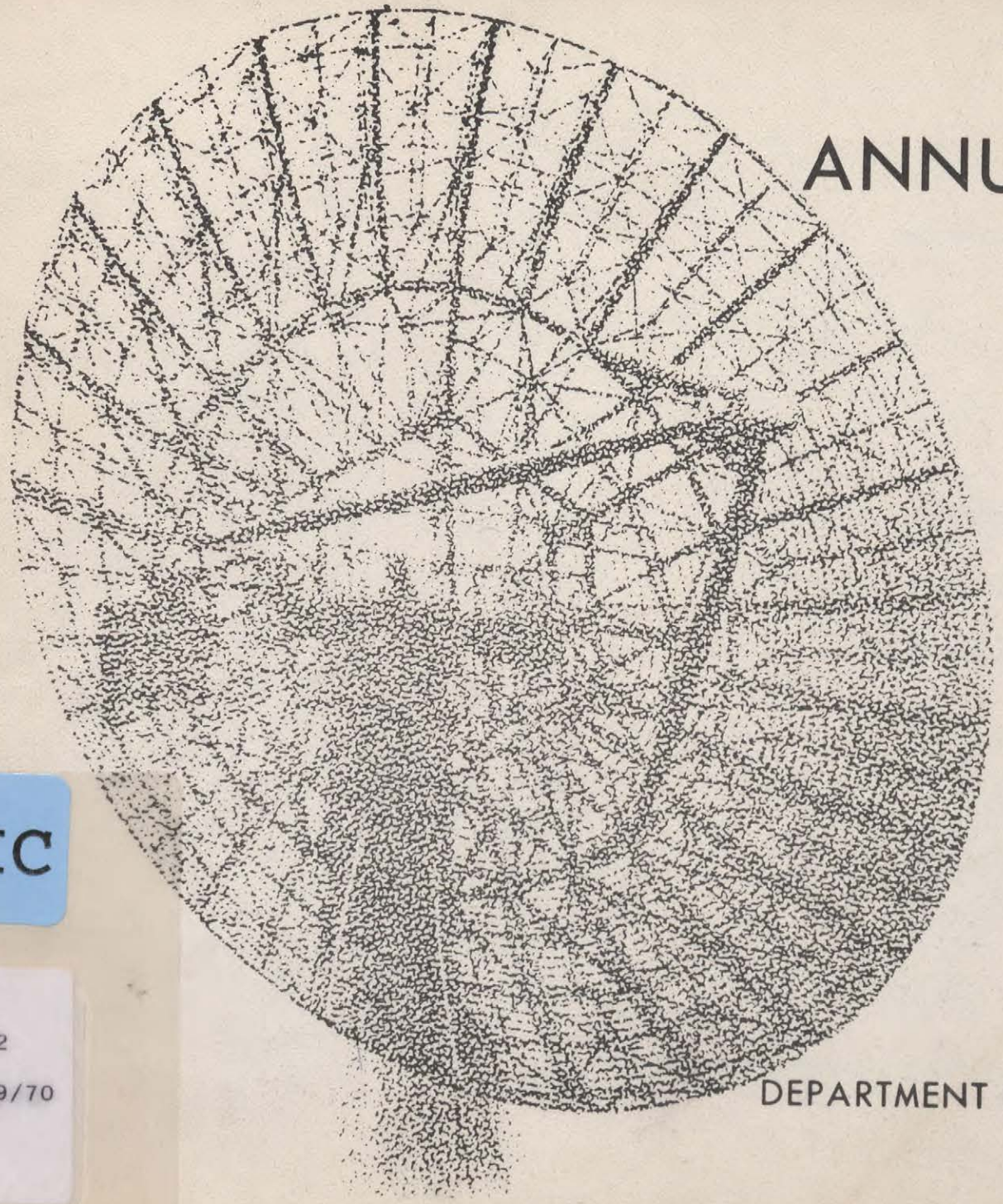

# ANNUAL REPORT

# 1969–1970

DEPARTMENT OF COMMUNICATIONS
OTTAWA CANADA

DEPARTMENT OF COMMUNICATIONS



# ANNUAL REPORT

FOR THE FISCAL YEAR ENDED

31 MARCH 1970


Submitted under the provisions of the Government Organization Act, 1969

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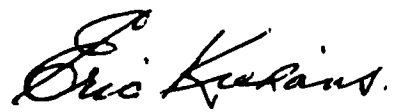
TO HIS EXCELLENCY THE RIGHT HONOURABLE ROLAND MICHENER, P.C. QC.,
GOVERNOR GENERAL AND COMMANDER–IN–CHIEF OF CANADA

Your Excellency,

I have the honour to present the first Annual Report of the Department of Communications for the fiscal year ending 31 March, 1970.

