

World Radiocommunication Conference(WRC-97) and its Implications on Commercial Utilization of Outer Space

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Abstract

The WRC is the international forum for world agreement on the use of radio frequencies and satellite orbits. The most important achievements of the WRC-97 include the replanning of the broadcasting satellites service, a service which is experiencing rapid growth worldwide and which delivers direct-to-home television services; and an agreement between new mobile satellite service operators which will see the development of a number of new broadband global satellite systems which have the potential to deliver internet and multimedia applications to home and businesses anywhere in the world. Increasing demand for those commercial satellite services including Global Mobile Personal Communications by Satellite(GMPCS) should be carefully implemented with due considerations of space law and related regulations for common interests of all the nations. Important issues in the WRC-97 including re-planning of the broadcasting satellite services, new allocation to mobile satellite services and paper satellites.

1. The items on the agenda of WRC-97 could be grouped roughly under six headings:
 - Regulatory/procedural matters in the context of efforts to simplify the Radio Regulations(RR)
 - The fifty-year-old difficulties of to plan for the high-frequency broadcasting (HFBC)service
 - The consolidation of up-dated operational provisions for the aeronautical and maritime mobile services with particular emphasis on the regulatory arrangements necessary for full implementation of the global maritime distress and safety system(GMDSS)
 - The enhancement of frequency allocations used by the mobile-satellite and fixed-satellite services in various bands
 - Extended provisions and allocations for various space science services
 - The question of updating the Plans for Regions 1 and 3 for the broadcasting-satellite services(BSS).
2. The Conference turned out to be the ones many people had predicted well in advance. The non-geostationary satellite(non-GSO) systems in the fixed-satellite service(FSS), was a contentious issue. But it did not work towards something that gave a satisfactory outcome. There were promising signs from the beginning of the Conference. There were tensions as well. The key results it have achieved include establishing a basis on which new non-GSO FSS systems can develop. The methodology adopted is quite new and obviously will benefit from the further studies to be undertaken on sharing methodologies. The Conference confirmed the future for Ka band non-GSO systems for which the 1995 Conference had laid the groundwork.[WRC-95 allocated 400 MHz of spectrum in the 19 and 29 GHz bands to non-GSO FSS systems for Teledesic

Corporation, which Corporation, which along with Motorola's *Celestri* were looking for an additional 100 MHz at WRC-97. The additional allocation has been made in the bands 18.8- 19.3 and 28.5- 29.1 GHz.]

Another contentious issue was the broadcasting-satellite service(BSS) planning. That initially proved to be highly contentious and extremely time-consuming. The question here was primarily the concern that the old BSS Plan, which was drawn up by the World Administrative Radio Conference (WARC) in 1977 for Regions 1 and 3, no longer reflected the realities. There was a need to make adjustments to the Plan to recognize the needs of new countries (new ITU Member countries or those which have geographically or administratively changed since 1977). Several developing countries also wanted additional channels. In that respect, the BSS Plan proved very contentious. However, the Conference made history by adopting not only the revised BSS Plan, but also a preparatory process to enable work to be done in preparation for a substantial planning task at another radio conference in the year 2000 or 2001.

3. . There are huge commercial business and service interests at stake. It is not just a commercial issue of companies that wish to design, build and operate a satellite system that is dependent upon a regulatory framework which has yet to be put in place. It is all the services that will flow from it. These technologies and use of technologies are not so much in the sense of the commercial interests that are trying to promote them, but rather of the people who will then want to use the services. Many of them will be the types of services that will impact on people that just simply do not have a satisfactory service now. And some of these services may be out of the financial reach of some countries. Anything that provides a better local communication

infrastructure will, in the end, benefit every one.

4. ITU's notification and coordination process for satellite networks has been in trouble for sometime now because of the so-called "paper satellites". In 1994 in Kyoto the Resolution 18 was adopted to review the ITU's frequency coordination and planning framework for satellite networks. The problem of paper satellites and the massive coordination load that comes from them both renders the coordination and planning process quite unsatisfactory for the ITU and all the countries. Some progress was made but not satisfactory. The administrative due diligence concept that the Conference adopted is unlikely to have any significant effect on the volume of paper satellites. This concept requires regular disclosure of implementation data for satellite systems, such as the name of the spacecraft manufacturer, the name of the satellite operator, the contractual date of delivery and the number of satellites procured, the name of the launch vehicle provider, the name of the customer and the contractual launch date. This aims at minimizing the number of paper satellites by requiring information which becomes available when systems have reached an advanced stage of development and are soon to be deployed. Even though, some form of financial fee is likely to be more effective and beneficial in offsetting high costs to the ITU.
5. It was important for this Conference to make provisions for systems that may be capable of providing global services. The operation of such systems requires a suitable amount of spectrum in appropriate frequency bands. Here, the non-geostationary satellite (non-GSO) systems in the fixed-satellite service (FSS) were a major candidate. SkyBridge, for example, was looking for regulatory provisions in the Ku band which is around 12 GHz allocated to the broadcasting-satellite service (BSS) and the

