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Prepared by WMO
Agenda item: G.2

CGMS *AD HOC* TASK FORCE ON INTEGRATION STRATEGY FOR DATA DISSEMINATION FROM METEOROLOGIAL SATELLITES

(Submitted by WMO)

Summary and purpose of document

To inform CGMS Members on the results of a meeting of the CGMS *Ad Hoc* Task Force on Integration Strategy for Data Dissemination from Meteorological Satellites.

ACTION PROPOSED

(1) CGMS Members to note the report and make comments, as appropriate;

(2) CGMS to consider establishing a dedicated working group to develop an overall strategy for convergence of planned ADMs as well as an associated implementation plan and "institutionalizing" the draft terms of reference for the *Ad Hoc* Task Force into a standing working group;

(3) CGMS satellite operators to reaffirm commitment to the AHRPT format for data streams from polar orbiting satellites.

Appendix: Final report of the CGMS *Ad Hoc* Task Force on Integration Strategy for Data Dissemination from Meteorological Satellites

DISCUSSION

Background

The CGMS *Ad Hoc* Task Force on Integration Strategy for Data Dissemination from Meteorological Satellites met at WMO Headquarters, Geneva, Switzerland on 29 April 2002. The primary objective for the meeting was to review the concept from a CGMS perspective for data access from the future space-based component of the Global Observing System (GOS). The Task Force meeting was held as a joint session with the OPAG IOS Expert Team on Satellite Systems Utilization and Products, in order to provide the Expert Team with a CGMS perspective on the topic of Alternative Dissemination Methods. The Final report of the Task Force is attached as an Appendix to this document.

CGMS-XXIX had established the Task Force with terms of reference and the Task Force was specifically requested to:

- review CGMS satellite operation plans for data dissemination from present and planned satellite systems;
- evaluate the potential volume of data to be disseminated;
- evaluate Alternate Dissemination Methods (ADM) presently in effect;
- consider WMO's requirement for an integrated strategy for data dissemination and ADM.

In summary, the Task Force meeting noted that most CGMS satellite operators either had in place or intended in the near future to use ADM. It was also noted that the ADM were unique to each satellite operator and that commonality and coordination between them were very limited. The Task Force also reviewed the proposed WMO concept for ADM as reported in the Final Report of the OPAG-IOS Expert Team on Satellite System Utilization and Products (SSUP-4) and was in full agreement with the concept.

The meeting concluded that derived products for many applications would depend on a spectrum of satellite data, i.e., many products would utilize multiple satellite data as well as other data types. This implied that the concept of reception and processing from a single satellite to produce a single-source product was no longer appropriate. Additionally, the distributed product production system, as exemplified in the EUMETSAT SAF concept, highlighted that product development and improvement would also depend on multiple data inputs. The meeting also recognized that there were regional differences in terms of required products and thus there should be regional differences in terms of the availability of multiple satellite data streams. Given the paradigm shift to multiple satellite data input into products, there would be a compelling need for harmonization of the different regional ADM. The CGMS satellite operators agreed that it was important to have a comprehensive and integrated data dissemination strategy to include geostationary, polar orbiting and R&D satellite data.

Recommendation: To avoid uncoordinated proliferation of ADM, the Task Force meeting recommended that each satellite operator strive to coordinate plans towards convergence of planned systems, especially in a WMO region. Such convergence can only occur if CGMS establishes a dedicated working group to develop an overall strategy for convergence of planned ADM as well as an associated implementation plan.

In order to initiate the development of the strategy, it would be necessary to prepare estimates of projected data volumes including products as well as to consider other facets, e.g. timeliness, user communities, etc.

Thus the CGMS *Ad hoc* Task Force recommended that its present draft terms of reference be institutionalized into a standing working group. The working group should meet on a regular basis and report progress made to each CGMS Plenary. The membership of the working group should include CGMS satellite operators and appropriate WMO CBS Open Programme Area Groups including Integrated Observing Systems and Information Systems and Services. It should address both geostationary and polar orbiting and both operational and R&D satellites. The strategy should take into consideration all users' temporal requirements for data.

Finally, the meeting recommended that CGMS satellite operators reaffirm the commitment to the AHRPT format for data streams from polar orbiting satellites.

OPAG-IOS Expert Team on Satellite System Utilization and Products (SSUP-4)

The fourth session of the Expert Team on Satellite System utilization and Products met from 29 April to 3 May 2002 and noted the reaction by CGMS satellite operators to the ADM concept as follows:

- EUMETSAT and NOAA/NESDIS both mentioned that they were in an early planning stage for the dissemination means of their future generations of geostationary satellites and would welcome any guidance from WMO;

- EUMETSAT underlined that establishing an ADM was a new experience for a space agency such as EUMETSAT, concerning satisfying the requirements for operational quality of service;

- CMA supported the approach which would allow access to global data, while noting that each region may have its own implementation plan which should be consistent with the resources available and the expected/targeted level of data utilization;

- ROSHYDROMET noted that in the Russian Federation Internet was now the most widely used alternative to direct broadcast. The need for ADM was particularly relevant for R&D satellites that required specific receiving systems.

- JMA saw a potential interest in ADM for Japan as regards the access to global data, and R&D satellite data in particular, as well as for contingency planning. The possible implementation of ADM in Eastern Asia should be reviewed with further information on the available communications satellites, preferably in coordination between CMA and JMA.

After an in-depth consideration on the ADM concept, the Expert Team developed a draft WMO position for ADM as described in WMO WP-22. The draft WMO position for ADM will be considered by the Commission for Basic Systems at its Extraordinary session in Cairns, Australia, in December 2002.

FINAL REPORT OF THE CGMS *AD HOC* TASK FORCE ON INTEGRATION STRATEGY FOR DATA DISSEMINATION FROM METEOROLOGIAL SATELLITES

1. ORGANIZATION OF THE MEETING *(AGENDA ITEM 1)*

1.1 Opening of the meeting *(agenda item 1.1)*

1.2 Adoption of the agenda

The agenda was agreed upon and is reproduced as Annex I. The Task Force elected Mr Hans Peter Roesli as Chairman while noting that it was convened jointly with the CBS Open Programme Area Group on Integrated Observing Systems Expert Team on Satellite Systems Utilization and Products. Annex II contains a list of participants for the joint meetings.

1.3 Working arrangements for the meeting

The working arrangements for the meeting were agreed upon.

2. REVIEW THE CONCEPT OF DATA ACCESS FOR THE SPACE-BASED GLOBAL OBSERVING SYSTEM *(AGENDA ITEM 2)*

The Task Force recalled that CGMS-XXIX had established it with terms of reference as contained in Annex III. Included in the terms of reference, the Task Force was specifically requested to:

- review CGMS satellite operation plans for data dissemination from present and planned satellite systems;
- evaluate the potential volume of data to be disseminated;
- evaluate Alternate Dissemination Methods (ADM) presently in effect;
- consider WMO's requirement for an integrated strategy for data dissemination and ADM.

For clarity during the joint meetings, it was agreed to use the following description for direct broadcast: the transmission or re-transmission of data from the meteorological satellite originating the data. ADM would include all other means to disseminate data including telecommunications satellites, land lines and Internet. The Task Force agreed in order to address the requests contained in the terms of reference that it would be appropriate to review individual CGMS satellite operator plans as follows:

EUMETSAT

Current Operational Systems

The current satellite system of the first generation of Meteosat satellites being operated under the framework of the Meteosat Transition Programme (MTP) is expected to continue in service until the end of the year 2005 (subject to EUMETSAT Council approval). Hence, after the launch of the first Meteosat Second Generation (MSG-1) satellite the two systems will support data dissemination services in parallel for a limited period of time. Below a short summary of the currently available data dissemination systems is provided.

