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WORKING GROUP ON PLANNING AND IMPLEMENTATION OF THE WWW IN REGION II
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REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON PLANNING AND IMPLEMENTATION OF THE WWW IN REGION II

(Submitted by Mr P. Rajesh Rao, Chairman of the Working Group)

Summary and purpose of document

This document provides information on the significant developments in the operational matters of WWW that have taken place in RA II and activities of the working group since its establishment by XII-RA II.

ACTION PROPOSED

The group is invited to note the information contained in the report and consider its working plan for the remaining period.

ANNEX: Tentative work plan of the WG for the period before the thirteenth session of RA II in 2004

DISCUSSION

Introduction

1. The twelfth session of the Regional Association II (Asia) held in Seoul, Republic of Korea from 19 to 27 September, 2000, vide Resolution 2 (XII-RA II) reestablished the Working Group on Planning and Implementation of the World Weather Watch (WG/PIW) in Region II. The terms of reference were as follows:

(i) To monitor progress made in the implementation and operation of World Weather Watch (WWW) in the Region and advice on possible improvements;

(ii) To keep under review the action taken under the Fifth WMO Long Term Plan with a view to updating and further developing the WWW Programme relating to RA II;

(iii) To develop proposals for full integration of the WWW components and functions with a view to cost effective operation;

(iv) To keep abreast of new developments in the field of meteorological data processing, observing techniques, telecommunications and codes and to make recommendations for their application to the region;

(v) To identify and keep under review Regional requirements for the exchange of observational data and processed products;

(vi) To develop proposals for implementation of the Public Weather Services Programme in the Region;

(vii) To advise the President of the Association on all matters concerning the WWW.

The Working Group composed of the following core members:

(a) A co-coordinator of a sub-group on Regional Aspects of the Global Telecommunication Systems;

(b) A Rapporteur on Regional Aspects of the Global Observing System;

(c) A Rapporteur on Regional Aspects of the Global Data Processing System;

(d) A Rapporteur on Regional Aspects of Data Management;

(e) A Rapporteur on Regional Aspects of Public Weather Services;

The detailed terms of reference of the sub-group and the rapporteurs were indicated in Annex to the Resolution 2 (XII-RA II).

2. The Regional Director for Asia and the South-West Pacific requested the Chairman of WG on PIW to develop the work programme for the RA II inter-sessional period. After obtaining inputs from the rapporteurs and considering decisions taken by XII-RA II session in Seoul, CBS-XII in Geneva (Oct. - Nov. 2000), 3rd session of WG on PIW in Doha (Oct. 1999) and 5th WMO Long Term Plan, the draft Work Plan for the inter-sessional period was prepared and submitted to the RA II President and WMO Secretariat in February 2001. All the members were requested to start work as per the Work Plan.

3. The meeting of Advisory Working Group (AWG) of Regional Association II in Nanjing, China (November 2001) approved the Work Plan. It appreciated the fact that the WG on PIW had already started its work and considerable progress was achieved.

Work Plan

4. The Work Plan for the WG on PIW during the inter-sessional period had given specific tasks to the sub-group on GTS and the Rapporteurs. It would be appropriate to list them in brief before as assessment of their current status is described.

Global Observing System

(i) To keep under review RBSN stations of the Region and identify defaulting stations on the basis of quantity monitoring reports;

(ii) To keep under continuous review the availability of CLIMAT/CLIMAT TEMP reports from RBCN stations in the Region;

(iii) To keep under close review the continuing investigations in the causes of failure of GPS sondes;

(iv) To explore the possibility of bulk procurement of GPS sondes through a Central Nodal Agency which could result in savings in costs;

(v) To keep under continuous review the list of RBSN stations of the region and mechanism be developed for regular update of the list of RBSN stations;

(vi) To work closely with JCOMM to increase awareness of VOS to mechanism of collection of ships observations in the Region;

(vii) To take up with AMDAR Panel, the need for increase in AMDAR data over Region II.

Data Management

(i) Revision of current reporting practice on precipitation in RA II;

(ii) Develop proposal on the promotion of the availability of snow depth reporting in SYNOP;

(iii) To prepare examples of coding of CLIMAT and CLIMAT TEMP data keeping in view the modification approved by CBS-XII;

(iv) To carry out survey among member countries for their requirement of additional data;

(v) To encourage all the Members of the Region for having Internet connection.

