IGDDS

Integrated Global Data Dissemination Strategy Update

ET-SUP-8, agenda item 6.1

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Integrated Global Data Dissemination Strategy

- IGDDS background and expected benefits to WMO members
- Challenges and opportunities
- Status of IGDDS discussions in ET-SUP and WMO bodies
- IGDDS reformulation
- Status and proposed actions
- IGDDS oversight

WMO 2012 Survey on the Use of Satellite Data

- Trend in the usage of satellite data
  - 80 % of respondents state that their overall use of satellite data is increasing, across all Regional Associations and all application areas
  - This trend is driven by many different factors, like demise of in-situ networks, new application areas, increased quality of satellite products, progress in NWP assimilation or increasing demand for value-added services that depend on satellite products.
- Access to satellite data
  - Globally 40 % of respondents however stated that “accessing data in near-real-time” is a challenge for the use of satellite data
  - This figure showed strong regional variability from 32 % for RA VI to 65% for RA V users and 72 % to RA III.
- Discovery of satellite data
  - Globally 39 % of respondents also stated that “Knowledge of available data” is a challenge of the use of satellite data
  - This figure showed marked regional variability from 31% for RA VI to 46 % for RA I, 50% for RA III and 53% for RA V.
- Resources for exploiting satellite data
  - Globally 64% of respondents stated that “resources (personnel, training, tools etc)” was a challenge for the use of satellite data
  - This figure showed strong regional variability from 55% in RA IV to 78% in RA III and 83% in RA V.

Expected benefits of IGDDS to WMO members and to satellite operators

- To all WMO members: secure the value chain for satellite data usage, enabling all WMO members to exploit the full benefits of satellite data
- To WMO users of satellite data: enhance the capabilities to access to satellite data and products, in today's and tomorrow's technical environment, and help optimize their investments for data access.
- To satellite operators: to guide future developments of the application component of their ground segment, and to reach out to a wider user community

