Report of the 43rd Meeting of the
Coordinated Group for Meteorological Satellites

Parallel Working Group Sessions: WGIII Report

WG III REPORT

Co-Chairs: Suzanne Hilding (NOAA), Peng Zhang (CMA)
Rapporteur: Derek Hanson (NOAA)

WGIII/0 Objectives

The Co-Chairs opened the meeting with a welcome and introductions. The Co-Chairs were pleased to note the large number of participants in this year's WGIII meeting.

WGIII/1 Review of actions and recommendations from previous meetings

The meeting reviewed the status of actions from previous meetings.

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
WMO	WGIII	38.40	Action 38.40: WMO in collaboration with the atmospheric composition community and satellite experts to further refine the requirements for atmospheric composition requirements and the optimal way to address these in the revised baseline.	CGMS-41: Remains open. No progress; Ad-hoc task team to review the needs for GAW (atmospheric composition) regarding satellite measurements and the 2004 IGACO recommendations has not yet been formed. Nov '14: Task is in progress with the establishment of a dedicated task team by the Global Atmospheric Watch programme. The GAW JSC OPAG-EPAC took an action on 20 Mar 2013 to update the requirements contained in the 2004 IGACO Report, in consultation with the WMO Space Programme and relevant Expert Teams. A WMO Global Atmospheric Watch Task Team on Observational Requirements and Satellite Measurements as regards Atmospheric Composition and Related Physical Parameters was established and held its first meeting on 10-13 November 2014. The meeting was very effective. Actions are in progress to update the observation requirements in support of 3 applications: Atmospheric composition forecasting, atmospheric monitoring assessment for international conventions, air quality in megacities. Working paper submitted to plenary - 43. Closed following WGIII actions. A new WGIII action will be reformulated/ made.	(CGMS-38) **New deadline CGMS-43**	**CLOSED**	HLPP #1.1.1

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
WMO	WGIII/4	41.42	WG III (actionee TBD) to review the categorisation of missions in the CGMS baseline and refine it as appropriate in order to support a high-level mapping with FCDRs.	See also action Plen G.1.1; 41.12. Interactions with ET-SAT is ongoing (Feb 2014) CGMS WGIII rapporteur has presented a report to JWG on climate and WMO-WP-08 will be discussed at CGMS-42. CGMS-42-WMO-WP-08: In progress with the contribution provided in the paper. Action closed following WGIII discussions. If needed, WGIII will create a new action or place one on CEOS-CGMS JWG climate.	(15 Dec 2013) new deadline CGMS-43	CLOSED	HLPP #5.1.2
WGIII	WGIII (Plen E.3.1.3)	41.48	WGIII to investigate the long-term planning of space based observation for global precipitation measurements and liaise as appropriate with the CEOS Precipitation Constellation	Discussed at CGMS-42: Regarding the long term planning of active precipitation measurement, will be postponed to 2015 in order to best take into account the progress of GPM-Core and CMA's plans for FY-3RM. CGMS-43: IPWG to provide an input to WGII, WGIII and to plenary on the current status, plans and recommendations to CGMS. IPWG has raised comments on the HLPP (contingency planning, observational gaps) relevant to WGIII.	(CGMS-41) New deadline CGMS-43	CLOSED	HLPP #1.1.3

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CGMS space agencies	CGMS-41 Plen E.4.3/ CGMS-42 Ad hoc space weather mtg	41.15 (from CGMS - 41 Plen)	CGMS Members to nominate points of contact to work with WMO/ICTSW in order to define jointly a procedure to improve the collection, availability, and use of satellite anomaly information (30 September 2013)	CMA: ZHANG Xiaoxin and Dr.GUO Jianguang xxzhang@cma.gov.cn; guojg@cma.gov.cn EUM: mike.williams@eumetsat.int JMA: Yasushi Izumikawa (Mr) satellite@ml.kishou.go.jp KMA: Inchul SHIN icshin@korea.kr NASA HQ: Elsayed R. Talaat, Discipline Scientist, Heliophysics, NASA HQ, elsayed.r.talaat@nasa.gov NOAA: vanessa.l.griffin@noaa.gov WMO: jlafeuille@wmo.int CGMS-42: Discussions. CGMS members to validate their poc and/or nominate new ones. NOAA response pending, per further discussions in WGIII CGMS-43	(30/09/2013) New deadline 30 Sep 2014	CLOSED	HLPP #5.2.1
WMO, CMA, EUM, ROSH, ISRO	WGIII/2.2	A42.01	WMO to initiate a dialogue with Indian Ocean satellite operators and clarify which data are essential in the sense of Resolution 40, in view of the meteorological requirements in the region.	CGMS-43-EUM-WP-14 A CGMS-43 plenary agenda item has also been foreseen.	CGMS-43	CLOSED	HLPP# 1.1.6

