

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)

JOINT WMO/IOC TECHNICAL COMMISSION FOR
OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)
EXPERT TEAM ON MARINE CLIMATOLOGY

ETMC-I/Doc. 2.2
(30.VI.2004)

FIRST SESSION

ITEM 2.2

GDYNIA, POLAND, 7 TO 10 JULY 2004

Original: ENGLISH

REPORT OF THE SECRETARIAT

(Submitted by the Secretariat)

Summary and Purpose of Document

This document contains general information related to the Team.

ACTION PROPOSED

The Expert Team on Marine Climatology is invited to note and comment on the information provided and take it into account when discussing related agenda items.

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- Appendices:**
- A. JCOMM structure
 - B. Summary of the first session of the Data Management Coordination Group
 - C. The Future WMO Information System (FWIS)
 - D. Resolution 2 (EC-LVI) - Inter-commission Coordination Group on the Future WMO Information System

DISCUSSION

Introduction

1. The Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) was formally established in 1999 by Thirteenth Congress and the Twentieth Session of the IOC Assembly, through a merger of the Commission for Marine Meteorology (CMM) (a WMO Technical Commission) and the Joint IOC/WMO Committee for Integrated Global Ocean Services System (IGOSS). JCOMM is the reporting and coordinating mechanism for all operational marine activities in both WMO and IOC. As such, it is charged with the international coordination, regulation and management of an integrated, operational, oceanographic observing, data management and services system which will eventually become the ocean equivalent of the World Weather Watch. The first session of the JCOMM (JCOMM-I) (Akureyri, June 2001) agreed that the work of the Commission would be organized in four major Programme Areas – Observations, Data Management, Services and Capacity Building. Within each Programme Area, specialized tasks will, in turn, be undertaken by a number of Expert Teams, Task Teams and Panels, as well as individual rapporteurs and other experts. The structure of JCOMM subsidiary bodies is in Appendix A. Coordination of the work in each Programme Area is ensured by a Coordinator, assisted by a small Coordination Group, comprising the chairs of the Expert and other Teams, the rapporteurs and other individual experts within the Programme Area in question. All four Programme Area Coordination Groups met during the first half of 2002, to ensure that the work strategies within each Programme Area (PA) are properly initiated and are on schedule to complete the JCOMM work programme established for the current intersessional period. Summary of the first session of the Data Management Coordination Group is in Appendix B.

2. The CMM Subgroup (originally Working Group) on Marine Climatology was first established by the second session of CMM (Hamburg, October-November 1956) and has been kept till the establishment of JCOMM. Considering that recent activities of the SGMC have been focusing on the data management of observations made by Voluntary Observing Ship, the Expert Team on Marine Climatology (ETMC) has been established under the Data Management Programme Area.

