

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

## 2<sup>nd</sup> Teleconference

6 November 2013, 15.00 UTC

### Summary

#### Participants:

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Stephan Bojinski, WMO ([sbojinski@wmo.int](mailto:sbojinski@wmo.int))

The agenda (Annex I) was accepted by participants.

#### 1. Feedback by participants to Satellite Data Requirements in RA III/IV

Several participants provided feedback (thereby closing Action 2). The current, initial set of satellite data requirements identified for Region III and IV is available online<sup>1</sup>. There is a need to (i) match these initial requirements against the “supply” side including data distribution mechanisms, and then, based on this augmented level of information (ii) to review and refine the user requirements. It was noted that there may be several providers and distribution channels related to each product needed by the users. This was valuable information for planning of a Region-based data distribution and dissemination strategy including, but not limited to GEONETCast-Americas.

The table in Annex II gives guidance for completing step (i).

**Action 2.1:** NOAA, INPE, EUMETSAT and potentially other data providers to complement the initial user requirements list with matching information on satellite products and data distribution mechanisms. For this purpose, the Excel sheet depicted in Annex II will be made available by email and on <http://satelite.cptec.inpe.br/geonetcast/es/datareq.html>). Deadline: 9 December 2013.

In connection with this, S. Wannop offered to circulate with the Group the current list of products disseminated over EUMETCast-Americas.

**Action 2.2:** EUMETSAT to send to the Group the EUMETCast-Americas products catalogue.

WMO pointed out that the INPE website hosting RA-3-4-SDR-related documents needed updating, including the reports from the Group teleconferences.

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<sup>1</sup> <http://satelite.cptec.inpe.br/geonetcast/es/products/RA-III-IV-Requirements-v20110321.xls>

**Action 2.3:** INPE to update RA-3-4-SDR website with 1<sup>st</sup> teleconference report, and updated RA-3-4-Requirements Table as depicted in Annex II.

## 2. Feedback by participants to draft Regional Questionnaire

Several participants provided feedback (this responds to Action 3):

Question 7 on used data reception systems should be held general, and not be limited to DVB-S systems. Question 3 on planned purchase of Direct Readout stations should be kept, even though only a limited number of countries may be concerned.

Subsequent to the teleconference, S. Bojinski revised the questionnaire (Annex III, with comments included). The Group decided that these questions be reviewed once more, then validated by all Group members, then be finalized. E. Collini offered to have the finalized version translated into Spanish.

**Action 2.4:** Group to review updated questionnaire given in Annex III, and provide feedback to S. Bojinski by 18 November 2013.

## 3. Discussion on use of Questionnaire by all participants

The Group recommended that each user representative on the Group (ie., from Argentina, Brazil, Canada, Chile, Colombia, Trinidad and Tobago, Venezuela) identify the countries and institutions he/she addresses with the questionnaire, within and outside their country. Primary focus is on institutions active in WMO priority areas in the weather, water and climate domains, such as: meteorological and hydrological services, oceanographic and marine offices, climate modelling and prediction centres, environmental agencies.

A list of the following type should be completed:

Name	Country, Institution(s) to address with questionnaire	Comments
E. Collini (Argentina)	TBD	
L. Machado, S. Pereira (Brazil)	...	
W. Bezerra (Brazil)		
D. Bradley (Canada)		
M. Egaña (Chile)		
O. Gonzalez / P. Barbosa (Colombia)		
B. Thomas (Trinidad & T)		
L. Fernandez (Venezuela)		
RA III Members:	<a href="http://www.wmo.int/pages/members/region4_en.html">http://www.wmo.int/pages/members/region4_en.html</a> (27 states and territories)	
RA IV Members:	<a href="http://www.wmo.int/pages/members/region3_en.html">http://www.wmo.int/pages/members/region3_en.html</a> (13 states and territories)	

Results from the 2012 WMO Survey on the Use of Satellite Data<sup>2</sup> should be taken into account: 44 users in Region IV responded, and 14 from Region III. Their institutional affiliations are given in Annex IV. Detailed results can be made available by the WMO Secretariat.

