

**WORLD METEOROLOGICAL ORGANIZATION
COMMISSION FOR BASIC SYSTEMS**

**MANAGEMENT GROUP
SIXTH SESSION
GENEVA, 3 - 5 APRIL 2006**



FINAL REPORT

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AGENDA

1. ORGANIZATION OF THE SESSION

- 1.1 Opening remarks
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

2. CBS WORK PROGRAMME

- 2.1 OPAG on Integrated Observing Systems
- 2.2 OPAG on Information Systems and Services
- 2.3 OPAG on Data Processing and Forecasting Systems
- 2.4 OPAG on Public Weather Services

3. INTERPROGRAMME COORDINATION AND IMPLEMENTATION OF WIS

4. CBS COLLABORATION WITH SPECIFIC INTERNATIONAL PROGRAMMES AND PROJECTS

- Group on Earth Observations (GEO)
- Disaster Prevention and Mitigation (DPM)
- International Polar Year (IPY)
- Quality Management Framework (QMF)
- World Weather Research Programme (WWRP), including THORPEX

5. ARRANGEMENTS FOR THE EXTRA-ORDINARY SESSION OF THE COMMISSION FOR BASIC SYSTEMS CBS-EXT. (06)

6. PROGRAMMATIC ARRANGEMENTS FOR THE TECHNICAL CONFERENCE IN CONJUNCTION WITH CBS-EXT. (06)

7. OTHER BUSINESS

8. CLOSURE OF THE SESSION

Executive Summary

The sixth session of the CBS Management Group (MG) was held in Geneva, Switzerland from 3 to 5 April 2006.

The CBS-MG reviewed the activities, which had taken place since its last session and addressed the evolving needs of each of its programmes.

The CBS-MG reviewed the development of the WMO Information System (WIS) and gave guidance on the work needing to be carried out to inform the other technical commissions, as well as other communities of the potential benefits that WIS can bring to them.

The CBS-MG addressed the topic of coordination with specific international programmes and projects, as well as coordination with the WMO cross-cutting programs.

The preparations for CBS-Ext. (06) was discussed and the programmatic arrangements for the technical conference on the WMO Information System WIS to be held in association with CBS-Ext.(06) were addressed.

General Summary of the work of the meeting

1. ORGANIZATION OF THE SESSION

1.1 Opening remarks

1.1.1 The session of the CBS Management Group (MG) was held in Geneva, Switzerland from 3 to 5 April 2006. The meeting was chaired by the CBS President, Mr A. Gusev. The list of participants is given at the end of this report.

1.1.2 Mr Gusev welcomed the participants and pointed to the need, in view of the coming session of CBS, to review the work which had been carried out and to determine the next steps to be addressed in order to update the CBS task list. He specially emphasized the need to discuss the participation of CBS in inter-commission programs, and mentioned the importance of WIS for the WMO-wide community. He also addressed the need to discuss the contribution of CBS to GEOSS.

1.1.3 The Deputy Secretary-General, Mr Hong Yan, welcomed the participants to the WMO Headquarters and wished them a productive meeting and an enjoyable stay in Geneva. He pointed out his appreciation for the work of the Commission, which was supporting the WMO-wide community since it shaped the basic infrastructure, which all Members were using to achieve their goals. He stressed the increasing relevance of cross-cutting activities and highlighted the role that CBS had to play in these areas. He specially welcomed the extensive reply that CBS provided to the GEO 2006 work-plan, and the constructive cooperation proposals, which were included in it. He urged CBS to continue being proactive and to take active part in the newly formed GEO committees to foster collaboration for the benefit of all. He also highlighted that WMO products had been very well received at the meeting on Disaster Reduction, which had just been held in Bonn.

1.2 Adoption of the agenda

1.2.1 The agenda was adopted by the participants. It is reproduced at the beginning of this report.

1.3 Working arrangements

1.3.1 The working hours and tentative timetable for the meeting were agreed upon.

2. CBS WORK PROGRAMME

2.1 OPAG on Integrated Observing Systems

Summary of Key Points Presented

2.1.1 The MG reviewed activities carried out within OPAG-IOS since the MG-5 meeting including deliberations of the following meetings:

- The second CBS/GCOS Expert Meeting on the Coordination of the GSN and GUAN (Asheville, USA, 28 to 30 September 2005);
- The first meeting of the Expert Team on Satellite Utilization and Products (ET-SUP), Geneva, 17-21 October 2005;
- The Coordination Meeting on Antarctic Meteorology and related IPY Activities, St. Petersburg, Russian Federation, 21- 23 November 2005;
- The first session of the CBS OPAG-IOS Expert Team on Satellite Systems (ET-SAT), Geneva, 5–9 December 2005;
- The first session of the CBS OPAG-IOS-Expert Team on Evolution of the GOS (ET-EGOS), Geneva, 7-9 December 2005;
- RA I Sub-Regional Training Seminar on CLIMAT and CLIMAT TEMP Reporting, Morocco 20-22 December 2005;
- The second session of the Task Team on GOS Regulatory Material, Geneva, 20-22 February 2006;

- The fourth session of the CBS OPAG-IOE Expert Team on Automatic weather Stations (ET-AWS), Geneva, 20-24 March 2006.

2.1.2 The MG noted that proposals and recommendations developed during the above meetings will be further reviewed during the upcoming session of the Implementation/Coordination Team on Integrated Observing Systems in September 2006 with subsequent submission to the CBS-Ext.(06) for approval. In particular, the MG noted with appreciation activities on continuous monitoring of the **Implementation Plan for Evolution of Space- and Surface-Based Sub-Systems of the GOS** (WMO/TD No. 1267) distributed to all WMO Members, efforts ensuring that satellite data and products are more fully adapted to user's needs and adequately accessible to various users, on-going process for transition of R&D satellite capabilities to operational environmental satellites, development of AWS BUFR code tables adequate for resolving operational workload issues, revision and updates of major GOS regulatory material, including **Manual on the GOS** (WMO-No. 544), **Guide on the GOS** (WMO-No. 488) and **Vol. A of WMO Publication No. 9**, further enhancement of collaboration with GCOS through coordination meetings of experts and training seminars on generating climatological reports. The MG also noted the implementation of the Antarctic Basic Synoptic Network (ABSN) and Antarctic Basic Climatological Network (ABCN), and observational network performance in the Antarctic related to the IPY. Final reports of the above meetings are available at <http://www.wmo.ch/web/www/CBS-Reports/IOS-index.html>. The MG also noted that the following meetings will take place before CBS-Ext.(06):

- ET-EGOS, second session, 10-14 July 2006 (place TBD)
- ET-SAT, second session, 4-8 September 2006, Geneva
- ET-SUP, second session, 4-8 September 2006, Geneva
- ICT-IOE, fourth session, 11-15 September 2006, Geneva

2.1.3 The MG was informed that Dr Paul Menzel resigned from the position as Chair of ET-EGOS, effective 1 February 2006. It appreciated the tremendous contributions he made to the International community through his Chairmanship of the Expert Team since its inception for nearly two decades. Through his leadership, combined with his depth of knowledge on observing systems, particularly satellite observing systems, the Expert Team made remarkable strides in moving forward the evolution of the GOS. The MG endorsed the proposal that Dr John Eyre should assume responsibilities of the ET EGOS Chair.