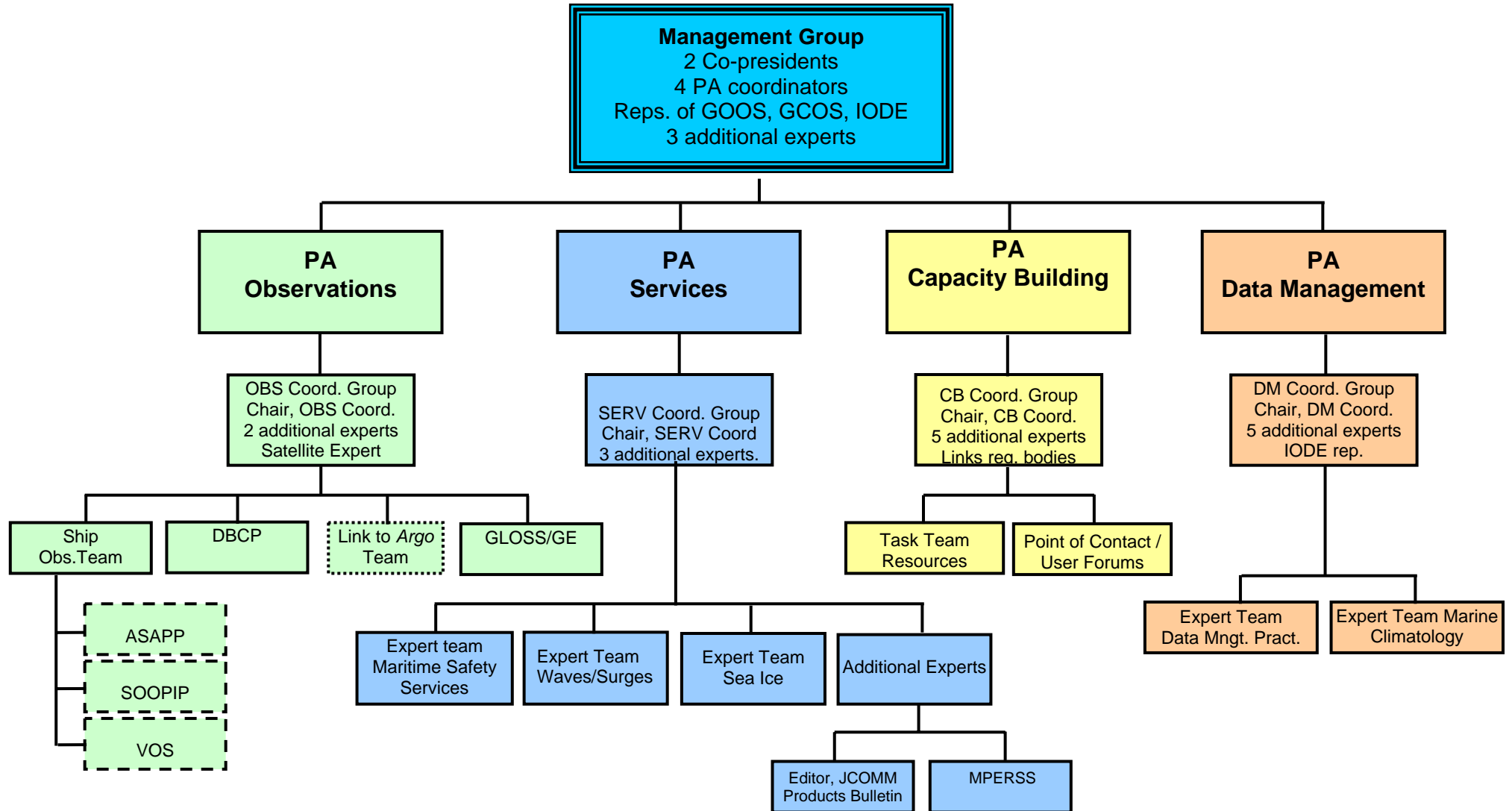
3. Activities by other JCOMM bodies related to the ETMC are summarized in the report of the chairman of the Team (ETMC-I/Doc. 2.1). Activities of the Expert Team on Data Management Practices, the other team under the Data Management PA, are reported in ETMC-I/Doc. 2.3.

4. Another information to be noted by the Team would be the development of the Future WMO Information System (FWIS). The FWIS is an overarching approach to meet information exchange requirements of all WMO Programmes; and will help WMO to achieve avoiding and eliminating data incompatibilities, duplication of effort and undue limitation in the sharing of highly valuable data between various programmes. A summary of FWIS is in Appendix C. The WMO Executive Council, at its fifty-sixth session, adopted a resolution on inter-commission coordination on the FWIS (Appendix D).

Action proposed

5. The Expert Team on Marine Climatology is invited to note and comment on the information provided and take it into account when discussing related agenda items.

JCOMM STRUCTURE



**Summary Report on the First Session of the JCOMM Data Management Coordination Group
(DMCG-I)
Paris, May 2002**

The JCOMM Data Management Programme Area encompasses a variety of issues to address the requirement of a fully integrated and mutually supportive approach to ocean data management, which was a major driving force for the creation of JCOMM. Specific tasks within the Data Management Programme Area will be undertaken by its Coordination Group and two Expert Teams; the Expert Team on Data Management Practices and the Expert Team on Marine Climatology.

The Data Management Programme Area Coordination Group is chaired by Professor Lin Shaohua (China), Data Management Programme Area Coordinator, who replaced Dr Wang Hong (see WMO Bulletin 51 (3) (July 2002)). It includes the chairs of the two Expert Teams; three individual experts with specific expertise in, respectively, data exchange codes and formats; communication systems for data exchange; and data flow monitoring; two other experts; and a representative of the IOC International Oceanographic Data and Information Exchange (IODE). The group held its first meeting in the UNESCO headquarters, Paris, 22-25 May 2002.

