



The electronic version (PDF) of this article was scanned by the International Telecommunication Union (ITU) Library & Archives Service.

Journal Title: ITU Newsletter

Journal Issue: No. 2(1994)

Article Title: First World Radiocommunication Conference.

Page number(s): pp. 2-9

1995: mobile satellite service (MSS)

First World Radiocommunication Conference

In 1992, the Additional Plenipotentiary Conference reviewed the structure and functioning of the Union by adapting its organizational structure to the challenges of the continuing changes in the global telecommunication environment. The implementation of these changes had to occur with the least possible delay. A major element of change is the regular sequence of Radiocommunication Conferences now to be convened every two years in association with the Radiocommunication Assembly. While a Conference would normally revise the Radio Regulations and deal with any other questions within its competence, the Assembly would review the work results of the past study periods to be

other purposes and to arrange for the first World Radiocommunication Conference (WRC) to meet for five days in Geneva and to make a recommendation to Council for the agenda of the second WRC in 1995 and to propose a preliminary agenda for the third WRC in 1997. Then, the new system of biennial conferences and the technical preparations for them in the Study Groups and the Conference Preparatory Meetings (CPM) would hopefully run smoothly and avoid overcharged agendas and exhausting marathon meetings.

During the first WRC, however, delegations were not yet fully prepared to avoid evening and night meetings. WRC-93 was chaired by Mr V. V. Timofeev (Russia). Mr S. Pinheiro (Brazil) chaired the substantial committee that prepared the agendas. Over 600 delegates from 123 countries attended the Conference and "enjoyed" their usual evening meetings on three out of the available five working days. Finally, on Friday morning (19 November) at 2.30 a.m., they agreed on the contents of the two agendas and on the other material to be included in the Final Acts of WRC-93.

Agenda for 1995

The recommended agenda for 1995 includes items related to the mobile satellite service (MSS) that were left over from the last World Administration Radio Conference (WARC-92) in Malaga-Torremolinos. Such issues were centered in particular around the relations between the MSS and the terrestrial services in the bands around 2 GHz and provisions for the future public land mobile telecommunication systems (FPLMTS). The agenda consequently includes a review of the technical constraints and related provisions associated with these allocations, such as



carried out in the next period. Thus, Conferences and Assemblies direct all activities of the Radiocommunication Sector. These changes were to be provisionally applied on 1 March 1993 and will come into force on 1 July 1994.

To bridge this transitional period, it was decided to use the funds already set aside for

sharing criteria, PFD limitations, coordination procedures, etc. In relation with the bands foreseen for the MSS and the FPLMTS and its satellite components, extended discussions concerned the implementation date agreed on by WARC-92: 1 January 2005.

Several administrations even proposed to review that date at this Conference and/or to decide to allow commencement of the coordination procedures of Resolution 46 earlier than the six-year period set before the first possible date of bringing into use the respective satellite network.

However, the Conference decided to put the issue of date review on the 1995 agenda. Furthermore, WRC-93 emphasized in a Recommendation that administrations shall comply with the decisions of WARC-92, without prejudice to the decisions taken at WRC-95, recommended also that WRC-95 consider the status of MSS satellite networks which have been published in advance of WRC-95 and invited administrations to cooperate in coordination consultations.

Another agenda item concerned feeder links for the MSS. In accordance with Radio Regulation 2613 geostationary-satellite space systems enjoy a certain priority *vis-à-vis* non-geostationary space stations which should not cause harmful interference to a geostationary network in the fixed-satellite service (FSS). This causes problems in the case of feeder links to non-geostationary MSS which are presently not provided for. The question of appropriate allocations and a regulatory regime will be discussed in 1995.

A question remaining from WARC-92 concerned missing power limits for earth stations in the Earth exploration satellite, space operation and space research services in the band 2025–2110 MHz and WRC-95 will have to set such limits. It will also review the allocations to the FSS in the band 13.75–14 GHz (Resolution 112).

Long discussions were held on the extent to which WRC-95 should be allowed to reopen

discussions on allocation matters and most views were for a very restrictive approach. Hence, items such as a potential revision of AP30/AP30A (the 1977 Plan) and taking into account, where practical, the orbital arcs of AP30B, the availability of the newly-allocated HFBC bands, various allocation requirements expressed in Resolution 712 and, in particular, the requirements for additional allocations to the MSS and associated feeder links, will be discussed on the basis of studies carried out in the Study Groups and the CPM, and any decision taken will be preparatory to definite action to be taken by WRC-97.

Further routine agenda items were agreed upon such as the review of Resolutions and Recommendations, consequential action, consideration of the activity report of the Director of the Radiocommunication Bureau, and consideration of the agendas for WRC-97 and WRC-99.

