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Digital broadcasting era set to begin

Radiocommunication conference outlines digital broadcasting plan

All around the world, radio and television are going digital. In Europe, where ITU hosted its Regional Radiocommunication Conference (RRC-04) in May, driving the switchover from analogue to digital television broadcasts is a key objective of the eEurope 2005 action plan passed by the European Union. Digital broadcasting via cable or satellite is only part of the picture. The other part is terrestrial digital broadcasting.

The move from analogue to digital broadcasting, "will create new distribution networks that can carry a wide variety of digital broadband content. And the television set, which has played a key role in creating our information society, is poised to play an even more important role in the knowledge society," ITU Secretary-General, Yoshio Utsumi, told delegates at the closing session of the three-week RRC-04 (Geneva, 10–28 May 2004). Mr Utsumi added that, "digital terrestrial broadcasting will be able to offer mobile reception of video, Internet and multimedia data. The result, when combined with digital storage technologies, will be applications,

From left to right: Yoshio Utsumi, ITU Secretary-General, Professor Mark Krivocheev Chairman of RRC-04, Trajco Gavrilov, Plenary Secretary and Valery Timofeev, Director of the ITU Radiocommunication Bureau

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services and information that is accesible and usable, anywhere at anytime."

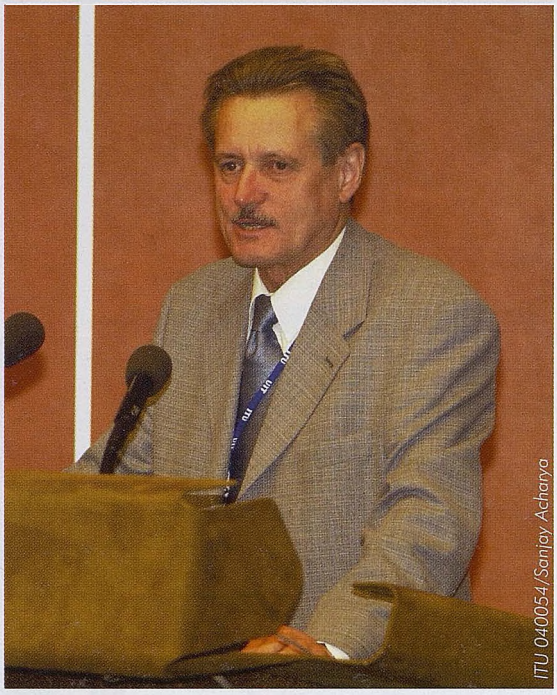
In January 2000, European countries wrote to ITU stating that efficient implementation of terrestrial television broadcasting will not be possible on the basis of the existing frequency assignment plan contained in the European Broadcasting Agreement of Stockholm 1961. These countries asked ITU to organize a conference to revise the Stockholm Plan of 1961. Their request resulted in an ITU Council decision to convene a Regional Radiocommunication Conference for the planning of the digital broadcasting service in the Bands III (174 – 230 MHz) and IV and V (470 – 862 MHz).

The Council decision further directed the conference to be held in two sessions. Other countries also recognized the advantages of a structured approach to an all-digital situation. This led to further consultations with the ITU membership, which resulted in extending the scope of the conference. It was decided that RRC-04 would deal with an expanded planning area that now includes 119 Member States (out of a total of 189), from Europe, Africa, Middle East and the Islamic Republic of Iran, as well as some Asian countries bordering the Russian Federation, Kyrgiz Republic, Tajikistan, Turkmenistan and Uzbekistan.

A successful first step

RRC-04 has taken the first step towards an "all-digital" terrestrial broadcasting service (radio and television) with the establishment of the technical basis for the planning of this service in the frequency bands 174–230 MHz and 470–862 MHz for countries of Europe and Africa (Region 1) and the Islamic Republic of Iran in Region 3. Delegates adopted the technical parameters and criteria to be used for performing the planning exercises in the intersessional period before the second session of the conference, which will take place in 2006 as decided by the ITU Council in June 2004. The decisions taken at RRC-04 will be validated during the intersessional period, and the second session will either confirm or modify them.

A major challenge of RRC-04 was to find ways of permitting digital broadcasting to operate side-by-side with analogue broadcasting without causing interference between the two. According to Valery Timofeev, Director of the ITU Radiocommunication Bureau, the success of the conference, which was characterized by a "pragmatic and business-like approach to all of the issues, produced a straightforward framework of what is needed to ensure the introduction of the digital terrestrial broadcasting service, while maintaining the integrity of the existing analogue system." He acknowledged that there is still work to be done: "we don't have all of the tools in place, such as the necessary software, and our timelines for the planning exercises in the intersessional period are tight, but I am sure that the Member States and the regional groups who have worked so constructively during the first conference will live up to the commitments they have made."