One of the urgent priority issues in the Data Management Programme Area is to consider the overall question of end-to-end, integrated data management for oceanographic and meteorological measurements. An end-to-end integrated data management system is central to any observational programme in JCOMM. One of the key objectives of this session was therefore to develop a data management strategy and pilot projects to facilitate the implementation of JCOMM observational programmes as fully integrated end-to-end systems.

The group recognized a need to have a single consolidated strategic plan for integrated end-to-end data management under JCOMM. Long-standing and successful work such as the Marine Climatological Summaries Scheme (MCSS), the Global Digital Sea Ice Data Bank (GDSIDB) and the Global Temperature and Salinity Profile Programme (GTSP), as well as relatively new data management practices for the VOS Climate Project (VOSCLIM) (see WMO Bulletin 51(2), April 2002) and for Argo, should be fully integrated into the JCOMM new data management system. Thus ideas and views of these existing data management systems will be combined into such a strategic plan. The group also agreed that a technical document regarding the integration technology to be used for end-to-end data management should be prepared by the Expert Team on Data Management Practices, and that a technical meeting could help finalizing such a document.

The group was presented with a proposal on an Ocean Information Technology (OIT) project drafted by Dr Neville Smith, chairman of OOPC. OIT aims at creating an efficient and effective data and information management system for the marine environment, based on leading-edge ocean information technology, and at serving the oceanographic community and beyond. The project should include the following components: (i) telecommunications and telemetry; (ii) standards for data representation and exchange and protocols; (iii) datum and data set integrity; (iv) data circulation and service; (v) data and products servers; (vi) data assembly, quality control; and (vii) the user interface. The project will be initiated as a pilot project, divided into a number of well-defined work packages, to be implemented in parallel.

The group agreed that the Ocean Information Technology Project proposal was an important initiative within the framework of the JCOMM Data Management Programme Area and identified four components to be developed as pilot projects for discussion at the OIT Steering Team planned to be held in November 2002. These included common protocols, data serving, data standards for XML, and a technology study. The group further noted that the OIT pilot project on the integration of data streams could be part of the design of the strategic plan.

The group addressed a number of other issues, including:

- (1) Possibility of IODE co-sponsorship of the JCOMM Expert Team on Data Management Practices;
- (2) A comprehensive study of existing metadata systems;
- (3) Designation of JCOMM representatives at relevant CBS bodies including the Expert Team on Data Representation and Codes, the Expert Team on Migration to Table-Driven Code Forms, the Expert Team on Integrated Data Management, and the Inter-programme Task Team on Future WMO Information Systems, to effect liaison between JCOMM and CBS;
- (4) Consideration of a centre to host a comprehensive metadata base for Ocean Data Acquisition Systems (ODAS);
- (5) Organization of a second CLIMAR International Workshop on Advances in Marine Climatology in November 2003, in conjunction with an historical conference to celebrate the 150th Anniversary of the Brussels Conference of 1853.

To implement tasks in the Data Management Programme Area, the group agreed that a detailed work plan for the group and two Expert Teams, based on drafts by the chairpersons and the outcome of the meeting, should be prepared.



WMO SECRETARIAT

The Future WMO Information System

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THE FUTURE WMO INFORMATION SYSTEM – SUMMARY

In 1998, it became apparent that the various WMO Programmes either had already, or were in the process of developing, their own information systems independently of each other. Since the multiplicity of systems resulted in incompatibilities, inefficiencies, duplication of effort and higher overall costs for Members, the continued development of the systems in this uncoordinated manner would have exacerbated these problems and would have further isolated the WMO Programmes from each other and from the wider environmental community. It would have increased the difficulty in sharing information between programmes, which was essential for them to fulfil their requirements. The Fourteenth World Meteorological Congress (2003) reviewed a preliminary concept proposed by CBS and confirmed that an overarching approach was required: a single coordinated global infrastructure, the Future WMO Information System (FWIS):

- FWIS should be used for the collection and sharing of information for all WMO and related international programmes;
- FWIS should provide a flexible and extensible structure that would allow the participating centres to enhance their capabilities as their national and international responsibilities grew;
- Implementation of FWIS should build upon the most successful components of existing WMO information systems in an evolutionary process;
- FWIS development should pay special attention to a smooth and coordinated transition;
- The basis for the core communication network should be the present communication links used within the World Weather Watch (WWW) for the high priority real-time data;
- FWIS should utilize international industry standards for protocols, hardware and software.

