CONFLICT OF INTERESTS:

The Ideas, Interests and Institutions Involved in the Development of Canadian Satellite Policy from 1960 - 1980

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ABSTRACT

This thesis looks at the development of Canadian satellite policy between 1960 and 1980 through a study of the policy decisions relating to Telesat Canada, its specific corporate structure, and mandates and ownership patterns. The analysis draws upon a modified "interplay" model, which examines public policy as an amalgam of interacting ideas, interests and institutions. On the basis of available documents, supplemented by interviews, and supporting secondary analyses, the sometimes contradictory decisions made by the DOC and the CRTC with regards to Telesat's Agreement with the Trans Canada Telephone system during this period are argued to reflect a policy process driven by the interplay of competing views of Telesat's primary purpose and, by extension, competing visions of what constitutes the public interest.

RÉSUMÉ

Cette thèse porte sur l'evolution de la politique canadienne en matière de satellites entre 1960 et 1980 examinée à partir des décisions d'orientation concernant Telesat Canada, sa structure d'entreprise spécifique, son mandat et la structure de son capital. L'analyse fait appel à un modèle "d'interaction" modifié, en vertu duquel les politiques publiques sont examinées comme si elles constituaient un amalgame d'idées, d'intérêts et d'institutions interreliés. En se fondant sur les documents dispcnibles, completés par des entrevues, et sur des analyses justificatives complémentaires, l'auteur soutient que les décisions parfois contradictoires prises par le ministère des Communications et le CRTC relativement à l'entente liant Telesat et Télécom Canada pendant cette période reflètent un processus d'orientation mû par l'interaction de conceptions opposées de la raison d'être principale de Telesat et, par extension, de conceptions opposées de ce qui constitue l'intérêt public.

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INTRODUCTION

This thesis began out of an interest in the introduction of new communications technologies, and focused initially on the mobile satellite services being developed as a cooperative effort between Canada and the U.S. Through interviews with a number of people at different levels, it became apparent that each group was concerned about obstacles to the new system, but identified different factors. Those involved in international negotiations believed that orbit/spectrum disputes were the problem, while many policy analysts regarded the powerful terrestrial interests as the primary hinderance. Policy makers at the Department of Communications were promoting mobile services as "reaching all Canadians", though 'to each his own dish' seemed a weak justification for the amounts of funds the project would require to get off the ground.

It became apparent that the story was not new, and that these issues had been part of the development of Canada's satellite services for some time. In reviewing the literature, however, there was a marked lack of historical analysis which could provide a context for an assessment of contemporary issues. A pivotal point for me was the CRTC's denial of the Telesat-TCTS Agreement, and the subsequent overturning of this decision. This 'crisis' had been discussed at length by scholars from law and political science, but never, it seemed,

as part of a pattern that had evolved over time. Many of the arguments tended to centre on a "producer protection" theme, concluding that, for whatever reason, the government had protected the vested interests of the terrestrial corporations to the detriment of satellite technology.

I decided to use the TCTS Agreement as an endpoint, and to assess the kinds of interests and ideas which had led to this difference of opinion between the two government bodies. I believed that the "producer protection" thesis could not explain adequately the different decisions. Both the Federal Department of Communications and the CRTC argued that their decision was made in the public interest. An approach was needed which could account for the conflicting opinions of what constituted the public interest. The "entry point" to the discussion was the early development of satellite technology, (although many of the ideas and issues concerning communication technologies had already a long and interesting history).

In the search for an analytical basis for studying a particular public policy field, the student is faced with a broad array of models, methods and approaches. Public policy analysis has developed out of a number of academic disciplines, including law, political science, sociology, public administration, economics, and management. Each of these disciplines emphasizes a different aspect of public policy.

Looking at Canadian public policy as it was formulated

for satellite communications between 1960 and 1980, I was concerned with the interests and institutions involved with a special focus on the ideas which formed the basis of arguments both for and against a domestic system.

Historically, because of their increasing ability to communicate over long distances, communications technologies have been identified as a means to promote Canadian unity and identity. Communication also represents an increasingly important aspect of both national and international economics. To an ever increasing extent, nations have targeted control over communications as an important element of economic growth and direction. To what extent did these ideas play a role in Canadian satellite policy and what were the consequences?

Analyzing these factors required a model which would allow for a critical examination of a number of interrelating factors. First and foremost, the model would place satellite systems and satellite policy clearly within the context of Canadian telecommunications as a whole. William Melody (1979) argues that few, if any, analyses of satellites provide any critical examination of the justification for public investment in satellite technology rather than alternative services. Melody believes there is a pressing need for critical analyses that will answer questions that have rarely been addressed. These questions include:

- What are the perceived benefits of satellites?
- Which services are likely to be developed, when, and for what segments of the population?

- Are satellites the best means to provide these services?

According to Melody, these questions can be answered by addressing the role of satellites within the larger context of Canadian and North American telecommunications systems.

An appropriate model for this study would allow for an assessment of satellite policy as a dynamic process which has evolved over time. It would analyze historical trends and changes, not merely within government, but within the greater national and international social, political and economic contexts.

A number of different interests within government and industry were involved in the development of Canada's domestic satellite system. A theory of interests and interest group dynamics as it applies in the Canadian context was therefore essential as a means of explaining how the concerns of specific interests were articulated, why the demands of certain groups were met more frequently than those of other groups, as well as how policy makers negotiated with and balanced the often conflicting demands of different interests. Why were the interests of the terrestrial telecommunications carriers met sooner than those of the broadcasting or cable industries for instance? How did the interplay of these different interests affect policy decisions?

An appropriate model would also identify which levels of government interact with different interests, stress different

concerns for different reasons, and have different amounts of authority. Governments also have different "tools" at their disposal for implementing policy. They can choose to tax, to spend, to impose constraints through independent regulatory agencies, or to establish crown corporations as means to achieving their goals. How these variables affect the policy process should also be taken into account.

The model would also consider how uncertainty and the limits of knowledge affect the policy process. Related to this is the complex "problem" of technology. While most policy analysis tends to minimize the issue, some theorists have argued that technological change cannot be directed or controlled by policy makers.[1] A detailed discussion of these arguments is beyond the scope of this thesis. An appropriate model would nevertheless allow for some discussion of the fact that policy makers often promote technologies to achieve exogenous goals. In Canada, for instance, communications technologies have been promoted as a means to achieving social and economic goals (such as national unity and industrial expertise). What, if any, were the exogenous goals (both explicit and implicit) behind the promotion of satellites? And to which extent did the system fulfil these objectives during the period under discussion? What were the consequences?

The "interplay" approach of Bruce Doern and Richard Phidd as outlined in Canadian Public Policy (1983) came

closest to meeting the requirements of the most appropriate model for this thesis. According to this approach, public policy consists of an amalgam and interplay of ideas, various interests, institutions, and processes. Supplementing the interplay approach, Bruce Doern's and Allan Tupper's (1981) analysis of public corporations provided a means to assess the sometimes contradictory mandates public corporations often face. As well, Richard Schultz's theory of regulation provided a basis for understanding the role the CRTC played in the Telesat-TCTS Agreement.

The primary research material for the thesis was drawn from a number of sources. Government documents, including House of Commons Debates, Minutes of the Standing Committee on Broadcasting, CRTC Decisions, and several Acts relating to the discussion are the major sources. Reports commissioned by various government institutions provided additional information. Personal interviews with both policy makers and corporate executives helped to illustrate how varied were the interpretations of those involved intimately with the satellite system. These sources have not been quoted, but their input helped to inform this discussion, and was greatly appreciated. Secondary sources include articles in scholarly journals and books and which provide context and critical analyses.

The thesis is limited in several ways. The major limitation is the lack of analysis relating to the development

of satellites for military purposes. Espionage and military mandates are extremely important forces behind the development of almost all satellite services, but the information is, for the most part, confidential. Because it covers events over a relatively long span of time, rather than assessing a specific decision or incident, the result is more an effort to provide a context and an understanding of the process than a detailed analysis of a particular event. It is hoped, however, that it may contribute to an historical understanding of policy decisions relating to communication satellites in Canada.

Chapter One looks at the question of models, methods and approaches which can be used as an analytical basis for studying public policy. The parameters of Bruce Doern's and Richard Phidd's "interplay" approach are outlined, and its drawbacks assessed. The model is supplemented by Bruce Doern and Allan Tupper's analysis of public corporations and by Richard Schultz's theory of regulation. The model is used as a basis for arguing that the "public interest", as it is perceived by various interests, is useful for understanding bureaucratic behaviour.

To provide a context for the development of Canadian satellite policy, Chapter Two gives a brief historical overview of the technical developments, ownership and jurisdiction patterns, and a review of the early failure to develop a national system that resulted in a confusing mix of regula-

tors, rules and rates. Pricing policies, particularly system cross-subsidization, which were developed early in the history of Canadian telecommunications, have consequently become major concerns for contemporary policy makers. Advances in technology have blurred the boundaries between industries, products and services. This has called into question basic premises upon which Canadian telecommunication policy traditionally has been based. As the industry has grown more complex, there has been an increasing emphasis, especially from the Federal Government, on the need to manage its direction. This "embrace" of telecommunications has exacerbated tensions between federal and provincial governments. This "interplay" has influenced Canadian satellite policy.

Chapter Three looks at the key interests and institutions which played pivotal roles in shaping satellite policy in Canada. Key discussions, reports and papers provide the basis for an assessment of government institutions in terms of the rationale for their creation, the dominant ideas shaping their institutional mandates, and their responsibilities and scope. Private interests were also involved in the development of communication satellites, and the positions of these interests with regards to the establishment of Telesat are discussed.

Chapter Four examines Telesat's first decade of operations. Telesat's difficulties in fulfilling a mandate containing both broad social and commercial objectives are examined, and the agreement to join the TCTS is assessed in

terms of the ideas and interests involved. Finally, the CRTC Decision against the Agreement, and the Government's varying of the Commission's Decision is assessed.

NOTES

1. See, for instance: Jaques Ellul, The Technological Society (N.Y.: Vintage Books, 1964) and Langdon Winner, Autonomous Technology: Technics-Out-of-Control as a Theme in Modern Thought (Cambridge: MIT Press, 1977).

CHAPTER ONE

I) Policy Models

Analyses of government activity tends to focus on either the reasons for, or the process of, intervention. According to traditional economic analysis, government intervention in the private marketplace exists as a result of "transaction" or "market" failure. This is a situation in which some aspect of transactions between buyers and sellers is felt to be inefficient or inequitable. Until the 60's, the "public interest" was most commonly used to explain government intervention. It was argued that intervention is a response by governments to public demands for the amendment of unfair or inefficient practices by individuals or organizations. For instance, regulation was often considered necessary to correct potential inefficiencies or unfair practices in monopoly situations. In Canada, telecommunications has traditionally been considered a natural monopoly, and all telecommunications providers are presently regulated. Problematically, the public interest theory does not explain the means by which public demands are translated into government action.

Many contemporary models focus on the process of policy formulation. Woodrow and Woodside for instance, view policy making as a process of bargaining games among players in government as well as private industry (Woodrow et al. 1980, Woodrow and Woodside 1986). This approach identifies the

major players and channels of influence. In addition, it provides a good overview of the basic ideas and issues inherent in Canadian communication policy as revealed through various policy conflicts, if only a limited treatment of institutional structures.

The "public choice" model evolves out of a critique of public interest assumptions. It denies policy makers' public interest motives and argues that individual decision makers are "utility maximizers" whose policy making behaviour is best explained in terms of their self interest. Among the Canadian proponents of this theory are Douglas Hartle (1979) and Hartle, Treblicock et al (1982). Hartle (1979) views the policy process in Cabinet-Parliamentary government as a series of interlocking games. These include the special interest group game, the political game, the bureaucratic game and the media game. Each "player's" behaviour is best explained in terms of maximizing their own and their sector's leaders' self interest.

The public choice model is problematic because it lacks a means of dealing with the relationship between interests and institutional structures. In addition, there is no explanation of how the different "games" interact. But none of the models described above takes into account the relevance of ideas in the policy process. Although all have important applications to public decision-making, the focus on specific goals or objectives results in narrowed understanding of

motivation.

II) The Interplay Approach

The preferred model for this study takes an interdisciplinary approach which comes closer to meeting the requirements of the 'appropriate' model as outlined above. It is based on the approach developed by Bruce Doern and Richard Phidd in Canadian Public Policy (1983).

Doern and Phidd agree in principle with William Jenkins' definition of public policy as: "A set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where these decisions should, in principle, be within the power of these actors to achieve".[1] However, this definition must be augmented by the understanding of a number of key features upon which the authors elaborate. Public policy

> consists of an amalgam and interplay of ideas; numerous structures headed by individual elected and appointed persons who are engaged in ranking, balancing and allocating scarce resources of money, personnel, political energy and time; and processes. Ideas refer to the broad normative content of policy including ideas which are the central basis for the existence of the key institutions surveyed above. Structures refer to organizations and bureaucracies and the persons who head them, including those in public and private sector institutions. Processes refer to the changing dynamics which arise when decision makers are required to deal with uncertainty and with a changing environment, an ever present feature of policy making. Both structures and processes are imbued with the key ideas of political life (Doern and Phidd 1983, 34).

Several key aspects of the Doern and Phidd model are particularly appropriate as tools of analysis: normative content, interests and interest groups, governing instruments and the limits of knowledge as they impact on the policy-making process. A brief outline of these concepts will help to illustrate their relevance.

Ideas

a) Normative Content

According to Doern and Phidd, ideas make up the "broad normative content" which is the central element of public policy. They distinguish three levels of normative content. The broadest of these is the ideological. An ideology is defined as "an umbrella of belief and action that helps provide political and social identity to its adherents and that serves to integrate and co-ordinate their views and actions on a wide range of political issues" (Doern and Phidd 1983, 51). Ideologies are equated with "the broad 'isms" of Canadian political life: liberalism, conservatism and socialism" (Doern and Phidd 1983, 51).[2]

In Canada, the differences between these ideologies is of degree with "Conservatism" tending towards reliance on private enterprise to direct the economy while socialism tends towards greater centralized government control. During the discussion over Telesat's proposed ownership structure, the Conservatives argued that private enterprise should own and

develop the system, whereas the NDP promoted a fully public corporation. The Liberals opted for a "mixed" ownership structure where the government retained a certain amount of control but benefitted from the funding and expertise of the established telcos.

Dominant ideas form the second "level" of normative content. Dominant ideas include: efficiency; individual liberty; stability (of income and of other desired conditions); redistribution and equality; equity; national identity, unity and integration; and regional diversity and sensitivity. Separately or in combination, these ideas form part of the fundamental basis for all policy fields, regardless of the party promoting certain initiatives.

Efficiency is tied to the notion of the free market and emphasizes the attainment of goals at the least possible cost (measured in both absolute and opportunity cost). In the case of Canada's domestic satellite system, efficiency was not the primary concern during the initial promotion of the system. It became increasingly important, however, during Telesat's first decade of operations as it became more and more difficult to justify the expenditure of public funds on new services which had questionable benefits for Canadians.

Individual liberty is related to the concept of efficiency in that it includes economic as well as religious and other freedoms. Although both efficiency and individual liberty are important, Doern and Phidd contend that Canadians

have not embraced these concepts to the same extent as have the Americans. Stability of income (and of other desired conditions) stresses the need for predictability and reliability. The concept is obviously broad and can include anything from the appeal for law and order to the demand for income protection for those faced with seasonal and foreign market vagaries.

The concepts of redistribution and equality stress the importance of correcting social imbalances of wealth and power. In some cases, governments use funds from one area of the economy to promote another sector. In the case of satellites, the Federal Government used funds supplied by Canada's financially secure terrestrial systems (through their ownership and use of Telesat) to bolster the fledgling high tech space industries. The idea of equity is linked to the concept of equality. It can lead to somewhat contradictory goals, however, since it simultaneously urges policy makers to: "treat people in equivalent situations equally, and to treat people who are not in equivalent situations unequally (that is, be fair and reasonable)" (Doern and Phidd 1983, 55).

The concept of equity plays a major role in Canadian telecommunications policy and in the development of Canadian telecommunications in general. Early in the century, telcos used the idea of equity to increase customers and coverage. Pricing schemes were developed so that customers who could assumably afford to pay more (such as businesses) subsidized

private lines, and lucrative routes in high traffic centres subsidized links to remote or less densely populated areas. Public policy developed along similar lines: the CRTC's jurisdiction is based on maintaining "just and reasonable" prices while at the same time disallowing "unjust discrimination". The CRTC's rather "broad" interpretation of these concepts in the late 70's and 80's caused a great deal of inter and intragovernmental conflict.

Both national unity and regional diversity are based on a territorial view of policy. However, while the ideas of national unity and nationalism value policies which encourage the identification of individuals and groups within Canada as a whole,[3] regional diversity stresses the importance of differences between regions. The conflict between the national unity goals of the Federal Government and the provinces' arguments for the importance of regional diversity and regional control was a major issue during Telesat's first decade of operations and was a particularly important element of Telesat's bid to join the TCTS.

While all these concepts are desirable, many are also contradictory and result in political conflict. According to Doern and Phidd:

> The constant need to rank, balance or otherwise deal with the relations and contradictions among dominant ideas is a central aspect of public policy. It is indeed the feature which puts the "politics" in public policy. Politics is the "authoritative allocation of values" or, as we have expressed it here, of "dominant ideas". The public policy system must not only continuously rank them but actually

allocate scarce resources among them in a manner which gives meaning to these ideas" (Doern and Phidd 1983, 57).

Specific objectives are the specifically discussed and possibly disputed purposes of various policies. They make up the third and "narrowest" level of normative content. Doern and Phidd argue that while it is often believed that policies can be understood if the objectives are known, this is a false assumption. A comprehensive evaluation of any policy or policy field must include an understanding of all three levels of normative content.

b) Institutions and Ideas

The discussion of normative content is incomplete without a brief analysis of the connection between institutions, ideas and public policy. Doern & Phidd argue that the recent tendency to reject the role of institutions is erroneous. They maintain that "institutions such as federalism, Cabinet-Parliamentary government, interest groups and the mass media are forged on key ideas" (Doern and Phidd 1983, 59). The ideas that inform various institutions influence and are themselves shaped by public policy. Doern and Phidd suggest that, as an institution, capitalism influences public policy two ways. First, many have argued that business interests have successfully promoted the view of Canadian politics as being dominated by regional and linguistic conflicts. This has tended to relegate issues such as redistribution and

equality to "second place". (Doern and Phidd point out that whether this is a "distortion" of how policy should be made is not a question that can be answered according to their model. Canadian public policy is influenced by a number of ideas, some of which predominate over others at different points in time.)

Business has also taken a selective view towards what constitutes government intervention. While ideologically opposing intervention and promoting the free market, many businesses nevertheless invite protectionist policies which help to stabilize the investment environment.

The established telcos, for instance, have continuously used the CRTC's application reviews to justify monopoly control over various aspects of Canada's telecommunications. They argue that free competition will undermine the established cross-subsidy system and will drive local area prices upwards. In the case of intermodal competition such as satellites, the terrestrial companies argued that the new system would benefit from their control through expertise and guaranteed wage. Their bargaining power with the Federal Government, however, was based primarily on their ability to fund the system.

Federalism "institutionalizes the idea of regional diversity within the confines of a larger political union" (Doern and Phidd 1983, 63). There are currently two elements of federalism, which Doern and Phidd define as "executive" and

"province-building" federalism. Executive federalism has tended to characterize intergovernmental relations as a generally diplomatic bargaining process. However, the growing "expansionist" tendencies (including the growth of bureaucratic and legislative power) among the provincial governments tends to contradict this notion. Doern and Phidd explain that "Federal-provincial relations are a dominant element of Ottawa's policy process both because of the interdependent effect of each level of government's decisions and because of the competition, partisan and otherwise, for citizen loyalty and the acquisition of political credit" (Doern and Phidd 1983, 63). In recent years, control over communications has been an important source of conflict between the federal and provincial governments.[4]

The Doern and Phidd model was chosen for this study because of its emphasis on ideas as basic to public policy. For the purpose of this thesis, its main drawback is its failure to define or assess the concept of public interest in terms of its relevance to decision maker's primary purpose. Public policy makers of all kinds claim to base their decisions on the public interest. That few will attempt to define this term indicates its problematic vagueness. According to Roger Noll, however, this does not invalidate the term's usefulness for analytical purposes:

> The shaky foundation for a "public interest" as a clear, identifiable concept does not imply any fundamental error in public-interest theories of bureaucratic behaviour. As long as officials

> believe that a public interest has been defined for them and act to serve it, the fact that the public interest they perceive lacks interesting normative properties is unessential to the theory of their behaviour. The key issue is what they believe the public interest to be, not whether their beliefs are correctly or theoretically well founded (Noll 1985, 19).

The public choice and bureaucratic behaviour models are also acknowledged as having important applications for explaining policy makers' behaviour. This study looks at the "public interest" as a primary motivating force for policy making. In defining this concept, a specific decision maker must assess and balance a number of competing dominant ideas. Differences in policy over time and between different levels of government can be partly explained by the fact that different dominant ideas formed the basis of various public interest interpretations. As we shall see, the DOC and the CRTC evolved different definitions of the public interest, and this partly explains their contradictory decisions in the Telesat-TCTS case.

Interests and Interest Groups

In much of the literature, interest group theories have been linked with regulatory theory. The original models derived from economic analysis and were formulated in an attempt to explain why regulatory agencies did not always appear to represent the public interest. One of the earliest was developed by Marver Bernstein (1955) and came to be known as "capture theory". Bernstein proposed that regulatory

agencies become "captured" by those whom they are supposed to regulate. Rather than promote the public interest, they come to represent the interests of the regulated.

Some critics of this theory have argued that some regulatory agencies were actually formed as a response to the demands of private interests. George Stigler (1971) for instance, argues that regulation is a response by government to the demands of specific segments of society who seek to alter market conditions to their own advantage. Regulation is thus "acquired" by industry and is operated primarily for its benefit. According to this "producer protection" theory, a central purpose of regulation is to control entry. Stigler argues "Every industry or occupation that has enough power to utilize the state will seek to control entry (1971, 5). Industry gains control over governments (which are "vote maximizers" and which need money for political campaigns) because it has the capacity to organize and because it controls a good deal of financial power. It remains unclear, however, why some interests are represented more effectively than others.

