Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

Satellite communications working for you

Canada

The Satellite Communications Applications Program (SCAP)

Satellite communications working for you

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Putting communications satellites to work

Canada has a long history of success using satellites for scientific research and telecommunications.

The launching of the scientific satellite Alouette in 1962 made ours the third nation to enter the space age. Since then, Canada has launched 13 satellites, nine of them for communications. Anik A1, sent into orbit in 1972, was the world's first national telecommunications satellite in commercial service.

Our pioneering efforts continue, with much of today's emphasis on new technology and new applications for space communications. Helping Canadians use satellite communications to meet their social and economic needs is a major thrust of Canada's space program.

This task has been entrusted to the Department of Communications, in keeping with its responsibility for the orderly growth of telecommunications in Canada.

Current activities build on the achievements of two earlier programs: Hermes and Anik B.

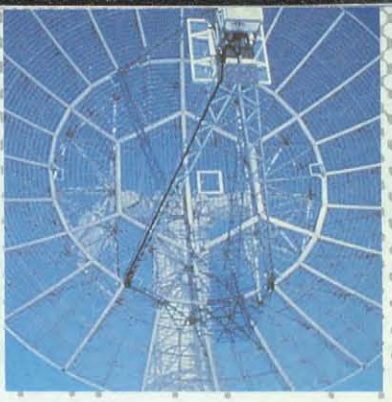
Between 1976 and 1979, experiments with the communications technology satellite Hermes explored new service concepts and demonstrated use of a new range of higher radio frequencies that could be received with smaller, less expensive earth stations than needed for the Anik A satellites operating in C band (6/4 GHz).

Hermes was a major milestone in the Canadian space program. It was the most powerful domestic communications satellite in the world, proved the feasibility of using Ku band (14/12 GHz) and paved the way for many new commercial services. More than this, it systematically involved hundreds of Canadians in planning and developing innovative applications of communications technology.

The most promising applications were developed further through full-scale pilot projects on the Anik B satellite from 1979 to 1984. Many of these have since developed into commercial operations.

Experience gained through the Hermes and Anik B programs put Canadian industry at the forefront of communications technology and confirmed Canada's international stature as a leader in satellite communications.

The Satellite Communications Applications Program helps Canadians find innovative ways of using satellite communications to meet their social and economic needs.



Since 1984, the Department of Communications has continued to encourage Canadians to find innovative ways of using communications technologies through its **Satellite Communications Applications Program (SCAP)**. Like the Hermes and Anik B programs, **SCAP** directly involves the user community in developing new applications through service trials.

To assist organizations undertaking service trials, **SCAP** offers:

- technical advice,
- free satellite time,
- earth stations on loan.

When suitable earth stations are not available, **SCAP** can develop new technology to do the job.

Service trials give organizations a clear understanding of the costs and benefits of using satellite communications — information they must have to decide if their service can operate commercially.

More than this, service trials allow Canadians to develop the skills to put satellite communications to the best possible use in their organizations. From such direct involvement come the confidence and competence that ultimately result in viable services that meet the needs of the user community.

The transfer of earth-station technology from government labs to industry is an ongoing activity of SCAP.

A wealth of new services

A decade of developmental work by the Department of Communications has resulted in a wealth of new satellite communications services. Among the most successful are those in health care, broadcasting and education. Present efforts are focussed on development of satellite data networks and investigation of the potential of higher frequency bands.

Better health care

Since its first experiment in satellite communications in 1977, Memorial University of Newfoundland has become a world leader in the use of telecommunications to extend health-care services.

Memorial's first project provided medical conferencing and continuing education courses for doctors and health-care professionals in Newfoundland and Labrador via the Hermes satellite. The outcome was a permanent terrestrial network serving 45 communities in the province, which has recently been extended by satellite to Africa and the Caribbean.

Extending medical care to offshore oil workers was the aim of another satellite communications project undertaken by Memorial in 1983. Using Anik B, the university tested satellite links to enable doctors at its Health Services Centre to view slow-scan and other medical data transmitted from an oil rig on the Grand Banks. The doctors could then recommend on-board treatment, and advise whether sick or injured workers needed to be evacuated, and how quickly.

Memorial now offers long-distance medical consultation for crews on ships and offshore drilling rigs as a commercial service and has developed an international reputation in hyperbaric medicine, the treatment of people who work undersea in pressurized conditions.