High Resolution Image (HRI) Dissemination

Direct dissemination of digital data and products via the current Meteosat satellite is provided through two dissemination channels in L-band at 1691 MHz and 1694.5 MHz with a data rate of 166 kbps. The high resolution image (HRI) dissemination service uses the latter frequency channel to disseminate digital images of Meteosat-7, and also of other geostationary satellites, like GOES-E, GOES-W, GMS and Meteosat-5 at the Indian Ocean position. HRI data are received by a Primary Data User Station (PDUS).

The HRI service is schedule-driven with the data content being defined in a published schedule and all deviations from the schedule (including notification of missing or incomplete data) are included in administrative messages embedded in the data stream and also published on the EUMETSAT web site.

In accordance with EUMETSAT data policy the digital images originating from Metoesat-7 are subject to encryption with the exception of 6-hourly image data (at 00.00, 06.00, 12.00 and 18.00 UTC) which are considered to be “essential data” in accordance with WMO Resolution 40. Encrypted data are decoded by the installation of a decryption unit (MKU) in the user’s PDUS, the distribution of MKUs being under the direct control of EUMETSAT.

WEFAX Dissemination

WEFAX analogue transmissions from Meteosat are available on both dissemination channels and can be received by Secondary Data User Stations (SDUS). WEFAX transmissions are free-to-air and are comprised of formats compatible with the Automatic Picture Transmission (APT) system, which has been used for decades by many meteorological satellites (e.g., ESSA, METEOR, NOAA).

The WEFAX dissemination service supports:

- the relay of image data from Meteosat at the nominal position (0° longitude);
- the relay of image data from the American GOES-E (75°W);
- the relay of image data from the Japanese GMS (140°E);
- the relay of image data from Meteosat 5 over the Indian Ocean (63°E);
- cloud top height maps;
- administrative messages sent in WEFAX image format;
- test pattern transmissions to check and adjust receiving stations.

The WEFAX service is also schedule-driven with the data content being defined in a published schedule and all deviations from the schedule (including notification of missing or incomplete data) are included in disseminated administrative messages and published on the EUMETSAT web site.

Meteorological Data Dissemination (MDD)

The primary objective of the Meteorological Data Dissemination (MDD) Service is the transmission of basic meteorological information to Africa and the surrounding regions, the prime motivation being to provide access to these data to users having no access to conventional telecommunication channels, especially the GTS. To receive MDD transmission an MDD receiving station is required. The MDD dissemination uses three distinct dissemination channels at 1695.725, 1695.7562 and 1695.7874 MHz with a bandwidth of 20 kHz. The data rate is 2.4 kbps.

A variety of meteorological information, either in the form of alphanumeric bulletins in WMO code format, binary data or pictorial products, are disseminated. Since the MDD service is considered as a space based extension of the Global Telecommunication System (GTS) of the

WMO, access to this data follows the same conditions as for the GTS system. To this end the data are encrypted and access rights are usually only granted to national meteorological services.

The MDD data are uplinked from three dedicated ground stations at Bracknell (UK), Toulouse (France) and Rome (Italy). These centres have the responsibility to gather the data for uplink, to comply with the technical constraints of the uplink process and to provide backup capabilities for each other in the event of station unavailability.

Data Collection System (DCS)

The Meteosat DCS is the regional system for the Meteosat coverage area. 33 regional telecommunications channels are used to relay environmental data to the EUMETSAT ground station in Fucino. Selected data are then retransmitted back to suitably equipped users through Meteosat over the data collection platform (DCP) Retransmission System (DRS). In addition, the DCP data are transmitted to the EUMETSAT Mission Control Centre (MCC) in Darmstadt for further processing and distribution. The data of interest to the programmes of the World Meteorological Organization (WMO) are transmitted over the Global Telecommunications System (GTS), while a variety of other distribution systems (including the Internet – see below) are also used.

Meteosat contributes to the **International Data Collection System** (IDCS), which is coordinated amongst satellite operators through the Coordination Group for Meteorological Satellites (CGMS). A further 33 international channels are implemented for this purpose on the satellite and in the ground segment, meaning that mobile platforms moving through the Meteosat coverage area are supported in exactly the same way as the regional platforms described above. The transmission frequencies dedicated to DCPs are located in the UHF band and are shown below:

First Generation Meteosat DCP Channel Allocation

33 international	33 regional
402.0025 MHz to 402.0985 MHz (3 kHz spacing)	402.1015 MHz to 402.1975 MHz (3 kHz spacing)

The main virtue of the Meteosat DCS is that it rapidly transmits environmental data from any DCP at any location to the Mission Control Centre in Darmstadt. From there it can be rapidly transmitted onward over conventional communications systems. The problem is that many potential users of these data, especially those in Africa, do not have access to efficient communications systems. The Meteosat **Data Retransmission System** is designed to overcome this difficulty in a cost-effective way.

DCP data arriving at the EUMETSAT ground station are selected for transmission over the DRS and are transmitted back to Meteosat in the short time gaps (26.5 seconds) occurring every four minutes between transmissions of individual WEFAX formats. The transmission speed of 12.5 kbps is adequate to send many reports, which arrive individually at the ground station at a rate of only 100 bps. This concept means that a simple SDUS-class receiver can be used to receive the DCP reports anywhere in the field of view of Meteosat and a normal personal computer can be used to filter out the observations of local interest. This capability has proven to be extremely useful in Africa where many meteorological services have installed a DRS terminal and can receive reliable local observational data for the first time.

Meteorological Product Dissemination

A set of Meteorological (level 2) products are routinely and automatically derived from Meteosat image data in the EUMETSAT Meteorological Products Extraction Facility (MPEF). These data are distributed to end-users via the GTS/RMDCN. Like the level 1.0 and level 1.5 image data they are also archived and made freely available for non real time use via the EUMETSAT Archived Data Retrieval Service.

Data Dissemination via the Internet

In addition to the data distribution via Meteosat also a subset of these data are made available to the user community making use of the Internet. The following sections describe the services currently available.

DCP data

This service allows DCP operators to view and download their own DCP messages by logging in to a EUMETSAT Internet server. However, the DCP operators must first register to gain access to this service. In addition some DCP operators are also provided with their DCP data by 'pushing' these to their respective FTP servers or by sending the data via e-mail.

Rapid Scanning Service (RSS)

Since 18 September 2001 more frequent imagery, originating from Meteosat-6, the in-orbit spare satellite, are made available to the user community by the newly introduced operational Rapid Scanning Service (RSS). The RSS will continue to be provided within the framework of the Meteosat Transition Programme (MTP) as long as Meteosat-6 is available as the in-orbit spare spacecraft for the 0° Operational Service. RSS data are made available to users both covering the full Rapid Scan Region (FRS) scan area (approximately 10°N to 70°N) as well as covering a limited European area of interest, both at 10-minute intervals. Data are available in GIF and JPEG formats for qualitative uses and also in the proprietary EUMETSAT OpenMTP format for quantitative uses.

Rapid scan data are made available to users via a EUMETSAT FTP server and can be downloaded given a username and password that is supplied after successful registration with the EUMETSAT User Service. National meteorological services of EUMETSAT's Member States and Co-operating States are also provided with rapid scanning data via the FTP 'push' mechanism upon request. Near real-time data, which are available to users who hold, or are authorised for a current licence agreement to receive 30-minute data, and have completed the registration with EUMETSAT, remain on the FTP server for 24 hours. Data are made available for download within five minutes of the end of the rapid scan image cycle. After this 24-hour period has passed the data are then transferred to an archive directory on the FTP server where they are kept for a further 7 days in what is known as the '7-day rolling archive'. Data that are stored in the archive are freely available to everyone, but the data are password protected and access is also subject to registration in order that the service may be effectively managed and monitored. After the rapid scan data are removed from the FTP server they can still be ordered at any time from the EUMETSAT Archived Data Retrieval Service.

