1974
1975
ANNUAL REPORT

DEPARTMENT OF COMMUNICATIONS

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(submitted under the provisions of the
Department of Communications Act)

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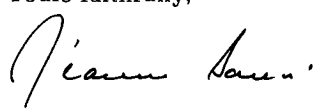
To His Excellency the Right Honourable Jules Léger, Governor General and Commander-in-Chief of Canada

Your Excellency,

I have the honour to present the Annual Report of the Department of Communications for the fiscal year ending March 1975.

Yours faithfully,



Jeanne Sauvé
Minister of Communications

1 FOREWORD

It has been said that Canada has one of the most efficient and extensive communications systems of any country in the world. Certainly, the statistics demonstrate that we are a nation of communicators. In Canada 96.8 per cent of households are equipped with television; 98.3 per cent of our homes have at least one radio receiver; telephones are installed in 96.4 per cent of Canadian homes; and there are now approximately 400,000 licensed radio stations whose users vary from oil explorers to air traffic controllers to taxi drivers.

There is, however, a paradoxical situation in Canada where communications are concerned. In the South, they are taken for granted. Indeed, in major metropolitan areas, the number of radio stations licensed has increased to the point where congestion is prevalent in the heavily utilized radio frequency bands. In the North, where communications are so vital, systems are sparse because of the barriers created by scattered population, immense distances, and high costs.

While the Anik series of domestic communications satellites has significantly improved communications in many Northern communities, bringing radio, telephone, and television services to a number of remote locations, much remains to be done. The Department undertakes a number of programs designed to improve communications in the North, ranging from continuing studies of the ionosphere to the development of rugged trail radios for use by hunters, trappers, and local residents. During the year, the Minister of Communications toured several Northern communities for a first-hand assessment of communications in the North.

In the South, Canadians are placing increasing reliance on communications for their entertainment, information, cultural contact, business and public service operations. The various communications networks and systems are becoming more and more integrated.

The Federal Government regulates broadcasting, including cable television, and radio communications, and regulates telecommunications carriers operating in more than one province. The regulation of other telecommunications carriers comes under provincial authority.

Federal-provincial consultation continued during the year as both federal and provincial governments across Canada undertook reviews of the legislative and regulatory frameworks under which communications systems operate. At the beginning of the 1974-75 fiscal year, the Minister of Communications met with individual provincial Ministers to put forward certain federal proposals in response to provincial positions enunciated at the first federal-provincial conference of Ministers responsible for communications in November 1973. During the year, there were a number of exchanges of correspondence between the Federal Government and the provinces aimed at clarifying their various positions on the most appropriate means of harmonizing federal and provincial communications interests. These exchanges culminated in the preparation within the Department of a further set of proposals, many of which were outlined to the provinces early in the year. The proposals were to be presented to the provincial Ministers and released publicly in advance of a second federal-provincial conference planned for May 1975.

During the year, a bill was introduced in the House of Commons to amalgamate the existing Telecommunication Committee of the Canadian Transport Commission and the Canadian Radio-Television Commission, creating a single federal communications regulatory authority called the Canadian Radio-television and Telecommunications Commission. The bill, when enacted, will place all Federal Government communications regulation under one organizational roof.

The creation of the new commission was considered as Phase I of a two-step legislative process. By the end of the year, discussions had begun in preparation for the proposed Phase II. This step is to be more comprehensive, entailing a revision of existing statutes with a view to clarifying their application to contemporary and future modes of telecommunications, rationalizing the respective roles of the Government and the new regulatory authority, providing for more effective collaboration with the provinces, and, in general, establishing a coherent body of federal law on communications.

Throughout the year, the Department of Communications continued to carry out programs and activities consistent with its objectives. The following annual report highlights these activities.

2 MANAGEMENT OF THE RADIO FREQUENCY SPECTRUM

Almost 400,000 radio stations are licensed in Canada to transmit and receive radio signals. All, of course, make use of the radio frequency spectrum, a public resource managed by the Department.

The Department develops, coordinates, and implements overall policies designed to increase the effectiveness of spectrum management; regulates the use of radio and radio frequencies; develops technical standards to control interference to radio reception; certifies the technical and engineering aspects of broadcast and cable television applications; and tests and type-approves communications equipment. Statistics on radio use in Canada are provided in the appendices. As seen in the following chapter, day-to-day spectrum management is carried out by the Department at the regional level to better serve local and regional requirements.

During the fiscal year 1974-75, the Department made a number of changes to the Radio Regulations governing the use of radio in Canada and was involved in other significant and spectrum-management-related activities as follows:

- General Radio Regulations, Part I, were amended to provide for the licensing of foreign governments to operate radio stations in Canada;
- General Radio Regulations, Part II, were amended to exempt from licensing requirements emergency locator transmitters (ELTs) used to locate crashed aircraft;
- General Radio Regulations, Part II, were amended to allow persons whose hearing is limited to one ear to be examined for a radio operator's certificate;
- A handbook was prepared for users of the General Radio Service;
- New specifications were issued governing low-power wireless microphones and telemetering devices and type-approval of emergency locator transmitters;
- Technical requirements for land mobile and fixed radio services operating in the 450 MHz band and for radio relay systems operating in the 900 MHz band were drafted and are being reviewed;
- Specifications for land and mobile AM single sideband stations operating at frequencies below 28 MHz were released to the general public and the Canadian Radio Technical Planning Board for comments;
- The Department received and evaluated 608 applications for type-approval of radio equipment, an increase of 44 per cent over the previous fiscal year. This brings the total approved radio apparatuses in Canada to 14,500;
- During the year, the Department continued to consult with a number of organizations, including the CRTC, on the availability of channels for broadcasting stations. In order to aid in selecting the operating channels for future Very High Frequency (VHF) TV stations, a computerized mapping system was developed to show TV frequency allocation across Canada;
- A revised table of radio frequency allocations, reflecting internationally agreed amendments, was published;
- New frequencies were assigned to Canadian coast stations to provide for a teletypewriter service with ships.

To increase the effectiveness of spectrum management, the Department began to develop an automated system that will continuously survey and record radio spectrum utilization. A pilot project will be used to survey the Very High Frequency bands as part of Phase I, thus allowing the Department to evaluate the effectiveness of a system for overall spectrum management.

As technological advances occur and the use of radio by Canadians increases, the Department makes a continuing effort to improve the efficiency of spectrum use. During the year, in-depth analysis of Canada's land mobile service continued, examining such factors as frequency assignments, channel sharing and locating. The study constitutes a general assessment of current conditions and a projection to 1980. A study was also begun with respect to the use of television and high-capacity long-haul digital microwave services. The Department published a proposed policy for Very High Capacity Microwave systems for use by cable television systems and others, and invited public comment. A final policy is to be announced next year.