Issues Raised

2.1.4 During discussions the following issues were raised:

- IPY and CAS/THORPEX activities related to the OPAG-IOE;
- Observing systems and migration to the table-driven codes;
- Brochure on the evolution of the GOS;
- OPAG-DPFS Rapporteur on the Impact of Changes to GOS on NWP;
- Integration of observing systems

2.1.5 The MG noted that both IPY and THORPEX could benefit from OPAG-IOE expertise but expressed concern at the lack of information about IPY plans in relation to observing systems and, in the case of THORPEX, the lack of regional science and implementation plans. The MG noted the existing difficulty in developing national plans for migration and stressed that the evolution of the GOS should be associated with migration to table-driven codes. It was noted that the on-going activities on the redesign of the GOS should be more transparent to various users and special Brochure on the Evolution of the GOS should be prepared. The MG felt that the TORs of the OPAG-DPFS Rapporteur on the Impact of Changes to GOS on NWP actually duplicate those established for OPAG-IOE Co-Rapporteurs on Scientific Evaluation of OSEs and OSSEs. In the light of the development of the 7LTP, emphasis should be given to integrated global observing systems

Decisions

2.1.6 The MG agreed on the following:

- OPAG-IOS to request updates on the current and planned IPY activities, ensure coordination with appropriate working structures of IPY;
- OPAG-IOS to draw attention of CAS/THORPEX on the requirement to develop regional science and implementation plans, specify more clearly the role of Members in planning and implementation of THORPEX and IPY;
- ET-EGOS and CT-MTDCF to coordinate migration strategy issues relevant to the evolution of the GOS;
- OPAG-IOS in coordination with the secretariat to prepare the draft layout and type (CD-ROM, Leaflet, etc.) of the Brochure on the Evolution of the GOS;
- Merge the activities of the OPAG-DPFS Rapporteur on the Impact of Changes to GOS on NWP into those of the OPAG-IOS Co-Rapporteurs on Scientific Evaluation of OSEs and OSSEs reporting also to OPAG-DPFS;
- OPAG-IOS, within overall activities on the evolution of the GOS, to consider strategies for an integrated approach for incorporation of all WMO observing systems and others as relevant.

2.2 OPAG on Information Systems and Services

2.2.1 The MG noted with satisfaction the progress report on activities OPAG on Information Systems and Services and concurred with the work plan that was fully consistent with the programme as agreed upon at CBS-MG-V (April 2005). The following meetings of the teams and related events had been held or were planned to take place before the CBS extra-ordinary session (2006):

- | | |
|---|-------------------------------|
| • ICT-ISS | 3-7 July 2006, Geneva |
| • CT-MTDCF | 1-4 November 2005, Geneva |
| • ET-DRC (followed by training seminar) | 5-8 December 2005, Oman |
| • Joint meeting ET-DRC and CT-MTDCF | 8-12 May 2006, Montreal |
| • IPET-MI jointly with Workshop on Metadata | 26-30 September 2005, Beijing |
| • IPET-MI (half day joint session with ET-WISC) | 3-5 May 2006, Moscow |
| • ET-WISC | 11-14 October 2005, Geneva |
| • ET-WISC (half day joint session with IPET-MI) | 3-5 May 2006, Moscow |
| • ET-CTS | 25-28 April 2006, Tokyo |
| • SG-RFC | 16-17 March 2006, Geneva |
| • WMO Workshop on Radio Frequencies | 20-21 March 2006, Geneva |
| • ET-OI jointly with ICM on the GTS-WIS MTN | 16-19 May 2006, Geneva |

2.2.2 The MG noted with concern that only a small number of countries had developed or were currently developing a national plan for the migration to Table Driven Code Forms (TDCF), although the plan had been developed many years ago. The meeting felt that this status revealed that serious difficulties were foreseen by NMSs in the implementation of the plan and/or insufficient benefits were expected in view of the efforts and risks involved. The MG agreed that one of these difficulties was the necessity for the WWW centres to continue providing data in Traditional Alphanumerical Codes (TAC) to some user communities (e.g. aviation, marine community), as well as the reluctance of users in using the BUFR code that is not a common industry standard. On the other hand, the MG emphasized that the TDCF were needed by the WMO community to meet the evolving data requirements, and were actually implemented by several NMHSs for new observing systems (e.g. AWS). The meeting felt that the strategy and the plan for the migration should be reviewed with a view to better focus on the requirements, benefits and cost-efficiency. It also agreed that the requirements of the user community should be re-visited, especially as regards the possibility to use industry standards such as XML. The MG agreed that this important issue should be considered at CBS-Ext. (06)

2.2.3 The MG requested the Coordination Team on Migration to TDCF (CT- MTDCF), at its forthcoming meeting, to review the MTDCF plan and consider possible adaptation to mitigate the

difficulties experienced by NMHSs. The MG asked the CT-MTDCF to consider sampling WMO Members to compile information on the common difficulties met in the migration, and receiving comments on the ability to implement the plan and possible suggestions to amend it. The survey should also investigate the use of XML in the meteorological community. The MG re-affirmed the need to develop guidance or recommended practices on the use of XML for the presentation of WWW data and products to users outside the WMO community. It noted that the Expert Team on Data Representation and Codes (ET-DRC) would require additional expertise to study how to represent the meteorological data and products in XML for their distribution to the users. The meeting recommended that the Secretariat consider the possibility of hiring a consultant in order to assist the ET-DRC in this task.