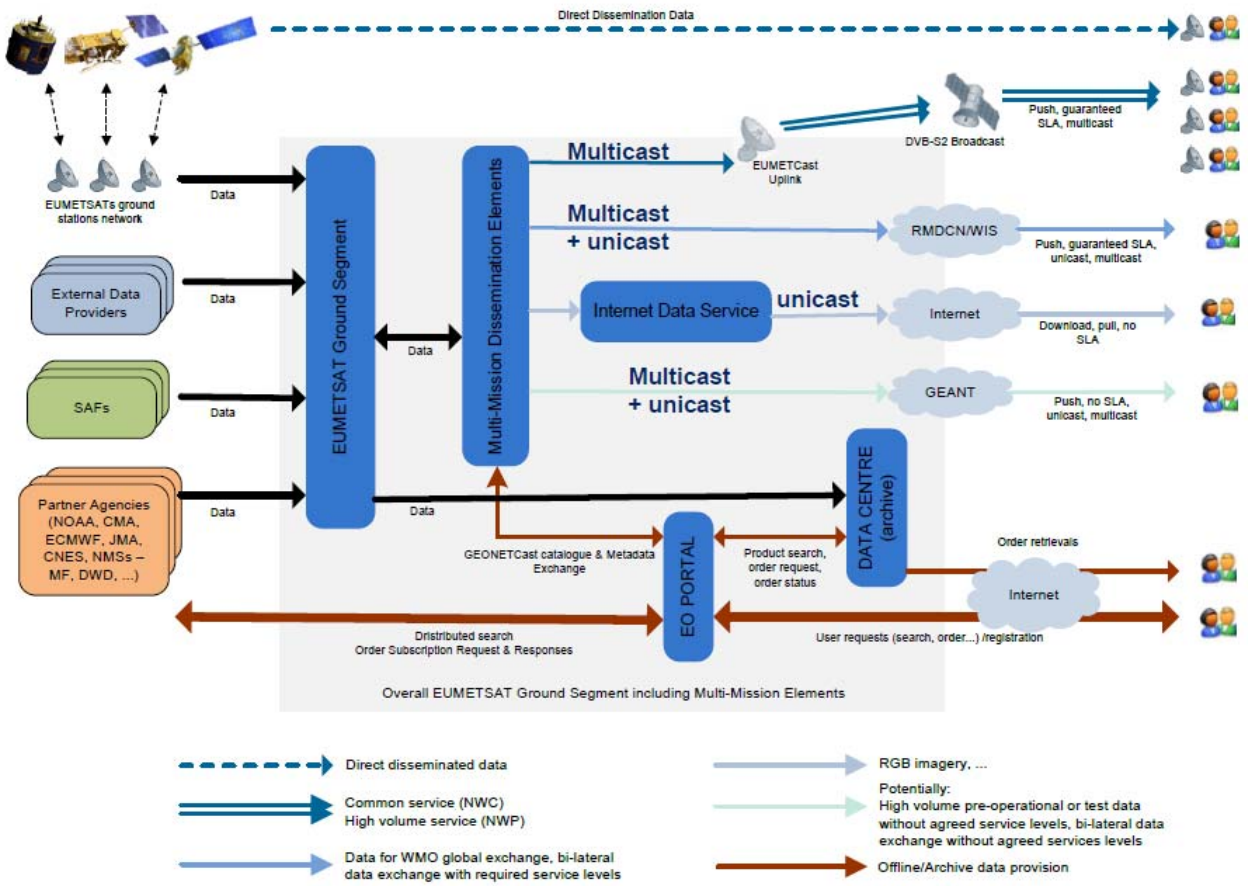
IGDDS background

- Challenges for strategy update
  - Still significant difficulties for users to access satellite data
  - Increasing dependency on satellite data of new user communities (ocean, space weather, ...)
  - Increasing operational relevance of data from R&D satellites
  - Need to consolidate and coordinate data access methods. There are many technical options to access data, but this causes dispersion of efforts
  - Future LEO and GEO satellite systems will cause an explosive development of data volumes, also posing particular challenges for regional and global data exchange
  - WMO has stated a clear objective of integration of all information systems under the umbrella of WIS. Satellite data represent a particular challenge for this process,
  - Increasing pressure on Radio-frequency spectrum allocations necessitates the most effective utilization of existing Direct Broadcast bands
  - Fast evolution of dissemination-relevant technologies, increased need to anticipate changes in the technology landscape
  - Increasing need for concerted actions between different WMO actors (SP, WIS, WIGOS)
  - Important upcoming decisions with potential large impact emphasize the need to more clearly position IGDDS to be able to engage decision makers

IGDDS background

- Opportunities for IGDDS
  - The commitment of CGMS members to continue coordinating Direct Broadcast standards for LEO as exemplified in last update for the new X-band LEO DB services;
  - The Regional Data Requirements dialogue in all Regional Associations
  - Technology evolutions for Re-Broadcast from Telecommunication Satellites (SATCOM), including increased use of DVB-S2
  - Technology evolutions for terrestrial networks with possible use for inter-regional data exchange as well as for regional end-user data retrieval
  - Well established GEONETCast dialogue between dissemination operators
  - Ongoing WIS implementation, in particular regarding monitoring and metadata and catalogue standardization
  - Continued momentum in RARS projects, including NOAA DBRTN initiative for NPP-JPSS
  - Space based architecture for climate increasingly involves R&D agencies, addressing data availability and quality
  - Space agencies are generally reconsidering their ground segment strategy for data access to better take into account user needs and technology evolutions. An example is the planned multi-mission data access architecture from EUMETSAT:

State-of-the art future Multi-Mission Data Provision Infrastructure (Courtesy of EUMETSAT)



Status of ET-SUP discussions about IGDDS

- IGDDS, evolution of concept
  - The initial (2006) scope of the Integrated Global Data Dissemination Service (IGDDS) was to respond to the request of EC-LVI in 2004 “to consider an IGDDS that builds on the “Alternative Dissemination Methods” concept (DVB-S based dissemination using telecommunications satellites)”.
  - With the evolution of the WIS architecture, the scope of IGDDS was then widened to ensure that space-based observation data and products would be handled in an integrated manner with the other (non-space) data.
  - Furthermore it was recognized, that the so-called “ADM” (i.e. the use of DVB-S services) should not exclude other means such as Direct Broadcast or Internet.
  - In summary, IGDDS should be seen addressing the whole circulation scheme of satellite data and products within the WIS, in compliance with WIS standards, with an overarching goal to enhance data access by WMO Members. Achieving the dissemination of satellite data and products worldwide by DVB-S services remains a core objective of IGDDS, without being limitative.
  - Note: Originally IGDDS stood for “Integrated Global Data Dissemination Service”, but since it has become clearer that the goals cannot be realized through any single service, IGDDS started being used in the meaning of “Integrated Global Data Dissemination Strategy”
- ET-SUP 4 (2010)
  - ET-SUP recalled earlier discussions of the IGDDS-IG on the IGDDS Implementation Plan and recognized that a revision was needed to encapsulate the evolutions of the IGDSS concept
  - The revision Should highlight on one hand the overall strategy, and on the other hand the actions. Priorities for implementing the strategy should be identified and critical and time-limited high-level actions should be identified

Status of ET-SUP discussions about IGDDS

- ET-SUP 5 (2010)
  - The group reviewed the proposed priorities for the IGDDS Implementation Plan and suggested the following:

    - Organizing the formulation of data requirements (both from a regional approach and a thematic approach) and the dialogue between data users and providers;
    - Implementing regional DVBS dissemination systems in every region to offer a cost efficient and integrated access to satellite data sources;
    - Demonstrating the inclusion of all relevant data types in the broadcast services, including interregional data exchange;
    - Support harmonization of future Direct Broadcast systems as well; Support the implementation of complementary data access and distribution via the Internet;
    - Implementing WIS data standards and conventions, satellite operators becoming Data Collection or Production Centre (DCPC) within the WIS framework;
    - Permanent information resources through adequate portals, and active user information, including links to appropriate software tools;
    - Monitoring the progress and seeking feedback

