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WMO Space Programme Update - Importance of RAII Satellite User Mechanism and Work Plan

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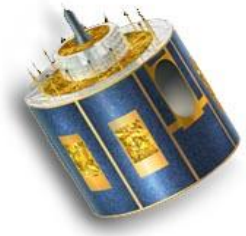
3rd Meeting of the Coordinating Group for the
RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training

Tokyo, Japan, 14 Nov 2015

WMO Space Programme : a joint undertaking



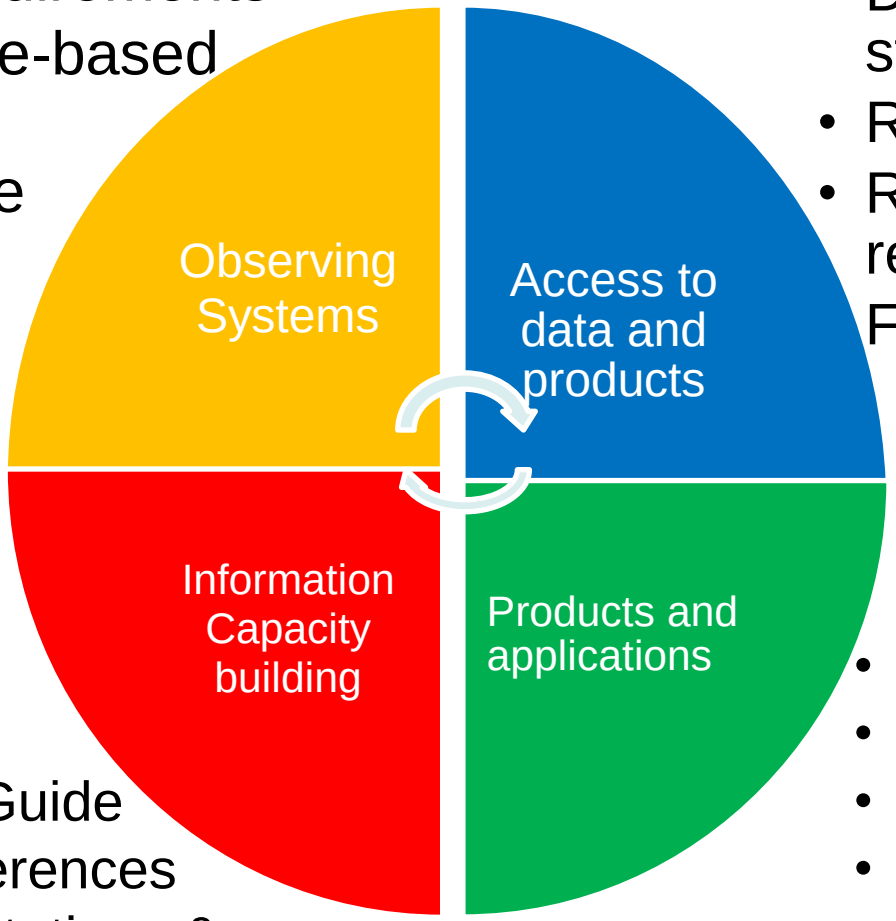
For satellite operators
to contribute to the global picture in a cost-effective way,
to meet their goals to serve users

Provide a framework for dialogue, develop a shared vision, foster interoperability, share best practices & resources

For users in 191 WMO Members
to consolidate their requirements,
to be informed and trained to take advantage of satellite systems

Activities: For Earth Observation and Space Weather

- Observing requirements
- Vision of space-based system
- OSCAR/Space
- Gap analysis
- Calibration



- Data access strategy
- RARS (DBNet)
- Regional data requirements
Frequencies

- VLab
- User Readiness SATURN
- Product Access Guide
- Sponsoring conferences
- Address user limitations & challenges

- SCOPE-CM
- SCOPE-NWC
- Polar STG
- IxWG

WMO Space Programme 2015 Highlights (1)

- Initial discussions on a Vision of WIGOS/Space in 2040
- OSCAR updates (http:oscar.wmo.int)
  - instrument status, actual dates, link to calibration and events
  - expert system being developed for gap analysis
  - OSCAR/Surface being developed by MeteoSwiss
- GSICS in progress (now 10 years)
  - VIS/NIR lunar and DCC calibration in good progress
  - GSICS Quarterly Newsletter
  - User requirements (On-going)
- Preparation for new satellite generations: SATURN (http://www.wmo-sat.info/satellite-user-readiness/)
- Updated Satellite Data Dissemination Strategy
  - Guide to DBNet

