETSAT for hosting him as a visiting scientist during 2014.

Agenda Item: 2i ISRO Agency Report – 12:00 (20 minutes)	
Presenter	Pradeep Thapliyal - ISRO
Discussion point, conclusions, Actions, Recommendations	

Pradeep provided an overview of the current and planned satellites operated by ISRO and their payloads.

ISRO use RAOB/Analysis + RTM to monitor INSAT-3D sounder.

Pradeep reported problem accessing IASI data through EUMETCAST.

Action: Tim to put Pradeep in touch with 3G activity to assess uncertainties in RAOB-Sat.

Agenda Item: 2j JAXA Agency Report – 13:20 (20 minutes)	
Presenter	Keiji Imaoka - JAXA
Discussion point, conclusions, Actions, Recommendations	

Keiji provided an update on JAXA current and planned satellites and their instrument payloads. These include FTS and CAI instruments on GOSAT, which are already providing lunar calibration results, and the moderate resolution (~250m) SGLI instruments on GCOM-C, which is designed to perform the lunar calibration by pitch manoeuvres. Seb will check with JAXA the possibility to share those data.

He also described JAXA's inter-calibration activities related to microwave imagers, which are coordinated through GPM X-CAL group, and expanded on the calibration of the DPR dual frequency precipitation radar.

Action: JAXA to correspond with Microwave Sub-Group to consider whether GSICS products could/should be generated for active instruments such as DPR.

Agenda Item: 2k JMA Agency Report – 13:40 (20 minutes)	
Presenter	Masaya Takahashi - JMA
Discussion point, conclusions, Actions, Recommendations	

Masaya reported his progress over the last year on may aspects of GSICS activities, which will be reported in other topics during the meeting, including GEO-GEO using a web application developed by Hidehiko, which is very useful for real-time monitoring to compliment GEO-LEO IR.

He also reported a single static link page recently developed to be linked from WMO OSCAR.

JMA can share all lunar observation with the community.

JMA has been working on GEO-GEO IR inter-calibration with MTSAT-2 and FY-2E.

Agenda Item: 2l KMA Agency Report – 14:00 (20 minutes)	
Presenter	Hyesook Lee - KMA
Discussion point, conclusions, Actions, Recommendations	

Hyesook showed the nice complementarily of vicarious methods for VIS channels of COMS, covering different parts of the dynamic range.

Hyesook also showed results on the double difference of IASI-A and -B with COMS1, which resulted in small differences (<0.5K). She also showed that the cold bias in the WV channel could be explained by an SRF shift of 2.5cm-1.

KMA plan to submit COMS-IASI to GPPA as demonstration product and are currently reviewing data format.

Action: KMA to clarify during the discussion on lunar data policy the position of KMA wrt to their data (already closed).

Agenda Item: 2m NASA Agency Report / MODIS and VIIRS status – 14:20 (20 minutes)	
Presenter	Jack Xiong
Discussion point, conclusions, Actions, Recommendations	

Jack provided an update on the current status of MODIS and VIIRS instruments, which are continuing to perform as predicted. He noted the VIIRS mirror contamination during the mirror manufacturing.

Question: Do we keep Aqua/MODIS as our Primary GSICS reference for VIS/NIR channels?
Answer: Yes! But need to develop method to transfer calibration. See Aisheng Wu's presentation

Saturation in MODIS 0.8µm band? Yes – always over DCCs (answer by Jack and Dave).

He also reported the status of Landsat-8 OLI, which is very stable. Even the shortest wavelength (Band 1 @443nm) has only degraded 1% over 2 years.

When asked how this little degradation was possible, Jack explained that OLI was based on a push-broom design with no scan mirror to get contaminated - a design which is replicated in the CLARREO concept.

Agenda Item: 2n NOAA Agency Report – 14:40 (20 minutes)	
Presenter	Fred Wu - NOAA
Discussion point, conclusions, Actions, Recommendations	

Fred gave an update on the NOAA/NESDIS activity related only to supporting the calibration of GOES. (Although he also introduced OMPS-GOME2 inter-calibration, made during his absence from the GOES team).

Plans for GOES-R Cal/Val include field campaigns with airborne instruments.

Actions: Close actions on Isaac Moradi and AIRS flag files, as no longer needed.

Action: Outstanding action on ISRO and GCC to coordinate for implementation of GEO-LEO IR by ISRO - <ins>add IMD to ISRO</ins>.

Action GLCWS_14.2 (from Lunar Calibration Workshop): to resolve different VIIRS oversampling factors - still open.

Fred raised the question of the requirement for GSICS products to be incorporated into L1 product to achieve operational status is already implemented for VIS, but still not progressing for the IR side, due to lack of user support. It was clarified that this is not a requirement from the GPPA, but the EP requested that all GPRCs investigate the feasibility of doing so. Jérôme clarified that including the product would encourage adoption within the user community. For example the DCC algorithm would be able to make use of this correction.

Action: EUMETSAT to circulate report on investigation of the impact of the GSICS correction on atmospheric motion vector winds and other products.

Action: NOAA to report on plans to incorporate GOES-R/ABI in ICVS.

Action: NOAA to provide their GEO-LEO IR algorithm code to IMD.

Agenda Item: 2o USGS Agency Report – 13:20 (20 minutes)	
Presenter	Greg Stensaas - USGS
Discussion point, conclusions, Actions, Recommendations	
Not presented.	

Agenda Item: 2p DOI overview to support its use in GSICS – 16:00 (20 minutes)	
Presenter	Peter Miu - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Peter explained what a DOI is and how they are used. He pointed out they are already in use in GSICS for Quarterly newsletter.

Considerations: worthy of citation? yes!
Who will manage? Centralise or each agency responsible for own products?
New version means new DOI. As such data sets, which are continuously updated for near-real time applications, would not be eligible for DOIs. Only products derived from reprocessing/recalibration may be eligible.

Decision: It was agreed that DOIs are not a requirement for GSICS products to be promoted to

operational status.

The question of responsibility was also raised, as there were concerns about how the continuing maintenance of the landing pages could be managed.

Action: GCC to investigate application of DOIs to NOAA's operational GOES-IASI products and associated version control and report.

Agenda Item: 2q MIIC Framework – GSICS requirements – 16:20 (20 minutes)	
Presenter	Dave Doelling - NASA
Discussion point, conclusions, Actions, Recommendations	

Dave described the fabulous potential of the MIIC framework to support inter-calibration activities. NASA team in charge is working on putting together a proposal and GSICS interest would be highly beneficial. Non-US agencies could also participate to the project. Standing orders will be supported on a daily basis. They are looking for beta testers during the next year.

What instruments are available? NCDC datasets only VIIRS, CrIS, ATMS, OMPS. Potentially CALIPSO too. Larry further clarified that this is limited to operational flows, and some are patchy.

Action: Dave to investigate the use of MIIC to generate DCC data for near-real-time processing of DCC using VIIRS.

Can we copy the design? Based on OPeNDAP, so will only work with HDF, netCDF, so it could be transferred to other agencies.

Action: Dave to investigate potential to transfer this technology to other data centres.

Recommendation: DCC teams to provide feedback on the MIIC in order to establish the user requirements.

Agenda Item: 2r What is a GSICS product? – 16:40 (20 minutes)	
Presenter	Larry Flynn - NOAA
Discussion point, conclusions, Actions, Recommendations	

Larry also raised the question of whether we have a responsibility to preserve intermediate data - and maybe call that a GSICS product?

Instrument event databases and instrument information may be coordinated and promoted through GSICS, but may not need to be reviewed through the GPPA.

Jérôme suggested that if GSICS adds value to the SRF (e.g. through adjustments and harmonized presentation) it should be a GSICS deliverable. Would not necessarily be reviewed through GPPA as the GSICS "products".

Tim: Is it inter-calibration? If not, then not it's not a GSICS product.

Decision: Retrieved SRFs could be considered as a GSICS Product, if they are derived on an ongoing basis, as a result of inter-calibration. However, it was recognised that adjustments can be made during commissioning as a result of GSICS algorithms and it would be difficult to review these through the GPPA on a useful timescale.

It was discussed whether Inter-calibration algorithms themselves could be considered as potential GSICS products. This would require them being reviewed through the GPPA, which would require the algorithms to be applied to test datasets to check their quality.

Larry clarified that this is limited to operational flows.

Recommendation: GSICS sub-groups should consider promoting approved transfer standards and tools to the community, endorsed as being suitable for inter-calibration.

Decision: Agreed on terminology:
- **GSICS Deliverables include GSICS Products, Tools, Reference datasets, Algorithms and Documents:**
- **GSICS Tools for use by inter-calibration developers, (GIRO, SBAF, …)**
- **GSICS Products for users of satellite data, including calibration corrections/coefficients**
- **GSICS Algorithms, which describe inter-calibration processes, (described by ATBD)**
- **GSICS Documents, including Guidelines, Reports, …**
- **GSICS Recommended Standards, including Solar spectrum, …**

Action: Jérôme to draft proposal on terminology for GSICS deliverables based on this discussion and circulate for review before Exec Panel, then the User Workshop.

Agenda Item: 2s Requirements for NRTC/RAC/ARC – 16:40 (20 minutes)	
Presenter	Rob Roebeling - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Rob reviewed the inter-calibration requirements for various climate application projects and explained how "absolute" and "relative" re-calibrations (FCDRs) can be inter-converted using SBAFs. Note that this is a preliminary review and is mostly based on informal discussions with users from the different communities. To consolidate the list of requirements we may need make this a more official action and discuss it in more detail with the different user communities.

The requirements from the different user communities differ. The Near-Real-Time community appreciates timely availability of the calibration. When the data are used for assimilation in a Numerical Weather Model the preference is to have sensor equivalent calibrations ("absolute calibrations") including error estimates and information on the spectral response function. The retrieval community is split in their opinion on whether they prefer sensor equivalent calibrations ("absolute calibration") or reference sensor normalised calibration ("relative calibration") information. Therefore, the International Clouds Working Group asks GSICS to provide both types of calibration information. Within the Climate community (GCOS) there is are strong requirements on the regular evaluation of the recalibration quality from different sensors and performing consistency checks of the calibrations from multiple sensors. Moreover, this community asks for information on time-dependent biases and random errors in the calibrations. For the sake of climate these types of calibrations are needed for past/present/(and future) satellites. All communities emphasis the need for providing the calibration information, either as separate files or as part of recalibrated Level-1 data or an Fundamental Climate Data Record, in standard formats (e.g. BUFR or netCDF) using standard metadata naming conventions.

This terminology was debated. Sebastien suggested adopting the term "homogenised".

Action: Rob to propose new terminology, based on the term "homogenised" or "MODIS (or whatever)-equivalent".

