



INTERNATIONAL TELECOMMUNICATION UNION TELECOMMUNICATION DEVELOPMENT BUREAU

**WORLD TELECOMMUNICATION DEVELOPMENT
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PLENARY MEETING

Radiocommunication Bureau

ACTIVITIES IN THE RADIOCOMMUNICATION SECTOR OF INTEREST TO DEVELOPMENT

1 Introduction

A significant responsibility in the work programme of ITU-R is its supporting role for developing countries. The agendas of WRCs continue to be dominated by issues concerning new telecommunication services which, in turn, have a vital part to play in the economy and growth of not only developed countries but also the developing world. In addition, ITU-R (and the Radiocommunication Bureau) attempts to follow closely the work programme of the ITU Development Sector, resulting in fruitful liaison in activities of mutual interest.

The paper describes areas of work currently underway within the Radiocommunication Sector which are of interest to developing countries. It addresses issues arising from decisions of WRC-97 and RA-97, and describes activities within the ITU-R Study Groups. Finally, mention is made of other areas of liaison between the two Sectors and their respective Bureaux.

2 World Radiocommunication Conference (WRC-97)

2.1 Technical preparation in ITU-R Study Groups

The technical studies in preparation for WRC-97 were undertaken largely within the Conference Preparatory Meeting (CPM) mechanism, established under Resolution ITU-R 2. Some 25 technical groups were involved, representing all eight Study Groups and the Special Committee. The final report was prepared at the CPM meeting in May 1997 and comprised seven chapters (and some 340 pages), each corresponding to a major topic of the agenda.

2.2 WRC-97 preparation meetings

In order to help countries and, in particular, developing countries prepare for WRC-97, regional preparatory processes were encouraged by the Bureau and Bureau staff participated in at least one preparatory meeting in each Region. In addition, two regional "Preparation meetings" were organized with the assistance of the Bureau - the first in Bamako (June, 1997) for the African States, the second in Damascus (July, 1997) for the Arab States. The main purpose of the meetings was to allow an exchange of views among the Member States and Sector Members from the region concerned, in order for them to gain an appreciation for the relevance and potential impact of the various Conference issues. Presentations were given by Bureau staff on each of the Conference agenda items using the CPM Report as the basic material.

In addition, an information meeting was held in Johannesburg (February, 1997), addressing issues related to HF broadcasting and the associated preparatory work for WRC-97.

These information meetings were considered to represent a major element of the Sector's preparatory work for WRC-97 in better acquainting representatives from developing countries with Conference-related studies and by facilitating discussion of the issues of greatest importance to them.

2.3 Issues from WRC-97

WRC-97 took some far-reaching decisions, many of considerable interest to developing countries.

2.3.1 The simplified Radio Regulations

Today's radiocommunication services require an appropriate regulatory framework that must be responsive to new technologies and services, while at the same time protecting the interests of all parties concerned. Thus, both developed and developing countries need a regulatory arrangement which will ensure rational and efficient use of the radio frequencies and satellite orbits.

In moving towards such a regulatory arrangement, the Radio Regulations (RR) were significantly simplified at WRC-95 and further refined at WRC-97 in the light of short-comings and inconsistencies discovered in the intervening period. Article S13 introduces greater transparency related to the work of the Radio Regulations Board, and new simplified provisions (Articles S9 and S11) were introduced to deal with effecting "coordination" with, or obtaining the "agreement" of, other administrations. In particular, the need for undertaking coordination is now more easily identified. The simplified RR also contain a single procedure concerning the notification of frequency assignments to the Radiocommunication Bureau with new possibilities concerning notification of typical stations. A new resolution was adopted intended to cope with the problem of "paper satellites", pursuant to Resolution 18 (Kyoto, 1994). Finally, WRC-97 adopted new Article S12 concerning the seasonal planning of the HF bands allocated to the broadcasting service, as the latest in a long series of regulatory attempts to address the issue of HF broadcasting.

WRC-97 also initiated a course of action for a more efficient and more effective dissemination of the relevant coordination and notification information, through the fortnightly publication of the IFL, Weekly Circulars and Special Sections on CD-ROM.

All these measures, accompanied by appropriate training for developing countries, will hopefully contribute to greater involvement of developing countries in all relevant aspects of international frequency management.

