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Department of Canada
Ministère des Communications

Gouvernement du Canada
Ministère des Communications

The Department of COMMUNICATIONS



An overview

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The Department of **COMMUNICATIONS**



An overview **COMMUNICATIONS CANADA**

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Introduction

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Canada's geography and history have made it a pioneer in communications. The need to link widely separated population centres across a vast landmass has meant that the nation's development, even its survival, depended first on efficient transportation and, later, communications.

Canada: a world leader in communications

By most standards, Canada is among the world's leaders in telecommunications capacity: telephones and TV sets per capita; annual phone calls per capita; number of cable-delivered TV channels; and percentage of households with cable TV. Canada is also a technological innovator: our Anik A1 was the first geostationary satellite used for commercial domestic service; Telidon, invented in Canadian laboratories in 1978, is the world's most advanced videotex system.

The challenge: making technology serve human needs

Today, Canada faces further challenges. New communications and information technologies are arriving on the scene rapidly. High-powered satellites make it possible to beam television signals directly into our homes. Word processors, electronic workstations, sophisticated digital-switching systems, ever more powerful and cheaper computers are transforming the office, where 55 percent of Canadian workers earn their living. Electronic banking and shopping are on the horizon. But it is more than a matter of inventing new ways to communicate. We must also ensure that communications and information technologies serve the nation's social, economic and cultural needs.

Communications policy is assuming an importance beyond the traditional, and still vital, need to ensure that Canadians can communicate with each other. There are growing economic and cultural stakes, too. The information revolution caused by the merging of computers and telecommunications is transforming the way people work and live, creating sophisticated products and industries to make them, and offering new opportunities for the expression of our cultural identity.

The Department of Communications' role

The Department of Communications plays a key role in meeting these challenges and in ensuring that all Canadians benefit from the complete range of communications services. Because of the broadening scope of the communications field, the department's operations are diverse, ranging from space programs to broadcasting policy, from scientific and technical research to the day-to-day management of the

airwaves. As well, because of the increasingly close connection between the production of cultural content -- television programs, films, books, musical recordings -- and the technical means for its transmission, the department has important responsibilities in national cultural development. It formulates federal cultural policy and -- in collaboration with the cultural agencies, the cultural community and the provincial governments -- implements these policies.

The department's organization and resources

To carry out its responsibilities effectively, the department is organized into six sectors: Policy, Space, Research, Arts and Culture, Spectrum Management and Government Telecommunications, and Financial Management. Services are provided throughout the country by five regional offices and 47 district and sub-offices (see Appendix A).

The Department of Communications employs 2,300 people, 45 percent of whom are scientific or technical specialists. One third of the staff work at the Ottawa headquarters, one third at the Communications Research Centre, and one third in regional and district offices.

Telecommunications and Broadcasting Policy

The Policy sector formulates strategies for the development, promotion and monitoring of broadcasting and telecommunications services; conducts economic, social, and technical studies related to communications and culture; is responsible for co-ordination of federal-provincial relations in communications; and develops Canada's policy on international aspects of communications, participating in the negotiations of such agencies as the International Telecommunication Union (ITU).

Several current policy issues illustrate the far-reaching effects of communications on our lives.

Broadcasting policy

Broadcasting has played a unique and vital role in fostering Canada's identity as a nation, giving voice to our individual and collective sense of the world and our place in it. Broadcasting will be no less important in our future national development; new technologies like direct-broadcast satellites and new services like pay-television will augment its power to shape our ideas and values.

The department is responsible for developing a strategy to ensure that Canadians will have a national radio and television broadcasting system that provides a variety of programming, a system that allows us to enjoy the best of foreign offerings while expanding and improving Canadian production. At the same time, attention must be paid to the needs of particular groups of Canadians. For example: extending a wider variety of broadcasting services to the six million people who live in rural and remote areas, and providing closed-captioned television programming to hundreds of thousands of hearing-impaired Canadians.

In the years to come, technology will pose both problems of adjustment and opportunities for Canada's broadcasting system. Direct-broadcasting satellites, two-way cable systems and videotex require a continuing assessment of our broadcasting institutions and their proper role in achieving national cultural objectives.

Telecommunications regulation

The laws and regulations governing communications must account for cultural, social, economic and technological changes; they must also balance the interests of the public with the economic realities faced by the telecommunications industry.

Based on its analyses of decisions made by independent regulatory bodies and on assessments of the public interest and industry concerns, the department provides advice on regulatory matters for which the Minister of Communications is responsible.

