

# WORLD METEOROLOGICAL ORGANIZATION

## PUBLIC WEATHER SERVICES CORE IMPLEMENTATION COORDINATION TEAM

HONG KONG, CHINA

24-28 November 2003



FINAL REPORT



## EXECUTIVE SUMMARY

A meeting of the Public Weather Services (PWS) Core Implementation Coordination Team (ICT) was held in Hong Kong, China from 24 to 28 November 2003. The meeting was chaired by Mr Kevin O'Loughlin (Australia). Under its terms of reference, the ICT had to work on seven broad areas namely: overall coordination of the work of the PWS Expert Teams and collaboration with other technical commissions and CBS OPAGs; enhancing awareness of the information and guidance material on PWS and the development of a web-based reference system; economic aspects of PWS; training activities; improvement in national PWS implementation; Members' user assessment activities; and support to the Olympic Games.

The meeting discussed key points arising from a review of decisions of Congress XIV including the new major programme of Disaster Prevention and Mitigation and the Space Programme.

The key conclusions from the work of the Expert Team are summarised below.

### TOR (a)

- The Chairman of the Expert Team on Media Issues (ET/MI), reported on of the meeting of this Team, which had taken place in Moscow in October 2003. The Team had successfully addressed all its terms of reference. It had formulated ten suggestions as to how awareness of the WWIS and SWIC Web sites might be enhanced; had decided to prepare a set of guidelines to promote good communication skills within NMSs; and a second guidelines document on improving the delivery of weather information via radio. The Team had appointed a rapporteur in the area of improving the communication of the concepts of confidence and uncertainty within forecasts. In discussing this report the ICT considered the implications of extending the availability of the information collected for the WWIS Web site.
- The Chairman of the Expert Team on Product Development and Service Assessment (ET/PDSA), reported that his Team had met in Kuala Lumpur in September 2003 and had highlighted the following key issues within the context of PWS: the direct linkage between the emergence of new computer and telecommunication technologies and information systems such as the Internet and wireless technologies, to the evolution of PWS dissemination/service delivery integration; new opportunities offered by the evolution of digital forecasting techniques based on forecaster interaction with a database for integrating PWS forecast dissemination and service delivery; new opportunities for new and improved PWS including Nowcasting, Ensemble Prediction Systems products, extended range forecasting, weather indices, NMS product presentation, and the evolution of the forecaster workstation; proposal for standardized formats based on recognizing that emerging technologies, globalization, and the cross-border impact of weather-related disasters on people and national economies; development of a set of guidelines on preparing and incorporating air quality forecasts and bio-meteorology information into PWS programme; development of additional guidance material on quality management for NMSs including core service assessment criteria and questions.

- The Chairman of the Expert Team on Warning and Forecast Exchange, Understanding and Use (ET/WAFU) reported that the main focus since the last meeting held in Hong Kong in 2002 had been on the development of the guidelines on: (i) improving public understanding of and response to warnings and (ii) cross-border exchange of warnings; as well as on the implementation of the two WMO pilot projects, namely the World Weather Information System (WWIS) and Severe Weather Information Centre (SWIC). The second phase of the WWIS project was launched in December 2002. The Web site was revamped in August 2003 to display weather icons alongside the worded forecasts to enhance visual inspection. The new feature benefited non-English speaking users worldwide. With the introduction of this new feature, page views jumped from about 4 million to over 15 million per month. By mid November 2003, 88 Members were providing forecasts for 835 cities. A total of 153 Members were providing climatological information for 1002 cities.
- The SWIC pilot project also has made progress. By October 2003, total global coverage for tropical cyclones had been achieved. All 6 Regional Specialized Meteorological Centres (RSMCs) and 5 Tropical Cyclone Warning Centres (TCWCs) under the WMO Tropical Cyclone Programme (TCP) as well as a total of 19 WMO Members participate in the project. Dynamical tropical cyclone information is now featured in the Web site. More than 1.3 million page views were recorded during the month when tropical cyclones were active in the Northern Hemisphere.

#### **TOR (b)**

- The ICT was informed that steps had been taken to identify and contact relevant CBS OPAGs and technical commissions to collaborate on issues related to the exchange of products and the delivery of services. The ICT noted that this was a successful start to collaboration with other technical commissions. Based on the responses received by ET/PDSA, the ICT agreed to designate points-of-contact between the ICT and four other CBS OPAGS and one technical commission as follows: OPAG/IOS, OPAG/DPFS, OPAG/ISS, and the Commission for Climatology. Additional technical commissions will be contacted in the near future to determine possible collaborative opportunities

#### **TOR (c)**

- The ICT recognized that there were continued difficulties in ensuring that guidance documents which had been prepared by the Expert Teams, and sent to NMSs, were reaching those personnel who might benefit most directly from the advice contained therein. The specific suggestions from ET/MI regarding the promotion of the WWIS and SWIC Web sites were examined, and relevant actions agreed with the co-operation of the staff of the Hong Kong Observatory. A number of other suggestions relating to the enhancement of awareness of the PWS programme were discussed, including the feasibility of initiating a project for school children based around the information available via the severe weather and city forecast Web sites.

#### **TOR (d)**

- The ICT was informed by the Secretariat representative on training activities since its last meeting. It was also informed that the International Association of Broadcast Meteorology (IABM), in conjunction with WMO, planned to conduct a three-day course in media weather presentation immediately preceding the First World Conference on Broadcast Meteorology in Barcelona in 2004. The ICT considered that full use should be made of this opportunity to promote the effective delivery of PWS through the media.

- The RA VI Sub-Group on PWS has started to develop the concept of regional training in public weather services. Focus will be on those training topics that emphasised service delivery as opposed to forecast techniques. A seminar is planned for mid 2004 and will be directed towards those countries in RA VI with the greatest training needs.
- The OPAG Co-Chair also reported on the success of a recent training seminar held in Brazil under the WMO WWRP for participants from RA III/IV. This seminar promoted practical provision of weather services in severe weather events.

**TOR (e)**

- On the best way to identify improvements in PWS activities at the national level, the ICT agreed that the Chair of the OPAG would write to the PWS Regional Rapporteurs to ask that they distribute a PWS questionnaire along the lines of those done by RA/II and RA/VI and include questions on this issue.

