

WMO Space Programme Update - Input to RA II Satellite User Mechanism and Capacity Building

Stephan Bojinski

World Meteorological Organization (WMO)
Space Programme

4th Meeting of the Coordinating Group for the
RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and
Training

Songdo, Republic of Korea, 28 Oct 2016



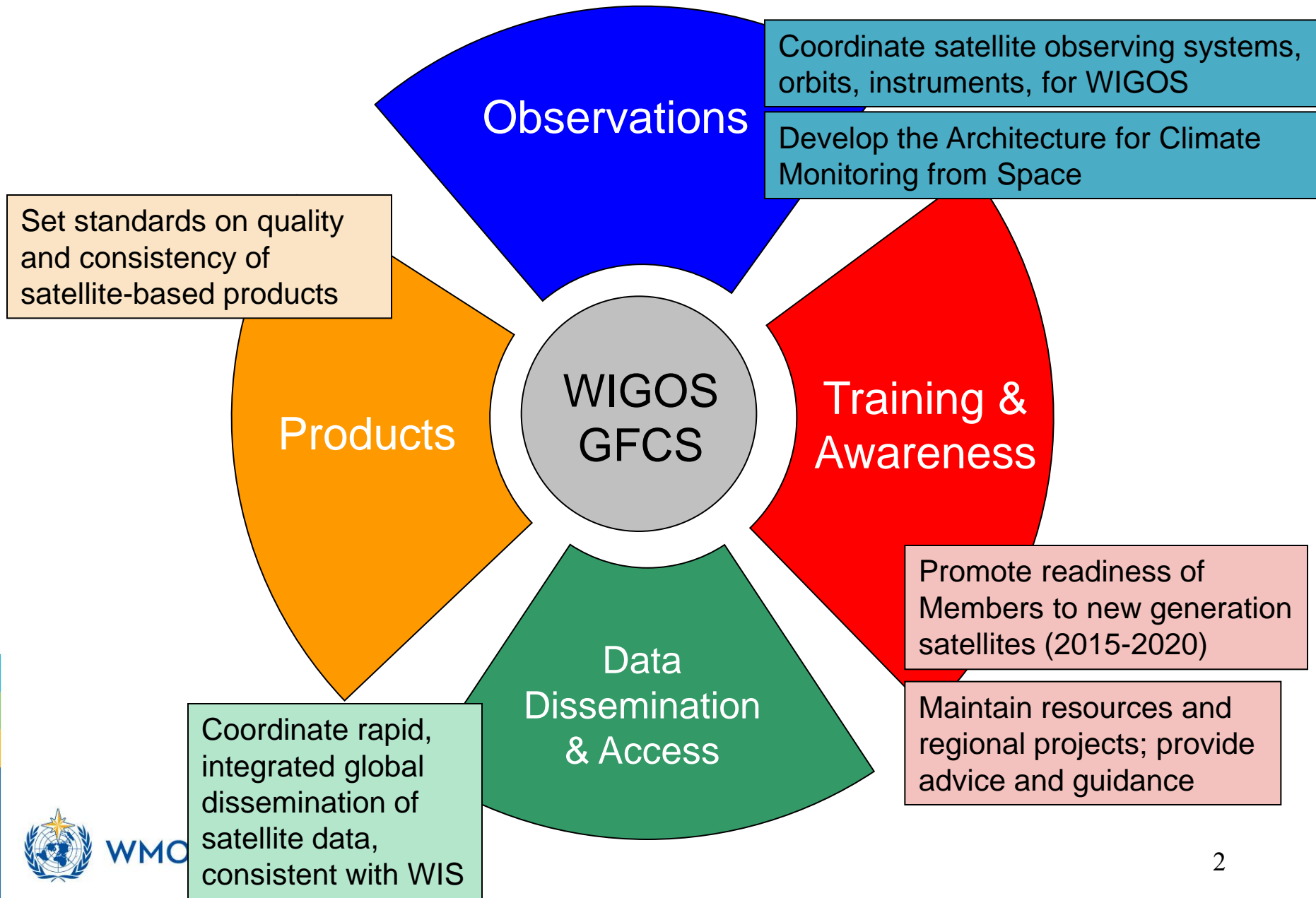
WMO OMM

World Meteorological Organization

Organisation météorologique mondiale

WMO Space Programme: 4 Activity Areas

supporting weather, water, climate, and space weather



WMO Space Programme 2016 Highlights (1)

- Vision of WIGOS Space in 2040 – Draft v1.0
 - Vision for WIGOS Surface underway; merging for Cg-18
- OSCAR updates (<http://oscar.wmo.int>)
 - OSCAR/Space v2.0 online since Sep 2016; including instrument status, calibration events, rule-based assessments & gap analyses
 - OSCAR/Surface online since May 2016, hosted by MeteoSwiss
- Preparation for new satellite generations:
 - SATURN (<http://www.wmo-sat.info/satellite-user-readiness/>)
 - Best practices – Reference User Readiness Project (AOMSUC-7 talk)
- Satellite Data Dissemination Strategy
 - Guide to DBNet completed (DBNet: “Direct Broadcast Network for Near Real-time Relay of Low-Earth Orbiting Satellite Data”, formerly “RARS”)

WMO Space Programme 2016 Highlights (2)

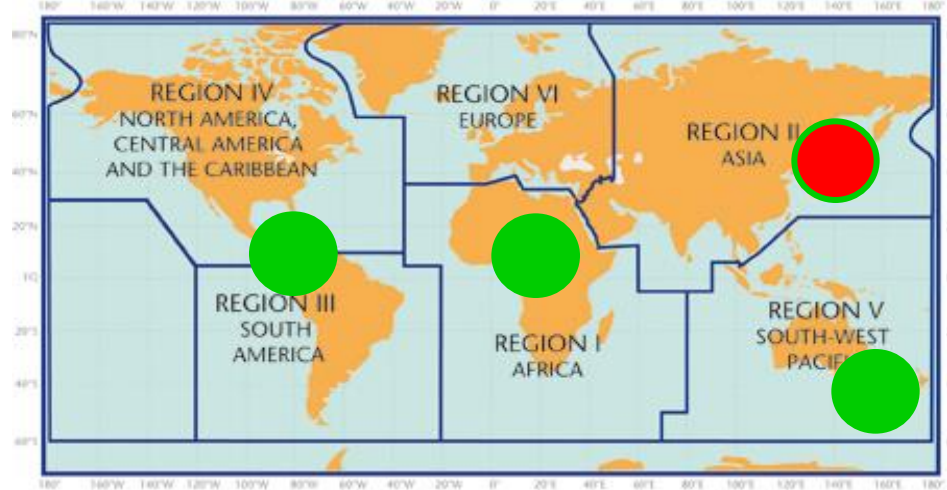
- Satellite Data Dissemination Strategy:
Metadata standards for WIGOS and WIS developed
 - WIGOS: fit-for-purpose to describe satellite data
 - WIS: metadata implementation has started
- SCOPE mechanisms
 - Nowcasting pilot projects (RA II focus on Severe Weather Forecasting (SWFDP), and sand and dust monitoring)
 - Climate monitoring products (SCOPE-CM)
- Regional groups for satellite data requirements
- Space weather
 - Executive Council June 2016 approved Four-Year Plan of Action
- Staff changes:
 - Toshiyuki Kurino new Chief – Space-based Observing Systems Division (replacing Jérôme Lafeuille)
 - Wenjian Zhang promoted to Assistant Secretary-General of WMO; Director post currently vacant