This process is complicated for many reasons. There are several different kinds of organizations regulated — broadcasters, cable companies, telephone companies and telecommunications companies. The federal and provincial governments each has its own particular concerns and responsibilities in regulation. And, in a world where communications technology may seem even to abolish national boundaries, policymakers must pay close attention to the effects of regulatory decisions made abroad, especially in the United States.

The push of technology

Moreover, technological changes are blurring traditional distinctions between broadcasters, telecommunications carriers, cable companies, print publishers and data-processing companies. This new environment demands a re-examination of the very basis for the regulation of these industries.

Cable television illustrates the problem. People usually think of cable TV simply as a means to deliver television programming from remote sources. However, two-way cable systems can also carry interactive services like videotex, teleshopping and even telebanking. The development of an appropriate regulatory system to ensure that such new services are introduced in an orderly manner is one area under study.

Standards

Another concern is the development of standards to permit customer-owned equipment (from single-line telephones, to private branch exchanges and radio paging devices) to be connected to the networks of federally regulated carriers. Since 1976, the Department of Communications has sponsored a voluntary, co-operative program to establish such standards for new types of customer-owned terminals, through the Terminal Attachment Program Advisory Committee (TAPAC), which includes members from the federally regulated carriers, manufacturers, users and participating provinces.

The individual in the information society

The new technologies not only affect institutions; they may also transform, in sometimes unexpected ways, the lives of individuals, affecting for better or worse, their job prospects and opportunities to participate fully and effectively in society.

The Policy sector monitors and evaluates the social impact of new technologies, like videotex, and new services, such as cable-satellite networks. Among the questions studied are people's needs (community information, for example) and the effect of technological developments on human rights (access to personal information held in data banks, and the right to privacy). Another current priority is the development of measures that will permit the physically disabled to benefit from the full range of modern communications services.

Other concerns include the social effects of videotex (one object of Telidon field trials); the implications for Canada's cultural and economic sovereignty of international data banks and public on-line information services; and the consequences of office automation, which, while offering opportunities for increased productivity in white-collar jobs, also has the potential, unless its introduction is properly managed, to cause serious disruptions in the labor market.

Arts and Culture

In 1980 the Department of Communications became responsible for the federal government's arts and culture policies and programs. This realignment of responsibilities recognized the close link between culture and communications. It was intended to ensure that communications policy would be conducted with the highest concern for cultural content and the cultural implications of communications technology, and that the cultural milieu would benefit from technological advances in communications.

Through its arts and culture policies and programs, the department addresses the needs of performing and visual artists, libraries, museums, archives and galleries, as well as the cultural industries -- book and periodical publishing, film and videotape production, and sound recording. In addition, it administers various programs of grants and contributions with a total budget of about \$25 million.

Also, in order that they may work toward common cultural objectives in a coherent way, the Arts and Culture sector promotes co-ordination and co-operation among the nine federal cultural agencies, for which the Minister of Communications is responsible: the Canada Council, the Canadian Broadcasting Corporation, the Canadian Film Development Corporation, the National Film Board of Canada, the National Library of Canada, the Public Archives of Canada, the National Museums of Canada, the National Arts Centre, and the Social Sciences and Humanities Research Council. (The role of each of these agencies is summarized in Appendix B.)

Communications, culture, nationhood

Communications has two aspects. On the one hand, it refers to the technical systems used to convey messages -- radio waves, coaxial cables, satellites or fibre optics, for example. On the other hand are the messages themselves, the information and ideas communicated among people. Depending on one's point of view, this two-fold nature of communications can be denoted by different terms. Thus, regulators of telecommunications systems distinguish between "carriage" and "content", an engineer thinks of "hardware" and "software", while others refer to "medium" and "message" -- a distinction made famous by the Canadian communications theorist Marshall McLuhan.

In effect, the sum total of communications is cultural activity, the dissemination and sharing of information and ideas, whether through books and magazines, broadcast programming, films or any other form of human expression. To a large extent, the character of a community, of a nation, is determined by the nature and vigor of its cultural life. As the technical means for communications expand, new channels are opened for cultural expression. There is, then, a close and dynamic relationship between communications technology and cultural content.

Canadians have both a sophisticated communications system and a rich, varied and unique cultural heritage. To ensure that new technologies are used to foster national cultural expression is a vital concern of the Department of Communications.

Cultural policy

The Arts and Culture sector is responsible for the development of policies designed to stimulate the creation, production, dissemination and conservation of Canadian cultural products and forms of expression. The policies have two fundamental goals: to foster opportunities for Canadians to express and display their creative ideas and talents, and to promote a stronger sense of national identity.

