

A decade in the life of Working Party R

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Those whose daily work brings them into close contact with the EBU Technical Committee and its five Working Parties no doubt have a clear understanding of their rôle in European broadcasting. Others may have a less clear idea of the problems that are being studied within the Technical Committee, or the new systems that are being developed.

*The **EBU Technical Review** has invited the Chairman and Secretary of each Working Party to present its current activities, highlight a few of their recent achievements and explain the significance of their work in the wider broadcasting context.*

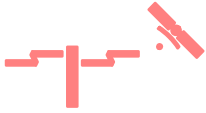
The first presentation in the series, for Working Party R (Broadcasting technology) is given here. The Working Party's agenda is defined largely as a function of the Radio Conferences of the ITU, although many studies are in hand in other fields, including RDS, propagation, planning methods, and new services (HDTV, DAB, ...).

1. Radio Conferences

1.1. Introduction

In a very real sense, the activities (and thus the life) of Working Party R during the past decade or so, have been inextricably intertwined with the preparations for the World and Regional Radio Conferences held under the auspices of the International Telecommunications Union (ITU). These Conferences have as their aim the regulation of the radio spectrum (radio in its wider sense of radio–frequency and not in the narrower sense of sound radio, as would be the more common meaning among broadcasters). Because all broadcasting activities related to the transmission and reception of sound radio and television programmes can be profoundly affected by the outcome of these conferences, it has been vital for broadcasters to be involved in the preparations and to try to influence the outcome. Other users of the radio spectrum are also involved in the same way, of course, and for the same basic reasons.

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The radio spectrum is a limited natural resource and there is ever-increasing pressure on its use. Because of this, there is a growing tendency among spectrum regulators to favour those uses which can exhibit a high efficiency of usage, that is which can achieve “more” communication with less spectrum and also to favour those uses which cannot be transferred to other communications media, for example, cable. It is to be expected that newer developments of radio frequency technology will be more spectrum efficient than older ones and this poses a major problem for broadcasters because the very large number of receivers in the domestic market place imposes long time scales on any significant changes. If only thousands of transmitters and receivers are involved, then the process of change from one system to another can be fairly rapid. However, in broadcasting there are millions, or tens of millions of receivers involved and the process of change must be more gradual. Because of this, there is a tendency for broadcasters to be seen as conservative in their approach to changes in the usage of the radio spectrum. Indeed, within the last decade or so this may have been true. However, the previous decade saw many changes in the broadcasting scene. The widespread introduction of colour television in Europe in place of black and white, the introduction of stereo radio in place of mono were both achieved with no additional demands on the radio frequency spectrum. No similar major developments were seen in the last decade. Other developments have taken place, of course, but they have also needed more spectrum or they have not yet had the impact of the two items mentioned above. It is generally expected that the next decade will see the introduction of digital radio and television services and the necessary foundations for these have already been established by Radio Conferences. What, then, has been achieved in the last decade and what has been the part played by Working Party R?

■ 1.2. *Regulatory*

It can be argued that the basis for the last decade of Working Party R’s work was the 1979 World Administrative Radio Conference (WARC), probably the last such conference at which major revisions to the Radio Regulations will take place. The decade closed with the 1992 WARC at which more limited changes to the Radio Regulations were agreed. This timetable means that the “decade” lasted a little more than twelve years; really only a point of detail!

Of course, Working Party R was involved in the preparations for the 1979 WARC, but it was the main results (for broadcasters) which affected the following decade. One result was an increase in the amount of spectrum allocated to broadcasting in the HF bands, 790 kHz on a world-wide basis. A second result was the extension (in Region 1, essentially Europe, Africa and the then USSR) of the broadcasting spectrum near 100 MHz from its previous range of about 87.5–100 MHz to about 87.5–108 MHz. This had the result of approximately aligning this portion of the spectrum on a world-wide basis, although the lower band-edge is not entirely consistent throughout the world. Both of these changes had the effect of requiring further Radio Conferences.

■ 1.3. *VHF/FM*

The years 1982 and 1984 saw the first and second sessions of the Conference which was required to produce a new frequency plan for Region 1 (and part of Region 3) for the band 87.5 to 108 MHz. For most countries this plan was intended to provide VHF/FM radio services, although some countries in Eastern Europe continue to use the sub-band up to 100 MHz for television transmissions. Within Working Party R, the task of preparing for the 1982 and 1984 Conferences involved the production of suitable technical bases and also a computerised planning analysis method. Both of these were to a large extent adopted by the relevant Conference. In addition, a large amount of effort was deployed in organising, in collaboration with the CEPT, an exchange of databases of requirements among EBU members together with analyses of the potential incompatibilities. This work initiated a considerable amount of formal coordination between the administration concerned and this, in turn, contributed to a very large extent to the success of the 1984 Conference in the area represented by EBU members. This type of success often passes without comment; indeed it is often not noticed at all and certainly there is nothing flamboyant about it. It can really only be measured against the difficulties experienced by the countries which have not had the benefit of testing their plans against those of their neighbours in the relative calm of the period before a Conference rather than in the tense atmosphere of the Conference itself. In many ways, it is this type of quiet success which has been the real achievement of Working Party R.