Full agreement was reached without difficulty on the agenda item referring to the review of the final report of the Voluntary Group of Experts (VGE). This report will forward the proposals developed by the experts since 1990 as a result of their review of definitions, structure, relative status of allocations, regulatory provisions and procedures of the Radio Regulations with a view to improving spectrum utilization and simplification of the Radio Regulations in general. Administrations are invited to base their proposals on the texts recommended by the VGE.

Preliminary agenda for 1997

The recommended preliminary agenda for 1997 includes a vast variety of items proposed for consideration, and although one or two issues generated more heated discussion than the majority, no real problems were encountered in establishing this agenda. It starts out with urgent issues which will be specifically presented by WRC-95 for action in 1997. Then, there follows consideration and

1997: review of various frequency bands

19 November 1993: signature of the Final Acts of WRC

appropriate action on a number of topics referred to in Resolutions and Recommendations. These include:

- the review of propagation information in AP28 used for the determination of a coordination area in frequency bands between 1 and 40 GHz when shared by space and terrestrial services;
- the protection of space services in 2025–2110/2200–2290 MHz;
- the earth-exploration satellite service in 401–403 MHz, 13.4–13.75 GHz and above 50 GHz;
- allocation issues of other unplanned space services;
- spurious emissions, wind profiler radars, multiservice satellite networks;
- examination of the use of the HF bands allocated to broadcasting;
- issues related to implementation of the global maritime distress and safety system;
- the use of AP18 (transmitting frequencies for stations in the maritime mobile service);
- the revision of AP30/AP30A for Regions 1 and 3 taking account of the need to ensure that the integrity of the Region 2 Plans and their associated provisions is preserved.

There is also an item allowing the revision of the Radio Regulations with respect to unresolved and pressing issues concerning frequency allocations and regulatory aspects related to the MSS including their feeder links.

Finally, the routine agenda items, such as consideration of the activity report from the Director, proposed agenda items for 1999 and 2001, consequential changes and amendments to the Radio Regulations, and the review of Resolutions and Recommendations, were also agreed upon without any undue difficulty.

The Final Acts

The Final Acts of WRC-93 contain the agendas described above in the form of Resolutions (COM4/1 and COM4/2) which invite Council to establish the agenda for 1995 and to initiate the necessary consultations with Members and to consider the proposals made for 1997. The Final Acts also contain Recommendation PL/2 on the treatment of MSS satellite networks published under Resolution 46 prior to the entry into force of the respective allocations around 2 GHz.

A further issue briefly discussed at the WRC-93 concerned a potential revision of the regional agreement on MF/LF broadcasting of 1975.

This discussion ended in Recommendation PL/1 in the Final Acts which recommends Council to consider convening a regional conference to revise the modification procedure for the 1975 Plan on the basis of relevant standard procedures elaborated by the VGE. This matter concerns Administrations in Regions 1 and 3 only.

WRC-93 concluded its work and the delegations signed the Final Acts on Friday afternoon after having noted 19 declarations and seven additional declarations.



New fixed service Recommendations

Working Parties 9A, 9B, 9C, 9D and 9E met in Geneva in September 1993 and finalized 45 draft Recommendations (23 new and 22 revised). All of them are to be submitted to the March 1994 meeting of SG 9 for adoption and then approval according to Resolution ITU-R R1, Section 10 procedure approved by the 1993 Radiocommunication Assembly.

Main activities and results reached at these meetings are given below.

■ Under the chairmanship of Mr O. Langer (Germany), the third meeting of WP 9A (21–30 September) prepared six new and one revised draft Recommendations on the following main topics:

Integration of digital radio systems in the synchronous digital network of B-ISDN

A new Recommendation was drafted on error performance objectives for constant bit rate digital paths at or above the primary rate carried by digital radio-relay systems which may form part of the international portion of a 27 500 km hypothetical reference path. This is the first Recommendation aligned to draft new ITU-T Recommendation G.826 on the same subject. Existing Recommendation 634 (Error performance objectives for real digital radio-relay links forming part of a high-grade circuit within the integrated services digital network) was revised to extend error performance objectives to real circuits longer than 2500 km.

In line with ITU-T Study Group 13 that has started to develop draft Recommendation I.35x on the network availability, a Correspondence Group on availability objectives was established. The interest of administrations on the subject is reflected by the fact that 11 of

them are registered to participate in the Correspondence Group.

Effects of propagation

In answering to Question 122/9, a new Recommendation provides guidance on the effects of multipath propagation in the design and operation of digital radio-relay systems. It is based on Report 784 which is therefore deleted.