3 REGIONAL OPERATIONS

In a country as vast as Canada, the Department could not hope to carry out its mandate from a centralized location. As a result, a large share of the Department's services to the public is provided through district offices and monitoring stations in five designated regions. Through its regional operations, the Department is able to carry out specific programs aimed at improving the development and efficiency of communications systems and services across Canada. See Appendix I for locations of offices.

Each regional office is responsible for managing the radio frequency spectrum in its area by licensing radio stations, inspecting radio facilities to ensure conformity with regulations governing the use of radio, investigating sources of interference to broadcasting and communications, monitoring radio transmission, and holding examinations to certify users of specific radio services. The regions also participate in various technical and socio-economic programs and research activities.

Another important aspect of regional activities is a consultation and liaison program with provincial governments, telecommunications carriers, the electronic industry and universities to develop the background information necessary for an effective regional contribution to the development of national communications policies.

The Government Telecommunications Agency, through the regional offices, plans and manages the various local and inter-city government communications networks and acts as a consultant to federal departments on a broad range of telecommunications services.

As part of its ongoing efforts to improve services to the public, the department opened a new district office in Windsor, Ontario. A new district office was also opened in Yellowknife, Northwest Territories, to serve the expanding communications needs of Canada's North.

4 BROADCASTING AND CABLE TV

The Department carries out technical evaluation of all broadcasting and cable television licence applications and advises the Canadian Radio-Television Commission (CRTC) whether a Technical Construction and Operating Certificate will be issued. This permits the Commission to consider these licence applications at public hearings.

In addition, the Department undertakes a number of research projects in support of the development of new policies and legislation required to further the objectives of a national broadcasting policy.

The Department studies, on a continuing basis, various aspects of broadcast policy, including an evaluation of private and public broadcast systems, program production services, advertisers and cable television systems. The Department also analyzes current and projected costs and profits of cable systems in Canada.

Another study measured the economic impact of cable television on over-the-air broadcasting and explained various options for alleviating the financial impact of cable signals on broadcasting.

A number of cable television companies in metropolitan areas are beginning to introduce service over and above the basic 12-channel cable facility through the use of converters. A study was undertaken on the cost of providing more than 12 channels over cable television facilities.

5 TELECOMMUNICATIONS SYSTEMS AND SERVICES

In Canada, there is a mixture of publicly and privately-owned telecommunications companies — or common carriers as they are often called. Regulation of these carriers is divided among federal and provincial authorities. Although the tariffs of federally-regulated carriers are controlled by the Telecommunication Committee of the Canadian Transport Commission (CTC), the Department develops policies and programs related to communications carriers and the telecommunications industry as part of its general mandate. For example, the Department studies such aspects as corporate and financial structure, economic activity and intercorporate relationships of the telecommunications industry. It recommends policies that will foster the development of key sectors of the telecommunications and related industries. And it carries out programs designed to satisfy present and future needs for telecommunications services and access to communications networks.

A significant program was announced during the year which would permit the attachment of a limited range of customer-provided terminal devices (such as automatic telephone answering machines) to the networks of the federally-regulated carriers. The plan provides that certain customer-provided devices certified by the Department as complying with Departmental technical standards would be accepted by the carriers for direct connection to their networks. Consultation is continuing with the carriers and industry.

A major review of the telecommunications industry in Canada was completed and published under the title *Canadian Telecommunications Carriers and Their Suppliers*. The review is a first step in developing further policies to ensure a stronger Canadian presence in the telecommunications industry.

In February 1975, the Department began an inquiry into the procurement practices and policies and the intercorporate relationships of the British Columbia Telephone Company. The Department was also looking into a proposal by the Canadian Transport Commission to investigate the possibility of an indexing or rate-adjustment formula for telecommunications rate increases, especially as the proposal has implications related to overall regulatory and anti-inflation policies. In addition, the Department monitored and analyzed the major rate cases heard by the CTC and participated in the technical work of a CTC cost inquiry. During the course of the year a number of other internal studies were carried out in the area of telecommunications systems and services.

6 COMPUTER COMMUNICATIONS

Following publication of an exhaustive study of computer communications in 1972 and a Green Paper in 1973, the Department has continued to formulate policies in this fast-growing field.

Of special significance during fiscal year 1974-75 was the announcement by the Ministers of Communications and Finance of a new policy on the evolution of computer communications and its use in the country's payments system. Banks and other financial institutions are rapidly automating systems that have traditionally been paper-based. Computer communications systems are already beginning to be used for direct payroll deposit to a customer's account and for many other financial transactions. The policy seeks to ensure that the evolution of an electronic payments system will provide protection for the rights of individuals, enhance the competitive environment and ensure an efficient and equitable system.

The policy supports a common-user network for the payments system. This would be a shared service, openly accessible to all qualified users on a fee-for-use basis. An implementation committee is to be formed to develop the standards for the electronic payments system.

In January 1975, the Government also outlined its position with respect to the participation of chartered banks and federally-regulated communications carriers in public data processing.

These policy announcements followed work carried out within the Interdepartmental Committee on Computer Communications Policy and Program Coordination, established by Cabinet in April 1973.

The Department continued its involvement with an Interdepartmental Committee on Privacy, formed to study and

recommend policies which the Federal Government could implement to ensure the rights of individual privacy with regard to its own data banks.

In addition, a study was made on the possible use of computers in community information centres. A study on Electronic Legal Retrieval, carried out for the Department and made public in May, focussed on the potential impact of computerization on the law profession.

7 THE GOVERNMENT TELECOMMUNICATIONS AGENCY

The internal telecommunications challenges facing the Federal Government are impressive. During fiscal 1974-75 for example, 14.9 million calls were carried over the Government communications network.

Founded in 1966, the Government Telecommunications Agency (GTA), part of the Department of Communications, plans and coordinates telecommunications facilities and services used by the Federal Government. For example, the agency manages consolidated telephone systems in 15 cities coast-to-coast using over 650,000 miles of intercity circuits leased from the communications industry. The Government's long-distance telephone bill would have been more than $37 million at full commercial rates. As it was, using GTA-managed facilities, the cost to the Government was $15.2 million.

The agency operates by recovering costs from its clients — Federal Government departments and agencies. Financial statistics are presented as Appendix XII.

Escalating costs and increased reliance on telecommunications by these clients have led the GTA to seek out new, less costly, and more efficient systems, while revitalizing existing ones. Intercity systems now include voice and data networks for shared use by all departments.

