

WORLD METEOROLOGICAL ORGANIZATION

IPET-SUP-1/Doc. 5.1  
(16.III.2015)

COMMISSION FOR BASIC SYSTEMS  
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND  
PRODUCTS

ITEM: 5.1

FIRST SESSION

Original: ENGLISH

GENEVA, SWITZERLAND, 16-19 MARCH 2015

## **Satellite Data Dissemination Strategy**

*(Submitted by Secretariat)*

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### **Summary and Purpose of Document**

As follow-up to discussions at ET-SUP-8, and with a view (i) to improve satellite data access and exchange (globally and regionally), and (ii) to inform a future update of the IGDDS in WMO regulatory material, a medium-term Satellite Data Dissemination Strategy (SDDS) has been formulated. For each of the IGDDS strategic targets, the status is presented and strategic actions and indicators are proposed.

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### **ACTION PROPOSED**

The session is invited to:

- (a) Comment on the proposed strategy and on how to advance individual actions;
  - (b) Give guidance on a mechanism to monitor progress against indicators.
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## Satellite Data Dissemination Strategy

As follow-up to discussions at ET-SUP-8, and with a view (i) to improve satellite data access and exchange (globally and regionally), and (ii) to inform a future update of the IGDDS in WMO WIS regulatory material<sup>1,2</sup>, a medium-term Satellite Data Dissemination Strategy has been formulated. For each of the IGDDS strategic targets, the status is presented and strategic actions and indicators are proposed.

CBS (Ext) 2014 “was pleased to note that a draft strategy for improved availability and accessibility of satellite products had been presented to CGMS, as outlined in the Annex to this paragraph. It recommended refining this strategy in consultation with ET-SAT, ET-SUP, and OPAG ISS with a view to submit it to the sixteenth session of CBS. In particular, it welcomed the steps taken to develop the Direct Readout Acquisition and Relay of Satellite Data (DRARS) which will follow and enhance the Regional ATOVS Retransmission Services (RARS), and recommended to complete a Guide on DRARS as part of the WIS reference documentation.

The time horizon for the proposed actions in the following table is the coming five years.

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<sup>1</sup>The [Manual on the WMO Information System](#) (WIS, 2012 edition) states that “2.7.3 The goal of the WMO Integrated Global Data Dissemination Service (IGDDS) is to ensure the definition and operational implementation of an efficient circulation scheme of space-based observation data and products meeting the needs of WMO programmes, in the context of WIS. IGDDS shall remain an important component of WIS, mainly for the exchange and dissemination of data and products generated by space-based observing systems.”

<sup>2</sup> The [Guide to the WMO Information System](#) (2012 edition) states that “2.7.2 With regard to satellite-based data and products, the WMO Integrated Global Data Dissemination Service (IGDDS) addresses: user requirements review; data concentration; inter-regional data exchange; data dissemination; data discovery; data access on request; data delivery to authorized users; and, data management, including interoperable catalogue, quality of service monitoring and user support; 2.7.3 In addition to satellite-based data and products, IGDDS should distribute a basic subset of the information intended for global exchange; 2.7.4 IGDDS calls for regional dissemination components linked in a global network for inter-regional data exchange. Each regional component should include a DCPC and should ensure routine dissemination by various means including a satellite-based Digital Video Broadcast (DVB-S) service covering its region.”

