CANADA:

NATIONAL PRESENTATION ON TELECOMMUNICATIONS

Canada

Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

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NATIONAL PRESENTATION ON TELECOMMUNICATIONS

PREPARED IN RESPONSE TO AN OUTLINE PROVIDED BY THE OECD

FOR THE OECD COMMITTEE ON INFORMATION, COMPUTER AND COMMUNICATIONS POLICY - SPECIAL SESSION ON THE INTERNATIONAL IMPLICATIONS OF CHANGING MARKET STRUCTURES IN TELECOMMUNICATIONS SERVICES - MEETING AT PARIS, 13 - 15 DECEMBER, 1982.

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1. INTRODUCTION

The structure of both the Canadian telecommunications industry and the associated governmental regulation differ significantly from the situation one finds in other OECD countries. Canada presents a complex mixture of federal and provincial legislation, policies and regulation and, unlike the situation in several European countries where there is a state controlled Post, Telephone and Telegraph (PTT) organization, the Canadian telecommunications carriage industry consists of a mixture of private, governmental and joint private-governmental corporations and organizations. These are generally regulated by a single federal or provincial regulatory agency.

This complex industry and regulatory structure is described in some more detail in the balance of the paper. In particular, section 2 outlines the industry structure and is followed, in section 3, by a description of principal telecommunications services. Section 4 describes the telecommunications regulatory structure and is followed, in section 5, by an outline of major policy developments.

2. CARRIERS

2.1 Carrier Overview

In Canada, there are two national telecommunications systems, namely the TransCanada Telephone System (TCTS) and CNCP Telecommunications (CNCP) which together account for approximately 93% of the $6 billion telecommunications carriage market.

TCTS is an unincorporated association of the largest telephone company operating in each province plus Telesat Canada, the domestic satellite carrier. Thus, the member companies of TCTS are:

British Columbia Telephone Co.
Alberta Government Telephones
Saskatchewan Telecommunications
Manitoba Telephone System
Bell Canada
New Brunswick Telephone Co. Ltd.
Maritime Telegraph and Telephone Co.
Island Telephone Co.
Newfoundland Telephone Co. Ltd.
Telesat Canada

Almost all Canadian telecommunications carriers are majority owned by Canadian investors and/or governments. Each of the principal Prairie telephone companies, i.e. Alberta Government Telephones, Saskatchewan Telecommunications and the Manitoba Telephone System, are owned by their respective provincial governments. All the other members of TCTS, with the exception of Telesat, are privately owned. Bell Canada, which operates in Ontario and Quebec, is the largest member of TCTS, has 58% of the telephones in Canada, is owned by a large number of mainly Canadian shareholders and has significant direct and indirect equity interests in the principal telephone companies in each of the Atlantic provinces- New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland. The British Columbia Telephone Company, the second largest telephone company in the country, with approximately 11% of the telephones, is indirectly owned and controlled by the U.S. based General Telephone and Electronics Corporation. Telesat Canada is jointly owned by the federal government and by the major common carriers.

In addition to the TCTS member companies there are a number of other, generally smaller, telephone companies. The largest of the non-TCTS telephone companies are 'edmonton telephones', the Thunder Bay Telephone System (both municipally owned), Télébec Ltée (a subsidiary of Bell Canada), Québec Téléphone (indirectly owned and controlled by the General Telephone and Electronics Corporation), and NorthwesTel and Terra Nova Telecommunications, both owned by Canadian National Railways (a corporation owned by the federal government).

CNCP Telecommunications is a partnership of the telecommunications divisions of the major Canadian railways, i.e. Canadian National Railways and privately owned Canadian Pacific Ltd.

Finally, in this brief review of major Canadian telecommunications carriers we must note the key role of Teleglobe Canada, a corporation owned by the federal government, which provides facilities, or otherwise arranges for telecommunications services between Canada and overseas points, including the provision of private switched networks and leased circuits. Teleglobe is Canada's representative in the Commonwealth Telecommunications Organization, INTELSAT (the International Telecommunications Satellite Organization) and INMARSAT (the International Maritime Satellite Organization).