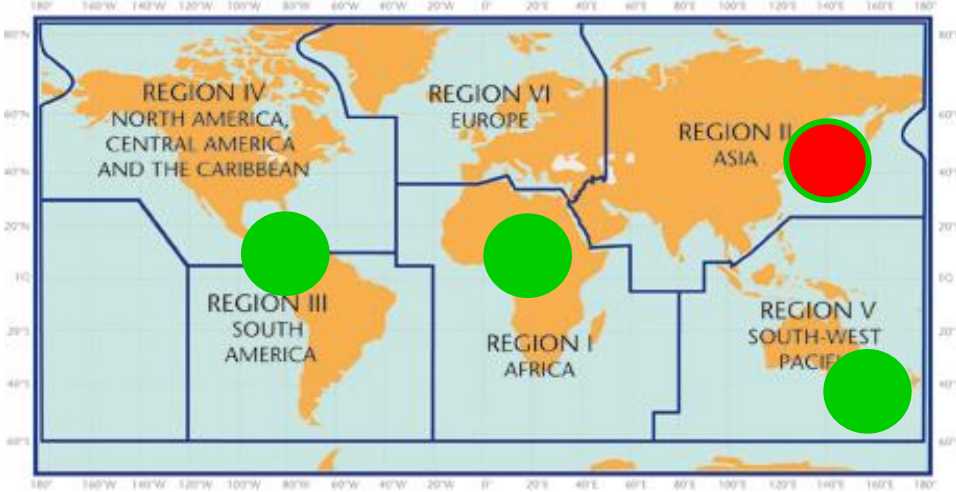
WMO Space Programme 2015 Highlights (2)

- Global Framework for Climate Services
  - Case studies for a climate monitoring architecture (New!)
- Other applications
  - Volcanic ash detection algorithm intercomparison
  - Nowcasting pilot projects (SCOPE Nowcasting – RA II focus on Severe Weather Forecasting (SWFDP) and dust monitoring)
  - Climate monitoring products (SCOPE CM)
  - Cryosphere monitoring
- Regional groups for satellite data requirements
- Space weather
  - Congress decision to undertake global operational coordination
  - Ongoing work with ICAO

WMO Strategic Priorities 2015-2018 (Cg-17)

- DRR (improved impact-based forecasts and early warnings)
- Global Framework for Climate Services (GFCS)
- Implementation of observation/information systems (WIGOS/WIS)
- Aviation meteorological services
- Services in polar and high-mountain regions
- Capacity development
- Review of WMO governance

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:

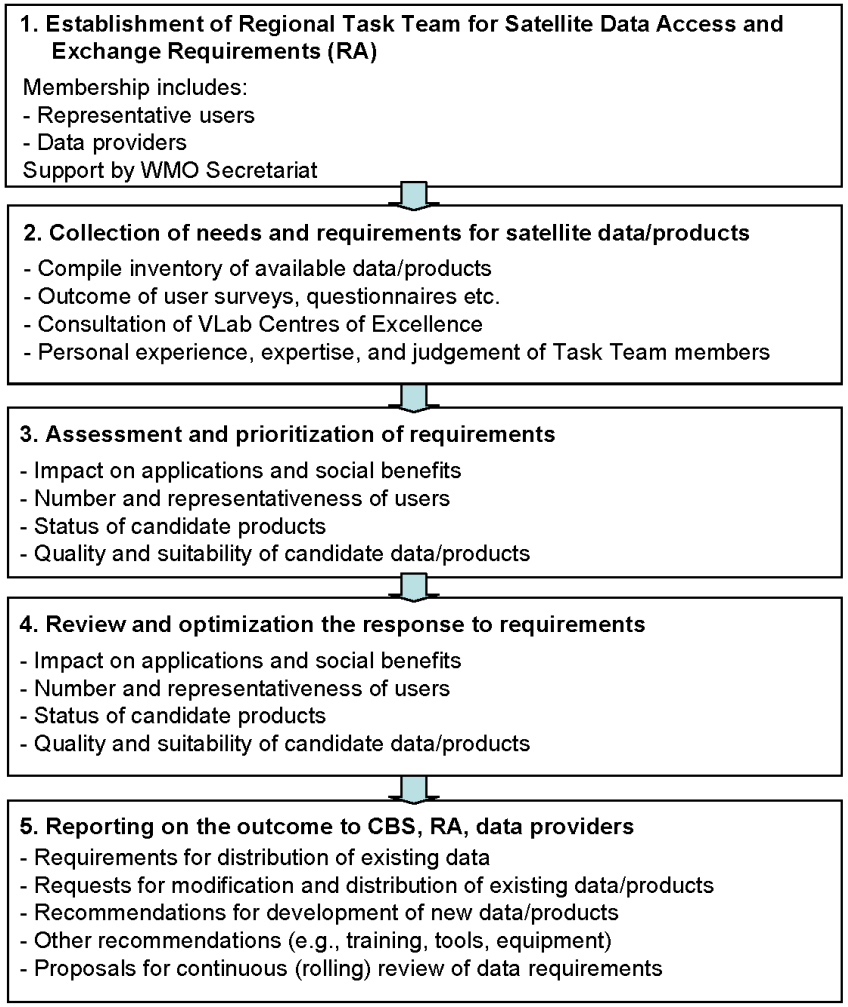
- Effective user-provider dialogue
- Defined format for expressing requirements
- Coordination of data distribution
- Identification of training needs
- Implementation of WIGOS/WIS