Action: EUMETSAT to circulate Rob's review of FCDR inter-calibration requirements to GRWG/GDWG, identifying which type of inter-calibration product could meet each of these.

Action: GCC to review these FCDR inter-calibration requirements, in the framework of the GSICS User Product Guidance, to identify common inter-calibration types, which are not specialised to specific applications, and report to GRWG. These could be considered as potential future GSICS products.

Agenda Item: 2t GRWG Data, Products, Combination Tools; GDWG understanding summary – 17:20 (20 minutes)	
Presenter	Masaya Takahashi - JMA
Discussion point, conclusions, Actions, Recommendations	
Cancelled as covered in GDWG	

GRWG Breakout Session Day 3 – 18th March, 2015

Chair	Dave Doelling
Minute Taker	
Attendance	CNES: Denis Jouglet
	EUMETSAT: Tim Hewison, Sebastien Wagner, Rob Roebeling
	IMD: A.K. Sharma
	ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava
	JMA: Hidehiko Murata
	KMA: Hyesook Lee
	NASA: Xiaoxiong ("Jack") Xiong, David Doelling
	NOAA: Xiangqian ("Fred") Wu
	WMO: Jérôme Lafeuille
Remote Attendance	EUMETSAT: Bart Viticchie, Viju John, Pablo Benedicto
	NASA: Amit Angal, Aisheng Wu
	NOAA: Fangfang Yu
	JMA: Arata Okuyama
	USGS: Tom Stone (very briefly),
	CMA: Xiuqing ("Scott") Hu, Ronghua Wu, Yong Zhang, Wang Hongbo, Lin Chen, Sun Ling, Xu Na, Li Yuan
	KMA: Tae-Hyeong Oh
Part Time	

Agenda Item: 3a Intro to VIS/NIR session – 8:30 (20 minutes)	
Presenter	Dave Doelling - NASA
Discussion point, conclusions, Actions, Recommendations	

It was agreed that in principle, the Sun should be the reference for these products.

For DCC, the anvil conditions are problematic. A way to smooth their impact is the statistical approach. If there is a way to filter better anvils it would be highly beneficial to the DCC method.

Scan angle dependencies, in particular for reference instruments, are still a issue and should be validated in time.

Dave presented a plan for the coming year activities.

Action: A. K. Sharma to interact with GDWG to provide INSAT-3D SRFs.
Action: EUMETSAT to interact with KNMI to see if they could process the SCIAMACHY data to have the SBAFs for the last two bands (beyond 1900nm). NASA is ready to provide the code.
Action: KMA to deliver their RTM DCC BRDF model.

MODIS B1: 1.6% difference between Thuillier and Kurucz spectra!

Decision: The solar spectra should be added in the GSICS data base (as the SRFs).

Action: Jack Xiong (NASA) to deliver the MODIS spectral response to the GSICS wiki
Action: Sebastien Wagner (EUMETSAT) to deliver the Wehrli solar spectrum to the GSICS wiki
Action: GCC to add link from SRF page on GSICS Wiki to NASA's SRF plotting page, where these can be visualised.

DCC can be used to detect discontinuities that are larger than the temporal standard deviation.
Dave suggests that ray-matching on a daily basis is the best method to detect discontinuities.

Agenda Item: 3b MODIS scan angle and lunar referencing – 8:50 (20 minutes)	
Presenter	Jack Xiong - NASA
Discussion point, conclusions, Actions, Recommendations	

In VIIRS it is the telescope that moves. So all optics are fixed. But there is a mechanism close to the focal plane to rotate the image back. Doing this it is more efficient (reduced scan angle dependence). In MODIS, the rotation is done at the entry mirror point, so far away from the focal plane. That leads to more scan angle dependence.

The new Landsat-8 did not degrade much over the last 2 years after launch. It was determined it does not scan by a mirror. This concludes that the mirror is the source of most of the degradation.

The degradation factor of the solar diffuser is integrated into the reflectance factor (M1, slide 6)

Different degradations are observed with the Solar Diffuser (SD) and with the Moon (Slide 9). This difference comes from a scan-angle dependence as two different angles are used. A law is derived for Earth view data to correct the data.

Some channels in Coll6 have still some problems. Solutions are under science testing. Does that mean that there will be a Coll7? Answer: Not yet

Using VIIRS observations, over a year of data, we can see there is some libration residual as VIIRS cannot have 'jumps' like the lunar calibration has.

Tim asked if we should come up with reference view angle. Answer: the SD view should be the reference as it is the absolute calibration.

We may need different scan angle corrections for MODIS for different GSICS products (Moon, DCC).

Agenda Item: 3c MODIS to VIIRS transition – 9:10 (20 minutes)	
Presenter	Dave Doelling - NASA
Discussion point, conclusions, Actions, Recommendations	

In the MET-09 NIR16 band there is a jump in the count time series (after September 2011). Dave will provide the date of the observed jump.

Can use DCC to characterise scan angle dependence (RVS), which changes with time due to mirror degradation.

Agenda Item: 3c MODIS to VIIRS transition – 9:10 (20 minutes)	
Presenter	Aisheng Wu (presented by Jack) - NASA
Discussion point, conclusions, Actions, Recommendations	

Aisheng described a methodology based on combining SNO, Libya-4 and Dome-C to compare the calibration of MODIS and VIIRS.

Uses NASA LandPeate processing of VIIRS calibration, not those from the CLASS server.

Uses MODTRAN to derive SBAF to compensate for different SRFs, which is a function of viewing angle, surface type and water vapour, which are taken from L2 satellite data.

VIIRS is 1.3% darker than MODIS Aqua over desert.

VIIRS SDR show stable trend within 1% over first 3 years of mission.

Results show relative calibration within 2% for most RSB and 3% for I2 band.

There will be continued work to tie the calibration of MODIS to VIIRS.

Agenda Item: 3d Extending DCC to other bands and DCC ray-matching – 9:30 (20 minutes)	
Presenter	Dave Doelling - NASA
Discussion point, conclusions, Actions, Recommendations	

DCC calibration can be applied to all other visible channels. The trend stability was less than 1 for wavelengths less than 1µm and ~2% for wavelengths greater than 1µm.
The DCC trend standard deviations were consistent between Terra-MODIS, Aqua-MODIS, and NPP-VIIRS of the same channel.

DCC calibration was applied to the Meteosat-9 0.86µm and 1.6µm. The 0.86µm has a lower trend standard deviation than the 0.65µm. The DCC calibration Met-9 1.6m showed a discontinuity after 2012.

To reference the GEO DCC mode reflectance to Aqua-MODIS, it is compared to the Aqua-MODIS DCC mode reflectance. To validate this assumption, DCC ray-matching between Aqua-MODIS and the GEO is performed over DCC clouds. DCC ray-matching can have less restrictive matching criteria, than grid ray-matching.

It was shown that DCC and grid ray-matching gave consistent gains. However, DCC ray-matching had half of the standard deviation of gridded ray-matching.

Agenda Item: 3e Combining algorithms: DCC+Lunar – 9:50 (20 minutes)	
Presenter	Fred Wu (NOAA)
Discussion point, conclusions, Actions, Recommendations	

In Fred's previous analysis, reported in Toulouse meeting in 2010, All methods were showing seasonal variations - especially deserts
Fangfang's approach: (for desert, DCC, ray-matching (over cloud), Moon, stars(inactive))
1. Remove seasonal variations
2. Used monthly stats
3. Normalize monthly data
4. apply recursive filter
GOES-MODIS Ray-matching: apply reflectance filter - effectively DCC ray-matching

Why do target measurements change in time?
1. Degradation/Anomaly of the instrument
2. Natural variability of the target
3. Inherent uncertainties of the vicarious calibration

4. How to combine (aim to isolate 1 from 2 & 3):
5. Active - with weights assigned by experts (could also be zero)
6. Passive - weighted by STD, with recursive filter (2-sigma)

Still need to account for scan angle dependence - both in GOES and MODIS

Fred claimed it takes at least 2 years to establish a reliable seasonal cycle if info can be combined (Dave says 3).

Agenda Item: 3f DCC inter-calibration for FY2 and FY3 visible – 10:50 (20 minutes)	
Presenter	Lin Chen - CMA
Discussion point, conclusions, Actions, Recommendations	

Lin had analysed different vicarious calibration methods for FY3/MERSI and found they gave different results, which he attributed to a residual non-linearity in the instrument's response. He also found that there is significant difference of DCC reflectance from FY-2D, FY-2E and FY-2F. This means that their visible calibrations have large bias. The calibration coefficient update based on DCC improve the visible calibration results which was validated by MODIS SNO.

He combined these to derive an operational calibration of MERSI.

Agenda Item: 3g DCC Seasonal variations – 10:50 (20 minutes)	
Presenter	Sebastien Wagner - EUMETSAT
Overview	The method currently in place in EUMETSAT's GSICS DCC algorithm was presented in details. Some additional slides were presented to address the applicability of the method to other channels and the ability to detect anomalies in the gain time series.
Discussion point, conclusions, Actions, Recommendations	

Sebastien's deseasonalisation method is based on an annual moving average, rather than fitting a mathematical function. He then removes the long-term trend and finds the mean annual cycle, to define the "seasonal factors". The DCC signal is scaled by this factor, which adds noise, but effectively removes the seasonality.

Although the deseasonalisation does not improve the uncertainty on the long-term drift estimate, it allows more rapid and unambiguous detection of other calibration changes.

He has written this up as an ATBD, which has been reviewed within the VIS/NIR subgroup.

Q: Do we include this in our DCC products? To be discussed later.

Q: Are other deseasonalisation methods better? Should do a comparison!

Action: Fred to implement Sebastien's deseasonalisation method and compare with Fangfang's and report back.

Fred suggested Sebastien try Fangfang's sensitivity study, based on analysing various time periods independently.

Sebastien's also analysed the ability to detect jumps. He showed the response time is a trade-off with the jump size, according to the smoothing period. Also, the results showed the mode introduces limitations in detecting changes on short time scales.

Applicability to desert targets? IMD were encourage to implement this method in their analysis of desert target.

Agreed may use different processing, filtering, deseasonalisation for different products - NRTC, RAC...

Action: NASA to consider providing centralised processing of MODIS DCC data

Action: Seb to present at a further web meeting on DCC the extracted time series for the NIR16 channel.

Recommendation: Seb to report at a further stage about the minimum length needed to establish correct drift after deseasonalising the data.

Agenda Item: 3h DCC Seasonal variations & BRDF – 11:30 (20 minutes)	
Presenter	Lin Chen - CMA
Discussion point, conclusions, Actions, Recommendations	

Lin's analysis confirmed that we should only use the early years of MODIS data as a reference period.

Lin's results also suggested the mode gave mode stable results than the mean. Fred: Have you considered median instead? Yes - Lin has.