Interference

A new Recommendation was prepared on interference mitigation options to enhance compatibility with radar systems. A preliminary Recommendation on maximum allowable levels of interference to radio-relay systems from radars is carried forward to the next meeting of WP 9A for further consideration.

Another new Recommendation deals with methods of calculating line-of-sight interference into radio-relay systems to account for terrain scattering. Procedures to be used to calculate the interference contribution are contained in the annex. This Recommendation is based on Report 1054 which is deleted.

A new Recommendation on maximum allowance performance and availability degradations to digital systems arising from interference from other sources has been drafted in reply to Question 127/9. Guidance for the application of the Recommendation is provided in the annex.

Coordination area

A draft Recommendation, entitled "A procedure for determining coordination area between radio-relay systems of the fixed service", describes the measures

**Enhancing
compatibility
with radar
systems**

recommended to determine frequency coordination area for interference studies.

■ Under the chairmanship of Mr R. D. Coles (Canada), WP 9B met for the third time (21–30 September) and produced six draft new and 12 revised Recommendations focused on the following subject activities:

RF channel arrangements

General Recommendation 746 on this topic was revised to update the two tables concerning frequency plans and channel spacing with the latest information contained in all the other Recommendations it mentions.

• Bands below about 17 GHz (Question 136–1/9)

A new Recommendation provides for new channel arrangements in the 1900–2300 MHz band. The intention is to make efficient use of some of the remaining spectrum allocated to the fixed service after WARC-92 and to cope with its Resolution No. 113. Another new Recommendation identifies channel arrangements for the 4400–5000 MHz band, which is used by several administrations for high-capacity digital systems. Two Recommendations were also revised, i.e. 385–5 for systems operating in the 7 GHz band, and 636–2 on 15 GHz band.

• Bands above about 17 GHz (Question 108/9)

A new Recommendation for the 55–58 GHz band was produced to meet the requirements for the utilization of higher frequencies for very short distance systems. Existing Recommendations 748 (25, 26 and 28 GHz bands) and 749–1 (Systems operating in the 38 GHz band) were revised and new annexes added.

Bandwidth and unwanted emissions

A new Recommendation provides definitions for the various bandwidths (i.e. occupied, necessary, allocated frequency band, RF frequency channel and guard band) and for out-of-band and spurious emissions, all within the context of the Radio Regulations. It also provides design objectives for these parameters to be used in the planning of digital systems.

Characteristics of digital radio-relay systems

A new Recommendation, entitled "Characteristics of digital radio-relay systems operating in frequency bands below about 17 GHz", gives information on factors to be considered in the design of digital systems (i.e. multipath distortion, modulation and coding techniques, spectrum utilization, countermeasures to interference, etc.).

Another new Recommendation, entitled "Characteristics of digital radio-relay systems operating in frequency bands above about 17 GHz", describes parameters of particular importance to the implementation of such systems such as availability and propagation limitations due to precipitation effects (i.e. fading and absorption) at higher frequency bands, that determine the critical hop length.

Concerning reference radiation pattern for radio-relay systems antennas, Recommendation 699 was revised with the inclusion of a new annex extracting important material from Report 614 that is deleted. The new material indicates that, when the actual radiation pattern is not accurately known, a reference pattern representing the side-lobe envelope in a simplified fashion might be used in the determination of the coordination area and for frequency reuse studies.

Recommendations 750 and 751 on digital systems for SDH-based networks and Recom-

mendation 752 on diversity techniques, were also revised to update the existing text with the addition of new material.

Interconnection characteristics and maintenance

Regarding interconnection, a revision of Recommendation 596 based on Report 938 provides for the interconnection of SDH radio-relay systems between them and with other transmission systems.

Measurement algorithm is the subject of Recommendation 700 that was also revised mainly to add a note which identifies proposed modifications presently being carried out within the ITU-T, in particular concerning Recommendation G.821. These modifications will require corresponding changes to be made to the performance and availability measurement algorithm in Recommendation 700.

■ With Mr A. Hashimoto (Japan) as its Chairman, WP 9C at its 3rd meeting (27–30 September) produced four draft new and three revised Recommendations as follows:

Line-of-sight systems

A new Recommendation on rural areas communications (bands 8 and 9) deals with technical characteristics for systems to be used in subscriber telephone connections. It specifies the types of possible services, grade of service and preferred voice encoding and access methods.

Regarding point-to-multipoint systems, Recommendation 755 was revised to incorporate new information on the systems operating in the 2.6 GHz band. The purpose of the amendment is to facilitate sharing with new services allocated by WARC-92 in this band.