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>1. REGIONAL DATA REQUIREMENTS</b>  <b>(Regional and thematic dialogues maintaining data requirements)</b></p> <p><b>Lead: WMO IPET-SUP, supported financially by WMO/DRA, and in-kind by GISCs</b></p>	<p>-Continuous regional user dialogues are existing in all RAs</p> <p>-In most RAs, data requirements have been established.</p> <p>-Most operators are have not formally responded to requirements</p> <p>-APSDEU-NAEDEX are addressing the global data requirements for NWP, but for other applications data requirements have not been formulated.</p> <p>-JCOMMs new Task-Team for Satellite Data Requirements is expected to formulate Data Requirements for Ocean Applications</p>	<p>-Establishment of a formal data requirements baseline in RA II, V</p> <p>-Urge satellite operators to formally respond to requirements</p> <p>-SP, with guidance from WIS staff, to keep TT-DC and TT-GISC informed about progress and agreed requirements documents</p> <p>-Encourage engagement of non-meteorological communities</p> <p>-Specifically address the needs of NMHSs with lesser capabilities</p> <p>-Dialogue should be strengthened with WMO Programmes, JCOMM and the CGMS/CEOS Climate Working Group to document evolving dissemination needs for satellite data</p> <p>-Results of initiatives like the “Southern Ocean Satellite Data” requirements survey should also be taken into account.</p> <p><b>Indicator: Availability of agreed Data Requirements documents for each Regional Association, addressing needs of all WMO Programmes</b></p>	<ul style="list-style-type: none"> <li>- Requirements should include dataset size, type, update frequency, to determine most efficient data distribution route</li> <li>- TT-GISC and future Inter-Commission WIS task team to address issue of efficient data distribution</li> <li>- Registration of products in WIS catalogues critical; registration guidance to WIS available through GISCs</li> </ul>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>2. FULL INTEGRATION AND OPERATION OF DVB BROADCAST SERVICES (Re-broadcast DVB services available in all Regions and integrated in WIS)</b></p> <p><b>Lead by : CGMS and GEONETCast Implementation Group; with ET-CTS involvement.</b></p>	<p>-EUMETCast, CMACast and GEONETCast Americas and MITRA are well-established systems, with HimawariCast and RapidCast emerging in the Asia-Oceania region.</p> <p>-However interoperability and WIS discovery has only been implemented for EUMETCast and CMACast</p> <p>-To be noted that DVB is mature off-the-shelf technology, and does therefore not need to be addressed from a technology point of view</p>	<p>-Continue coordination of existing and new DVB-based services in terms of footprint, data content.</p> <p>-Review, update, and communicate (together with WIS) the IGDDS DVB-S Operators Standard<sup>3</sup> for the integration of DVB-S(2) based dissemination services into WIS.</p> <p>-Ensure that existing systems and emerging systems like JMA's new HimawariCast system or RapidCast will meet WIS requirements.</p> <p>-ET-CTS to review the usage of DVB technology from a WMO point of view</p> <p>-Promote DVB-based technologies better to decision makers in NHMSs. A good opportunity would be a side event at the CBS TECO in 2016 (Caribbean)</p> <p><b>Indicators: Availability of WIS-integrated DVB service for each Region; degree of service compliance with Regional data requirements (see (1))</b></p>	<ul style="list-style-type: none"> <li>- Issues are mixed: coordination, costs incurred, interoperability of services, operational readiness of services, data policy, mandate (met vs non-met), commercial, national interests</li> <li>- Would require WMO or WMO-GEO forum with users and satellite operators participating (CGMS is not sufficient) to address issues; GEONETCast Implementation Group does not deliver this</li> <li>- Raise this need at Congress-17 during the WMO SP discussion</li> <li>- WIS concept, through GISCS, foresees regional data dissemination function by a member on behalf of many others; this principle could be applied to DVB services</li> </ul>

<sup>3</sup> [http://www.wmo.int/pages/prog/sat/documents/IGDDS\\_DVBS-standards.pdf](http://www.wmo.int/pages/prog/sat/documents/IGDDS_DVBS-standards.pdf)

