

## T H I R T E E N

# A Canadian Perspective on the 1985 ITU Space Conference

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### THE ROLE OF THE ITU

The International Telecommunication Union's 1985 World Administrative Radio Conference will be directed to the planning of the geostationary orbit and the radio spectrum associated with it. To understand the significance of the conference, it is necessary to look at the role of the ITU as an international regulatory body in the context of increased interest by many nations in telecommunications.

The ITU has regulatory and distributive responsibilities in establishing suitable regulations to control the use by its 160 members of the radio frequency spectrum. The regulatory function involves establishing procedures and regulations for coordination of orbital and frequency assignments in order to minimize harmful interference between systems of different countries and facilitate efficient use of the radio frequency spectrum.

The distributive function of the ITU, which has attracted more attention in recent years, focuses on the goal of

equitable access to the radio frequency spectrum and the geostationary orbit as well as on the equitable distribution of the benefits from the use of these resources.

International regulatory regimes for the use of the spectrum are established at ITU radio administrative conferences where solutions are sought to conflicting regulatory approaches among member countries. Up to the mid-70s administrations were able to satisfy their anticipated requirements with a fairly rigid approach to frequency planning for certain services. This approach accommodated requirements submitted to particular conferences but did not include modification provisions for the interim period between conferences.

### NEED FOR INCREASED FLEXIBILITY

In the 1970s, however, need was determined to establish more flexible means of allocating frequencies. A major turning point in frequency planning was the 1974 Maritime Mobile Services WARC which introduced flexibility into the a priori planning process by adding a procedure for making new entries to the plan as needs evolved.

Another point came at the politically sensitive 1984 High Frequency Broadcasting WARC which adopted planning principles, and a method embodying the major features of plans leading up to this conference. Additional flexibility was introduced in the areas of defining equitable access and satisfying basic requirements, as well as protecting frequency continuity and quality of service.

Technological developments in telecommunications have put a strain on, and encouraged, creative and innovative means of meeting the needs of spectrum users. While technological developments solved certain frequency congestion problems, demand for immediate access to this scarce resource by technologically advanced administrations, and concern by developing countries to ensure access to it when needed, have led to differing views on how to regulate and distribute certain frequencies.

There are many theological arguments for and against

a priori planning, for and against flexible planning, for and against "first-come first-serve," but in our view the question of the space conference is less one of whether to plan than one of how much rigidity is needed in planning the fixed satellite services in order to provide a credible guarantee of access to the orbit and what sort of planning method best serves the domestic, regional, and global interests of the ITU member countries which, of course, reflect the membership of the United Nations.

### SPECIFIC ISSUES OF THE CONFERENCE

The 1985 WARC will consider seven planning methods based on submissions from various administrations. These range from the existing regulatory procedures to long-term rigid a priori planning. These alternative approaches to planning methods and their variations will be discussed during the 1985 session.

Rigid a priori planning has the advantage of allowing administrations to implement systems with the certainty that the orbital resource will be available and protected from interference when they need it. The disadvantage is that such rigid plans make it difficult to alter systems at the time of implementation in order to take into account improvements in technology and changes in requirements.

Flexible planning allows for changes at the time of implementation, but the price to be paid is greater uncertainty about the nature of the system that will receive protection from other systems.

Whatever planning approach is accepted, the conference will have to take into account a number of politically sensitive issues. These include developing country concerns regarding whether the spectrum will be available when they require it, without undue and unreasonably costly technological burdens, and satellite operating country concerns to ensure immediate and continuing access to spectrum resources. Procedures will also be needed to incorporate technological change over time and to accommodate the requirements of regional and intergovernmental satellite organizations.

## CANADIAN PREPARATIONS FOR THE SPACE WARC

The majority of ITU member nations view the current spectrum regulatory regime as inequitable in the face of a potential shortage of spectrum and orbital resources. The 1985 conference is seen as an opportunity to redress this perceived imbalance in favor of the developed nations, and, conversely, as an opportunity to retain as much flexibility in allocation of orbit resources as possible to ensure continued access to it by technologically advanced nations.

In preparing for the conference, Canada is taking the view that discussion of planning principles cannot be avoided. We have tried to approach the conference in the most pragmatic way we can. As most administrations do, we started with an assessment of our own requirements, of the requirements of the major satellite users, and of what kind of planning principles meet the global requirements for access to the spectrum and permit everyone's space requirements to be met in the future.

The proposals that we are putting forward have been discussed with the U.S. administration, with the British administration, the administrations of the European countries, and with Latin American administrations. The objective of this process is to insure that the ITU Space Conference does not result in a major confrontation between what are essentially developed countries on one hand and developing on the other. It is most essential that we maintain a sense of cooperation and the working relationships in the ITU which are important to all of our administrations.

A working document, presented below, was drawn up with these concerns in mind and has been discussed bilaterally and regionally in order to solicit views and comments of interested administrations. Our objective in putting forward this document was to help lay the groundwork for development of workable proposals for the conference.

The ideas presented in the Canadian working document, encompassing the major points we believe need to be addressed at the 1985 conference should be seen in terms of their representational character. These ideas are based on discussions with various administrations and reflect the breadth of interests of the major users of satellite systems. They are meant to satisfy



the objectives of most ITU member countries in providing reasonable assurances of access to the geostationary orbit.

This document does not in any way complete Canada's preparations for the conference. Additional studies are being completed and consultations with other countries will continue right up until the Space WARC. Whatever planning approach is eventually adopted, regulatory procedures are likely to further emphasize the ITU's role as a "guarantor" of access to the spectrum. How this role will be defined will depend on the major features of the approach to frequency planning and associated regulatory procedures that will be included in the outcome of the 1985 conference.