Yours faithfully,



Eric Kierans
Minister of Communications

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# INTRODUCTION

This being the first annual report of the Department of Communications which came into official existence on the first of April 1969, I believe it would be desirable to review some of the background information which touches on the mandate of our department.

The fact that the Government of Canada did not have a Department of Communications before last year should not be taken as an indication that Canada has been underdeveloped in the field of telecommunications or that the Federal Government had failed to exercise a national policy designed to encourage a rational and equitable deployment of modern communications facilities. Quite the contrary. For more than a century Canada has been in the vanguard of telecommunications and from the outset the Federal Government has played an essential role in its development. The first transcontinental telecommunications links in Canada, the telegraph lines, were a by-product of the railroad system which figured so prominently in Canadian politics in the first years after Confederation. More recently, in the period that preceded the creation of our department, the Government of Canada exercised its responsibilities by elaborating a Canadian telecommunications policy in the national interest through the regulatory powers and licencing powers vested in the Minister of Transport.

Federal regulation is applied to three federally incorporated telephone companies, Bell Canada, B.C. Telephone and Bonaventure Telephone, and the telecommunications divisions of national railways. It was, and continues to be, exercised by the Canadian Transport Commission. The power to issue technical licences for the use of the electromagnetic spectrum which, among other things, affects the construction of microwave and broadcasting systems, touches all communications enterprises and is vested in the Department of Communications. The Minister also has jurisdiction over all overseas cable services through the Canadian Overseas Telecommunications Corporation. And the Department administers the Telegraph Act.

In this same period the Government of Canada, through the Defence Research Board and other research establishments, had created a team of scientists and technologists who had kept Canada abreast of developments in the field of space communications, lasers, and many other technologies which promise to revolutionize national and global communication systems.

It was the Government's decision to coordinate all of these dispersed activities which resulted in the creation of the department for which I have the honor to report and it is also this vision of Canadian telecommunications systems as a totality which has guided us in our first year.

It led to the creation of Telesat Canada in 1969. This unique corporation, to be financed by government, the telecommunications common carriers and the general public, will own and operate the world's first domestic commercial communications system based on geostationary satellites. It embodies the notions of a broadly based participation and of a national distribution of communications services.

The efforts that our department has made to promote an international management of Intelsat, the global satellite communications consortium, our proposals for an international regulation of space communications through the International Telecommunications Union, and our representations and activities in other international and Commonwealth organizations bear witness to this principle of internationalism. The Canadian Overseas Telecommunications Corporation, which reports to Parliament through my ministry, has been of invaluable assistance in this task not only as a supplier of efficient and economical overseas telecommunications, but also as an operating representative of Canadian interests in several international and Commonwealth committees and in Intelsat, where this Crown corporation acts as a shareholder on behalf of the people of Canada.

One of the most explicit statements of the principles of participation and coordinated developments in the interest

of all parts of the Canadian federation, was the launching in the summer of 1969 of the Telecommission. I should stress at this point that the Telecommission was not conceived as a body, such as a royal commission or a task force, but rather as a process. In this way we have been able to involve the participation of numerous federal and provincial agencies, of representatives of industry, professional groups and universities and of 11 departments of the Government of Canada in some 50 studies. This massive inventory of technical data, regulatory practice, systems deployment, social environment as affected by telecommunications, and of communications needs present and future used a variety of participatory techniques ranging from reports prepared by individuals or small groups of researchers to several multi-disciplinary seminars and conferences involving dozens and even hundreds of participants, who, in many cases, volunteered their time and effort free of charge and paid their own travel and living expenses.