Common to all these theories is the idea that some economic groups control a disproportionate share of the resources and that they can use this advantage to influence government decision-making. More recent analyses suggest that these theories are simplistic. Sam Peltzman (1976) gives some of the bargaining power back to regulatory agencies. Peltzman

proposes that in order to fulfil their goal of "maximizing votes", government officials arbitrate among competing interests.

The Doern and Phidd model provides a broader definition of interests than do traditional interest group theories. They distinguish "interests" (which could include political institutions and actors) from "interest groups" as we commonly think of them. They point out that certain groups within an interest group may wield more power than the formal group as a whole. For instance, some major corporations have more sway with government than the federations they are affiliated with. In addition, any individual may be a member of a number of different, sometimes competing, interests. He or she may be a union member, a consumer, part of a family and a member of a particular religious organization.

Powerful interests can inhibit the success of policy. According to Doern and Phidd, "Policies often fail not because one merely lacked knowledge or did not get the analysis quite right, but because interests will not let policies succeed or can partially counteract them. Provincial governments as interests have the power to act within limits. So do foreign governments, corporations and large labour unions" (Doern and Phidd 1983, 75). In addition, "core institutions" can represent powerful and often competing bases of legitimacy for policies. All these factors are important because interests are inextricably linked with the process and problems of

democratic consultation. A brief discussion of the roles and forms of interest groups will help to explain their relation to the consultative process in public policy making.

According to Doern and Phidd, "Interest groups compete with political parties, the media, and others for the privilege of interpreting the public will to key decision makers" (1983, 75). In addition, they provide certain goods and services to their members, represent the desires of their members to government and regulate their members' actions. Doern and Phidd categorize the "politically relevant" activities of Canadian interest groups in terms of Paul Pross' "two functions": the communications and the legitimation function (quoted in Doern and Phidd 1983). The communications function works two ways. First, interest groups provide the government with a range of information which may include technical data as well as members' views. However, interest groups also communicate the views of policy makers back to their members. The legitimation function relates to this latter aspect. Governments may use interest groups to test or find support for new policies. Interest groups may also act as "formal or informal agents of government" in terms of regulating the behaviour of their members. This interactive process often evolves into a mutual dependence. However, tensions remain since interest groups are wary of having their influence co-opted by governments. For instance, labour unions may fear being used as instruments of government to

enforce wage constraints.

It is important to remember that not all interest groups operate the same way, nor do they have equal amounts of influence in terms of the public policy process. Doern and Phidd distinguish two major categories of interest groups: producer interest groups and the broader collective rights associations. Producer groups include business, agricultural producers and professions such as law and medicine, while collective rights associations can mean anything from labour unions, to consumer or environmental protection groups, to womens' or students' rights associations. Producer groups are often considered to be involved in economic policy, while collective rights groups deal with social policy.

Although they consider it a somewhat arbitrary distinction, Doern and Phidd agree that this categorization does help to explain the differences in the extent to which various groups influence policy makers. In general, producer groups have more power in terms of affecting government decision making. This can be explained one of two ways. According to many economic analysts, "To organize politically is to incur significant costs". In broader based groups, this has exacerbated what has come to be known as the "free rider problem" (why invest money or time if someone else is going to advance both your interests anyway?). Many analysts suggest that the free rider problem explains why some groups are weaker and less cohesive than others. The second explana-

tion is based on class analysis and argues that non-producer groups maintain a more dependent place in a capitalist society and command less influence over the state which supports that system.

Whatever the reasons for these differences in power, Doern and Phidd maintain that

> there has never been in Canada the interest group pluralism alleged to exist in the United States. The "separation of powers" system of government and politics provides many more points of influence and power for such groups. A significant inequality of power among groups in Canada is readily acknowledged to exist...But it is the institutional realities engendered by, and inherent in, the relations between Canadian federalism and Cabinet-Parliamentary government that also help explain the different roles of interest groups in the Canadian setting (Doern and Phidd 1983, 78).

Inequalities in power affect the methods that groups use to influence government decision making as well as the instruments that policy makers use in response. Powerful interest groups are usually more successful at gaining access to closed door discussions with politicians, while non producer groups tend to campaign through the media or other forms of public appeal. Given a choice of basic instruments that includes exhortation, spending, regulation, taxation or public ownership, policy makers are most likely to choose regulation when dealing with the more powerful interest groups. According to Douglas Hartle, this is because it allows the government to express its concern and awareness of a problem without much adverse effect on the interest. With

regulation, the special interest "can marshal the resources (lawyers, accountants, experts) to protect its interest in a regulatory forum much more effectively than can those whose interests are nominally being served by regulation" (quoted in Doern and Phidd 1983, 79).[5]

Differences and inequalities exist even within the broad categories of producer and collective rights associations. Various groups may interact with different levels of government and organize differently in order to achieve their goals. These groups often find themselves in opposition as they attempt to promote their own interests as priorities. Policy makers must continuously take these differences into consideration in the attempt to achieve an equitable balance which simultaneously treats unequal groups <u>equally</u> as well as <u>fairly</u>.

Of the two main interests involved in the bid for ownership control of Canada's new domestic satellite system, the Trans Canada Telephone System (TCTS) wielded greater influence with the Federal Government than did broadcasting interests. The inclusion of the TCTS in Telesat's ownership structure indicates not only the bargaining power of that organization, however, but reveals certain government goals (such as the requirement for private investment and expertise) as well.

Doern and Phidd's broader definition of interests enables the inclusion of various levels of government and of depart-

ments within government as interests involved in the satellite policy discussion. Different interests were involved at different times and had different objectives and agendas. Departments such as the Science Secretariat and the Science Council of Canada were instrumental in promoting the idea of a domestic satellite system in the first place. The proposal was entirely in keeping with these organizations' mandates to promote science projects in general. The Federal Government promoted satellites as meeting Canada's social and cultural objectives, but its main underlying goal was the way in which satellites could enable an industrial strategy through the development and support of Canada's high tech industries. The government's increasing involvement in Canada's communications was also indicative of a trend toward the centralization of control over major aspects of the Canadian economy. The Federal Government's support of Telesat's bid to join the TCTS was in part an attempt to gain greater control over Canada's national communications system.

The provincial governments argued that communications should be under their jurisdiction. They were particularly concerned that an independent regulatory agency such as the CRTC should be making what they considered to be major policy decisions concerning Canada's telecommunications future. These factors resulted in enormous tensions between the two levels of government during the 70's and 80's.

Tensions also developed between the CRTC and the Depart-

ment of Communications over jurisdiction and authority. That the two government bodies had different agendas for satellite communications and a different interpretation of what constituted the public interest is revealed through the conflicting decisions over Telesat's bid to join the TCTS.

Governing Instruments

Once decisions have been made (based in part on consultations with the appropriate interests), the government must choose between a number of available "tools" in order to implement the policy. Doern and Phidd call these tools "governing instruments" and define them as: "the major ways in which governments seek to ensure compliance, support and implementation of public policy" (Doern and Phidd 1983, 110). Listed in terms of "degrees of legitimate coercion" the instruments of governing are: exhortation, expenditure, regulation (including taxation) and public ownership. The choice of instruments depends on the availability of resources, ideas concerning efficiency, equity and effectiveness (among others) as well as the power and influence of various interests. An understanding of policy formulation requires an assessment of why and when governments decide to use certain instruments as opposed to others. Finally, in evaluating the effectiveness of instrument choice, it is important to remember that the implementation of policy depends on inducing the appropriate changes in the behaviours

of private as well as public interests.

To implement satellite policies the Federal Government chose two governing instruments. Telesat Canada was set up as a "mixed" public/private corporation with the government owning roughly 50% of its common shares, and the terrestrial telecommunications industry owning the remainder (one "deciding share" was owned by Telesat President David Golden). This "mixed ownership" structure was designed to achieve two main government goals. By encouraging private enterprise involvement, the government received substantial funding as well as industry expertise for the new corporation. By retaining 50% of the shares, the government hoped to ensure control over the direction of satellite services in Canada. In addition, it was decided that the corporation would be regulated by the Canadian Radio-television and Telecommunications Commission (CRTC). This was a secondary means to ensure government control as well as to validate the corporation's status within the industry (since all other private telecommunications services were regulated, it would seem unjust that Telesat should be free from these regulations).

The interplay approach assesses the various governing instruments on a somewhat general level. This study also includes analyses which focus specifically on regulation or public corporations to enable a more in depth understanding of the reasons for and results of choosing these particular policy instruments.

Public Corporations

Bruce Doern and Allan Tupper (1981) address the special issues of crown corporations in Canada. There are two aspects of the public corporation process. The first involves the choice of a public corporation as a policy instrument, the second involves operations. As instruments of policy, public corporations are not among the government's first choices. After reviewing numerous federal and provincial public corporations, Doern and Tupper conclude that in all but two cases, public ownership was chosen as a last resort, after other instruments were found lacking. Despite this, Conservative critics concluded that there was a proliferation of these bodies under the Liberal Government.

According to Doern and Tupper, an important aspect of the decision to establish Telesat as a public corporation was a genuine concern about American intervention.

> Telesat Canada and AECL were created, in part, out of the belief in the need for a vehicle to derive Canadian benefits in new technologies...in which extraordinary hope and faith were placed, especially at the time the agencies were created (Doern and Tupper 1981, 20).

Doern and Tupper stress that the goals for which crown corporations are originally established are not static, but can change according to changing technological, economic and political circumstances. Goal fulfilment is also complicated by the variety of processes through which the corporation must operate. First, the corporation interacts with its "home" policy ministry, which is itself under pressure from adjacent

ministries. Any specific crown corporation may be only one of many directed by the ministry and must therefore compete for funds, capital and ministerial attention. Telesat competes with a number of other space and communications projects under the jurisdiction of the Department of Communications.

Crown corporations are also involved in federal-provincial relations. Telesat's bid to join the TCTS meant that a federal crown corporation was joining provincially owned telephone companies. This resulted in a number of questions concerning jurisdiction and control.

Public corporations have been increasingly involved in international affairs and relations. In some cases, public corporations are central policy actors as instruments of direct intergovernmental relations. Canadian satellite services must conform to international regulations concerning the spectrum and orbit resources and are affected by the complicated issues of transborder information flow and espionage concerns.[6]

Public corporations are involved in the government's expenditure and taxation process. Corporations must bid for and justify spending public funds. Crown corporations are also important elements of governmental economic management policies and are established in part to create jobs or increase trade.

When public corporations are also regulated, the regulat-

ory process is greatly complicated and federal-provincial problems often exacerbated. The Telesat TCTS case is assessed in part in terms of an underlying federal-provincial struggle for control over Canadian telecommunications.

Finally, public corporations must account for their success or failure in fulfilling the goals for which they were established and provided with public funds. Doern and Tupper argue that accountability is problematic because of the variety of (sometimes contradictory) goals for which the organization was created. According to the authors, public corporations must balance a "classic troika" of central purposes including:

1. efficiency (reflected in some measure of profit)
2. stability of income over time (at least for some groups of clients of the firm)
3. redistribution or cross-subsidation.

Often, the corporations' mandate also includes meeting various social or cultural goals. Canada's domestic satellite system for instance, was promoted to fulfil a number of national goals from "opening up the north" and providing telecommunications and broadcasting services to underserved areas, to bolstering Canada's fledgling space industry as part of the government's industrial strategy. Telesat was supposed to make a profit, but was not to infringe on the market of the established telecommunications providers. As Doern and Tupper point out, "Accountability for such diverse purposes cannot

help but be affected by the inevitably limited space that the political agenda at any point in time allows us for a single policy issue" (1981, 43).

Doern's and Tupper's analysis of public corporations supplements the interplay model in a number of ways. It enables a discussion of the reasons behind making Telesat a public corporation rather than a private undertaking. In addition, it facilitates the analysis of Telesat's complex and somewhat contradictory mandate, as well as the operating difficulties Telesat faced as a result.

Regulation

Doern and Tupper refer to the problems which can occur when public corporations are also regulated. But regulation itself is a complex policy instrument. One problematic aspect of discussing regulation is the lack of a common definition of the term. Some theorists use 'regulation' to mean virtually everything the government does, or argue that regulation is the essential function of government. Others use regulation to mean the specific functions of independent regulatory agencies as a subset of government activities. While it is true that some government policies are merely statements of ideological position, most policy analysis involves an assessment of government decisions, which are based on certain goals or objectives, and which use specific "tools" as a means of achieving these goals. Depending on how 'regulation' is

defined, it may mean all or one specific means of achieving government objectives. For the purpose of this thesis, the term "regulation" will be limited to the specific functions of independent regulatory agencies such as the Canadian Radio-television and Telecommunications Commission (CRTC).

The nature of regulation depends upon the goals for which it is implemented. The Economic Council of Canada (1981, 7) distinguishes between three different kinds of regulation. "Direct regulation" refers to "government intervention that directly prescribe such key determinants of economic performance as prices; entry into, and exit from, an industry or activity; standards of service; and rates of return". Social regulation involves "the setting of control standards, or alternatively, the provision of incentives for producers to achieve specific social goals". Regulation of common-property resources" encompasses the other two types in that specific controls are often established to attain broad economic and social goals".

Richard Schultz has dealt extensively with the special issue of independent regulatory agencies in Canada. Schultz argues that there is a pressing need for detailed analyses of regulation as it occurs in Canada, taking into account: the origins of specific agencies; the nature of regulation that emerges; the impact of different variables on the regulatory process; the nature of the regulatory process as part of the larger political process and finally, the regulatory process

over time (quoted in Whittington and Williams 1981).

Schultz focuses in particular on changes in the function of regulation. He argues that "regulation by independent agency has increasingly entailed political decision making... because regulation is not simply negative and proscriptive, but increasingly is positive and prescriptive" (quoted in Whittington and Williams 1981, 440).

Schultz (1985) distinguishes between three basic forms of regulation. Regulation as "policing" is a proscriptive form of regulation usually associated with natural monopolies. Its goals are generally narrow and indigenous (relating to participants within the industry) and it is largely insulated from other political processes. Regulation as "promoting" involves a shift towards protecting or promoting the economic viability of an industry. It involves a more active role than policing and characteristically includes some exogenous objectives (the use of the industry to attain goals beyond its immediate sector). Regulation as promoting requires more integration with the political process. Finally, regulation as planning involves a positive, prescriptive and initiating role for the regulator. Its decision making results from a broader, more generalized mandate, and a larger range of industry activity is subject to regulatory control. Its objectives include a complex mix of endogenous and exogenous goals. While regulation as policing focuses on rules, regulation as "planning" stresses public determined economic

and social outcomes. This form of regulation also involves an important shift in decision-making power from firms to governments. The expanded political role in the allocation of resources increases the political salience of regulatory decisions. Schultz argues that "Regulation, long a significant government activity, has emerged in recent years to rival taxing and spending as a primary means by which governments seek to influence, direct and control social and economic behaviour" (Schultz and Alexandroff 1985, 434).

According to Schultz, the much expanded "planning" capacity of federal regulatory agencies exacerbated intergovernmental tensions during the 70's. This was especially true in the field of telecommunications. Both the federal and provincial governments have increasingly used all modes of communication for social and economic development, but their priorities have tended to differ. Federal government policy statements have revolved around the theme of Canadian sovereignty. The provinces argue that this does not take adequate account of regional differences, and that in fact the promotion of federal goals could undermine provincial policies.

According to Schultz: "The most important reason for provincial opposition to federal regulatory actions was that they feared that control over the development of basic policies affecting all telecommunications carriers, not simply the federally-regulated, was passing into the hands of the Federal Government...[T]hey were particularly concerned that

such a role should be exercised by an independent federal regulatory agency" (Schultz and Alexandroff 1985, 97-98). As Schultz notes "What made the conflict more intense...was their collective fear that the CRTC which had been given a planning, managerial role for the broadcasting sector intended to assume, with or without a new legislative mandate, such a role in telecommunications" (1985, 99).

Schultz's model provides important insights into the events discussed in this thesis. It enables a discussion of the use of regulation to achieve certain goals in satellite communications. In addition, it helps to explain relationships between the Commission and the various interests and institutions involved, including the DOC and the federal and provincial governments.

The Role of Knowledge and Information on Public Policy

Knowledge and information have an important influence on the formulation of public policy. Doern and Phidd caution against an uncritical acceptance of the old adage that "knowledge is power", however. Knowledge is just one of the many important factors upon which power and influence may be based. According to them:

> Knowledge is an amalgam of facts and values produced both by intellectual-analytical processes and by social interaction among decision makers, their "advisors" and interests in and out of government. It involves ideas about knowledge and about the language and rhetoric of public debate. It involves numerous types and sources of information. Information, moreover, is both an output of policy

> and an input to policy development. The policy formulation process is characterized by both an active trade in information and knowledge and by strategies for strenuously withholding information and knowledge. (Doern and Phidd 1983, 328).

Doern and Phidd make several distinctions between different types of knowledge and information. The first of these involves the distinction between written and verbal information. They argue that the enormous growth of "paper flow has resulted in an increasing reliance on verbal information. Those who have access to ministers are in a position of relative power since their "expertise" will be a crucial part of the information upon which the minister may build knowledge.

Doern and Phidd also distinguish between "causal knowledge" and uncertainty. Since the "essence of public policy is to change or sustain desired behaviour in reliable predictable ways" it inevitably involves "causality" (Doern and Phidd 1983, 333). Unfortunately, causal theory, especially with respect to human behaviour, is extremely limited. People and interests do not always behave as expected, in fact, they often do the opposite to what was originally anticipated (according to theory). This results in a large measure of uncertainty, which becomes even more pronounced when two or more policy fields interact. Decision makers are often in a position of having to base policy on limited theory or partial knowledge. This affects the ability to forecast, and further complicates the priority setting process.

Distinctions are also made between voluntary and compulsory information and between information and knowledge as "input" and as "output" of public policy. As output, information and knowledge can be used to influence the behaviour of public and private interests or as an expression of bureaucratic concern. While the volume of information is enormous, Doern and Phidd stress that there are

> many policy fields and program areas where it is argued, often with great validity, that there is grossly insufficient information of the right kind either to make intelligent decisions in the first place or to evaluate them afterwards (1983, 344).

The limits to knowledge and information force a qualification of the "knowledge is power" thesis. In addition, these limitations complicate the policy making process, and increase uncertainty about the practical outcome of decisions based on theory.

Uncertainty and the limits of knowledge were important aspects of policy formulation for satellites in the 60's and 70's. Reports and estimates by the "experts" were often contradictory, and satellites sometimes failed to live up to their promises. The thesis looks at how uncertainty influenced government and industry support of satellites, as well as the extent to which it was a factor in government compromises during Telesat's establishment.

The Policy Process

According to Doern and Phidd, the process of public

policy consists ideally of several stages. The first, or identification stage, consists of the continuous articulation of an issue or concern. Sources of this articulation may come from within or without government, or from both. At the definition stage, the problem is more concretely defined according to what politicians consider to be its essential "meaning". After this follows a search for alternative solutions which are assessed according to costs, benefits, and probable efficiency and effectiveness. This stage of the process includes the consideration of possible instruments or combination of instruments. Doern and Phidd argue that the processes of definition and consideration of alternatives are the stages where politicians and bureaucrats have the greatest influence. After these decisions have been made comes the point of actual choice, where resources are firmly committed. Following this is the policy implementation stage. Implementation may involve drafting new legislation or may merely require minor changes to regulations or guidelines. Because this stage requires the involvement of both politicians and private citizens, it occurs over the longest period of time and is the most permanent. Finally, policies are ideally evaluated in order to ascertain whether or not the objectives have been met.

According to Doern and Phidd, the simple policy stages model outlines the "ideal" process of policy making. While policy makers may attempt to follow this structure as closely

as possible, this usually proves to be an extremely difficult task. The ideal model is limited in a number of ways. First, policy makers rarely have the luxury to focus their entire attention on one problem. In general they are simultaneously faced with a number of pressing issues from different policy fields. Second, as we have seen, decision makers must try to maintain a balance between contending dominant ideas. Concerns for equity, efficiency, stability and redistribution among others influence the policy process in almost every field.

A third weakness of the simple policy stages model is its failure to account for contending governing processes which occur simultaneously to the formulation of other policies. The tax, regulation and expenditure processes are also subject to policy dispute and occupy governmental time and resources. In addition, the model fails to take into account sufficiently the extent of the need to limit the range of alternatives and to achieve political consensus. Doern and Phidd point out that there can exist "policies without resources" where the government expresses its support in theory, but limits its spending or the enforcement of regulations. Finally, the simple policy stages model does not discuss major projects such as power dams or the establishment of a communications satellite system, which differ in several ways from "typical" policy concerns. First, these "mega projects" are capital intensive and thus are extremely sensitive to the vagaries of

the market and financing. They also tend to involve long term planning. Another aspect of these projects is the high political visibility (for better or worse) that they give to the ministers and decision makers involved. Finally, a major project usually involves a number of different policy fields and is therefore even more likely to be subject to tensions between contending concerns and ideas, and implementation will necessitate the use of a number of different political instruments.

The development of Canada's domestic satellite system is a good example of a major, capital intensive project which involved long-term planning and created substantial political visibility for the ministers involved in its promotion. It involved a number of different policy fields including intergovernmental and international relations, military concerns and industrial strategy policies.

It is extremely difficult to maintain priorities and to rationally "manage" the policy process. Priority setting is undermined by an ever changing domestic and international environment. Time constraints are also an important factor. Because so much energy is involved in electoral preparations, any one government has three years at best to develop and implement policy. The limits of knowledge also account for the difficulty of maintaining a priority agenda. Doern and Phidd stress that:

> Many policies fail because we lack theory (that is, a knowledge of causal relations), and we lack

> knowledge about what is required to change human behaviour in desired ways. Interests do not always want to "behave" properly. Policies rarely fail merely because we lack clear objectives. Because of the limits of knowledge, governments must constantly adjust priorities and policies. In short, they must constantly try to learn and adjust to the power of other institutions" (Doern and Phidd 1983, 107).