FWIS is intended to serve all relevant WMO Programmes. It would bring savings to the meteorological/hydrological community as a whole and increase the efficiency of their operations. Reviewing the requirements of the different WMO Programmes, the following needs were highlighted:

- A widely available and electronic (on-line) catalogue, including the necessary metadata information, of all meteorological and related data for exchange to support WMO Programmes is required;
- There is a need to rapidly access and integrate real-time and non-real-time (archive) data sets to better interpret weather events in a climatological context;
- There is a need to identify and utilize the potential of data from observation sites established by one Programme to meet the requirements of other Programmes;
- There is a need to harmonize data formats, transmission standards, archiving and distribution mechanisms to better support inter-disciplinary use of data and products;
- Standard practices for the definition, collection, electronic archival and exchange of metadata, both high-level and detailed, especially for stations and instruments, are needed.

In more technical detail, FWIS should provide an integrated approach to meeting the requirements for:

- Routine collection and automated dissemination of observed data and products (“push”);
- Timely delivery of data and products (appropriate to requirements);
- Ad-hoc requests for data and products (“pull”).

In addition, FWIS should be:

- Reliable;
- Cost effective and affordable for developing as well as developed Members;
- Technologically sustainable and appropriate to local expertise;
- Modular and scalable;
- Flexible and extensible - able to adjust to changing requirements and allow dissemination of products from diverse data sources and allow participants to collaborate at levels appropriate to their responsibilities and budgetary resources.

FWIS should also support:

- Different user groups and access policies, such as WMO Resolutions 25 and 40;
- Data as well as network security;
- Integration of diverse datasets.

Taking into account that information systems technology is evolving rapidly, FWIS should utilize industry standards for protocols, hardware and software. Use of these standards will reduce costs and allow exploitation of modern communication services, including the ubiquitous Internet and Web services. The ultimate implementation of FWIS will build upon the most successful components of existing WMO information systems. It will continue to rely upon the WMO communication system (initially the GTS) to provide highly reliable delivery of time-critical data and products. However, the following new features will be added:

- Commonality to all WMO Programmes supporting a variety of data types;
- Support of real and non-real time data sets;
- Support of routine dissemination as well as request/reply mechanisms for all data and products;
- Support of various communication protocols for data transmission matching exchange requirements, from e-mail and GTS procedures to emerging Internet standards like Web- and Grid-Services;
- Use of different types of communication links as available, appropriate and cost effective, including dedicated links and networks, e.g., GTS, satellites and Internet;
- Use of off-the-shelf hardware and software components.

To better describe FWIS, a functional view is adopted. Three major components are defined: *National Centres (NC)*, *Data Collection or Product Centres (DCPC)* and *Global Information System Centres (GISC)* together with a data communication network connecting the components. It should be noted that the terms are only used for describing the necessary functions, not actual organizational entities. There may be organizations like NMHSs which combine all three functions within their structure.

1. National Centre (NC)

Similar to the WWW distribution of functions and that of several other Programmes, e.g. GOOS, GCOS, WHYCOS, FWIS assumes the existence of a national component. This part of FWIS is responsible for collecting and distributing data on a national basis and to authorize the use of the FWIS elements for its accredited national users. Therefore, a national authority must be established, normally the Permanent Representative (PR) of the country, to coordinate the use of FWIS by the national participants in the different WMO Programmes.

2. *Data Collection and Production Centre (DCPC)*

Centres which fulfil within their own WMO Programmes the responsibility of producing data and archiving the information would undertake data exchange functions within FWIS. Examples of Centres taking up those functions are the European Centre for Medium-Range Weather Forecasts (ECMWF) in Reading, UK, and national Numerical Weather Prediction (NWP) Centres. Similarly, centres collecting information, like World Data Centres in Asheville, Obninsk or Beijing, or specialized agencies such as EUMETSAT and NESDIS, are also responsible for storing and archiving the information and making them available for standard dissemination or on a request-reply mechanism in accordance with agreed data access policies. Furthermore, some centres would ensure the collection of data on a regional or specialized basis (e.g. ARGOS) and thus act as DCPCs.