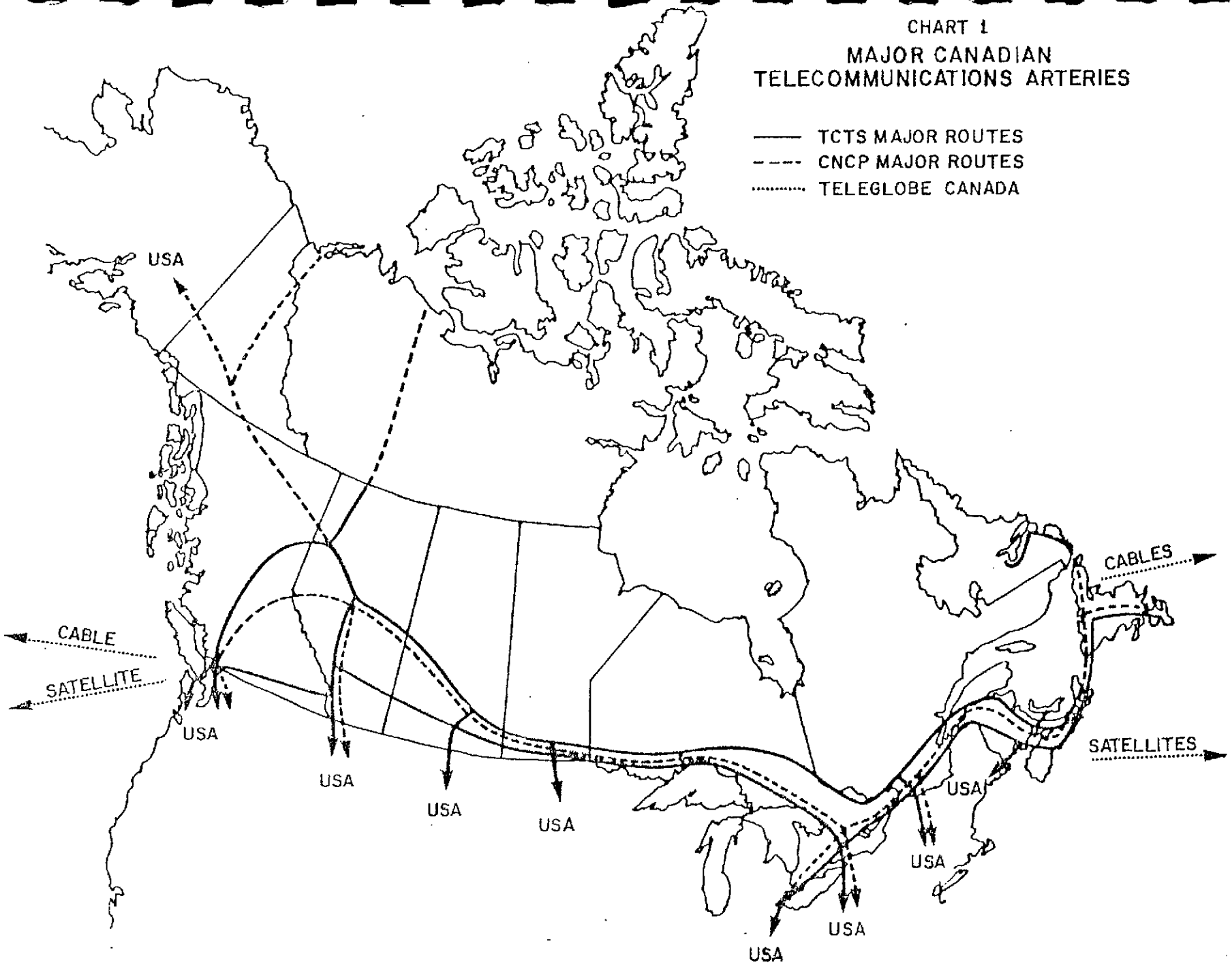
The Canadian telecommunications carriage industry has close links with a strong domestic telecommunications manufacturing and research capability. Thus, Bell Canada owns more than 50% of the telecommunications equipment manufacturer, Northern Telecom Ltd., and, together with Northern Telecom, owns Bell-Northern Research - the largest private industrial R&D organization in Canada. Similarly, B.C. Tel is affiliated with AEL Microtel Ltd. and with Microtel Pacific Research. Although most telecommunications research in Canada is undertaken by the private sector, the federal Department of Communications operates the Communications Research Centre, an internationally renowned centre of telecommunications research excellence, based at Shirleys Bay outside of Ottawa.

2.2 Carrier Facilities and Networks

The members of TCTS provide a range of facilities for the transmission and switching of local and inter-exchange traffic, including two coast-to-coast microwave relay routes. Long distance traffic is also carried on co-axial cable and via Telesat Canada satellites and earth stations. Overseas traffic is carried through the facilities of Teleglobe Canada via its international gateway switches, transoceanic cable or earth stations accessing INTELSAT satellites. CNCP operates its own national microwave relay system and its own switching centres but in general leases local loops from a local telephone company. Furthermore, CNCP has been granted interconnection to the local exchange facilities of Bell Canada and the British Columbia Telephone Co., permitting CNCP customers dial access to certain CNCP competitive data and voice services through the public telephone network. Major Canadian telecommunications arteries are shown on Chart 1. Telesat Canada satellite earth stations are shown in Chart 2.

