FIRST MEETING OF THE

WORLD METEOROLOGICAL ORGANIZATION

COORDINATION GROUP ON SATELLITE DATA REQUIREMENTS FOR RA III AND RA IV

Greenbelt MD, USA

27-28 April 2015

FINAL REPORT

1. INTRODUCTION AND ADOPTION OF DRAFT AGENDA (WMO, NOAA)

Stephan Bojinski (WMO) opened the meeting at 9.00 on 27 April 2015 by welcoming all participants and expressing deep appreciation to NOAA NESDIS for hosting this first meeting of the Group. He stressed the importance of the Group as a forum for linking users of meteorological satellites in the Americas (WMO Region III and IV) to the satellite providers. Wenjian Zhang (WMO) thanked NOAA NESDIS for having agreed to collocate this first session with the 2015 NOAA Satellite Conference, and for the support they provided to enable participation by delegates. He emphasized the mandate of the Group to act as s a bridge between satellite operators and users, and to address users' concerns. This is especially important with regard to the impending launch of GOES-R and the associated opportunities and challenges. He expressed his appreciation for the existing efforts by NOAA NESDIS to assist users in the Region.

Mark Paese (Deputy Assistant Administrator, NOAA NESDIS) expressed his pleasure to host this first meeting and recognized the key role of WMO to facilitate the use of satellite data throughout the Region. He looked at WMO for input used as NOAA manages its observing assets and distributes data with a view to maximize the benefit of these to the Region, within resource constraints. Having the Group is paramount to NOAA to have the dialogue with users. He appreciated achievements of the Group and looked forward to further collaboration across the Region.

Stephan Bojinski (WMO) explained modifications to the schedule of the agenda, which was subsequently adopted. He then gave the chairmanship of the Group to the previously designated co-chairs Luiz Machado (INPE) and David Bradley (Meteorological Service Canada).

Participants introduced themselves in a tour-de-table (Annex 1 has the list of participants).

2. TERMS OF REFERENCE AND REVIEW OF ACTIVITIES (WMO)

The Group's Terms of Reference are provided in Annex 4. The WMO Commission for Basic Systems (CBS) and subsequently Executive Council recommended a region-based approach to defining / maintaining requirements for satellite data access and exchange, in line with the Integrated Global Data Dissemination Service (IGDDS) defined in the Manual on the WMO Information System (WIS). This is in support of all WMO applications and building on successful examples such as in Region I (Africa). In WMO, the Group formally reports to the Regional Associations III and IV as well as to the CBS Inter-Programme Expert Team on Satellite Utilization and Products (IPET-SUP) which is part of the Open Programme Area Group on Integrated Observing Systems (OPAG IOS).

WMO Regional Associations are a coordination mechanism for meteorological, hydrological and related activities by Members of WMO. RA III at its 16th session in 2014 recognized the Group as technical advisory body of the Working Group on Infrastructure and Technology Development. RA IV at its 16th session in 2013 recognized the Group as advisory group of the Task Team in charge of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) implementation.

Membership of the Group as recorded by the end of the session comprises 14 Members (Annex 3), with

representatives from 21 Members in total participating in the meeting (RA III and IV have 38 Members in total).

Expected benefits of the Group are to:

- Identify and synthetize user needs for satellite data, products and associated training
- Ensure an effective user-provider dialogue towards meeting these requirements
- Find user-friendly and affordable cost-sharing arrangements for data access and distribution
- Prepare for the next generation of meteorological satellites
- Support operational services, application development, and capacity building in meteorology (weather and climate) in the Region
- Exploit synergy through links with other users, applications and GEO SBAs.

3. PERSPECTIVES OF PRESIDENTS OF REGIONAL ASSOCIATIONS

Julián Báez (President of RA III, Paraguay) emphasized the importance of continuity of GOES satellite imagery for South America. RA III represents 16 countries. He noted the concern expressed by some services of having only 1-hourly coverage during GOES RSO operations. He recognized the efforts by NOAA to help in many respects. The DVB-S based data broadcast system GEONETCast-Americas (GNC-A) is an option for NMSs, although it is currently not commonly used. Six NMSs of RA III are also responsible to hydrological services, and satellites should be used more regarding monitoring of flooding events which are at times hitting parts of the Region (for example, Paraguay). For operational services, it is important to know the technical and financial implications of transitioning to GOES-R, and he thanked WMO and NOAA to support this endeavour. He expected advice in this regard from the Group meeting and the NSC-2015. The President of Region IV was not represented in the session.

