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WMO IGDDS IMPLEMENTATION GROUP

1st MEETING

GENEVA, SWITZERLAND

5 – 6 July 2007

FINAL REPORT

PARTICIPANTS

The Participants of the meeting came from Australia, China, EUMETSAT, Korea, Japan, Russian Federation, United States of America, and WMO, and included a representative of GEONETCast. The contact details of all the participants are attached as Appendix III to this report.

1. INTRODUCTION AND REVIEW OF AGENDA

1.1 Dr Donald E. Hinsman, Director of the WMO Space Programme, welcomed the participants to Geneva and emphasized the importance of the Integrated Global Data Dissemination Service (IGDDS) to WMO. In particular it was stressed that:

- Among the main thrusts of the WMOSP is to improve access to satellite data and products, e.g. through definition of direct dissemination standards, or through promotion of the use of advanced dissemination methods;
- The IGDDS is thus a key project, within the WMO Information System (WIS), which itself was identified by WMO Congress as one of the 11 Expected Results in the WMO Strategic Plan;
- An IGDDS Implementation Plan has been developed, and endorsed by CGMS, that calls for the establishment of this IGDDS Implementation Group to provide oversight and guidance on the evolution and implementation of the plan.

1.2 Also, the participation in this meeting of Dr. Alexander Gusev, President of CBS, was noted with appreciation.

1.3 Dr Hinsman then thanked the group for their support in establishing the IGDDS and handed over the chairmanship of the meeting to Jerome Lafeuille, Head of the Space-based Observing System Division, who added his welcome to that of Dr Hinsman.

1.4 The participants then reviewed revision 1 of the provisional agenda and agreed that this should be adopted for the meeting. The agenda is attached as Annex I of this report.

2. TERMS OF REFERENCE AND MEMBERSHIP

2.1 The Chair started by recalling that the group was established for the duration of the IGDDS project, and that the members of the group had been nominated by their respective Permanent Representatives or Organizations. For information, the list of nominated members is attached as Annex II this report. It was noted that some designated members could not attend this first meeting but were represented, and that some Members of the RARS Implementation Group were able to attend the IGDDS Implementation group as well, thus helping coordination between the two groups.

2.2 It was noted that draft Terms of Reference for the group had been initially drafted within the Global RARS-IGDDS workshop, then reviewed and endorsed by 34th CGMS.

2.3 Some of the main elements of the Terms of Reference were then discussed, including:

- the ADM concept in the context of the IGDDS;
- the scope of the IGDDS and the need to cover all space-based observation data and products required to meet the needs of WMO programmes;
- WIS and its relationship to the IGDDS;
- the main tasks including:
    - the consolidation of regional requirements;
    - data concentration, taking account of the outcomes of the RARS project;
    - the implementation and interoperability of data dissemination elements;

    - user/data management and quality of service;
    - user information.
- contributors to the IGDDS;
- logistical aspects (e.g. meeting frequency, reporting and duration of the group's mandate).

2.4 In response to a query about coordination across WMO programmes, it was noted that the on-going dialogue between the WMOSP and WWW will be used to facilitate coordination.

2.5 EUMETSAT raised a point of clarification about RARS, and why it was specifically mentioned in the Terms of Reference. In response the Chair observed that RARS was seen as a very specific example of data concentration mechanisms. Also it was noted that IGDDS Implementation Plan called for a RARS-IGDDS Implementation Group, but it appeared convenient and efficient to convene the 2 groups separately but in sequence and this was a way to focus the activities of each group while maintaining a link between them.

2.6 It was further noted that whereas EUMETSAT RARS data are on EUMETCast, this is not generally applicable (i.e. GTS is predominantly used in other areas), therefore the specific feature of RARS is the mode of data concentration rather than the diffusion.

2.7 EUMETSAT then asked about the practical implications of coordinating with WIS. In response the Chair noted that EUMETSAT was already participating in the V-GISC project and suggested that further discussion of this point be delayed until agenda item 8 which will specifically address this point.

2.8 Roshydromet then asked for clarification concerning the use of the term "user information". The Chair replied that the term "user information" should be understood in the context of keeping the user community informed about the development of the IGDDS, and the group could make recommendations as to how progress should be reported to the user community. For example, the preceding RARS IG meeting had paid attention to wide user information through a RARS website.