**TOR (f)**

- The ICT considered how best to make the existing reference material more easily accessible and to increase the information available and suggested several improvements to the PWS and WMO Web sites.

**TOR (g)**

- In reviewing the results of service assessment activities undertaken by NMSs, the ICT noted that several NMSs had begun tracking Internet statistics as part of their service assessment programme. In addition, a number of NMSs are outsourcing portions of their service assessment activities. The Team agreed that NMSs should periodically re-evaluate their service assessment strategy and methods to bring new ideas and trends into the process and was pleased that the ET/PDSA was preparing additional guidance material on quality management for NMSs, that will include core service assessment criteria and questions.

**TOR (g)**

- The ICT discussed the issue of economic assessments of the public weather services. It agreed that this topic should feature in the planned technical conference on PWS in 2004 and recommended that a rapporteur on this topic be included in the work programme proposed to the next session of CBS.

**TOR (i)**

- The ICT considered the outline of guidelines on weather support for the Olympic Games. Draft guidelines will be completed by the second quarter of 2004.

## 1. Introduction

1.1 Hong Kong, China kindly agreed to coordinate a meeting of the Public Weather Services (PWS) Core Implementation Coordination Team (ICT) which was held at the Hong Kong Observatory from 24 to 28 November 2003. The meeting was chaired by Mr Kevin O'Loughlin (Australia). Ms Haleh Kootval (WMO Secretariat) welcomed the participants on behalf of the Secretary-General and briefed the participants on the structure of the PWS Programme within the CBS Open Programme Area Group (OPAG) framework, and especially on the objectives and expected outcome of the meeting of the ICT. She drew attention to the Team's Terms of Reference (TOR) as approved by the CBS as follows:

- (a) Coordinate and keep under review the work of the PWS expert teams;**
- (b) Continue with appropriate arrangements for consultation and collaboration with relevant technical commissions on cross-cutting issues, and with other CBS OPAGs to ensure coordination of services and systems;**
- (c) Promote awareness of the information and guidance material produced by the PWS Programme among NMSs and relevant media and user groups;**
- (d) Monitor and report on the effectiveness of PWS training activities;**
- (e) Monitor and report on the improvements in national PWS programmes as a result of activities under the WMO PWS Programme;**
- (f) Develop the concept of a Web-based reference system on PWS to complement the existing guidance material;**
- (g) Continue to review and report on the results of service assessment activities undertaken by NMSs;**
- (h) Develop material on the economic aspects of PWS;**
- (i) Develop guidelines on weather and climate support for the Olympic Games to be provided by the IOC to national organizing committees, and provide guidance to relevant NMSs as required.**

1.2 The meeting began its work with reports prepared by individual team members or small groups according to their responsibilities within the team. Each group discussed its TORs and prepared a separate report on the details of its work for inclusion in the final report of the meeting. It also reviewed the guidelines provided for the future work of the PWS Programme by WMO Fourteenth Congress.

1.3 The list of participants is given in Annex I. The programme of the meeting is contained in Annex II.

## 2. Background

2.1 The meeting was informed by Ms Kootval that the Extraordinary Session of the Commission for Basic Systems (CBS) (Cairns, Australia, December 2002) had approved the TORs of the Open Programme Area Group (OPAG) on PWS as proposed by the Implementation Coordination Team on PWS. CBS had agreed that the work of the PWS Programme should continue to be coordinated through the Expert Team on Product Development and Service Assessment (ET/PDSA); the Expert Team on Media Issues

(ET/MI); the Expert Team on Warnings and Forecasts Exchange, Understanding and Use (ET/WAFU); and the Implementation/Coordination (IC) Team. The TORs for all the teams had been modified to reflect the areas of work still outstanding, or those which needed emphasis in each team and covered all the broad issues of concern to the PWS Programme. Accordingly, the subsequent changes in the membership of each team were based on the areas of expertise required to complete the assigned TORs.

2.2 The results of work under the various TORs of the Expert Team are summarized below.

3. Review of the decisions of Congress-XIV

3.1 The OPAG Chair briefed the team on the discussions that took place during the Fourteenth WMO Congress and highlighted especially the emerging and important issues facing PWS and future directions of the programme as approved by Congress.

3.2 Congress had expressed satisfaction with the development of the PWS Programme since its last session. In particular Congress welcomed the excellent work on and outstanding results from the two pilot projects on Web sites for official cities forecasts and for warnings.

3.3 Taking into account the guidance from Congress, the ICT identified the following areas of work requiring priority attention:

- The role of PWS in support of safety of life and property and the contribution this makes to the overall thrust of the WMO Programme on Disaster Prevention and Mitigation;
- Increasing the effectiveness of PWS through strong community involvement and outreach activities;
- The economic aspects of PWS including the evaluation of economic benefits;
- Relationships and dialogue with the meteorological private sector;
- Methods for assessing the level of service provided based on user assessments, and quality control of products and services, including verification.

#### **4. ICT work programme**

##### **TOR (a) Coordinate and keep under review the work of the PWS Expert Teams**

4.1.1 Under this TOR, the three Expert Team Chairs presented the reports of the activities of their respective teams to the ICT and the OPAG Chair. Two Expert Teams namely ET/MI and ET/PDSA had held meetings prior to the ICT meeting with the ET/WAFU planning to have a meeting in 2004.

4.1.2 The ET/WAFU Chair reported on the progress in the work of the Expert Team since the last ET meeting held in Hong Kong in 2002. The main focus since the last meeting held in Hong Kong during 25 February to 1 March 2002 had been was on the development of the guidelines on: (i) improving public understanding of and response to warnings and (ii) cross-border exchange of warnings; as well as on the implementation of the two WMO pilot projects, namely the World Weather Information System (WWIS) and Severe Weather Information Centre (SWIC).