CHART 1

MAJOR CANADIAN TELECOMMUNICATIONS ARTERIES



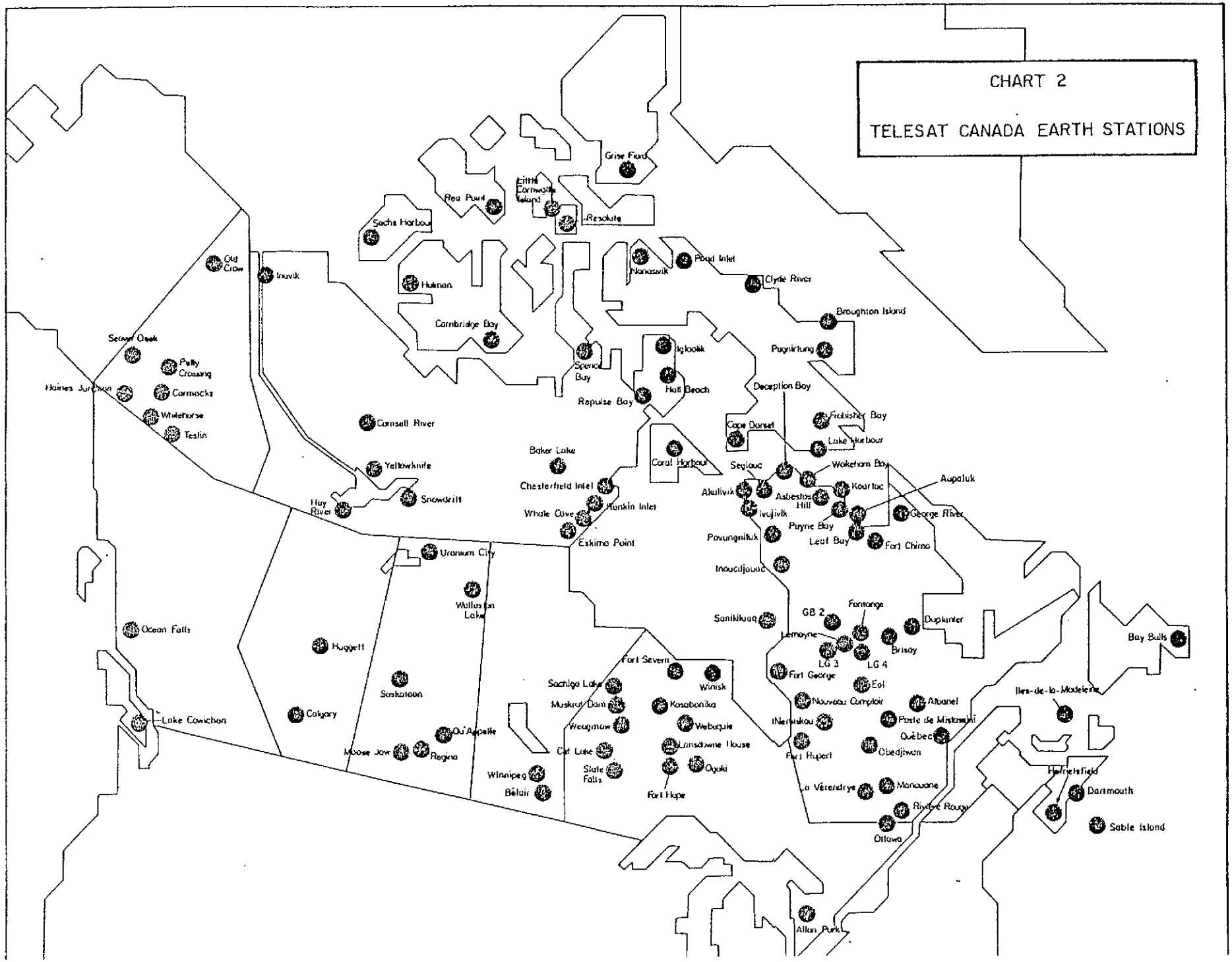


CHART 2
TELESAT CANADA EARTH STATIONS
Grise Fiord
Little Cornwallis Island
Resolute
Rea Point
Sachs Harbour
Old Crow
Inuvik
Holman
Cambridge Bay
Nanisivik
Pond Inlet
Clyde River
Broughton Island
Pugnirtung
Igloolik
Spence Bay
Hall Beach
Repulse Bay
Deception Bay
Frobisher Bay
Lake Harbour
Cape Dorset
Coral Harbour
Baker Lake
Chesterfield Inlet
Rankin Inlet
Whale Cove
Eskimo Point
Cornwall River
Yellowknife
Snowdrift
Hay River
Uranium City
Wollaston Lake
Seglauc
Wakeham Bay
Kourtac
Aupaluk
Akulivik
Asbestos Hill
Ivujivik
Puvirnituk
Puvne Bay
George River
Leaf Bay
Fort Chimo
Inoucdjouac
Fontange
GB 2
Sanikiluaq
Lemoyne
Duplanter
Brissay
LG 3
LG 4
Fort George
Eol
Nouveau Comptoir
Attanel
Poste de Mistassini
Québec
Obedjiwan
Manouane
La Vérendrye
Rivière Rouge
Ottawa
Fort Rupert
Iles-de-la-Madeleine
Bay Bulls
Halifax
Dartmouth
Sable Island
Allan Park
Sachigo Lake
Muskrat Dam
Weagamow
Cat Lake
Slate Falls
Fort Hope
Kasabonika
Webaquie
Lansdowne House
Ogoki
Winisk
Fort Severn
Winnipeg
Bélair
Moose Jaw
Regina
Qu'Appelle
Saskatoon
Calgary
Lake Cowichan
Ocean Falls
Haggett
Haines Junction
Carmacks
Whitehorse
Teslin
Ogoki

3. SERVICES

3.1 Services Overview

An overview of the kinds of domestic services provided by the different Canadian carrier groups is shown in Table 1 below:

Table 1

Overview of Telecommunications Services and Carriers

	Service Category		Carrier Category
1.	Voice telephony	Public switched	TCTS and other telephone companies
		Leased circuits (private lines)	TCTS, other telephone companies and CNCP
2.	Public message (telegram)		CNCP
3.	Switched Teleprinter		CNCP (Telex) and TCTS (TWX)
4.	Data	Public switched	TCTS and CNCP
		Leased circuits (private lines)	TCTS and CNCP
5.	Text		TCTS and CNCP
6.	Program Transmission	Audio	TCTS and CNCP
		Video	

The telephone companies (in their respective operating territories) have a monopoly on switched public voice telephony and CNCP has a monopoly in the provision of public message (telegram) services. In all other service categories, there are varying degrees of competition between TCTS and CNCP. All overseas telecommunications services are provided through Teleglobe Canada. A summary of the principal data networks and services is shown in Table 2 below.

TABLE 2

SUMMARY TABLE: DATA NETWORKS AND SERVICES

SERVICE	SWITCHED OR NON-SWITCHED	SPEED RANGE			MAJOR CARRIERS
		SUB-VOICE (300) BAUD	VOICE (300-9600) BITS PER SECOND	ABOVE VOICE (9600) BITS PER SECOND	
Direct Distance Dialing Network (DDD) [1]	Cct Switched	2	up to 1200 async up to 2400 sync		TCTS [4]
Telex	Cct Switched	50 Baud	2400 BPS		CNCP
TWX	Cct Switched	up to 110 Baud			TCTS [4]
Data Telex	Cct Switched	up to 180 Baud			CNCP
International Telex (including TWX)	Cct Switched	50 Baud			Teleglobe Canada
Multicom 1	Cct Switched		up to 1200 async up to 2400 sync		TCTS [4]
Broadband Exchange Service	Cct Switched		up to 9600 BPS	up to 56 KBPS	CNCP
Multicom 2	Cct Switched		up to 4800 BPS		TCTS [4]
International Datel 600	Cct Switched		600 BPS		Teleglobe Canada
Multicom 3	Cct Switched			up to 50KBPS	TCTS [4]
Globedat	Packet or Cct Switched		2400/4800/ 9600 BPS sync		Teleglobe Canada
Telenet	Message Switched	2	2	2	CNCP
Private Switched Message Service (Autocom II)	Message Switched	up to 300 Baud			Teleglobe Canada
Infodat	Non-Switched Digital	2	2	up to 56KBPS	CNCP
Dataroute	Non-Switched Digital	2	2	up to 56KBPS	TCTS [4]
Dataroute International [3]	Non-Switched Digital	2	2	up to 56KBPS	Teleglobe Canada
Datalink	Circuit-Switched Digital		9600 BPS sync		TCTS [4]
Teletex			2400 BPS		TCTS [4]
Infotex			1200 Baud async (2400 Baud planned)		CNCP
Globetex			up to 9600 BPS		Teleglobe Canada
Datapac	Packet Switched	2	2		TCTS [4]
Infoswitch	Cct Switched, Virtual Connection, Packet Switched	2	2	2	CNCP
Alta-Net	Non-switched		up to 2400 sync		AGT
Computer Message Switching Service (CMSS)	Message Switched	2	2	2	CNCP

1. While intended as a public switched voice network the Direct Distance Dialing network is used extensively for the transmission of data.

2. A full range of speeds available.

3. A Canada-U.S. service.

4. TCTS telephone company members.

3.2 Public Network Services

(a) Telephone

Domestic local and long distance public voice telephone services are provided by the TCTS member companies and by other telephone companies and co-operatives. Most of the TCTS companies have border-crossing points and inter-carrier agreements with U.S. carriers for the carriage of transborder (Canada-U.S.) traffic. Traffic to other countries is handled by the international public telephone switches of Teleglobe Canada. Telesat Canada has entered into discussions with U.S. satellite carriers concerning arrangements for transborder satellite traffic.

Most telephone companies in Canada follow similar pricing principles and have adopted comparable rate structures. Thus, local, residential and local business telephone services are offered on a flat-rate basis while rates for long distance service vary with usage, i.e. distance, duration and time of day.

Key principles and factors that are taken into account in rate-setting are company-wide rate averaging, value of service, costs and usage. Rate averaging means that all customers pay the same for the same class of service. The value of service principle reflects the economic fact that a prospective buyer will pay a price that is reasonably related to the value derived from the service. Thus, basic local flat-rate charges are higher at locations where there is a larger number of subscribers in the local calling area; and business telephone rates are higher than those for residential subscribers. Costs are taken into account by charging more for higher cost services. Thus, operator-assisted long distance telephone calls are priced higher than the comparable direct-dialled calls. Usage is a rating factor that can be associated with both value and cost considerations. With respect to value, subscribers attach value to "use" and are willing to pay more for more use. With respect to costs, increased use of a service may

cause increased costs. Reduced charges for Sunday, week-end or night service is consistent with the principle of cost-recognition in that it can assist increased network utilization at a low incremental cost to the system and help reduce peak traffic demands.