4. USER REQUIREMENTS FOR SATELLITE DATA: STATUS AND EVOLUTION (GROUP CO-CHAIRS)

Luiz Machado (INPE) presented the satellite data requirements for Region III/IV and other achievements by the Coordination Group on Satellite Data Requirements. Key issues for RA III identified in the 2012 WMO survey on the use of satellite data were resources, access to near real-time data, and data processing. Preceding this meeting,

- A 2009-2011 Task Team on Satellite Data Requirementes developed an initial set of requirements, under NOAA, INPE, WMO leadership
- Its work led to improved & tailored dissemination of satellite data products in RA III, RA IV
- A preparatory Meeting of the RA-3-4-SDR Group was held at the 2013 NOAA Satellite Conference
- 13 teleconferences were held during 2013-2015
- Several other achievements
- Formal recognition by WMO Regional Associations

The Group had identified several satellite data distribution systems available in the Region. Direct readout was an option for only a few countries (e.g., Argentina, Brazil, Canada), while a DVB-S2 broadcast system was a low-cost data access option for many countries. However additional data and confirmed operational support and sustainability were required for broader uptake of this technology. It was noted that the internet had limited bandwidth to serve for near real-time applications in many countries.

Luiz Machado (INPE) then described the current status of the Satellite Data Requirements for Region III and IV[1], with currently 396 entries spanning GEO and LEO level 1b/1.5 data and products such as on winds, precipitation, lightning, fire, SST, cloud parameters, turbulence, soil moisture, volcanic ash). In the table, user requirements were prioritized and matched with data and products available from the providers (NOAA,

[1] The 15 Sep 2014 version of the requirements is given at http://satelite.cptec.inpe.br/geonetcast/es/docs/RA-III-IV-Requirements-v20140913%20-%20V2.xls and an overview of the Group's work at http://satelite.cptec.inpe.br/geonetcast/es/datareq.html

EUMETSAT, INPE) through various distribution means (not only GEONETCast-Americas). More work on prioritizing needs and identifying the specific users for each required entry is required.

He also described user preferences expressed in a 2014 Regional survey on data access, dissemination, investment in direct readout systems, and regional data distribution systems. He explained how the Group helped coordinate a response to NOAA on additional GOES-13 scan frames during RSO over South America (South America Center, South America South), which led to the currently operational "optimized schedule".

He recalled the NOAA official response to action items from the 2013 Conference, including recognition of the Group as interlocutor on Region-specific satellite matters, and on the NOAA plans to replace the GOES East NOP imagery with an equivalent amount of GOES-R series imagery if GOES-R is placed at the GOES East position.

He finally raised key points for discussion under item 6.

5. CURRENT AND FUTURE SATELLITE SYSTEMS FOR THE REGION (NOAA, EUMETSAT)

Paul Seymour (NOAA) gave a verbal summary of the status of operational NOAA satellite systems, and associated data distribution systems: regarding geostationary satellites, GOES NOP is fully deployed, with GOES-14 in storage, GOES-13 and 15 being operational in East (75°W) and West (135°W) positions, respectively. The new-generation GOES-R planned for launch on 15 Mar 2016 will have a check-out phase of roughly twelve months and then be used operationally. The position where GOES-R will be deployed is yet to be decided, depending on the health, safety and performance of the constellation. This decision is going to be made after the launch of GOES-R, which is currently scheduled for March 2016.

There is no direct conversion of the current GVAR direct readout system to the new GOES Rebroadcast (GRB) system. For GOES-R, new receiver systems, antennas, and computers will be required by users. The data feed will increase tenfold. HRIT/EMWIN will be combined in GOES-R with an increased data rate; LRIT users need to completely replace their ground system; HRIT users need to update their software.

Regarding polar satellites, the POES constellation is fully deployed, and Suomi-NPP is operational; JPSS-1 is set to launch in March 2017. HRPT and APT broadcast will be replaced, and an X-band receiver will be needed to receive JPSS, with no conversion from current system.