More than 500 government offices now have facsimile and a general Government facsimile network is being studied. A new federal intercity voice network is being planned for 1979 and local consolidated systems are being planned for Calgary, Regina, Mirabel, Belleville-Trenton, Sault Ste. Marie, Windsor, Peterborough and St. John's.

In the past year, the annual costs of dedicated systems, developed and managed by GTA for client departments, increased by 29 per cent over the preceding year to $2.3 million.

The GTA has also assisted DOC in carrying out its policy objectives in the North. One example is the arrangements made by GTA with Bell Canada to provide telecommunications facilities using satellite circuits in 15 remote Ontario, Quebec and Northwest Territories areas until 1978. This project assisted the local communities by providing them with service, and helped the industry to make effective use of the satellite.

During the year, GTA inaugurated a new data communications network for Federal Government requirements. It is a store-and-forward computer-switched system capable of moving information according to user needs and provides full access to the general Telex network. The existing 150 terminals on the system at year end are forecast to increase to 800 by the end of March 1976.

8 SPACE PROGRAMS

Canadians have welcomed the introduction of communications satellites to supplement the established terrestrial telecommunications network. Space systems are capable of providing reliable yet relatively economical communications services in remote areas and a greater volume and diversity of broadcast and telecommunications services than could be handled previously. Space also offers opportunities to Canadian industry in an area of high technology.

Canada's domestic communications satellite system, the first of its type in the world, is owned and controlled by Telesat Canada. The corporation's two operational satellites and fifty earth stations provide television, radio, voice, data and facsimile transmission services to urban, rural and remote regions across Canada. A third satellite was scheduled to be launched in May 1975.

Looking to the future, the Department is engaged in a number of projects designed to meet projected requirements for communications satellite systems in the 1980s and beyond.

The Communications Technology Satellite

The Communications Technology Satellite (CTS), one of the major projects of the Department, is being undertaken to develop a new generation of communications satellites, operating at higher frequencies (12/14 GHz) and having considerably higher power transmitters than current communications satellites. Under an agreement with the U.S. National Aeronautics and Space Administration (NASA), the Department of Communications, primarily through contracts to Canadian industry, is designing, building and testing a satellite to be launched in January 1976. NASA is providing several spacecraft components, is making available spacecraft environmental test chambers, and will launch the satellite and place it in the required geostationary orbit. The European Space Agency (ESA) is also participating by developing and supplying certain spacecraft components. The Department will operate the CTS during its planned two-year lifetime. The U.S. and Canada will have equal access to the satellite to carry out a variety of social and technical experiments in communications.

Following the integration and test of the engineering model to confirm the basic design and to demonstrate the compatibility of spacecraft design with the launch and orbital environment, the main activities during 1974-75 were the procurement and initial integration of the flight spacecraft. The environmental testing and integration services for the CTS program were principal activities of the David Florida Laboratory, a national laboratory located at the Communications Research Centre (CRC) at Shirley Bay.

Groups across Canada will use the satellite on an experimental basis to study and test a number of new communications services made possible by the high power of the satellite, which permits the use of smaller earth terminals. These organizations are planning a variety of experiments including satellite data transmission tests; telephone and TV transmission and reception in large urban environments; as well as more socially-oriented experiments in education, long-distance medical diagnosis, community interaction and satellite communications for native peoples. The individual experiments are the responsibility of the sponsoring organization in each case, with overall coordination and assistance coming from the Department. During the year, planning for the experiments continued and contracts were awarded for the manufacture of earth terminals.

Meanwhile, the spacecraft ground control centre, which will control the satellite and gather data after launch, was being developed. Sixty per cent of the computer hardware had been installed by year end and software for the system was being developed under contract. The centre also controls and gathers data from the three remaining active Canadian research satellites, Alouette II, ISIS I and ISIS II, which continue to operate routinely.

Multi-purpose UHF Satellite

The Department has been studying the feasibility of a multi-purpose Ultra High Frequency (UHF) satellite communications system to fulfill specific communications needs of a number of Federal Departments. It has been determined that the system would be technically feasible and the costs reasonable in relation to the alternatives available.

As a result, an interdepartmental study group has recommended that the next stage in planning — project definition — be undertaken to outline more precisely all aspects of the system. This is currently in progress.

Aeronautical Satellite (AEROSAT)

Trans-Atlantic air traffic density has led to growing concern over the adequacy of current navigation and communications networks. Canada is participating with the United States and the European Space Agency in an experimental aeronautical satellite program to improve navigation and flight safety. Under an arrangement signed in December 1974, two satellites are planned.

The Ministry of Transport is responsible for Canadian participation in the overall experimental program, and the Department of Communications is responsible for the Canadian contribution to the space segment and is providing management and engineering expertise to the AEROSAT Space Program Office located in the Netherlands. On behalf of the Ministry of Transport, the Department is designing, specifying and procuring major items for the ground segment, such as the Canadian earth terminal for AEROSAT, and is also providing systems support to the AEROSAT Co-ordination Office.

An extensive program of research and development is being carried out by the Department in association with the European Space Agency, NASA and the U.S. Federal Aviation Administration to determine the types of communications equipment and traffic control techniques which best suit Canadian requirements for aircraft communications via satellite. Modulation techniques and antenna designs have been carried to the point of hardware development for exploitation by Canadian firms participating in the AEROSAT program.

International Maritime Satellite

In 1972 the Inter-Governmental Maritime Consultative Organization (IMCO) established a Panel of Experts to study satellite systems which could enhance the safety of life at sea and improve

public communications and vessel traffic management. The Panel of Experts, in whose work departmental officials participated, recommended that such a system should be established. IMCO considered the report of the Panel of Experts and has decided to convene an international conference in London in April and May 1975 to decide on the desirability of setting up an international maritime satellite system.