2.9 Following this explanation the Roshydromet queried the relationship between this group and IGDDS Implementation Plan, as the plan was not mentioned in the Terms of Reference. The Chair acknowledged that this was an omission and took the action to propose an amendment to the Terms of Reference and at the same time to correct a small editorial mistake.

Action IGDDS-IG-1.1: WMOSP to propose the addition of a bullet in the Terms of Reference to explicitly identify the need for the IG to keep the IGDDS Implementation Plan under review and to propose updates as appropriate (and to add "Data" in the first paragraph - editorial correction).

3. IGDDS IMPLEMENTATION PLAN PRIORITY ACTIONS

3.1 The paper entitled "IGDDS Implementation Plan Priority Actions" was then presented which contained proposals for four priority action areas:

a) Establishing data requirements for each regional DVB-S service;
b) Quasi-global dissemination coverage on a sustainable basis;
c) Identification of suitable data exchange mechanisms for transferring data between regions;
d) Provision of appropriate user support arrangements.

3.2 EUMETSAT noted that quite a lot of work remained to be done to achieve the IGDDS objectives and these proposed action areas could be assigned about the same priority.

3.3 NOAA felt that the paper captured the issues very well and noted that most of the proposed actions would be addressed in more detail later on under specific agenda items.

3.4 Roshydromet felt that it was a very clear document which could be updated with information concerning the Russian dissemination system (MITRA).

3.5 Concerning the point in section 2.2 on data requirements, Roshydromet felt that the focus of the group should be on the establishment of the dissemination infrastructure (rather than on establishing requirements). The Chair clarified that this group was not expected to formulate the requirements. Instead the role of this group would be to make sure that suitable mechanisms are in place, and associated actions carried out, to ensure that an appropriate set of requirements are established.

3.6 It was agreed that the proposed priority actions would be revisited under item 12 (after more detailed discussions on related agenda items had taken place).

3.7 Concerning the ET-SUP comments included as Annex II of the paper, WMO noted that the main thrust of their comments on the IGDDS Implementation Plan was the need to have assigned actions, together with a timescale, and appropriate monitoring mechanisms in place. It was felt that the IG should bear this in mind for every issue it would address rather than to consider a change to the document at this stage.

4. REVIEW OF HIGH-LEVEL FUNCTIONAL REQUIREMENTS

4.1 For this agenda item the high-level functional requirements contained within the IGDDS Implementation Plan were discussed, covering:

- data concentration and exchange;
- data dissemination;
- data access on request;
- data and user management.

4.2 NOAA asked about the implications of the plan having an “approved” status, and what should be understood by this. The Chair clarified that CGMS have approved the plan as a first version, with the understanding that it may need to be refined and updated as the project develops.

4.3 NOAA felt that the functional requirements should be considered as high-level objectives, rather than committing requirements. Some specific requirements could be problematic (e.g. if the requirements for data exchange meant that all data sets had to be exchanged between DCPCs then this would raise issues such as implications for bandwidth and the matching of data content with regional requirements).

4.4 The group agreed that this should be clarified in the wording of 4.1.c) by stating that data would be made available to other DCPCs “*if required for inter-regional data exchange*”.

4.5 The definition of “recent data” in section 4.3b) for on-demand access was queried and it was clarified that clauses 4.3a) and 4.3b) should be considered together – data discovery should be totally open whereas data retrieval would have more implications, for example involving taking account of the policy of the data owner.

4.6 EUMETSAT noted that, in terms of functional scope, there appeared to be a difference between the IGDDS and GEONETCast, as the GEO offline portal for GEO is not part of GEONETCast (whereas the IGDDS includes the offline component). This definition of the functional scope of the IGDDS may cause some problems for this group as its representation is focused on real-time dissemination aspects, and discussions on the offline component would require a different representation. Furthermore, EUMETSAT felt that a key factor in the success of GEONETCast has been the restriction of its focus to real-time aspects.

4.7 The Chair felt that it would be quite justified to focus the group's activities on real-time dissemination, which is where satellite applications are specifically demanding, and, for offline aspects, to place reliance on what is being done in other parts of the WIS project.

