1975
1976
ANNUAL REPORT

DEPARTMENT OF COMMUNICATIONS

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

Department of Communications
Ministère des Communications

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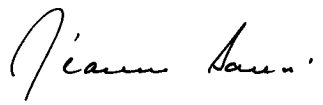
To His Excellency the Right
Honourable Jules Léger, Governor
General and Commander-in-Chief
of Canada

Your Excellency,

I have the honour to present the
Annual Report of the Department of
Communications for the fiscal year
ending March 1976.

Yours faithfully,



Jeanne Sauvé
Minister of Communications

1 INTRODUCTION

On January 17, 1976, Canada's Communications Technology Satellite (CTS) was launched into geo-stationary orbit from the Kennedy Space Centre. This event signalled more than the successful orbiting of another satellite by Canada and the conclusion of a six-year period of intensive testing, evaluation and construction by the Department of Communications, although it was both of these. CTS could be the beginning of a new era of communications in Canada.

CTS, now named "Hermes", is the world's most powerful communications satellite. Because of its high power and use of new frequencies, Hermes could be the forerunner of the direct space-to-home broadcasting satellite. It is being used in a series of experiments to test this advanced communications hardware, to explore new techniques of communication and to assess the social, cultural and economic impacts of this new technology. One of the most important objectives is to demonstrate the feasibility of transmitting a variety of signals — from television programs to computer data — directly to small, low-cost earth stations. Details of the Hermes program appear in the chapter on Space Research.

Canadians are already heavy users of satellite communications. Telesat Canada has operated a domestic satellite network since 1973 which now numbers 50 earth stations providing television, radio, voice, data and facsimile transmissions to urban, rural and remote areas across the country. Teleglobe Canada provides overseas links using satellite and cable.

Canadians, because of their climate, geography and scattered population, place heavy reliance on communications systems. More than 98 per cent of Canadian homes have at least one radio; 97 per cent have television sets and more than 96 per cent have telephones. In addition, a total of more than 515,000 radio station licences were in force during 1975-76, an increase of about 30 per cent over the previous year. Much of the increase was due to the phenomenon of Citizen's Band radio, officially known in Canada as General Radio Service (GRS). More than 200,000 Canadians currently hold GRS licences, and the figure is increasing rapidly.

These statistics point to a fact that may be left aside when we think about communications in Canada. The electromagnetic spectrum, through which radio communication takes place, is not only a valuable resource, but a limited one which must be used for the benefit of all Canadians.

The Department of Communications directly regulates the use of radio in Canada, manages the electromagnetic spectrum and develops policies with respect to telecommunications.

Federal-provincial consultations on telecommunications matters are a continuing responsibility of the Department. During the year, there were two sessions of the Federal-Provincial Communications Ministers Conference, in May and July, 1975, and near the end of the fiscal year a series of bilateral meetings between the Federal Minister of Communications and her provincial counterparts had begun.

Also during the year under review, an Act of Parliament created a single Canadian Radio-television and Telecommunications Commission, amalgamating the former Telecommunications Committee of the Canadian Transport Commission and the Canadian Radio-Television Commission under one administrative roof. This was the first of a two-step legislative process, the second phase of which will involve a consolidation and more substantial revision of the statutes of governing communications and the provision of mechanisms to ensure more effective regulation and administration of telecommunications in Canada.

Part of the mandate of the Department is to promote the extension of communications services in Canada and, as a result, a growing priority is to encourage improvements to communications services in rural and remote areas of Canada.

The following chapters provide highlights of the activities of the Department during the fiscal year 1975-76.

2 MANAGEMENT OF THE RADIO FREQUENCY SPECTRUM

The number of radio stations licensed to transmit in Canada jumped dramatically by about 30 per cent during the year. As of March, 1976 the figure had reached 515,000. The growing popularity of General Radio Service (GRS) often called Citizen's Band, accounted for most of this increase as Canadians by the thousands flocked to equipment dealers to buy two-way CB radio sets.

All radio transmitters make use of the radio frequency spectrum, a limited public resource. In managing the spectrum, the Department:
- issues licences for radio stations;
- conducts examinations for persons desiring to obtain certificates of proficiency as radio operators;
- regulates the use of radio stations and radio frequencies;
- develops standards to control interference to radio and TV reception;
- tests and type-approves radio apparatus;
- issues technical and operating certificates for broadcasting undertakings;
- takes measures to increase the effectiveness of spectrum management.

As more Canadians make use of spectrum, the Department is searching for and applying new ways to manage this resource more effectively.

During fiscal year 1975-76 for example:
- the Department began developing an automated spectrum management system to ensure effective sharing of spectrum resources, particularly in urban areas;
- several changes to radio regulations were made. As illustrations, new radio interference regulations were introduced in October, 1975 that include new limits for radio noise produced by spark ignition systems; General Radio Regulations Part II, affecting GRS, were amended to spell out maximum permissible power and to prohibit malicious interference of one GRS station with another; age requirements for candidates wishing to take a radio operator certificate examination were revoked in July, 1975; and Radio Regulations Part II were amended in March, 1976, to exempt low powered devices operating in the AM band (such as phono-oscillators or baby surveillance apparatus) from licensing requirements;
- an up-to-date consolidation of the Radio Act and radio regulations was published during 1976;
- information on common carrier service for radio paging and the revised maritime mobile radiotelegraph bands were published and distributed;
- revised technical and theory examinations for second class certificates were implemented;
- five new Morse code examinations in both official languages were produced on a single cassette for the amateur radio operator certificate examination;
- a study was undertaken on the concept of fleet licensing as applied to the authorization of radio stations in Canadian aircraft.

More attention is also being given to electromagnetic compatibility between systems using the radio frequency spectrum, and various programs are being implemented to ensure that radio systems are free of interference from unnecessary or unwanted emissions. The expanding use of radio in urban areas and increasing transmitter power make this measure essential to preserve service quality.

3 REGIONAL OPERATIONS

The Department of Communications is responsible for management of the radio frequency spectrum in five administrative regions — the Atlantic, Quebec, Ontario, Central and Pacific. Through district offices and monitoring stations in each region, the Department licenses radio stations, inspects radio facilities to ensure conformity with federal regulations, investigates sources of interference, monitors radio transmissions, and conducts certificate examinations for operators of specific radio services. Regional offices also take part in programs designed to examine technical, social and economic factors contributing to the reliability and utility of communications systems in Canada. In all regions, 1975-76 was a year of significant growth in operational activities, particularly in licensing as the number of radio station licence applications continue to increase substantially.