The drop in the DCC signal after 2010 is a concern.
Dave: We should use only the first years of MODIS data. After 2010, it is the scan angle dependence that is causing problems.

Fred: What about the Gaussian filter? Does Lin use a fixed function?
Answer: no fixed function.

Agenda Item: 3i Discussion – 11:50 (20 minutes)	
Presenter	Dave Doelling - NASA
Discussion point, conclusions, Actions, Recommendations	

Decision: Mode, no median. But some results should be exchanged by emails to confirm that the median is not as good as the mode.

Decision: Baseline DCC algorithm to use the Hu BRDF model

Decision: Baseline DCC algorithm to use MODIS reference dataset = till end 2009.

1. Should we use mode or mean?

Go with mode for now.
Median to be addressed at web meeting/email exchange.

Action: Lin and Seb to circulate statistics of mode/mean/median for review by email.

2. Which BRDF model?
Stick with Hu model, unless another model is proven to be better.

Action: KMA to provide BJ model for review by web meeting (duplicate action)

3. Reference instrument period?
Agreed to use Aqua/MODIS 2002-end 2009
Fixed period reduces ability to track seasonality

4. Deseasonalisation?
Agreed to go ahead with Sebastien's ATBD for current Demo model for 0°E domain
Allow each GPRC freedom to implement this (or an alternative deseasonalisation), subject to meeting uncertainty level of the seasonal residuals (TBD)?
To be reviewed at **web meeting on DCC deseasonalisation**

5. Geometric Limits?
Agreed to use current angular constraints

6. Discontinuity detection?
Agreed to address this requirement later - perhaps through other method (e.g. lunar)

7. Smoothing period and method?
Agreed to adopt 30d window
Bigger question: Only update when significant change
Or use temporal trend as the product...
Deferred to **web meeting on updating**!
Volunteers were requested to analyse uncertainty on trends, based on different periods.

Decision: GSICS should aim to provide users with the most recent available calibration data, at the highest available update frequency. This will allow users to decide how to apply it for their particular application. For example, users interested in trends may not want artificial jumps in the calibration time series, which could be avoided by applying frequent calibration updates - whereas near-time applications may want to minimise additional calibration noise by using the most accurate, stable calibration.
Action: Tim to propose the approach of issuing frequent GSICS corrections to the Exec Panel and Users Workshop.

Agenda Item: 3j Data requirements for DCC demo products – 12:10 (20 minutes)	
Presenter	Masaya Takahashi - JMA
Discussion point, conclusions, Actions, Recommendations	

Filenames should not be picked up by the users.
Files should provide the results of the method combination in order to avoid misuse.

Masaya explained the various options considered by the GDWG to allow the results from multiple methods to be included in netCDF files.

Decision?: Agreed on compromise solution for netCDF format: One variable with the combined results, another variable containing the coefficients from the individual methods (and the combined result) for plotting tool.

Decision: Key plotting variable = Percentage bias with respect to nominal calibration coefficient

Agenda Item: 3k – 12:10 (20 minutes)	
Presenter	Sebastien Wagner
Discussion point, conclusions, Actions, Recommendations	

Sebastien presented a summary of the outcomes of the lunar calibration workshop, hosted by EUMETSAT in December 2014, highlighting the key decisions that need to be discussed today.
Lin expressed an interest in analysing the effect of using different lunar soil samples in the spectral smoothing.

Action: Jack to put MODIS solar irradiance spectrum on GSICS Wiki (duplicate action)

Agenda Item: 3l Application of the GIRO to FY-2(E) & FY-3/MERSI – 12:10 (20 minutes)	
Presenter	Lin Chen - CMA
Discussion point, conclusions, Actions, Recommendations	

As previously reported.
Recommendation: CMA and JMA to consider setting the gain of their imagers to ensure the space count is not zero, to aid lunar calibration.

Agenda Item: 3m Application of the GIRO to INSAT-3D – 12:10 (20 minutes)	
Presenter	Yogdeep Desai - ISRO
Discussion point, conclusions, Actions, Recommendations	

EUMETSAT could provide code to help ISRO with their lunar image identification and extraction.

Recommendation: ISRO to express relative bias as a ratio, as a function of Moon phase angle, following the GIRO documentation.

Agenda Item: 3n Application of the GIRO to Himawari-8/AHI – 12:10 (20 minutes)	
Presenter	Hidehiko Murata - JMA
Discussion point, conclusions, Actions, Recommendations	

Hidehiko presented recent results from the very impressive dedicated rapid Moon scans acquired by Himawari-8/AHI during commissioning testing.

At present it is difficult to disentangle the effect on instrument calibration changes from phase angle dependence. Additional Moon scans expected in the near future should help resolve this.

GRWG complimented JMA on the success of AHI and this analysis of the lunar observations.

Agenda Item: 3o Update on GIRO application to COMS – 12:10 (20 minutes)	
Presenter	Hyesook Lee - KMA
Discussion point, conclusions, Actions, Recommendations	

COMS1 observes the Moon once a month - in near full Moon conditions.

Hyesook reported the results of adjusting the threshold radiance used to identify the Moon disc. She had also tried changing the size of the Moon area. Sebastien pointed out that if the results are sensitive to the size of the lunar imagette, that suggests there is a problem with the integration of the lunar irradiance.

KMA should push the analysis to separate sources of uncertainties: Check if their operational system and the GIRO input are consistent (time, satellite position, observed lunar irradiance). Once of that is check, only the simulated lunar irradiance should be compare to understand the differences between the GIRO and KMA implementation. Then, the methodology for computing the observed lunar irradiance shall be reviewed to ensure the observed irradiance is the same.

Recommendation: The guidance in the GIRO documentation encourages thresholds to be avoided in the calculation of the lunar irradiance, by calculating instead the total irradiance in the lunar imagette, then subtracting the contribution from the space component of the image.

Recommendation: KMA to consider comparing only the observed irradiance with that calculated from GIRO, and separately compare the GIRO predictions with the KMA implementation of the ROLO model.

Recommendation: All GIRO users are now encouraged to use the latest official release, v1.0.0, available from the GSICS Wiki.

Agenda Item: 3p EUMETSAT Lunar calibration data sharing – 16:30 (20 minutes)	
Presenter	Sebastien Wagner - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Review of Clauses in GIRO Usage agreement:
1. Subcontractors may be provided with GIRO by agreement of the prime contractor, through whom all communication will take place.
2. Agreed
3. Agreed
4. Agreed - move to sub-bullet
5. Only differences significant with respect to machine precision need be reported.
6. Agreed, but noted that the "Lunar Calibration Community" is defined in the relevant documentation to include attendees of the workshop, covering both GSICS and CEOS-IVOS. We should also be specifying who will review modifications to the source code. Also need to clarify that this refers to changes to the official source code to generate a new version.

Review of Clauses in GIRO Data Sharing agreement:
1. Agreed
2. Agreed
3. Agreed
4. Agreed - add "or in case of additional support from members of the Lunar Calibration Community"

5. Agreed - as a minimum (see above) - and emphasised as a very important point
6. Agreed

Extending the GLOD

1. Supported
2. Supported (GDWG not available for comment) - should be addressed with the mechanism to record version changes of GSICS deliverables.

Process for Requesting access to GIRO and the GLOD - All agreed.

The membership of the review board needs to be agreed. As a starting point, it could comprise representatives of the four organisers of the Lunar Calibration Workshop (CNES, EUMETSAT, NASA and USGS), plus JMA on the basis of their support of this workshop, (plus potentially GRWG and IVOS chairs in future). This and the policies should be agreed by consensus agreement. It was agreed that the decisions of this review board shall be based on majority vote.

Action: Sebastien to circulate these revised proposed policies for approval by Lunar Calibration Community within 1 month by 1 June 2015.

Action: Sebastien to organise a web meeting to close the discussion on the GIRO + GLOD policy, seeking attendees' agreement by 1 June 2015.

Agenda Item: 3q Lunar calibration data sharing – 16:50 (20 minutes)	
Presenter	All
Discussion point, conclusions, Actions, Recommendations	

Hyesook confirmed that KMA will share the compulsory lunar data.
Hidehiko confirmed that JMA plan to share the AHI lunar calibration data within the lunar calibration community.
Lin expressed CMA's intention to share all their lunar observations also.

Agenda Item: 3r Proposal to develop GSICS lunar products – 17:10 (20 minutes)	
Presenter	Sebastien Wagner - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Sebastien identified the steps necessary to generate inter-calibration products, based on GIRO. These include:

A. Estimation of the over-sampling factor (to be done by all data suppliers)
B. Drift Correction - this could be based on any method - at the discretion of the data suppliers
C. Accounting for spectral differences between instruments - and validating these
This validation could involve analysis of hyperspectral lunar observation datasets.
D. Establishing an absolute scale for lunar calibration - agreed to focus initially on 0.6µm band
E. Investigate possibility to participate in international consortium to fund dedicated measurement campaigns to tie ROLO to an absolute scale.

Who is interested in doing C and D? And on what time scale?

Action: Dave to ask Constantine Lukashin to participate in accounting for spectral differences. But this will not happen this year.

Dave confirmed that he is free to distribute the entire Hyperion dataset.

Action: Dave to check availability of lunar observations in the Hyperion dataset by 1 April 2015.

Decision: It was agreed to start v1 of DCC and Lunar Calibration products

Action: Jack Xiong and Dave Doelling to report plans to investigate the double difference between MODIS and VIIRS lunar observations in preparation to transfer the calibration reference and at web meeting.

Action: Dave to investigate whether CLARREO could fund dedicated observation campaigns to tie lunar irradiance models to an absolute SI-traceable scale.

Action: Sebastien to circulate survey on participation in the planned activities to develop lunar inter-calibration to members of lunar calibration community.

Action: Sebastien to organize a web meeting to report on the progress made on inter-calibration using the Moon (between October and December 2015).

GRWG Breakout Session Day 4 – 19th March, 2015	
Chair	Tim Hewison
Minute Taker	Sebastien Wagner
Attendance	CNES: Denis Jouglet EUMETSAT: Tim Hewison, Sebastien Wagner, Rob Roebeling IMD: A.K. Sharma ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava JMA: Hidehiko Murata KMA: Hyesook Lee NASA: Xiaoxiong ("Jack") Xiong, David Doelling NOAA: Xiangqian ("Fred") Wu WMO: Jérôme Lafeuille
Remote Attendance	CMA: Xu Na EUMETSAT: Viju John NOAA: Fangfang Yu
Part Time	

Agenda Item: 5a MTSAT-IASI towards pre-operational – 08:30 (20 minutes)	
Presenter	Masaya Takahashi - JMA
Discussion point, conclusions, Actions, Recommendations	

Demo phase started about 5 years ago. Delay in the GPPA mostly due to the uncertainty evaluation +product review.
Action: GCC to introduce one reviewer for JMA GEO-LEO IR products.

