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Towards a new communication satellite regulatory regime is there communication equity in the global village?

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TOWARDS A NEW COMMUNICATION SATELLITE REGULATORY REGIME:
IS THERE COMMUNICATION EQUITY IN THE GLOBAL VILLAGE?



by
Dwayne Roy Winseck

A Thesis
submitted to the
Faculty of Graduate Studies and Research
through the Department of Communication Studies
in partial fulfillment of the requirements for the Degree
of Master of Arts at
the University of Windsor

Windsor, Ontario, Canada
1989



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ABSTRACT

This study is a critical evaluation of the contribution of the International Telecommunication Union's (ITU) new satellite regulations to the ability of developing countries to realize their national communication policies. Data for the study was obtained from an intensive review of the literature on the subject, careful scrutiny of the primary ITU documents and from correspondence with Canadian and U.S. representatives to the ITU.

In the age of global communications, the information based economy and privatization, existing and proposed satellites services are straining the capacity of the geo-stationary orbit (GSO) and radio spectrum. These circumstances are threatening to pre-empt developing countries from the important field of satellite communications and the realization of their national communication policies.

At a 1979 World Administrative Radio Conference (WARC) this prospect prompted calls by the developing countries for a special conference to deal specifically with guaranteeing them practical and equitable access to the GSO and radio spectrum. The response was a two-part conference, commonly referred to as Space WARC, convened in 1985 and 1988. In the years leading up to the conference, Space WARC was touted as a revolutionary vehicle to integrate the developing countries into the burgeoning field of satellite communications.

The conference did not result in a revolutionary approach to

the international administration of satellite communications but in a slightly evolutionary approach which saw the interests of the dominant satellite users firmly protected and entrenched. Instead of embarking on a radically new "a priori" regulatory approach the conference, in the main, preserved the "first come first serve" mechanisms which were the source of problems that had originally motivated the conference. A minimalist version of guaranteed, but not equitable, access was promoted through the establishment of an Allotment Plan.

Because of the inability of the conference to escape the quagmire of competing political and economic interests, this thesis proposes a model of property rights to the GSO and radio spectrum. The model, based on public and private property principles, aims to rectify the shortcomings of the new regulations and allow developing countries to pursue their communication policies. This model is contained in chapter 5.

Unlike the diagnosis of some Western communication scholars the findings of this study indicates, that, at least in this area, the source of Third World under-development is at least as much a product of external, systemic and structural barriers to advancement as of any internal problems that might exist in developing countries. The objective of this study is to lay out the regulations adopted at Space WARC so as to aid the practitioner and student of communication in coming to terms with the salient issues in international communication regulations.

DEDICATION

This thesis is dedicated to the memory and spirit of Meng, Xiaoping (November 10, 1953 - August 29, 1989). Her enthusiasm, dedication, love and keen intellect were a constant source of inspiration. Let this thesis stand as one of many monuments to Xiaoping's legacy of spirited inter-cultural communication and universal love.

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I would especially like to thank Dr. Marlene Cuthbert. Dr. Cuthbert's enthusiasm for the field of international communication and dedication to her students made this undertaking both intellectually and emotionally satisfying. Her demanding, yet tolerant tutelage allowed me to fully grasp the material involved and to shape the outcome in my own image.

I would also like to thank Professor Mary Gerace - Gold for letting my enthusiasm for the subject to reign free while ensuring that such freedom did not outstep the bounds of good scholarly precision.

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CHAPTER 1

AN INTRODUCTION TO INTERNATIONAL COMMUNICATION
SATELLITE REGULATIONS

1. The Genesis of A Priori Planning

A priori planning or allotment planning is an important concept that refers to the geo-stationary orbit (GSO) and the radio spectrum. It stems from the call by the third world countries during the 1960's for a New International Economic Order (NIEO), which was followed in the 70's by a call for a New World Information and Communication Order (NWICO). In essence, the trend towards a global information based economy has effectively made NWICO the functional adjunct of the NIEO.

To attain a semblance of symmetry in this environment NWICO stresses a "more just and equitable balance in the flow of, and content of information, a right to national self-determination of domestic communication policies, and, finally, at the international level, a two-way information flow reflecting more accurately the aspirations and activities of the developing countries" (McPhail, 1987: p. 11). The role of a priori planning in achieving these ends is twofold: to (a) allow developing countries to realize their national communication policies by (b) redressing the disproportionate use of the GSO and frequency spectrum by the developed countries. To do so, it is argued, would give developing countries "guaranteed" and "equitable" access to the tools of the information revolution (Hudson, 1986:

p. 210).

The genesis of a priori planning, as applied to satellite communication, can be traced back to 1959 when an Administrative Radio Conference (ARC) first dedicated a portion of the radio spectrum to space services. In 1963 WARC allocated additional frequency bands and adopted technical criteria for satellite services. A WARC in 1971 gave rise to frequency assignments and established coordinating procedures for Broadcast Satellite Services (BSS). It was the first conference to promulgate the notion of equal rights of all members to the GSO and radio spectrum. Essentially, this conference assigned specific portions of the bandwidth reserved for communication satellites to the different satellite communication services available at that time -- Broadcast, Mobile, Fixed, and so on. To reach these ends it established rules and regulations for the orderly development of BSS that were to be administered on a bilateral or multilateral basis (Sweeney, p. 92). At a Regional Administrative Radio Conference (RARC) in 1977 a sharing agreement was arranged between BSS and other services using the 12 GHz frequency band. Orbital assignments were also implemented in Regions 1 and 3, which includes all countries lying outside the Americas (United Nations, p. 79).

Some of the most crucial decisions for the purposes of this thesis came out of WARC-79. This conference completely overhauled the ITU's Radio Regulations and promulgated the notion of a policy which would guarantee equitable access, in practice,

to the GSO (Hudson, 1986b: p. 338). This notion was to guide the creation of international satellite policy at two future sessions after 1984. In 1983, the Americas, Region 2, adopted a plan for BSS. However, the agreement did not receive international recognition until it was incorporated into the Radio Regulations in 1985 (Demac et al., p. 8).

Although the 1985 Space WARC brought the Region 2 Agreement on BSS into the Radio Regulations, its primary purpose was to establish principles and criteria to provide a framework for final policy decisions, and to identify which services and frequency bands to plan (U.S. Senate Hearings, 1983: p. 5). Between 1985 and 1988 inter-sessional working parties were established to translate the principles and criteria established at the 1985 session into the technical parameters that guided the policy coming out of the 1988 Space WARC. The 1988 Space WARC brought the ITU members together to finally vote on, and piece together, the options that resulted in new regulations that now guide international and domestic satellite communication.

After obtaining a thorough understanding of the principles put forth by the 1985 session, and the regulations adopted during the 1988 session, this study proceeds to analyze their implications for the ITU, the developed countries and, most importantly, the ability of developing countries to implement and attain the goals of their communication policies. The objective is to determine if current ITU initiatives, with respect to a priori planning, adequately address the concerns of the

developing countries.

1.1. Problem Areas Revealed During the Literature Review

As I have indicated, the a priori planning concept evolved out of the NIEO and NWICO movements. The establishment of communication regulations by the ITU contributes to formalizing the order of technological innovation and distribution, the efforts of the ITU vis a vis realizing the objectives of the NWICO and a framework for guiding the establishment of property and commercial activities in space. In doing so, the regulations have the potential to allow developing countries to use communication satellite technology effectively to realize their development plans.

Along this dimension, the study demonstrates how the current regulations benefit mainly the west, presents ideas and efforts directed at redressing these imbalances, and assess the efforts of the ITU to maintain flexibility so that cost effective, state of the art satellite systems can be introduced. Marlene Cuthbert provides focus when she states that regulatory efforts, vis a vis new technology, must be directed at "the extent to which technology can be appropriated and used and not left to its own momentum and direction" (p. 168). This is an important issue as it gives tacit recognition to the idea that communication satellites are not neutral and that sound policy must guide their implementation so their use is in the interests of all. A carefully qualified statement can be made that this realization

has partially guided recent ITU initiatives.

A fundamental presupposition of the NIEO and NWICO is that all countries should receive an equitable share of benefits derived from common international resources such as the GSO (Galloway, p. 280). This is known as the "common heritage of mankind" principle. The "common heritage of mankind" principle, as it relates to the GSO and radio spectrum, was put forth by the United Nation's 1967 Outer Space Treaty. The Treaty states that outer space shall be used to benefit and be in the interest of all countries regardless of economic and scientific development (Galloway, p. 280). Since the inception of radio communication, economic, technical and political realities have naturally suggested that the radio spectrum, and later the GSO, be guided by public property principles. In the technical and economic arena, the early patenting efforts of Marconi threatened to monopolize the radio spectrum. This threat, coupled with the competing interests of nations using the radio spectrum, has always suggested that the spectrum and G.S.O. be kept free of proprietarial interests (Lorimer et al., p. 154). Additionally, United Nations proceedings on issues related to the use of the radio spectrum and the GSO have repeatedly urged its members to exchange information to "supplement but not duplicate" technology to allow all nations to realize the benefits of radio communication (United Nations, p. 1).

Article 33 of the International Telecommunications Convention catches the spirit of the U.N.'s direction on the

spectrum and GSO issue. However, prior to 1982, important conditional provisions within Article 33 still contradicted the spirit of the Outer Space Treaty. Prior to 1982, Article 33 read as follows:

In using frequency bands for space radio service Members shall bear in mind that radio frequencies and geo-stationary orbits are limited natural resources that must be used efficiently and economically so that countries or groups of countries may have equitable access both in conformity with the provisions of the radio regulations according to their needs and the technical facilities at their disposal (emphasis added) (Galloway, p. 276).

Since developing countries often do not have the requisite "technical needs at their disposal" the Convention was amended at the Nairobi Plenipotentiary Conference (1982) by deleting the offensive clause in favour of one that addressed the "special needs of developing countries."

Within these provisions lies the crux of the problem at hand. Neville Jayaweera rightly asks how satellite technology can be implemented without reinforcing existing structural inequities that are the source of most Third World problems (p.15). Essentially the focus is whether the GSO should be allocated according to economic and technological imperatives or whether consideration should be given to broader social, political, historical and developmental criteria.

The first set of criteria is the principles of the "first come first serve" position held by the developed countries. The latter set of criteria are those held by countries promoting the a priori planning concept. Although there are relatively few

countries that perfectly follow these distinctions, the dichotomy provides for ease in conceptualizing the parameters of the issue. The respective promulgators of each of these methods hold different, and often contradictory, notions as to what constitutes equitable and efficient mechanisms for accessing the orbit/spectrum resource. Efficient use of the resource, from the perspective of developed countries, is primarily a function of the number of satellites that can be deployed with a minimum amount of regulatory delay. On the other hand, developing countries measure equitable and efficient use of the orbit/spectrum on the basis of the "number of staff needed to monitor regulatory plans and procedures, the cost in time and travel for countries to meet and resolve problems or modify the planning process and the perceived danger of dependency on imported, overly complex and costly technology to meet requirements" (Hudson, 1986b: p. 337). It is these problems that establish a benchmark to which the study refers when considering the effectiveness of recent ITU initiatives in addressing the needs of developing countries.

Previously the ITU's "first come first serve" regulatory regime was guided by technical and economic considerations alone (Hudson, p. 210). Services were implemented on a case by case basis with concern only for technical efficiency and compatibility. Resource conservation per se was not of great concern (Dizard, 1985: p. 11). The ITU is no longer solely concerned with technology co-ordination, but is also engaged in

assisting developing countries. The ITU has assumed a balancing act in which the rapidly changing technological and commercial needs of industrialized countries are dealt with and counter-balanced by securing the transfer of telecommunications resources to developing countries. It has become necessary to accommodate the needs of developing countries to maintain the viability of the ITU and the global communications network. This is the paradox of international communication.

A review of the literature to date has revealed a series of problems associated with the "first come first serve" regime. They are briefly outlined here and more thoroughly throughout the subsequent chapters. First, considering the problem from the perspective that the resource is severely limited will not prove to be effective. Instead, I suggest that the problem be viewed as a product of the disproportionate use of the resource by some countries, and that the current regulatory regime, containing unfair criteria and principles for dividing up the resource, reinforces structural inequities that prevent moving towards a NWICO. From this perspective it is quite clear that the developed countries, having exclusive use of 72 percent of the available satellite space, hold disproportionate amounts of capacity (Hudson, p. 210). It has also been pointed out that 90 percent of the radio spectrum's capacity is held by the governments, mass media, multinational corporations and military of the developed world (Smythe, 1986: p. 3).

Yet, it must be remembered that in the last twenty years the

spectrum has been greatly expanded, and its use made more efficient through advances in technology. This has been done by increasing the power and capacity of satellites, decreasing the angle of separation required between satellites and techniques which allow frequencies to be re-used (Galloway, p. 281).

However, this expanded capacity contains a number of important implications for those intending to use satellite communication to realize their national policies. The notion of sufficient capacity of the GSO and spectrum, although true, tends to obfuscate important concerns of the developing countries. The expanded GSO and spectrum, while opening up more space, have tended to increase satellite construction and operating costs (Levin, 1986: p.260). Harvey Levin claims that developing countries are often shunted off into the higher bands being opened up by regulatory means or technological innovation. Ultimately, this tends to increase the cost of developing and operating communication satellites (1984: p.434). This occurs because initial non-recurring engineering costs are absorbed by those proposing to operate in the new bands. Consequently, these services are unable to avail themselves of the economies of scale enjoyed by those in the lower spectral regions, where fully developed technology is readily available with operating characteristics that are thoroughly understood.

Basically, the higher spectral regions contain harsher propagation characteristics that must be compensated for in the design of the satellite communication network (Levin, 1986:

p.267). The higher one moves up the spectrum the greater the signal attenuation due to natural elements such as rain and solar disturbances. Considering that most developing countries are located in the tropics, there is a very legitimate concern that their allocated spots may be inconsistent with climatic and atmospheric realities.

Second, there is a relationship between the planned orbital spaces, frequency allocation and the ability to initiate appropriate satellite programs for development. Presently most satellites serve heavily travelled routes whereas what is needed in most developing countries are satellites developed for thin routes (Rice et al., p. 127). There is a multi-variate relationship between higher satellite costs to serve thin routes, the need for low cost ground stations for rural development (and these necessarily require spectrum inefficiency) and consequently the need for orbital parking spots (Clippinger, p. 199). The study discusses each of the factors in this relationship, and how they impinge on one another in relation to, and as a measure of, the success of the measures adopted by the ITU.

Currently there is technology available that is orbit efficient and designed to serve thin communication routes typical of developing countries. However, such technology is afflicted with two problems. First, both the earth and space segments of such a satellite system are expensive. This is because the closer spacing requires higher transmitting power and more

discriminating, yet smaller, receiving dishes (Hudson, 1986b: p. 337). The second relates to the question of who the technology is serving and where it is being deployed. Unfortunately, the answer, in large part, can be found in the domestic policies of the most advanced satellite producing and using country, the United States. U.S. domestic satellite policy has encouraged international competition with INTELSAT through private commercial satellite entities (U.S. Senate Hearings, 1985: p. 14). The result of this domestic policy initiative has been a plethora of proposals for commercial operations in the lucrative trans-Atlantic corridor and between the geographically separated operations of multinational corporations. Such systems contribute to further congestion of the already taxed capacity of the GSO and radio spectrum.

Because of these problems it is often reported that late-comers to the GSO experience higher entry costs (Levin, 1986: p. 252). The satellite used by India for its Satellite Instructional Television Experiment (SITE), and by Indonesia, for its PALAPA satellite series, provide concrete examples of the late-comer higher cost phenomenon (Doyle, p. 8). Both countries had difficulty in coordinating their GSO and frequency needs with the existing INTERSPUTNIK and INTELSAT services. The result was a change in their preferred orbital positions and power restrictions which increased the cost of earth stations. This latter alteration can be implicated as a cause of the net reduction in benefits accruing to the SITE experiment.

The experiences of India and Indonesia raise the important issue of responsibility for accommodating coordination costs--will it be the late-comer or the incumbent? If it is the late-comer, inevitably those from developing countries, then this represents an excessive burden to market entry. This has been the practice under the "first come first serve" regime. Thus one of the goals of a priori planning, or an allotment plan, is to prevent the build-up of excessive entry costs (Levin, 1986: p. 255). This thesis gives detailed consideration to how this phenomenon was addressed by the procedural changes in the regulations developed and adopted by the 1985 and 1988 WARC sessions. Chapters three and four enumerate these procedural changes and evaluate their effectiveness in eliminating such structural inequities.

As will be demonstrated, these aspects were not adequately addressed by the provisions adopted at the 1985 WARC session and implemented at the 1988 WARC session (New York Times, 8 August, 1985). The sessions adopted an Allotment Plan for the expanded C and Ku bands where technology is not readily available. Gaining an understanding of the services and frequencies covered is also important to understanding other concerns of the developing countries.

The last area studied is the area of rights in space. Specifically, does a priori planning, or allotment planning, establish sovereign rights to the GSO? If so, what are these rights and what are the implications for the "common heritage of

mankind" principle? Under the "first come first serve" regime de facto rights were established. This was supported by coordinating procedures, as discussed earlier, that placed the burden of achieving technical compatibility on the newcomer. The new procedures purport to accommodate future users and not to enshrine the rights of those who get there first. The rights and obligations that nations assume under the Allotment Plan, with respect to their use of the GSO and radio spectrum, are presented and discussed in the following chapters.

The answer to the question of rights is important to understanding some of the development schemes alluded to in the literature. William Melody proposes such a scheme when he speaks to the idea of renting unused portions of the GSO (p. 233). Considering that many developing countries will not have the technical skill, the economic wherewithal or even the need for a dedicated space and associated frequencies Melody notes that it may be attractive to allow them to "rent or lease out" their spot. Monies collected could be tied to indigenous development plans. However, the possibility of such a scheme is dependent on the nature of rights that are established in space. Some countries have put forth strident and vitriolic demands, claiming national sovereignty over the portion of the orbital arc that lies adjacent to a nation's land mass. Such claims have been vehemently put forth by Columbia and other equatorial nations but have been dismissed as abrogating international public property principles associated with the orbit/spectrum resource (U.S.

Senate Hearings, 1983: p. 32). However, it is my contention that the retention of public property principles no longer serves the public interest, but, ironically, benefits commercial interests that they were established to thwart. As such, chapter five contains a model based on equity and private property principles that could allow the above mentioned arrangements to be executed.

1.2. The Significance of This Study

Most importantly, the study is concerned with the contribution of the new satellite regulations to the ability of the developing countries to realize their national communications policies. This is, in part, dependent on the reduction of current global communication inequities. By accomplishing these objectives, the regulations would become a formidable element in the reduction of dependent geo-political relations that so often characterize the encounters between developing and developed countries.

The decision by countries to undertake a satellite based telecommunication based network requires them to:

- (i) make a large committment of financial resources; and
- (ii) establish a professional infrastructure that is capable of managing the technological sophistication of the hardware.

In doing so, the implementing country enters into territory fraught with the potential for dependent relationships.

As noted by McPhail, dependent relationships can be "established by the importation of communications hardware, along

with engineers, technicians and related information protocols, which unconsciously establish a set of foreign norms, values, and expectations which may alter the domestic culture and socialization process" (emphasis added, McPhail et al., 1987b: p. 294). As well, since communication satellites transcend geographic barriers and inter-connect with a variety of national telecommunication networks, the responsible country must be cognizant and keep abreast of international regulations applying to communication satellites. These regulations can either inspire equitable communication relations or the furtherance of gaps between developing and developed countries.

The regulations can guide communication satellites that come, as Neville Jayaweera states, "in a socio-economic-cultural-political package...[that]...by its very inner dynamic seeks to integrate its users into the larger system of which it is the expression and the tool" (p. 15). Thus, the "a priori plan" adopted must be evaluated in terms of its ability to allow countries to use satellite technology to assert themselves within the larger system of which they are a part. In short, the regulations must contribute to an environment in which all countries can implement their communication policies as they see fit. Thus, the terms and conditions contained in the new regulations can be inspected for their consistency with these objectives.

Yet, it must be noted that the quagmire of national development plans, international geo-political relations and

processes of establishing international regulatory policies often result in warnings, like those of McPhail and Jayaweera, going unheeded. In this environment, Marshall McLuhan's notion of a global village silently forges ahead, being drawn even more closely by communication satellites. Communication satellites are a potent technology that tighten the cultural, political and economic bonds of the world's people. The new communication satellite regulatory initiatives will figure greatly in shaping the power relations characterizing these bonds. They will guide the distribution and equitable use of satellite technology and, consequently, contribute to determining who will be the beneficiaries of this greatly inter-connected global village. The regulations need to be viewed for their revelations of a "new international order", and with the objective of bringing to light areas that resonate with the colonial and neo-colonial practices of the past. Thus, the regulations, and McLuhan's global village, are conceptual tools to measure the equity of communication relations. It must be asked, do the regulations and use of communication satellites mark the evolution and emergence of a global village characterized by equitable relations, or do they further the interests of the haves against the have-nots?

As has been noted, the formation of regulations and policies by the ITU are integral to the reinforcement or lessening of existing inequities in international relations. The outcomes of Space WARC will have definite implications for developing

countries' use of the GSO and radio spectrum. The importance stems from the realization by all countries that the GSO and radio spectrum are resources that they must "use...for their own national development" (Hedebro, p. 11). Adequate regulations adopted by the ITU will allow these countries to realize their own national communication policies and to realize the intent of international doctrines guiding the use of the GSO and radio spectrum.

The benefits of the new regulations are, theoretically, to allow developing countries to gain control of a useful tool for self directed development, to reduce dependency and to constitute one element in the creation of a symmetrical international economy. In a very real sense the regulations can alleviate the spectre of having national communication policies pre-empted by congestion in the GSO and radio spectrum. Alleviating these concerns can assist in:

- (i) reducing the number of circumstances that handicap newcomers access to the GSO and radio spectrum. This was a situation that ultimately has driven the cost of Indonesia's satellite communication system beyond \$840 million when more than half that countries population earned "less then \$50 per year" (Chomsky et al., p.215).
- (ii) avoiding the premature allocation of resources. This is a phenomenon that can be readily seen in Mexico's Morelos Satellite system that currently is operating at less than 50% capacity, and losing \$20 000 per day (Satellite Week, Jan. 23, p. 3).
- (iii) the development of national communication policies that have clearly defined, long term strategies, a policy that will have profound political, economic, social and cultural implications for years to come.

Considering that the international economy is becoming

increasingly dependent on the flow of information, it is a logical extension to now identify the NWICO movement as the functional arm of the NIEO. In the international economy land and labour are no longer the pre-eminent factors of production as they were in the past. Now it is the rapid transfer and manipulation of information which underpin the economy. Dallas Smythe indicates that managing and conducting international business is inextricably tied to the orbit/spectrum resource (p. 1). Indeed, the commercialization of these resources was the largest industry in the U.S. last year (Macleans, p. 25). As such, an adequate communication infrastructure has become a prerequisite to participation in the global economy and the reduction of current inequities. With this in mind distributive regulatory measures must be promoted and employed with the aim of achieving symmetry among the participants of an international economy. Succinctly stated, developing countries must have access to the tools of the information revolution. According to Heather Hudson, communication can facilitate development through:

1. Efficiency - that is the improvement of the output to cost ratio.
2. Effectiveness - the extent to which indigenous development goals are achieved.
3. Equity - the distribution of development benefits equally both nationally and internationally (Hudson, 1986b: p. 337).

It has been noted that relatively low investment in existing telecommunication hardware leaves developing countries free to invest in satellite technology dedicated to such purposes

(Jussawella, p. 11; Hudson, 1986b: p. 333). Presently, in comparison to developed countries, the investments of developing countries in telecommunications are low. The current rate of investment in telecommunication infrastructure development in developing countries is, on average, equal to only .3 per cent of their GNP. This is only one-half that of the developed world (Stevenson, p. 65). This is significant when related to recent findings which suggest that the rate of return on telecommunication investments in developing countries averages around 27 percent (Garcia, p. 55). It is reasonable to expect that because of the lower costs associated with telephone services using satellite linkages as opposed to a solely land based system, demand for the orbit/spectrum resource will increase among the developing nations. This is becoming evident as a number of developing countries prepare to launch their own satellite based system. Recent studies indicate that developing countries are rapidly expanding their telecommunication infrastructure and, therefore, a regulatory regime can no longer remain which does not provide for equitable access or, on a de facto basis, results in higher late-comer entry costs (Smythe, 1986: p.9).