Examples of policy activities undertaken in the past include the development of the national museums policy; the establishment of the Special Program of Cultural Initiatives; and film-sector initiatives such as the Capital Cost Allowance for film investment and support for film festivals. There have been similar initiatives in all the other cultural sectors. As well, the department is participating in a major review of copyright legislation and is active in studies of other cross-sectoral issues, including tax and trade measures.

Currently, the department is proceeding with a major sector-by-sector review of its cultural policies. Recent important developments in broadcasting policy will be followed in 1983-84 by new policy proposals in the fields of film, sound recording, crafts, and heritage; comprehensive reviews will also be undertaken in the fields of book and periodical publishing, the performing arts and the visual arts.

These reviews will permit the federal government to clarify and elaborate its cultural policies, and thereby

refine its cultural-support programs to improve the economic and social environment for Canadian artistic and cultural expression.

Cultural industries

Key to the achievement of national cultural objectives are the cultural industries. They combine artistic creation with the techniques of mass communication to shape our society — creating myths, popular heroes and heroines, and our very sense of community and history. The cultural industries employ thousands of Canadians in film and video production, sound recording, book and periodical publishing, and broadcasting.

The department administers a range of programs designed to foster a climate in which our cultural industries will flourish. Some examples follow:

Book publishing

Good books alone cannot guarantee the survival of Canadian publishers, who with a relatively small domestic market in world terms, compete against a flood of books imported from abroad. To ensure that Canadians may continue to enjoy the works of their own authors, the department provides about \$7.5 million annually in contributions to Canadian book publishers. These funds are used to help with marketing, textbook development and the financing of studies designed to increase the industry's competitiveness.

Film and video production

Investors in certified Canadian film and video productions are eligible for a 100 percent capital-cost allowance for income tax purposes (the deduction being claimed over two years); this is both a direct tax incentive and an indirect aid in raising money for Canadian productions. Certification procedures are administered by the department's Canadian Film and Videotape Certification Office, according to criteria intended to promote Canadian participation in and control of all aspects of production; a mandatory requirement for feature-film certification is the employment of a Canadian actor or actress in one of the two leading roles, and the use of a Canadian director or screenwriter.

In addition, the Department of Communications' Films Festivals Bureau supports the industry's marketing efforts at more than one hundred film festivals around the world each year. The bureau also publicizes Canadian films and festivals by providing financial aid to organizers of film and video festivals.

Periodicals publishing and postal rates

Approximately 3,500 newspapers and periodicals benefit from second-class preferential postal rates for distribution in Canada and abroad. Reduced rates are also available to libraries and book publishers, wholesalers and retailers who mail books within Canada and to other countries. The Department of Communications makes a financial contribution to Canada Post to compensate for the reduced revenues associated with these preferential postal rates. In this way, Canadians at home and abroad have access to Canadian publications.

Museums and heritage

Under the Cultural Property Export and Import Act, the department supports vital efforts to preserve in Canada the most valuable examples of our artistic and cultural heritage in its many forms — fine art, ethnographic objects, historical artifacts, books, manuscripts and others.

A secretariat within the department administers a system under which the export of outstanding cultural property is controlled. In addition, it provides administrative services to the Canadian Cultural Property Export Review Board, which administers tax-incentive measures designed to encourage owners of important cultural objects to donate or sell them to designated Canadian institutions.

Furthermore, these designated institutions — public galleries, museums and archives -- are eligible for grants to assist them in buying cultural property for which export permits have been denied or which is located outside Canada.

The Special Program of Cultural Initiatives

This program was established in 1980 to respond to urgent needs of Canadian artistic and cultural organizations. Financed through revenues accruing to the federal government under the federal-provincial agreement on lotteries, the program has four components: it supports innovative projects that develop applications of communications technologies by arts and cultural organizations; encourages management development in Canadian cultural organizations; provides capital assistance for the development of a national network of performing-arts and custodial facilities; and supports nationally significant

cultural and artistic events throughout Canada. Nearly \$40 million in support has been provided during the first three years of the program.

Cultural research

In support of the department's central role in cultural policy formulation, the Arts and Culture sector conducts an extensive program of cultural research. The work includes detailed financial, economic, sociological and statistical studies of specific cultural sectors, industries and occupations, as well as multidisciplinary reviews of artistic and cultural activities. The department also funds, in collaboration with Statistics Canada, a \$1.2 million cultural-data collection program, in order to provide information required for the development of effective cultural programs.