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
EUM, ISRO	WGIII/2.2	A42.02	EUMETSAT and ISRO will address the technical issues to accommodate high-resolution half-hourly data from INSAT-3D on dissemination means.	To be implemented mid 2015.	CGMS-43	CLOSED	HLPP# 1.1.6
WMO	WGIII/2.2	A42.03	WMO to consider sending a request to CMA for moving an FY-2 spacecraft over the Indian Ocean after successful launch and commissioning of FY-2G.	(CGMSSEC Dec '14: Action slightly amended from "WMO to consider sending a request to CMA for moving FY-2D over the Indian Ocean after successful launch and commissioning of FY-2G."). This will be considered after launch of FY-2G. FY-2G was succesfully launched on 31/12/2014.	CGMS-43	CLOSED	HLPP# 1.1.6
NOAA	WGIII/2.2	A42.04	NOAA to report at the first WGIIII Intersession meeting on its plans regarding the possibility of pre-operational dissemination of GOES-R data via e.g. GEONETCast-Americas both as a risk reduction measure and as a way to reap the earliest benefit of the new system.	Discussed at CGMS WGIII IS#1 of 17 March 2015. Closed as a consequence.	30-Nov-14	CLOSED	HLPP# 1.1.6

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
ISRO	WGIII/2.2	A42.05	ISRO to report at CGMS-43 on its progress on radio-occultation processing of ROSA on Oceansat-2 and Megha-Tropiques, and on the possibility of near-real time access to ROSA data acquired at a high latitude station such as Svalbard.	CGMS-43 ISRO-WP-03 partially closed. NRT access to ROSA data remains open	(CGMS-43) new deadline CGMS-44	OPEN	HLPP# 1.1.4
EUM	WGIII/2.2	A42.06	EUMETSAT to review the schedule of its ECMWF radio-occultation study with the aim to deliver advanced results on the specific impact of the high-latitude COSMIC-2 constellation.	Nov '14: Study now at mid-term. First review Oct '14. The full set of scenarios, including the analysis, is expected early 2015, to be presented at the IROWG-4 meeting (Apr '15). The final report should become available in Q3 2015. Action on EUMETSAT; has been partly address by providing early results at various workshops, meetings (e.g. A. Thorpe's talk at Eighth FORMOSAT-3/COSMIC Data Users' Workshop 2014), and by providing a Working Paper/Presentation for CGMS-43: CGMS-43-EUM-WP-12	CGMS-43	**CLOSED**	HLPP# 1.1.4

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CNSA, EUM	WGIII/2.2	A42.07	EUMETSAT and CNSA to report at CGMS-43 on the progress of EUMETSAT-SOA collaboration on the dissemination of HY-2 data in near real time.		CGMS-43	**CLOSED**	HLPP# 1.1.3
EUM, ISRO	WGIII/2.2	A42.08	ISRO and EUMETSAT to report at CGMS-43 on their discussions on data dissemination collaboration for SCATSAT data.	Ongoing. New deadline following CGMS-43 WGIII discussions.	CGMS-43) **new deadline CGMS-44**	**OPEN**	HLPP# 1.1.3
CMA, ROSH	WGIII/3	A42.09	CMA and ROSHYDROMET to provide points of contact for possible participation in GHRSST.	CMA: Mrs. WANG Sujuan wangsj@cma.gov.cn; Dr. LU Feng lufeng@cma.gov.cn ROSH: Mr. Alexey Chudin, leading programmer, SRC "PLANETA", Far Eastern Center E-mail: niokr@dvrcpod.ru, alexchudin@dvrcpod.ru	31-Aug-14	**CLOSED**	-

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CEOS OCR-VC	WGIII/3	A42.10	OCR-VC Chair to provide feedback on the CGMS Baseline, and suggest more specific provisions addressing the needs of ocean colour monitoring, if relevant, for consideration by CGMS.	Input provided to WMO/J. Lafeuille by S. Bernhard, 17 Oct 2014	CGMS-43	**CLOSED**	HLPP# 1.1.6
NOAA	WGIII/5	A42.11	NOAA to communicate to WG III the link to the information material collected by the SETT Tiger Team.	The link was circulated by e-mail.	31-Aug-14	**CLOSED**	HLPP# 4.1.1
NOAA	WGIII/5	A42.12	NOAA to report at the first intersessional web meeting of WG III on the progress of the SETT.	Progress report provided at CGMS WGIII IS#1 of 17 March 2015. Closed as a consequence.	30-Nov-14	**CLOSED**	HLPP# 4.1.1
NOAA	WGIII/5	A42.13	NOAA to circulate to WG III the 2-3 page report on socio-economic benefit to be produced by the SETT.	The report was circulated to the csr.	30-Apr-15	**CLOSED**	HLPP# 4.1.1

