

UPDATE ON THE INTEGRATED GLOBAL DATA DISSEMINATION SERVICE (IGDDS)

In response to CGMS Recommendation 34.23 and Permanent Actions 07 and 08

The paper describes the progress that has been made with the IGDDS initiative since CGMS-34.

The IGDDS Implementation Group (IGDDS-IG) was established. The document reports on details of the discussions and outcomes of the first meeting of that group. The group suggested some clarifications to its Terms of Reference and to the IGDDS Implementation Plan.

The paper draws attention to the activities identified by the IGDDS-IG as requiring the highest priority. These include the establishment of data requirements for each region, the achievement of sustainable quasi-global coverage of services that respond to the identified requirements, the identification of suitable data exchange mechanisms for transferring data between regions and the provision of appropriate user information and support.

A further topic of importance is the need to ensure complete harmonization with the emerging standards being developed for the WMO WIS, of which IGDDS is defined to be a crucial element. This is a key to global interoperability which is a need for WIS and even reinforced in the context of the GEOSS.

The paper furthermore reports the views of ET-SUP which emphasized the requirement for level 1 imagery data from geostationary satellites in the DVB-S dissemination component of IGDDS in all regions, and noted the particular status of RA-III in this respect.

The paper also briefly reports the discussions on this topic at the recent APSDEU-8 meeting.

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1. BACKGROUND AND INTRODUCTION

At CGMS-34 the status of IGDDS was reviewed on the basis of an Implementation Plan and on the outcome of the previous joint IGDDS-RARS workshops, along with the deliberations of the Expert Teams on Satellite Systems (ET-SAT) and Satellite Utilization and Products (ET-SUP) at their sessions in September 2006.

CGMS-34 highlighted that IGDDS should guarantee a quality of service and traceability of the delivered products. It felt it essential to clearly identify the requirements to be fulfilled by IGDDS when infrastructure components were shared by different (meteorological and non-meteorological) applications. It recommended that CGMS operators should support the objectives of the IGDDS Implementation Plan (Recommendation 34.23) noting that an IGDDS Implementation Group would be established to refine the Plan and monitor its implementation.

In accordance with the conclusions of CGMS-34, the WMO Space Programme established an IGDDS Implementation Group. Noting the very close relationship with the RARS Implementation Group, the first meetings of these two groups were convened by WMO on consecutive days in July 2007. The status of the RARS initiative is described in a separate paper.

2. THE FIRST IGDDS-IG MEETING

The first meeting of the IGDDS Implementation Group (IGDDS-IG-1) took place at WMO in Geneva on 5-6 July 2007. Participants came from Australia, China, EUMETSAT, Japan, the Republic of Korea, Russian Federation, the United States of America and WMO and included a representative of GEONETCast.

The IGDDS-IG reviewed its Terms of Reference and proposed some clarifications, which are shown in Annex 1 **highlighted thus**. The group clarified that its main focus should be on real-time data dissemination, which is the area where satellite data applications are most specifically demanding, rather than off-line distribution or archiving strategy, for which a different expertise would be needed.

The group reviewed the high level functional requirements addressed by the Implementation Plan and agreed that some updates to the plan were required to apply appropriate focus and to avoid ambiguity. These updates are shown in Annex 2 **highlighted thus**.

The IGDDS-IG reviewed the implementation status of the project and highlighted the following six important issues:

- Establishing data requirements for each regional dissemination service;
- Ensuring quasi-global coverage by DVB satellite dissemination services in accordance with agreed requirements;
- Ensuring robustness;

- Inter-regional data exchange between regional hubs;
- Appropriate user support;
- Compliance with WIS standards.

The group assigned several actions that reflected the importance of these priority areas. Each of these issues is described in more detail below.