Uncertainties for MTSAT-2 are a bit larger than for SEVIRI. JMA will investigate further.

Using AIRS, the uncertainties are larger than for IASI for systematic uncertainties.

JMA is planning to finish the uncertainty estimation work by the end of Summer 2015.

JMA has difficulties to find reviewers inside JMA due to the preparation of Himawari-8/AHI.
Manik commented that the GPPA offers the possibility to have exemption (EXCEMPT).

Discussion (slide 11):

Masaya: Should we promote products to operational even if instruments are not operational anymore?
Tim: Yes. In particular in the case of re-analysis products.
Seb: GSICS takes also care of past instruments. So this cover the case of instruments that are not operational anymore.

Recommendation: use 29 days for the RAC analysis as it corresponds to the repeat cycle of the Metop orbit. But it is up to each GPRC to decide.

Guidance should be provided to the user with respect to the applicability of the correction, with their associated uncertainties (within the course of the day). This is particularly true for 3-axis stabilised satellites where diurnal cycle is much pronounced.
Recommendation/action: clarify the use of the correction.

Tim proposed to relax the GPPA when uncertainty analysis is missing some uncertainty sources. In

this case, the product follows the same ATBD but refine the uncertainty analysis.
Manik and Fred support the proposal.

Action: GCC to guide GPAT to encourage reference to existing uncertainty analysis for similar products to facilitate requirement for analysis or product uncertainties.

Agenda Item: 5b GOES-IASI towards operational – 08:50 (20 minutes)	
Presenter	Manik Bali - NOAA
Discussion point, conclusions, Actions, Recommendations	

GOES-IASI product in pre-op phase. It is ready to move to op phase.

Does NOAA need full scale diurnal uncertainties assessment to move to OPE? As discussed previously, as soon as the user is informed about the range of applicability of the product (outside the midnight period), it is fine.
Action: NOAA to update the product user guide for GOES-IASI products accordingly.

Manik mentioned that resources are limited.

Tim: what are the next steps for NOAA?
Manik: from the GPPA check list point of view, everything is completed.
Tim: so we should move to OPE.
Manik: what about processing the complete family of GOES?
Tim: if all instruments are processed in the same way, then the promotion to OPE can go ahead. However, if a specific instrument requires adjustment, it may require the GPPA again. But this cannot be appreciated from the outside.

Tim: due to limited resources, only 2 MSGs can be processed to a pre-op standard. But the issue is being addressed.
Fred: NOAA has similar issues.

Agenda Item: 5c Meteosat-IASI towards pre-operational – 09:10 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Version control document: Tim would like to see a process within GSICS to ensure this is achieved.
Action: Tim to cooperate with the GDWG to develop a version control document

Recommendation: All GPRCs should consider adding calibration coefficients before and after applying the GSICS Corrections in their netCDF product.

Do we promote secondary references as GSICS products or do we wait until Primary GSICS Corrections are ready?
Fred: NOAA will probably provide one product.
For the moment we go ahead with IASI-A (Tim +Fred).

Decision: It was also agreed that we should aim to promote both NRTC and RAC products to

operational status using current primary reference instrument.

Uncertainty analysis: random components (day-to-day variation) were underestimates by 2-4 times. Tim recommends to inflate the current uncertainties in the ATBD and operational implementation to ensure they are consistent with the time series estimates of the random component of the uncertainty. The current assessment misses some sources, such as the cloud parallax.

Question: should we update the ATBD to inflate all the coeffs' uncertainties?
This impact all products based on the ATBD.
Action: EUMETSAT to update the GEO-LEO IR ATBD and operational implementation to inflate the coefficient uncertainties to obtain consistency with time series estimates of the random component.
Recommendation: all GPRCs to consider the update of the GEO-LEO IR ATBD in their uncertainty assessment following the EUMETSAT example of adjusting uncertainty estimates to obtain consistency with time series statistics.

Will the user guide replace the ReadMe files?
GCC needs to check the user guide before providing an answer.

Action: GCC (Manik) to provide feedback on the user guide (GEO-LEO IR product)

MVIRI:
Do we promote NRTC + RAC for MVIRI (Meteosat-7) based on the current implementation?
No, as there is no user request.

Agenda Item: 5d INSAT3D-IASI towards demo – 09:30 (20 minutes)	
Presenter	Pradeep Thapliyal - ISRO
Discussion point, conclusions, Actions, Recommendations	

ISRO is experiencing problem with EUMETCAST. Data collection for IASI is problematic (60% of the data only is received). ISRO would like to try alternative solution to retrieve the data.
Tim: one solution could be to have a standing order but with a 24h delay. Another one would be to use the sub-sampled data on the GSICS server. IMD offered to provide ISRO with data.

Recommendation: ISRO is encouraged to engage with IMD to address the Metop IASI data delivery.

About the GSICS servers: 3 servers are available at global level (NOAA, EUM, CMA).

Recommendation: ISRO is invited to contact the GDWG to have access to these servers.

Recommendation: IMD and ISRO are strongly encouraged to produce a unique product.

Possibility for training the representative at DWG and RWG?
Tim: a visit can be easily organised, in a similar manner as for CMA or JMA.

ISRO will make available the demo product on their server for external access.

Agenda Item: 5e FY2-IASI towards demo – 09:50 (20 minutes)	
Presenter	Xu Na (remotely) - CMA

Discussion point, conclusions, Actions, Recommendations

CMA have their products online (or soon) for FY-2 versus IASI: daily NRTC, TB bias RAC, double difference sequence (under building) using IASI and CRIS. Products are ready for demo.

For FY-3C and Metop-A, LEO-LEO inter-cal product are produced monthly. ATBD is ready and will be submitted for review.
Results were shown for FY-3C/VIRR, FY-3C/IRAS and FY-3C/MERSI.

Summary slide:
• FY2-IASI
  – Daily NRTC products of Demo version are ready and downloadable from CMA data server;
  – RAC products of Demo version are ready, and will online in two weeks;
  – CMA GSICS web can provide two kinds of figure products, daily NRT regression and TB re-analysis. Double difference sequence is under building.
• FY3-IASI
  – GSICS LEO-LEO inter-calibration are applied to VIRR, MERSI and IRAS.
  – ATBDs are ready, and will be submitted for review.
  – CMA GSICS web can provide monthly regression results.
  – NC and TB re-analysis products are under building follow GEO GSICS convention, and will be finished by the end of summer 2015.
• FY2-IASI to Demo plan in 2015
  – Upload FY2-MetopA/IASI RAC ;
  – Complete FY2-MetopB/IASI NRTC and RAC products;
  – Test GSICS Plotting tool based on RAC;
  – Complete ATBDs and user guides

Questions/comments about FY-2 products:
Tim supports CMA to precede towards demo mode their FY-2/IASI products.

What is the time frame for NRTC and RAC products? It is the same for NRTC and RAC.
Recommendation: CMA is encouraged to extend the RAC smoothing window in order to centre the time window.

Questions/comments about FY-3 products:
Recommendation: CMA is encouraged to investigate if the same approach for the smoothing (rolling window) is applicable for FY-3C/IASI daily products.
Na: it is difficult to achieve as there are not collocation every day.
Tim: a possibility would be to extend the smoothing window to more days than currently.

Agenda Item: 5f COMS-IASI towards demo + WV analysis – 10:40 (20 minutes)	
Presenter	Hyesook Lee - KMA
Discussion point, conclusions, Actions, Recommendations	

KMA observed some bias in the warm end and on the cold end of the SNOs with IASI for the WV channel. They focused on the warm end. They investigated SRF shift. The preliminary analysis is based on the work by Wu and Yu (PUT REF). The SRF was shifted by 2.5 cm^{-1} (-0.0114 μm). Doing so, they reduced the bias by 0.4K.

NOAA originally did something similar for GOES-13 at commissioning time.

Tim mentioned that the results seem to indicate an issue with the BB, which would results in an

offset rather than a shift of the SRF.

Fred suggested to account for the water vapour content in the RTM analysis.

Tim mentioned that a similar approach (SRF shift) is used for microwave sounders in order to flatten the bias regression line (bias as a function of the Tb).

Agenda Item: 5g Handling diurnal cycle in GEO-LEO IR – 11:00 (20 minutes)	
Presenter	Fred Wu - NOAA
Discussion point, conclusions, Actions, Recommendations	

Fred provided an overview of this issue. The problem was identified looking at the SST (which was increasing between midnight and sun rise) with GOES products. The root cause was thermal stress coupled with black body that is less than black (M. Weinreb et al.). More findings were reported in Yu and Wu (2013, TGRS).

The midnight effect is amplified in the case of GEO-GEO inter-calibration because of the diurnal cycle happens at different times as the GEOs are located at different longitudes.

This effect is related to the 3-axis stabilised platform. So, similar issues will probably appear for more instruments now. JMA does not have access to the data before MBCC.

Action: KMA to investigate the possibility to extract the data before the MBCC is applied, and in collaboration with NOAA to assess the impact of MBCC on the data. KMA to report back at the next GSICS annual meeting.
Action: ISRO to explore NOAA MBCC more into detail and to apply it. ISRO to report back at the next GSICS annual meeting.

Agenda Item: 5h Prime GSICS corrections – 11:20 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Tim would like someone to volunteer to address the issue of how to account for uncertainty caused by extrapolating delta corrections beyond the overlap period between reference instruments.

Recommendation: Masaya to report on his investigation about the stationary tests using AIRS and IASI.

Recommendation: Tim to establishment of the user requirements based on input from SCOPE-CM projects.

Rob would like to propose in the framework of IOGEO recalibration activities and cloud community to apply these primary corrections on recent instruments to test it. Dave mentioned that the CERES community would be interested by testing it if long time series are available.

Decision: EUMETSAT to go ahead with the generation of demo products for all current operational Meteosats (including Meteosat-7) using both IASI-A and -B.

Recommendation: ISRO to report about progress on analysis of the double difference with AIRS / IASI such as Masaya is doing

Recommendation: EUMETSAT to report on blending method (DCC + Lunar) at the next annual meeting.

The skeleton of a draft of the white paper on the comparison of IR reference instruments was presented.

Agenda Item: 5i Retrieving SRFs – 11:40 (20 minutes)	
Presenter	Discussion
Discussion point, conclusions, Actions, Recommendations	

Discussion:
Within FIDUCEO, work will be done on the VIS bands for the MFG radiometers. However the time line is quite long (3 years). Seb commented that this work has some communalities with the work carried on within GSICS on the IR bands. Interactions should be pursued in order to learn from the various experiences and move forward.

Tim asked whether the SRF evaluation should be a one-off or performed more times. This is a decision for the instrument operator, based on their analysis of the performance, and of the acceptable of such changes to the users.