Other Projects

The Department was also engaged in a number of other projects or studies related to space applications:

- A study, using computer simulation, is underway to determine the effect on the quality of satellite communications as the number of satellites in orbit and the number of users of a frequency band increase. The results of the study, being undertaken by industry, will help to determine the best orbital positions and frequencies for future communications satellites, and will be a useful tool in preparing for future world administrative radio conferences.
- Eureka, in the high Arctic, was the site of a joint experiment in July with Telesat Canada. A mobile earth station was designed, assembled, tested and subsequently transported to the site in Eureka for two weeks of signal propagation measurements. These measurements demonstrated the feasibility of satellite communications in the very high Arctic as well as supplying important technical design data which were not previously available.
- A study has shown that up to 97 per cent of lost aircraft within the last five years could have been located with the aid of a geostationary satellite and an improved emergency locator transmitter on board the aircraft. It was also shown that the existing low powered emergency locator transmitters could be located only by using a low altitude satellite in polar orbit.
- A Canadian mobile earth station was the first to receive signals over the western antenna beam from the Franco-German satellite Symphonie. Signal strength measurements were made to verify predicted satellite performance as well as to establish the feasibility of satellite communications via Symphonie from earth stations located at Ottawa.
- A number of development projects with universities and industries were undertaken, for example, to examine the potential of hollow glass microspheres as an insulation medium for spacecraft; to develop a software package to predict the performance of v-grooved heatpipes as a thermal control medium for aerospace and terrestrial applications; and to design a lightweight deployable solar array for future satellite applications.

9 RESEARCH

Research is one of the keys to future development of any sector and this is specially true in communications, on which man's reliance is steadily increasing and where change is often considered the only constant.

Scientific and technical research in communications is carried out in Canada by universities, industry and governments. The Department maintains its own research establishment which conducts research in support of the Department's objectives as a whole. In addition, the Department supports valuable research in a number of different fields through contracts within universities or industry.

During the year, a research policy and planning group was established to propose overall research policy, to develop the Department's research program and to develop projects that could be exploited by Canadian industry.

A Communications Research Advisory Board was established and held its first meeting early in the fiscal year. The board, which represents the views and interests of common carriers, universities and other government departments, advises the Department on the quality and relevance of its research program and recommends measures to improve coordination of communications research in Canada.

The Department's research centre has built up considerable expertise and a sound reputation in ionospheric, radio communications and radio propagation research. The ionosphere, because its reflection and absorption properties with respect to radio waves are highly variable, both in space and time, has a great influence on radio communications especially at high latitudes. Data on the upper ionosphere continues to be collected from the ISIS series of Canadian scientific satellites. Particular emphasis in current programs is on the structure and behaviour of the polar ionosphere, although some studies have been made of the mid-latitude and equatorial regions and new insights have been obtained concerning the generation of radio noise in the ionosphere. Studies of the lower ionosphere — the region responsible for the reflection of Low and Very Low Frequency radio waves (used for communications and navigation) and for the attenuation of High Frequency radio waves reflected from higher levels in the ionosphere — have also continued during the current year. Observations of the partial reflection of Medium Frequency radio waves have been made, principally at the Ashton, Ontario, field site, but also at Churchill and Resolute Bay. A cooperative program between the Department and the Lockheed Palo Alto Research Laboratory resulted in a better understanding of the ionospheric effects of energetic particles, those that result in auroral absorption of High Frequency radio waves.

As a part of research activities undertaken in support of the Department of National Defence, theoretical studies were carried out to develop an antenna to meet High Frequency communications requirements for reliable, long-range circuits.

The Department of Communications operates a Radar Laboratory to provide research and development services to other government departments and agencies. A joint Canada-United States experiment, Polar Cap III, demonstrated the feasibility of High Frequency radars in high latitudes. Another project evaluated airborne radar systems for long-range patrol aircraft.

Remote sensing is the means by which different aspects of the earth's environment can be measured, monitored and studied from a distance, such as from aircraft or satellite. Considerable research is directed at finding uses for radio and radar techniques in the area of remote sensing. For example, equipment using UHF impulse radar was developed and tested at the Department's Communications Research Centre for use in measuring the thickness of sea ice or fresh water ice or the moisture content of soil.

Another area of research in aid of the Department's spectrum management role is the development and use of HF automatic equipment to survey and monitor the High Frequency range of the spectrum (2-30 MHz). Other equipment has been developed to measure and analyze radio noise — noise that may interfere with radio communications. In particular, studies of power line noise have been made.

The effect of rain and other atmospheric conditions on microwave transmission represents another area of research. Work has continued on the production of Climatology Atlases that provide information and data on these effects. To assess the improvement of satellite ground station performance that could be achieved through the use of two receiving antennas spaced a few kilometres apart, equipment was installed near Montreal and Toronto. The work is being carried out by the Canadian Overseas Telecommunication Corporation.

Under a university research program, 120 proposals from Canadian universities were received and 45 were authorized for contracts. The program, through which university researchers conduct experiments and studies ranging over all aspects of communications, includes work in the areas of sociology, northern communications, multidisciplinary studies, economic and regulatory analysis, computer communications, communications technology and communications systems.

Two industrial research contracts were completed during the year, one by Bell Northern Research relating to loudspeaking telephones and the second by Nautel relating to a frequency agile transmitter.

Most of rural Canada suffers from a relatively low standard of telephone service and poor TV and radio broadcast reception. An overall research program in remote and rural communications has been developed and approved in principle. The Department is determining ways in which rural services could be improved. The emphasis in research is towards examining the role that new techniques and equipment might play in providing services in rural areas. For example, the Department began developing a rugged trail radio system to meet the requirements of people working in the harsh environments of Northern Canada. Equipment will soon be tested and used operationally.

In November, a project to develop a computer terminal for use in police cars was announced by the Department and the Royal Canadian Mounted Police. The terminal, to consist of a keyboard and video screen mounted below the dashboard of patrol cars, would put police officers in instantaneous touch with a nationwide computerized information system, greatly increasing the efficiency of police communications. The project is part of the Department's ongoing efforts at identifying potential markets for communications devices in Canada and stimulating industrial manufacturing and development activity.

Research continues into the application of fibre optics to communications. The emphasis has been on techniques of coupling light into and out of fibres and on the management of a project to deliver a fibre optic cable assembly to the Department of National Defence to replace a bundle of coaxial cables currently in use in an operational system.

10 EDUCATIONAL TECHNOLOGY

An area of exclusive provincial legislative authority where rising costs have been felt is education. Here, the efficient use of modern communications technology is an important means of reducing costs while improving the quality of education. The Educational Technology Program was established to provide provinces, at their request, with technical advice and help in the application of communications media — including audio-visual aids, computer-assisted instruction, and data processing — to various aspects of the educational process. Agreements were reached with three provinces: Nova Scotia, for a comprehensive study of educational technology; Newfoundland, for an assessment of the role of computers in educational technology; and Alberta, for an evaluation of audio-visual equipment. In addition, the program was assisting the Department of National Defence in a program to link a French and English military college for the teaching of bilingual courses.

Various types of audio-visual equipment in the area were tested by the National Film Board. Other support studies came from the National Research Council.