Radio Spectrum Management

All radio services, including broadcasting, radar, satellite systems and mobile radios, depend on a finite resource -- the radio spectrum. Spectrum management is the planning and application of technical rules and regulations to ensure that all radio services operate satisfactorily and without interference; it also ensures that all Canadians who want to use the spectrum are treated equitably in the shared use of this limited resource. Thus, in many respects, spectrum management is analagous to the rules of the road and highway.

Under the Radio Act, this management process is the role of the department's spectrum management specialists.

A critical requirement: planning

The demands for radio frequency are growing rapidly as technology advances and new applications of radio are introduced. Careful planning to meet these needs is a critical aspect of spectrum management. Planning is based on forecasts of future demand, taking into account differences between localities and applications.

Also to be considered are the effects of new technologies that may be able to meet future demand through more efficient utilization of the spectrum, preferably without requiring the reallocation of frequency bands. If planning indicates that reallocations may be necessary, the department undertakes a detailed assessment of its technical and economic consequences in comparison to alternatives.

Licensing and spectrum control

Key spectrum-management functions are licensing and control. All radio transmitters must be licensed, and certain categories of radio operators have to be certified. The terms and conditions of the licences and certificates ensure that radio transmitters are operated properly, on assigned frequencies, according to established technical standards and procedures. The department uses advanced computer systems and employs inspectors throughout Canada to issue licences and ensure that radio-licence conditions are respected and that radio operators are fully competent.

The safety services were one of the first uses of the radio spectrum -- and still the most vital. Radio is used to dispatch police, fire and ambulance vehicles, and to relay medical data from heart-attack victims en route to hospital. Radar-equipped tugs and ocean-going vessels rely on radio to navigate in fog and to communicate with each

other. Large aircraft are guided to safe instrument landings by radio systems. Because operators using one portion of the radio spectrum can unknowingly interfere with users of other parts of the spectrum, strict control of the spectrum -- by licensing, equipment-type approvals and operator certification -- is essential to the services devoted to the safety of life and protection of property.

The electronic environment

The spectrum regulators develop, update and enforce technical standards for radio equipment and other electronic devices capable of interfering with radio signals. Applications for radio licences are evaluated against these standards and national or regional spectrum-management plans.

Of increasing concern has been the problem of electronic interference. The department co-operates with Canadian manufacturers to find ways to reduce the malfunctioning of TVs, stereos and other devices caused by strong radio signals. A departmental official chairs the Canadian Standards Association committee that deals with electronic compatibility, a group that develops standards to measure and establish tolerable levels for radio interference.

Technical support

To provide technical support to the spectrum-management function, the department maintains at Ottawa a laboratory that develops methods for testing radio equipment, calibrates and overhauls testing equipment, and carries out tests required for the approval of new types of radio equipment.

Broadcasting

Technical aspects of radio and television broadcasting, and cable TV systems, are regulated by the department, which issues technical construction and operating certificates under the Radio Act. Technical standards and procedures are developed, along with frequency plans for the allotment of broadcasting stations, to ensure interference-free reception in all frequency bands allocated to broadcasting. Corresponding standards are developed for the design and operation of cable TV systems and related equipment.

Government telecommunications

The federal government is the largest user of telecommunications services in Canada. The Government Telecommunications Agency (GTA) provides shared voice and data telecommunications services on a government-wide basis. The GTA serves 80 departments and agencies by leasing services from telecommunications carriers; costs are recovered from departments based on usage.

In addition, the GTA promotes a concerted approach to telecommunications management in government departments. It provides technical advice on new communications systems and assists departments to meet their needs in the most cost-effective way.

Canada is an innovator in communications in two respects: it has a world reputation for the development of highly sophisticated technical systems; it is also a leader in demonstrating how technology can be used to meet social and economic goals. Our role in space demonstrates both themes.

Canada was the third nation, after the Soviet Union and the United States, to produce an artificial satellite — Alouette I, launched in 1962; Telesat Canada's Anik A1, launched in 1972, was the first commercial communications satellite placed in geostationary orbit; when launched in 1976 Hermes was the most powerful communications satellite ever built to that time; a Canadian industrial team designed and constructed the Remote Manipulator System, better known as the Canadarm, a vital component of the U.S. Space Shuttle program.

And Canada has shown how satellite technology can be used to achieve important social and human benefits -- to link remote communities with new services like telemedicine and tele-education, to extend broadcasting and telecommunications services to the remotest reaches of a vast land, and to provide more reliable and efficient telecommunications.