The Department opened two new district offices during the year, at Charlottetown, P.E.I. and Cranbrook, B.C., bringing the total to 42.

In addition to day-to-day spectrum management activities and the administration of Government Telecommunications Agency services across Canada, regional offices often undertake special projects or collaborate in programs with headquarters or with other regions. For example, during the year through its various regional offices, the Department:

- undertook a technical survey of television reception in New Brunswick;
- helped prepare for the communications requirements of the Montreal Olympic Games;
- assisted the Northern Quebec Inuit Association with a project designed to establish a radio network to link 14 Inuit communities;
- provided funding on an experimental basis for the operation of radio station CFTL in Big Trout Lake, Ontario, a community radio station operated by the Ayamowin Communications Society of Northwestern Ontario;
- evaluated a proposal to extend cable television to a number of Northeastern Ontario communities;
- prepared experiments and pilot projects for programs to upgrade rural and remote communications;
- began developing and testing a solar panel power source for trail radios.

Another important aspect of regional activities is consultation and liaison with provincial governments. The Department prepared briefing material and coordinated preparation for two sessions of a federal-provincial communications ministers' conference in May and July 1975, as well as for related discussions with provincial officials in June. Subsequently, in conjunction with provincial officials, the Department arranged a series of bilateral meetings between provincial communications ministers and the federal minister.

Federal-provincial liaison at the regional level complemented these meetings. For example, the Maritime Consultative Committee on Communications, now renamed the Atlantic Consultative Committee with the joining of Newfoundland, continued to provide effective federal-provincial cooperation, meeting four times in 1975-76 to discuss communications matters. Meetings were also held in Ontario with provincial agencies involved in communications to discuss and compare federal and provincial policies and plans.

4 BROADCASTING AND CABLE TV

The Department is involved in various aspects of broadcasting and cable TV. To begin with, the Department conducts technical evaluations of all broadcasting and cable television licence applications and advises the Canadian Radio-television and Telecommunications Commission (CRTC) whether a technical construction and operating certificate will be issued. During the year, the Department evaluated more applications than ever before, owing to the CBC accelerated coverage plan and CRTC policy for extending FM broadcast services throughout the country.

The Department also undertakes research projects supporting new policies and legislation concerned with national broadcasting and studies various aspects of broadcasting policy on a continuing basis. These activities include an evaluation of private and public broadcast systems, program production services, advertising and cable television systems.

During the year, the Department continued to consult with a number of organizations, including the CRTC, on the availability of channels for broadcasting stations. Procedures and criteria have been developed so that television service may be extended to small communities by means of low-power UHF television broadcasting stations. This complements procedures developed some time ago for low power VHF stations.

5 TELECOMMUNICATIONS SYSTEMS AND SERVICES

An important part of the Department's responsibilities entails the examination and statistical analyses of various telecommunications systems. These include the corporate and financial structures of telecommunications companies; the economic activity and inter-corporate relationships of the carriers; forecasting future demand and supply trends; and studies on many other aspects of the industry.

Recent activities include the development of econometric models for Bell Canada and B.C. Telephone. During the fiscal year, these models contributed to a greater accuracy in the Department's ability to project operating revenues and expenses for federally-regulated carriers.

With the growing use and importance of communications, the Department is developing an annual handbook focussing on the communications tariffs of Bell Canada and CNCP Telecommunications.

A study of the Extended Area Service (EAS) provided by Bell Canada and B.C. Telephone was completed during the year, including a full description of the methods and principles used to determine an exchange local service rate group and an investigation of how these principles have changed through time. The study assessed the effect of EAS on local service rates, volume of traffic and revenues.

During the year, the Department consulted with domestic telecommunications carriers on their procurement practices. A major review of the procurement practices and policies and the intercorporate financial relationships of the British Columbia Telephone Company was published in July 1975.

In a move which should have significant results, the Department reached an agreement with federally-regulated common carriers to allow the attachment of certain customer-provided devices to telecommunications networks. The practice in the past has been that devices (such as telephone answering equipment and recording machines) could be attached to networks only through a protective coupler, supplied by the carrier and charged to the customer on a rental basis. The new agreement would facilitate the offering of a wider range of communications devices to the Canadian public without the need for coupling devices provided by the telephone company.

During the year, the Department developed a proposal for the extension of basic intercommunity telephone services to all communities of the Northwest Territories which are inadequately served.

In cooperation with United States authorities and the Newfoundland Telephone Company, the Department also arranged for the replacement of discontinued military communications facilities, which had been serving a number of communities in Labrador, with a modern microwave system built by the Newfoundland Telephone Company.

6 COMPUTER COMMUNICATIONS

Canada is moving away from paper-based information storage and processing due to the growing use of computers. As a study of computer communications in 1972 and a Green Paper published in 1973 have shown, this is a development of major significance that raises complex policy issues touching the responsibilities of many departments, including the Department of Communications.

A measure of the speed at which this shift is occurring is the growing expenditure in all economic sectors on computers and related services. The cost of computer-based services to users in Canada (including computer equipment, supplies, personnel and data communications services) is estimated to have reached $2.6 billion in 1975. This represents a growth of $1.5 billion since 1970 and further growth to a total in excess of $5 billion is expected by 1980.

To help ensure the orderly transition from paper-based data systems, the government devoted considerable effort during the last year to developing the necessary infrastructure for continuing co-ordination and co-operation

among federal and provincial governments and between the public and private sectors. Discussions at the official level between federal and provincial governments and a number of associations in the private sector were held to establish a basis for the development of compatible approaches to computer communications policies throughout Canada. In addition, a number of studies were completed by the Interdepartmental Committee on Communications Policy and Program Coordination, established by Cabinet in April, 1973 to formulate recommendations related to computer communications.

Work continued on the development of a common user communications network for use in Canada's financial payments system, as announced by the Finance and Communications Ministers in January 1975. The Canadian Payments System Standards Group was formed to prepare the groundwork for the network, envisaged as a shared service, accessible to all qualified users on a fee-for-use basis. Government policy in this area also aims at protecting the rights and privacy of individuals while enhancing the competitive environment of the banking industry. In preparation for the 1977 revision of the Bank Act, the Computer Communications Secretariat prepared a review of the types of computer-based services banks might provide and the conditions under which they may be provided.