Finally, the scarcity of resources and media criticism affect the need to balance and alter the priority agenda.

It becomes obvious that the policy stages model can serve as a guideline only. True understanding of the process and problems of policy making require an assessment of a multitude of factors which serve to limit the simple model.

III) Summary

An "interplay" approach is appropriate to this thesis for a number of reasons. First, the focus on the interplay between ideas, structures and processes requires a rigorous appreciation of historical trends and changes. It allows for an appreciation of policy making as a dynamic process which changes according to changes in social, economic and political-philosophical contexts. Doern and Phidd also provide a broad definition of interests which includes various levels of government and government departments. This provides a means of understanding institutions as they relate to ideas and to each other. In this thesis, a number of government bodies are assessed as interests competing with others to promote their specific ideas in the satellite policy discus-

sion. Supplemented by Doern's and Tupper's approach dealing specifically with crown corporations, and Schultz's theory of regulation, the model also allows for an analysis of governing instrument choice as an important aspect of policy.

The interplay approach also explores the link between process and uncertainty. According to the authors, uncertainty "is created not only by the limits of knowledge, analysis and the lack of causality, but by the difficult political calculus of anticipating how other interests and realms of private behaviour will actually react to policy initiatives" (Doern and Phidd 1983, 43). Finally, although Doern and Phidd do not deny the influence of leadership, their focus on ideas, structures and processes over an historical time period forces a recognition of ideas and policies which persist unaltered despite many changes in leadership.

As a general policy approach, the interplay model does not deal specifically with the special issues of what has been described as the "problem of technology". This includes questions such as the extent to which governments can control the rate or direction of technological development, and the consequent changes in political, social and business structures. Although an in depth discussion of these issues is beyond the scope of this thesis, it is acknowledged that they are important limiting factors in policy development and success.

The interplay approach enables an assessment of the

dominant ideas behind the formulation of policy as well as the process through which competing ideas promoted by various interests and institutions result in policy.

The interplay approach is applied in an analysis of policy to enable a discussion of the decision to implement a domestic service, the development of Telesat's "mixed" ownership structure, the kinds of services which were offered, and who benefitted as a result.

NOTES

1. W.I. Jenkins, Policy Analysis (London: Martin Robertson, 1978), 15, quoted in G. Bruce Doern and Richard Phidd, Canadian Public Policy: Ideas, Structure, Process (Toronto: Methuen, 1983), 33-34.

2. The term "ideology" has been defined in numerous ways depending on the discipline and the purposes for which it is used. For the purpose of this study, Doern and Phidd's somewhat limited "political" definition will be accepted.

3. Nationalism may also involve the identity of specific groups within particular regions. Thus the "nationalist" leanings of French Canadians may also involve separatism and threaten national unity.

4. For a more detailed analysis of federal-provincial relations, see Richard Schultz and Alan Alexandroff, Economic Regulation and the Federal System (Toronto: University of Toronto Press, 1985).

5. Doern and Phidd stress that governments and interests are continually "trading in a market of governing instruments": "If the "price" of one or another instrument is politically too high, politicians will turn to other instruments" (1983, 89). The most important thing is that they are seen to be doing something.

6. Recently, Telesat has played an important role in a joint U.S./Canadian project to offer mobile satellite communications services in North America.

CHAPTER TWO

As a general policy approach, the interplay model does not deal specifically with the special issues of Canadian telecommunications or satellite technology. This chapter provides a context for assessing these issues.

The first part of the chapter describes the historical development of the Canadian telecommunications industry, ownership and jurisdictional patterns, and government policies and regulations. It argues that many of the challenges facing contemporary Canadian policy makers are a direct result of historical factors. The fact that Bell did not establish a national system hampered the Federal Government's later attempt to do so, and led to jurisdictional disputes between the federal, provincial and sometimes even municipal, governments. The erosion of monopolistic boundaries and increasing intermodal competition calls into question traditional pricing policies based on system cross-subsidization, as well as justifications for regulation.

The second part of the chapter provides a brief historical overview of the technological developments that made satellite communications possible. It argues that the "space race" between the U.S. and U.S.S.R. resulted in a more rapid development and implementation of space technology than would have been the case without the political rivalry. Pushed to a certain extent by military rivalry, the "space race" caused

many countries to re-evaluate domestic space policies. In Canada's case, this resulted in a decision to implement a domestic communications satellite system.

I) Canadian Telecommunications - An Historical Overview

Since 1806, when the first telegraph was sent from Toronto to Hamilton, Ontario, developments in Canadian telecommunications have been rapid and far-reaching. In 1846, Canadian Pacific Railways announced the completion of the first trans-Canada telegraph service, and the basis for what was to become the Canadian Broadcasting Corporation was established. The telephone was invented by Alexander Graham Bell at his summer house just outside Brantford, Ontario in 1874. Two years later, Bell made Canada's first long-distance call from Brantford to Paris, Ontario. The Bell Telephone Company of Canada was founded in 1880 and was originally chartered to provide telephone service across the country. This initiative failed, however. Bell's facilities in the Maritimes were bought out. The Governments of Manitoba, Saskatchewan and Alberta established their own companies which eventually "bought Bell out" in these provinces as well. British Columbia was served from the beginning by several different companies.

In 1921, a number of independent telephone companies organized the Telephone Association of Canada to assess the possibility of providing long-distance service through the

interconnection of various systems. In 1931, the network, known as the Trans Canada Telephone System (TCTS)[1] was completed. Soon afterwards, the TCTS began experiments with long distance microwave signals, and by 1958 had formed a Canada-wide microwave route. This route remains central to the provision of long distance services in Canada.

Although it did not seem crucial at the time, Bell's original inability to provide a national system has resulted in a number of barriers to the Federal Government's attempt to establish and direct a unified Canadian telecommunications system. One major problem involves jurisdiction. According to many students of policy, intra-provincial services should be regulated by the provinces, while inter-provincial and international services should fall under federal jurisdiction.[2] As a result of the historical development of the industry, however, Canada's system is characterized by a confusing mix of regulators, rules and rates. A brief summary of the various ownership and regulatory patterns will indicate the extent of this jurisdictional labyrinth.

II) The Regulatory Mosaic

Regulatory "diversity" began early in the history of telecommunications. In 1906, the Board of Railway Commissioners was given responsibility for the regulation of telephone companies within federal jurisdiction. Most provincial governments formed agencies to regulate carriers

under their jurisdiction soon after.[3] Technological developments have made the contemporary regulatory scheme even more complex. There are two national carrier systems in Canada: CNCP Telecommunications and Telecom Canada. CNCP is owned jointly by the Federal Government (through CNR) and by Canadian Pacific, and is federally regulated. Telecom Canada is an unincorporated association comprised of Canada's major telephone companies plus Telesat Canada, and is not itself regulated. Of Telecom's members, Alberta Government Telephone, Saskatchewan Telecommunications, and the Manitoba Telephone System are owned and regulated by their respective provincial governments. All other members, with the exception of Telesat, are privately owned. Bell Canada and B.C. Tel fall under federal jurisdiction. The principle telephone companies of the Atlantic provinces - Island Tel, Maritime Telegraph and Telephone (MT & T), New Brunswick Tel and Newfoundland Tel are regulated by the provinces in which they operate. Of the non-Telecom Canada members, the largest companies are "edmonton telephones" and Thunder Bay Tel (the former owned and regulated by the city of Edmonton, the latter regulated by the Ontario Government); Télébec Ltée. and Québec Tel, regulated by the province of Québec; and NorthwesTel and Terra Nova Tel, both federally owned (through Canadian National Railways) and regulated.

Teleglobe Canada, which provides international telecommunications services, was privatized in 1987, and is now

regulated by the CRTC. It is Canada's signatory in the Commonwealth Telecommunications Organization, the International Telecommunications Satellite Organization (INTELSAT) and the Maritime Satellite Organization (INMARSAT).

Telesat Canada, the national satellite carrier, is owned jointly by the Federal Government and the major telecommunications carriers, and is regulated by the CRTC. Its establishment, ownership structure, and bid for membership in the TCTS is the central topic of this paper.

III) The Hidden Telephone Welfare System

A second characteristic of Canadian telecommunications which developed early in the history of telephony, and which has consequently become a major problem for contemporary policy-makers, is system cross-subsidization.

Cross-subsidization results from two different pricing schemes. The first, "flat rate" pricing, is based on the overall cost of the monopoly service, and means that within a given geographical area each customer pays the same basic rate for service, regardless of the cost of providing that service. Flat rate pricing was developed by the original telephone monopolies to attract new customers. When first introduced, it made good sense - it encouraged use, was easy to administer, and resulted in predictable bills for subscribers and revenue stability for companies. This scheme eventually developed into a policy of "universal service", in

which affordable telephone rates are available to all customers, including those in remote areas.

Cross-subsidization also results from the "value-of-service" pricing scheme, in which prices of services are based on their relative value to the user. Local service is divided into residential and business services, with business users paying almost twice as much as residential customers. Local service is subsidized by long-distance, and rates are standardized within a company rather than within a territory. In Canada's system, a certain amount of inter-company subsidization compensates local and long distance networks which contribute to generating long distance, inter-company revenues.

The value-of-service scheme made sense when it was originally implemented. With developments in technology and growing demand however, the costs of providing long distance service have dropped relative to the costs of providing local service. As a result, revenues from long distance are increasingly compensating losses in the local system.

The demand for increased competition in the telecommunications industry threatens not only the telephone companies' monopolies, but the built-in system of cross subsidization as well. As Richard Schultz points out, whatever its original purposes, the telephone cross-subsidy system

> is now defended as well, or even primarily, on welfare grounds as a means of satisfying social policy objectives...The present pricing system for long distance services and the related Revenue

> Settlement Plan of Telecom Canada provides subsidies from users of one system for those of others. This is particularly true in the case of allocation of revenues for Canadian-American traffic where the bulk of this traffic originates within one territory, namely Bell Canada. Consequently, any suggestion of tampering with the pricing system can be expected to result in political conflicts not only among different subscribers but amount different companies and their respective regulators (Schultz and Alexandroff 1985, 85).

IV) The Historical Development of Regulation

Understandably, substantial differences in the functions and objectives of the various regulatory bodies can result in tension between the regulators and within the industry. Somewhat surprisingly, few problems of this nature were experienced during the first seventy-odd years of telephone service (Schultz and Alexandroff, 1985, 85). Technological and economic changes have played an important role in the jurisdictional disputes which arose in the late 60's and which have continued to the present. According to Schultz these disputes have also resulted from a change in the Federal Government's treatment of the telecommunications industry and the subsequent development in scope and function of its regulatory agent (Schultz and Alexandroff 1985).

Technological change has drastically altered the face of the telecommunications industry and has posed enormous challenges to the fundamental premises upon which telecommunications policy is based.

Since Canada's first telecommunications services were

owned and operated by the Railways, the Railway Act became the statutory basis for policy. The two most important sections relating to telecommunications are Sections 320 and 321 which require that all tolls be "just and reasonable" and that there be no "unjust discrimination" with respect to rates, services or facilities. The Railway Act also gives the regulator jurisdiction to approve or deny agreements between carriers for the interchange of telecommunications traffic.

Historically, Canadian telecommunications policy has been premised on three central assumptions:

(1) that only one telecommunications provider can ensure the benefits of an "economy of scale" and therefore services are best provided on a monopoly basis;

(2) that a single provider should be responsible for end to end service; and

(3) that the pricing scheme for telecommunications should be based on a value-of-service rather than cost basis.

Because telecommunications services traditionally have been provided on a monopoly basis, the primary objectives of regulation have been to prohibit discrimination and to prevent the monopolist from earning excess profits. Supplementing these two negative functions has been the authorization of what Schultz refers to as "acceptable discrimination" - the allowance of a limited amount of income redistribution in the form of cross-subsidization.

Advances in technology have called into question these basic premises. The two most profound technological changes

affecting the field of telecommunications have been the development of alternative modes of transmission (including satellites) and the convergence of computers and communications. This has had an enormous effect on the nature of the industry and of the structure and purposes of regulation.'

Advances in technology have blurred the boundaries between industries, allowing multi-industry entry and resulting in what Janisch and Irwin describe as a "new order of competition" (1983, 621). This environment of multiple products and services increases risk and uncertainty in the private sector, and forces a re-evaluation of rules and regulations by which the public sector manages change in the economy (Janisch and Irwin 1983, 621-622).

The erosion of the traditional monopolistic boundaries held by telephone companies has created increasing pressure for both systems interconnection and for terminal attachment to the public switched network. At the same time, there has been growing concern that the traditional regulatory prohibitions have impeded innovation and blocked the adoption of new technologies thereby stifling the positive growth of Canada's telecommunications industry.

Central to these concerns is the question of the extent to which, if at all, competition should be allowed between telecommunications carriers. The main problem is that competition will force prices closer to cost, undermining the system of cross-subsidization that both federal and provincial

governments have used as a means of "effecting redistribution in a disguised form".[5] As Janisch and Irwin note, the situation is problematic on a number of levels:

> Not only does the resultant prospect for higher local rates present regulators with unpopular changes, it is inextricably bound up with the jurisdictional conflicts which plague communications regulation. Local rates are primarily the concern of state and provincial regulators who view the advent of competition in toll with its impact on politically sensitive local rates with considerable alarm (Janisch and Irwin 1983, 627).

Ironically, as the industry has grown more complex, there has been an increasing emphasis on the need to manage its direction. While some studies hail the so-called "information revolution" as a period of almost limitless potential and growth, many warn of the dangers involved for Canada as a nation. The Clyne Committee Report (1979) is one of the better examples of the latter response. In it, the authors argue that telecommunications will play a central role in Canadian sovereignty:

> Canadian sovereignty in the next generation will depend heavily on telecommunications. If we wish to have an independent culture, we will have to continue to express it through radio and television. If we wish to control our economy then we will require a sophisticated telecommunications sector developed and owned in Canada to meet specific Canadian requirements (Clyne et al. 1979, 2).

According to the Report, as the "foundation for the future society" telecommunications should not be left to the vagaries of the market, and principles such as "totally free competition" may not be deemed appropriate in this sphere (Clyne et al. 1979, 2).

Richard Schultz argues that the Canadian Government's response to this kind of "defensive nationalism" was to give telecommunications a "governmental embrace" (Schultz and Alexandroff 1985). This "embrace" resulted from two assumptions: that telecommunications would be central to Canada's social and economic future, and that its uncontrolled development could pose serious problems, especially if the U.S. gained undue influence.

According to Schultz, the creation of the DOC in 1968 with a mandate to develop policy to "integrate and rationalize all systems of communication" marked a turning point in the Federal Government's treatment of the industry. Its new policy approach sought to use telecommunications to achieve a broad range of social and economic goals. It not only expanded its own role, but specifically sought to use regulation to plan, rather than to "police" the industry (Schultz and Alexandroff 1985, 90).

All these factors contributed to the intergovernmental conflicts which arose in the late 60's and which have continued to the present. Despite its "embrace" of the industry, federal policy discussion has been carried on at a very general level. With little concrete direction from the government, the CRTC has been left to determine policy through a series of ad hoc decisions. Provincial governments have become increasingly concerned that an independent regulatory agency is infringing on their jurisdiction, developing basic

policies that could affect all telecommunication carriers. And technological change has forced a re-assessment of the role of telecommunications in society, and called into question the employment of the industry to achieve broader social goals. These factors all came into play during the development of Canadian satellite policy in the 60's and 70's.

V) The Origins of Satellite Communications

Technological Change

Arthur C. Clarke is generally credited with originating the concept of communications satellites. In 1945 Clarke published a paper in Wireless World which provided the basic technical parameters of the communications satellite. Clarke explained that one of these "rocket stations" orbiting at an altitude of 23,000 miles would appear motionless to an observer or receiving station on earth. Furthermore, three of these stations equipped with receiving and transmitting equipment would be sufficient to provide world wide communications coverage.[6]

Although Clarke's proposal was beyond the technical capability of the time, a number of developments between 1945 and the 1960's quickly made his plan seem feasible. A significant aspect of satellite technology is the size and weight of the hardware. The invention of the transistor in 1946 rendered the bulky vacuum tube obsolete. The subsequent miniaturization of electronic components made lightweight

electrical systems possible. Finally, the development of high speed computers enabled the sophisticated systems necessary for tracking orbiting satellites.

The Political Push

Military involvement was another extremely important factor in the rapid development of space technology. Experimentation during World War II had examined the possibility of using rockets as weapons. The U.S. research and construction of liquid fuel rockets was a direct response to growing cold war hostilities. In the '50's, the U.S. Department of Defense was responsible for space technology research, and satellite programs were highly classified. Application of the study results were stymied however, when it was believed that rockets weren't capable of carrying missiles.

International political rivalry was the stimulus that got the U.S. space program off the ground. In October 1957, the Soviets awed the world with the launch of Sputnik, the first artificial satellite. The craft weight 184 lbs and orbited 560 miles above the earth. For its time, the technological achievement was tremendous and the launch caused a wave of widespread concern in the U.S. According to Delbert Smith,

> the weight of the spacecraft and its high orbit suggested a critical difference in the military capabilities of the two super-powers: current American plans for satellites were considering a mere 21.5 pound satellite orbiting at 300 miles up; the Russians apparently possessed superior rockets whose thrust could send a heavier craft into a much higher orbit. The U.S. scientific and military race

against Russia reached a new level of concern (Smith 1976, 34).

The immediate U.S. response to the Soviet lead was the establishment of a national space program. According to the President's Science Advisory Committee, the compelling urge of man to explore the unknown; the military potential of outer space; the effect on national prestige; and the opportunities for scientific observation and experimentation were the four factors most important to a national space program. Time was at a premium. The first U.S. satellite, Explorer I, was launched on January 31, 1958. The creation of the National Aeronautics and Space Administration (NASA) later that year provided an official structure with a specific mandate to conduct and support space research. According to Smith:

> The pressures of international military rivalry were able to push technological research and development far faster than the new technology could be applied for peaceful purposes and gave rise to the need for large scale transfer of space technology and applications to private and peaceful uses (1976, 23).

Significantly, NASA was a civilian rather than a military agency. In addition, its charter limited space and aeronautical activities to a research orientation. Congress specifically restricted the implementation and operation of space technology to the private sector and to other government agencies. (For instance, the operation of space technology for military uses continued to be the responsibility of the Department of Defense.) Thus, U.S. industrial policy in-

fluenced the creation of structures which encouraged private sector involvement as well as the implementation of space technology for commercial, rather than military purposes.

VI) The International Scenario

Although the initial development of satellite technology was a response by the superpowers to military and political rivalry, there was a growing awareness internationally that satellite communications were important in terms of national sovereignty and in their potential for commercial uses. Frequency allocation quickly became an issue. In 1959, the Geneva meeting of the International Telecommunications Union (ITU)[7] had set aside thirteen frequency bands for space communications. By 1960, however, the UN's Committee on the Peaceful Uses of Outer Space (COPUOS) was stressing the need for more comprehensive allocations.

Two issues have dominated international debates since the early 1960's. The first involves the overflow of signals across national boundaries. Many countries claim that this transborder flow erodes cultural identity and undermines national unity, and thus seek international regulations to prevent this from occurring. Other nations, the U.S. for instance, support a "free flow" of information between countries.[8] Negotiations over transborder information flow have therefore involved balancing concerns over national identity against the liberty to be able to send and receive

communications internationally.

The second issue hinges on the fact that the radio frequency spectrum and slots in the geostationary orbit are limited resources. Most industrialized nations support a "first come, first served" allocation of these resources in the name of efficiency and economic stability for those corporations involved in such a high risk industry. Most Third World nations, on the other hand, have argued for a more equitable, planned approach which would ensure frequencies and orbital slots for each country whenever they gained the technology and expertise to be able to use them.

In the '60's, the industrialized nations commanded most of the political power within the ITU.[9] The 1963 Extra Ordinary Administrative Radio Conference (EARC) essentially supported the arguments of nations interested in establishing a global communications satellite network (later known as INTELSAT) by allocating sufficient bandwidth to meet the anticipated requirements for satellite communications for the next decade.

VII) Summary

Many of the problems facing contemporary Canadian telecommunication policy-makers are the direct result of historical developments in the industry. At present, no one regulator has jurisdiction over national telecommunications traffic. Intergovernmental disputes over the control and

direction of telecommunications in Canada result from an interplay of different concerns and objectives. Technological and regulatory changes allowing increased intermodal competition have called into question traditional pricing schemes based on system cross-subsidization and exacerbated tensions between the federal and provincial governments. The introduction of a domestic satellite system was affected by all of these factors.

The 1960's marked the first era in history that humanity gained the technological capability to launch objects beyond the earth's ionosphere. Pushed to a great extent by international military rivalry, the "space race" resulted in a reassessment of international and domestic policies. While space technology had numerous potential uses, however, this did not mean they would be developed or implemented. Choices concerning whether and how to use them depended to a great extent on the purposes of policy makers in each country.

International negotiations have primarily involved concerns for national identity versus the freedom to send and receive information across international borders. Orbit/spectrum allocation negotiations have balanced the concern by First World countries for efficiency and economic stability against the arguments for more "equitable", planned approaches propose by Third World nations.

NOTES

1. In 1983, the TCTS was renamed Telecom Canada.

2. Richard Schultz (1985) points out that academic legal commentary unanimously supports the fact that the Federal Government should have jurisdiction over interprovincial and international operations of all telephone companies, but that, until recently, no jurisdictional challenge has occurred. See also Robert Buchan and Christopher Johnston, "Telecommunications Regulation and the Constitution: A Lawyer's Perspective", in Robert J. Buchan et al., Telecommunications and the Constitution (Montreal: IRPP, 1982).

3. Saskatchewan did this only in the 1980's.

4. See for instance: Hudson Janisch and Manley Irwin, "Information Technology and Public Policy: Regulatory Implications for Canada", Osgoode Hall Law Journal, 20 (1982): 610-641; Richard Schultz, "Regulation as Maginot Line: Confronting the Technological Revolution in Telecommunications", Canadian Public Administration, 26 (1983): 203-218; and Shirley Serafini and Michael Andrien, The Information Revolution and its Implications for Canada (Ottawa: DOC, 1980).

