WORLD METEOROLOGICAL ORGANIZATION

Weather – Climate - Water

WMO Information System (WIS)

Managing & Moving Weather, Water and Climate Information in the 21st Century

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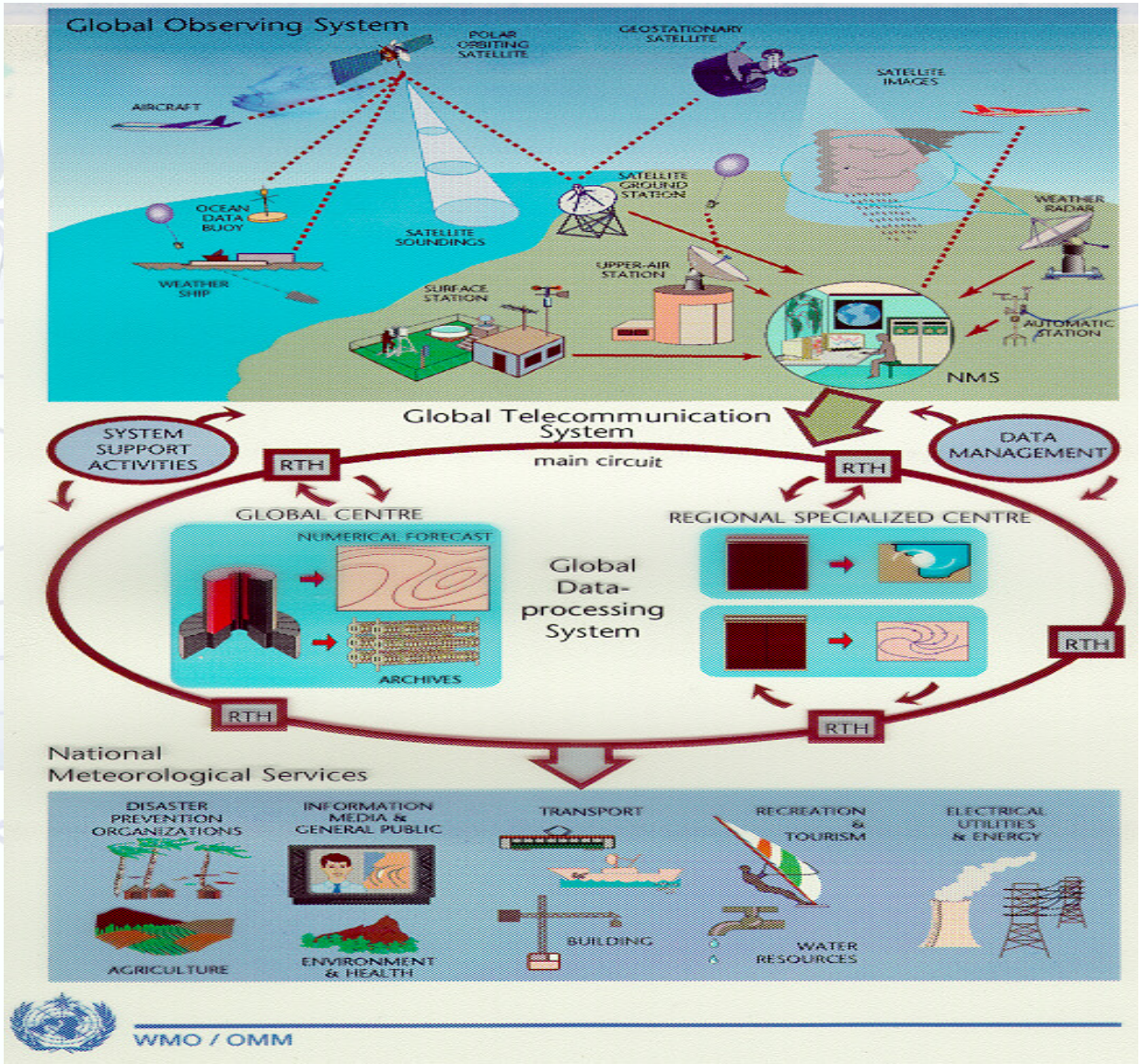
Acting Director, WMO Information System Branch
Observation and Information Systems

How Does the Global Operational Network of WMO Operate?