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>3. GLOBAL EXCHANGE OF ESSENTIAL DATA ON THE WIS (Globally required satellite data provided to the WIS core network);</b></p> <p><b>Lead: CBS ET-WISC TT-GISC</b></p> <p><b>Supported by: CGMS, WMO IPET-SUP</b></p>	<p>-The ongoing operational WIS implementation has not explicitly addressed satellite data, and only the CMA is currently providing catalogue visibility of satellite data. Note that once registered in any GISC, the metadata is available at all GISCs. Also GISCs do not provide metadata, it comes from the DCPC or NC which in CMA's case is the Satellite Centre.</p>	<p>-Satellite operators to register products in the WIS and ensure that essential data become available operationally in WIS</p> <p>-Initiate dialogue with WIS centres on visibility and monitoring of satellite data</p> <p>-Pilot project with specific GISC for providing WIS access to satellite data could be envisaged</p> <p>- TT-GISC (and future Inter-Commission WIS Task Team) to request GISCs to reach out to all satellite operators to register products based on global user requirements</p> <p><b>Indicator: Availability of satellite data in WIS global cache.</b></p>	<ul style="list-style-type: none"> <li>- The technical monitoring of WIS data (e.g., bulletins, files) is being covered by TT-OM, but programmatic monitoring of satellite data availability is not. This issue should be addressed. This is not a TT-OM activity but it is covered under normal WWW AGM etc. Monitoring of data is a programme activity not WIS.</li> <li>- Check approach to monitor surface-based remote sensing data pursued by WMO ET-SBO</li> <li>- Clarify terminology: whether "global data" means no limitations on use imposed by provider, or data that must be cached by GISCs (the latter may be large volumes)</li> </ul>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>4. REGIONAL EXCHANGE OF ADDITIONAL DATA (Exchange of additional satellite data and products between Regions);</b></p> <p><b>Lead: CGMS</b></p>	<p>-Exchange of satellite data is in place between most regions, through bilateral arrangements between satellite operators.</p> <p>- Due to the absence of a global WIS authentication scheme, these exchanges will continue to be done outside the WIS network. – This is quite wrong. The very aim of WIS is to register and to understand all exchange mechanisms. It is a matter of setting the data access policy in the metadata simply stating that it is limited access through appropriate suppliers</p>	<p>-Encourage bilateral agreements between CGMS members for exchange of additional data</p> <p><b>Indicator: Matrix of Availability of Data Exchange mechanisms for other satellite data and products between Regions</b></p>	<ul style="list-style-type: none"> <li>- Bilateral agreements under satellite operator responsibility, to continue in CGMS context</li> <li>- Requires definition of “essential data” globally and per Region?</li> <li>- Refer to IPET-SUP discussion on “essential data”</li> </ul>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>5. STANDARDIZED DATA FORMATS</b>  <b>(Use of appropriate, standardized formats);</b></p> <p><b>Lead: WMO WIS (IPET-MDRD for Future Data Model and Discovery Metadata, IPET-DRMM for detailed representation of observations) and CGMS-WMO Task Force on Metadata Implementation</b></p>	<p>-For current generation of instruments used in NWP efficient coordinated data formats are in use.</p> <p>-For non-NWP instruments a diversity of product formats exist, hindering global and regional exchange of data</p>	<p>-Define efficient formats for exchange of data from new generation of high-performance NWP instruments and LEO and GEO imagers</p> <p>- IPET-MDRD to discuss adoption of well-documented non-WMO data formats used in satellite operations, such as netCDF/CF in GSICS</p> <p><b>Indicator: Availability of globally agreed formats for Data Exchange for each instrument in GOS baseline.</b></p>	<ul style="list-style-type: none"> <li>- To be addressed by IPET-MDRD for new data formats</li> <li>- To be addressed by IPET-DRMM for existing WMO data formats</li> <li>- IPET-SUP can provide input through user case scenarios</li> </ul>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>6. GLOBAL RELAY OF DIRECT READOUT DATA (Global coverage of LEO Direct Readout Acquisition and Relay systems);</b></p> <p><b>Lead: RARS IG (WMO SP and CGMS)</b></p>	<p>-The full adaptation of RARS to the high-performance instruments on NPP/JPSS, METOP and FY-3 is starting, but commitment from regional alliances is crucial due to the significant technical challenges.</p> <p>-Expansion of RARS to Africa has started with the support of the EU.</p> <p>- In dimensioning the WIS networks, the capacity needed for the exchange of this data should be taken into account, since the new high-resolution instruments will result in increased data volumes, in particular for regional exchange</p>	<p>-Continue the evolution of RARS, with focus on the new generation of instruments on METOP/NPP/JPSS/FY-3,</p> <p>-Establish a WIS guide on RARS systems, addressing data management and network issues and a WIGOS guide on RARS products</p> <p><b>Indicator: Global coverage statistics for RARS (% area of Globe covered)</b></p>	<ul style="list-style-type: none"> <li>- Meeting on 11-13 March 2015 at WMO on (D)RARS coordination, to develop draft guide on standards and best practices for operations (WIS team invited to participate)</li> <li>- No specification in RARS on how data are exchanged (files, routes); TOVS hitherto exchange via GTS; needs guidance for hyperspectral sounders since data volumes O(10) larger</li> </ul>