But even while the Telecommission was doing its work certain policy needs became clear: the regulation of private wire services offered by telecommunications companies; the licencing of new microwave systems and the growing integration of information systems with the telecommunications networks to form what have been called computer utilities. Thus in the first year of its existence the Department of Communications introduced legislation (Bill C-11) to extend the powers of the Canadian Transport Commission to cover private wires, announced that social and economic criteria would be considered in addition to technical standards in the granting of licences for new microwave systems, and laid the groundwork for discussions and policies designed to assure a rational and equitable distribution of computer power to meet the social, economic and political needs of the peoples of Canada.

Eric Kierans,
Minister of Communications

# REPORT ON FINANCE AND PERSONNEL MANAGEMENT

Total expenditures of the Department of Communications for the fiscal year ending March 31, 1970 amounted to $20.2 million divided as follows: administration, operation and maintenance, 73.8 per cent; capital expenditures, 24 percent; grants and contributions, 2.2 per cent. Salaries paid to employees, part of which was to a sizeable scientific staff involved in telecommunications research, represent 54.5 per cent of the budget.

Total of products and income reached $6.8 million. Accordingly, net expenditures amounted to $13.4 million.

During the fiscal year, the Department obtained the co-operation of the Ministry of Transport for the support services which are essential to the smooth operation of its regional offices, i.e., pay, hiring, staff relations, suppliers' accounts, etc. This latter also assumed responsibilities concerning fund entries and central card-index keeping; it provided computer services required for the management of the radio frequency spectrum.

The Personnel Branch endeavoured to complete the Department's establishment in Ottawa. Recruitment was all the more difficult since professionals from a wide variety of scientific and technological disciplines had to be found.

The Department had anticipated the use of 1245 man-years for the term ending March 31, 1970. However, only 94 per cent of this total was reached, a number of positions having been defined only by the end of the fiscal year.

Last year, the Personnel Branch handled 34 different collective bargaining agreements ranging from trade groups and support staff to the highly specialized group of space research professionals.

## FINANCIAL SUMMARY

Summary of income and expenditures for the fiscal year ending March 31, 1970

| | Millions of dollars |
|---|---|
| | 1969–70 |
| Administration, operation and maintenance expenditures | 14.9 |
| Capital expenditures | 4.8 |
| Grants and contributions | 0.5 |
| TOTAL EXPENDITURES OF THE DEPARTMENT | 20.2 |
| Less: | |
| Products and income on account of credit | 6.8 |
| NET EXPENDITURES OF THE DEPARTMENT | 13.4 |

# COMMUNICATIONS RESEARCH CENTRE

The Communications Research Centre, with a staff of about 500, carries out research and development in radio propagation, terrestrial and space communication systems, electronics, space mechanics, domestic and research satellites. The main CRC site is at Shirley Bay, Ontario, 15 miles west of the centre of Ottawa. CRC also operates a number of experimental sites, chiefly in the Ottawa area, and at remote northern locations such as Resolute Bay and Fort Churchill.

The present programme of the Communications Research Centre is concentrated in three main fields: communications research, satellite technology and research supporting radio spectrum management. The work is either directly in support of national programmes, in support of other agencies or addressed to the advancement of knowledge and capability in communication processes and associated technology. Close association with industry and universities is fostered by informal liaison and

co-operation, and through a wide variety of contractual arrangements.

## INTERNATIONAL SATELLITE FOR IONOSPHERIC STUDIES (ISIS)

To date, three Canadian built satellites have been placed in orbit by U.S. launch vehicles. All three are still operating satisfactorily. Alouette I launched in September, 1962, was designed to obtain information about the earth's ionosphere; such information is particularly relevant to long-range communications. Its outstanding success led to the ISIS programme and the launchings of Alouette II (November, 1965), and ISIS-I (January, 1969). ISIS-B contains 12 scientific experiments and is being prepared for launch in March, 1971. Like Alouette II and ISIS-I, ISIS-B is being built by Canadian industry with CRC as the design authority. CRC controls these satellites from Shirley Bay, through a world-wide chain of ground stations operated by the USA, Canada, Britain, France, Japan, Australia and India. For this project, CRC has established an advanced data processing centre, monitors the quality and schedule of data production by all participants, and carries out extensive analysis, interpretation and application of the data.

