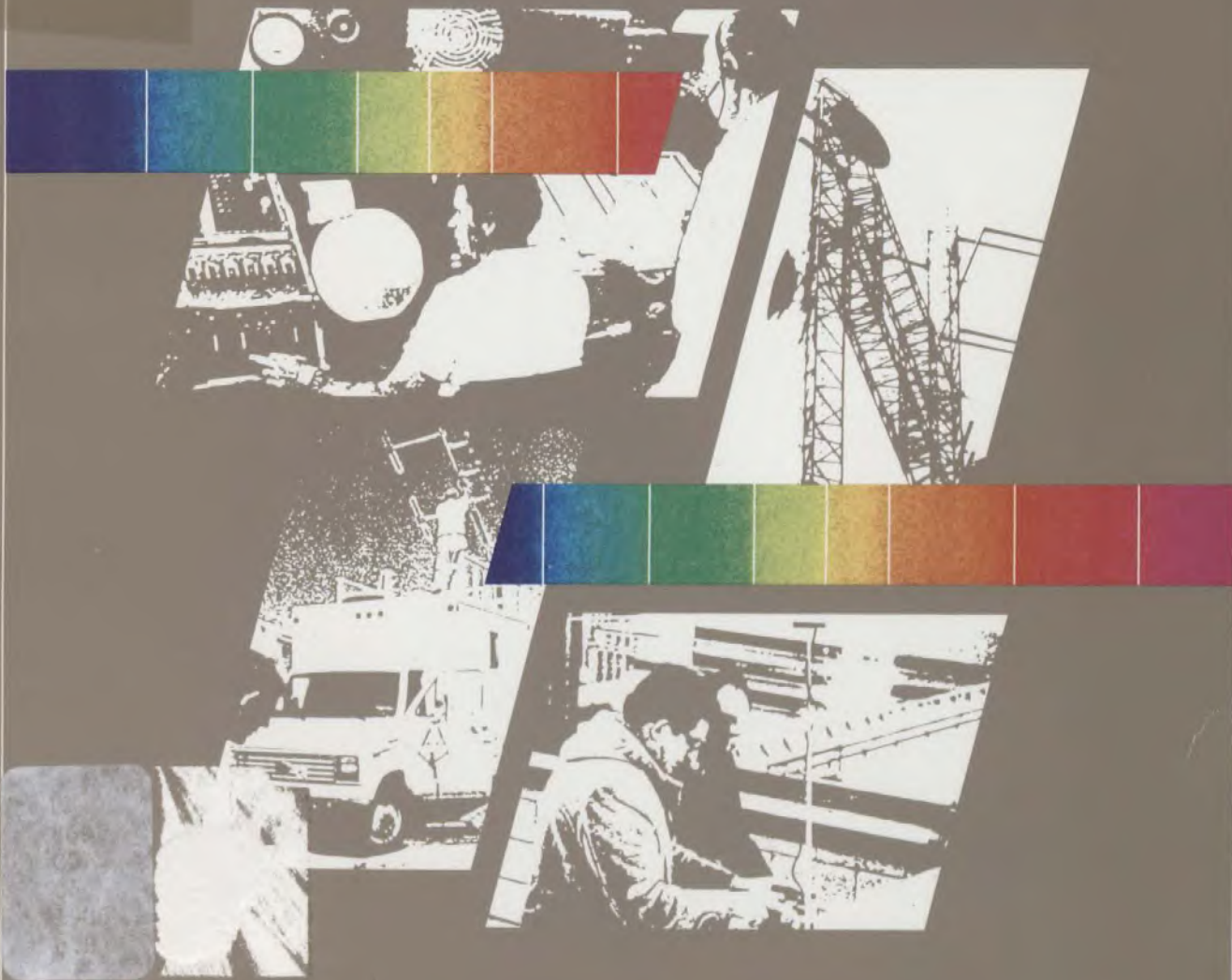


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Canada

World leader in spectrum management



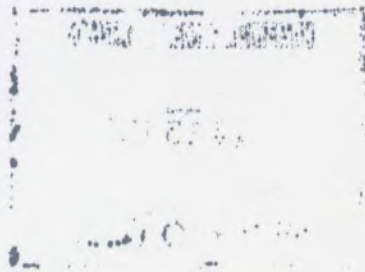
Gouvernement du Canada
Ministère des Communications

Government of Canada
Department of Communications





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Canada

World leader in spectrum management

In today's world, demands for radio frequency spectrum use are rising dramatically, while the radio environment is becoming increasingly complex with intensive usage, thus necessitating effective management of the frequency spectrum.