Following representations from the Government of Manitoba on the possible benefits of decentralizing Federal Government electronic data processing activities, a working group was established which made specific recommendations to Treasury Board. Consultation among Federal Government departments and the provinces took place during 1975-76 to consider development of a standardized job profile description for computer communications across Canada. Such a system would define expertise and knowledge requirements and provide a basis for developing training programs.

7 THE GOVERNMENT TELECOMMUNICATIONS AGENCY

The Government Telecommunications Agency was authorized in 1966 to plan, establish and manage telecommunications facilities and services that would satisfy the requested needs of federal departments and agencies on an economic basis. A major goal is to achieve cost effectiveness for government departments through good management and bulk leasing of facilities at reduced costs.

From the original three consolidations at Ottawa, Montreal and Toronto in 1966, the network has grown to twenty systems in the past decade with the addition of Calgary, Regina and St. John's, Newfoundland this year. A total of 60,000 main local telephones are now sharing common network services.

There were 19.5 million intercity calls handled on the network this past year at an average cost of $1.06 for each six minutes. The equivalent cost of these calls if routed over the long distance commercial service would have been $55.6 million as compared to the actual cost of $20.7 million.

Apart from the voice/data intercity network, a computer based low speed store and forward message switching system was developed and introduced for shared government use in February 1975. This is leased from CNCP Telecommunications and processed some 93.8 million words in the first year of operation at a saving of 20 per cent over normal Telex commercial costs. Negotiations are in progress to extend the capacity from 550 to 1000 terminals to serve additional offices.

Responding to a growing requirement for facsimile service to transmit documents and drawings from one location to another, GTA is studying ways of encouraging compatibility of equipment and reducing cost through bulk purchasing.

GTA was approached by Canadian Penitentiary Services during the year under review to be the consulting and design authority on all telecommunications services required for federal penitentiaries. This work is associated with the renovation of existing institutions and the planning of a number of new ones. At the end of the year, terms of reference were drawn up as a guide for the Agency in undertaking this program.

Other projects underway include:
- study and evaluation of telecommunications services and facilities required to implement a database system for the Secretary of State Translation Bureau. (The system will permit translators of both official languages to search a computerized data storage base and quickly obtain standard translations of words and phrases);
- development of an automated notices system for the Public Service Commission to improve the way in which employment and advancement opportunity notices in the public service are transmitted to federal government offices across the country;
- a review of telecommunications requirements for the training institute of the Ministry of Transport; an automated film booking system for the National Film Board; and the coordination on behalf of External Affairs of telecommunications facilities for the Habitat Conference on Human Settlements.

8 SPACE PROGRAMS

Canada has been an early leader in the field of space communications. Domestic and international satellite systems as well as terrestrial networks routinely provide reliable and economical communications services to most parts of Canada. In developing Canada's capabilities in space, Canadian industry has gained substantial expertise and a considerable reputation in this high-technology field.

Telesat Canada's domestic satellite system, with its three Anik satellites, continues to provide both east-west and north-south communications links and is reaching an increasing number of urban, rural and northern communities with telephone, radio, TV and other services. International satellite communications, using the world-wide INTELSAT system, are provided through Teleglobe Canada.

The Department is engaged in a number of space programs designed to help meet future requirements for satellite systems.

The Communications Technology Satellite/Hermes

On January 17, 1976, Canada's Communications Technology Satellite, now renamed Hermes, was launched from the Kennedy Space Centre in Florida. The satellite is "on station" and ready to begin a two-year program of experiments in communications. Hermes represents a six-year development program and a significant step toward direct-to-home broadcast satellites.

Hermes is different from the current generation of communications satellites in a number of respects. First, it is much more powerful than conventional satellites. At its heart is a 200 watt broadcasting tube. It also operates at a higher frequency — 12 and 14 GHz instead of the 4-6 GHz frequencies used by current operational satellites. The result is that Hermes can provide telephone, colour TV, radio and data services to very small, less expensive and even portable ground stations.

To provide the increased energy required to power the satellite, Hermes is equipped with two large solar arrays, studded with about 27,000 solar cells. In addition, Hermes is stabilized on three axis, unlike the spin-stabilized, conventional satellites.

The objectives of the CTS program are: to demonstrate high-powered television and other transmissions to small, low-cost earth stations; to explore by means of communications experiments the social, cultural and economic impact of the eventual introduction of services that might be provided; to flight-test major advanced technology sub-systems of the spacecraft itself; and to develop and demonstrate the abilities of Canadian industry in the design and fabrication of subsystems and components for the space communications systems of tomorrow. With the launching of Hermes, these objectives have been met with the exception of the experimental program, which is to begin in April 1976.

In all, about 80 per cent of the value of the industrial contracts let for construction of Hermes has gone to Canadian industries. In addition, the program has provided a means of encouraging Canadian manufacturers to develop capabilities for the design and manufacture of advanced components and sub-systems for spacecraft. The U.S. National Aeronautics and Space Administration (NASA) provided some components, launched the spacecraft, and will share time on the satellite. The European Space Agency also participated.

The construction of the satellite was completed within budget and on time to within a few weeks. During the past year, final integration and environmental tests preceded the launch of the spacecraft. Checkout and control of the satellite in its geostationary, on-station position is now in the hands of the Department's Communications Research Centre. In the latter part of the year, the CTS on-orbit activities, including the co-ordination of the experimental program, were amalgamated into a single management group, which also includes the management of the earlier Alouette/ISIS missions.

Eleven significant papers resulting from Hermes developments were presented this year to the scientific public. Twenty groups across Canada representing industry, governments, broadcasters, universities and associations will use the satellite to experiment with new communications services such as telemedicine, TV transmission using small earth stations, tele-education, community interaction and others.

Aerosat

Aerosat is an international program involving Canada, the United States and the nine European Community countries which calls for purchase and launch of two satellites to provide air traffic control services on an experimental basis over the North Atlantic.

A coordinated experimental program involving 11 countries will be undertaken. In Canada, the Ministry of Transport will be responsible for establishing a ground station and equipping a number of aircraft with avionics to permit communications and navigational experiments to be carried out. The Department of Communications is responsible for the Canadian involvement in the space segment of the Aerosat program and is also providing technical support on other communications aspects of the program.

Telesat Dual-band Spacecraft

During 1975 Telesat Canada placed an order for a new spacecraft. To be built by RCA Ltd., for launch by NASA in 1978, this spacecraft will be equipped with a 14/12 GHz transponder in addition to 6/4 GHz equipment similar to that used in the previous ANIK series allowing it to operate in two different frequency bands. The 14/12 GHz transponder is intended to test new services, equipment and techniques foreseen for future Telesat operational systems. The Department is supporting the introduction of these new services by contracting with Telesat for the use of part of the 14/12 GHz transponder capacity.