Enhancing satellite data utilization (2)

Formal basis for Regional user mechanism:

Recommendation 4.2/4 (CBS-15): Procedure for Documenting Regional Requirements for Satellite Data Access and Exchange

WMO Executive Council Resolution 12 (65th session): Regional Requirements for Satellite Data Access and Exchange



Enhancing satellite data utilization (3)

Formal basis for Tokyo Satellite Events:

- Recommendation 7.3 (CBS ET-SUP-7):

  Regional mechanisms fostering coordination of requirements for satellite data access and exchange should be strengthened by collocating, where possible:

  (i) region-based satellite user conferences;

  (ii) regional training events covering
  a. current and upcoming satellite systems,
  b. enabling users to utilize data from these systems,
  c. practical information on data access, visualization and analysis tools, and

  (iii) meetings of Regional Satellite Data Requirements Groups.

- AOMSUC-5 “Shanghai” Statement (ToR)

✓ AOMSUC-6

✓ Training Events 9, 13 Nov 2015

✓ 3rd RA II WIGOS CG Meeting

Enhancing satellite data utilization (4)

[Template for documenting Regional Requirements for Satellite Data Access and Exchange (xls spreadsheet):]

Information from satellite data providers

User Requirements (Priority, Latency etc)

	INFORMATION FROM PROVIDERS											USER REQUIREMENTS			
ID #	Data Provider	Data Characteristics	Format	Data Distribution	Geographical Area	Frequency	Size (kB)	Size Comment	Format Expected in the Future	FINAL Size (Compressed) kB	Societal Benefit Areas	Priority	Timeliness	Basic Application (Identified by User)	Specific Application (Detailed)
1	GOES Imagery														
1.7	NOAA NESDIS	GOES images, channel VIS, WV, IR, Resolution 4km Follows GOES East and West Schedules	LRIT	NOAA Low Rate Informa-tion Trans-mission Service	3AM (All routine and RSO Scan Sectors fm GOES East	Constant Broad-cast	2340	128 Kbps Constant Broadcast	HRIT/LRIT	N/A	☐DIS ☐WAT ☐BIO ☐HEA ☑WEA ☐ENE ☐ECO ☐CLI ☐AGR	◉High ○Medium ○Low ○Not Required	30 min	Image generation	Sectorized image generation for South America

	INFORMATION FROM PROVIDERS											USER REQUIREMENTS			
ID #	Data Provider	Data Characteristics	Format	Data Distribution	Geographical Area	Frequency	Size (kB)	Size Comment	Format Expected in the Future	FINAL Size (Compressed) kB	Societal Benefit Areas	Priority	Timeliness	Basic Application (Identified by User)	Specific Application (Detailed)
1.14	NOAA NESDIS	GOES West Visible	JPEG Image	WWW site	GOES East & West Foot-print	3 Hours	48	Example image	N/A	N/A	☐DIS ☐WAT ☐BIO ☐HEA ☐WEA ☐ENE ☐ECO ☐CLI ☐AGR	○High ○Medium ○Low ◉Not Required	15 min	Image generation	
											☐DIS ☐WAT ☐BIO ☐HEA ☐WEA ☐ENE ☐ECO ☐CLI ☐AGR	○High ○Medium ○Low ◉Not Required	15 min	Image generation	