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CGMS members	Plen H.1 for WGIII	A42.14	CGMS Members to establish an implementation team tasked to define detailed objectives for the implementation of CGMS space weather activities as defined in the Terms of Reference	NOAA: suzanne.hilding@noaa.gov cc kimberly.hurst@noaa.gov Closed following CGMS-43 space weather discussions. To be addressed in the next inter-sessional webex meeting on 2 Sept 15	(15 Oct 2014, CGMS-43)	**CLOSED**	HLPP# 5.2.2
CGMS members	Plen H.1 for WGIII	A42.15	The space weather implementation team to propose next steps until CGMS-43 and objectives to be included in the HLPP. This includes space weather observations into the WIS and implementation procedures to report on spacecraft anomalies	NOAA: To be discussed further in WGIII at CGMS-43. Closed following CGMS-43 space weather discussions. To be addressed in the next inter-sessional webex meeting on 2 Sept 15	(15 Mar 2015, CGMS-43)	**CLOSED**	HLPP# 5.2.2
WMO	CGMS -42 Ad hoc space weather mtg	A42.16	WMO to establish an e-mail listserver for CGMS Space Weather activities (including CGMS members and associated organisations)	Created 9 March 2015 CGMSspaceweather@wmo.int (Please inform cgmssec@eumetsat.int if you would like to be added/removed from the list).	30 Sep 2014	**CLOSED**	HLPP #5.2.1

WGIII status of actions on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CGMS members	CGMS-42 Ad hoc space weather mtg	A42.17	CGMS Members interested in space weather activities to indicate to the CGMS Secretariat their points of contact for inclusion into the e-mailing list.	ZHANG, Xiaoxin xxzhang@cma.gov.cn GUO, Jianguang guojg@cma.gov.cn mike.williams@eumetsat.int Andrew.monham@eumetsat.int Joachim.saalmueller@eumetsat.int paul.counet@eumetsat.int IZUMIKAWA, Yasushi satellite@ml.kishou.go.jp SHIN, Inchul icshin@korea.kr LEE, Hyesook hslee05@kma.go.kr suzanne.hilding@noaa.gov terry.onsager@noaa.gov kimberly.hurst@noaa.gov Charles.wooldridge@noaa.gov elsayed.r.talaat@nasa.gov jlafeuille@wmo.int cgmssec@eumetsat.int	30 Sep 2014	**CLOSED**	HLPP #5.2.1

WGIII status of recommendations on the occasion of CGMS-42							
Actionee	Action	#	Description	Action feedback/closing document	Deadline	Status	HLPP ref
CGMS satellite opera-tors	WGIII /2.1 (CGMS-41) WGIII /2.2 (CGMS-42)	R41.14	CGMS Satellite Operators to address the anticipated or potential gaps identified by WG III, in particular: • infrared and microwave sounding on the early morning orbit, • geostationary coverage of Indian Ocean • hyperspectral sounding missing in some geostationary sectors • ocean surface wind by scatterometry • long-term follow-on of radio-occultation constellation, • global precipitation measurement precipitation radar follow-on mission, • long-term Earth Radiation Budget monitoring • limb sounding for high-vertical resolution observations in the stratosphere and mesosphere (of temperature, humidity, wind, aerosol, ozone and other trace gases).	Ref CGMS-41 WGIII R 40.36. Ongoing. Discussed in WGIII at CGMS-41 and -42. CGMS-42-ROSH-WP-02: In order to fill the gaps in Hyperspectral sounding and Long-term Earth Radiation Budget monitoring over the Indian Ocean Roshydromet plans to install the appropriate instruments onboard future Electro-M geostationary satellites. Recommendation amended following WGIII CGMS-42 discussions. Closed following WGIII discussions. Terms of Reference for WGIII will be documented taking this recommendation into account. Furthermore the future agenda of WGIII will contain an item looking at any new potential risk areas.	(CGMS-43)	**CLOSED**	HLPP# 1.1

The WGIII attendees agreed to close some older actions, and to reformulate them if needed. The majority of the CGMS-42 WGIII actions were closed by WP presentations or through discussion during the WGIII meeting.

The WG also discussed the possibility of removing the final recommendation, for responding to potential gaps identified by WGIII, and incorporating that recommendation into a new Terms of Reference for WGIII.