NMHSs of 187 countries contribute to Global Observing System every day

Global Telecommunication System- 32 Regional Tele-communication Hubs

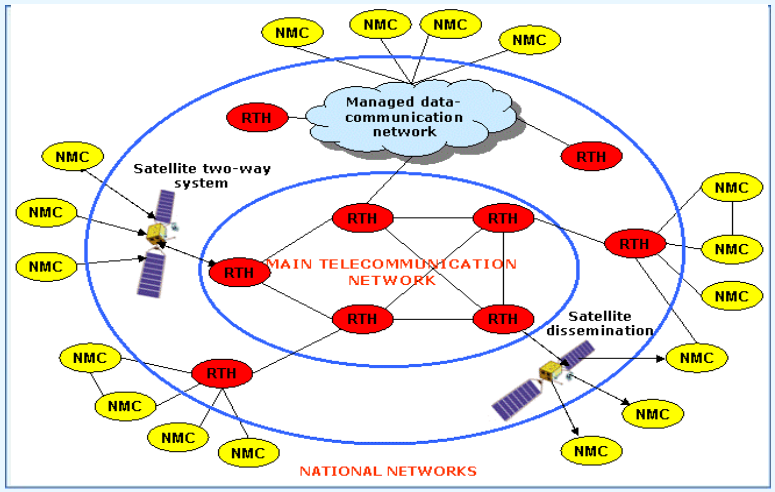
3 World Meteorological Centres

40 Regional Specialized Centers

NMHSs deliver data and early warning services

Current situation: GTS

WWW GTS



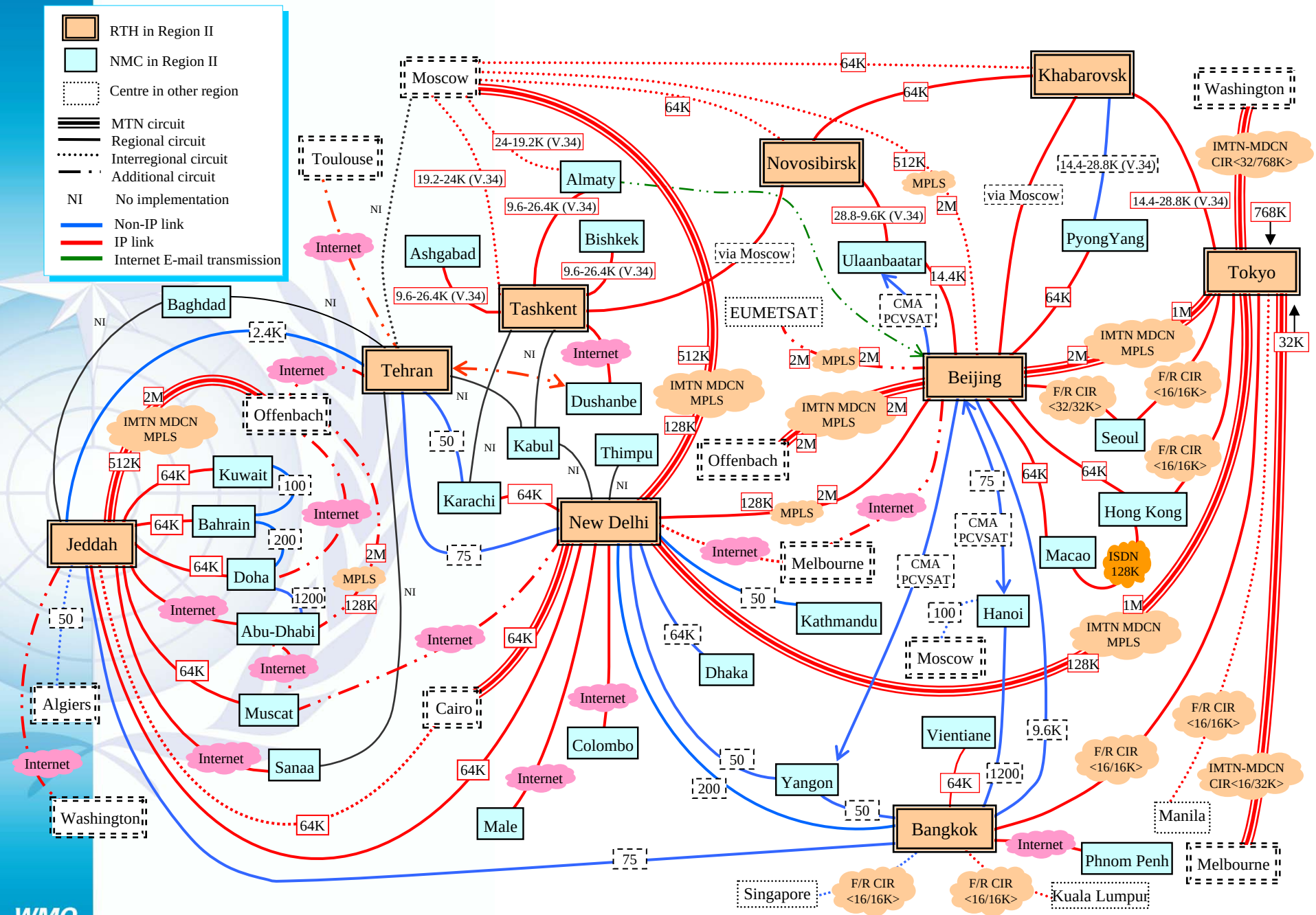
Regional/Specialized Meteorological Centres

Meteorological and R&D Satellite Operator Centres

interconnects

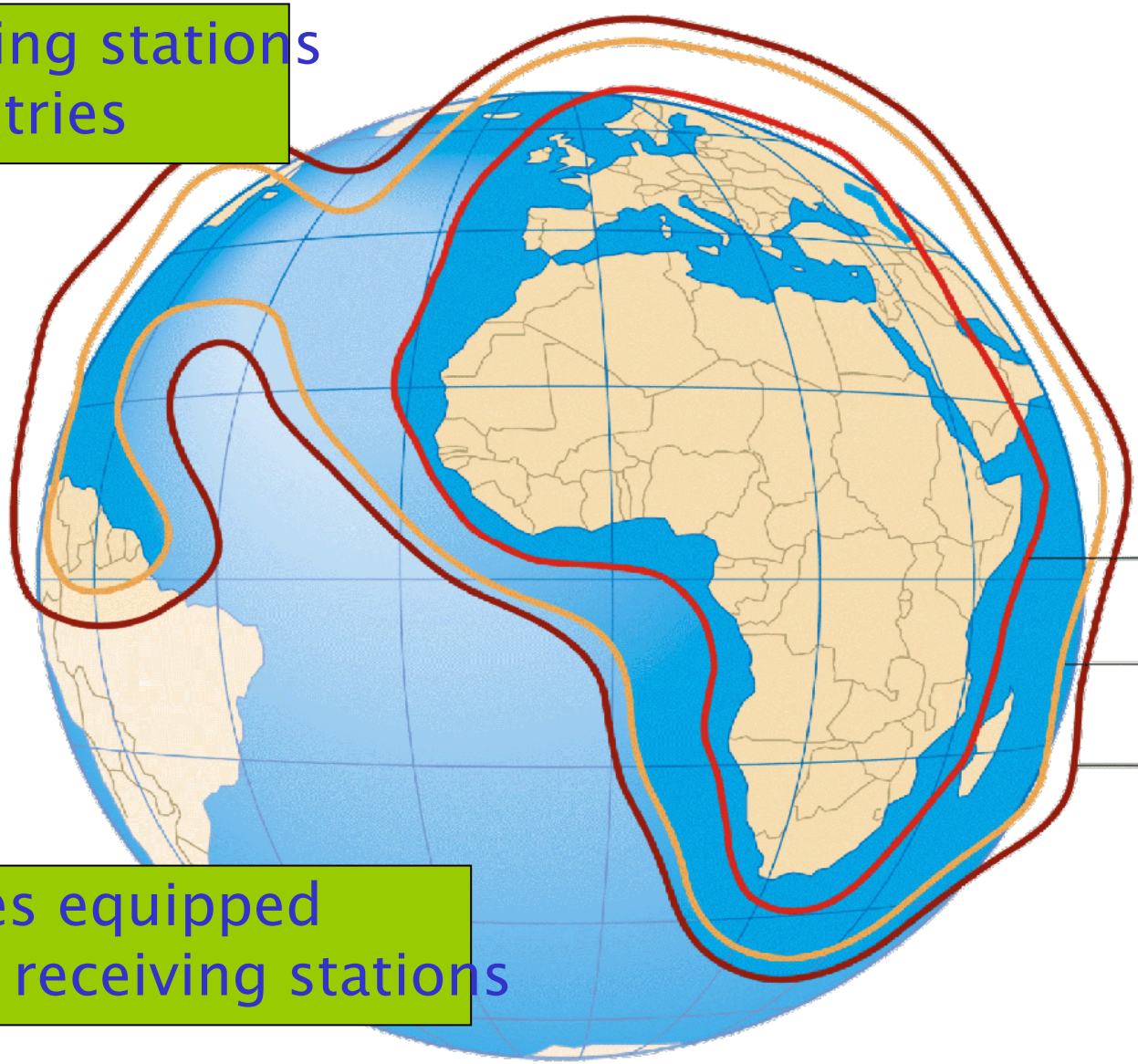
National Meteorological Centres

World Meteorological Centres


RTH in Region II
NMC in Region II
Centre in other region
MTN circuit
Regional circuit
Interregional circuit
Additional circuit
NI No implementation
Non-IP link
IP link
Internet E-mail transmission
Moscow
Khabarovsk
Washington
Toulouse
Novosibirsk
Almaty
Ashgabad
Bishkek
Ulaanbaatar
PyongYang
Tokyo
Baghdad
Tashkent
Tehran
Dushanbe
Beijing
Offenbach
Kabul
Thimpu
Karachi
New Delhi
Seoul
Hong Kong
Macao
Kuwait
Bahrain
Jeddah
Doha
Abu-Dhabi
Muscat
Sanaa
Algiers
Cairo
Colombo
Male
Dhaka
Kathmandu
Melbourne
Hanoi
Vientiane
Yangon
Bangkok
Phnom Penh
Manila
Singapore
Kuala Lumpur
Internet
EUMETSAT
via Moscow
CMA PCVSAT
IMTN MDCN MPLS
IMTN-MDCN CIR<32/768K>
IMTN-MDCN CIR<16/32K>
F/R CIR <32/32K>
F/R CIR <16/16K>
ISDN 128K
MPLS
64K
512K
2M
1M
768K
32K
14.4K
14.4-28.8K (V.34)
28.8-9.6K (V.34)
24-19.2K (V.34)
19.2-24K (V.34)
9.6-26.4K (V.34)
9.6K
2.4K
1200
200
100
75
50
NI