4.1.3 The second phase of the WWIS project to provide city forecasts was launched in December 2002. To facilitate NMSs with different technological capabilities to present their city forecasts in the pilot Web site, a variety of communication methods using GTS, E-mail, FTP and web-forms were implemented for submission of forecasts. The Web site was revamped in August 2003 to display weather icons alongside the worded forecasts to enhance visual inspection. The new feature benefited non-English speaking users worldwide. With the introduction of this new feature, page views jumped from about 4 million to over 15 million per month. By mid November 2003, 88 Members were providing forecasts for 835 cities. A total of 153 Members were providing climatological information for 1002 cities. Oman launched the Arabic version of the WWIS Web site in May 2003. China is planning to host a simplified Chinese version. Macao, China is also in contact with Hong Kong, China concerning the development of a Portuguese version. France is helping to identify a potential host for a French version of the WWIS.

4.1.4 An XML feed of weather forecasts and climatological information in the WWIS has been developed by Hong Kong, China and is ready for use by active contributing Members. This means of data dissemination may also be used for provision of city forecasts to the media.

4.1.5 The SWIC pilot project also made progress. By October 2003, total global coverage for tropical cyclones had been achieved. All 6 Regional Specialized Meteorological Centres (RSMCs) and 5 Tropical Cyclone Warning Centres (TCWCs) under the WMO Tropical Cyclone Programme (TCP) as well as a total of 19 WMO Members participated in the project. Dynamical tropical cyclone information is now featured in the Web site. In September 2003, the SWIC pilot Web site was revamped to yield a more professional look and to improve navigation. More than 1.3 million page views were recorded during the month when tropical cyclones were active in the Northern Hemisphere.

4.1.6 More facilities would be developed to assist NMSs to deliver their warnings and advisories dynamically onto the Web site. Plans are in hand to extend the Web site to cover other severe weather types. As a pilot idea, the occurrence of heavy rain all over the world, based on GTS reports and with a threshold of 50 mm per 24 hours, would be displayed as a new product on the SWIC Web site. Members participating in the WWIS project are being consulted for their feedback.

4.1.7 The Chairman of the ET/MI presented a report to ICT on the meeting of the Team in Moscow from 20 to 24 October 2003. The key recommendations and conclusions are included in the full report of the Team which is available on the PWS pages of the WMO Web site.

4.1.8 In relation to the promotion, in the media, of the SWIC and WWIS Web sites as resources, the Chairman of ET/MI had agreed to conduct a brief survey of use and awareness by using available networks of email contacts. Attention was drawn to the distinction between promoting the use of the city forecast information and promotion of the WWIS Web site itself. ET/MI had gathered ten specific suggestions designed to promote awareness of these Web sites.

4.1.9 The ET/MI had continued its ongoing work relating to advice on meeting the demand by media for information of weather-related disasters. In relation to monitoring trends and technological developments in the media, ET/MI stressed the importance of focusing primarily on user needs rather than on delivery technologies themselves, and on the need for NMSs to be flexible in effectively responding to new opportunities.

4.1.10 The ET/MI had commenced the preparation of a set of Guidelines in the area of communication skills. These should be completed by April 2004. In addition in view of the

critical importance of good communication in the delivery of weather services, ET/MI had suggested that ICT might propose to CBS the establishment of a certification process for weather broadcasters. The ICT agreed that the establishment of such a certification scheme would raise certain difficulties, and that a more attainable alternative approach would be to award certificates to those who had attended WMO-conducted training courses in media. The ICT proposed that such training should be integrated into the syllabus of the Education and Training Programme of WMO as part of the overall training programme for the NMS staff.

4.1.11 The Chairman of ET/MI reported that existing guidance materials on media issues had been made available on the PWS Web site. In view of the continuing importance of radio as an accessible medium for reaching a great majority of the public, and the fact that at present no specific guidance material existed on radio, the Team had decided that a set of guidelines should be developed on the delivery of weather information on radio and prepared an outline of the guidelines.

4.1.12 The ET/MI indicated that, in view of the important advances in the area of probabilistic forecasting techniques, it was important for NMSs to recognise these developments and ensure the effective communication of such information to the public. ET/MI appointed a rapporteur to keep abreast of developments in the relevant CBS OPAG teams and to liaise with them as regards the requirements of PWS on this topic.

4.1.13 The ICT considered the advisability of making the information collected for the WWIS Web site more generally available outside the NMS community. It was agreed that this was a matter that required a high-level policy decision, and that it would need to be discussed by CBS. The ICT noted that this idea could not be implemented until the WWIS Web site progressed from pilot phase to operational phase ideally with the participation of at least 100 Members to ensure that some key information gaps had been filled in.

4.1.14 Among the issues which would need to be satisfactorily addressed in policy discussions were a) the potential for conflict with WMO Members who themselves provided a range of international city forecasts to clients, or on their Web sites, and b) whether or not the provision of WWIS information to media or other private sector interests should be for free or on the basis of revenue generation. Hong Kong Observatory emphasised that they did not wish to generate income for themselves from the provision of WWIS information, but that such income, if generated, might go to support the PWS programme.

4.1.15 The issue of ongoing maintenance and development of the WWIS and SWIC Web sites were also raised. The ICT recognized the tremendous work of Hong Kong China in establishing and developing these resources to their current level, but considered that it was necessary to examine eventually the issue of resources required to maintain the Web sites.

4.1.16 The ICT noted the ongoing difficulty in achieving satisfactory attribution, in weather broadcasts of the international media for WMO Members. The Chairman of ET/MI acknowledged that there had not been much progress on this topic and noted that, while the IABM supported the policy of attribution, it was not possible to insist that media organisation carried attribution messages. The ICT agreed that it would be impractical to expect attribution of individual Members, but that simple, short messages of attribution for the collective WMO membership should be promoted.

4.1.17 The ET/PDSA discussed, and took action on, several key areas. The Team discussed the application of new and emerging technology, research and scientific understanding and the positive impacts and benefit it will have on PWS. In particular, ET/PDSA noted that the evolution of PWS dissemination/service delivery integration is directly linked to the emergence of new computer and telecommunication technologies and

information systems (e.g. the Internet, wireless communication technologies). Of these, the Internet and wireless technologies are considered most critical. NMSs should continue to identify opportunities to integrate PWS dissemination and service delivery utilizing the Internet and wireless technology within their existing forecast programme. The ET/PDSA also acknowledged that the evolution of digital forecasting techniques based on forecaster interaction with a database offers new opportunities for integrating PWS forecast dissemination and service delivery.