Enhancing satellite data utilization (1)

Regional user mechanisms

Through:

- RA I (Africa): Dissemination Expert Group
 - **RA II (Asia): WIGOS Project Coordination Group**
 - RA III/IV (Americas): Coordination Group
 - RA V (SW Pacific): Task Team on Satellite Utilization
-
- Membership:
 - Operational users
 - Satellite providers
 - Training centres (VLab CoEs)
 - Scientific users
 - Others



Advantages for Region:

- Effective user-provider dialogue
- Defined format for expressing requirements
- Coordination of data distribution
- Identification of training needs
- Implementation of WIGOS/WIS

Enhancing satellite data utilization (2)

AOMSUC Memorandum (June 2016):

- signed by PRs of Australia, China, India, Indonesia, Japan, Republic of Korea, Russian Federation, and WMO Secretary-General
- “add to the current mandate of the International Conference Steering Committee (ICSC) of AOMSUC the coordination responsibility for: (i) a user-focused training event; and (ii) as appropriate, a meeting of the WMO Satellite User Requirements coordination groups in Regions II and V, held jointly with the AOMSUCs”

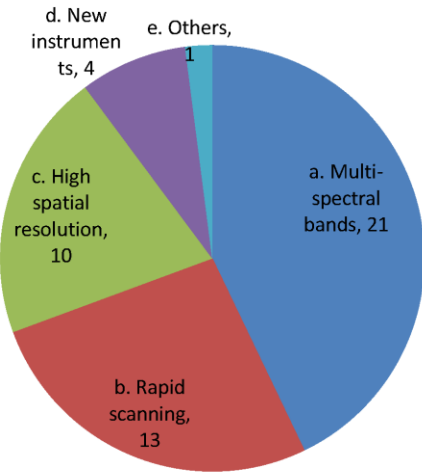
- ✓ AOMSUC-7
- ✓ Training event
21-22 Oct 2016
- ✓ 4th RA II WIGOS
CG Meeting



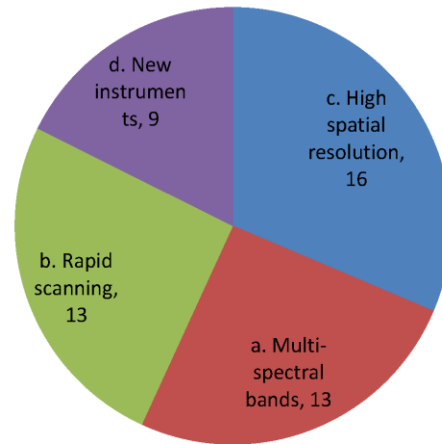
AOMSUC Memorandum Signature Ceremony, 16 June 2016, Geneva, Switzerland

Enhancing satellite data utilization (3)

No.1: Tropical cyclones



No.2: Severe thunderstorms



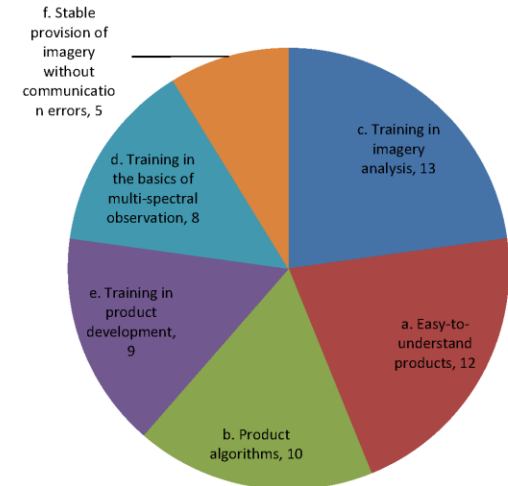
Capacity building requirements to reap benefits

Benefits of new-generation satellite capabilities

No.1: Tropical cyclones



No.2: Severe thunderstorms



Source: Questionnaire on use of new-generation satellite data (presented at 3rd meeting, 2015)

RA II (Asia)

- Many satellite providers
- Wide range of user capabilities
- Need a Systematic Approach to
 - Identify
 - Document
 - AddressUser Needs

Example for a Region-based Satellite User Requirements Documentation

RA III-IV (Americas)

SATELLITE DATA REQUIREMENTS FOR RA III AND RA IV - PRIORITIES ACCORDING TO THE REGION

USER REQUIREMENTS					INFORMATION FROM PROVIDERS										
PRIORITY	N° of "High Priority" votes (Weight 3)	N° of "Medium Priority" votes (Weight 2)	N° of "Low Priority" votes (Weight 1)	TOTAL SUM	Product ID #	Data Provider	Data Characteristics	Format	Data Distribution	Geographical Area	Frequency	Size (kB)	Size Comment	Format Expected in the Future	FINAL Size (Compressed) kB
1	9	5	2	39	1.8	NOAA NESDIS	GOES Full Disk Visible Full Resolution	GeoTIFF	GNC-A	GOES East Footprint	3 Hours	178	Average File Size (6 per day)	GeoTIFF	108,600.0
2	6	8	1	35	1.9	NOAA NESDIS	GOES Full Disk IR Full Resolution	GeoTIFF	GNC-A	GOES East Footprint	3 Hours	8	Average File Size (8 per day)	GeoTIFF	4,900.0
3	7	5	3	34	1.1	NOAA NESDIS	GOES Full Disk WV Full Resolution	GeoTIFF	GNC-A	GOES East Footprint	3 Hours	4	Average File Size (8 per day)	GeoTIFF	2,100.0
4	8	3	0	30	1.7	NOAA NESDIS	GOES images, channel VIS, WV, IR, Resolution 4km Follows GOES East and West Schedules	LRIT	NOAA Low Rate Information Transmission Service (LRIT)	3AM (and R Sectors East a					
5	7	3	0	29	1.12	NOAA NESDIS	GOES East Visible	JPEG Image	WWW site	GOES E Footprint					
6	7	2	1	26	1.11	NOAA NESDIS	GOES East IR	JPEG Image	WWW site	GOES E Footprint					
7	5	4	1	24	1.5	INPE	GOES images, channel VIS, WV, IR, Resolution 4km/ rectangular projection	GeoTIFF	GNC-A / FTP	SAM	30 minutes	18000	3 images	GeoTIFF	10000
8	4	4	3	23	1.6	INPE	GOES images, Channel IR, Resolution 4km/ rectangular projection	GeoTIFF	GNC-A / FTP	SCA	3 Hours	7000	1 image	GeoTIFF	4000

Satellite Data and Product Requirements Baseline of RA III / IV (Americas): TOTAL 402 products

EXAMPLE FROM REGION III AND IV (AMERICAS)

ANNEX 6: Overview of GOES-R Data Access Mechanisms, Processing and Visualization Tools, and Selected Providers