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Much of Canada's communications are carried by radio.



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What is spectrum management?

Spectrum management is the set of activities that enables government to ensure high-quality, reliable radio communications to serve national economic, social and cultural development objectives.

Since radio waves recognize no international boundaries, bilateral and multilateral co-operation is essential. A specialized agency of the United Nations, the International Telecommunication Union (ITU), co-ordinates the use of both radio and telephone communications throughout the world, at the macro level.

The 160 member-administrations of the ITU decide on the worldwide allocation of radio frequency bands to each of 26 different radio services, taking into account the unique characteristics that make each band most effective and efficient for certain uses.

Working within this international framework, each country is responsible for radio spectrum management in its own territory. This includes spectrum planning and engineering, establishing national frequency allocations, licensing radio stations, and ensuring that they operate on assigned frequencies in accordance with approved technical specifications, standards and procedures.

Most of the world's nations belong to the ITU. Through the ITU, radio frequencies are allocated in blocks or bands to specific radio services. An artist's conception of the spectrum is shown below.



Microwave networks and communications satellites carry high-volume traffic across six time zones and connect remote communities with the rest of the country using the radio frequency spectrum.

Canadian expertise can help you

In Canada, we have advanced spectrum management capabilities and years of experience that we are eager to share with other countries.

Our communications system is one of the finest in the world, providing high-quality, inexpensive and reliable service for a population of 25 million people spread over a vast area.

Radio is a critical part of this system, carrying high-volume traffic across six time zones and connecting remote settlements with major centres.

We began using radio in 1904 to communicate with ships in the Gulf of St. Lawrence. Our first legislation to regulate radio use was enacted a year later. That gives us more than 80 years of experience in the field.

More importantly, we are at the leading edge of modern spectrum management. Sophisticated computer-based systems enable the Canadian government, through the Department of Communications, to award thousands of new licences each year, even in highly congested frequency bands.

Application of advanced technology has made this possible. The benefits of our expertise are now being made available to other countries through Canadian private enterprise.



Spectrum engineering

Our nationwide spectrum control network ensures continued interference-free communications. Spectrum observation centres, such as the one shown here, are used to gather technical information.

Engineering lies at the heart of spectrum management, ensuring maximum benefit at optimum cost for all radio users.

The first step in spectrum management is planning. This results in the allocation of blocks of frequencies to specific types of radio services to meet the country's overall needs for radio communication.

The resulting table of frequency allocations is a valuable tool that enables government to distribute a scarce but reusable resource — radio frequencies — among competing users in an equitable manner.

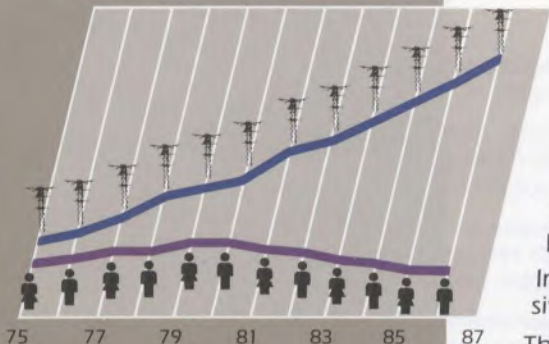
Spectrum engineers begin by defining the technical requirements of each radio service, for example, the amount of information to be transmitted and the distance to be covered. Then they establish criteria for allocating frequencies to specific types of radio services, taking into account both current and projected levels of use.

Engineering studies are also the foundation of national radio regulations covering equipment and systems standards as well as operating procedures.

To ensure compliance with these regulations, standards and procedures, a national spectrum-engineering laboratory tests and approves radio equipment and other equipment that may cause interference with radio operations. The laboratory also calibrates all testing and monitoring equipment used in spectrum management.