3. *Global Information System Centre (GISC)*

The regional and global connectivity of the FWIS structure is guaranteed by the existence of a small number of core communication centres whose areas of responsibility in total cover the whole world and which collect and distribute the information meant for routine global dissemination. In addition, they serve as collection and distribution centres for their areas of responsibility and also provide an entry point for any request for data held within FWIS, i.e. they maintain metadata catalogues of all information available for any authorized user of FWIS, independent of its location or type. In addition, for all environmental data available within FWIS which are not subject to any access control, the GISC will provide a portal for data searches by anybody, even without prior authorization. This new service will greatly facilitate data searches by researchers.

4. *Data communication network structure*

The data communication network connecting the various parts of FWIS should be based on any agreed technology available to the participating centres and being capable of handling the foreseen traffic. There should be satellite communication channels as well as terrestrial links or managed data network services. Similarly, any suitable transmission protocol could be employed. The user should decide the format of the selected information, being able to choose from a wide variety of options. Metadata information should be available in a standard format, e.g., as XML documents.

FWIS addresses the information and communication functions of WMO Programmes and would ensure the data access and delivery services. The related telecommunication and data management responsibilities of WMO Programmes centres would be mapped into the corresponding functions within the FWIS, including the required interface with the data observing and data processing components of WMO Programmes. Data and products generation as well as archiving is not a FWIS responsibility, and would remain under the control of the respective programmes and relevant centres.

Once fully operational, FWIS will provide the following services:

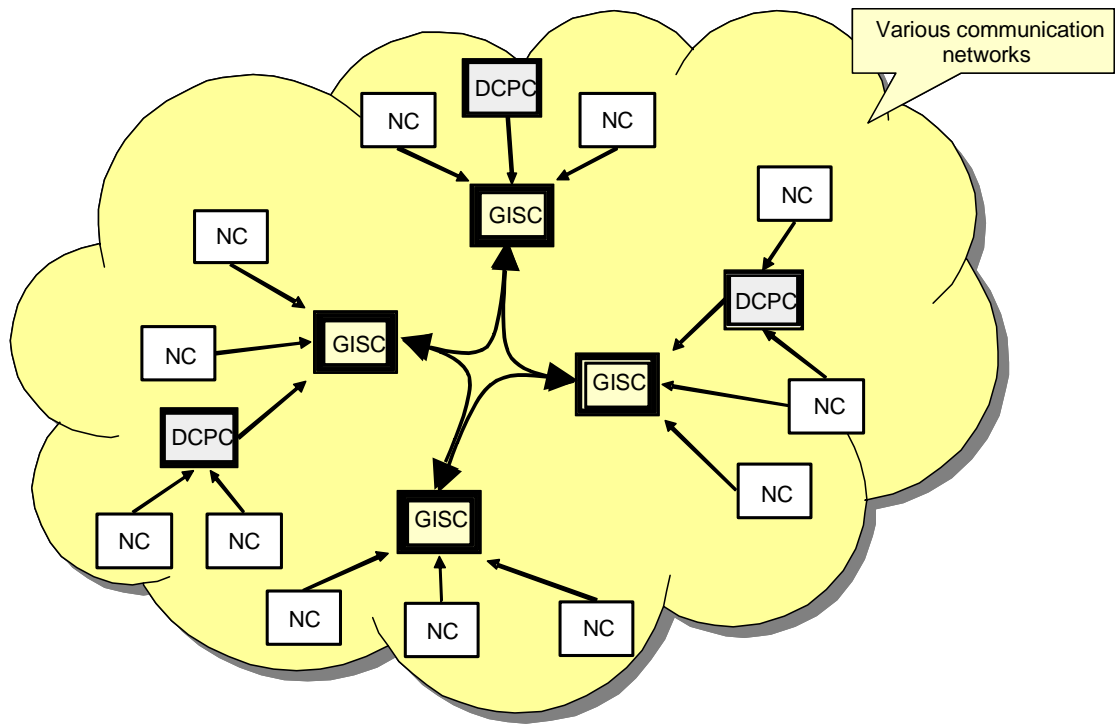
- For WWW, with regard to high priority time-critical data and products, the current GTS dissemination of data will continue. Any foreseeable or possible enhancement of the GTS will be supported;
- Further development of satellite transmission systems will enable all participants of FWIS, in particular the least developed Members of WMO, to receive the routine global dissemination of data and products;
- Other established international programmes can use the FWIS with the agreement of WMO to transmit data either in real-time or in delayed mode. The required timeliness and size of the data determine the media to be used for the data transmission, e.g. leased lines, GTS links, Internet or satellite distribution systems. In addition, the data transmission protocol can be chosen either by the initiating programme or by each recipient from an agreed common set;