<sup>2</sup> [http://www.wmo.int/pages/prog/sat/documents/SAT-PUB\\_SP-9-Survey-Report-2012.pdf](http://www.wmo.int/pages/prog/sat/documents/SAT-PUB_SP-9-Survey-Report-2012.pdf)

#### 4. NOAA Briefing on GOES-13 Scanning Options

P. Seymour and K. Sponberg briefed the Group on the technical possibilities related to additional scanning frames provided by the GOES-13 imager during Rapid Scanning Operations (RSO) (responds to Action 1; see Annex V). Rapid Scanning Operations are event-based and invoked at the request of U.S. weather forecasting offices and other operational centres, e.g. in case of a hurricane. The GOES scan sectors and schedules including RSO are available here: [www.oso.noaa.gov/goes/schd-sector/index.htm](http://www.oso.noaa.gov/goes/schd-sector/index.htm)

NOAA NESDIS are offering to users in RA III and IV the possibility of additional scan time during RSO of the GOES-13 imager; per hour, this scan time could be distributed over two scans of 2:05 minutes length each (one option aiming at good coverage of the South American landmass is depicted in Annex V). This would mean that during RSO, every three hours, the southern portion of South America would be covered by 1 full disk scan, and 5 x 2:05 minutes scans. Two scans are better than one scan as it allows offset of the scans and thus better coverage of the region. There could in fact be three scans using the same amount of scan time, but instead of two images rotating every half hour on non-full disk hours, you would rotate 3 scans every 90 minutes.

The total duration of the scans is not expandable, i.e. the area covered by scans per hour is more or less fixed. The frames can be expanded in N-S direction at the cost of E-W coverage, and vice versa). Expanding in N-S direction requires relatively more scan time (due to mechanics of the line scanner), leading to a slight reduction in total coverage.

P. Seymour indicated that NOAA is considering moving the southern border of the Northern Hemisphere scanning frame further South; this would improve the overall coverage of South America. He agreed to inform the Group on details as soon as they are available. The Northern Hemisphere frame is covered every 30 minutes at all times.

It was noted that the geostationary Meteosat-10 SEVIRI imager covers the area East of an arc ranging from roughly Rio de la Plata to Caracas (Venezuela) every 15 minutes. EUMETSAT are distributing these data operationally via EUMETCast-Americas.

The Group started a discussion on the possible location of the scan frames. S. Bojinski showed one option of moving both frames A and B further West to cover the Andean cordillera, at the expense of areas to the East of the continent, mainly Brazil. S. Pereira stated that frame A could be moved to the West to cover Peru, without major drawbacks to Brazil. However, the location of frame B over South-East Brazil was vital because there was no real alternative: Meteosat-10 SEVIRI imagery was less useful due to strong distortion at the edge of its field-of-view prevalent in this area; in addition, it would not be straightforward to combine GOES and SEVIRI imagery.

**Action 2.4:** P. Seymour agreed to investigate whether a simple tool was available to the Group for developing options for size and location of scan frames.

P. Seymour also answered to questions raised at the 1<sup>st</sup> teleconference:

1. IDEAM Colombia enquired whether frames A and B could overlap with the “Northern Hemisphere” frame.  
Answer: Yes; but it would probably reduce the total area of frames A and B. The two sectors can overlap.
2. E. Collini stressed that coverage of the entire Andean Cordillera was a high priority given the presence of active volcanoes and the areal responsibilities of the Volcanic Ash Advisory Centre Buenos Aires for aviation safety; temporal sampling of 30 minutes is desirable;  
Answer: The total duration or time is set. Image sectors can be moved depending on the consolidate requirements.

3. She further noted that regular coverage of the southernmost region of South America, the Antarctic Peninsula, and the ocean in between was important for maritime safety services;  
Answer: This is technically possible. Image sectors can be moved South and West with the loss of coverage of the East Coast.
4. Colombia expressed a requirement for coverage of the areas just south of the equator south of Colombian territory, especially to capture the airflows and cold fronts that come from the south and the coast of Peru;  
Answer: Technically feasible. This would require moving Sector A westward with the probable loss of East Coast coverage.