The GEONETCast-A broadcast is via Intelsat-21 at 58°W, with operational support regarding the telecommunications uplink and broadcast, but no 24/7 support regarding content and tools on the NOAA side. Recent additions to the GNC-A data stream include NCEP GFS model runs, EUMETSAT 3-hourly MSG imagery, ASCAT scatterometry, and GOES imagery in GEOTIFF format.

Terrestrial data distribution is also changing with GOES-R/S, with introduction of the Product Distribution and Access (PDA) system. Don Slater (NOAA NESDIS) briefed on the PDA which is taking over all distribution of NOAA satellite products via terrestrial networks, starting in early 2016 with NPP products. The PDA is intended to be a near real-time data distribution system; McIDAS area files continue to be distributed to Weather Forecast Offices. Non real-time data distribution occurs through the Comprehensive Large Array-data Stewardship System (CLASS). There are plans to use high-speed terrestrial National Research and Education Networks (and equivalents in other regions) to distribute data.

More information on GOES-R is available on the WMO SATURN portal at https://www.wmo-sat.info/satellite-user-readiness/topic/satellites/goes-r/

Mark Paese (NOAA NESDIS) informed that the 1695-1710 MHz (L) frequency band was auctioned off to broadband users, therefore the 1675-1695 MHz is now being used and competition for its use is growing. He encouraged that Group members advocate in their countries for the protection of the key frequencies required for meteorological sensing and telecommunications.

Paul Counet (EUMETSAT) informed on status and future plans of the EUMETCast-Americas service. It

started with 2006 upon initiative by the meteorological service of Spain and, as a baseline, is operating until the end of 2015. The service has always been operated on a best-efforts basis. Its extension to the end of 2016 is contingent on a transition plan executed in partnership with NOAA to reduce the risks of interruption of service for current EUMETCast-Americas users. As part of the transition, some data sets distributed currently on the service are moved to NOAA data distribution services such as GNC-A (such as 3-hourly MSG imagery, ASCAT). Guidance on how to convert a EUMETCast-Americas receiving station to GEONETCast-Americas will also be provided (this is technically straightforward).

Sally Wannop (EUMETSAT) informed on current geostationary satellites operated by EUMETSAT, Meteosat-7 and Meteosat Second Generation. The EUMETCast-Americas service as a sub-system of the operational EUMETCast broadcast includes 100 collections of data, such as from MSG, a selection of meteorological products, from the OSI-SAF, ASCAT, 3-hourly GOES-E/W, DevCoCast land and vegetation products, Copernicus Global Land Service products. MSG-4 is to be launched on 2 July 2015 and intended for storage; the operational altimeter Jason-3 is to be launched on 27 July 2015, and the European Commission Sentinel-3A polar-orbiting satellite on 31 October. EUMETSAT will operate the Sentinel-3A satellite and be responsible for the ocean product service.

The future geostationary Meteosat Third Generation satellites are: MTG-I1 with an imaging service (FCI) and a lightning mapper; and MTG-S1 carrying a geostationary sounder, and the Sentinel-4 UV sounder.

6. MEETING USER REQUIREMENTS:

6.1 DATA RECEPTION AND DISTRIBUTION IN THE REGION

Covered under item 5.

6.2 FRAMEWORK FOR USER-PROVIDER INTERACTION

Key points for discussion raised by the co-chairs were:

1. How to ensure that data distribution systems meet the regional satellite data requirements on an operational basis?
2. How to prepare the Region to receive and exploit data from the next satellite generation (GOES-R)?
3. How to ensure effective dialogue of Group with satellite operators at both technical and management levels?
4. How to ensure continued leadership and support to the Group?

The Group discussion identified the following points:

J. Chira (SENMHI Peru) identified a key difficulty for many users in the Region, including in meteorological services, posed by the uncertainty around the availability of operational GOES-R data to South America: how can a user decide on investing in a new GRB reception station without knowing whether the operational system for the new few years will be an old or new generation GOES? An additional challenge is to reconcile this uncertainty with the cycles and intricacies of national budget plans.

S. Bojinski (WMO) stressed that GNC-A could serve as a risk reduction tool during the transitional period from GOES to GOES-R/S over the next few years. Data needed by the services in the Region could be made available on its data broadcast for an extended time period (GOES), and thus give more flexibility to the service in purchasing new direct readout equipment. Also, pre-operational sample data from GOES-R/S could be made available through GNC-A to help in user preparedness projects.