## CANADIAN DOMESTIC COMMUNICATIONS SATELLITE

CRC has provided technical and management support to TELESAT. This has involved up to eight engineering and scientific staff in 1969/70.

## COMMUNICATIONS TECHNOLOGY SATELLITE PROGRAM

A significant event for CRC was the Canadian decision to plan for a Communications Technology Satellite in co-operation with NASA. The principal objectives of the project are to develop and flight-test new communications concepts and systems. Studies are being carried out to determine the spacecraft configuration and weight, design the experimental systems, and provide cost estimates. Features under discussion include high power transponders operating at about 12GHz that would make possible television broadcasting direct from a satellite to community receiving antennas; large, unfurlable solar power arrays delivering 1.5 to 2 kilowatts of power;

stabilization systems for a spacecraft with flexible appendages and thermal control techniques.

## EARTH RESOURCE TECHNOLOGY SATELLITE PROGRAM

An agreement for Canadian participation in the United States Earth Resource Technology Satellite Program is being negotiated by the Department of Energy, Mines and Resources. The intended Canadian participation includes a telemetry ground station, a signal processing centre, and a data handling and distribution centre. Data collected over Canadian territory will be widely distributed within Canada. It is anticipated that CRC staff will manage the construction of the telemetry station during the initial phase and will conduct research into associated signal processing technology.

## RESEARCH FOR THE DEFENCE RESEARCH BOARD

About a quarter of the CRC manpower is devoted to research on behalf of the Defence Research Board in a blending of civil and military research which is most desirable in Canada. Communications research covers tactical and strategic requirements including satellite communication systems. The development of a novel airborne antenna array led to the demonstration, believed to be the first in the world, of air-to-air voice communications via a satellite. A facility has been developed to investigate the limitations imposed by the ionosphere on the accuracy of high frequency direction finding. The radar research program includes work on air traffic control problems and has led to the development of an experimental airborne transponder, the application of which is being discussed with the Department of Transport. Increasing effort is now being devoted to a study of the capabilities and limitations of surveillance from aircraft and satellites.

## RADIO PROPAGATION

Studies of radio propagation at a wide range of frequencies from Very Low Frequency (VLF) to microwave are carried out to extend our knowledge of the nature and effects of the earth and its atmosphere on communications, and to support the Department in its licencing and regulating functions. At the lower end of the frequency range data are obtained from the Alouette/ISIS satellites, from measurements by rocketborne instrumentation and

from many ground based experiments conducted throughout Canada. The microwave studies are concerned mainly with the effects of precipitation.

## ELECTRONICS

A scanning electron microscope is being used to study the microscopic structure of components and integrated circuits. This facility is being used for the ISIS Program and on a contract basis by Canadian industry.

An experimental facility to design prototype microelectronics circuitry for use in laboratory research projects is nearing completion. Computers are being used to aid in designing electronic circuits.

## OPTICAL PROCESSING

Studies of optical signal processing, including the new science of holography, have extended our knowledge of the capability of such systems in the extraction of information, the storage and retrieval of data, and in data displays. The exploitation of such processes is being pursued with various government departments and with a Canadian company which is developing a map display system.

# GOVERNMENT TELECOMMUNICATIONS AGENCY

The Federal Government coast-to-coast network is comprised of consolidated telephone systems serving departments and agencies at various Canadian centers as well as facilities for intercity voice calling and transmission of low speed data from, to, and in many cases between, such consolidated systems. The network was created to obtain much more efficient service at less cost. The Government achieves benefits from it, the criteria for providing services being that it must improve efficiency and/or costs, while the general public benefits since there is easier access to departments either through direct-in-dialing or via a central answering point from where their call can be directed to the proper area for attention.

Essentially the Glassco study observed that available telephone service offerings were not being utilized to their potential and, consequently uneconomical and inefficient proliferation of separate switchboard systems plus their attendant staff, was the common practice, and also that significant savings and efficiency were lost since advantage was not being taken of available bulk rate private line and Wide Area Telephone System (WATS) facilities. Consistent with related recommendations, the Government Telecommunications Agency was formed and among other things charged with administering resulting consolidated telecommunications networks with costs thereto recoverable on an equitable basis.