4.1.18 The ET/PDSA agreed that it was essential to keep abreast of great achievements and strides being made in the science of meteorology and related technologies for providing the latest products and services to the public. In addition, the Team recognized that it was essential to anticipate the emerging needs of the users in the near future and make plans in anticipation of such developing trends. Several areas of interest were noted including nowcasting, Ensemble Prediction Systems (EPS) products, extended range forecasting, weather indices, NMS product presentation, and the evolution of the forecaster workstation.

4.1.19 The emergence of new technologies, globalization, and the recognition that weather-related disasters are increasingly causing serious damage to the population and economies across national boundaries, has brought to the forefront the necessity to standardize forecast and warning formats. The ET/PDSA examined the issue of standardized PWS product formats and developed a proposal based on the work done in developing the (WWIS). The proposed format also addresses establishing thresholds, icon standardization, warning levels, and adaptation of the format to new technologies (e.g. XML).

4.1.20 Air quality forecast and bio-meteorology information is becoming an increasingly more prominent issue in many countries. The ET/PDSA agreed that a set of guidelines on preparing and incorporating air quality forecasts and bio-meteorology information into PWS program was warranted. During the discussion of this topic, the ET/PDSA recognized that in many cases, NMSs are not the only governmental agencies involved in air quality forecasts and related environmental issues. As such, many of these entities also maintain environmental databases. The ET/PDSA believed, and the ICT concurred, that there was a need to link the various environmental information sources/databases in order to provide the best possible air quality forecasts and bio-meteorology information to the public.

4.1.21 CBS regarded the PWS guidance material on verification and service assessment as a valid first step toward quality management in PWS, but noted that a more rigorous approach needed to be developed to ensure the best possible practices in PWS production and delivery. After reviewing the existing documentation and guidance materials produced by the ET/PDSA over the last several years, the Team decided to develop additional guidance material on quality management for NMSs that will include core service assessment criteria and questions.

**TOR (b) Continue with appropriate arrangements for consultation and collaboration with relevant technical commissions on cross-cutting issues, and with other CBS OPAGs to ensure coordination of services and systems**

4.2.1 The OPAG Chair briefed the ICT on the relevant issues arising from the CBS Management Group meeting held in Langen Germany in October 2003. The Management Group had asked all CBS OPAGs to examine how they could contribute to the new WMO Space Programme. The recent Earth Observing Summit was also discussed. The linkage between PWS and the new WMO initiative on Disaster Prevention and Mitigation was emphasised. The Chair spoke of the planned global experiment Thorpex and the possible future connections with improved performance of forecasting and warning systems. Management Group also endorsed the concept of and provided guidance on a technical conference on PWS to be held in conjunction with the CBS-XIII session.

4.2.2 Mr Wolfgang Kusch briefed the ICT on the results of the ET/PDSA's consultation and coordination tasks with relevant WMO technical commissions and CBS OPAGs that have a role in the exchange of PWS products and the delivery of services. As a first step, a questionnaire was sent out to the Chairs of CBS OPAGs as well as the President and Vice President of the Commission for Climatology (CCI). Responses to the questionnaire were received from the Chairs of OPAG/ISS, OPAG/IOS and the Vice President of CCI. The analysis of the responses showed the following:

- A strong interest exists to collaborate with the OPAG/PWS in the following areas: development of the GTS and the FWIS, Internet use, satellite data utilization, education and training using satellite data via virtual laboratory, and **The Observing System Research and Predictability Experiment (THORPEX)** through the ET on **Observational Data Requirements and Redesign of the GOS (ODRRGOS)**
- An interest in the work of PWS by the OPAG/CCL on Monitoring and Analysis of Climate Variability and Change
- A suggestion from the CCI to establish a Public Climate Service (PCS) including a Climate Alert System.

The ICT acknowledged the ET/PDSA's efforts as a successful start to collaboration with other technical commissions.

4.2.3 After further discussion regarding the responses to the ET/PDSA questionnaire, the ICT agreed to designate points-of-contact between the OPAG/PWS and the following:

- OPAG/Integrated Observing Systems
- OPAG/Data Processing and Forecasting Systems
- OPAG/Information Systems and Services
- Commission for Climatology.

The OPAG/PWS points-of-contact for each of the OPAGs and the CCI listed in the table below.

<b>PWS point of contact</b>	<b>CBS OPAG/Technical Commission</b>	<b>Point of contact</b>
Mr John Guiney	OPAG/Integrated Observing Systems	Mr Hans Peter Roesli
Mr Wolfgang Kusch	Commission for Climate	Mr Thomas Peterson
Mr Edwin Lai	Data Processing & Forecasting Systems	EPS...RAP/NWP-SWF
Mr Juan Coronado*	Data Processing & Forecasting Systems	EPS...RAP/NWP-SWF
Mr C.Y. Lam**	Information Systems and Services	Mr Geerd-Ruediger Hoffmann

\* Member of ET/PDSA – will serve as co-POC

\*\* Mr C.Y. Lam, Chair of ET/WAFU, or his designee, will serve in this capacity

The OPAG Chair will contact the Chairs of the abovementioned OPAGs and CCI to invite them to pursue a collaborative arrangement between their group and the OPAG/PWS. Additional OPAGs/technical commissions will be contacted in the near future to determine possible collaborative opportunities.

**TOR (c) Promote awareness of the information and guidance material produced by the PWS Programme among NMSs and relevant media and user groups**

4.3.1 The Team agreed that there were two distinct aspects of this issue to consider; the promotion of the use of guidance material within the NMS community, and making this resource available (and promoting awareness of PWS generally) outside NMSs. This latter aspect can be subdivided into three groups; the media, who were the first focus when establishing the SWIC and WWIS Web sites; other special interest groups such as emergency managers, who engage in ongoing work related to public weather services, and those (such as school groups) within the general community.