A number of university research studies were carried out in support of the Educational Technology Program. These included computer networks; technology for the handicapped; remote tele-teaching; simulation studies; and computer teaching in remote areas.

The program began to establish appropriate national standards for educational technology and carried out various industrial, marketing and technological forecasting studies related to educational technology.

11 INTERNATIONAL COMMUNICATIONS

There are few areas of human endeavour which require as much international cooperation and involvement as telecommunications. Radio waves recognize no national boundaries and decisions taken within one country can often affect its neighbours. Telecommunication links among countries are proliferating, especially through cable and satellite. The Department of Communications is the focal point in forming Canadian policy with respect to the international aspects of telecommunications and participates in some 20 international organizations.

International communications links are provided commercially in Canada by the Canadian Overseas Telecommunication Corporation, a Crown corporation which shares the ownership and use of international satellite and undersea cable facilities.

The Department safeguards Canadian interests in telecommunications; ensures that Canada's obligations under international agreements are fulfilled; participates in the international regulation and coordination of the frequency spectrum; and helps establish international standards for equipment and facilities.

The following highlights some of the activities of the Department in the international sphere during the year.

Canada continues to play a leading role in the United Nations Committee on the Peaceful Uses of Outer Space, particularly in the development, along with Sweden, of proposals on direct television broadcasting by satellite.

Regular international conferences are held under the aegis of the International Telecommunication Union (ITU) in order to update and improve the international regulations regarding the use of radio. In 1974, a World Maritime Administrative Radio Conference was held to revise regulations in the particular area of maritime mobile telecommunications. Specific revisions, which come into force in January 1976, relate to the radio-telephone and radio-telegraph frequency allocation tables, the list of maritime mobile UHF channels and the use of single sideband transmissions. At the conference, a Canadian was elected to the five-member International Frequency Registration Board of the ITU.

In 1977 and 1979, three major World Administrative Radio Conferences are to be held and Canada has already begun to prepare for them. The first two, in 1977, centre around regulations governing the implementation of direct broadcasting by satellite in the 12 GHz band and aeronautical mobile radio services. The 1979 conference will attempt a general revision of the international radio regulations including the

technical, administrative and operational regulations pertaining to the use of the radio frequency spectrum.

In preparation for these conferences, a Canadian Interdepartmental Committee was established in October 1974 under the chairmanship of the Department. The committee is preparing Canadian proposals for presentation at these conferences and will analyze the positions of other countries to determine their impact on Canadian telecommunications services.

The ITU Administrative Council also met in Geneva for its 29th session to plan for the forthcoming conferences and to follow up on decisions made in 1973 by the ITU Plenipotentiary Conference. Canada is one of the 36 elected members of the Administrative Council.

In 1974, as in previous years, the Department pursued its policy of exchanging knowledge in the telecommunications sector with other countries. These exchanges have been carried out with many countries through direct personal contacts between individual scientists, without a formal arrangement. In other instances, official agreements under which bilateral exchange programs have been developed have proved useful. Canada has held formal scientific exchanges in telecommunications primarily with France, the Federal Republic of Germany and Japan. A presentation on the applications of communications satellite technology was made in Indonesia by a member of the Communications Research Centre. Canada has also made numerous scientific contributions through multilateral organizations.

A number of countries, including Nigeria, Tunisia, Morocco, and Mauritania, requested Canadian technical cooperation in fields such as satellite communications and telephone systems. The Minister of Communications visited Tunisia, Algeria, and Morocco to discuss various aspects of communications and to strengthen the basis for cooperation.

The Department also participated in a number of other international conferences and meetings including:

- two committees of the Inter-Governmental Maritime Consultative Organization. The first, a sub-committee on radio communications, is revising standards for international maritime distress systems and establishing standard radio requirements for fishing vessels. The second, a panel of experts, is investigating the possibility of an international maritime satellite system;
- the annual meeting of the Executive Committee of the Inter-American Telecommunications Conference held at Quito, Ecuador. Participants discussed a broad range of matters of interest to Canada affecting telecommunications in Latin America and the Caribbean.
- the Final Study Group meetings and XIIIth Plenary Assembly of the International Radio Consultative Committee (CCIR), an organ of the ITU. The assembly approved recommendations relating to technical and operating aspects of terrestrial, maritime, aeronautical, space and broadcasting services.

Canada was represented at a number of meetings of the International Telephone and Telegraph Consultative Committee (CCITT), another organ of the ITU, dealing with recommendations relating to the technical, operating and tariff aspects of telegraph, data and telephone services.

Canada also attended meetings of the European Space Conference in Paris, as an observer.

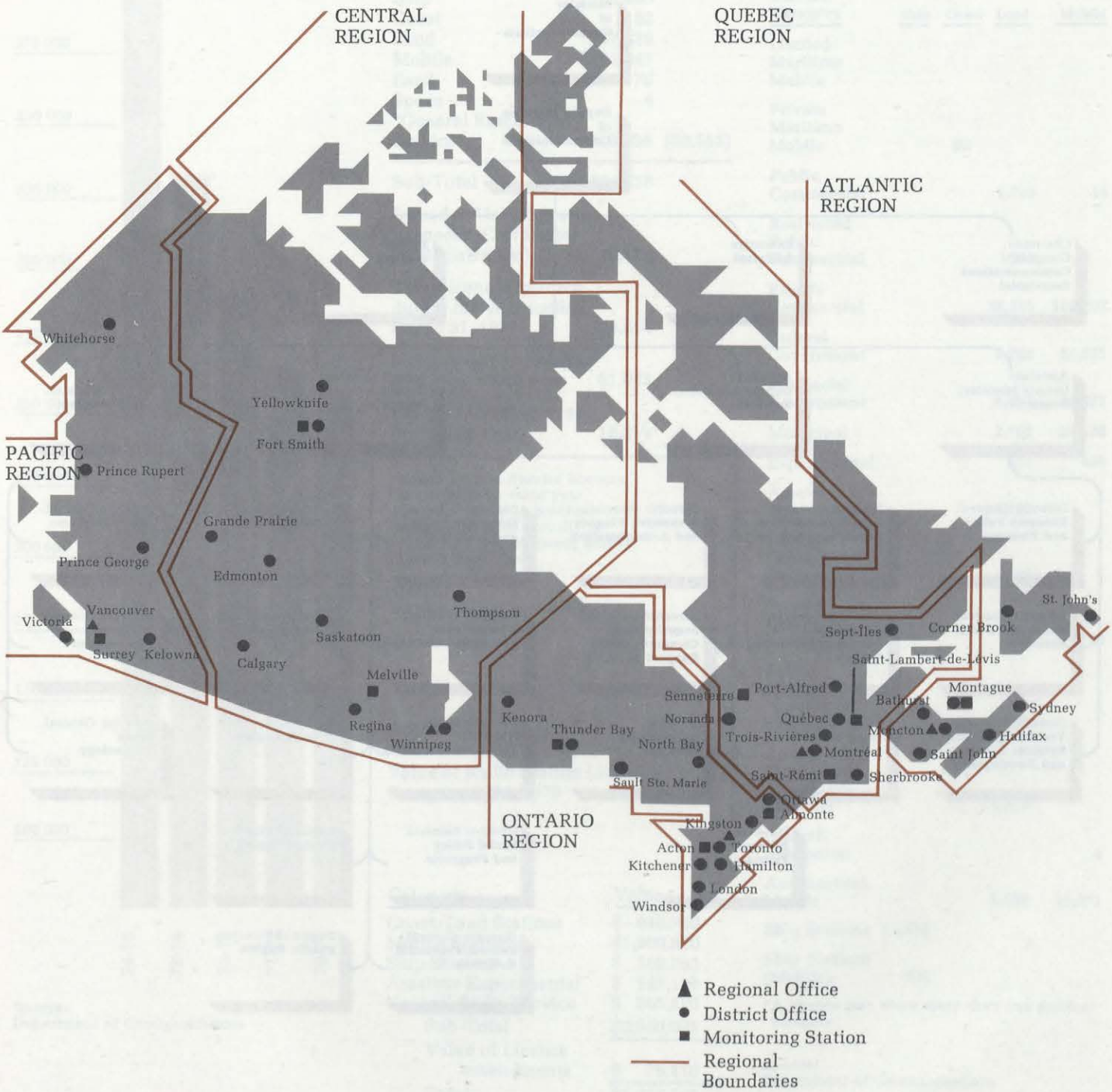
In March 1975, Canada hosted an international meeting of experts in data communications.