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<p><b>7. STANDARDIZED DIRECT BROADCAST (Globally coordinated Direct Broadcast from LEO and GEO);</b></p> <p><b>Lead: CGMS</b></p>	<p>-CGMS DB standards revised for X-band transmissions from LEO satellites (NPP, JPSS, FY-3, METOP-SG).</p> <p>-New GEO DB services are however not fully coordinated, e.g. GOES-R GRB is not based on HRIT/LRIT standard.</p> <p>-Due to the high data rates and increased use of X-band, cost of user stations remains a concern for both LEO and GEO</p>	<p>-Monitoring of the implementation of the new LEO DB standard.</p> <p>-Encourage efforts for reliable, low-cost DB receiving stations for both LEO and GEO.</p> <p>-Clarify need for global standardization of GEO Direct Broadcast.</p> <p><b>Indicator: Availability of user Stations specifications and preprocessing software per mission and instrument.</b></p>	<ul style="list-style-type: none"> <li>- CGMS standards based on CCSDS</li> <li>- User issues: affordable reception systems; communication frequency protection; preprocessing software</li> <li>- No major involvement of WMO other than as member of CGMS WG I</li> </ul>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>8. ROUTINE ACCESS TO R&amp;D DATA</b>  <b>(Routine access to required data and products from R&amp;D satellites);</b></p> <p><b>Lead: CGMS</b></p> <p><b>Supported by: CBS ET-WISC TT-GISC, WMO IPET-SUP</b></p>	<p>-Some agreements exist, ensuring access to R&amp;D satellite data, e.g. from NASA, JAXA, SOA and ISRO.</p> <p>-However not all R&amp;D missions are covered and the agreements do not ensure data access for the global WMO community.</p>	<p>-Dissemination operators to establish arrangements with R&amp;D agencies ensuring availability to WMO members.</p> <p>-Global agreements between WMO and R&amp;D agencies could be considered</p> <p>- To improve visibility and access to R&amp;D and environmental satellite data, WMO through WIS to encourage Members to invite (where appropriate) such providers to become a DCPC</p> <p>- WMO SP to encourage non-meteorological satellite operators at CGMS to register in the WIS through a DCPC</p> <p><b>Indicator: Availability of Data Access agreements per R&amp;D mission, including data redistribution regulations.</b></p>	<p>- TT-GISC and the future Inter-Commission WIS task team to address issue of efficient data distribution (see target 1)</p>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>9. MAKING SATELLITE DATA AVAILABLE ON THE WIS (Dissemination providers acting as WIS DCPC, by providing coordinated data discovery, data access and data retrieval (DAR) for all satellite data);</b></p> <p><b>Lead: IPET-MDRD and CGMS Task Force on metadata implementation</b></p>	<p>-WIS implementation of DAR services has up to now concentrated on non-space data, and to support WIS→ CGMS has therefore established the CGMS-WMO Task Force on Metadata Implementation.</p>	<p>-CGMS members to support the Task Force with metadata expertise</p> <p>-CGMS Task Force on Metadata Implementation to work closely with IPET-MDRD.</p> <p><b>Indicator: Availability of DAR services for each baseline GOS mission (L1 and L2 data).</b></p>	