Status of ET-SUP discussions about IGDDS

- Priorities proposed by ET-SUP were endorsed by CBS in Nov 2010 and Congress in May 2011 and amended by EC-65 in May 2013:
  - ABRIDGED FINAL REPORT OF THE SIXTEENTH WORLD METEOROLOGICAL CONGRESS (§ 3.7.6, Page 68)
    - Congress stressed the need for improved accessibility of satellite data and products, particularly in developing countries, and welcomed the recommendation from CBS-Ext.(10) to consider among its priorities:
      - (a) to organize the formulation of data requirements and the dialogue between data users and providers;
      - (b) to implement sustainable regional Digital Video Broadcasting by Satellite (DVB-S and DVB-S2) dissemination systems (such as IGDDS or GEONETCast) offering cost efficient access to satellite data and products in every region;
      - (c) to integrate all relevant data types in such broadcast services, including inter-regionally exchanged data; and
      - (d) to support harmonization of future Direct Broadcast Systems as well as complementary data access and distribution services via the Internet, recognizing the different user needs.
    - Congress welcomed the setting up of regional expert groups in RA I, RA III, RA IV and RA V to review the requirements for satellite data access as well as the Pilot Project in RA II aiming to enhance accessibility of satellite data in the Region.
  - EC-65 General Summary (2013) (§4.4.57, Page 54)
    - The Council recalled that the Integrated Global Data Distribution System (IGDDS) originally focussed on the definition and operational implementation of an efficient distribution method for space-based observation data and products in the context of WIS. The Council noted that the scope of IGDDS had evolved to include terrestrial and satellite communications for the collection and distribution of satellite data and other operationally critical information. Such integration was exemplified by the success of the Regional ATOVS Retransmission Service (RARS) and the progress on the development of an international forum of users of satellite data telecommunications systems).

IGDDS reformulation

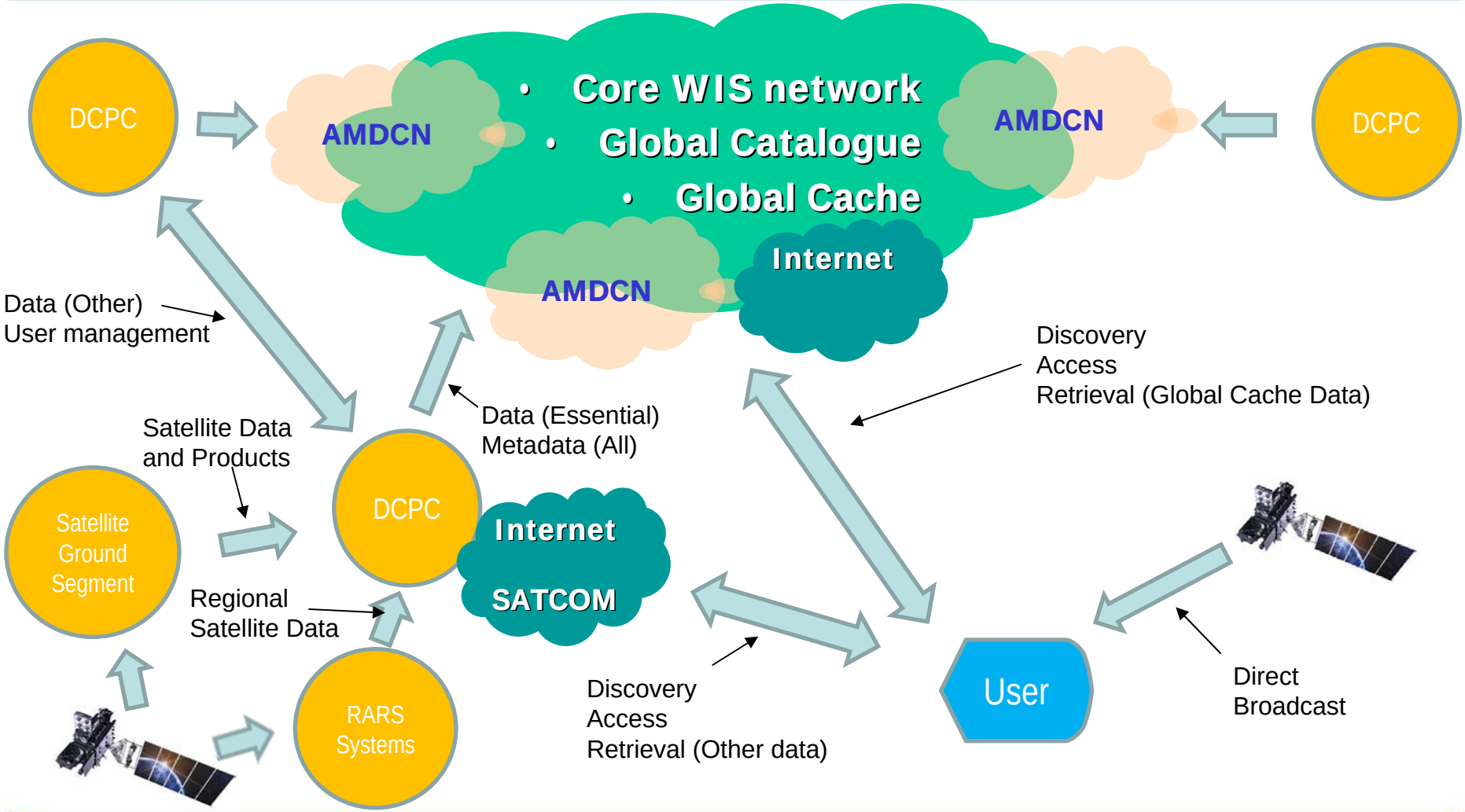
- IGDDS is now reformulated as a broad strategy, including
  - A vision
  - Strategic targets realizing the vision
  - Strategic activity threads for the realisation
  - A concept for overseeing the strategy implementation

IGDDS vision and strategic targets

- **Vision:** Timely and reliable access through the WIS to all satellite data and products needed to meet the operational needs of all WMO members.