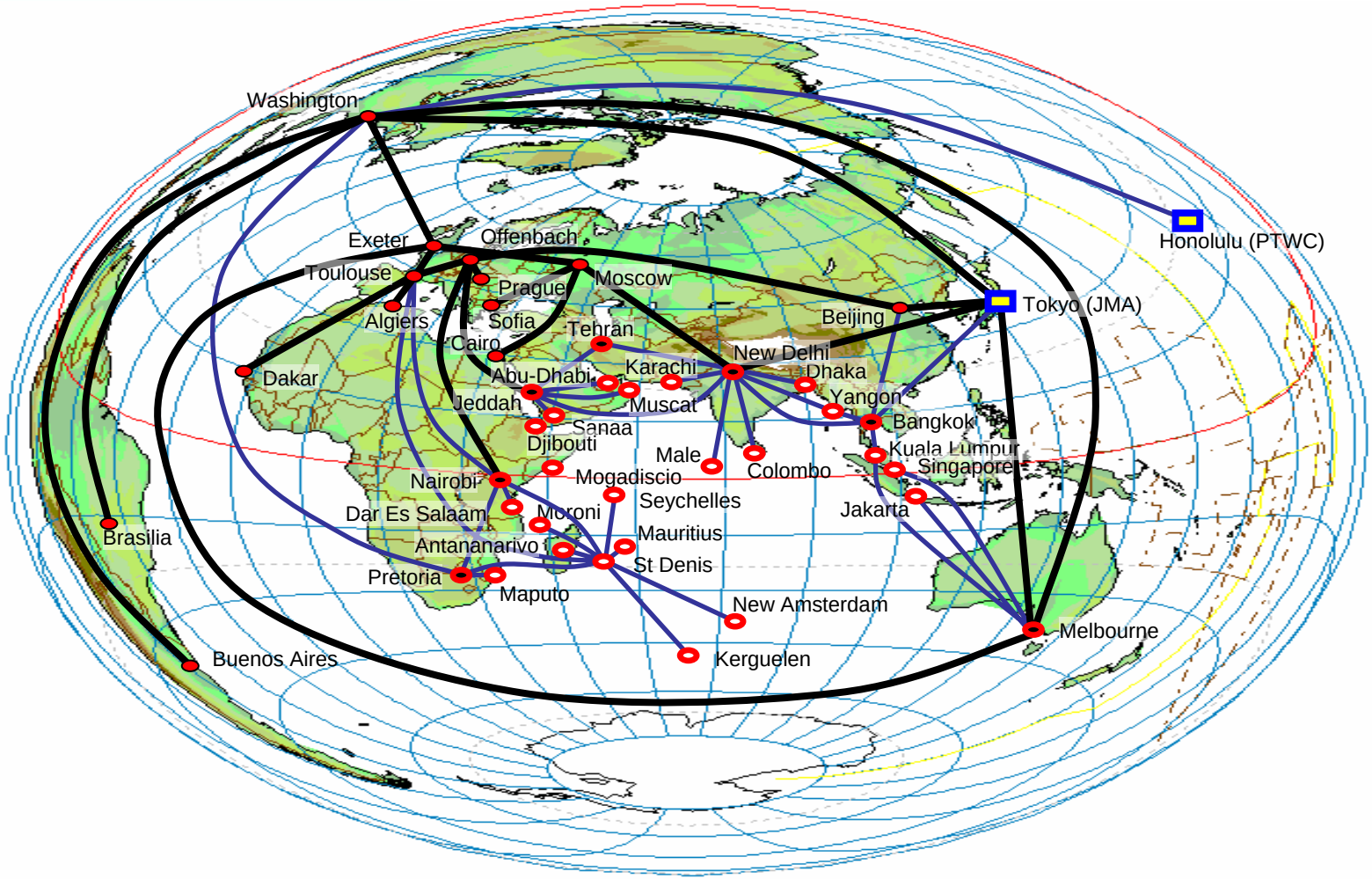
Satellite-based data-distribution systems: e.g. coverage of RETIM-Africa, EUMETCast

38 RETIM receiving stations in 18 RA I Countries



All RA I Countries equipped with EUMETCast receiving stations

Use of GTS for dissemination of Interim Tsunami Watch Information (TWI) for the Indian Ocean issued by Honolulu (PTWC) and Tokyo (JMA)



Tsunami Watch Information center

National Meteorological Center in the Indian Ocean Rim

WMO's Action Plan for a Fully Operational GTS for the IOTWS

Step 1 - Multidisciplinary workshop (Jakarta, March 2005) – Completed

Step 2 - GTS operational arrangements & tests for interim TWS – Completed

Step 3 - WMO Expert missions to NMHSs – Completed

Step 4 - Implementation of upgrade to NMHSs' GTS capabilities - Completed

Step 5 - WMO Training on GTS operations - Completed

Step 6 – Regional operational tests – Current quarterly tests of tsunami advisories distribution by JMA Tokyo

WMO Information System (WIS)

WMO Congress decided:

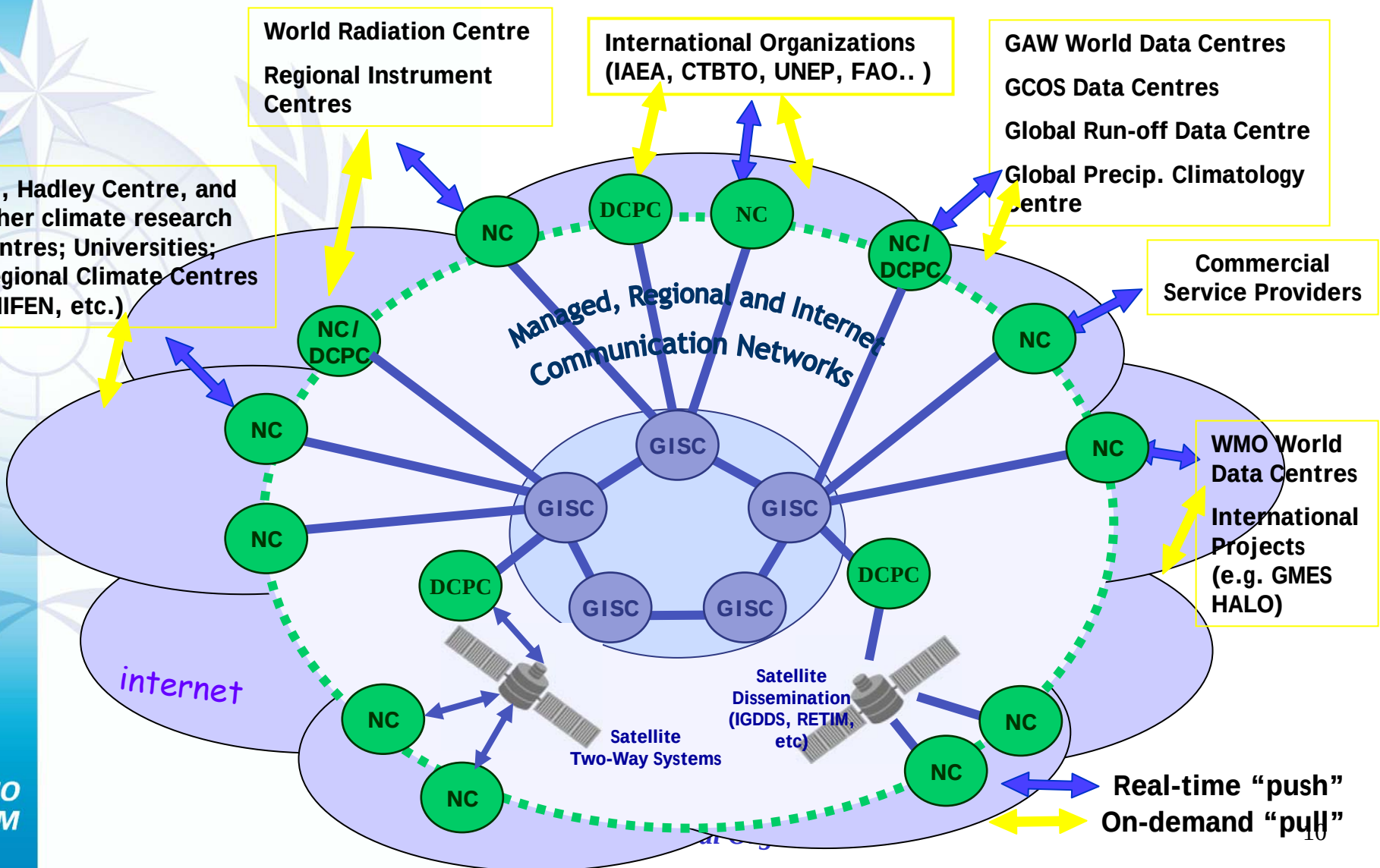
- *An over-arching approach for solving data management problems for all WMO and related international programmes*
- *A **single**, coordinated global infrastructure, **the WMO Information System (WIS)** for the collection and sharing of information*

WIS Vision

Integrated approach for all WMO Programmes

- **Routine collection and dissemination of time-critical and operation-critical data and products:**
  - Real-time "push" through dedicated telecommunication
- **Data Discovery, Access and Retrieval service:**
  - "Pull" through the Internet (HTTP, FTP,…)
- **Timely delivery of data and products:**
  - Delayed mode "push" through dedicated telecommunication means and public data networks, especially the Internet
- **Unified procedures**
  - More efficient data exchange
- **Coordinated and standardized metadata**
  - Interoperability between programmes
  - Improved data management
  - ISO 191xxx series for geographic information

WIS


World Radiation Centre
Regional Instrument Centres
International Organizations (IAEA, CTBTO, UNEP, FAO..)
GAW World Data Centres
GCOS Data Centres
Global Run-off Data Centre
Global Precip. Climatology Centre
IRI, Hadley Centre, and other climate research centres; Universities; Regional Climate Centres (CIIFEN, etc.)
Commercial Service Providers
Managed, Regional and Internet Communication Networks
NC
DCPC
NC/ DCPC
GISC
WMO World Data Centres
International Projects (e.g. GMES HALO)
internet
Satellite Two-Way Systems
Satellite Dissemination (IGDDS, RETIM, etc)
Real-time "push"
On-demand "pull"

WIS brings new features and opportunities

- Common information exchange standards, functions and services for all WMO programmes
- Inter-disciplinary discovery, retrieval and exchange of information in real-time and non-real time
- Inter-operability through on-line catalogues using metadata based on ISO 19100 (geographic information standard)
- Industry standards and off-the-shelf hardware and software systems to ensure cost-effectiveness and compatibility

What will a NMHS gain from the WIS?

1. ***Improved forecasting/warning services***
   - Faster and more cost-effective exchange of operation-critical information;
2. ***Improved and expanded range of services***
   - Discovery and access to new data and products:
     - Satellite data and products, ensemble prediction products, climate predictions, oceanographic data and products, operational, and research data and products, reports, publications
3. ***Strengthened role as national service provider***
   - Ability to "push" to national users critical information:
     - Warnings, advisories, selected measurements, etc.; (eg: national agencies dealing in disaster mitigation, agriculture, energy and water management,)
4. ***Better appreciation by partner agencies***
   - Supports their "pulling" relevant information from WMO

Structure of WIS

Functional centres:

- National Centres (NC)
- Global Information System Centres (GISC)
- Data Collection or Production Centres (DCPC)

and

- Data communication networks

WIS concerns only information exchange and data management functions

Structure of WIS

Functional centres interconnected by data communication networks:

- **National Centres (NC)**
  - Links national data providers and users to regional and global data exchange nodes, and administrates access to WIS
- **Data Collection and Production Centres (DCPC)**
  - Provides for regional and international exchange of WMO programmes' data and products
  - Supports data and information push and pull
- **Global Information System Centres (GISC)**
  - Provides for global exchange of data and products
  - Collects and provides metadata for all data and products
  - Supports data and information discovery and pull

WIS, a key issue: interoperability

Interoperability enables the discovery, the retrieval and the usage of the data

- ✓It needs the development and the implementation of relevant Metadata standards
- ✓Development of a WMO Metadata Profile of the ISO 191xx series for geographic information

WIS SERVICES

WIS provide three types of services to meet the different requirements:

(1) Routine collection and dissemination service for time-critical and operation-critical data and products:

Based on real-time "push" mechanism (incl. Multicast); implemented essentially through dedicated telecommunication means with guaranteed quality of service, e.g. leased circuits, dedicated data communication network services and satellite-based data-distribution systems;