***Promoting awareness of PWS publications within the NMS community***

4.3.2 The OPAG Chair recalled that there was a tremendous interest in PWS at Congress-XIII with a large number of contributions to the debate. However, when material such as PWS guidance materials were sent to NMSs it was not always apparent that it reached those who directly provide weather services to the public.

4.3.3 The representative of the Secretariat pointed that there were no formal PWS focal points established in NMSs on a global basis. In some regions however, such as RA VI, the PWS rapporteur had established an informal list of PWS contacts to whom information could be circulated. The ICT encouraged all of the regional rapporteurs to identify PWS contacts within NMSs in their respective regions, and to maintain a list of such contacts in some easily accessible form. The existence of the guidelines could be made known through such a network of contacts and links to the guidelines on the WMO Web site could be provided.

***Promoting awareness of the WWIS and SWIC Web sites***

4.3.4 The ICT noted the suggestions contained in the report of the ET/MI meeting which were designed to increase the awareness and use of the WWIS and SWIC Web sites. In regard to these proposals, and following consultation with the staff of the Hong Kong Observatory (HKO), who were directly involved in the maintenance of these facilities, the following points were agreed.

1. There should be renewed efforts to promote awareness of the Web sites once they became operational. In the case of the WWIS Web site, it was considered that this would occur when the participation of 100 Members (including the participation of two or three key Members who, as yet, are not contributing) had been achieved. The approval of CBS on this issue would be sought.
2. The ICT recommended to CBS that Web sites of individual NMSs should incorporate links to the WWIS Web site (and, where relevant, to the SWIC Web site). The ICT further recommended that NMS Web sites should incorporate some promotional material for the WWIS and SWIC Web sites which would emphasise the official nature of the forecasts and warnings contained therein.
3. The HKO agreed to prepare drafts of promotional material related to the Web sites and to make this conveniently available for download and use in Members' Web sites. The HKO, with the co-operation of regional rapporteurs, will contact NMSs directly to make them aware of the availability of this material. The ICT agreed to aim for such promotional material and links to be available on the Web sites of 5

Members in each of the WMO Regions by August 2004. Promotional material, in the form of very short phrases and slogans, would also be prepared which would be suitable for NMSs to append to appropriate products and press releases issued to their media contacts. Regional rapporteurs would encourage members to make full use of these promotional opportunities. The outcome of this promotional project is to be reported to CBS-XIII.

4. The ICT noted that ET/MI had suggested that NMS's inform national and regional media associations of the existence of the WWIS and SWIC Web sites. ICT recommended that the OPAG Chair, in the course of his report to CBS, should ask NMS representatives to do this as a matter of priority.
5. The ICT noted that the upcoming conference on Broadcast Meteorology planned for Barcelona in June 2004 offered an excellent opportunity to promote the WWIS and SWIC Web sites within the broadcast community, and recommended that consideration be given to providing a promotional booth and a demonstration site for the Web sites at the event. It was agreed to ask the IABM to promote the Web sites further through their newsletter and their own Web site.
6. The ICT emphasised that attribution of WMO Members by those using the WWIS and SWIC Web sites was very important, and noted the draft attribution text proposed by ET/MI. It considered that the importance of attribution might be addressed and explained to those broadcasters who would attend the Barcelona event.
7. Noting the suggestion in the report of ET/MI regarding the use of the database of city forecasts for the provision of a service via mobile phones and other such devices, the ICT felt that this suggestion might be advanced when technology allows. The ICT also noted that such a service had the capability of generating revenue; however it felt that policy decisions were needed on this matter.
8. The HKO will make contact with those Members who contribute to the WWIS Web site to source verification statistics from them with a view to making these available through the Web site on an optional basis.
9. The HKO will continue to implement strategies that will increase the likelihood of the most prominent web search engines (Google, Vivisimo, Alta Vista, Yahoo etc) returning links to the WWIS and SWIC Web sites near the top of their listings.
10. The OPAG will suggest, in a letter to the Secretary General of WMO, that full use be made of World Meteorological Day and other suitable occasions in raising awareness in the media of the existence and usefulness of the WWIS and SWIC Web sites.
11. The Chairman of the ET/MI will draft some promotional material, suitable for publication in newspapers and magazines, on the WWIS and SWIC Web sites. This material will be discussed with the staff of the HKO, who might be able to add in suitable graphics and illustrations. This material could then be translated into the working languages of WMO with the co-operation of Members (such as Oman, which hosts the sites in Arabic). The aim would be to assemble this material on a CD-ROM which could be distributed to representatives of NMSs at CBS, with a view to their further distributing it to media contacts in their own countries.

***Promoting awareness of PWS to special interest groups other than the media***

4.3.5 The ICT suggested that umbrella organizations of specific interest groups, such as the International Emergency Management Association, might offer an efficient mechanism for promoting awareness of the SWIC and WWIS Web sites, and also of the relevant PWS

guidelines and other publications. Members of the ICT undertook to identify relevant contact points within such organizations.

***Promoting awareness of PWS to the general public, and especially to school children***

4.3.6 The ICT discussed the possibility of developing a collaboration with the education community as a means of highlighting public weather services. Noting the WWIS and SWIC Web sites as a widely available resource, the ICT considered the potential benefits of devising a competition for school-children which would direct them to use these Web sites. Such a competition might act as a vehicle for promoting knowledge and appreciation of meteorology while at the same time building a strong user community for PWS in the future. The projected competition should be both global and local in its focus, and would need to be sponsored by an organization that was in a position to provide both financial and logistical support. A major international financial institution might represent an appropriate partner.

**TOR (d) Monitor and report on the effectiveness of PWS training activities**

4.4.1 The representative of the WMO Secretariat reported on two training activities conducted since the last meeting of the ICT (Athens, November 2002). These were a PWS workshop for the participants from the WMO Hurricane Committee region in April 2003 in Miami and a workshop for the participants from the WMO RAI Tropical Cyclone Committee in November 2003 in La Réunion. Both events were conducted in conjunction with training courses on tropical cyclone forecasting and followed theoretical training in forecasting skills and techniques with concepts on improving presentation and dissemination of such forecasts, as well as focus on user needs and satisfaction assessment. Other concepts on quality management and economic valuation of public weather services were also introduced to the participants.