- This vision will be realized through the realisation of:
  - Effective user-provider dialogue on regional and global basis to address evolving needs of all users, including the less developed countries
  - Regional re-broadcast services from telecommunications satellites available using state-of-the-art dissemination technology wherever cost-efficient
  - Global exchange of all satellite data and products, including agreements on Data Access and User Management to enable re-dissemination
  - Locally acquired data from LEO satellites processed and routinely available on a regional basis
  - Globally coordinated Direct Broadcast services from GEO and LEO
  - Routine access to all required data and products from R&D satellites
  - All providers of satellite data dissemination infrastructure fulfilling the role of WIS DCPC, providing data discovery, data access and data retrieval (DAR) for all their satellite data and products
  - Globally applied standards for discovery metadata defined for satellite data and products
  - All operationally used satellite data and products discoverable in the WIS catalogue
  - On-demand access to satellite data and products, compliant with WIS rules.

Vision:
Satellite Data Access in WIS



Dissemination strategy

- A number of Strategic Activity Threads are necessary for achieving the strategic targets
  - Establish WMO guidance on optimal access to satellite data and products
  - Continue and develop Regional User Dialogue
  - Develop data access requirements from broader range of WMO and co-sponsored programmes
  - Develop DVB-S based dissemination services, including WIS integration
  - Coordinate the regional acquisition and processing of LEO satellite data
  - Ensure global exchange of Satellite Data between main centres
  - Encourage agreements between operational dissemination providers and R&D satellite operators
  - Define optimal formats for global and regional data exchange
  - Maintain and evolve Direct Broadcast standards
  - Establish global standard for discovery of satellite data
  - Integrate satellite data in WIS, including monitoring of availability
  - Harmonize approach for on-demand access to satellite products
  - Enhance the information resources supporting access to satellite data
  - Strengthen dialogue with all decision makers to ensure support to strategy

IGDDS strategic activities, status and proposed actions

- Establish WMO guidance on optimal access to satellite data and products
  - Status
    - WIS architecture has been developed with improving access to satellite data in mind.
    - However currently no overall guidance on optimal access to satellite data and products has been established inside the WIS context
  - Actions
    - Establish a global WIS guide on access to and management of satellite data.
  - Lead: WMO SP and WIS programme

IGDDS strategic activities, status and proposed actions

- Continue and develop Regional User Dialogue
  - Status
    - Continuous regional user dialogues are existing in all Regional Associations. In all RAs, except RA II, baseline data requirements documents have been established.
    - Satellite operators are now engaged in all Regional User Dialogues, but formal response to requirements is still pending in most regions
  - Actions
    - The establishment of a formal data requirements baseline in RA II should have priority in the short–term
    - Encourage satellite operators to formally respond to requirements
    - Encourage engagement of non-meteorological user communities
    - The needs of smaller NMHSes, with lesser capabilities should have particular attention in the regional dialogue, including for example the formulation of requirements for high level products, allowing all NMHSes to exploit the value of satellite data without major investments
  - Lead: WMO SP, supported financially by DRA

IGDDS strategic activities, status and proposed actions

- Develop data access requirements from broader range of WMO and co-sponsored programmes
  - Status
    - Observational requirements exist for the WMO programmes and these are handled well in the rolling requirements review process.
    - However specific requirements for data and products do not generally exist
    - For marine meteorology JCOMM has established a Task-Team for Satellite Data Requirements. It is expected that this task team will formulate Data Requirements for Ocean Applications
  - Actions
    - Dialogue should be strengthened with WMO Programmes, JCOMM and the CGMS/CEOS Climate Group to document evolving dissemination needs for satellite data and ensure that operators respond formally to these requirements
    - Results of initiatives like the “Southern Ocean Satellite Data” requirements survey should also be taken into account.
  - Lead: WMO SP

IGDDS strategic activities, status and proposed actions

- Develop DVB-S based dissemination services, including WIS-integration
  - Status
    - Considerable progress with EUMETCast, GEONETCast Americas, JMACast, RapidCast.
    - However interoperability for user management has only been implemented between EUMETCast and CMACast, and data discovery and data access through WIS has only been established for EUMETCast.
  - Actions
    - Continue Coordination of existing and new DVB-based services.
    - Establish (together with WIS) a requirements baseline for the WIS integration of DVB-S based dissemination services.
    - Ensure that existing systems and the emerging systems like JMAs new DVB system or RapidCast will meet WIS requirements.
  - Lead: CGMS and GeoNetCast IG