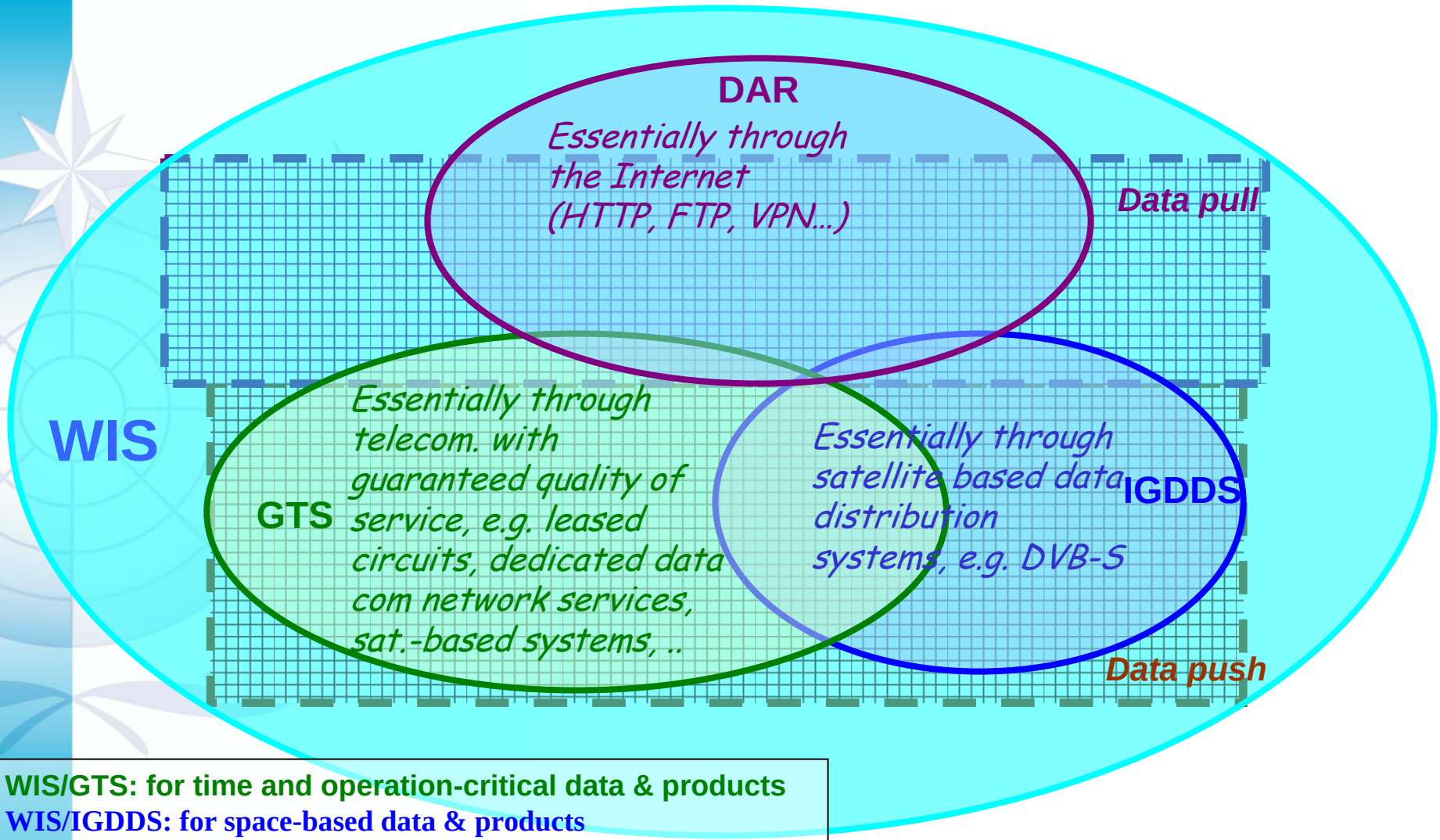
(2) Data Discovery, Access and Retrieval service:

Based on request/reply "pull" mechanism with relevant data management functions; implemented essentially through the Internet (HTTP, FTP,…);

(3) Timely delivery service for data and products:

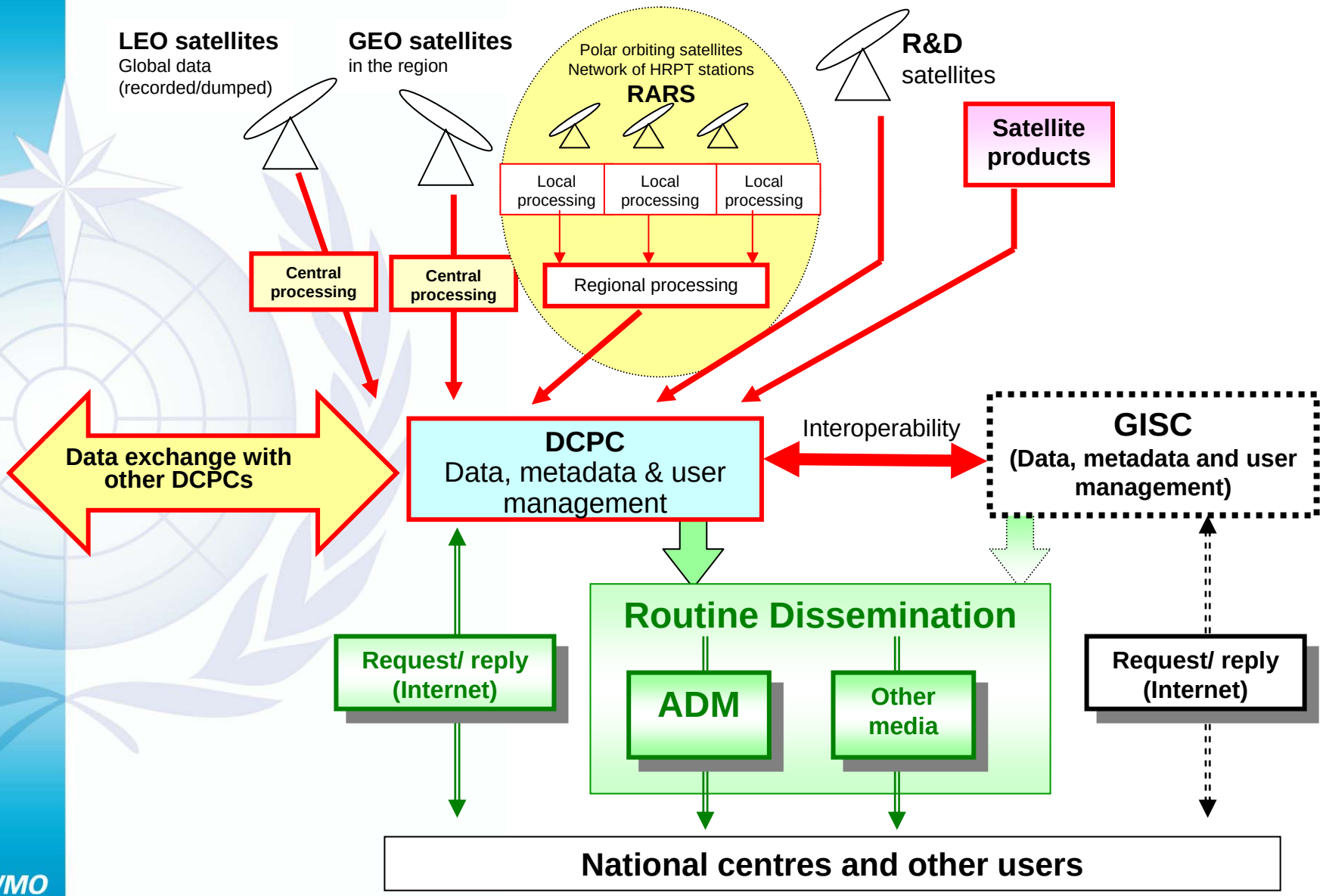
Based on delayed mode "push" mechanism; implemented through a combination of dedicated telecommunication means and of public data networks, especially the Internet.