Global Telecommunication System

(i) To review the status of implementation of different circuits of the GTS in the region and make efforts to have all NMCs connected to the GTS;

(ii) To closely monitor the progress of integration into RMTN;

(iii) To pursue with participating countries in the pilot project the results of satellite broadcast of bulletins (through SADIS);

(iv) To pursue with JCOMM for early identification of the appropriate system to replace HF broadcast requirement of maritime community;

(v) To pursue with all RTHs on MTN in Region II to maintain their parts of the comprehensive catalogue of meteorological bulletins;

(vi) To urge all members o the Region to implement TCP/IP procedures on GTS circuits through detailed circular;

(vii) To closely follow the development of new proposals on exchange of addressed messages, routing of observational data, detection of duplicated bulletins;

(viii) To pursue for early development of proposal for improved RMTN.

Global Data Processing System

(I) To develop proposals for establishment of a Regional Data Base for providing access to high resolution NWP products from major GDPS centres to Members of the Region II;

(ii) To develop proposals for technical assistance to developing countries of the Region for strengthening their NWP capability;

(iii) To develop proposals for training of experts from developing countries of the Region in interpretation of NWP products;

(iv) To conduct a survey among Members of the Region on the use and requirement of:

(a) Ensemble prediction system products
(b) GPV products
(c) NWP products used in industrial meteorology

(v) To develop proposals for a regional workshop on the use of EPS products;

(vi) To develop proposals for providing appropriate NWP system in Workstations to those members who do not have them.

Public Weather Service

(i) To promote the establishment of central website for weather of major cities of the world.

(ii) To coordinate with Hong Kong, China and WMO Secretariat for inclusion of warnings issued by Region II Members regarding Tropical Cyclones.

(iii) To promote standardization of formats and contents of severe weather warnings issued by Members of the Region.

(iv) To organize a regional workshop for training of forecasters in severe weather forecasting.

(v) To promote development of product development and service evaluation techniques for benefit of members of the Region II.

Current Status

5. In the intervening period, considerable work has been completed by the sub-group and the Rapporteurs. Substantial progress has been achieved on all the items for which WMO Secretariat members of WG-PIW deserve full credit. The Rapporteurs have attended the meetings of Implementation Coordination Team (ICT) of the various Open Programme Area Groups of CBS and submitted proposals pertaining to Region II. Many of the issues were taken up in the extraordinary session of CBS held in Cairns, Australia (4-12 December 2002) and resulted in appropriate recommendations. Based on progress reports of the Rapporteurs, decisions taken in the extraordinary session of CBS, and the current status of the various actions listed in Para 2 are described in subsequent paragraphs.

Global Observing System

RBSN Stations of the Region

6. The twelfth session of RA II (Seoul, September 2000) approved a revised RBSN list for the Region, which resulted in 1198 surface stations, 298 radiosonde stations and 35 rawin stations.

7. The October 2002 annual monitoring results show that the availability of RBSN in RA II was 83% for SYNOP reports and 64% for TEMP reports. Amongst the RBSN stations, 78 SYNOP stations and 47 TEMP stations which have been implemented, were ‘silent’ and 6 SYNOP stations and 7 TEMP stations, which were not implemented, were also ‘silent’.

8. The extraordinary session of CBS (Cairns, Australia, 4-12 December 2002) noted that the level of implementation of RBSN stations had shown stability, but certain weaknesses still remained over certain areas of Region II, particularly from the northern, southeastern and western parts. The greatest cause of missing reports continued to be the lack of trained staff or consumables in counties where financial difficulties persisted.

9. Some new RBSN stations, which belong to Pakistan, Maldives and Islamic Republic of Iran, are not included in Volume A. The Rapporteur on Regional Aspects of GOS has taken up the matter with CBS Rapporteurs of Volume A and the PRs of these countries for obtaining the meta data of these stations.

10. For proper follow-up and continuous review of status of RBSN stations, it is felt that each Member should appoint a national focal point on GOS in RA II and their detailed address be provided to the Rapporteurs.

CLIMAT / CLIMAT TEMP Reports of RBCN

11. XII-RA II approved the establishment of a Regional Basic Climatological Network (RBCN) for providing a good representation of climate on a regional scale. The RBCN list of RA II consists of 593 surface observation stations and 194 upper air-observing stations.

12. The annual monitoring results show that the availability of RBCN in RA II is 50% for CLIMAT reports and 42% for CLIMAT TEMP reports. It was also noted that there were large number of coding errors in the messages. The Rapporteur on Data Management has completed examples of general coding errors, which are being distributed to Members.