The need for maximum possible concentration of telephone services used by departments and agencies, including switchboard installations, at particular locations, with common main answering positions, coupled with provision of direct-in-dial services to users quickly became evident. This also was deemed essential to achieve the much more significant economies available through maximum utilization of bulk user intercity private line and other similar offerings.

Network objectives require the grade and quality of services being maintained to commercial standards to satisfy overall needs of the Federal Government. They further require expansion, or retraction, to maintain maximum efficiency and/or economy and that equitable recovery of costs be based on actual use where feasible.

During the year, consolidated telephone systems were introduced in Vancouver, Victoria, Winnipeg, London and Halifax to provide local telephone service to Federal Government departments and agencies in these areas. This added approximately 5400 main telephones to those already serviced by consolidations, bringing the total to about 30,000 at year's end. Growth and expansion of the intercity portion of the network continued with Vancouver, Victoria, Nanaimo, Edmonton, Calgary, Cornwall, St. Hyacinthe, Granby, Guelph, Regina, Charlottetown and St. Johns, Newfoundland being added. Arrangements also were completed in cooperation with DND to handle calls from Ottawa to most of the United States through Washington. As a result of these and other steps being taken by the Agency, economies in the order of $9 million per year are being achieved.

Data transmission is now in use within and between departments, and it is expected to expand rapidly in the near future as use of computers on a shared time basis and for remote data processing, is extended.

The Agency's role as a communication consultant to the Departments is also expanding. Advice on such matters as data sets, data transmission, radio systems, intercom systems, and the use of Telex, is provided on demand.

# INTERNATIONAL ACTIVITIES

Under the Government Organization Act of 1969, the Minister of Communications is required to "take such action as may be necessary to secure, by international regulation or otherwise, the rights of Canada in communication matters". The effective pursuit and implementation of this task requires that the Department contribute to and take part in the work of a number of International Organizations, such as the International Telecommunications Union (ITU) and the International Telecommunications Satellite Consortium (Intelsat).

## THE INTERNATIONAL TELECOMMUNICATIONS UNION - (ITU)

Canada is an elected member of the Council and this year the Canadian representative served as Chairman of its twenty-fourth session. Our financial commitment to the support of the ITU was met by the payment of $215,000. This represents the voluntary obligation to pay 18 of a total 473 1/2 budgetary units of the Union.

Other activities within the scope of the ITU were the regular study group meetings of the International Radio Consultative Committee (CCIR) and the International Telegraph and Telephone Consultative Committee (CCITT). These consultative committees represent two of four permanent organs of the ITU, and deal specifically with technical and operational problems related to international telecommunications.

Considerable importance is placed on Canada's membership and participation in the International Telecommunications Union. It has been made clear that Canada favours the strengthening of the ITU to enable it to play a major and more dominant role in the international coordination of the new and rapidly developing satellite or space communications.

## INTERNATIONAL TELECOMMUNICATIONS SATELLITE CONSORTIUM - (INTELSAT)

INTELSAT was established by international agreement in 1964 as a consortium to establish, own and operate the space segment of a single global telecommunications system. Canada, with a 3 1/4 per cent share in the consortium, participates in the Interim Communication Satellite Committee (ICSC) which directs the affairs of the consortium. Its designated entity on the ICSC is the Canadian Overseas Telecommunications Corporation (COTC).

INTELSAT is a provisional organization, with final arrangements for the global communication satellite system still to be concluded. The Deputy-Minister of Communications heads the Canadian delegation to the Plenipotentiary Conference charged with this task. The Conference met in Washington in February/March 1969, and in February, 1970, and its work continues. Preparation for Canada's position was coordinated by DOC.

## COMMONWEALTH TELECOMMUNICATIONS ORGANIZATION

Cooperation amongst Commonwealth countries in the field of international telecommunications date back to the late 1800's. A number of arrangements have evolved since but the latest, adhered to by 24 members, were defined in 1968, at an intergovernmental Conference. While the overall agreement is between Governments, each

participating government has designated or instituted an entity to participate in the ownership, implementation, operation and management of the Commonwealth system. The COTC was instituted for that purpose in Canada by Act of Parliament in 1949 and represents Canada on the Commonwealth Telecommunications Council which meets on the average twice a year. DOC participates in preparation for such meetings and, as the need arises, provides an advisor to the COTC representative.