Other Programs

The Department has also been concerned with a number of other projects related to space.

The Department is considering the potential impact of the United States space shuttle on the Canadian satellite program. The space shuttle represents a significant advance in satellite launching techniques, permitting recovery and re-use of the launch vehicle. Use of this new launching method will have an important impact on future satellite design. In-house planning was supplemented by a study commissioned with SPAR Aerospace Products Ltd., of Toronto.

An international program called INMARSAT is aimed at providing a satellite communication service to shipping throughout the world. A large measure of international agreement has already been reached and it is expected that resolution of remaining differences may be achieved at a conference in September 1976.

The Department is developing a computer program enabling radio interference between geostationary satellite systems to be accurately simulated. Such a program will aid in the planning of satellite systems to make the most efficient use of the radio frequency spectrum and of limited orbit space.

The possibility of using a satellite for search and rescue purposes was being evaluated during the year in co-operation with the Departments of National Defence and Transport.

In addition, France and Canada with cooperation from Quebec, experimented in a series of trans-Atlantic video conferences, using the French-German Symphonie satellite system. The satellite provided temporary two-way audio visual links between a number of locations in Canada and France, for the purposes of cultural and educational exchange.

9 RESEARCH

How will Canadians communicate 10 years from now? What new technologies could and should be introduced? What new demands will be placed on Canada's communications systems and how can they be met?

Research helps to answer these and other questions. The Department undertakes scientific and technical research both directly, at its Communications Research Centre (CRC) near Ottawa, and indirectly, through a program of industry and university contracts for specific research projects.

The CRC has had a distinguished history, particularly in the fields of defence communications, high frequency transmission, the ionosphere and radar. Now the Department is in process of re-orienting research efforts to relate them more closely to the public telecommunications sector — to telephone, telegraph, broadcasting, cable distribution, data networks and mobile communications.

The Department is also re-examining its existing radio research programs with a view to ensuring that research in this area is carried out in line with the Department's responsibilities to manage the radio frequency spectrum.

A working paper produced during the year highlighted the major foreseeable public telecommunications developments in Canada over the next decade. Among key problem areas identified are: (1) under-developed rural communication; (2) over-wiring in the urban sector; (3) critical congestion and spectrum scarcity in radio communication; (4) technological advancement that could radically revise the economics of wide-band transmission.

Work began on defining the general scope of the rural communications problem in Canada, and ways in which improvements could be instituted.

Preliminary consultations began with industry researchers and planners to identify priorities for research into urban communications. The consultations, which take into account changing technology and service trends, are expected to develop into plans for urban research programs during 1976-77. In addition, a general reassessment of the Department's research budgeting and contracting policies was submitted to the Senate Special Committee on Science Policy, in January 1976.

A long-range program to look at the possible effects on communications of such factors as energy shortages, conservation, employment and inflation was identified.

During 1975-76, too, the Department continued its program of general research for the Department of National Defence in radar and high frequency (HF) communications. Through briefings and day-to-day consultations, the two departments assessed new cooperative ventures in defence telecommunications.

The Department continued to organize and manage a $700,000 university research program. Designed to provide the Department with the benefit of academic research and to provide university researchers with opportunities to work in telecommunications, the program this year approved 50 projects. Ten were in the field of space communications, 14 in conventional communications, seven in radio wave propagation and 19 in socio-economic aspects of communications.

With respect to industrial research liaison and assistance, the Department evaluates unsolicited proposals forwarded through the Department of Supply and Services. Two major projects in optical fibre systems and high frequency transmitters and a number of smaller contracts, were processed.

Communication using fibre optics — thin glass threads through which communication is transmitted by light — is a subject of continuing research. During the next decade, the use of this new technology is expected to spread, particularly since the cost and scarcity of the copper used in conventional wire and cable systems is becoming an increasingly important factor. Fibre optics also hold the promise of greater transmission capacity with less interference than wired systems. More than 80 scientists gathered at the Communications Research Centre in May 1975 to attend a symposium on fibre optics. And in Halifax, an experimental fibre optics system developed by the CRC went into operation, replacing a Department of National Defence coaxial cable installation.

A system using telephone lines which permits interactive communication with high quality images is also being investigated by the Department. A number of possible applications are being studied, and an experimental system is planned for the Royal Military College in Kingston.

A joint project of the Department and the Royal Canadian Mounted Police to develop a computer terminal for use in police cars continued during the year. The terminal, including a video screen and typewriter keyboard mounted near the patrol car dashboard would put mobile police officers in instant communication with a nationwide computerized information system. The project is part of the Department's efforts to encourage the development of advanced communications systems for specific uses and to promote development of the communications supply industry.

In the far North, hunters, trappers and those in small remote communities often need reliable, portable communications systems. The Department is conducting research on the practicability of a combined short range relay system and a longer range, high-frequency radio system for providing reliable low-cost trail communications. Another project is aimed at developing techniques for integrating high-frequency radio transmissions in the North with existing communications and satellite networks. Other research is being conducted into the technology and future requirements of inter-city networks.

Microwaves are used extensively in both terrestrial and satellite communications, and a research program is underway to study the effects of rain, turbulence, weather systems and other atmospheric conditions on microwave propagation. Weather information from more than 50 stations, covering a 10-year period is being analysed to provide information to systems designs and spectrum managers on these effects.

One of the best ways of providing information on and predicting the performance of specific radio transmissions at different locations is through computer programs. Such programs are available for the high frequency part of the spectrum and, during the year, a program for the very-high frequency (VHF) and ultra-high frequency (UHF) part of the spectrum was developed.

The location of satellite earth stations is an important part of satellite communications planning. Through a contract with Teleglobe Canada, the Department has been studying site diversity — testing various ground station sites to receive signals — as a means of improving the reliability of satellite systems.

The Departmental radar research laboratory investigates new uses of radar, such as in remote sensing of the environment; studies the application of new technology to radar systems; helps users specify and select new radar equipment; and investigates problems encountered in operating radar systems. The Department of National Defence is the principal client of the laboratory, but many civilian agencies also make use of its services. This year, a project of the laboratory in conjunction with the Canada Centre for Remote Sensing and NASA uses digital computer techniques to process signals from a satellite-borne radar. Technical consulting services to DND provided help in specifying and selecting radars for air and ship applications. A study was completed on the problems of detecting light aircraft in the vicinity of airport terminals, one which could have implications in reducing light aircraft accident hazards.