WIS DATA-COMMUNICATIONS IMPLEMENTATION
(for weather, water, climate and related data and products)



WIS/GTS: for time and operation-critical data & products
WIS/IGDDS: for space-based data & products
WIS/DAR: data discovery, access and retrieval
Data push: routine distribution of data & products
Data pull: access to and retrieval of data & products

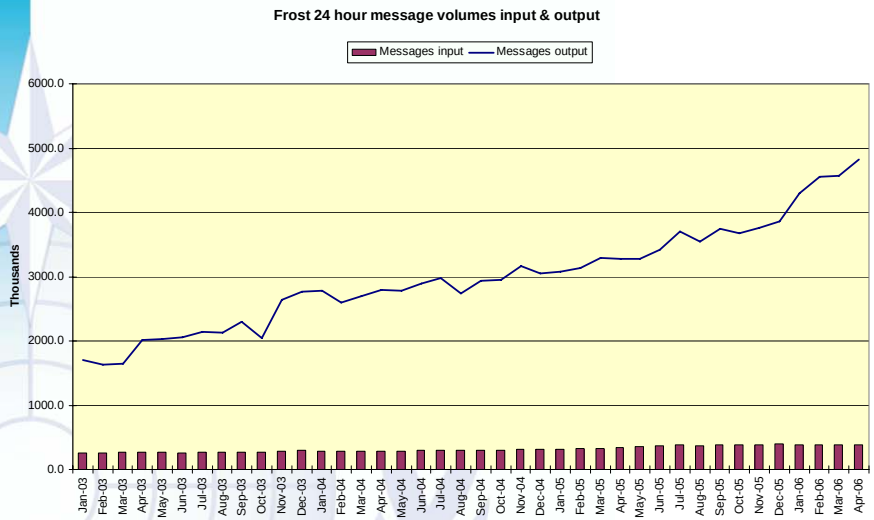
IGDDS within the WIS

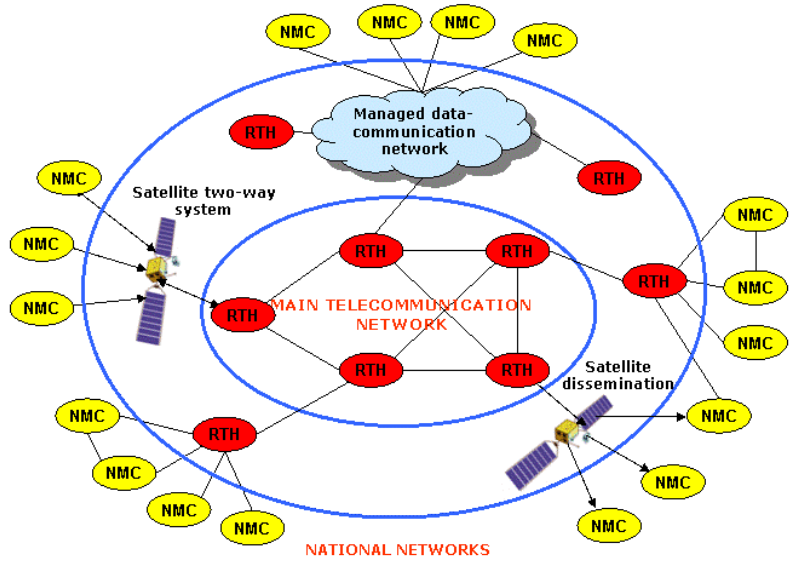


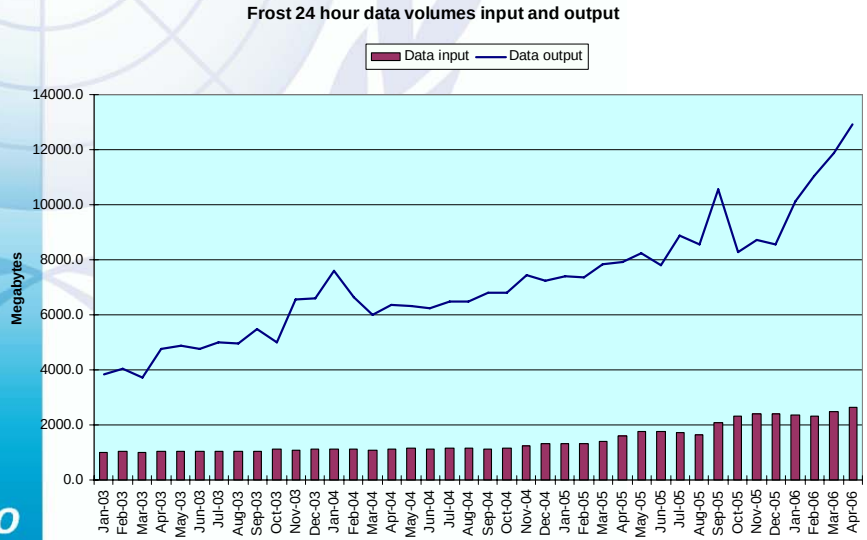
WIS implementation

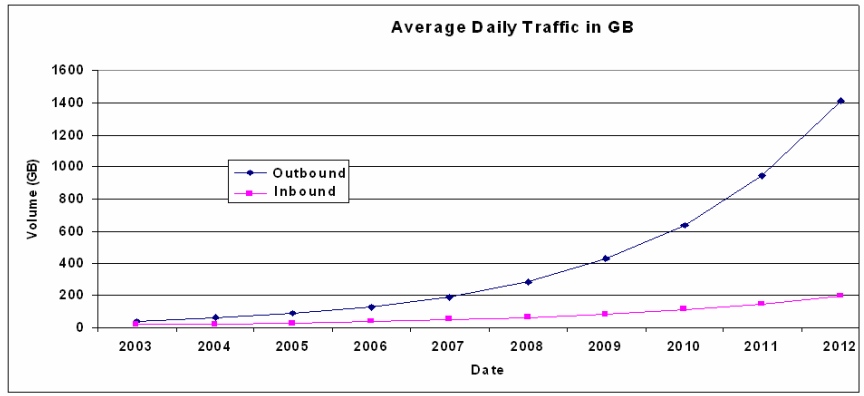
- **Part A: GTS Evolution into WIS**
  - Provides consolidation/improvement for time-critical and operation-critical data
  - Includes extension to meet operational requirements of all WMO programmes in addition to World Weather Watch
- **Part B: Extension to WIS**
  - Provides for an **extension of the information services** through flexible data discovery, access and retrieval services to all users, as well as flexible timely delivery services