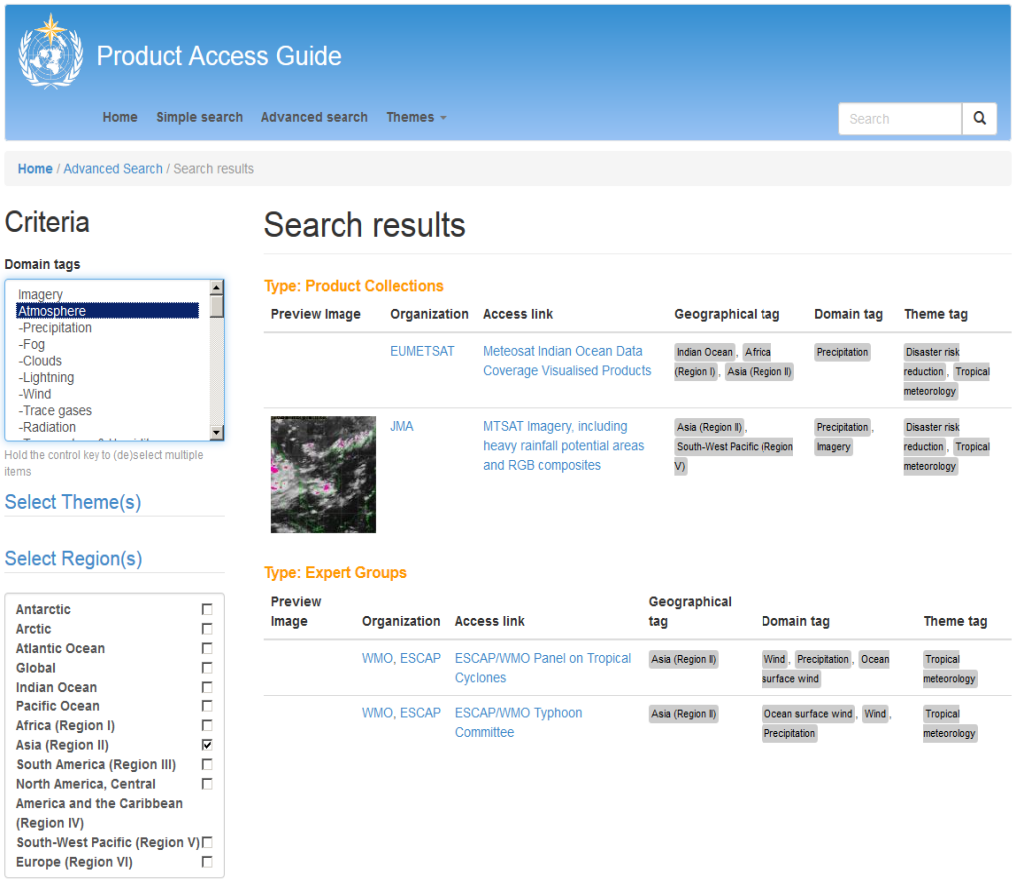
Enhancing satellite data utilization (5)

- 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 (RA II members: Hidehiko Murata (JMA), Fang Xiang (CMA))



RA II WIGOS Project: Online resources

- Project Website
  - Now 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

Contents

Background　Mission　Accomplishments　Work Plan for the Next Project Phase
Coordinating Group　Meeting　Newsletter　Survey Result