5. W.T. Stanbury and G. Lermer, "Regulation and the Redistribution of Wealth," Canadian Public Administration, 26 (1983): 379-401.

6. Arthur C. Clarke, "Extraterrestrial Relays: Can Rocket Stations Give World Wide Radio Coverage?" Reprinted in Arthur C. Clarke, Voices From the Sky: Previews of the Coming Space Age (N.Y.: Harper & Row, 1965).

7. For a detailed explication of the structure and functions of the ITU see George Codding and Anthony Rutkowski, The ITU in a Changing World (Dedham, MA: Arlech House 1982).

8. For a fuller account of these arguments, see Anthony Smith, The Geopolitics of Information (N.Y.: Oxford University Press, 1980).

9. See Codding and Rutkowski, The ITU in a Changing World.

CHAPTER THREE

This chapter looks at the interplay of events, interests and institutions which led to the creation of Telesat Canada in 1969. Government institutions are assessed in terms of the rationale for their creation, their responsibilities and scope, and the dominant ideas shaping their institutional mandates as revealed through key discussions, reports, papers and legislation.

The "rationalization" of science policy outlined by the Glassco Commission in the early 60's is assessed as part of the Federal Government's industrial strategy which promoted the transfer of technical skills from government to private industry, where these skills could be applied for the development of technology for commercial purposes.

Governmental reorganization resulting in response to the Commission's recommendations led to the creation of a number of new institutions. These included the Science Secretariat (1964), the Science Council (1966), the DOC (1968) and the CRTC (1968). The creation of these agencies increased the number of federal government players promoting a domestic satellite system. Reports commissioned by the Science Secretariat and Science Council and the 1968 White Paper which created Telesat Canada in 1969 promoted the potential benefits of satellites for national unity, sovereignty and northern development. It is obvious, however, that the Federal

Government's industrial strategy goals to develop Canada's expertise in the high tech space and communications industries were paramount.

The concerns of the provinces with regards to the proposed system and the Federal Government's response to these concerns are assessed as part of a growing political struggle for jurisdiction over communications. In the case of satellite communications, the Federal Government was quick to assert its jurisdictional rights, and provided no role for the provinces in the ownership or control of Telesat.

The key private interests which have influenced and been affected by the development of new communications satellite technology are also introduced. Both broadcasters and terrestrial telecommunications carriers made bids to develop a domestic satellite system, although only the carriers' bid was seriously considered.

The Federal Government wanted to maintain control and direction of the system, however, the investments from private industry was an attractive source of funding. As a result, Telesat was established as a "mixed corporation" owned equally by the Federal Government and private terrestrial telecommunications carriers. As part of the negotiations, the interested carriers insisted that contractual agreements with Telesat stipulate extremely limited leasing capabilities. These restrictions did much to hamper Telesat's growth during its first decade of operations.

I) Satellite Communications in Canada: Early Research

Like the U.S., much of Canada's early research into satellite technology was stimulated by military requirements. Although some ionospheric studies had been conducted by the National Research Council (NRC) in the 1930's, problems with radio communications during World War II indicated that a greater understanding of the effect of the ionosphere on radio waves was necessary. At the end of the war, Canadian ionospheric studies became the responsibility of the Defense Research Board (DRB), and were conducted at the Defense Research Telecommunications Establishment (DRTE) at Shirley's Bay, just outside Ottawa (Hartz and Paghis 1982, 52).

In 1957, scientists from all over the world met to discuss studies concerning geophysical aspects of the planet. Known as the International Geophysical Year, this convention encouraged Canadian scientists to expand ionospheric experimentation (Chapman 1967, 5). Then, in 1958, the Space Science Board of the U.S. National Academy of Sciences invited other nations to propose experiments that might be included as part of the American space development program. Discussions between Canada and the U.S. resulted in a Canadian proposal for an experimental satellite that would explore the top-side ionosphere. A formal agreement between NASA and the DRB was signed in 1959. Canada was to design, construct and finance the satellite, while NASA was responsible for the launch vehicle. Any data obtained was to be shared by both

nations. Alouette I was designed and built at the DRTE, and on September 28, 1962, Canada became the third nation to successfully launch an artificial satellite into earth orbit.

Alouette I could be considered an unmitigated success by any standard:

> Though Alouette had been designed for a nominal lifetime of one year, a three-month period of operation was chosen as the criterion for a "complete success" since that would contribute enormously to the then very limited knowledge of the top-side ionosphere. As it turned out, the spacecraft operated for an unprecedented 10 years and set a record for the greatest number of scientific papers based on data produced from a single satellite (Hartz and Paghis 1982, 61).

The project's success encouraged Canada to expand its space program. In 1963, Canada and the U.S. agreed to undertake a second joint project to further knowledge of the ionosphere. Known as ISIS (International Satellites for Ionospheric Studies), the project involved the ionospheric research programs of both nations. Similar to the arrangements for Alouette, Canada was to design and build the satellites, while NASA was responsible for launching the series between 1964 and 1970.

Significantly, one of the requirements established by the Federal Government was that Canadian industry be involved in the program to the fullest possible extent. This policy was a direct response to the recommendations of the Royal Commission on Government Organization (the Glassco Commission). Published in 1963, the Commission Report recommended the transfer of technical skills from government to private

industry, where they could be applied for the development of technology for commercial purposes. This marked the beginnings of an attempt to formulate an industrial strategy which would be applied to space technology. The debate resulted in a number of structural changes within government and led to the creation of Telesat Canada near the end of the decade.

II) Rationalizing Science policy - The Institutional Response to Technological Change[1]

The Glassco Commission Report

In 1963, as part of a huge inquiry into federal organization, the Royal Commission on Government Organization (the Glassco Commission) published a report on Canadian Scientific research and development. In terms of general science policy, two major issues predominate. The first involves the "machinery" of science policy. The report is very critical of the then existing policy machinery, arguing that the system had failed to function as intended. According to the report, the Privy Council Committee on Scientific and Industrial Research, and the Advisory Panel for Scientific Policy had met only infrequently. The NRC had "turned aside from its original duty of advising on broad national policy" and had spent most of its funds and energy supporting research and development projects in universities and in its own labs (Canada Royal Commission, 1963, 220). As a result of this "organizational vacuum", most decisions concerning science were made by the technically less experienced Treasury Board.

Based on its critique, the Commission made two recommendations which were intended to "rationalize" scientific input into government decision making. First, it recommended the creation of a "Central Scientific Bureau" which would act as the Cabinet's science secretariat. It also encouraged the creation of a National Scientific Advisory Council whose numbership would be drawn from the various scientific disciplines, as well as the academic, industrial and governmental sectors. This Council was to review and submit "independent advice" with respect to national science policy (Canada Royal Commission 1963, 224).

The second major problem identified by the Commission was the imbalance between governmental, industrial and academic input into research. According to the Commission, as compared to other advanced nations, a much larger proportion of Canada's research activities were performed by the government, rather than the private or academic sectors. In 1961-62 for instance, industrial research received only 9 1/2% of the government's total scientific expenditure. Of this small amount, most of the funds had been procured for industry by the Department of Defense Production for a joint U.S. - Canadian development sharing scheme. Two arguments were commonly advanced to explain Canada's relative lack of industrial research. The first tended to blame Canada's "branch plant" economy - many large firms were not Canadian owned and parent companies tended to carry out research in

their own countries (primarily the U.S.). In addition, it was believed that the Armed Forces lacked confidence in Canadian science in general.

Both these arguments are acknowledged by the Commission. It maintains however, that the most important reason for the imbalance was "the nature of the evolution of the government's own programmes and the attitudes and motivation of its senior scientific personnel" (Canada Royal Commission 1963, 231). It charges that "through most of the period of greatest expansion, industry has had no effective spokesman" and points out that although the NRC was originally established in part to promote research in industry, it had been unsuccessful in this role (Canada Royal Commission 1963, 231).

With regards to the organization of space research the Commission makes several specific recommendations. It notes that because space research is related to a wide range of other topics, programmes had been set up in a number of different government agencies. Of these, the most important were the Defense Research Board, the National Research Council, and the Department of Transport. The report recommends that all defence-related research now conducted by the Radio and Electrical Engineering Division of the NRC should be transferred to the Defense Research Board. At the same time, all non-military research into space and telecommunications should become the responsibility of the Radio and Electrical Engineering Division of the NRC. This research

would include: all upper atmosphere and satellite research then conducted by other divisions of the NRC; all research on meteors and satellites conducted by the Radio and Electrical Engineering; and all research on behalf of the Department of Transport "which should not be encouraged to set up its own facilities" (Canada Royal Commission 1963, 273-274).

According to Bruce Doern (1972) the Commission's relatively equal balance of sectorial representation was crucial to its recommendations. Of its members, five were drawn from industry, five were academics and three represented government departments. Glassco himself was a businessman, and his pragmatic philosophy influenced greatly the report's industry orientation. The central concern of the Glassco Commission was with efficiency. The redistribution of influence and input into scientific research and development was also a crucial aspect of the Commission's recommendations. According to Doern, "The Glassco Commission study marked the first occasion where the existing scientific establishment in the government was challenged" (Doern 1972, 7). Thus, the Glassco Commission marked a shift in the government/private industry balance of influence in space and satellite telecommunications endeavors.

Government Response to the Glassco Commission

The Glassco Commission's recommendations were taken very seriously by the Federal Government. By 1965, one hundred of

the recommendations had been approved and implementation of many of these had begun. The fact that action was taken so quickly was due in part to the activities of the Bureau of Government Organization which had been set up by the Prime Minister to appraise and implement the Commission's recommendations.'

Among the recommendations implemented was the establishment of a number of government "structures" which had various degrees of influence over Canadian satellite communications policy. These included: the Science Secretariat, the Science Council, the Department of Communications and the CRTC.

The Science Secretariat

In keeping with Glassco's recommendations, a Science Secretariat was established as part of the Privy Council Office in late April, 1964. Its functions were to "assemble and analyze information about the government's scientific programs and their interrelations with other scientific activities throughout Canada" (House of Commons Debates 1964, 2752).

One of the first studies commissioned by the Science Secretariat was a special study called Upper Atmosphere and Space Programs in Canada, and otherwise known as the Chapman Report. Its purpose was to "review existing Canadian financed research and development related to space and the upper atmosphere" and to assess these projects in relation to

Canada's immediate and long-term economic interests. It also proposed to study the aims and objectives of Canada's research in space in order to establish a basis for Canadian space policy (Chapman 1967, preface). The study argued that "the need for communications satellites for domestic use is clearly established" and that unless action were taken post haste, there was "a risk that ultimate control over the space segment may not reside in Canada" due to a potential scarcity of orbital positions. These claims encouraged a sense of urgency within government and industry.

The Science Council of Canada

The Science Council of Canada Act received assent on May 12, 1966. The Council's stated purpose was "To define and determine feasible long term objectives for science in Canada, to suggest appropriate paths for reaching them and to consider the responsibilities of the various segments of the industrial, academic and government communities in this field" (House of Commons Debates 1966, 2849). Its specific duties involved making recommendations concerning the adequacy of, as well as establishing priorities and long term plans for, scientific and technological research and development. It was also to give advice concerning the development of technological manpower; Canada's participation in international scientific affairs; and to comment on the responsibility of Government agencies and departments as well as those of the

universities and the private sector, for furthering science and technology in Canada. Finally, it was to provide statistical and other information on scientific and technological research to the government to provide a basis for formulating science policy (Science Council of Canada 1967, 26).[3]

The Science Council's first Report, A Space Program for Canada was submitted in July, 1967. Using the Chapman Report as a basis, its stated purpose is "an attempt to secure an integrated approach to the understanding and utilization of space for the greatest advantage of the Canadian people" (Science Council of Canada 1967, 1). According to its analysis of the Chapman report, three main issues predominate. These are: the need for a central organization for space activities in Canada; the need for Canadian satellites for domestic telecommunications by 1970 or '71; and the growing need for a Canadian satellite launching capability (Science Council of Canada 1967, 3). A central agency is deemed crucial to encouraging Canada's advancement in space and to ensuring the development and use of space technology by Canadian industry. Satellites' potential to improve telecommunications services such as telephone and television to underserved areas could help industries in those areas attract personnel. In addition, the development of "spin off" technology would develop Canada's expertise in the high tech industries, and increase Canada's markets both at home and abroad. The report brings up dependency issues, warning that

if Canadians allow other nations to develop the knowledge, hardware and services relating to "space matters" they will find themselves increasingly dependent, both technologically and economically. Based on its evaluation, the study proposes the creation of a space agency through which a space program could be defined, coordinated and implemented.

One of the most important aspects of both the Chapman and Science Council Reports is their emphasis on the need to transfer space technology know-how to Canadian industry. They specifically promote the development of this technology as part of an industrial "strategy", and encourage research into potential applications for every day use:

> The success of an industrial development program arising out of the space effort will depend on the extent to which the new technology and production methods are transferred to other fields of activity, in the everyday lives of people. It is expected that a special study and development activity will be required to effect this transition (Science Council of Canada 1967, 13).

The Department of Communications and the CRTC

Two other government bodies established during this period of reorganization dealt specifically with communications. Both created in 1968, these were the Department of Communications (DOC) and the Canadian Radio-Television Commission (now the Canadian Radio-television and Telecommunications Commission (CRTC)).

The creation of these new bodies was an indication of an expanded federal government role in the communications sector.

This government "embrace" of communications was a result of several factors. Technological change raised concerns over economic stability and growth. The growth of alternative services called into question the "natural monopoly" principles of telecommunications policy and the convergence of computers and communications undermined traditional industry boundaries. As a consequence, policies based on distinct and separate services became less and less applicable (Schultz and Alexandroff 1985, 88-89).

Concurrent with technological change was the growing belief that communications were central to a nation's social and economic infrastructure. New communications technologies could encourage national identity and unity, but, at the same time, could make a nation vulnerable. The Federal Government decided it needed greater control over Canadian communications.

The Department of Communications' responsibilities included the coordination, promotion and recommendation of national communications policies; and the promotion and establishment of efficient communications systems and facilities. The Minister was also to help national systems and facilities to adjust to changing domestic and international conditions. The legislation did not include a statement of public policy. This was especially notable in light of Prime Minister Trudeau's announcement at the time that "we can foresee that the whole field of communications will be of

growing importance to Canada and require increasing Federal Government involvement" (Schultz and Alexandroff, 1985, 89). The Government's intention to become much more involved in a planning capacity and to use regulation as its primary instrument is also clear in the Minister of Communications' statement:

> The purpose of planning will not be regulation for regulation's sake but regulation where and when needed, for the public good. We intend to evolve a national communications policy to integrate and rationalize all systems of communications whether those of today such as telephones, microwave relays, telex, TWX, telegraph and the Post Office, or those of tomorrow: communication satellites, sophisticated information retrieval systems linking computers which exchange and store information of all kinds; waveguides, lasers, and on up to the 'wired city of tomorrow (Schultz and Alexandroff 1985, 90).

At no time did the Government explain why federal planning of telecommunications was necessary, nor why regulation would be used for the instrument for achieving significantly expanded government objectives. That these "exogenous" objectives were central, however, was made clear in the Government's 1973 Green Paper on a new Communications Policy for Canada. The new policy was intended to counter "the strong north/south pull of continentalism" and to foster "national unity and identity in a Canada of admittedly diverse cultural and regional components". According to the Green Paper it was clearer than ever before that "the technologies and economic aspects of communications are intimately related with their social and cultural implications" (Minister of Communications 1973, 4).

The Canadian Radio Television Commission was established as part of the 1968 Broadcasting Act to regulate, set conditions of, and grant licenses to, both public and private broadcast entities. Most government documents since the 1957 Report of the Royal Commission on Broadcasting (the Fowler Commission) had argued that Canadian Broadcasting should be treated as a "single mixed system". In this system, both public and private broadcasters would be regulated by one agency representing the public interest and responsible to Parliament. It was not until the creation of the CRTC, however, that the concept of a single regulator became a reality.

Regulation of Canadian broadcasting has traditionally been justified as a means to protect the system from economic pressures which could force broadcasters to import programming and could lead to the "Americanization" of Canadian radio and television. In addition, a government supported public network (the CBC) was considered essential, even though this might not be the lease expensive option.

The 1968 Broadcasting Act makes the sovereignty issue explicit. Canadian broadcasting is to comprise both public and private elements which are to be "owned and controlled by Canadians so as to safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada" (Canada Statutes 1967-8, S.3 (b)). Each broadcaster, in addition to providing varied and comprehensive programming

offering different views on issues of public concern should use "predominately Canadian creative and other resources" (Canada Statutes 1967-8, S.3 (d)). Finally, broadcasting is expected to promote national unity, and all Canadians are "entitled to broadcasting service in English and French as public funds become available" (Canada Statutes 1967-8, S.3 (e)). The manner in which these goals were to be achieved was left up to the new regulatory agency.

In 1976, jurisdiction over telecommunications was transferred from the Canadian Transport Commission to the CRTC. Although Communications Minister Gérard Pelletier described the move as "a housekeeping operation" designed to "tidy up" the federal regulatory system (House of Commons Debates 1975, 3782), the CRTC took its duties much more seriously. Its understanding of its new role was based in part on the 1973 Federal Green Paper which had laid the ground work for the combination of broadcasting and telecommunications under a single agency's jurisdiction.

According to the Commission, the public interest required that telecommunications services "be responsive to public demand over as wide a range as possible, and equally responsive to social and technological change" (CRTC Policy Statement, July 1976). Although its jurisdiction was still based on the Railway Act, the Commission proposed a significantly expanded interpretation of "just and reasonable":

> As our society has evolved, the idea of what is just and reasonable has also changed, and now takes into

> account many considerations that would have been thought irrelevant 70 years ago, when regulatory review was first instituted. Indeed, the Commission views this principle in the widest possible terms and considers itself obliged to continually review the level and structure of carrier rates to ensure that telecommunications services are fully responsive to the public interest (CRTC Policy Statement 1976, 3).

In 1978, the Minister of Communications introduced a new Communications Act covering both telecommunications and broadcasting. Although the bill - C-16 - was never passed, it is significant for its application of a broadcasting concept to the whole of telecommunications. According to its section 3 (a):

> Efficient telecommunications systems are essential to the sovereignty and integrity of Canada, and telecommunications services and production resources should be developed and administered so as to safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada" (Canada, House of Commons, Bill C-16, Nov. 9, 1978).

III) Provincial Concerns

The provincial governments were also beginning to consider the potential benefits of satellite communication. Québec went furthest with this interest. In 1965, as part of a cultural agreement between Canada and France, Québec had expressed its desire to strengthen its ties with France through cultural, educational and scientific exchanges. One of the projects considered was the Symphonie program, a cooperative agreement to build a satellite which would link France and Québec through French-language programming.

This initiative caused quite a stir within the Federal

Government and was instrumental in forcing a quick conclusion to the debate concerning jurisdiction over satellite communications. Central to this debate was the issue of jurisdiction over telecommunications in general, which was increasingly a source of conflict between the federal and provincial governments (Schultz and Alexandroff 1985, 63-101; Woodrow et al. 1980). The matter was a delicate one, in which the Federal Government had to assure the provinces of continued input, while asserting its ultimate authority over the proposed satellite system. Hon. member David Lewis asserted that the Federal Government should have exclusive jurisdiction in telecommunications, although he allowed that "in practice, part of the exercise of that jurisdiction may be delegated to the provinces within their own exclusive field." (House of Commons Debates, 1969, 4983). Hon. Heath Macquarrie was more forceful, arguing that in "no uncertain terms" satellite communication falls under the jurisdiction of the Federal Government (House of Commons Debates 1969, 5291).

In terms of the more specific issue of Québec's initiative with France, the Federal Government's position was clear: no agreement of the sort could exist between France and Québec (House of Commons Debates 1969, 6281). According to the Honourable Mitchell Sharp, then Secretary of State for External Affairs: "the Canadian government has adopted, in the matter of space communications, a very active policy consistent with its exclusive responsibilities for telecommunications

and with the interests of the country including those of Québec and of French Canadians throughout the land" (House of Commons Debates 1969, 4982).

Once federal jurisdiction over satellites had been established, the provinces were primarily concerned with rights of access to the system and the guarantee that provincial jurisdiction over cultural and educational matters be preserved (House of commons Debates 1969, 7491-7512; 7527-7540). The Federal Government assured the provinces that the proposed satellite system would benefit all Canadians and guaranteed the existing provincial jurisdictions over culture and education.

IV) Private Sector Interest in Satellite Communication

While the Federal Government was engaged in studies, reports, structural reorganization, and intergovernmental negotiations, industrial interests had begun to look at the possibility of satellite communications from their own practical perspectives. In 1966 Niagara Television, Ltd. and the Power Corporation put an application before the Board of Broadcast Governors (the BBG, the regulatory agency responsible for broadcasting at that time) to enable them to develop a domestic satellite system for a third national television network (Drury 1968, 38). In March 1967, the BBG held a one-day hearing to consider applications to use communications satellites in broadcasting. Since it didn't have the author-

ity to deny or approve these applications, however, the proposal was put on hold until further study.[4]

The broadcasters' proposal, augmented by the sense of urgency outlined in the Chapman Report, shocked the Trans Canada Telephone System (TCTS) and Canadian National/Canadian Pacific Telecommunications into creating a consortium of carriers which responded with a proposal of its own. In September 1967, the RCA Victor Company of Montreal issued a separate proposal which included definitive design criteria for a communications satellite that Canadian industry would be capable of constructing. In January 1968, Northern Electric Company announced that it had agreed with Canadair Ltd. of Montreal and Hughes Aircraft of California to form a group for those interested in the design and construction of satellite equipment.[5]

V) Federal Government Response

The growing interest of the private sector was an important motivating factor for a Federal Government decision on the proposed satellite system. In July of 1967, the Government directed the Science Secretariat to create a Task Force.[6] Its mandate was to study and advise on the question of satellite communications in the Canadian context. In the background were the Federal Government concerns over sovereignty, national unity and industrial strategy outlined in the Science Council and Chapman Reports. Provincial concerns

relating to access, as well as the preservation of jurisdiction over culture and education were also part of the interplay of issues. In addition, growing private industry interest was an important factor in considerations relating to the ownership of the proposed system.