4.8 Roshydromet queried the meaning of "GEO systems" in the first bullet of section 4.1a). It was clarified that "GEO" in this context meant "Geostationary", and not the "Group on Earth Observations". The group recognized the potential for ambiguity in the use of the term and agreed that clarification via a glossary of terms is often useful.

4.9 A general discussion then took place concerning the ability of users to receive data, and how this was reflected in Section 4.2: "Data Dissemination" and Section 4.3: "Data Access on Request".

4.10 Following this discussion, the WMO prepared a re-wording of 4.4.f) of the high-level functional requirements, and following its circulation to the Group, the following revised text was proposed for section 4.4 f):

> *4.4 Data and User Management*
>
> *f) Reception of data and products disseminated in near-real time will be possible for all suitably equipped users. However, access shall be constrained by control 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).*

Action IGDDS-IG-1.2: WMO Secretariat to update Section 4 of the IGDDS Implementation Plan in line with IGDDS-IG1 discussions.

5. IDENTIFICATION OF REGIONAL DATA REQUIREMENTS

5.1 In support of this agenda item, the paper entitled "Identification of Regional Data Requirements" was presented.

5.2 The Chair emphasised the need for a formal set of requirements for regional data dissemination, since the current WMO requirement for satellite data access is only expressed in terms of availability of direct receiving stations for each WMO Member. The importance of reviewing this basis being underlined by the changes that have taken place in recent years, including:

- the increased role of multi-purpose retransmission systems in comparison with direct dissemination;
- the availability of more sophisticated instruments requiring distribution of high-level products generated by dedicated processing centres rather than direct dissemination of raw data

Also, any process that is undertaken to define regional requirements needs to mesh with what is available with what is required (as illustrated in the diagram on page 3 of the paper).

5.3 It was further clarified that feedback from this group would be beneficial in two main areas:

- the proposed mechanisms for establishing the requirements;
- the proposed format of the requirements (as illustrated in the tables attached to the paper).

5.4 It was noted that as this was the initiation of a new task, rather than an updating process, and it was not straightforward to put in place an appropriate mechanism.

5.5 BoM asked if there was merit in augmenting the suggested mechanisms with inputs from other frameworks such as APSDEU and the North America and Europe Data Exchange meetings.

5.6 NOAA felt that both the Regional Associations and these Data Exchange frameworks could benefit from a two-way dialogue. In addition it was noted that the United States is considering setting up an Americas group for GEO (consisting of US GEO plus other representatives from the Americas).

5.7 EUMETSAT asked if the focus of the table in the paper was on real-time dissemination. The Chair confirmed that this understanding was correct since the requirements for off-line data could be basically reflected by actual data retrieval or user requests.

5.8 Roshydromet found the discussions very useful and mentioned the possibility of making use of sub-regional mechanisms. In this respect it was noted that the Intergovernmental Council on Meteorology, which includes former members of the USSR, could be a useful forum for this activity and Roshydromet will work with this Council to try to define a list of products that should be disseminated, which should be possible to do within a year.

Action IGDDS-IG-1.3: Roshydromet to report back to IGDDS-IG-2 on the progress in establishing sub-regional requirements.

5.9 It was noted that the two data exchange meetings could also consider regional data requirements in the context of, but not constrained by, the dissemination footprints that are likely to be available within the region.

Action IGDDS-IG-1.4: IGDDS Implementation Group members participating in APSDEU and the North America and Europe Data Exchange meetings to report back to IGDDS-IG-2 on items of relevance to the establishment of regional requirements.

6. STATUS OF MTSAT DELIVERY VIA INTERNET

6.1 JMA presented the status of MTSAT data delivery via Internet. The presentation included the following highlights:

- JMA have been operating an Internet service since 2002. Since March 2007 data from all channels on MTSAT have been included and currently 18 NMHSs are registered for this service;
- Since March 2007 JMA have provided MTSAT image data and NWP products via the Internet for display / manipulation with the SATAID tool as a WIS prototype service;
- The Sentinel Asia service, an Internet-based Web-GIS disaster management support system for the Asia-Pacific region, is expected to be introduced through a joint effort of JMA and JAXA in July 2007. This service will be a contribution to GEONETCast;
- Direct dissemination to MDUS and SDUS users is foreseen to continue until the end-of-life of MTSAT-2 (around 2015);
- For the next generation of satellites JMA are already considering the feasibility of data dissemination via direct broadcast, the Internet of other means.