Image Data

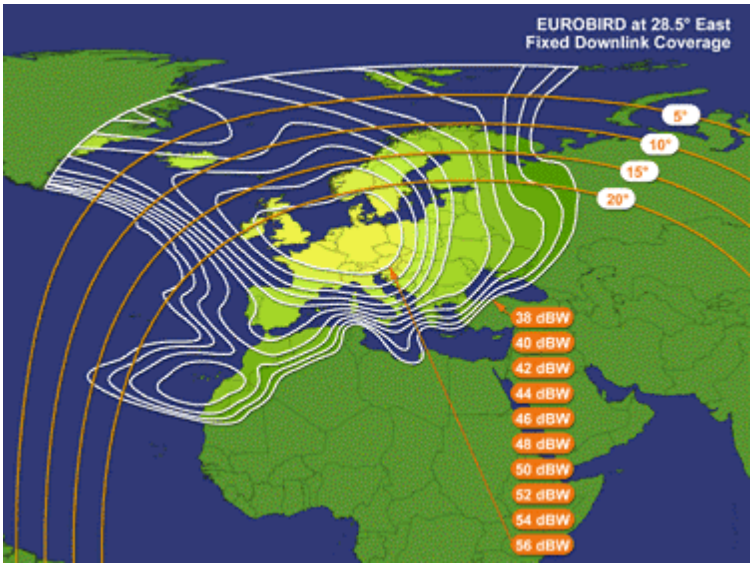
A subset of the Meteosat images in WEFAX type formats are also freely available for general public interest on the EUMETSAT Web site at: http://www.eumetsat.de/en/m_area5.html.

EUMETSAT ATOVS Retransmission Service (EARS)

The aim of the EUMETSAT ATOVS Retransmission Service (EARS) is to provide sounder data from the NOAA satellites with a timeliness and a geographical coverage suited to the needs of European operational short range regional numerical weather prediction models. It is planned that the EARS will become operational in an incremental fashion from the second half of 2002 through 2003.

In its final configuration 6 selected HRPT stations will receive and process the HRPT data and forward the generated meteorological products to EUMETSAT. The EUMETSAT ATOVS and AVHRR Processing Package (AAPP) will be used to process the instrument data. The AMSU-A, AMSU-B and HIRS/3 data will be retransmitted as both level 1a and 1c. Cloud information derived from the AVHRR data will be transmitted as level 1d mapped onto the HIRS/3 grid. EUMETSAT will collect the products and disseminate them to the users via a commercial satellite broadcast service. The selection of the HRPT receiving station has been based on the need to have a good coverage of the Northern hemispheric Atlantic Ocean as well as of the Mediterranean area.

Access to the ATOVS data will be provided by means of a commercial broadcast service. To receive the freely-available data users will need to purchase a 60-80 cm antenna dish, a universal LNB, a DVB-PCI card and a standard PC. A backup FTP service will also be operated by EUMETSAT whereby files will be stored in a circular archive. Although the ATOVS data will be freely available, registration with the EUMETSAT user service will be required for these reception mechanisms. Currently, broadcast trials (disseminating rapid scanning data) aimed at proving the concept and gaining experience of expected performance are ongoing making use of the Eurobird satellite at 28.3°E. To illustrate the area covered by ATOVS retransmission service, the figure below shows the footprint of the currently used Eurobird satellite:



It should be mentioned that the commercial direct broadcast service to be used is being procured specifically for the dissemination of the ATOVS data but that it is a scalable service which could also be considered in future for the distribution of other type of data. Typically, consideration may be given to extend this type of service to any additional data for which the current dissemination channels on Meteosat (or MSG) have insufficient capacity.

The data-rates for routing the ATOVS data from the individual receiving stations via IP VPN to EUMETSAT is 128 kbps while for the onward routing to the direct broadcast uplink provider a 256 kbps line is used.

Future Systems

Meteosat Second Generation (MSG)

Image data from the SEVIRI instrument plus other data are made available to the user community either via the Low Rate Information Transmission (LRIT) or the High Rate Information Transmission (HRIT) services in accordance with the CGMS LRIT/HRIT Global Specifications. In addition to the data distribution via MSG itself a subset of the image data are made available to the user community via an operational service through the Internet. When defining the content of the LRIT and HRIT dissemination data streams it was aimed to avoid excessive redundancy in the two channels (thereby exploiting the total available bandwidth) but to retain an attractive stand-alone service concept for the LRIT only case. Users who are interested to receive the full information from MSG will therefore need to receive both services. Industry has been advised of this and is marketing user stations with joint LRIT/HRIT reception capabilities – the so-called XRUS concept.

Like the current Meteosat HRI data, and in accordance with EUMETSAT's data policy, the digital images from MSG (both LRIT and HRIT data) are subject to encryption except for the 6-hourly data at 00.00, 06.00, 12.00 and 18.00 UTC which are considered to be essential data in accordance with WMO Resolution 40. Encrypted data are decoded by the installation of a decryption unit (SKU) in the user's station, the distribution of SKUs being under the direct control of EUMETSAT.

High Rate Information Transmission (HRIT)

The HRIT channel contains digital image data from all SEVIRI spectral channels. The HRIT data stream has a capacity of 1 Mbps which allows the reception of the disseminated level 1.5 data in quasi real time and full spatial and temporal resolution. The data are segmented, JPEG- or Wavelet- compressed and encrypted for the purpose of transmission. The compression is lossless for all SEVIRI spectral channels except for the HRV channel, for which moderate compression losses are implemented.

Low Rate Information Transmission (LRIT)

The LRIT channel contains digital image data from a subset of 5 SEVIRI spectral channels. In addition LRIT carries the full set of foreign satellite image data together with some derived meteorological products, MDD type data and retransmitted DCP messages. The LRIT data stream capacity is 128 kbps. All SEVIRI image data are compressed in a lossy manner (by about a factor of 8) in full spatial resolution with the pixel data rounded to 8 bits representation. The current baseline is that only every second SEVIRI image is disseminated (periodicity of 30 minutes). The current MDD data set (as described in section 1.3 above) will be integrated into the LRIT data stream and provided to users via this service.

DCP system capacity for MSG

As mentioned above the DCP data will be retransmitted via the LRIT data stream.

However, in comparison to the current Meteosat system the MSG system has a significantly increased capacity for DCP messages as the number of channels has been increased from 66 to 256 as can be see from the table below:

Meteosat Second Generation DCP Channel Allocation

210 contingency	**33 international**	**223 regional**
401.7025 MHz to 402.0010 MHz 1.5 kHz spacing	402.0025 MHz to 402.0985 MHz 3 kHz spacing	402.1015 MHz to 402.4350 MHz 1.5 kHz spacing

The MSG regional DCP channels are spaced at 1.5 kHz, which is a tighter spacing than for first generation Meteosat. Any new DCPs making use of the narrower channel spacing will be allocated towards the top of the band so that existing DCPs, operating with 3 kHz spacing, can continue to operate without interference from them. The MSG satellite also has sufficient bandwidth to accommodate 210 extra channels which can, in an emergency, be used to support regional DCPs which would normally operate with neighbouring (e.g., USA or Russian) CGMS geostationary meteorological satellite data collection systems.

