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ANNUAL REPORT
DEPARTMENT OF COMMUNICATIONS

Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

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(submitted under the provisions of the
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To:
His Excellency the Right Honourable
Edward Schreyer, P.C., C.C., C.M.M.,
C.D., Governor General and
Commander-in-Chief of Canada

Sir:
I have the honour to present the
Annual Report of the Department of
Communications for the fiscal year
ending March 1979.

I remain, Sir,
Your Excellency's obedient servant,

Francis Fox,
Minister of Communications

1 INTRODUCTION

It is becoming evident that in all major industrial countries the production of information is overtaking the production of traditional goods and services. By 1971, almost 40 per cent of Canada's labour force was engaged in information related activity. At the end of the year under review, that figure is closer to 50 per cent.

Rapidly emerging communications technologies are creating a host of new issues, new problems and new opportunities. The department is not only studying the issues and laying the groundwork for new policies; it is also on the leading edge of the development of new technologies.

For example, Telidon, the world's most sophisticated videotex system, was introduced in August 1978, giving Canada a lead in what promises to be a major growth area in home and business communications in the 1980s and beyond.

Canadian-designed fibre optic transmission systems began going into operational networks. Across the country, field trials in urban and rural locations were planned or underway. In the department's laboratories, researchers made further major advances in fibre optics technology.

Hermes, Canada's experimental satellite, pioneered direct satellite-to-home TV broadcasting and tested a wealth of other new communications services. Commercial viability of these services is now being explored on Telesat Canada's Anik B, launched in December 1978.

New communications technologies such as these are spearheading fundamental institutional and social changes that will affect our very way of life. Other advanced countries such as the United Kingdom, France and Japan have recognized the far-reaching changes that could flow from the impact of these technologies, and have developed policies to deal with them. They have also made major commitments of funds. In 1978, the United Kingdom committed $1 billion Canadian to aid its microchip industry, while France allocated $625 million Canadian to development of information technologies.

Canada, too, is aware of the need for appropriate policies to ensure that we maintain our technological lead, reap the economic benefits of the new developments, and are able to set our own social priorities.

To assist in formulating a response to the tremendous changes taking place in telecommunications, in November 1978 the minister appointed an independent consultative committee on the implications of telecommunications sovereignty, under the chairmanship of the Hon. J. V. Clyne. The committee was asked to examine solutions currently under discussion and to advise on a strategy for restructuring the Canadian telecommunications system so as to safeguard Canada's cultural and industrial sovereignty and to take best advantage of new and converging technologies. The committee's report, in preparation at year's end, is expected to generate constructive public debate on the future of telecommunications in Canada.

The department realized at a very early stage that creating public awareness of the Information Revolution and its implications was critically important. For the first time in six years, the department opened its Communications Research Centre to the public for three days in October 1978. A new series of background publications was lauched, to examine current issues in communications. The department's magazine, *In Search*, published quarterly, carried lively information and opinion articles on controversial topics. The department also assisted the Ontario Educational Communications Authority in production of "Fast Forward" a series on the information revolution shown on TV Ontario during the fall.

Within the department, the economic and social implications of the information economy are recognized as prime issues and as major targets for research. The department's economic researchers measured the extent of information activity in the Canadian economy, investigated the role of information labour and capital in Canadian manufacturing, and undertook a supply and demand study of new information and communications services. The potential effects of technological change on individual Canadians and our society are also being investigated. Among the issues receiving particular attention are the labour market implications of Telidon, privacy and consumer rights and the impact on political processes of interactive communications.

In November 1978, the minister reintroduced communications legislation aimed at making federal regulation of telecommunications more responsive to technological change and to provincial concerns. Bill C-16 provides a broad statement of national telecommunications policy and establishes a clear demarcation between the functions and responsibilities of the government and the CRTC. It also contains provisions for implementing policy and delegation agreements with provincial governments.

To ensure the fullest possible access to new satellite services, and to encourage the extension of choice in TV programming, the department announced a new policy in February 1979, allowing broadcasters, cable TV operators and telecommunications carriers to own and operate satellite earth stations to receive television signals from Canadian satellites.

The need to develop a package of Canadian programming signals was the subject of continuing policy concern during the year, as was the amount of U.S. television programming watched by Canadians. Since American programming is unlikely to nourish our own distinctive cultures and values or to contribute to our survival as an independent country, the

department has been working to find ways of encouraging the production of Canadian programs that Canadians will want to watch.

Stimulation of high-technology industries is an important concern of the government. For many years, the department has been fostering the development of a domestic prime contracting capability for satellite construction. During 1978/79, the prime contract for the Anik D satellites was awarded to a Canadian company, as a result of the minister's intervention with Telesat Canada. Other measures to strengthen Canada's industrial base in this area include a $20 million expansion of the David Florida Laboratory to handle integration and testing of complete satellites, and a continuing program of transferring to Canadian industry the results of research and development work by the department.

On the international scene, Canada submitted its proposals for revisions of radio frequency allocations to the International Telecommunication Union in preparation for the 1979 World Administrative Radio Conference. At this conference, the table of frequency allocations established in 1959 will be revised to better accommodate world requirements now and for the remainder of the century.

2

FEDERAL-PROVINCIAL RELATIONS

Relations between federal and provincial governments are expanding across a wide range of issues, as the provinces grow more deeply concerned about telecommunications activities and policies.

In response to decisions taken at the last federal-provincial conference of communications, held in Charlottetown March 29, 1978, the department participated in a working group of federal and provincial officials which met regularly over the year. The working group addressed the issues of competition and structure within the telecommunications industry, and developed policy principles for the provision of Canadian telecommunications services consistent with public interest. An interim report was submitted to the ministers.