2.1 Establishing data requirements for each regional dissemination service

The participants agreed that action was needed in this area since current mechanisms and procedures do not adequately capture what is required. The group was informed that the determination of data requirements was also a necessary step in the context of the WIS. It was recognized that the administrative boundaries of WMO Regions are not necessarily corresponding with the footprint of DVB-S systems, which suggested that discussions of requirements within WMO Regional bodies should bear in mind the context of these footprints but not be constrained by them. The group agreed that several avenues could be explored including:

- Involving WMO Regional Associations, through their Working Group on Planning and Implementation of the World Weather Watch (WG-PIW) and their Rapporteurs on Satellite Matters;
- Interacting with the existing two data exchange forums: the North America-Europe Data Exchange meeting and the Asia-Pacific Satellite Data Exchange and Utilization meeting (APSDEU);
- Invoking sub-regional mechanisms such as the one which brings together members of the former USSR.

IGDDS-IG agreed on a number of important actions on this topic including the following sequence of three actions to identify requirements of Asia-Pacific countries for possible additions to the FengYunCast dissemination service:

Action IGDDS-IG-1.9: *CMA to provide the current FengYunCast product dissemination schedule to the IG by the end of August 2007 (action completed)*

Action IGDDS-IG-1.10: *JMA, BoM and KMA to express their requirements for proposed additions to the FengYunCast dissemination schedule, to enhance the regional operational value, by end of September, in order to allow a presentation and discussion at APSDEU-8, with a view to obtaining a consolidated regional proposal from APSDEU-8 (to be formally communicated to CMA following APSDEU-8).*

Action IGDDS-IG-1.11: *CMA to investigate the feasibility of adding the requested products to the FengYunCast dissemination schedule and to provide a timetable for their introduction by the end of 2007.*

2.2 Ensuring quasi-global coverage by DVB satellite dissemination services in accordance with agreed requirements.

The group heard presentations from the various participants on the current status of dissemination systems including DVB-S systems as well as Internet-based ones. Alongside the systems already in place the group noted with particular interest the developments in JMA to disseminate MTSAT data via the Internet and the Russian operational MITRA system which represents a potential for an additional operational component of the IGDDS DVB-S infrastructure.

The group noted the particular situation of South American countries, which were benefiting from the EUMETCast-Americas service on a provisional basis, and which will be served by the new GEONETCast-Americas service recently established by NOAA in the GEO context with a particular focus on environmental value-added products.

2.3 Ensuring robustness

The IGDDS-IG acknowledged that the multi-purpose DVB-S dissemination infrastructure offered a potential for very effective access to a wide range of data serving a wide range of operational applications through a single system but, as a consequence, it represented an unprecedented level of data concentration, which created a particular vulnerability. Service continuity should be considered through availability performance, on the one hand, and robustness or vulnerability, on the other. This should be addressed in part via appropriate terms of contractual agreement with telecommunication service providers and, in parallel, by identifying alternative routes as possible back-ups in the context of the WIS and with the support of Internet. For such cases, it is considered as an advantage that data should be available in similar formats on these various means, in order to facilitate switching to back-up mode.

2.4 Inter-regional data exchange between regional hubs

The group considered the emerging DVB-S physical architecture in terms of data exchange and interoperability, and the following topics were discussed:

- Inter-regional data exchange which, for the foreseeable future, will be carried out using a combination of dedicated links, the GTS (and its extensions) and the Internet;
- The possible technical solutions to the question of applying the data policy and user management of data passed to a regional dissemination system operated by an agency other than the owner of the data;
- The interoperability of dissemination systems with overlapping footprints, from a user point of view; noting that if users wish to take advantage of different systems available in their area, it is expected to be more efficient to have several dedicated receiving systems rather than implementing complicated combined receivers.

2.5 Appropriate user support

The importance of user documentation and appropriate support for the implementation and operation of a receiving hardware and software was highlighted, especially for a 'cross-border' user community. In the FengYunCast context BoM volunteered to act as a pilot foreign user of FengYunCast and to provide feedback on user support aspects to CMA.

2.6 Compliance with WIS standards

Following a presentation on the current status and plans for the WIS, the group considered the implications for the IGDDS project of compliance with WIS standards. In addition to bulletin header and file naming issues, WIS standards were mainly related to enabling the registration of products and services utilizing the WMO profile of ISO19115 metadata standard. This will enable a Global Information Service Centre (GISC), through a common interface, to harvest metadata from the catalogues of IGDDS contributors. This standardization aspect was a key to ensure interoperability of various information systems within the GEO GEOSS.