(b) Switched Teleprinter

CNCP and TCTS compete in the provision of switched teleprinter services. Telex, provided by CNCP has more than 50,000 Canadian subscribers. The comparable TCTS services, Teletypewriter Exchange (TWX) service, has a smaller number of Canadian subscribers. Both services allow access to over one million telex or telex-type installations around the world.

(c) Data Services

Each of CNCP, TCTS and (for overseas service) Teleglobe Canada provide public switched data network services. Two of the major competitive service offerings are Infoswitch and Datapac. Infoswitch, provided by CNCP, is a nationwide, digital switched data communications network which offers both circuit and packet switching facilities to users. Charges for use of the Infoswitch network consist of transmission and access components. Transmission charges vary with volume more than with distance. Access charges are fixed monthly amounts which are directly related to terminal transmission speed.

Datapac, provided by TCTS, is a nationwide packet switched public data network. Datapac rates are volume and distance sensitive. Excluding installation and optional features charges, each service has two main rating elements: access and network usage charges. The access charge varies with each Datapac service offering while the usage charges are based on the number of packets transmitted.

Both Infoswitch and Datapac can be connected to numerous other countries through Teleglobe Canada's Globedat international data Gateway which routes both packet and circuit switched traffic and provides low to medium speed data transmission. The service is accessible from the Canadian domestic networks of Datapac and Infoswitch. Other access arrangements may be provided if required. Charges are volume oriented and consist of two basic components applied at the call originating end, namely (i) the national network access charges, and (ii) the international network usage charges based on volumes measured in kilocharacters or kilosegments and call duration in minutes.

There are few restrictions on the use of the public data networks so long as technical criteria are met. Thus, terminal attachment policies with respect to public data networks have been considerably more liberal than for voice; the primary concern has been to prevent damage to the networks. The use of coupling devices leased from or approved by the carrier is required by some carriers.

(d) Text

Various text services are offered via the public networks. Both TCTS and CNCP provide facsimile communications service which allow for the transmission of graphics over their respective networks. Teleglobe provides connections to overseas destinations on its Globefax fasimile service. Intelpost is a graphics service (document facsimile), operated jointly by Canada Post, CNCP and Teleglobe, which is available within Canada and to a number of international destinations. The integration of the Intelpost and Globefax services has been proposed. New text services are described in Section 3.4 below.

3.3 Leased Circuits

In most regions in Canada, leased circuits are readily available, on a competitive basis, from telephone companies and CNCP. Included in this category are circuits leased for the transmission of audio and video program material. Rates for leased circuits are largely determined by competition, subject to approval by a regulatory authority. As a result of competitive and regulatory influences, telephone company and CNCP charges for leased circuits are comparable. Customers are able to choose between public network offerings and leased facilities according to what best suits their needs. However, the sharing and re-sale of leased circuits is not generally permitted.

Interconnection of leased circuits to the public switched voice or data networks is permitted at the customer's switching equipment and also, in certain cases, within the telephone network. The attachment of customer-supplied terminal equipment is generally permitted subject to compliance with technical criteria.

3.4 New Services

While neither the federal government nor the major telecommunications carriers currently publish overall plans for the long term development of telecommunications services, both the carriers and the federal government are significantly involved in the development and introduction of new telecommunications technology. For example, the federal government is sponsoring a number of field trials of Telidon - the videotex technology which was developed by the Canadian Department of Communications. To encourage the development of new Telidon services, the Canadian Government instituted the Telidon Industry Investment Stimulation Program (IISP) in 1981. Under the Program, the Government will arrange to have 6,000 Telidon terminals

built by Canadian firms and will make them available for use in new Telidon systems operated by the private sector. To date, fifty Telidon projects, including several submitted by telephone companies, have qualified to receive a total of $9.5 million under the IISP. Of particular note is the Manitoba Telephone System's Grassroots project - the first commercial Telidon system in the world.

The Government has also allocated funds to support field testing of Canadian "Office of the Future" technology. The money will be spent under the Office Communications System (OCS) Program to help Canadian companies develop the industrial capacity to supply the growing national and international markets for integrated electronic office products and services.

Often called the Office of the Future program, the OCS program deals with the rapidly merging technologies of micro-electronics, high-speed communications, and information management systems that are transforming the modern office. In the Office of the Future, intelligent, multifunctional workstations linked by telephone, coaxial cable, or optical fibre networks will provide access to voice, video, data, and graphics services. Each workstation will allow the office worker to perform a wide range of tasks, including word processing; tele-conferencing; storage, retrieval and sorting of information in local and remote data bases; electronic messaging and mail box services; and the processing and programming of data, text, voice, and video materials.

The program will also address a number of contentious social and economic issues by studying the implications of information technology in the human context. The program will examine alternative methods of implementing the technology and methods of training and retraining office workers to ensure that the potential benefits of the electronic office are achieved and equitably distributed.

In addition to Government initiatives towards the introduction of new services, both the major carrier systems, TCTS and CNCP have also been actively promoting new offerings of their own. TCTS and CNCP have recently announced competing services which would allow word processors made by different manufacturers to communicate with each other. The TCTS offering, known as Teletex conforms to international standards developed by the International Telegraph and Telephone Consultative Committee (CCITT). Similarly, the CNCP offering, Infotex, is compatible with CCITT standards. Both services will enable users to communicate nationally and internationally. The services will meet a wide variety of communications applications for users who have text preparation equipment. The overseas connections will be provided by Teleglobe, under the name of Globetex.