"A pragmatic and business-like approach to all of the issues produced a straightforward framework of what is needed to ensure the introduction of the digital terrestrial broadcasting service, while maintaining the integrity of the existing analogue system."

Valery Timofeev, Director of the ITU Radiocommunication Bureau

Professor Mark Krivocheev
Dean and Chairman of RRC-04

From left to right: Kavouss Arasteh and Chris van Diepenbeek, acting co-Chairmen of RRC-04

Chris van Diepenbeek (Netherlands) together with Kavouss Arasteh (Islamic Republic of Iran), acting co-Chairmen of RRC-04, compared the results of this conference with the successful refurbishment of a gramophone record shop, which needs renovation in order to sell CDs. "For a certain, but not well-defined, period of time the shopkeeper has to sell both products and, therefore, he has to provide in the limited space of his shop, racks and display furniture for both articles. Moreover, the shop has to be open during the renovation process. This first phase of the process of transfer from analogue to digital was successful thanks to the fact that all customers understood the need for the innovation, and thanks to the skills and ability of the team of building labourers and constructors," commented Chris van Diepenbeek.

The digital dividend

There are several reasons for going digital:

- The added services it can offer.
- The higher video and audio quality.
- The increased amount of data it can transmit.
- The additional number of channels that can be accommodated.
- The consistency of the data over long distances.
- The greater spectrum efficiency.
- The types of data the signal can carry.

Digital broadcasting uses the radio-frequency spectrum much more efficiently than analogue broadcasting. For terrestrial television, four to five digital TV programmes can be accommodated in the same amount of frequency spectrum currently required to transmit a single analogue TV programme. The improved efficiency is known as the "digital dividend". The extent of this "digital dividend", in terms of additional frequency space made available will not be known until the work of the intersessional period is completed and the second phase of the conference adopts the Plan.

With respect to the possible future developments to be taken into account, the conference approved the following text: "In addition to video and audio signals distribution, digital terrestrial broadcasting may serve as a data platform for innovative telecommunication applications (e.g. e-health, e-government, e-learning) to effectively help to bridge the digital divide, in particular, in the developing world".

The RRC-04 issues for:

Broadcasters

Many, but not all broadcasters are anxious to move to digital television as it provides them with an opportunity to expand their revenue base by creating more specialized television channels. They hope to increase the size of their audiences for existing material and may be able to create new markets for the content they already have in store. This may be particularly appealing to "private" advertising-funded broadcasters. For "public" funded broadcasters, digital television may help them diversify their offerings to include products such as all-News services.

By freeing up frequency spectrum that is currently used by the analogue service, broadcasters may be enticed to explore other areas such as interactive or mobile-reception oriented television. As well, digital production technology is making programming production less costly, which means the potential exists to create greater and more varied content.

However, broadcasters will likely look for as short a transition period as possible between analogue and digital television as they may not likely see the economic returns hoped for with digital television as long as they have to run both services simultaneously.

Manufacturers

The introduction of digital television means existing analogue television sets will either need to be entirely replaced or adapted through the purchase of set-top "adapters". The idea of a complete consumer turnover in television sets may appeal to the existing television manufacturers, however; it may in fact create more competition for them. This was the case in the United Kingdom when digital audio broadcasting was introduced and more flexible and innovative manufacturers were able to enter the market.

Consumers

While the radio and television consumer may find the "digital" television promise of greater content and innovative services such as mobile or interactive television appealing it won't come without a price. The cost of a set-top digital conversion "box" can be as much as EUR 100. This may not place an excessive strain on all European households with larger per capita disposable incomes, but it could be an economic and political challenge for Member States and their citizens in a number of countries in the planning region. ■

However, as Petko Kantchev (Bulgaria) notes, "during the deliberations at the conference it appeared that in the upcoming multiplicity of competing delivery systems, rather than converging on a single system, there will be a need to reconsider some definitions in ITU Radio Regulations, such as digital broadcasting and interactivity, as well as an allocation of spectrum use for interactive applications, at competent world radiocommunication conferences in the near future". Mr Kantchev adds that:

"The requirements might differ dramatically between and within different countries, and so the choice of return path methods for innovative interactive applications (via wired networks or cellular wireless systems of various operators) may be left with Member States, who should ensure the coordination of relevant frequency planning aspects with their neighbouring countries in accordance with the provisions of the ITU Radio Regulations."

A transition map: Clear signposts but options still available

Engineering an appropriate transition period between the analogue and digital service to satisfy the demands of administrations, broadcasters and consumers, at the same time ensuring the integrity of existing services, was not a simple task.