Performance of GPS sondes

13. As a consequence of inter-comparison of GPS sondes carried out in Brazil (May 2002), the manufacturer of GPS sondes identified some deficiency, which could be the cause of failure of some sondes during flight. Countries using these sondes have reported some improvement in performance. It is expected that as manufacturers continue carrying out improvement in design, situation will further improve in near future.

Bulk Procurement of GPS sondes

14. Many developing countries of the Region are having serious financial constraints, due to which they are unable to procure costly GPS sondes. Compared to omega sonde, which were used earlier (with Omega network, which is non-functional now), the GPS sonde is more than twice as costly. One method to reduce cost could be the bulk procurement of sondes by one agency and then supply to various users. This issue has been discussed in CBS-2000, AWG of RA II, as well as CBS-2002 but has not been implemented as yet. WMO Secretariat may take a lead in the matter.

Update of RBSN Stations

15. For a correct assessment of availability of observations, and to identity deficiency in RBSN network through global and SMM monitoring, it is essential that the list of functional stations be regularly updated. Due to various reasons like U/S of ground equipment, non-availability of consumables, some stations may be temporarily non-functional.

16. The Rapporteur has suggested that a focal point that is responsible for the management of the observing network in the country should be nominated by each Member so that regular updates are available to the users.

Marine Observations

17. CBS-2002 noted that there was a decline in number of Voluntary Observing Ships (VOS) to around 6000. The number of reports had stabilized at around 6000 reports per day. A VOS Climate (VOSCLIM) was being implemented to provide a subset of high quality VOS data for various applications including global climate studies.

18. Many Members have established their own ARGO programme. Japan has 85 ARGO station, the Republic of Korea has 16 ARGO stations. China has set-up one ARGO station and more are planned. It is expected that availability of observations over the sea will increase substantially in near future.

Aircraft Observations

19. Although the progress on AMDAR (Aircraft Meteorological Data Relay) in Region II is very poor, several projects are under development. The details of these projects have been given by the Rapporteur in his report.

20. The issue of low availability of AMDAR reports in various regions, particularly in Region II was discussed in CBS 2002. A recommendation asking CBS and CAeM (Commission of Aeronautical Meteorology) to develop appropriate mechanism, in consultation with ICAO to fully integrate AMDAR activities into the World Weather Watch Programme, was approved by the Commission.

Data Management

Precipitation Reporting

21. An amendment to the coding procedure on precipitation in FM 12 – XII SYNOP and related codes was approved by CBS Ext.(02) and EC-LV and the amendment will come into

force on 5 November 2003. The Rapporteur on DM has prepared consequential amendments to the Regional Coding Procedure in RA II and the same has been approved by the Acting President of RA II.
CBS-XII recommended that members might consider aligning their reporting practices in accordance with global procedure so as to ensure reporting precipitation for the preceding 6 and 12 hours period. The proposal has been circulated to members for comments.

Snow depth reporting in SYNOP

22. The Rapporteur has circulated a paper showing the importance of snow depth reporting in its use in forecast models. SYNOP snow-depth data has a positive impact on medium and extended range forecast.

Coding examples of CLIMAT and CLIMAT TEMP

23. The Rapporteur has prepared an exhaustive set of examples of coding of CLIMAT and CLIMAT TEMP data indicating the probable errors made by the observers. WMO Secretariat has circulated this report to all members. It is expected that the quality and quantity of CLIMAT and CLIMAT TEMP reports from the Region will show significant improvement.

Requirement of additional data

24. CBS-XII and CBS-Ext.(02) noted that the deficiencies in the current RBSN could be eased if data from RBSN could be supplemented with other data such as satellite imagery and derived products and AMDAR data. The Rapporteur on DM has carried out a survey among Members for their requirement of additional data. The detailed report has been submitted to the Secretariat. Members producing such data may provide access to those Members who require it.

Internet Connection

25. CBS-XII stressed that Internet is fast becoming a reliable means of transmission and reception of data and products, which could become a supplement to GTS circuits. This will help in reducing congestion and delay in low speed GTS circuits. The Rapporteur on DM has completed the survey on the websites operated by members for circulation to all Members of the Region.

26. It is suggested that WMO Secretariat may arrange survey of websites of members of other Regions and prepare a comprehensive document listing websites addresses of all the Members and other specialized agencies like ECMWF etc.