NOAA informed that a GRB simulator was available in the NSC-2015 exhibition area, to see how GOES-R data streams would look like. Vendors at the NSC-2015 are developing and marketing equipment for receiving the various planned services.

Alaor Dall'Antonia (INMET Brazil) explained the use of EUMETCast-Americas in his institution, which pays 110K EUR annually as user license for hourly reception of Meteosat data and products. When asked by him about a possible GOES dedicated to South America, NOAA NESDIS responded that they currently cannot promise whether an equivalent of GOES-12 South America could be provided in the future; this will depend on the health of the constellation.

Luiz Machado (INPE) noted that specialized users will access data through direct readout system, but most users in the Region will have to rely on GNC-A, for reasons of budget and telecommunications infrastructure. The key questions are:
- whether the requirements developed by the Group can be delivered through GNC-A?
- what are the upcoming decisions and constraints by NOAA regarding GNC-A?

NOAA and INPE are currently analysing which data can be added, and there are plans to add 1 Mbit/s bandwidth to GNC-A using INPE funding. INPE can also upload products on GNC-A on behalf of the Region.

Chris O'Connors (NOAA NESDIS) clarified that initially GNC-A was conceived as a contribution to GEOSBA users, and over time other data was added in response to user needs. NOAA considered henceforth that GNC-A data distribution should not duplicate other dissemination means.

Stephan Bojinski (WMO) emphasized that for some countries in the Region, GNC-A is the only viable option to receive satellite data, and these countries would not perceive such data delivery as duplicative. Tailored solutions need to be developed through discussions in the Group, and recommendations to NOAA at the technical and management level, as appropriate.

Glendell De Souza (BCT) clarified that GNC-A is a back-up system for RA IV. Julián Báez stated that in RA III, GNC-A is currently not the primary satellite data reception system for many NMSs, but could be an option for the future, especially in light of the transition to GOES-R.

Anthony Mostek (NOAA NWS) advocated for developing a Region-based transition plan; leadership at management level on the part of NOAA is required. Wenjian Zhang (WMO) raised the point whether detailed guidance could be developed to countries in order to communicate the challenges at hand.

Mark Paese (NOAA NESDIS) confirmed that he was personally committed to the WMO regional satellite data requirements (SDR) process as a means to provide Region III and IV's prioritized set of data requirements from users. Solutions for the Region should be developed, however, different alternatives may be needed in different countries. This SDR process should also allow all users to receive the same information from NOAA for their planning purposes.

Glendell De Souza (BCT) committed to connect the Group to RA IV management level (the Group is recognized as an advisory group to the the RA IV Task Team in charge of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) implementation). Group members should work with their respective PRs to ensure that the Group's issues are recognized by Heads of meteorological services.

Stephan Bojinski (WMO) thanked Mark Paese for the great interest and commitment by NOAA NESDIS to the Group. Connecting the Group to GEO for example through a GEO representative would also help ensure recognition and support within NOAA and internationally.

Julian Baez (RA III) emphasized the importance of satellites to save lives and property; regarding GOES-R time was short and budget cycles are long which makes planning sometimes difficult.

Wenjian Zhang (WMO) confirmed that results of the Group will be communicated to WMO management and at WMO Congress.

Some Spanish-speaking participants requested that key information be provided in clear and plain English, and preferably be interpreted into Spanish. This is a key point to be considered at future meetings of the Group.

7. DISCUSSION FOLLOW-UP

In the discussion on 28 April, the Group addressed:

a) User perspectives and issues, including training needs

The co-chairs invited perspectives regarding satellite data reception and issues from all participants (see Annex 5 for a summary table):

(Collini, Argentina) Suggested 3 training events:
- WMO/NOAA Theoretical course on GOES-R and JPSS
- Practical training "train the trainer" with WMO VLab
- GOES-R simulator, JPSS simulator, McIDAS, proxy data
- Classroom courses and on-site hand on training during operational working hours

If GNC-A can provide proxy/pre-operational data for GOES-R:
- Third course on GNC-A-based used of GOES-R images during pre-operational period

(Panama) Currently have a GVAR station, no GNC-A; asked about the use of GOES-R wrt GOES-13,15? - First at 89.5W, then undecided