The approach of this study is to seek out structural barriers to advancement in the developing world from the field of international communication. Consequently, the approach differs from previous research that emphasized the source of all Third World ills as coming from problems within developing

countries themselves. From the perspective of others these so called problems ranged from social and psychological ineptitude to economic and technological backwardness.

This study also rejects the theoretical assumptions of researchers such as William Shramm and Daniel Lerner who held that mass communication was the panacea for development in the western style (McPhail, 1987: p. 41). It is now becoming common knowledge among communication scholars that investments by developing countries in mass media facilities have often been misdirected. Recent approaches suggest that developing countries which re-orient their priorities to basic interactive telecommunication infrastructures will experience the most benefits.

1.3.

Research Method

The study is a historical and critical evaluation of the contribution of a priori planning, as adopted by the ITU, to national development. Primary data for the study were obtained from the findings and resolutions of the relevant WARC sessions and from various people at national departments of communication involved in ITU policy formation. Additional primary sources were correspondence and telephone interviews with others currently studying this subject. Secondary sources are from an intensive review of the literature containing commentary on the issue.

Most of the people with whom correspondence and interviews

were conducted represented Canada and the United States at the 1985 and 1988 Space WARC's. Their expert knowledge and candid answers to questions posed by the author were essential in extracting some of the finer and more subtle details that guided the conference proceedings and ultimately the regulations that were adopted. Because of the input from these policy and industry experts, the thesis is able to go beyond material published on the subject to provide a more penetrating analysis that puts the conference into an overall context.

Throughout the following chapters, the information derived from these sources and the published material on the subject is used to determine if the regulations contribute to self-reliant national development. Value is placed on the fundamental presupposition that communication regulations adopted by the ITU should facilitate national priorities. Principles and conditions that detract from this value are identified, and possible solutions recommended.

An important aspect of the thesis is defining key terms and the relevant linkages among them. However, the reader has to bear in mind that some definitions are over-simplified. This is most visible when the distinction is made between the "first come first serve" regulatory regime and the "a priori planning" regulatory structure. Although relatively few countries fit the dichotomy perfectly there is a definite correlation between a nation's development, satellite communication capacity and its position on regulatory policy. For example, as countries such as

India and China obtain satellite communication facilities and adopt policies promoting the rapid expansion of satellite based communication networks, their position tends to move towards that of the developed countries. As well, countries, like Indonesia, that experienced difficulties in the past are now showing reluctance to make any compromises to facilitate the arrival of new satellite systems (Carew, Note 1). Furthermore, countries such as Canada, in the spirit of compromise and international diplomacy, have tabled mechanisms such as the macro-segmentation approach to orbit allocation and proportional burden sharing formulas, which deviate from hard line "first come first serve" positions. One must also bear in mind that this fluidity is an integral part of the political process. Negotiations, socializing, international diplomacy, and even sanctions are as much of the process as the many other 'technical' considerations (U.S. Senate Hearings, 1985: p. 40). A useful way of visualizing the distinction is to regard the policy principles as fixed and the positions of the countries as fluid.

Within this international environment countries are constantly striving towards the development and refinement of cohesive national communication policies. These policies are, as Goran Hedebro states, concerned with three broad aspects of communication. First, national communication policies set forth the purposes and functions of the media. Second, they determine the technology to be used. Third, they establish an institutional framework within which the media will operate.

Primarily the focus is on "the development of the nation" and "[h]ow...the media can contribute to such efforts" (p. 12).

Another term which requires some explanation is context. It must be realized that the social and cultural directions of countries are inextricably melded into a larger macro-political and economic structure. This is becoming increasingly apparent as the so-called electronic global village relentlessly transcends national boundaries.

The most important aspect of this context to bear in mind is the legacy of colonialism that afflicts most developing countries, and the relationship of colonialism to the NIEO and NWICO. To become truly independent developing countries must abandon much of the legacy of colonialism, as well as the modern role of the client state, in favour of acquiring control of the means, such as satellite communication, to acquire their sovereignty and, at the same time, participate in the global economy. This is crucial to redressing the structural inequities entrenched during colonialism, and perpetuated since. When the term 'context' is employed this is the image I wish to evoke. The remaining terms will be defined as they arise.

1.4. Organization of this Thesis

This study considers the origin of a priori planning and the active debate and policy changes it has generated within the International Telecommunications Union (ITU). The following chapters discuss the implementation of a priori planning to date.

The thesis is organized into five chapters, the first of which is the outline presented here. Chapter two is a description of the ITU's organizational structure and a discussion of the factors which impact on the formulation of international regulatory policy. The next chapter discusses the political principles and technical basis developed by the first half of Space WARC (1985), that guided the formalization of a relatively new international satellite regulatory regime at the 1988 Space WARC. Chapter four presents and analyzes the regulations as they appear in the conference's Final Acts. Essentially, chapter four is a concluding analysis of the results of Space WARC in light of the need of developing countries to have an adequate regulatory environment to realize their communication policies. The study concludes in chapter five with a broad synthesis that places some of the conference's deliberations within the current international communications environment. Chapter five also proposes a new model for property rights to the GSO and radio spectrum.

CHAPTER 2

THE ROLE OF THE INTERNATIONAL TELECOMMUNICATION UNION (ITU) IN THE DEVELOPMENT OF INTERNATIONAL COMMUNICATION REGULATIONS

2. The History and Development of the International Telecommunication Union

The International Telecommunication Union started out as the International Telegraph Union in 1865. It is the oldest international inter-governmental agency. It was originally conceived to facilitate and coordinate the international use of the telegraph among its member administrations. This was conducted in a primarily laissez-faire environment in which a minimum amount of standards and regulations were promulgated. This environment was derived from the desire of nation states to ensure sovereignty and to avoid a regulatory regime that would impede technological progress while at the same time promoting the efficient development of an international network (Coddington et al., p. 15). These concerns still persist.

For technical and political reasons a separate loosely structured organization of nations existed to regulate radio. However, by 1932 communications had progressed to a point where it was no longer desirable to maintain two separate organizations. The number of bilateral and multilateral arrangements between the national administrations of Western Europe, Austria and Germany began to contradict one another, creating chaos. From this point on communications involving the telegraph and radio became part of the general mandate of the

International Telecommunication Union (ITU) (Coddington et al., p. 5).

Between 1903 and 1932 the basic purpose and structure of the ITU was established. The ITU evolved as an institution to: provide a forum for nations to meet on a regular basis to establish basic technical and operating standards; to collate, distribute and store information on telecommunications matters; and to establish procedures for the acquisition of frequencies free of interference from other operating systems (Coddington et al., p. 18).

Member nations are bound by ITU rules and regulations which have the force of international treaties (Coddington et al., p. 203). Membership in the ITU is limited to sovereign states. During the first eight decades of the ITU's existence, when colonialism was still an acceptable practice, this provision had the effect of eliminating a vast amount of territory from participation. As well, the instituted scheme of 'colonial voting' greatly favoured the colonial powers of Western Europe and kept the views of a constantly expanding membership in check. This scheme allowed Imperial nations to possess a number of votes equal to the number of colonies administered. Under this practice Britain, France, and Portugal each held six additional votes (Coddington et al., p. 11). For this reason much of the ITU's organizational structure and policy instruments took on a distinctive form. However, this practice was finally abolished in 1973 and voting is now truly conducted on a one

nation/one vote basis.

In 1947, the ITU became a specialized agency of the United Nations. Under the UN/ITU Agreement the ITU became the agency for translating the general legal principles developed in the UN on communication matters, into a workable international regulatory structure (Sweeney, p. 17). General principles promulgated by the UN have the objective of protecting the sovereignty of nations, providing for the equitable distribution of the electro-magnetic spectrum and facilitating international cooperation on political, economic, social, cultural, education and health matters. These principles do not have the force of an international treaty but are expressions of its member's political will (Rutkowski, p. 345). It is the ITU that translates this general political will into rules and regulations which carry the force of international treaties.

Prior to World War II the western nations dominated the ITU and agreement was usually reached by consensus (NTIA Report, p. 289). The process of allocation was on a case by case basis with only economic, technical efficiency and compatibility considerations coming into play. Resource conservation per se was not of great concern (Dizard, 1985: p. 11). Proposed services were put into effect by simply informing the ITU's registration board which would ensure that the proposed system did not interfere with existing systems. This process established a nation's rights to international recognition for the use of the designated frequency and the protection of that

frequency from harmful interference. This process has come to be known as the "first come first serve" regulatory regime and is generally considered to favour those nations with advanced technological and economic infrastructures. For the most part these have been western industrialized nations and the U.S.S.R. (Mathey, p. 346).

World War II had two important implications for the ITU. First, the war resulted in a greatly accelerated rate of technological development in both the military and civilian sectors. The rapid rate of telecommunication technology development and deployment amplified the importance of promoting an integrated network and required the ITU to step up its efforts in coordinating membership activity in order to avoid chaos. Paradoxically this technological imperative reactivated old fears that regulations would impede technological advances (Coddington et al., p. 15).

The second development arising out of the war was the process of decolonization, vigorously promoted by the United States. This process manifested itself in all international organizations during the 1950s and 1960s and the ITU was no exception. The influx of new members from the Third World set the stage for a considerable shift in the balance of power within the ITU. The formalization of the non-aligned movement in 1955, at Bandung, marked a turning point in the ITU's history (Smythe, 1986: p. 7). After this, and much to the consternation of the developed countries, the ITU became more responsive to the needs

and concerns of the Third World.

The effect has been to steadily erode the economic and technical basis of the ITU's regulatory regime and broaden the criteria to encompass broader social, political, historical and development criteria (Naslund, 1985: p. 18). This was done within the context of the New International Economic Order (NIEO) and the New World Information and Communication Order (NWICO) .

However it was apparent then, as it is now, that standardization is necessary from both an economic and technological point of view. Standards minimize the use of differing techniques and the consequent cost of expensive conversion equipment (Renaud, p. 181). As well, by establishing standards prior to the implementation of new products, the ITU promotes new business opportunities by providing sufficient certainty of a common approach to induce manufacturers to produce equipment and operators to buy and build systems. (The negative aspects of this will be discussed below) (Dizard, 1984: p. 40).

Before getting into the fundamentals of the current organizational structure and policy making structure of the ITU, this chapter will discuss how the NIEO and NWICO movements relate to the development of international communication regulatory policy.

The NIEO starts from the premise that the gap between the rich nations of the industrialized north and the under-developed nations of the south is a major blight on the twentieth century.

The 1974 UNESCO Resolution (3201) captures the essence of the movement well in encouraging its members to:

work urgently for the establishment of a New International Economic Order based on "equity, sovereign equality, interdependence, common interest and cooperation among all states," irrespective of their economic and social systems which shall correct inequalities and redress existing injustices, make it possible to eliminate the widening gap between the developed countries and developing countries and ensure steadily accelerating economic and social development and peace and justice for future generations (McPhail, 1987: p. 79).

It is the economic importance of telecommunication that has brought it within the sphere of the New International Economic Order (NIEO). The economies of the developed countries are now propelled by the information sector. In these countries the information sector now employs 50 per cent of the work force (Renaud, p. 180) and contributes more to the GNP of these nations than the traditional manufacturing sector (McPhail et al., 1987b: p. 289).

The new communication technologies have contributed to the economic development of those countries that have them, but threaten to widen the gap between them and the majority of the countries that have no such infrastructure. In fact 75 per cent of the world's population live in countries with less than 10 telephones per hundred people and 50 per cent live in countries with less than 1 telephone per hundred people (Hudson, 1986: p. 211). With such an inadequate infrastructure, participation in the emerging global economy is unlikely.

Not only does an inadequate infrastructure preclude

involvement in the evolving economic structure but it complicates the delivery of such basics as food, shelter, education, transportation, and health care (McPhail et al, 1987b: p. 291). Accordingly, the development of an adequate telecommunications infrastructure is looked upon as part of the solution to redressing past inequities. However, insufficient numbers of trained personnel, an inadequate technical infrastructure and the lack of capital continue to contribute to the under-development of information systems in the Third World. As we will see below the developing countries have called upon the ITU, amongst other agencies, to help address this situation.

The development of a telecommunications infrastructure is an integral part of the NWICO movement. New developments in telecommunication, such as satellite communication, have considerably altered the construction of social, economic and political organizations and the way mankind interacts (McPhail et al., 1987b: p. 125). Given this reality developing countries are actively participating in relevant forums instead of remaining passive recipients to technological and economic imperatives. The basic goals of the NWICO movement are captured in the following Articles of UNESCO's Universal Declaration of Human Rights.

Article 19 states:

Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media regardless of frontiers.

Article 3 states:

The mass media have an important contribution to make to the strengthening of peace and international understanding and in countering racialism, apartheid and incitement to war...through (Article 6) the establishment of a new equilibrium and greater reciprocity in the flow of information ... to correct inequities in the flow of information to and from developing countries, and between those countries (Kleinwachten, 1986: p. 139).

Developing countries have taken guidance from these provisions in their attempts to redress the imbalances in cultural and ideological representation in the media and to address the issue of sovereignty and autonomy over the development of national communication policy and exploitation of the information resource. For developing countries, as for the developed world, the ability to control information allows for the development of social, political and economic power.

The NWICO concept was adequately researched and defined during a decade of prominence at UNESCO and has now been imported into the ITU (McPhail et al., 1987: p. 207). The primary effect of the NWICO has been to force the ITU to consider the politically sensitive issue of the ability of developing countries to access the radio spectrum and geo stationary orbit (commonly referred to as the orbit/spectrum). The issue confronts the ability of the ITU to ensure developing countries access to these resources without undue prohibitive entry costs, while recognizing the need of the developed countries to have access at a rate significant enough that technological advance, and associated spinoff benefits, are not retarded (Montgomery, p.

203). To many developed countries this represents the 'politicization' of the ITU and a significant deviation from its mandate.

As I will illustrate later the mandate of the ITU has indeed been changed. However the present discussion will indicate that this does not represent the politicization of the ITU, simply because political matters have always entered its agenda. The only real difference is that there has been a significant shift in power that has disentranced the old 'establishment'.

The ITU has been a political body since its inception. In the period in which colonial voting existed, nations exercised power within the ITU proportionate to their colonial holdings. Since the number of votes possessed could affect the outcome of the rules and standards adopted, substantial time was spent amongst the colonial powers arguing over who controlled what (Dizard, 1984: p. 40). In between ITU forums colonial possessions could have changed hands many times over. Colonial voting was finally abolished in 1973 (Mosco et al., p. 18).

Admitting new countries to the ITU has often raised the political temperature of its sessions. The United States did not join the ITU until several years after its debut because it concluded that participation in the forum might interfere with its private sector. Considering the free-enterprise and conservative ideological heritage of the communication sector in the U.S., the thought of a group of nations regulating and setting standards for American industry was particularly

troublesome. However, once involved in the forum, the U.S. became particularly vociferous in its denunciation of the applications of Latvia, Lithuania, and Estonia for membership (Mosco et al., p. 19). The U.S. repeated this tactic at a later date when an application for membership was put forth by the Chinese government. Presumably, taking into account the spirit of the Cold War that permeated the globe, their position was based on an abhorrence of the communist ideology.

Ideological debates continued in later years over the continued membership of Israel and South Africa. The issue of Israel's continued involvement in the ITU was vigorously debated in 1982. Through the diplomatic activities of the U.S., and the threat of their withdrawal if Israel were to be expelled, Israel's continued involvement was narrowly supported (International Telecommunication Convention, p. 7). However, the Third World vote coalesced around a motion to exclude South Africa from any future ITU activities (Coddington et al., p. 48).

2.1. The Organizational Structure of the ITU

As indicated earlier, the mandate of the ITU has changed over the years. The following section will discuss the organizational structure, the location and process of policy making within this structure and how these elements have evolved within the changing international environment. The organizational structure of the ITU contains the following elements: The Convention and appended rules and regulations;

Plenipotentiary Conferences; the Administrative Council; Administrative Conferences, which include General World Administrative Radio Conferences (WARCs), Specialized WARCs, and Regional Administrative Radio Conferences (RARCs); the General Secretariat; the International Frequency Registration Board (IFRB); the International Radio Consultative Committees (CCIR); the International Telegraph and Telecommunications Consultative Committees (CCITT). It is also necessary to focus on the role and location of the private sector within the organizational structure.

2.1(a) The Convention and Appended Rules and Regulations

The Convention provides the institutional framework of the ITU and the general provisions and principles that shall guide it in the formation of regulations that have the force of international treaties. The basic function of the Convention is to set ground rules which guide ITU activities and members participation therein (Noll, pp. 19-21). It delineates matters such as the ITUs legal existence, relationship to the UN, membership criteria, the activities that it shall undertake and the composition of its various subordinate councils and committees (Coddington et al., p. 203). For instance, as we saw earlier, the ITU is open to sovereign states and decisions are arrived at by simple majority based on the one nation/one vote system. This is an example of how the Convention works in practice.

The Convention also deals with the rights of the public for

the use of the international telecommunication services, the rates charged for telecommunication services; the criteria for establishing, maintaining and protecting telecommunication facilities, and, the roles of government and non-government entities in the ITU and in the provision of services (Noll, p. 20-22).

Annexed to the Convention are the regulations covering three areas that comprise telecommunication - telegraph, telephone and radio (Noll, p. 22). The regulations annexed to the Convention serve to establish the technical and operating orbital positions (Coddington et al., p. 250 - 252). In establishing technical and operating standards the ITU undertakes an assessment of the emission qualities of the service, the portion of the radio spectrum required by the service and the codes and signals to be used for the purpose of identification.

Ironically, regulations are becoming more important as the number of countries privatizing their telecommunication sector increases. The establishment of proprietorial protocols and a lack of common standards in different national markets often amount to the equivalent of trade barriers. By establishing common standards the ITU helps to facilitate international trade in telecommunication hardware (Naslund, p. 85 -86).

There are two ways of vesting rights to the orbit/spectrum and these can be arrived at through two different procedures. The traditional method of assignment is known as the "a posteriori" method. The second, which is increasing in use, is

the "a priori" planning method. "A posteriori" is primarily used when resource conservation is not an issue, and when it is felt that an "a priori" planning regime will impede technological advancement and the efficient use of the natural resources utilized by telecommunication.

The ITU has employed two different procedures when assigning portions to the spectrum/orbit. The first is a simple process of notification and registration with the International Frequency Registration Board (IFRB) of a member state's intention to introduce a new service. The IFRB then checks for potential conflicts with existing systems. If potential conflicts are identified the parties are brought together and the IFRB assists in resolving the matter. This procedure is associated with the a posteriori planning regime. The second method is more involved, requiring the establishment of global or regional plans. Prior to allocating the spectrum/orbit, the type of service, the range of the spectrum/orbit to be utilized and the geographic areas to be serviced are identified (Coddington et al., pp. 274-276).

The rules and regulations annexed to the Convention, as mentioned earlier, carry the force of an international treaty. However, before a regulation or the Convention itself becomes legally binding on an administration, it has to be ratified or approved by that administration's government (Cassapoglou, p. 72). As well, there are two ways to circumvent the effect of particular regulations or portions of the Convention. The first, dealing specifically with regulations, is the use of the

footnote. A footnote indicates that a country intends to use a portion of the spectrum for purposes other than those which are specified. If a footnote cannot be obtained a device known as the reservation can be employed. This informs the ITU and member countries that the country registering the reservation will not be bound by the regulation or portion of the Convention in question (McPhail, 1987: p. 130). The reservation is a diplomatic tool that allows a country to save face. In effect the reservation is stating that:

...there are rules that must be followed if the international telecommunication system is to work while, at the same time, an attempt is made to give the appearance that in following these rules the state in question is not giving up its precious sovereignty (Coddington et al., p. 211).

Finally, features of the Convention, standards and regulations can be periodically altered to more accurately reflect changes in scientific, technical, social and political spheres. Formulating rules or amendments to either the Convention or the regulations is done through submissions from member states, or other ITU organs such as the Plenipotentiary Conference, the Administrative Council, Administrative Conventions or the International Consultative Committees. Proposed changes require a seconding motion and are then delegated to study groups for examination. Then proposed changes to the regulations or Convention are accepted or rejected on the basis of majority vote (Cassapoglou, p. 73).

2.1(b) Plenipotentiary Conferences

Plenipotentiary conferences are convened once every five or six years. The last one occurred in 1989 at Nice; the one previous to Nice was held at Nairobi in 1982. They are composed of delegations representing member administrations. Their mandate is to revise the Convention if necessary, implement procedural changes in the rule making process, establish the basis for the budget and set the dates for WARCs and RARCs (NTIA Report, p. 27).

The Plenipotentiary Conferences are of prime importance since it is these sessions alone that can change the ITU's guiding principles contained in the Convention. Since the 1960s these conferences have steadily implemented changes in an attempt to address the needs of the developing countries. One of the first changes instituted was a revamping of the financial contributory scheme. The objective of the restructured scheme was/is to make the level of contributions commensurate with the amount of an administration's participation in ITU activities. Since the participation of developing countries is lower than that of the developed nations, the effect was to transfer more financial responsibility to the developed countries (Coddington et al., p. 45).

The ITU expanded its primary function of facilitating an internationally integrated and compatible telecommunication network by placing greater emphasis on development issues such as technology assistance programs. The ITU became formally involved

in development issues through an amendment to Article 4, which now directs the ITU to:

foster the creation, development, and improvement of telecommunication equipment and networks in new or developing countries by every means at its disposal, especially its participation in the appropriate programs of the UN (Coddington et al., p. 285).

A related amendment also directed the CCIs to these same ends. To the developed countries this was a serious alteration of the ITU's objectives. In reality it was an equitable compromise to the competing interests involved.

Later Plenipotentiary Conferences, such as the one held at Nairobi in 1982, instituted further changes to achieve development objectives. Probably one of the most important outcomes of this conference was the recognition of the spectrum and geo-synchronous orbit as "limited natural resources". Article 33 was amended to read:

In using the frequency bands for space radio services Members shall bear in mind that the radio frequencies and the geo-stationary satellite orbit are limited natural resources and that they must be used efficiently and economically, in conformity with the provisions of the radio regulations so that countries or groups of countries may have equitable access to both, taking into account the special needs of the developing countries and geographical situation of particular countries (Melody, 1984: p. 267).

There were four other major revisions in the Convention that addressed the concerns of developing countries. (a) The membership of the Administrative Council was expanded to reflect more accurately the composition of the forum. (b) The general budget was expanded to increase technical assistance to developing countries. (c) The election procedures for membership

on boards of directors of the CCIs were revised. (d) New language was introduced into the Convention in appreciation of the expanded approach of the forum (Rutkowski, p. 243).

Although the conference expanded the amount of funds to be allocated to development assistance by twenty percent, the amount of funding still remains low. Even with this increase the ITU is only administering six percent of its total annual budget, which in itself is only one-quarter of one percent of the budget administered by a large European PTT, to development assistance. An additional measure was taken by establishing a Special Voluntary Fund. However, participation to date has been minimal (Solomon, p. 243). There has been a reluctance on the part of the developed countries to contribute directly to this or any other such fund. Instead they argue that benefits from the rapid expansion of the global telecommunication network being implemented by the developed countries will 'trickle down' to developing countries.

Although many of the benefits of the Plenipotentiary Conferences remain intangible, the general direction they have given suggests that the concerns of developing countries will be considered.

2.1(c). The Administrative Council

The Administrative Council is the day to day managing body of the ITU. It is comprised of 41 members who represent their national telecommunication administration (International Telecommunication Convention, p. 39). The Nairobi Conference,

as mentioned above, increased the number of seats on the Council by four -- three of the seats went to members of African nations and one was assigned to an Asian representative (Coddington et al., p. 45). However there is still a disproportionate number of representatives from developed countries.

The Administrative Council has two other main purposes. The Administrative Council can, between Plenipotentiary Conferences, set the agenda for WARC's and RARC's. However, any agenda setting activity must meet with the concurrence of a majority of the members (Noll, p. 36).

The Administrative Council's other primary function is to administer the general budget of the ITU as set down by the Plenipotentiary Conferences. It also administers the \$33.3 million portion of the UN Development Program (UNDP) fund dedicated to the ITU for technical assistance programs it approves. The UNDP fund is used to help local governments in developing countries plan their telecommunication sector. It does this by focussing its efforts on three areas:

(a) development of regional telecommunication networks; (b) strengthening telecommunication technical services; and (c) training local personnel to operate and maintain the telecommunication facilities (Solomon, p. 243).