The department's Space sector is a key player in these developments. It conducts research and development, operates Canada's scientific satellites, and directs programs using available satellite capacity. It also operates the world-class David Florida Laboratory, in which space components, space systems and complete spacecraft are integrated, assembled and tested.

The sector is an active partner of Canada's space industries. It supports the development of Canadian industrial capacity to build space systems and components, sponsors the transfer of technology from laboratory to commercial application, and gives technical support to the international marketing initiatives of Canadian companies.

Major projects

Important current projects include development of a satellite, called MSAT, that would carry nationwide mobile-communications services, participation in an international program for the development and evaluation of a satellite-aided search-and-rescue system (SARSAT), and a role in the program of the European Space Agency (ESA), notably development of ESA's large satellite (L-SAT).

MSAT

Government experts have been studying the concept of a mobile satellite communications system since 1972. A major step came in 1979 when the World Administrative Radio Conference allocated the 806-890 MHz band to this service in North America. The Department of Communications immediately followed up with studies of the technical and economic feasibility of extending mobile-communications services by satellite to Canadians in rural and remote areas of the country. This program is now known as MSAT (for "Mobile Satellite").

The MSAT system would serve mobile terminals anywhere in Canada or North America, without restriction on operating distance. Thus it would meet the most urgent needs of mobile-communications users in such applications as oil exploration, mining, trucking, shipping, business, and personal communications. Government agencies would also use MSAT in services such as law enforcement, forest-fire fighting, and resource management.

A \$22-million program of economic studies and engineering design continues, leading in 1984 to a formal proposal for construction and launching of MSAT later in the decade. It is expected that MSAT would develop a mobile-services market large enough to sustain a commercial operations in the 1990s.

SARSAT

Planning for a satellite-aided search-and-rescue system began early in the 1970s, when experiments by the Communications Research Centre demonstrated that satellites equipped to receive emergency transmissions from aircraft and ships could locate distress sites within minutes -- to an accuracy of 10-20 km.

In 1979 Canada, the United States and France, later joined by Norway and the United Kingdom, agreed to co-operate in the SARSAT program. The system, which begins 15 months of demonstration and evaluation in 1983 features Canadian-built repeaters installed in three U.S. polar-orbiting weather satellites. The SARSAT partners are co-operating with the Soviet Union, sponsor of COSPAS, a compatible search-and-rescue satellite system inaugurated in June 1982.

L-SAT

Another major high-technology project with important international implications for Canada is the Large Telecommunications Satellite (L-SAT) program of the European Space Agency. L-SAT, scheduled to begin five years of operation in 1986, will be able to carry a wide range of communications and other payloads.

Canada participated in the definition phase of the project, and in 1981 agreed to join the development and manufacturing phases in partnership with several European countries.

Canada's \$90-million contribution represents about 9 percent of program costs. Canadian companies will build the craft's solar array and some payload components, and final integration and testing of the craft will be carried out in the department's David Florida Laboratory.

Direct-broadcast satellites

Direct broadcasting by satellite (DBS) was pioneered in Canada with the Hermes satellite, and developments continue with the Anik B and Anik C satellites. In DBS systems, television and radio signals can be received directly by small dish like antennas anywhere within the satellite's coverage pattern.

The need to improve radio and television services for six million Canadians living in remote and underserved areas has led the department to undertake a program of multi-disciplinary studies on the feasibility of a Canadian DBS service. These investigations are being conducted in consultation with broadcasters, cable operators, telecommunications carriers and provincial governments.

Building a space industry

An important objective of the Space sector is to support the growth of a competitive Canadian space industry, capable of supplying domestic needs as well as winning orders in international markets. This support takes several forms:

- A satellite-technology development program encourages industry to develop subsystems and components for planned domestic and foreign satellite systems. Some products now under development include small-satellite reception antennas, spacecraft on-board power systems, spacecraft dynamics and control systems, and new materials for use in future communications and remote-sensing satellites.

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- . The transfer of technologies developed in the department's laboratories to Canadian companies helps to ensure they have the products they need to compete internationally. Among recent transfers are devices used to process signals in communications satellites and radar systems, semiconductors for UHF and applications, and emergency locator transmitters.
 - . The department actively aids Canadian companies in their sales efforts at home and abroad. It supports vendors both of hardware and services -- consulting, project management and technical training programs.

A world-class laboratory

The David Florida Laboratory (DFL), part of the department's Communications Research Centre, is one of the few facilities in the world capable of testing and assembling aerospace components and complete systems.

The laboratory was recently expanded and now has all the equipment necessary to integrate and test large spacecraft, such as L-SAT and any that could be launched by the Space Shuttle or the Ariane launch vehicle.