The international channels are, in fact, supported by most of the CGMS satellites (USA, EUMETSAT, Russia, China and Japan). By using the International Data Collection System, mobile DCPs, moving through the fields of view of adjacent satellites, can be monitored continuously.

Derived Meteorological Product Dissemination

As for the current satellite generation for MSG a set of Meteorological (level 2) products will be routinely and automatically derived from image data in the EUMETSAT MSG Meteorological Products Extraction Facility (MPEF). These data will be distributed to end-users via the GTS/RMDCN. Like the level 1.0 and 1.5 image data the products will also archived and made freely available for non real time use via the EUMETSAT Archived Data Retrieval Service.

In addition to the central product extraction the future application data processing will be also performed in a number of operational processing facilities, the satellite application facilities (SAF). Therefore the number of derived products will significantly increase compared to the current situation.

Internet Image Dissemination

In addition to the data distribution via MSG itself a subset of data will be made available to the user community via the Internet. In particular the following services are available:

DCP data

This service will be a direct continuation of the already existing DCP data provision via Internet of the current Meteosat system (see section 1.4.1).

Image Data

Like for the current Meteosat system, a subset of near real time MSG images will be made freely available via the EUMETSAT Internet pages. A two-tier service will be implemented reflecting the data policy differences between data that can be made freely available in near real time (an ‘open’ service with limited data) and that which would be restricted to users with a license for reception of LRIT data in near real time (a ‘closed’ Internet service with more frequent data).

The precise technical implementation has yet to be finalised but might involve mirrored servers in EUMETSAT Member States in order to address performance considerations.

MSG Follow-on Data Distribution

The successor programme to MSG, currently referred to as MSG Follow-on, is under discussion. To date the most significant discussion topics have focused on the data needs of users and the associated issues of spacecraft payload definition. No significant discussions on a strategy for access to EUMETSAT data after the period of MSG operations (i.e., after the year 2015) has yet been initiated. This discussion will have many facets including end-user inputs, data policy issues, developing technologies, etc., and it will clearly be subject to analysis of current and future developments in the field of regional and global data communication and dissemination systems.

EUMETSAT Polar system (EPS)

In the era of operations of the EUMETSAT Polar System (EPS) a series of three polar orbiting METOP satellites will be flown after the year 2005. These satellites will carry a set of instruments composed of currently available instruments from the US NOAA series (e.g., AVHRR, AMSU, HIRS) and newly developed ones (e.g., IASI, GRAS). The EPS programme concept has evolved from the framework of an agreement to address requirements for an Initial Joint Polar System (IJPS) in close co-operation with the United States.

The instrument data will be made available to the user community either as local area coverage or global area coverage datasets. The local area coverage data will be disseminated via the Low Rate Picture Transmission (LRPT) and advanced High Rate Picture Transmission (AHRPT) services in accordance with the CGMS LRPT/AHRPT Global Specifications. The global area coverage data will be dumped down to the EPS Core Ground Segment (CGS) for onward relay, via the EUMETSAT Control Centre in Darmstadt, to European users via a direct broadcast service making use of so-called Near Real Time (NRT) terminals.

The METOP payload transmission details are summarised in the table below:

METOP			
	Centre Carrier Frequency	**Bandwidth**	**Data rate**
LRPT	137.9125 nominal or 137.1 backup	150 kHz	72 kbps
AHRPT	1701.3 nominal or 1707.0 backup	1698.75 - 1703.25 MHz 1704.75 - 1709.25 MHz	3.5 Mbps
GDS	7.8 GHz	63 MHz	70 Mbps

As can be noted in the table above, the bandwidth for the METOP AHRPT dissemination is 4.5 MHz.

Low Rate Picture Transmission (LRPT)

The METOP local area coverage data which are disseminated in the Low Rate Picture Transmission (LRPT) data stream will contain data from the following METOP instruments:

- AVHRR/3 LR (JPEG compressed resolution only);
- AMSU - A1;
- AMSU - A2;
- HIRS/4;
- Microwave Humidity Sounder (MHS);
- GRAS;
- Space Environment Monitor (SEM).

Access to the METOP LRPT direct broadcast service will be controlled by data encryption in accordance with the EUMETSAT data policy. Encrypted data are decoded by the installation of a decryption unit (SKU) in the user's station, the distribution of SKUs being under the direct control of EUMETSAT.

Advanced High Rate Picture Transmission (AHRPT)

The METOP local area coverage data which are disseminated via the Advanced High Rate Picture Transmission (AHRPT) data stream will contain data from all instruments onboard METOP in full resolution.

Access to the METOP LRPT direct broadcast service will be controlled by data encryption in accordance with the EUMETSAT data policy. Encrypted data are decoded by the installation of a decryption unit (SKU) in the user's station, the distribution of SKUs being under the direct control of EUMETSAT.

Development of Receiving Stations for the Initial Joint Polar System

As the technical expertise for building HRPT receiving stations is readily available in the marketplace the EUMETSAT delegate bodies, in contrast to the approach for MSG, have stated a general view that they do not see any need for funding the development of a prototype receiving station for LRPT / HRPT data reception. However, they recognise the need for harmonisation of software interfaces to significantly facilitate the exchange of processing software, even if there were differences in reception station design. The view has been expressed that other partners could be encouraged to contribute to this particular harmonisation activity.

Near Real Time Dissemination (NRT) Service

In addition to the provision of local area coverage data via LRPT/HRPT dissemination another dissemination service for the METOP global area coverag data will be made available for users in Europe. The Near Real Time (NRT) dissemination service will be used to disseminate the full set of global METOP products (level 1b and elected level 2) from the EUMETSAT Central Ground Segment (CGS) in Darmstadt to National Meteorological Services and centres of excellence in Europe.

The basic NRT concept is based on a commercial broadcast service**.** The data will be made available making use of the pipe-line concept, thereby ensuring a permanent data flow. The NRT service will be a high data rate dissemination service for delivering the global area coverage data to a professional end user community.

The NRT service will be implemented to fulfil the following objectives:

- To ensure end-to-end delivery of full set of data and products;
- To allow all recipients to receive potentially all products (flexibility per product and per recipient);
- To support the principles of data denial (per product and per recipient);
- To cover all EUMETSAT Member States, Co-operating States and potential Member/Co-operating states;
- To provide flexibility with respect to recipient's location and to allow for additional recipients;
- To be flexible with respect to possible changes of the service content and the broadcast service provider itself;
- To de-couple the communication service from the applications;
- To use WAN Protocol End Points within the Central Ground Segment (CGS), with standard local FTP to User connections.

Therefore, the NRT direct broadcast service is designed in a scalable manner to provide a dissemination capacity of initially 8 Mbps. The current baseline for the EPS NRT service will have the following characteristics:

- It will use the TELENOR SkyCast™ service, on Eutelsat W3 (7 East);
- It is based on multicasting protocol (PGM over IP) via standard DVB platforms;
- The reception equipment is low cost/high quality;
- It is a quasi error-free broadcast (BER < $10^{-11)}$;
- It has no return link;
- It supports data rates between 8 Mbps and 12 Mbps;
- The receiving station antenna size is between 2.4m (typical) and 3.8m;
- The expected service availability shall be 99.5%.

The development of the NRT broadcast service was kicked off in January 2001 and has reached the end of the system design phase in early 2002. The system acceptance is planned for spring of the year 2004.

Derived Meteorological Product Dissemination

A set of Meteorological (level 2) products (e.g., temperature, humidity, ozone concentration) will be routinely and automatically derived from METOP data in the EUMETSAT CGS. These data will be distributed to end-users via the GTS/RMDCN. Like the level 1.0 and 1.5 image data they will also archived and made freely available for non real time use via the EUMETSAT Archived Data Retrieval Service.