A series of international experiments in teleconferencing between groups in Canada and France was undertaken using the facilities of INTELSAT, the international satellite communications consortium, and the Canadian Overseas Telecommunication Corporation. The Department was involved in planning for another series of international satellite teleconferencing experiments, this time using the recently-launched Franco-German Symphonie satellite.

APPENDICES

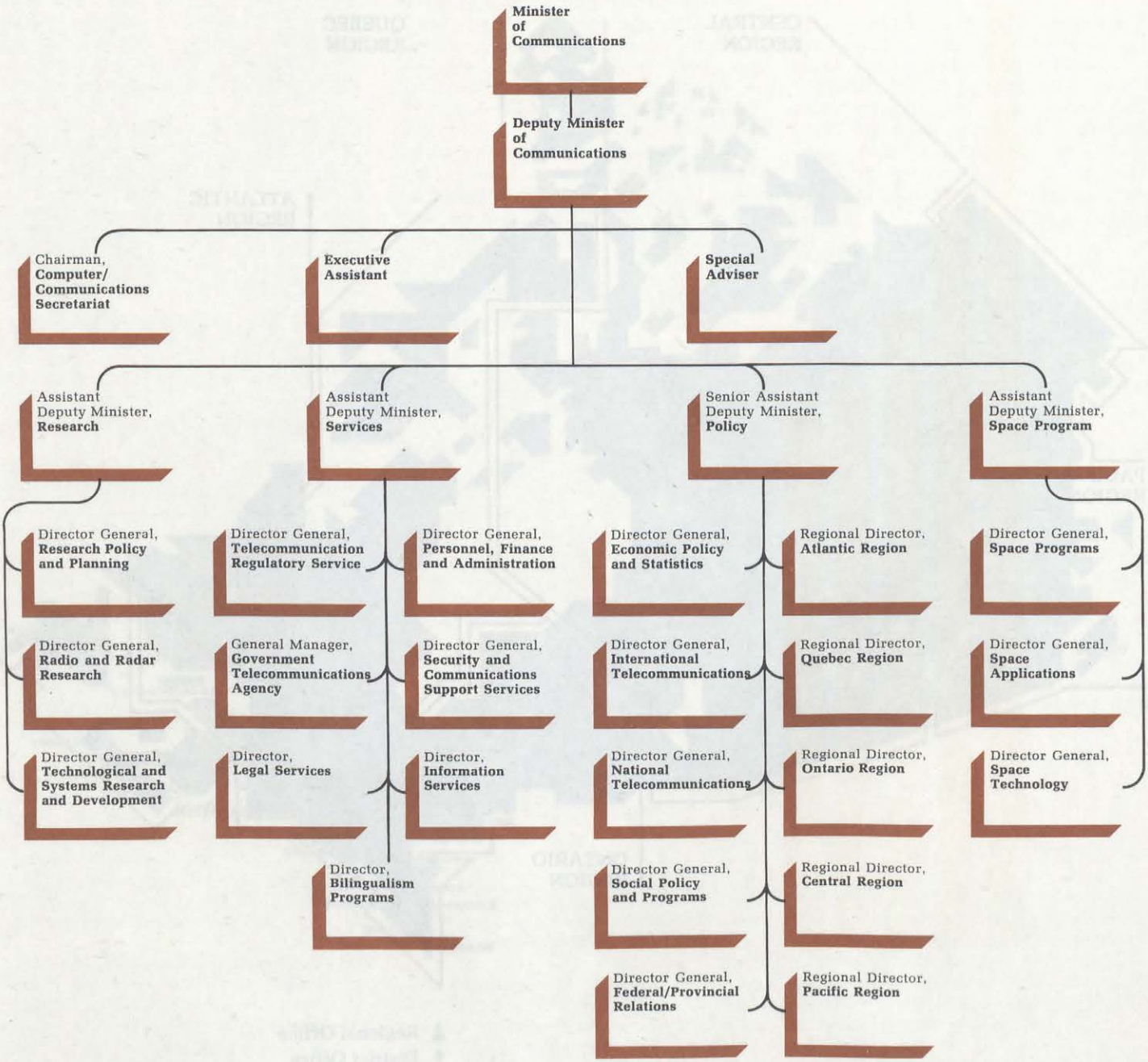
Appendix I

Department of Communications:
Locations across Canada



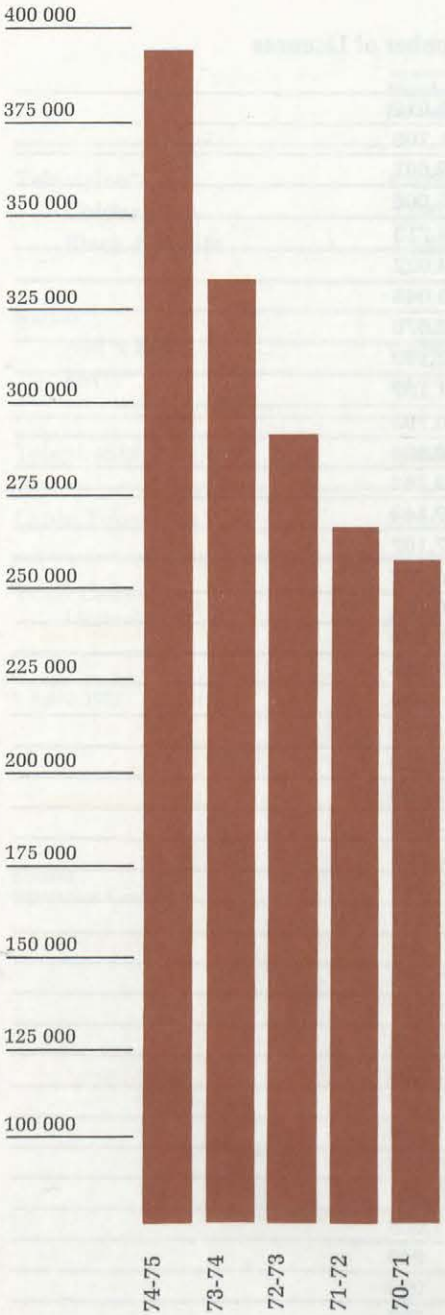
Appendix II

Department of Communications
Organizational Chart, March 31, 1975



Appendix III

Radio Station Licences in Force 1970 - 1975 (All Classes)



Source:
Department of Communications

Appendix IV

Summary of Radio Station Licences in Canada by Category, 1974/1975

Ship	11,955	
Coast	82	
Land	57,639	
Mobile	202,847	
Earth	75	
Space	4	
*General Radio Service	113,836	(50,552)
Sub-Total	386,438	
Issued to United States licensees (Certificates of Registration)	9,176	
Total licences in force during the year ending March 31, 1975	395,614	
Net increase in licences over preceding year	61,043	
Per cent increase over preceding year	18.2%	

*General Radio Service licences are valid for a three year period. Figures in brackets indicate licences actually issued (new and renewed) during 1974/75 fiscal year.

Source:
Department of Communications

Appendix V

Value of Radio Station Licences by Category, 1974/1975

Category	Value
Coast/Land Stations	$ 848,760
Mobile Stations	$1,309,820
Ship Stations	$ 169,765
Amateur Experimental	$ 147,130
General Radio Service	$ 505,520
Sub-Total	$2,980,995
Value of Licence amendments	$ 76,110
Total	$3,057,105
*Net Increase over previous year	$ 391,072.50
Per cent increase over previous year	15%

*Excludes value of amendments.

Source:
Department of Communications

Appendix VI

Number of radio stations by service category, 1974/1975*

Service Category	Ship	Coast	Land	Mobile
Limited Maritime Mobile				
Private Maritime Mobile		82		
Public Commercial			1,798	14
Restricted Public Commercial			558	
Private Commercial			28,255	165,297
Federal Government			5,723	16,551
Provincial Government			6,577	24,871
Municipal			2,702	25,536
Experimental			511	436
Amateur Experimental			14,713	
Public Commercial Receiving			82	
Private Commercial Receiving			512	170
Public Commercial Automatic Repeater			1,123	
Private Commercial Automatic Repeater			1,896	
Aircraft Navigation				4
Aeronautical Mobile			1,652	11,371
Ship Stations	11,955			
Ship Stations (Mobile)	406			

*A licence may show more than one service category.

Source:
Department of Communications