The DFL's facilities are available for use by government agencies and private-sector companies on a cost-recovery basis. Spar Aerospace Limited has been the major client so far, for work on projects that included the Canadarm, partial testing of the Anik C2 satellite, and testing of the complete Anik D1 and D2 satellites, for which it was the prime contractor.

Telecommunications Research and Development

The Research sector conducts a wide range of communications-technology research, both in its own laboratories and through contracts with universities. It gives technical and scientific advice to the department's policymakers and to other departments and agencies, and conducts military-communications research on behalf of the Department of National Defence. Its research facilities are concentrated at the Communications Research Centre (CRC), located near Ottawa.

On the technological frontiers

In recent years the sector's work has focused on transmission and delivery systems, the use of the radio spectrum, fibre optics, and new information technologies like Telidon and office-communications systems. Another current priority is the study of open-systems inter-connection, with the aim that eventually all computer users will be able to communicate with each other over existing and future telecommunications networks.

Telidon: a global standard

The department introduced Telidon, the Canadian videotex system in 1978. This easily-used two-way visual-communication system is an outstanding example of new services made possible by the marriage of communications and computer technologies.

Through an adaptor attached to or built into an ordinary TV set, a Telidon user can call up information stored in distant computer databanks and see it displayed on the screen in the form of text and graphics. Telidon is compatible with virtually any means of signal transmission -- telephone lines, coaxial cable, broadcasting, fibre optics or satellites.

Superior to competing videotex systems because of the excellent quality of its color graphics, Telidon is rapidly becoming the accepted videotex standard in many parts of the world.

Because any message or transaction that can be committed to paper can also be handled by videotex systems like Telidon, the range of applications is limitless. Already or soon to be a reality are such services as information retrieval, electronic publishing, two-way message services, telemail, teleshopping and telebanking.

For example, Canada's first commercial videotex service, Grassroots, provides farmer-subscribers in southwestern Manitoba with up-to-date weather forecasts, commodities and livestock prices, and community information, as well as a range of retail services.

Teleguide to Ontario is making it easier for Toronto-area residents and tourists to find their way around and enjoy the city's attractions. Telidon terminals placed in malls, hotel lobbies and other public locations can be used freely by anyone who needs information on bus and train schedules, entertainment, restaurants, special events and the weather.

Another Canadian innovation is a Telidon-based information system that lets users obtain information, including a picture of the album cover, on Canadian sound recordings. This bilingual catalogue contains ten thousand entries subdivided into 80 subcategories.

Abroad, Telidon has opened new markets for Canadian high-technology products and services. Telidon services now operate in the United States, Great Britain, Venezuela, Australia and Switzerland.

At home, the Department of Communications administered Telidon Industry Investment Stimulation Program is providing \$10 million to help accelerate the introduction of Telidon services from coast-to-coast. The funds assist sponsors of 50 projects to buy Telidon equipment, thus stimulating innovation in the creation of new services, reducing equipment costs, providing new jobs and developing the worker skills that will be in demand in the 1980s and 1990s.

Harnessing light to communicate

Canada is also a pioneer in fibre-optic communications systems. Optical fibres use high-frequency light impulses to transmit signals through flexible hair-thin strands of glass. These fibres are not only potentially cheaper and more reliable than copper wire, but can also carry many more signals simultaneously.

In 1981 the federal government co-operated with the Manitoba Telephone System to introduce the world's first application of fibre optics in a rural environment: 150 households in two small communities, St. Eustache and Elie, were "optically wired" to receive single-part telephone, cable TV, FM-stereo radio and Telidon services.

Another Canadian achievement is also based on fibre optics. In 1982 Saskatchewan Telecommunications inaugurated a 200 km fibre-optics link between Regina and Yorkton, the first step in a plan to link 52 communities in a 3,200 km, the longest optical-fibre system in the world.

A revolution in the office

A third critical area in which the Research sector is active is office-communications systems. The 1980s will see an increasing demand for computerized office systems and data networks, as Canadian firms strive to increase white-collar productivity and efficiency by means of completely integrated office-communications systems.

Through a special program, the department helps manufacturers of sophisticated business equipment solve technical problems in introducing automated office systems to the market. The program also supports studies of the human factors of office automation, so that designers can optimize human/machine systems to achieve the greatest benefits.

The department has also sponsored the establishment of the Office Communications Systems Research Centre in Laval, Quebec, to conduct research on software, content and design of electronic information systems.

Field trials are underway in several federal government departments to test new products and services and to evaluate the human effects of the new technologies on a large scale. Once the products have been refined, Canadian companies will have field-proven products to sell both at home and abroad.