2.2.4 The MG noted that new non-destructive data compression methods might be able to augment the WMO-specific compression methods. It asked OPAG-ISS to explore these technologies with a view to making WMO data more accessible to others. The MG also noted that an invited expert (from NCAR) will join the ET-CTS meeting (Tokyo, 25-28 April 2006) to provide specific expertise for the task of developing recommended practices on OPeNDAP, NetCDF and HDF procedures.

2.2.5 The MG also noted with appreciation the efforts made by the ET-WISC in developing the technical and operational specifications of the WIS GISCs and DCPCs, including the fruitful outcome of an ad-hoc GISC & DCPC developers meeting (Langen, Germany, 29-31 March 2006) that was organized at the initiative of its co-Chair, Mr H. Knottenberg (Germany) with the support of DWD (see also agenda item 3).

2.2.6 The MG was pleased to note the activities related to radio frequencies, including a Workshop and the preparation of the forthcoming ITU World Radiocommunication Conference (WRC-2007) on the agenda items of concern for the Weather, Water and Climate community.

2.2.7 The MG was informed of the developments related to the prominent role of the GTS in the exchange of multi-hazard early warning and related data, especially the establishment of a Tsunami Warning System in the Indian Ocean. It noted the ET-OI would address the specific requirements and consolidate relevant GTS/WIS procedures (priority routing, message format for acknowledgment of receipt of a bulletin, and operational tests).

2.2.8 The MG was informed of WMO's participation in the World Summit on the Information Society (WSIS), including its two phases (Geneva, 2003 and Tunis, 2005) and the related preparatory activities. More detailed information on WMO's contributions and the related WSIS outcome is included in the annex to this paragraph.

2.3 OPAG on Data Processing and Forecasting Systems

OPAG on DPFS Structure and Terms of Reference

2.3.1 The OPAG teams structure, and terms of reference of the teams and rapporteurs have been implemented as decided at the CBS MG-V (2005).

Coordination of DPFS with WWRP

2.3.2 The MG noted that the OPAG Chairman has been appointed member of the Science Steering Committee of the World Weather Research Programme (WWRP) to provide effective coordination between the operational DPFS programme, and the research and development components for NWP systems, e.g. the implementation of the CBS Severe Weather Forecasting Demonstration Project.

Coordination of DPFS with THORPEX

2.3.3 The MG noted that the main area of interest of DPFS in THORPEX is in relation to developments of the Global Interactive Forecasting System - THORPEX Interactive Grand Global Ensemble (GIFS-TIGGE) project, which, while in research and development, is related to the work and interest of the Expert Team on Ensemble Prediction Systems (EPS). The Chairman of the Expert Team on EPS participates on the GIFS-TIGGE Working Group.

Evolution of the working structure of the OPAG on DPFS including ERA

2.3.4 The MG agreed with the following directions:

- a) The Expert Team on EPS should place increased emphasis on the use of ensembles (or any other tools) for the production of probabilistic forecasts, and in broader terms for the generation of products in support of decision-making. The DPFS would be guided by a statement of needs from the PWS regarding probabilistic forecasts, and other users and decision makers.
- b) The terms of reference of the expert team on Long-range Forecasting (LRF) should become more oriented toward product development and guidance on use of products. A single expert team would be needed to cover all aspects of LRF.
- c) As applications of NWP to severe weather forecasting are becoming more and more relevant and important, the subject should at some stage be assigned to an expert team.
- d) Since the roles of the DPFS Rapporteur on impact of changes of GOS to NWP and of the IOS Co-rapporteurs on scientific evaluation of OSEs and OSSEs are overlapping, the MG decided to add the terms of reference of the DPFS Rapporteur to those of the IOS Rapporteur, recognizing that one joint IOS-DPFS Rapporteur on the subject would be efficient and adequate.
- e) An expert team is needed to address issues related to very short-range forecasting including “nowcasting”, such as on the use of very high-resolution models, with the principal focus on severe weather forecasting. This team could also deal with the provision of nesting data sets for Limited Area Models (LAM) ran at NHMSs.
- f) The ICT should consider the establishment of an expert team or a coordination group in the area of operational NWP verification, to review and update current procedures for computing WMO standard scores, and to respond to new requirements such as the verification of very high resolution NWP models, or the verification of nowcasting products. As well, an expert from this group would participate to the appropriate expert group in the Commission for Atmospheric Sciences (CAS) that is concerned with NWP verification.

2.3.5 The MG noted the progress of DPFS and ERA programmes of activities. In addition:

- a) The MG noted that a number of producing centres of long-range forecasts will deposit their nominations to be recognized as a Global Producing Centre (GPC) of Long-range Forecasts at the next CBS Extraordinary Session, CBS-Ext.(06). In conjunction with the designations of GPC, the MG noted that the designation of the Regional Climate Centres is under the responsibility of Regional Associations and the Commission for Climatology.
- b) The MG considered the request made by EC-LVII (2005) to CBS to consider ways to provide location-specific NWP products to developing countries as an incentive to enhance support for the GOS, under the WWW Programme (EC-LVII paragraph 3.1.1.5 (c) (vii)). The meeting concluded that while CBS could develop guidelines or standards for products for international exchange (e.g. new products from EPS), it does not consider data policy issues. The MG decided to assign an additional task to the Expert Team on EPS to develop product guidelines and standards for location-specific time series of meteorological parameters in the form of graphical products known as “EPS-grams” for international exchange.

2.4 OPAG on Public Weather Services

2.4.1 The Chair of the OPAG on PWS, introducing the report on this item, detailed the activities, which had taken place within the OPAG over the previous year.

2.4.2 The ICT had met in Dublin, and had received presentations on THORPEX from Dr David Burrige of the IPO, on GMES from Dr Adrian Broad of the UKMO, and on EMMA, the European Multi-hazard Meteorological Awareness initiative. The ICT had also done work on a strategy and workplan for PWS, regarding which the Chair requested opinions and views from the members of the MG.

2.4.3 The ET on PWS in support of DPM, within the OPAG, had taken the lead in preparing a questionnaire on the vulnerability of WMO members to natural disasters; this survey had been distributed by the Chair of the OPAG in January; to date 52 replies had been received. The Chair noted that, of the 187 members of WMO, between 10 and 15 members were not contactable on

the email or fax numbers supplied by the WMO Secretariat. This represented a weakness in the communications system.