IGDDS strategic activities, status and proposed actions

- Coordinate the regional acquisition and processing of LEO satellite data
  - Status
    - The RARS initiative has achieved considerable success for ATOVS processing in several Regional Associations.
    - An expansion into RA I now has started with the support of the EU.
    - The most significant challenge is however the full adaptation of RARS to the high-performance instruments on NPP/JPSS, METOP and FY-3. New concepts for processing and data handling are necessary and the experience of EUMETSAT and NOAA/CIMMS is crucial in this regard.
    - Of importance is also the reflection of the RARS in WMO regulatory documentation
  - Actions
    - Continue the evolutions of RARS, with focus on the new generation of instruments on METOP/NPP/JPSS/FY-3
    - Establish regulatory RARS documents
      - » WIS guide on RARS system addressing the data management and network issues
      - » WIGOS guide on RARS products addressing the contents
  - Lead RARS IG (WMO SP and CGMS)

IGDDS strategic activities, status and proposed actions

- Ensure exchange of Satellite Data between regions
  - Status
    - Efficient communication connectivity for global exchange of satellite data between major satellite operators are generally in place based on bilateral arrangements, and are used for exchanging both Essential Data for global exchange as well as Other Data as per Res # 40.
    - It is however an important unfulfilled objective that the exchange of essential satellite data become a fully integrated part of WIS operations, whereas exchange of other data continue to be implemented through bilateral arrangements using specific technical solutions between data providers.
  - Actions
    - Through CGMS encourage data providers to formally define their set of essential data
    - Through CGMS trigger a dialogue between satellite operators and WIS to ensure that all essential data become part of WIS operations
    - Continue to encourage bilateral agreements between CGMS members for exchange of “other data”, including redistribution to WMO members within regions.
  - Lead: CGMS, ET-WISC

IGDDS strategic activities, status and proposed

- Encourage agreements between operational dissemination providers and R&D satellite operators
  - Status
    - Some agreements are in place ensuring regional access for a number of R&D satellites from NASA, JAXA, SOA and ISRO.
    - There is however limited commitment of R&D operators towards global WMO community, therefore giving limited opportunities for general access to R&D data by WMO members.
  - Actions
    - Dissemination infrastructure operators (CGMS members) should continue to establish arrangements with relevant R&D space agencies and ensure availability to members.
    - More global agreements between WMO and R&D agencies could also be considered.
  - Lead: CGMS members and WMO SP

IGDDS strategic activities, status and proposed actions

- Define optimal formats for global and regional data exchange
  - Status
    - For instruments currently used by NWP efficient globally coordinated data formats exist and are in use for global exchange
    - For non-NWP instruments a diversity of product formats exist, based mainly on user community and data producer preferences.
    - This diversity significantly affects the global and regional exchange of data
    - For new high-performance NWP instruments, high-efficiency formats have generally not been defined yet
  - Actions
    - For new generation of high-performance NWP instruments and LEO and GEO imagers considerable effort will required for definition of efficient formats
  - Lead WMO WIS (ET-DRC) and CGMS

IGDDS strategic activities, status and proposed actions

- Maintain and evolve Direct Broadcast standards
  - Status
    - Direct Broadcast services will continue to play an important role for the access to data from both LEO and GEO.
    - A set of CGMS standards have been in place for the DB services since the 1990s, covering the current generation of satellites.
    - A major achievement was the recent revision of the CGMS DB standards, incorporating the X-band transmissions from the new and upcoming LEO satellites: NPP, JPSS, FY-3 and METOP-SG.
  - Actions
    - The implementation of the new DB standard is crucial for the future LEO DB services and should be monitored closely.
    - A major concern is the cost of DB stations. Efforts should therefore be encouraged to make available reliable, low-cost DB receiving stations (hardware and software).
    - Exchange of equipment experience and user information should be encouraged, and the availability and cost of DB systems monitored.
    - The use of DB for GEO data will be regional in the future and the need for further global standardization therefore needs to be clarified..
  - Lead: CGMS

IGDDS strategic activities, status and proposed actions

- Establish global standard for discovery of satellite data
  - Status
    - Activities for definition of discovery metadata in the OPAG ISS expert team IPET-MDRD have up to now concentrated on non-space data.
    - To move this issue along, CGMS established the Task team on Discovery Metadata for Satellites, that will work closely with IPET-MDRD.
  - Actions
    - Monitor the implementation of complete discovery metadata for satellite data.
    - The progress of the task team work is crucial to ensure the discoverability of satellite data in the WIS catalogues, ET-SUP is specifically invited to support the Task Team.
  - Lead: CGMS (TT on Discovery Metadata) + IPET-MDRD