## **5. Discussion on priorities vis-a-vis NOAA**

Over the next few weeks, the Group is expected to develop a list of prioritized options to be proposed to NOAA for location and size of the GOES-13 RSO scan frames over South America. The preferred timeframe / deadline for this activity needs clarification.

**Action 2.5:** P. Seymour to inform the Group by what deadline a prioritized scan schedule for South America should be available.

## **6. AOB**

IDEAM raised a question about the transition from current to future geostationary satellite systems, and implications for data reception. Together with Action 4, it was agreed that this be clarified bilaterally between NOAA and IDEAM.

The meeting closed at 16:45 UTC.

## **ANNEX I: AGENDA**

1. Feedback by participants to Satellite Data Requirements in RA III/IV
2. Feedback by participants to draft Regional Questionnaire
3. Discussion on use of Questionnaire by all participants
4. NOAA Briefing on GOES-13 Scanning Options
5. Discussion on priorities vis-a-vis NOAA
6. AOB

## ANNEX II

### Regional Requirements Table

This draft table is based on the latest 2011 version<sup>3</sup>, with columns added: “Data Provider” (column C), “Data Distribution” (column F). product types identified by users are in light blue, and need to be complemented by information from the data providers (in white); user requirements related to these product types are given in yellow. The table is available in Excel format for download at <http://satellite.cptec.inpe.br/geonetcast/es/datareq.html>.

DRAFT Regional Requirements for Satellite Data in Central and South America.