A second request made by ministers at the conference was for a study into the possibility of establishing a central clearing house for decisions taken by regulatory boards at the two levels of government. The department completed this study, and will make recommendations to the ministers once consultations have been held with the provincial regulatory boards and other potential users of such a service.

The third ministerial request was that the department develop a model for the introduction of a national pay television system, in consultation with the provinces. This project is well under way.

In January 1979, in response to provincial requests, federal officials presented a draft proposal on cable in constitutional language. This proposal obtained broad provincial support in February but Quebec reserved its position.

During the year, the Atlantic Consultative Committee on Communications met three times to discuss matters of mutual interest to the federal government and the Atlantic provinces. The department held several meetings with Ontario to explore possible arrangements for sharing authority over cable television. The first meeting of the Ontario-Canada Committee on Telecommunications Carrier Policy Issues took place. Topics discussed were satellite earth station ownership policy, system interconnection, rural service, and computer communications. There were also two meetings with Saskatchewan at the ministerial level to discuss how to reconcile the province's desire to prohibit alcohol commercials on cable television with the federal government's responsibility for the Canadian broadcasting system.

3

MANAGING THE RADIO FREQUENCY SPECTRUM

The Department of Communications manages the radio frequency spectrum in Canada. It does so by allocating frequencies for different communications services, regulating the use of radio, developing standards and specifications for all users of the resource, and promoting more effective use of the spectrum.

To meet the growing consumer demand for low-power remote control radio devices for control and security applications, the department made a proposal in April 1978 to create three frequency bands, 310-320, 350-360 and 380-400 MHz. Within these bands, approved devices will be permitted to operate without radio licences.

In February 1979, the minister announced changes in Canadian spectrum allocations in the 406-960 MHz frequency band to accommodate the growing requirements of a number of radio services including mobile, broadcasting and amateur. This announcement culminated a process of public consultation that began in 1976. The largest block of spectrum affected is the 806-890 MHz band, to be reallocated from broadcasting (UHF TV) to the mobile service. No licensing will take place in this band until detailed arrangements have been co-ordinated with the United States and until the band has been fully planned with a view to spectrum efficiency. Details of the new allocations and the main considerations behind the new policy are contained in the publication *Spectrum Allocation Policy in the 406 to 960 MHz Frequency Band.*

Also in February 1979, the minister announced a new schedule of licence fees for non-broadcasting stations to go into effect April 1, 1979. The new schedule introduced the concept of variable fees, reflecting the size and complexity of the system being licensed as well as its location. Higher fees apply in 23 metropolitan areas where the spectrum is now or soon will be congested. General Radio Service (GRS) and Amateur licences are not affected by the fee revision. The new schedule is in accordance with the principle that the cost of licensing radio stations should be borne by the licensees and not by taxpayers generally.

Day-to-day management of the radio spectrum is the responsibility of offices in five administrative regions: Pacific, Central, Ontario, Quebec and Atlantic. District offices and associated spectrum surveillance centres carry out such activities as licensing, inspection and enforcement. A new district office opened in the Pacific region, at Langley, B.C., on June 1, 1978, bringing to 44 the total number of district offices across Canada.

After many months of dramatic increases, the demand for new General Radio GRS or Citizen's Band (CB) licences levelled off. From a peak of 53,000 in April 1977, the number of new GRS licences issued per month has stabilized at about 20,000.

By March 1979, the total number of radio licences in force in Canada was 1,413,537, a 12.6 per cent increase over the previous year. Of these, 951,849 — or 67 per cent of the total — were for GRS. During 1978/79, the department issued or renewed 247,925 GRS licences, and issued 75,335 new licences in other categories.

A number of changes to the radio regulations were made during the year.

- Technical requirements were prescribed for standard, cable compatible and cable converting receiving apparatus.
- A new Amateur Digital radio operator's certificate was introduced to permit amateurs to use digital and packet radio techniques as well as pulse-type emissions.
- All pilots must have a restricted radiotelephone operator's certificate to use air-to-ground radios installed aboard aircraft. Francophone pilots will no longer need a knowledge of English to obtain this certificate.
- Requirements for certifying and marking spark ignition systems of internal combustion engines were removed from the radio interference regulations.
- The GRS regulations were amended to prohibit possession of linear amplifiers by GRS licensees who are not also licensed as Amateurs; to restric Channel 9 to emergency traffic; and to add four frequencies for the operation of remote controlled models.

Following a series of eight regional symposia in fall 1977, the department held a national GRS symposium in Ottawa in September 1978. It also continued its efforts in user and public education, releasing "The Electronic Highway", a 13½ minute colour film explaining GRS, and drafting a new GRS handbook.

The pace of selective enforcement and prosecution activity stepped up considerably from 1977/78, with emphasis on the more flagrant offences of unlicensed operation, unauthorized use of linear amplifiers (a prime cause of interference), and obscene language. By publicizing the results of prosecutions, the department hopes to deter potential offenders.

Regional offices have instituted a new system for dealing with interference complaints. When complaints are received, the department first contacts the complainant by telephone to try to resolve the problem. A diagnostic questionnaire is filled out and analysed, before an investigator is sent to the site. In the Ontario region alone, this procedure reduced non-compulsory investigations to 15 per cent of the previous year's figure. The department also published a brochure, *How to Identify and Resolve Radio and TV Interference Problems,* which is available on request from regional and district offices.

The department has an on-going responsibility to conduct technical evaluations of all applications made to the CRTC for broadcasting and cable TV licences. During 1978/79, it processed 1,171 applications for cable TV, 66 for AM, 103 for FM and 140 for TV. It also handled 1,616 broadcast proposals from other countries, mainly the United States, to ensure that proposed foreign stations would not interfere with existing or planned Canadian broadcasting stations.