Data Access		
	Key features	Typical Country requirements to be met
Direct Readout		
<ul style="list-style-type: none"> • GRB <ul style="list-style-type: none"> ○ Harris ○ Seospace ○ EEC – Telespace ○ Global Science & Technology (GST) - DirectMet ○ Quorum ○ Scisys ○ Global Imaging 	Full res L1b: ABI data GLM Space weather L2 products, as specified in contract 31Mbps	Processing of L1b into products Depending on country needs and obligations
<ul style="list-style-type: none"> • HRIT/EMWIN <ul style="list-style-type: none"> ○ Global Imaging ○ Dartcom ○ Microcom ○ Scisys 	Continuity of EMWIN and DCS, including watches and warnings Some HRIT imagery (400kbps), reduced resolution 1-1.2m dish, LNB, receiver, computer, visualization SW Stable turn-key systems with est'd support Full-disc GOES	Imagery for situational awareness
Satellite-based		
<ul style="list-style-type: none"> • GEONETCast-Americas <ul style="list-style-type: none"> ○ EEC Telespace ○ 'custom' ○ Global Imaging ○ Knightsky Ilc ○ Systems Strategies and Analysis (USA) ○ Scisys ○ Dartcom 	Imagery and L2 products, depending on user requirements Multi-format data New system, support structure evolving Coverage of IS-21 satellite (all of the Americas except northern parts of Canada, Alaska, Easter Island) DVB-S based, scalable 6.7Mbps	Risk reduction in transitioning from GOES to GOES-R Back-up system Primary system, depending on needs and resources
<ul style="list-style-type: none"> • NOAAport 	CONUS content Limited value for Central and South America DVB-S2, SES-1 60-75Mbps	Mostly for US-based users
Internet		
<ul style="list-style-type: none"> • PDA 	Full res L1b (ABI data, GLM),	For all users

test footer

Satellite Data Access Mechanisms for Users in RA III / IV (Americas):

- Direct readout
- GEONETCast-type
- Internet
- Terrestrial networks
- Low-bandwidth services

...

ANNEX 9: OVERVIEW OF EXISTING AND PLANNED SATELLITE DATA RECEPTION INFRASTRUCTURE IN RA III AND IV (OUTSIDE THE U.S.)

State / Territory	Present satellite data reception systems	Planned or potential future systems	Comments
Antigua and Barbuda	ftp/http	GRB, GNC-A, GOES-LRIT	With info from 2015 survey
Argentina	GVAR, HRPT; AHRPT, GNC-A (CONAE); DR X-band (CONAE, INTA)	DR X-band (SMN project on stand-by); GRB (SMN, CONAE), AHRPT (CONAE), GNC-A (1-2 at	With info from 2015 survey
Bolivia	GOES-LRIT; ftp/http; EUMETSAT-Americas	GRB, GOES-LRIT; HRIT/EMWIN; GOES-DCS; GTS; GNC-A	With info from 2015 survey
Brazil	(INMET): GVAR (INPE): GVAR, GNC-A, EUMETCast-A, HRPT, DR X-band	(INMET): GNC-A (INPE): GRB, GNC-A, DR X-band	
Cayman Islands	GVAR		With info from 2015 survey
Chile	GNC-A (U la Serena), GVAR; HRPT, X-band	3 HRPT, 3 GRB; renovation under way	
Colombia	GVAR, GNC-A; HRPT (not operational); ftp/http	GNC-A (first choice); Internet data services (under investigation)	
Ecuador	GVAR, HRPT (not operational), EUMETCast-Americas (not operational); ftp/http	GRB, GNC-A; HRPT; ftp/http	With info from 2015 survey

Satellite Data Reception Infrastructure: Overview of existing & planned

Satellite-specific Two-Year Vlab Training Plan under development

Results from WMO 2016 Survey

WMO Survey on the Use of Satellite Data 2016

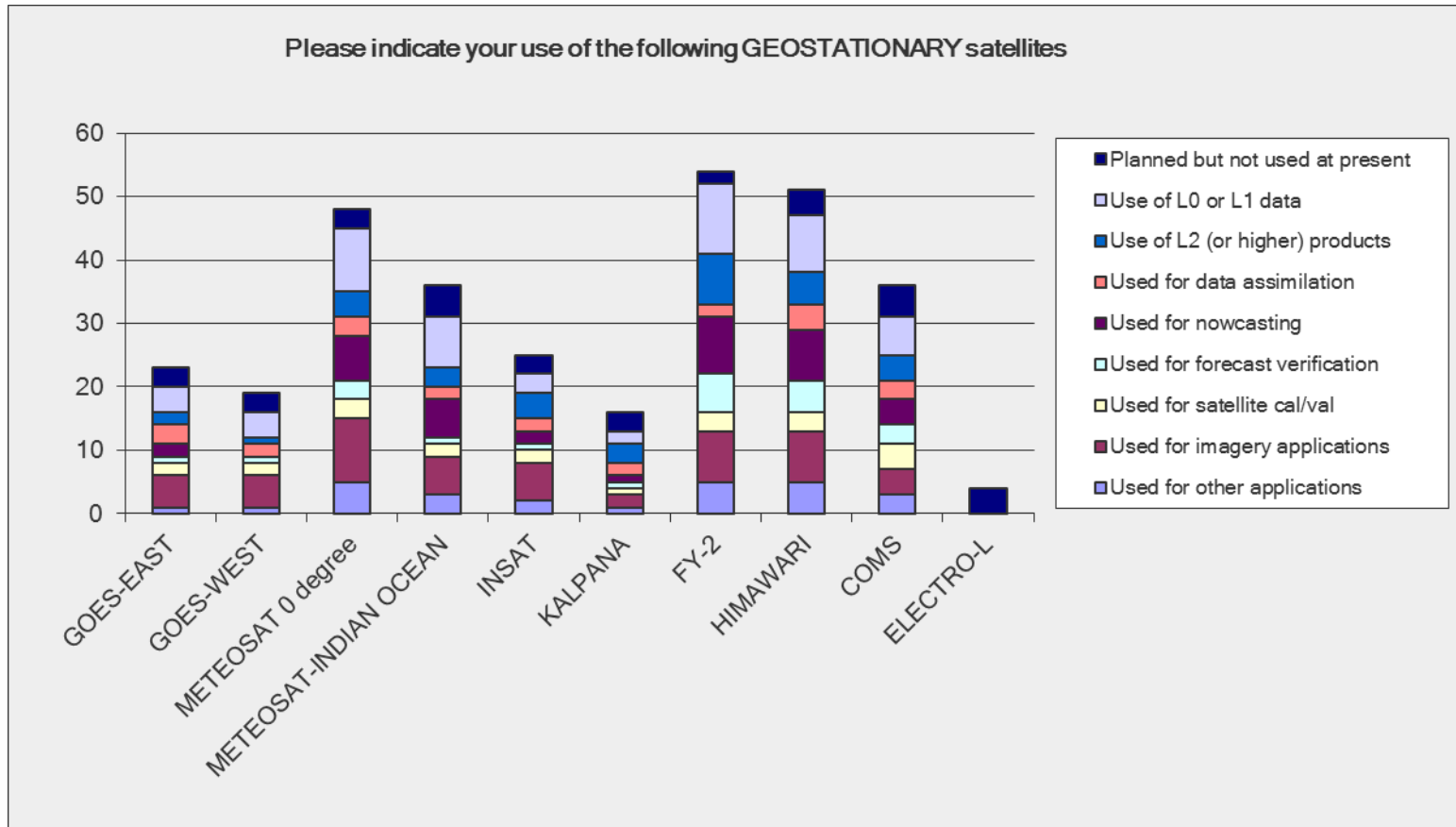
- March-May 2016
- 215 responses globally
- 38 from RA I, from 14 countries

- 66% NMHS
- 8% Other gov't agency

- 24% Research, academia

Bangladesh
China
India
Iran
Japan
Kazakhstan
Kyrgyzstan
Oman
Pakistan
Republic of Korea
Russian Federation
Thailand
United Arab Emirates
Uzbekistan

RA II: GEO Data Use [%]



RA II: GEO Data Access, Processing and related Training

- Access to GEO data good
- Some challenges in GEO data processing and visualization (mostly minor)

SOFTWARE NEEDS			
Answer Options	No extra software needed	L1-L2 processor needed	Response Count
GOES-EAST	4	3	7
GOES-WEST	4	3	7
METEOSAT 0 degree	6	→ 10	16
METEOSAT-INDIAN OCEAN	6	8	14
INSAT	4	5	9
KALPANA	4	2	6
FY-2	4	7	11
HIMAWARI	2	→ 10	12
COMS	5	3	8
ELECTRO-L	2	1	3

“Little experience in processing Himawari-8 into high level secondary products. e.g. RDT products for severe storm detection”

RA II: GEO Data

- Training needs:

MY TRAINING NEEDS ARE...