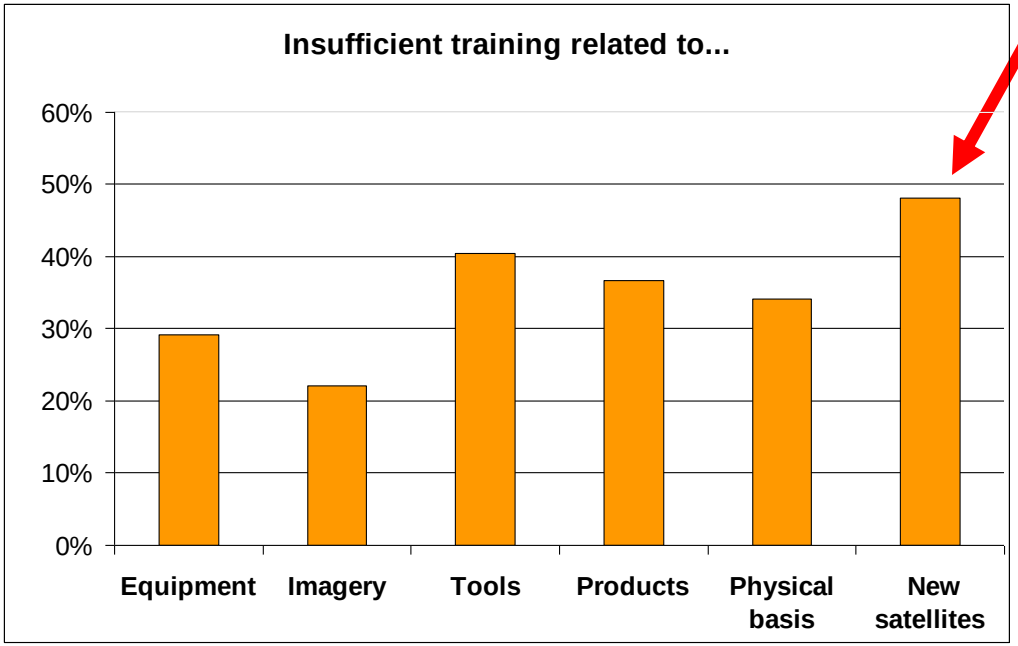
Background

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

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

- Identifed 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

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,

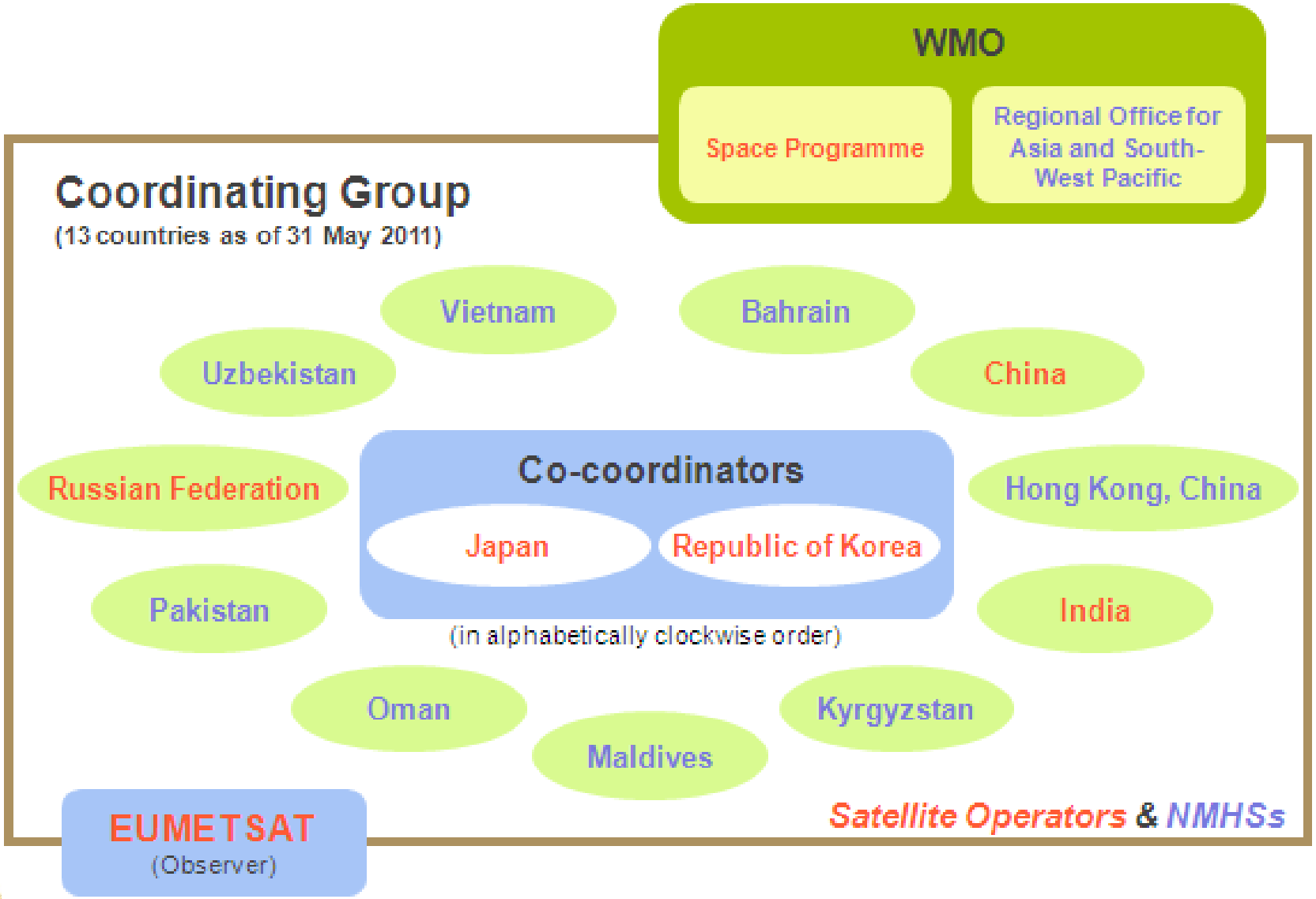
(iv) further improvement of the GTS and implementation of the WIS/WIGOS,