## THE UNITED NATIONS

The United Nations Committee on the Peaceful Uses of Outer Space from time to time establishes working groups to consider specific subjects. Such a working group was set up to study the implications of direct broadcasting from satellites. Sessions of this working group were held in February and in July 1969. The Deputy Minister of Communications headed delegations to the two sessions, in Geneva and New York, respectively. Canada, in co-operation with Sweden, has submitted working papers to each of the sessions, and has participated actively in the deliberations and in drafting the reports of the sessions. DOC has also participated on Canadian delegations to meetings of the full Committee.

## UNESCO

In December of 1969 the United Nations Education Scientific and Cultural Organization (UNESCO) held a meeting of Governmental Experts on International Arrangements in the Space Communications Field. Canada participated in this meeting and the Honourable Eric W. Kierans, Minister of Communications was elected Chairman.

The Interdepartmental Committee on Copyright has recently established a Sub-committee on Communications under DOC chairmanship. This Sub-committee is preparing Canadian position papers for future international meetings on copyright and related subjects to be held under the auspices of UNESCO and other international organizations.

## INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION - (IMCO)

The DOC, in exercising its responsibility in matters relating to Maritime Mobile Telecommunications, prepared for and participated with the Ministry of Transport in the

work of the IMCO Sub-Committee on Radio Communications at its sixth session in London, January 1970.

## INTERNATIONAL CIVIL AVIATION ORGANIZATION - (ICAO)

In 1968 ICAO established a panel of experts to study the "Application of Space Techniques Relating to Aviation" (ASTRA) Panel. The DOC participated with the Ministry of Transport in the second meeting of the panel during 1969.

## NORTH ATLANTIC TREATY ORGANIZATION - (NATO)

The Allied Radio Frequency Agency (ARFA) was established by NATO to define the Radio Communication and frequency spectrum requirements for that organization. As part of the preparations for the ITU World Administrative Radio Conference on Space Telecommunications (Geneva-1971) ARFA meetings were held, one in Athens and the other in Brussels. Representatives of the DOC participated along with DND and MOT. Preliminary to these meetings, talks between Canada, United Kingdom and the United States (CANUKUS) were held in London. A second CANUKUS meeting was held in Ottawa in January 1970.

## INTERNATIONAL LAW ASSOCIATION - (I.L.A.)

DOC joined the Canadian Branch of this non-governmental international organization in sponsoring, in October 1969, in connection with related studies of the Telecommission, a Conference on the Legal Problems of International Communications at the Institute for International Co-operation, University of Ottawa. Nearly one hundred Canadian lawyers, government officials, businessmen, and academics participated in sessions on INTELSAT, direct satellite broadcasting and computer communications. The Minister of Communications provided the keynote address to the Conference. The proceedings of the Conference were published in the University of Toronto Law Journal (Vol. XX no. 3).

# REGULATIONS AND LICENCING

The regulatory and licencing activities of the Department of Communications fall under the Telecommunications Regulation Branch and the National Telecommunications Branch. The former participates in the management of the radio spectrum to ensure its efficient use, and the growth of radio in Canada. This management involves the development of regulations, technical standards and radio frequency plans, as well as participation in international conferences. It includes the licencing of radio stations, the technical certification of broadcasting undertakings, and finally the inspection and monitoring of radio stations to ensure adherence to regulations and provide information for spectrum planning purposes. The National Telecommunications Branch is concerned with the development and effectiveness of Canada's communication systems, with the ability of the Canadian telecommunications industry to serve public and private needs in the country, with the elaboration of policies to strengthen and extend Canada's communication systems and with special problems.

During the past fiscal year, the licencing policy relating to microwave radio relay stations was revised. Formerly, applicants for licences had only to meet prescribed technical standards. Now the Department also considers economic and social criteria in determining if it is in the public interest to grant a licence. This policy, which is subject to review as part of the Telecommission studies is designed to assist in the planning of a more effective and comprehensive Canadian communication system.

