

ALTERNATIVE DISSEMINATION METHODS

(Submitted by WMO)

Summary and purpose of document

To inform CGMS Members of WMO activities towards an integrated global data dissemination service.

ACTION PROPOSED

CGMS Members to note and comment on the proposal to establish a WMO project for an integrated global data dissemination service.

Appendix: Extract from the WMO Space Programme Implementation Plan relating to the Integrated Global Data Dissemination Service

DISCUSSION

Introduction

1. As described in WMO WP-6, a WMO Space Programme Implementation Plan has been prepared and reviewed at the fourth session of the WMO Consultative Meetings on High-level Policy on Satellite Matters (CM-4). CM-4 reviewed and agreed to the WMO Space Programme Implementation Plan for 2004-2007 prepared by the Secretariat. One particular section in the Implementation Plan relates to an integrated global data dissemination service as described in the Appendix that is an extract from the full Implementation Plan. CM-4 felt that the description of the integrated global data dissemination service were well structured and appropriately detailed although consideration should also be given to dissemination services presently operated by NMHSs and other organizations, e.g., ICAO/WAFS. An opportunity now existed to improve data dissemination while integrating existing mechanisms.

2. It should be noted that the Implementation Plan proposed that the coordination of the design and implementation of an integrated global data dissemination service be handled as a specific WMO Space Programme project.

3. An integrated global data dissemination service could also serve as the core of the new data exchange and dissemination component of the Global Earth Observing System of Systems (GEOSS) presently being developed within the ad hoc intergovernmental Group on Earth Observations (GEO). (See WMO WP-27). It has already been agreed that an integrated global data dissemination service will also be part of the Future WMO Information System (FWIS). The data exchange and dissemination component will provide the necessary data and access to designated centres, including those for archive as well as on-demand access. This component will also provide interoperability between individual observing systems. The GEOSS architecture requires agreed-upon interoperable interfaces among components. The data exchange and dissemination component will improve data sharing by facilitating access to data and to metadata about holdings and planned acquisitions. As GEOSS participants operate systems within their mandates, many varieties of communications technologies will be in use, including, but not limited to, the Internet. For instance, observation collection systems may involve data exchange among satellites in orbit or floppy disks sent by mail from remote rain forest locations; disaster-warning systems may involve broadcast TV alerts and messages displayed on highways. (Detailed requirements will be described elsewhere in the GEOSS Implementation Plan.) GEOSS will draw on existing Spatial Data Infrastructure (SDI) components as institutional and technical precedents in areas such as geodetic reference, common geographic data, and standard protocols.

**EXTRACT FROM THE WMO SPACE PROGRAMME IMPLEMENTATION PLAN RELATING TO
THE INTEGRATED GLOBAL DATA DISSEMINATION SERVICE**

Integrated Global Data Dissemination Service

62. Bearing in mind the requirement for cost-optimized access to meteorological data/products, and the planned increases in associated data volumes, the concept of Alternative Dissemination Methods (ADM) has been developed.

63. With this approach, access to satellite data and products by WMO Members would be through a composite system consisting of both Direct Broadcast (DB) from meteorological satellite systems and ADM. ADM would be the baseline while DB reception would serve as a limited backup, as well as for those WMO Members unable to take advantage of the ADM service.

64. As the composition of the space-based Global Observing System evolves, the ADM concept will allow for the seamless inclusion of data/product sets from polar and geostationary operational satellites, as well as from relevant R&D environmental satellites. It is expected that the most demanding application utilizing this composite service would be NWP, and that NWP requirements could thus be taken as a benchmark for sizing the data communications infrastructure.

65. The advantages of the ADM approach include:

- ?? Scalability – the communications infrastructure can be progressively upgraded to match the planned increase in data volumes;
- ?? Accessibility – the availability of standard user terminals, which make data access affordable for a larger number of users. This greater accessibility could also alleviate the need for the internal redistribution of very large volumes of data;
- ?? Flexibility – because of the separation of the observing satellite and the dissemination platform the dissemination scheme can be modified/enhanced without impact on the observational satellite. For example, it would allow the seamless addition of data and products from the relevant R&D environmental satellites to complement the existing operational data and products;
- ?? Transition planning – the transition between different generations of observing satellites will be facilitated as the same user terminals could be utilised for both generations;
- ?? Robustness - in the event of contingencies on observing system satellites the ADM component would be unaffected in the event of problems with the DB components of the observing system satellites;
- ?? Extension of observing system satellite lifetimes – in some cases the lifetime of observing system satellites is constrained by inclination limits associated with direct broadcasting. As ADM would be the prime dissemination mechanism, in such cases, the useful lifetime of the observing system satellite could be extended.

66. Several satellite operators have implemented, or have plans to implement ADM. For the time being the most advanced implementation appears to be EUMETCast by EUMETSAT. EUMETCast already disseminates data from polar and geostationary satellites, as well as from other meteorological data sources. By using Ku and C-band, DVB services provide a dissemination service at very reasonable cost to both EUMETSAT and the users.