WGIII/2 Status of implementation of the CGMS baseline

WGIII/2.1 Mapping of planned missions against the baseline

WGIII/2.2 Continuity issues, risk analysis

CGMS-43-ISRO-WP-03 ROSA data processing at ISRO

In this paper, ISRO responded to CGMS-42 WGIII A42.05 and provided an update on their ROSA data processing. ISRO discussed the latest update to the ROSA software, which shows considerable improvement in many respects and resulted in a 7% increase in the number of products delivered.

Additionally:

- Both bias and RMSD show significant improvement in refractivity between 8-25km.
- Corresponding improvement seen in temperature error.
- Higher errors persist above 25km causing large retrieval errors in geophysical parameters at these levels.
- Systematic errors in refractivity suggest improved algorithms are needed.
- Trade-off between more occultation events-penetration vis-a-vis quality of profiles, to be treated on merits, as data sparse regions and for critical applications, strict quality regimes might need to be relaxed. This may call for dual data processing regimes.

CGMS-43-EUMETSAT-WP-12 Status of EUMETSAT study on radio occultation/saturation with realistic orbits

EUMETSAT presented this WP in response to CGMS actions CGMS-41 WGIII A41.36 and CGMS-42 WGIII/2.2 A42.06. The information is also relevant with respect to Action Plen IV.4, 40.06 (WMO to coordinate impact studies) and Recommendation WGIII/2.1 (CGMS-41) WGIII/2.2 (CGMS-42) R41.14 (address the anticipated or potential gaps).

First results of a study currently running at ECMWF were presented. The study looks at saturation effects when assimilating RO observations, where RO observation positions are simulated using realistic LEO and GNSS orbits. This study is thus a refinement of an earlier study that assumed RO occultations to be randomly distributed in space and time.

An Ensemble of Data Assimilation (EDA) approach, using 10 (+1) members in a 4D-Var modern NWP system, was used. Within this study, the following 3 main issues are addressed:

- Refine the earlier, random occultation position, study with realistic future satellite orbits;
- Assess which observation constellation is best suited to achieve the best distribution in space and time;
- Provide guidance on RO instrument deployments on future LEO satellites.

Regarding Point 1, it has been found that although realistic orbits affect occultation positions significantly, a modern NWP system can still effectively use any observations, thus the impact of realistic orbits is small. Regarding Point 2, the more observations are available, the lower forecasting spreads are found; constellations that provide most observations at low latitudes are particularly useful, since here, per area the least occultations are available from polar orbiting RO instruments and the model errors are the largest. Regarding Point 3, it again can be concluded that the more observations, the lower the forecast spread, even if additional instruments are provided in orbits that are already populated with RO instruments.

The study itself is formally finishing by August 2015, with a final presentation at EUMETSAT about 1 month earlier. Underlying EDA runs have been run over the last year and are complete. Results, discussions and conclusions will be included in the final report. The study results have also been presented and discussed at IROWG-4 in April 2015.

EUMETSAT emphasized that the first results show that the full COSMIC-2 constellation (equatorial and polar) produces the largest improvements to accuracy. Jason-CS produces a relatively small impact, but is particularly important in the absence of COSMIC-2 polar. There was no saturation seen in any one orbit.

Statistically, improvements are determined mainly by observation numbers, rather than orbits. However, EUMETSAT pointed out that for specific events, certain orbits could be particularly important.

WMO reiterated the importance of COSMIC-2 to NWP and noted the importance of these measurements to long-term climate monitoring. WMO will also organize an Impacts Workshop in May 2016.

Proposed recommendation:

CGMS-43 recommendations – WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
CGMS Members	WGIII/2.2	R43.01	CGMS members are encouraged to consider including RO capabilities on all future polar-orbiting satellites.	Ongoing	OPEN	HLPP # 1.1.4

CGMS-43-IPWG-WP-08 Summary of highlights and request for guidance from IPWG-7

Working paper IPWG-WP-08 was written by the two co-chairs of the International Precipitation Working Group (IPWG), Dr. Nai-Yu Wang and Dr. Kazumasa Aonashi. The report summarizes the outcome of the IPWG-7 meeting. Furthermore, it highlights the recent achievements of IPWG and provides an outlook

for the planned activities over the next two years. The report also cites specific recommendations for CGMS members and IPWG comments on the current HLPP, including concern for continuity of Indian Ocean Data Coverage, support for conically-scanning microwave platforms, data reprocessing, and others (full list in WP).