2.3.2 Broadcasting-satellite plans (Appendices S30 and S30A)

WRC-97 adopted a revision to the BSS and feeder link plans for Regions 1 and 3 (Appendices 30 and 30A) following replanning exercises, undertaken by the Bureau and Study Groups 10 and 11. This revised plan reflects technological advances since the original plans were drawn up. The revised plan also ensures assignments for all new ITU Member States and, in general, each country receives a "package" of 5 or 4 channels per beam (5 in Region 1 countries; 4 in Region 3 countries), with national coverage. Large countries obtain multiple beam entries, each with 5 or 4 channels depending on the Region. In addition, requests for modifications to the original plans with different characteristics, and which successfully completed the procedure of coordination/agreement, are also included in the revised plan.

WRC-97 also decided to initiate studies on the possibility of increasing the number of assignments up to about 10 equivalent analogue channels. The results of these studies should be considered by WRC-99 and, if the conclusion is such that replanning is feasible, appropriate steps will be initiated for completion no later than 2001. Moreover, special provisions relating to requests for modifications to the plan, already published by the Bureau, need to be reviewed taking account of the parameters adopted by WRC-97.

2.3.3 Space services

At WRC-97, issues concerning space services were dominated by the expansion of non-GSO systems and the consequential need for more spectrum for i) non-GSO MSS (usually for data and voice telephony) and ii) non-GSO FSS (usually for broadband Internet-type applications). Largely as a result of the Conference recognizing the potential of these new services for improving telecommunications accessibility in under-served areas, as well as the large bandwidth capabilities which will support new types of multimedia application in the global information infrastructure, allocations for these new systems were adopted.

Specifically, WRC-97 agreed to:

- the allocation of additional spectrum, on a regional basis, to the mobile-satellite service (MSS) below 1 GHz to be used by the so-called little LEO systems. These systems, providing "mobile data" narrow-band type service, because of their low cost, could be of particular benefit to developing countries;
- the implementation of generic allocations for the MSS at 1.5/1.6 GHz, and the bringing forward of the date of entry into force of the 2 GHz allocations for some Region 2 countries (from 2005 to 2002);
- the extension of allocations at 20/30 GHz for non-GSO MSS feeder links from the original 2 x 300 MHz allocated at WRC-95 to 2 x 400 MHz;
- new allocations to the non-GSO fixed-satellite service (FSS) in the 20/30 GHz bands (2 x 100 MHz) and the 12 GHz bands, as well as new approaches (application of provisional power limits) to overcome difficulties experienced in coordinating non-GSO systems with GSO FSS and terrestrial systems.

Frequency allocations to science services (typically the earth exploration-satellite, meteorological-satellite and space research services) were rationalized by WRC-97 to a large extent, with primary worldwide allocations being agreed in most cases. This more stable regulatory situation should facilitate the development of the related scientific satellite systems for the benefit of all.

2.3.4 HF broadcasting

WRC-97 adopted a new planning procedure (Article S12) based on a system of voluntary coordination among administrations. The procedure encourages direct coordination among administrations by means of interregional meetings, with incompatibilities resolved prior to submissions being made to ITU. The number of seasons will be reduced to two per year and, based on administrations' submissions, the Bureau will calculate the expected interference using agreed standards. Administrations may submit modifications before the start of the seasonal schedule, and also in-schedule modifications. Calculations are made and published every two months on CD-ROM and the Bureau is requested to provide user-friendly software for data input and calculations, in accordance with the methods adopted.

WRC-97 did not agree to advance the date of the bringing into use of the additional HF bands allocated by WARC-92, but agreed to review the matter at WRC-99 when information is available on the actual usage of these bands by existing services.

The Conference confirmed the date of 31.12.2015 for completing the transition from double sideband to single sideband transmissions. At the same time, it recognized recent developments in new modulation techniques such as digital and decided that other "spectrally efficient" techniques, identified by ITU-R studies, could also be introduced at the same time.

2.3.5 Maritime mobile and maritime mobile-satellite service

WRC-97 addressed several important maritime issues, recognizing the special need for increasing the efficiency of services for safety of navigation and safety of life at sea, as well as for other commercial services (efficient and effective port operations and public correspondence services). Regarding the implementation of the Global Maritime Distress and Safety System (to be fully operational in early 1999), the Conference recognized the lack of appropriate shore-based facilities to support the GMDSS in many regions of the world and consequently decided to maintain in force the regulatory provisions concerning the existing distress and safety system for some time into the future, so as to enable administrations to continue with voluntary operation of that system in relation to non-SOLAS vessels. It also introduced provisions for enabling telecommunication interoperability between GMDSS and non-GMDSS vessels.