2.1(d). The Administrative Radio Conferences

It is within the Administrative Radio Conferences that the most important ITU activities take place. It is here where administrations meet to promulgate standards and regulations and

implement the intent of the ITU expressed in its Convention. There are three types of Administrative Radio Conferences: (1) General World Administrative Radio Conferences (WARC); (2) Specialized World Administrative Radio Conferences (WARC), and; (3) Regional Administrative Radio Conferences (RARC) (For administrative purposes the globe has been broken down into three regions: Region 1 which includes Europe and Africa; Region 2 which includes the Americas; and, Region 3 which includes Asia and the U.S.S.R.). The type of conference held is dependent on the scope of the subject matters covered and the geographical extent of their implications.

As mentioned earlier, these conferences take their direction from the Plenipotentiary Conferences. However, as a result of the Malaga - Torremolinos Plenipotentiary Conference in 1973, recommendations coming from the technical consultative committees (CCIs) also give direction to the conferences on specific technical matters (Coddington et al., p. 95). (This will be discussed in greater detail in the next section).

The specialized WARCs and RARCs deal with specific services, such as Fixed Satellite Service, Broadcast Satellite Service or Mobile Radio Service, with the intent of making policy in regards to the service under consideration. The sessions establish the technical criteria, principles and plans for implementing the service. The regulations adopted here take on the force of international treaties once they receive ratification by a member's domestic government. If such ratification is not

forthcoming either a footnote or reservation is employed (NTIA Report, p. 240).

Since 1971 the administrative conferences have taken a decidedly different tact. It is here that a policy shift away from technical and efficiency considerations to broader social, political and historical criteria is most noticeable.

Although the 1971 conference maintained the 'first come first serve' regulatory regime, the interests of developing countries were recognized. Katherine Sweeney notes five major outcomes of the 1971 WARC:

- (1) The establishment of rules that provide direction for the orderly development of the Broadcast Satellite Service (BSS).
- (2) The establishment of provisions to regulate intentional and unintentional spillover.
- (3) The establishment of the principle of equal rights of all states to the spectrum/orbit.
- (4) The establishment of a bilateral and multi-lateral process of negotiation and prior consent between states effecting a BSS and those states upon whom the operations of the service might transgress.
- (5) The assignment to future WARCs and RARCs the requirement of using "planning development" for the implementation of BSS as well as the establishment of interim coordinating procedures until such a conference was held (p. 92).

These changes addressed several concerns of developing countries. Specifically, the establishment of prior consent addressed the principle of national sovereignty with respect to information flow in opposition to the free flow doctrine. As well it recognized Third World concerns regarding equitable

access to the spectrum/orbit. On a very qualified basis this was the acceptance of "a priori" planning, as opposed to "a posteriori" planning.

An "a priori" plan was first implemented at the World Marine Administrative Radio Conference in 1974. Although the plan adopted at this session greatly favoured U.S. interests their opposition to "a priori" planning continued unabated. The scheme adopted at the conference gave the U.S. four times the allotments of any other nation and contained a provision requiring the forfeiture of allocations that remained dormant for more than four years. Yet the U.S. continued to adamantly oppose any "a priori" scheme (Coddington et al., p. 40).

At a 1977 RARC an "a priori" planning scheme was extended to BSS in Regions 1 (Europe and Africa) and 3 (Asia and the U.S.S.R.), realizing the intent of the earlier 1971 WARC. However, no planning was undertaken in Region 2 which includes the Americas. Such efforts were postponed until 1983. At this time a similar plan was accepted for BSS in the Americas. The effect of each of these conferences was to allocate orbital slots and frequencies on a per country basis (Sweeney, p. 212). The Region 2 plan was finally incorporated into the Radio Regulations at the 1985 Space WARC.

In 1985, the principles for "a priori" planning were again implemented but on a global basis. The focus of the planning efforts were on the Fixed Satellite Service (FSS). Because this service is the most widely used, providing point to point

communication, it was experiencing the highest level of spectrum/orbit congestion (Jakhu et al., p. 282). With the FSS the prospect of being excluded from a total portion of the spectrum and GSO was clearly evident and therefore a change in policy was required.

The practical outcome of implementing "a priori" plans is to provide equitable access and affordable access. The fact that the "first come first served" regulatory regime created problems for new comers can be illustrated most aptly by citing the experiences of India and Indonesia. India, for its SITE program satellite, and Indonesia, with its PALAPA series of satellites, had difficulty in coordinating their GSO and frequency needs with the existing INTERSPUTNIK and INTELSAT services. The result was a change in their preferred orbital positions and power restrictions which increased the overall cost of implementing the systems (Doyle, p. 8). Similiar problems are reoccurring as Telesat Canada, acting on a consultancy contract basis, tries to coordinate the satellite systems of some Asian countries with those already in existence (Carew, Note 1).

The fact that demand for satellite services is doubling every three years and taxing the limit of the spectrum/orbit resource would suggest that "a priori" planning will be used more frequently for the services that remain unplanned (Kirby, p. 351).

2.1(e). The International Consultative Committees (CCIs)

There are two consultative committees - the International Radio Consultative Committee (CCIR) and the International Telegraph Consultative Committee (CCITT). The CCIR became affiliated with the ITU in 1927 (Renaud, p. 182) and the CCITT in 1925 (Coddington et al., p. 85). They are charged with studying the propagation characteristics of radio signals through the electro-magnetic spectrum and with analyzing and understanding advances in electrical engineering. They are essential components of the ITU. Aside from the day-to-day activities conducted by the Administrative Council, the two committees account for 85 per cent of the working days used to conduct the affairs of the ITU (Rutkowski, p. 29). They are especially important since they provide the vehicle for private sector involvement in the ITU policy formation process.

General direction is given to the research agenda once every four years by a plenary assembly (Mosco et al., p. 7). Between plenary assemblies the CCIs meet several times a year to work out the technical basis of ITU policy. The recommendations of the CCIs carry considerable force in the administrative conferences where, as mentioned before, policy is implemented. The 1973 Malaga - Torremolinos Plenipotentiary Conference raised the status of the CCIs recommendations to "provisional regulations". This was an attempt to alleviate the concerns of telecommunication hardware manufacturers and their administrations in the developed world that the infrequent

meetings of the administrative conferences was creating an excessive amount of regulatory lag and retarding the rate of technological development. However, the recommendations remain provisional until final approval is obtained at the next administrative conference (Coddington et al., p. 95).

As well as establishing the basis of ITU policy the standards recommended by the CCIs are used globally, especially within the developing countries, as a basis for procuring telecommunication hardware (NTIA Report, p. 242). It has even been suggested that one of the functions of the CCIs is to act as a "marketing vehicle of the large telecommunication manufacturers" (Rutkowski, p. 35).

Like all the other organs of the ITU, the CCIs have been given the mandate to consider development issues. Article 13 of the Convention was amended in 1959 to direct the CCIs to:

pay due attention to the study of questions and formation of recommendations directly connected with the establishment, development and improvement of telecommunication in new or developing countries in both the regional and international fields (Renaud, p. 184).

To accomplish this objective the CCIs have tried to facilitate the involvement of developing countries. Working parties have been established to attend to specific problems ranging from rural telecommunication to the establishment of public data networks. However, the sessions dedicated to developing countries concerns have been attended primarily by countries from the same, and poorly attended by the administrations and private sector representatives from the

developed world (Renaud, p. 184). Basic telephone service, which can be maintained by local personnel in the Third World and thus serve the needs of the often widely dispersed populations, who are often ignored in favour of more sophisticated technologies such as Integrated Switched Digital Networks (ISDN) (Coddling et al., p. 26). However, such systems remain the prerogative of the most advanced nations and multinational corporations.

The participation of representatives from the developing countries is generally low in CCI sessions that are not specifically oriented to their needs. For instance, at the 1979 CCI Plenary Assembly, 84 per cent of the 300 delegates were from the ten most advanced countries. The pattern was similar in the study groups. Developing countries, despite possessing two-thirds of the seats in the ITU, only support 30 per cent of the delegates to CCI sessions. Low participation is often attributed to a generally low level of expertise and insufficient financial wherewithal to sponsor delegates to the sessions. Lack of participation means that Third World concerns receive little or no attention (Coddling et al., p. 103 - 104). This lack of involvement remains particularly troublesome because it feeds itself into Administrative Conference agendas. Lack of involvement manifests itself at the conferences in ill-prepared delegations from the Third World, and an agenda skewed by a series of technical and economic trade-offs by the manufacturing sectors and administrations of the developed countries.

As noted above, the CCIs are where the private sector

interfaces with the ITU for the purpose of developing international telecommunication policy. Domestic governments encourage the participation of the private sector within the CCIs. In Canada this is done through the Canadian National Organization for the International Consultative Committees. The members of this organization include the CBC, Teleglobe Canada, the Canadian Association of Broadcasters, Spar Technology, Bell Northern Research, and Motorola Information Systems, among others (Mosco et al., p. 10). The U.S. counterparts are the Senior Level Interagency Committee and the Coordinating Committee for Future Radio Conferences. Both operate under the auspices of the State Department and have a mandate to give direction to preparatory conferences and, ultimately, international telecommunication policy (NTIA Report, p. 249). The U.S. private sector is represented by such telecommunication interests as: AT&T, GTE, ITT, RCA, Satellite Business Systems, Telenet Communication Corporation, Tymshare and Western Union, among others (Coddling et al., p. 345). Also represented under the heading of Scientific and Industrial Organizations (SIOs) are: Ford Aerospace, General Electric, Harris Corporation, Honeywell, Hughes Aircraft, IBM, Rockwell International, Western Electric and Xerox (Coddling et al., p. 350).

The private sector conducts 65 percent of the CCIs workload and therefore participates directly in the development of international telecommunication policy (Coddling et al., p. 102). The private sector is also well represented in the higher

echelons of the CCIs. At the 1976 Plenary Assembly, where the upcoming mandate of the CCIs research agenda was determined, three of 18 study groups were chaired by an employee of AT&T and one by a GTE employee (Coddington et al, p. 94). This situation was paralleled at the 1985 and 1988 Space WARC's, and during the interim period devoted to constructing the technical basis for implementing the principles and agenda agreed upon at the 1985 session. This, in part, accounts for agendas which emphasize technologies, such as ISDN, that are not particularly relevant to the Third World. The functions and expenses of full ISDN are far greater than the developing world's need for basic, and universally accessible, communication infrastructures.

Presently the private sector represents 80 to 90 per cent of the U.S. delegation sent to CCI meetings. This is the highest proportion of any nation (Rutkowski, p. 35). However, the current trend towards deregulation and privatization may increase the role of the private sector in the delegations of other administrations. Recent announcements by Japan regarding private sector involvement tend to confirm this trend (Telecommunication Journal, p. 255). The fact that some CCI recommendations now take on the form of provisional regulations make the linkage between policy making and the private sector particularly interesting.

2.1(f). The General Secretary

The general secretary is elected at Plenipotentiary Conferences. His role is to provide legal advice to the various organs of the ITU. He also acts in consultative fashion at ITU meetings, keeping members abreast of the relevant considerations guiding the task at hand. It is also his responsibility to publish the agreements of the administrative conferences. The last of his responsibilities is to function as a diplomatic channel through which administrations register their vote (Noll, p. 37).

2.1(g). The International Frequency Registration Board (IFRB)

Since radio waves do not respect political boundaries the ITU developed the IFRB to minimize the interference among the many signals that simultaneously occupy the spectrum (Kirby, p. 351). To do this the IFRB is empowered to:

- (a) scrutinize the conformities of submissions to the Radio Regulations.
- (b) evaluate the probability of harmful interference to which existing recorded assignments might be exposed and to adopt and announce its findings.
- (c) record, under specified conditions, such use in the master register (Mathey, p. 346).

The method of registering services with the IFRB is the basis of establishing rights to "international recognition for the use of the frequency and the right to protection from harmful interference" (Coddington et al, p. 346). As mentioned earlier there are two ways of establishing such rights. The IFRB can simply register the intended service, as is the case under the

"first come first serve" regulatory regime, or it can document the use of the spectrum/orbit once it comes on line according to a preconceived allocation scheme.

It is important to note that the range of frequencies coming within the sphere of the IFRBs activities are constantly being expanded. In 1927 the Table of Frequency Allocations ranged from 10KHz to 30MHz. Today the range of frequencies is from 10KHz to 400GHz (Mathey, p. 346). This is important because the range has been expanded by means of advanced telecommunication hardware. This has primarily been a function of efforts by the western industrialized nations and is fundamental to their argument against rigid "a priori" schemes. However, it must be remembered that some frequencies are particularly suited for some services over others, that some ranges are becoming increasingly congested, and, that the cost of operating in the higher bands is generally higher.

2.2 New Trends Impacting On the Organizational Structure and Policy Making Process of the ITU

There are emerging trends that suggest a change in the overall operations of the ITU. In particular the dislike of prior planning by the west, especially the U.S., is threatening the very existence of the ITU. Also, as

internal ITU resources are diverted to technical assistance the time could come when the PTTs in Europe, and their counterparts in North America and Japan might conclude that the ITU does not reflect their own interests and that alternative arrangements might be preferable (Solomon, p. 244).

Suggestions of alternative methods of achieving an international body of policies have been bantered about (See, for example, the NTIA report). But, paradoxically, the emergence of the global economy, and the necessity of maintaining an integrated telecommunication infrastructure that this entails, makes the abandonment of the ITU an unlikely situation.

Instead we are likely to see an increase in activities outside the ITU. This will occur as parties with similar interests meet prior to important ITU sessions to develop 'consensus positions'. This is already taking place as western nations step up their efforts to form allegiances amongst allies. So too have the developed nations. This was evident prior to the 1979 WARC when members of the non-aligned movement met in Havana, Cuba to reach an agreement on the NWICO issues that would be pushed at the conference (McPhail, 1987: p. 127).

In response to the growing level of competence amongst all participants at ITU sessions, the U.S. has increased its efforts to develop and co-ordinate cohesive policy between government and private sector representatives prior to attending ITU meetings. The "educating" efforts, and bilateral discussions of the U.S. with countries around the world for Space WARC were the most extensive in telecommunication history (U.S. Senate Hearings, 1986). The U.S. is also expanding its activities outside the ITU because of the uneven development of privatization outside of North America. When undertaking deregulation, the U.S. opened up its markets to foreign competitors. In turn the U.S. anticipated

liberalized access to foreign markets. However only Britain and Japan have vigorously pursued deregulation, thus requiring the use of bilateral negotiations outside of the ITU (Ito, p. 97). However, recent indications coming out of France, Germany, Canada and Peru show that the efforts of the U.S. have not been in vain (U.S. Senate Hearings, 1988).

Before concluding I will discuss one last issue of major significance. The fear that developing countries might, by the 1990s, block western initiatives has called the "one nation one vote" system into question. Although this system protects democratic nature of the institution it is being suggested that the vote be altered to more accurately reflect the financial contributions of ITU members.

CHAPTER 3

PRINCIPLES AND TECHNICAL CONSIDERATIONS GUIDING
THE DELIBERATIONS OF SPACE WARC 1985

3. Introductory Discussion

The purpose of this chapter is to introduce the reader to the planning principles, technical parameters and other relevant considerations that guided the 1988 Space WARC's policy deliberations. It is necessary to become conversant with these considerations to understand the magnitude of the task undertaken and, at least in part, the implications of the policy adopted. The 1985 Space WARC, the first session of a two-part policy-making endeavour, forwarded an agenda containing thirteen items to the 1988 Space WARC (Report to the Second Session). The first session recommended that this agenda be implemented according to eleven broad planning principles. Fundamentally, the agenda and planning principles embody the conference's attempt to reconcile "guaranteed practical and equitable access", with the need for efficient and economic use of the orbit spectrum.

The agenda and planning principles can be considered the accomplishments of the 1985 session. However, the reader must bear in mind that the accomplishments of this conference were merely recommendations, and consequently, not binding on the second session. Theoretically, all the work of the first session could have been completed by the second session (Ducharme, Note 3). However, this was an unlikely possibility, considering the amount

of time and diplomatic effort put into the session. This agenda and its associated guiding planning principles, which are attached as Appendices A and B, provide the organizational framework for this chapter.

3.1. The Nature of the Geo-Stationary Orbit and Radio Spectrum

The geo-stationary orbit (GSO) is an imaginary ellipse that exists 35 600 km above the earth's equator. The GSO assumes a physical quality when the altitude of a satellite and its speed are aligned in such a manner as to allow the earth's gravitational pull to counter balance the satellite's centripetal force. Within this limited range of "equilibrium" a satellite will revolve around the earth's north/south axis at the same rate as the earth -- 23 hours and 56 minutes. As a result of this process, as envisaged by Arthur C. Clarke in 1945, a satellite will hover in a fixed position relative to a given point on the earth's surface, and thus, be capable of providing continuous communication.

However, not all satellites make use of the GSO. For example, those dedicated to remote sensing applications, will traverse the globe at various angles to the equator. Satellites of this type will appear to "enter" and "exit" the visible horizon in about one-half hour, and require expensive tracking stations. Although their uses are manifold, continuous communications is not one of them (Blonstein, p. 6). It is the ability of the GSO to provide continuous communication that make

it a widely sought resource.

Because the GSO is a limited, but non-depletable resource, much conjecture and debate has surrounded its use, and the development of international policy. This is also true of the radio spectrum, which is as much a part and parcel of any policy considerations as the GSO. The usable portion of the radio spectrum for satellite communication extends from 8 MHz to about 30 GHz (Blonstein, p. 72). Ranges within this bandwidth are apportioned out among 17 different satellite services. However, different operating characteristics within different frequency ranges, and orbital locations, coupled with the rapid expansion of the satellite industry have given rise to concerns that both the spectrum and orbit, in certain locations and bandwidths, are becoming congested. In fact, proposals to operate satellites in the C and Ku bands doubled between 1980 and 1985 with "90 per cent of the proposals belonging to developed countries or international organizations" (White et al., p. 202). Specifically, the Fixed Satellite Service (FSS), offering telephony, telegraphy, television relay, audio conferencing with visual aids, data transmission, facsimile, communication between computers and videoconferencing, was faced with the most acute depletion of desirable orbital locations and frequency bands (White et al., p. xxiv). The possibility of being "frozen out" of the orbit and radio spectrum, when the need to employ satellite communication developed, dominated the 1979 WARC. This possibility drove the developing countries to call for future

conferences to "guarantee, in practice, equitable access" for all ITU members to these resources. The 1985 and 1988 Space WARC's were established as the "future conferences" that would deal with the issue.

The ITU has been hardstruck to reconcile two often contradictory positions. On the one hand, there is a call for equitable access to limited resources; yet on the other, there is the undeniable fact that both resources can be "expanded" through technological advance. However, the old truism that "nothing comes for free" is clearly applicable to the increase in GSO and radio spectrum capacity. It is necessary to examine the legal and technical basis of these two considerations in relation to their application at the 1985 Space WARC. The following discussion will be limited to a description of the factors brought to bear on the agenda and planning principles promulgated by the 1985 session. However, a more comprehensive and detailed analysis will be provided in the following chapter.

3.2. The Conference's Relationship to the United Nations: A Contradiction Between Free Space and Private Property

As a specialized agency of the United Nations the ITU functions according to general UN principles. It is important to note that the ITU receives and gives direction to the UN for the creation of a legal regime governing the orbit and spectrum. This will become evident as the present discussion unfolds. In short, the principles contained in Appendix B are in accordance

with general principles established by the UN. In fact, it is UN Resolutions 1721 and 1802 that establish the direct relevance of UN principles to activities in space (Zhukov et al., p. 33). For instance, the Declaration of Legal Principles Governing the Activities of States in the Use of Outer Space (United Nations General Assembly Resolution, 1962, XVIII) declares that a nation's "exploration and use of outer space should be only for the betterment of mankind and to the benefit of states". Preceding sections of the same resolution unabashedly give nations the right to freely explore space, but the above condition, just as clearly, imposes obligations. The obligations are in the form of exhortations which direct nations to consciously avoid imposing any impediments to other's free right to use space.

Furthermore, the Committee On the Peaceful Uses of Outer Space (COPOUS) established, in Article IX of the 1967 Outer Space Treaty, that nations shall be guided by the principles of "cooperation and mutual assistance..." and the fruits of space activities "...shall be in the province of all mankind". Article II of the Treaty also states that the orbit and spectrum "are not subject to national appropriation by claim of sovereignty...or by any other means." These provisions have been retained to the present date and are often reiterated in matters dealing with satellite communications (See for example: United Nations, 1986). In theory, the "common heritage of mankind" principle makes the establishment of private property in the GSO and radio spectrum

legally impossible. However, in practice, as described previously, certain ITU procedures contradict this principle.

It is at this point that a direct link can be established between these provisions, the procedures for initiating satellite service contained in Articles 11 and 14 of the ITU's Radio Regulations, and the planning principles and agenda promulgated by the 1985 Space Warc. The planning principles forwarded clearly indicate that there cannot be any establishment of proprietorial interest in the allocations received through the plan; and that all services, regardless of orbital location or portion of the spectrum used, are to share the resources on an equitable basis (White et al., p. 214).

The ITU's role on these matters is vitally important. Its importance in establishing a legal regime, at least on a de facto basis, if not explicitly, for the use of the GSO and radio spectrum, was recognized by the 1982 UNISPACE conference. This conference, convened under the auspices of COPUOS, directed the 1985 Space WARC to

continue to evolve some criteria for the most equitable and efficient use of the geo-stationary orbit and radio frequencies and to develop planning methods and/or arrangements that are based on the genuine needs, both present and future, identified by each country. Clearly, such a planning method should take into account the specific needs of developing countries, as well as the special geographic situation of particular countries (United Nations, p. 6).

It is sufficient to say that the "common heritage of mankind" principle was an important consideration of the 1985 conference. Indeed, it is strongly reflected in the agenda and

planning principles forwarded to the second half of the conference. Nonetheless, one cannot conclude that the "common heritage of mankind" principle strongly advocated will be maintained once the new regulations are exercised. A further analysis will be given to this aspect in the next chapter.

3.3. Factors Impeding a Definitive Resolution of the Contradiction Between Free Space and Private Property

There are three factors constraining a definitive resolution of the matter of property rights in space. First, the conference declared the issue of property rights out of its jurisdiction. Instead the issue was dealt with by a Plenipotentiary Conference held in May and June, 1989 (Smythe, Note 10).

The second factor impeding a resolution of property rights is the claim by some equatorial countries to sovereignty over the GSO which is directly above their land mass. The key elements to their arguments can be found in the Bogota Declaration (1977) (U.S. Senate Hearings, 1985, p. 31-33). The basis of their contention stems from the international community's inability to supply a consistent, static, scientific or technical conception of where space begins. It is further aggravated by the fact that international law provides for national sovereignty over airspace, but is unable to mark the transition point at which airspace becomes outer space. It is this quasi-vacuum-like status that provides the impetus for equatorial nation's

arguments. It is their contention that the geo-stationary orbit is physically dependent on the existence of the earth's gravity, which they are fortunate enough to have coalesce 35 600 km. over their geographical location (Zhukov et al., p. 155). However, as I have indicated, international opinion and practices are not in favour of this position.

The third factor which calls into question the nature of property rights to the GSO and radio spectrum are the coordination procedures contained in the ITU's Radio Regulations. Previous coordination procedures, recalling the discussion contained in chapters one and two, placed the onus of assuming coordination costs and making technical trade-offs on the newcomer. The 1985 conference directed the IFRB to consider and comment on the suitability of the coordination procedures contained in Articles 11 and 14 of the Radio Regulations. The intent was to establish a mechanism within the Radio Regulations to prevent the de facto establishment of property rights of indefinite length (Report to the Second Session, Doc. 324 (Rev.1). 3.2.3(b)).* The ultimate goal was to "align the law of telecommunication with the law of outer space" (Demac et al., p. 14).

* World Administrative Radio Conference on the Use of the Geo-stationary-Satellite Orbit and the Planning of Space Services Utilizing It, First Session (1985) Report to the Second Session of the Conference, Geneva. (herein cited as Report to the Second Session).