Moreover, the two domestic carrier systems are now considering new communications services utilizing communications satellites and time division multiplexers. Users will be able to subscribe to specific voice, data or video services which have been designed to be capable of extending to other locations by linking them to existing terrestrial networks.

Finally, in Saskatchewan, a particularly significant development was the inauguration, early in 1982, of the world's first commercial fibre optics telecommunications system to carry cable TV signals. The occasion marked the completion of the first section of a 3200 km fibre optics network. When completed in 1984, the new network will connect all Saskatchewan cities and 40 of the province's largest towns.

4. REGULATORY STRUCTURE

4.1 Regulatory Structure Overview

Telecommunications regulatory jurisdictions in Canada have evolved to the present structure whereby carriers are regulated on their entire operations by either the federal agency, the Canadian Radio-television and Telecommunications Commission (CRTC), a provincial government utility board (or, as is currently the case in Saskatchewan, by the provincial cabinet), or in some cases, by a municipal council. A list of major Canadian telecommunications carriers and their respective regulatory agencies is given in Table 3.

4.2 Regulatory Agencies and Telecommunications Policy Development

Generalizations about "the primary focus of responsibility for telecommunications policy making" can be misleading. However, generally speaking, federal and provincial governments determine telecommunications policy within their respective jurisdictions. Usually, carriers must apply to their regulatory agency for approval of the terms and conditions on which service is provided. The origin of telecommunications regulation was to protect subscribers against monopoly providers of telecommunications services. The role of the regulatory agencies has evolved into a broader oversight of telecommunications carriers, which generally are regulated by the approval or disapproval of carrier applications, according to the provisions of governing legislation. Naturally, on occasion, regulatory agency decisions on significant issues, such as system interconnection or terminal attachment, have a policy impact. However, it is important to note the power of the federal Cabinet to vary or rescind any CRTC telecommunications decision - a power which is exercised sparingly and usually only when significant or broad public policy issues are involved.

TABLE 3

MAJOR CANADIAN TELECOMMUNICATIONS CARRIERS
AND THEIR REGULATORY AGENCIES

CARRIER	REGULATORY AGENCY
Bell Canada)	
British Columbia Telephone Co.)	Canadian Radio-television and
CNCP Telecommunications)	Telecommunications Commission
Telesat Canada)	(CRTC)
NorthwesTel)	
Terra Nova Telecommunications)	
Alberta Government Telephones	Alberta Public Utilities Board
Saskatchewan Telecommunications	See Note 1
Manitoba Telephone System	Manitoba Public Utilities Board
New Brunswick Telephone Co. Ltd.	New Brunswick Public Utilities Board
Maritime Telegraph and Telephone Co.	Nova Scotia Public Utilities Board
Island Telephone Co. Ltd.	Prince Edward Island Public Utilities Commission
Newfoundland Telephone Co. Ltd.	Newfoundland Public Utilities Board
'edmonton telephones'	City of Edmonton
Northern Telephone	Ontario Telephone Service Commission
Québec Téléphone	Régie des services publics du Québec
Télébec Ltée	Régie des services publics du Québec
Teleglobe Canada	See Note 2
Thunder Bay Telephone System	City of Thunder Bay

Note 1: Saskatchewan Telecommunications is not presently regulated by an independent agency but is owned and subject to control by the Saskatchewan government. In July, 1982 the Saskatchewan government passed an Act to establish a Public Utilities Review Commission. As of September, 1982, the Act had not come into effect.

Note 2: Teleglobe Canada is not regulated by an independent agency but is owned and subject to control by the federal government.

In addition to all the normal mechanisms for public participation in the development of public policy that one finds with a representational form of government there are in Canada various mechanisms for direct public participation in telecommunications policy making. At the federal level, the Department of Communications publishes official government notices from time to time that invite comments or submissions from interested parties on subjects undergoing policy review. The federal regulatory agency, the CRTC, receives submissions from and permits the representation, at public hearings, of interested parties including, for example, the Consumers Association of Canada, the National Anti Poverty Organization, the Canadian Industrial Communications Assembly and various other groups and individuals. Furthermore, the CRTC can make rulings whereby a portion of the costs of certain intervenors are re-imbursed. At the provincial level practices vary. In most jurisdictions public hearings may be held in certain instances in order to maximize input from affected groups and the public.

4.3 Regulation of Leased Circuits

The terms and conditions governing the provision and use of private leased circuits are normally incorporated in a carrier's tariffs or in a contract between a carrier and a user, either of which would usually require the approval of the appropriate regulatory agency, subject to any governing legislation. Federal telecommunications law does not specifically allow or disallow the shared use or resale of private leased circuits. This would normally be a decision to be taken, in the first instance, by the appropriate federal or provincial regulatory agency. There are, however, no re-sale carriers in Canada. Telephone companies do not permit re-sale and regulatory agencies have not objected. In the case of international leased circuits, relevant CCITT recommendations are applied by Teleglobe Canada.