The IPWG-7 was held at the Tsukuba International Congress Center and hosted by the Japanese Aerospace Exploration Agency (JAXA) Earth Observation Research Center (EORC), Tsukuba, Japan during 17-21 November 2014. The meeting was attended by 125 participants from over 20 countries that included 49 oral and 57 poster presentations. It consisted of nearly three full days of plenary sessions (12 oral, 3 poster), one full day of working group discussions and a final group plenary, and then closed with a special session dedicated to Dr. Arthur Hou, NASA Global Precipitation Measurement (GPM) Project Scientist, who passed away in late 2013. Additionally, a satellite training course was given, which took place in parallel to the IPWG workshop; 28 participants attended the course.

Two new co-chairs were selected; Remy Roca (CNRS, France) and Tufa Dinku (IRI, USA). IPWG-8 will be held in the fall of 2016, with an African venue being targeted, however, former co-chair Vincenzo Levizzani has offered to host the meeting at his ISAC/CNR facility in Bologna, Italy as a secondary option.

Following the presentation, there was discussion about continuity of microwave imagers and need for NWP centers to demonstrate their benefit.

Proposed recommendation:

CGMS-43 recommendations – WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
IPWG	WGIII/2.2	R43.02	IPWG should consider reporting impact of both passive microwave imaging and active dual-band radar to WMO Impact Workshop in May 2016.	1 Nov 2015	OPEN	-

CGMS-43-IROWG-WP-13 Outcome and recommendations from the IROWG-4

This paper described the outcome and main recommendations of the fourth IROWG meeting. The full set of recommendations, relevant at CGMS, at satellite operator, and at IROWG level will be made available at http://www.irowg.org.

For work in the immediate future CGMS-43 is invited to emphasize the following four main IROWG-4 recommendations:

- Ensure that both, equatorial and polar components of COSMIC-2 are fully funded and launched; this is required for Numerical Weather Prediction, Climate, and Space Weather;
- IROWG recommends targeting at least 20,000 occultations/day to be made available in near-real-time to the operational and research communities of Numerical Weather Prediction, Climate, and Space Weather;

- IROWG recommends that the RO receiver design includes sufficient software/firmware flexibility to allow changes in the signal processing including processing of new GNSS signals/constellations as they become available; all receiver measurements should cover the ionosphere as well;
- International space/research agencies (e.g., NASA, ESA, CMA, CSA, NSF, NOAA, EUMETSAT and others) to hold an interagency workshop to define cooperation options for implementing the next steps towards a LEO-LEO research and demonstration mission.

All presentations, minutes, and the IROWG-4 CGMS working paper will be made available at http://www.irowg.org.

The IROWG representative emphasized the need to launch COSMIC-2 Polar and to develop an RO continuity plan after COSMIC-2. NOAA confirmed that it is looking at developing a continuity plan. The IROWG representative noted that NOAA is undertaking an extensive OSSE that is expected to be completed by the end of 2015. Finally, the IROWG representative encouraged CMA to make RO data available from their FY satellites and noted that there is significant interest in using this data.

Proposed actions:

CGMS-43 actions - WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
NOAA	WGIII/2.2	A43.01	NOAA to report on results of new OSSE on radio occultation.	CGMS-44	OPEN	HLPP # 1.1.4
WMO	WGIII/2.2	A43.02	WMO to report on the outcome of the WMO Impact Workshop in May 2016.	CGMS-44	OPEN	HLPP # 1.1.4

WGIII/2.3 Indian Ocean Data Coverage (IODC) – CGMS roadmap

CGMS-43-EUMETSAT-WP-14 Indian Ocean Data Coverage (IODC) – CGMS roadmap

In this paper, EUMETSAT proposed a way forward for the provision of Indian Ocean Data Coverage (Services) after the end of life and re-orbiting of Meteosat-7 in 2017, based on the analysis of the current status of CGMS partner satellite systems (CMA, EUMETSAT, ISRO and ROSHYDROMET) in the region.

The combination of satellites and services should lead to an overall resilient multi-partner IODC service, for which a requirements baseline has been agreed at CGMS-42. The paper proposes a detailed scenario and timeline for approval by the CGMS partners contributing to future IODC services.

EUMETSAT noted that currently:

- Data from ISRO's INSAT-3D is available and being received by EUMETSAT. EUMETSAT plans to disseminate images via EUMETCast later this year.

- Data from CMA's FY-2D and FY-2E is available. EUMETSAT plans to disseminate images via EUMETCast later this year, following CMA planned relocation of FY-2E to 86.5 degrees E.
- Data from ROSHYDROMET's Electro-LN1 was regularly available until a satellite anomaly in March 2014 - Electro-LN2 scheduled for launch this year.

EUMETSAT proposes to partner with CMA, ISRO, and ROSHYDROMET, and to move EUMETSAT's Meteosat-8 to 40 degrees E, following successful launch and commissioning of MSG-4 and assuming the continued health of the rest of the Meteosat constellation. The final decision could be made at the June 2016 EUMETSAT Council meeting. There would be significant coverage overlap between Meteosat-8 at this location and the satellites from identified partner agencies, allowing for coverage of the Indian Ocean region and for cross-calibration, etc. DCS would also be sufficiently covered.