FSS and sharing with the existing services of the geostationary satellite(GSO) networks was the major issue. These bands are very heavily used by the GSO networks. However, SkyBridge made the case that by introducing some technical and operational constraints, sharing should be possible. So this Conference established technical constraints, in the form of provisional power flux density limits, which it requested the Radiocommunication Sector(ITU-R) to review and if necessary revise. The attraction is that the Ku band being lower in frequency, there is more off-the shelf technology available and the propagation conditions are more favourable which relate directly to the cost and performance of the system. When you have to put a "bird" up there, you get into a lot of design issues and many other factors. While the Ka band is relatively new for use by FSS, due to spectrum requirements of GSO and non-GSO FSS systems, and other sharing issues, we are already running out of spectrum in this frequency range. The other challenge for the Conference was to find an additional, very limited amount of spectrum for little LEO systems. They are not in very high frequency bands, they operate below 1 GHz where many services exist already. The Conference made some additional allocations for these systems in the band 454-460 MHz on a regional basis. Another challenge was that for sometime now, they have been trying to make additional spectrum available for the mobile-satellite service (MSS) in the 1-3 GHz range. But because of the growth in the MSS requirements, MSS operators along with some countries were looking for additional spectrum particularly in the band 1559-1567 MHz. At issue was that aeronautical radionavigation and radionavigation-satellite services are allocated in the band 1559-1610 MHz on a primary basis and that these are safety services and must therefore be protected from harmful interference. In

particular, this band is used by the global positioning system (GPS) and global orbiting navigation satellite system (GLONASS), both systems are components of the International Civil Aviation Organization's (ICAO) global navigation satellite system(GNSS).

6. The broadcasting-satellite service Plan for Regions 1 and 3 has been cited as one of the success stories of WRC-97. Actually the revision of the broad casting-satellite service Plan, including the feeder link Plan for Regions 1 and 3 was one of the mile-stones of the WRC-97. The story goes back to Resolution 531 of WRC-95 which established guidelines for revising the Plan contained in Appendices 30 and 30A of the Radio Regulations. WRC-95 had also recommended new planning parameters and planning principles for carrying out such a review. After extensive work carried out by the Radio-communication Sector (ITU-R) between WRC-95 and WRC-97, and by this Conference itself, a revised Plan developed basically on the guidelines. One of the main points of concern was the unsatisfactorily low number of channels – in general five for Region 1 and four for Region 3 – provided by the Plan and a number of countries felt very strongly that the minimum number of channels should be increased to about ten at this Conference. However, this was completely impossible to achieve, due among other things, to lack of time at the Conference. In the end a compromise was reached, one element of which is to examine the possibility of replanning on the basis of a greater number of channels per country. From a technical point of view, the Plan revision has also been extremely successful in that virtually all assignments have positive overall equivalent protection margins. Now, who will benefit from the Plan revision? The Plan revision was a compromise which provides a minimum number of channels per country

and that additional capacity was sought. The Conference therefore decided that an inter-conference group should be established to consider the possibility of reviewing the Plan to provide all countries with a minimum of around ten analogue equivalent channels based on national coverage. Capacity for future additional requirements such as sub-regional systems is also to be taken into account. Systems already included in the Plan are to be Protected and the Plan for Region 2 has to be preserved. The result of this inter-conference work will be submitted to WRC-99 with a view to deciding whether to convene a replanning conference that would take place no later than 2001.

7. The work would not be over when the Conference ended and the ITU was entrusted to implement the additional post-Conference tasks and actual decisions of the Conference. Above all, it would be necessary to eliminate the processing delays in satellite network coordination requests. This is because, in future, the publication date of any such request will determine when the coordination procedure will start. Also, a single processing line will now be required for all related procedures in order to assure adequate protection for all systems concerned. It would be also necessary to study the feasibility of increasing the capacity of the Broadcasting-satellite service Plans in Appendices S30 and S30A of the Radio Regulations. This means reviewing all related old publications, using the new technical criteria, in order to determine any new coordination that may be required under the Plans as modified by WRC-97.

ITU must prepare to apply the administrative due diligence procedures to filings for a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service. Some procedures were adopted by the Conference to start addressing the

problem of reservation of orbit and spectrum capacity without actual use.

It is quite certain for every country to secure its orbit and spectrum capacity for its future use. Therefore, the next WRC might be also more important for commercial use of those limited resources in space activities.

Reference

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- Documents and Reports on the home page of the ITU ([URL: http://www.itu.int](http://www.itu.int))