Memorial University's Dr. Max House, an internationally recognized expert in telehealth, was honored in 1986 by the Minister of Communications for his distinguished contributions to the quality of life in remote areas of Canada.

Innovations in broadcasting

Canadian satellites have been used since 1973 to distribute television programming, but the new frequencies made available through the Hermes and Anik B programs have made possible numerous innovations, including satellite-to-cable networks and direct-to-home broadcasting by satellite.

Quebec cable network relies on satellite

The world's first commercial user of Ku band was a consortium of Quebec cable operators, La Sette. Ku-band technology was so well established by 1980, when the newly formed consortium started up, that it was able to go directly into commercial service using Anik B to distribute its signal to cable systems. Today, La Sette transmits on Anik C3, providing more than 800,000 cable subscribers access to programming from three networks in France. Because there is no danger of interference between Ku band and terrestrial microwave transmissions, cable operators can install their satellite receivers anywhere, even in city centres.

Northern native television

More than 30 communities in the Northwest Territories, Arctic Quebec and Labrador now receive TV programming produced in the Inuktitut language by the Inuit Broadcasting Corporation (IBC), thanks to the satellite applications development programs of the Department of Communications.

Participation in the Hermes and Anik B programs enabled Inuit in the Eastern Arctic to train their own TV production crews, run broadcast trials and establish the feasibility of setting up an Inuit television network. As a result, the IBC was created in 1981.

Introducing the world to direct-to-home television

Canada pioneered the technology of broadcasting direct from a satellite to small home receivers. Direct broadcasting systems are now operating in the United States and Japan and systems are planned for France and Germany.

"Even in my most optimistic moments," says the President of the IBC, "I sometimes doubted that it would ever be possible for the Inuit to have a television network of their own."

The world's first demonstrations of direct broadcasting were given in Canada by the Canadian Broadcasting Corporation (CBC) in 1976, using Hermes.

Hermes experiments in 1978 and 1979 proved conclusively that earth stations with small antennas, about one metre in diameter, could provide good quality home reception of satellite broadcasting.

A three-year service trial followed from 1979 to 1982, using the Anik B satellite to reach thousands of viewers in Ontario, British Columbia, the Yukon and the Northwest Territories. Specially developed television receive-only terminals were purchased from Canadian industry by the Department of Communications and loaned out for installation in homes and schools, at libraries and cable companies.

The Anik C satellites are capable of providing direct broadcasting service in Canada once consumer demand is sufficient to make it economically feasible.

Reaching distant students

Educators have been quick to see the promise of satellite technology as an effective tool to help them fulfil their mandate of bringing all levels of education to even the most distant students.

The use of satellites for educational broadcasting is now well established in Canada. Since 1976, educators have moved from small-scale experiments on Hermes to permanent operations using commercial satellite time. Today, Ontario, Quebec, Alberta and British Columbia all have large dedicated networks distributing educational television programming via Telesat Canada's Anik C system.

Educators are now looking to satellites to provide services other than radio and TV distribution. Soon their satellite networks will be able to link remote classroom and home computers to large educational databases and support computer-aided learning, offering students in outlying areas a quality of education previously available only in urban centres.

The world's first direct broadcasting service trial began September 25, 1979, when a terminal at the home of the King family in MacDiarmid, Ontario, was turned on and the TVOntario picture beamed in loud and clear.

Better service for the public

The department's initiatives through **SCAP** are yielding great dividends in improved government services to the public. Co-operative ventures with the province of Ontario, for example, have led to numerous innovative applications for satellite technology.

Weather briefings for pilots

One of these applications is the commercially operated Telidon Aviation Briefing System, which uses Telidon graphics to display air weather for all points on a pilot's route.

This eliminates the need for sometimes lengthy phone discussions with the aviation weather briefer, saving time for both pilots and the weather office.

Soon, continually updated weather information for all North America will be broadcast by satellite for reception at remote airstrips in the northern reaches of the province. Pilots will be able to log their flight plan on a terminal and have weather data for their route tabulated on site by microcomputer.

Safer winter roads

A modified version of the aviation weather system is being developed to help plan winter road maintenance in Ontario.