The GTS: continued improvements





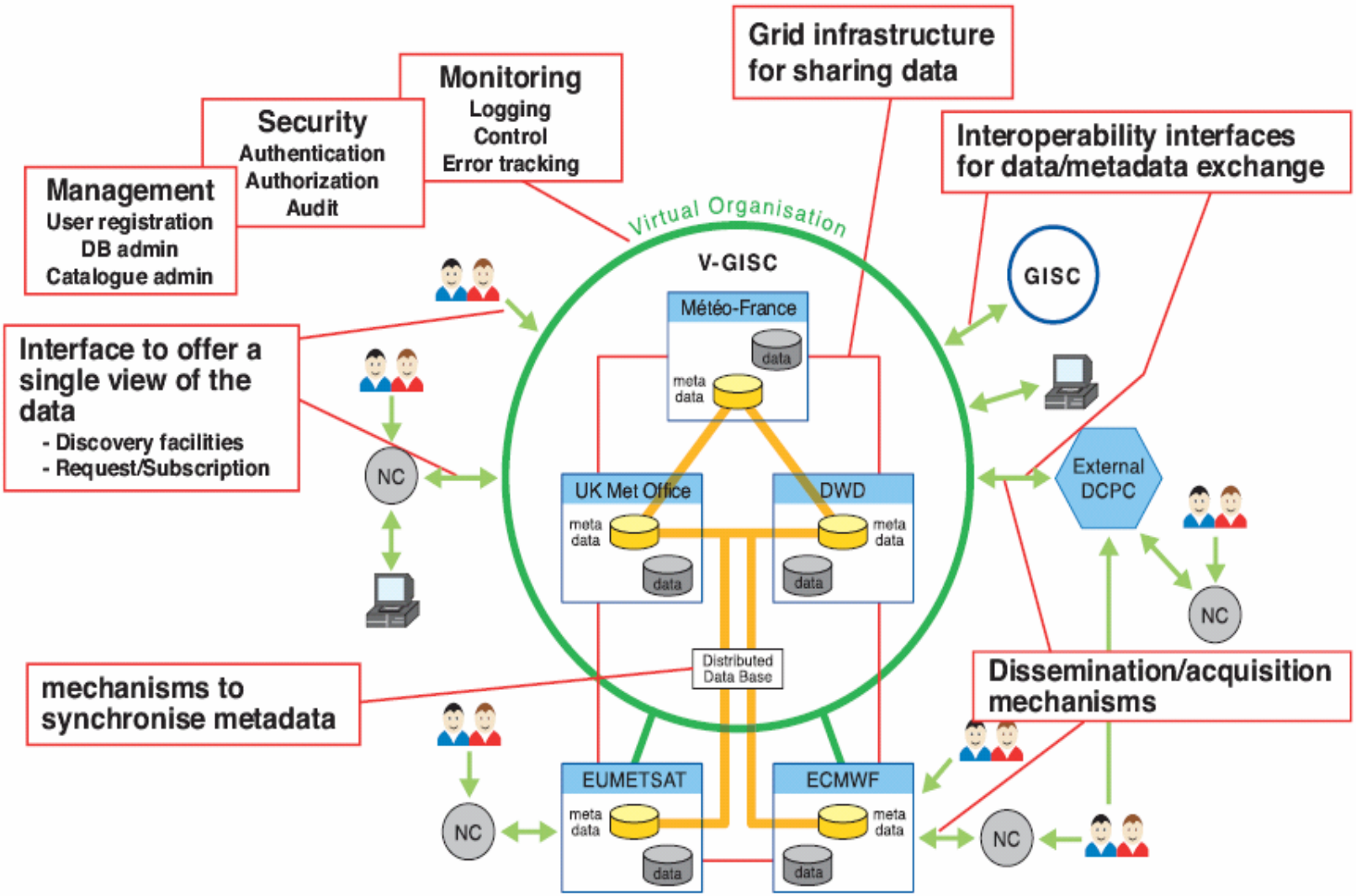




WIS Implementation – accomplishments

- ✓ Continued GTS upgrades (IMTN, satellite-based datacast,..)
- ✓ WMO Core metadata
- ✓ Internet portal
- ✓ Basic data acquisition, discovery and push-pull services
- ✓ GISC prototype: RA VI VGISC project
- ✓ DCPCs prototypes:
  - ✓ ECMWF & EUMETSAT associated with VGISC project
  - ✓ NCAR (Boulder)
  - ✓ NODC (Obninsk) for JCOMM related data
- ✓ IGDDS (Space-based data)
- ✓ Asia-Pacific VPN pilot project
- ✓ Technical Conference on WIS (Korea, 6-8 November 2006); VGISC & DCPC prototype demo

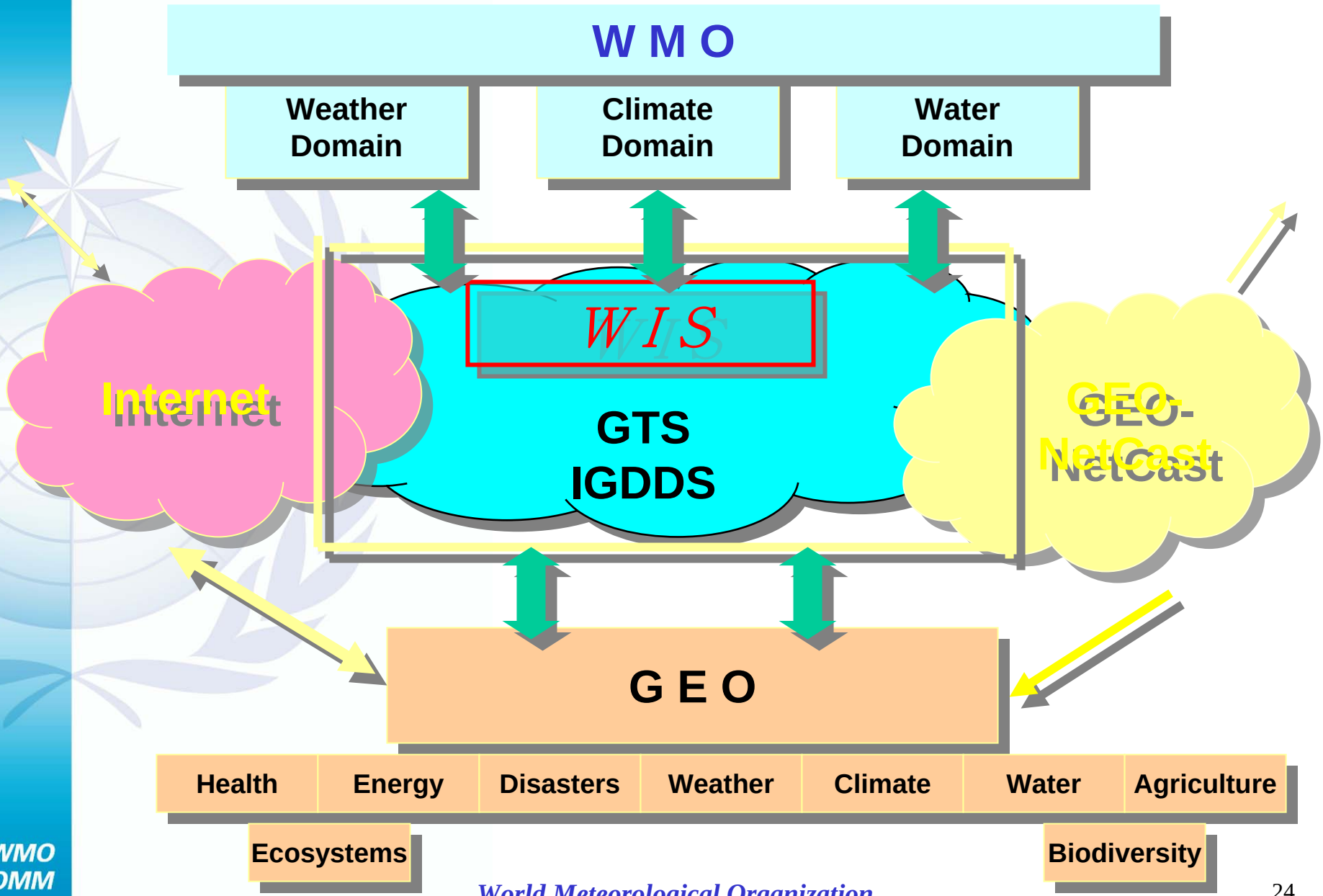
European Virtual GISC Project Operational early 2009