IGDDS strategic activities, status and proposed actions

- Integrate satellite data in WIS, including monitoring of availability
  - Status
    - The target is to achieve full operational integration of satellite data in the WIS, allowing WMO members to use WIS mechanisms to access satellite data
    - Monitoring of data availability is an are of priority of the WIS implementation
    - In the WIS implementation satellite data have however up to now not been addressed explicitly, and satellite data are not generally available in the GISCs.
  - Actions
    - Initiate dialogue with WMC Washington (CBS lead centre for satellite data) on improved monitoring of satellite data availability
    - There is therefore a need for a intensified dialogue with WIS about the integration and monitoring of satellite data.
    - A pilot project with a specific GISC supported by DCPC for providing WIS access to satellite data could be envisaged
    - An outcome of this dialogue could be the definition of the regulatory documents governing the integration of satellite data in the WIS and the definition of the baseline monitoring of availability of satellite data in the WIS.
  - Lead: WMO-SP and ET-WISC

IGDDS strategic activities, status and proposed actions

- Harmonize approach for on-demand access to satellite products
  - Status
    - Different user Interfaces and system architectures have over the last years been put in place for access to satellite products via the internet.
    - Incorporating flexible on-demand access to specific data sets is an important objective of the WIS, but has so far not been much advanced in the WIS implementation
    - The possibility of using on-demand mechanisms however vary widely primarily due to internet connectivity issues.
  - Actions
    - Monitor the implementation of on-demand access in the WIS
  - Lead: WMO SP

IGDDS strategic activities, status and proposed actions

- Enhance the information resources supporting access to satellite data
  - Status
    - Several agencies are providing information resources supporting the access to satellite data. However these information resources are very heterogeneous.
    - The SATURN portal will provide more homogeneous access to information about data access mechanisms for upcoming satellites, both for NRT dissemination and on-demand access, and will provide a vehicle for encouraging satellite operators to improve their channels of communication with the user community.
    - The Product Access Guide will provide direct access to product collections at agency web sites, including information relevant to the access to the data
    - The OSCAR portal will inter alia provide links to information about access to L0/L1 data from all missions.
  - Actions
    - Continue the development of the WMO information resources on access to satellite products (Product Access Guide, SATURN, OSCAR)
    - Encourage satellite operators to support the development of these resources
  - Lead: WMO SP

IGDDS strategic activities, status and proposed actions

- Strengthen dialogue with all decision makers to ensure support to strategy
  - Status
    - Original concept of IGDDS was to formulate a single project that had the perspective of significantly improving the access to satellite data and products.
    - The reality in 2014 is much more complex and only concerted action in a number of very different areas will realize the overall vision.
  - Actions
    - Regular reporting to stakeholders about the status of progress is essential
    - The complexity of the strategy however presents particular challenges for synthetic reporting to stakeholders.
    - The reporting should therefore be based on strategic indicators, see below
  - Lead: WMO SP