INFORMATION FROM PROVIDERS											USER REQUIREMENTS					
#	Product name	Data provider	Data characteristics	Format	Data distribution	Geographic area	Frequency	Size (kB)	size comment	Format expected in the future	FINAL Size (compressed) - kB	Basic Application (defined by User)	Priority	Timeliness (min)	Required data rate (kb/s)	
1	GOES imagery over the Region A		GOES satellite, channel VIS, WV, IR, Resolution 4km	level 1b original from Satellite		SAM	15 - 30 minutes	16500	3 images	GeoTIFF	8250	1) Product and Image generation.	P1	Real time	15	73.33333
		INPE	GOES images, channel VIS, WV, IR, Resolution 4km/rectangular projection	level 1b original from Satellite	...	SAM	15-30 minutes	16500	3 images	GeoTIFF	8250					
		NOAA NESDIS	GOES images, channel VIS, WV, IR, Resolution 4km/rectangular projection	LRIT	...	3AM (full disk)	3 hours	3000	3 images	LRIT	3000					
		EUMETSAT	GOES images, channel VIS, WV, IR, Resolution 4km/rectangular projection	LRIT	EUMETSAT - Americas	3AM (full disk)	Hourly	3000	3 images	LRIT	3000					
2	GOES imagery over the Region B		projection	TIFF image		SAM	30 minutes	2100	3 images	GeoTIFF	1050	warning (+Synoptic analysis)	P1	Real time	5	28
		(TO BE COMPLETED BY PROVIDER 1)	ETC.													
		(TO BE COMPLETED BY PROVIDER 2)	ETC.													
		ETC.														
3	GOES imagery over the Region C		GOES satellite, other channels	level 1b original from Satellite		SAM	30 minutes	5500	GOES (+1 ch South America)	GeoTIFF	2250	1) Product and Image generation.	P2	Real time	10	30
		ETC.														
4	GOES imagery from other regions		GOES satellite, channel IR, Resolution 4km	level 1b original from Satellite		to be defined	3 hours	5500	One ch/ additional GEO Sat.	GeoTIFF	2250	1) Product and Image generation.	P1	Real Time	20	15.0
5	MSG imagery over the Region - A		GOES satellite, channel VIS, WV, IR, Resolution 4km	level 1b original from Satellite		30N, 30E, 50W, 50E	15 - 30 minutes	40500	six channels compressed	GeoTIFF	40500	1) Product and Image generation.	P1	Real time	10	540.0
6	MSG imagery over the Region - B		GOES satellite, channel VIS, WV, IR, Resolution 12km	TIFF image		15N, 37E, 71W, 25E	30 minutes	2100	3 images	GeoTIFF	1050	synoptic Analysis	P1	Real time	10	14.0
7	MSG imagery over the Region C		GOES satellite, other channels	level 1b original from Satellite		60N, 60E, 60W, 60E	30 minutes	13500	full disk one channel	GeoTIFF	6750	1) Product and Image generation.	P2	Real time	10	90.0
8	Regional Wind vectors from GEO-A		Low, middle, and high level Low resolution	TIFF image		SAM	3 hours	2100	3 images	GeoTIFF	1050	Synoptic analysis	P1	realtime	10	14.0
9	Regional Wind vectors from GEO-B		From IR, WV, VIS and 3.9 Retrieval zonal, meridional, height and quality indicator	BUFR		SAM	3 hours	8000	four images (4 channels)	BUFR	8000	Product generation, Synoptic analysis, Assimilation	P1	realtime	30	35.6
10	Global Wind vectors from GEO		From IR, WV, VIS and 3.9 channels, Retrieval zonal, meridional, height and quality indicator	BUFR		Global	3 hours	40000	(5 satellites)	Bufr	40000	Assimilation	P3	real time	60	88.9
11	Polar regions Wind vectors from LEO-A		Retrieval zonal, meridional, height and quality indicator	BUFR		POLAR	3 hours	7800		Bufr	7800	Synoptic analysis, Assimilation	P1	realtime	30	31.1
12	Polar regions Wind vectors from LEO-B		Low resolution, Retrieval zonal, meridional, height and quality indicator	TIFF image		POLAR	3 hours	6000		GeoTIFF	3000	Synoptic analysis	P1	realtime	30	13.3
13	Global Radio-occultation sounding		Retrieval profiles	BUFR		Global	1 hour	10000		Bufr	10000	Product generation, Assimilation	P1	realtime	40	33.3
14	Global hyperspectral Sounding		RARS Hyperspectral (RAS and GIS)	level 1C, original from satellite operator		Global	30 minutes	21000	one pass	Bufr	21000	Product generation, Assimilation	P3	realtime	10	280.0
15	Global operational LEO sounding		RARS Data (NOAA / MET Op)	level 1c data in BUFR		Global	30 minutes	1500	one pass	Bufr	1500	Assimilation	P1	realtime	10	20.0
16	GEO sounding channels over the Region		(full spatial resolution)	level 1b original from satellite operator		SAM	2 hours	380	one satellite	Bufr	380	Product and Image generation, Assimilation	P3	realtime	10	5.1
17	GEO sounding over other regions		(full spatial resolution)	level 1b original from satellite operator		to be defined	2 hour	760	GOES E and W	Bufr	760	Product and Image generation, Assimilation	P3	realtime	10	10.1
18	Regional LEO MW Imagery for precipitation		(operational and RGB, (E), NOAA, DMSP and MET Op)	level 1b, original from satellite operator		SAM	3 hours	5500	(one granule)	Bufr	5500	Assimilation	P1	realtime	10	73.3
19	Regional Data Operational LEO		3.9, 10 and 11u channels Full resolution imagery (NOAA-MET OP - FY)	level 1b, original from satellite operator		SAM	3 hours	45000		GeoTIFF	22500	Product and Image generation.	P1	realtime	30	100.0
20	Rainfall Nowcasting		2 hour forecasts based on GOES satellite data - Regional Coverage	TIFF image low resolution		SAM	30 minutes	700		GeoTIFF	200	Warning (+Synoptic analysis)	P1	realtime	5	5.3
21	Regional Rainfall Satellite		Rainfall Satellite based on GOES satellite data	TIFF image low resolution		SAM	30 minutes	400		GeoTIFF	200	Synoptic analysis	P1	realtime	10	2.7
22	Regional Precipitation		accumulated daily	TIFF image low resolution		SAM	daily	400		GeoTIFF	200	Synoptic analysis	P1	realtime	20	1.3
23	Total Precipitable Water Estimation		Regional LEO satellite	TIFF image low resolution		SAM	3 hours	400		GeoTIFF	200	Synoptic analysis	P1	realtime	20	1.3
24	Discharge losses		Regional LEO satellite and lightning detector onboard	TIFF image low resolution		SAM	1 hour	400		GeoTIFF	80	Synoptic analysis	P1	realtime	10	1.1
25	Stability index		Regional LEO satellite	TIFF image low resolution		SAM	3 hours	400		GeoTIFF	100	Synoptic analysis	P1	realtime	10	1.3
26	GEO Fire detection		from GOES satellite - NDVI - TIRS latitude and longitude (CART)			SAM	30 minutes	70		ASCII (CAP)	70	Warning	P1	realtime	3	3.1