2.4.4 The Expert Teams in the OPAG had scheduled meetings in the forthcoming period as follows:

- ET on Services Provision and Improvement New York, USA, May 1st to 5th
- ET on Communication Dubrovnik, Croatia, May 29th to June 2nd
- ET on PWS in support of Disaster Prevention and Mitigation Beijing, China, June 12th to 16th

2.4.5 The Chair of the OPAG had participated in meetings relating to GEO, and a task had been accepted from the PWS Programme for inclusion in the 2006 GEO Workplan. He was also an active member of the Societal and Economic Applications Working Group of THORPEX; this WG had met in January and again in March. The THORPEX WG had recently been given independent status as a Working Group under CAS, and would assume responsibility for all the Societal and Economic aspects of CAS work. There was some uncertainty as to what this extra work and responsibility would entail.

2.4.6 In conjunction with the Education and Training Department a PWS Expert Group on Education and Outreach had been convened in Geneva from March 22nd to 24th. This Expert Group had identified three distinct interest groups as target areas for education and outreach:

1. Supporting Primary and Secondary level students;
2. Supporting user communities
3. Supporting high-level policy and decision makers.

2.4.7 A Task Team on Social and Economic benefits of PWS would be convened from May 15th to 18th; the work of this Team would contribute to the process leading to a major WMO Conference on the Social and Economic benefits of NMHSs, scheduled for Madrid in March 2007. This conference was being co-ordinated by the Office for Strategic Planning in WMO. If there was an ongoing requirement for the Task Team it might, in time, develop into another Expert Team under the OPAG.

2.4.8 The PWS Programme was also organising a workshop, in collaboration with DPFS, on the avoidance of weather hazards using nowcasting technologies. This was tentatively scheduled for late 2006 in Australia.

2.4.9 A series of Guideline publications had been prepared through PWS over the past few years; there were now plans to prepare a brochure to advertise these publications, in order to introduce them to a wider audience.

2.4.10 A number of definitions relating to Public Weather Services had been proposed by the ICT, and these were discussed by the MG. The definitions were agreed as follows:

a. What are Public Weather Services about?

PWS are concerned with the delivery and communication by NMHSs of high quality, and timely, weather and related information (past, present and future) so as to enable users to make informed decisions.

b. How do Public Weather Services function?

Through building and maintaining the position of NMHS's as suppliers of high quality services through:

- a) Applying excellence in science and technology;
- b) Understanding, respecting, and responding to user needs;
- c) Building relationships with stakeholders;
- d) Establishing credibility in weather products and services.

Deriving from these definitions, nine areas of strategic interest to the PWS Programme had been identified, as follows:

- a) Engaging in capacity building / training and outreach activities
- b) Improving the reach of NMHS products and services (strengthening the brand)
- c) Promoting the application of the science and technology of Meteorology to improve products and services; engaging in demonstration projects.
- d) Collaborative activities as appropriate
- e) Establishing and promoting best practice
- f) Promotion of PWS activities; preparing and promulgating expert reports
- g) Engaging in surveys and assessments
- h) Researching and providing information on socio-economic aspects of weather services
- i) Promoting and strengthening the brand of WMO

For each of these areas a workplan had been developed. Finally, the ICT had developed the following statements encompassing the “Essential” and “Recommended” elements of a national PWS Programme:

Essential Elements of a National PWS Programme:

- Provide basic weather observations and forecasts to aid citizens in their day-to-day activities; warnings of severe weather, and information to other government authorities as appropriate in pursuance of their mission to protect their citizens lives, livelihoods, and property.
- Engage in education, awareness and preparedness activities aimed at helping citizens to make the best use of forecast and warnings information, understand the potential impacts of severe weather, and be aware of the appropriate mitigating actions.

Recommended Elements of a National PWS Programme:

- Exchange and coordinate warnings with neighbouring NMHSs.
- Provide presentation training to all NMHS staff who are required to interact with the media in the course of their work.
- Conduct quality assurance activities, and use the outcome of these initiatives to improve products and services.
- Facilitate a two-way communication between the research and user communities to enable the optimum application of research results to improvements in products and services, and encourage the design of R&D programmes that take account of user needs.
- Develop and strengthen collaborative relationships with the media to ensure the optimum reach of PWS products and services.

It was intended that the president of CBS will include reference to these issues in his report to EC..

3. INTER-PROGRAMME COORDINATION AND IMPLEMENTATION OF WIS

3.1 The MG reviewed the decisions, guidance and relevant outcome from EC-LVII (June 2005) related to WIS. EC-LVII concurred with the relevant CBS work programme; it also reaffirmed that the GTS and the Improved MTN would be the basis for the core communication component of WIS for the reliable exchange and delivery of time-critical data and products. EC-LVII also emphasized the important role WMO would have to play in contributing the essential WIS data exchange and data management services to the future GEOSS.

3.2 CBS pursues its proactive role in the further development of the WIS and OPAG on ISS Expert Teams were established to directly contribute to WIS development, including:

- Inter-Programme Expert Team on Metadata Implementation (IPET-MI)

- Expert Team on WIS-GTS Communication Techniques and Structure (ET-CTS)
- Expert Team on WIS GISCs and DCPCs (ET-WISC)

3.3 The MG noted the outcome of the second session of the Intercommission Coordination Group on the WMO Information System (ICG-WIS) (Boulder, USA, October 2005) that was submitted to the Presidents of Technical Commissions Meeting (25-27 January 2006). The PTC concurred with the ICG-WIS when, emphasizing the cross-cutting nature of WIS in serving all WMO Programmes, it stressed that significant further work was required from the individual WMO Programmes, as well as through a common effort.

3.4 The MG concurred with the Presidents of Technical Commissions (PTC) in emphasizing that Metadata aspects, and, hence the IPET-MI activities are crucial for the WIS development and operation. The PTC noted the need for operational governance and WMO's authority for the management of metadata expressed by the ICG-WIS, which may require quick (monthly to quarterly) decisions, with major decisions to be taken on an annual basis. The PTC agreed to take up the role as WMO's authority for the management of metadata, with a delegation to the president of CBS for monthly to quarterly decisions during intersessional periods. The MG also shared the view of the PTC in endorsing the ICG-WIS recommendation for the establishment of small ad-hoc steering groups when necessary, composed of key experts from relevant TCs and Programmes, to foster the development and coordination of critical components.