Previously, under the Railway Act, the Canadian Transport Commission regulated telephone and telegraph rates only if a charge was made to the public. Recent amendments extend the jurisdiction of the CTC over rates charged for private wire services.

A series of technical meetings was held this year with the United States representatives, to plan and implement a program of changes of frequency co-ordination agreements in the maritime mobile radio service. A convention was signed with the United States to permit licencees in the Canadian General Radio Service and in the U.S. Citizens' Radio Service to operate their stations while temporarily in the other country.

The number of radio stations licences in force in Canada during the year, including registrations issued to United States licencees in Canada, was 245,789—a net increase of 6.9 per cent over the preceding year. A total of 343 applications for technical construction and operating certificates for broadcasting undertakings (AM, FM, TV, and CATV stations) were processed and coordinated for the Canadian Radio-Television Commission. Seventy-two private commercial broadcasting stations either commenced operation or modified their facilities in accordance with the Minister's certification authority.

In order to deal with licence applications and other matters concerning radio systems, the Department maintains six regional offices: in Vancouver, Edmonton, Winnipeg, Toronto, Montreal and Moncton.

Considerable progress was made in developing and evaluating new spectrum engineering techniques for high speed off-the-air data acquisition as a means of measuring channel occupancy in the radio spectrum. Computer programs have been developed to aid in the selection of frequency complements by evaluating interference situations and assessing the coverage of stations. Studies were made throughout the year on radio frequency noise levels from vehicles and household electrical equipment, and work has continued on the development of a new program for the control of spectrum pollution.

The Department has also developed, in consultation with industry, a broadcast procedure which establishes new technical standards for cable television (CATV) systems. It is expected to be brought into effect for compliance by new systems before 1971 and for compliance by existing systems over a period of time. Research is now being conducted looking to the development of engineering criteria for CATV systems with a capacity of more than 12 channels, through the use of the mid-band range of frequencies (120–174 MHz), with the objective of preventing interference to other radio services in the mid-band and to subscribers connected to the system.

# POLICY, PLANS AND PROGRAMS BRANCH

The Policy, Plans and Programs Organization is the focal point for both the Department's Strategic Planning activities and the administration of the Planning, Program and Budgeting System (P.P.B.S.).

In the PPBS area, it has the responsibility for coordinating the Department's current and long-range plans and programs and for formulating, recommending and reviewing objectives and program/activity structures. It also has a mandate for the development of annual operational plans. It prepares, implements and monitors project controls and a project reporting system. It carries out cost-effectiveness analysis.

In the Strategic Planning area, the Organization is concerned with long-range and conceptual planning activities involving five major fields:

HUMANISTIC STUDIES. These are a broad based, open ended continuing series of studies in which the possible impact on society of different communications developments and possibilities are critically examined.

ECONOMIC AND REGULATORY STUDIES. These studies cover such areas as the role of communications in economic development, the regulation of computer/communications services and the economics of an automated society.

COMMUNICATIONS TECHNOLOGY EVALUATION. It continuously reviews the relevant technologies of computers and communications to establish the technological framework for meaningful long-term planning.

CONCEPTUAL SYSTEMS PLANNING. It conducts broad based feasibility studies for new major systems.

PORTFOLIO WIDE PLANNING. It can be described as a composite activity intended to integrate the work of the other fields and create a continuously updated master computer/communications long-range plan for Canada.

# THE TELECOMMISSION

The Télécommission studies announced by the Minister on 18 September 1969 have been a major preoccupation of the Department. Some fifty separate studies have been organized as a cooperative undertaking, in which departments and agencies of the Federal Government have worked with representatives of the telecommunications industry and others, including specialists under contract, to examine and report on all aspects of telecommunications in Canada. The objective has been to gather as much information as possible, together with the widest possible cross-section of opinion including that of the governments of the provinces. The studies have been organized by a Directing Committee, comprising officials of the Department and of the Privy Council Office, and the Chairman of the Canadian Radio-Television Commission. Progress has been monitored and coordinated by a General Committee consisting of representatives of the Federal Departments and agencies most directly concerned. The reports of the Telecommission studies are expected to be available early in 1971.