<sup>3</sup> <http://satellite.cptec.inpe.br/geonetcast/es/products/RA-III-IV-Requirements-v20110321.xls>

DRAFT Regional Requirements for Satellite Data in Central and South America.

27	LEO Fire detection	(mosaic from NOAA, accumulated spots) -	tiff image low resolution		SAM	daily	400		Geotiff	50	Product generation	P1	realtime	30	0.2
28	SST - A	Global LEO satellite - 50km	image tiff - low resolution		Global	3.5 days	700		Geotiff	350	Synoptic analysis	P1	no real time	50	0.9
29	SST - B	Regional LEO satellite	netcdf		SAM	daily	3000	South Am region, mosaic	Geotiff	1500	Product generation	P1	no real time	40	5.0
29a	SST - C	Regional LEO satellite	netcdf		SAM	daily	3000	South Am region, mosaic	HDF	3000	Assimilation	P1	no real time	40	10.0
30	Cloud Top Pressure	GOES Imagery	tiff image low resolution		SAM	30 minutes	2100	three images	Geotiff	1050	warning (+Synoptic analysis)	P1	Real time	5	28.0
31	Cloud Classification	Regional GOES Imagery	tiff image low resolution		SAM	every 30 minutes	400		Geotiff	200	synoptic analysis	P1	realtime	30	0.9
32	Regional Cloud analysis	Regional GOES Imagery	level 2		SAM	30 minutes	13000	image size	Geotiff	6500	Product and Image generation	P1	realtime	15	57.8
33	Global Cloud analysis - A	Global GOES Imagery	level 2		Global	3 hours	65000	6 satellite s	Geotiff	32500	Product and Image generation	P2	realtime	60	72.2
33a	Global Cloud analysis - B	Global GOES Imagery	level 2		Global	3 hours	65000	6 satellite s	HDF	65000	Assimilation	P3	real time	60	144.4
34	Turbulence	From forecast model	Bufr		SAM	3 hours	400		Bufr	400	Product generation	P1	realtime	30	1.8
35	Synthetic Aperture Radar	(SAR) images	tiff image low resolution	to be defined		daily	400		Geotiff	200	Synoptic analysis	P1	realtime	50	0.5
36	Soil moisture - A	Regional LEO satellite (AQUA/AMSR-E)	image tiff - low resolution		SAM	daily	3000		Geotiff	1500	Synoptic analysis	P1	no real time	40	5.0
37	Soil moisture - B	Regional LEO satellite (AQUA/AMSR-E)	Bufr		SAM	daily	3000		Bufr	3000	Assimilation	P1	no real time	40	10.0
37a	Soil moisture - C	Regional LEO satellite (ASCAT, SMOS, SMAP)	Bufr		SAM	daily	3000		Bufr	3000	Assimilation	P1	no real time	40	10.0
38	Volcanic ash - A	Regional LEO satellite	tiff image low resolution		SAM	daily - when it is detected	70		Geotiff	50	Warning	P1	realtime	3	2.2
38a	Volcanic ash - B	Regional LEO satellite	tiff image low resolution		SAM	daily - when it is detected	70		Ascii CAP	50	Warning	P1	realtime	3	2.2
39	Number of Days without Rain	Regional LEO and GEO satellites	tiff image low resolution		SAM	daily	400		Geotiff	100	Synoptic analysis	P1	realtime	10	1.3
40	Ultra Violet Index		tiff image low resolution		SAM	every 30 minutes	400		Geotiff	100	Synoptic analysis	P1	no real time	50	0.3
41	Land Surface temperature	Regional GEO satellite	tiff image low resolution		SAM	every 30 minutes	400		Geotiff	100	Synoptic analysis	P1	no real time	50	0.3
42	R&O LEO Imagery	VIS to IR Imagery Regional Data (MODIS)	level 11b (HDF)		SAM	6 hours	50000	(granule)	Geotiff	25000	Product and Image generation	P2	realtime	50	66.7
43	Global LEO Scatterometer sensors	Retrieval Winds	BUFR		Global	3 hours	24900	three granules	Bufr	24900	Assimilation	P2	realtime	30	110.7
44	Ocean surface altimetry - A	Regional (Atlantic and Pacific) LEO satellite altimeter sensor	Retrieval altimetry level 2		SAM	6 hour	680		Bufr	680	Product generation Assimilation	P3	no real time	40	2.3
45	Ocean surface altimetry - B	Global LEO satellite altimeter sensor	Retrieval altimetry ASCII		Global	daily	10200	(15 granules)	Bufr	10200	Product generation Assimilation	P3	no real time	60	22.7
46	Oceanic chlorophyll	Global LEO satellite - Modis	tiff image low resolution		Global	daily	9000		Geotiff	4500	Synoptic analysis	P3	realtime	50	12.0
47	Surface Solar and Earth radiation	Regional LEO satellite - NOAA	tiff image low resolution		SAM	3 hours	400		Geotiff	200	Synoptic analysis and applications	P3	realtime	10	2.7
48	Ice and snow extent	Special Sensor Microwave Imager/Sounder (DMS/SSMIS)	tiff image low resolution		SAM	daily	400		Geotiff	200	Synoptic analysis	P3	no real time	50	0.5
49	Ozone	(sensor SBUV/2, GOME)	tiff image low resolution		SAM	daily	400		Geotiff	200	environmental analysis	P3	realtime	50	0.5
50	Fog	1 Km NOAA/MODIS	tiff image low resolution		SAM	daily	400		Geotiff	200	synoptic analysis	P3	realtime	30	0.9
51	Vegetation index - A	Global LEO satellite (VGT and Modis)	Level 2		Global	10 days	15000		Geotiff	12000	Product generation	P3	no real time	120	13.3
51a	Vegetation index - B	Global LEO satellite (VGT and Modis)	Level 2		Global	10 days	15000		HDF	15000	Assimilation	P3	no real time	120	16.7
52	Vegetation index - C	Global LEO satellite (VGT and Modis)	tiff image low resolution		Global	every 15 days	200		Geotiff	180	Synoptic analysis	P3	no real time	50	0.5