During the year, the department revised FM allotment plans for the Maritimes, south-eastern Ontario and British Columbia. The department also developed a revised allotment plan for UHF TV in a reduced band (470-806 MHz), and carried out both laboratory and field tests on interference between UHF TV and land mobile to determine what frequencies would be affected.

In addition, the department prepared guidelines for the assignment of call letters and drafted regulations to govern the identification of stations.

The department also approved a total of 1,098 models of radio equipment during the year.

4 GOVERNMENT TELECOMMUNICATIONS

The Department of Communications is responsible for the overall co-ordination and planning of telecommunications to serve all departments and agencies of the federal government, the largest user of telecommunications in Canada. Through shared and customized systems managed by the Government Telecommunications Agency, the department ensures they receive the most appropriate quality of service at the lowest cost to the government.

The Government Telecommunications Agency manages consolidated telephone systems in 20 Canadian and two American cities, inter-city networks leased from the telecommunications carriers, and a shared store-and-forward message switching system providing record communications services to some 1,000 terminals in Canadian government offices across the country.

During 1978/79, the agency tested and put into service a nationwide digital facsimile network, used primarily for distributing employment posters and appeal notices to 15 cities for the Public Service Commission. It completed a feasibility study for a government-wide shared facsimile network, contributed to the definition of federal standards on data network performances, and undertook studies for new services including an office communication system, and an integrated electronic distribution network for electronic mail, facsimile and teleword processing.

Under its consulting program, the Government Telecommunications Agency custom-designed a data entry and word processing system for the Ministry of Transport to access the Secretary of State's Terminology Bank. The agency also reviewed overall voice communications requirements of Atomic Energy of Canada Limited and arranged to meet their needs through the government inter-city network. Many other departments and agencies also received advice on the application of telecommunications to meet their specific needs.

Consistent with the recommendations of the Cabinet-appointed Task Force on Service to the Public, the Government Telecommunications Agency assisted departments in developing functional lists of government services for all telephone directories in Canada. The agency also provided for an improved telephone referral service at the 20 consolidations to help the public locate the appropriate Government of Canada organizations.

5

BROADCASTING AND SOCIAL ISSUES

Broadcasting has become a major policy preoccupation of the department as new technologies widen the gap between the program delivery capacity of the Canadian broadcasting system and the amount of Canadian programming available for distribution.

Satellite program package
Throughout the year, the department worked towards the creation of a basic package of Canadian network TV signals that could be distributed via Anik to presently ill-served areas such as rural and remote communities. Policy issues, institutional options, operating costs, potential market and price structure were among the factors that received special consideration — as were the elements of a satellite program package. A major conference was held on the subject in early March 1979, involving broadcasters, the cable industry and national carriers, in addition to federal departments and agencies.

Border broadcasting
During the year, there were further repercussions resulting from the 1976 amendment to the Income Tax Act disallowing as a deductible expense advertising on U.S. stations directed at Canadian audiences.

In August 1978, several U.S. border TV stations filed a petition in Washington requesting retaliatory trade measures against Canada. Canada responded by sending a document outlining the position of the Canadian government to the U.S. State Department in November for transmittal to the Office of the Special Representative for Trade Negotiations.

A consultant's study on the effectiveness of the amendment, completed in January 1979, concluded that the amendment was achieving the intended results.

Communications for the handicapped
Reflecting its goal of providing access to basic telecommunications services for all Canadians, the department continued its efforts to see that the handicapped receive better services.

In March 1979, the department completed licensing arrangements to allow the Ontario Mission of the Deaf to manufacture, market and distribute the Visual Ear. This portable terminal allows people with hearing and speech problems to use the phone by typing messages on a small keyboard. The messages are displayed on a similar device at the receiving end.

During the year, preliminary design work began on a Braille terminal, also for use with the telephone network.

Attention also focussed on the need to make television more accessible to the deaf, and technical approval was granted under the Radio Act to provide a captioning service on line 21 of the broadcast TV signal.

Canadian Communications Research Information Centre
In February 1979, the centre closed as a result of problems ensuring long-term funding by users. Set up in 1974 under auspices of the Canadian Commission for UNESCO, the centre served as an information clearinghouse for those involved in communications research in Canada, especially at universities. The department contributed to funding of the centre during its lifetime and was represented on its board of directors.

6

TELECOMMUNICATIONS SYSTEMS AND SERVICES

The emergence of the information society underlines the importance of one of the department's major objectives, to ensure that Canada's telecommunications systems evolve efficiently and economically in response to the needs of Canadians and the opportunities afforded by technological developments. The department analyses various aspects of the industry, including future demand for telecommunications, institutional structures and inter-corporate . relationships, and recommends national standards and policies to foster improved services.

Northern communications
In April 1978, the government signed memoranda of understanding with Bell Canada and Canadian National Telecommunications for provision of basic local and long-distance telephone service to communities in the Northwest Territories. These were the first contracts signed under the Northern Communications Assistance Program, which will provide about $9 million in federal contributions over a five-year period towards

the capital cost of communications facilities required to bring reliable long distance telephone service to the NWT. By year-end, work to establish local and long-distance facilities was completed or underway for eight communities, and two trunk routes had been installed in preparation for extension of service to other communities.