(v) establishment of a region-wide multi-hazard early warning system for Disaster Risk Reduction,

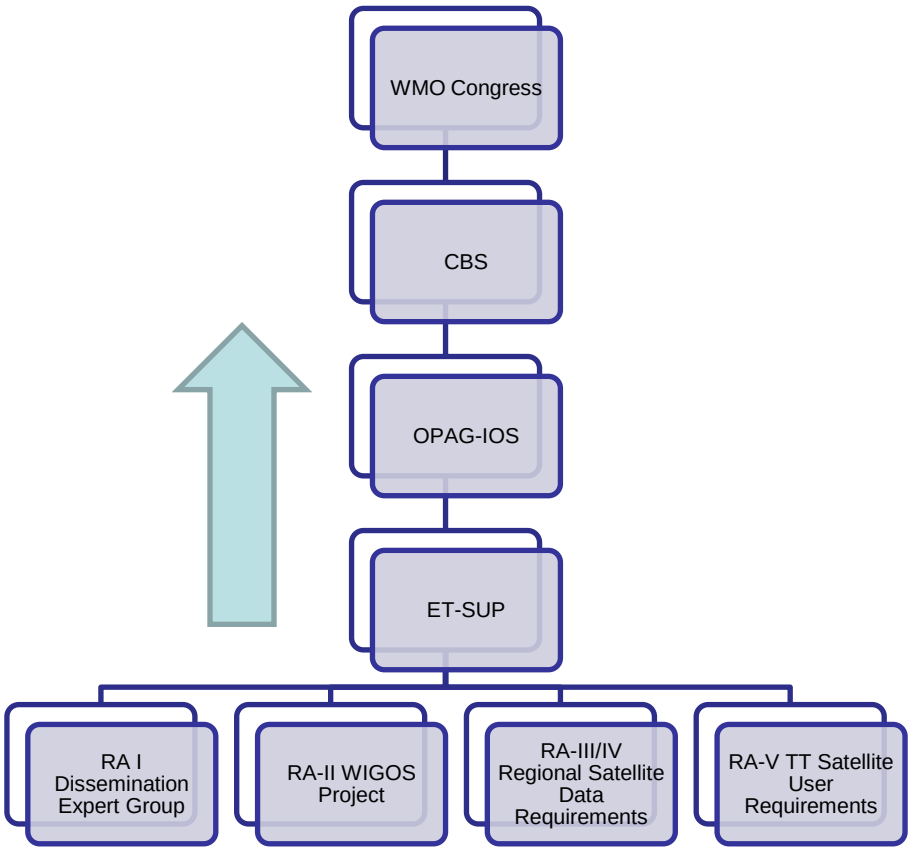
(vi) invite Lao PDR to become a member of the RA II WIGOS Project, given the emerging interest in utilization of satellite data in this country. All efforts should be taken to ensure that all RA II Members have the opportunity to contribute to the Project, and