- Authorized users of FWIS can ask for routine or ad-hoc dissemination of data known to FWIS;
- Any user, even without authorization, can use FWIS via Internet for data directory browsing or access to data that is available to everybody without restriction.

Since FWIS will use international industry standards and, therefore, off-the-shelf hardware and software components, it will be cost-effective and highly flexible. Thus, in the future, emerging standards (e.g. Web or Grid services) will be supported.

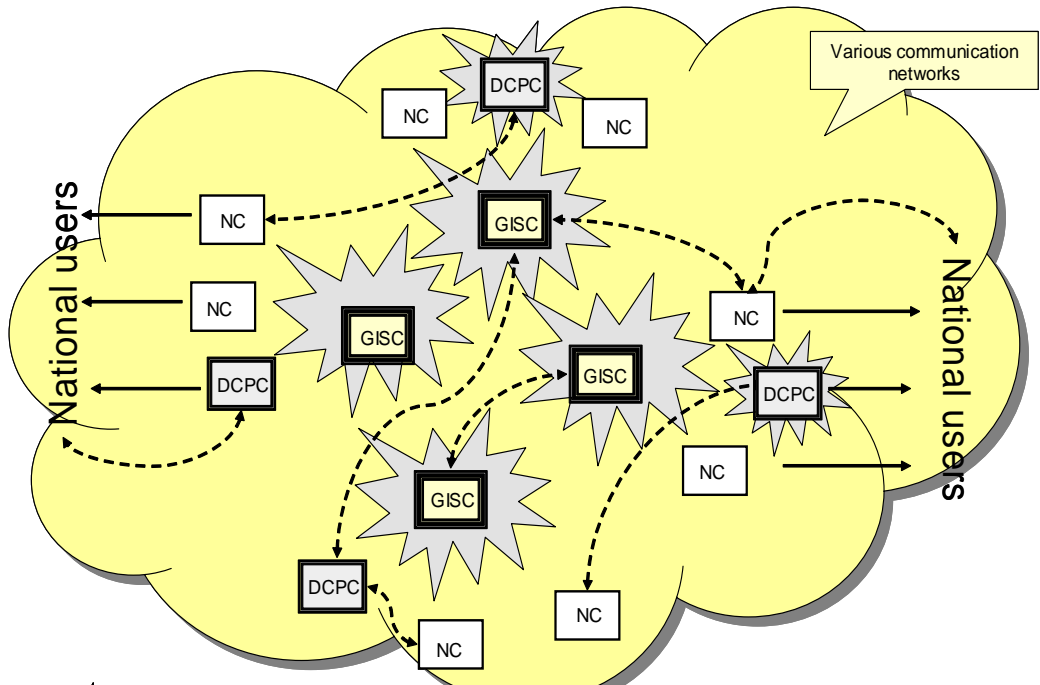
FWIS will add services to the current systems and will allow the exploitation of synergy effects by creating a single, integrated system for all WMO Programmes that supports a range of data exchange services adapted to the actual requirements (timeliness, security, volumes). This would facilitate the active participation of the less developed Members in the WMO Programmes, especially the WWW.

Actual development and implementation of FWIS should be pursued through a gradual introduction and evaluation of enabling technologies through pilots and prototypes. The major innovation is needed in the development of metadata directories for which all programmes should contribute. Successful prototypes could then be expanded to serve additional communities and/or distributed to other Members and centres for wider implementation. In this way, the enhanced functions provided by FWIS would be gradually introduced and expanded.