(Aruba) Currently Aruba has a GST Directmet GVAR receiver, NOAAPORT, and EMWIN. Aruba will plan to use GNC-A as back-up for satellite data and other meteorological data, and GRB as main satellite reception system; representative of Aruba was concerned whether GNC-A could be used for operational purposes? (Costa Rica) Stressed the impact of volcanic ash on Costa Rica and neighbouring countries; intention to purchase GRB station

(Peru) Is discussing options how to receive GOES data but faces difficulty in planning the investment, for the uncertainty around GOES-R (investments in GRB and GNC-A pending, internet slow)

(Belize) Are entirely relying on internet, looking at back-up solutions; also have access to EMWIN system; have the intention to investigate the SDR requirements list with a view to purchase a direct readout station in future

(Trinidad & Tobago) Investigate the SDR list; main issue is uncertainty about the GOES-R position

(Chile) Have a GNC-A station; Issue of position of GOES scan window cutting off in West, and in extreme South of country

(Saint Lucia) Are entirely relying on internet; possible investment in GRB station; training is needed in use of satellite products

(Dominica) Internet and EMWIN as back-up; would like to explore use of GNC-A as back-up system and for DRR

(Ecuador) Have a GVAR system, face planning issues in investing in a follow-on technology

(Brazil INMET) Plan investment in GNC-A receiving stations in regional meteorological office; will purchase a direct readout station for polar satellites (X band)

(Argentina) Have a GVAR and an old HRPT station which needs to be replaced; currently a bid is underway to buy reception equipment for NPP, Metop, FY-3, Terra, Aqua, etc.; have special training needs that should

be partly covered by experts from Brazil, NOAA, SSEC; are currently planning to buy hardware and software to transform a EUMETCast reception station into a GNC-A station

(Argentina) CONAE can act as data reception back-up to SMN; however, the communication between the two sites (Buenos Aires –Córdoba) is too slow for real time operations.

(CIMH) Are investing in a GNC-A station; unclear whether to invest in GRB station; can play a role in the provision of education and training

(Honduras) Are relying on internet; plan to invest in a GNC-A station

(Paraguay) Have GVAR and EUMETCast-Americas receiving stations; need at least one year to plan for an investment in new ground infrastructure

(Curacao) Have GVAR, NOAANet and several EMWIN stations; need to identify a basic service level that is required, and how much it costs; a Region-based approach can be helpful in negotiating with vendors; negotiations can also include delayed payments depending on the availability of the new satellite

(BCT) Four out of five countries represented by CMO in WMO operate EMWIN stations, one operates a GVAR station; planning for new systems underway.

Glendell de Souza suggested that Members should:

1. Ascertain whether the Service presently has a GVAR, HRPT or LRIT satellite direct readout system or is taking satellite imagery from the Internet.
2. Get a GEONETCast-Americas system to transition from the present direct readout or Internet for satellite imagery.
3. Develop terms of reference for a GOES-R GRB system based on present and future needs of the Service for direct readout system.
4. Seek a range of system costs based on developed terms of reference.
5. Seek funding from national funding authority or international funding agency.

(Canada) GVAR stations will be replaced by two GRB stations in the East and West of the country

b) Guidance for transitioning to GOES-R

This is a topic for further discussion by the Group over the coming months.

The Satellite User Readiness Portal (SATURN) maintained by WMO has user-relevant information on GOES-R and the other next-generation meteorological satellites: https://www.wmo-sat.info/satellite-user-readiness

SATURN contains a Reference User Readiness Project which should help Members in structuring their activities in preparing for GOES-R and JPSS. The generic Readiness Project recommends activities to be completed as a function of the satellite launch date (by 2 years prior to launch, by 6 months prior to launch etc.). Annex 5

c) Regional data dissemination and re-distribution via GNC-A

This will be comprehensively addressed by the first task team identified under item 8.

d) Position of GOES scan frames over Ecuador, Chile

It was clarified that these frames are an additional service by NOAA to South America, that the position has been the result of a compromise developed in the Group, given that the available scan time was limited.

8. INTERNAL ORGANIZATION AND WORK PLAN

8.1 INTERNAL ORGANIZATION

The Group decided on two main tasks

Task 1: Ensuring and coordinating satellite data access and availability

The task team should assess the status of data reception systems in the Region, and develop options for each member on the Group (see Annex 5).