Like for the MSG system the product extraction will be also performed in a number of operational processing facilities, the satellite application facilities (SAF). Therefore, the number of derived products will significantly increase compared to the current situation and thereby requiring significantly more bandwidth on the GTS/RMDCN.

NOAA/NESDIS

Commonality of User Stations

NOAA is developing a plan to investigate the implementation and transition of the NPOESS broadcast services and address the commonalities of the polar-orbiting broadcast services. Actions are being taken to initiate a study to evaluate the NPOESS broadcast formats and the AHRPT Global specifications to make recommendations on system requirements definition and analysis to promote commonality among the systems. NOAA plans to under take the following actions to ensure commonality among the satellite broadcast services. These tasks include:

(1) Coordination with other satellite operators to establish a global dissemination service;

(2) Review and evaluate the AHRPT Global Specifications to meet NOAA's direct broadcast service requirements;

(3) Coordinate with other satellite operators to determine a common frequency;

(4) in the 1698 -1710 MHz band and a common bandwidth (3.5 Mbps);

(5) Coordinate the data content with other satellite operators;

(6) Develop specifications for an affordable user station;

(7) Investigate alternative dissemination means for future direct broadcast services, including internet-like systems using push-pull FTP, land line distribution or commercial point to multi-point services.

Data Dissemination Plans for Polar-orbiting Satellites

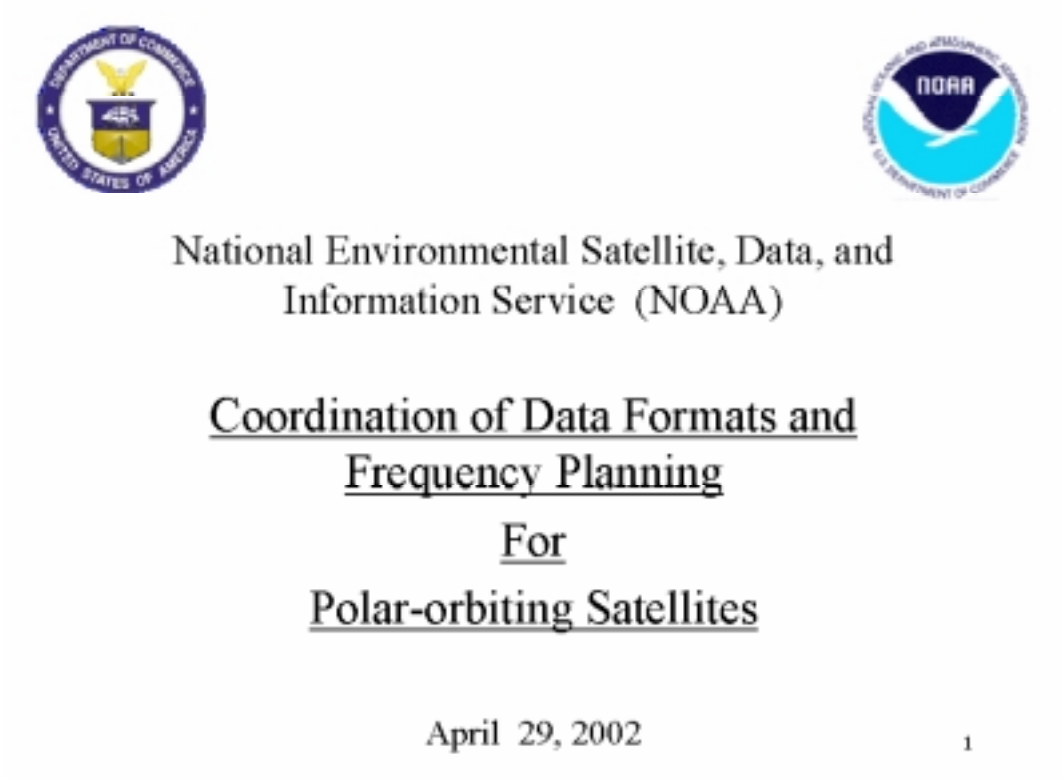
NOAA plans to investigate alternative means of data dissemination for the polar-orbiting satellites. Several options for distributing the data are being considered. Currently these choices include the internet, VSAT, DOMSAT, land lines, region distribution and HRIT.

Data Dissemination Service GOES

The Low Rate Information Transmission (LRIT) service will begin on 1 January 2003 on the GOES-east spacecraft. NOAA will time share the LRIT broadcast with the current WEFAX transmissions. Design specifications for the receive station will allow users to acquire the LRIT signal with a one (1) metre antenna above five (5) deg of elevation. A slightly larger antenna, 1.8 metres, is required for elevations below 5 degrees. NOAA will start with an initial data rate of 128 kbps.

Improvements in the LRIT data stream include additional products and services. The USA National Weather Service will provide increased numerical weather predictions, synoptic and upper air observations, meteorological bulletins and warnings/watches. Also, NOAA will include the full GOES Data Collection Service data stream in the LRIT broadcast.

The following graphics contain the presentation made at the CGMS Ad hoc Task Force meeting:



NOAA Data Formats Proposal

- Commonality of User Stations
  - Recommendation: CGMS satellite operators investigate the possibility of establishing a global data dissemination service with common frequency, common bandwidth, CGMS global specifications for AHRPT and comparable data content.
  - Recommendation: CGMS satellite operators investigate alternative dissemination means.

2

NOAA Data Formats Proposal

Low Rate Data (LRD)

- Data Rate 3.5 – 4.0 Mbps
- L-band frequency = in range of 1702 - 1710 MHz
- Modulation = QPSK or O-QPSK
- Coding = (255, 233) Reed Solomon with I=4
- Polarization = Right Hand Circular
- Global Broadcast
- Target aperture = 1.0 meter
- Contains 8 to 15 EDRs – compressed, decimated, etc

3

NOAA Data Formats Proposal

Minimum LRD Requirements

High Priority EDRs, In Priority Order from Highest to Lowest
Imagery Threshold Attributes: • 0.8 km horizontal spatial resolution (HSR) worst case across scan for at least one visible and one IR band. • Day/night band at night with 2.7 km HSR • Provide Day and Night capability for the Field Terrestrial User** to: - Interpret High, Mid, and Low Cloud Types - Detect all Fog Types (Valley, Coast, etc.) - Distinguish Between Snow & Clouds - Detect Coastal Water Mass Features (coastal fronts, eddies, river plumes, etc.) - Detect Dust/Aerosol-haze/Smoke ** The users intend to primarily exploit the LRD imagery by manual methods (interpretation, Detection, and Distinction) of inspection of processed images. When interpreting images, edge effects are important and may influence the algorithm processing the contractor chooses to implement for the Imagery EDR.
Atmospheric Vertical Temperature Profile (Surface to 100 mb only) Measurement Accuracy Threshold Attributes: • Surface to 700 mb: 2.5K/1 km • 700 mb to 300 mb: 1.5 K/1 km • 300 mb to 100 mb: 1.5K/3km Measurement Accuracy attribute applies to clear and cloudy conditions.
Atmospheric Vertical Moisture Profile (Surface to 100 mb only)
Global Sea Surface Winds (Speed and Direction)
Cloud Base Height
Cloud Cover/Layers
Pressure (Surface/Profile)
Sea Surface Temperature (SST)

4

NOAA Data Formats Proposal

High Rate Data (HRD)

- X-band frequency = 7812 MHz
- Data Rate = 20 Mbps
- Modulation = QPSK
- Coding = (255, 223) Reed Solomon with I=4
- Polarization = Right Hand Circular
- Global Broadcast
- Target Aperture = $\leq$ 2.0 meters
- Contains all data from all sensors except SESS
- Ancillary Data
- Auxiliary Data

5

NOAA Data Formats Proposal

Terminals

- NPP In-Situ Terminal being built by NASA GSFC
- NPOESS Terminal Acquisition Approach
  - Develop, produce and distribute non-proprietary HRD and LRD Interface Data Processing Segment software.
  - Software to be released to commercial vendors
  - System Requirements Specifications to be released to commercial vendors
- Plan for Commercialization of Data Processing IDPS for terminals
- IPO Following NASA In-Situ Terminal Model

6

NOAA Data Formats Proposal

THE PLAN –

- NOAA plans to inform the APT and HRPT users, vendors and manufacturers about the development and implementation of the new broadcast services.
- NOAA plans to outline the effects of the new generation of satellites will have on the existing broadcast services.
- NOAA will coordinate and participate with EUMETSAT, CMA, RUS and the WMO on evolving the commonalities in the broadcast services to allow manufactures to develop a single field terminal to acquire data from the various satellite constellations.