Fred suggested that it may also be worth changing the shape of the SRF.
What do we do when we have leaks? If hyper-spectral measurements are available, it will

Action: ISRO to report back on their investigations on SRF retrieval.
Action: CMA to report back on their investigations on SRF retrieval.
Action: EUMETSAT (Rob Roebeling) to report on the progress in FIDUCEO regarding SRF retrievals using AIRS data with input from John Mittaz.

Agenda Item: 5j Comparison of hyper-spectral IR references – 13:00 (20 minutes)	
Presenter	Denis Jouglet - CNES
Discussion point, conclusions, Actions, Recommendations	

Tim provided an introduction to the comparison of hyperspectral IR reference instruments, "GSICS Infrared Reference Sensor Traceability and Uncertainty Report", which he initiated in autumn 2014, together with Denis and Dave Tobin. This document is intended to replace the previous version, GSICS Traceability Statement for IASI and AIRS. Its development is an ongoing activity. Results of different comparisons need to be consolidated before they can be shared.

Agenda Item: 5k LEO-LEO – e.g. MODIS-IASI – 13:20 (20 minutes)	
Presenter	Xiong / Doelling / Aisheng - NASA
Discussion point, conclusions, Actions, Recommendations	

The bias results obtained with Collection 6 are far better than for Collection 5 for both Terra and Aqua when comparing with IASI. There are still some issues in a few bands (see Slide 10).

NASA have not tried to make the difference in radiance and convert back in brightness temperature.

The plots on the Bt biases go down only to 220K. What about DCCs with 205K for Band 31? Dave mentioned that the bias increase but remains less than 0.5K.
Tim: we are not in the position yet to say if we need LEO-LEO inter-calibration products for DCC algorithms. Dave will perform some sensitivity analysis to help defining the need or not.

Agenda Item: 5l GEO-GEO – e.g. MTSAT-FY2 – 13:20 (20 minutes)	
Presenter	Hidehiko Murata - JMA
Discussion point, conclusions, Actions, Recommendations	

GEO-GEO inter-comparison is currently applied to AHI/MTSAT-2 for monitoring.
The method was put in place using MTSAT-2 and FY-2E.

They identify some anomalies in the GEO-GEO comparison that could be caused by stray light.

Pradeep asked how the zenith angles are handled for the comparisons.
The range of angle is enlarged in order to check if some effects (such as stray light come out). But for the comparison, the angles are more constraint.

Action: JMA to investigate and provide a report on the uncertainty analysis to support progress to Pre-Operational mode.

Dave mentions that it would be worth looking at geostationary instruments that are more apart from each other.

First step: Identify one date which is common to all GEOs (without stray light or midnight effect)
Second step: a person/a group to investigate the GEO-GEO comparison across the GEO ring.
Rob mentioned that the climate community would test the result of this work.

Action: Tim to ask ECMWF for double differencing of geostationary ring.
Action: IMD/ISRO to contact the IMD NWP and NCMRWF about double differencing of geostationary ring.
Action: Tim to conduct a survey to identify a date among GPRC so that they produce the GSICS corrections for that date and provide them to Dave.
Dave suggests taking 0/3/ 6/9 GMT for that date.
Action: Dave to report on the analysis of GEO-GEO double-differences.
Action: Tim to provide SBAF tool to support the analysis of GEO-GEO double-differences.

CMA mentions that they are interested to compare the FY-2 observations to other instruments.

GRWG Breakout Session	Day 5 – 20th March, 2015
Chair	Tim Hewison
Minute Taker	Sebastien Wagner
Attendance	CNES: Denis Jouglet EUMETSAT: Tim Hewison, Sebastien Wagner, Rob Roebeling IMD: A.K. Sharma ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava JMA: Hidehiko Murata KMA: Hyesook Lee NASA: Xiaoxiong ("Jack") Xiong, David Doelling NOAA: Xiangqian ("Fred") Wu WMO: Jérôme Lafeuille
Remote Attendance	CMA: Xiuqing ("Scott") Hu, Zhe Xu, Li Yuan, Yong Zhang
Part Time	

Agenda Item: 5m Alternative inter-calibration algorithms – 14:20 (20 minutes)	
Presenter	Fred Wu - NOAA
Discussion point, conclusions, Actions, Recommendations	

This topic was addressed on Friday morning in a joint presentation with agenda item 7b.

Discussion on evolving our current GEO-LEO IR products: a mechanism is already in place for the uncertainty analysis with the current version (V1.0.0) of the IR algorithms. Now, more time could be spent on further analysis (Tim).

Recommendation: after Dave suggestion, the IR sub-group to look into the cold end.

Recommendation: JMA to consider investigating alternative regression algorithms for GEO-LEO IR.

Action: NASA-MODIS (Jack) to consider investigating alternative regression algorithms in radiance instead of Tb and report at next GRWG annual meeting

Action: CMA to report on generalising regression in GEO-LEO IR products to include polynomial terms and report by next GRWG meeting

Question (Jack): should the comparison be in absolute value or in relative?
Tim: comparison in radiance but presentation of the results in Tb (see previous comments from the IR session).

Inter-channel – VIS/NIR
Recommendation: the lunar calibration community to investigate the possibility of using lunar observations for inter-channel calibration following the NASA/NOAA approach (MODIS/AVHRR, see paper Cao 2009). EUMETSAT and JMA to collaborate on this issue.

Action: NOAA to investigate inter-channel calibration with IASI.

Recommendation: IVOS members of the Lunar Calibration Community to investigate the use of lunar observations for MTF post-launch characterisation.

Agenda Item: 5o Progress towards demonstration products – 14:20 (20 minutes)	
Presenter	All
Discussion point, conclusions, Actions, Recommendations	
Addressed in an earlier discussion slot.	

Agenda Item: 7a Scoring scheme for reference instruments – 09:30 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT
Discussion point, conclusions, Actions, Recommendations	

Tim presented an example of scoring scheme with SEVIRI IR channels and IASI-A.

Denis mentioned that the scores should be define for all target instruments at once with respect to one reference in order to check if the reference is good for more instruments. He also mentioned that the selection of the parameters and the associated values are very subjective.
Dave mentioned that it is better to have a reference across a long time series rather than a super reference that has a short lifetime.

Recommendation: the reference instrument's expert should be part of the GSICS Research Working Group in order to provide support to the GRWG (after comment by Dave).

Tim hopes this tool should help us to decide about the reference and how to move from a reference to another. When asked how to adjust the weights, Tim suggested the adjustments should be based on the uncertainty analysis should help, but noted that in practice this is the most subjective part. For VIS/NIR, it is not the priority and the VIS/NIR will wait for the IR sub-group to test the approach. The VIS/NIR still needs to make the uncertainty analysis (which would support the establishment of the parameter list and the weights). The fact that products will also be a blend requires further thoughts.

Action: GRWG Chair to coordinate review by all GPRCs of requirements for inter-calibration references for GEO-LEO IR products.
Action: Denis and to review capabilities of IASI and AIRS and CrIS to meet these requirements.
Action: Fred to invite Pagano and Yong Han to join this review as relevant instrument experts.

Agenda Item: 7b Inter-channel calibration – 08:50 (20 minutes)	
Presenter	Fred Wu - NOAA
Discussion point, conclusions, Actions, Recommendations	
Done with 5m (first talk on Friday).	

Agenda Item: 7d Requirements for sharing L1 data – 09:30 (20 minutes)	
Presenter	Zhe Xu / Xiuqing Hu - CMA
Discussion point, conclusions, Actions, Recommendations	

CMA hopes to get data from IASI and GOME-2 for FY-3 SNOs.

CMA thinks that a GSICS data centre for L1 data should be set-up in order to allow data sharing. Should it be a scope of the GDWG?

Pradeep confirmed that ISRO has same expectation as CMA in terms of data sharing and support the proposal from CMA. There are 3 requirements: sub-sampling, availability on the server (number of days, currently one day) and timeliness.

ISRO and CMA accepted the current limitations of using the GSICS servers for the L1 data to derive the products, including timeliness and potential outages.

Rolling archive (currently 30 days): if more data are shared we may have to shorten the current length. The recommendation is a minimum of 5 days. Pradeep suggested keeping both IASI-A and –B on the servers.

Requirement on MODIS centralised dataset? Dave works on a reduced data set (every 2nd pixel every 2nd line).

Action: Dave to investigate how to share the existing data set for MODIS 0.6µm band (2002-end of 2009) with the GRWG.

Dave is interested in having the GOME-2 data in an NRT feed.

CMA is also interested in obtaining CrIS data.

Action: Larry Flynn (NOAA) to consider mechanisms to provide delayed CrIS data for FY-2 inter-calibration.

Agenda Item: 7e Instrument landing pages for OSCAR – 09:50 (20 minutes)	
Presenter	Rob Roebeling
Discussion point, conclusions, Actions, Recommendations	

CGMS Calibration Event Task Team is (almost) established (CCETT).
WMO OSCAR is being updated to allow linking landing web pages (currently in test).
CCETT to prepare stable landing pages (on-going work)
Proposal from GDWG: each landing page should include instrument specifications, calibration events, instrument monitoring and data outages. They proposed and agreed about a format for the landing page.

Decision: a proposal on the format of the landing page was agreed.

Action: Rob to propose the maximum frequency on the update requirement for non-routine events

Rob had a list of proposed actions to GSICS.

Agenda Item: 7f Calibration Site Information in OSCAR – 10:10 (20 minutes)	
Presenter	Jérôme Lafeuille
Discussion point, conclusions, Actions, Recommendations	

An updated version of OSCAR was developed to allow the attribution of additional information to individual instruments (e.g. commissioning date, status, event landing page) . It will be released very

soon once testing is completed and feedback available. A demonstration was made to show the add-ons.

Recommendation: users are requested to provide feedback to WMO on the new version of OSCAR.

Jérôme presented also the principle of a concept expert system to identify the instruments in OSCAR that best fit purposes for deriving geophysical quantities. In a first step this will replace and reproduce the "evaluation of sensor relevance to measure particular variables", which is currently available in OSCAR and is the basis for the Gap Analysis. In a second step, thanks to increased transparency and modularity, this system will enable enhanced collaboration with experts to review and gradually refine the knowledge basis in the expert system. Tim showed interest in adopting a similar approach or even this tool to select the reference instrument(s) (see presentation by Tim with instrument scoring).

Action: Manik to interact with Jérôme to push forward the development of the expert system as a tool to select inter-calibration reference instruments

Action: Tim to provide to Manik a list of parameters from his scoring proposal to include them into the expert system.