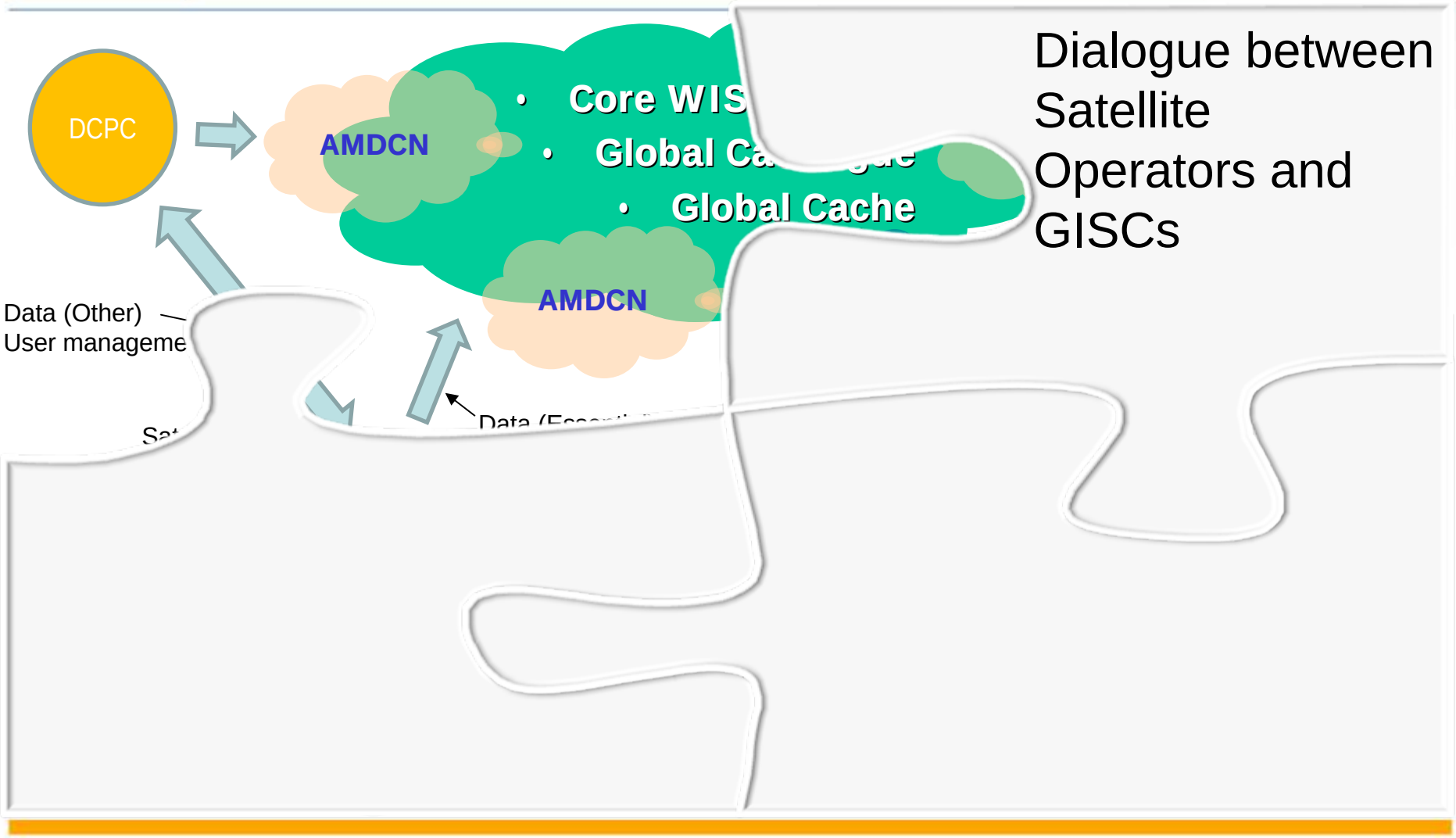
IGDDS oversight

- The continuous oversight of the IGDDS and its implementation should be the responsibility of ET-SUP, based on detailed reporting from WMO SP
- It would however be very useful to define Strategic indicators, demonstrating objectively the progress of implementation of the IGDDS and these should be part of the regularly reporting to ET-SUP and as well be used for reporting to other stakeholders (CGMS, CBS, CM and EC)
  - Examples are indicators for overall availability of satellite data (volumes: total, per mission, per instrument) in WIS, for global exchange of satellite products, for coverage of RARS services, coverage and evolution of regional requirements, coverage of DVB-based systems, etc
  - Suggestions from ET-SUP?
- IGDDS will be presented to CGMS-42 May 2014 for first discussions with satellite operators, and submitted to CM June 2014 for endorsement and in–principle commitment from satellite agencies for implementation of strategy
- Relevant regulatory documents should be identified for CBS (WIGOS and WIS). A challenge here is the internal coordination in the secretariat, between Space Programme, WIGOS and WIS
- The Space Programme will continue to report on the implementation of the strategy to ET-SUP, CGMS, CM and CBS.

Most of all, realizing IGDDS Vision requires dialogue:

Dialogue between Space Programme and WIS

Most of all, realizing IGDDS Vision requires dialogue:



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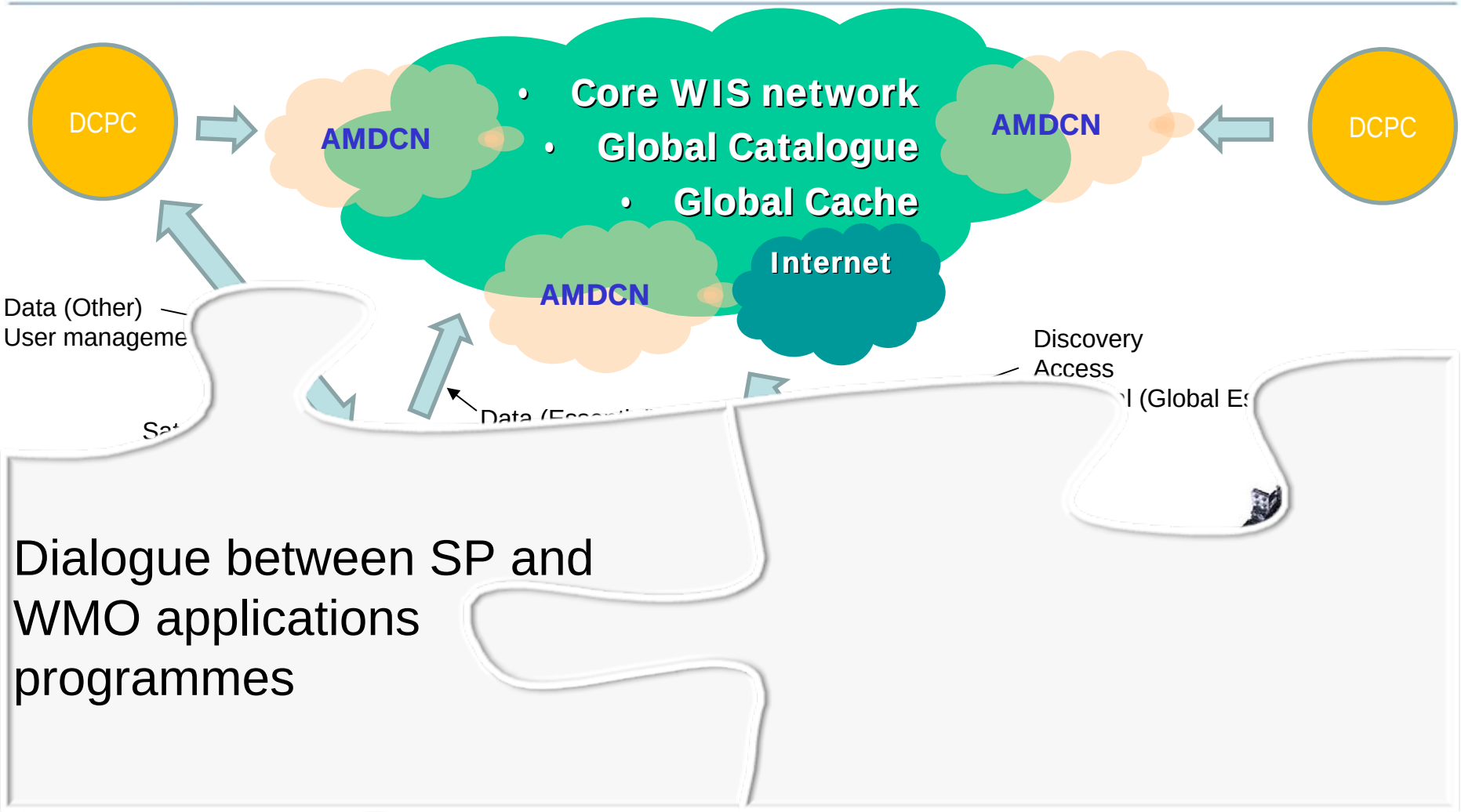