3.5 The PTC emphasized that, as the WIS was developing as a major component of all WMO Programme, there was an emerging requirement for appropriate regulatory documentation (e.g. a Manual on WIS) as well as guidance material for implementation; It recommended that the ICG-WIS consider and initiate the relevant activities. The MG agreed that the relevant OPAG-ISS ETs should contribute to this task.

3.6 The MG strongly emphasized the very tight schedule of activities that were needed to ensure that an initial implementation of some WIS functions could be achieved by the end of 2006 in a semi-operational mode. It urged that special efforts and resources be focused on the further development of the following projects:

- WMO Core Profile version of metadata and reference implementation
- RA VI VGISC project as a GISC prototype;
- DCPCs prototypes including the ECMWF and EUMETSAT DCPC projects associated with the VGISC project;
- A DCPC prototype for JCOMM related data;
- An NCAR DCPC prototype.

3.7 The MG noted with concern the general lack of adequate financial and human resources for the proper development of WIS, despite the huge efforts made by a few NMSs in the development of WIS pilot projects and prototypes. It felt that special efforts should be urgently made in promoting the value and benefits that are expected from the WIS, in order to trigger the Members' decision towards implementation. It was also noted that the WIS position and functions in the general WMO infrastructure should be precisely defined for better understanding and implementation by the Member countries.

3.8 The MG considered a proposal developed by the Secretariat on the Enhancement of WIS Development and Implementation, that aimed at fostering active participation from all WMO Programmes and user communities. The meeting supported the proposal, which was seen as being appropriate and timely to

- generate increasing awareness of WIS at higher management levels;
- promote coordination for relevant programmes, organizations and their user communities to develop and coordinate their WIS requirements,
- strengthen activities for WIS implementation coordination in the various user communities;
- prepare and support developing countries to enable them to use WIS effectively.

3.9 With respect to the activities proposed in the Plan, the meeting recalled the need to ensure full integration of IGDDS into WIS so that the dissemination and exchange of satellite-based data and products and the other WIS services were complementary and cost-effective for the user. The meeting recommended that the rapid progress of IGDDS activities be taken into account in the overall WIS implementation planning. The meeting also urged to strengthen the dialogue with GEO, inter alia, by providing information on WIS to the appropriate GEO Committees, so that GEO was enabled to adopt WIS as a core contribution of WMO to the GEOSS.

3.10 Further with respect to the definition of user requirements, the meeting supported the proposal to develop a WIS Rolling Requirement Review mechanism to ensure that requirements developed by the various user communities are comprehensive and up-to-date. It requested the OPAG-ISS to contribute to this goal, and invited the ICG-WIS to finalize the WIS-RRR

3.11 The meeting stressed the need for a coordinated, effective plan for building capacity in developing countries to enable them to participate in WIS. It requested the OPAG-ISS, and in particular its Implementation Coordination Team, to develop recommendations on requirements, suitable mechanisms, and materials for training as well as on type and specifications of regional or sub-regional WIS implementation projects. The meetings also stressed the necessity to include developing countries' experts in the development work of WIS to obtain a profound knowledge of the realistic capabilities, opportunities and constraints that will determine the participation of the NMHSs of the developing countries in the WIS, and ensure a smooth uptake of the new services of the WIS within the next few years.

3.12 The meeting underlined that the Plan was centred on reaching out to a broader user community and to developing countries. However, it concluded that, at the same time, it was equally important to progress the technical development of the WIS, e.g., development of technical documentation, definition of interfaces, development of WIS operational management and governance aspects. In that connection the need for a technical coordinator for WIS was emphasized. Noting that successful and timely progress would mainly depend on the availability of resources in terms of expert staff and money, the meeting urged the Secretariat to address the requirements, availability and mobilization of resources for these purposes.

4. CBS COLLABORATION WITH SPECIFIC INTERNATIONAL PROGRAMMES AND PROJECTS

4.1 Group on Earth Observations (GEO)

4.1.1 The MG noted information on activities related to the Group on Earth Observations (GEO) and its associated Global Earth Observation System of Systems (GEOSS) that had occurred in 2005/2006. It was pleased that WMO, and in particular CBS, had maintained active participation in the initial phase of GEOSS implementation. The MG was told that the GEO Secretariat had been fully established.

4.1.2 The MG recalled its special meeting of November 2005, at which time the version 1 of the 2006 GEO work-plan was reviewed and detailed comments were prepared. The MG was pleased to note that the GEO Secretariat has included the majority of CBS comments in the version 3 of the GEO 2006 work-plan, which was approved at the GEO plenary in December 2005. The MG was also pleased that WMO has become a co-chair of the GEO Architecture and Data Committee. The MG was pleased that representatives of GEO took part in most of the session and that its director took part in the agenda item addressing GEO.

4.1.3 The GEO director recalled that the basis for the foundation of GEO was the need for governments to have observations to use as base for making decisions and that governments had the feelings there would be some duplications in observing systems serving different societal benefit areas. The goal of GEO is consequently much more centred on coordination of plans rather than on developing new plans, which would enable to make savings. GEO should not be considered as an implementation agency and has no funding to support activities. The GEO director mentioned that some misunderstandings had occurred in the participation of organizations and members in the provision of tasks sheets responding to the GEO 2006 work-plan version 3. Some organizations had seen this process as addressing programmatic plans, while it was actually

a way of reporting on activities. The benefit to be gained from this joint reporting was to identify synergies to be used in the future.

4.1.4 As far as GEONetcast was concerned, the GEO director explained that its aim was to provide easy access to as much data and as many people as possible, and that it would be up to the participating members to decide what they were willing to contribute to it.

4.1.5 The GEO director informed on the process, which would be followed to develop the 2007 work-plan, and which would basically follow a procedure similar to the one used for the 2006 work plan consisting of consultation of experts with no formal process followed by reviews by the members. The work-plan would be different in the sense that it would be a more strategic multi-year work-plan that would contain programmatic components.

4.1.6 The MG expressed its concerns related to GeoNetcast supporting operational activities, since it would be based on the voluntary contribution of GEO Members, which could at any time decide to stop providing their facilities. The MG felt that it could lead to a lack of continuity. The MG expressed the wish that GEO and GeoNetcast leading organizations would start by developing clear concepts and plans for GeoNetcast. The MG reemphasized its support to the conclusions and proposals of its special CBS MG session on GEO, and wish to collaborate with GEO as expressed in the report of the CBS Meeting on GEOSS matters held in November 2005.