Terminal attachment program
The second phase of the department's terminal attachment program went into effect October 1, 1978. The program enables the public to buy certain no-dialling devices certified by the department for direct attachment to the facilities of the federally-regulated carriers. Phase one of the program, which began in 1976, covered automatic telephone answering and recording machines, as well as plugs and jacks. The second phase covers dial-in alarm devices, graphic communications equipment, facsimile, bio-physical medical terminals, modems and traffic measuring equipment. The program is intended to stimulate development of a wider range of communications devices for the Canadian public and encourage development of Canadian industry. Initially, the department will perform certification testing in its own laboratory, but in future other Canadian laboratories could apply for authorization to conduct these tests.

Earth station ownership policy
A new policy was announced in February 1979, allowing broadcasters, cable TV licensees and telecommunications common carriers to own and operate earth stations to receive authorized television signals from Canadian satellites. The carriers will be permitted to apply for licences for receive and transmit stations to operate with the 12/14 GHz Anik C satellite system scheduled for service in 1981. Applications will also be considered for earth stations operating temporarily in remote offshore locations. The decision to liberalize this policy follows an extensive review and public consultation launched in 1977. Aims of the new policy are to encourage the extension of services and to ensure full access to new satellite services.

Public message service
Certain CNCP telegraph offices were closed during the year. The department undertook to ensure that suitable alternative arrangements were made for the areas affected. The department also investigated night letter rates in view of Teleglobe's desire to abolish this category of service to coincide with the wishes of international administrations.

Network development
The department completed detailed studies on selected network aspects of interconnection and interworking of Canada's public data networks. In addition, the department organized federal study programs on performance standards for data communications, and models for computer network architecture, as well as international studies on new data networks.

Urban network studies
During 1978/79, the department assessed potential advantages of optical fibre for urban local distribution plant during the next decade. For cable services only, projected costs of optical fibre plant were significantly higher than those of conventional coaxial cable plant. For telephone services combined with cable TV services, no economic advantage was found for integration at this time in the urban environment. These conclusions are under continuing review, in light of the development of new markets and new capabilities in optical fibre and other network technologies.

Pay TV delivery systems were also the object of study during the fiscal year. Two broad systems approaches were studied: pay-per-program systems and pay-per-channel systems. Costs of delivering services and of controlling, monitoring and billing were investigated for various types of delivery networks. These studies continue.

Economic analysis
The department continued its assessment of the performance of the federally regulated carriers and the outlook of the Canadian economy as it pertains to telecommunications.

Numerous applications from the federally regulated carriers were considered by the CRTC during the year. The department analysed all applications for approval of rate increases and equity issues as well as economic matters related to CNCP's application to interconnect with TCTS facilities. The department also monitored the hearings of the Restrictive Trade Practices Commission inquiry into the manufacture and sale of telecommunications equipment in Canada.

During the year, the department commenced a study to determine the distribution and extent of the Canadian public's capital investment in mobile radio equipment. The data will be of value to the department in setting future regulatory policy in this area. The department contributed to the work of an OECD group of experts on the contribution of the information sector to national economies, carrying out a study on the Canadian situation as input to the OECD report. The department also worked closely with the OECD on international networks and data bases, and the transborder flow of data.

Statistical information
The department maintains a variety of statistical information relating, for example, to the current tariffs of major carriers, CATV systems, radio and television broadcasting and computer hardware. Some of this data is published annually under the title, *Financial Statistics on Canadian Telecommunication Common Carriers*. During 1978/79, the department undertook a survey of construction expenditure for plant in the period 1973-1982. This project is being carried out in co-operation with the Canadian Telecommunications Carriers Association.

7

COMMUNICATIONS RESEARCH AND DEVELOPMENT

Advances in technology are a primary means of improving and expanding telecommunications networks and services. In recent years, increasing emphasis has been placed on public telecommunications such as telephone, broadcasting, data networks and mobile communications. Through transfer of technology, innovations developed by government researchers can benefit Canadian industry and create Canadian jobs in high technology fields. Research also serves as a base for the policy planning and program functions of the department.

The department performs communications research in house, mainly at its Communications Research Centre near Ottawa, as well as through contracts with industry and universities. In addition to research to meet its own requirements, the department undertakes research in support of other government departments. Most of this research is for the Department of National Defence in the areas of radar and military communications systems.

Telidon

In August 1978, the department gave its first public demonstration of Telidon, the Canadian interactive television system developed at the Communications Research Centre. Telidon allows users to retrieve a virtually unlimited amount of data on demand for instant display on an ordinary TV screen. Telidon's sophisticated coding method ensures high-quality images and independence of both the communications medium and the terminal hardware.

Canadian officials believe that because of its greater flexibility, Telidon has considerable advantages over videotex and teletext systems developed in other countries, and they are working for international acceptance of the Telidon standard.

During the year, the system was widely demonstrated in Canada and abroad, and officials held numerous talks and consultations with potential manufacturers and information suppliers, as well as with potential field trial operators such as the cable and telephone companies.

At year-end, a number of field trials and market studies were underway. For example, the Ontario Educational Communications Authority was experimenting with educational applications, and some cable TV operators were planning to test Telidon as a home information technology.

Human factors research was initiated into two areas related to Telidon: user reactions to the search structure for retrieving information, and studies of reading from visual displays. A study was also undertaken into the implications of Telidon for the labour market, including productivity, level of employment and occupational composition of the labour force.

Fibre Optics communications

In February 1979, the department signed an agreement with the Canadian Telecommunications Carriers Association (CTCA) for a joint $6.1 million field trial of fibre-optics technology to take place in the rural area of Elie, Manitoba. The five-year program will offer residents single-party telephone service, multi-channel TV and FM radio, and a variety of new home services, including Telidon.

Objectives of the Elie trial are to assess the feasibility of using fibre optics to improve telecommunications in rural areas, to check out the technology under real operating conditions, and to encourage Canadian industry to participate in the development of practical alternatives to the radio frequency spectrum.