**Geographical area legend:**  
 SAM (3 Americas)  
 SAM (South America) - 10N, 55S, 110W, 25W  
 SCA (South and Central America)  
 GLOBAL (Global coverage)  
 POLAR (Polar region)

TOTAL P1 = 1143.6  
 TOTAL P2 = 369.6  
 TOTAL P3 = 600.6  
 TOTAL GERAL 2113.7

NOTES:  
 1) The Timeliness is the maximum time to broadcasting a product once available in the uplinker server;  
 2) "Product Name - A, B, C": this letters are being used only to differentiate similar products(same name) associated to different regions or to different formats, and/or data characteristic  
 3) The sizes given in column "Size" refers to the total number of images indicated by "size comment", whenever this latter is explicit,  
 4) Priority scale:  
 P1 - assigned most to regional products considered of highest importance to be broadcast;  
 P2 - assigned most to global products next in priority;  
 P3 - assigned to products considered important, but not yet foreseen for operational use in short term, or considered less important.

## ANNEX III

### Questionnaire for survey within RA III and RA IV (proposed version, 8 Nov 2013):

1) **Country and name of your organization:**

2) **Type of your organization**

- National meteorological/hydrological service
- Other operational governmental agency
- Regional/international organization
- Research/academic institution
- Other

4) ~~What are your satellite data requirements?~~ [Comment: this seems too general a question; it is suggested to split it into three questions: on satellite systems (Q3), on application areas (Q4), and on requirements for datasets (Q6)]