6.2 In response to a query, JMA confirmed that the public Internet was used for the delivery of the services.

6.3 In terms of timeliness of the delivery of image data via Internet, JMA confirmed that this was the same as for the direct broadcast service. It was also confirmed that it was a “pull” service.

6.4 BoM informed the group that they are using the system as a back-up for receiving MTSAT data.

6.5 In response to a question concerning how many users could be supported by the system, JMA indicated that the system could easily handle 20 users but server limitations could affect the quality of the service if the number of users was too large.

6.6 The Chair inquired as to whether the service could be used for remote islands in the region. BoM explained that the SATAID component was a low bandwidth service that could be used to support islands which may be otherwise restricted by bandwidth limitations.

6.7 NOAA agreed with a point made in the JMA paper that cost-effectiveness for operators is also important and not just cost-effectiveness for users. This is a factor that NOAA has to take into account in its considerations as to the appropriate way forward for its planned DVB-S service.

6.8 JMA described that an LRIT service via Internet was planned to begin in 2008 and, in response to a question, it was confirmed that visible channel data was included in LRIT.

7. STATUS OF DVB-S DISSEMINATION INFRASTRUCTURE

7.1 EUMETCast

7.1.1 EUMETSAT gave a presentation of the EUMETCast current status and future plans. The presentation included the following highlights:

- A general service description describing:
  - A guaranteed service level of 99.5% (a level which is usually exceeded);
  - A highly scalable infrastructure;
  - A full range of access control options at the file and User level;
  - The current service content in terms of data and products.
- A description of current performance, including:
  - MSG level 1 data: 10 Gbytes/day per satellite with timeliness of 5 minutes from sensing;
  - Metop + NOAA-18 global level 1 data: 60 Gbytes/day with timeliness of 135 minutes from sensing;
  - Metop + NOAA-18 regional (EARS) level 1 data: 3 Gbytes/day with timeliness of 30 minutes from sensing.
- A description of the geographical coverage and bandwidths of the various services:
  - 12 Mbps over Europe;
  - 3 Mbps over Africa;
  - 2 Mbps over Americas.
- An illustration of the large and growing numbers of users for the operational services;
- The role of EUMETCast in the current implantation and future plans for GEONETCast.

7.2 FengYunCast

7.2.1 In discussing the status of FengYunCast, CMA informed the group that there were no significant changes in the status of the service since last year. CMA confirmed that there are currently around 130 users inside China and 6 outside China and the bandwidth is now 8Mbps. CMA also clarified that it is planned to maintain MTSAT imagery on FengYunCast. In response to a question from Roshydromet about the size of the receiving antenna, CMA stated that the required dish size was 1.8m or 2.4m (in C-band).

7.2.2 Concerning progress towards the regional trial, CMA noted that the focus is currently on developing countries in the region (which relates directly to the 6 users outside China). BoM stated that they have been negotiating with ShineTek to buy a FengYunCast receiving system and hope to have it in place by the end of the year.

7.2.3 The Chair noted that interesting information had been presented at the RARS-IG meeting concerning the possible merging of two CMA's DVB-S systems.

7.3 MITRA

7.3.1 Roshydromet presented the current status and future planning for the Multi-address Information Transmission (MITRA) system. The presentation included the following highlights:

- A description of the MITRA system including the fact that there are currently more than 200 subscribers in Russia and the neighbouring states of Kazakhstan, Tadzhikistan, Armenia and Byelorussia;
- The four satellites used by the MITRA system to broadcast the data including their respective footprints (collectively covering the whole of Europe and a significant part of Asia);
- The current service content in terms of data and products;
- A description of a typical low-cost MITRA user terminal including:
  - terminal hardware;
  - terminal software:
    - data receiving software;
    - data processing and presentation software.
- The measures taken to address system robustness.