WRC-97 also reviewed the regulatory provisions concerning the use of the VHF band by the maritime mobile service, taking account of such issues as congestion on calling and port working channels, decreasing demand for public correspondence, increased demand for data transmission, etc. However, WRC-97 was not in a position to undertake a major revision of AP S18, having in mind the international character of the maritime mobile service and the need for continued provision of distress and safety services. It invited the ITU-R to undertake further studies on new technology to provide improved efficiency and to report its findings to WRC-99.

WRC-97 also initiated the necessary action for introducing new technologies and operating methods in the maritime service, such as new digital technology in the HF bands and further improvements in the use of VHF and UHF channels (e.g. use of interleaved channels at 12.5 kHz).

2.3.6 Aeronautical mobile service

WRC-97 reviewed the current provisions of the aeronautical mobile (R) service, deleting several secondary services from the band 136 - 137 MHz, and thereby lessening the potential for harmful interference. However, some allocations were retained in a number of countries until 1.1.2005.

2.3.7 Fixed service in the bands above 30 GHz

Recent studies have clearly indicated severe difficulties in sharing between the fixed service and various space services in the frequency bands above 30 GHz. As a result, WRC-97 designated new primary allocations, or some existing allocations, to the fixed service for high-density applications, with a view to minimizing sharing constraints or coordination requirements with space services.

As these applications are seen as part of the global information infrastructure, these decisions of WRC-97 facilitate the building of such an infrastructure, in particular in developing countries, as the harmonized allocations should result in significant economies in the manufacturing of appropriate equipment.

WRC-97 also designated bands for use by high-altitude platforms in the fixed service (around 47 GHz). As these systems also have considerable potential for relatively low-cost broadband information services, these new provisions may have far-reaching benefits for developing countries.

2.3.8 Adaptive systems at MF/HF

In the MF/HF bands, where congestion and interference have become increasingly severe, new frequency management techniques are becoming available such as frequency agile equipment with digital signal processors for frequency control and error-correction. These techniques may contribute significantly to the improved use of the relevant frequency bands which are still of great interest for many developing countries.

WRC-97 decided that operation of MF/HF adaptive systems should not be limited to specific blocks of spectrum but should be encouraged over the whole range (with some exceptions). A new Resolution adopted by WRC-97 contains guidance for use of adaptive systems, intended to provide for more flexible and improved frequency management of the fixed and some of the mobile services in the MF and HF bands.

3 Radiocommunication Assembly (RA-97)

Held just prior to WRC-97, the Assembly reviewed the organization and activities of the Study Groups, and set the work programme for the following two-year period. The results of these deliberations are reflected in revisions to various ITU-R resolutions. Of note are Resolutions ITU-R 2 and 38 which set out the provisions of the CPM and the Special Committee, the latter now being activated only by a decision of a WRC, or the first session of the CPM as authorized by the WRC.

Also of special interest to developing countries are Resolutions ITU-R 11 and 22 which deal, respectively, with the development of automated spectrum management systems, and with national spectrum management practices and techniques. Resolution ITU-R 40 discusses worldwide databases of terrain height and surface features, stressing the usefulness of such data in developing countries for their service planning, and Resolution ITU-R 42 draws attention to the recommendations of ITU-2000.

The revised version of Resolution ITU-R 5 (Work programme of Radiocommunication Study Groups for 1998-1999) represents one of the major products of the Assembly, listing some 400 ITU-R Questions to be addressed. Many of these concern newly developing technologies of particular interest to developing countries **and effective liaison with ITU-D Study Group 2 (through Question ITU-D 1/2) ensures that such Questions are brought to the attention of the Development Sector.** Recent examples, approved at RA-97, include Questions on topics such as

the adaptation of mobile radiocommunication technology to the needs of developing countries, fixed wireless local loop applications, point-to-multipoint radio systems and new broadband services. Studies will also continue on many existing Questions of long-term relevance to developing countries - for example, items connected with spectrum management techniques and radiowave propagation.

4 Current studies in the ITU-R Study Groups, including preparation for WRC-99

The structure of the eight ITU-R Study Groups is contained in Resolution ITU-R 4. Their current work programme is defined, not only by the Questions listed in Resolution ITU-R 5, but also by those resolutions and recommendations approved by WRC-97 which request studies by ITU-R, generally to be completed in time for WRC-99.