4.2 Disaster Prevention and Mitigation (DPM)

4.2.1 The MG noted the report of the CBS Coordinator for DPM on her plans to develop a mapping of CBS activities in the area of DPM against the objectives of the DPM Programme. The MG also welcomed the report of the Chief of the DPM Programme Office on the implementation strategy for the Programme (including the possible roles of the Technical Commissions and the Regional Associations) and the establishment of a database on Members DPM profiles.

4.2.2 Progress on the mapping exercise had been slower than expected but now that other Technical Commissions were starting to appoint DPM Coordinators, it was hoped that there would be a more focussed effort, in collaboration with the Chief DPM, to conduct a two-way mapping exercise – to identify where the DPM Programme can support the work of the Commission and to identify the specific activities within CBS that can be strengthened to support DPM objectives. Part of this effort will be based on a survey of Technical Commission DPM focal points.

4.2.3 In her report, the Coordinator stressed the basic underlying structure that CBS provides, not just for DPM but for ongoing basic service provision by NMHSs, and the extent to which the CBS work programmes, through the OPAGs and the ETs, were constantly revised and updated to reflect changing requirements of user communities and increasing scientific and technological capabilities. Support for disaster prevention and mitigation is just one outcome served by the WWW and PWS Programmes, and from the highest CBS level through to the national operations in NMHSs, DPM activities needed to be nested within ongoing basic service provision.

4.2.4 While recognizing that CBS was a constituent body of WMO with a large Membership and a clear mandate to deliver basic services and implement basic systems for all NMHSs of Members, the need for close communication and collaboration between the DPM Programme and CBS was emphasised, to ensure that duplication of effort did not occur and that opportunities to leverage on respective activities was fully capitalised. Chair of OPAG PWS expressed particular concerns about the apparent duplication in the conduct of surveys and the possible overlaps in key areas of activity in relation to public education and outreach. All the OPAGs, through their Expert Teams, have access to a considerable volume of expertise across all relevant fields and through all WMO Regions, and the opportunity should be maximized to make maximum use of this resource in implementing DPM objectives.

4.3 International Polar Year 2007-2008

4.3.1 The session noted progress report on the preparation of the International Polar Year (IPY) presented by Dr E. Sarukhian, Special Adviser to the Secretary-General on IPY 2007-2008. It was pleased to note that the Joint Committee for IPY (JC) at its second session (Geneva, November, 2005) had welcomed the involvement of WMO technical commissions in the development and implementation of IPY, in particular addressing observational data and products, data management and information services.

4.3.2 The session reviewed the recommendations developed by the WMO Intecommission Task Group for IPY regarding the IPY observing component and IPY data management and noted that CBS and other bodies had successfully implemented most of them in the process of IPY preparation. However, the session expressed concern that due to lack of information from JC some recommendations still need to be realised. This concerns, in particular the submission of requirements for satellite data and products from IPY projects as well as requirements related to exchange of IPY data and information via WIS that have to be developed as a high priority matter and provided to CBS for planning purposes. Needs for close communication between the JC Sub-Committee on Observations and Sub-Committee Data Policy and Management on one side and CBS OPAGs on IOS and ISS on another side were stressed.

4.3.3 The session noted that IPY Sub-Committee on Observations had made initial analysis of observing facilities given in the IPY project proposals and discovered an insufficient security provision for the legacy of new observing systems that planned to be established during the IPY. The session agreed with recommendation of the Sub-Committee that this issue should be addressed through JC to WMO, IOC, and UNEP Members as well as to CBS, CAS, CHY and JCOMM.

4.3.4 In view of importance the CBS representation in the IPY JC Sub-Committee on Data Policy and Management the MG reminded JC for IPY that it had nominated Mr Al Kellie (USA) as representative of WMO Information System.

4.4 Quality Management Framework (QMF)

4.4.1 The MG was informed about the activities, which were carried out under the WMO-QMF. In particular, the MG was informed that a meeting of the Inter-Commission Task Team on the Quality Management Framework (ICTT-QMF) was going to take place from 25 to 27 April 2006 and it would develop recommendations relative to the further development of the WMO-QMF. Contacts had been initiated with the ISO Secretariat in view of discussing possibilities of cooperation between WMO and ISO

4.4.2 The MG group discussed the possible requests for application of QM by Members, by the Secretariat and by the Technical Commissions. It was mentioned that a lot could be learnt from the implementation of a quality management system based on ISO 9001 as far the inter-relationship between separate programmes was concerned and that ISO 9001 was not only focusing on documentation, but also on continuous improvement.

4.4.3 The MG felt that, in view of the present guidance given within the WMO QMF, it would continue to concentrate on the up-dating of its technical guides and manuals. The MG noted that Mr. Zaitsev would represent CBS at the meeting of the ICTT-QMF. As far as additional actions were concerned, the MG was of the opinion that guidance from the ICTT-QMF and eventually, decisions from EC, were needed to guide the commissions and enable them to undertake appropriate activities to move forward.

4.5 World Weather Research Programme (WWRP), including THORPEX

4.5.1 The MG was informed about the meeting of the World Weather Research Programme, which met in Kunming (China, October 2005). Forecast Demonstration Project and Research Development Projects, which were of particular relevance to CBS and which might lead to a need of operational implementation in a near future were fire weather prediction and sand and dust storm. Other topics of special relevance for CBS were the activities carried out relating to now-casting, verifications and forecast systems, in particular for severe/high-impact weather. Within THORPEX, the project of highest interest to CBS was TIGGE, which was progressing well.

4.5.2 The MG recognized that more work should be directed at now-casting within CBS, specially in view of ensuring a smooth transition into operation. There will consequently be a need for setting up an appropriate structure (an expert team), which could address the operational aspects of now-casting. It was agreed that the ICT-DPFS would discuss this topic at its next session in view of making a proposition to be submitted at the next CBS session.

4.5.3 The MG was very pleased that CAS activities were now addressing topics closely linked to and of high relevance to CBS.

4.5.4 The MG was informed about the THORPEX Planning Meeting held in Reading in March 2006. It appears, that regional science plans are still in development and it was felt that the development should consequently be aligned with the THORPEX overall science plan.

5. ARRANGEMENTS FOR THE EXTRA-ORDINARY SESSION OF THE COMMISSION FOR BASIC SYSTEMS CBS-EXT. (06)

5.1 The MG agreed on the provisional agenda for the session of CBS-Ext.(06) to be held in November 2006. This agenda is attached to this document as annex to this paragraph.