The Federal Government's essential concern was to find the best means of achieving its industrial strategy goals while drawing on the expertise and financial resources of the private interests. The Report of the Task Force and the subsequent 1968 Government White Paper creating Telesat a year later justified federal ownership and control. No mention is made of any role for the provincial governments (Woodrow et al., 1980, 31).

The White Paper on a Domestic Satellite System for Canada was published in 1968 (under the jurisdiction of C.M. Drury, then Ministry of Industry). The White Paper reiterates the national unity and sovereignty arguments used in the Science Council and Chapman Reports to justify the Federal Government's establishment of a domestic satellite system. It is obvious, however, that the fulfilment of industrial strategy goals is the central mandate of the proposed system. The White Paper also insists that federal government ownership and control are essential to ensuring that these goals are met.

Through the White Paper the Federal Government promotes satellite communications as being ideally suited to the Canadian context and concludes that "a domestic satellite

system is of vital importance for the growth, prosperity and unity of Canada, and should be established as a matter of priority" (Drury 1968, 8). The report observes that growing demands for communications services indicates inadequacies in the present system and that a domestic satellite communications system is" the only means to provide the 'jump' in the capacity needed to ensure the rapid expansion in the services now contemplated" (Drury 1968, 10).

The White Paper also argues that satellites could encourage Canadian unity and Northern development. Satellites would supply economically both French and English programming to areas receiving only unilingual services. A domestic communications satellite system would also "open up" the North and other remote areas through the provision of telephone and television. The lack of live TV in the North was an issue raised often by interest groups, and a major topic of Parliamentary debate. Satellites' potential to resolve this problem became the program's major selling point (House of Commons Debates 1969, 7491-7512).[7]

High quality communications would encourage northern development by reducing workers' sense of isolation in these areas. This would help attract personnel to government and industrial projects in remote areas. Operations which would benefit included mining and industrial interests, as well as government departments such as Search and Rescue, Defense, Emergency, and Scientific operations (Drury 1968, 34).

Through the White Paper the Federal Government also promotes the advantages of a domestic satellite program for Canadian industry. But it is up to Canadians to decide whether to merely use space technology developed by others, or to be "a leader" in its development (Drury 1968, 50). According to the White Paper, Canadian industry had already proven itself fully capable of designing and constructing a satellite system. In order for the benefits to be maximized for Canadians, however, the operation would have to be a national undertaking, with the specification, design and construction remaining in Canadian hands (Drury 1968, 50). (It was deemed acceptable for components or sub-systems to be bought from other countries "when the volume might not justify Canadian development or production".)

Canadian control of the program would provide a number of benefits. First, it would build on Canadian industrial and technological competence by giving Canada "essential experience" in the rapidly evolving field of space technology. The experience gained by Canadian firms would improve their chances of participating in international programs, and there was a potential for export of special types of space stations which would be developed for the Canadian context. Second, skills acquired would be transferred to the development of other high technology products. This would have a "spin off" effect, ultimately benefiting many different Canadian industries (Drury 1968, 51-52). Finally, the development of

such a program would offset the growing problem of Canadian scientific "brain drain" to the U.S. The White Paper asserts

> "National identification is intimately associated with technological progress. The power of programmes such as this to attract and hold scientists, engineers and others, and to cause them to identify their own aims with those of Canada, cannot be ignored" (Drury 1968, 52).

The White Paper injected a sense of urgency into the public debate to encourage a speedy passing of the Telesat Canada Act. It argued that the potential advantages of satellites for Canada depended on rapid action by Canadian government and industry. First, there was a possibility that the U.S. would appropriate all the desirable slots in the geostationary orbit. It was therefore important that the Canadian Government make haste in coming to an agreement with the ITU to reserve "parking spaces" for its satellites. In addition, the benefits to industry would diminish the longer the program was delayed:

> ...insofar as the possibility of Canadian industrial participation in developing and producing satellite communication equipment is concerned, it will be apparent that the real advantage lies in being amongst the leaders in the field. Conversely, as foreign competition develops, the prospect for later entry into the market diminishes rapidly with time (Drury 1968, 36).

The Chapman and Science Council Reports and the White Paper can be assessed as three stages of an increasingly sophisticated argument. All three reports promote the development of a satellite communications system in Canada, and argue the same benefits to justify its implementation.

In the rhetoric, national unity, identity and the redistribution of communication resources are central. It becomes obvious, however, that the presumed economic benefit of the system as part of an industrial strategy is the primary justification to encourage government expenditure.

The "experts" involved in preparing the reports were drawn from the scientific communities both within government and from private industry. In terms of future employment, both groups had a stake in the development of the system.

The project also appealed to many politicians by combining the "glamour" of space technology with the high political visibility of "mega projects" which allow "political actors and their private sector partners to experience a visible success" (Doern and Phidd 1983, 105).

A "substantial need" for satellites was never clearly established, however, nor was it certain that they were the most economical means of providing communications services. Charles Dalfen (1969) points out that although the Chapman Report conducted extensive studies on the costs of the system, the costs and process of tying the terrestrial and satellite links together, and the possible benefits that could be attained through the use of satellites, there was no cost-benefit analysis comparing the relative advantages of satellite over microwave technology (Dalfen 1969, 185-186).[8]

Rather than grapple with the uncertain economics of the system, the Government promoted its benefits to Canadian unity

and sovereignty. One of its central arguments was that satellites could strengthen Canadian sovereignty in the North by ensuring the promotion of Canadian "ideologies". The idea was not new. In 1957, the Commissioner to the Yukon suggested that he would not be surprised "if the operators of the Soviet radio service looked upon our Northland as an interesting battleground of Soviet and American ideologies through the medium of radio, while Canadian viewpoints are totally absent" (Royal Commission on Broadcasting 1957, 297). According to the Commission, the promotion of "Canadian" ideology depended in part on the extension of Canadian radio services to the North. Soon the CBC was under pressure from mining communities to provide television as well.

Between 1965 and 1966, the CBC had studied the feasibility of a TV "Frontier Coverage Package" for northern remote communities. This package was designed to be a temporary, pre-satellite TV system which would make use of inexpensive video technology. Live programming was taped, then sent to "eligible" communities for rebroadcasting several months later. Eligibility for the service depended on the communities' needs, its population, existing broadcast services, isolation, the importance of the community as an industrial centre and the relative cost of providing "live" service. Native language programming was not included, nor were relevant northern subjects given any particular importance. According to Roth:

> the CBC (as spokesman), with the backing of the Departments of Indian and Northern Affairs, Transportation and Mines and Resources, responded to the articulated demands for television from only those community institutions which conformed to Northern Development priorities consistent with federal interests. Access to FCP service, therefore, parallelled economic, administrative and transportation developments in the North and reinforced the federal government's need to assure sovereignty over Canadian territory which had always been low on the services priority scale" (Roth 1983, 37).

The first communications services provided by satellites tended to follow this precedent set by the Frontier Coverage Package. Although Communications Minister Eric Kierans told the House of Commons that satellite services amounted to a "northern vision for the 1970's" in which "Eskimos and Indians" would for the first time feel part of Canadian unity (House of Commons Debates 1969, 7492, 7510), the native people themselves were not consulted. And although members had discussed the necessity of "input" from the northern communities early in the debates concerning the establishment of Telesat (House of Commons Standing Commission 1969, No. 17), discussions continued to reflect federal economic development policies and ignored indigenous priorities.

VI) Telecommission

If not consulted native peoples were not silent regarding the implementation of satellite services. When plans for a domestic satellite system became public in 1969, both natives and social scientists expressed concern as to the potential impact of the new technology on indigenous cultures. The

first formal discussions were organized by government initiatives. In the fall of 1970, a Northern Communications Conference, jointly organized by the Departments of Communications and Indian Affairs, was held in Yellowknife to focus attention on the relevance of communications to northern needs. In 1971, the report of a Telecommission into Communications in the North was published with recommendations on northern communications priorities (Canada Department of Communication, 1971). These priorities conformed only in part to those previously established by the Federal Government. At the top of the list was a call for improved intra-regional telephone and teletype service, with efficient telephone contact considered absolutely essential. Radio was also considered to be an essential means of mass communication, and participation by the indigenous population was encouraged. Live television service with programming "suited to northern needs" was sixth on the list of priorities (Kenney 1971, 51-54).

In the fall of 1971, two volumes of a Task Force study on communications entitled Communications Study: Man in the North Project was published by the Arctic Institute of North America as part of several studies on northern community development. The first volume calls for a reformulation of satellite policy to better meet the needs of the people it was intended to serve. Author and Coordinator G.I. Kenny points out that a rebalancing of priorities and expenditures would

be required in order to ensure appropriate technologies and services:

> The priorities of spending vast amounts of money to bring live TV to certain northern locations must be balanced against expenditures that would attain socially valid goals in terms of communications as desired by the people -- for example, satellite channels in conjunction with community radio stations, regional and local programming for radio and TV, community video tape projects, improved telephone communications, educational television, etc.... it is extremely important that the use of the system in the underdeveloped North be significant in social terms" (Kenny 1971, II-3).

Kenney elaborates on the details of a mixed system which would use a special channel on the Anik satellite and which would establish regional and local radio and TV stations using satellites as a medium to link the network. Estimated costs for the project were one million dollars for the TV production centre and two hundred thousand dollars for each of the four radio centres. This was substantially less than Anik's estimated ninety million dollar costs!(Kenny 1971, II:32-9).

The Telecommission and Task Force conferences were among the first forums where it was recognized that alternative uses of the system could be more appropriate to northern and remote populations. Even so, the discussion centred not on whether the satellite system was necessary, but rather on the uses to which it would be put and its impact on indigenous cultures.

The Telecommission's recommendations were not implemented, and it is evident that the social agenda of serving northern populations was not central to the decision-making. By the time the report was submitted, the Federal Government

had already planned the Anik program and the contractors had been chosen.

Ground stations capable of receiving TV only would cost $150,000.00 compared to the one to two million dollars estimated costs for ground stations capable of carrying radio, television and telephone traffic, which also met Telesat's standards. Less expensive ground stations could have been developed, but these did not meet Telesat's standards.

Cost economics meant that most of the smaller remote communities were provided with relatively less expensive TV receive-only ground stations. Ironically, these were the communities most in need of two-way telephone systems (Roth 1983, 47).

The remote communities' indigenous population did not represent a powerful lobby at the time (Roth 1983, 37). The Telecommission Study and the Man in the North Communication project did, however, mark the beginning of the rise of Inuit lobbies which became increasingly sophisticated and powerful in their demands for telecommunications technology "appropriate to their needs". In addition, the projects made apparent a set of issues which would have to be seriously considered by federal communications planners in their future communications projects in the north (Roth 1983, 63).

VII) The Creation of Telesat Canada: Issues and Interests

The 1968 White Paper embodied two major policy decisions

with regards to a Canadian domestic satellite system. The first was that Canada's increasing communications needs should be met through the use of satellites, the second was that the system should be Canadian owned and operated. Concerning these two decisions, there was little controversy. In contrast to the U.S., where the debate concerning a domestic satellite system was still ongoing, in Canada "the politics of consensus - and a good deal of apathy - reigned supreme among the main political parties, the major special interest groups, and the provincial governments" (Dalfen 1969, 183-184).[9]

Although there was a general consensus concerning the system's goals, the issue of ownership aroused a good deal of controversy. The terrestrial carriers argued that they should finance, own and operate the system as part of "a multi purpose domestic communications system" (House of Commons Debates 1969, 9838). The carriers based their proposal on the fact that they had expertise in the field of communications. They were confident that they could support possible losses incurred during the early years, as well as uneconomical services (such as links to the north), through cross- subsidation from other parts of the system.

The Federal Government was unwilling to give complete control of the system to the carriers. Once again, the rhetoric of national unity and sovereignty was used to justify federal government ownership and control. Communications

Minister Eric Kierans argued that the carriers would not be particularly concerned with the development of northern communications, which had been a primary goal of the proposed satellite system (House of Commons Standing Committee 1969, 2049). (As we saw earlier, these goals were not foremost for the governments either.)

More importantly, the carriers were unlikely to be dedicated to developing satellite technology which could potentially make land-line technology obsolete. Thus, the primary purpose for establishing a domestic satellite system, that is, the development of Canada's high tech industries, would be stymied.

In addition, the Federal Government was concerned about gaining greater control over national communications. If the satellite system became part of the TCTS, some provinces would gain partial control through their ownership in telephone companies. The Federal Government was determined that it should manage this new aspect of Canadian telecommunications. According to the White Paper: "The relationship between domestic communication satellites and the national interest is of vital and unique importance. This must be made unmistakably clear" (Drury 1968, 56).

The Government argued that its aims in establishing a domestic satellite communications system would best be achieved through involvement in the ownership and management of the organization. It used several arguments to justify

this contention.

International negotiations for the use of launching services, radio frequencies and orbital positions were matters of foreign policy which fell under federal jurisdiction (Drury 1968, 58).

Involvement in the new corporation would also enable the Government to promote the extension of national television to the north, and French services throughout Canada, as well as to encourage scientific research and development. In addition, the Government argued that it had already made substantial investments in the development of space technology through its early programs. Involvement in the new corporation would mean that taxpayers could benefit from the profits made by an operational system.

The advantages of competition were another justification for federal government control. According to the White Paper, the introduction of domestic satellites represented an aspect of a communications revolution which would encourage further development of long distance technology. The availability of competitive means of long distance transmission would benefit the telephone companies and the broadcasters, as well as their customers. A separate corporation would encourage competition between manufacturing subsidiaries of the telephone companies and manufacturers independent of the carriers (Drury 1968, 46).

A separate body would also facilitate cost analysis and

would help pinpoint services that required subsidies.

At that point it was next to impossible to unpack the complicated system of costs and cross-subsidies which had evolved in terrestrial communications. (This became a major regulatory issue in the 1970's.)[10] The Federal Government wanted to ensure that it remain aware of future proceeds or losses resulting from satellite services.

The Government concluded that the public interest would be served best if it maintained a say in the company's operations. This could be achieved through a combination of ownership and regulation.

The Government was not prepared, however, to make the new organization a wholly-owned Crown corporation.[11] Although it was never explicitly stated, there were indications that the Government was unwilling to become the sole financier of the system (House of Commons Standing Committee 1969, 2128). It was aware of the risks that a satellite system entailed. One problem was that system malfunction would necessitate replacement rather than repair. Underutilization of the service would result in major financial losses or significant rate increases. Given their interest, expertise and capital, the carriers would make excellent partners and would ensure that the Government need assume "only a portion of the cost". The Government also wanted to encourage participation of the private carriers in order to gain capital "from as many sources as possible" (House of Commons Standing Committee

1969, 2150).

Mindful of these considerations, the Government proposed a tripartite structure in which shares of the orporation would be distributed between the Government, the carriers and the general public in roughly equal proportions.[4]

Broadcasting interests were not represented in the ownership structure of Telesat. This is especially interesting, since the greatest potential for satellites lies in the point-to-multipoint (broadcast) and multipoint-to-multipoint (network) services. Point-to-point services were already well provided by the landline carriers. Satellites would certainly augment the service by reaching remote communities, but could not hope to be competitive with the established landline technologies (since the most financially lucrative routes originate in and run between major centres).

The fact that broadcasting interests were not represented in Telesat's ownership structure says much about the power that the common carriers wielded with the government at the time - power that was based on the carriers' ability to financially support Telesat in its early years. The carriers played an all-or-nothing game in their negotiations with the government, and ensured their control by restricting Telesat's leasing capabilities. This did much to ensure that Telesat would not pose a competitive threat to the common carriers during its first decade of operations.

VIII)The TCTS Power Play

When it became apparent that they would not have control of the entire system, the carriers suggested that they should own the ground terminals. This proposal was rejected on the grounds that it would complicate the planning and operation of the system. The Federal Government supported a corporate form under which,

> the satellites and earth stations together would form a single system under the control of a single management. this would provide the operational and technical control which is essential to facilitate the progressive incorporation of new technology, and so fulfil the minimum conditions for financial success (Drury 1968, 46).

The carriers countered by a proposal that would limit Telesat's leasing capabilities. They reasoned that if Telesat could lease to all potential users, the TCTS would be supporting a competitor. Thus, only the approved common carriers, the CBC and federal or provincial agencies should have access to it. Others wanting to use the system should lease from the TCTS.

In its promotion of the new technology, the Government had given numerous assurances that satellites would compliment, rather than compete with, the existing terrestrial system. Communications Minister Eric Kierans had insisted that "Except in the instances of the CBC and of certain possible purchasers of a complete, undivided television channel on a sustaining basis, the sole customers of the corporation will be the common carriers" (House of Commons Debates 1969,

7496). The TCTS interpreted Kierans to mean that besides themselves, Telesat could only lease to the CBC and other government agencies. Now they wanted this to be part of the legislation. If the proposal was not approved, the carriers threatened to withdraw entirely (House of Commons Standing Committee 1969, 1737-1744).

Kierans argued that the amendment did not "accept the spirit" of his statement. He had only meant that satellite service was particularly suited to long distance transmission of volume traffic. Backed into a corner, Kierans held a private meeting with the carriers. He proposed that as part of contractual agreements, the carriers should stipulate that Telesat could only sell to customers requiring a complete TV channel on a sustaining basis (House of Commons Standing Committee 1969, 2050). The carriers agreed. The Telesat Canada Act received Royal Assent on June 27, 1969 (Telesat Canada Act 1969, c.51).

IX) Summary

A number of factors helped to promote the development of a Canadian satellite system. Originally impelled by military rivalry, the "space race" of the early 60's lent an air of glamour to satellite technology. Growing international involvement in space also indicated a potential market for space-related high-tech products.

A second factor involved the growing significance of

science itself within Canadian economic policy. The 1963 Glassco Commission was the first public proposal that scientific research and technical skills be transferred from Government to private industry where they could be applied for commercial purposes. The Glassco Commission also recommended a "rationalization" of science policy machinery within Government. The creation of the Science Secretariat (1964) and the Science Council (1966) established a structure of support for science and space initiatives. These agencies provided new players for the task of promoting the development of a Canadian domestic satellite system.

A third factor was a growing belief in the importance of communications as a basis of Canada's social and economic infrastructure. The creation of new government bodies such as the CRTC (1968) and the DOC (1968) was part of a federal initiative to gain greater control over Canadian communications through regulation and through the promotion of new communications technologies.

Several themes of influence can be seen in government policy with regards to the development of satellite communications in Canada. Issues of national identity, unity and integration were paramount in the rhetoric. Government reports and documents such as the Chapman and Science Council Reports and the 1968 White Paper promote satellites as encouraging national identity and unity. Satellites would provide an economical means to supply both French and English

programming to areas receiving only unilingual services. In addition, satellites could help to transmit "Canadian ideology" to the North. Satellites could also reduce a sense of isolation by providing telephone and television services to remote areas. This could help attract personnel to government and industrial projects.

A critical reading of these government commissioned documents indicates, however, that satellites were primarily justified as part of the Government's industrial strategy. The White Paper argues that a domestic satellite system built and serviced by Canadian industry would increase Canada's expertise in the high tech fields. This would help make Canadian industry competitive internationally and bolster Canada's economy at home.

The issues of regional diversity and regional sensitivities were largely ignored. Although the provinces were assured that the system would benefit all Canadians, and that provincial jurisdiction over culture and education would be preserved, the White Paper makes no mention of any role for provincial governments in ownership or direction of the satellite system.

The governments' decision to maintain control over the system through ownership and regulation had much to do with increasing federal/provincial power struggles over jurisdiction in telecommunications. If the satellite system became part of the TCTS, some provinces would gain partial control

through their ownership in telephone companies. The Federal Government was determined to manage this new aspect of Canadian communications.

Regional sensitivities were also ignored with respect to service offerings and programming content. These were decided in Ottawa, with little consideration given to the specific needs or wants of special populations. Recommendations regarding appropriate technologies and services submitted by the Telecommission on Communications in the North were not implemented. Early programming tended to be in English, which much of the indigenous population could not understand. It is obvious that the social agenda was not a primary factor in the decision making that established Telesat.

In the early "identification" and "definition" phases of the policy process, the issue of economics of the satellite system was generally avoided. As the project came closer to implementation, however, economic efficiency became a paramount concern. Although it was never explicitly discussed, the general consensus was that government could not support the system alone. Private industry was embraced as a source of funding and technical expertise.

The decision to establish Telesat as a public/private corporation left a number of issues unresolved. Like other "mixed" corporations, Telesat would have to balance public and private industry mandates such as efficiency, stability, redistribution and various other social goals. Problematical-

ly, the new corporation was also in a potentially competitive position with its owners! Because the common carriers were a major source of funding, they had a great deal of bargaining power when it came to Telesat's leasing capabilities. The contractual agreement with the carriers that Telesat lease only full channels on a sustaining basis seemed an equitable compromise which would fulfil the various requirements of the Government and the common carriers. Unfortunately, this policy significantly hindered Telesat's marketing potential during its first decade of operations.

1. For an excellent analysis of the structural changes resulting from the attempt to "rationalize" science policy up to the early '70's, see G. Bruce Doern, Science & Politics in Canada (Montreal: McGill-Queen's University Press, 1972).

2. For a fuller account of the background and activities of the Bureau, see G.V. Tunnoch, "The Bureau of Government Organization: Improvement by Order-in-Council, Sommittee, and Anomaly", Canadian Public Administration 4 (December 1965): 558-68.