This conference-related work programme was established at the first meeting of CPM-99, held in November 1997 the week after WRC-97 concluded, where the relevant ITU-R Study Groups, Working Parties and Task Groups were identified to undertake the various technical items relevant to WRC-99. The establishment of this work programme was aided considerably by the holding of a meeting of Chairmen and Vice-Chairmen of Study Groups, the Special Committee and the CPM, the same week. The CPM work programme essentially reflects the WRC-99 agenda items, and corresponding chapters will be prepared on: 1) Mobile and radionavigation services; 2) Mobile-satellite and radionavigation-satellite services; 3) Non-GSO FSS issues; 4) Space science services and radio astronomy; 5) Appendices S30 and S30A; 6) Fixed and fixed-satellite services; 7) Other matters. Detailed allocations of work items have been defined and appear in BR Administrative Circular-letter (CA/48).

Many of these topics relate to the study of complex sharing situations involving new non-GSO systems in the MSS and FSS, and their introduction into bands already allocated to other services. The work will involve the establishment of technical and operating criteria to facilitate sharing, coordination procedures, and measures that can be taken to protect existing services. Other important areas of work in preparation for WRC-99 include, *inter alia*, spurious emission limits, technical characteristics of IMT-2000, and a review of the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting distress and safety applications. One of the most demanding topic areas will be that concerning the BSS bands (see § 2.3.2 above) where, in addition to Study Groups 10 and 11, the Bureau will be required to make a considerable contribution to the required studies.

The need for preparations for world radiocommunication conferences to be coordinated at a regional level was underlined by the adoption (by WRC-97) of Resolution 72 (formerly PLEN-2). The Resolution calls on the Directors of the BR and the BDT to consult regional telecommunication organizations on the means by which assistance can be given to their preparations for future world radiocommunication conferences; for example, to provide help in the organization of regional preparatory meetings.

5 BR Seminars

As in previous years, the Bureau has a programme of Seminars based on the theme of Spectrum Management. The regular biennial Seminar in Geneva will be held in autumn 1998 (28 September - 2 October), whilst three regional seminars are planned to be held during the year in Libreville, Namibia and the Caribbean region.

In addition, the Bureau will organize two training sessions in Geneva, one in the spring and one in the autumn. These sessions, each of one week duration, are addressed to developing countries who need special assistance on specific problems such as notification, use of software, etc.

6 Liaison activities between ITU-R and ITU-D

Strong liaison exists between ITU-R and ITU-D through contact-points within the respective Bureaux and via the Advisory Groups (RAG and TDAB).

6.1 ITU-D Study Groups

The Bureau pays attention to ITU-D Questions under study in ITU-D Study Groups 1 and 2 and also to those programmes of the BAAP where ITU-R can contribute. In particular, through Questions ITU-D 1/2 and 2/2, those areas of study in ITU-R of relevance to developing countries, as well as the ITU-R handbook programme, have been continually brought to the attention of ITU-D Study Group 2. Special emphasis has been placed on newly developing technologies such as those connected with broadband systems and digital broadcasting. It is the intention that these liaison activities will continue in connection with work programmes initiated by WTDC-98.

6.2 Radiowave propagation studies

The Bureau, with the support of ITU-R Study Group 3, collaborates with the BDT in the area of radiowave propagation, particularly in relation to the establishment of measurement experiments and the acquisition of data from regions of the world for which adequate propagation information for service planning is lacking. Advice is offered regarding the specification of experiments according to specific needs and the subsequent analysis of measurement data.

6.3 Training projects

The Bureau assists the BDT in supporting certain training projects involving engineers from developing countries. Currently, the Bureau contributes to the ITU-D Virtual Training Centre in organizing distance learning courses on spectrum management and service planning. In addition, the Bureau continues its close association with the International Centre for Theoretical Physics (ICTP), Trieste, in consultancy/training linked with specialized projects in developing countries - topics frequently relating to aspects of spectrum management, networking and radiowave propagation.

7 Concluding remarks

The above has described current areas of activity within ITU-R, having in mind their relevance to developing countries. In order to succeed in these tasks, it is essential that all countries, both developed and developing, are adequately represented at the various ITU-R fora where important decisions are reached which may be carried forward to the major conferences and meetings. A notable example is the ITU-R groups preparing technical inputs to WRC-99 via the Conference Preparatory Meeting (CPM). It is only with this participation that ITU-R can fully appreciate the telecommunication problems of the developing countries and respond effectively to their needs.