7.3.2 The primary purpose of the system is to replace the old system for transmitting meteorological data nationally. MITRA, using DVB-S technology, started 3 or 4 years ago. The system has now evolved and can provide each user with data that reflects their needs (by masking). The system has been installed in some neighbouring countries and Roshydromet would like to organise a discussion with Russian-speaking countries about data requirements (see earlier related action). Roshydromet stated that, in principle, there would be no problem in increasing the bandwidth, but it would depend on the particular requirements and applications

7.3.3 The Chair, noting the use of 4 satellites with overlapping footprints, asked how the data streams were distributed between the various satellites. Roshydromet replied that, in principle, each footprint contains the same information with the bandwidths ranging from 256 Kbps to 1 Mbps. It was also confirmed that one user terminal could receive data from all four satellites and, for reasons of robustness, each reception station is equipped with 2 antennas. Other end-user terminals are also used via peer-to-peer Internet architecture to restore missing data.

7.3.4 In the GEO context, EUMETSAT inquired about user interface for the reception of data. Roshydromet considered this to be an open point at the moment, and noted that the first relevant applications could be related to disaster mitigation.

7.4 GEONETCast

7.4.1 NOAA, representing the GEONETCast Implementation Group, provided a presentation on GEONETCast. The presentation included the following highlights:

- A description of GEONETCast and how it is a key element of the notional dissemination component of GEOSS. The plan to demonstrate the global capability of GEONETCast at the 4th Earth Observation Summit in Cape Town in November was also mentioned;
- All the major GEONETCast participants were described including data providers, dissemination service managers, satellite service providers and end users;
- A description of the interface to GEO and, in particular, of the membership and structure of the GEONETCast Implementation Group;

- The global nature of GEONETCast was illustrated both in terms of the coverage of the dissemination services and through a list of GEO members and other organizations who have expressed interest in GEONETCast;
- Past activities, such as the First International GEONETCast Participants Meeting in 2006 and a number of live demonstrations were described as well as a number of planned activities which include:
  - The establishment of technical interoperability mechanisms between the dissemination services (EUMETCast, FengYunCast and GEONETCast-Americas);
  - The establishment of inter-agency agreements on exchange of data;
  - Actively exploring the potential involvement of Russia;
  - The expansion of the content to include all 9 SBAs through interaction with existing and new data providers;
  - The consolidation of user requirements.
- A description of the concept of global data exchange within and across regional boundaries;
- The major upcoming milestones for GEONETCast.

7.5 GEONETCast-Americas

7.5.1 NOAA provided a presentation on GEONETCast-Americas. The presentation included the following highlights:

- A description of how the GEONETCast-Americas service will fit into the overall GEONETCast concept including its notional coverage and project schedule;
- The initial operational capability of GEONETCast-Americas was described including:
  - The possibility of using DVB-S2 rather than DVB-S;
  - An initial data throughput of 2 Mbps which could be expanded to 10 Mbps depending on demand;
  - A service availability of 99.5% with an option for 99.9%.
- A description of the system architecture and of a typical user receiving station (with some price estimates);
- An assessment of the potential end-users and a description of expected product information (including data format, access control mechanisms, etc), along with a sample of proposed initial products.

7.5.2 In response to a query as to whether it was assumed that GEONETCast-Americas and EUMETCast-Americas would co-exist, NOAA confirmed that this was the current baseline, noting, for example, that the GEONETCast-Americas service will not contain satellite image data, although the technical capability does exist to expand the capacity.

7.5.3 Concerning the relationship to data providers, NOAA stated that one option could be to have one channel per SBA.

7.5.4 It was noted that the specification for the new service makes reference to the DVBS-2 standard and it was clarified that:

- DVBS-2 can carry 30% more data for a given bandwidth (compared to DVBS);
- it is straightforward to upgrade a user station from DVBS to DVBS-2 (replacement of a card);
- DVBS-2 is compatible with DVBS (so DVBS transmissions can be received by a DVBS-2 reception station).

7.5.5 In response to a question about potential transition from EUMETCast-Americas to GEONETCast-Americas, it was confirmed that, if NOAA were to broadcast all the data that is currently on EUMETCast-Americas via GEONETCast-Americas, (i.e. to have only one consolidated service over the Americas) then the impact on a current EUMETCast-Americas user

would be confined to the re-pointing of their antennas, and a possible change to the multicast software (assuming DVBS transmissions rather than DVBS-2).