■ 1.4. HF

A second Conference started in 1984, that for HF broadcasting (the second session took place in 1987). The preparations for this within Working Party R were undertaken by two Specialist Groups, one dealing with technical matters, the other having a more political sphere of activity. The latter was necessary because the 1979 WARC had insisted that the spectrum extensions given to HF broadcasting should be “planned” but the concept of HF planning was opposed by many of the major HF broadcasters who required a more flexible approach in order to have the freedom to react to world events (or even to propagation changes) on a day-by-day basis. It is obviously difficult to be completely consistent while developing a planning method which is technically valid and simultaneously opposing its use. In spite of this contradiction, many of the EBU ideas were adopted by the 1984 Conference and the IFRB then had the task of converting these ideas into a computerised planning method, including the synthesis of frequency plans. During this process it became apparent that there were shortcomings in the method developed in 1984. Possibly because of a lack of experience of computerised planning systems among HF broadcasters, it had not been considered necessary to specify some elements which were actually considered vital, for example, continuity of use of the same frequency for the whole duration of a given transmission. On the other hand, efficiency of spectrum usage had been specified and to maximise this the computer system could ask for several changes of frequency during a transmission! This type of result was not acceptable to most broadcasters. Neither was the fact that the results showed in printed form that there was insufficient spectrum to meet the combined quantity of requirements and quality of reception requested. This result was not unexpected, but many people must, secretly, have been hoping for a miracle!

The second session of the HF Conference, in 1987, was thus very difficult. The EBU was not in a position to offer the type of help which could lead to obviously positive results, because its own members had very different views on what the outcome should be. However, it was possible to identify the elements which would need to be taken into account. Although containing everything which had been asked for, the resulting system had become so complex that it was regarded as unusable because it required by far too much administrative effort.

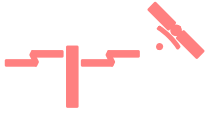
■ 1.5. Satellite services

Within this decade, the satellite services of direct interest to broadcasters were those which could operate from satellites in the geo-stationary orbit and the Conference for planning this took place in 1985 and 1988. There were several issues to be settled. In some ways the most important for broadcasters was to resolve the long-outstanding problem of the up-links for the 12 GHz broadcasting services which had been planned at the 1977 Conference, at least for Regions 1 and 3 (that is for the whole world, excluding the Americas). The 1977 Conference had established a frequency plan for the down-links, that is for the paths from the satellites to the viewers, but it had not established an up-link plan. This was needed to permit television signals to be sent to the satellites without mutual interference. Within Working Party R, a considerable amount of work had been undertaken both in establishing the principles involved and the overall effect on the results which could be given by satellite based broadcasting services (that is, taking into account all possible degradation, whether on the up-link or on the down-link) and also in the preparation of suitable computer software. In practice, the EBU software and computing facilities were extensively used during the 1988 Conference to establish a suitable up-link plan.

Two other important steps were taken at the 1988 Conference, although they did not reach their conclusions until 1992. There had been discussions for some time about suitable frequency bands for digital radio and television transmissions from satellites. However, particularly in the case of the sound radio service, the suitable parts of the spectrum were already in use by other services or were being considered by other services. None the less, the discussions helped to bring the matters to the minds of a world-wide audience and also served to focus attention on the appropriate parts of the spectrum. It is now a matter of history that at the 1992 Conference in Malaga-Torremolinos, there was a near world-wide allocation near 1.5 GHz for digital sound radio and near 21.5 GHz for digital television. These were the EBU's preferred bands and were those which received most attention in 1988.

■ 1.6. Television

The final broadcasting planning Conference of the decade was that which produced a television plan



for Africa and some neighbouring countries. This was also held in two sessions, in Nairobi in (1988) and in Geneva in 1989. Working Party R also helped with the preparations for this Conference.

The main task for the EBU was to help in establishing the technical basis for planning television services. Within Europe, the planning for television has been on the basis of the 1961 Stockholm Plan. However, since 1961 there have been many developments and these are incorporated into the planning methods without being included in the formal structure of the Final Acts of a planning conference. Similarly there had been no need to produce a consolidated CCIR report on the subject. However, it was obvious that a formal technical basis would need to be established for the purposes of the African Conference and the obvious source for such a document was the experience in Europe. Such a document was produced by the EBU and material from it formed a large part of the CCIR input to the Nairobi session of the Conference where it was agreed and subsequently transferred to the Final Acts of the Geneva (1989) session. The computer programmes needed for the African Conference were produced by the IFRB but it is interesting to note that they contained a large part of the material developed in the early 1980s by the EBU for the VHF/FM Conference.