## WORKING DOCUMENT: CHARACTERISTICS OF AN A-PRIORI PLANNING METHOD FOR THE FIXED-SATELLITE SERVICE

### *I. Preamble*

This a priori planning method is intended for application to the fixed-satellite service in the heavily-used 6/4 GHz and 14/11-12 GHz bands. This planning method is seen to be a priori and flexible at the same time because it strikes the best balance between seemingly contradictory requirements of providing long-term guaranteed access by administrations (includes "group of administrations") to the use of the geostationary orbit, while allowing sufficient flexibility to introduce cost-effective state-of-the-art systems.

This planning method responds to the need of administrations to have enough spectrum/orbit resource reserved in a precise way for their use when required and at the same time allows management of that spectrum/orbit resource to be responsive to the latest technical innovations available. It does this by specifying a minimum number of parameters, i.e., orbit position, frequency band, and service area, and allowing all other parameters such as antenna characteristics, interference limits, modulation characteristics, spacecraft station-keeping, and pointing-error characteristics of the satellite networks to be determined

at the time that those networks are implemented. This results in the maximum possible flexibility within the context of an a priori plan.

Under this method an a priori plan will be developed at the 1988 Space WARC, which will assign specific orbital positions and frequency bands to each administration. As a result, the method allows implementation of state-of-the-art networks to be coordinated under the plan, and avoids the need to specify the detailed characteristics of these systems in 1988 long before they are designed. This balance, or one very close to it, will have to be adopted by WARC-ORB if there is to be an orderly and effective use of the geostationary orbit by the fixed-satellite service in the 1990s. This is consistent with the objectives of Resolution 3 of the ITU Radio Regulations.

## *II. Characteristics of the Plan*

### *1. Development of the Plan*

The formulation of the plan will be based on requirements requested by administrations. These stated requirements will include the frequency band width, the service area, and the service orbital arc of each required network. Separate sets of requirements would be submitted and accommodated for the 6/4 GHz band and the 14/11-12 GHz band, with account taken of the need to meet certain requirements with multi-band hybrid satellites. The number of orbital positions assigned to an administration in the plan would be determined by the conference and would be based on the requirements submitted by that administration.

To develop the plan, supplementary sets (perhaps four) of detailed technical parameters representative of the types of systems which are expected to be implemented during the lifetime of the plan would be developed by the conference to enable the creation of the plan. Each set would correspond to agreed typical satellite systems and include such parameters as antenna gains, interference limits, signal characteristics, spacecraft pointing accuracies, and station-keeping tolerances. Requirements submitted by administrations to the second session would be defined in terms of the applicable set and would be used to develop the entries in the plan.

Once the plan is established these detailed sets of parameters would have very limited use; they would in no way constrain the characteristics of systems when they are implemented under the plan, nor when they are coordinated. They would, however, be used to determine the acceptability of proposed modifications to entries in the plan, i.e., the frequency band, orbital position, or service area.

#### *2. Entries in the Plan*

Administrations will be given entries in this plan in response to their stated requirements. Each such entry will specify the nominal orbital position, the frequency band or sub-band, and the service area of the network to be implemented under the plan. Unlike the earlier broadcasting satellite plans, no other characteristics than the above would be specified in the plan; they would be left intentionally to be agreed upon at the time that systems under the plan are coordinated.

#### *3. Accommodation of Existing Systems*

To allow a smooth implementation of the plan, satellites of an administration in orbit at the time that the plan is adopted but not at an orbit position assigned to that administration will be accommodated for the remainder of their notified operational lifetime, at their existing orbital position if possible, or, if not possible, then within their service arc. During this transition period of perhaps several years, existing systems may have to change orbital position within their service arc to accommodate new systems as they are implemented in accordance with the plan. It is understood that the number of changes so imposed on operational systems would be kept at a minimum.

#### *4. Coordination of Systems within the Plan*

As systems are implemented in accordance with the plan, they will be coordinated based on procedures to be developed at the conference, procedures which will be similar to Articles 11 and 13 and Appendix 29 of the current Radio Regulations. Two situations apply:

a) Under normal circumstances, new systems implemented in accordance with the plan will be coordinated through bilateral or perhaps multilateral discussions between administrations using the actual technical parameters of operational systems and of other new systems that are being coordinated, subject to

the orbital positions, frequency bands, and service areas specified in the plan. Coordination will be based upon the latest CCIR recommendations or technical criteria agreed to by the parties concerned. For the majority of cases, it is expected that the systems to be implemented will fall within the set of parameters identified with the original requirement.

b) In exceptional circumstances, where coordination cannot be readily completed, the IFRB will convene a special meeting of the administrations involved in the original coordination to find a means by which the proposed system shall be shared both by the administrations of existing networks and the administration wishing to establish the new network.

#### *5. Plan Modification Procedure*

A modification procedure would be part of the administrative procedure associated with the plan, to be used where required to make additions, deletions, or changes to the basic parameters of the entries in the plan, i.e., to the frequency bands or sub-bands, orbit positions, or service areas. Modifications would be subject to agreement of affected administrations. The examination of such proposed modifications would take into account the actual characteristics of systems that are already operational or coordinated, and the characteristics originally assumed in the plan for all other entries.

The modification procedure would also be used whenever a change to the basic parameters of the plan was required as a result of the coordination process.

#### *6. Duration of the Plan*

The resulting plan would be in effect for a minimum of ten years, and would be subject to review after that time. It would remain in effect until such time as it is replaced by a new agreed plan. The ten-year duration is the expected interval over which its technical basis would reflect the technology used to implement actual systems.