WMO responded that they are pleased with the thorough plan presented by EUMETSAT. WMO asked about the plan for dissemination of data from these satellites through other means beyond EUMETCast and outside of that footprint.

WGIII endorsed the EUMETSAT proposal.

EUMETSAT noted the need to send clear signals at Plenary and at the upcoming WMO Congress that CGMS has a solid plan for Indian Ocean Data Coverage. EUMETSAT also noted that this proposal would be a major step forward over the current IODC, which relies on only one satellite, Meteosat-7, which is well beyond its design life. The new proposal would create a much more robust constellation, comprised of newer satellites from CGMS partners with long-term commitment to continued coverage in the region.

As a consequence an action was passed to WGIV:

EUMETSAT to coordinate with CGMS partners to develop a data dissemination plan from Indian Ocean Data Coverage partners identified in the CGMS-43-EUM-14 roadmap, to be reported and discussed at the first WGIV intersessional. (See WGIV report).

CGMS-43-IMD-WP-02 Continuation of EUMETSAT satellite service over Indian Ocean

ISRO presented the paper on behalf of IMD. ISRO noted that Meteosat-8 will provide a useful demonstration of additional capabilities that ISRO plans to use in their future satellites. ISRO confirmed that Indian Ocean Data Coverage is a big priority for India.

WMO thanked ISRO and IMD for their commitment to supporting Indian Ocean Data Coverage and encouraged ISRO to have the Indian delegation to WMO Congress to make clear that India is committed to continuing flying INSAT-3D satellites. WMO also emphasized the importance of availability of data in near-real-time.

CGMS-43-WMO-WP-04 Satellite data user needs in the Indian Ocean region

To inform the discussion on satellite data coverage services over the Indian Ocean region, WMO carried out a survey among key users of satellite data in February/March 2015. Responses from eleven countries were received, regarding baseline requirements for satellite data (L1 and L2) needed for routine operations, and additional requirements in case of an emergency or a severe event.

Key conclusions from the survey are that (i) requirements are dominated by the need to monitor and forecast tropical cyclones; (ii) requirements are not limited to the need for observing the Indian Ocean but also address land applications, such as fire detection; (iii) some redundancy in satellite coverage of the region is needed; (iv) according to the majority of responses, the required baseline repeat cycle for GEO imagery over the region is 30 minutes; (v) GEO has higher importance in case of emergencies or severe events due to its higher repeat cycle; most users require additional GEO imagery in such cases, with the majority requiring rapid-scan imagery every 10 minutes or less, (vi) several users expressed a requirement for GEO lightning products (both as baseline and as additional requirement).

The requirements identified in the survey have not yet been validated by the broad user community in the Indian Ocean region, nor matched against existing or planned capabilities. Further refinement and consolidation of the requirements needs to be discussed, and WMO plans to report on validated and consolidated user requirements at CGMS-44.

EUMETSAT noted that at CGMS-42, IODC user needs were identified. It appears as if those user needs closely match those identified in this WMO paper.

Proposed recommendation:

CGMS-43 recommendations – WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
CGMS members	WGIII/2.3	R43.03	CGMS members to take into account the user requirements identified in the WMO survey (CGMS-43-WMO-04) when discussing continuous satellite coverage over the Indian Ocean region and report results to CGMS-44.	CGMS-44	OPEN	HLPP # 1.1.6

CGMS-43-WMO-WP-14 Updated risk assessment and gap analysis

In support of the discussion on global continuity and risk analysis by the Working Group on Operational Continuity and Contingency Planning (WG III), this paper recalled the status of critical missions identified in Recommendation 41.14 from CGMS-41 and CGMS-42.

Working Group III was invited to consider this document as a “Risk Register” to be updated in the light of the status and plans of their respective satellite programmes.