4.4 Foreign Ownership

As noted in section 2.1 above, almost all Canadian telecommunications carriers are Canadian-owned. Principal exceptions are the British Columbia Telephone Company and Québec Téléphone, both of which are indirectly owned and controlled by the U.S. based General Telephone and Electronics Corporation. While there are no explicit restrictions on the ownership of Canadian telecommunications carriage facilities by foreign investors, these facilities are considered to be of strategic national importance. Therefore, any proposal to extend foreign ownership in this sector would probably be considered on a case-by-case basis.

5. POLICY DEVELOPMENTS

5.1 System Interconnection

There has, naturally, been system interconnection between adjacent telephone company networks for many years. A milestone in the development of a national telecommunications network in Canada was the 1931 agreement between major regional telephone companies to set up the TransCanada Telephone System. One of its major achievements was the establishment of an all-Canadian route for long-distance telephone calls. Moreover, there is interconnection between Canadian telecommunications facilities and the U.S. continental network and, through Teleglobe Canada's facilities, with overseas networks. This permits the connection of virtually all Canadian telecommunications services with those of other countries.

A significant development in recent years was the 1979 CRTC decision that permitted CNCP to interconnect its facilities with Bell Canada's local telephone network. This allows CNCP's customers to access its competitive data and voice services via the local Bell Canada telephone network. A similar 1981 CRTC decision permitted CNCP to interconnect its facilities with those of the British Columbia Telephone Company. CNCP is pressing to obtain similar interconnection arrangements throughout Canada. The result of the system interconnection currently granted to CNCP is to significantly increase its ability to compete with TCTS in the provision of a wide range of business services.

5.2 Terminal Attachment and Procurement

The range of policies governing the attachment of customer owned terminal equipment across Canada is shown in Table 4. There is a trend towards liberalizing terminal attachment regulations subject to compliance with technical criteria. The technical standards being developed by the federal Department of Communications Terminal Attachment Program Advisory Committee (TAPAC) are increasingly being recognized as the appropriate national technical standards.

The Terminal Attachment Program Advisory Committee is chaired by the federal Department of Communications (DOC) with the voluntary participation of certain carriers, manufacturers, suppliers, users and provincial governments. The object of the Program is to develop terminal attachment standards suitable for adoption on a nationwide basis. In order for equipment to be certified by DOC as meeting TAPAC-developed standards it must be tested by a DOC or DOC-approved laboratory. This procedure applies to all equipment regardless of origin. Standards for terminals to be attached to telephone networks have been published under the Program for network non-addressing devices as well as for network addressing devices such as single line telephones, key systems and PBXs.

TABLE 4

TERMINAL ATTACHMENT IN CANADA

CARRIER	AREA SERVED	TERMINAL ATTACHMENT POLICY
Bell Canada	Parts of Ontario, Quebec and the eastern Northwest Territories	DOC*-certified network non-addressing devices without a coupler are permitted. The attachment of single line extensions, key systems and PBXs is permitted in accordance with CRTC Decision 80-13 which prescribes interim requirements for the attachment of subscriber-provided network addressing equipment.
British Columbia Telephone Co.	Most of British Columbia	Same as for Bell Canada above.
Alberta Government Telephones	Most of Alberta	Customers may choose between renting a telephone set from the telco or buying their own, subject to customer owned equipment meeting DOC* technical standards. Network non-addressing devices are also permitted.
Manitoba Telephone System	Manitoba	Network non-addressing devices with telephone company-provided couplers are permitted. The Manitoba Legislature has passed a bill (not yet proclaimed) which would permit attachment only as approved by the provincial regulatory board.
Saskatchewan Telecommunications	Most of Saskatchewan	Network non-addressing devices with telephone company-provided couplers are permitted. Retailers are forbidden by provincial law to advertize or offer for sale any device not authorized by the telephone company.
Maritime Telegraph and Telephone Co.	Nova Scotia	Network non-addressing devices with telephone company-provided couplers are permitted.
New Brunswick Telephone Co.	New Brunswick	Attachment of telephone company-approved single line residentail extension and of network non-addressing devices with telephone company-provided couplers are permitted.
Newfoundland Telephone Co.	Most of Newfoundland and Labrador	Network non-addressing devices with telephone company-provided couplers are permitted.

TABLE 4 (Contd.)