7

NOAA Data Formats Proposal

THE PLAN -- (continued)

- NOAA plans to investigate frequency allocations. Recommendations for broadcast will be determine on the basis for either a common frequency, if possible, or the proposed LRD band for a tunable field terminal.

- NOAA plans to conduct a study to investigate the commonalities in the AHRPT, CHRPT and LRD formats develop specifications for acquiring these formats on a single field terminal.

8

NOAA Data Formats Proposal

THE PLAN -- (continued)

- NOAA plans to initiate a study to investigate alternative methods of disseminating environmental data. Study options include:
  - Internet using single and multiple injection points
  - VSAT
  - DOMSAT
  - Line lines
  - Regional Distribution
  - HRIT

9

NOAA Data Formats Proposal

THE PLAN -- Technical Milestones

- NOAA will create a regional Field Terminal Center to support the management and distribution of data format changes that effect user stations and COTS products.
- NOAA will support the management of the decryption key program and develop distribution strategy to get decryption keys to authorized users through the Field Terminal program office.

10

NOAA Data Formats Proposal

Three Major issues are currently being worked by NOAA to ensure successful implementation and utilization of NOAA broadcast services:

- Prioritization and validation of the EDRs for the LRD data stream.
- Design and Implementation of NPOESS Ground Systems
- Development and Availability of Affordable LRD User-terminals

11

NOAA Data Formats Proposal

NOAA NPOESS Ground System

- Architecture Definition and Design
- Contractual Mechanisms in-place for Development and Implementation
- "Day-1" Products Exist
- Broadcast services proposals are being evaluated

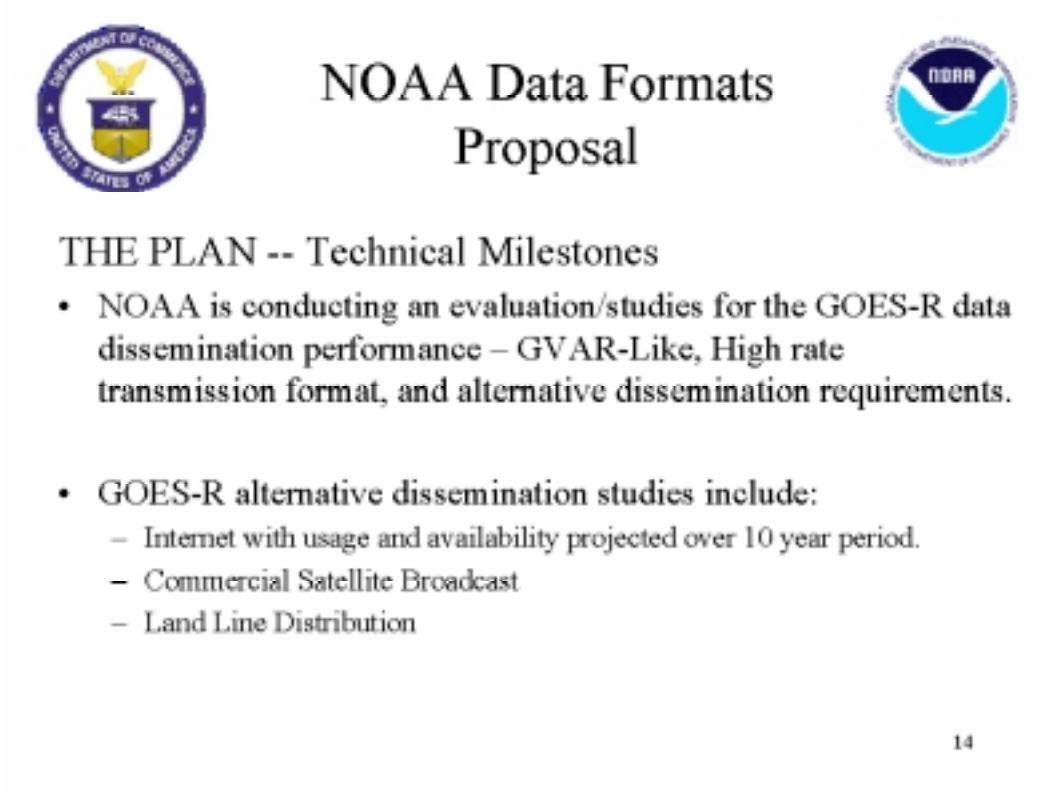
12

NOAA Data Formats Proposal

Commonality in User Stations

- Coordinate development activities with European, Chinese, Russians and the WMO
- Investigate new technology to reduce front-end receive system risks
- NOAA will work with the manufacturing community to provide early, stable requirements for development

13



CHINA METEOROLOGICAL ADMINISTRATION (CMA)

The Consideration of FY-2 LRIT

The low-resolution analogue data transmission (WEFAX) of geostationary meteorological satellite will be changed to low-resolution information transmission (LRIT). China plans to broadcast LRIT from FY-2C. It is scheduled that FY-2C will be launched in 2004.

To coordinate the LRIT broadcasting, CGMS issued document "CGMS LRIT/HRIT Global Specification". CGMS also discussed contingency plans between Chinese and Japanese geostationary meteorological satellites. CMA expressed that Japanese satellite is located at 140˚E and Chinese satellite is located at 105˚E. The coverage of the two satellites has 2/3 overlap. The two satellites of FY-2 and GMS are already in a complementary condition. In order to meet the requirements of the CGMS contingency plan, within capability, CMA will make its best effort to maintain its configuration of satellite observations and products including transmission characteristics and data format be compatible with GMS. Therefore, both satellite are partially backing up with each other in ordinary conditions.

At present, FY-1C processing facility is under construction. For FY-2C LRIT data broadcasting format, there are two possibilities.

WEFAX of different meteorological satellites are completely compatible. The first possibility is to make FY-2C LRIT data broadcasting format totally compatible with the future MTSAT. This would be beneficial to users, as the user station receivers can receive either the satellites' LRIT data without great change. To reach such compatibility, from physical layer, both satellites should have near LRIT transmission characteristics.

At present, LRIT transmission characteristics issued for GOES, MTSAT and MSG, are summarized in Table 1.

Table 1
LRIT transmission characteristics

	GOES	MTSAT	MSG
Frequency	1691MHz	1691MHz	1691MHz
EIRP	48.2 dbm	45 dbm	34dbm
Polarization	linear	Linear, perpendicular to orbital plane	Linear, perpendicular to spin axis
Bandwidth	Sufficient for 293Kb/s	250 KHz	660 KHz
Modulation	PCM/NRZ-L/BPSK	PCM/NRZ-M/BPSK	PCM/NRZ-L/BPSK
Packed data rate	128 Kb/s during FOC	75Kb/s	125 Kb/s
Total coded Data rate	293 Kb/s at FOC	150 Kb/s	290 Kb/s
Receiver G/T	-0.3 db (IOC) for 1 m antenna 3.2 db (FOC) for 1.8 m antenna		5.0 db for 1.8 m antenna

From Table 1, we see that for different satellite, some LRIT transmission characteristics (such as total coded rate, bandwidth, modulation) are different, and the required sizes of antenna are not the same either.