Highway maintenance centres throughout the province will be hooked into a satellite data network carrying the latest weather forecasts. By combining this information with local road reports, district highway supervisors will be able to plan more precisely, saving thousands of dollars on snowploughing and sanding, while ensuring public comfort and safety.

The first trials of the road information system took place in Eastern Ontario in the winter of 1986-1987 with the assistance of **SCAP**.

By substituting communications for transportation and by developing new methods of educational delivery and support, a province-wide electronic classroom can be an effective vehicle for learning.

New ideas keep coming

Experimenters in government are finding that the more experience they get with satellite communications, the more new uses they can think of. There's a snowball effect. Communications satellites are serving needs today that no one even knew existed a few years ago, and the ideas just keep coming.

For example, Ontario is now studying ways of adapting the road-information system to include such details as lane closures. This could lead to special-purpose systems to meet the needs of the police, the trucking industry and the travelling public.

The possibility of using satellites to provide two-way voice communication for air ambulances is being investigated. With more than 4,000 critical air evacuations a year in the province, improved communications could help save many lives.

Plans are also being made to extend agricultural weather reports to all crop-growing areas of the province by using a commercial satellite to relay the weather radio signal to rebroadcasting stations.

Finally, like many other governments, including the federal government, Ontario is evaluating the cost and performance of satellite links in serving the pooled communications needs of its ministries.

Completely self-contained broadcast uplink terminals now available from Telesat Canada can start sending news reports via Anik C satellite within 20 minutes of arrival on location.

Tailor-made technology

Throughout its applications development work over the past decade, the department has recognized the importance of customizing technology to suit the needs of users.

Often the kinds of earth stations they want do not exist; so **SCAP** will come up with a design, build prototypes and test them in experimental situations. As soon as an earth station design is proven conceptually sound, the technology is transferred to industry for product development and marketing.

To date, such customized technology has included:

- low-cost home terminals to receive TV broadcasts by satellite,
- transportable uplink terminals for feeding TV coverage via satellite,
- stabilized voice and data terminals for use on offshore oil rigs,
- highly portable telephone terminals.

While initial technology development is often carried out at the Department's Communications Research Centre, Canadian manufacturers are involved at an early stage to ensure maximum industrial benefit.

In some cases, special-purpose technology is developed by industry with scientific and financial assistance from the government. For example, in 1986 Microtel Ltd. completed development of a small two-way data terminal that could be used to link thousands of sales outlets, automatic tellers or personal computers to their host computer via private satellite networks. **SCAP** is arranging user trials of prototypes, after which the terminal will go into commercial production at Microtel's plant in Burnaby, British Columbia.

Whether concept development takes place in government or industry, the basic principle remains the same. **SCAP** believes that technology should serve the needs of users, not define them. This belief lies at the heart of **SCAP**'s user-responsive approach.

The terminals had to be small enough so as not to interfere with the operation of the oil rig and they had to be stabilized to compensate for the motion of the semi-submersible drilling platforms.

Frontiers of the future

By the end of the century, Canada expects to need much higher frequency bands than are in service today. A two-year trial with the European Space Agency's Olympus satellite now being planned by **SCAP** will give us an opportunity to explore communications at 30/20 GHz (Ka band).

The Olympus-type system holds great promise for intercity business communications. The advantage is that Ka band can carry large volumes of data and the satellite signals can be focussed on urban areas for reception by umbrella-size rooftop antennas. Possible experimenters include banks, resource companies and governments.

Olympus is scheduled for launch in 1988. The experimental high-power satellite is being constructed by an international consortium including Canadian industry.

Meanwhile, through **SCAP**, the Department of Communications continues to:

- identify potential applications made possible by emerging technology,
- support the efforts of the Canadian space industry to supply domestic and export markets,
- encourage the wide participation that has given so many Canadians first-hand experience with satellite technology and has led to valuable new concepts that are shaping the communication services of the future.

One of the department's highly transportable telephone terminals was loaned to Rick Hansen in late 1986 as he began the Western Canada segment of his "Man in Motion" wheelchair tour around the world to raise money for spinal cord research.

If you would like to find out more about the **Satellite Communications Applications Program**, please contact one of the regional offices of the Department of Communications listed below.

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Canadian needs are being served today with satellite communications technology that no one even knew was possible a few years ago.