In its efforts to improve radio communication the Departmental radio communications laboratory continued experiments in the use of the ionosphere, which deflects radio waves, to communicate over long distances. In one experiment, the ionosphere is heated by a high-power, high-frequency transmitter. As a result, its characteristics are changed in the heated area and, under certain conditions, it may be possible to use VHF and UHF frequencies for communications at longer distances than the usual line-of-sight limit.

Some of the Department's research on behalf of the Department of National Defence concerns radio direction finding techniques. Current research is aimed at studying the limitations in accuracy and improving the design of direction finding equipment. Other research for DND involved over-the-horizon radar studies, and methods to improve communications at high latitudes. The laboratory also researches the effects of different kinds of radio noise — such as that caused by power lines, cars and atmospheric conditions — on the performance of radio communications systems.

From March 1973 to September 1975, the department conducted an educational technology program, in response to the needs of educators for assistance and advice in the application of communications media to education. Agreements were reached and joint projects were carried out with several provinces and other Federal Government departments and agencies. Reports were published on a number of these projects.

10 INTERNATIONAL COMMUNICATIONS

Canada plays a significant role in international efforts to coordinate world telecommunications operations and policies. Through the Department of Communications, Canada participates in the work of some 20 international organizations concerned with the orderly development and use of telecommunications links among countries, promotes technological cooperation in telecommunications, and takes part in special international conferences for improving frequency spectrum regulation.

In 1975-76, as one of 36 elected members, Canada participated in the 30th session of the International Telecommunication Union Administrative Council in Geneva. As one of its major tasks, the council planned for three major World Administrative Radio Conferences to be held in 1977, 1978 and 1979 in order to update and improve international regulations governing the use of radio. The 1977 conference will centre around regulations for the implementation of broadcasting by satellite; the 1978 conference will deal with aeronautical mobile radio services; the 1979 conference will attempt a general revision of international radio regulations including technical, administrative and operational regulations pertaining to the use of the radio frequency spectrum.

During the past year, work continued on preparation of Canadian proposals for presentation at these conferences. In the course of the year, an interdepartmental committee met with representatives of the provinces and industry and circulated the first draft proposals for the 1977 and 1978 conferences to interested parties for comment. The committee will also analyze the positions of other countries to determine their impact on Canadian telecommunications services.

Canada also continued 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. In addition the Department participated in a number of other international conferences and meetings including:

- four committees of the Inter-Governmental Maritime Consultative Organization (IMCO): two meetings of the sub-committee on radio communications to draft international maritime standards for emergency position indicating radio beacons; and two meetings of the International Conference on the establishment of an international maritime satellite system, held under the aegis of IMCO;
- the meeting of the Inter-American Telecommunications Conference held in Rio de Janeiro, Brazil. Participants discussed a broad range of matters of interest to Canada affecting telecommunications in Latin America and the Caribbean and regional co-ordination of preparations for the World Administrative Radio Conferences;
- several meetings of the European Space Agency Council. The Agency, set up in May 1975, has granted Canada observer status;
- the panel of experts on the rearrangement of radio regulations and the Joint U.N./UNESCO Latin American Regional Seminar on Satellite Broadcasting Systems for education and development held in Mexico City.

The Department, in addition, acted as coordinator for the preparation and development of government positions on matters concerning the International Telecommunications Satellite Organization (INTELSAT) in which Canada is represented on the Board of Governors by Teleglobe Canada.

The Department, which coordinates Canada's interests in international scientific and technological exchange programs, was also involved during 1975 in arranging or coordinating a number of visits including:

- visits by Australian post office officials to discuss technical standards for cable television and telecommunications transmission systems;
- a visit from France by "le Groupe des villes nouvelles", interested in obtaining information on various aspects of the cable television industry;
- a number of visits by Japanese government officials and representatives of Japanese industry to discuss various aspects of cable television, data communications and the development of frontier technologies.

The Department also participated in the Canadian exhibit at the Second ITU World Telecommunications Exhibit in Geneva with a presentation highlighting Canadian research and development efforts in the field of satellite communications. Designed to lend support to individual Canadian industrial exhibitors, the Department's presentation sought to convey an overall sense of telecommunications expertise available in Canada.

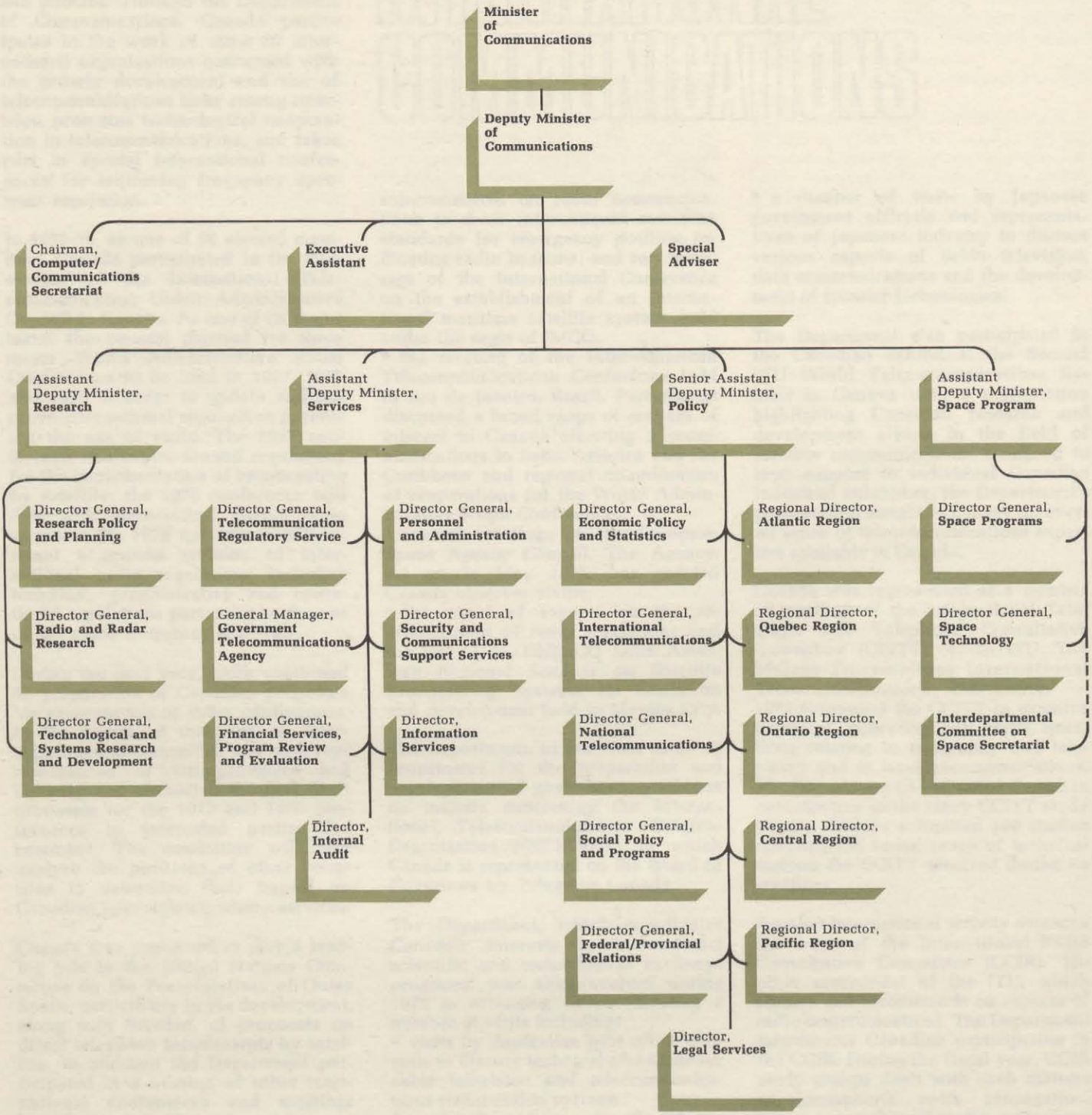
Canada was represented at a number of meetings of the International Telegraph and Telephone Consultative Committee (CCITT) of the ITU. The Malaga-Torremolinos International Telecommunications Convention — 1973 empowers the CCITT to examine technical, operating and tariff questions relating to telegraphy and telephony and to issue recommendations. The Department co-ordinated Canadian participation in the many CCITT study groups. Canada submitted 100 studies covering the broad range of technical matters the CCITT received during its meetings.