The first consideration is to make FY-2 LRIT transmission characteristics close to those of MTSAT as much as possible.

The second possibility is to adopt wider bandwidth, higher data rate, and bigger antenna for more data to be transmitted.

The Consideration of FY-3 Data Distribution

FY-3 remote sensing data will be broadcast through two data channels, L-band and S-band. L-band will broadcast data from the following instruments: Visible and Infrared Radiometer (VIRR), Microwave Radiation Imager (MWRI), Infrared Atmospheric Sounder (IRAS), Microwave Atmospheric Sounder (MWAS), Total Ozone Mapper and Ozone Profiler (TOM/OP), Radiation Budget Instrument and Space Environment Monitoring Instrument. X-band will broadcast data from Moderate Resolution Visible and Infrared Imager (MODI). The characteristics of the two data channels are listed in Table 2.

Table 2
Major parameters of FY-3 data transmission channels

Channel	FREQUENCY	Modulation	Data Rate (Mbps)	Polarization
L-Band	1698-1710	QPSK	4.2	Right Spin Circular
X-Band	7750-7850	QPSK	18.2	Right Spin Circular

RUSSIAN FEDERAL SERVICE FOR HYDROMETEOROLOGY AND ENVIRONMENTAL MONITORING (ROSHYDROMET)

Russian meteorological satellites data dissemination plans

During the next few years, in the frame of new satellites creation, Roshydromet plans to implement the transition to new digital standards of data broadcast – Low Rate Information Transmission (LRIT) and Low Rate Picture Transmission (LRPT) for geostationary and polar orbiting meteorological satellites, respectively.

With the objective to expand access to all data and thematic products, Roshydromet also plans to develop alternative dissemination methods (ADM) on the base of INTERNET technologies, which are used now by SRC Planeta for data collection from remote receiving stations, satellite data catalogue and for operational dissemination of satellites products to users in Russia (more than 50 users).

Not only formats and methods of data dissemination are important for users, but of course CGMS members' satellites comparable data content. Development of new Russian geostationary and polar orbiting meteorological satellites also included new instruments created with the parameters closely to the other CGMS satellites payloads. Thus, the next generation of Russian meteorological satellites contribute further to the space-based component of the Global Observing System.

In its activities, Roshydromet takes into account other satellite operators' plans, WMO and CGMS decisions and recommendations.

Future geostationary satellite GOMS/Electro N2 data dissemination.

The satellite GOMS/Electro N2 is planned to be launched in 2005 and will be placed into geostationary orbit at 76°E. Lifetime of this satellite – 7 years.

The key payload will consist of a standard meteorological communication package (Data Collection System and re-transmitters) and MSU-G imager with 12 channels in VIS and IR bands, similar to the MSG SEVIRI. The spatial resolution at the sub-satellite point will be about 1 km (VIS) and 4 km (IR).

Broadcasts of low and high resolution data will be implemented in LRIT and HRIT formats, respectively, after data normalization by the ground receiving and processing center (SRC Planeta).

The access to satellite data and products will also be realized by using the SRC Planeta WEB-server.

Future polar orbiting satellite Meteor - 3M N2 data dissemination.

The launch of the satellite Meteor - 3M N2 is planned for 2004-2005.

The following key sensors for imaging and sounding missions will be installed on board Meteor-3M N2:

- *multichannel scanning radiometer (six channels in visible and IR bands, similar to AVHRR/3, spatial resolution is close to 1 km);*
- microwave atmospheric sounder MTVZA with 26 channels in the range of 18.7–183.3 GHz for temperature and humidity soundings of global coverage;

- advanced IR atmospheric sounder (IKFS-2) based on Fourier transform spectrometer (spectral range of 5.0–15 μm; spectral resolution is equal or better than 0.5 cm^{-1}).

The possibility of installing instruments analogous to HIRS is under consideration.

Direct broadcasts of high resolution data will be implemented in AHRPT format (1.7 GHz band). At present it is planned to use APT format (0.137 GHz band) for direct broadcasts of low resolution data, but the possibility to use LRPT digital format is also under consideration .

The access to satellite thematic products will be realized by using the SRC Planeta WEB-server.

JAPAN METEOROLOGICAL AGENCY (JMA)

Imagery Data Dissemination by MTSAT

The Multi-functional Transport Satellite 1 Replacement (MTSAT-1R), which is the successor to the present GMS-5, is planned to start its operation in 2004. JMA will continue two kinds of data dissemination services of high-resolution imagery for medium-scale data utilization stations (MDUSs) and processed imagery for small-scale data utilization stations (SDUSs).

Data format for MDUS and SDUS will be changed from current ones of GMS-5. The new formats follow the global standard approved by CGMS.

Data Dissemination Service for MDUS

High Resolution Imager Data (HiRID) service will be started as a replacement of present S-VISSR. The data of a new observation channel is added and the dynamic range of each channel data is expanded to ten bit counts. As HiRID format is upper compatible with S-VISSR format, existing MDUSs can receive and process HiRID data without any modification of reception system and processing if they don't use newly added information.

HiRID is an interim transmission to MDUS users to maintain the compatibility with current S-VISSR. High Rate Information Transmission (HRIT) service is planned to start in March 2005. It is a dissemination of original resolution imagery, i.e., 1 km for visible and 4 km for infrareds, with ten bits level resolution. Since the communication link and the data format are totally different from S-VISSR and HiRID, users need to change a receiver and data processing softwares of the existing system.

Satellite imagery in HiRID and HRIT is pre-navigated and rectified full disk imagery. Spatial resolution of HiRID is downgraded to 5 km from original 4 km resolution to be compatible with S-VISSR. Level resolution of visible imagery is also reduced to 6 bits from original resolution in HiRID.

During the period of about three years from March 2005 to the end of the meteorological mission of MTSAT-1R, HiRID and HRIT will be available via the same frequency and according to a time-shared broadcasting schedule.

Data Dissemination Service for SDUS

Law Rate Information Transmission (LRIT) service will start with MTSAT-1R operation and digital satellite imagery and other meteorological data will be broadcast. The meteorological data to be disseminated by LRIT includes numerical weather predictions, synoptic/upper-air observations and meteorological bulletins such as tropical cyclone advisories.

The satellite imagery in LRIT is a rectified full disk imagery with 2200 lines and pixels each. Hourly IR1 (11 micron) and 6 hourly water vapour (6.7 micron) images are broadcast. The users in far-east area can use regional high-resolution visible imagery. Imagery depths are 8 bits for infrareds and 6 bits for visible.

The current WEFAX dissemination service is continued until March 2005 parallel to LRIT by time-shared manner. WEFAX service will be terminated in March 2005.

Radio Frequency for the Dissemination

Radio frequency allocation for MDUS and SDUS is maintained to be the same frequency as GMS-5: 1687.1 MHz for HiRID and HRIT transmissions, and 1691.0 MHz for LIRT and WEFAX transmissions. Transmission rates are 3.5 Mbits/sec for HRIT and 64 Kbits/sec for LRIT.