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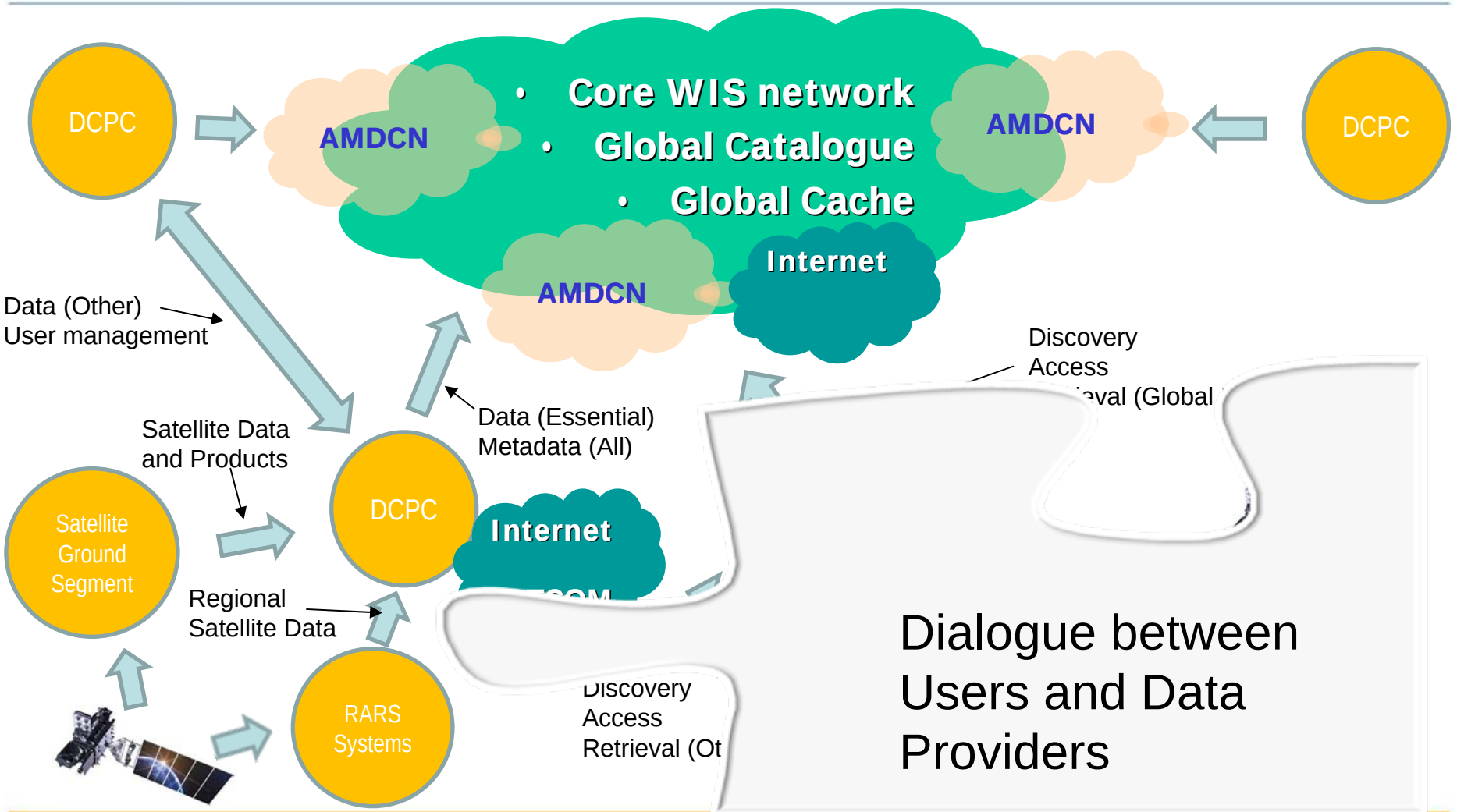

Thank you for your attention!