The IGDDS-IG agreed several specific actions to take the subject forward including two pilot actions, one by EUMETSAT to implement the standard to RARS ATOVS data and the other by BoM to apply it to marine data.

2.7 Overall programmatic aspects

IGDDS-IG was informed that the CBS had agreed on a recommended procedure for the designation of Global Information System Centres (GISC) and Data Collection and Product Centres (DCPC) within the WIS. The procedure for designating DCPC consists of three steps:

- The service offered by potential DCPCs would be reviewed by the relevant Technical Commissions and submitted to the Inter-Commission Coordination Group on the WIS (ICG-WIS) that will analyze compliance with WIS DCPC functions;
- The candidate DCPC should demonstrate to CBS its capability to provide the relevant services;
- The Executive Council will consider for approval the recommendations by ICG-WIS and by CBS.

It was considered beneficial to maintain a link between the IGDDS-IG and the GEONETCast Implementation Group, in order to ensure a regular flow of information between these two projects, noting that satellite meteorology is acting as a pilot application area for GEONETCast, and that many of the issues addressed within the IGDDS-IG are of direct relevance to GEONETCast as well.

The group agreed that their next meeting should be in May 2008 and, if feasible, should once again be held back-to-back with a RARS-IG meeting.

3. THE VIEWS OF ET-SUP

ET-SUP, at their third session in September 2007, reviewed the outcomes of the first meeting of the IGDDS-IG and agreed the following:

- ET-SUP took note of, and welcomed, the progress of the IGDDS project as stated in reports of the first meeting of the IGDDS-IG;
- ET-SUP noted that the IGDDS project has been formulated with the needs of WMO members as a key goal;
- ET-SUP noted the proposed changes to the IGDDS-IG Terms of Reference and to the IGDDS Implementation Plan and endorsed both changes;
- ET-SUP indicated that the use of the term “Data discovery” in section 4.3 a) of the Implementation Plan might not be widely understood and its meaning could be better defined.

The group raised the issue of the NPOESS so-called ‘safety net’ network and whether, under a Joint Polar System agreement between EUMETSAT and NOAA, it was foreseen that Metop data could be handled by such a system with the consequent improvements in timeliness. The group could not supply the answer from within their membership and hence raised the following action for this to be clarified at CGMS, with the agreement of the Chair of the Open Programme Area Group on Integrated Observing Systems (OPAG-IOS):

Action ET-SUP-3.8 The Chair of OPAG-IOS is requested to seek clarification through CGMS as to whether the provisions of a Joint Polar System would enable Metop to take advantage of the NPOESS safety net in order to improve timeliness of global data delivery to users.

ET-SUP considered the issue of identifying regional IGDDS requirements. They considered a generic Standard Product Inventory that had been drafted by the WMO Secretariat and reviewed by the IGDDS-IG to be used as a “first guess” for detailing user requirements for satellite data and products disseminated in each Region. The session further noted that the IGDDS-IG had advised that requirements should be discussed within WMO Regional bodies. ET-SUP considered the mechanisms proposed to be appropriate for the purpose but noted that WG-PIW meetings are usually convened only every four years so their input would be restricted by this.

From their user point of view and based on their own expertise, ET-SUP stressed that “GEO imagery over the region” as stated in the generic requirement table would be a high priority requirement to be carried out by DVB-S systems for all regions. In this respect, ET-SUP noted the status of DVB-S data dissemination over RA III (South America) and expected that the outstanding CGMS Action 33.24 would lead to a solution satisfying this requirement.

4. DISCUSSION AT APSDEU-8

The eighth meeting of the Asia Pacific Satellite Data Exchange and Utilization group (APSDEU-8) in Montreal, Canada on 9-12 October 2007 discussed the actions raised by the IGDDS-IG in respect of the evolution of FengYunCast. Since CMA unfortunately could not be represented, WMO presented the FengYunCast product

dissemination schedule (as received from CMA some days before the meeting). The APSDEU-8 participants agreed that this sequence of actions constituted an important part of the process of evolving FengYunCast from a national to a regional IGDDS component. The group expressed its deep appreciation to CMA and took actions to respond on possible additional regional requirements.