Global Telecommunication System

Status of Circuits

27. CBS-Ext.(02) noted that the observational data collection system in Region II was in general quite satisfactory, except in a few countries where serious shot-comings still existed. Most of the Region II GTS circuits were operating at medium or high speed, but there were still a number of low-speed connections. The status of these circuits was reviewed in ICT meeting held in New Delhi (January 2002) and is being reviewed in ICT meeting at Moscow (8-10 September 2003). A Training Seminar on Information and Communication Technology for the GTS was also held in Bangkok (September 2002).

Improved RMTN

28. The IMTN, as agreed by the Commission at its twelfth session and reviewed at its extraordinary session in 2002, was being implemented through data communication network services from a small number of providers. The Commission endorsed the implementation of the IMTN project through two "Clouds". The "Cloud II" would be an extension of the Region VI RMDCN, providing inter-connectivity between RTHs Bracknell, Toulouse, Offenbach, RTH / WMC Moscow and other RTHs i.e. RTHs Nairobi, Dakar, Algiers, Cairo, Jeddah, New Delhi and Beijing. The inclusion of Tokyo-Beijing and Tokyo-New Delhi circuits would also provide an effective inter-connectivity between both "Clouds".

29. Equant Network Services Limited, which is the contractor for the Region VI RMDCN, had agreed to provide the required connectivity. RTH Beijing had concluded the required arrangements to joint "Cloud I" and Tokyo was firmly planning implementation by mid 2003 and New Delhi in 2003.

Alternative to HF broadcasts

30. It was noted that the HF broadcast still being maintained by some NHMSs was a great financial burden and the service was not cost effective. CBS-Ext.(02) noted that Digital Audio Broadcast (DAB) could transmit other data as well as audio. Satellite-based DAB services, such as those provided by World Space, also included commercial "data casting" services. DAB data casting services were a cost-effective solution in terms of recurrent and investment costs for meteorological data distribution with moderate capacity, in particular for replacing RTH radio broadcasts.

31. In the ICT meeting in New Delhi (January 2002), India reported that it has initiated a project with satellite-based DAB service with Worldspace as a replacement of HF radio broadcasts. The system has been commissioned and has provided satisfactory results. Based on assessment of the ICT meeting, Members may consider fixing a date for discontinuation of HF broadcasts in Region II. Other Members notably RTH Beijing and Tokyo may also consider having similar satellite broadcast services for replacing their HF broadcast.

Catalogue of Meteorological bulletins

32. CBS-XII had recommended that all the RTH should maintain in their service a routeing catalogue of meteorological bulletins being transmitted by them. This would be useful for access by other RTH whenever required for verification of bulletins and their source of issue. The ICT meeting in New Delhi noted that many RTHs in the Region had still not implemented this recommendation.

33. Members maintaining RTHs are requested to implement this recommendation as early as possible to ensure 100% availability of routeing catalogue of meteorological bulletins.

TCP/IP and related protocols on the GTS

34. CBS-Ext.(02) noted that the Expert Team on Data Communication Systems and Techniques was keeping under review the procedures and implementation guidance for the use of TCP/IP and related protocols on the GTS, as described in the Manual on the GTS (WMO No.386). CBS-Ext.(02) also approved the amendments to Attachment II-15 to the Manual on the GTS, Vol.1, Part II, which referred to the file naming convention for new types of data.

35. There has been considerable progress in the improvement of GTS circuits in the Region. The migration to TCP/IP firmly continued. New Delhi-Karachi and New Delhi-Tokyo circuits have been upgraded to 64kbps speed operated with TCP/IP sockets procedures.

There were firm plans to upgrade New Delhi-Cairo inter-regional circuit to 64kbps TCP/IP protocol.

36. With the availability of Internet in many Members of the Region, many Members have linked up the GTS centers through Virtual Private Network (VPN) via the Internet. New Delhi-Oman and New Delhi-Melbourne links via the Internet have been in successful operation since last two years. It is suggested, that Members may explore having Internet link as a supplement to low speed GTS circuits. The guidance material on VPN via the Internet, between GTS centers brought out by the Expert Team on Data Communication and Techniques can be referred to by Members for assistance. In fact, the Internet link would be a cost effective solution for those centers presently having no links or circuits. It is also suggested that in countries where high speed Internet is available, NMHS may consider upgrading/supplementing their low speed GTS circuits through VPN via the Internet.