3.4. Dual Planning: The Delicate Balance

A key feature of the planning principles forwarded by the 1985 conference to the 1988 session is the recommendation that administration or multi-administration satellites, and systems already in existence, not be entitled to permanent priority to their allocations "in such a way as to foreclose access" to others (Telecommunication Journal, p. 496). With this principle the conference had to delicately balance the need to protect existing systems with its primary interest of providing guaranteed equitable access. Conference participants felt that it may be necessary for existing systems to make adjustments to accommodate the allotment plan, but, in general, stated a preference for tying the amount of accommodation required to a systems stage of development (Report to the Second Session, Doc, 324 (Rev.1), 3.2.5). For example, intercessional studies recommended that so-called "paper satellites", those merely proposed and in the pre-fabrication stage, be able to deviate as much as 10 degrees from the preferred orbital position. It was envisaged that the amount of deviation requested would diminish as the stage of development progressed to a final requirement of 0 degrees for existing systems (Ducharme, p. 4).

Consistent with the two-tiered nature of the plan (See Appendix A, Agenda items 1 and 2), and the overall tone of the session, a double-pronged approach was recommended to guarantee equitable access without retarding the benefits that could accrue through technological advance. For the portion of the C and Ku

bands subject to planning, often referred to as the expansion bands because of their allocation to the FSS during the 1979 WARC, a method for turning allotments into recognized assignments was recommended. Under "arc allotment planning" each administration would receive at least one orbital position within a predetermined arc and at least 800 MHz of bandwidth from predetermined frequencies (Report to the Second Session, Doc. 324 (Rev.1), 3.3) For the unplanned C and Ku bands a new administrative device, known as Multi-lateral Planning Meetings (MPMs), was envisaged. The MPMs would improve and simplify the ITU's coordination procedures for accessing the GSO and radio spectrum (Ducharme, Note 3). Again, consistency can be recognized in the approach to reconcile the need for equitable access, while retaining an incentive to increase the efficiency and utilization of the spectrum and orbit through technological advance.

In the first case, turning an allotment into an assignment would require the determination of a "nominal orbital position, a service area for national coverage, generalized parameters used for establishing the plan, a predetermined arc within which the definitive orbital position may be chosen and the frequency bands required to operate the satellite" (Giroux, p. 793). After making this determination an administration would notify the International Frequency Registration Board (IFRB), which would check the proposal for conformity with the Radio Regulations. If found to be in conformity with the Radio Regulations the proposal

would receive status and international recognition through its listing in the Master International Frequency Register (Report to the Second Session, Doc 324 (Rev. 1), p.8).

3.5. The Technical Basis for Dual Planning

With the preceding discussion in mind, the technical basis for the above factors will be defined and examined. It is important to note that all these factors are not germane to the planning approach, but are dealt with in a different manner in the unplanned bands. Outside the planned bands the consideration of these factors will be done as the need arises through the MPMs, instead of on an a priori basis.

The nominal orbital position will be the selection of an optimum location from a pre-determined arc "as a means of increasing the flexibility of the plan" (Report to the second Session, Doc. 324 (Rev. 1), 3.3.4.5). However, the conference did not specify the parameters to be associated with a predetermined arc. Nonetheless the conference did state that the ability of a satellite "to perform its mission satisfactorily is determined by the visible arc and the service arc of the network" (Report to the Second Session, Ch. 3.4.3.1.1).

Although no predetermined arc was specified we can consider it to extend from 5 degrees on either side of the service area outward to 35 degrees east or west of the desired area of coverage (Jansky et al., p. 447). Below this level the angle will be too direct and will result in the signals experiencing

interference from terrestrial systems (Blonstein, p. 96). Above 35 degrees the approach angle will be too low, and consequently, the signals transmitted will be scattered and/or absorbed by the atmosphere. Another problem, which will be given greater treatment later in this chapter, is that low angles cause receiving dishes on earth to emit interfering signals, called sidelobes. Sidelobes, in turn, decrease the efficiency of the radio spectrum (Nosaka et al., p. 43).

The ideal location to place a satellite in the GSO is 15 to 30 degrees west of the coverage area, so that down-time experienced during autumn and spring equinoxes can be synchronized with periods of low traffic demand. As the renowned satellite expert, Larry Blonstein, indicates, a satellite placed directly above its service area will experience "blackout" during a relatively high traffic period from 11:25 pm until 12:25 am during the spring and autumn equinoxes. However, a nominal position 30 degrees west of the coverage area will shift the time of "blackout" two hours later when traffic demand is not as great (p. 39-40). It is this factor that allows one to make the statement that all orbital locations are not created equal. Because of the geographical dispersion of land mass, some orbital locations, such as the Americas, are more likely to be congested than others.

Intersessional work by the International Radio Consultative Committee (CCIR) recommended that satellites remain capable of deviating from their nominal orbital position by +/- .1 degree

(Wu, p. 546). This should not pose a problem since it is well within the limits of current technology. Secondly, deviation from the nominal position should have little or no bearing on questions of footprint spillover and sovereignty that are more applicable to Broadcast Satellite Service.

However, more contentious issues arose over the issue of satellite spacing within the arc. These issues are in addition to the limitation of available orbital positions in "desired locations" and are a product of standard generalized technical parameters that were, in part, to guide the development of the plan (Report to the Second Session, Ch. 3.4.2.1.1). The purpose of these standards is to "reflect the technical characteristics for all interference parameters" that effect the capacity of the orbit and the radio spectrum (Report to the Second Session, Ch. 3.4.4.1.2.4). Somewhat paradoxically, problems arise as the capacity of the GSO and the radio spectrum are expanded through advances in technology. These advances often come at the expense of more stringent and costly technique. This concern is fundamental to the developing countries proposal for guaranteed access to "feasible, applicable and suitable technology" (Demac et al., p. 9).

Because of the wide variety of services offered, and the large range of system characteristics typical of the FSS, it was impossible to come down with a fixed standard for the angle of separation between systems. However, the trend towards orbit and spectrum intensive systems could not be ignored. This trend

appears most developed in Canada and the U.S. where a recent agreement, which also includes Mexico, established effective separation standards of 1 to 3 degrees (Bowen et al., p. 2). This is consistent with the developed countries desire to promote equal access through technological efficiency.

This is also consistent with the implicit meaning contained in many of the planning principles in Annex B. In essence, the planning principles are concerned with maintaining "flexibility to permit unforeseen requirements to be met, as well as the use of various technologies; efficiency in orbital use, and protection of existing systems", although the latter is more a problem of proprietorial concerns than the current topic of discussion (Demac et al., p. 11). As one author notes the most efficient use of the GSO and spectrum, in purely numerical terms, is a "function of the system design both of the space segment and the ground segment." However, she further states that standards cannot be set so high as to act as "barriers to entry" (Jussawalla, 1984: pp. 241-242).

3.6. Standard Parameters in the Use of the GSO and Radio Spectrum

The 1985 Space WARC recommended the use of generalized technical standards for "the effective use of orbit and spectrum by the fixed satellite service" (Report to the Second Session, Ch. 3.4.2.1). In addition, the technical parameters were to address the needs of "certain special geographical situations"

(Report to the Second Session, Ch. 3.4.2.1.3). Although the session made some recommendations along these lines, much of the work was conducted in the period between the first and second conference by the CCIR. The CCIR singled out the following as the "standard technical parameters":

- earth station transmitting antenna (dish) diameter and transmitting power.
- earth station receiving antenna (dish) pattern.
- satellite antenna pattern.
- e.i.r.p. and minimum satellite bandwidth.
- Carrier to noise ratios (C/N) for the uplink and downlink signals.
- Carrier to interference ratios (C/I)
- propagation margins (Wu, p. 540).

Essentially the above parameters are directed at expanding the capacity of the orbit and spectrum while maintaining interference levels which are compatible with the performance demanded of a satellite. The first session of the conference, recommended that national administrations be allowed to judiciously manipulate these factors, without exceeding some predetermined threshold level based on a combination of these factors, to realize their particular needs. This measure is directed at maintaining flexibility and allowing the parameters to be combined in whatever manner is "most economical in the particular circumstances of the network in question" (Report to the Second Session, Ch. 3.4.2.1.4 (d)).

The primary consideration of the satellite user is the

desired area of coverage (or footprint). It is the desired footprint pattern that "fixes the [transmitting] antenna's size and thus its gain" (Blonstein, p. 83). Once the antenna size is fixed the designer must decide how to apportion the available power supply across the number of transponders available to meet the needs of the service being offered (Blonstein, p. 46). Essentially, sending more information requires greater power from the transmitting antenna. This output of power is referred to as the effective isotropic radiated power (e.i.r.p.).

A general rule of thumb is that a correlation exists between the earth station antenna (dish) diameter and transmitting power, e.i.r.p. Increasing the satellite's transmitting e.i.r.p. will work to increase the systems capacity and to lower the size, and consequently, cost of earth receiving dishes (Report to the Second Session, Doc. 328 (Rev. 2), 4.4.5). The e.i.r.p. is a function of the output power of the transmitter and the antenna's ability to focus the power output (gain) (Blonstein, p. 81). Thus, raising the output power and/or the antenna gain will produce a higher e.i.r.p.

At the earth station, the transmitting antenna's gain is essentially a measure of its ability to concentrate the outwardly radiated signal into a focussed beam (Nosaka et al., p. 43). Antenna gain can be increased by enlarging the size of the antenna, or by effectively increasing its size in relation to the frequency wavelength (Blonstein, p. 78). The latter for instance, can be realized if it is remembered that higher

frequencies have shorter wavelengths. Thus, holding the size of the transmitting antenna constant and using a higher frequency will have the effect of increasing the dish's size in relation to the frequency's wavelength. Doing so will result in a higher e.i.r.p. Importantly, increasing the concentration of power allows satellites to be placed closer to one another in the GSO (Jansky et al., p. 118).

In the real world where demand for power and higher frequencies are constrained by natural, technical and regulatory factors, increasing antenna diameter, and holding power levels constant, produces the desired effect (Jansky et al., p. 116). Choosing this route, however, increases the cost of each receiving and transmitting dish on the ground.

Using smaller dishes, and holding power and the frequency range used constant, will alter the pattern of the transmitting antenna. Basically, the smaller a dish the greater its transmitted beamwidth. The beamwidth of the transmitted signal is also referred to as the transmitting dish's "field of vision." When taking the size of the dish into consideration regulations will establish antenna pattern parameters to effectively prevent the transmitting dish from "seeing two satellites" in the GSO (Blonstein, p. 89). With the current trend towards using higher frequencies in the Ku band, smaller dishes and closer spacing in the GSO, the focus of research and development teams is to achieve larger gains and more concentrated beams. This is, on the one hand, to prevent the sending, or uplink antenna from

"seeing two satellites", and, on the other, to compensate for the harsher propagation characteristics in the Ku band (Gereiga, Note 5). This also applies to transmitters on-board the satellite. From the satellite based antenna larger gains and more concentrated beams are being adopted for the Ku band to allow for the use of smaller receiving dishes back on earth, and to compensate for greater signal attenuation (Pritchard, p. 20). Essentially, this increase in performance is due to the fact that the e.i.r.p. is concentrated over a much smaller area.

Avoiding the "seeing two satellites" phenomenon is done by concentrating the transmitted signal and eradicating, to the largest extent possible, the presence of "off-centre", interference causing sidelobes. Sidelobes introduce interference into the transmitted signal and also into the signals of adjacent systems. The first phenomenon is called the gain to noise ratio, and is represented in the engineering literature as G/T , where T is measured in degrees Kelvin. The better the G/T , the better will be the signal to noise ratio, which is most appropriately referred to as the C/N ratio. Basically, higher C/N ratios result in greater signal fidelity (Blonstein, p. 89). The fidelity of the signal required depends on the type of information being transmitted (ie. voice, data or video signals); and, establishing acceptable performance so as not to violate aggregate C/N levels established for particular arc segments.

As for the first consideration, data transmissions will

require much higher C/N ratios than basic telephone service, where fidelity is much more subjective than the need for accurately representing bit streams. In developing countries, where basic telephone service is the primary concern, stringent C/N ratios are not particularly relevant. The subjective quality of the information being transmitted, and the ability of conversing participants to fill in "missing information" allows for greater signal degradation than would a financial transaction. However, higher C/N ratios allow for more efficient use of the orbit and radio spectrum and, thus, relieve some of the problems of congestion. This "double-edged sword" of technological advance is definitely integral to the shaping of international regulations.

The fact that sidelobes also interfere with adjacent systems is captured in the expression "carrier to interference" or C/I ratio. Remembering that we are working with limited resources, namely the orbit and radio spectrum, the question becomes how these resources can be used without creating interference between adjacent systems. Essentially interference can be mitigated by providing for physical separation between the systems, or by seeking methods to reduce the amount of interference contributed by adjacent systems. In practice a combination of both methods is employed (Ducharme, Note 2). However, recalling that a major assumption of the ITU is to increase the use of these resources through the efficiencies afforded by technological advance, it is the latter method that is stressed to reduce the reliance on

physical separation. This is evidenced by the constant decline in the angle of separation required between satellites. Thus, a major portion of the increased capacity of the orbit and radio spectrum can be attributed to techniques which work to suppress sidelobe levels and contribute to better C/I ratios (Wu, p. 544).

Essentially C/I is measuring the proportion of unwanted signal to the wanted signal (Ducharme, Note 2). It is concerned with the existence of sidelobes during transmission and reception as well as the ability of the system to discriminate between wanted and unwanted signals. One factor that plays upon a systems overall "discriminating capacity" is the orbit location of the satellite relative to its service area (Wu, p. 46). Another factor, recalling previous discussions, is an antenna's gain, which measures its ability to focus outgoing signals and to discriminate between wanted and unwanted signals. To reiterate, the gain increases in proportion to the size of the receiving or transmitting dish and the frequency range used (Nosaka et al., p. 40-43). Thus, there are two ways of preventing dishes from "seeing two satellites". On the one hand, larger dishes can be used to enhance the systems performance. The same effect can be obtained using smaller dishes in conjunction with higher frequencies. These combinations can be manipulated to enhance the signal to interference ratio.

This, in part, accounts for the wider availability and application of smaller dishes in the higher frequency Ku band. However, it must be remembered that some of the increase in gain

is offset by compensating for the adverse propagation characteristics associated with the Ku band. This will be especially true for communication satellites using the Ku band in tropical climates, ie. developing countries. One can presume that this compensation limits the user's ability to fully realize the advances in smaller dish designs.

In the author's opinion this is an important factor in the debate over whether developing countries can more easily obtain small, simple and cheap earth stations in the C or Ku band. For example, small 1 metre dishes are available that could operate in the C band, with acceptable quality for some applications such as simple telephone service (Blonstein, p. 81; Geriega, Note 5). However, the same size dish operating in the Ku band, under generalized conditions, can obtain a substantially higher level of performance. The important question to ask is whether this dish, operating under tropical conditions, will still allow users to avail themselves of its increased performance after allowing for part of its performance to be "used up", so to speak, when compensating for the adverse conditions.

C/I levels are calculated on a single entry, or multiple entry basis. In a single-entry evaluation a new system will be measured against adjacent systems. The international standard recommended by the 1985 Space WARC is 26 dB, or four hundred parts of wanted signal to 1 unit of unwanted signal (Ducharme, Note 2). If C/I levels between adjacent systems are not acceptable, the conference, and intercessional work by the CCIR,

recommended that systems be capable of moving within a "pre-determined arc" to achieve acceptable levels. It was recommended that the range of movement required would be between 0 and 10 degrees, depending on the "offending" satellite's stage of development. That is the lower the stage of development the greater the move that could be required (Sahay et al., p. 4). In addition, the presence of a new system must not only meet the single entry standard of 26 dB, but the established aggregate threshold level for that portion of the arc. This is referred to as the multiple entry standard (Wu, p. 542).

It is the multiple entry standard that is the fundamental basis of the Canadian proposal for macro-orbital segmentation (McAllister, Note 8). Macro-orbital segmentation works on the basis of isolating dissimilar systems into different portions of the service arc, and into the polar ends of the bandwidth allotted to the service. Indeed, under the allotment plan recommended and forwarded to the 1988 Space WARC, converting an allotment into an assignment would require conformity with other systems and the macro-segmentation approach (Ameroon et al., p. 2).

Basically, the proposal attempts to separate low capacity systems into lower ends of the bandwidth allocated to the service, and to place high capacity systems at the higher end of the frequency band (Sahay et al., p. 4). Essentially, the greater the homogeneity between systems using the available bandwidth, and operating within similar regions of the arc, the

lower the chance of single entry and multiple entry C/I level degradation (Wu, p.542). According to Canadian representatives, the fact that portions of the orbit and spectrum are planned should "provide considerable stability" for designing and implementing systems to operate in accordance with this practice (Bowen et al., p. 6).

Indeed, the first session felt the "harmonization of satellite networks" would go a long way in increasing the efficient use of the orbit and radio spectrum (Report to the Second Session, Ch. 3.4.2.4.1). Furthermore, it strongly indicated that global systems that have stringent nominal orbital position requirements, because they diminish the possibility of "reduc[ing] inter-satellite spacing and introduc[ing] inhomogeneity in relation to systems using spot beams" (Report to the Second Session, Ch. 3.4.2.5.2) should be used "to the minimum extent possible" (Report to the Second Session, Ch. 3.4.2.5.4.3).

From the author's view, this can be legitimately construed as a strong exhortation against the development of national systems for the provision of international services outside of Intelsat. This is in addition to economic arguments which claim that global systems operating in lucrative routes, such as the trans-Atlantic corridor, will adversely affect Intelsat's practice of "route averaging". The net effect will be to diminish Intelsat's ability to provide universal service. (Wheelton et al., p.5). The combination of these two factors

would appear to fly in the face of recent U.S. initiatives that encourage global satellite systems (U.S. Senate Hearings, 1985: p. 14). (See generally, Report and Order in the Matter of Establishment of Satellite Systems Providing International Communications, FCC Docket No 84-1299, FCC 85-399, September 3, 1985). This illustrates, as should the rest of the discussion to this point, that technical considerations are not vacuous, but have very important economic and political implications.

Up to this point I have illustrated that "standard technical parameters" were recommended which would effect the way in which "guaranteed equitable access" would be provided through apportioning the orbit and radio spectrum. I have also indicated that the application of these parameters will not be unduly restrictive in the planned bands because of the relatively stable regulatory environment. However, it must be recognized that these constraints will be relatively mild "for some frequency bands and orbital arcs, where the demand is low, even though more stringent constraints may have to be applied where the demand is high" (Report to the Second Session, Ch. 3.4.2.1.4 (c)). Recalling that the conference recommended a dual-planning approach, it now becomes important to see how the standards will be applied in the unplanned bands.

3.7. Application of Technical Standards in the Unplanned Bands

In chapter 4, section 3, of its Report to the Second Session, the 1985 Space WARC made recommendations for what are now commonly referred to as Multi-lateral Planning Meetings (MPMs) (p. 75-76). As a new element of the ITU's administrative bureaucracy the MPM concept would have to be incorporated into the Radio Regulations at the second half of the conference in 1988 (White et al., p. 212). The 1985 conference recommended that MPMs become the normal way for accessing the orbit and radio spectrum in the unplanned bands (Report to the Second Session, Ch. 3.3.5.1). Essentially the conference saw the MPM as a mechanism to reconcile the need for improved and simplified coordination procedures in the frequencies left unplanned, with the fact that these bands often required more stringent adherence to technical parameters because of existing high levels of congestion.

Instead of relying on the bilateral coordinating procedures that now exist in the Radio Regulations, an individual country, or a group of countries, proposing to access the orbit would convene a meeting involving all those affected by the new system. However, the ground rules for the MPMs were not laid out very well at the first session (Ducharme, p. 3). Many factors, such as the timing of the meetings, status of the decisions attained, who should be included, requirements of the participants, that is, who would pay for convening an MPM and protecting the

interests of the non-participants, were left unresolved (White et al., p. 213).

However, one key feature, known as "proportional burden sharing" was considered and forwarded to the second session (Report to the Second Session, Ch. 3.3.5.3 (c)). According to inter-sessional work by the CCIR, proportional burden sharing should include "cooperative acceptance in inter-system interference, increased required spacecraft or earth station performance, or more demanding operational requirements to a proposed or operational requirements to a proposed or operational system." The objective of proportional burden sharing, in the CCIR's view, "is to achieve equity in apportioning interference" (Wu, p. 545).

Essentially, the concept of proportional burden sharing is concerned with the equitable apportionment of technical and economic trade-offs. The emphasis is on surmounting the shortcomings in the Radio Regulations that have, to date, placed the burden of accommodation upon the shoulders of the new-comer. Clearly, recalling the earlier discussion on India and Indonesia's experience with the Intelsat and Intersputnik systems, the regulations worked to the detriment of developing countries. In this respect they were the antithesis of equitable access to the orbit and spectrum. Provisions were included that would require existing systems to accommodate new arrivals, but their extent was not clearly delineated (White et al., p. 215)

3.8. Official Status for Multi-Administration Satellite Systems

For the first time the conference recommended that official ITU status be given to multi-administration satellite systems such as INTELSAT and INTERSPUTNIK (Report to the Second Session, Doc. 324 (Rev. 1), 3.2.6). However, the attainment of status within the ITU by multi-administration satellites did not come without a series of trade-offs and additional amendments to the recommendations.

The incorporation of INTELSAT and other common user organizations (CUOs) was initiated by Switzerland and backed by thirty other countries to "ensure that they were included in the planning process" (White et al., p. 216). Integral to their proposal was that the CUO's needs to serve its various members be treated on a basis of equality with other countries planning domestic services (Demac, et al., p. 10). However, there was fear within the U.S. delegation that this would afford the CUOs preferential treatment. With this in mind they successfully sought to add "without affecting the rights of administrations with respect to national systems" to a clause in the recommendation involved (Demac et al., p. 11).

Herein lies a considerable trade-off. Basically, the CUOs are on equal footing with other systems. However, the interpretation of "national systems" is troublesome. The compromise left open differences about whether such systems were limited to domestic services or if they extended to any system

within a nation's jurisdiction regardless of its offerings, that is national or international service. The U.S. position is that "there is no doubt on the part of the Commission" that international services offered by an entity deemed acceptable by its regulatory service are covered (U.S. Senate Hearing, 1985: p. 19). To insure that its position was clearly understood the U.S. filed a declaration to the effect that none of the recommendations forwarded by the first session could be construed so as to constrain its "telecommunications requirements" (U.S. Senate Hearing, 1986: p. 19).

This is clearly consistent with the U.S.'s "open-sky" policy, but it appears to contradict strong exhortations coming from the 1985 conference, recalling the earlier discussion on the inefficiencies created in the orbit and radio spectrum by such services. However, remembering that the ITU cannot usurp a nation's sovereignty by dictating what its "minimum requirements" are, or should be, leaves it in an ineffectual position. Again, it can be stated that the U.S. position is clearly in opposition to those favouring a unified international service represented by Intelsat. How this unfolds and affects Intelsat, and the needs and policies of other administrations, will be explored in the next chapter when a discussion of the final form this recommendation took in the second session's Final Acts is undertaken. This will be in addition to laying out and analyzing the form that all of the above described recommendations took in the Final Acts.

Conclusion

In short, the 1985 Space WARC recommended a series of planning principles and technical parameters. However, a definitive resolution of the legal status of the GSO and radio spectrum was not amongst its accomplishments. To accommodate the divergent interests brought to the conference a unique dual-planning approach was adopted to provide equitable access, while maintaining efficient and economic use of the GSO and radio spectrum. Furthermore, it recommended an entirely new administrative device, known as the MPMs, which are directed towards achieving equitable access to the "unplanned bands". In the "planned bands", it was recommended that each administration be allotted 800 MHz of bandwidth and enough space in the GSO to provide at least one coverage of their country.

As noted above the technical parameters were very important in establishing the above complementary versions of equitable access. More importantly, these parameters can be seen as going beyond being merely technical, and having important economic, political and legal implications. Finally, although the conference gave Multi-Administration Satellites systems official status in the ITU they were left in an awkward position. Overall, the session set the tone for the final conference. It overcame many of the divisive issues, which allowed the second session to get down to work once it was convened.

Although divergent interests were brought to bear on the subject matter, a fairly comprehensive agenda was forwarded to

the second session from which a final policy was adopted. However, its attempt to reconcile "guaranteed practical and equitable access" with advances in technology that are making the use of the GSO and radio spectrum more efficient will remain the focus of much conjecture for years to come.