Appendix VII

Major Users of Radio in Canada, 1974/1975

User	Number of Licences
General Radio Service (including Certificates of Registration)	123,012
Building & Other Construction & Trades	21,709
Taxi Systems	19,692
Air Transport & Services	15,006
Amateur Experimental Service	14,713
Truck Transport	14,022
Ships & Water Transport Services	13,043
Police Services (Federal, Provincial, Municipal)	12,676
Electric Power Systems	12,189
Other Federal, Provincial & Municipal Services	11,187
Railway Transport	10,793
Forestry Services	9,836
Logging	9,782
Telephone Systems	9,543
Highway & Bridge Maintenance	7,187
Mines & Mines Services	6,287
Services to Business Management	6,164
Petroleum & Other Prospecting	5,679
Highway, Bridge & Street Construction	5,368
Fuel Dealers	4,644
Ready Mix Concrete Manufacturers	4,316
Farms & Agricultural Services	3,229
Pulp & Paper Mills	2,649
Sawmills, Planing Mills, Wood Industries	2,598
Petroleum & Gas Wells-Absorption Plants	2,265
Insurance, Real Estate & Investment Companies	1,944
Schools, Universities & Related Educational Services	1,847
Gas Distribution Systems	1,803
Bus & Urban Transit Systems	1,753
Engineering & Scientific Services	1,717
Pipeline Transport	1,212
Fishery Services & Products	1,194
Civil Defence (EMO Services)	1,187
Machinery & Equipment Wholesalers	1,183
Water & Other Utilities	1,153
Lumber & Building Materials Wholesalers	1,061
Fire Services (Provincial & Municipal)	1,008
Lodging Houses & Residential Clubs	940
Iron & Steel Mills	920
Motor Vehicle Dealers & Repair Shops	797
Tire, Battery & Accessory Dealers	791
Private Investigators	761
Gasoline Service Stations	681
Radio, T.V. & Electrical Appliance Repair Shops	616
Communications Equipment Manufacturers	386

Source:
Department of Communications

Appendix VIII

Use and Availability of Communications Services: Selected Data (1975)*

	Number of households	Percent of total households	Increase (Decrease) over 1974	
			Number	Percentage
Television**	6,488,000	96.8	231,000	3.7
Colour	3,581,000	53.4	689,000	23.8
Black & White	4,543,000	67.8	(213,000)	(4.5)
Radio				
AM & FM	6,588,000	98.3	214,000	3.4
FM***	5,074,000	75.7	422,000	9.1
Telephones	6,463,000	96.4	241,000	3.9
Cable Television	2,710,000	40.4	Not available	
Total Canadian Households	6,703,000	100.0	215,000	3.2

* April 1975

** Because some households have more than one television receiver, combining households with colour television and those with black and white television does not equal total households with television receivers.

*** These data include combination AM and FM receivers, therefore subtracting these figures from the above would not give the exact number of households with AM receivers.