Wenjian Zhang (WMO) stressed that the Group should develop a coordinated, Region-based satellite data access and (re-)distribution plan in order to share resource load and responsibility, and to be cost-efficient. A Region-based approach to this problem will also make it easier for NOAA and vendors to respond to the Region and country needs.

Task team: Haime Pieter (Curaçao), Joel Pierre (St. Maarten), Emmanuel Aguilar, Leonel Herrera (Panama), Diego Souza (Brazil), Rodolfo Sánchez (Costa Rica), Dwayne Scott (Belize), Diana Rodriguez (Argentina), Glendell De Souza (BCT), Jorge Chira (Peru), Lisandro Arends (Aruba)

Task 2: Identifying and ensuring training and education for satellite applications

The task team should identify technical and application-specific training needs of all members of the Group.

Task team: Estela Collini (Argentina), Pedzi Girigori (pedzi.girigori@meteo.cw, Curaçao), Bryan Thomas (Trinidad and Tobago), Simone Costa (Brazil), Glendell De Souza (BCT), Evelyn Quiros, Eladio Solano (Costa Rica), Homero Jacome (Ecuador), Kathy-Ann Caesar (CMO), Francisco Argenal (Honduras), Marck Oduber (Aruba)

NOTE: Both task teams are open to participation by members from the Region. The members identified here are committed to engage in advancing the work of the team on the respective topics.

8.2 WORK PLAN AND ACTIONS/RECOMMENDATIONS

ACTION 1.1: Identify the list of current GNC-A content and document this in the SDR requirements list. Who: Co-Chairs; By: 15 May 2015.

ACTION 1.2: Group to identify priority requirements in the SDR requirements list. Who: All Group Members; By: 1 Nov 2015

ACTION 1.3: For participants on the Group to be confirmed by the WMO PR where this is not yet the case. By: 1 Sep 2015.

ACTION 1.4: The Group at its next teleconference to discuss the possibility of a meeting in South America in 2016. By: 23 Jun 2015.

RECOMMENDATION 1.1: NOAA to clarify whether GNC-A can be used by the Region as an operationally supported data distribution system for a priority set of meteorological data/products (for primary official duty or back-up purposes).

RECOMMENDATION 1.2: NOAA to make available some pre-operational GOES-R data available on GNC-A, to assist the Region in preparing for its use.

The Group agreed to hold teleconferences roughly every 2 months (by webex and telephone).

The next teleconference will be held on **23 June 2015 at 13.00-15.00 UTC** (9.00-11.00 EDT, 10.00-12.00 Brasilia time).

Holding a side event for RA III and IV on satellite data access and exchange at 17th World Meteorological Congress was envisaged.

9. ANY OTHER BUSINESS

None raised.

The Group adjourned its first session on 28 Apr 2015 at 19.30.

References

Meeting documents: http://www.wmo.int/pages/prog/sat/meetings/RA-3-4-SDR-1.php .

Background documents: http://satelite.cptec.inpe.br/geonetcast/es/datareq.html

ANNEX 1: LIST OF PARTICIPANTS

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ANNEX 2: AGENDA

WORLD METEOROLOGICAL ORGANIZATION
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RA-3-4-SDR-1/Doc. 1.1
(30.III.2015)
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COORDINATION GROUP ON SATELLITE DATA REQUIREMENTS
FOR REGION III AND IV

FIRST SESSION

ITEM: 1

GREENBELT, MD, USA, 27-28 APRIL 2015

Original: ENGLISH

AGENDA

GREENBELT MARRIOTT HOTEL, ROOM CHESAPEAKE A

MON 27 APR 2015

START: 9.00

1. INTRODUCTION AND ADOPTION OF DRAFT AGENDA (WMO, NOAA) (15')
2. TERMS OF REFERENCE AND REVIEW OF ACTIVITIES (WMO) (20')
3. PERSPECTIVES OF PRESIDENTS OF REGIONAL ASSOCIATIONS (20')
4. USER REQUIREMENTS FOR SATELLITE DATA: STATUS AND EVOLUTION (GROUP CO-CHAIRS) (30')
5. CURRENT AND FUTURE SATELLITE SYSTEMS FOR THE REGION
   NOAA (20')
   EUMETSAT (10')
6. MEETING USER REQUIREMENTS:

6.1 DATA RECEPTION AND DISTRIBUTION IN THE REGION (P. Seymour, S. Wannop) (20')

6.2 FRAMEWORK FOR USER-PROVIDER INTERACTION (15')

DISCUSSION (30')

END: 12.00 NOON

TUE 28 APR 2015

START: 17.30

7. DISCUSSION FOLLOW-UP
8. INTERNAL ORGANIZATION AND WORK PLAN
9. AOB

END: 19.30

ANNEX 3: MEMBERS OF THE COORDINATION GROUP FOR SATELLITE DATA REQUIREMENTS IN REGION III AND IV (STATUS: 28 APR 2015)

Name	Institution	Country
Estela Collini	Servicio de Hidrografía Naval (SHN) and Servicio Meteorológico Nacional (SMN)	Argentina
Marck Oduber	Meteorological Department, Aruba	The Netherlands (Aruba)
Dwayne Scott	Belize Meteorological Service	Belize
Luiz Augusto Machado (Co-Chair)	Center for Weather Forecasting and Climate Studies (CPTEC), National Institute for Space Research (INPE)	Brazil
Wagner de Aragão Bezerra	National Institute of Meteorology (INMET)	Brazil
Glendell De Souza	Caribbean Meteorological Organization	British Caribbean Territories (BCT)
David Bradley (Co-Chair)	Meteorological Service of Canada	Canada
Juan Pizarro	Dirección Meteorológica de Chile	Chile
Olga Gonzalez	Institute of Hydrology, Meteorology and Environmental Studies (IDEAM)	Colombia
Fitzroy Pascal	Dominica Meteorological Service	Dominica
Homero Jacome	Instituto Nacional de Meteorología e Hidrología (INAMHI)	Ecuador
Jorge Chira	Servicio Nacional de Meteorología e Hidrología (SENAMHI)	Peru
Venantius Descartes	Saint Lucia Meteorological Service	Saint Lucia
Bryan Thomas	Trinidad and Tobago Meteorological Service	Trinidad and Tobago
Luis Fernández	National Meteorological and Hydrological Institute (INAMEH)	Venezuela
Satellite operators		
Paul Seymour	NOAA NESDIS	USA
Kelly Sponberg	NOAA NWS and UCAR	USA
Sally Wannop	EUMETSAT	International

ANNEX 4: TERMS OF REFERENCE OF THE COORDINATION GROUP FOR SATELLITE DATA REQUIREMENTS IN REGION III AND IV

1. The Group consists of a representative number of members from the satellite data user community in the Region, joined, as associate members, by satellite data providers and WMO. The Group is chaired by one or two representatives from key satellite data user organizations of the Region.

2. The Group maintains an updated list of satellite data and products available to the Region through existing dissemination services. Data and products shall be classified by categories of variables and derived products.

3. The Groups regularly reviews sources of regional needs and undertakes, as needed, further information gathering, such as surveys, to ensure that views of WMO Members in the Region are adequately represented.

4. The Group analyzes the requirements for each relevant category of product, and identifies which requirements are not adequately met by existing services. The unmet requirements are prioritized, taking into account:

   a. The applications supported and their impact

   b. The number and representativeness of the users

   c. The status of the required data or products

   d. The quality and suitability of the required data or products.

5. In summary the Group formulates recommendations pertaining to:

   a. Existing satellite data/products (with detailed references) to be included in existing distribution services, or moving a product from one service to another, or assigning lower priority to an existing product (or removing it if obsolete)

   b. Amendments of existing products or development of new products

   c. Evolution (upgrade, or consolidating) of data dissemination means, or other (e.g. training, tools, user equipment)

   d. Short-term action to implement these recommendations

6. The Group maintains a dialogue with satellite data providers of relevance to the Region, and other partners as needed, to ensure that its recommendations are implemented.

7. The Group uses the WMO Procedure for Documenting Regional Requirements for Satellite Data Access and Exchange, for guidance.

8. The Group meets in person at least every two years, and, to ensure continuity, works through collaborative tools during the intersessional period.