CARRIER	AREA SERVED	TERMINAL ATTACHMENT POLICY
The Island Telephone Co. Ltd.	Prince Edward Island	Network non-addressing devices with telephone company-provided couplers are permitted. Island Tel has submitted an application to the provincial regulatory board to permit the attachment of network-addressing equipment. The application proposes that attachable equipment must conform to DOC* standards.
'edmonton telephones'	City of Edmonton, Alberta	Attachment of telephone company-approved single line residential extensions and of DOC*-certified network non-addressing devices is permitted.
Northern Telephone Ltd.	Parts of Northern Ontario	Attachment of telephone company approved single line extensions and of network non-addressing devices with telephone company provided couplers are permitted.
NorthwesTel	Northern British Columbia, the Yukon Territory and western Northwest Territories	DOC*-certified network non-addressing devices are permitted.
Québec Telephone	Parts of Quebec	Effective June 30, 1983 the majority of telephone subscribers under the jurisdiction of Quebec will be able to connect certain of their own telephone equipment to the telephone company network subject to technical and other restrictions which are to be determined by the Régie des services publics du Québec following public hearings.
Télébec Ltée	Parts of Québec	Same as for Québec Téléphone above.
Terra Nova Tel	Parts of Newfoundland and Labrador	DOC*-certified network non-addressing devices are permitted.
Thunder Bay Telephone System	City of Thunder Bay, Ontario	Attachment of telephone company-approved single line extensions and of network non-addressing devices with telephone company-provided couplers is permitted.

* DOC is the Canadian Department of Communications

The attachment of network non-addressing equipment has been permitted for some time in several jurisdictions, as noted in Table 4. Connection of customer-provided single line extensions, key sets and PBXs is permitted in the territories of Bell Canada and B.C. Tel (which together comprise about 70% of the Canadian market) under the terms and conditions of CRTC Decision 80-13 - Interim Requirements Regarding the Attachment of Subscriber-Provided Equipment. This decision was modified by CRTC Decision 81-23, Subscriber-Provided Terminal Equipment - Interim Technical Standards (issued November 16, 1981) which permits the attachment of terminal equipment which meets at least one of the following technical requirements:

(a) the equipment is of a class and manufacture which meets the requirements of the current issue of Certification Standards CS-03 approved by TAPAC;

(b) is of the same class and manufacture as that provided by Bell Canada or B.C. Tel to their respective subscribers; or

(c) is of a class and manufacture which meets the current requirements of Part 68 of the Rules and Regulations of the Federal Communications Commission of the United States.

The subscriber must submit to the telephone company a letter of attestation by a professional engineer qualified to practice in a province of Canada that his terminal equipment complies with the interim requirements. The telephone company must then sign a special agreement with the subscriber within thirty days. However, a "type approval" procedure applies as an alternative to special agreements for single line terminals provided that the manufacturer or supplier has provided the necessary attestation to, and has entered into a special

agreement with the carrier. In this case, the subscriber may attach the terminal equipment without signing a special agreement, but he is required to notify the telephone company of his intentions. Suppliers are expected to encourage such notification through the provision of appropriate information to purchasers of extension telephones which have received the necessary "type approval". The CRTC has asked for public comment as to whether and to what extent Decision 80-13 should be modified to incorporate TAPAC-developed standards.

An in-depth public hearing on Terminal Attachment was held by the CRTC in November and December 1981 and a decision is expected later this year. In the meantime, the interim requirements will remain in force.

There are no governmental restrictions on the sourcing of customer-provided terminal equipment as long as the equipment meets technical requirements that are approved by the appropriate regulatory agency. With respect to restrictions that affect the export of Canadian telecommunications equipment to other countries, there are, naturally, a range of circumstances that vary from country to country. While, on occasion, technical standards may discourage international trade in telecommunications equipment the two most significant "restrictions" are indirect ones, namely (1) the terminal attachment policy that applies in different jurisdictions, and (2) the practice or policy of many state-owned PTTs to seek domestic suppliers for the majority of their equipment requirements. It is notable that major Canadian telecommunications equipment manufacturers, such as Northern Telecom and Mitel, have set up manufacturing plants in other countries.

5.3 CRTC Cost Inquiry

An important current regulatory initiative is the CRTC's inquiry into telecommunications carriers' costing and accounting procedures. In this third phase of the inquiry the CRTC is seeking to determine, for regulatory purposes, a costing methodology for existing services. The focus on service costing is largely a consequence of

concerns that carriers which operate in both monopoly and competitive markets may price their competitive services below cost, to the detriment of both their monopoly subscribers and their competitors.

Previously, in Phase I, the Commission dealt with the principles and approaches relating to depreciation and accounting changes, accounting procedures, treatment of deferred taxes and rate base calculation, for federally-regulated carriers. The Commission also considered the type of information it would require from carriers under its jurisdiction at the time of filing for new services in Phase II of the inquiry.

6. CONCLUSION

In this national presentation on telecommunications in Canada, prepared in response to OECD guidelines for submissions to the December, 1982 Special Session on telecommunications, we have provided an overview of Canadian telecommunications common carriers, networks and services, regulatory structure, and policy developments. The mixture of private and governmental ownership of carriers and the mixture of federal, provincial and municipal regulation are key aspects of a complex structure which, as noted in the Introduction, differs from the situation one finds in other OECD countries. Nevertheless, Canada has one of the finest telecommunications systems in the world and is at the forefront of technological developments in many areas, including digital switching and transmission, satellite communications, fibre optics, protocols for communicating word-processors, and the Telidon videotex technology. Canada is proud of the contribution it has been able to make in several international telecommunications institutions, including the International Telecommunications Union, INTELSAT, INMARSAT and the Commonwealth Telecommunications Organization, and will continue to work toward mutually agreeable international arrangements that respond to the challenges and opportunities created by technological and market developments in the 1980s.