37. The Co-coordinator of the subgroup on GTS may consider issuing a suitable circular to Members on the subject.

Global Data Processing System

Regional Data Base of NWP products

38. A survey was conducted for the operation of GDPS centres in Region II during January 2002. The survey showed that there is a growing concern on the development of operational NWP system, particularly, among the developing NWP centres. Some Members of the Region are running Ensemble Prediction System (EPS) on an operational basis. Whereas, some others do not have any access to products from advanced GDPS centres. These Members have stressed the need to establish a regional database for providing access to high resolution NWP products from major centers such as ECMWF, EGRR, KWBC, etc.

39. It is suggested, that a website similar to a website of weather of major cities of the world be established by an advanced centre of the Region for hosting dynamically the high resolution NWP products of major GDPS centers. This will help members to access the products through a single source.

Interpretation of NWP products

40. Many members of the Region have expressed the need for arranging frequent training workshops for experts of developing countries in the interpretation of NWP products. A regional workshop on NWP was held in Cairns Australia (December 2002), which was attended, by a large number of experts from the developing countries. Another hands-on training workshop in storm surge modeling is proposed to be held in Malaysia during September 2003.

EPS and GPV products

41. The Rapporteur on GDPS has circulated a questionnaire for the operational requirement of EPS and GPV products by the Members. The results of the survey are being presented in the current session.

Workstations

42. CBS-Ext.(02) recalled the conclusions and recommendations developed by the Rapporteur on Workstations. It was noted, that the requirements for workstations are

becoming acute as a lot information such as NWP and remote sensed data need proper tools available on workstations to integrate and visualize forecasts. It urged developed Members of the Region to provide proven systems to developing countries through technical cooperation with the support of relevant development funding agencies. It was noted, that many Members of the Region have requested provision of workstations under VCP assistance.

Public Weather Services

Web site for official city forecasts

43. CBS-XII had endorsed a pilot project for the development of a web site, which will provide official city forecasts and had authorized Hong Kong, China to take the lead in the matter. The web site WWIS, was being implemented in two phases with phase I providing climatological information of selected cities and city forecasts in phase II.

44. CBS-Ext.(02) was pleased to note that climatological information of 826 cities from 150 Members were available on the web site (http://www.worldweather.org). The phase II was completed in December 2002 and now forecasts of 680 cities from 70 Members can be accessed by the users. Oman is now hosting an Arabic version of the site.

45. Members of the Region who are yet to supply city forecasts to the site are requested to do so as early as possible.

Web site on severe weather warning

46. As per recommendations of CBS -12, Hong Kong, China had established the website, Severe Weather Information Centre (SWIC) which provided advisories from RSMC-Tokyo Typhoon Centre and local warnings from nine Members of ESCAP/WMO Typhoon Committee.

47. CBS-Ext.(02) was pleased that the SWIC website was thoroughly tested during the 2002 typhoon season. The Commission recommended that the efforts be concentrated on further development of the SWIC website. It further recommended the extension of the site to cover tropical cyclone information from other Regions.

48. The Rapporteur on PWS has reported that prototype web pages to cover tropical cyclone information from RSMCs and TCWCs in RA V, Central North Pacific Ocean, South-west Indian Ocean, Bay of Bengal and the Arabian Sea have since been developed. Arrangements are in progress to have all these pages updated dynamically. This will fulfill the needs of many Members for tropical cyclone information affecting their area of interest.

49. The WG on PIW session may likely to place on record its deep appreciation of the commendable efforts of Hong Kong, China in developing, updating and maintaining the two websites.

PWS data and products

50. One of the most important roles of NMHSs is to provide reliable and effective weather and related products and services to ensure the safety of life, protection of property and the well being of their nation's citizens. To fulfill this mandate, NMHSs rely on progress in both science and technology as applied to meteorology. Modern observational computing and communication systems, steadily improving numerical prediction models together with improved understanding of atmospheric sciences continue to contribute to the enhancement of weather forecasting capabilities.

51. The OPAG on PWS has brought out a document (WMO/TD No.1054) detailing the technical framework for data and products in support of public weather services. This is an excellent publication and will be found very useful by developing NMHSs in organizing its services tuned to the varied requirements of forecast products for the media and the public.

Product development and service assessment

52. The importance and necessity to carry out ongoing performance assessment of public weather service to ensure that they effectively and efficiently meet the needs of the public, have been well recognized. The public encompasses the range from the individual citizen to a nation's political leadership.