In the next chapter each factor that was discussed above will be brought forward to describe and analyze the features incorporated into the Final Acts. Indeed, each of these factors will be integral to evaluating the second session's accomplishments. This will be crucially important when the duration of the "plan" is discussed in relation to the issue of property rights discussed earlier in this chapter. Further consideration will be given to the technical recommendations and their ability to promote equity, and, at the same time, economic and efficient use of the orbit and radio spectrum. Finally, an analysis of the incorporation of CUOs into the workings of the ITU will be of considerable interest.

CHAPTER 4

TOWARDS A NEW SATELLITE REGULATORY REGIME

4. Introduction

As expected the 1988 Space WARC established a two tier regulatory regime for the fixed satellite service (FSS). In the conventional bands, for the most part, the status quo prevailed. In the frequency bands newly allocated to the FSS by the 1979 general WARC, an allotment plan was adopted. The operative ingredients of the planned bands include:

- at least 800 MHz of bandwidth in the C and Ku bands;
- a minimum of one orbital location to provide one coverage for a nation's territory.

The outcome reflects the tension between maintaining flexibility and the necessity of providing a guarantee of access to the orbit/spectrum resource. Essentially this was done by maximizing the former and minimizing the latter. The outcome is consistent with the developed countries desire to stay away from a rigidly planned environment, and to retain the rules and procedures that have served them well. From their perspective the conference was not needed, and therefore their efforts were directed at "damage control" (Broadcasting, Oct. 3; p. 32). The fact that developed countries were extremely successful in achieving this has been widely reported in the trade press of these countries (For example, see Broadcasting, Oct. 3 and 10; Satellite Communications, January; Telecommunications Report,

Oct. 10 and 24.)

This chapter discusses the changes in the regulatory regime according to a framework based on the agenda guiding the activities of the 1988 Space WARC (See Appendix A). Essentially, I have collapsed this thirteen item agenda into the four major aspects and sub-components that comprise the efforts of the 1988 Space WARC's deliberations. Thus, this chapter will consist of a discussion on the following regulatory components:

1. Satellite Services and Frequency Bands Considered

2. Unplanned or Conventional Bands

-improved procedures in the unplanned bands;

-the absence of a "significant and powerful" mechanism for accessing the unplanned bands, originally envisaged as Multi-lateral Planning Meetings (MPMs) based on some formula of proportional burden sharing;

3. Planned or Allotment Bands

-procedures for converting an allotment into an assignment;

-the presence of "existing systems" in the Plan

-procedures for establishing "sub-regional systems"

4. General

-the absence of provisions giving official status to Multi-Administration Satellites;

-commentary on the rights vesting mechanism associated with the new regulatory environment with some suggestions for the future.

4.1. Satellite Services and Frequency Bands Considered

Although there are 17 satellite services making use of the radio spectrum, Space WARC was limited to the Fixed Satellite Service (FSS). However, the conference did make allowances for Broadcast Satellite Service (BSS) "feeder links" (Final Acts, Appendix 30A). To do so the conference redefined Article 1 of the Radio Regulations so that FSS is now considered to be

a radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed satellite service may also include feeder links for other space radiocommunication services (Final Acts).

As well, the conference passed a resolution to "facilitate the implementation of a unique world-wide standard for high definition television (HDTV)" (Final Acts, Res. COM5/5).

As directed by the 1985 Space WARC recommendations, the 1988 session established a two-tier regulatory regime. Basically, the status quo would prevail in the majority of the radio spectrum used by the FSS. A rather limited Plan was established in the so-called "expansion bands".

Overall the C band contains 1 675 MHz of bandwidth (uplink and downlink). Of this, 1 075 MHz was left unplanned, subject only to minimally improved advanced publication, coordination and recording procedures (Contained in Art(s) 11, 14 and 13 respectively; these will be discussed in detail below). Out of a total of 2 375 MHz of bandwidth in the Ku band only 1 000 was

allocated to the Plan. However, originally even this unbalanced approach did not satisfy ardent supporters of the status-quo. The U.S, U.K. and France filed reservations at the first session with respect to planning in the Ku band (Broadcasting Magazine cited in White et al; p. 177).

Interestingly the reservations of the U.S., U.K. and France were not applied at the 1988 session. More important, however, is why the reservations were not exercised at this session. Basically, the reservations were withdrawn once flexibility was built into the planned bands to accommodate additional, non-conforming uses (Gorman, Note 6). This will be discussed later in a section dealing specifically with this issue.

The trade-off reflects a substantial acquiescence on the part of the conference to the demands of the U.S., U.K., and France. Had the conference not acquiesced, and U.S., U.K. and France retained their reservations, no "other administration... [would]...be obliged to observe" or protect the non-conforming "additional use" or "existing" systems of the reserving countries (Final Acts, p. III). Essentially, had this compromise not taken place, no other services, for example, mobile satellite, could operate in the planned bands. Yet the Final Acts did accommodate the flexibility demanded by developed countries for satellites services other than those contained in the Plan. This chapter will demonstrate that allowing systems, other than those contained in the Allotment Plan, questions the success of the 1988 Space WARC in achieving its mandate.

Table 1 illustrates the portions of the radio spectrum that retained the "first-come, first-serve" procedures, and those that were subject to limited "a priori" planning.

Table 1

<u>C Band (6/4 MHz)</u>		<u>Planned</u>	
<u>Unplanned</u>			
Uplink	Downlink	Uplink	Downlink
5 850 - 6 425	3 700 - 4 200	6 725 - 7 025	4 500 - 4 800
<u>Ku Band (14/11-12 GHz)</u>			
14.00 - 14.50	10.95 - 11.20	12.75 - 13.25	10.70 - 10.95
	11.45 - 11.70		11.20 - 11.45
	11.70 - 12.20**		
	12.50 - 12.75		

Total			
1 075 MHz	1 375 MHz***	800 MHz	800 MHz
	2 200 MHz		

* In Region 2

** In Regions 1 and 3

*** Total is adjusted to take into account the different bandwidths of the different regions.

From Table 1 we can see that of the 2 200 MHz of downlink bandwidth available, approximately 35% is contained in the Allotment Plan. Furthermore, the bands to which the allotment plan applies are those that have been relatively unused to date (Report to the Second Session, Ch. 2, p. 3). The table also shows us that the bands where the problems of orbital congestion and spectrum scarcity have been most acute were left unplanned. This is a very significant feature of the "new" regulatory

regime. For all intents and purposes the regulatory environment for these bands is predominantly a "dressed up version" of the old procedures (Ducharme, Note 3). The reasons and implications of this will be presented throughout this chapter.

Certain bands discussed for planning did not get considered. Despite the interest expressed by at least 10 developing nations in the 8/7 GHz band it was entirely excluded from the conferences proceedings (Demac et al., p. 9). This band was excluded from the conference because of objections from the U.S and U.S.S.R. who make heavy use of these frequencies for military and other bureaucratic purposes (Ducharme, Note 2). Essentially, developing countries were excluded from these bands by a "coordinated NATO position" that was successful in removing any "unacceptable operational constraints on the [U.S.] Department of Defence" (U.S. Delegate Report, p.13). The shared position of these two countries is not new on orbit and spectrum issues; nor is it surprising, considering that both countries are the largest users of these resources (U.S. Senate Hearings, 1986, p. 31).

Also excluded from consideration are the bands operating at 30/20 GHz, often referred to as the Ka bands (Final Acts, Res. GT-Plen/1). As such the Ka bands will not be subject to either the "improved procedures" or the procedures contained in the Allotment Plan (U.S. Delegate Report. p. 10).

Presently the use of this portion of the spectrum is minimal, "although they potentially have great capacity." The

conference concurred with a CCIR recommendation that "it would be extremely unwise for these bands to be subject to planning at this time..." (Final Acts, Res. GT-Plen/1). The prevailing rationale behind this view is similar to the logic that has guided the ITU's practices in the past. That is, the effective and efficient use of this band will come through actual practice and technological innovation (U.S. Senate Hearings, 1986, p. 42).

This sentiment is, provisionally, undeniable. The Ka band is the most susceptible to attenuation during peak afternoon traffic. Yet it also has the greatest capacity (Fritchard, p. 16). Therefore, practical use of this band, as has been the case in the development of other bands, can lead to corrective innovations which increase its utilization. However, and equally undeniable, it is these same practices that motivated a conference to deal with "guaranteed and equitable access" to begin with. The historical trends underlying the development of satellite communications, indeed all forms of technological development, have caused developing countries to grow wary of the weathered promises of equity through innovation. To neglect this fact would 'fly in the face' of the logic that motivated the 1985 and 1988 Space WARC's.

The historical realities underpinning the conference were not lost on its delegates in relation to this and other matters. Indeed, delegates from Algeria, Kenya and at least 10 other developing countries, were astutely cognizant of these exigencies as they called for some form of "guaranteed and equitable access"

to the Ka band (Demac et al., p. 9). Although the Ka band was not brought under the auspices of the Allotment Plan, its development and use must be vigilantly monitored to ensure that the practices of the past do not reoccur.

4.2. Initiating and Coordinating Services In the Unplanned Bands

Essentially, accessing the orbit and radio spectrum in the unplanned bands will be done as usual, albeit through somewhat "improved and simplified procedures". Basically it will be a three step process that includes:

- advanced publication and coordination with existing systems (Article 11);
- coordination for "additional uses" and/or with terrestrial systems (Article 14);
- notification and recording in the Master International Frequency Register (Article 13).

To obtain registration in the Master Register a country intending a satellite system must initiate the procedures contained in Article 11 of the Radio Regulations. Employing this process is the first step towards attaining international recognition and protection from interference for the intended system.

Within Article(s) 11 and 14 are detailed conditions under which a satellite system can ascend to "official status", or conversely, the conditions and requirements necessitating coordination. The most notable "simplification" of these "first come, first serve" procedures is the allowance for satellites to

be coordinated on a "network basis" as opposed to the piecemeal, component by component process of the past (Final Acts, Appendix 4). Such simplified procedures are intended to ease access to the orbit/spectrum resource while protecting existing systems. Yet, it must be noted that there is "absolutely no improvement in the unplanned bands in the way of a guarantee" (Ducharme, Note 3).

To implement a satellite system in the unplanned bands an administration must undertake an "advanced publication and coordination" process at least two years prior to and not more than 6 years before the satellite becomes operational. However, the administration can extend this period up to 3 years (Final Acts, Res. COM6/4). Yet, even this period may be extended if the International Frequency Registration Board (IFRB) continues its past practice of only removing dormant listings with the permission of the administration involved (Lett, Note 7). The failure of the IFRB to exercise its prerogative in the past has led to the practice of hoarding. This practice caused the issue of an "appropriate time limit for extensions...[to become]...very sensitive" at the conference (Canadian Delegation Report, Committee 6, p. 5). It was implied to conference delegates that the 3 year extension was a "quid pro quo" for the elimination of hoarding (Lett, Note 7).

To initiate the advanced publication and coordinating procedures a country must submit the following to the IFRB:

-separate information for each intended satellite, including

- general information on the systems characteristics;
- the operating characteristics of the up and downlink, as well as their combined performance qualities;
- information on "space to space relay" characteristics when applicable;
- in addition the notifying administration can provide "supplementary information and data for interference calculations for the purpose of inner-network coordination" (Final Acts, Annex 4).

The IFRB, upon receiving the above information, will check the submission for conformity with the Radio Regulations. It will then draw the attention of ITU members to the submission by publishing the information, in its weekly circular within 3 months of receiving the submission. After receiving the information the onus is on ITU members to notify the board of problematic aspects in the submission, or conversely, remain silent (Final Acts, p. 5).

There are two major aspects for developing countries within this provision. First and foremost, developing countries must stay abreast of current developments affecting their interests. Second, making this determination will now be easier because of new provisions in the Radio Regulations making the IFRB available to countries requesting assistance (Final Acts, p. 5). This addition to the Radio Regulations effectively aligns them with the recently amended Convention. Recalling earlier discussions, the Convention was amended at Nairobi (1982) to direct the IFRB "to perform any additional duties concerned with the assignment and utilization of frequencies and with the equitable utilization of the geo-stationary satellite orbit..."

(International Telecommunications Convention, Art. 10, 4(d)).

This will allow developing countries, often lacking a strong bureaucratic infrastructure, to stay abreast of developments in international relations and determine if their interests are implicated.

4.2(a). Coordination Procedures

The coordination procedures in the unplanned bands are for the most part "first come, first serve". From the outset it is incumbent upon the newcomer to proceed with the assumption that there can be no "possibility of adjustment to [existing] networks of other systems" (Final Acts, p. 6). If this proves unfeasible the newcomer can request "other administrations, either bilaterally or multilaterally, or in exceptional circumstances through the convening of multi-lateral meetings [MPMs]...to mutually help resolve these difficulties" (emphasis added, Final Acts, p.6). Yet, even this new administrative device is predominantly based on "first come, first serve" practices, containing only exhortations for the parties involved to collaborate in the resolution of difficulties. According to both Canadian and U.S. delegates to the Space WARC, the highly touted "improved and streamlined procedures" are merely "cosmetic window dressing" on the status quo (Lett, Note 7; Ducharme, Note 4).

The relegation of the MPMS to the position of the "court of last resort" is significantly at odds with the recommendations forwarded by the 1985 Space WARC. As originally envisaged the

MPMs were to be "the normal process for gaining access to the orbit/spectrum resources" (Report to the Second Session, Ch. 3.3.5). The significance of this outcome is discussed in greater detail later in this chapter.

Countries intending to initiate a satellite service must also, in the advanced publication process, identify to the IFRB "the names of the administration with which coordination is sought" (Final Acts, Art. 11, R.R. 1074). The IFRB is directed to help simplify and reduce the burden of coordination amongst the affected parties. It will do so by

- evaluating the levels of interference;
- defining, with the agreement of the administrations concerned, the method and criteria to be used;
- making arrangements to facilitate discussion (Final Acts, Art. 11, R.R. 1054).

The role of the IFRB in this process is that of a mediator. Its actions are limited to advising and making exhortations to the parties involved. In no way can its activities be construed as binding (Ducharme, Note 4).

The administrations involved are to consult the relevant CCIR recommendations for guidance in resolving their differences. As mentioned in chapter 2, developing countries have little representation at the CCIR sessions. It is imperative that this situation be rectified. Otherwise, during the coordination process developing countries may find themselves referring to CCIR recommendations that do not adequately address their concerns. In circumstances where

relevant CCIR recommendations are absent, the parties involved will be required to mutually agree upon "the methods and criteria" to be used in settling their differences (Final Acts, Art. 11, R.R. 1084.1).

Although the Final Acts urge the parties involved to "make all possible mutual efforts to overcome the difficulties" they do not mention a binding dispute settlement mechanism, that is, proportional burden sharing (Art. 11, R.R. 1085(a)). Clearly, the "improved and simplified procedures" for coordination in the unplanned bands have not eliminated the procedures that gave rise to the coordination difficulties encountered by India and Indonesia (see chapter 1). As the number of proposed systems become operational in the already congested unplanned bands, this shortcoming may prove to be particularly acute.

Although the conference specified that only FSS could operate in the bands considered, a degree of so-called flexibility was incorporated into the Radio Regulations. Flexibility was fostered by allowing for conditional "additional uses" of these bands (Final Acts, Art. 11: 162-165, and Art. 14). Essentially, additional uses can be made of these frequencies so long as the proposing country obtains the agreement of those affected, and does not exceed "threshold values" for the region involved, as established by the CCIR. (See the discussion in chapter 3 on "generalized parameters") (Final Acts, Art. 11, R.R. 1067).

After receiving the agreement of neighboring countries the

proposal can be listed in the Master Register. Even those systems exceeding CCIR threshold values, provided agreement is reached with potentially effected neighbours, can receive status in column 2(d) of the Master Register. This column denotes the non-conforming use of the system and assigns it an inferior status with respect to international protection and coordination obligations (Final Acts, Art. 13, R.R. 1518). Systems having this status will be required to submit additional information to the IFRB and may have to assume a greater responsibility in accommodating coordination burdens (Final Acts, Appendix 3). However the Final Acts are not clear on this issue.

Countries whose interests are implicated by a proposal for "additional uses" will be well advised to consider the consequences of their decision. Although "additional use" systems are limited in their duration to 15 years, as opposed to 20 years, the actual practices of the past have established de facto property rights which may make future coordination with this system problematic (Gorman, Note 6). In addition, the ambiguity of the Final Acts about the status of such systems should elevate concerns that expedient short-term decisions may in fact pre-empt the prerogative of future administrations coordinating a proposal with the existing "additional use" system.

At this juncture one of three outcomes is possible. The most favorable would be notification and recording of the proposal in the Master Registry. If this is not possible the

proposal can either be modified or the proposing country can invoke the "exceptional circumstances" clause to convene an MPM.

4.2(b). Multi-lateral Planning Meetings

As previously mentioned the "court of last resort" will be the multi-lateral planning meetings (MPMs). Again, it must be reiterated that this is contrary to the recommendations of the 1985 Space WARC. Despite the claims of some authors, the MPM concept is not "an entirely new approach to the traditional bilateral coordinating mechanisms used in the ITU for over 80 years" (White et al., p. 212). MPMs are a natural evolution and formalization of the bilateral and multi-lateral negotiation processes that have characterized the coordination procedures for years. The recently concluded agreement between Canada, the U.S. and Mexico is testimony to this fact (Amero et al., p. 3).

MPMs were originally conceived as being the normal method of accessing the GSO and spectrum in the unplanned bands. According to Canadian delegate and vice-chairperson, Ed Ducharme, the MPMs would improve and simplify the process of accessing the GSO and spectrum. Most importantly they would contain an element of proportional burden sharing. In the main, the MPMs have become a "dressed up version of the 'first come, first serve' procedures with a minimal element of guaranteed access". And, for all intents and purposes any considerations of proportional burden sharing is now a "dead issue" (Note 3). Why did this occur?

As mentioned in the previous chapter the MPM was conceived

at the 1985 Space WARC. However, its terms and obligations were not well defined (White et al., p. 213). As they now stand the MPMs include:

- an administration which cannot attend an MPM may delegate another administration to represent it;
- the pertinent provisions of Article 11 will be applied to the networks of affected administrations unable to attend;
- the results of an MPM will be considered as coordination agreements among participants without prejudging the rights of non-participants;
- MPMs will be open to representatives of affected Multi Administration Satellite Systems (ie. INTELSAT);
- the ITU may be requested to supply secretarial services under contractual arrangements;
- the costs of participation will be borne by the participants (Canadian Delegation Report, Executive Summary, p. 5; see generally Final Acts, Res. COM6/3).

Despite these features, a clear delineation of the obligations and responsibilities of the participants appears to have eluded the second session, notwithstanding a three year interim period to resolve the outstanding concerns. In the absence of definitive obligations as to who should assume the costs of convening such meetings, the obligations of those affected with respect to proportional burden sharing are weak exhortations. One such exhortation states that "any administration...has the right to propose...the holding of an MPM", yet "all' administrations and organizations whose systems are [implicated are only] urged to participate" (Final Acts, Res. COM6/3). In light of this, as the U.S. Delegate Report correctly notes, an administration causing a newcomer "major difficulty" in

accessing the GSO and radio spectrums, "is under no obligation" to participate in an MPM (p. 4). Nor can the outcomes of an MPM prejudice the rights of the entity with whom coordination is sought (Final Acts, Res. COM6/3).

For those administrations that do attend there are no clear responsibilities assigned for incurring the expense of convening an MPM. The Final Acts speak only of participants seeking agreement amongst themselves (Res. COM6/3). This arrangement is tenuous at best, inequitable at worst. With no clearly delineated obligations and responsibilities it is not difficult to see why the MPM has become the "court of last resort". Affected countries are left clinging to vague exhortations and promises that the process will provide focus and, consequently, peer pressure on the parties involved to achieve an amiable and equitable solution (Ducharme, Note 3). History has taught the developing countries that these mechanisms inadequately address their concerns.

The equivocal nature of the MPMs is a product of two factors. First, and foremost, it reflects a lack of consensus on an acceptable proportional burden sharing formula. This persisted despite clear definitions forwarded by the CCIR (see last chapter) and the Canadian delegation. The Canadian proposal called for burden sharing that would be commensurate with the involved countries use of the GSO and radio spectrum.

In a hypothetical scenario involving the U.S., Canada, Mexico and Argentina the burden sharing would be in proportion to

their respective use of the two resources. In this case the U.S. has 30 satellites, Canada 3, Mexico 2 and Argentina a proposal for one system, for a total of 36 satellites. As such the U.S. would assume 83% (30/36) of the accommodating burden, Canada approximately 8.5%, Mexico approximately 6% and Argentina the remaining 2.5% (Ducharme, Note 2). The reason this was not adopted is rather obvious, despite its apparent "equitability".

The second major reason the MPM turned out to be a "toothless tiger" stems from the fear of some administrations that the establishment of a separate, sub-operation of the ITU would require amendments to the Convention. MPMs, it was feared, might also put additional strains on the ITU's budget (Canadian Delegation Report, Committee 6, p. 3). The latter can be dismissed, since the cost of convening the MPM would be reflected in an adequate proportional burden sharing formula. The former concern is also misleading since a major Plenipotentiary Conference, whose primary mandate is to revise and update the Convention, was held eight months after the Space WARC. Had consensus been achieved at the WARC's amending the Convention would have been a mere formality.

Nonetheless, if an MPM is convened, and a satisfactory coordination agreement achieved, the satellite in question obtains official status and international protection through recording in the Master Register. That is, the notifying administration will, like every other proposal that has successfully applied the coordination procedures of Articles 11

and 14, invoke Art. 13, which obligates the IFRB to list the new system in the Master Register.

4.3. Initiating Satellite Services in the Allotment Plan

A "new" regulatory regime under the auspices of an Allotment Plan will commence on March 16, 1990, and remain in effect for 20 years or until revised by a "competent WARC". In the planned bands the advance publication, coordination, notification and recording process is referred to as "converting an allotment into an assignment" (Final Acts, Appendix 30B). In essence, the intention of the Plan is to exempt administrations from the "firstcome, first serve" procedures contained in Articles 11, 13 and 14. However, as I will demonstrate, "first come, first serve" practices are not excluded from the Plan.

There are currently 240 allotments within the Plan (Ducharme, Note 4). These allotments are divided into Part A and Part B of the Plan. Part A of the Plan contains 186 allotments while Part B contains 54 allotments (Final Acts, Addendum, p. 70). The distinction between the two parts in the allotment plan is a result of the conference's decision to allow for "existing systems" within the plan.

Part A of the Plan consists of all the new allotments worked out at the conference. The allotments in Part A of the Plan consist of

-a nominal orbital position;

- an overall bandwidth of 600 MHz in the C band , and 1000 MHz in the Ku band;
- a service area equal to one national coverage;
- generalized parameters, as discussed in chapter 3; and
- a predetermined arc from which the orbital position is chosen (Final Acts, Appendix 30B, Art. F).

Part B of the Plan consists of 54 existing systems. These systems are defined as those

- recorded in the Master International Frequency Register;
- that have initiated coordination procedure;
- which have submitted all the information relating to advance publication prior to August 29, 1985 (Final Acts, Appendix 30B, Art. F).

Despite the clarity of definition for "existing systems" in Article F, the Final Acts do contradict themselves in three places (See Articles F and L (section IB) and Res. COM4/2). These contradictions leave the status, and the duration of the "existing systems" unclear. The vice-chairperson of the Canadian delegation concurred with the author that the Final Acts may in fact be erroneous in this regard. Although some authors have made a distinction between "new" and "old existing systems" their claim is not borne out by the text of the Final Acts (Taylor, p. 31).

This "flaw" is attributable to a last minute "political" resolution to appease the Spanish delegation (Ducharme, Note 4), and the efforts of the U.S.S.R. and U.S. to have the existing systems incorporated into the Allotment Plan (Telecommunications Report, Oct. 10, p. 19). The implications of incorporating

"existing systems" into the Plan will be explored in greater detail below. However, it is essential that the reader bear in mind the above mentioned "flaw" in relation to these implications.