Another joint project, this one with a consortium of five Canadian cable TV companies, involved installation of a fibre optic supertrunk between the head-end of a cable company and its main distribution centre in London, Ontario. Results have been encouraging in that only one repeater has been needed to span the 8 km length of the trunk.

The department recorded significant technical advances in fibre optics research during the year including:

- a novel design for a star reflection coupler that will be useful for data networks in which a large number of terminals interchange signals; and
- development of an optoelectronic crosspoint switch using photodiodes as switching elements; this will be useful for switching broadband signals.

Spectrum research

Spectrum research in the department's laboratories is directed to finding ways of using the radio spectrum more efficiently and extending its use to higher frequencies.

A computerized spectrum management system developed by the department was tested in the Montreal area during 1978/79. The system monitors channel usage in the land mobile bands by geographic area and assigns the most suitable frequencies to new licence applicants.

In response to a request by private broadcasters, the department is working to develop standards for the location of power lines, highrise buildings and broadcasting transmitters to avoid interference problems caused by reradiation of AM broadcast signals.

The department's researchers continued their program of studying radio noise to help predict performance of communications systems. During 1978/79, they concentrated on high voltage power-line noise (which affects TV signal reception and land mobile communications) and on noise affecting landing and other aeronautical communications. Researchers also investigated the effect of man-made noise on the error rate of high-speed point-to-point data transmission by radio.

Research continued in the area of propagation, notably into anomalous long-range propagation in the UHF and VHF broadcasting and land mobile bands along the U.S. border. Results are expected to lead to more effective channel assignment.

Various options were evaluated for future development of general mobile service and radio telephony integrated with the national telephone system. Attention focussed on national use of the newly allocated 800 MHz band and development of related equipment by Canadian industry.

The department also supported experiments at 11, 15, 18, 37 and 74 GHz to investigate the potential of these higher frequencies, and studied the effects of rain attenuation in these frequency bands. Co-operative experiments required for future space communications systems were carried out with Telesat, Teleglobe and BNR/TCTS, and co-operation on terrestrial communications experiments was arranged with the B.C. Telephone Company and the Maritime Telephone and Telegraph Co.

Rural and remote communications
In 1978/79, the department commenced work on an advanced digital transmission system suitable for rural areas where houses are strung out along miles of country roads. The system will provide single-party service, and will increase the number of customers that can be handled by one cable.

A radio telephone system now in final design stages will enable users in remote areas to dial direct to any telephone in Canada without going through an operator. Integrating existing advanced technology for high frequency radio, speech processing and electronic telephone switching, the system automatically tests eight different frequencies, selects the best frequency available, then connects the call and minimizes interference for the duration of the call. Plans are being made for evaluation of a pilot system in 1979.

Research during the year on low-cost VHF and HF trail radio led to the concept of adding a radio-to-telephone interconnection facility to the existing system (now under evaluation trials in Northern Labrador). This concept will allow radio users on the trail or in a remote camp to dial and speak directly to anyone with a telephone in their base community. Further work is planned for industrial development and field trials.

Mobile radio data system
In January 1979, an advanced mobile radio data system was officially turned over to Vancouver police. Funded in large measure by the department, the system consists of small data terminals installed in police cars and a communications controller to manipulate data flows to and from all terminals. The system is applicable to the control of any fleet of vehicles and is not limited to police applications.

Design for a simpler terminal for use in the transportation industry was completed in November 1978 and will undergo field trials in 1979.

University research program
During 1978/79, 46 contracts were awarded for applied communications research in Canadian universities, 14 of them to French-language institutions. The program complements in-house research of the department and helps build communications expertise in the university community. To qualify for support, projects must be in line with federal responsibilities and priorities in the social, economic, regulatory or technological aspects of telecommunications.

Inventions
Eleven patent applications were filed in 1978/79. Through licensing by Canadian Patents and Development Limited, concepts of commercial interest developed by the department's researchers are made available to the private sector.

Communications Research Advisory Board
Following meetings in spring 1978, the Communications Research Advisory Board, an independent, voluntary group of business, academic and government experts in telecommunications, urged the government to take immediate steps to ensure the development of a strong, domestically owned telecommunications industry. The board identified videotex and fibre optics as key areas where, with modest government funding, significant levels of industrial stimulation and job creation could be achieved.

8

SPACE COMMUNICATIONS

Canada's domestic use of satellite communications dates back to the first Anik, launched in 1972. Today, Telesat Canada's three Anik A satellites provide TV and radio program distribution to regional centres, as well as voice and data transmission. The Department of Communications is laying the ground work for future development of satellite communications through a variety of programs.

Hermes
The experimental Hermes satellite, launched in January 1976, exceeded its design lifetime of two years, and its mission was extended through 1978 until November 1979. The most powerful communications satellite in orbit, it is the result of a co-operative program undertaken by the Department of Communications and NASA, with the participation of the European Space Agency.

Major experiments in such fields as telehealth, tele-education, community interaction, TV broadcasting and advanced technology demonstrated the technical feasibility of a wide range of new communications services in the 12/14 GHz range.

Anik B
The usefulness and cost effectiveness of such new services will be tested through a series of pilot projects of long duration conducted under close to normal operating conditions on Telesat Canada's hybrid satellite Anik B. A number of advanced technology experiments are also planned.

Launched in December 1978, Anik B went into service in February 1979. It has a 12/14 GHz capability as well as a conventional 4/6 GHz system. The department has leased the higher frequency portion for two years starting in 1979, with an option for a further three years.