4.4.2 The reaction of the participants at both workshops has been very encouraging. In particular the move from purely scientific and forecasting issues to the more practical and "hands on" concepts of establishing contacts with the user groups and therefore acquiring visibility for the NMS has always been met with enthusiasm among the participants. A common remark at the end of both these workshops have been that they were too short and the participants would have liked to spend more time on certain topics and in particular on practical sessions.

4.4.3 The ICT noted that the HKO would organise a "Training Course on Provisions of Weather Service via the Internet" for ten participants under the WMO Voluntary Cooperation Programme from 1-5 December 2003. The objective of the course would be to enhance the capability of trainees in working with diverse meteorological information from the Internet and in providing public weather services via the Internet.

4.4.4 Based on a questionnaire issued and evaluated in 2001/2002, the RA VI Subgroup on PWS developed a concept for education and training, especially tailored to the needs of the RA VI Members. Focus was given to those training topics that emphasized service delivery as opposed to forecast techniques. These include:

- User focus: Understanding user/customer needs
- Working in a changing environment
- Co-ordination with the media
- Co-ordination with emergency planners and managers
- Verification and service assessment
- New and improved products and services
- Visibility
- Economic valuation

- Quality management
- Co-operation between NMSs and other service providers to improve services to the public.

The first training event for RA VI - PWS is planned for mid-2004 and is directed to countries in RA VI with greatest training needs.

4.4.5 The ICT noted training activities in several other Regions. African NMSs have participated in PWS training activities, the latest of which was the workshop in La Réunion for participants of RA I held in November 2003. A nowcasting training seminar for the participants from RA III/IV was organised in Brazil under the WWRP and included practical as well as theoretical sessions concerned with effective provisions of weather services in severe weather events.

4.4.6 The ICT noted that the IABM, in conjunction with WMO, planned to conduct a three-day course in media presentation of weather for 20 trainees immediately preceding the First World Conference on Broadcast Meteorology in Barcelona (31 May to 2 June 2004). The ICT considered that full use should be made of this opportunity to promote the effective delivery of PWS through the media.

4.4.7 The ICT stressed that even with very limited funds, the PWS Programme should make every effort to continue with the training activities since this element of the Programme is undoubtedly one of the most fundamental pillars of assistance to developing NMSs.

**TOR (e) Monitor and report on the improvements in national PWS programmes as a result of activities under the WMO PWS Programme**

4.5.1 The ICT noted the report of the OPAG Chair and Co-Chair on this topic. Progress on compiling examples of success had been slower than hoped and the ICT agreed that the best approach would be to more actively engage the Regional Rapporteurs on PWS. It was noted that the rapporteurs of Regions II and VI had conducted surveys in their respective regions and that these could be adapted easily to other regions to obtain information on PWS improvements that have occurred. The OPAG Chair will write to all rapporteurs outlining the approach to be taken in obtaining information for each Region.

**TOR (f) Develop the concept of a Web-based reference system on PWS to complement the existing guidance material**

4.6.1 The Secretariat representative presented some information on the concept of Hydrological Operational Multipurpose System (HOMS), which has been developed and used by the Hydrology and Water Resources Programme of WMO. The purpose of the system is to facilitate transfer of technology and training especially in developing countries. The information is presented in components consisting of manuals, descriptions of equipment and computer software, and training aids.

4.6.2 The ICT discussed the merits of developing a system for PWS based on a similar idea of cataloguing the information on existing guidance material produced by the OPAG on PWS through the WMO Secretariat as well as those existing on national levels. The ICT felt that the concept of HOMS was quite useful and relevant to PWS in some ways but was at a level of detail that was not required for PWS at this stage. However the ICT felt that there were a number of avenues that could be explored to improve the availability of information on PWS programmes of NMSs. These included:

- Modification to the WWIS Web site to make information available on aspects of NMS activities such as the range of warnings issued and their criteria;

- Improvements to the existing WMO and PWS Web sites to improve the visibility and accessibility of reference information;
- Improvements to NMS Web sites as needed to make reference material on PWS more easily accessible.

4.6.3 The ICT decided that the OPAG Chair should write to the President of CBS on the importance of improving the WMO Web site and to request him to raise the issue at the next meeting of the presidents of technical commissions.

**TOR (g) Continue to review and report on the results of service assessment activities undertaken by NMSs**

4.7.1 The Chair of ET/PDSA took the lead on this topic by reviewing the work of his team in this area. The ET/PDSA has noted that several NMSs have begun tracking Internet statistics as part of their service assessment program. For example, the HKO routinely monitors the frequency of page visits to its Internet site and uses the trends to plan future enhancements to its PWS.

4.7.2 A number of NMSs are outsourcing portions of their service assessment activities. Both the Australian Bureau of Meteorology and HKO use private companies to poll users on PWS. While discussing their experiences several issues were noted. When using private polling agencies, NMSs should be sure that as far as practical, the entire report (methodologies, etc) not just the results, can be published and released to the public. Another suggestion was to periodically re-evaluate their service assessment strategy and methods to bring new ideas and trends into the process. The downside of this approach is that continuity with previous assessment data is lost.

4.7.3 As part of its work, the ET/PDSA reviewed and discussed the existing guidelines it has prepared on service/performance assessment (*Guidelines on Performance Assessment of Public Weather Services - WMO/TD No. 1023, 2000; Supplementary Guidelines on Performance Assessment of Public Weather Services – WMO/TD No. 1103, 2002*) and concluded that additional information regarding core service assessment criteria and questions would assist NMSs to improve their products and services. Thus, the ET/PDSA is in the process of developing additional guidance material on quality management for NMSs that will include core service assessment criteria and questions.

**TOR (h) Develop material on the economic aspects of PWS**

4.8.1 The OPAG Chair led the discussions on this subject. The ICT acknowledged that in view of the developments in the economic and political environment in which NMSs were working, the provision of public weather services could not be treated completely separately from questions relating to economic value of such services. The experiences of the last few years in working closely with NMSs on PWS issues have clearly shown that many NMSs could greatly benefit from advice and guidance in demonstrating the economic value of the services they provide, particularly to their funding authorities.