53. The two major component of an assessment programme are product verification and the user based assessment. The overall purpose of the verification of forecasts is to ensure that the products such as warning forecasts are accurate and reliable. Forecast verifications are produced in an objective fashion free of human interpretation. The results tend to be numbers and statistics, which can be interpreted using statistical theory. On the other hand, user based assessment should give true reflection of user perception of products and services provided by the NMHS, as well as qualitative information on desired products and services. This type of assessment contains almost completely subjective information, subject to human perception and interpretation.

54. An assessment programme should contain both the components and the result should enable in accuracy of forecasts as well as satisfaction of users. Every NMHS should carry out a regular assessment of the services it provides to the different users. The Expert Team on product development and services assessment has brought an excellent technical document (WMO/TD No. 1103), which gives practical examples and models employed by various NMHSs. It is suggested that all members may carry out the assessment of their services and submit the results to the Rapporteur on PWS for discussion in the next session of RA II in 2004.

Regional Workshop

55. Under the WMO PWS programme, RA II Regional Training Seminar on Objective Interpretation of GDPS products was held in Bahrain (September 2002). The next Seminar is proposed to be held in Brunei in September 2003. These seminars are of immense help to Members for improving their public weather service programme.

Emerging Issues and challenges

56. With continuous and possibly breathtaking changes in communication technology, Internet, high speed computing platforms and new improved modeling techniques, spectacular changes are taking place in forecast quality, timeliness and accuracy. Future WMO Information System concept is evolving and has reached a stage where specific roles of NMHS, GDPS etc. can be defined. With private sector entering the services sector in a big way in many countries, there is a pressure on NMHS to realign themselves on commercial lines. Meteorological Services for Aviation services are being provided by private entities outside the government at many international airports.

57. All members of Region II have to keep abreast of the rapid changes taking place and try to use the opportunities to their best advantage. However, it must be understood that the role of NMHS would continue to grow in the years to come.

58. Many emerging issues, which have to faced and tackled by the NMHS and are being discussed in various fora of WMO are briefly described.

Redesign of the Global Observing System (GOS)

59. The Expert Team on Observational Data requirements and the Redesign of the GOS drafted the vision of the GOS in 2015 and beyond. It was noted that the existing surface based GOS suffered from closure of Omega system and high cost of sondes of GPS system. As a result, many upper air stations had closed down in recent years. However, new observing systems like AMDAR, GPS water vapour measurements, wind profilers and satellite soundings have emerged, which could the existing observing systems. The vision for the evolution of the GOS to 2015 includes:

a) For the space based component

i. six operational GEO's
ii. Four operational LEO's
iii. Several R&D Satellites
iv. Improved inter-calibration and operational continuity

b) For the surface based component

i) Automation to enable
- a) Targeted observation in dara sparse areas
- b) Optimal operation of
  - i) Rawinsonde ii) ASAP system iii) Aircraft in flight

ii) Rawinsondes
- a) Optimized utilization
- b) Stable GUAN
- c) Supplemented by
  - i) AMDAR ascent / descent
  - ii) Ground based GPS water vapor measurement
  - iii) Wind Profilers
  - iv) satellite soundings
- d) Rawinsonde automatically launched
- e) Computerized data processing
- f) Real-time data transmission
- h) High vertical resolution

iii) Commercial aircraft observations
- a) of temperature and wind plus humidity
- b) In-flight ascent / descent data
- c) High temporal resolution
- d) Availability from most airports
- e) Possibly supplemented by UAV

iv) Surface Observations
- a) Automated systems
- b) Land sensors at high spatial resolution for local use such as road weather
- c) Ocean platforms (ship, buoys, profiling floats, moorings)

v) Radar Observing Systems measuring
- a) radial winds
- b) Hydrometeor distribution &size
- c) Precipitation phase and rate
- d) Multiple cloud layer, including cloud base and cloud top height

vi) Data Collection and transmission

a) Digital in a highly compressed form
b) Entirely computerized processing
c) Role of humans in observing chain reduced to minimum

60. CBS-Ext.(02) agreed to develop as soon as possible an infrastructure and implementation plan including a detailed time schedule within WMO to ensure full utilization of the evolving GOS. The impact of redesigned GOS on Members varied depending upon their GOS status. Members of the Region particularly the developing countries are requested to keep abreast of the new development and make use of the emerging systems to supplement their GOS.