Key Future Milestones

- Consolidate plans on development, governance and implementation of WIS: 2008-2009
- Develop WIS regulatory documentation and guidance for implementation (GISC & DCPCs interfaces,user interface): 2008
- Develop scheme and practices for security, authentication and authorization procedures for WIS services : 2008-2009
- Implementation of first operational GISC: 1Q 2009
- Implementation of other operational GISCs: 2009 - 2011
- Implementation of DCPCs: 2008-2011
- Outreach & Capacity building: 2008-2011

WIS contribution to GEO

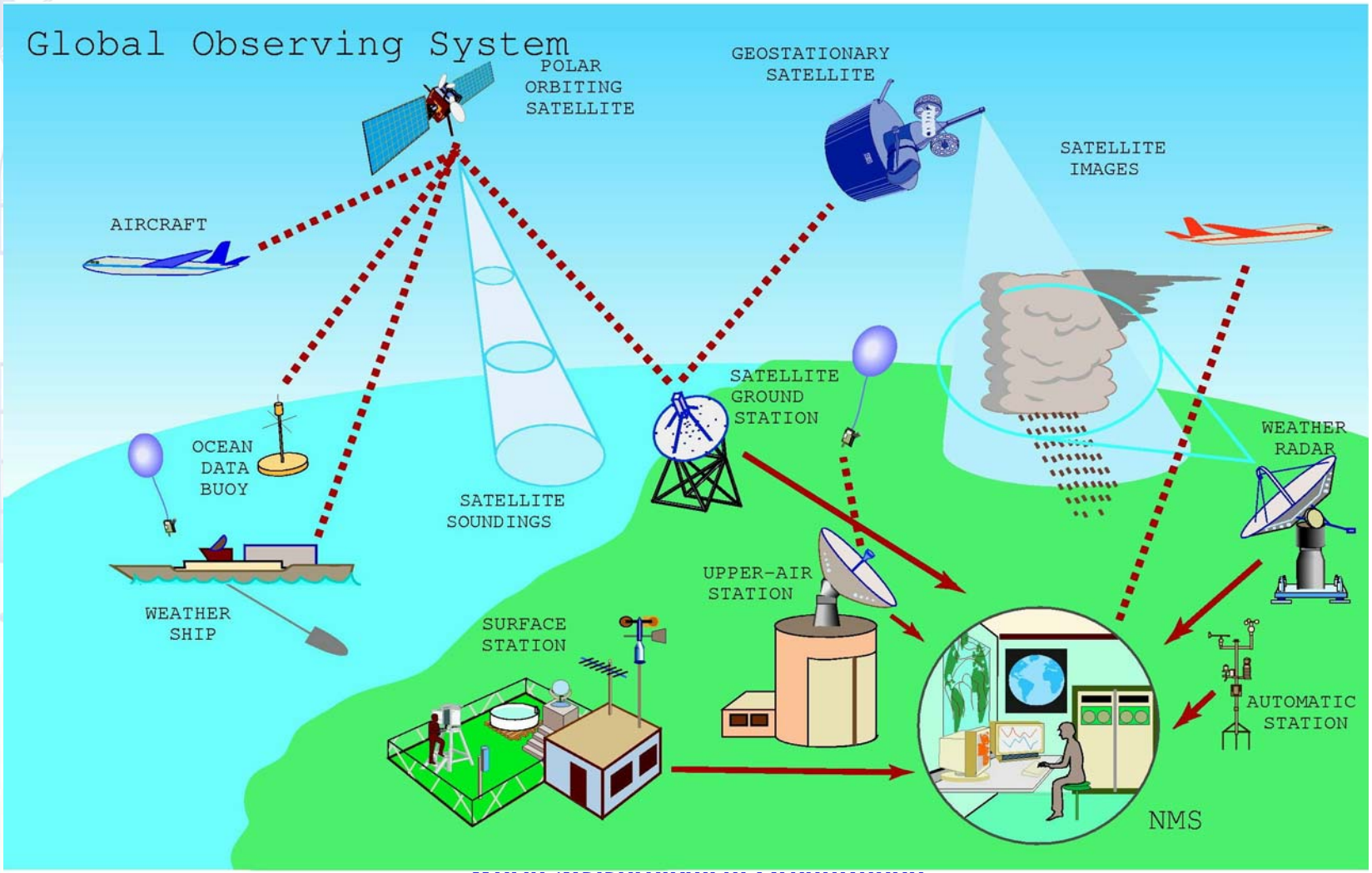


Radio Frequency spectrum for Weather, Water and Climate monitoring

Prime importance of specific radiocommunication services for meteorological and related environmental activities for:

- prevention, detection, early warning and mitigation of natural and technological (man-made) disasters
- safety of life and property
- protection of the environment
- climate change studies and scientific research,

Importance of radiocommunications for weather, water and climate operation and research



Radiocommunication Services used for weather, water and climate sciences and operations

- Specific radiocommunication services:
  - Meteorological Aids Service
  - Meteorological-Satellite Service
  - Earth Exploration-Satellite Service (passive)
  - Earth Exploration-Satellite Service (active)
- As special systems of generic radiocommunication services:
  - Meteorological weather radars and Wind-profiler radars of the Radiolocation Service
- As users of Radiocommunication Services:
  - Fixed Service, Mobile Service, etc.

Radio Frequency spectrum for Weather, Water and Climate monitoring

WMO and its 187 Members (National Meteorological and Hydrological Services and related entities) do their utmost at national, regional and international levels to ensure the availability and protection of suitable RF bands for weather, water and climate monitoring, with particular attention to bands that are a unique natural resource for passive sensing

Thank you

more information at:
http://www.wmo.int/pages/index_en.html
http://www.wmo.int/pages/prog/www/index_en.html