As well as giving each country at least one allotment, and incorporating "existing systems" into the Plan, the conference also established mechanisms for

- the establishment of sub-regional systems;
- additional uses of the expansion bands other than those contained in the Plan (Final Acts, App. 30B, Art. F); and,
- procedures for adding new allotments to the Plan for new ITU members (Final Acts, App. 30B, Art. K).

Like the allotments in the Plan each of these classifications must undergo a process of "converting an allotment into an assignment". Generally speaking, the Final Acts provide four different mechanisms for converting each 'system classification' into an operable assignment. New allotments to the Plan will undergo the same procedures as the standard allotments (App. 30B, Art. J). Upon successful application of the relevant procedures a satellite will attain official status in the Master Registry.

Generally, converting an allotment into an assignment requires the advanced publication and coordination processes to be undertaken no later than one year, and not earlier than five years, before the date the system is to become listed in the Master Register (Final Acts, App. 30B, Art. L). The shorter advanced publication and coordination period reflects the

relative stability associated with "a priori" planning (Bowen et al., p. 6).

To initiate operations each system in the Plan must provide the same information as those in the unplanned bands. They are also required to file information relating to the satellite's designated service area, generalized parameters, orbit location, the macro-segmentation concept (for a discussion of this and the preceding factors refer to chapter 3) and compatibility with "existing systems" in Part B of the Plan (Final Acts, App. 30B, Annex 2, 5). After doing so the proposed service will either be listed in the Master Register, have to resolve offending incompatibilities, and/or undertake additional measures -- for "sub regional" and "additional use" systems (Final Acts, App. 30B, Art. L).

4.3(a). Proposals Not In Conformity With the Plan

There are two situations that will preclude successful conversion of an allotment into an assignment. The first arises when the proposal does not conform to the criteria contained in Part A of the Plan. However, the occurrence of this possibility should be relatively rare since the requirements of systems operating in the planned bands are clearly spelled out. Satellites operating in the planned bands will not be subject to the rapidly changing technological environment characteristic of the conventional bands. The second, and more likely occurrence, arises when a proposal does not achieve compatibility with

existing systems in Part B of the Plan (Final Acts, App. 30B, Art. L, 107-106). Under the first scenario the remedies available to the "offending proposal" are rather straightforward. The offending proposal can either be modified and resubmitted or the responsible administration can seek an alternative orbital location, "preferably within its predetermined arc (PDA)." In either case the assistance of the IFRB is available (Final Acts, App. 30B, Art, L, Sec. IA, 202).

The PDA concept is tied to allowable interference levels-C/I ratios - and a satellite system's stage of development. The PDA concept will be applied to those systems whose introduction abrogates the allowable single entry or overall aggregate level (Final Acts, App. 30B, Annex 5, 1.1). As recommended by Space WARC 85, all systems within the same PDA as the offending proposal will be requested to make adjustments to their nominal orbital positions. The amount of change required is heirachically ordered in accordance with the affected system's stage of development. Essentially as a country "moves toward converting [its] allotment into an assignment the slot diminishes in size" (Broadcasting, Oct. 3, p. 32). Successful application of the PDA concept will result in notification and recording in the Master Register (Final Acts, App. 30B, Art. M, 102).

In the second scenario, allotments in Part A of the Plan, sub-regional systems and "additional use" systems must achieve compatibility with the 54 "existing systems" in Part B of the Plan. This is potentially the most troublesome feature of the

Allotment Plan. The requirements of the parties involved are very ambiguous, to say the least. Primarily the requirements are based on "first come, first serve" principles, with the obligatory exhortations for both parties to cooperate in the resolution of difficulties.

Under Article L the country "responsible for an existing system...shall...take all technically and operationally possible measures...to accommodate the requirements of an administration seeking to convert its allotment into an assignment". Yet, the country converting an allotment into an assignment is, at least, equally obligated to be involved "in the resolution of difficulties." Furthermore, the amount of accommodation required is dependent upon the affected systems "stage of development" (Final Acts, App. 30B). Presumably "existing systems" will always be in a more advanced "stage of development" than an allotment. Consequently, the newcomer will be "handicapped" by assuming a greater portion of burden in achieving compatibility. Nonetheless, once an allotment achieves compatibility with "existing systems" it attains official status in the Master Register (Final Acts, App. 30B, Art. M, 102).

The intrusion of "first come, first serve" practices into the planned bands is particularly objectionable. This factor, coupled with the status quo in the majority of the frequency bands, seriously call the conference's success into question. The ambiguities of the regulations in no way "guarantee" that the circumstances plaguing Indonesia and India in the 1970s, will

not resurface in the planned bands. As well, the question of "equitable access", considering that the procedures for accessing the majority of the radio spectrum allocated to FSS are virtually unchanged, is a foregone conclusion.

The regulations go beyond giving "equitable treatment to existing systems", as claimed by U.S. delegate chairperson, Theodore Brophy (Telecommunications Reports, Oct. 24, p. 19). They establish de facto priority and extend the often criticized coordination procedures of the unplanned bands into the Allotment Plan. Indeed, developing countries argued that the adopted Plan gives "precedence to existing systems over national allotments" (U.S. Delegate Report, p. 27). As could be expected developing countries objected to reconciling their allotments "with the operations of an existing system" (Broadcasting, Oct. 3, p. 32). Not surprisingly, their objections were dismissed by delegates representing established satellite interests as "hot air and ego" that tried "the patience of their colleagues from developed countries" (Broadcasting, Oct. 3, p. 32).

The treatment of "existing systems" is particularly problematic because these systems have only come into existence since the allocation of the "expansion (planned) bands" to the FSS by the 1979 WARC. Moreover, these so called "existing systems" are merely 'paper satellites' (U.S. Senate Hearings, 1986: p. 34). Their existence does not extend beyond the drawing board and, unfortunately, the IFRB's Master Register. Somewhat ironically, the only systems close to actual operation

are those of tiny Papua New Guinea and Pakistan (Ducharme, Note 4).

It must be noted that half of the "existing systems" belong to the U.S.S.R. and the U.S. The others belong to a handful of developed western countries, except the aforementioned systems of Papua New Guinea and Pakistan (Final Acts, Addendum, p. 70). This extension of the practice of hoarding into the Allotment Plan makes an absolute mockery of the ITU's mandate and recording process. Yet, it must be remembered that these practices were absolutely within the prerogative of the above mentioned countries. The legitimacy of the IFRB's recording practices will come up at the 1989 Plenipotentiary Conference (Coddington, 1989). The most discouraging aspect of this provision is that the language used can be interpreted as giving "authority for extending the life of existing systems, now fixed in the plan at 20 years" (Broadcasting, Oct. 10, p. 42).

This undermining of the conference's mandate could have been avoided by considering "existing systems" in the expansion bands as a nation's de facto allotment. However, even this would not account for the number of "existing systems" possessed by a few countries. The solution would be to take the excess systems and assign them the inferior status of "additional use" systems. This status would reverse the burden of accommodation, placing it upon the "existing system" (Final Acts, App. 30B, Art. L, sec. III). The bare minimum should have been clearly delineated proportional burden sharing obligations. The historic pre-

eminence of the developed countries in the ITU ensured that neither of these solutions was adopted. We must remember that these bands were specifically allocated to the FSS in 1979 to provide developing countries with a "guarantee of equitable access" to the GSO and radio spectrum.

These are not theoretical issues, nor are they limited to the concerns of developing countries. A number of countries, from the very outset, found their allotments prejudiced "by the discriminatory effect of 'existing systems'" (Telecommunications Report, Oct. 10, p.19). Among the countries taking reservations to the inclusion of "existing systems" were Australia, Denmark, Greece and the Netherlands (Telecommunications Report, Oct. 10, p. 20).

As well, the inclusion of such systems required the intensive use of valuable ITU resources at the same time the administrations responsible are urging the ITU to exercise budgetary restraint (Solomon, p. 244). Indeed, the inclusion of these systems occupied the time and capacity of a large number of computer programmers, engineers and a specifically designed computer software package for a number of weeks (Canadian Delegation Report, Committee 4, p. 2) - notwithstanding the years of effort spent by Canada, Japan and the U.S. in developing a workable program. It is readily acknowledged, but "dismissed as academic", that a plan acceptable to all allotments "could have been developed if the existing systems (Part B of the Plan) had not been included" (Bowen et al., p. 5).

Thus, it is no surprise that U.S. delegates greeting the press at home were euphoric. Their efforts at "damage control" were wildly successful. Reports by Theodore Brophy, on "last minute plenary work aimed at reconciling national allotments... with those of existing systems" underscore the delegation's enthusiasm (Telecommunications Report, Oct. 10, p.19).

4.3(p). Sub-regional Systems and Additional Uses Other Than Those Contained in the Allotment Plan

Sub-regional systems are defined as:

a satellite system created by agreement among neighboring countries, members of the ITU, or their authorized telecommunication operating agencies, and intended to provide domestic or sub regional services within the geographical areas of the countries concerned (Final Acts, App. 30B, Art. F).

Allowances for sub-regional systems recognize that such systems are, for many developing countries "their only means of access to satellite service, at least for the foreseeable future" (Broadcasting, Oct. 3, p. 32). This trend is reflected by the African proposal, RASCOM; the initiation of the Andean Satellite System by five South American countries; and the increased number of south-east Asian countries that will use Indonesia's second generation PALAPA satellites (Via Satellite, pp. 44-45). It is also cognizant of the fact that such systems are already in place and effectively increasing the access of developing countries to telecommunication facilities. Yet this increased access cannot overwhelm the fact that many developing countries still have inadequate telecommunication facilities (Demac et al.,

p. 8).

The establishment of a sub-regional system requires the submission of the aforementioned advanced publication material required of all satellites operating in the planned bands. As well, such systems must designate the "participating administrations...[and] the part of the national allotments proposed to be used...and the notifying administration" (Final Acts, App. 30B, Annex 2, 5). The consortium's application will then be checked for compatibility with other allotments in the Plan. If it is found to be incompatible it will have to undertake the measures relating to modification, the PDA concept and existing systems. Successful completion of the advance publication and coordination process will allow it to be listed in the Master Register.

Countries participating in a sub-regional system will have their orbit and frequency allotments "suspended" for the duration of their participation. A country's suspended allotment will "enjoy the same protection...afforded other allotments in the plan" unless the allotment encounters interference from another sub-regional system, or, if a participating member decides to withdraw from the organization prior to it officially disbands. When either of these circumstances arise the suspended allotment will be considered to have the inferior status of an "additional use" system (Final Acts, App. 30B, Art. L sect. III, 202 - 204 and 215). Under such status, a country will have to coordinate its allotment with all other systems on a "first come, first

serve" basis (Final Acts, App. 30B, Art. L, sec. III). In the latter case, if the organization disbands, the allotments of each of the participants will be reinstated, with no decline in status (Final Acts, App. 30B, Art L, sec. III, 216).

The above aspects of the Final Acts were viewed with consternation by the developing countries, "particularly those in Africa and South America" where proposals for sub-regional systems are nearing fruition (U.S. Delegation Report, p. 26). This is because the feature abrogates the highest international legal principle - sovereignty. It is undeniable that suspending, and the possibility of degrading, a nation's allotment encroaches upon its sovereignty. Allotments should not be suspended, nor should they be subject to a decline in status. The provisions create an environment in which countries will have to "second guess" their decision to withdraw from an organization they perceive as no longer meeting their needs. This problem is particularly acute when it is considered that the provisions can be construed as allowing a nation to "contract out" its requirements to an entity with the technological and economic wherewithal (Levin, 1988: p. 61). Indeed, there is nothing in the current regulations that preclude this type of contractual arrangement. The current escapades of the Republic of Tonga, which are discussed in detail below, are testimony to this fact (Satellite Week, No.7, p. 1). However, the current regulations are skewed so as to effectively eliminate an escape route for a nation unhappy with the 'contractors way of doing business'.

Effectively the disgruntled administration is forced to choose between continuing an arrangement it is dissatisfied with, or reactivating its allotment, albeit with inferior status. This is clearly unacceptable.

Furthermore, the situation will be aggravated by the tendency of developing countries to disengage from such systems as they gain command of the technology. This is already evident as countries reduce their reliance on INTELSAT facilities and try to "go it alone". As one representative from a developing country warns this process will "not be limited by economic questions" (Via Satellite, p. 44). Thus, in a very real sense, suspending and/or diminishing the status of an allotment will hinder a nation's right to assert itself through autonomously developed national communication policies. These are policies which have tremendous economic, political, social and cultural implications.

Despite opposition from several Latin American countries, the conference adopted the U.S. proposal to allow for systems other than those in the Allotment Plan (Broadcasting, Oct. 10, p. 41). The motion was able to proceed despite recognition by the 1985 session that such systems increase the likelihood of interference with adjacent systems (Wu, p. 542).

The proposal was able to proceed because it allowed the degree of flexibility some developed countries wanted built into the Plan. However, to protect the sanctity of the allotments a clause was inserted requiring that such systems be approved by

countries whose interests would be affected. The effect is to impose "first come, first serve" arrangements on those intending to implement a satellite service falling under the "additional use" category. "Additional use" systems were also limited to using their assignments for a 15 year period - five years shorter than other systems in the unplanned and planned bands (Final Acts, App. 30B, Art. L, sec. III, 302). Yet a degree of caution is in order here because the Final Acts are silent on the renewal of listings contained in the Master Register. (Final Acts, App. 30B, Art. L, sec. III).

Indeed, if the flexibility and ambiguity in the relevant provision is invoked, as is intended for the time constraints placed on "existing systems", a country could have command over a portion of the GSO and radio spectrum for 39 years, if not longer, from the time the ITU receives a satellite's advanced publication information (Broadcasting, Oct. 3, p.42). This, plus the prevalence of the status quo in the majority of the bandwidth considered, and because the conference was unable to successfully and definitively resolve the question of property rights in space, suggests that steps be taken to resolve the matter. Hence, the latter half of the next chapter is directed towards this end.

4.4. Conclusion

Recognizing that communication satellites, particularly those offering FSS, come in a "socio-economic-cultural-political package...that tries to integrate its users into a larger system of which it is the expression and the tool" and that the radio spectrum and GSO were facing an acute problem of congestion, the 1985 and 1988 Space WARC's were established to provide developing countries with guaranteed and equitable access to these resources (Jayaweera, p. 15). Essentially the conferences were directed to establish regulations that would allow developing countries to realize their national communication policies by, in part, redressing the disproportionate use of the GSO and radio spectrum by the developed countries.

In the end, the conference solution was to establish a two-tier regulatory regime. However, in doing so it reserved only a small portion of the orbit and radio spectrum coming under its jurisdiction for allotment planning. Consequently, the status quo prevails in the majority of the spectrum used by the FSS. Although the regulations purport to have "improved and simplified procedures" for activating a satellite in the unplanned bands, there have been no substantive changes. There is no clear delineation of obligations and responsibilities for those involved in the coordination process, and consequently, "absolutely no improvement in the unplanned bands in the way of a guarantee" (Ducharme, Note 3). The most notable simplification is in the allowance of satellites to be coordinated on a network

basis. However, this simplification will primarily serve large communication interests.

In short, the "new" regulations contribute to reinforcing the current structures of international geo-political relations. Instead of indicating a marked shift from dependent and colonial relations of the past, the new regulations sustain an environment in which 'satellite poor' countries remain reliant on the goodwill of developed countries. Basically, the needs of developing countries will be measured in terms of their consistency of fit with the plans of the developed countries. For the most part, securing the transfer of satellite telecommunication resources will be done by tying the developing countries into the commercial needs of the developed countries (U.S. Senate Hearings, 1988). Where the situation justifies the use of satellite communication to integrate the developing countries into the production and distribution of commercial goods and services, the developing countries will get access to satellite communication. The primary function of the hardware will be to administer the production and distribution aspects of commercial interests; the spin-off benefits will be the establishment of public telephone networks, but at excessive costs. This is discussed in greater detail in Chapter 5.

This result of the conference can be attributed to its inability to escape the quagmire of reconciling public property principles that guide the use of the GSO and radio spectrum with the rights of nations to exercise their prerogatives, commercial

or otherwise, in space. The lack of fortitude in this respect allowed the proverbial "carriage to be put before the horse". Instead of achieving equitability and then allowing nations to pursue their prerogatives, the conference reversed the order of priority. Thus, developing countries are left, for the most part, relying on the withering promise of equity through technological innovation and the 'trickle down' benefits of western economic development theory.

Consequently, the regulations, based primarily on "first come first serve" practices, do not eradicate the possibility of the "latecomer handicap" phenomenon. The fact that demand for satellite communication doubled between 1980 and 1985, and that "90% of the proposals [for new systems] belong to developed countries or international organizations" suggests that this issue will become increasingly apparant in the near future as the GSO and radio spectrum become more congested (White et al., p. 202). Indeed, as pointed out in chapters one, three and four, the occurrence of this phenomenon is already increasing. In the Far East, Canadian consultants from Telesat, working with a number of countries, are experiencing difficulty in coordinating these countries' proposed systems with those already in existence.

It is no exaggeration to claim that the Space WARCs were an extensive exercise in subterfuge and obfuscation. On the one hand, developed countries paid lip service to the movement for "guaranteed and equitable access". This movement was initiated

in 1955 at Bandung by the formation of the non-aligned movement (Smythe, 1987: p. 7). The Space WARC's were called to meet the concerns of the developing countries and to culminate their years of working towards a NWICO in the ITU and other forums. While maintaining "the promise", developed countries took the offensive. At the same time that they were paying lip service to the mandate of the Space WARC's, they were busy applying pressure in the corridors of the ITU, the conference itself and other areas of trade to ensure that the status quo prevailed. This was all part of a massive and unparalleled campaign to "educate and seek views on the U.S. position" that started many years prior to the conferences debut (U.S. Senate Hearings, 1983: p. 45).

All countries did achieve guaranteed access by being allotted at least 800MHz of bandwidth in the C and Ku band and a minimum of one orbital location to provide at least one coverage of their respective territories. Yet, even this minimalist version of guaranteed access is not without problems. For instance, the regulations allow the radio spectrum to be used for purposes other than FSS if the implementing agency obtains the prior consent of nations close to the proposed service area. This is problematic because the regulations lack clarity in defining the valid period of use that such systems enjoy. The U.S. Delegate Report claims that the wording in the relevant provisions allow the systems to operate beyond the 15 year period referred to in the Final Acts. The concern is that prior consent is not well defined with respect to the duration of its

application or the conditions under which it can be rescinded. Thus, it is possible to have future government initiatives handicapped by 'prior consent obligations'.

A second factor of the so-called guarantee is found in the provisions allowing for establishment of and participation in "sub-regional" satellite systems. The conference recognized that such systems are already in place and effectively increasing the access of developing countries to satellite communications. However, the regulations impose measures that restrict countries' ability to exercise their discretion once involved in a "sub-regional" system. By penalizing countries that withdraw from a sub-regional system while it remains in existence, the conference effectively abrogated the highest international legal principle - national sovereignty. This aspect of the Final Acts will cause countries to 'second guess' their decision to withdraw from such organizations. This will become particularly acute when (a) countries gain command of the technology and disengage from the organization, as has been the case with INTELSAT participation, and (b) countries become disenchanted with others involved in the operations of the "sub-regional" organization and break away from the organization. Hence, the effect of the clause is to eliminate a dimension along which countries can exercise their decisions.

The most troublesome aspect of the Final Acts is the inclusion of "existing systems" into the Allotment Plan. Included in the Allotment Plan are 240 allotments and 54 "existing

systems", half of which belong to the U.S. and U.S.S.R. From the outset a number of countries found their allotments prejudiced by the presence of these existing systems. This is particularly problematic because the allotments of others must be coordinated on a "first come first serve basis" with the "existing systems", although all of these, except those of Pakistan and Papua New Guinea, are merely 'paper satellites'. Instead of equality, as the developing countries argued, the Allotment Plan gives "precedence to existing systems over national allotments" (U.S. Delegate Report, p. 27). To aggravate matters further, the language used in the regulations can be interpreted as giving "authority for extending the life of existing systems, now fixed in the plan at 20 years" (Broadcasting, Oct. 10, p. 42).

At a time when the ITU is constantly accused by the developed countries for its so-called politicization, it is ironic that they instigated and obstinately insisted on incorporating "existing systems" into the plan. It is readily conceded that a more acceptable plan could have been more easily obtained if "existing systems" were not a concern. Importantly, the conference marks an increase in the level of political awareness of the developed countries in ITU matters.

The exclusion of critical, non-affiliated observers from the meeting floor in Geneva and the absence of commentary on the perspective of developing countries in the popular and trade press of the west, causes the acceptability of the Final Acts to remain unknown. Some of the direct references pointed out above

indicate that many of the aspects in the Final Acts are not acceptable.

Because of the inability of the ITU to successfully resolve the concerns of the developing countries, the concluding chapter of this thesis proposes a model of property rights to the GSO and radio spectrum. The current ITU property regime, based on the "common heritage of mankind principle" of the Outer Space Treaty (1967), is outdated, as it primarily serves the interests of the technologically advanced nations and threatens to further the gap between the rich and poor nations of the world. As such, the model in chapter five intends to

- (i) redress the disproportionate use of the GSO and radio spectrum;
- (ii) eliminate the practice of hoarding in both the unplanned and planned bands;
- (iii) circumvent the practice of de facto appropriation by the developed countries, and recently, Tonga;
- (iv) allow equal realization of the economic benefits accruing from the use of the GSO and radio spectrum.

Essentially the model is directed at allowing countries to participate in satellite communication when the need coincides with their ability. It is to allow countries to avoid making premature and economically unjustifiable investments in costly technology while at the same time allowing them to avoid dependent relations with service providers. In the environment promoted by the model, countries would be less fearful of being pre-empted and more likely to develop long-term communication policies that attend to their specific needs.

This thesis concludes with a discussion of the conference outcome in relation to the international communication environment, especially as it pertains to competition with INTELSAT and the development of national communication policies. The lack of provisions giving official status to MAS in the ITU provides sufficient scope to see how the new regulations will be activated within the context of the many divergent and conflicting interests that are characteristic of the ITU's membership.

CHAPTER 5

SYNTHESIZING THE RESULTS OF THE CONFERENCE WITH THE
CURRENT INTERNATIONAL COMMUNICATIONS ENVIRONMENT5. Provisions For Multi-Administration
Satellite Systems

The status of multi-administration satellite systems (MAS) in the ITU, or the lack thereof, is a crucial feature of the regulations adopted at the 1988 Space WARC. Basically, despite the recommendation of the 1985 conference session, MAS were not given official status in the ITU. Had this been a feature of the Final Acts, organizations such as INTELSAT would have had a voting position in the ITU for the first time.

Such an outcome would have given these organizations the opportunity to pursue their own positions in the ITU without relying on national administrations whose needs do not always coincide with that of the MAS. A case in point is the position of the U.S. as both competitor and majority shareholder in INTELSAT. Under these circumstances the competing interests of U.S. delegates from the private sector and those from the same delegation representing INTELSAT (Lett, Note 7) puts the organization in an awkward and somewhat perilous situation

The failure of the conference to establish official status for MAS reveals a poignant lesson in international economics and politics. For the most part there was general acceptance of allowing MAS official status at the first session. To reiterate from the last chapter, this move was initiated by Switzerland and

thirty other countries to "insure the inclusion of MAS in the planning process" (White et al., p. 216). However, the U.S., buoyed by the support of the U.K., France and West Germany, was able to tag onto the recommendation the clause, "without affecting the rights of administrations with respect to national systems" (Demac et al., p. 11). The reasons for doing this were twofold. First, the U.S. administration felt that the recommendation gave preferential treatment to MAS (U.S. Senate Hearings, 1986: p. 19). The second, and more revealing reason, is that the U.S. intended to employ the clause in its campaign of justifying competition with INTELSAT.

Without equivocation, the U.S. administration let the ITU know its intentions with respect to this matter. In 1985, shortly after the first session concluded, the ITU was informed that "there is no doubt on the part of the Commission...[that]... U.S. telecommunication requirements" cannot be abrogated by ITU regulations (U.S. Senate Hearings, 1986: p. 19). If the decisions of the forthcoming WARC were unsatisfactory there would be no way the U.S. would "surrender its sovereignty and allow an international body to tell us which frequencies at which power" we can use (U.S. Senate Hearings, 1986: p. 43). Furthermore, during Senate Hearings leading up to the 1988 Space WARC, the intention of the U.S. to realize its "open skies" policy was made explicit (U.S. Senate Hearings, 1988). Words were followed with action as the U.S. established agreements with the U.K., France, West Germany and Peru, allowing customers in

these countries to access the facilities of PANAMSAT and ORION (U.S. Senate Hearings, 1988; Lett, Note 7).