Answer Options	MET	PARTIALLY MET	NOT MET	Response Count
GOES-EAST	3	2	1	6
GOES-WEST	3	2	1	6
METEOSAT 0 degree	5	→ 7	2	14
METEOSAT-INDIAN OCEAN	5	6	2	13
INSAT	3	2	3	8
KALPANA	2	2	1	5
FY-2	6	5	0	11
HIMAWARI	5	→ 8	0	13
COMS	3	3	1	7
ELECTRO-L	0	2	1	3

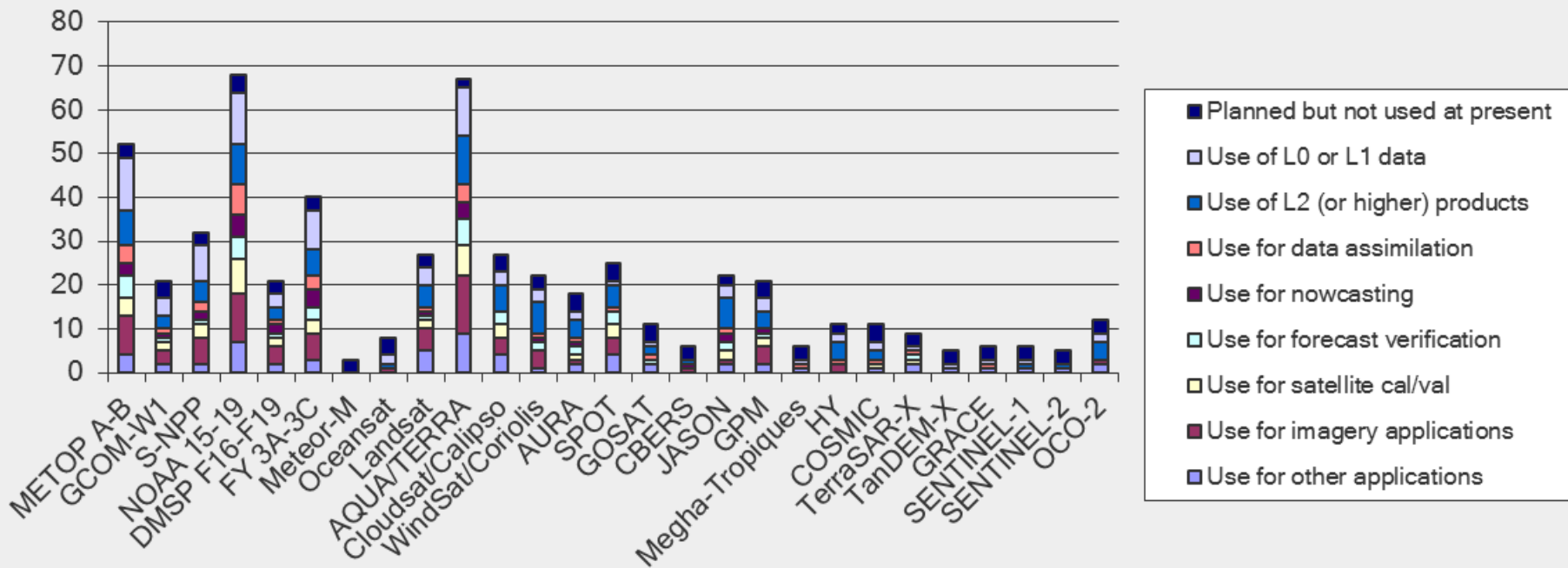
- User Readiness to Next-Gen GEOs:

Readiness Level					Response Count
Answer Options	We are aware of the mission but have not acted	We have started the planning process	We have plans to upgrade our systems	We are implementing plans to upgrade our systems	
Electro-L N2 (2015)	6	1	0	0	7
GOES-R (2016)	7	0	2	1	10
FY-4A (2016)	6	3	3	3	15
INSAT-3DR (2016)	9	1	0	1	11
GEO-KOMPSAT-2A (2018)	8	0	0	2	10
GEO-KOMPSAT-2B (2019)	7	0	1	2	10



RA II: LEO Data Use [%]

Please indicate your use of the following LOW-EARTH ORBIT satellites



RA II: LEO Data Access, Processing and related Training

- No issues with access; needs for pre-processing packages (Metop, POES, S-NPP, Aqua/Terra, FY-3) and related training
- Part of training course on 21-22 Oct 2016

SOFTWARE NEEDS					
Answer Options	No extra software needed	L0-L1 processor needed	L1-L2 processor needed	Both L0-L1 & L1-L2 needed	Response Count
METOP A-B	1	1	2	7	11
GCOM-W1	2	1	2	1	6
S-NPP	1	1	1	6	9
NOAA 15-19	2	1	1	9	13
DMSP F16-F19	3	2	2	1	8
FY 3A-3C	1	1	0	7	9
Meteor-M	2	0	0	1	3
Oceansat	3	0	0	2	5
Landsat	3	0	1	6	10
AQUA/TERRA	1	0	3	7	11
Cloudsat/Calipso	2	0	2	3	7



WMO Tools

- Improving User Knowledge of Available Data, Tools and Resources

- User fora, conferences (eg. AOMSUC)
- Online resources

[WMO Space Programme web site](#)

- [Product Access Guide](#)
- [Satellites User Readiness Navigator \(SATURN\)](#)
- [Processing and Visualization Tools](#)
- [OSCAR/Space Database](#)



RA II WIGOS Project: Online resources

- RA II Product Portal

- Now integrated in WMO [Product Access Guide](#)

- Maintained by
CBS IPET-SUP

(Focal Points for RA II :
Hidehiko Murata (JMA),
Fang Xiang (CMA),
Jin Woo (KMA))

Product Access Guide

Home Simple search Advanced search Themes ▾

Search

Home / Advanced Search / Search results

Criteria

Domain tags

- Imagery
- Atmosphere**
- Precipitation
- Fog
- Clouds
- Lightning
- Wind
- Trace gases
- Radiation

Hold the control key to (de)select multiple items

Select Theme(s)

Select Region(s)

- Antarctic
- Arctic
- Atlantic Ocean
- Global
- Indian Ocean
- Pacific Ocean
- Africa (Region I)
- Asia (Region II)
- South America (Region III)
- North America, Central America and the Caribbean (Region IV)
- South-West Pacific (Region V)
- Europe (Region VI)