8. STATUS OF WIS DEVELOPMENT

8.1 David Thomas, the WMO WIS Project Manager, introduced himself and presented the WIS status. The presentation included the following:

- A description of the current situation with the GTS and why WIS has been introduced to extend and enhance the functionality;
- A description of the virtual structure of WIS including the roles of:
    - The Global Information Systems Centres (GISC);
    - The Data Collection or Production Centres (DCPC);
    - The National Centres (NC);
    - The Data Communications Network.
- The vision of the WIS was described illustrating how all of the elements described above fit together into a single virtual entity;
- The relationship between the IGDDS and the WIS both in conceptual and architectural terms;
- The WIS contribution to GEO;
- The WIS project plan with its management, schedule and key milestones;
- WIS Governance;
- The designation procedures for GISCs and DCPCs;
- The schedule risks associated with the many key activities not sown as explicit milestones.

8.2 In view of the dependence of the WIS on the IGDDS, the Chair felt that it was very useful to have the overall context of the WIS (particularly the relationship between the DCPCs and the GISCs). Concerning the need for adherence to WIS standards, clarification was sought concerning the applicable standards (from an IGDDS perspective).

8.3 EUMETSAT noted the relationship between IGDDS and GEONETCast and observed that whilst, some of the GEONETCast approach might fit with the IGDDS/WIS concept, parts might not. Clarification was also requested concerning the DCPC designation approach.

8.4 Concerning the approach to DCPC designation, the WIS Project Manager explained that the services of a consultant had been procured to (i.a.) propose a designation process. This has now been done and the designation process is captured within the relevant governance papers, which have been endorsed by CBS. It was also noted that, in order to ensure that the WIS infrastructure is economical for stakeholders, performance management provisions have been built into the governance process. Concerning WIS standards, a lot has been learnt from SIMDAT which has developed some synchronisation standards. Metadata standards are also under development. Other standards (e.g. registry and catalogue standards) are also coming into play. However, when talking about standards in the context of the IGDDS, the main issues are really metadata standards and file-naming conventions. It is important to be aware that the WIS will be primarily driven by the metadata. The data filenames need to be unique and the accompanying metadata file will describe how the data file should be decoded. Hence the main structural requirements are:

- uniqueness of filename;
- accompanying metadata file.

8.5 EUMETSAT noted that EUMETCast carries multiple data sources with different applicable standards. Filenames are a very useful source for high-level metadata and, in the case of EUMETCast, most of the lower-level metadata is embedded in the actual data file. The spectrum of different data types on EUMETCast may be too wide to achieve full standardisation of filenames.

For files in a BUFR format there should be no problem. In response, the WIS Project Manager emphasised the need to avoid embedding the metadata inside the data file as each data file then has to be opened in order to decide what to do with it. Such an approach would slow down the system.

8.6 The Chair noted that some priority actions had been previously identified and raised the question as to whether there were any WIS inputs to the priority actions, e.g. file-naming conventions and metadata.

8.7 Following a discussion it was agreed that a pilot investigation should be undertaken to assess the implications in the area of file-naming conventions and metadata standards. As a result, a number of separate actions were defined.

Action IGDDS-IG-1.5: The WMO WIS Project Manager to send information on WIS File-naming Convention and WIS Core Metadata Profile Standards to the Group by the end of July 2007.

Action IGDDS-IG-1.6: EUMETSAT to investigate the implications of applying this convention and standards to a relevant test case (e.g. ATOVS data), with WMOSP and WIS PM support. Action due date mid-November 2007.

Action IGDDS-IG-1.7: BoM to report back on their experiences on metadata for marine applications by the end of 2007.

8.8 Once the results of these actions are available, the next steps will be defined.

8.9 In response to a question about the situation for GEONETCast, NOAA explained that the issues of file-naming convention and metadata standards have not yet been addressed for GEONETCast. It was also not clear if the WIS developments, with their focus on meteorological data, would be fully applicable to GEO as the GEO data will be coming from all Societal Benefit Areas.