4.8.2 In view of its importance, the ICT agreed that this topic should be featured in the programme of the planned technical conference on PWS to be held in conjunction with CBS-XIII in 2004 and that the material prepared for the conference may be of use in developing guidelines of assistance to Members. It was also agreed that it would be useful to include questions on this issue in future questionnaires distributed by regional Rapporteurs on PWS. In addition, the ICT recommended that a rapporteur with expertise on this subject be appointed to develop further material on this subject.

**TOR (i) Develop guidelines on weather and climate support for the Olympic Games to be provided by the IOC to national organizing committees, and provide guidance to relevant NMSs as required**

4.9.1 The ICT recalled that at its previous meeting (Athens, 2002), the discussions on the necessity to provide meteorological and climate information by the host country in support of the Olympic Games had led to this term of reference.

4.9.2 The OPAG Chair briefed the ICT on the detailed information obtained on the weather support provided at the Sydney 2000 Olympics. Information was also provided by Chair of ET/PDSA on the support provided for the Winter Olympics in Salt Lake City. The OPAG Chair undertook to arrange for this material to be converted to a set of generic guidelines by the end of April 2004 for use as a basis for discussions between WMO and the IOC

**5. Preparations for CBS-XIII**

5.1 The Secretariat representative informed the ICT that the Thirteenth session of CBS will be held in the last quarter of 2004 at a venue yet to be decided. The preparations for the session would get underway soon and accordingly the OPAG on PWS would need to start its own preparations for the session. Two major issues which were discussed at length by the Team as part of its preparations for this event were:

- (a) Technical Conference on PWS
- (b) Terms of Reference for the OPAG on PWS

5.2 The ICT was briefed on the plans to hold a Technical Conference on PWS in conjunction with the CBS session. This follows the practice of holding such conferences for each of the OPAGs comprising CBS. Technical conferences have already been held on OPAGs on IOS, ISS and DPFS. The CBS Management Group at its meeting in October 2003 discussed the plans for the Conference and agreed that it would be held over a two-day period prior to the CBS session and would consist of presentations under a number of themes focusing on essential issues under the PWS Programme.

5.3 The ICT considered the arrangements for organizing the Conference including the activities and schedule and proposed the following:

***Conference Committee***

The Organising Committee for the Conference would be headed by the OPAG Chair as the Conference Director and would have as members the OPAG Co Chair, the three ET Chairs plus Mr Wolfgang Kusch (Chair of RAVI Sub-group on PWS), Mr Mnikeli Ndabambi (Regional Rapporteur, RAI), and Mr John Gill (Australia).

***Conference Programme***

The ICT prepared a preliminary draft of the conference programme taking into consideration the major issues facing the PWS Programme. The draft programme will be further refined by the Conference Committee (deadline:16 December 2003) and follow up actions will be taken according to the schedule below.

## **Planning Schedule**

The Secretariat, assisted by the Conference Committee, should draft and issue a call for papers before 1 February 2004. The call for papers should be directed to a wide audience including Members, all members of CBS, members of other technical commissions, representatives of related international programmes, the environmental research community, media, disaster management organizations and the private sector. The conference and call for papers should also be announced via the WMO Bulletin and the WMO Web site.

- a. Abstracts of papers should be received by 1 May 2004.
- b. The committee should review the abstracts and select papers to be presented at the conference by 1 July 2004.
- c. Final papers should be provided to WMO Secretariat, preferably in electronic form, by 1 September 2004 and published on a conference Web site created on the WMO server.

5.4 The ICT reviewed the terms of reference of the three Expert Teams and based on proposals from the Chairs of the teams amended the terms of reference. These will be presented to CBS-XIII and are contained in Annex III to this report.

## **6. Visit to the Hong Kong Observatory Forecast Office**

6.1 The ICT visited the Central Forecasting Office of the Hong Kong Observatory and was briefed on its operational functions. The ICT noted new developments there, in particular, the planning of the new lightning location network to be installed in 2005; the collaboration with neighbouring authorities over the Pearl River Delta in the exchange of AWS and radar data as well as warnings; and the nowcasting system called SWIRLS (Short-range Warning of Intense Rainstorms in Localized Systems) in support of the operation of rainstorm and landslip warnings.

## **7. Closing**

The meeting of the PWS Core ICT closed at 1600 on Friday 28 November 2003.

**Participants at the meeting of the  
Core Implementation /Coordination Team**

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**PUBLIC WEATHER SERVICES CORE IMPLEMENTATION COORDINATION TEAM**  
(Hong Kong, China, 24 – 28 November 2003)

**PROGRAMME**

	Monday, 24 November	Tuesday, 25 November	Wednesday, 26 November	Thursday, 27 November	Friday, 28 November
AM 0900	<b>1. Opening</b> <b>2. Background Information and Objectives (Secretariat)</b> <b>3. Review of the decisions of Congress-XIV including emerging and important issues facing PWS and future directions</b>	TOR (d): Reports on two training activities in 2003 by: <b>Secretariat</b>  TOR (e): Report by <b>Chair/Co-Chair OPAG</b>	TOR (h): Discussion of key issues led by: <b>OPAG Chair/Secretariat</b>  TOR (i): Report and Discussions led by: <b>OPAG Chair and Chair ET/PDSA</b>	<b>6. Preparation of report of the ICT</b>	Preparation of report of the Expert Team (continue)
1200					
	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
PM 1330	<b>4. ICT work programme</b> TOR (a): Reports of the work of Expert teams by: <b>3 ET Chairs</b>  TOR (b): Reports by: <b>OPAG Chair, Wolfgang Kusch (Questionnaire result for ET/PDSA)</b>  TOR (c): Discussion of key issues led by: <b>3 ET Chairs</b>	TOR (f): Discussion of key issues led by: <b>Secretariat/OPAG Chair</b>  TOR (g): Report and Discussion of key issues led by: <b>Chair ET/PDSA</b>	<b>5. Preparations for CBS-XIII (Last quarter of 2004)</b>	<b>7. Visit to the Hong Kong Observatory Forecast Office</b>	Review and adoption of the report  <b>8. Close</b>
1700					