Another international activity concerns the work of the International Radio Consultative Committee (CCIR), another component of the ITU, which studies and recommends on aspects of radio communications. The Department coordinates Canadian participation in the CCIR. During the fiscal year, CCIR study groups dealt with such matters as ionospheric radio propagation, space research and radio astronomy services, mobile services, standard frequencies and time signals and radio propagation in non-ionized media.

APPENDICES

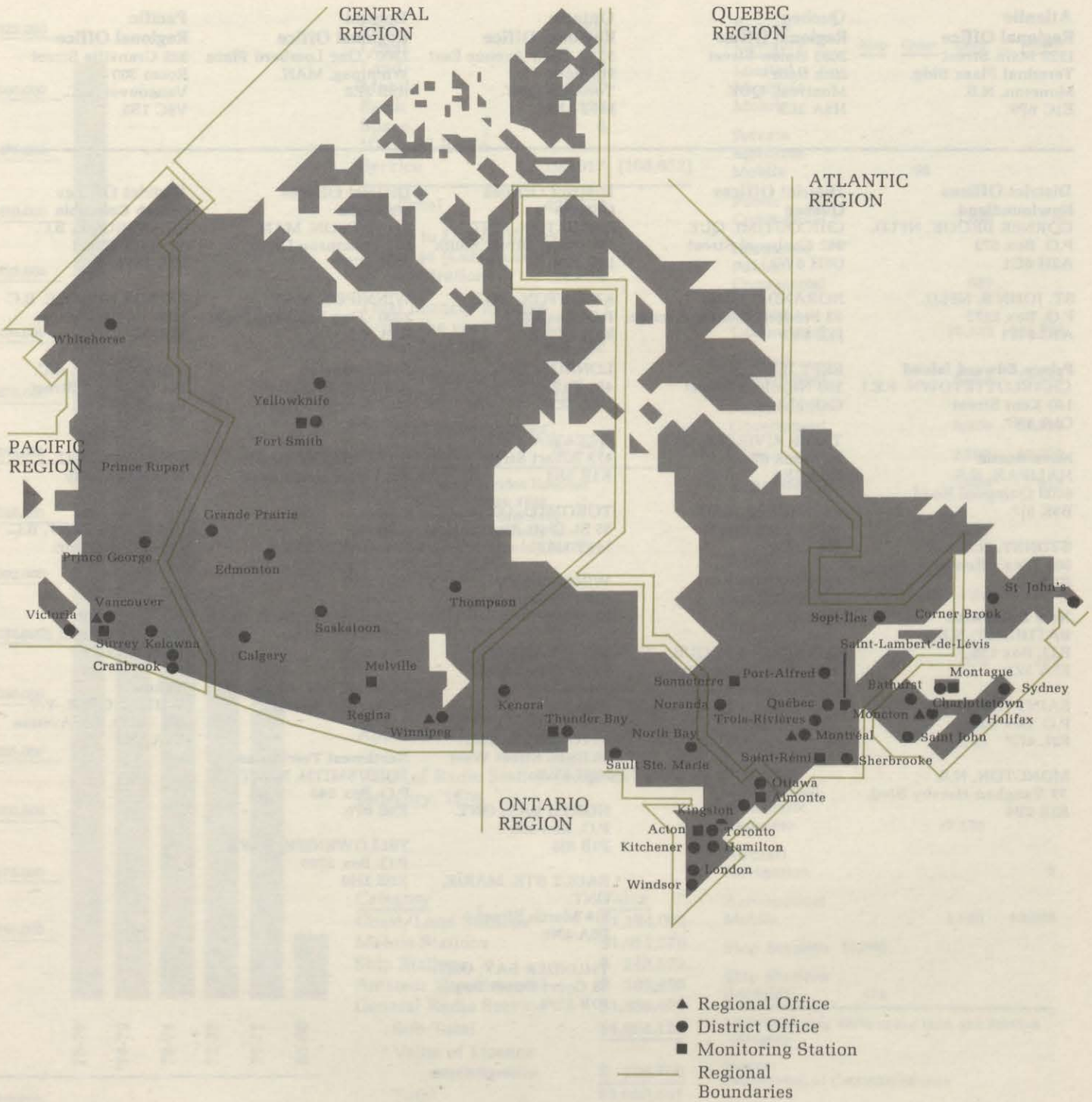
Appendix I

Department of Communications
Organizational Chart



Appendix II

Department of Communications:
Locations across Canada



Appendix III

Addresses of regional and district offices of the Department of Communications

Atlantic
Regional Office
1222 Main Street
Terminal Plaza Bldg.
Moncton, N.B.
E1C 8P9