Plenary GRWG + GDWG Summary Session	Day 5 – 20th March, 2015
Chair	Tim Hewison (EUMETSAT)
Minute Taker	Tim Hewison (EUMETSAT)
Attendance	CNES: Denis Jouglet EUMETSAT: Tim Hewison, Peter Miu, Sebastien Wagner, Rob Roebeling IMD: A.K. Sharma, Suman Goyal, Virendra Singh, A.K. Mitra, N. Puviarasan ISRO: Pradeep Thapliyal, Anurag Pushpakar, Munn Shukla, S.S. Srivastava JMA: Hidehiko Murata, Masaya Takahashi KMA: Hyesook Lee, Jae-Gwan Kim NASA: Xiaoxiong ("Jack") Xiong, David Doelling NOAA: Xiangqian ("Fred") Wu, Manik Bali WMO: Jérôme Lafeuille
Remote Attendance	CMA: Xiuqing ("Scott") Hu, Zhe Xu, Li Yuan, Yong Zhang
Part Time	

Agenda Item: 9a GRWG Summary and Agree Actions – 11:30 (20 minutes)	
Presenter	Tim Hewison (EUMETSAT) – Chair GRWG
Discussion point, conclusions, Actions, Recommendations	

The actions, recommendations and decisions identified during the Mini Conference, plenary and GRWG sessions were reviewed and agreed in principle. These will be published online for further review and, potentially, rewording for a period of 1 month before being finalised and published on the WMO website.

Recommendation: The PIs of inter-calibration algorithms are encouraged to attend the annual GRWG/GDWG meeting.

Agenda Item: 9b GDWG Summary and Agree Actions – 10:50 (20 minutes)	
Presenter	Masaya Takahashi (JMA) – Co-chair GDWG
Discussion point, conclusions, Actions, Recommendations	

Should we keep for existing products the existing variable? Yes. If not, the products should be put in pre-op again.
Recommendation: GRWG members are invited to have a look at the presentations made by the GDWG that are relevant to their activities.

Version number: the user should have access only to the last version. Item to be address in another meeting as it was not in the agenda.

The tool for generating SRF in GSICS will be available to the community. It will be updated to include the uncertainties for those instruments that have it.

Action: Seb needs to iterate with Pete on what to put in place to share the GIRO code and the GLOD (GSICS Lunar Observation Dataset).

Action: Alternatives to the current action tracking tool should be discussed at further stage (web meeting).

Action: GDWG will come with a proposal on how to number the actions. The action tracking tool should include the actions coming from the web meetings.

Agenda Item: 9d Nomination of the GRWG Vice Chair – 13:30 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT and Chair GRWG
Discussion point, conclusions, Actions, Recommendations	

Tim encouraged all GSICS member organisations to consider nominated a candidate for the position of vice-chair of the GRWG, recognising the benefit of distributing the GSICS management among member organisations. He also proposed forming an IR Sub-Group to lead the development of inter-calibration products for the thermal infrared, which would further distribute the responsibilities among GSICS members and reduce the workload on the chair. In the following discussion several excellent candidates were identified among current GRWG members.

Actions:
- **CMA to consider nominating Scott Hu as vice-chair of the GRWG.**
- **JMA to consider nominating Arata Okuyama as vice-chair of the GRWG.**
- **KMA to consider Dohyeong Kim's current role as vice-chair of the GRWG.**
- **CNES to consider nominating Bertrand Fougnie as vice-chair of the GRWG.**

Tim offered to support as vice-chair during a transition period until the 2016 annual meeting. Scott Hu was favourable to the proposal and will follow it up with the Exec Panel. Other candidates can be presented.

Agenda Item: 9e GSICS Quarterly Special Issues/Editors – 13:50 (20 minutes)	
Presenter	Manik Bali – NOAA and deputy director of the GCC
Discussion point, conclusions, Actions, Recommendations	

Participants were concerned about the formalism currently adopted by the newsletter, where it could prevent researchers to publish their work. It prevents possible contributors to send papers.

Action: GCC takes this feedback on-board and will propose an approach more like conference papers.

Decision: GCC will continue to have a DOI.

Agenda Item: 9fb GSICS/CEOS IVOS interaction – 14:30 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT and chair GRWG
Discussion point, conclusions, Actions, Recommendations	

Recommendation: IVOS to set a mailing list such as the gsics-dev@googlegroups.com in order to ensure good communication.

Re-naming GSICS was discussed. It was agreed that the acronym should not change to avoid confusion. However, the words could change (Space-Based -> Satellite), and *inter-calibration* could

be replaced by *inter-comparison and calibration*. The GRWG members expressed different opinion on the topic without reaching a consensus.

Defining the scope of GSICS (through the terminology) is the responsibility of the Executive Panel.

Agenda Item: 9fa Formal recognition of GSICS in WMO – 14:10 (20 minutes)	
Presenter	Jérome Lafeuille - WMO
Discussion point, conclusions, Actions, Recommendations	

GSICS should be recognized as a building block of the WMO Integrated Global Observing System (WIGOS) since it directly contributes to interoperability and integration of data sets from multiple sources. Formal recognition would anchor GSICS on a solid user basis and strengthen the case for agencies to dedicate the necessary resources to GSICS activities.

Furthermore, Jérôme considers that the products are not sufficiently described to reach out to the wide user community. So he proposed an outline for a Guide to GSICS in order to improve this description.

Action: Jérôme to circulate a draft GSICS Functional Architecture, which could serve as an input to the future WIGOS Functional Architecture document.

Action: Jérôme to provide the GCC with a draft structure of what is expected for a Guide to GSICS, which could be ultimately integrated in a future Guide to WIGOS.

Agenda Item: 9g – 14:30 (20 minutes)	
Presenter	Manik Bali - NOAA and GCC deputy director
Discussion point, conclusions, Actions, Recommendations	

The 2015 GSICS User Workshop will be in Toulouse, in a side-session to the EUMETSAT conference. SPIE Remote Sensing Europe is happening during the same week. So potentially more users will be involved. It will be organised by the GCC, Tim Hewison and Jack Xiong, who are on the programme committees of the respective conferences. The organisers will invite presentations from GSICS members who are attending these conferences to introduce GSICS and its deliverables and address specific questions where user input is needed. They will also identify attendees at the conferences, who may be interested in GSICS, invite them to the Users Workshop, and to give presentations on their feedback and/or requirements for inter-calibration products. No abstract submission process is to be followed.

Agenda Item: 9h Discussion – 15:10 (20 minutes)	
Presenter	All
Discussion point, conclusions, Actions, Recommendations	

Action: GRWG Chair to set up an additional web meeting on SBAF determination

It was agreed that the next annual meeting should be a full 5 days. There was also a suggestion that it could be split over a weekend to allow for other meetings and interactions, following the example of the popular International TOVS Study Conference. We left it that any hosting organisation could propose such a structure.

It was also agreed that the priority for presentation slots at the mini-conference should be given to the hosting organisation.

It was agreed that the UV and Microwave Sub-Groups should be encouraged to consider running sessions in parallel with the IR and VIS/NIR sessions respectively at the next annual meeting.

For the workshop, presentations should be shortened to 10min to allow more discussion.
Action: GDWG, GRWG and sub-group chairs to provide guidance to avoid delay in the agenda topics at 2016 annual meeting.

GRWG chair acknowledge the level of engagement of IMD and ISRO into GSICS activities and in the organisation of the 2015 meeting.

Action: JMA and JAXA to investigate the possibility to organise the next GRWG/GDWG annual meeting.

CMA offered to organise the GRWG/GDWG annual meeting in 2018 (because of the launch of their next satellite series).

Agenda Item: 9a GRWG Summary and Agree Actions – 10:50 (20 minutes)	
Presenter	Tim Hewison - EUMETSAT and Chair GRWG
Discussion point, conclusions, Actions, Recommendations	
The actions, decisions and recommendations captured in these minutes were reviewed and agreed in principle - with the understanding that the wording can be fine-tuned during the review period of 1 month after the end of the meeting.	

Agenda Item: 9b GDWG Summary and Agree Actions – 10:50 (20 minutes)	
Presenter	Masaya Takahashi - JMA and co-chair GDWG
Discussion point, conclusions, Actions, Recommendations	
The actions, decisions and recommendations captured in these minutes were reviewed and agreed in principle - with the understanding that the wording can be fine-tuned during the review period of 1 month after the end of the meeting.	

Synopsis: GDWG minutes recorded from the discussion of agenda items from the joint meeting.	
Date & Time	18th – 20th March, 2015 from 09:00 till 17:30
Location	India

GDWG Breakout Session Day 1 (morning) – 18th March, 2015

Chair	Peter Miu (EUMETSAT)
Minute Taker	Peter Miu (EUMETSAT) and Masaya Takahashi (JMA)
Attendance	Manik Bali (NOAA), Jae-Gwan Kim (KMA), Jerome Lafeuille (WMO), Pradeep Thapliyal, Munn Shukla (ISRO), Suman Goyal, Virendra Singh, A.K. Mitra, and N. Puviarasan (IMD)
Remote Attendance	Zhe (Thomas) Xu and Di Xian (CMA)
Part Time	

Agenda Item: 4a GDWG Baseline Reviews – Websites – 08:00 (20 minutes)	
Presenter	Masaya Takahashi (JMA)
Overview	To review existing websites by the GDWG to propose updates and to agree on a minimum set of requirements to be specified for GPRC GSICS websites
Purpose	To support the development of GPRC websites as well as ensure GSICS users' expectations are met when visiting any GPRC GSICS website.
Discussion point, conclusions, Actions, Recommendations	

Minimal set of content is agreed with no further comment.

ISRO and IMD will introduce their GSICS web pages according these recommendations. ISRO is expected to have their web page available in the near future while IMD intends to make available their web pages once their Data Centre has been established in 2016.

Action: ISRO to provide GPRC web pages to GDWG co-chairs for review by 30/04/2015.

Action: EUMETSAT to support the review of all GPRC for minimum content and provide suggestions for updates.

Action: ISRO to support GCC to provide a satellite constellation image for the GCC website.

Action: WMO to update JMA GPRC website URL on the WMO portal (closed on 24 March 2015).

Action: KMA to add hyperlinks to the GCC, product catalogue, and THREDDS servers.

Action: KMA to modify a hyperlink to CMA GPRC website.

While reviewing the WMO website, WMO representative suggested that ISRO should provide an update to its GSICS members.

Action: WMO to contact current ISRO EP member to provide updates to the GSICS members.

Action GDWG_14.06 is closed in favour of this is a standard operational aspect of supporting the GSICS collaboration effort.