ANNEX 5: Overview of WMO Members in RA III and IV, and satellite reception systems (starting point; to be subsequently completed)

State / Territory	Present satellite data reception systems	Planned or potential future systems	Comments
Argentina	GVAR, HRPT	DR X-band	
Bolivia			
Brazil	(INMET): GVAR (INPE): GVAR, GNC-A, EUMETCast-A, HRPT, DR X-band	(INMET): GNC-A (INPE): GRB, GNC-A, DR X-band	
Chile	GNC-A		
Colombia			
Ecuador	GVAR		
France (Guyana)			
Guyana			
Paraguay	GVAR, EUMETCast-A		
Peru		GRB or GNC-A	
Suriname			
Uruguay			
Venezuela			
Antigua and Barbuda			
Bahamas			
Barbados			
Belize	ftp/http, EMWIN	GRB	
BCT	GVAR (1 country), EMWIN (4 countries)		
Canada	GVAR	GRB (E, W)	
Colombia			
Costa Rica		GRB	
Cuba			
Curacao and Sint Maarten	GVAR, NOAAPort, EMWIN		
Dominica	ftp/http, EMWIN	GNC-A	
Dominican Republic			
El Salvador			
France (DOM/TOM)			
Guatemala			
Haiti			
Honduras			
Jamaica			
Mexico			
Netherlands (Aruba)	GVAR, NOAAPORT, EMWIN	GRB, GNC-A	
Nicaragua			
Panama	GVAR	GRB	
Saint Lucia	ftp/http	GRB	
Trinidad and Tobago	GVAR	GRB	

ANNEX 6: WMO Satellite Reference User Readiness Project
http://www.wmo-sat.info/satellite-user-readiness

Time relative to Launch Date ("L")	Satellite System development Activities and Milestones	User readiness Project Activities and Milestones	Needed deliverables from operators
L-5y (years) -> L-4y	Ground Segment Development Phase C	Initiation of NMHS user readiness Project. Initiation of cooperative projects addressing needs of less developed WMO members.	Overall specifications of user segment, including high-level definition of migration path from existing user segment. Preliminary schedule for deliverables to users
L-4y -> L-3y	System Critical Design Review	Identification of drivers for investment and running cost. Planning and allocation of human resources and budgets for investments and running costs. Establish prioritized data requirements, as clear priorities for current and future products allow the best preparations to be made for establishing data access and delivery capabilities. Initial training on capabilities for trainers and decision makers.	General description of NRT dissemination mechanisms. Detailed specifications of L2 and L1 products to be available at start of operations (Day-1 products). Heritage test data. Plans for evolution of products after start of operations (Day-2 products).
L-3y -> L-2y	System Production On-ground characterization of instruments	Design of new reception system. Design of comms network changes, including GTS/RMDCN capacity. Design of new data handling and processing functions. Training on specific application areas, based on proxy data.	Specifications of instruments performance. Proxy test data Detailed specifications of NRT dissemination mechanisms. Detailed specifications of Direct Broadcast mechanisms, including frequency and signal characteristics. General description of offline data access. Data/product volume estimates. Data/product format definitions. Data access conditions (e.g. licensing, key units, etc). L1 pre-processing software. Establish and use 2-way communication channels for user inquiries
L-2y -> L-1y	Ground System	Procurement, installation and acceptance testing of	Synthetic test data

	acceptance	systems. Software design for data processing, including NWP ingest.	Continuous periods test dissemination of synthetic test data. Long-term operations plan. Planning for data exchange to serve global community.
L-1y -> L-6m	Flight readiness of satellite	End-user training (forecasters)	Start of regular updating of plans for launch and commissioning.
L-6m -> L	Operational System Validation and Launch preparations	Data processing software testing (using proxy data). Technical training on reception systems and other system elements. Data acquisition system testing (using synthetic data).	Proxy data based on on-ground instrument characterization. User documentation for dissemination mechanisms and delivered software tools. Routine operations schedules.
L->L+6m	Satellite In-orbit verification Commissioning of L1 products	Full system and software testing (using pre-operational data). Support to operators CAL/VAL activities, in particular through NWP assimilation.	Early dissemination of un-validated L1 data. Early switch-on of Direct Broadcast Pre-operational L1 data dissemination. In flight characterization of instrument performance. Start of routine User Support
L+6m->L+2y	Commissioning of L2 products	Scientific data exploitation (iterative based on increased understanding of real data). Post-launch training based on real data. Declaration of user operational readiness	Operational L1 data dissemination, from both old and new satellites (as long as possible, but minimum until L+1y).