Quebec
Regional Office
2085 Union Street
20th floor
Montreal, QUE.
H3A 2C3

Ontario
Regional Office
55 St. Clair Avenue East
9th floor
Toronto, ONT.
M4T 1M2

Central
Regional Office
2300 - One Lombard Place
Winnipeg, MAN.
R3B 2Z8

Pacific
Regional Office
325 Granville Street
Room 300
Vancouver, B.C.
V6C 1S5

District Offices
Newfoundland
CORNER BROOK, NFLD.
P.O. Box 572
A2H 6G1

ST. JOHN'S, NFLD.
P.O. Box 5273
A1C 5W1

Prince Edward Island
CHARLOTTETOWN, P.E.I.
180 Kent Street
C1A 1N7

Nova Scotia
HALIFAX, N.S.
6009 Quinpool Road
B3K 5J7

SYDNEY, N.S.
500 King's Road
B1S 1B2

New Brunswick
BATHURST, N.B.
P.O. Box 155
E2A 3Z1

SAINT JOHN, N.B.
P.O. Box 1285
E2L 4G7

MONCTON, N.B.
77 Vaughan Harvey Blvd.
E1E 2B4

District Offices
Quebec
CHICOUTIMI, QUE.
942 Chabanel Street
G7H 5W2

NORANDA, QUE.
32 Frédéric Hébert Avenue
J9X 1V2

SEPT ILES, QUE.
106 Napoleon Street
G4R 3L7

TROIS RIVIERES, QUE.
P.O. Box 67
G9A 5E3

MONTREAL, QUE.
2085 Union Street
H3A 2C3

QUEBEC, QUE.
2 Place Québec
G1R 2B5

SHERBROOKE, QUE.
1650 King Street West
J1J 2C3

District Offices
Ontario
HAMILTON, ONT.
135 James Street South
L8P 2Z6

KINGSTON, ONT.
P.O. Box 633
K7L 4X1

LONDON, ONT.
451 Talbot Street
N6A 5C9

OTTAWA, ONT.
473 Albert Street
K1R 5B4

TORONTO, ONT.
55 St. Clair Avenue East
M4T 1M2

WINDSOR, ONT.
880 Ouellette Street
N9A 1C7

KENORA, ONT.
Federal Building,
Room 154
P9N 2X9

KITCHENER, ONT.
30 Duke Street West
N2H 3W5

NORTH BAY, ONT.
P.O. Box 596
P1B 8J5

SAULT STE. MARIE, ONT.
118 March Street
P6A 5N5

THUNDER BAY, ONT.
33 Court Street South
P7B 2W6

District Offices
Manitoba
THOMPSON, MAN.
436 Thompson Drive
R8N 0C6

WINNIPEG, MAN.
2300 - One Lombard Place
R3B 2Z8

Saskatchewan
REGINA, SASK.
2101 Scarth Street
S4P 2H9

SASKATOON, SASK.
206 Circle Drive East
S7K 0T5

Alberta
CALGARY, ALTA.
205 - 8th Avenue, S.E.
T2G 0K9

GRANDE PRAIRIE, ALTA.
Federal Building
T8V 0X9

EDMONTON, ALTA.
10621 - 100 Avenue
T5J 0B4

Northwest Territories
FORT SMITH, N.W.T.
P.O. Box 540
X0E 0P0

YELLOWKNIFE, N.W.T.
P.O. Box 2700
X0E 1H0

District Offices
British Columbia
CRANBROOK, B.C.
11 - 14th Street
V1C 2W9

PRINCE GEORGE, B.C.
1294 - 3rd Avenue
V2L 3E7

VANCOUVER, B.C.
325 Granville Street,
Room 300
V6C 1S5

KELOWNA, B.C.
471 Queensway
V1Y 6S5

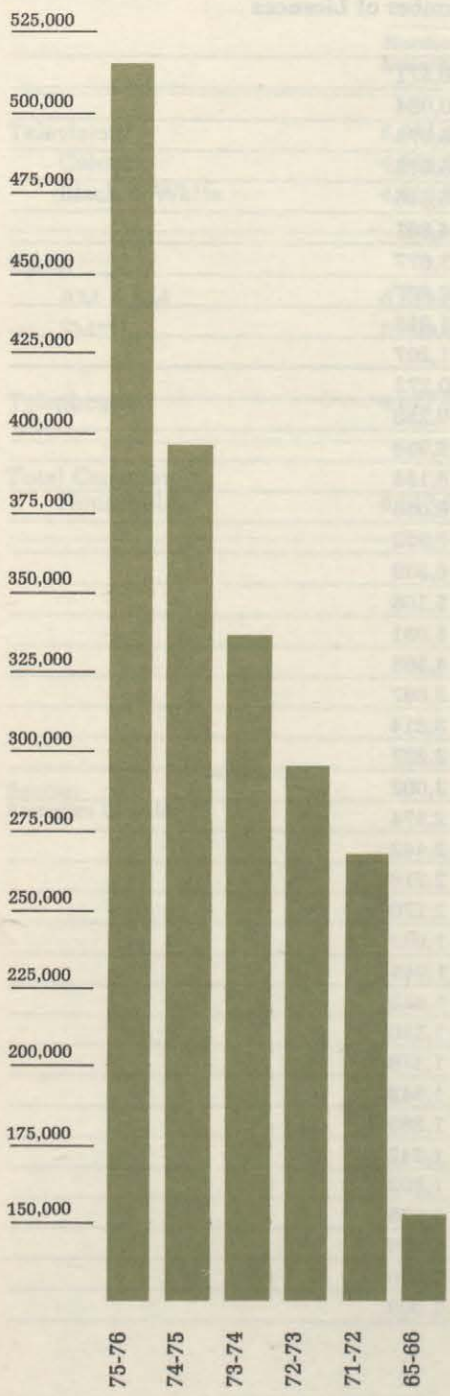
PRINCE RUPERT, B.C.
Federal Building,
Room 227
V8J 1G8

VICTORIA, B.C.
816 Government Street
V8W 1W9

Yukon
WHITEHORSE, Y.T.
201 - 4133, 4th Avenue
Y1A 1H8

Appendix IV

Radio Station Licences in Force 1971-1976 (All Classes)



Source:
Department of Communications

Appendix V

Summary of Radio Station Licences in Canada by Category, 1976

Ship	13,090	
Coast	98	
Land	61,698	
Mobile	229,630	
Earth	129	
Space	6	
*General Radio Service	193,617	(106,652)
Sub-Total	498,268	
Issued to United States licensees (Certificates of Registration)	16,954	
Total licences in force during the year ending March 31, 1975	515,222	
Net increase in licences over preceding year	119,608	
Per cent increase over preceding year	30.2%	

*General Radio Service licences are valid for a three year period. Figures in brackets indicate licences actually issued (new and renewed) during 1975/76 fiscal year.