3. Doern points out that these duties are "strikingly similar" to the NRC's original mandate. He argues that although the NRC's statutory role was formally changed after the creation of the Science Council, the informal resolution of the advisory roles of the two organizations remained unclear (Doern 1972, 13). Another problematic aspect of the new science machinery, was the relationship between the Science Secretariat and the Science Council. As it was originally established, the Science Council did not have a full-time chairman, nor any permanent staff. Instead, the Science Secretariat served as staff support for the Council. There were two problems with this structure. First, since the Science Council made recommendations to the Government, which then handed them to the Secretariat for analysis, the Secretariat was placed in the awkward position of having to evaluate recommendations that some of its own members had formulated. Second, the Council's mandate to stimulate public debate conflicted with the Secretariat's role as confidential advisor to the Cabinet. In the fall of 1968, the two were redefined as totally separate entities, and the Science Council became a crown corporation on April 1, 1969 (Doern 1972, 84).

4. At the time, the Department of Transport had jurisdiction over federally regulated communications services.

5. The events leading to the establishment of this group are interesting. In 1967, the Department of Transport commissioned a report on the financial viability of a commercial Canadian satellite system. The report was prepared by Northern Electric and Hughes Aircraft, two companies with an obvious interest in promoting such a system. They affirmed that under certain conditions, a commercial system could work. The report was not released to the public however - possibly because the Government itself was uncertain about aspects of the economics of the system. this reticence to issue a public

statement resulted in demands from the opposition that the government "come clean" with cost figures and was an issue during discussions concerning the actual creation of Telesat (House of Commons Standing Committee 1969, 1604-1605).

6. Doern argues that the need for a Task Force was never clearly established. As a result of its creation, both the Privy Council Committee on Scientific and Industrial Research and the Technical Advisory Panel were left dormand. According to Doern, this reflected a continuing inability on the part of the Government to get "implementative" machinery operations (Doern 1972, 80). The Task Force project group was subsequently transferred to the DOC.

7. Dalfen points out that it became "politically rewarding" to promote the availability of telephone and television to all Canadians everywhere. Progressive Conservative M.P. Heath Macquarrie once cut short a lengthy oration by Communications Minister Eric Kierans on this point with: "I, too, love the North, the mighty Mackenzie, and bilingualism, and on that we will say amen" (quoted in Dalfen 1969, 187-188).

8. In fact, when it became obvious to the carriers that they would not be the sole owners of the system, they reversed their support of the White Paper's assertions. They argued that the need for satellites was marginal, and that as a result, Telesat would not be profitable in its early years. Losses resulting from under use would have to be born by Telesat's investors (House of Commons Standing Committee 1969, 1677, 1879, 1912).

9. Dalfen argues that the support for Telesat amongst several interest groups may have been based on their hopes for important roles in the satellite system (Dalfen 1969, 185, Note 15).

10. See CRTC Telecom Decision 81-13, 1981.

11. There was substantial debate on this point, both during the Standing Committee discussions and the House of Commons Debates. Some members considered it a "sell out" of the public interest to allow private industry participation. They argued that only a Crown Corporation would ensure that profits would be distributed to the public, rather than to the private sector. Others argued that since the telcos had offered to develop the system themselves, they should be allowed to take the financial risks (House of Commons Debates 1969, 7527, 9838-40; House of Commons Standing Committee 1969, 1514, 2042).

12. The "tripartite" ownership structure never evolved. The initial distribution of shares took place in 1971. The Federal Government and carriers each owned approximately 50% of the shares while the corporation's president, David Golden, held the final decisive share. Public shares have never been distributed.

CHAPTER FOUR

Introduction

This chapter is a case analysis of the Telesat-TCTS Agreement, and includes events leading up to the Agreement, the debate concerning what constituted the public interest in this case, and the divergent conclusions of the two government bodies responsible for communications - the DOC and the CRTC.

The first part of the chapter addresses the intergovernmental conflicts resulting from the Federal Government's attempt to play an expanded role in the planning and direction of Canadian telecommunications in the 1970's. The two government's differing assessments of what constituted the public interest are elaborated. The chapter then reviews the Hermes and the Remote Manipulator System (RMS) projects as indications of the Government's policy of support for high tech industry development. The second half of the chapter examines Telesat's first decade of operations, notably the problems encountered in attempting to reconcile social and commercial objectives. The debate and subsequent varying of the CRTC decision to disallow Telesat's proposed membership in the Trans Canada Telephone System can be seen as an example of how the public interest was interpreted by two government bodies responsible for communications in starkly divergent ways. This conflict over the public interest, the chapter argues, is really the consequence of contradictory goals laid

out for satellite communications in Canada in the preceding decade by the Federal Government.

I) Federal-Provincial Conflict Over Telecommunications

The 1970's marked a decade of intense intergovernmental conflict over the control of telecommunications in Canada. Several factors helped to precipitate this conflict. The 1960's brought a period of dramatic technological and economic changes within the telecommunications sector. The entry of new services such as satellites and cable eroded the traditional monopolistic boundaries and called into question system cross-subsidization. The convergence of computers and communications were a second factor which brought telecommunications to the forefront of industry and government interest. These two forces resulted in a re-evaluation of traditional telecommunications principles and marked a dramatic shift in Canadian public policy, particularly at the federal level, towards the telecommunications sector.

Richard Schultz contends that prior to 1968, the telecommunications sector had been virtually ignored, but that after this period it was given a governmental "embrace" (Schultz and Alexandroff 1985, 88). There were two key aspects to this embrace. The first was a recognition of telecommunications as a vital element of the social and economic infrastructure, the second was the concern that if telecommunications were so important, its undirected development could leave the Canadian

economy open to undue influence from external forces (especially from the U.S.) (Schultz and Alexandroff 1985, 88).

The Federal Government was determined, therefore, that it should have greater control over the planning and direction of the industry. The creation of the Department of Communications in 1968 with a mandate to "coordinate, promote and recommend national policies and programs" and to "promote the establishment, development and efficiency of communications systems and facilities for Canada" (Canada Statutes 1970, 55) was one of the first indications of an expanded federal government role in the communications sector. Richard Schultz contends that a clear indication of the Government's intention to plan the telecommunications system and to use regulation as its primary instrument was evident in the first minister of communication's address to the House of Commons:

> The purpose of planning will not be regulation for regulation's sake but regulation, where and when needed, for the public good. We intend to evolve a national communications plan and a national communications policy to integrate and rationalize all systems of communications... (Schultz and Alexandroff 1985, 89-90).

Despite these indications of an expanded federal government role in telecommunications, it wasn't until 1973 that inter-governmental conflicts became public, following the release of a Federal Government position paper entitled Proposals for a Communications Policy for Canada (Canada Department of Communications 1973). The position paper indicated that communications policy in the future would be

formulated to serve primarily cultural and national unity objectives. According to the paper, the objectives of such a policy should be to:

- safeguard, enrich and strengthen the cultural, social and economic fabric of Canada;
- contribute to the flow and exchange of regional and cultural information;
- reflect Canadian identity and the diversity of Canadian cultural and social values;
- contribute to the development of national unity;
- facilitate the orderly development of telecommunications in Canada, and the provision of efficient and economical systems and services at just and reasonable rates (Canada Department of Communications 1973, 3).

Simultaneously, the Federal Government suggested it might favour the introduction of competition in some areas of telecommunications (Schultz and Alexandroff 1985, 91). To add fuel to the fire, the Green Paper pointed out that there had hitherto been no "coordinating authority" to ensure the expression of the public interest, in a national sense, in the orderly development of telephone systems in Canada (Canada Department of Communications 1973, 7-8).

The suggestion of a significantly expanded set of federally imposed objectives for telecommunications as well as the potential for competition which could call into question the traditional cross-subsidy system sparked a great deal of provincial opposition. At the first Federal-Provincial Conference on Communications in November of 1973, the Provincial Governments presented a joint opposition to the

federal initiatives (Woodrow et al. 1980, 32).

In 1975, the provinces submitted a Joint Provincial Statement that explicitly opposed the federal position and offered an "interprovincial alternative" to centralized federal control (Woodrow et al. 1980, 32-33). While the Federal Government saw telecommunications as a means to promote unity and sovereignty through centralized nation-wide regulation, the provinces pressed for a more decentralized approach which would remain sensitive to regional differences. That these were completely divergent interpretations of what best served the public interest was evident in the discussions that followed.

The provinces argued that communications policy should fall under their jurisdiction since they were responsible for the social, cultural and educational spheres (Schultz and Alexandroff 1985, 92). They contended that telecommunications services presently regulated by the provinces should remain under their jurisdiction, and that those regulated by the Federal Government - namely Bell Canada and B.C. Tel - should henceforth fall under Quebec's, Ontario's and B.C.'s jurisdictions. Not surprisingly, the Federal Government refused these changes, arguing that this "would effectively remove the Federal Government from a substantial role in telecommunications (Schultz and Alexandroff 1985, 92).

Intergovernmental negotiations effectively ended with a standoff at the July 1976 conference (Schultz and Alexandroff

1985, 92; Woodrow 1980, 33). The conflict did not end, however, but there was a shift in focus away from the Federal Government and towards its regulatory agency, the Canadian Radio-television and Telecommunications Commission (CRTC). The CRTC had surfaced as a new actor in 1975 when jurisdiction over telecommunications was transferred to it from the Canadian Transport Commission. In 1976, in a statement on procedures and practices, it elaborated a much expanded role for the Commission. An example of this expanded role is evident in its interpretation of "just and reasonable".

> As our society has evolved, the idea of what is just and reasonable has also changed, and now takes into account many considerations that would have been thought irrelevant 70 years ago, when regulatory review was first instituted. Indeed, the Commission views this principle in the widest possible terms and considers itself obliged to continually review the level and structure of carrier rates to ensure that telecommunications services are fully responsive to the public interest (CRTC Annual Reports 1976, 3).

Schultz argues that this indicated a shift from a limited, proscriptive and firm-specific "policy" approach to an expanded, prescriptive and industry or system-oriented "planning" approach (Schultz and Alexandroff 1985, 95).

Subsequently, provincial concern was transferred from the Federal Government, which was becoming less fervent in its attempts to gain control over Canadian telecommunications, to the CRTC, which appeared ready to "pick up the torch". The provinces now had to contend not only with the threat of federal dominance in the industry, but with an independent

federal regulatory agency as potentially the primary policy maker and interpreter of what constituted the "public interest" (Schultz and Alexandroff 1985, 99).

II) Government Support of the High Tech Space Industries

During the 1970's, federal government activities involving satellites took three main directions.[1] Through its ownership in Telesat Canada, the Government was involved in meeting what it considered to be "essential needs" for Canadian telecommunications. Through the DOC, the Government also maintained its involvement in developing space technology for longer term needs. The Communications Technology Satellite (CTS), better known as Hermes, represented the DOC's first venture into space communications. Through the NRC the Government continued to support space science projects in universities and government labs. In the 1970's, the NRC's major project was the Remote Manipulator System or "Canadarm" which was built in cooperation with NASA as part of its space shuttle project. Both the DOC and NRC experiments also provided a focus for government funding which helped support and encourage Canada's fledgling space industries. A major federal government goal during this period was to establish a Canadian "prime contractor" with the technical expertise to build Telesat's future satellites.

III) The Hermes Project[2]

Hermes was a cooperative project carried out by Canada's Department of Communications (DOC) and the U.S. National Aeronautics and Space Administration (NASA) between 1970 and 1980. Canada built and operated the space craft, while the U.S. was responsible for building the high-power tube for the satellite transponder, as well as launching and services. Both nations shared experimental time on the satellite.

The project's explicit goals were to advance communication satellite technology through the development of a satellite system which would operate at a higher power and frequencies than existing systems (Hartz and Paghis 1982, 110). Established technology (including Telesat's) operated in the 64 GHz band. The orbital positions for this frequency were becoming rapidly filled, and the potential for interference necessitated large and costly earth stations located a good distance from heavily populated areas. Hermes was designed to operate in the then vacant 14/12 GHz band. Experiments carried out on the satellite were meant to test the potential economic, political and social impact of new services such as two-way telemedicine, tele-education, direct broadcasting and special community services (Hartz and Paghis 1982, 108-110).

A less explicit, but important Canadian objective for the project was the promotion of Canada's fledgling space industry. Contracts for various subsystems were awarded to a

number of Canadian companies. Spar Aerospace supplied the spacecraft structure and mechanical subsystems while RCA Ltd. of Montréal provided electrical subsystems as well as antennas and earth stations. SED Systems Ltd. of Saskatoon built three large earth stations and developed computer software for the launch. A number of other Canadian companies were involved in various ways (Hartz and Paghis 1982, 111).

In addition to nurturing private industry expertise, it was proposed that the project would benefit Telesat Canada through the development of technology that would meet future Canadian requirements (Canada Department of Communications 1980, 16-17).

The financial burden undertaken by the Government was significant. The original projected estimates were for $60 million in construction costs, with an additional $50 million for operating expenses (Don Sellar "Canada's $100 Million Camble" Ottawa Citizen 17 Oct. 1974 p.90). Real costs exceeded those estimated (Hartz and Paghis 1982, 111). Despite this costly promotion of private industry however, the DOC remained the prime contractor and maintained overall control. Industry was not prepared to take the high financial risks involved in developing the new technology (Hartz and Paghis 1982, 109).

IV) The Remote Manipulator System

In 1969, the U.S. invited Canada to participate in its

Space Shuttle program. This led to a cooperative agreement between the NRC and NASA to develop a Remote Manipulator System (RMS) - a remotely controlled "arm" which would be attached to the shuttle and which could perform various functions in space. The NRC was responsible for having the design, development, testing and evaluation of the "Canadarm" carried out in industry. NASA was to coordinate its integration with the shuttle. An essential element of Canada's participation would be the development of a prime contractor which could not only fulfil the research and development responsibilities for the RMS, but which could also construct Telesat's satellites and distribution links.

The total contract for the RMS was $76 million. Spar Aerospace was awarded prime contractor status, with RCA Canada, CAE Electronics, and Dilworth, Secord, Meagher and Associates acting as subcontractors (Fry and Killing 1983, 16-17). The project is interesting from the perspective of the private sector. Spar had initiated discussions with NASA in order to "fill the void" after the CTS was completed. It wasn't easy to convince the Canadian Government to support an American project. But NASA would only award the contract to a Canadian firm if Canada supplied the development funds. Although SPAR found a "project champion" in the NRC, a long process of reports and presentations was necessary to convince the Government of the project's potential. RCA and Toronto consultants were brought in for "political and technical"

reasons. According to Clarke: "it took two years and we probably spent $500,000 before Mme Sauvé announced in 1974 that the government would support the U.S. shuttle program" (quoted in Fry and Killing 1983, 17).

Despite the success of the RMS, it wasn't until 1979 that the Canadian Government finally awarded prime contractor status to Spar for Telesat's future generations of satellites.

V) Telesat Canada: The First Decade

During the debate concerning the establishment of Telesat, the Federal Government promoted satellite communications as an answer to key Canadian problems of unity, industrial development and northern expansion. But the Telesat Canada Act left a number of issues unresolved.

Telesat was expected to promote national unity and identity, encourage industrial development and northern expansion and at the same time, to operate as a profit-making corporation. Problematically, there was no indication of which goals should be given priority. For instance, section 5 (2) of the Act states that

> The company shall utilize, to the extent practicable and consistent with its commercial nature, Canadian research, design and industrial personnel, technology and facilities in research and development connected with its satellite telecommunication systems and in the design and construction of the systems.

At what point would the use of Canadian research, design and personnel no longer be consistent with the commercial nature

of the corporation? At what point would the extension of services to the north be considered too expensive to make them practicable? How could Telesat be commercially viable if it was not permitted to compete with terrestrial services on some of the more profitable routes? And how was the corporation to be assessed - in terms of profitability, or the achievement of its public policy goals?

The involvement of the telephone companies as part owners was also problematic. Obviously the common carriers had a vested interest in using terrestrial technology. Another problem was the inevitable cross-alliance faced by particular directors. When representing Telesat, a carrier-elected director would want to charge high rates, but as the head of a telephone company, would want to pay little for Telesat's services. In addition, although the common carriers were to be part owners and major users of the system, Telesat was to be treated independently in terms of policy and regulation.

The legislation also failed to address the potential effect on broadcasting that the introduction of satellite services could produce. Broadcasting entities were not involved as owners of the new system. Telesat's full-channel leasing policy also made it extremely difficult for private broadcasters to afford satellite services. This was ironic in view of the fact that one of the justifications for promoting satellites was that Canadian <u>programming</u> - that is, broadcasting - could eventually reach all Canadians.

These were issues that remained unresolved when Telesat began operations in 1969. The following section looks at Telesat's first decade in order to assess the extent to which these issues affected the commercial and public policy objectives of the new corporation.

The Early 70's

In August of 1969, Department of Industry Deputy Minister David Golden was appointed as Telesat's first Director and President. By the end of September, all of Telesat's eleven directors had been appointed and most of the Satellite Project Office staff had been transferred from the DOC to the new company. The initial distribution of shares took place in 1971. Only 6 million and one of the proposed 10 million shares were distributed, however. The government and carriers owned approximately 50% each, while the corporation's president David Golden held the final decisive share: public shares were never distributed. Anik 'A', Telesat's first satellite, was launched in November of 1972 and the corporation commenced full commercial services early the following year (Doern and Tupper 1981, 228).

Economic Difficulties

The conflicts and contradictions embedded in Telesat's mandate affected the Corporation's operations almost from the beginning. A major problem during the 70's was the under-

utilization of satellite capacity. One reason for this was that during contract bids, the cheapest "package" was for three satellites with twelve radio frequency (r.f.) channels instead of two satellites with six r.f. channels. As result, supply considerably exceeded demand (Doern and Tupper 1981, 228, 236-238).

An even more important reason for underutilization was Telesat's policy of leasing only full channels, rather than allowing channel sharing as was the practice in the U.S. During the 70's, RCA was the only customer from the private sector to lease a full channel. Telesat's other customers were Bell, CNCP, members of the TCTS who rented as a consortium, and CBC which was funded by the Government (Telesat Canada Annual Reports 1970-1979).

The telephone companies had several reasons for not using satellites. The common carriers were regulated according to their investment in landline facilities, and allowed to earn the going rate of return (10-12%) on these investments. When they leased channels from Telesat, they were only allowed to recover the cost of the lease. Thus, as William Melody points out, "It is in their economic interests to use satellites only for services that cannot be served at all by landline technology and only under conditions where there can be no economic threat to the landline carriers" (Melody 1977, 264).

Underutilization drove prices up. A comparative Federal-Provincial Task Force Study on the use of satellites for

educations services found Telesat's rates to be twice as high as those in the U.S. Even so, Telesat had difficulty making a profit. During the 70's, government support of more than $100 million (through indirect subsidies such as advances, low-cost loans, federally arranged lines of credit, prepayments, or service agreements) was required to keep Telesat in operation (Telesat Annual Reports 1970-1980).

Industrial Development

In addition to its difficulties operating as a profit-making enterprise, Telesat had problems achieving its industrial and technological development mandates. The use of Canadian industry in satellite construction and design is a case in point. By 1969, two Canadian companies had the technical capability to construct Telesat's first satellites, and were eager to procure the contract. The first, RCA Limited of Montréal had been the prime contractor for Alouette 2 and for ISIS 1 and 2 (Hartz and Paghis 1982, 68-70). The Northern Electric Company Ltd. (a Bell Canada Subsidiary) was also interested in obtaining the Telesat contract. Its expertise in the field of telecommunications made it a prime candidate for the job. In 1967 it had collaborated with Hughes Aircraft on a confidential study for the Department of Transport outlining the financial and design criterion for a Canadian satellite system. It held a leading position among Canadian manufacturers of telecommunications and electronic

equipment. It had conducted developmental work on an experimental earth station and Hughes had recently awarded it a subcontract for a subsystem on Intelsat IV (Drury 1968, 38-40).

In 1968, RCA responded to a Department of Industry confidential study with an estimate of $55 million for two satellites. In January of 1969, the Northern Electric Company announced that it had formed a consortium with two U.S. firms - Hughes Aircraft Co. and Canadair (a subsidiary of General Dynamics Corporation) to offer communications satellite equipment. Its bid consisted of three satellites for $43.5 million. Then, in the summer of 1970, Hughes Aircraft Company of California came forward with an unsolicited bid of $30 million for three totally "off the shelf" communication satellites. RCA of Canada initially dropped its bid to $42 million, then unexpectedly, withdrew entirely. Executives from the parent company in New York had decided that the venture was too risky. According to a former RCA executive: "The credibility of the Canadian company was absolutely destroyed when New York made us withdraw that offer. We were seen by the government as a puppet, without any real decision-making power...We are no longer the chosen instrument of the Canadian government in its space policy" (quoted in Fry and Killing 1983, 12). Although both RCA of Canada and Northern Electric obtained sub-contracts for the system, Telesat ultimately purchased its first generation of satellites (three

12 radio frequency channel satellites) from Hughes Aircraft Co. for $31 million on September of 1970 (Fry and Killing 1983, 11-12).

The Hughes contract posed problems for the fulfilment of Telesat's mandate to utilize Canadian industry in the research, design and construction of its system (Telesat Canada Act 1971, 5 (2)). The original bid provided only 12% Canadian content. Although the final agreement upped Canadian participation to 20% (primarily through subcontracts to Spar Aerospace and Northern Electric), the remained far below RCA's promise of 65% Canadian content (Doern and Tupper 1981, 237).

A number of factors help to explain why Hughes was chosen over RCA or Northern Electric, and indicate some of the economic, political and technological pressures influencing Telesat's decision. Price was an obvious factor. Both the Minister of Finance and the Minister of Communications supported the lower Hughes bid on this basis (Doern and Tupper 1981, 237).

Concern over the possibility of system failure was also extremely important. There were disagreements as to what constituted adequate redundancy, however. The implication of the final agreement was that "about half of the capacity on the space segment of the domestic satellite system would be surplus during the five year period" (Doern and Tupper 1981, 238). This decision obviously exacerbated Telesat's problems of system underutilization.

Time was a third factor which influenced the decision. In its 1968 study on a domestic communications satellite system, the Department of Industry noted that delays could result in the loss of position in the launch schedule, and could decrease reliability (Drury 1968, 36). Since the three Hughes satellites were almost totally "off the shelf", they were more quickly available and the reliability of the contract was considered to be greater.