A new Recommendation describes technical requirements for point-to-multipoint systems

used in the local grade portion of an ISDN connection. The two annexes provide guidance on configuration to be used for ISDN applications, system capacity and examples of two possible methods for assignment on demand of ISDN circuits.

Transportable equipment for relief operation is the topic of a new Recommendation. It describes several types of fixed radio equipment for use in emergencies and the associated preferred frequency bands, interconnection points and other technical parameters. Consideration is given to transmission quality and detailed engineering principles.

Trans-horizon systems

A new Recommendation proposes guidance for the design of trans-horizon systems in relation to radio propagation aspects. System parameters such as preferred diversity methods, effects of multipath dispersion, adaptive equalization techniques, etc., are included.

The revision of Recommendation 698 specifies preferred frequency bands for trans-horizon radio-relay systems according to the length of the link. Amendments were made so that the frequency bands described in the sections on sharing issue be consistent with the results of WARC-92.

■ The third meeting of WP 9D (22–30 September), under the chairmanship of Mr G. F. Hurt (United States), prepared two new and one revised Recommendations. Liaison statements were also drafted on sharing issues, addressed to other Task Groups and Working Parties of relevant ITU-R Study Groups. In particular:

Sharing in the 1–3 GHz band

Much of the focus of the meeting was devoted to studies on the sharing of this part of the spectrum. The results served as

Transportable equipment for relief operations

Protection criteria for the fixed service

the basis for input material addressed to former Task Group 12/4 (new TG 2/2) which was formed as a consequence of Resolutions of WARC-92 with the scope to develop Recommendations regarding sharing between fixed service (FS) and other services, especially broadcasting-satellite service (sound) (BSS) and mobile-satellite service (MSS).

The FS is aware of the need to share the band with other services and is considering using interference-resistant modulation schemes, interference cancellers and improved antenna diversity techniques as means for increasing permissible levels of interference.

Sharing with geostationary and non-geostationary satellites

A new Recommendation deals with visibility statistics for calculating interference into the FS from satellites occupying the geostationary-satellite orbit (GSO).

A method for developing criteria for protecting the FS is described, including a computer program which implements the method. The methodology is useful to examine sharing between FS on the one side and MSS and BSS operating with satellites in the GSO.

Another new Recommendation deals with criteria to protect FS receivers from emissions of space stations operating in non-geostationary orbits in shared frequency bands. It describes a computer simulator method for determination of the visibility statistics of space stations in circular non-geosynchronous orbits, in particular from MSS, as seen by a terrestrial station.

Recommendation 760 on protection of FS from BSS around 20 GHz was revised to modify the bands in which sharing occurs in accordance with decisions made at WARC-92.

■ Under the chairmanship of Mr N. M. Serinken (Canada), the second meeting of WP 9E (20–24 September) produced five new Recommendations and five amendments to Recommendations. A summary of the draft Recommendations is given below:

Technical and operational characteristics

This Recommendation presents the general characteristics of HF adaptative systems which can be used to automate HF links and enhance their quality. It incorporates information on Report 551 which is consequently deleted. Different adaptative systems are described in annexes 3 to 7 to this Recommendation.

Recommendation 762 on remote control and monitoring systems for HF stations was revised with the inclusion of a new annex describing a protocol for remote control operations.

HF radiotelephony

One Recommendation on improved *Lincompex* systems describes additional use of *Lincompex* control tone, as well as operation with non-*Lincompex* stations. It is an extension of Recommendation 455–2 to which a lot of new specifications have been added.

Another Recommendation, entitled "Digitized speech transmissions", reflects the information of Report 1127 (annexes 1 to 3), to which a new annex 4 describing linear predictive vocoders has been added.

HF radiotelegraphy

Recommendation 436 on arrangements of voice-frequency telegraph channels has been revised to incorporate two Reports (i.e. Report 337 on the same subject and Report 1132 as a new annex) that are deleted.

Recommendation 518 (Single-channel simplex ARQ telegraph systems) was

amended mainly to update references to maritime mobile Recommendation M.635.

HF data transmission

This Recommendation presents systems employing meteor burst operation on the basis of information previously contained in Report 1130 that is deleted.

Recommendation 764 (Minimum requirements for HF radio systems using packet transmission protocol) was amended with the addition of a new annex which describes a transmission system that uses an IBM PC for storing data, a message, facsimile or any

other data file which is transmitted by a procedure combining FEC coding, error detection and selective repetition of errored packets.

Radio Regulations Board

At the beginning of this year Mr M. Harbi succeeded Mr M. Miura as Chairman of the Radio Regulations Board. Mr W. H. Bellchambers is Vice-Chairman for 1994. The other Members of the Board are Messrs G. C. Brooks, V. V. Kozlov and M. Miura.