GISC Global Information System Centre
 DCPC Data Collection or Product Centre
NC National Centre

Information collection data flow



Routine dissemination (Internet, private network, satellite, etc.)
 National dissemination
 Request/reply (Internet)

Information distribution data flow

Res. 2 (EC-LVI) — INTER-COMMISSION COORDINATION GROUP ON THE FUTURE WMO INFORMATION SYSTEM

THE EXECUTIVE COUNCIL,

NOTING:

- (1) Resolution 25 (Cg-XIV) – Sixth WMO Long-term Plan,
- (2) *Abridged Final Report with Resolutions of the Fourteenth World Meteorological Congress* (WMO-No. 960), general summary paragraphs 3.1.2.7 to 3.1.2.10,
- (3) Report of Presidents of Technical Commissions Meeting, 2004,

CONSIDERING:

- (1) That the Future WMO Information System (FWIS), was an overarching approach to meet information exchange requirements of all WMO Programmes; and would help WMO to achieve avoiding and eliminating data incompatibilities, duplication of effort and undue limitation in the sharing of highly valuable data between various programmes,
- (2) That the FWIS concept developed by CBS, was endorsed by the Fourteenth Congress,
- (3) That Congress requested CBS to pursue the development of FWIS, and all WMO Programmes and Technical Commissions to actively participate and contribute their own expertise in all phases of this development,
- (4) That it would be necessary to:
 - (a) Share knowledge, resources and commitment and increase communication between the technical commissions and their associated programmes,
 - (b) Strengthen mechanisms for coordinating issues between the technical commissions,
- (5) That a strong, high-level coordination mechanism spanning across the technical commissions was required for achieving this challenging task,

DECIDES:

- (1) To establish a Inter-Commission Coordination Group on FWIS with the following terms of reference:
 - (a) To coordinate the refinement and consolidation of the FWIS based on the approved concept and then the implementation planning phases;
 - (b) To assess in detail the data exchange and data management requirements of WMO Programmes, at present and for the foreseeable future, which should be met by the FWIS;
 - (c) To advise the technical commissions on the development in data-communications and management functions to be required in the FWIS as regards their respective programmes;

- (d) To guide the orderly evolution of existing WMO information systems towards FWIS;
 - (e) To address the major issues that had been identified, as listed in the Annex to this resolution;
- (2) That one representative from each technical commission should serve as members of the group;
 - (3) That the chairperson may seek advice from, or invite experts as necessary;

DESIGNATES as chairperson of the group;

REQUESTS:

- (1) The presidents of the technical commissions to designate, in accordance with **DECIDES** (2), an expert to participate in the work of the Inter-Commission Coordination Group;
- (2) The presidents of technical commissions to review, at the annual meeting, the outcome of the work of the Inter-Commission Coordination Group;
- (3) The president of the Commission for Basic Systems to report on the work of the group to each session of the Executive Council, taking into account the outcome of the Presidents of Technical Commissions Meetings;

REQUESTS the Secretary-General to provide the necessary assistance and Secretariat support for the Inter-Commission Coordination Group on FWIS, within the available budgetary resources.

Annex: 1

Annex to draft Resolution 3.1/1 (EC-LVI)

Major issues the Inter-Commission Coordination Group on FWIS should address and coordinate

- Development of a widely available, electronic (on-line) catalogue of meteorological and related data, including links to other national, regional and global catalogues;
 - Further development and coordinated implementation of a detailed WMO metadata standard for all programmes;
 - Promote the harmonization and consistency of data formats, transmission standards, archiving and distribution mechanisms to fully support inter-disciplinary use of data and products (e.g. ensuring that data from observation networks established by one programme can be shared with other programmes);
 - Coordination of cross-programme standardized practices for the collection, exchange and electronic archival of data and related metadata, both high-level and detailed, including for stations and instruments (including expanded standard for station index numbering);
 - Coordination of flexible, coordinated data-communication practices that evolve in step with the evolution of the Internet and relevant data-communication services;
 - Mapping, with respect to information and communications, of the current and future structure and organization of WMO Programme centres to the functional components of FWIS (i.e. NCs, DCPCs and GISCs functions).
-