Future WMO Information Systems (FWIS)

61. The Inter-Programme Task Team on Future WMO Information System (FWIS) has made considerable progress in its refinement of FWIS concept. It takes care of the needs of NMHSs, commercial interests and other varied users of their product requirements employing the state of art communication technology. The FWIS concept defines three functional components:

1. National Centres (NC
   a) Collect observational data within their country.
   b) Provide observation and products intended for global dissemination, their respective GISC
   c) Provide observation and products intended for regional distribution to the responsible DCPC
   d) Collect, generate and disseminate products for national use
   e) Participate in monitoring the performance of the system

2. Data Collection or Product Centre (DC PCs)
   a) Collect information intended for dissemination to NC within its area of responsibility
   b) Collect special programme related data and products
   c) Produce regional or specialized data and products
   d) Provide information intended for global exchange to their responsible GISC
   e) Disseminate information not intended for global exchange to their responsible GISC
   f) Support access to their products via WMO reply/request mechanism
   g) Ensure that they have procedures and arrangements in place to provide swift recovery or back up of their essential services in the event of an outage

3. Global Information System Centres (GISCs)

   a) Receive observational data and products for global exchange from NC's and DCPC's within their area of responsibility

   b) Exchange information intended for global exchange with other GISC's

   c) Hold the entire set of data and products agreed by WMO for routine global exchange and make it available via request/reply mechanism

   d) Provide round the clock connectivity to the public and private networks at a bandwidth that is sufficient to meet the global and regional responsibilities.

e) Participate in monitoring the performance of the system

62. It was pointed out that FWIS should build upon the most successful components of existing WMO information system in an evolutionary process. The existing WWW centers could be mapped with the corresponding functions within FWIS as given below:

Current WWW centre	**FWIS Functions**
NMC	NC
RSMC	DCPC and/or GISC
WMC	DCPC and/or GISC
RTH	DCPC
RTH on MTN	DCPC and/or GISC

Quality Management Process

63. The report on application of total quality management to NMHS submitted by CBS Rapporteur was reviewed by CBS Management Group. It determined that the development of quality management processes within the existing framework of WWW procedures and practices would be most appropriate. CBS-Ext.(02) noted that ICAO had recommended the joint development of guidance material by ICAO/WMO to assist members in the development of quality management systems for the provision of meteorological services for international air navigation.

64. The fifty-fourth session of the Executive Council agreed that WMO should work towards its own quality management framework by making use of the already developed comprehensive system of documented WMO procedures and practices in the technical regulations, manuals, guides, guidelines and technical publications. This issue was further discussed in CBS-Ext.(02) and it was agreed that it may be appropriate for WMO to develop a quality management framework that could be used by NMHSs as a model for establishing quality management systems.

Severe Weather Forecasting

65. CBS-Ext.(02) noted that in the case of severe weather events, the evolution of the current models was very sensitive to model physics as well as the initial conditions so that it was not possible to completely rely on the solution given by NWP model. The automated forecast produced by NWP models had to be carefully examined by forecasters before warnings of the occurrence of severe weather events were issued. There is a need to further increase the resolution of the regional models to below 10km to capture mesoscale features, further improve data assimilation and to enhance the data availability in data sparse areas in the tropical and Southern Hemisphere.

Migration to Binary Codes

66. Standardization of the formatting of data has always been a fundamental requirement. The self description flexibility and expandability of Table Driven Code Forms (TDCF) viz; BUFR, CREX and GRIB are the only solution to the demands of the rapidly evolving science and technology for representation of new type of data, metadata, higher resolution data in time and space dimensions and higher precision of data. BUFR and CEREX offer great advantages in comparison with the traditional alphanumeric codes (TAC). BUFR offers condensation of data while alphanumeric code CEREX provides human readability but not packing. The TDCF will easily permit to satisfy existing, as well as, future needs. Further, the reliability of binary data transmission provides for an increase in data quality and quantity received at Met. Centres. The universal use of TDCF will reduce the

diversity of data formats that needs to be processed, consequently reducing software and other operational requirements.

67. CBS-Ext.(02) has approved initiation of pilot projects for migration to TDCF. It is to be noted that this will have implication at every step of WWW data flow as described below.

a) Data Producers

The current automated observing system encoding data in TAC will have to be replaced. At centers where manual system presently exists, automated system generating message encoded in BUFR will be required.

b) Data Conveyors

For some observations, there will be periods during transition when the same data will be exchanged in both TAC and TDCF. Thus there will be increased load on the GTS switching systems.

c) Data Users

68. The GDPS centres may have to change some applications as a result of migration to TDCF, which would be in the preprocessing layer. The centre will benefit from reduced formatting errors and reduction of multiplicity of programs to single BUFR decoders.