3) **A) You are currently using data from which satellites:**

- GOES-E     GOES-W     Meteosat-10
- METOP     CBERS     POES     Aqua/Terra     DMSP
- Cloudsat/Calipso     FY-3     METEOR-M     NPP
- SPOT     Oceansat     GOSAT     Landsat     Aquarius/SAC-D
- SMOS     SAR missions (Radarsat-2, TerraSAR-X, Cosmo-Skymed, TanDEM-X)
- Jason     TRMM     Megha-Tropiques     HY     COSMIC     Other

**B) You are planning to use data from which satellites:**

- GOES-R
- JPSS     METOP     Sentinel-3     Sentinel-1     Sentinel-2
- FY-3     Landsat     GCOM-W     SMAP     ADM-Aeolus     GPM
- Jason-CS     Other

4) **What is your main use of satellite data?**

Weather forecasts and warnings	<input type="checkbox"/>
Climate predictions and assessments	<input type="checkbox"/>
Hydrological forecasts, warnings and assessments	<input type="checkbox"/>
Oceanography and marine meteorology	<input type="checkbox"/>
Space weather applications	<input type="checkbox"/>
Disaster mitigation and preparedness	<input type="checkbox"/>
Land monitoring (e.g., for agriculture)	<input type="checkbox"/>
Environmental assessments	<input type="checkbox"/>
Socio-economic mapping	<input type="checkbox"/>
Research and development	<input type="checkbox"/>
Education and training	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>

- 4) **Data timeliness: are you mostly using**  
 Near-real time data (timeliness 0-48 hours)   
 Historical data   
 Both are equally important to me

- 5) **A) How do you currently receive and access satellite data? Give details on the reception system (e.g., antenna) as appropriate.**

System		Details
Direct readout (e.g., HRPT)	<input type="checkbox"/>	
GTS point-to-point	<input type="checkbox"/>	
Internet (ftp, http)	<input type="checkbox"/>	
DVB-S/S2: GEONETCast-Americas	<input type="checkbox"/>	
DVB-S/S2: EUMETCast-Americas	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

- B) How would you like to receive satellite data in the future?**

System		Details
Direct readout (e.g., HRPT)	<input type="checkbox"/>	
GTS point-to-point	<input type="checkbox"/>	
Internet (ftp, http)	<input type="checkbox"/>	
DVB-S/S2: GEONETCast-Americas	<input type="checkbox"/>	
DVB-S/S2: EUMETCast-Americas	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

- 6) **Do you intend to buy direct readout stations for the next satellite generation?**

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Comments	

- 7) **Are you aware about of GEONETCast/EUMETCast?**

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>
Comments	

- 8) **An initial set of satellite data requirements for RA III and RA IV has been developed; please comment, and add your requirements as necessary:**

<http://satellite.cptec.inpe.br/geonetcast/es/products/RA-III-IV-Requirements-v20110321.xls>

Are you are aware of the RAIII and RAIV data requirements; if yes, do you agree with these satellite data requirements? If not please access the data requirement in the following address and comment.

- 7) ~~What data reception system do you use?~~ [Comment: covered by Q5]

- 9) ~~Is this information useful for your service/institution?~~ [Comment: not clear and perhaps redundant with Q4; if this question refers to the value of satellite data for the institution, suggest the following: ]

**In what context is satellite data being used for in your service/institution?**

Operations	<input type="checkbox"/>
Research and Development	<input type="checkbox"/>
Education	<input type="checkbox"/>
Value-added services	<input type="checkbox"/>
Other (pls specify)	

- 9) **Would you like to distribute data and products to other users in Region III and Region IV (e.g., by upload on the GEONETCast-Americas system)?** ~~Would you like to upload data and products to the Geonetcast system?~~ [Comment: more general formulation of the question]

No	<input type="checkbox"/>
Yes	<input type="checkbox"/>
Give details	

- 10) **Would your institution be ready/considering to contribute to a Region III/IV-wide data distribution system by allocating financial and technical resources?** ~~Is your institution ready/considering to contribute to the budget of the Geonetcast dissemination system?~~ [Comment: again, more general formulation, not Geonetcast-centric]