67. In order to ensure that these initiatives result in a dissemination system that is optimized with respect to the needs of the global user community, it is appropriate to consider the possible shape of an Integrated Global Data Dissemination Service; which builds upon this ADM concept.

68. Indeed, the creation of an Integrated Global Data Dissemination Service is central to the vision of an integrated space-based component of the GOS, as it will facilitate the access, in a seamless manner, to the complete range of data and products from this component of the GOS.

69. It is envisaged that the Integrated Global Data Dissemination Service would be constructed from dissemination services provided in five or six discrete dissemination service areas which, taken together, would provide an integrated data dissemination service to all WMO members around the globe.

70. To minimize data exchange and data dissemination volume requirements, it is proposed that each dissemination service area be delineated by a longitude band; with the longitude band centred close to the orbital position of an operational geostationary meteorological spacecraft.

71. A starting point for the configuration of a five dissemination service area system could be:

Dissemination Service Area	Approximate Centre of Service Area
Europe, Africa and Eastern Atlantic	0°
Western Atlantic, North-East America, South America and Eastern Pacific	75°W
North-West America and Eastern Pacific	135°W
Eastern Asia, Australia and Western Pacific	140°E
Western Asia and Indian Ocean	76°E

72. In order to cope with the future data volume requirements, and the geographical distribution requirements, it is expected that data dissemination service providers would predominantly make use of commercial communications satellites for dissemination, augmented as appropriate by terrestrial means (e.g., the Internet).

73. It is expected that the precise communications architecture used to provide a particular data dissemination service would depend on the availability of the communication services. Based on the current availability of commercial satellite communications services, it is unlikely that the dissemination requirements for a particular dissemination service area could be met by one communications satellite. Instead, in order to meet the coverage requirements, it is expected that the communications architecture would consist of a mosaic of satellite communications services, augmented, as appropriate, by terrestrial means (e.g., the Internet).

74. Because of this dependency on the availability of commercial services it would not be appropriate to be prescriptive concerning the precise longitude domains for each dissemination service area.

75. Instead it is proposed that, based on "expressions of interest from satellite operators" for providing dissemination services for all, or part of, one of the five dissemination service areas, the CGMS would be invited to:

- ?? Identify the precise boundaries of the dissemination areas, considering that:
- the centre (in terms of longitude) of each dissemination service area should be close to the position of an operational geostationary meteorological satellite;
 - every WMO member should be adequately covered by an ADM service;
 - the boundaries of existing dissemination services need to be considered.

- ?? Consolidate the data dissemination requirements in each dissemination service area, taking due account of:
- the requirements for regional satellite observational data defined by the relevant WMO Regional Associations;
 - any other regional satellite observational data requirements for which a dissemination service is currently provided, or planned to be provided;
 - the WMO requirements for global satellite observational data;
 - any relevant obligations stemming from the Future WMO Information System (FWIS) concept. For example, satellite operators providing a dissemination service may have to fulfil the role of a Data Collection or Product Centre (DCPC). The adoption of this role could have implications in the following areas:
 - catalogue/metadata standards to ensure catalogue interoperability;
 - protocols;
 - the inclusion within the dissemination scheme of regional observation data not derived from satellites (e.g. data currently broadcast via the GTS).
- ?? Identify the Satellite Operator(s) that will provide the dissemination service for each dissemination service area, noting that within one dissemination service area, responsibility for providing the service may be shared between satellite operators or, indeed, one satellite operator may cover more than one service area.
- ?? Based on the identified dissemination service area boundaries, the satellite operators who have opted to provide a dissemination service would then be responsible for:
- acquiring and disseminating regional data;
 - exchanging global data with other operators of the integrated global data dissemination service.
- ?? Define the global architecture of the five dissemination services that, taken together, constitute the Integrated Global Data Dissemination Service (including a description of the communications means by which each WMO member will receive data from the service).
- ?? When defining the global architecture, it is considered essential that:
- the underlying requirement for standard, affordable user reception stations is respected;
 - a co-ordinated approach is taken to:
 - communication standards;
 - data format standards;
 - encryption mechanisms;
 - user station operating systems.
- ?? Identify actions that will enable global networking so as to ensure the smooth exchange of data and products between dissemination service operators, noting that:
- the requirements for data exchange are expected to be restricted to satellite data;
 - data ownership and data protection issues may need to be addressed.
- ?? Produce an overall schedule for the introduction of the Integrated Global Data Dissemination Service.

76. Once these detailed implementation arrangements have been established by CGMS, progress towards the full introduction of the service would be monitored within both the CGMS and the Consultative Meetings.

77. It is proposed that the co-ordination of the design and implementation of an Integrated Global Data Dissemination Service is handled as a specific WMOSP project.