While there is demand for digital broadcasting services, the financial costs to the industry and the consumer were a major consideration. However, Mr Timofeev is confident that the technical and planning framework adopted by the conference "will usher in the era of digital broadcasting because it provides clear, *a priori* criteria for the establishment of new services, without causing undue interference to existing services. At the same time, the framework provides the flexibility needed to respond to new market realities such as those created by mobile communications."

During the transition period, the existing and planned analogue assignments will continue to be used and protected by the new digital plan. After this period, analogue assignments may continue to be used, provided that:

- protection is afforded to the new digital plan and its subsequent modifications;
- no protection is claimed from the new digital plan and its subsequent modifications.

This period starts at the date of entry into force of the new agreement and ends on a date to be agreed by the second session of RRC (Geneva, 15 May–16 June 2006). Two options were identified with respect to this second date:

Option 1: As early as possible and preferably not later than 2015; however, longer or shorter transition periods may be agreed multilaterally provided they do not affect other administrations concerned.

Option 2: No earlier than 2028 and no later than 2038; however, shorter transition periods may be agreed multilaterally.

It is up to each administration to decide on the date as to when its analogue transmissions will cease.

Sharing the spectrum but protecting existing services

While most countries in the planning area use the broadcasting service in the bands 174–230 MHz and 470–862 MHz, the broadcasting service does not have exclusive access to these bands. Therefore, the framework that was agreed to will consider the following sharing situations with other primary services:

In the VHF band, this will be between the broadcasting and the following primary services:

- the fixed service;
- the mobile service;
- the aeronautical radionavigation service.

In the UHF band, this will be between the broadcasting and the following primary services:

- the fixed service;
- the mobile service;
- the radionavigation service (including the aeronautical radionavigation service);
- the radio astronomy service;
- the broadcasting-satellite service;
- the mobile-satellite, except aeronautical mobile-satellite service.

The framework identified areas in the planning region where a compatible operation needs to be ensured between digital terrestrial broadcasting and primary non-broadcasting services. However, interference may also occur not only within the bands (as above) but also, between adjacent bands. The conference

will continue to identify criteria for the testing of compatibility within and between bands, to ensure the integrity of its testing methods during the period between the two sessions of RRC.

Aeronautical radionavigation — Safety first

Protecting the aeronautical radionavigation service from harmful interference during any transition to a digital broadcasting service was one of the priority considerations for the conference.

There are several types of systems, which needed to be protected. These include: short range radionavigation system (RSBN); air traffic control secondary radars, including ground radar and aircraft responder; as well as air traffic control aerodrome and rout primary radars.

Work on developing protection criteria has already begun, but it will be challenging, as several services including broadcasting operate in the same frequency band used by the aeronautical radionavigation service. Increased demand for frequency space for this service could have an impact on the integrity of the aeronautical radionavigation service. The conference decided to carry out additional studies urgently, in order to develop the protection criteria for these types of radionavigation systems. A report will be made to the second session of the conference.

Equitable access

The ITU Constitution includes the principle of "equitable access" to frequency resources. It was recognized by the conference that the agreement must provide a framework in which individual countries can continue to develop their individual and different requirements on an equitable access basis. However, the methods and criteria for the implementation of the principle of equitable access will be studied during the intersessional period and reported to the second session for consideration.

Iraq — A unique case

The Republic of Iraq, which has been absent from ITU conferences and meetings for over a decade but is included in the planning area, will follow a special procedure. That country is required to submit a list of its analogue broadcasting assignments to ITU by 28 August 2004.

ITU 040051/Sanjay Acharya

Professor Mark Krivocheev Chairman of RRC-04, receiving the ITU Gold medal from Secretary-General, Yoshio Utsumi

ITU will examine the list and identify any frequency assignments of other Member States in the planning area that could be affected before the first planning exercise of the intersessional period. The Republic of Iraq and those others concerned will make every effort to coordinate the assignments. The uncoordinated assignments will be submitted to the second session of the conference for consideration and action, if needed.

Conclusion

The first session of the RRC has successfully completed its main task, that of establishing the basis for the intersessional work and the second session. In the words of Ken Hunt, Consultant at the European Broadcasting Union (EBU): "This task was not easy as it involved taking into account the often divergent views expressed by representatives of many different services and sometimes the divergent views expressed on behalf of different broadcasters. However, this is not the end of the work. Far from it! One task now facing many people, broadcasters and administrations, is to turn the proposals of the first session into hard reality as the digital broadcasting requirements which will form the basis for the future digital plan. Another task is to ensure that all of the various technical issues are taken into account by the computer software which will be needed. In due time, which for some broadcasters means very soon while for others it may take longer, we can expect that the new digital plan will provide all of the benefits expected of it and, who knows, even some additional benefits which nobody has yet given any thought to." ■