5.2 The MG recognized there is a need to highlight the future of table-driven code as a sub-item of the ISS item and that this aspect should be highlighted in the explanatory memorandum of the session.

6. PROGRAMMATIC ARRANGEMENTS FOR THE TECHNICAL CONFERENCE IN CONJUNCTION WITH CBS-EXT. (06)

6.1 Following the practice of holding a technical conference in conjunction with a Commission session and the fact that such conferences were considered to have improved participation of experts from developing countries as well as to have provided useful input, the Intercommission Coordination Group on WIS and CBS-XIII supported that a conference on the WMO Information System (TECO-WIS) be held in association with the Extraordinary session of CBS in 2006.

6.2 The conference would be held during the three days preceding the Extra-ordinary session of the Commission (November 2006). The conference would be organized by a conference committee, headed by a conference director and co-director and including the session chairs, and assisted by the Secretariat. MG-V already agreed that the chair of the ICG-WIS and CBS vice-president, Prof. G.-R. Hoffmann, and the OPAG-ISS chair, Mr P. Shi, serve as the conference director and co-director respectively, the other members of the committee would be the session chairs.

6.3 The chair of the ICG-WIS (also CBS vice-president) consulted with the OPAG-ISS chair and the members of the ICG-WIS and developed, with the assistance of the Secretariat, a provisional programme of the conference. The MG reviewed and revised the programme, which is included in the annex to this paragraph. The provisional programme was developed on the assumption that potential lecturers were identified, and that a call for presentations was not required. It was emphasized that the TECO-WIS should highlight the crosscutting functionalities of the WIS and the involvement of all WMO Programmes; The TECO-WIS should reach out the potential user communities, and most of the third day would be dedicated to WIS-users. It is also important to promote the participation of industry, especially manufacturers of equipment related to current WMO Programmes' information systems (e.g. GTS) and potential GISC, DCPCs and NCs systems.

6.4 It is planned to issue the formal announcement of the TECO-WIS by mid-April, with a view to collecting the presentation summaries from lecturers by July 2006. The detailed programme would be reviewed and finalized by the ICG-WIS at its next session (5-8 September 2006, Beijing).

6.5 It is recalled that, with respect to the EOS initiative, CBS-XIII and EC-LVI emphasized that the WIS (including the WWW GTS) should be an important backbone building block within the GEO system of systems (GEOSS) for achieving a greater interoperability and connectivity among individual component observing systems. CBS-XIII agreed that the participation of the WIS as a critical component of the GEOSS was a unique opportunity as well as a challenge. It is therefore important to ensure the involvement of the GEO experts in the Technical Conference on WIS; the CBS GEO co-coordinators and the Secretariat GEO Focal point may undertake coordination and action with a view to this cooperation.

6.6 The MG noted that extra-budgetary resources were needed to support the Technical Conference. The director and co-director of the conference would work with the Secretariat to coordinate efforts to seek contribution from sponsors and donors.

7. OTHER BUSINESS

7.1 The last edition of the CBS software registry was prepared in 2000. No updates to the CBS software registry have been provided by WMO Members since 2000. The meeting requested the Secretariat prepare a new edition of the CBS software registry (see Annex to this paragraph). The new edition should be organised so that the information given in the WMO server be the minimum information facilitating the access to the detailed information available in the servers of the WMO Members.

7.2 The MG expressed its warmest thanks to Dieter Schiessl, the former World Weather Watch director, for all the support he had given to the CBS MG over the years and for all the fruitful projects, which had resulted from this collaboration.

8. CLOSURE OF THE SESSION

8.1 The meeting was closed on Wednesday, 5 April 2006, at 12:48 hours.

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Annex to paragraph 2.2.8:

World Summit on the Information Society (WSIS)

The World Summit on the Information Society (WSIS) was held in two phases, with participation of 175 countries. The first phase took place in Geneva hosted by the Government of Switzerland from 10 to 12 December 2003, and the second phase took place in Tunis hosted by the Government of Tunisia, from 16 to 18 November 2005. Four documents were adopted:

- [Geneva Declaration of Principles](#)
- [Geneva Plan of Action](#)
- [Tunis Commitment](#)
- [Tunis Agenda for the Information Society](#)

Detailed information on the WSIS, including the complete texts of these four documents, is available from the WSIS web server (<http://www.itu.int/wsis/>). These documents include themes and action relevant to WMO Programmes, in particular as regard natural disasters.

The following list of action included in the Geneva Plan of Action is relevant to WMO:

- To establish monitoring systems, using ICTs, to forecast and monitor the impact of natural and man-made disasters, particularly in developing countries, LDCs and small economies (see paragraph 20.(c) of the Geneva Plan of Action under E-environment);
- To promote the long-term systematic and efficient collection, dissemination and preservation of essential scientific digital data, for example meteorological data in all countries (see paragraph 22.(c) of the Geneva Plan of Action under E-science);
- To promote principles and metadata standards to facilitate cooperation and effective use of collected scientific information and data as appropriate to conduct scientific research (see paragraph 22.(d) of the Geneva Plan of Action under E-science).

The Secretariat participated in the preparation of the second phase of the WSIS as a member of the WSIS [High-Level Summit Organizing Committed \(HLSOC\)](#). The Secretariat presented the development and implementation of the WMO Information System (WIS) as a contribution to the [WSIS stocktaking of activities](#). The Secretariat organised a WSIS thematic meeting on ICT Applications in Natural Disaster Reduction (21 January 2005, Kobe, Japan). The [report of the chairman of the WMO/WSIS thematic meeting](#) was submitted to the chairman of the Preparatory Committee of WSIS as a contribution for the preparation of the Tunis Phase of the WSIS.

As regards the outcomes of the Tunis phase, it can be noted that the [Tunis Agenda](#) (see paragraph 91) recognizes the important enabling role of ICTs at the national, regional and international levels including:

- Promoting technical cooperation and enhancing the capacity of countries, particularly developing countries, in utilizing ICT tools for disaster early warning, management and emergency communications, including dissemination of understandable warnings to those at risk;
- Promoting regional and international cooperation for easy access to and sharing of information for disaster management, and exploring modalities for the easier participation of developing countries;
- Working expeditiously towards the establishment of standards-based monitoring and worldwide early-warning systems linked to national and regional networks and facilitating emergency disaster response all over the world, particularly in high-risk regions.