Although the actions of the U.S. reinforce its interpretation of the issue, there is by no means consensus on the issue (Demac et al., p. 11). It can be inferred that the absence of the 1985 Space WARCs recommendation in the list of the 1988 sessions's accomplishments indicates a continuing lack of consensus on the issue. Yet, it must be recognized that this silence does not bode well for those supporting the argument that competition in international communications will undermine universal inter-connectivity (see, for example, numerous articles by Joseph Pelton). The inability of delegates to achieve consensus has effectively eliminated the ITU from a role in determining this question, leaving the entire issue "moot" (Lett, Note 7). It appears that the issue of international competition is a fait accompli. This is true in light of both the above and in the fact that the U.S., U.K., France and West Germany are the majority shareholders of INTELSAT, with whom final approval must be sought in accordance with Article 14(d). Indeed this has been the record to date as PANAMSAT and ORION have already successfully met Article 14(d) requirements. A definitive resolution on international competition with INTELSAT was expected to come from a July 11-13, 1989 meeting of INTELSAT signatories (Lett, Note 7). As far as can be seen there are no multi-lateral forums left to deal with the issue. This too benefits the current actions of the U.S. as it consults with, and

threatens sanctions against non-complying governments around the world (U.S. Senate Hearings, 1988).

These developments must be monitored for two reasons. First, the quality of participation to be expected from developing countries in the INTELSAT meeting of signatories is suspect, given the heavy burden placed on these administrations by the "most important year in the ITU's history" (Ducharme, Note 2), a year which had already seen major WATTC, WARC and Plenipotentiary Conferences, and was still to have an INTELSAT meeting. In light of this, it is not unreasonable to postulate that developing countries will indeed be relegated to a minor role in the ultimate resolution of the international competition issue.

The second reason, a product of the first, is that just at a time when developing countries are increasing their access to telecommunication facilities, new developments are threatening the manner in which these facilities will be made available to the general population. The focus here is on the practice of "bypass" as it relates to (i) inter-connectivity; (ii) the principle of universality; (iii) the practice of cross-subsidization; and (iv) the distribution of the benefits amassing through rapid technological innovation.

The concept of universality is being threatened at both the international and national level. For the most part, the threat stems from an era of privatization, an era that was largely initiated by the deregulatory environment in the U.S., and given

credibility by the Maitland Commission's suggestion that developing countries privatize their telecommunication facilities (ITU, p. 38). In this so-called era of liberalization the key jargon of old (inter-connectivity, universality and cross-subsidization) has been replaced with innocuous and righteous sounding terms like barriers to trade, open market entry, bypass, cost based accounting, non-discrimination, and technological innovation, among others.

At the international level universality is being threatened by forces within and outside INTELSAT. The push for cost based pricing encompasses many of the factors contributing to this threat. The objective of cost based pricing is to bring the cost of a service in line with the cost of providing that service. The ultimate aim of such a policy is to eliminate INTELSAT's practice of cross-subsidization (U.S. Senate Hearings, 1988). In relation to INTELSAT the practice involves taking revenues from lucrative routes, that is, the trans-Atlantic corridor, to subsidize service along marginal routes, for example Haiti to Ecuador, where the cost of providing the service outstrips the revenues generated.

Although INTELSAT's practices have fostered world wide inter-connectivity, inadequate facilities remain in many countries. This prevents the widespread use of these facilities, and thus keeps the price per use relatively high. Bringing the cost of service in line with providing the service is not conducive to increasing the use of INTELSAT facilities.

The objective should be to increase the use of these facilities so that, in time, the unit cost of communicating will fall encouraging further use.

Also occurring at the international level are efforts directed toward bypassing the national public exchange networks. In some cases, such as in the U.S., West Germany and the U.K. this practice is already occurring. Other nations are being threatened with trade sanctions and the withdrawal of aid programs to encourage them to develop their communication policies in a manner that would not contradict U.S. interests and "free market" ideology (U.S. Senate Hearings, 1988: p.55). This practice is not limited to developing countries.

The efforts of the U.S. with respect to Canada in the recently concluded Free Trade Agreement (FTA) typify these developments (U.S. Senate Hearings, 1988). Although the U.S. received access to the Canadian market, it claims this was not enough. The U.S. was able to achieve this access without any concomitant obligations to the long established tradition of universality in Canada. In fact, an Annex to the FTA directs the Canadian government to ensure that monopoly carriers do not engage in the anti-competitive practices of cross-subsidization, predatory pricing and discriminatory access to network facilities. They are currently pressing for further access. (For further information as to what the U.S. did and did not get through the FTA, see the relevant provisions on Trade in Information Services.)

This directly confronts the legitimacy of practices that have allowed the universality of service to prevail in Canada through constantly declining prices to average consumers (Pike et al., p. 26). In fact Pike and Mosco point out that Canada's current deregulatory environment promises to take the momentum out of declining rates, as has already been demonstrated in the U.S. (pp. 27-28). Deregulation effectively exempts business users from their traditional responsibility to cross-subsidize the public network. In Canada, business users have traditionally paid "more than residents for the same telephone service because their telephone service is deemed to have more 'value' to them than it has to residential users" (Salter, p. 385). Without this support, sustaining the practice of universality in Canada is questionable.

In all of this it must be realized that FSS technology is particularly well suited for accomplishing this task. U.S. corporations have used FSS technology to bypass and, consequently, withdraw their economic support from the public switched networks for years (Blonstein, p. 81). Indeed, part of the negative connotations of the Tongasat proposal are related to the fact that the FSS systems it is proposing have no applications outside the business and governmental communities. Essentially, the American expatriate at the helm of Tongasat is taking advantage of the technology, loopholes in ITU regulations and the era of liberalization to tie up valuable orbital slots and frequency bands with no concomitant obligations to the

general public whose resources are being used. In exchange he is offering competition with INTELSAT and the potential decline in access this will entail (Satellite News, Feb. 13, p. 2).

The last point demonstrates the inherent paradox of the current telecommunication era. It has been pointed out that the average person using the public switched network in the current era of liberalization, despite the advantages accruing from a hitherto unseen rapid rate of technological innovation, has not experienced rate declines which parallel those of history (Pike et al., p. 33). This applies not only to the North American scene but also to that of the developing world.

For instance, Dominica, a small Caribbean island of 305 square miles, has recently been provided with an extensive, almost universal, telephone system. But, for what purpose, and whose interests does the system serve? If history is a teacher the primary function of the system will be to administer the trade, marketing and military needs of transnational corporations (Smythe, 1987: p. 13). This is a view corroborated by some Dominicans.

In the case of Dominica, its 305 square miles has been divided into seven exchanges, approximately eight by five miles each, with toll charges applying to all calls going out of each exchange in excess of \$1 Cdn. for the original minute, and \$.25 thereafter. Essentially, considering the small exchange size, the system is configured on a 'pay per use' basis, a pricing system that has been vehemently opposed in Canada and the U.S.,

although it has made some inroads in the latter. The prices charged to the Dominican public would be considered outrageous in the developed world. Calls leaving the island are even more expensive.

By comparison, the North American network has exchanges of far greater size, and comparatively smaller rates for accessing each one. Yet, Dominicans are better off in comparison to five years ago - they at least have a telephone. However, they are paying dearly for their enthusiastic response. The point is that international trends are increasing the availability of the hardware but at excessive costs. The former is a product of technological innovation, and the latter the privatization of this technology. The Dominica case also illustrates that the vision of "restructured colonial pricing" has not occurred under market based telecommunications (Rones, p. 27). In the end, hardware still gravitates towards the local elite in the developing countries for the purpose of administering foreign capital. The spread of facsimile and computer services amongst the Dominican business community, the primary users of the new telecommunication infrastructure, is a case in point.

The absence of provisions giving MAS official status and a vote in the ITU, reinforces these trends. At the international level private communication corporations, motivated by profit, will establish links consistent with their objectives. Links will be established with those whose traffic requirements are compatible with the economic imperatives of private enterprise.

It is unlikely that these systems will operate consistently with the objectives of inter-connectivity and universality, as was the case for INTELSAT. This new environment promises to unfold much in the same way it has in North America, that is, under a rate structure that does not equally reflect the advances of technological innovation for both the general public and business.

In addition, the spread and use of the radio spectrum and GSO by international systems outside of INTELSAT needs to be monitored for (a) the de facto expropriation of orbital locations and bandwidth that could more appropriately be used to serve the domestic needs of countries more geographically proximate to the portion of the usable "service arc" in which the international service operates, and; (b) observing to whose interests the arc's use is being dedicated. The primary concern is that the existence and use of the GSO and radio spectrum by these international communication satellites does not hinder efforts to provide 50% of the world's population, who have less than one phone per hundred people, with greater access to the fruits of the information revolution.

5.1. **A Model Dedicated to the Resolution of Rights
to the Geo-stationary Orbit and Radio Spectrum**

Once again the ITU failed to come up with a resolution of the issue of rights to the orbit/spectrum issue. This is particularly problematic considering that (i) the majority of the

spectrum allocated to FSS still operates under "first come, first serve", practices; (ii) these practices were also able to penetrate the small portion of the radio spectrum set aside for the Allotment Plan; and (iii) similar circumstances are prevalent for other services and frequency bands.

The only indication that the issue was dealt with at all comes from the time limits placed on systems using the orbit/spectrum. As in the past, and to remain consistent with the principles guiding the use of the orbit and spectrum, there were the obligatory and tired statements to the effect that use does not constitute ownership. However, there is a large contradiction in this respect between the Radio Regulations and their implementation by national administrations.

This will become more acute as many systems approaching the end of their 20 year "valid period" of GSO and frequency use show reluctance to vacate their investments. This is becoming obvious as Canadian representatives from Telesat, acting as consultants for a number of south-east Asian countries, encounter difficulties trying to coordinate new systems with satellites of administrations whose assignments are approaching the end of the ITU's allowable period of use (Carew, Note 1).

The objective of this model is to make explicit the implicit rules of property applying to the GSO and radio spectrum. At this point in the evolution of radio communication such a model is necessary, especially in light of the hoarding practices of the developed countries and Tonga that are making a mockery of

current ITU regulations. Recently the Republic of Tonga, a small South Pacific island country, put eight orbit and frequency slots on the market for \$2 million U.S. Essentially, Tonga has taken advantage of the ITU's advance publication and coordination procedures to effectively tie up eight orbital slots and associated bandwidth in the already congested orbit above the South Pacific (Satellite Week, No. 7, pp. 1-2). By making advance publication to the ITU, Tonga has reserved eight orbital positions for a minimum of nine years. During this period, all those wishing to access the adjacent orbital slots and bandwidth must apply the "first come, first serve" coordination procedures with respect to Tonga's 'paper satellites'. It is ironic, to say the least, that the consternation Tonga has aroused for its legitimate application of the Radio Regulations may result in a formal re-evaluation of the practices that allow de facto property rights to be established.

The quintessential factor in establishing a model to provide a guarantee of equitable access to the GSO and radio spectrum is the nature of the property involved. Should the model be based on public or private property principles? Unfortunately, this is not easy to resolve, which suggests that it should be some combination of both. In fact, the current international regulations and the practices of national administrations naturally suggest this assumption.

Essentially, the activities of the ITU place obligations on its members with respect to their use of the GSO and Radio

Spectrum. Accordingly, countries, usually through a regulatory agency at the national level, implement their domestic communication policies consistent with their international obligations (Cooper, p. 195). However, a contradiction arises between the duration of ITU assignments and allotments (20 years, plus nine for advanced publications and coordination procedures) and the licensing practices of national communication agencies. The practices of some countries, like Canada and the U.S., in effect permit licensees the use of the airwaves in perpetuity.

Canadian and U.S. telecommunication and broadcasting history indicates the extreme rarity of revoking an entity's privilege to use the radio spectrum or GSO. Historically, these two countries have issued licenses to prevent the monopolization of the airwaves and to recognize the "public property" aspect attached to these resources (Lorimar et al., p. 154). In issuing licences the regulatory agencies in Canada and the U.S. attached conditions which, if not adhered to, provide grounds to revoke a license. However, despite the communication industry's constant attack on and abrogation of these conditions, licences have rarely been revoked. In Canada this has been most noticeable with licensees constantly circumventing or outrightly ignoring Canadian content regulations. In both countries the restrictions on ownership have been treated in a similar manner. In essence an entity's commitment, measured in the value of the hardware and client base, prevent the licence from being revoked unless there is a serious and blatant disregard of the "public

trust" factor under which these entities purportedly operate. As such, the regulatory emphasis appears to be not on the public component attached to the GSO and radio spectrum, but the tangible property involved.

The notion of GSO and radio spectrum as "possessible and transferrable property" is further exemplified by the sale and trade of licenses, a phenomenon in which the public property has at least equal value to that of the tangible property involved. Governmental use of the GSO and radio spectrum also indicate the permanency of property attached to these resources. Canada's new generation of Anik satellites, operating in the same frequency ranges and around the same orbital locations, illustrate that the ITU's 20 year limit on the use of the spectrum and orbit are not serious considerations. This is given credence by U.S. representatives, who have commented that "the language [of the Final Acts], like that in the original compromise, could be used as authority for extending the life of existing systems, now fixed in the plan at 20 years" (Broadcasting, Oct. 3, p. 42).

The point is not that these practices are wrong, but that ITU regulations in this respect are, as has been demonstrated throughout the preceding chapters, meaningless. There is no way they can be construed as diminishing the reality of 'de facto property rights'. The allocation of substantial technical, economic and political resources required to operationalize the GSO and radio spectrum naturally suggests that ITU members be given permanent possession of these resources subject to certain

limitations. Doing so would provide stability for national planning strategies, and the rational, equitable and efficient use of the GSO and radio spectrum.

It must be recognized that the orbit/spectrum resources have value. Value can be attributed to these resources in two ways. The first and most tangible is to recognize them as essential components of any radio communication service. This is particularly true of communication satellites. The value of the orbit and spectrum are readily apparent in the price private companies receive from the sale of a service making use of these resources. Sale prices have a long history of outstripping the cost of the actual hardware involved (Levin, 1988: p. 59). For the most part, the sum received, over and above the cost of the hardware, reflects the value attached to the right to use public property. Yet the public receives no tangible benefits from this sale. This will become particularly evident as the commercialization of space progresses. As noted elsewhere this is already the largest industry in the U.S.

In the U.S., where this practice is most prevalent, all the revenues accrue to the seller, with no residual payments going to the FCC. Cognizant of this situation, the U.S and U.K. are currently considering a "franchising mechanism" that could provide "more efficient management and greater revenues for the government" (Levin, 1988: p.57). This licensing arrangement, given the historical reluctance of regulatory agencies in some western countries to terminate licences, is tantamount to the

actual sale and privatization of the spectrum and orbit allotted to these countries. The consequent commitment of hardware and professional resources by the "franchised entity" would essentially prevent the franchise from being terminated, although it could be transferred from one entity to another. Nonetheless, the revenues from such a system could be earmarked for cultural development and telecommunication programs. Despite the abhorrence of "a priori planning" expressed by developed countries at the international level, their licensing practices of the past, and the above proposals, are analogous to such a regulatory environment (Levin, 1988: pp. 57 - 58).

A recent case in the U.S. involving the Cygnus Corporation and PANAMSAT provides a reasonable estimate of the value of the GSO and Radio Spectrum. In essence Cygnus had an orbital location and frequency assignment registered in its name at the ITU yet it lacked the actual hardware to actualize the assignment. PANAMSAT, having the actual hardware, but not the orbital and frequency assignment, entered into an agreement with Cygnus that effectively transferred the 'title' from the one to the other - market price, \$355 621.42 U.S. (Levin, 1988: p. 67). Tonga's asking price for a one year lease of its orbital locations and bandwidth, \$2 million, provides another indicator of the market value of these resources.

The economic value of the GSO and radio spectrum can also be ascertained by considering their 'production value'. In 1987 these resources were an essential factor in the production of a

\$900 billion global information economy, of which the U.S. controlled 40% (U.S. Senate Hearings, 1988: p. 20). An FCC study indicates that the U.S. alone received \$100 billion in 1985 from the use of the GSO and radio spectrum (cited in Smythe, 1987: p. 5).

Furthermore, a World Bank study concludes that continued investment in the exploitation of the orbit and spectrum will contribute to further growth in the information economy (cited in Rones, p. 27). Similar information has been around for years and used to justify various rent and development schemes. Indeed this was not lost on the now famous MacBride Commission when it suggested the "establishment of an international duty on the use of the electromagnetic spectrum and geo-stationary orbit space for the benefit of developing countries" (MacBride, p. 275).

Such programs have almost always been spurned by those with extensive interests in the GSO and radio spectrum (Ducharme, Note 4; U.S. Senate Hearings, 1986). However, such proposals and ultimately the development of an adequate, conditional and equitable model of appropriation are warranted in light of five facts:

- (i) The disproportionate use of the geo-stationary orbit and radio spectrum. Recall that 10% of the world's population control 90% of these resources (Smythe, 1987: p. 3).
- (ii) That the above countries have systematically practiced hoarding in both the unplanned and planned frequencies;
- (iii) Impending chaos if the precedent established by Tonga is mimicked by other countries around the world;

- (iv) That economic value can be assigned to both the GSO and radio spectrum; and
- (v) That the GSO and radio spectrum are bound by the 'common heritage of mankind principle'.

Despite widely espoused international doctrines that prohibit the establishment of private property to the GSO and radio spectrum, the above factors have resulted in 'de facto property rights'. There is nothing in the ITU regulations that prohibit these practices. Nor is there anything in the regulations preventing the leasing of orbital assignments (Satellite News, Feb. 20; p. 10). Thus, the current practice of hoarding, and the shrewd proposal of an American businessman, acting as an agent of the Tonga government, may be immoral, but they are not illegitimate.

To overcome the above mentioned practices an adequate model of ownership must be created. Such a model must incorporate a mix of public and private property principles. The objective is to give (i) permanent entitlement to the GSO and radio spectrum; (ii) to achieve the equitable realization of the economic value, and "common heritage of mankind principle" of these resources; and to (iii) eliminate the hoarding and disproportional 'possession' of the GSO and radio spectrum.

The preeminent factor in the model would be a formula for the equitable apportionment of the GSO and radio spectrum. 'Distribution criteria' would have to be based on universal common denominators, such as population and land mass. As well, the ITU could subject the allotments to periodical review to

maintain congruence between the underlying distribution criteria and the actual number of allotments to which a country holds the rights. This is a substantial alteration of the current regulatory regime, and would, in effect, require the elimination of the time based assignments now contained, but not practiced, in the Radio Regulation. The allotments distributed to each country under this formula could be held on a "temporary, renewable and transferable basis" (Levin, 1988: p. 60), taking into consideration the four principle players involved - the national administrations holding the rights to the allotment, herein referred to as the "rights holding" administration; the licensed entity operating on the allotments; the client base of the licensed entity; and potential clients.

For the model to incorporate transferability it would have to respect three exigencies. First, the model would have to be renewable on a basis that does not interrupt the satellite services of the licensed entity. Contracts between the "rights holding" administration and the licensed operating entity could be gauged to a satellite's "lifetime", 10 to 12 years. This would achieve the objective of non-interruptability, and allow the rights and obligations of the contracting parties to be determinable. After the expiration of the contract the political and economic status of the "rights holder" and market forces would determine if the contract were to be renewed.

Second, the model would have to be dynamic. The distribution of allotments must be alterable as the underlying

criteria change. This would be the prerogative of newly developed ITU "periodical review" sessions. Conditional transferability would also have to be "contractually synchronized" with a hierarchical ordering of access to the satellite between the "rights holder", the licensee, and those using it. The interests of the "rights holding" country would be primary. The rights of the licensed entity could remain unencumbered so long as the agreed upon rights of the licensing administration are observed. Thus, the licensee could make intensive use of his 'property' to the maximum extent technically feasible. This would allow the model, vis a vis technological innovation, to remain vibrant. At this point the model retains stability, respects the rights of the parties involved and allows for technological innovation.

Effectively these mechanisms are designed to respect, but not entrench, the equity represented in the hardware by the licensee. Additionally, equity would extend beyond the duration of lease agreements and the mere satellite link involved. This 'extended equity' would be represented in ground facilities and customer bases developed during the period of possession (Rones, Note). As such the transfer mechanism would have to respect these factors according to a clearly delineated ranking of access priority for (i) the "rights holding" administration, (ii) the licensed entity, (iii) those holding extended equity in the current system and (iv) new clients.

This prompts the third consideration in the establishment of

an adequate transfer mechanism. The preeminent concern is with the rights of subsequent administrations, whose interests and policies could be prejudiced by the actions and agreements of the current administration. It must be remembered that the 'government of the day' is holding the rights to the orbit and spectrum as a 'public trust'. Consequently, it must maintain priority of access to these resources (Rones, Note 9). In this respect, clear agreements must be established delineating when this priority of access can be exercised, and how 'extended equity', established under previous agreements, can be accommodated.

Priority of access could be exercised according to the current advanced publication and coordination period of the ITU-- six years. That is, six years prior to the satellites 'expiry date' and the end of the contract, the country possessing the rights to GSO and spectrum allotments could notify the licensed operator of its intention to implement its own facilities. As such, the licensee could not renew its lease at the end of its current satellite's lifetime. After that the "rights holding" country could implement and distribute access to its satellite on its own terms. Those with 'extended equity' in the previous satellite could be protected through 'first option rights' to renew their old agreements with the new operating agency. New customers could be brought on to utilize the remaining available capacity.

There would be reasonable stability in this approach since

(i) only the satellite link would be exchanged; and (ii) the implementing administration would most likely have a vested interest in implementing a satellite network compatible with existing terrestrial hardware established under the previous system. The underlying assumption is that administrations contemplating the development of their own communication satellite system would have gained experience using the facilities of the now expired system of the lessee.

This implies that the implementing country previously exchanged its allotment rights for a number of transponders dedicated to its domestic use. This would have been done in lieu of a cash arrangement. Previous experience illustrates that this is not an unreasonable assumption. Countries that previously used and held shares in INTELSAT facilities have now gained a command of satellite technology and are proceeding with their own systems (Via Satellite, p. 44). As well, Peru established an agreement with PANAMSAT allowing PANAMSAT to access clients in Peru. In lieu of a cash settlement, Peru received the use of a PANAMSAT transponder for domestic purposes (Lett, Note 7).

In light of the above we can see that this model is, for the most part, compatible with the current international legal order governing the GSO and radio spectrum. It remains so because it (i) realizes the "common heritage of mankind" principle; (ii) protects national sovereignty; and (iii) follows established precedents. Under such a model the rights of a country to

implement its own communication policies would not be abrogated, as they are now. Recalling the discussion on sub-regional systems, the model eliminates the regulations which allow a country's allotment to be suspended, and subsequently degraded, as it exercises its prerogatives. Their intentions could be put on hold, but not pre-empted. The model provides a more relaxed atmosphere from which countries can develop well structured strategies for exploiting the potential of the GSO and radio spectrum, while gaining practical experience through actual use. As such, national communication policies could be painstakingly developed from agreed upon political, economic, social and cultural objectives and from the lessons of actual use.

From this point of view the model is economically justifiable. Countries will receive the benefits from their natural resources without having to commit the \$100 million necessary to implement their own satellite (Geriega, Note 5). It should also provide time for reflection so that countries do not find themselves tied to a money losing system, like Mexico's Morelos satellite. In this case, Mexico, to avoid being pre-empted from the GSO and radio spectrum, prematurely allocated resources to the development of a satellite system that is currently "50% under utilized" and losing "\$20 000 per day" (Satellite Week, No. 4, p. 3).

Nor would it be likely that countries find themselves involved in situations similar to those of Indonesia and India, situations that put huge strains on their economy, not to speak

of their political, social and cultural goals. This situation eventually cost Indonesia \$840 million at a time when "nearly half [their population] earned less than \$50 a year" (Chomsky et al., p. 213-214). In this environment countries will be less anxious about being preempted from the increasingly important field of satellite communication. They will also find themselves less dependent on developed countries, relying on them only as clients, and as the temporary possessors of technology that can be bought with outright cash -- cash that would accrue through carefully structured and equitable contracts. This would remove the spectre of "aid packages" that are so often constructed to serve alternative motives (Chomsky et al.). As well as providing equity, the model would also contribute to reducing the number of conferences held, and the consequent drain on the economies of developing countries which participation represents.