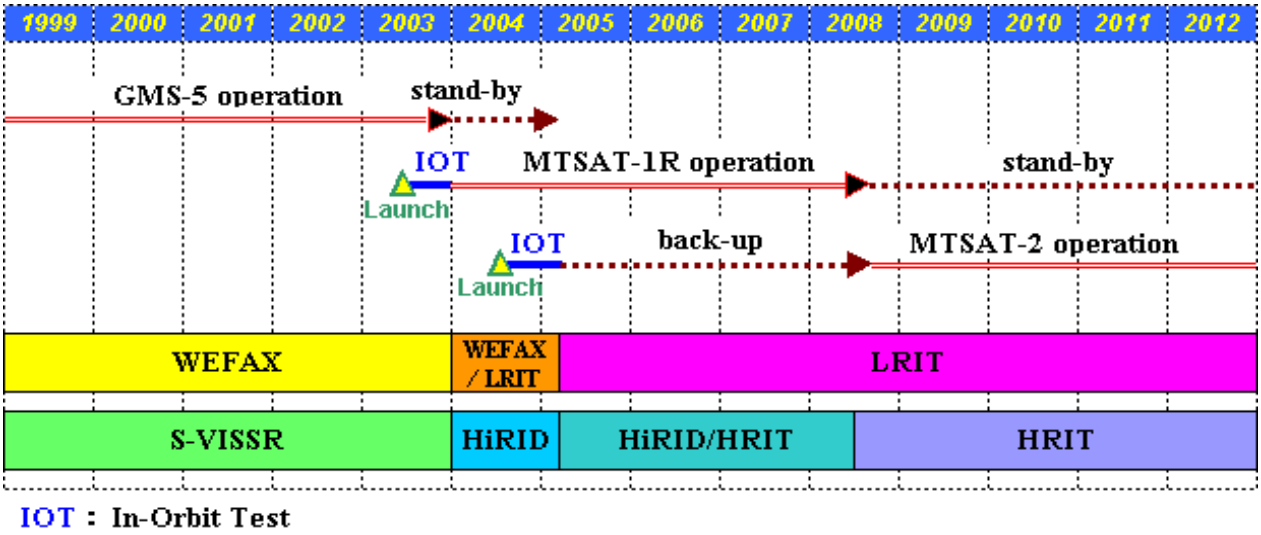


Fig. 1 Transition Plan from GMS-5 to MTSAT

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In summary, the meeting noted that most CGMS satellite operators either had in place or intended in the near future to use ADM. It was also noted that the ADM were unique to each satellite operator and that commonality and coordination between them were very limited. The Task Force also reviewed the proposed WMO concept for ADM as reported in the Final Report of the OPAG-IOS Expert Team on Satellite System Utilization and Products (SSUP-4) and was in full agreements with the concept.

The meeting concluded that derived products for many applications would depend on a spectrum of satellite data, i.e. many products would utilize multiple satellite data as well as other data types. This implied that the concept of reception and processing from a single satellite to produce a single-source product was no longer appropriate. Additionally, the distributed product production system, as exemplified in the EUMETSAT SAF concept, highlighted that product development and improvement would also depend on multiple data inputs. The meeting also recognized that there were regional differences in terms of required products and thus there should be regional differences in terms of the availability of multiple satellite data streams. Given the paradigm shift to multiple satellite data input into products, there would be a compelling need for harmonization of the different regional ADM. The CGMS satellite operators agreed that it was

important to have a comprehensive and integrated data dissemination strategy to include geostationary, polar orbiting and R&D satellite data.

Recommendation: To avoid uncoordinated proliferation of ADM, the meeting recommended that each satellite operator strive to coordinate plans towards convergence of planned systems, especially in a WMO region. Such convergence can only occur if CGMS establishes a dedicated working group to develop an overall strategy for convergence of planned ADM as well as an associated implementation plan.

In order to initiate the development of the strategy, it would be necessary to prepare estimates of projected data volumes including products as well as to consider other facets, e.g. timeliness, user communities, etc.

Thus the CGMS *Ad hoc* Task Force recommended that its present draft terms of reference be institutionalized into a standing working group. The working group should meet on a regular basis and report progress made to each CGMS Plenary. The membership of the working group should include CGMS satellite operators and appropriate WMO CBS Open Programme Area Groups including Integrated Observing Systems and Information Systems and Services. It should address both geostationary and polar orbiting and both operational and R&D satellites. The strategy should take into consideration all users' temporal requirements for data.

Finally, the meeting recommended that CGMS satellite operators reaffirm the commitment to the AHRPT format for data streams from polar orbiting satellites.

5. CLOSURE OF THE MEETING *(AGENDA ITEM 3)*

The Chairman thanked the participants for their excellent preparation, cooperation and dedication. The Chairman closed the session at 17h30 on Monday, 29 April 2002.

ANNEX I

PROVISIONAL AGENDA

AGENDA AND EXPLANATORY MEMORANDUM

1. ORGANIZATION OF THE MEETING

The primary objective for the meeting is to review the concept from a CGMS perspective for data access from the future space-based component of the Global Observing System (GOS). Note: 29 April will be a joint meeting with the CBS OPAG IOS Expert Team on Satellite System Utilization and Products. The Expert Team will continue to meet after the CGMS meeting. The dates for the Expert Team meeting are 29 April until 3 May 2002. CGMS members are invited to attend the entire Expert Team meeting.

1.1 Opening of the meeting

The meeting will open at 09h30 on Monday, 29 April May 2002 at the WMO Headquarters in Geneva, Switzerland. Registration and distribution of documents will take place as from 09h00. As noted above, the first day of the meeting will be a joint meeting with the CBS OPAG IOS Expert Team on Satellite System Utilization and Products.

1.2 Adoption of the agenda

The provisional agenda, as contained in this document will be submitted to the meeting for adoption.

1.3 Working arrangements for the meeting

The work of the meeting will be conducted in Plenary and small working groups as required. The meeting and documentation will be in English only. The meeting will decide on other arrangements for the meeting such as its working hours.

2. REVIEW THE CONCEPT OF DATA ACCESS FOR THE SPACE-BASED GLOBAL OBSERVING SYSTEM

The stated goal in the Terms of Reference for the CGMS *Ad Hoc* Task Force on Integrated Strategy for Data Dissemination from Meteorological Satellites is to establish an integrated data dissemination strategy which will maximize access to all data from all CGMS satellites, taking into account direct broadcast and alternative dissemination methods, and including appropriate transition strategies. The joint meeting will review presentations by each CGMS satellite operator as to its plans for direct broadcast for both geostationary and polar-orbiting satellites systems as well as for any alternative dissemination methods including appropriate strategies. Based on the presentations, the Task Force will seek to establish an integrated data dissemination strategy for consideration at the next CGMS Plenary as well as by the CBS OPAG IOS Expert Team on Satellite System Utilization and Products.

3. CLOSURE OF THE MEETING

The meeting is tentatively scheduled to close at 17h00 on Monday, 29 April 2002.

ANNEX II

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ANNEX III

Draft Preliminary Terms of Reference

For the CGMS *Ad hoc* Task Force on Integrated Strategy for Data Dissemination from Meteorological Satellites

***GOAL**: To establish an integrated data dissemination strategy which will maximize access to all data from all CGMS satellites, taking into account direct broadcast and alternative dissemination methods, and including appropriate transition strategies.*

In achieving this goal, the Task Force will:

1. *review CGMS satellite operation plans for data dissemination from present and planned satellite systems.*

2. *evaluate the potential volume of data to be disseminated.*

3. *evaluate Alternate Dissemination Methods (ADM) presently in effect.*

4. *consider WMO's requirement for an integrated strategy for data dissemination and ADM.*

5. *propose possible ADM.*

6. *propose interconnectivity between regional ADM.*

This strategy to be reviewed at CGMS XXX.