The 17 projects to be carried out by federal and provincial agencies, voluntary associations, universities, and the carriers are expected to lead to new commercial services which would use Telesat's Anik C satellites, presently planned for 1982 launch.

Direct broadcast satellite studies
The technical feasibility of direct broadcasting by satellite was successfully demonstrated through the Hermes program. Studies carried out in 1978/79 indicate that this would be a cost-effective method of delivering multi-channel TV to the approximately six million Canadians in rural and remote areas who now have limited TV reception or none at all.

In early 1979, the department conducted an experiment on Hermes using small TV receive-only terminals in North-West Ontario and Labrador to demonstrate the feasibility of direct broadcasting by satellite.

Space industry development
The government has recognized for some time that development of a Canadian prime contractor for communications satellites is a prerequisite to capturing a greater share of the domestic and export markets for satellites.

To this end, the government sought the co-operation of Telesat Canada in placing the prime contract for the two Anik D satellites with a Canadian firm, Spar Aerospace Ltd., and approved the payment of $22.4 million to partially cover the higher cost of using a Canadian prime contractor. The government also authorized the Minister of Communications to enter into contracts with Spar for the integration and partial testing in Canada of the third Anik C spacecraft. This will provide a learning experience for the industry as it gears up to become prime contractor for the Anik D program. The program is expected to double the number of jobs in Canada's space industry over the next three years.

International demand for satellites, ground stations and related expertise and software is expanding rapidly. The department is therefore working closely with the Department of Industry, Trade and Commerce to identify opportunities and to support Canadian industry in international marketing activities.

David Florida Laboratory expansion
In 1978, the expenditure of $20 million was approved to upgrade facilities of the David Florida Laboratory at the Communications Research Centre to handle integration and testing of complete satellites.

Expansion began in 1978/79. The new and improved facilities include a thermal-vacuum chamber large enough to accommodate satellites compatible with the U.S. Space Shuttle and vibration facilities capable of testing at up to 40,000 pounds force.

Musat
Feasibility and engineering studies continued for Musat, a multipurpose ultra high frequency satellite system. The proposed system would provide federal and provincial governments with reliable communications to mobile or transportable terminals based on land, air or sea. Potential applications include pollution control, emergency communications and meteorology. Technical and economic studies carried out during 1978/79 at the direction of an interdepartmental steering committee indicated that a domestic mobile-satellite system is desirable, feasible and viable.

Other activities
Through the Communications Research Centre, the department provides specialist expertise to support space applications programs sponsored by other departments and agencies. These programs include military satellite communications, aeronautical and marine navigation, search and rescue, remote sensing, surveillance, weather forecasting and development of the remote manipulator for the U.S. Space Shuttle.

Interdepartmental Committee on Space
The department continued to provide a permanent secretariat to the Interdepartmental Committee on Space (ICS), as it has done since 1976. The ICS was formed in 1969 to advise on policy and planning Canadian space activities, and to ensure the co-ordinated development of government, university and industrial activities as well as international co-operation. It is composed of senior officials of departments involved in space activities. Since 1975, it has reported to the Minister of Communications.

9

INTERNATIONAL TELECOMMUNICATIONS

International Telecommunication Union
The International Telecommunication Union (ITU), the United Nations specialized agency responsible for co-ordinating international use of telecommunications, has scheduled a World Administrative Radio Conference (WARC) for fall 1979. This conference will revise the table of frequency allocations established in 1959, to better accommodate world telecommunications now and for the remainder of this century.

Canadian proposals for revisions, formulated by an interdepartmental committee of the federal government following extensive consultations with provincial governments and the private sector, were submitted to the ITU in February 1979.

The main concerns covered in these formal proposals were: allocation of additional spectrum for mobile communications; extension of the standard AM broadcasting band; increasing the amount of shortwave spectrum for international broadcasting; and providing more spectrum for amateur radio and for satellite communications.

Canada took part in preparatory seminars held in Nairobi, Panama and Sydney to assist the developing countries in clarifying the issues and, with Sweden, sponsored travel fellowships for representatives of the developing nations attending the Panama seminar.

Canada also participated in meetings of the Inter-American Telecommunications Conference (CITEL) and the Allied Radio Frequency Agency (ARFA) of NATO relating to WARC 1979.

Two committees of the ITU, the CCIR and the CCITT study technical and operating questions relating to radiocommunications, and to telegraphy and telephony.

In June 1978, the CCIR met in Kyoto, Japan, to review the output from final meetings of 11 CCIR study groups and two joint CCIR/CCITT study groups on international radio standards. In October and November 1978, CCIR members met to prepare technical and operational bases for the 1979 WARC.

During the year, most CCITT study groups met to review proposals from various members. Canada succeeded in gaining approval of recommendations in the field of interactive retrieval of information, particularly Telidon. The director of the CCITT paid an official visit to Canada in April 1978.

The UN and outer space
A question of consuming interest during the year in the UN Committee on the Peaceful Uses of Outer Space was the use of nuclear energy sources in space. Canada informed the scientific and technical subcommittee of the presence of radioactive particles in the wreckage of COSMOS 954 collected on Canadian territory, and proposed the creation of a task force on the technical implications of using nuclear energy sources on spacecraft. Despite the resistance of the USSR in the subcommittee – where decisions are reached by consensus – the proposed task force was set up and is scheduled to report in 1979.

Another matter of continuing interest is the establishment of principles for direct broadcasting by satellites. Although the matter has been under discussion for 10 years, no progress was made during the year, mainly because the United States feels it cannot accept a principle that would restrict the free flow of information.

European Space Agency
Canada and the European Space Agency (ESA) signed a co-operative agreement on December 9, 1978. The agreement came into force January 1, 1979, providing for closer co-operation between Canada and ESA as well as its 11 member countries. Until now, Canada has had observer status in the ESA council.