Appendix A

The department's regional and district offices

The department's network of regional and district offices is the focal point of most of its direct contact with radio users, suppliers, manufacturers, telecommunications carriers, broadcasters, the media and the general public. Regional and district staff play a key role in ensuring that the full range of departmental programs and services -- in policy development, research, space communications, spectrum management, and arts and culture -- are provided effectively at the regional level.

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P.O. Box 633
KINGSTON, Ont.
K7L 4X4

Department of Communications
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421 Bay Street
P.O. Box 727
SAULT STE. MARIE, Ont.
P6A 5N3

CENTRAL REGION

Manitoba

Regional Office
Department of Communications
Room 200
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WINNIPEG, Man.
R3C 3Y9

District Offices
Department of Communications
Room 200
386 Broadway Avenue
WINNIPEG, Man.
R3C 3Y9

Saskatchewan

Department of Communications
206 Circle Drive East
SASKATOON, Sask.
S7K 0T5

Department of Communications
Financial Bldg., Room 101
2101 Scarth Street
REGINA, Sask.
S4P 2H9

Alberta

Department of Communications
10th Floor, Liberty Bldg.
10506 Jasper Avenue
EDMONTON, Alta.
T5J 2W9

Department of Communications
Government of Canada Bldg.
820 - 220 4th Avenue S.E.
P.O. Box 2905, Station M
CALGARY, Alta.
T2P 2M7

Department of Communications
202 - 11117 100th Street
GRANDE PRAIRIE, Alta.
T8V 2N2

Northwest Territories

Department of Communications
P.O. Box 2700
YELLOWKNIFE, N.W.T.
X1A 2R1

PACIFIC REGION

British Columbia

Regional Office

Department of Communications
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VANCOUVER, B.C.
V6C 1S5

District Offices

Department of Communications
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Room 224
VICTORIA, B.C.
V8W 1W9

Department of Communications
Federal Building, Room 304
471 Queensway
KELOWNA, B.C.
V1Y 6S5

Department of Communications
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Room 584
PRINCE RUPERT, B.C.
V8J 3T1

Department of Communications
3884 192nd Street
P.O. Box 3396
LANGLEY, B.C.
V3A 4R7

Department of Communications
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VANCOUVER, B.C.
V6C 1S5

Department of Communications
707 - 299 Victoria Street
PRINCE GEORGE, B.C.
V2L 5B8

Department of Communications
101 - 125 10th Avenue South
CRANBROOK, B.C.
VIC 2N1

Yukon District

Department of Communications
Polaris Building
201-4133 4th Avenue
WHITEHORSE, Y.T.
Y1A 1H8

Appendix B

The federal cultural agencies

The Canada Council

The Canada Council's mission is to foster and promote the study, enjoyment and production of works in the arts. Its main source of revenue is an annual parliamentary grant, supplemented by income from a \$50-million endowment fund established in 1957.

The council fosters creativity through direct financial aid to individual artists and supports arts organizations through operating grants and special project grants. The fields of activity eligible for support include writing, publishing, music, dance, theatre, visual arts, film, video and photography.

Its Explorations Program supports new forms of expression and public participation in arts, humanities and social sciences. The Art Bank purchases works which are then rented to government agencies, government departments and nonprofit organizations for display in public areas. The Touring Office provides subsidies, technical assistance and support services to encourage touring by Canadian performing artists. Another program assists in the training and professional development of tour sponsors, commercial agents and impresarios.

The council also offers or administers several literary prizes and awards, including notably the Governor General's Literary Awards.

The Canadian Commission for UNESCO, which is administratively housed in the Canada Council, co-ordinates UNESCO projects abroad and administers activities in furtherance of UNESCO objectives in Canada.

The Canadian Broadcasting Corporation (CBC)

Under the Broadcasting Act, the CBC, as Canada's national broadcasting service, has four primary objectives: to provide a balanced service of information, enlightenment and entertainment for people of different ages, interests and tastes; to extend service to all parts of Canada as funds become available; to operate English- and French-language services that meet the specific needs of the regions, and to contribute the exchange of cultural and regional information; and to contribute to the development of national unity and the expression of Canadian cultural identity.

The CBC operates seven domestic services: the English- and French-language TV networks; the English- and French-language AM Radio networks; the English- and French-language FM radio networks; and the Northern Radio Service, which broadcasts in the English, French, Indian and Inuit languages. Radio Canada International (RCI) is the CBC's external shortwave service, which broadcasts in 11 languages.