During the past 10 years, the efficiency of issuing licences has improved greatly. The number of licences issued has steadily increased, while the number of people employed in this function has fallen.



Person-years

Licences Issued

Licensing

Licensing is the process of authorizing the use of specific frequencies (for prescribed periods of time) in accordance with the national frequency-allocation plan and the particular application.

Governments in all countries today face accelerating demands for radio licences. At the same time, they are under mounting pressure to accommodate more licences in congested parts of the spectrum, particularly in the heavily populated centres.

In Canada, we have successfully met this challenge through extensive use of specialized computer systems.

These systems provide fast access to complete technical information on all licensed radio stations, perform electromagnetic compatibility studies, offer a list of frequencies available for allocation, permit optimum selection, print licences and renewal notices, and keep track of licence-fee payments. They also incorporate engineering analysis tools for frequency selection and enable the government to pinpoint the level of occupancy and spectrum use at any time.

Automation has enabled us to effectively handle a 100 percent increase in licences in the past decade. It has also kept the need for highly skilled frequency-allocation experts to a minimum and helped us overcome congestion problems through efficient use of the spectrum.

Our experience in Canada confirms the benefits of computer-assisted licensing systems. Similar systems can be designed and implemented for other countries by Canadian private industry, based on its experience in the design of these systems for the Canadian government.

Spectrum monitoring and inspection

Department of Communications' radio inspectors investigate sources of interference using advanced techniques.

Monitoring and inspection are essential parts of spectrum management, ensuring that all stations operate as licensed, without causing interference to other radio users.

In Canada, monitoring stations located throughout the country carry out all-band surveillance to check that signals conform with established technical requirements. They also collect statistical information on spectrum usage, which is fed back into the computerized allocation planning and frequency assignment processes.

Inspectors visit radio installations periodically to see if they are operating in accordance with technical standards, as licensed. Stations are advised of any discrepancies. If they do not take corrective action within a specified period, their licences can be suspended or revoked, or legal proceedings may be started under the Radio Act.

Inspectors also respond to complaints of radio interference, using vehicles specially equipped to carry out on-site investigations and locate and eliminate potential causes of interference.

Canadian companies have a well-deserved reputation for excellence in spectrum monitoring, making them a logical choice for countries interested in modernizing their monitoring systems.



Department of Communications' experts plan and study geographical zones across Canada before selecting frequencies.

A delegation of Canadian company and government officials visited China to demonstrate Canada's spectrum management technology and expertise.



Acquiring know-how

An efficient spectrum-management organization requires experienced staff with specialized knowledge of communications and electronics technology — skills that are in short supply in many countries.

To keep personnel up-to-date on state-of-the-art developments in spectrum management, Canadian companies offer well-structured training programs, from fundamental to advanced and refresher courses.

In addition, these companies offer management training for supervisors in the form of intensive seminars on such subjects as personnel management, and the use of advanced computer technology in management information systems.

Because of their extensive experience in training, they can meet the full range of your personnel training needs in spectrum management.

The Department of Communications also appreciates the importance of transferring technological know-how to help other countries achieve the broad objective of national self-sufficiency.



Canadian expertise at your service

Canadian experts can help your country modernize its spectrum management operations.

Canadians are recognized as world leaders in managing and monitoring the radio frequency spectrum.

Private companies have participated extensively in the development of Canada's sophisticated spectrum management and monitoring systems, as consulting engineers and as suppliers of both equipment and computer software.

From this broad base of experience, they now offer a range of spectrum management services to other nations. Specifically, they can:

- design a complete spectrum-management organization with integrated cost-effective computer aids;
- provide expert human resources, including engineers, software analysts, programmers and laboratory technologists;
- train engineers, technicians, data processing and other operating personnel;
- supply proven, state-of-the-art equipment, systems and associated software;
- manage the spectrum management organization under contract;
- implement turn-key projects and provide associated services.



Canada's communications system is one of the finest in the world, providing high-quality, inexpensive and reliable services for the entire population.



For more information

Canadian companies have the expertise you need to help your country establish effective, modern spectrum management. For more information, contact the nearest office of the Government of Canada, or write to us at:

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