Search results

Type: Product Collections

Preview Image	Organization	Access link	Geographical tag	Domain tag	Theme tag
	EUMETSAT	Meteosat Indian Ocean Data Coverage Visualised Products	Indian Ocean, Africa (Region I), Asia (Region II)	Precipitation	Disaster risk reduction, Tropical meteorology
	JMA	MTSAT Imagery, including heavy rainfall potential areas and RGB composites	Asia (Region II), South-West Pacific (Region V)	Precipitation, Imagery	Disaster risk reduction, Tropical meteorology

Type: Expert Groups

Preview Image	Organization	Access link	Geographical tag	Domain tag	Theme tag
	WMO, ESCAP	ESCAP/WMO Panel on Tropical Cyclones	Asia (Region II)	Wind, Precipitation, Ocean surface wind	Tropical meteorology
	WMO, ESCAP	ESCAP/WMO Typhoon Committee	Asia (Region II)	Ocean surface wind, Wind, Precipitation	Tropical meteorology

RA II WIGOS Project: Online resources

Project Website

– Hosted by JMA

Meteorological Satellites -Japan Meteorological Agency (JMA)-

- ["WMO Space Programme"](#)
- ["Access to low-level satellite data"](#)
- ["WMO OSCAR/Space \(Satellite missions, systems, and instruments\)"](#)
- ["Satellite products and imagery for RA II"](#)
- ["WMO Product Access Guide"](#)

RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training

Co-coordinator

 気象庁
Japan Meteorological Agency

 KMA Korea Meteorological Administration
A New Era of Hope

Under the auspices of

 World Meteorological Organization
Weather • Climate • Water

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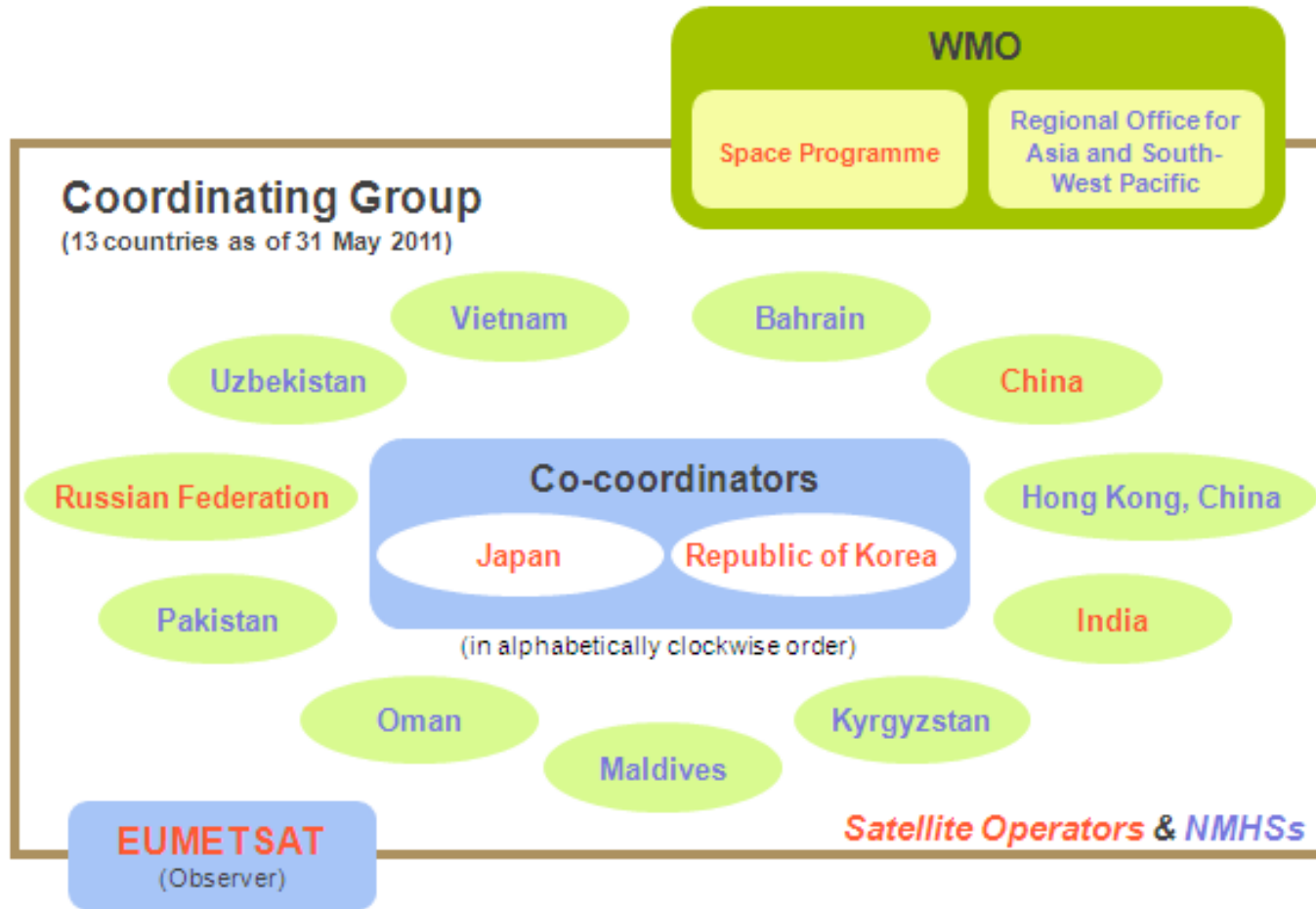
[Coordinating Group](#) [Meeting](#) [Newsletter](#) [Survey Result](#)

Background

The 14th session of WMO Regional Association II (XIV-RA II), held in Tashkent, Uzbekistan from 5 to 11 December 2008, adopted a resolution to establish a pilot project for the development of support for National Meteorological and Hydrological Services (NMHSs) in the areas of satellite data, products and training. After the session, the WMO Secretariat invited WMO Members to join the Pilot Project Coordinating Group, whose members as of 31 May 2011 are Japan (Co-coordinator), the Republic of Korea (Co-coordinator), Bahrain, China, Hong Kong – China, India, Kyrgyzstan, Maldives, Oman, Pakistan, the Russian Federation, Uzbekistan, Vietnam and, as an observer, EUMETSAT.

At the 15th session of Regional Association II (XV-RA II) held in Doha, Qatar in December 2012, it was decided that the RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training should continue and become the RA II

RA II WIGOS Project Coordination Group



Adding new members:

- Beneficiary countries of satellite receiving equipment
- ...



**World
Meteorological
Organization**

Weather • Climate • Water

Thank you for your attention

Stephan Bojinski
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BACKUP SLIDES



What is WIGOS?

- An over-arching **framework** for the **coordination and evolution** of WMO observing systems and the contributions of WMO to co-sponsored observing systems;
- A WMO priority & a key contribution to **GFCS**
- With WIS, a WMO contribution to **GEOS5**;
- It is about doing more & better with what we have now to enable more efficient and effective service delivery;
- It is about **changing the way** we plan, operate and deliver observations to meet user needs.