(vii) issuance of newsletters for RA II members.

RA II WIGOS Project Coordination Group



Get Involved



- This can make data available at very low cost, real time, improve utilization, training
- Provides a channel of communication between user and data providers
- Provides the opportunity to have your products disseminated across the region.

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Thank you for your attention

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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

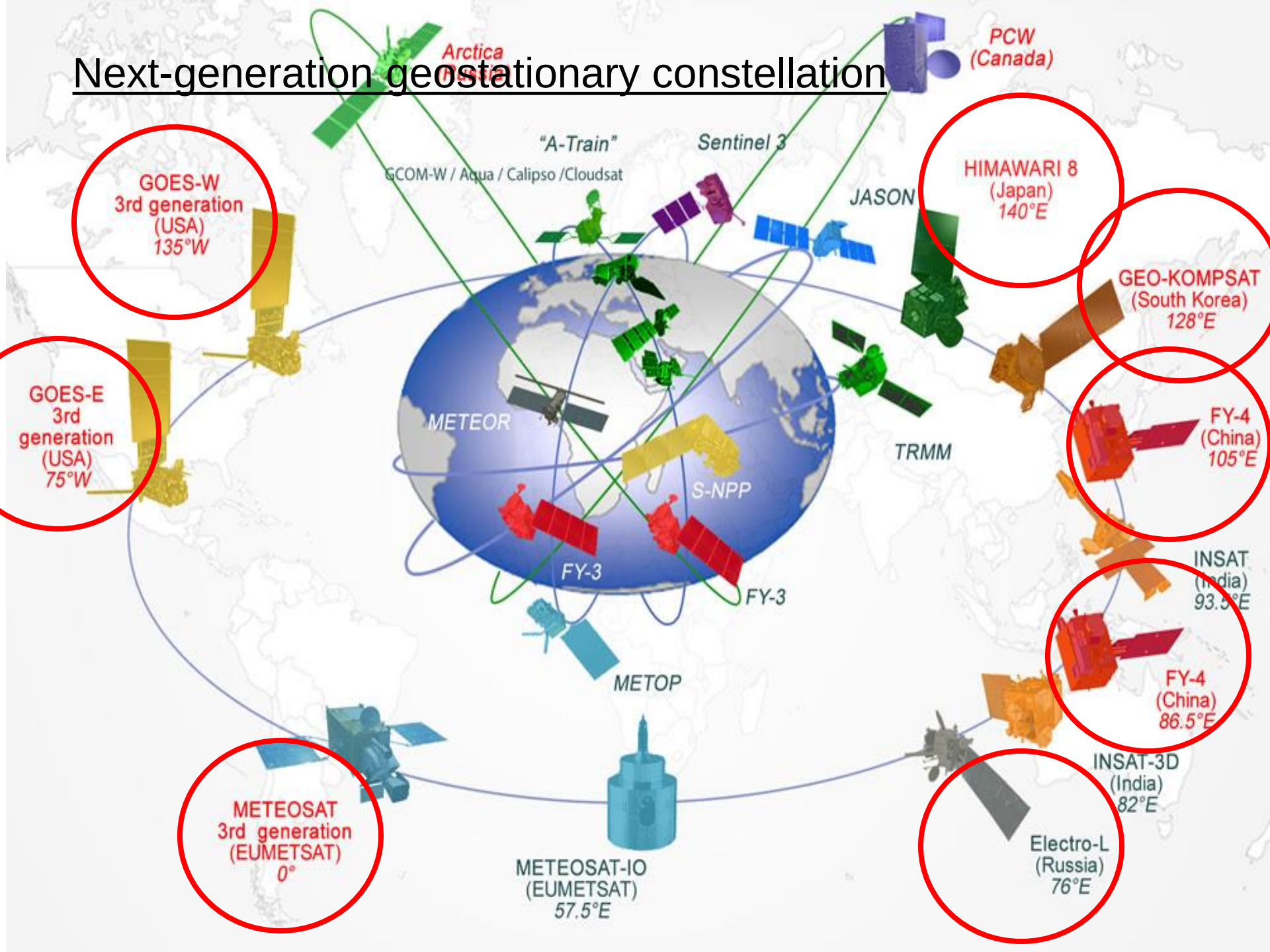
Ensuring satellite user readiness

- **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



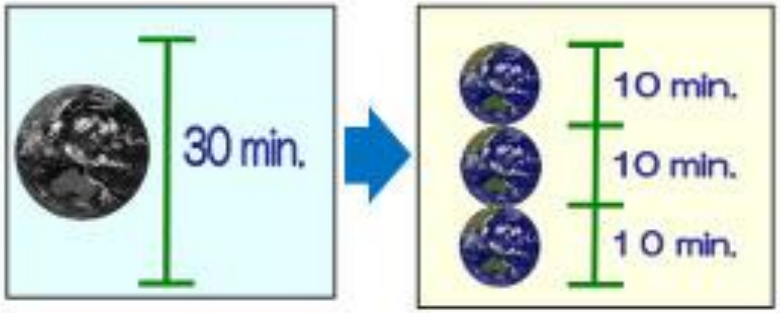
Enhancement of Himawari-8/9's observation function over that of MTSAT-1R/2

Higher spatial resolution

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

More frequent observation

Full disk observation with 10-minute intervals

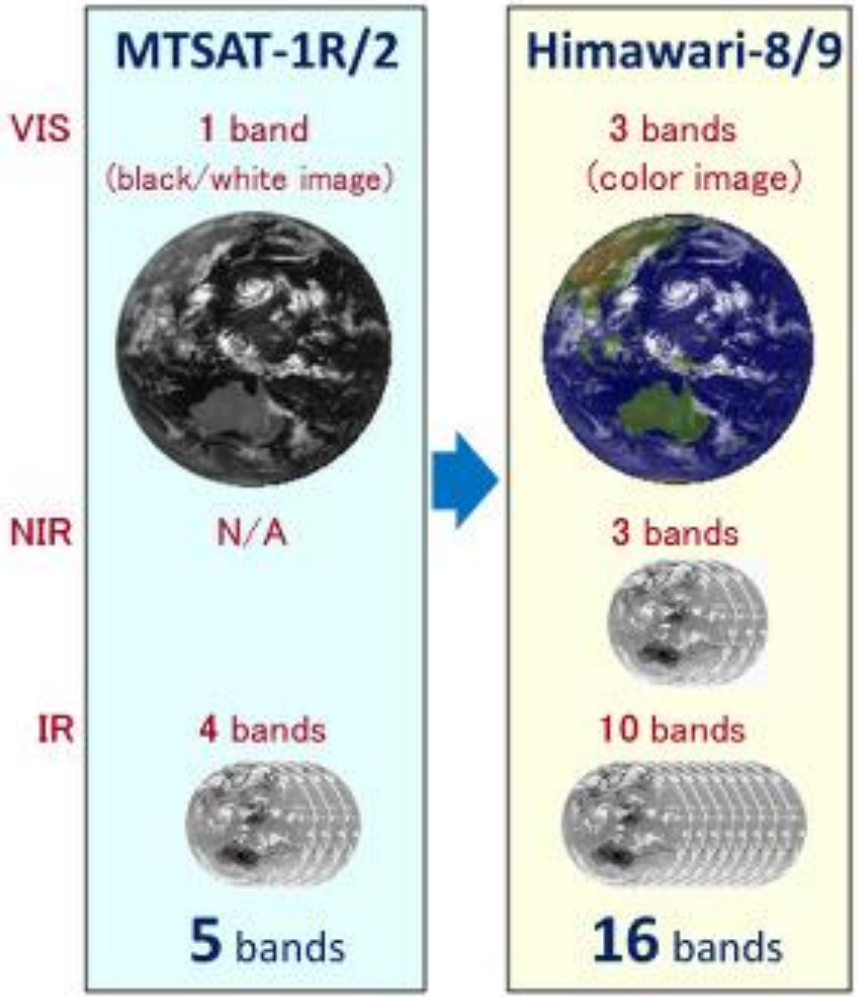


Rapid scan observation

New

Every **2.5** minutes around Japan

More spectral bands



BACKUP SLIDES

What is WIGOS?