9. DVB-S ARCHITECTURE ISSUES

9.1 In support of this agenda item, a paper on DVB-S Architecture Issues was presented which focused on:

- interoperability;
- robustness.

9.2 In discussions it was agreed that the issue of data format should also be considered within the context of interoperability.

9.3 In response to a question as to whether the format of data subject to inter-regional exchange was modified, EUMETSAT confirmed that it was not changed and was relayed in the same format.

9.4 A general discussion then ensued on the advantages and disadvantages of adopting common formats across the IGDDS. Whilst noting the benefits from an interoperability viewpoint, it was felt that the practical implications could be quite considerable. It was also noted that the same formats would have to be used for both near real-time and off-line delivery.

9.5 A discussion on “redundancy policy versus availability” then followed and it was noted that:

- redundancy policy requirements are designed to avoid single point failures at a strategic level (and thereby aim to secure long-term continuity of service);
- availability requirements are designed to ensure that the routine service levels are acceptable (i.e. the routine availability of data exceeds an operational threshold);
- the physical architecture (both ground and space segment) of the system needs to simultaneously satisfy both the availability requirements and the redundancy policy requirements;
- the increasing concentration of data distribution from different sources on DVB-S dissemination systems requires that a systematic approach be adopted to strategic redundancy, and this should be eventually reflected in the IGDDS standards.

9.6 The potential robustness benefits accruing from the context of the IGDDS within the WIS was discussed and it was noted that the interoperability of DCPC and GISCs and the use of Internet (which is an integral part of the WIS) as an alternative route could provide a limited back-up in the event of failures (noting that there may be some bandwidth restrictions).

9.7 BoM noted that Europe is in a different position to the Asia-Pacific region, where direct broadcast is still primarily used. Imposition of a high standard of strategic redundancy may limit the growth of the DVB-S dissemination infrastructure, and it is important that any analysis of vulnerability to single point failures takes due account of the availability of direct broadcast transmissions.

9.8 Concerning inter-regional data exchange EUMETSAT felt that, so far, the inter-regional data exchange mechanism limitations have not held us up (with use being made of dedicated links, the GTS and the Internet).

9.9 Concerning the main discussion points proposed in the paper, the situation was summarised as follows:

a) Absence of a Comprehensive Inter-regional Data Exchange Mechanism

It was noted that, for the foreseeable future, interregional data exchange will be carried out by a combination of:

- dedicated links;
- GTS and extensions thereof;
- the Internet.

b) Need to Converge on Regional Data Dissemination Requirements

The process and mechanisms for converging on regional data dissemination requirements was discussed under agenda item 5. Once these requirements have been established, the implications for inter-regional data exchange will become clearer.

c) Functionality Requirements Stemming from Data Policy Considerations

Two technical options were identified:

- each regional operator provides access control to their end-users (provided suitable user access data is available);
- the originator of the data provides access control (requires a suitable key port for the decryption software in the end-user reception station).

d) Interoperability and Future Arrangements for Dissemination over the Americas

These topics were addressed under agenda item 7.

e) Minimum Redundancy Arrangements

It was agreed that robustness should be addressed at different levels within IGDDS:

- in establishing DVB-S dissemination services, the responsible agencies should consider contracts with their telecom providers containing suitable redundancy provisions, e.g. specifying conditions for swapping on other transponders or satellites in case of emergency;
- due account should be taken of the possibility of receiving data via alternative means (e.g. direct broadcast and Internet) provided the data formats were the same.

The redundancy provisions shall be addressed in the IGDDS standards.

10. CODE AND FORMAT ISSUES

There was no separate discussion on this agenda item.

11. REVIEW OF OPEN ACTIONS FROM THE 3rd IGDDS AND GLOBAL RARS WORKSHOP

11.1 In support of this agenda item a paper entitled "Status of Actions and Recommendations on IGDDS from the 2nd and 3rd Global RARS/IGDDS Workshops" was reviewed.

