

CCIR:

Radio Communications during the 1990s

What were the main accomplishments of CCIR (ITU's Radio Committee) during the 1980s? And what will the future look like, within the field of radio communications? These are some of the subjects covered by Richard Kirby, Director of the CCIR, in the following interview.

Richard Kirby: I think one of the first things to appreciate is that telecommunications, as defined by the telecommunications convention, is a very broad field. It is more than the telecommunications network, it includes radio navigation and broadcasting, with many private and government users. Two thirds of CCIR's work is in the area of spectrum utilisation and the use of geostationary satellite orbits. This means that we operate in a very close relationship with IFRB (the International Frequency Registration Board), inside ITU, and much of our work is devoted to preparation of the technical basis for "Administrative Radio Conferences". During the 1980s, we prepared the reports of CCIR, from more than eight conferences of that type, global, regional, and planning conferences, the most recent being the African Television Broadcasting Conference.

TELE: *Looking back, which were the most important achievements of the 1980s?*

RK: There were some very important events, in the spectrum area and in system standards. In the spectrum area, the work for radio conferences was extremely important. One example is the preparatory technical work for planning of the utilisation of the fixed service satellites, in the geostationary satellite orbit. That was a two-session conference, in 1985 and 1986. It was absolutely essential to the future of satellite communications and virtually all technical basis for this conference was prepared by CCIR.

Apart from the conferences, some important decisions about spectrum utilisation, for example for satellite systems, the orbit utilisation Recommendations requiring a certain protection between adjacent satellites were revised, to increase the capacity of the geostationary orbit. In my opinion, this increase in the communications capacity of the geostationary satellite orbit, was a significant Recommendation.

A very wide range of Recommendations for digital microwave radio relay systems was adopted, to bring a set of recommendations, which makes digital microwave relay systems fully compatible with any ISDN requirements.

Another important contribution from CCIR (and, of course, all members participating in its work) is in television standards: Initially, in 1982, we adopted the first digital television standard for studios and the

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exchange of programmes, basically a digital scheme that would accommodate any of the existing standards, PAL, SECAM, NTSC, in a digital format. This was followed by the recording standards for digital television and then by the transmission standards.

We also have one large important joint group (with CCITT), called CMTT (Commission Mixed de Transmission de Television). CMTT is concerned with network transmission, which often means that bit-rate reduction and bit-rate reduction schemes for TV-transmission are done in this group - to say nothing of HDTV.

HDTV Standards

TELE: *What about HDTV?*

RK: There has been considerable progress in HDTV. In fact it was CCIR that really started this ball rolling. In 1982, we started towards a standard, and there were three intense years (up to 1985), when there appeared to be some convergence towards a standard. The point is that HDTV had not had that much visibility until then. Then it became very visible, caused much of reflection around the world and people suddenly began to have divergent ideas about HDTV. I would say that we are now closer to convergence, but the path is not easy. Anyhow, we were quite close to a Recommendation in 1985. We hoped for a final agreement in Dubrovnik, at the last plenary assembly of CCIR, but, in fact, what we had was a sharp differentiation, essentially between the European approach and what was at the time the American-Japanese approach. And now there is even more divergence.

One thing about HDTV should be clear. Up to present, CCIR has concerned itself with a standard for an image, the standard high-definition image that we wish to exchange, so that people can devise different broadcasting systems, because we must recognize there will be some different broadcasting systems. There is too great a heritage in various regions of the world, to expect a single global broadcasting system. Also, we have different media we have satellites and cables and we have network transmission to deal with all of which require different transmission standard, but the starting point is to define a high-definition image. The unique thing about broadcasting (that makes it different from all other high-definition television that people talk about, when they talk about convergence of high-definition television

for different applications), is the motion portrayal, which must be very fast. My feeling is that that is the source of dissent right now.

For the last two years, Study Group XI has had the task of proposing 34 parameters, which describe the high-definition image. At the last SGXI meeting, there was agreement



Richard Kirby, Director of CCIR.

on 22 of these parameters. This is where we stand, right now. Agreement on 22 parameters sounds good and I am very pleased, although the difficult ones remain. Motion portrayal, in particular, is left and may always be; it boils down to the question of the 50/60 Hz field rate. Now, it is conceivable that we could agree on all other parameters.

TELE: *What will be the practical consequences, if agreement is reached on a standard?*

RK: Let us suppose that we agreed on a standard, for all parameters except the field rate. This would leave an important conversion problem, since programmes originating in different parts of the world would have different field rates. That is a very difficult problem at the high-definition level. HDTV, without any conversion between standards is, at the present, operating pretty much at the state-of-the-art to produce a high-definition image. It is known that conversion between two standards, at least with the present technology,

would introduce an perceptible degradation. That may be the real world, which we must finally accept. But we are still working on this. For instance, in March, we have a meeting of our interim Working Party on HDTV, in Atlanta, to see if any parameters can be added, from this table of parameters. That would comprise the material finally sent to the CCIR plenary assembly in Dusseldorf (May 21-June 1). What results from this meeting at the end of March, probably represents the best that can be done at the current state. People who insist on two standards can be expected to minimize this problem (the problem of conversion), but if you look at the best the technology can do today, it is clearly in favour of a single standard. In fact every single CCIR document to date says that our objective is a single standard and everybody is striving towards that, but the problem is, which standard?

Apart from this, there are half a dozen other vital recommendations in the field of television, that we adopted at the recent study group meeting and that will go to the plenary assembly, which mean real progress. To name but one example, we have a Recommendation on the subjective assessment of HDTV; which is a uniform basis for comparing such systems and making final assessments of performance.