Source:
Department of Communications

Appendix VI

Value of Radio Station Licences by Category, 1976

Category	Value
Coast/Land Stations	$1,194,002
Mobile Stations	$1,955,576
Ship Stations	$ 248,573
Amateur Experimental	$ 199,498
General Radio Service	$1,386,476
Sub-Total	$4,984,125
Value of Licence amendments	$ 106,706
Total	$5,090,831
*Net Increase over previous year	$2,003,130
Per cent increase over previous year	67%

*Excludes value of amendments.

Source:
Department of Communications

Appendix VII

Number of radio stations by service category, 1976*

Service Category	Ship	Coast	Land	Mobile
Limited Maritime Mobile				
Private Maritime Mobile		98		
Public Commercial			1,880	16
Restricted Public Commercial			689	
Private Commercial			30,633	185,720
Federal Government			6,018	19,655
Provincial Government			6,878	29,320
Municipal			2,994	28,708
Experimental			509	515
Amateur Experimental			15,346	
Public Commercial Receiving			87	
Private Commercial Receiving			572	159
Public Commercial Automatic Repeater			1,145	
Private Commercial Automatic Repeater			2,155	
Aircraft Navigation				3
Aeronautical Mobile			1,689	13,088
Ship Stations	13,090			
Ship Stations (Mobile)	414			

*A licence may show more than one service category.

Source:
Department of Communications

Appendix VIII

Major Users of Radio in Canada, 1975/1976

User	Number of Licences
General Radio Service (including Certificates of Registration)	210,571
Taxicab Operations	20,084
Truck Transport	15,973
Federal Administration	15,612
Amateur Experimental Service	15,346
Air Transport	14,861
Electric Power Systems	13,677
Special Trade Contractors	12,877
Other Construction	11,215
Railway Transport	11,207
Telephone Systems	10,272
Logging	10,250
Forestry Services	9,958
Highway and Bridge Maintenance	8,134
Engineers and Scientific Services	8,055
Provincial Administration	7,032
Miscellaneous Services to Business Management	6,839
Miscellaneous Services Incidental to Mining	5,106
Wholesalers of Petroleum Products	5,031
Ready-Mix Concrete Manufacturers	4,568
Provincial Police Services	3,697
Radio and Television Broadcasting	3,314
Other Transportation	3,237
Pulp and Paper Mills	3,002
Building Construction	2,574
Crude Petroleum and Natural Gas Industry	2,442
Gas Distribution	2,216
Local Administration	2,170
Services Incidental to Air Transport	1,963
Insurance and Real Estate Agencies	1,945
Bus Transport, Interurban and Rural	1,653
Miscellaneous Services Incidental to Transport	1,530
Petroleum Refineries	1,376
Pipeline Transport	1,342
Other Utilities	1,286
Wholesalers of Lumber and Building Material	1,242
Iron and Steel Mills	1,202
Miscellaneous Wood Industries	1,176
Local Police Services	1,130
Local Fire Services	1,030
Security and Investigation Services	1,008

Source:
Department of Communications

Appendix IX

Use and Availability of Communications Services: Selected Data (April 1976)

	Number of households	Percent of total households	Increase (Decrease) over 1975 Number	Percentage
Television*	6,684,000	96.6	196,000	3.0
Colour	4,913,000	60.6	612,000	17.1
Black & White	4,318,000	62.4	(225,000)	(5.0)
Radio				
AM & FM	6,817,000	98.5	229,000	3.5
FM**	5,293,000	76.5	219,000	4.3
Telephones	6,677,000	96.5	214,000	3.3
Total Canadian Households	6,918,000	100.0	215,000	3.2

*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 X

Cable television in Canada by region*

	British Columbia**	Prairies	Ontario	Quebec	Atlantic	Canada
Systems	63	24	111	131	22	351
Subscribers	562,552	341,211	1,359,907	516,183	88,684	2,868,537
Households in licensed areas	688,187	582,149	1,970,770	1,251,920	154,999	4,648,025
Penetration (%)	81.7	58.6	69.0	41.2	57.2	61.7

Source:
Department of Communications

*Figures are for the period September 1, 1975 to August 31, 1976.

**Includes the Yukon and Northwest Territories.

Appendix XI

Microwave Facilities, 1976

Appendix XII

Satellite Earth Stations, 1976

Appendix XIII

Department of Communications
1975/76 Expenditures by Activities (thousands of dollars)

Activity	Expenditures
Departmental Administration	$ 8,766
Telecommunications Research	12,889
National Telecommunications Development	3,196
International Participation	1,272
Management of the Radio Frequency Spectrum	18,828
Space Applications	21,290
Contribution to Employees' Benefit Plans	3,215
	$69,456
Less:	
Receipts and Revenues Credited to the Vote	14,607
Recoverable Expenditures from other Departments	2,918
Total Cost	51,931
Add:	
Services provided by other Departments	4,405
Accommodation provided by this Department	1,916
Total Cost of Program	$58,252

Appendix XIV

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, 1976

Assets		Liabilities		
Current assets		Current liabilities		
Employee's travel	$ 3,421	Accrued liabilities		$3,555,520
Accounts receivable — Departments and agencies of the Government of Canada	4,637,529	Advances from Canada for working capital (authorized $2,000,000)		1,391,269
Accrued revenue	390,523	Plus: Replacement funds overdrawn for purchase of capital assets		2,203
	5,031,473	Capital assets financed from parliamentary appropriations prior to April 1, 1971		92,546
		Retained earnings		
		Balance at beginning of year	(79,255)	
		Prior years' adjustments	2,562	
Capital assets		Net profit (loss) for the year, per Statement of Income and Expense	202,202	
Equipment and furniture, at cost or appraised value	213,496			
Less: Accumulated provision for replacement	77,922	Balance (deficit) at end of year		125,509
	135,574			
	$5,167,047			$5,167,047

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