Source:
Statistics Canada.

Appendix IX

Cable television in Canada by region*

	British Columbia**	Prairies	Ontario	Quebec	Atlantic	Canada
Systems	71	30	118	153	27	399
Subscribers	509,086	284,736	1,226,193	471,857	64,681	2,556,553
Households in licensed areas	634,363	551,957	1,825,925	1,142,372	118,317	4,272,934
Penetration (%)	80.3	51.6	67.2	41.3	54.7	59.8

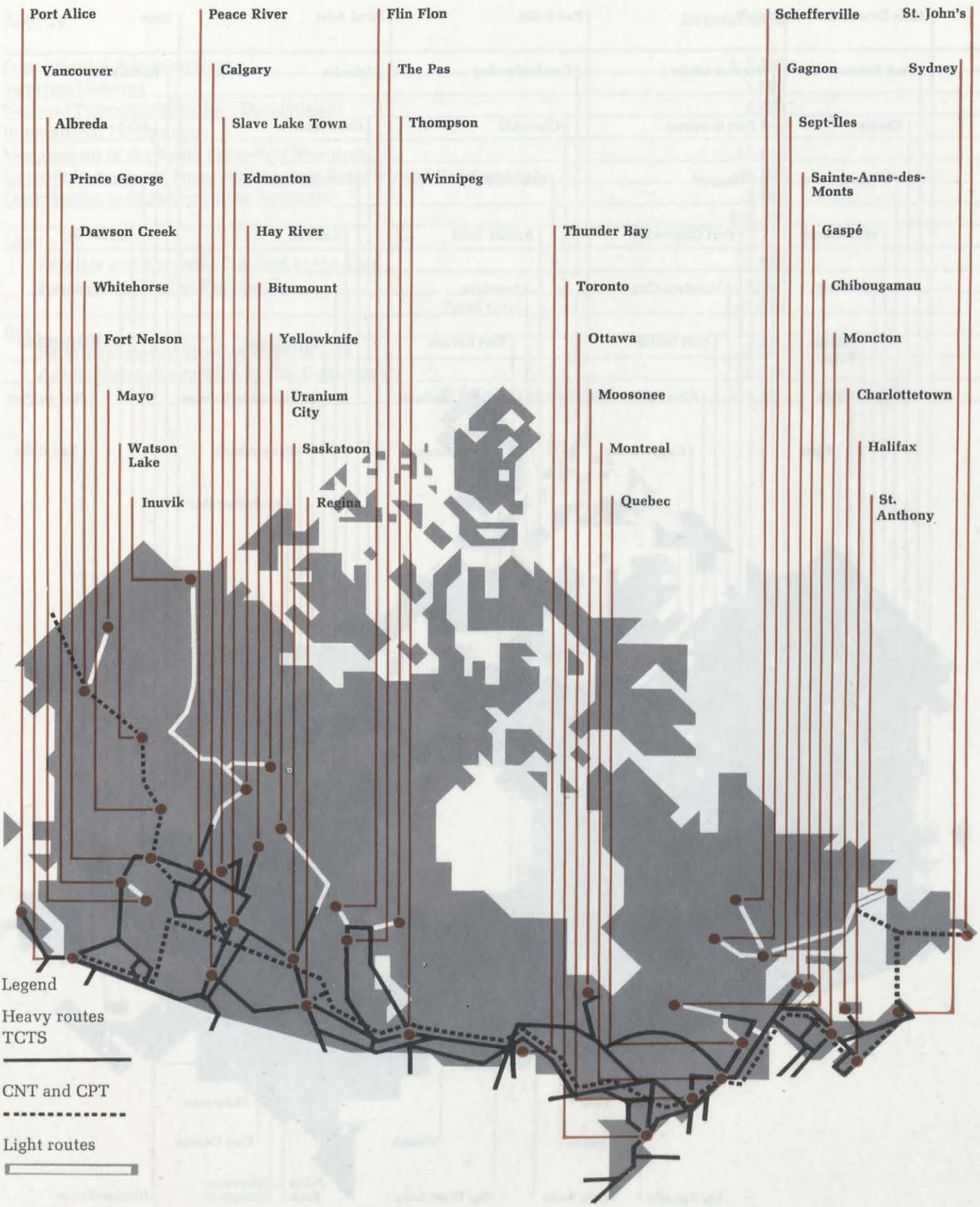
Source:
Department of Communications

* Figures are for the period September 1, 1973 to August 31, 1974.

** Includes the Yukon and Northwest Territories.

Appendix X

Microwave Facilities, 1975



Appendix X-A

Satellite Earth Stations, 1975

Appendix XI

Department of Communications
1974/75 Expenditures by Activities (thousands of dollars)

Activity	Expenditures
Departmental Administration	$ 7,785
Strategic Planning	1,780
National Telecommunications Development	2,629
International Participation	1,162
Management of the Radio Frequency Spectrum	13,948
Communications and Space Applications Research and Development	33,107
Contribution to Superannuation Accounts	2,344
	$62,755
Less:	
Receipts and Revenues Credited to the Vote	11,243
Receipts Credited to Revenue	3,639
Total Cost	47,873
Add:	
Services provided by other Departments	2,250
Accommodation provided by this Department	1,314
Total Cost of Program	$51,437

Department of Communications
Government Telephone Account Revolving Fund
(Authorized by Vote L20, Appropriation Act No. 5, S.C. 1963, c.42)

Balance Sheet as at March 31, 1975

Assets			Liabilities		
Current assets			Current liabilities		
Employee's travel and removal advances		$ 1,493	Accounts payable and accrued liabilities		$3,396,796
Accounts receivable — Departments and agencies of the Government of Canada		3,096,092	Advances from Canada for working capital (authorized $1,000,000)		—
Accrued revenue		141,145	Less: Replacement funds available for purchase of capital assets		—
Due from Canada for working capital	71,646		Capital assets financed from parliamentary appropriations prior to April 1, 1971		95,957
Less: Replacement funds overdrawn for purchase of capital assets	12,058	59,588	Retained earnings		
		3,298,318	Balance at beginning of year	66,085	
Capital assets			Prior years' adjustments	12,455	
Equipment and furniture, at cost or appraised value		171,489		78,540	
Less: Accumulated provision for replacement		56,309	Net loss for the year, per Statement of Operations	(157,795)	
		115,180	Balance (deficit) at end of year		(79,255)
		$3,413,498			$3,413,498

Note: The Treasury Board has authorized the fund to carry forward to future years surpluses or deficits to a maximum amount of $150,000.