The [Tunis Agenda](#) (see paragraphs 102, 103, 104 and 109, and Annex) calls for the establishment of a UN group on the Information Society within the UN system Chief Executives Board for Coordination (CEB) with the mandate to facilitate the implementation of WSIS outcomes. WMO was designated as the provisional focal point for the multi-stakeholder implementation and follow-up at the international level of the WSIS Plan of Action relevant to E-environment ICT applications.

Annex to paragraph 5.1:

Draft Provisional Agenda for CBS-Ext. (06)

- 1. OPENING OF THE SESSION**
 - 2. ORGANIZATION OF THE SESSION**
 - 2.1 Consideration of the report on credentials
 - 2.2 Adoption of the agenda
 - 2.3 Establishment of committees
 - 2.4 Other organizational questions
 - 3. REPORT BY THE PRESIDENT OF THE COMMISSION**
 - 4. REVIEW OF DECISIONS OF EXECUTIVE COUNCIL RELATED TO THE COMMISSION**
 - 5. STATUS OF WORLD WEATHER WATCH IMPLEMENTATION AND OPERATION**
 - 6. WORLD WEATHER WATCH PROGRAMME, SUPPORT FUNCTIONS AND PUBLIC WEATHER SERVICES, INCLUDING THE REPORTS BY THE CHAIRS OF THE OPEN PROGRAMME AREA GROUPS**
 - 6.1 Integrated Observing Systems (IOS)
 - 6.2 Information Systems and Services (ISS)
 - 6.3 Data Processing and Forecasting System (DPFS)
 - 6.4 Public Weather Services (PWS)
 - 6.5 Operational Information Service (OIS)
 - 6.6 System support activities, including technical cooperation
 - 7. WMO INFORMATION SYSTEM, INCLUDING THE REPORT ON THE TECHNICAL CONFERENCE ON WIS**
 - 8. OTHER CROSS-CUTTING ACTIVITIES**
 - 8.1 WMO Space Programme
 - 8.2 Group on Earth Observations
 - 8.3 Disaster Prevention and Mitigation
 - 8.4 Quality Management Framework
 - 8.5 THORPEX
 - 8.6 International Polar Year
 - 9. LONG-TERM PLANNING RELEVANT TO THE COMMISSION**
 - 10. FUTURE WORK PROGRAMME**
 - 11. OTHER BUSINESS**
 - 12. DATE AND PLACE OF THE FOURTEENTH SESSION**
 - 13. CLOSURE OF THE SESSION**
-

Annex to paragraph 6.3:

Provisional TECO-WIS programme

1 Day 1

1.1 Opening

- Overview of WIS and its role in the WMO Programmes structure

1.2 Metadata

Session Chair: P. Shi

- ISO 19xxx series J. Seib
- WMO Core Metadata Profile S. Foreman
- NERC Metadata Gateway (TBD)
- JCOMM & IOOS Metadata R. Keeley

1.3 Information and Communication Technology (ICT) building blocks

Session Chair: H. Ichijo

- Portals technology L. Cinquini
- JAVA Engine S. Fischer
- Registry Technology J. Tandy
- Grid (SIMDAT) M. Dell'Acqua
- OAI M. Burek
- WebWerdis S. Fechner
- Protocols (NetCDF, OpenDAP) D. Brown
- Data compression Techniques SCAI

2 Day 2

2.1 ICTs building blocks (ctnd)

Session Chair: S. Foreman

- GTS status and transition K. Adler
- IMTN and VPN H. Ichijo
- Satellite-based com. (IGDDS, EUMETCast) EUMETSAT expert
- Internet services and security J.-F. Gagnon

2.2 Pilot projects

Session Chair: A. Kellie

- VGISC, including SIMDAT H. Knottenberg
- E2EDM (JCOMM) N. Mikhailov
- EUMETNET UNIDART C. Little
- DMAC (TBD, USA)
- Cliware (CCI) A. Besprozvannykh
- Earth System Grid (ESG) D. Middleton
- NCAR DCPC

2.3 Industry

Session Chair: H. Knottenberg

- MicroSoft, IBM, Corobor, IBL, GST, MFI,....

3 Day 3

3.1 GISC Prototype demonstration

- DWD, ECMWF, EUMETSAT, MeteoFrance, UKMetOffice

3.2 Users

Session Chair: R. Keeley

- Overview of value and benefits of WIS
- IGOS data exchange requirements
- GDPFS and PWS data exchange requirements
- NCs and “bridging the gap” TBD (Finland)
- WAMIS (CAgM) Korea
- THORPEX/TIGGE (CAS) W. Zwiefelhofer
- GEOSS TBD
- Run-off Data Centre (CHy) TBD (Germany)
- Climate Data Centres (CCI) TBD
- WMO NDPM TBD

3.3 Users (ctnd)

Session Chair: M. Ndabambi

- IOC
- ISDR
- CTBTO
- IAEA
- FAO
- UN/OCHA
- WHO
- IFRCRC
- WSIS

3.4 Conclusions and Closure

Session Chair: G.-R. Hoffman & P. Shi

Annex to paragraph 7.1:

Preparation of the 2006 edition of the CBS software registry

1. The information in the WMO server is limited to:
 - The WMO Member providing the software package;
 - The relevant CBS component/function: Global Observing System, Global Telecommunication System – WMO Information System, Global Data-processing and Forecasting System, Data Management (e.g. codes, monitoring);
 - A short description of the software package with a link to the server of the WMO Member.

2. The WMO Members are responsible to inform the WMO Secretariat of software packages and of the relevant links to their web sites, in which Members will maintain detailed information on the software packages. The WMO Members should preferably post on their web sites a condensed introduction in a revised format of presentation of the 2000 edition, with a view to ensuring an homogenous presentation of that information amongst Members' web sites. This format will be revised to take into account licence issues. More detailed information, including presentations (e.g. PowerPoint presentation) helping in demonstrating/assessing the interests/benefits for users, should be added to this introduction.

3. The WMO Secretariat is responsible to update the information in the WMO server in accordance with the information provided by Members, to check that the links to servers remain valid and to invite WMO Members to update the registry.

4. The Secretariat will invite WMO Members:
 - To review their lists of software packages, parts of the CBS software registry
 - To provide the information detailed in above paragraph 2 so that a new edition of the CBS software registry be available before CBS-Ext. (2006),
 - To provide information on the software packages received from other Member countries in the framework of the CBS Software Registry since 2000.