Agenda Item: 4b GDWG Baseline Reviews – Standards 08:20 (20 minutes)	
Presenter	Peter Miu (EUMETSAT)
Overview	To review existing GDWG guidelines, conventions and standards such that they are up to date. Obsolete information should be removed and additions should be proposed and discussed with a view to inclusion into the GSICS effort.
Purpose	To ensure the quality of the Data Management work we do on GSICS. Expected output: new version of the GDWG guidelines, conventions and standards .
Discussion point, conclusions, Actions, Recommendations	

A background on the GSICS file naming and netCDF conventions was provided to the group, including a clarification between the netCDF-3 library (supports only the netCDF classical data model) and netCDF-4 library (supports the netCDF class data and enhanced data models).

No general changes were requested but some later agenda items will address specific changes.

NOAA enquired whether the GDWG can contribute on the GSCIS Correction information in L1 broadcasting dataset. WMO pointed out that the GDWG could provide some advices on this development, but not this is not in the GDWG ToR.

ISRO does not have DataLocationIndicator code for use in the WMO filenames. JMA enquired which Indian agency is responsible for defining these parts in the WMO filename. IMD explained that they are the management agency providing the products from the Indian satellites to its users while ISRO develops/implements the methods. IMD will work with ISRO on defining their sub centre names.

Action: IMD are kindly requested to provide ISRO LocationIndicator and sub centre indicator for updating the Manual on Codes document (common codes Table C-12, note CCCC code is DEMS) prior to the development of their productions identified by a WMO filename where this information is required. Note, some time is needed to publish such updates.

Agenda Item: 4c Existing netCDF format Updates 09:10 (30 minutes)	
Presenter	Masaya Takahashi (JMA)
Overview	To introduce requested GRWG updates to the GDWG for discussion.
Purpose	To discuss, accept or provide an alternative to these updates.
Discussion point, conclusions, Actions, Recommendations	

Major changes to the proposed GEOLEOIR products formats, these are:

1. **Reducing the number of variables by combining them into a single variable.**

   - No objections from the netCDF format point of view; existing netCDF tools and THREDDS servers will still work.

   - **Plotting tool (and any existing tool developed for these products; expected to be 0) needs major update to support the new variables.**

Action: The GRWG need to examine the aspects to be revalidated and confirm they have no major impact (ref: changing the existing GEOLEOIR variables to combined versions).

   o **Potential ATBD updates needed.**
   o **User Guides (?)**
   o **Manage any user expectations.**

If this change is accepted, then the new product should be rechecked before entering the GPPA pre-operational phase.

2. **Improve the information provided in the validity_period variable.**

Additional information is needed for this variable to provide users with a more accurate indication of what this variable is providing. Possible solutions are to change the ISO 8601 time format used for storing time information for this period or add additional information to all variable on timing.

This information is presented in the ATBD, so the proposed solution is to add a comment attribute to this variable containing this information, if acceptable then:

Action: Update the GEOLEOIR GSICS product template on the Wiki.

Action: Update the Wiki to include the accurate timing information as an optional comment attribute of the validity_period in their products.

3. **Global Attributes Updates.**

No major issues with the addition of attributes to improve the meta data content so it was proposed to provide a list of these updates to the GDWG members for consideration and agreement.

Action: JMA to provide list to GDWG members and member should provide input within 1 week on the proposed updates (can set up a doodle poll for responses and if objections, discuss on gsics-dev mailing list).

Agenda Item: 4d New GSICS Products 09:40 (30 minutes)	
Presenter	Masaya Takahashi (JMA)
Overview	Present proposed products; GEOLEOVISNIR, GEOLEOIR Prime Correction, Blended products.
Purpose	To inform and discuss data management aspects of the proposed products.
Discussion point, conclusions, Actions, Recommendations	

Overview of the products was presented and how they could be organised and what WMO file names could be used. The new products introduced can contain corrections from multiple implementations of ATBDs.

Proposals were made for the organisation of the netCDF file in the following ways:

1. Implementing these products in the enhanced data model such that the "Group" structure can be used to separate the different corrections.
2. Attaching qualifiers such as a prefix to the same variables containing the same data but for different ATBDs.

Proposal 1 has advantage of clearly showing the organisation but may not be compatible for use by existing free netCDF tools. Resources are required to analyse if this has 'major' impact from a user standpoint.

Proposal 2 is less clear but is compatible with existing tools.

EUMETSAT suggests that the use of the enhanced data model should not be used based on organisation of the data as it is likely that the product is view once by the users but after that, software is used to process it so readability is not so important. The enhanced data model should be used if:

- User defined types are required.
- If the data file size is expected to be >4Gbytes (?)
- Parallel processing functionality (?)

Recommendation is option 2, but if option 1 is preferred then the following action is needed:

Action: identify if using the enhanced data model has impact to the usage of the new products.

Regarding the proposed GSICS Prime Correction WMO filename, the following format is recommended:

    W_XX-EUMETSAT-Darmstadt,SATCAL+RAC+GEOLEOIR.MSG3+SEVIRI-PRIME_C_EUMG_...

Agenda Item: 4e Data Versioning Updates 10:40 (20 minutes)	
Presenter	Masaya Takahashi (JMA)
Overview	Review the existing GSICS versioning guidelines.
Purpose	To address ambiguous version numbers.
Discussion point, conclusions, Actions, Recommendations	

JMA presented the version ambiguities, these are (with discussed proposal):

1. Is the operational version be assigned as v1.0.0 – YES
2. How should bug fixes be identified – example => v0.0.1, v0.0.2, v0.0.3, ...
3. How should minor updates be identified – example => v0.1.0, v0.2.0, ...
4. How should major updates be identified – example => v1.2.3 => v2.0.0

Action: GCC to support the revising of the GSICS versioning and update the Wiki.

Agenda Item: 4f Proposed MW Standards 11:00 (30 minutes)	
Presenter	Manik Bali (NOAA)
Overview	Provide MW product overview, proposed WMO filename and content.
Purpose	For comment and consideration.
Discussion point, conclusions, Actions, Recommendations	

NOAA has worked with EUMETSAT and JMA on this product.

There were no issues with the proposal.

Action: NOAA to provide templates of proposed WMO file name and the content of the MW GSICS product on the GSICS wiki.

Agenda Item: 4g GPPA Timeliness 11:30 (50 minutes) – Moved to Thursday 6e 13:30	
Presenter	Manik Bali (NOAA)
Overview	Introduce the delays and propose solutions.
Purpose	For comment and consideration.
Discussion point, conclusions, Actions, Recommendations	

Delays are incurred due to a lack of responses from developers and reviewers.

One suggestion is to impose a sense of urgency on the procedure by:

1. If a reviewer does not respond within the pre-defined time, then it is "passed by default". Reviewers who regularly "pass by default" are requested to provide offer an alternative reviewer.
2. If a developer does not respond with the pre-defined period, then their product is removed from the GPPA.

This is an option but is not the only proposal.

GCC proposes that to reduce the time taken for the GPPA, it will customise the schedule for each product submitted and provide guidance to improve the speedy validation of the product. No step from the GPPA will be skipped.

Breakout Session Day 1 (afternoon) – 18th March, 2015	
Chair	Masaya Takahashi (JMA)
Minute Taker	Peter Miu (EUMETSAT)
Attendance	Manik Bali (NOAA) , Jae-Gwan Kim (KMA), Jerome Lafeuille (WMO), Pradeep Thapliyal, Munn Shukla (ISRO), Suman Goyal, Virendra Singh, A.K. Mitra, and N. Puviarasan (IMD)
Remote Attendance	Zhe (Thomas) Xu and Di Xian (CMA)
Part Time	Xiuqing Hu (CMA – Scott), Jerome Lafeuille (WMO)

Agenda Item: 4h Repository for GSICS Work - Code 14:30 (15 minutes)	
Presenter	Peter Miu (EUMETSAT)
Overview	Currently source codes for GSICS tools such as bias plotting tools and netCDF metadata checker resided with the GPRC leading its development. The disadvantage of this is only the GPRC can support future agreed enhancements thus can hamper the progress of GSICS activities. In order to share codes by all GPRCs, a configuration control process (e.g., review updated, track changes) is required. Possible solutions Peter proposed were 1) GPRC to provide a code to members for development 2) GCC to be the central repository for GSICS developed Code 3) Investigate a "free" tool for code configuration.
Purpose	To list these tools and identify a mechanism whereby the enhancement of these tools can be shared amongst the GSICS members.
Discussion point, conclusions, Actions, Recommendations	

IMD is interested in the GSCIS Product Generation Framework developed by EUMETSAT and CMA. EUMETSAT was asked whether this framework is applicable to re-processing of IMD GEO data or not. This is possible, but need to be tested.

EUMETSAT was asked what kind of version controlling software is used in each GPRC. Current candidate software is gitHub, but it needs to be checked whether gitHub is available in all the GPRCs.

JMA enquired the difference between the solutions presented for the GCC to take on the admin role for managing the configuration control of the code for the tools, and using a free tool administered by a GPRC. They are similar, but this is depends on where resources are available and where the expertise is available for review updates for new versions.

Participants agreed GCC should coordinate, if possible. This issue is required by GRWG as soon as possible, so the following actions are assigned as high priority ones.

Action: all GPRC to report what version controlling software is used and propose possible software to be used in the GSICS activities.

Action: GCC to check the availability to provide administration role on gitHub.

Agenda Item: 4i Existing Tools Updates - Code 14:45 (60 minutes)	
Presenter	Peter Miu (EUMETSAT)
Overview	To identify all GSICS tools and discuss updates.
Purpose	To propose a list of tool updates if needed.
Discussion point, conclusions, Actions, Recommendations	

All existing GSICS tools have been identified in the presentation with their developers and the current status of the tool with possible updates.

NOAA indicated that they will investigate the possibility of provide a dedicated GDWG member with the technical skills to attend the meeting and support these GDWG activities (i.e. distinct from GCC activities).

Action: EUMETSAT to provide estimate the resources needed and the expectations for when the updates will be implemented, and present these to the GDWG and EP to request for resources.

Agenda Item: 4j Products' Content Access Study - Code 15:45 (15minutes)	
Presenter	Zhe Xu (CMA)
Overview	To provide the GDWG a new way to access contents of GDWG products
Purpose	To discuss and evaluate further investigation.
Discussion point, conclusions, Actions, Recommendations	

CMA presented a new storage method for the GSICS corrections in a Database which has the flexibility to generate different formats.

CMA suggested to do a study as part of their GEOLEOIR GSICS product development which generate the agreed GSICS GEOLEOIR product but also to implement a proof of concept using the database.

The concept is very interesting but the group questioned if the users would be interested in such a service.

Action: CMA to discuss with CMA GPRC members on the usefulness of GSICS products in database.

Presentation information should also be provided to the GRWG.

Agenda Item: 4k IMD Data Centre Presentation	
Presenter	N.Puviarasan (IMD)
Overview	Present the existing Data Centre and the design of the new Data Centre
Purpose	For information and comment.
Discussion point, conclusions, Actions, Recommendations	

IMD kindly gave a presentation on their existing Data Centre and their plans for the development of their new Data Centre.