The agreement follows a year of long and difficult negotiations, protracted by the reluctance of some nations – notably France and Great Britain – to see industrial benefits shared with a non-European space power.

Under the agreement, Canada will participate in ESA's long-term study program, with the emphasis on specific projects. In January 1979, ESA sent a mission to brief Canadian industry on procedures. Several companies subsequently registered with ESA to receive requests for proposals in general studies and technological research.

Canada/USA frequency co-ordination
Canadian and American telecommunications officials held a number of meetings to discuss matters of mutual interest, including co-ordination of the use of parts of the MF, VHF, UHF and SHF radio frequency bands.

Other activities
In September 1978, Saudi Arabia's minister of post and telecommunications visited Canada at the invitation of the minister to review Canada-Saudi co-operation in telecommunications. In February 1979, the Australian minister of posts and telecommunications came to investigate this country's satellite communications capabilities. Telecommunications officials from the Federal Republic of Germany, Australia, Japan, Korea, and the People's Republic of China also visited Canada to meet with departmental officials and industry representatives.

Officers of the department made visits to France, the United Kingdom, the Federal Republic of Germany, Italy, Switzerland, the People's Republic of China, and Saudi Arabia.

The department provided information on various aspects of telecommunications in response to requests from the ITU Technical Cooperation Department and administrations of the U.K., the Netherlands, Ireland, New Zealand, Brazil, Thailand, Argentina, Mexico, Columbia, Kuwait, India and Sweden.

APPENDICES

Appendix I

Canadian telecommunications industry – 1978

	Telephone and other carriers	Radio and television broadcasting**	Cable television***	Total
Total operating revenues	4,820.6	788.0	269.8	5,878.4
Net fixed assets — land, property and equipment	12,404.0	527.4	311.9	13,243.3
Total assets	14,416.0*	1,075.5	480.4	15,912.8
Value of wages and salaries paid	1,764.0	549.6	74.0	2,387.6
Number of employees	107,850	26,851	5,202	139,903

*Does not include assets of CNCP Telecommunications.
**Includes private stations and CBC.
***Includes only licensees reporting more than 1,000 subscribers.

Source: Statistics Canada and Department of Communications

Appendix II

Trends in the Canadian telephone industry, 1948 – 1978

	1948	1958	1968	1978
Telephone companies	2,992	2,619	1,772	260*
Telephones, all types (millions)	2.5	5.1	8.8	15.1
Full-time employees	38,851	61,400	66,699	92,873
Local and long-distance calls (billions)	4.1	5.1	14.4	24.0
Calls per capita	320	511	687	1,020

*Fourteen of these companies provide 98 per cent of the services.

Source: Statistics Canada

Appendix III

Canadian households with communications services – May 1978

Type of Facility or Equipment	Households		Increase (Decrease) over 1977	
	Number	Percent of Total	Number	Percentage
Television*	7,121,000	97.3	299,000	4.4
Colour	5,294,000	72.3	530,000	11.1
Black & white	3,819,000	52.2	(133,000)	(3.4)
Radio AM & FM**	7,206,000	98.4	324,000	8.3
Telephones***	7,063,000	96.5	292,000	4.3
Cable television	3,625,000	49.5	337,000	10.2
Total Canadian households	7,320,000	100.0	298,000	4.2

*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.

**Includes households with one or more receivers.

***Includes households with one or more telephones.

Source: Statistics Canada

Appendix IV

Canadian broadcasting stations, March 1978

Province	AM	FM	TV*	Low power AM** (unprotected)	Total
Newfoundland	28	25	111	17	181
Prince Edward Island	4	1	2		7
Nova Scotia	23	13	36	17	89
New Brunswick	19	8	26	11	64
Quebec	92	60	116	43	311
Ontario	109	85	106	58	358
Manitoba	20	29	56	6	111
Saskatchewan	20	16	68	1	105
Alberta	40	31	98	16	185
British Columbia	72	42	269	83	466
Yukon Territory	3	1	18	12	34
Northwest Territories	6	12	27	14	59
Total	436	323	933	278	1970

*Approximately half these are low power unprotected stations.

**Approximately 99 per cent are CBC stations.

Note: Under international regulations, low power stations are not entitled to protection from interference caused by regular stations on allotted channels.

Source: Department of Communications.