The percentage of Canadian participation increased in contracts for later generations of satellites. Canadian content was approximately 30% for the Anik B's and 40% for the Anik C's (Telesat Annual Reports 1979). In December of 1975, the Federal Government sent letters to the presidents of RCA, Northern Telecom and Spar Aerospace outlining the benefits these companies had received from the space program. It was now up to one of them to step in as prime contractor. RCA refused, but Spar's president Larry Clarke responded with a "qualified yes" - provided that the government could ensure sufficient domestic business to allow Spar to expand in order to compete effectively in international markets (Fry and Killing 1983, 21). Based on the Government's assurances, Spar purchased two sub-divisions of RCA and in 1979 was awarded a $78.6 million contract for the Anik D series of satellites.

The increase in Canadian content and promotion of the space industry was not without cost. As part of its experimentation with higher frequency channels, the DOC specifi-

cally asked Telesat to accept a bid for hybrid satellites for the Anik B series. In compensation for the extra cost, the Government agreed to lease four experimental channels (Fry and Killing 1983, 13). In addition, Telesat received about $28 million from the Federal Government towards Canadian content "premium" costs for the D program (Canada Report of the Task Force on Broadcasting 1986, 594).[3]

Northern Development

One of the primary justifications for creating a domestic satellite system in Canada was that it would "open up" the north and strengthen Canadian sovereignty in areas remote from urban centres. Most of the discussions reflected federal economic development policies and northern mining and business demands for improved communications services for their staff. Indigenous priorities were not initially considered.

The Anik program provided new basic communication services such as live TV, FM radio with regional production centres and telephone facilities for a limited number of communities based on population size. In general, the larger communities were mining towns rather than native villages. Native language and culturally relevant programming was not included.

Economic constraints were a major problem when it came to the kinds of services provided. Ground stations capable of carrying TV, radio and telephone traffic and which would

meet Telesat's standards cost $1 - 2 million. Ground stations capable of receiving TV only cost approximately $150,000. As a result, many isolated communities could receive colour TV, but had only unreliable radio systems for contact with the outside work (Roth 1983, 38).

Experimental projects such as Hermes were explicitly implemented to test the economic, political and social impact of such communication services as two-way telemedicine, tele-education, direct broadcast services and special community services (Hartz and Paghis, 1982, 110). The main objective of these programs, however, was not to develop services for northern and remote communities (until it became "economically feasible"), but to promote Canada's space industry and to test new technologies for international markets. According to Roth:

> From the perspective of the seventies, therefore, Northern communication policy had evolved on an ad hoc, or rather post hoc, basis in response to a technological policy determined to make Canada internationally competitive in the aerospace industry. Early Northern communication policy was synonymous with technological extension policy until 1974 when the indigenous population of the North reorganized themselves into lobby groups and resolved to make an uncompromising effort to transform the structure of Northern communications to assure regional and cultural promotion (Roth 1983, 15-16).

While the Anik program did improve phone and radio service in the north, there was no funding for relevant television programming. Follow up studies have tended to confirm the worst fears of natives and academics concerning

the social impact of southern programming on northern populations. Social scientists describe the identity conflicts which resulted when young natives were exposed to opposing sets of values, expectations and cultural information, and argued that this was contributing to the breakdown of northern native communities.[4]

Native groups at the time that Telesat was established did not represent a significant lobby. Since then the Inuit Tapirisat and Northern Québec Inuit Association have become increasingly powerful and have worked persistently to change federal government communication priorities in the North. Through interventions in CRTC license applications, negotiations with the CBC and other legal and political channels, the Inuit have lobbied to ensure that the communication services offered are more consistent with their own priorities. This has resulted in the input of new, but increasingly powerful actors into the interplay of influences in Canadian telecommunications policy.

Telesat's Contradictory Mandates

Telesat's mandates, like other mixed enterprises, required fulfilling the corporate goals of stability and profitability as well as meeting government cultural and social objectives. Government exacerbated the circumstance by failing to provide a clear hierarchy of goals for the new corporation - justifying its existence as a means to achieving

sovereignty and national identity objectives, but expecting it to support an industrial strategy and still make a profit. The limits of market knowledge were also important - a domestic satellite system was a risky and highly capital intensive undertaking, and few could predict future markets or directions. Of all its difficulties, however, Telesat's corporate structure was most problematic. Its potentially competitive position with its industry owners resulted in a hobbling leasing policy which almost inevitably ensured its failure as a profit-making entity.

VI) The Telesat-TCTS Agreement

Telesat's early years of operation were justifiably described as "thin".[5] Underutilization had kept returns low and by 1976, the company faced the prospect of having to plan its next generation of satellites. At this point that telephone companies again made a bid to gain control of space communications. The previous year, TCTS had approached Telesat with the proposal of an arrangement by which Telesat would become a member of the consortium. Discussions between the two organizations led to a draft Agreement, submitted to the Cabinet for approval in November 1976. The Cabinet accepted the Agreement, subject to several considerations:

- Telesat would continue to have economic viability without the need for public support;
- Telesat would be equal in all respects with other members of the TCTS;

- independent access to Telesat would be available, especially for experimental and government programs;

- CNCP and other non-TCTS telecommunication companies could play a role in definition planning for satellites;

- the Agreement would not inhibit (either through rate structure or administrative measures) non-TCTS members from using Telesat's services;

- the Agreement would not jeopardize the exclusivity of Federal legislative and regulatory authority over satellite communications.[6]

The Government's acceptance was given without prejudice to the role of the CRTC. On January 17, 1977, the Agreement was submitted to the Commission for approval. Subject to its acceptance, the Agreement would become effective January 1st, 1977.

Terms of the Agreement

The Connecting Agreement first reaffirmed the basic TCTS arrangement whereby a Board of Management would be responsible for establishing terms and conditions of services to be offered, the rates to be charged, and the apportionment of revenues accruing from TCTS business. Each member had one representative on the Board of Management and decisions required unanimity. A Memorandum attached to the Connecting Agreement elaborated Telesat's specific membership rights and responsibilities. Telesat was guaranteed the rights of full membership in the TCTS, including representation and equal voting power on the Board of Management. In addition to voting rights, the Memorandum included an arrangement whereby

voting rights, the Memorandum included an arrangement whereby Telesat would receive a guaranteed rate of return of 6%, 7%, 8% and 9% for the years 1977-1980 respectively. Finally, by assuring Telesat's ability to procure its proposed Anik C series (which would operate in the 14/12 GHz band), the Agreement provided for an extension of Telesat's system.

In return for these rights and guarantees, Telesat agreed to a number of conditions. The proposed Anik C system was to be compatible with economic and performance requirements established by the TCTS. Members of the consortium would designate the location of earth stations and had first option to purchase them should Telesat decide to sell them. Members also had first option on the design, ownership and operation of support facilities and services for earth stations in their territories.

The Agreement also placed a number of restrictions on Telesat's operating activities. Telesat could provide consulting services, or satellite and earth station facilities for experimental or specialized services not related to TCTS business. Apart from these services, it was not to own or operate ground facilities within TCTS member's territories. Only TCTS members could lease complete radio frequency channels from Telesat, and only these carriers could market services based on portions of channels. Rates for channels were to be approved by the CRTC, however, and could not be higher for non-TCTS carriers than for members.

The CRTC's Jurisdiction

The basis of the CRTC's jurisdiction with respect to the TCTS case was section 320(11) of the Railway Act which states that:

> All contracts, agreements and arrangements between the company and any other company...or corporation having authority to construct or operate a telegraph or telephone system or line...are subject to the approval of the Commission, and shall be submitted to and approved by the Commission before such contract, agreement or arrangement has any force or effect.

Under these terms, the Commission's jurisdiction was limited to approving or withholding approval of the agreement.

Section 320 (11) declined to specify criteria upon which the decision should be made. The Commission decided, therefore, that the Agreement should be judged according to whether or not it was in the public interest. In terms of scope, it was concluded that the "complexity and far reaching nature" of the proposal necessitated viewing the public interest in a "broad sense" (CRTC Telecom Decision 1977, 276).

Public interest considerations were divided into two main categories. The first involved those issues relating to the Commission's statutory obligation under the Railway Act: 1) to ensure that rates be just and reasonable (Section 321(1), and 2) to determine that no unjust discrimination or undue preference be made (Section 321(2)). The second category contained more general public policy considerations. These included the potential effect of the Agreement on the power and autonomy of Telesat, on the availability and extension of

satellite services in Canada, and on competition between telecommunications services. Although the Commission was prepared to base its decision on the first category of regulatory considerations alone, it acknowledged that the more general issues of public policy were also taken into consideration (CRTC Telecom Decision 1977, 285).

Arguments Against the Agreement

Interveners argued that the Agreement was not in the public interest for a number of reasons. The first involved its potential to interfere with the CRTC's regulatory powers. Several interveners, notably CNCP, CCTA, and the Director argued that because the Agreement guaranteed Telesat specific rates of return this would interfere with the CRTC's ability to decide whether Telesat's rates were just and reasonable. The merger would make it difficult to ascertain whether Telesat's management was ignoring lower cost alternatives. Finally, because the Agreement would lessen the potential for competition, the CRTC would have difficulty comparing space vs. terrestrial communications rates (CRTC Telecom Decision 1977, 278).

By limiting Telesat's customers to TCTS members (except for experimental and consulting services) the Agreement effectively made Telesat a "carrier's carrier". Rates charged to the public for satellite services would be filed by TCTS members with their various regulatory agencies. As the

Commission pointed out: "No single agency could therefore fully review the principles underlying these rates, their related costs or their overall effects" (CRTC Telecom Decision 1977, 279). This would also tend to "dilute" the CRTC's regulatory powers with respect to space telecommunications.

TCTS pricing policies were also considered to be problematic. The TCTS system had traditionally involved a great deal of "cross subsidization", where parts of the network subsidized less lucrative aspects. If Telesat became part of this system, it would be very difficult for any regulatory agency to identify satellite vs. terrestrial costs and economics. It would be next to impossible to ensure that the public would receive the full benefits of satellite technology (CRTC Telecom Decision 1977, 280).

With respect to section 321 (2), which disallows unjust discrimination or undue preference,[7] the Commission's concern was that restrictions outlined in the Agreement had the potential to give unfair advantages to TCTS members over non-member carriers. CNCP (the only non-member carrier in competition with the TCTS) argued that this would indeed be the case. In particular, provisions which gave members the right to designate earth stations; to have satellite systems designed to be compatible with TCTS requirements; to have the option to design, own, operate and maintain support facilities; and to have first option to purchase earth stations would constitute unfair advantages. CNCP also argued that

TCTS members would benefit by receiving early notice of new facilities as well as "subtle biases" in network designs (CRTC Telecom Decision 1977, 282).

The Agreement's "revenue sharing plan" was also a point of contention. This involved the provision whereby any excess revenues over Telesat's guaranteed rate of return would be divided between Telesat and TCTS members. CNCP argued that this would effectively result in a rebate to TCTS members. Finally, interveners pointed out that should any discriminatory practices occur, they would be very difficult for regulators to detect (CRTC Telecom Decision 1977, 282).

The Applicants' Defense

In response to the charges that the Agreement would interfere with the CRTC's ability to ensure that rates be just and reasonable, the Applicants insisted that it would neither alter the law nor affect the Commission's authority. Nothing in the Agreement prevented the CRTC from reviewing rates that Telesat charged its customers for satellite services.

The Applicants also denied that the Agreement would give TCTS members unfair advantages. They argued instead that the public would benefit from the joint planning and integration of network facilities. Joint planning would avoid costly duplication of capital resources and facilities, would guarantee a high quality and diversity of services and would encourage innovation in satellite technology (CRTC Telecom

Decision 1977, 283).

The Commissioner's Conclusion

After considering these arguments, the Commission decided that the Agreement would indeed prejudice the process of effective rate regulation. The Agreement would make it difficult to identify costs and economics of satellite services, cause problems for effective intervention in Telesat rate cases, and subsequently, would reduce incentives for efficiency (CRTC Telecom Decision 1977, 284).

The Commission also decided that the Agreement did not provide adequate measures to protect CNCP from unjust discrimination or undue advantage. It agreed with CNCP that the provisions outlined by the Agreement appeared "to raise a substantial likelihood of undue advantage or preference". Nor was the Commission convinced that system integration was necessary to achieve the public benefits outlined by the applicants (CRTC Telecom Decision 1977, 284).

The Commission decided that the restrictions limiting channel leasing to TCTS members gave them undue advantages over non-members. Telesat's policy of leasing only full radio frequency channels had already restricted access to large customers. The provisions in the Agreement further limited access to cable services, shutting out customers such as the CBC, as well as potential ones like the cable consortium or northern pipeline organizations. Importantly, since only TCTS

members could lease full radio frequency channels, only they could market services based on portions of channels. These considerations led the Commission to conclude that the Agreement was contrary to the public interest (CRTC Telecom Decision 1977, 284-285).

General Public Policy Issues

Although the CRTC was prepared to base its decision on the above regulatory considerations alone, it also assessed more general public policy issues. The first pertained to the Agreement's effect on Telesat's corporate autonomy. The Commission concluded that while the Agreement would be legal under the Telesat Canada Act, it was concerned that Telesat's autonomy would be curtained in several important ways. Under the Agreement, decisions made by Telesat's executives concerning system design, costs and performance requirements, as well as terms, conditions and rates for services were subject to veto by TCTS members. This could affect Telesat's autonomy, and could potentially "blunt" government and regulatory authority as well. The Commission concluded that "the erosion of Telesat's decision-making capacity...would not be consistent with the intent of the statute to create an independent autonomous corporation providing satellite services on a commercial basis" (CRTC Telecom Decision 1977, 288).

A second more "general" public policy issue concerned the availability and expansion of satellite services. Applicants

had argued that the Agreement was necessary to achieve the proposed 14/12 GHz system. Advantages of the system included the fact that the frequencies involved would not interfere with existing terrestrial systems. Earth stations could be located closer to major centres, eliminating the need for costly "back haul" transmission facilities. Applicants claimed that this would mean greater versatility and lower costs, and would result in increased use of satellite technology (CRTC Telecom Decision 1977, 288).

Interveners questioned the need for the 14/12 GHz technology. It had not been proven that the 6/4 GHz system had been fully exploited. The real impediments to satellite usage were Telesat's constraints on earth station ownership and full channel leasing policies (CRTC Telecom Decision 1977, 288-89).

Broadcasting interests were especially concerned as to the effect of the Agreement on the Broadcast industry. In essence, the Agreement would give the carriers monopoly control over satellite services which could provide a cheaper alternative to national and regional transmission (CRTC Telecom Decision 1977, 289).

The Inuit Tapirisat argued that the Agreement would reinforce policies and practices which would hinder the extension of services to the North. In addition, the proposed 14/12 GHz technology, though well suited to the northern regions was planned to be introduced only in the south (CRTC

Telecom Decision 1977, 289-90).

In face of these arguments, the Commission concluded that Telesat's corporate success depended on the kinds of services it offered. The 6/4 GHz system, by now fully integrated with the terrestrial network, would continue to be offered with or without the Agreement. As to whether the 14/12 GHz technology was necessary, the CRTC was not qualified to say. The Commission was not convinced, however, that the Agreement was crucial to the implementation of the new system (CRTC Telecom Decision 1977, 290).

The final policy issue addressed by the Commission concerned the impact of the Agreement on competition within the telecommunications industry. Interveners argued that the Agreement would effectively merge space and terrestrial technologies into a monopoly, which they claimed would be contrary to the public interest. Non-TCTS members (eg. cable TV companies) would not only lose the possibility to choose between Telesat and terrestrial carriers, but would be forced to discuss service plans with potential competitors. In its Final Argument, Ontario had contended that

> If the Agreement as it stands is approved... a major step will in effect have been taken towards a single integrated monopoly system and that a defacto and irrevocable change in the structure of the industry will have taken place (CRTC Telecom Decision 1977, 20,22).

The Applicants countered that so far, satellite technology had not been competitive with terrestrial services. The only non-TCTS company to use Telesat had been the CBC. This

was due to the high cost of channel rental, a condition which would be partially alleviated by the Agreement. The Agreement would also increase Telesat's competitive position by guaranteeing the implementation of the 14/12 GHz system (CRTC Telecom Decision 1977, 291).

The Commission conceded that Telesat had not thus far been competitive "in the sense of offering an alternative service between the same points that could be obtained at a price as good as or better than that offered by the other carriers" (CRTC Telecom Decision 1977, 291). In assessing Telesat's competitive potential, however, the CRTC made a distinction between traffic generated by TCTS monopoly services, and non-TCTS traffic. With regards to telephone traffic, it was unlikely that Telesat would become competitive. In the case of non-TCTS services such as data, video and point to multi-point transmissions over long distances, however, Telesat's competitive potential was considerably greater. The Commission thus concluded that the Agreement could potentially and unjustifiably restrict competition within the telecommunications industry. Based on these considerations and conclusions, the CRTC decided that the Agreement was contrary to the public interest, and did not approve it (CRTC Telecom Decision 1977, 291-92.)

Government Reaction

Government reaction to the CRTC decision was swift and

decisive. The Commission's decision was overturned by an Order-in-Council (P.C. 1977-3152) and the Agreement accepted. Anticipating questions concerning the CRTC's autonomy, Communications Minister Jeanne Sauvé argued that "The range of factors affecting these policy issues is far wider than that which the CRTC could reasonably have expected to consider. Many of these issues lie well beyond the purview of the Commission" (Department of Communications 1977, 2). In defense of the Agreement itself, Sauvé argues that Telesat's membership in the TCTS was in keeping with its original mandate:

> The complementary role for Telesat was recognized in the early statements of the Minister of Communications who presented the Telesat Act to Parliament in 1969. The statutory structure of the corporation provides for major equity interest by the existing telecommunications companies and for their membership on the Board of Directors. Obviously, this ownership structure would never have been implemented if free competition were envisaged. The membership of Telesat Canada on the Board of Management of the Trans-Canada Telephone System is a further evolution of this principle" (Sauvé 1977, 15).

Conveniently overlooked in the Minister's statement is the fact that Telesat's originators had opposed telephone company ownership of earth stations and had only agreed to semi-exclusive leasing privileges when the carriers threatened to boycott the system entirely (Standing Committee on Broadcasting 1969). The Agreement effectively gave TCTS members control over earth stations by allowing them to become sole operators. It also further cemented Telesat's position

as a "carrier's carrier" with authority to lease only to TCTS members.

The Minister essentially defines the issue as being one of competition vs. monopoly. She acknowledges that the public interest could be served by "an element of competition in the provision of certain business telecommunications facilities and services that clearly fall outside the family of monopoly telephone services" (Sauvé 1977, 16) - an acceptance of CNCP's position in the industry. But Canadians cannot "afford the luxury" of three or four competitive telecommunications carriers.

While Sauvé expounds the advantages of satellites for the Canadian public, an important basis of the Government's decision is made apparent only later in her address. According to Sauvé, the financial support of the TCTs was considered essential for the procurement of the Anik C system - a "critical component" in sustaining and developing the Canadian space industry.[8] Government policies to advance industrial and technological competence in Canada depended on Telesat's viability as an enterprise. In no uncertain words, Sauvé states: "The Government was not prepared to jeopardize the accomplishment to date and the related skilled employment by leaving the Canadian satellite carrier, Telesat, to the vicissitudes of the competitive domestic environment which some suggested" (Sauvé 1977, 17). Instead, the Government saw the Agreement as a means to further integrate Telesat into the

existing institutional framework and to thereby promote the use of space technology. The Agreement was therefore accepted, and Telesat became a member of the Trans Canada Telephone System, with all the rights and constraints outlined in the original terms of the Agreement.

In overturning the CRTC's decision against the Agreement, Communications Minister Jeanne Sauvé claimed that the DOC decision was based on a "wider range of factors" than those within the Commission's purview. This thesis contends that the divergent decisions of the two government bodies are the consequence of contradictory goals laid out for satellite communications in Canada in the preceding decade by the Federal Government. The final chapter will provide an analysis of the ways in which these contradictory goals, complicated by the various objectives of different government and industry interests, exacerbated the problems faced by Telesat Canada during its first decade of operations and affected the development of satellite policy in Canada.

NOTES

1. Government involvement in the SARSAT program coordinated by the Department of Defense; the three Remote Sensing Satellite programs (LANDSAT, SURSAT and SEASAT); and the meteorological satellite programs is beyond the scope of this thesis. For a description of these activities, see Canada Department of Communications, The Canadian Space Program: Five Year Plan (Ottawa: Supply & Services Canada, 1980).

2. Background information for this section comes from Hartz and Paghis 1982, 110-170; and Royal Society of Canada, Vol.3.

3. The Government also spent $15 million to upgrade the David Florida Laboratory as a test facility (Canadian Space Program; 5 Year Plan 1980, 7).

4. See for instance Rosemarie Kuptana, "Neutron Bomb Television" Arctic Policy Review, 12, (1983).

5. David A. Golden, "President's Message" Telesat Annual Report (1979). Golden agrued that these "shortcomings" did not reflect insufficient demand or an inability to meet demands, but rather were a result of "the extreme difficulty experienced by the social, political, regulatory, and institutional establishments in keeping pace with the dramatic advance and the potential of a mushrooming technology.

6. Letter from the Minister of Communications to David A. Golden, President of Telesat Canada, Nov. 23, 1976. Reprinted in CRTC Telecom. Decision 77-10 (1977), 271.

7. See Chapter 1 for a discussion of why some discrimination or preference is sometimes considered to be in the public interest.

8. It was estimated that the Anik C system would provide $75 million in work for the Canadian space industry over 3 or 4 years.

CONCLUSION

Development of public policy for satellite communications in Canada between 1960 and 1980 was a process complicated by a number of interacting and often conflicting ideas, interests and institutions.

Ideas in conflict regarding the role of communications technologies played a major part in the identification and definition phases of the process. The "space race" of the early 60's did much to lend an air of glamour to space technology. At the same time, communications of all kinds were being re-assessed as integral aspects of nations' social and economic infrastructures. Some analysts argued that a nation's economic health depended on "keeping up" with the rapid changes in computer and information technology.