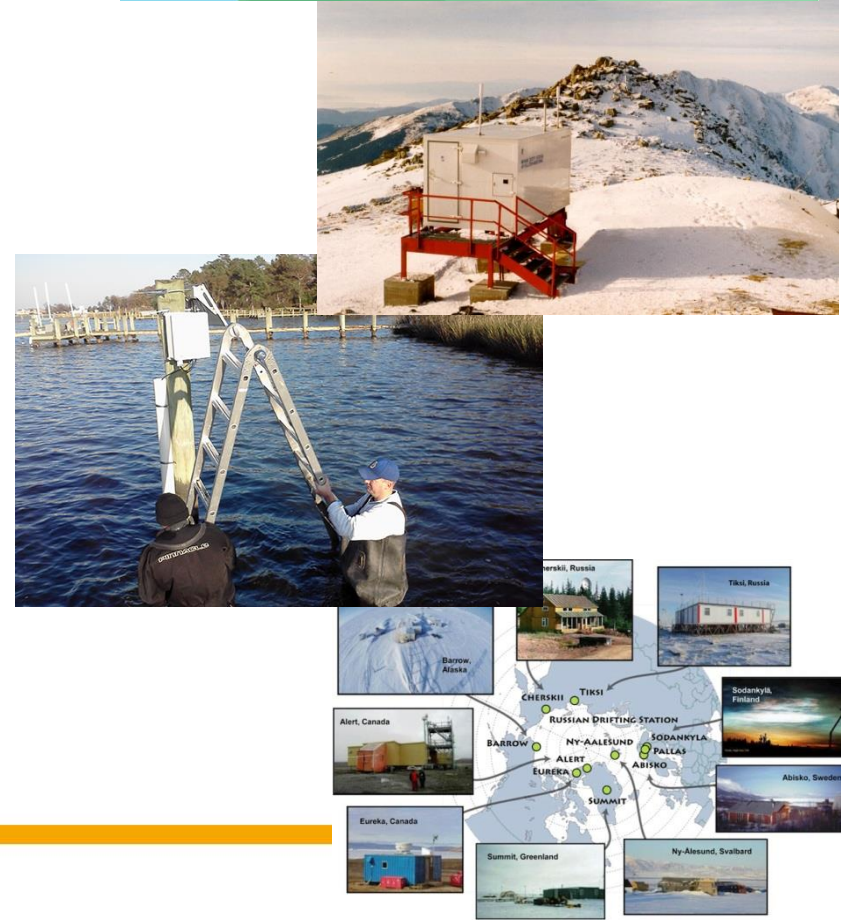
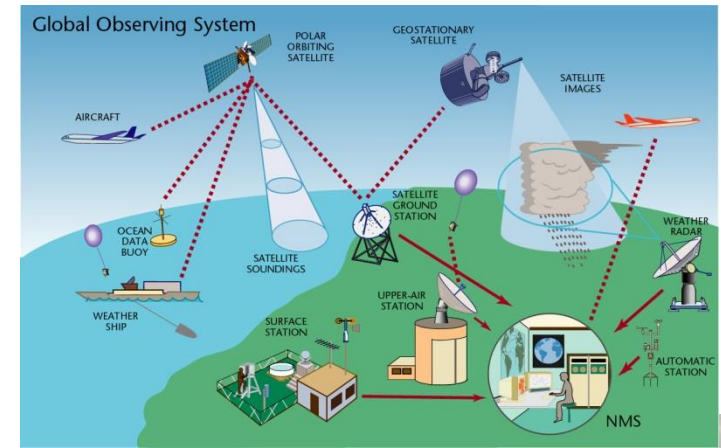
WIGOS Framework

- At its simplest, the WIGOS framework is about:
 - **Documenting and implementing** standard and recommended practices and procedures in making and sharing observations,
 - **Coordination and collaboration** for efficiency and effectiveness,
 - **Integration and interoperability** in all senses,
 - **Timely delivering observations** that meet user needs in a way they can use them,
 - **Empowering** NMHSs

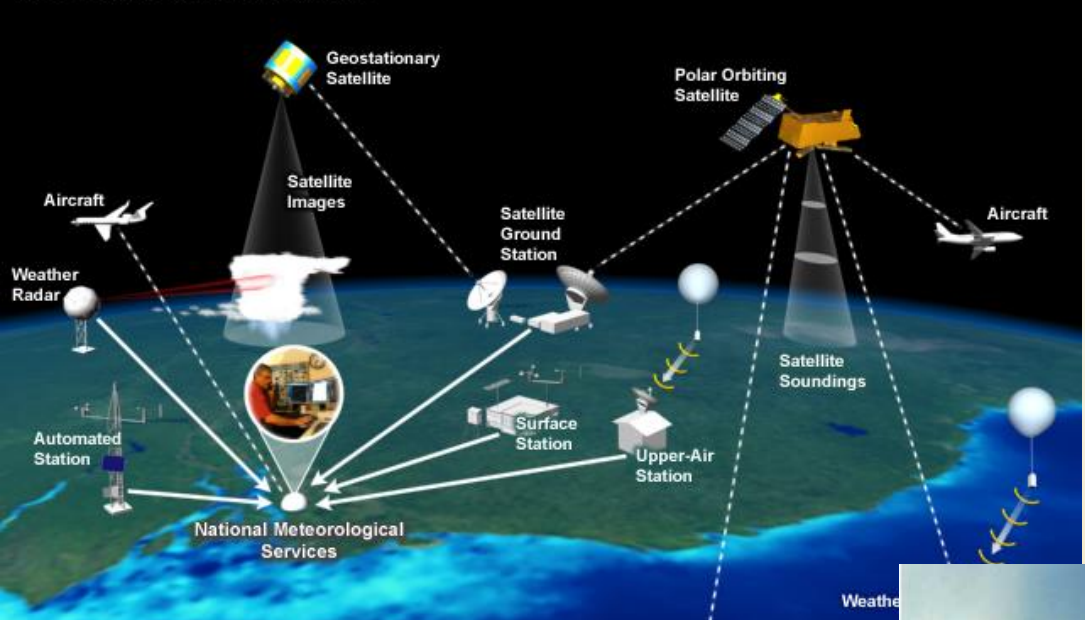


WIGOS Observing Systems

- Global Observing System (WWW/**GOS**)
- Observing component of Global Atmospheric Watch (**GAW**)
- WMO Hydrological Observations (including **WHYCOS**)
- Observing component of Global Cryosphere Watch (**GCW**)



WMO Global Observing System



Why WIGOS?

- ***Challenges – how to response to:***
 - Disasters (multi-sector, multi-hazard, multi-disciplinary)
 - Climate change
 - Resource pressures and accountability
- ***Advances (scientific and technical):***
 - Observing technology (improvements & new)
 - Numerical modelling and data assimilation
 - Capacity to access and use observations in decision making



Why WIGOS?

- ***Shortcomings of the current situation:***
 - Obs. networks/systems not sustainable and stable,
 - Design and planning not coordinated,
 - Obs. standards not respected (lack of compliance),
 - DBs not integrated (inconsistent, not compatible) including those of metadata,
 - Considerable deficiencies in QMS (maintenance, ...),
 - Lack of qualified staff;
- Through coordinated **data sharing** and **networks/systems development**, Members will be better equipped to address existing deficiencies and to meet future challenges



Proposed Workplan for RA II WIGOS Project 2015-2017

(i) identifying and regularly documenting Region-oriented requirements for satellite data access and exchange **using the Regional Requirements Template (spreadsheet),**

~~(ii) addressing the deficiencies and challenges reported by RA II Members in response to the survey,~~ **address challenges by RA II members reported at AOMSUC and within RA II WIGOS CG; WMO plans global survey in 2016 – use the RA II response to identify challenges;**

(iii) preparation of satellite data users in RA II to the new generation of geostationary meteorological satellites (such as Himawari-8, FY-4A, GEO-KOMPSAT-2A), in line with the CBS-15 “Guideline for Ensuring User Readiness for New Generation Satellites”. The preparation should involve user training, guidance to upgrade processing software and hardware, information and tools, **(confirmed as a major priority)**