■ 1.7. Regulatory

The final Conference of the decade was that held in February 1992 in Malaga – Torremolinos. This had the task of revising parts of the Radio Regulations and was seen as vital by broadcasters who wished to obtain new spectrum for digital radio and television services and also to obtain a further expansion of the HF broadcasting spectrum. Again, Working Party R played a major role in coordinating the broadcasters' views and in coop-

erating with the CEPT in the latter's preparations. The results of this Conference are fresh in most peoples' memories and will not be commented upon here. However, it is worthwhile to point out that when one service obtains extra spectrum, it is because another service is losing some spectrum and this always necessitates a certain amount of time to effect an orderly change-over. These time-scales can be quite long. For example, some of the additional spectrum given to HF broadcasting in the 1979 WARC, at the start of this long decade, is still not officially available for broadcasting. (What happens in practice, of course, is a matter for individual administrations to decide.) Similarly, some of the changes agreed in Malaga may not be fully implemented until after the year 2007.

In one sense the decade closed as it began, with a Radio Regulatory Conference. Such conferences set the pattern for the future and each, while not entirely closing the door on the work of its predecessor, certainly opens the door to reveal the possibilities for development in the future.

■ 2. Other Working Party R activities

Radio Conferences are only one part of Working Party R's activities, albeit a very visible and time consuming part. One other major success of the past decade has been the development and promotion of the Radio Data System (RDS). Its origins in the late 1970s attracted a certain amount of technical interest in that some of the spare capacity of a VHF/UHF channel could be used to convey additional information but there was little indication then that RDS would later become so attractive that manufacturers of radio receivers (especially



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car radios) would see it as being the major element in their market strategies prior to the introduction of digital radio towards the end of the 1990s. This change has been brought about primarily as a result of continuous development within Working Party R with new features being added to meet new requirements. RDS is now seen to be so useful that almost all of its features will be taken over into the new digital radio system when this reaches the market place. (Digital radio is reported on elsewhere in this issue).

Other less spectacular developments have also taken place. Many are concerned with improvements to existing systems but can be of major importance none the less. A key issue in most broadcasting conferences is the matter of propagation prediction. If it is not possible to make accurate predictions of signal levels then it is not possible to determine the extent to which interference from other broadcasting stations might affect any given service. In this context, it is worth recalling that one of the primary purposes of a radio conference, or indeed of the whole planning process, is to limit the damaging effects of interference, especially from "foreign" radio and television stations. The task of improving propagation prediction methods is part of the responsibility of Working Party R. While the results of this activity do not reach the headlines, they form an essential background to those items which do.

Improved propagation prediction methods or planning methods can offer opportunities for the introduction of new services or the extension of existing services to a wider audience. In the context of public service broadcasting it can be of major interest to extend reception to isolated communities. It is just in this area that new methods and techniques can be of help. Although the benefits may be experienced by only a limited number of people, for those people the results can be truly spectacular.

In addition to technical developments during the decade, there have also been visible changes to the people involved. Most of them have become older, although this is not always visible. There have been retirements and there have been new faces.

The chairmanship has also changed. At the start of the decade, the chairman was Mr. H. Eden (then with IRT). He was succeeded in 1984 by Mr. E. Schwarz (PTT CH) and in 1992 the current chairman, Mr. D. Sauvet-Goichon (TDF), was appointed and the latter has the task of guiding the Working Party into the next decade.

3. *The next decade*

There seems to be little doubt that the major developments during the next decade or so will be in the field of digital broadcasting. Digital radio is already under trial from terrestrial transmitters and is very likely to be in widespread use from satellites within the next decade. Taking advantage of digital coding and modulation methods it is possible to achieve very high quality reception even in the difficult environment of a vehicle moving in a dense urban area. By combining the use of terrestrial and satellite transmissions, it will be possible to have the advantages of local and regional services from terrestrial transmitters and of national and international services from satellites. There may well also be two developments of digital television. Wide RF-band transmissions from satellite should provide HDTV quality to anyone who has a satellite receiving system or who is connected to a suitable cable system and should also offer the possibility of an increase in the number of services possible compared with analogue transmissions. Narrow RF-band television systems are also being investigated as a replacement for the existing terrestrial analogue transmissions. Such a replacement can lead to major improvements in reception quality for viewers, many of whom have pictures impaired by noise or by delayed images. At the same time, digital transmissions hold out the real possibility of a significant increase in the number of services which could be offered on the terrestrial networks.

It is too early to say exactly in what form these developments will finally be realised but it is already clear that they offer the potential for a radical change in the pattern of broadcasting reception. The next decade is certain to be an exciting one.