The Canadian Film Development Corporation (CFDC)

The CFDC's mandate is to foster and promote the development of the film industry in Canada. To this end, it may invest directly in and share in the proceeds of short- and feature-film productions; make interest-bearing loans to producers; grant awards for outstanding accomplishments in production; and advise or assist producers of Canadian feature films.

The National Film Board of Canada (NFB)

The NFB's mission is to interpret Canadians to Canadians and Canada to the world. It initiates, promotes, produces and distributes films in the national interest, and represents the government in relations with private firms producing films for government departments.

The English- and French-language production branches complete more than one hundred new films a year, ranging from one-minute shorts to two-hour features, exploring themes such as social development, economics, culture, and scientific and technological developments. NFB products include theatrical features, TV specials, documentaries, dramatizations and educational materials in videocassette, film and other formats.

In Canada, NFB productions are seen in theatres (with bookings arranged through regular commercial channels), and on national and regional television networks, TV stations and cable systems. Films may also be borrowed for viewing through local NFB offices, libraries, departments and boards of education, and provincial and university audio-visual departments. Abroad, NFB productions are available through embassies, trade posts and commercial distribution channels.

The National Library of Canada

The National Library's main objective is to facilitate the use of the country's library resources by the government and people of Canada. Thus, it leads and co-ordinates national programs and systems to support this objective.

Among its specific responsibilities, the National Library co-ordinates and provides national interlibrary-loan, location, reference, referral, advisory and consulting services; compiles and maintains the Canadian Union Catalogue, a list of the contents of the principal library collections throughout the country; compiles and publishes a national bibliography (Canadiana) of books produced by or of special interest to Canadians; provides the Canadian component of the Universal Bibliographic Control System; and co-ordinates library services of government departments, branches and agencies.

The National Library's collections encompass the social sciences, the arts, the humanities and canadiana of all kinds.

The National Museums of Canada

The National Museums of Canada incorporates in a single administrative entity Canada's four national museums -- the National Gallery of Canada, the National Museum of Man (including the Canadian War Museum), the National Museum of Natural Sciences, and the National Museum of Science and Technology (including the National Aeronautical Collection).

The National Museums Policy, announced in 1972, supports activities that increase public access to the collections of Canadian museums and art galleries and that lead to greater preservation of these collections. In support of this objective, the corporation administers several programs:

Museum Assistance Programs provide assistance for a network of the largest museums and public-programming galleries in the country, national exhibition centres, and a number of specialized museums;

Project assistance is available to qualifying institutions for exhibitions development, capital assistance, conservation assistance, special activities, staff training, and registration;

The Canadian Conservation Institute (CCI) is engaged in the conservation of cultural artifacts, technical consultation on the preservation of collections, conservation research, and training of museum and gallery conservators;

The Mobile Exhibits Program uses "museumobiles" to take exhibitions to smaller centres across the country;

The Canadian Heritage Information Network catalogues more than one-million artifacts held in collections throughout Canada;

An international program fosters exchanges with museums abroad.

The Public Archives of Canada (PAC)

The Public Archives has a dual role. As a research institution, it is responsible for acquiring and preserving significant archival material related to all aspects of Canadian life and national development, and for providing suitable research services and facilities to the public. As an essential part of the government administration, the PAC has broad responsibilities for promoting efficiency and economy in the management of its records; this is done by providing government departments and agencies with storage facilities, advice in records management, and microfilming services.

The Archives Branch comprises eight divisions which have custody of the historical records of the PAC: Manuscripts; Federal Archives; Machine Readable Archives; Picture Division; National Film, Television and Sound Archives; the National Photography Collection; the National Map Collection; and the Library.

The Social Sciences and Humanities Research Council of Canada

The objective of the council is to promote and assist excellence in Canadian research and scholarship in the social sciences and humanities. To these ends, it supports independent research, assists in and advises on maintaining and developing national research capacity; encourages research on themes of national importance; and facilitates the communication and exchange of research results.

Assistance is provided in the form of scholarships and fellowships for postgraduate and university scholars, research grants, conference grants, and sponsorship of international scholarly exchanges.

The National Arts Centre Corporation

The corporation operates and maintains the National Arts Centre, a showcase for the performing arts in Canada's National Capital Region. It also assists the Canada Council in the development of the performing arts elsewhere in Canada. Toward these goals, it arranges for and sponsors performing-arts activities at the National Arts Centre; encourages and assists in the development of performing-arts companies resident at the centre; and provides accommodation for national and local organizations whose objectives include development of the performing arts in Canada.