~~(iv) further improvement of the GTS and implementation of the WIS/WIGOS,~~ **including registration of satellite datasets in WIS catalogues, and population of Product Access Guide**

(v) establishment of a region-wide multi-hazard early warning system for Disaster Risk Reduction, **(important indeed, but arguably beyond the mandate and capability of the Group)**

(vi) invite Lao PDR to become a member of the RA II WIGOS Project, given the emerging interest in utilization of satellite data in this country. **(Lao PDR invited in 2013, with no response; other countries with satellite receiving equipment should also be invited)**

~~(vii) issuance of newsletters for RA II members~~ **(to continue but seek feedback on utility).**



Proposed Workplan for RA II WIGOS Project 2015-2017

(ix) Hold annual meetings with AOMSUC; co-coordinators to organize 2 inter-sessional teleconferences



Workplan for RA II WIGOS Project 2013-2015

- (i) identifying and regularly documenting Region-oriented requirements for satellite data access and exchange,
- (ii) addressing the deficiencies and challenges reported by RA II Members in response to the survey,
- (iii) preparation of satellite data users in RA II to the new generation of geostationary meteorological satellites (such as Himawari-8, FY-4A, GEO-KOMPSAT-2A), in line with the CBS-15 “Guideline for Ensuring User Readiness for New Generation Satellites”. The preparation should involve user training, guidance to upgrade processing software and hardware, information and tools,
- (iv) further improvement of the GTS and implementation of the WIS/WIGOS,
- (v) establishment of a region-wide multi-hazard early warning system for Disaster Risk Reduction,
- (vi) invite Lao PDR to become a member of the RA II WIGOS Project, given the emerging interest in utilization of satellite data in this country. All efforts should be taken to ensure that all RA II Members have the opportunity to contribute to the Project, and
- (vii) issuance of newsletters for RA II members.



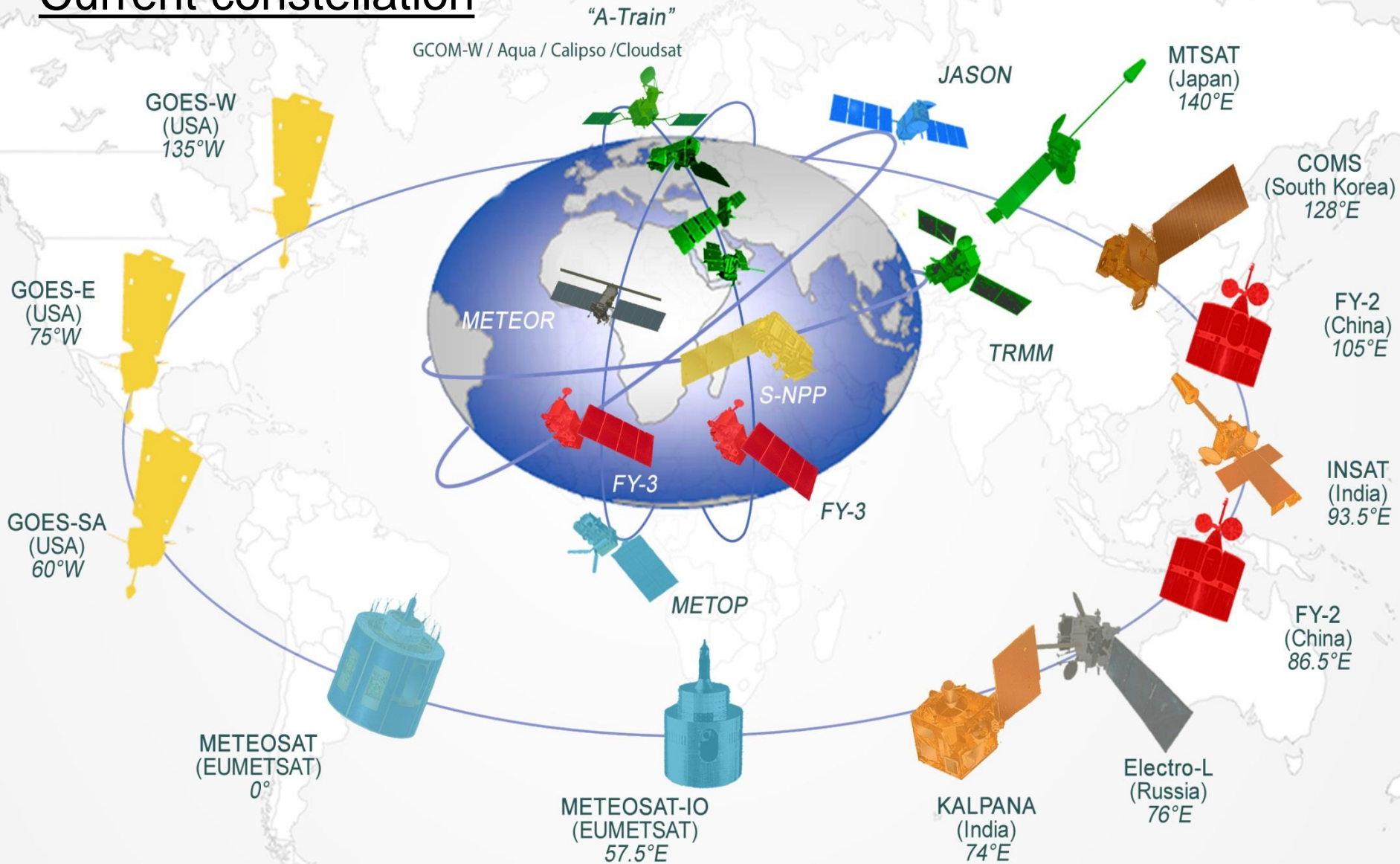
Ensuring satellite user readiness

- **PREPARING USERS TO NEXT-GENERATION SATELLITES**
- **OPERATIONAL BY 2015-2020 AND BEYOND**
- **Himawari-8 first GEO of its kind**