WGIII addressed the risk assessment and gap analysis in real time:

a) Indian Ocean Data Coverage: This issue was sufficiently addressed earlier in WGIII.

b) Transition to GOES-R in South America: NOAA has addressed this issue and the working paper reflects the current status.

c) Geostationary infrared sounding: The working paper reflects the current status.

d) Imagery and sounding on early morning orbit: CMA confirmed its plan to operate FY-3E in early morning orbit. WMO thanked CMA for this very important decision and looks forward to the announcement at the WMO Congress. WMO also encouraged CMA to continue to support the early morning mission beyond FY-3E.

e) Continuity of afternoon primary missions: NOAA confirmed that it is taking all possible steps to ensure Suomi NPP operates as long as possible and currently does not see any risks to the satellite's health. NOAA also confirmed that the JPSS-1 development is proceeding well, and have budget requests this year for JPSS-3 and -4. Additionally, considering high-risk gap mitigation, the EON satellite can be considered for the most important measurements. In short, WGIII will need to continue to monitor the situation, but have seen significant positive developments in the past year.

f) Radio occultation: NOAA noted that it has made significant progress in the past year, as the budget request includes funding for the COSMIC-2 polar constellation.

g) Altimetry: NOAA noted that Jason-3 is currently scheduled for launched on July 22, although we are awaiting resolution of a technical anomaly. EUMETSAT noted that it has started restricted dissemination of SOA HY-2 data, and the data looks good. There are discussions with SOA on improving the latency and increasing its distribution. WMO encouraged this EUMETSAT/SOA effort and the increased access to near-real-time data.

h) Active ocean surface wind measurement: EUMETSAT confirmed that quality of HY-2 scatterometry has been reviewed and is good. EUMETSAT noted that discussions are on-going with ISRO on SCATSAT. It was noted that Rapidscat on ISS is also currently providing useful data.

i) Earth Radiation Budget: Working paper reflects current status.

j) Limb sounding: Working paper reflects current status.

WGIII/3 Space-based observing system review and optimisation

CGMS-43-WMO-WP-17 The new functionality of WMO OSCAR/Space

The Observing System Capability Analysis and Review online tool (OSCAR) is a building block of the WIGOS. It has two main components: (i) OSCAR/Surface which is being developed by Meteo-Suisse on behalf of WMO; (ii) OSCAR/Space module (www.wmo.int/oscar/space) which is widely used in the satellite community with around 1000 visits per day. This working paper discusses the recently

completed development to allow the recording of the individual status of each instrument, including the start and end dates of operations, with link to "landing pages" maintained by satellite operators to provide calibration and other technical details as agreed by GSICS. It will enable more accurate availability charts for gap analysis.

In order to facilitate the future scientific maintenance of OSCAR/Space, a new concept has been developed for the mapping of instrument to variables and the evaluation of their potential performances. Using an expert system approach, it relies on a collection of expert rules, which apply to objective sensor features such as spectral, radiometric, and geometric characteristics. A proof of concept was performed to check the resulting performance assessment for all Earth Observation instruments, which was found similar to, or better than in the operational version. Developments are underway to implement this new scheme in OSCAR with the aim to deliver a beta-testing version OSCAR 2.0 before the end of the year 2015.

The rules being recorded in a declarative form, could be submitted to expert groups for review, for the variables or instruments corresponding to their fields of competence. Such a transparent, collaborative process, under the supervision of the Secretariat, would be a way to maintain and further improve the reliability of OSCAR gap analysis.

NOAA and CMA noted that this tool and these improvements are very important to CGMS and to considerations of future satellite development.

WMO noted that OSCAR only works when it receives updated information from the satellite operators, so it thanked CGMS members for their support.

Proposed recommendation:

CGMS-43 recommendations – WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
CGMS Members	WGIII/3	R43.04	CGMS satellite operators to keep WMO informed of satellite/instrument commissioning dates or termination dates and prepare individual instruments "landing pages" that could be pointed to by OSCAR.	Ongoing	OPEN	HLPP # 1.1

WGIII/3.1 NOAA to present Requirement Analysis Tool

CGMS-43-NOAA-WP-28 NOAA's Observing System Portfolio Management

NOAA provided an overview of how it analyses NOAA observing systems and capabilities, collects NOAA's observing requirements, develops suites of analysis tools, and conducts portfolio analyses. There are plans to migrate these four tools into a US-government wide Earth Observing Requirements Evaluation System (EORES).

CMA thanked NOAA for the presentation and noted that it serves as a good example for other agencies.

WGIII/4 Integration of R&D missions (research to operations transition)

CGMS-43-NOAA-WP-30 NOAA Activities Towards Transition Mature R&D Missions to an Operational Status

NOAA noted that it uses 11 test-beds and proving grounds to facilitate the orderly transition of research capabilities to operational implementation through development testing, pre-deployment testing, and operational readiness/suitability evaluation (in operational proving grounds). U.S. Joint Center for Satellite Data Assimilation (JCSDA) is another important tool used by NOAA to effectively assimilate satellite observations, including from many non-NOAA satellites. The Satellite Product and Services Review Board (SPSRB) is the NOAA body responsible for transitioning products to operational use.

WMO inquired as to whether the operational use of research missions influences the status of those missions. NOAA responded that on a case-by-case basis, interactions among operational users and the operators of research missions have developed accommodations to benefit users (working to reduce latency, for example).