The GDWG members were very impressed by the design as well as the care taken to ensure users were consulted such that accurate requirements were specified.

IMD invited comments from the group, some comments received were:

1. Enquiry on the archived data backup policy; backup of data sets will be done electronically to another IMD site.
2. If more than 1 copy to be created on media, then different medias should be used to reduce risk of media integrity being an issue over a long period of time.

Agenda Item: 4l Event Log – Landing Page + Future Implementation 17:00 (1 hour)	
Presenter	Rob Roebeling (EUMETSAT)
Overview	Provide information and progress status for activities related to event logging.
Purpose	For information and comment.
Discussion point, conclusions, Actions, Recommendations	

WMO OSCAR is a central database to provide information on satellites and instruments operated by different space agencies. The website shall be updated in 2015, and shall offer for each Satellite Instrument a link to a landing page pointing to information on instrument calibration events.

At present, some GPRCs (e.g., EUMETSAT and JMA) reported their landing pages. The presention introduced EUMETSAT landing page. This page contains all the EUMETSAT satellites and instruments information. All GPRCs were asked to launch this kind of landing page. As a next step, GDWG needs to get a consensus on common naming conventions for calibration events at the level of Main-Categories/Sub-Categories/Event Types". A timeline for this is

1) EUMETSAT to write a white paper
2) GDWG to discuss the naming conventions
3) 3) EUMETSAT to report the discussion results at 2016 CGMS-44.

WMO reported updates of WMO OSCAR to add hyperlinks of calibration event logging. This will also be presented on Friday morning session.

Rob asked the following questions to all the participants.
"What mandatory fields should appear on the stable landing page?"
-> Existing fields, 1) Instrument Specifications 2) Calibration Events 3) Calibration Monitoring 4) Data Outages, are enough.
"Should we aim at using common nomenclature for calibration events?"
-> GDWG agreed.

"Should we aim at using a common data model for calibration events?"
-> Ideally yes, but difficult to ask each GPRC to change/follow the data model if they already have their own ones.
"How can we populate events databases with historic data?"
-> Depends on each GPRC. For example, one agency archives past satellites information only in a paper version.

Action: IMD and ISRO to nominate a representative that is part of the calibration events task team (CGMS-42: WGII/3 Action 42.02).

Action: EUMETSAT and JMA to provide templates of landing page to GDWG (or GSICS wiki).

Action: EUMETSAT to write a white paper on the standard nomenclature for calibration logging and monitoring.

In the following are statuses of actions assigned at the 2014 GSICS annual meeting.

GDWG_14.10 "All GPRCs to provide satellite instrument specific links to calibration events to WMO-

OSCAR" is closed even though not all the agency reported their landing page.

GDWG_14.11 "All GPRC to seek consensus on common naming conventions for calibration events at the level of Main-Categories/Sub-Categories/Event Types" will be discussed after EUMETSAT provides the white paper. Due date: 30 April 2016

GDWG_14.12 "EUMETSAT/NOAA/NASA/JMA to define a calibration events database design, and if needed, discuss this in a future webex meeting" will be discussed in future. Due date: 1 Mar 2018.

Breakout Session Day 2 (morning) – 19th March, 2015	
Chair	Peter Miu (EUMETSAT)
Minute Taker	Peter Miu (EUMETSAT) and Masaya Takahashi (JMA)
Attendance	Jae-Gwan Kim (KMA), Jerome Lafeuille (WMO), Pradeep Thapliyal, Munn Shukla (ISRO), Suman Goyal, Virendra Singh, A.K. Mitra, and N. Puviarasan (IMD)
Remote Attendance	Zhe Xu (CMA - Thomas), Pablo Benedicto Espeja (EUMETSAT)
Part Time	Manik Bali (NOAA)

Agenda Item: 6a Repository for GSICS Work – Clarification on Archiving (1 hour)	
Presenter	Masaya Takahashi (JMA)
Overview	GRWG has requested as a high priority task the storage of various supporting data sets.
Purpose	GDWG to provide possible storage solutions for these data sets.
Discussion point, conclusions, Actions, Recommendations	

1. GRWG requested the storage of SRF netCDF files. These are small files generated typically once for each instrument and used with the cross calibration corrections. Existing instruments have SRF file but not in the netCDF format so a solution for this is also requested.

GDWG proposed the following actions to support the storage of SRF files:

Action: JMA GRWG to provide the list of existing SRF data sets to be stored. GPRC responsible for these data sets shall provide them to GDWG co-chair as soon as possible.

Action: JMA to provide the netCDF template to GDWG co-chair for these SRF files.

Action: EUMETSAT to support the generation of the existing SRG files into the netCDF format.

Action: GCC to update the Instrument Info Kisok with the SRF netCDF files provided by EUMETSAT.

Action: The GEOLEOVISNIR or LEOLEOVISNIR shall include an optional global attribute referencing the location of the associated SRF netCDF file.

2. Lunar Calibration netCDF files are to be stored and accessible ONLY by the lunar calibration community. File size between 5MB to 20MB. Number of files per month can be from 5 to 500. These file could be provided on the THREDDS server but ideally a more elegant solution should be found.

Action: EUMETSAT to investigate how THREDDS can be used to limit access to these data sets.

Agenda Item: 6b Tools for GRWG activities 10:30 (1 hour)	
Presenter	Masaya Takahashi (JMA)
Overview	GRWG has requested as a high priority task the sharing of code and collaboration in the enhancement of tools using this code.
Purpose	GDWG to provide possible suggestion to support this task.
Discussion point, conclusions, Actions, Recommendations	

EUMETSAT has developed GIRO code which is intended to be shared amongst the GPRCs in their operational environments. Collaboration updates are also expected to this code so the proposed solution should also cater for this requirement.

GDWG members do not endorse the idea of sharing code as this can introduce a lot of support issues.

GDWG also recommends that the GRWG should consult the GDWG when developing code to ensure that GSICS Data Management good practises are followed.

The GDWG recommends the portable black box solution ideally written in Java with variable configuration during start up via a XML configuration file. A use guide and technical of the tool should be available for users to clearly understand the functionality provided by the black box.

For collaboration, the code should following the solution proposed for agenda item 4h; Repository for GSICS work – Code.

Action: GDWG co-chair to support GRWG to implement the recommendations for sharing work in a Data Managed way.

The GRWG also requests a GIRO product checker. This checker is the same as the proposed netCDF checker so it is recommended to allocate resources to support this task.

Action: EUMETSAT to provide requirements and design for the netCDF GSICS product checker.

Action: CMA, IMD, JMA and KMA to collaborate in the implementation of the netCDF GSICS product checker.

Agenda Item: 6c Directory Structure Updates 11:30 (15 minutes)	
Presenter	Masaya Takahashi (JMA)
Overview	Provide the updates to the THREDDS directory structure to support new products.
Purpose	To inform, request comments for updates needed such that a consensus can be achieved.
Discussion point, conclusions, Actions, Recommendations	

There were no objections to the presented updates. Implementation of the new structure will require substantial resources to reconfigure the THREDDS servers.

Action: CMA to check the proposed new THREDDS server's directory structure with their GRWG

member if the new structure fits the needs of CMA.

Action: EUMETSAT to take the lead in performing these updates and provide these to the administrators of the other collaboration servers.

Ideally, an automated method for generating THREDDS configuration files should be implemented (new action for the future ?).

Breakout Session Day 2 (afternoon) – 19th March, 2015	
Chair	Masaya Takahashi (JMA)
Minute Taker	Peter Miu (EUMETSAT)
Attendance	Manik Bali (NOAA) , Jae-Gwan Kim (KMA), Jerome Lafeuille (WMO), Pradeep Thapliyal, Munn Shukla (ISRO), Suman Goyal, Virendra Singh, A.K. Mitra, and N. Puviarasan (IMD)
Remote Attendance	Zhe Xu (CMA - Thomas)
Part Time	Xiuqing Hu (CMA – Scott), Jerome Lafeuille (WMO)

Agenda Item: 6d Mirroring of Products (30 minutes)	
Presenter	Peter Miu (EUMETSAT)
Overview	The original concept for the GSICS collaboration network is to provide redundancy of the GSICS products through its duplication amongst the network servers. This is not the case at present so the group is invited to re-visit this requirement.
Purpose	To reconfirm if this mirror is needed and if so, then propose a technical solution for this mirroring.
Discussion point, conclusions, Actions, Recommendations	

GRWG requests mirroring to ensure operational systems can always access GSICS products. Security policies prevent some of the collaboration servers from being FTP'ed to i.e. FTP push (client initiates the transfer). A suggested solution to the acquisition of the GSICS products from one GSICS server to another using "FTP pull" (server initiates the transfer). The following action is proposed:

Action: CMA to investigate if their GSICS source data download tool can be used to perform the transfer of GSICS products between the collaboration servers support the mirroring of the products can be achieved.
Action: **NOAA to investigate the mirroring of EUMETSAT products on the NOAA server.**

EUMETSAT Data Centre order download client could be adapted to provide a solution for this functionality, EUMETSAT could estimate the resource needed to support this.

Agenda Item: 6f Document Management System (30 minutes)	
Presenter	Manik Bali (NOAA)
Overview	Provide information on what GCC can offer to support the storage of GSICS documents.
Purpose	To identify how to store GSICS documents.
Discussion point, conclusions, Actions, Recommendations	

NOAA has a wild cat system that can store documents and provide global access to these documents. Some NOAA policies need to be taking into account if this system is used.

An alternative is to provide a set of templates for GSICS documentation and GPRCs should use these templates when documenting their GSICS activities. This is a simpler and preferable solution. GCC can store these documents appropriately.

Action: WMO and GPRCs to provide the GCC with examples of document management procedures including templates to support the creation of GSICS branding documentation templates.

Breakout Session Day 3 (Morning Only) – 20th March, 2015	
Chair	Masaya Takahashi (JMA)
Minute Taker	Peter Miu (EUMETSAT)
Attendance	Manik Bali (NOAA) , Jae-Gwan Kim (KMA), Jerome Lafeuille (WMO), Pradeep Thapliyal, Suman Goyal, Virendra Singh, and A.K. Mitra (IMD)
Remote Attendance	Zhe (Thomas) Xu and Di Xian (CMA)
Part Time	Jerome Lafeuille (WMO)

Agenda Item: 6e Summary of Tasks (30 minutes)	
Presenter	Peter Miu (EUMETSAT)
Overview	Summarise the GDWG discussions and tasks.
Purpose	To propose a work plan to the GDWG for 2015/2016.
Discussion point, conclusions, Actions, Recommendations	

All the participants reviewed actions assigned during the GDWG breakout session.

Action: **EUMETSAT to provide a harmonised action identifier for the working groups and the EP.**