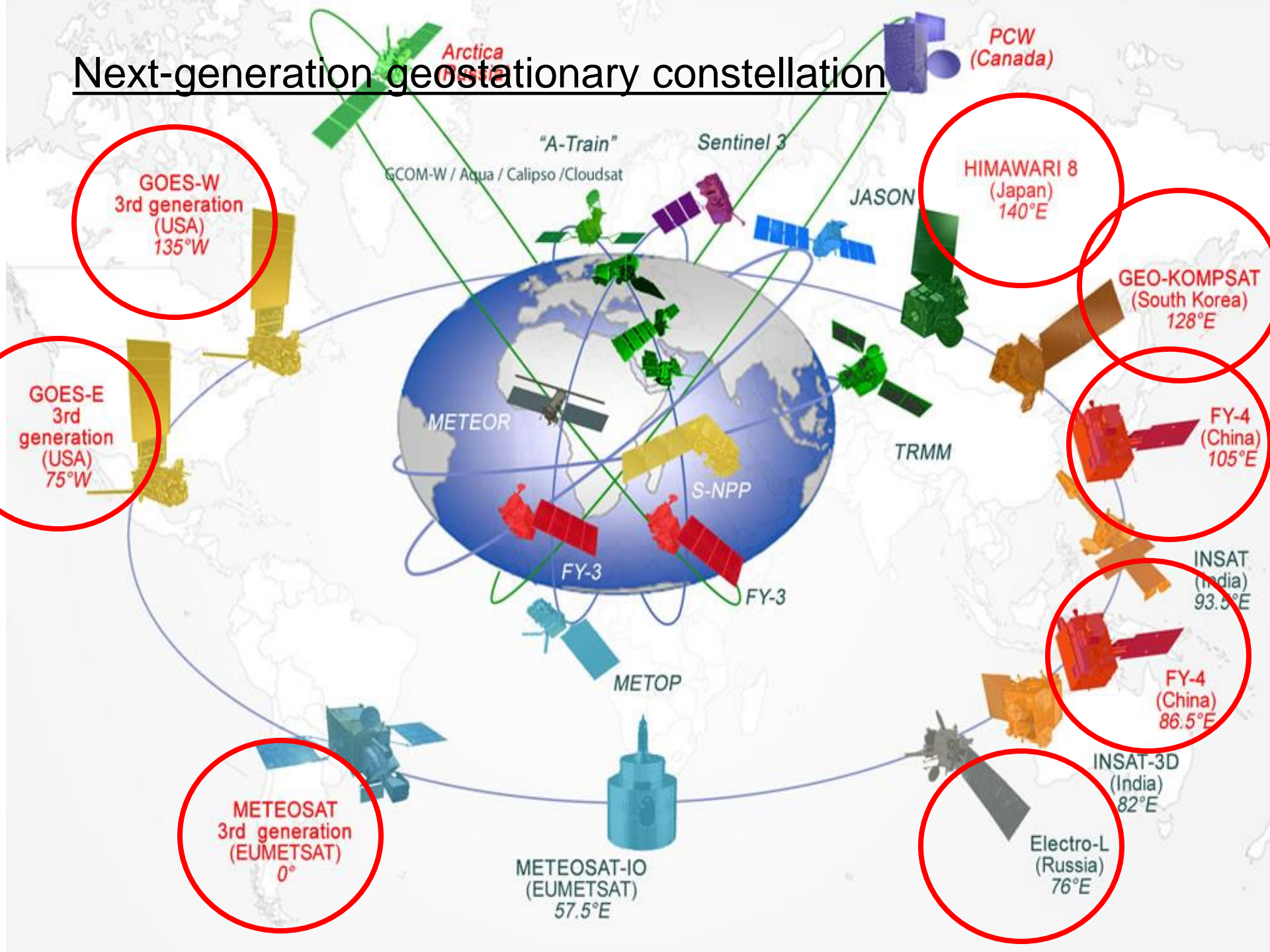


Ensuring satellite user readiness

Current constellation



Next-generation geostationary constellation

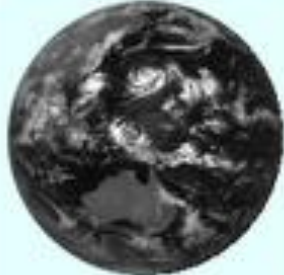






Enhancement of Himawari-8/9's observation function over that of MTSAT-1R/2

Higher spatial resolution

MTSAT-1R/2	Himawari-8/9
VIS 1km	VIS 0.5 - 1km
	NIR 1 - 2km
IR 4km	IR 2km

More spectral bands

	MTSAT-1R/2	Himawari-8/9
VIS	1 band (black/white image)	3 bands (color image)
		
NIR	N/A	3 bands
		
IR	4 bands	10 bands
		
	5 bands	16 bands

More frequent observation

Full disk observation with 10-minute intervals

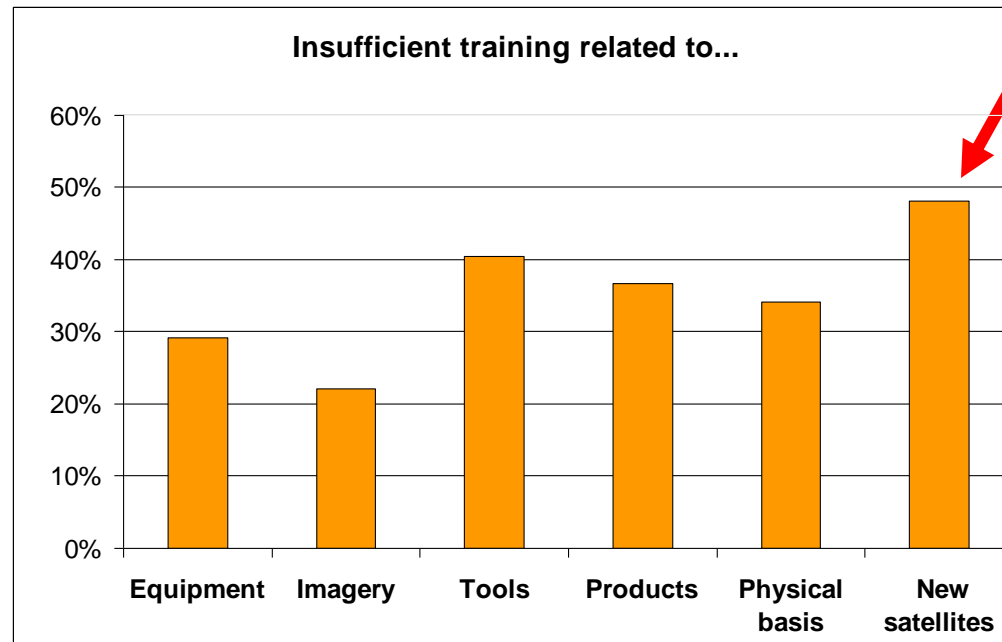


Rapid scan observation **New**
Every **2.5 minutes** around Japan



Ensuring satellite user readiness

- Many Members report they are insufficiently prepared to the new generation of meteorological satellites



- Source: WMO 2012 Satellite User Survey - 227 responses from 95 countries



Ensuring satellite user readiness

- Formal basis

Resolution 37 (WMO Congress-17): Preparation for New Satellite Systems

- New satellite systems offer the possibility for significant enhancements of products and services delivered by Members,
- Ingest of new satellite data in operational schemes has major impact on user infrastructure, systems, applications and services, and generally requires coordinated actions at the scientific, technical, financial, organizational and educational levels,
- Timely and careful preparation is essential to avoid disruption of operations upon transition to a new system and to take best advantage of the new capabilities
- Next generation of both geostationary and low-Earth orbit satellites (Himawari-8, FY-4A, GEO-KOMPSAT-2A, Elektro-L N2; FY-3E, JPSS-1, EPS-SG)



Ensuring satellite user readiness

- Formal basis (2)

Resolution 37 (WMO Congress-17): Preparation for New Satellite Systems

- Urges the satellite operators to provide regular and timely updates on their new systems through appropriate means and in particular through inputs to SATURN and OSCAR;
- Requests the CBS (incl. IPET-SUP), the regional associations, through their appropriate expert groups on satellite data access and exchange [..] to take appropriate actions in collaboration with satellite operators in order to raise awareness among Members and to facilitate a seamless transition to the exploitation of the new satellite systems



Ensuring satellite user readiness

- Formal basis (3)

VLab Strategy [2015-2019](#) approved by WMO and CGMS

- Identified as one strategic driver the introduction of the new generation of satellites, with new data types and products as well as new dissemination systems
- for the design of training events, such as the
- [ONLINE VLAB EVENT WEEK](#)
[“Preparing for Next Generation of Satellite Imagery”](#)
[on 16-20 November 2015](#)