WGIII/5 Update on the Socioeconomic Benefits Tiger Team activities

CGMS-43-NOAA-WP-29 Status Report of CGMS Socio-economic Benefits Tiger Team (SETT)

NOAA chairs the CGMS Socioeconomic Benefits Tiger Team (SETT) and presented an update of its accomplishments and ongoing activities. Workshop #2 outlined a proposed CGMS SETT case study on "Understanding and Assessing the Value of Improved Satellite Data for the Users of Operational Sea Ice Products and Information." The case study is intended to demonstrate approaches and best practices for conducting socioeconomic benefit studies by CGMS members. During the coming year, the CGMS SETT will finalize the case study design and seek the resources needed to execute the study. CGMS SETT is also developing a guidance document for use by CGMS Members considering their own socioeconomic benefit studies.

NOAA invites further participation by additional CGMS Members, and plans to move forward with the case study design and complete the guidance document this year. The next CGMS SETT Workshop will be hosted by the Organisation for Economic Co-operation and Development (OECD) in October 2015 in Paris.

NASA suggested engaging with the SERVIR team in this effort.

WMO congratulated NOAA and emphasized the importance of this effort and encouraged the SETT to keep up its momentum. WMO also noted the importance of recognising the benefit of space-based observations in disaster response. Additionally, WMO encouraged SETT to consider a broader collaboration with GEO and WMO groups, and noted that one potential conference under consideration at the WMO Congress would address socioeconomic benefits

WGIII/6 Review and updating of the HLPP

CGMS-43-CGMS-WP-29 Proposed CGMS High Level Priority Plan (HLPP) 2015-2019

As part of the agreed revision cycle for the CGMS High Level Priority Plan, this document presents a proposed HLPP covering the period 2015-2019.

WGIII-specific topics included advancement of the implementation of the CGMS baseline missions, in particular the requirement for three LEO missions. Have made significant progress on identification of potential gaps and ensuring appropriate contingency measures. No HLPP targets have been fully achieved, but significant progress has been made on most.

WMO inquired as to the process for revising the CGMS/WMO baseline.

WGIII agreed to endorse the proposed CGMS HLPP 2015-2019.

Proposed action:

CGMS-43 actions - WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
WMO	WGIII/6	A43.03	WMO to report on the status of the Vision for the WIGOS space-based component in 2040 in WGIII meeting at CGMS-44.	CGMS-44	OPEN	-

WGIII/7 Any other business

WGIII/8 Inter-sessional activities/meetings in 2015-2016 [CGMS-43 -> CGMS-44]

Proposed dates for WGIII inter-sessional meetings are September 2, 2015, January 13, 2016, and May 4, 2016.

WGIII/9 Review of actions, conclusions, preparation of WG report for plenary

Summary of Proposed WGIII Actions:

CGMS-43 actions - WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
NOAA	WGIII/2.2	A43.01	NOAA to report on results of new OSSE on radio occultation.	CGMS-44	OPEN	HLPP # 1.1.4
WMO	WGIII/2.2	A43.02	WMO to report on the outcome of the WMO Impact Workshop in May 2016.	CGMS-44	OPEN	HLPP # 1.1.4
WMO	WGIII/6	A43.03	WMO to report on the status of the Vision for the WIGOS space-based component in 2040 in WGIII meeting at CGMS-44.	CGMS-44	OPEN	-

Summary of proposed WGIII Recommendations:

CGMS-43 recommendations – WGIII						
Actionee	AGN item	#	Description	Deadline	Status	HLPP ref
CGMS Members	WGIII/2.2	R43.01	CGMS members are encouraged to consider including RO capabilities on all future polar-orbiting satellites.	Ongoing	OPEN	HLPP # 1.1.4
IPWG	WGIII/2.2	R43.02	IPWG should consider reporting impact of both passive microwave imaging and active dual-band radar to WMO Impact Workshop in May 2016.	1 Nov 2015	OPEN	-
CGMS members	WGIII/2.3	R43.03	CGMS members to take into account the user requirements identified in the WMO survey (CGMS-43-WMO-04) when discussing continuous satellite coverage over the Indian Ocean region and report results to CGMS-44.	CGMS-44	OPEN	HLPP # 1.1.6
CGMS Members	WGIII/3	R43.04	CGMS satellite operators to keep WMO informed of satellite/instrument commissioning dates or termination dates and prepare individual instruments "landing pages" that could be pointed to by OSCAR.	Ongoing	OPEN	HLPP # 1.1

The status of CGMS-43 actions and recommendations will be maintained on the CGMS website under MEETINGS and CGMS-43.