Canadians traditionally had seen communications, along with transportation, as essential means to unifying an enormous country scarcely peopled by citizens of different ethnic and linguistic backgrounds. Many were thus ideologically prepared to accept the argument that satellite technology could help ensure Canada's sovereignty. Since satellites were distance and terrain "insensitive", they could provide telephone and television to northern and "remote" populations. Satellites could also provide French and English CBC programming to areas receiving only unilingual services.

Although sovereignty issues were highlighted in the rhetoric, this analysis provides evidence that the Canadian Government considered the development of satellite technology to be even more important as an integral aspect of its industrial strategy. Canada already had one of the best communications systems in the world. If new communications technologies were going to be increasingly important (especially for export purposes), it seemed obvious to build on that expertise.

The thesis also shows that the goals of some interests outweighed those of others during the early planning stages. The requests of mining companies and government research groups for telephone and television service in outlying areas were considered a serious justification for the development of a domestic system. In contrast, although government proponents of satellites cited better services to Canada's native communities as a primary concern, these constituencies were not consulted as to which services they considered to be appropriate to their real needs.

Intragovernmental institutional reorganization was also an important element of the early stages of satellite policy. The recursive relationship between ideas and institutions is particularly evident during this period. Based on the belief that science, space and communications were becoming increasingly important, the Canadian Government focused on "rationalizing" its institutions involved in these areas. This

included not only the reorganization of responsibilities of existing agencies, but the establishment of new agencies as well.

In many cases, the "rationalization" program resulted in redundant responsibilities and overlapping jurisdictions which caused problems as time went on. The relationship between the CRTC and the DOC is a prime example. Although the DOC was ostensibly responsible for policy development, its typically broad or general statements left much room for interpretation. As a result, the CRTC often ended up making ad hoc policy through its decisions as regulator. When these decisions contradicted the DOC's vision of communication policy, conflict resulted, as was the case in Telesat's bid to join the TCTS in 1977.

The formation of new agencies and departments specifically involved in science, space and communications issues (such as the Science Secretariat, the Science Council, the DOC and the CRTC) meant that more attention and support was given to the development of these industries. Government reorganization initiatives also stressed the participation of private industry, especially the telephone companies. Since they had much of the expertise, these industries were involved to a significant degree in preparing reports promoting a domestic satellite system for Canada. Obviously, they were not disinterested in the outcome.

One of the ideas that satellites challenged was that telecommunications services should be provided on a monopoly basis. A domestic satellite system would be in direct competition with terrestrial lines for long distance service. The telephone companies had an enormous vested interest in terrestrial technology, and therefore in controlling the satellite system.

As the policy process neared the implementation stage, efficiency considerations began to outweigh national sovereignty and identity arguments. The Government considered partnership with the terrestrial carriers an ideal means to achieving its policy objectives. The carriers had significant expertise in the business and could provide much of the capital. Through its participation in the satellite corporation, the Government could redistribute resources to the space industry without having to increase taxes.

This arrangement gave the telephone companies a great deal of bargaining power, however. They had to be convinced that satellite services would complement, rather than compete with, the terrestrial system especially in terms of the lucrative long distance services. In addition to its positive policy goals, Telesat had to ensure that it did not interfere with the economic returns of the carriers. Among the concessions Communications Minister Eric Kierans made to the carriers was that Telesat would lease only full channels on a sustaining basis rather than allowing for channel sharing

between several buyers as was the case in the U.S. The high cost of individual channels meant that few companies could afford them. This led to underutilization, which did much to undermine Telesat's economic success during the 1970's.

The 1970's marked a period of intense intergovernmental conflict over the direction and control of Canadian telecommunications. The Federal Government's approach was characterized by a much expanded role in planning the industry to achieve a number of exogenous objectives. It saw telecommunications as a means to promote unity and national sovereignty through centralized nation-wide policies and regulation. The provinces pressed for a more decentralized approach which would remain sensitive to regional differences. (Of course, they also saw in the existing cross-subsidization system a means of effective redistribution of funds in a disguised form.) Many claimed that they should direct and regulate communications services. These completely different interpretations of what constituted the public interest were not resolved by the end of the decade.

The expanded role of the CRTC, which gained jurisdiction over federally regulated telecommunications carriers in 1975, exacerbated the situation. Although the move was described as "mere housekeeping" neither the Commission nor the provinces viewed it that way. Taking its lead from a Federal Green Paper proposing a new communications policy for Canada, the CRTC applied a significantly broader interpretation of the

terms "just and reasonable" than had its predecessor, the CTC. Just as the Federal Government lessened its attempts to direct Canadian communications, the federal regulatory agency took up the torch. Now the provinces were faced with an independent regulatory commission whose decisions could easily affect the cross-subsidy system.

These issues came to a head over Telesat's application to join the TCTS. Although the Federal Government did have control over Canada's initiatives in space, its primary instrument, Telesat Canada, had failed to live up to its promoters' expectations.

The difficulties Telesat encountered attempting to fulfil its mandates were due to a number of factors. Like other mixed enterprises, it was required to fulfil corporate goals of stability and profitability as well as meet Federal Government cultural and social objectives.

For its part, the Government initially set out potentially contradictory goals and then failed to provide a clear hierarchy for their fulfilment by the new corporation. Telesat's existence was justified as a means to achieving sovereignty and national unity objectives, but the research suggests that the Federal Government's overriding goal for the corporation was that it support an industrial strategy to encourage the development of the high-tech industries. Government funded projects such as Hermes and the Remote Manipulator System were a means to promote the development of

expertise in the space industries and helped support Canada's fledgling space industry, particularly the government's chosen prime contractor, Spar Aerospace.

The Hermes project was justified as a means to meeting Canada's future needs for telecommunications services, and Telesat was considered to be the ideal choice for the "practical" implementation of the 14/12 GHz system (conveniently overlooked was the underutilization of Telesat's 6/4 GHz services).

In addition to these goals, Telesat was to operate as a profit-making enterprise. The limits of market knowledge were important factors with regards to this goal - a domestic satellite system was a risky and highly capital intensive undertaking, and few could predict future markets or directions.

Of all its difficulties, however, Telesat's corporate structure was the most problematic. The Federal Government needed private industry funding and chose to include the common carriers as part owners. This meant that Telesat was in a potentially competitive position with its industry owners for the provision of telecommunication services. Despite assurances from the government that satellites would complement, rather than compete with the terrestrial system, the carriers wanted more concrete insurance. Leasing policies were therefore developed as part of contractual agreements whereby Telesat could lease only full channels on a sustaining

basis. The high cost of these channels resulted in the underutilization of satellite services.

By the mid 70's, Telesat's viability was becoming increasingly strained. Idealistic assumptions about Telesat's profit-making potential had ceased to materialize. Under-utilization of channels drove prices up, and government support of more than $100 million was required to keep the corporation in operation. As a result, the Government had increasing difficulty justifying its expenditure of public funds on new projects such as the development of 14/12 GHz services - especially since Telesat's 6/4 GHz technology had not been fully exploited.

Nor was Telesat fulfilling its industrial development mandates. A prime example was the use of Canadian industry in satellite construction and design. Although two Canadian companies (RCA and Northern Electric) had the technical capability to construct Telesat's first satellites, because of cost and time constraints, the contract was awarded to Hughes Aircraft Company of California. Although the "Canadian content" increased with later generations of satellites, it wasn't until 1979 that Spar Aerospace was awarded prime contractor status for the Anik D series of satellites.

Telesat also had difficulty fulfilling the northern development and Canadian unity goals which were among the Federal Government's primary justifications for developing domestic satellite services. Analysis reveals, however, that

these objectives were not central to the Federal Government's concerns. Government documents such as the 1968 White Paper and Science Council Reports, reflected federal economic development policies and northern mining and business demands for improved communications for their staff. Indigenous populations were not initially consulted. A Telecommission on Communications in the North was submitted in 1971, outlining a vastly different vision of appropriate communications services for Canada's native and remote communities. The Anik program had already been planned by the DOC, however, and the Telecommission's recommendations were not implemented.

Cost limitations meant that the Anik program could provide new basic communications services (such as live T.V., FM radio with regional production centres and telephone facilities) to only a limited number of communities based on population size. In general, the larger communities were mining towns rather than native villages. Native language and culturally relevant programming was also not included.

To exacerbate financial concerns, by 1976 Telesat faced the prospect of having to plan its next generation of satellites. It was during these uncertain times that the TCTS once again made a bid to control Canada's domestic satellite system.

The Agreement to include Telesat as part of the telephone consortium answered a number of problems for Telesat and the Federal Government. A guaranteed rate of return meant that

Telesat would need less funding from the government. It was also hoped that the telephone system would use satellite services more readily, which would partially answer Telesat's problem of underutilization. Corporate profitability and full-channel utilization would encourage the implementation of the 14/12 GHz technology which the government had invested in heavily to promote Canada's fledgling space industry. In addition, the Federal Government hoped that an affiliation with the TCTS would give them more say in the direction of Canada's telecommunications services in general (especially those that were provincially-owned or regulated).

The TCTS saw the Agreement as a means to gain greater control over potentially competitive services. In exchange for voting rights and a guaranteed rate of return, the Agreement placed a number of restrictions on Telesat's operating activities. According to the terms of the Agreement, Telesat could provide consulting services, satellite and earth station facilities only for experimental or specialized services not related to TCTS business. Otherwise, Telesat could not own or operate ground stations within TCTS member's territories, and only TCTS members could lease complete radio frequency channels from Telesat. The terrestrial carriers retained the right to market services based on portions of channels.

The disparity between the decisions of the DOC and the CRTC with regards to the Agreement is instructive. Both

government bodies argued that their decisions were made in the public interest. The CRTC policy mandates, though somewhat general and ill-defined, had been legislated by the government. The Commission's decision that the Agreement was not in the public interest was based on a number of factors. First, the Commission argued that the Agreement would interfere with its regulatory powers. A guaranteed rate of return would make it difficult to ascertain whether Telesat's rates were just and reasonable. Since individual TCTS members would file rates with their various regulatory agencies, no single body could fully review the principles, related costs or effects of these rates. The TCTS system of cross-subsidization would further complicate matters. The merger would also make it difficult to tell whether Telesat's management was investigating lower cost alternatives. In addition, because the Agreement would lower the potential for competition, it would be difficult to compare space vs. terrestrial communication rates.

The Commission also contended that the provisions which gave TCTS members exclusive rights to design, own and operate earth station facilities within their territories constituted an unfair advantage over non-members such as the CNCP. The restrictions limiting full channel leasing to TCTS members also gave them undue advantage over non-members and shut out present and potential customers such as the CBC, and the cable TV consortium.

In assessing more general public policy issues, the Commission argued that the restrictions placed on leasing policies, and design, ownership and operation of earth stations would affect Telesat's autonomy and blunt government and regulatory authority. The Commission concluded that this would not be consistent with the statute to create an independent autonomous corporation providing satellite services on a commercial basis.

The impact of the Agreement on competition within the telecommunications industry was also a major concern. Intervenors from the broadcast and cable industries argued that the Agreement would effectively merge space and terrestrial technologies into a monopoly and that non-TCTS members would not only lose the option to choose between Telesat and the terrestrial carriers, but would be forced to discuss service plans with potential competitors.

According to the Inuit Tapirisat, the Agreement would reinforce policies and practices hindering the extension of services to the north. As a case in point, they noted that the proposed 14/12 GHz system, though well suited to northern regions, was planned to be introduced only in the South. The "opening up of the north" was obviously not a high priority for the DOC by the time the Anik D services were being planned.

Communications minister Sauvé's statement that the decision to accept the Telesat-TCTS agreement was based on a

"wider range of factors" than those within the CRTC's purview is instructive. This thesis argues that the divergent decisions resulted from two different perceptions of what constituted the public interest.

In order to provide a critical analysis, we return to William Melody's three questions:

- What are the perceived benefits of satellites?
- Which services are likely to be offered, when and for what segments of the population?
- Are satellites the best means to provide these services?

The CRTC saw satellites as an alternative to the monopoly services provided by the terrestrial carriers. The Commission saw this competition as providing a number of potential benefits to Canadians. First, competition could do much to control the prices being charged to consumers for various telecommunications services. Competition could also encourage the research and development of newer and potentially more efficient technologies which could benefit Canadians in terms of new service offerings as well as providing export possibilities. Competition could also help to ensure that research funds would be aimed at providing appropriate services for the needs of Canadians.

If the TCTS were to gain greater control over Telesat through the Agreement, many of these benefits could remain unrealized. In addition, it would be very difficult for the CRTC to regulate prices and to ensure that unjust discrimina-

tion did not occur. In essence, the Agreement could do much to undermine the Commission's authority and ability to regulate the telecommunications industry.

Analysis reveals that the Federal Government had different answers to Melody's questions than did the CRTC. This thesis has examined these issues as an interplay of institutional actors, public and private. The efforts of the players to reconcile public interest demands with industrial strategy development has been a key concern. The Federal Government justified the expenditure of public funds on the development of the system by arguing that satellites would promote Canadian unity, provide telecommunication services to underserved areas and bilingual services to areas receiving only one language. While these arguments were rhetoric in part, many politicians had initially a strong belief in the potential of the new technology. At the same time, a review of public documents reveals that the Government primarily perceived investment in satellites as a means to promote and develop Canada's high tech industries.

In assessing which services were likely to be offered, when, and to which segments of the population, it is obvious that the answers evolved over time. The larger mining communities initially benefitted most from the new technology, however, and the service offerings were not always those most needed. The Inuit and native populations were rarely consulted, and have only gradually come to benefit from the

system. Studies and submissions from these groups revealed that satellites were not considered the best means to provide the services most required.

One of the unintended consequences of initially ignoring native groups has been their emergence as potential actors in the area of communications. Their increasing lobbying power has led gradually to a reassessment of appropriate communications and alternative technologies for northern and remote areas.

The policy process is also an important factor in the assessment of the perceived benefits of satellites. At the identification and definition phases of the process, ideas and arguments are more abstract and general than those during implementation. The idealized potential of satellites was increasingly circumscribed by the pressure of various interests, (primarily but not exclusively the landline technologies), and by limited funds. Although it became increasingly apparent that the north would not benefit as much or as soon as had originally been predicted, the Government did not waver in its support of the system. This is another indication that Canadian unity and northern development were not as important as the perceived benefits for Canada's high tech space industries.

In a cutting critique of the Government's policies, William Melody charges that satellites' enormous potential has remained unrealized due to the vested interests of the

terrestrial carriers: "the history of satellites has been a history of wasted technological potential and outrageous economic inefficiency in order to preserve the near monopoly market dominance of the established telecommunications carriers and their landline telecommunications systems" (Melody 1977, 263). Melody sees the TCTS Agreement as another step in the same direction in which satellites will be made "totally subservient" to landline technologies.

Melody's charge that satellites' potential has remained unrealized due to the vested interests of the terrestrial carriers deserves serious consideration. The carriers did not welcome competition to their services. It was obviously in their interest to control the use of satellites, both in order to protect their investment in landline technologies and to gain revenue from the use of satellites. The limited leasing policies the telcos insisted on having implemented was a major factor hampering Telesat's early success.

The crucial factor behind much of the conflict was the original ownership structure of the new corporation. The Government could potentially have owned a greater percentage of Telesat, or allowed a more diverse group of interests to share in the private stock.

At the same time, it is improbable that the Canadian Government could have developed and supported a satellite system without private industry support. The telephone companies were a primary source of funding and expertise. In

addition, they represented satellites' major customers in terms of how the use of the new technology was originally envisioned. This was an important area where limited knowledge played a key role in the policies developed for this new and capital intensive technology.

Since broadcasting entities had been among the first interested in promoting satellites, it is difficult to understand why they were not included as part-owners of the new system. It is possible that the involvement of broadcasters could have radically changed the course of Telesat's early decades of operations.

The very nature of the technology makes satellites better suited to broadcasting. Satellites can provide four basic functions: point-to-point; point-to-multipoint (broadcasting); multipoint to point; and multipoint-to-multipoint (networking). Terrestrial services were arguably meeting Canada's point-to-point telecommunications needs, but only satellites could provide the other services over long distances. Although these other services have been developed and used increasingly over time, satellites were initially implemented as an extension of the point-to-point terrestrial service. This promoted satellites' most redundant function, and potentially hampered the growth of the new technology.

The reasons behind the Government's not involving the broadcasters at the outset should be the subject of further research. An obvious explanation is that it was initially

difficult for many to envision the numerous alternative services that satellites could potentially offer, and it seemed logical to implement the system as an extension of the existing telecommunications network.

Whatever the reasons behind the decision, it gave the terrestrial carriers an enormous vested interest in ensuring the financial feasibility of the enterprise while simultaneously allowing the telcos the power to ensure that the new corporation was not too competitive.

With regards to whether satellites were the best means to provide certain services originally envisioned by their promoters, many factors must be considered. Although satellites are distance and terrain "insensitive", the high cost of the technology meant that they initially were only cost effective for larger communities. The "opening up" of the north proved to be a more complicated and costly endeavour than was originally anticipated. Cost constraints meant service constraints, and many of those who were supposed to benefit from the new technology either did not receive services at all, or did not receive the basic services they really required. Thus developed the strange situation in which Inuit could receive television from the southern urban centres but did not have the technology to communicate among themselves.

As the technology has evolved, however, and as the groups affected have become more politically powerful, alternative

and more appropriate services are being developed. Over time, earth stations have become less expensive, and basic services are reaching the smaller communities. The Inuit now have regular input into regulatory hearings. This new activism is a possibly unintended, but interesting vindication of the public policy claims that were originally only rhetoric!

The use of Canada's domestic satellite system as a part of an industrial strategy to promote the high-tech industries has had a limited success. Canada has developed expertise in many areas of space technology and is now acknowledged as a leader in advanced space robotics. Seventy percent of the $350 million in 1986 industry sales came from the export market. Total industry sales are presently growing at approximately 20% a year (Canadian Space Agency, 1990).

Government funding in 1986 reflected a trend towards greater investment in remote sensing (35.3%) and the space station (37.3%) as compared to communications (9.6%). RADARSAT is expected to generate over $1 billion in industrial and public sector "spin-offs", and the $1.2 billion investment in the Space Station is anticipated to pay back approximately $5 billion in earth and space based revenues (Canadian Space Agency, 1990).

In terms of specific industry success, the Federal Government remains Spar's largest customer, and the award of the RADARSAT and MSAT projects in 1990 to its "chosen instru-

ment" greatly improved SPAR's financial outlook (Spar Aerospace Annual Reports 1986-1990).

After many years of financial strain, Telesat Canada is now more successful as a profit-making enterprise. In 1985, the corporation renegotiated its agreement with Telecom Canada. In return for phasing out its receipt of transfer payments, Telesat was allowed to market a full range of satellite services directly to its customers. It still remains the only carrier authorized to provide national satellite services, but its position in the industry has changed from being essentially a "carrier's carrier" to being a potential competitor to some of its own customers.

It is interesting to note that since 1985, Telesat's sales have grown an average of 35% per year (Telesat Canada Annual Reports 1985-1989). In 1987, approximately 60% of its revenues came from broadcasters, but this ratio is gradually changing due to aggressive targeting of businesses with high telecommunications traffic volume. High speed, long-distance data transmission and remote sensing, as well as integrated services digital network (ISDN) offerings and mobile communications are considered to be the areas of greatest potential growth.

Satellites still face stiff competition from landline technologies, particularly fibre optics, in many of these areas. It seems, however, that the liberalization of leasing policies and aggressive marketing strategies implemented since

Telesat's renegotiations with Telecom Canada, have encouraged growth and enabled Telesat to forge a more stable niche in Canada's telecommunications future.

APPENDIX A

Satellite Communications

A satellite communication system is comprised of a number of components. These can be categorized into (1) the transmission system, and (2) the orbit and spectrum resources.

The transmission of information via satellite works in three stages. Messages (voice, video or data) are converted into electromagnetic signals known as radio waves and sent from an antenna on the ground (earth station) to the satellite. This is called the "uplink". The satellite receives, reamplifies and retransmits the signal in the "space segment". The signal is retransmitted at a different frequency to avoid interference between the incoming weak, and retransmitted strong, signals. The segment from the satellite to earth is called the "downlink".

A satellite is defined as geosynchronous if its period of revolution is equal to the rotation of the earth about its axis (WARC ST, 1971, Final Acts). If a satellite is orbiting over the equator at an altitude of 35,787 km and is moving in the same direction as the earth, it will appear to be stationary with regards to an earth-based antenna. This eliminates the need for costly tracking equipment. The development of the geosynchronous satellite was a major breakthrough in the advance of communication satellite technology.

The capacity of the geosynchronous orbit (the number of

satellites which can be placed in the orbit without interference) depends on a number of factors including the power and frequencies of transmissions both to and from the satellite, and the doverage size of the beams. The size of the earth station is another important factor. As space technology has advanced, the purposes to which satellites are put and the conditions under which they must function have become increasingly varied. Satellite systems are designed to meet these various needs. For instance, the more complex and powerful the satellite is, the less expensive and smaller the earth station may be. This configuration is useful to developing nations where satellite systems often provide a telecommunications infrastructure among widely separated users. It is also the most advantageous for MSS systems, since antennae must be very small in order to be easily transported by trucks or cars. The smaller and less complex the earth station, however, the less able it is to distinguish between incoming radio signals. This means that satellites must be placed further apart in the geostationary orbit, resulting in a "less efficient" use of this resource, (In addition, the more complex satellites tend to be heavier, requiring more powerful and expensive launch vehicles.)

The design of a satellite system also depends on the radio frequencies it will use. Different frequencies have characteristics that make them more or less desirable for various uses and under different conditions. The higher the

frequency, the more information it can carry. This makes higher frequencies well suited to high speed data transmission. The higher energy level requires more complex and expensive equipment however. In addition, at frequencies above 10 GHz, raindrops can cause interference known as "fading".

Developing nations, especially those in tropical regions, argue that the "First World" should use the higher frequencies. This would "free up" the crowded "C band" (6/4 GHz) which requires less expensive equipment and is less affected by rain. Problematically, developed countries tend to have well established hardware manufacturing industries based on the earlier developed, lower frequency bands.

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