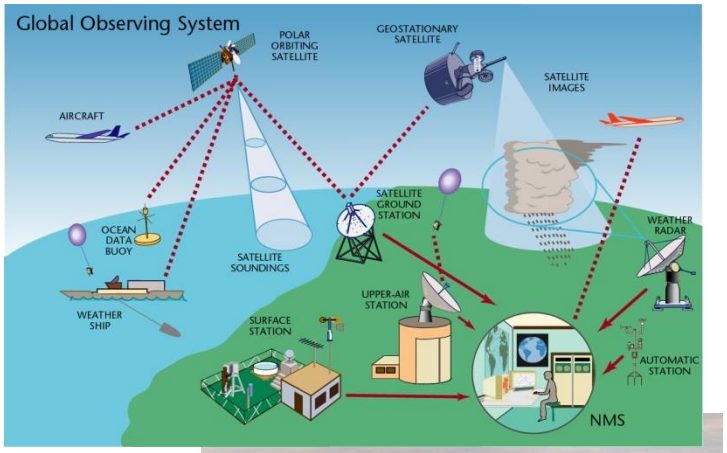
- An over-arching ***framework*** for the ***coordination and evolution*** of WMO observing systems and the contributions of WMO to co-sponsored observing systems;
- A WMO priority & a key contribution to ***GFCS***
- With WIS, a WMO contribution to ***GEOSS***;
- It is about doing more & better with 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.

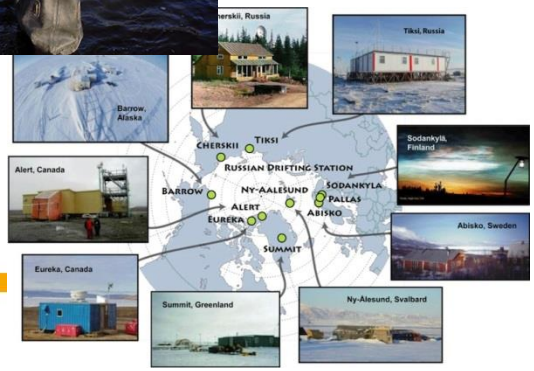
WIGOS Framework

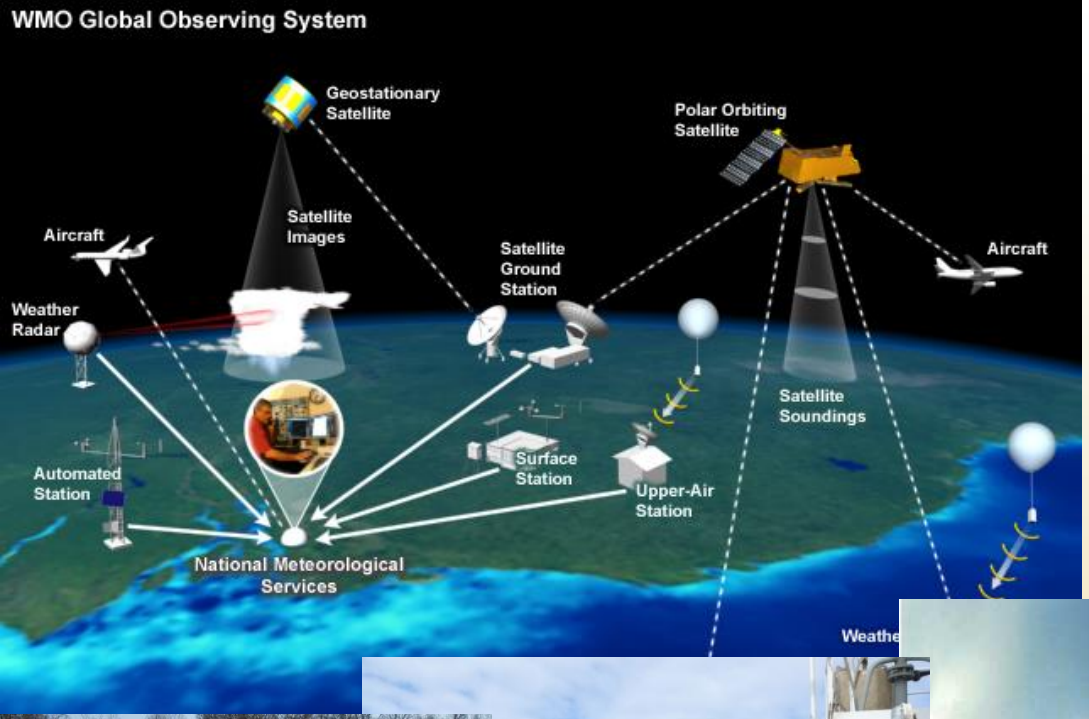
- At its simplest, the WIGOS framework is about:
  - ***Documenting and implementing*** standard and recommended practices and procedures in making and sharing observations,
  - ***Coordination and collaboration*** for efficiency and effectiveness,
  - ***Integration and interoperability*** in all senses,
  - ***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
Geostationary Satellite
Polar Orbiting Satellite
Satellite Images
Aircraft
Satellite Ground Station
Aircraft
Weather Radar
Satellite Soundings
Automated Station
Surface Station
Upper-Air Station
National Meteorological Services

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