No	<input type="checkbox"/>
Yes	<input type="checkbox"/>
Give details	

## ANNEX IV

### Institutions responding to the 2012 WMO Survey on the Use of Satellite Data<sup>4</sup> in Region III and IV

#### **Region III (South America): 14 responses**

The 10 responses from ***NMHSs and other operational governmental agencies*** came from the following institutions (multiple responses possible):

Centro Meteorológico Nacional, Argentina  
Servicio Meteorológico Nacional, Argentina  
INPE/CPTEC, Brazil  
Dirección Meteorológica de Chile  
INAMHI, Ecuador  
Servicio Nacional de Meteorología e Hidrología del Peru  
Comisión Nacional de Investigación y Desarrollo Aeroespacial (CONIDA), Peru  
INGEMMET, Peru

The 4 responses from ***Research & Academia*** came from the following institutions (multiple responses possible):

CONICET, Argentina  
Universidade Federal do Rio de Janeiro, Brazil  
University of Sao Paulo, Brazil  
Federal University of Itajuba, Brazil

#### **Region IV (North/Central America and the Caribbean): 44 responses**

The 21 responses from ***NMHSs and other operational governmental agencies*** came from the following institutions (multiple responses possible):

National Meteorological Service Belize  
Caribbean Meteorological Organization  
Meteorological Service of Canada  
Canadian Space Agency  
Environment Canada  
Instituto Costarricense de Electricidad  
Instituto Meteorologico Nacional Costa Rica  
Saint Lucia Meteorological Services  
NOAA National Environmental Satellite, Data, and Information Service  
NOAA National Weather Service  
NOAA National Climatic Data Center

The 23 responses from ***Research & Academia*** came from the following institutions (multiple responses possible):

Caribbean Institute for Meteorology and Hydrology  
University of Saskatchewan  
University of Toronto  
McGill University  
University of Waterloo

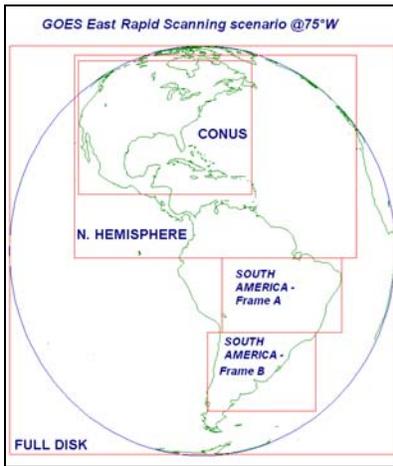
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<sup>4</sup> [http://www.wmo.int/pages/prog/sat/documents/SAT-PUB\\_SP-9-Survey-Report-2012.pdf](http://www.wmo.int/pages/prog/sat/documents/SAT-PUB_SP-9-Survey-Report-2012.pdf)

York University  
University of Alberta  
University of Calgary  
Université de Montréal  
Water Center for the Humid Tropics of Latin America and The Caribbean  
(CATHALAC)  
Center for Ocean-Atmosphere Prediction Studies, Florida State  
University  
Brigham Young University  
University of Texas Center for Space Research  
National Ecological Observatory Network  
National Snow and Ice Data Center, University of Colorado  
City College of New York  
NOAA NESDIS (at Cooperative Institute for Meteorological Satellite  
Studies, University of Wisconsin-Madison)

# ANNEX V:

## NOAA GOES-13 Rapid Scanning Scenarios



2 minute 2 second South America A @ 75°W

Lat	Lon	Elev	Scan	Line	Pixel	HS C,1	EW C,1	Time
Start: -1.881	-76.855	-9.28	8.89	8879	16380	6,2716	2,4826	2:80
Stop: -21.348	-58.299	-2.56	6.29	18958	22289	5,5479	3,2798	
Center: -18.859	-53.786	-1.88	3.58					

Instrument View



Earth View



2 minute 2 second South America B @ 75°W

Lat	Lon	Elev	Scan	Line	Pixel	HS C,1	EW C,1	Time
Start: -28.185	-73.568	-3.56	8.28	18958	15480	5,5479	2,3320	2:80
Stop: -49.828	-58.738	-6.21	5.18	12148	20988	6,5658	3,2488	
Center: -31.879	-56.499	-5.14	2.87					

Instrument View



Earth View