5. CONCLUSIONS

CGMS Members are invited to note that the IGDDS implementation is progressing in accordance with the plan, however particular attention is required on:

- The formulation of data dissemination requirements for each region;
- The achievement of a robust and sustainable DVB-S dissemination architecture, with quasi-global coverage;
- The provision of appropriate user support arrangements;
- The adoption of WIS file naming and metadata standards (See Annex 3)

Furthermore, CGMS Members are invited to:

- Note the question from the OPAG-IOSS Chair whether the provisions of a Joint Polar System would enable Metop to take advantage of the NPOESS safety net in order to improve timeliness of global data delivery to users;
- Consider the proposed changes to the Terms of Reference of the IGDDS Implementation Group and to the IGDDS Implementation Plan as shown in the Annexes to this paper;
- Note the requirement for DVB-S dissemination of GEO imagery, as one of the primary requirements, and the expectation that Action 33.24 would lead to a plan satisfying this requirement in South America.

ANNEX 1

DRAFT UPDATE TO THE TERMS OF REFERENCE OF THE IGDDS IMPLEMENTATION GROUP

1. An IGDDS Implementation Group is established by the WMO Space Programme in order to support the development and implementation of an Integrated Global Dissemination Service (IGDDS) as agreed by the Executive Council (EC-LVI) who requested “to consider the possible shape of an IGDDS which builds on the ADM concept [and] is seen as central to the vision of an integrated space-based component of the GOS...” and in accordance with CGMS discussions.
2. The scope of IGDDS project is to define and operationally implement the circulation scheme of space-based observation data and products meeting the needs of WMO programmes.
3. The tasks of the IGDDS Implementation Group are to monitor and provide guidance on the progress of IGDDS and more specifically on:
 - Consolidation of data requirements for each region;
 - Data concentration networks, taking namely into account the outcome of RARS activities;
 - Implementation and interoperability of data dissemination elements;
 - User/Data Management and Quality of Service;
 - Overall coordination with WIS;
 - User Information.
4. The IGDDS Implementation Group shall keep under review the IGDDS Implementation Plan and propose updates as appropriate.
5. The IGDDS Implementation Group shall be composed of technical experts designated by organizations contributing to IGDDS components and of WMO experts representing user communities.
6. The IGDDS Implementation group will meet nominally once a year and report on its activities to CGMS and WMO.
7. Unless otherwise agreed, the IGDDS Implementation group will cease its activities when the IGDDS will be fully implemented. Thereafter operational coordination of IGDDS activities will be achieved through the relevant permanent WMO and CGMS mechanisms.

ANNEX 2

DRAFT UPDATE TO SECTION 4 OF THE IGDDS IMPLEMENTATION PLAN

4. IGDDS HIGH-LEVEL REQUIREMENTS

4.1 Data concentration and exchange

- a) Capability to concentrate data from all following types of sources:
 - operational GEO systems
 - global (recorded on-board) data from operational LEO systems
 - regional retransmission of direct broadcast data from polar-orbiting satellites (i.e. RARS allowing timely access to polar-orbiting sounder data, and similar)
 - R&D or environmental satellites
 - Products derived by regional or national processing centres
- b) Capability to include data from all regions through inter-regional exchange arrangements
- c) Data from every DCPC are made available to any other DCPC, if required for inter-regional data exchange, taking due account of data ownership

4.2 Data dissemination

- a) All continents in all WMO regions should be covered by ADM.
- b) Coverage by ADMs or other means (direct broadcast or point-to-point lines) should be extended to the full globe (incl. Oceans, islands,..) to the extent practical.
- c) Data from multiple sources should be integrated in a limited number of shared ADM dissemination systems
- d) ADM user terminals (hard- and software) should be openly available at affordable prices
- e) For the foreseeable future, ADM will rely on Digital Video Broadcast by Satellite (DVB-S) and Internet Protocol (IP). (With reference to the Open Systems Interconnection (OSI) model of the International Standards Organization (ISO), this requirement refers to the "Transport Layer".)
- f) Data disseminated via ADM shall be in internationally agreed formats. (With reference to the OSI model of ISO, this requirement refers to the Session and Application layers.)
- g) ADM should provide optimal timeliness through data priority-handling scheme.
- h) Dissemination services should be reliable and continuously available as required for operational use.