## Proposed Revised Terms of Reference for the OPAG/PWS

### Terms of Reference of Implementation Coordination Team on Public Weather Services

- (a) Coordinate and keep under review the work of the PWS expert teams;
- (b) Continue with appropriate arrangements for consultation and collaboration with relevant technical commissions on cross-cutting issues, and with other CBS OPAGs to ensure coordination of services and systems;
- (c) Review and report on PWS support to WMO programme on disaster prevention and mitigation;
- (d) Explore the mechanisms to strengthen dialogues between NMSs and the private service providers;
- (e) Continue to provide guidance to Members on the issue of NMSs as the sole authority in the provision of official severe weather warnings;
- (f) Review and report on the effectiveness of the information and guidance material produced by the PWS Programme among NMSs and relevant media and user groups;
- (g) Review and report on the effectiveness of PWS training activities;
- (h) Review and report on the improvements in national PWS programmes as a result of activities under the WMO PWS Programme;
- (i) Continue to develop the concept of a Web-based reference system on PWS to complement the existing guidance material;
- (j) Continue to review and report on service improvement activities undertaken by NMSs;
- (k) Continue to explore the availability of material on the economic aspects of PWS with the eventual aim of collating such material for use by NMSs;
- (l) Continue to develop guidelines on weather and climate support for the Olympic Games to be provided by the International Olympic Committee to national organizing committees, and provide guidance to relevant NMSs as required.

EXPERT TEAM ON SERVICE IMPROVEMENT (ET/SI)  
(Formerly Expert Team on Product Development and Service Assessment)

#### General Responsibilities of the ET

- (a) Monitor and report on progress of earlier initiatives and on new developments in the relevant area of the PWS programme and make recommendations on issues that require the attention of the OPAG/PWS or CBS.
- (b) Monitor and report on aspects of PWS within the Team's mandate that relate to support of major WMO programmes such as Disaster Prevention and Mitigation, the

WMO Space Programme, and other WMO Programmes that are supported by PWS cross-cutting activities.

- (c) Bearing in mind the importance of the PWS Programme in assisting capacity building in smaller and less developed NMSs, identify ways of assisting to meet the needs of developing countries in their efforts to improve their national PWS programme

#### Specific TORs of ET/SI

- (a) Identify, report and provide recommendations on emerging needs for new and improved products and services with emphasis on key PWS user groups
- (b) Explore and report on the development of user-oriented NMS air quality and bio-meteorological forecasts and warnings
- (c) Explore and advise on methods of incorporating ensemble prediction system products into PWS with an emphasis on probabilistic forecasts and Nowcasts
- (d) Explore and advise on methods of integrating PWS across all time scales within the PWS program
- (e) Report and advise on collaborative activities with other CBS OPAGs and technical commissions
- (f) Explore and provide recommendations on a basic verification scheme for PWS with a special emphasis on developing countries
- (g) Continue to review the introduction of quality management procedures to NMSs

#### EXPERT TEAM ON APPLICATION OF TECHNOLOGY TO PWS (ET/APT)

(Formerly Expert Team on Warnings and Forecasts Exchange, Understanding and Use)

- (a) Develop further the concept of and conduct pilot tests on the improved international availability and access to NMSs' official severe weather information via the Internet web site (SWIC);
- (b) Continue to develop the official city forecast website (WWIS) and explore its potential both for conveying other information and for developing the web site in other languages, in addition to English;
- (c) Promote awareness of, and provide guidance to, Members on the exchange of public weather forecasts on the Internet;
- (d) Monitor and report on the development of cross-border exchange of warnings with reference to the published WMO guidelines;
- (e) Develop reference material on the application of nowcasting to the provision of public warnings associated with mesoscale weather phenomena;
- (f) Develop reference material on the application of emerging technology to the delivery of public weather services;
- (g) Develop reference material on the application of database concept and workstation

EXPERT TEAM ON COMMUNICATION OF PWS (ET/COM)  
(Formerly Expert Team on Media Issues)

General Responsibilities of ET

- (a) Monitor and report on progress of earlier initiatives and on new developments in the relevant areas of the PWS programme and make recommendations on issues that require the attention of the OPAG/PWS or CBS.
- (b) Monitor and report on aspects of PWS within the Team's mandate that relate to support of major WMO programmes such as Disaster Prevention and Mitigation, the WMO Space Programme, and other WMO Programmes that are supported by PWS cross-cutting activities.
- (c) Bearing in mind the importance of the PWS Programme in assisting capacity building in smaller and less developed NMSs, identify ways of assisting to meet the needs of developing countries in their efforts to improve their national PWS programmes.

Specific TORs of ET/COM

- (a) Examine, report and recommend on ways of continuing to develop positive partnerships with national and international media organisations, and of assisting NMSs to improve relations with the media;
- (b) Examine, report and recommend on broader aspects of effective communication of public weather services with particular emphasis on the Internet and the application of other new technologies that might enhance public weather services;
- (c) Report and advise on ways of assisting NMSs to enhance the education of, and improve the understanding of, users with a view to ensuring more effective use of PWS and enhancing the usefulness of new products and services, including those relating to the projection of weather patterns in the longer term;
- (d) Promote awareness of the importance of the impact of high quality, well communicated and delivered public weather services on the image and visibility of the NMS;
- (e) Assess the use of the information compiled for the WWIS and SWIC websites by the media, and develop strategies for the improved exploitation of authorised and official weather information through the use of new and emerging technologies;
- (f) Study and report on how to effectively communicate to end users the concepts of uncertainty and confidence that are increasingly available from the output of Ensemble Prediction Systems and other probabilistic forecasting systems;
- (g) Noting the ongoing difficulty in media attribution of the role of NMSs in providing basic services and infrastructure to support weather presentation to the public, study how this matter might be more effectively addressed and to develop advisory material for use by NMSs.
- (h) Noting the major media attention given to the increasing number of weather-related disasters and with a strong connection to the role of NMSs in the affected countries, report on and develop preliminary guidance material on how NMSs might more effectively communicate with emergency managers, the media, and the public on meteorological aspects of disasters.