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>10. FINDING AND ACCESSING DATA ON THE WIS (On-demand access to satellite data and products through the WIS (cf Target 3));</b></p> <p><b>Lead: CBS ET-WISC TT-GISC</b></p> <p><b>Supported by: CGMS, WMO IPET-SUP</b></p>	<p>- Flexible on-demand access to specific data sets, including satellite data, is an important objective of the WIS. DCPCs have the possibility to provide deep data access URLs for the GISC catalogue, that would allow users connected to a GISC to access on demand data sets directly, the possibility of using advanced on-demand mechanisms however vary widely primarily due to internet and AMDCN capacity limitations.</p> <p>- There is a dialogue missing between WIS and the space community regarding the application of new technologies (cloud) to improve the on-demand access to satellite data. Currently this is the subject of many initiatives in the space community, but the dialogue regarding the application of these technologies in a WIS context has been very limited.</p>	<p>-Monitor the implementation of on-demand access in the WIS and ensure specific consideration of satellite data</p> <p>-ET-DC to consider the implementation of on-demand data access links in the WIS catalogue</p> <p>-Investigate the application of new cloud technologies in the WIS context to improve the on-demand access to satellite data</p> <p>-TT-GISC to request GISCs to reach out to all satellite operators to register products based on user requirements</p> <p>-TT-GISC and future Inter-Commission WIS task team to address issue of efficient data distribution (including on demand and push services)</p> <p><b>Indicator: Availability of on-demand satellite data sets in WIS</b></p>	<p>-In the short and medium term, this need can only be met by the individual data centers providing specific data access URLs in the WIS catalogue. An on-demand data transfer mechanism will not be provided by the WIS in the foreseeable future.</p> <p>- TT-GISC and the future Inter-Commission WIS task team should address issue of efficient data distribution (including on demand and push services)</p> <p>The WMO Product Access Guide and basic data access webpages provide guidance for accessing data and products on demand</p>

Strategic Target	Status	Actions and Indicators	Remarks
<p><b>11. INFORMATION AND COMMUNICATION WITH SATELLITE DATA USERS (Information and guidance to users).</b></p> <p><b>Lead: WMO IPET-SUP, ET-SAT</b></p> <p><b>Supported by: Inter-Commission WIS Task Team and WIS staff</b></p>	<p>-Information on the access to satellite data is provided in a heterogeneous fashion, and WMO information resources (SATURN, Product Access Guide, OSCAR) will bridge this gap</p>	<p>-Continue the development of the WMO portals</p> <p>-Satellite operators to support the development and improve their channels of communication with the users regarding data access</p> <p>- Communicate the strategy at CBS and TECO and in RAs –</p> <p>- Register WMO online resources with GISC Toulouse</p> <p><b>Indicator: Usage stats and user feedback for WMO information resources</b></p>	

**List of Acronyms:**

WMO SP: WMO Space Programme

WMO DRA: WMO Development and Regional Activities Department

WIS: WMO Information System

GISC: Global Information System Centre (in WIS)

DCPC: Data Collection and or Production Centre (in WIS)

DAR: Data Access and Retrieval

RA: WMO Regional Association

ET-WISC : Expert Team on WMO Information System Centres (in CBS OPAG ISS)

TT-DC: Task Team on Data Centres (under ET-WISC, in CBS OPAG ISS)

TT-GISC: Task Team on GISCs (under ET-WISC, in CBS OPAG ISS)

TT-OM : Task Team on WIS Operations and Monitoring (under ET-WISC, in CBS OPAG ISS)

ET-CTS : Expert Team on WIS-GTS Communication Techniques and Structure (in CBS OPAG ISS)

IPET-MDRD : Inter-Programme Expert Team on Metadata and Data Representation Development

IPET-DRMM : Inter-Programme Expert Team on Data Representation Maintenance and Monitoring

IPET-SUP: Inter-Programme Expert Team on Satellite Utilization and Products (in CBS OPAG IOS)

ET-SAT: Expert Team on Satellite Systems (in CBS OPAG IOS)

ET-SBO : Expert Team on Surface-Based Observations (in CBS OPAG IOS)

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