4.3 Data access on request

- a) Data discovery should be possible for any user
- b) Archived or recent data should be accessible on-demand for authorized users

4.4 Data and user management

- a) A Rolling Requirements Review process shall be established for regional data needs and inter-regional data exchange in order to plan the evolution of telecommunication links in a cost-efficient way.
- b) A mechanism should be established to determine the agreed dissemination data content in response to the Rolling Requirements Review process.

- c) Metadata should be associated with data in accordance with WIS internationally agreed standards.
- d) Data catalogues should be implemented in an interoperable way to allow consultation, in accordance with WIS agreed standards.
- e) User Service capabilities should include user registration and user support, as well as subscription for routine real-time dissemination.
- f) Reception of data and products disseminated in near-real time will be possible for all suitably equipped users. However, access shall be controlled by mechanisms enabling the provision of data and products selectively, depending on the user's registered profile, in accordance with the data policy of the owner of the data/products and with WMO Resolution 40 (Cg-XII).
- g) Quality of service should be permanently monitored as per availability, continuity, error rate, timeliness.
- h) IGDDS operation and evolution will be coordinated within WMO

ANNEX 3

WIS FILE NAMING CONVENTION and WIS CORE METADATA PROFILE STANDARDS

Summary provided by the WIS Project Manager, July 2007

As noted in the draft report of the first meeting of the WMO IGDDS Implementation Group in paragraph 8.4, the main structural requirements of WIS are for centres to be able to provide information in files with unique names, and that for each file name or family of filenames, there needs to be a partner metadata file.

File naming convention

With respect to unique filenames, Mr Pierre Kerherve (WMO Secretariat) had provided a briefing to the first meeting of the RARS Implementation Group on Code and Format Harmonisation Issues (RARS IG-1 Item 6). This paper goes into specific details about the file naming conventions requirements for WMO systems for the RARS information. Kerherve's paper is based on the Manual on GTS Attachment II-15 "Recommended Practices and Procedures for the Implementation, Use and Application of TCP/IP on the GTS." The Manual on GTS is available online via the WMO GTS Web Page at

http://www.wmo.int/pages/prog/www/ois/Operational_Information/WMO386/ManOnGTS.html

In particular, WIS Filenames ideally take the form of

<code>pflag_productidentifier_oflag_originator_yyyyMMddhhmmss[_freeformat].type[.compression]</code>
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where components other than the 'free format' component are defined in the above reference, presently on page A.II-15/32. Mr Kerherve noted that the RARS community were already working on a standard for filling in the free format component, and with the exception of one or two issues were near completion.

Metadata file

The key to interoperability within WIS, is the ability to easily read and search on metadata that provides a high level description of what the information is, its purpose, geographical extent and where to access the information. The WIS Metadata Working group have identified that the metadata standard to be used is the ISO19115, accompanied by the other ISO19100 series standards as needed. To be compliant with the ISO19115 standard at the highest level is depicted in examples included in ISO19115. However, the Metadata Working group have identified several shortcomings in the standard and have created a profile of the standard which has some additional compulsory and optional components.

The WMO profile is available online from the WMO data management page at <http://www.wmo.int/pages/prog/www/WDM/wdm.html> and under metadata, WMO core profile of the ISO metadata standard or directly from [http://wis.wmo.int/2006/metadata/WMO_Core_Metadata_Profile_\(October_2006\)/documentation.htm](http://wis.wmo.int/2006/metadata/WMO_Core_Metadata_Profile_(October_2006)/documentation.htm)

Note that to utilise the ISO profile, you require a copy of the ISO standard 19115 from ISO.