Another important subject is mobile systems. In mobile systems, a major step forward in the last few years was the engineering design, specification of the necessary engineering parameters for the future global maritime distress system, which will be implemented by the International Maritime Organisation. We have a long good working relationship with IMO and they look to CCIR, for the technical foundation of maritime communication.

It is also important that we have a draft Recommendation on future universal public and mobile telecommunications, which we think will give a structure—an umbrella—within which future development can take place.

Regional standardisation

A few worlds could be added, about the relationship to regional standardisation organisations. My own feeling is that, while it is realistic for the international organisations to prepare an umbrella, which would constitute the common denominator, we can implement in various regions, within which regional standardisation could

be done. But these is no hope whatever, in my view, of taking the regional input standard and hoping to achieve some world standard from it. I think the investment, the discussions, the flexibility have all been used up. It will be very difficult to draft these standards and also very difficult to compromise at a later stage. So what I look for from now on is involvement in regional standardisation.

Mobile Communications

I see it as very important. We are looking towards a generation of personal universal mobile communications, beyond today's vehicular, cellular type of communications, which would be ubiquitous, where machine, voice and fax are available personally, everywhere. That, of course, has a close connection with the networks and we have an important and very clearcut interface with the network, in fact, we have a joint group with CCITT. But radio concepts of what could be done, where are the flexibilities, how can we get all of this capacity that we need, in the spectrum, are the primary question on which CCIR is working and what type of architecture could achieve this? We have a draft Recommendation, for approval by the plenary assembly in Dusseldorf, which I hope will provide a framework, to guide the work of the regional organisations.

Differences between the committees

To sum it up, we have hit some high points in the development of radio communications. At this stage, I would like to return, to clarify some differences between CCIR and CCITT.

One difference is that CCIR has many participants, which are not part of the public networks, broadcasters are probably the outstanding group, but many other applications can be mentioned, such as navigation applications, maritime communications, space research applications, all the use of radio in space-vehicle control communication, specially the spectrum recommendations on spectrum utilisations falls within the scope of CCIR.

One third of our work has to do with systems characteristics. A lot of this has to do with non-public telecommunications. Half of that, again, is related to the public network. So 1/6 of CCIR's work is to a large extent directed to public networks and that is our interface with CCITT.

I do not think that this picture is

widely understood, because people's view of telecommunications today is primarily that of the public network.

Cable or satellite?

Up to the 1920s, it was the transatlantic telegraph cable that was the main transatlantic communications carrier. It was replaced essentially by high-frequency radio, short-wave, point-to-point. Then, in 1957, we had the transatlantic telephone cable, which had fairly limited capacity but was enough to the pretty much obsolete the high-frequency systems. Then satellites came along and changed the picture once again. In fact, the telephone cables needed legal policy protection in most countries, directing that half the traffic should go that way. Now, with optical fibre, the situation has changed once more, so that the very large capacity for heavy trunk routes would appear, in the future, to be economically competitive. Satellites will certainly be strong on many routes, but, in the case of transatlantic traffic, it can be imagined that fibre cable will take a very large share. But what is the next phase?

I think there are two elements. One is the mobility of communications. I think that, within ten years, people are going to accept access to virtually all communications privileges and even with a machine like a personal computer, it will be possible to move around buildings (or wherever), without being connected to cables. I think there will be considerable use of radio in local networks, to give this flexibility of position and also, I am not sure that we will not see the development of a radio transmission scheme which is also quite competitive with optical fibre. Some people are working on these things today, even if it is too early to say anything definite about this development.

Turning to the more prosaic question of the future of CCIR, one important aspect is that the whole development within our field is becoming more and more complicated. This means that the CCIR workload is increasing accordingly.

TELE: *What do you expect of the plenary assembly in Dusseldorf?*

RK: First of all, I expect the approval of Recommendations put forward. But this time there will be a very considerable effort to improve working methods and structure. But within ITU; with a total zero growth of ITU, and the provisions made by the plenipotentiary conference in Nixce, to expand support to the telecommunications development

area, this reflects in reduced resources for other activities. So one of our problems is how to work with reduced resources. So we have to change our working methods drastically, and that would mean shorter Study Group meetings more decentralisation of the preparation and advance preparation for Study Group meetings. This is an important decision area. One important proposal is about interservice frequency spectrum sharing, i.e. compatible sharing of the frequency spectrum. That is one of our most important areas. And right now, our organisation is set up in such a way, that we deal with these questions on a service-by-service basis and the interservice questions require interservice joint studies. We have, I believe, a limitation in our decision-making capability here and I am suggesting a new group, which is expected to deal with this and meet a decision level for this, and deal with the urgent interservice frequency sharing and compatibility problem.

We will, at the plenary assembly, spend twice as much time, on the organisation and structure and priorities of Recommendations as we have spent in previous plenary assemblies, and correspondingly less, on our basic technical work.

TELE: *What about the problem of frequency allocation?*

RK: All the suitable bands we know in technology are already in use, so it is a question of strategies and techniques, for compatible sharing of frequencies. It has to be done, if the future radio is to expand. And I think that this is CCIR's No 1 problem, but I am quite optimistic about it.

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Probably CCIR's priority task for the next two years is preparing for the World Administrative Radio Conference in 1992, in Spain, which will deal with this set of problems and most critical band of frequencies in the vicinity of 1-3 GHz, where mobile services, mobile satellite services and broadcasting services all are involved. CCIR has some 6 or 7 small groups working, which will feed into a joint group, a conference preparatory group, which will meet in the first trimestre of 1991 and prepare a report for that conference. The conference itself will be held in the first quarter of 1992.