Appendix V

Cable television in Canada by region, 1978

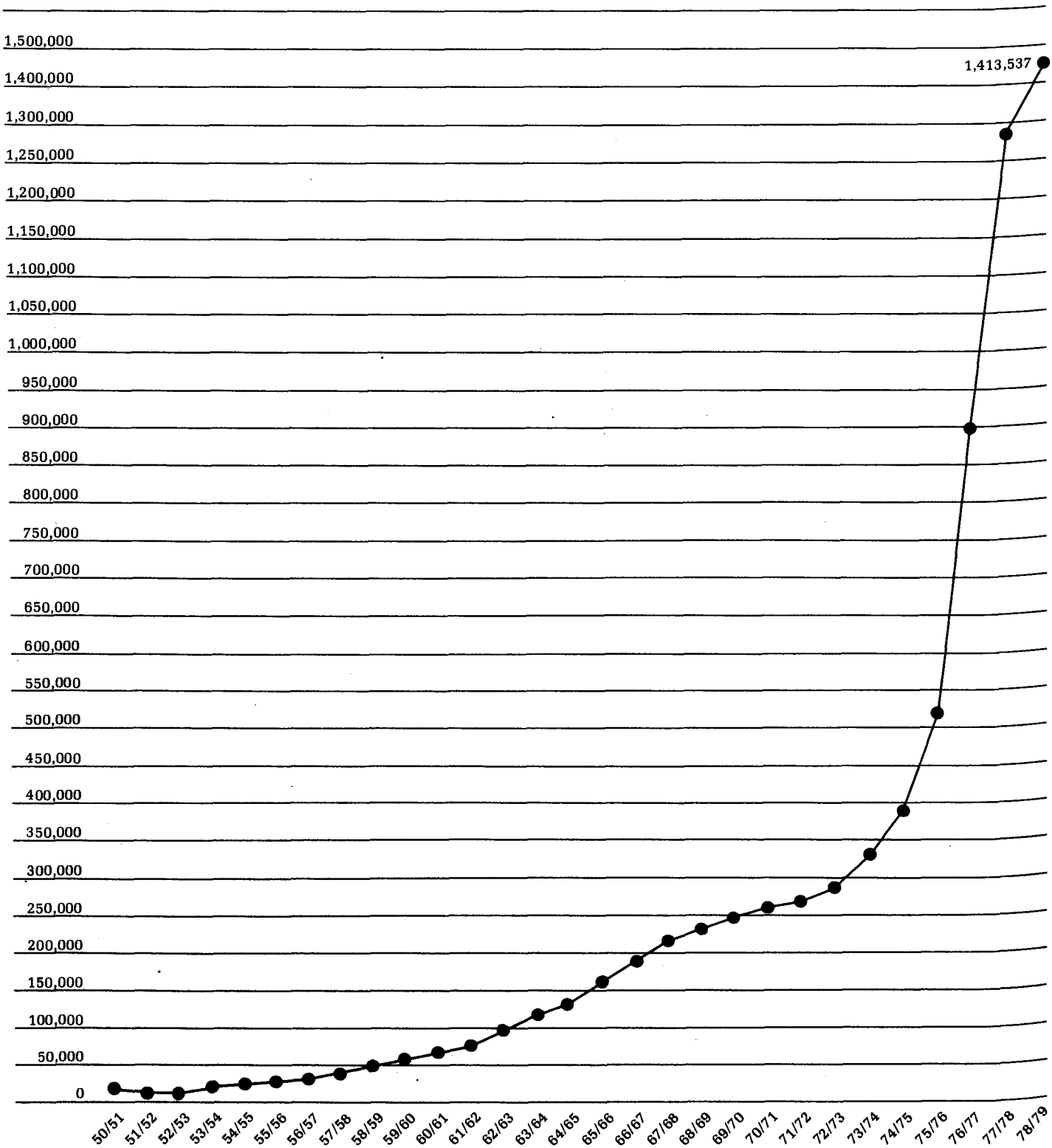
Total systems	**Pacific***	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**
Systems	72	37	118	141	40	408
Subscribers	692,853	512,564	1,652,397	737,015	180,804	3,775,633
Total households**	822,000	1,212,000	2,741,000	1,944,000	602,000	7,320,000
Percentage of households subscribing	84.3	42.3	60.3	37.9	30	51.6
Systems with more than 1,000 subscribers						
Systems	52	27	104	70	29	282
Subscribers	687,019	509,057	1,646,538	708,796	175,883	3,727,293
Households in licensed areas***	810,668	810,148	2,287,614	1,575,865	308,154	5,792,449
Penetration in licensed areas	84.7	62.8	72.0	45.0	57.1	64.3

*Includes British Columbia, the Yukon and the Northwest Territories.
**Figures as of May 1978.
***Areas licensed for the distribution of cable television.

Note: Figures are for the period September 1, 1977 to August 31, 1978.
Source: Statistics Canada

Appendix VI

Radio station licences
in force 1950 – 1978
(all classes)



Source: Department of Communications

Appendix VII

Number of radio stations by service category for 1978/79 fiscal year

Service category*	Ship	Coast	Land	Mobile	Earth**	Space**
Limited maritime mobile		2				
Private maritime mobile		107				
Public commercial			2,136	15		
Restricted public commercial			1,108			
Private commercial***			40,455	259,657		
Provincial government			7,343	38,561		
Municipal			3,910	38,062		
Experimental			564	659		
Amateur experimental			19,781			
Public commercial receiving			165			
Private commercial receiving			797	209		
Public commercial automatic repeater			1,229			
Private commercial automatic repeater			3,155			
Aircraft navigational				16		
Aeronautical mobile			1,771	15,455		
Ship stations	17,818					
General radio service****			951,849	951,849		
Earth stations					196	
Space stations						7

*Figures indicate the number of stations performing service in each category. A licence may show more than one service category.

**These are not service categories as defined in the Radio Regulations.

***Included in the figures for private commercial are 7,068 land and 27,498 mobile stations licensed to federal government departments.

****General Radio Service stations may operate either as land or as mobile stations.

Source: Department of Communications

Appendix VIII

Department of Communications 1978/79
expenditures by activity

	Operating	Capital ($000)	Grants and contributions	Total
Departmental administration	10,828	643		11,471
Telecommunications research	10,666	3,373		14,039
National telecommunications development	3,861		2,253	6,114
International participation	902		1,665	2,567
Management of the radio frequency spectrum	24,840	1,474	15	26,329
Space applications	30,653	6,231	2,530	39,414
Contributions to employee benefit plans	4,877			4,877
	86,627	11,721	6,463	104,811
Less: receipts and revenues credited to the vote	4,026			4,026
	82,601	11,721	6,463	100,785
Less: receipts credited to revenue	10,790			10,790
Add: services provided without charge by other departments	4,200			4,200
accommodation provided without charge by this department	2,389			2,389
Total cost of program	78,400	11,721	6,463	96,584