Recommendation 2.4: Asia-Pacific Regional Trial - this recommendation was **closed** and superseded by the following new actions:

Action IGDDS-IG-1.8: Following the procurement and installation of a FengYunCast reception system, which is expected to be available within 6 months, BoM in coordination with CMA, to act as a pilot foreign user, provide feedback to CMA, or assistance if appropriate, e.g. regarding the further development of the documentation, and facilitate the further regional development of the system by the end of 2007.

Action IGDDS-IG-1.9: CMA to provide the current FengYunCast product dissemination schedule to the IG by the end of August 2007.

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.

11.2 Subject to successful testing, BoM would also be pleased to actively recommend FengYunCast to other users in the Asia-Pacific region. CMA noted that BoM is an important user in the region and look forward to cooperating in this area.

Recommendation 3.1: **Closed** - related to Recommendation 2.4.

Action 3.4: WMO to propose a set of ADM Standards – action to be carried forward.

12. Next, Steps, Priority Actions and Recommendations

12.1 Under this agenda item the proposed priority actions, originally raised under agenda item 3 were reviewed to check that all the issues had been satisfactorily addressed.

a) Establishing Data Requirements for Each Regional DVB-S Service

12.2 The process outlined in the paper entitled “Identification of Regional Data Requirements” will be followed to establish the requirements, together with the related actions defined under agenda item 5.

b) Quasi-Global Dissemination Coverage on a Sustainable Basis

12.3 No additional actions were identified in this area. The situation will be reviewed at the next meeting of the Implementation Group.

c) Identification of Suitable Data Exchange Mechanisms for Transferring Data between Regions

12.4 No additional actions were identified in this area. The situation will be reviewed at the next meeting of the Implementation Group.

d) Provision of Appropriate User Support Arrangements

12.5 It was noted that one of the actions that supersedes Recommendation 2.4 (see agenda item 11) partially addresses this issue.

12.6 Following a review of the priority actions, the forthcoming milestones of relevance to the IGDDS were identified as:

- ICG-WIS: 4-7 September 2007;
- APSDEU-8: 10-12 October 2007;
- GEONETCast Workshop: 10-12 October 2007;
- CGMS-XXXV: 5-9 November 2007.

13. CONCLUSIONS

13.1 In closing the meeting, Jerome Lafeuille expressed his deep appreciation to all the participants for an extremely fruitful meeting, and for their continuing contributions to the implementation of the IGDDS which, once complete, will be of substantial benefit to the user community. He was glad to note that all priority issues had been addressed and had led to identify well focused actions. He also pointed out the benefit of maintaining good coordination with the GEONETCast project and it was agreed that GEONETCast should be systematically invited to be represented in forthcoming IGDDS-IG meetings.

13.2 It was agreed that the next meeting of the Group should take place in May 2008 (probably the 3rd week) and should, if feasible, be held back-to-back with the RARS IG meeting to minimise travel requirements for those IGDDS-IG Members participating in RARS-IG as well.

ANNEX I

IGDDS IMPLEMENTATION GROUP
First Meeting
(Geneva, 5-6 July 2007)

PROVISIONAL AGENDA (Rev.1)

Day 1: Thursday 5 July 2007, morning

1. Introduction and review of the agenda

2. Terms of Reference and Membership

3. IGDDS Implementation Plan Priority Actions

4. Review of IGDDS high-level functional requirements

5. Identification of regional data requirements

Day 1: Thursday 5 July 2007, afternoon

6. Status of MTSAT data delivery via the internet

7. Status of DVB-S dissemination infrastructure:

- **a) EUMETCast**
- **b) FengYunCast**
- **c) NOAA DVB-S projects**
- **d) MITRA**
- **e) GEONETCast**

Day 2: Friday 6 July 2007, morning

8. Status of WIS development

9. DVB-S architecture issues:

- **a) Interoperability**
- **b) Inter-regional data exchange**
- **c) User terminal and software aspects**
- **d) Robustness**

10. Code and format issues

Day 2: Friday 6 July 2007, afternoon

11. Review of open actions from the 3rd IGDDS and global RARS workshop

12. Next steps, priority actions and recommendations

13. Conclusions

ANNEX II

IGDDS IMPLEMENTATION GROUP

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ANNEX III

IGDDS IMPLEMENTATION GROUP
First Meeting
(Geneva, 5-6 July 2007)

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