69. The final result of the migration on data users will be beneficial since assimilation programmes, forecasters, climate, marine and aviation data bases will have more data of higher quality with additional useful parameters.

70. CBS-Ext.(02) requested every member country to develop a national migration plan, with analyses of inputs, costs, solutions, sources of funding (as necessary), national training, technical planning and schedule.

Natural Disaster prevention and mitigation

71. Nearly eighty percent of natural disasters and ninety percent of resultant loss of life are of meteorological or hydrological origin. For a large number of developing countries, the human and material losses caused by such disasters are a major obstacle to sustainable development. The World Summit on Sustainable Development (South Africa 2002) recommended that steps be taken at all levels to reinforce surface monitoring and to optimize the use of satellite data, so as to improve early warning systems and obtain more reliable forecasts for severe weather events.

72. Cg-XIV (Geneva 2003) has decided to initiate a new WMO major programme on natural disaster prevention and mitigation. This cross cutting programme is aimed at enhancing international cooperation in the field of natural disaster activities. WMO will collaborate with other organizations and international programmes concerned particularly the International strategy for disaster Reduction.

73. The Inter Commission Task Team has provisionally decided to take up Bay of Bengal as the region where the implementation of the programme is likely to have dramatic impact on prevention of disaster and loss of lives.

Future Work plan

74. Many of the actions listed under paragraph 4 above are in the process of implementation while a few others would be initiated during the next one-year. Further actions as a consequence of decisions in CBS-Ext.(02), Cg-XIV and EC-LV should also be

initiated. Other details of the working plan of the group for the period remaining before thirteenth session of RA II are presented in Annex to this document.

75. Finally, I would like to express my sincere thanks and appreciation to all the members of working group, staff of WMO secretariat and the Acting President of RA II for their assistance and excellent cooperation during the inter-sessional period. But for their untiring efforts, the completion of the various tasks would not have been possible.

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ANNEX

Tentative Work Plan of the WG for the period before the thirteenth session of RA II in December 2004

Global Observing System

(viii) To keep under review RBSN stations of the Region and identify defaulting stations on the basis of quantity monitoring reports;

(ix) To keep under continuous review the availability of CLIMAT/CLIMAT TEMP reports from RBCN stations in the Region;

(x) To ascertain from the Members the current performance of the GPS sondes;

(xi) To explore the possibility of bulk procurement of GPS sondes through a Central Nodal Agency which could result in savings in costs;

(xii) To pursue with the Members for appointing a focal point for continuous feedback on the status of RBSN stations;

(xiii) To keep abreast of the plan of redesign of the GOS and apprise the Members of its progress and possibility of new techniques of observations which could increase the availability of data from the Region;

(xiv) To pursue with the AMDAR panel for substantial increase of AMDAR data over Region II.

Data Management

1. To carry out survey among member countries for their requirement of additional data;

2. To encourage all the Members of the Region for having Internet connection;

3. To pursue the evolution of FWIS and apprise Members of the Region of its progress;

4. To closely follow the development of quality management framework and apprise Members of its status.

Global Telecommunication System

1. To review the status of the GTS in the Region and make efforts to have all NMCs connected to the GTS;

2. To closely monitor the progress of integration of GTS into the improved RMTN;

3. To pursue with participating countries in the pilot project the results of satellite broadcast of bulletins (through SADIS).

4. To plan for the discontinuation of the HF broadcast from the Region;

5. To pursue with all RTHs on MTN in Region II to maintain their parts of the comprehensive catalogue of meteorological bulletins;

6. To urge all Members o the Region to implement TCP/IP procedures on GTS circuits through detailed circular;

7. To closely follow the development of new proposals on exchange of addressed messages, routing of observational data, detection of duplicated bulletins and the pilot project of new monitoring of data.

Global Data Processing System

1. To develop proposals for establishment of a Regional Data Base for providing access to high resolution NWP products from major GDPS centres to Members of the Region II;

2. To develop proposals for technical assistance to developing countries of the Region for strengthening their NWP capability;

3. To develop proposals for training of experts from developing countries of the Region in interpretation of NWP products;

4. To develop proposals for a regional workshop on the use of EPS products;

5. To develop proposals for providing appropriate NWP system in Workstations to those Members who do not have them.

Public Weather Services

1. To coordinate with Hong Kong, China and WMO Secretariat for inclusion of warnings issued by Members regarding tropical cyclones;

2. To promote standardization of formats and contents of severe weather warnings issued by Members of the Region;

3. To organize a regional workshop for training of forecasters in severe weather forecasting.

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