Appendix A

Draft Agenda for the Second Session of the Conference

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It. (First Session - Geneva, 1985.)

considering

- a) Resolution No. 1 of the Plenipotentiary Conference, Nairobi, 1982, relating to future conferences of the Union;
- b) that Resolution No. 3 of WARC-79 invited the Administrative Council to take the necessary steps to convene a WARC consisting of two sessions relating to the use of the geostationary-satellite orbit and the planning of the space services utilizing it;
- c) that Resolution No. 895 of the Administrative Council, 1983, includes in the agenda of the first session the recommendation of a draft agenda for the second session of the Conference for consideration by the Administrative Council;
- d) the Final Acts of the first session of the Conference and the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983;
- e) that the second session will need to consider:
 - 1. proposals from administrations;
 - 2. the report of the first session;
 - 3. preparatory work carried out in the intersessional period;
 - 4. the relevant reports from the IFRB and the CCIR;
 - 5. the requirements for the allotment plan submitted by administrations;

recognizing

that some of the bands are allocated on a shared basis with equal rights to more than one space service and that most of them are also allocated with equal rights to terrestrial services, and that these rights must be taken into account;

recommends the Administrative Council

to consider the following draft agenda for the second session of the Conference, which shall take due account of the radiocommunication services not specifically addressed therein:

3.2.5 Consideration of existing systems

The planning method shall take into account the existing systems. If necessary, these systems may be subjected to some adjustments to allow for the accommodation of new systems. The degree of adjustment to which a system would be subjected would depend upon the stage of development of the system.

3.2.6 Provisions for multi-administration systems

a) The planning method shall take into account the requirements of administrations using multi-administration systems created by inter-governmental agreement and used collectively without affecting the rights of administrations with respect to national systems.

b) The planning method shall take account of the specific characteristics of multi-administration systems in order to enable them to continue to meet the requirements of administrations for international services as well as, in many cases, for national services.

c) It is understood that these multi-administration systems include those having a safety-of-life aspect* and having feeder links in the FSS.

3.2.7 Flexibility

The planning method should provide means to accommodate unforeseen requirements and modification of requirements of administrations. It should also be capable of accommodating advances in technology and should not prevent the use of technologies which are well proven and widely available.

3.2.8 Different planning solutions in different circumstances

A world-wide planning solution would be the most suitable, but the possibility of having different planning methods for different regions, frequency bands or orbital arcs shall not be excluded. In this case, the planning would be done at the same World Conference.

3.2.9 Efficiency

The planning method should ensure efficient and economical use of the geostationary orbit and frequency bands allocated to space services.

3.2.10 Provisions for multi-service and multi-band networks

The planning method should be able to accommodate multi-service and/or multi-band satellite networks, without imposing undue constraints to planning.

3.2.11 Others

The administrative cost of the developing and application of the planning method must be as low as possible.

* Some national systems serve the same purpose.

3.1 Frequency bands and space services identified for planning

The planning shall concern only the FSS in the bands 6/4 GHz, 14/11-12 GHz and 20/30 GHz.

3.2 Planning Principles

3.2.1 Guarantee of access and equitability

The planning methods shall guarantee in practice for all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to the space services utilizing it, taking into account the special needs of developing countries and the geographical situation of particular countries.

3.2.2 Sharing with other services

Where frequency bands allocated to one space service using the geostationary-satellite orbit are also allocated to other space services and/or to terrestrial services on an equal primary basis, the planning methods must fully respect the equality of rights to operate in these bands. Therefore, the planning method and associated regulations must not impose additional constraints on terrestrial and/or space services sharing the band on an equal basis.

3.2.3 Reservation of resources

a) The planning method should consider the full orbit/spectrum resource. The possibility of setting aside portions of the resources to accommodate unforeseen requirements and requirements of future members of the Union shall be considered after all requirements are satisfied.

b) The planning approach must be consistent with the universally accepted principle, that administrations or groups of administrations are not entitled to permanent priority in the use of particular frequencies and GSO positions in such a way as to foreclose access by other administrations to the GSO and frequency bands allocated to space services.

3.2.4 The technical aspects of special geographical situations

The planning method should take into account the relevant technical aspects of the special geographical situation of particular countries.

1.1 to establish the allotment plan and the associated regulatory procedures, based on considering e), for the fixed-satellite service in the bands:

- 4 500 - 4 800 MHz and 300 MHz to be selected in the band 6 425 - 7 075 MHz; and
- 10.70 - 10.95 GHz, 11.20 - 11.45 GHz and 12.75 - 13.25 GHz,

according to the principles and methods established at the first session;

1.2 to establish the improved regulatory procedures, on the basis of considering a) 1. to 4., for the fixed-satellite service in the bands;

- 3 700 - 4 200 MHz
- 5 850 - 6 425 MHz
- 10.95 - 11.20 GHz
- 11.45 - 11.70 GHz
- 11.70 - 12.20 GHz in Region 2¹
- 12.50 - 12.75 GHz in Regions 1 and 3¹
- 14.00 - 14.50 GHz
- 18.1 - 18.3 GHz^{1,2}
- 18.3 - 20.2 GHz²
- 27.0 - 30.0 GHz²

according to the principles and methods established at the first session.

1.3 to adopt appropriate technical standards, parameters and criteria, pertaining to the fixed-satellite service in the frequency bands specified in items 1.1 and 1.2;

2. to review and revise, as necessary, the regulatory procedures and appropriate technical standards, parameters and criteria pertaining to space services and frequency bands not to be subject to planning;

3. to review and revise, as necessary, the definitions relating to space services;

¹ In these bands the improved procedures shall apply between networks of the FSS only.

² The ITU is asked to study the technical characteristics of the fixed-satellite service in these bands and to report to the second session of the Conference with a view to take a decision on the future planning of these bands by a future competent conference.

4. to establish the provisions and associated plan for feeder links, in the bands 14.5 - 14.8 GHz (for countries outside Europe and for Malta) and 17.3 - 18.1 GHz, to stations in the broadcasting-satellite service in Regions 1 and 3 operating in accordance with Appendix 30 (ORB-85) to the Radio Regulations, on the basis of the relevant material identified in considering e), and to incorporate these decisions in the Radio Regulations, revising the Radio Regulations, as well as related Resolutions and Recommendations, only for these purposes as necessary;
 5. to consider, subject to the adoption of a suitable feeder-link assignment plan for Region 1, the amendment of the relevant articles of the Radio Regulations and associated Resolutions and Recommendations, if it is appropriate, to permit the use of the band 10.7 - 11.7 GHz (Earth-to-space) in Region 1 for all modes of fixed-satellite service operation, taking into account the frequency bands identified for planning in items 1.1 and 1.2 above;
 6. in accordance with Recommendation PLEN/C of the first session, to consider the results of the various up-to-date studies and, in reviewing the situation prevailing at that time, take appropriate decisions concerning the various aspects of satellite sound-broadcasting systems as outlined in Resolution No. 505 of WARC-79;
 7. to review the possibility of the long-term applicability of Resolution No. 2 (SAT-R2), and to take a definitive decision on this matter;
 8. in accordance with Recommendation PLEN/B of the first session of the Conference, and without prejudice to the present BSS allocation in the 22.5 - 23 GHz band in Regions 2 and 3, to consider the question of a suitable frequency band for the broadcasting-satellite service, preferably on a world-wide basis, to accommodate HDTV, including possible action as appropriate on the necessary changes to Article 8 at a later competent conference;
 9. to make such consequential amendments in the Radio Regulations as may be necessitated by the decisions of the second session of the Conference;
 10. to consider, revise as necessary, and take other appropriate action upon the relevant Resolutions and Recommendations;
 11. to evaluate the financial impact of its decisions upon the budget of the Union in accordance with No. 627 and other pertinent provisions of the Nairobi Convention.
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Bibliography

- Agrawal, Brij N. (1986). The Design of Geosynchronous Space Craft. New Jersey: Prentice Hall Inc.
- Amero, R.G., A.V. Carew, E.D. Ducharme, and A.D. McKay (1989), The New International Regulatory Regime For The Fixed Satellite Service: Opportunities And Constraints For Canada. Unpublished paper presented at the Canadian Satellite User Conference, June 19-21, 1989, at the Ottawa Congress Centre, Ottawa, Canada.
- Anonymous. (1988). The ORB(2) Conference is to begin its work. Telecommunication Journal. 55 (8), 495-500.
- Blonstein, Larry. (1987). Communication Satellites: The Technology of Space Communications. New York: John Wiley and Sons Publ.
- Bowen, Robert R., and Irena Streibl. (1989). The Orbit-Sharing Environment For Canadian Fixed Satellites In The 1990's And Beyond. Unpublished paper presented at the Canadian Satellite User Conference, June 19-21, 1989, at the Ottawa Congress Centre, Ottawa, Canada.
- Boyle, A.W. (1985). Satellites and Technical Cooperation. Telecommunication Journal. 52 (5), 368-382.
- Brophy, Theodore F. (Chairman). (1989). Report of the United States Delegation to the ITU World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and on the Planning of Space Services Utilizing It. Washington, D.C.: United States Department of State, Bureau of International Communications and Information Policy.
- Butler, R.E. (1985). The Washington Round of the World Telecommunication forum. Telecommunication Journal 52 (10), 539.
- Cassapaglou, Visilli G. (1985). International Telecommunication Treaties and Regulations. Secretary-General ITU The Washington Round: World Telecommunication Forum, Geneva, Switzerland: ITU, 69-83.
- Chomsky, Noam and Edward S. Herman. (1979). The Washington Connection and Third World Fascism. Montreal: Black Rose Books.
- Clippinger, John H. (1979). The Hidden Agenda. Journal of Communication. 29 (1), 197-203.

- Codding, George A. (1988). The 1989 ITU Plenipotentiary and the IFRB. Telecommunication Policy. 12 (3), 234 -242.
- Codding, George A. and Anthony M. Rutkowski. (1982). The International Telecommunication Union in a Changing World. Boston: Artech House Inc.
- Cooper, Bruce M. (1986). Satellite Telecommunications: The Implementation of International Conventions in Canada. Annals of Air and Space Law. 10 187-203.
- Cuthbert, Marlene. (1986). Communication Technology and Culture. Gazette. 38 (1), 161-170.
- Demac, Donna. (1986). Communication Satellites and the Third World. Traber, Michael (ed.) The Myth of the Information Revolution, London: Sage Publ. pp. 35-45.
- Demac, Donna A., George A. Codding, Heather E. Hudson and Ram S. Jakhu. (1986). Access to Orbit: After the 1985 ITU Space WARC. London: International Institute of Communication.
- Dizard, Wilson. (1985). The Role of Common User Organizations in the ITU. Intermedia. 13 (3), 10-14.
- _____. (1984). The ITU and the United States: Partners or Rivals. Sterling, Christopher H (ed.) International Telecommunication and Information Policy. Washington, D.C.: Communication Press Inc. 40-44.
- Doyle, Stephen E. (1987). A Priori Planning and Its Implications for the ITU. Journal of Space Law. 19 (3), 1-13.
- Galloway, Jonathan. (1987) Intelsats Markets and the New Competitors. International Journal. 42 (2 Spring), 276-288.
- Garcia, R. (1984). Telecommunications and Investment Decisions in the Philippines. Telecommunication Policy. 8 (1 March), 53-62.
- Giroux, M. R. (1988). IFRB intersessional activities for the ORB(2) Conference. Telecommunication Journal. 55 (8), 531-537.
- Gorove, Steven. (1984). WARC: Some Legal and Political Issues on Space Services. Gerbner, George and Marsha Siefert. (eds.) World Communications: A Handbook. New York: Longman Inc., pp. 418-423.

- Hedebro, Goran (1982) Communications and Social Change in Developing Nations: A Critical View. Ames: Iowa State University Press.
- Hudson, Heather E. (1986). Access to Information Resources: The Developmental Context of the Space WARC. Demac, Donna A. (ed.) Tracing New Orbits. New York: Columbia University Press, 209-221.
- _____. (1986b). New Communication Technology: Policy Issues for the Developing World. International Political Science Review. 7 (6), 332-338.
- International Telecommunication Union. (1988). Final Acts: Adopted by the Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It. Geneva, Switzerland: ITU.
- International Telecommunication Convention. (1982). International Telecommunication Convention: Final Protocol, Additional Protocols, Optional Additional Protocol, Resolutions, Recommendations, and Options - Nairobi, 1982. Geneva, Switzerland: General Secretariat - ITU.
- Ito, Youichi. (1986). Implications of the Japanese Telecommunication Policy Reform for International Telecommunication. Secretary-General, ITU The Washington Round: World Telecommunication Forum, Geneva, Switzerland: ITU, 91-98.
- Jacobson, Thomas. (1985). An Epistemological Shift in Development Communication Theory. Dervin, Brenda and Melvin J. Voigt. (eds.). Progress In Communication Sciences- Volume 6. Norwood, N.J.: Ablex Publ. Corp., 77-104.
- Jakhu, Ram S., J.L. Magdelenat, and H. Rousell. (1987). The ITU Regulatory Framework for Satellite Communication: An Analysis of Space WARC 1985. International Journal. 42 (2), 267-282.
- Jansky, Donald M. and Michel C. Jeruchim. (1983). Communication Satellites in the Geostationary Orbit. Boston: Artech House.
- Jayaweera, Neville A. (1983). Communication Satellites: A Third World Perspective. Media Development. 30 (4), 12-17.
- Jussawalla, Meheroo. (1984). The economic implications of satellite technology and the industrialization of space. Telecommunication Policy. 8 (3), 237-248.

- Jussawalla, Meheroo. (1981). Policy Outcomes of WARC '79: their Impact on Developing Countries" in Media Asia. Vol. 8, No. 1, 7-12.
- Kirby, R.C. (1985). Space Communication; CCIR Studies and Recommendations. Telecommunication Journal 52 (5), 351-367.
- Kleinsachter, Wolfgang. (1986). Freedom or Responsibility versus Freedom and Responsibility. Becker, Jorg, Goran Hedebro and Leena Paldan (eds.) Communication and Domination: Essays to Honour Herbert Schiller. Norwood, N.J.: Ablex Publ. Corp.
- Levin, Harvey J. (1988). Emerging Markets for Orbit Spectrum Assignments. Telecommunications Policy. 12 (1), 57-76.
- _____. (1986). Late-comer Cost Handicap: Importance in a Changing Regulatory Landscape. Demac, Donna A. (ed.) Tracing New Orbits. New York: Columbia University Press, pp. 251- 282.
- _____. (1984). U.S. Communication Policies at Home and Abroad: Are They Consistent? Gerbner, George and Marsha Siefert. (eds.) World Communications: A Handbook. New York: Longman Inc., pp. 433-444.
- Lorimer, Rowland and Jean McNulty. (1987). Mass Communication in Canada. Toronto: McClelland and Stewart Publ.
- Mathey, Arnold A. (1985). International Legislation in Relation to Space Radio Communication. Telecommunication Journal. 52 (5), 341-350.
- McPhail, Thomas L. (1987). Electronic Colonialism. London: Sage Publ.
- McPhail, T. and B. McPhail. (1987b). The International Politics of Telecommunication: Resolving the North-South Dilemma. International Journal. 42 (2), 289-318.
- Melody, William H. (1984). The Radio Spectrum: Principles for International Policy. Gerbner, George and Marsha Siefert (eds.), 229-235.
- Mosco, Vincent and Mary Louise McAllister. (1986). Canada and the International Telecommunication Union, (Unpublished paper presented at the Canadian Communication Association meeting. Winnipeg, June 4-6, 1986)
- Montgomery, W. (1986). A Canadian Perspective on the 1985 Space Conference. Demac, Donna Tracing New Orbits. New York: Columbia University Press, 201-208.

- Naslund, Ruben. (1985). International Technical and Operational Standards and Their Impact for Effective National and International Communication Flows. Secretary-General, ITU The Washington Round: World Telecommunication Forum. Geneva, Switzerland: ITU, 85 -87.
- _____. (1983) ITU Conference in Niarobi: Confrontation or Mutual Understanding. Telecommunication Policy. 7 (2), 100 -107.
- National Telecommunication and Information Administration. (1983). Long Range Goals in International Telecommunication and Information: An Outline for United States Policy. Washington, D.C.: U.S. Government Printing Office.
- Newman, Peter C. (1989). A Portrait of Two Nations: Bold and Cautious. Macleans. 102 (27), 24-25.
- Noll, Alfons. (1985). The Institutional Framework of the ITU and its Various Approaches With Regard to International Telecommunication Law and Treaty Conferences. Secretary-General, ITU The Washington Round: World Telecommunication Forum. Geneva, Switzerland: ITU, 19-67.
- Nosaka, Kunishi and Matsuichi Yamada. (1987). Earh Station Antennas. Pelton, Joseph and John Howkins (eds.). Satellites International. North Carolina: Stockton Press.
- Pike, Robert and Vincent Mosco. (1986). Canadian Consumers and Telephone Pricing: From Luxury to Necessity and Back Again. Telecommunications Policy. 10 (1), 17-33.
- Pool, Ithiel de Sola. (1979). The Problem of WARC. Journal of Communication. 29 (1), 187-196.
- Pritchard, Wilbur. (1987). The Basics of Satellite Technology. Pelton, Joseph and John Howkins (eds.).
- Renaud, Jean Luc. (1987). ITU and Development Assistance. Telecommunication Policy. 11 (2 June), 179-192.
- Rutkowski, Anthony. (1984). The International Telecommunication Union and the United States: Partners or Rivals. Sterling, Christopher H. (ed.) International Telecommunication and Information. Washington, D.C.: Communication Press Inc. 28-39.
- Rones, Julie. (1989). Space WARC and Planning Implications for Third World Nations. Media Development. 1, 26-28.

- Sahay, V. and V. Rawat. (1989). Technical Basis Of The ITU Allotment Plan For The Fixed Satellite Service In The Expansion Bands. An unpublished paper presented at the Canadian Satellite User Conference, June 19-21, 1989, at the Ottawa Congress Centre, Ottawa, Canada.
- Salter, Liora. (1987). The New Communications Environment: A View from Canada. International Journal. 42 (Spring), 364-394.
- Smythe, Dallas W. (1987). High Tech: Who Wins, Who Loses? Unpublished Paper Delivered to the Seminar on Socio-Economic Impact of New Communication Technologies. Labour Congress, Mexico, November.
- Smythe, Dallas W. (1986). Radio Spectrum Policy and World Needs. Paper presented at the First Canberra Conference on Communications, Canberra, Australia.
- Solomon, Jonathan. (1983). Rejoinder: The Politics of Relevance and the ITU. Telecommunication Policy. 7 (3), 243-248.
- Srirangan, T.V. (1985). Why Orbit Planning: A View from a Third World Country Part 2 - Issues for WARC (ORB) 85 and 88: Some Perceptions. Hudson, Heather E. (ed.) New Directions in Satellite Communications: Challenges for North and South. Boston: Artech House Inc., 265-277.
- Stevenson, Robert. (1988). Communication, Development, and the Third World. New York: Longman Press Inc.
- Sweeney, Katherine. (1978). Direct Broadcast Satellite and the United Nations, Netherlands: Sijthoff and Noordhoff.
- Taylor, Leslie A. (1989). Depoliticizing Space WARC. Satellite Communications. January, 28 - 31.
- Telecommunication Journal. (1985). 52 (4).
- United Nations. (1986). Space Activities of the United Nations and International Organization. New York: United Nations.
- United States Subcommittee on Communications and the Subcommittee on Commerce, Science, and Transportation - United States Senate. (1988). International Telecommunication Issues. Washington, D.C.: Gov't. Printing Office, U.S.A.

- United States Subcommittee on Communications and the Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation - United States Senate. (1986). First Session on World Administrative Radio Conference. Washington, D.C.: U.S. Gov't Printing Office.
- United States Subcommittee on Communications and the Subcommittee on Science, Technology and Space of the Committee on Commerce, Science and Transportation - United States Senate. (1985). World Administrative Radio Conference. Washington, D.C.: U.S. Gov't Printing Office.
- United States Subcommittee on International Operations of the Committee on Foreign Affairs - House of Representatives. (1983). Oversight of Preparation of U.S. Delegation to First Session World Administrative Radio Conference. Washington, D.C.: U.S. Gov't Printing Office.
- Warren, G.I. (Head of Delegation). (1989). Canadian Delegation Report on World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the planning of Space Services Utilizing It. Ottawa: Department of Communications.
- Wheelton, Albert and Barry Miller. (1987). Trends in Satellite Communication. Pelton, Joseph and John Howkins (eds.)
- White, Rita Lauria and Harold M. White. (1987). The Law and Regulation of International Space Communication. Boston: Artech House.
- World Administrative Radio Conference. (1985). The Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It. First session, Geneva, 1985. Geneva, Switzerland, General Secretariat of the International Telecommunication Union.
- Wu, Deyan. (1988). Technical Basis for planning the fixed-satellite service: A summary of the CCIR intersessional work. Telecommunication Journal. 55 (8), 539-547.
- Zhukov, Gennady and Yurry Kolosov. (1984). International Space Law. translated by Boris Betelzky, Praeger Publ, U.S.A in cooperation with Novosti Press Agency, Moscow.

(February 20, 1989). Tongasat: An Economic Development Project For Small Island Nation. Satellite News. p. 10.

(February 13, 1989). Tongasat Takes Aim At Pacific Rim Satellite Services. Satellite News. p. 2.

(November, 1988). First and Second World Nations Plan Satellite Strategies - For Own Good First. Via Satellite. pp. 44-45.

(October 24, 1988). Brophy Reports All U.S. Objectives Met at Space WARC; Informal, 'As Needed' MFMs Seen Retaining Coordination Flexibility While Allotment Plan Guarantees 'Equitable Access'. Telecommunications Reports. pp. 19-21.

(October 10, 1988). Chairman of U.S. Delegation Reports Successful Conclusion to Space WARC on Oct. 6. Telecommunications Reports. p. 19.

(Oct. 10, 1988). U.S. Pleased With WARC Results. Broadcasting. pp. 41 - 42.

(Oct. 3, 1988). All Systems Go at Space WARC. Broadcasting. pp. 32 - 33.

Tongasat Bid for 8 Satellite Slots. Satellite Week. 11 (8), 9.

Trafficking Denied: Little Tonga Corners Market on Pacific C-Band Slots, Plans to Lease Them. Satellite Week. 11 (7), 1-2.

Mexico Has Had Trouble Finding Enough Traffic. Satellite Week. 11 (4), 3.

Agreement on Satellites. (17 September, 1985). New York Times. sec. 4, p. 22.

Third World Seeks Better Place in Space. (15 September, 1985). New York Times. sec. 4, p. 7.

U.S. Position On Upcoming Space WARC. (8 August, 1985). New York Times. sec. 4, p. 7.

Reference Notes

1. Carew, A.V. (1989). Communication Systems Engineering Dept. at Telsat Canada. A telephone conversation with the author on 89 06 26.
2. Ducharme, Ed. (1989). Director-General of Canadian Regulatory Policy at the Dept. of Communication and vice-chair of the Canadian delegation to the Space WARCs. A taped interview with the author on 89 03 22.
3. _____ (1989). A taped interview with the author on 89 04 24.
4. _____ (1989). A series of telephone conversations with the author throughout May and June.
5. Geriega, Jonathan. (1989). Dept. of Space Communication, Hughes Aerospace. A telephone conversation with the author on 89 04 20.
6. Gorman, Rosalee. (1989). Lawyer at the FCC and a U.S. Delegate to 1988 Space WARC. A telephone conversation with the author on 89 06 12.
7. Lett, Steve. (1989). Engineer at the FCC and U.S. Delegate to 1988 Space WARC. A telephone conversation with the author on 89 06 14.
8. McAllister, Mary Louise. (1989). Queens's University. Currently researching the 1985 and 1988 Space WARC conferences. A telephone conversation with the author on 89 04 12.
9. Roness, Julie E. (1989). Lawyer for the National Association of Broadcasters and U.S. Delegate to 1988 Space WARC. A telephone conversation with the author on 89 06 08.
10. Smythe, Dallas W. (1989). A critical theorist on the role of advanced technology and political economy. A telephone conversation with the author on 89 04 23.