

Fibre Optics in Canada

The advantages of fibre optics over conventional transmission techniques have stimulated the interest of telephone companies, cable operators, governments and others in Canada who see telecommunications networks of copper wire, coaxial cable and microwave radio reaching physical and economic limits. Available and economic communications bandwidths are in short supply.

Two important Canadian breakthroughs in fibre optic technology have increased network efficiency — one is the development of two-way transmission techniques over a single optical fibre, the other is development of an optical coupler for transmission from one fibre to others, which simplifies the network.

State-of-the-art research on fibre optics is being done in Canada by the government, private sector companies and numerous universities. Among the main researchers are:

- The Communications Research Centre, Ottawa, which is the research facility of the federal Department of Communications;

- Bell-Northern Research, Ottawa, a subsidiary of Bell Canada and Northern Telecom;

- Canstar Communications, Montreal, a subsidiary of Canada Wire and Cable;

- Phillips Cables, Brockville, Ontario.

The largest manufacturers in Canada of fibre optic cable and equipment are:

- Northern Telecom, Montreal, a subsidiary of Bell Canada; it is involved in almost all areas of fibre optics systems and components;

- Canstar Communications, Montreal, a subsidiary of Canada Wire and Cable, principally involved in fibre fabrication and systems development;

- Phillips Cables recently began manufacturing fibre optic cable.

There are several fibre optics projects currently underway in Canada.

The Department of National Defence in 1976 had an internal fibre optics system in its Ottawa headquarters. Bell-Northern Research supplied the cable which can carry telephone, two-way TV and data for future telecommunications systems.

Bell Canada connected two switching centres in downtown Montreal by a 1.5 km long fibre optic cable containing six fibres in October 1977. The cable, which is about a centimetre thick, has been used for video conferencing. The project was a joint venture of Bell Canada and its subsidiaries, Northern Telecom and Bell-Northern Research.

One of the longest and highest capacity fibre optic cables in the world becomes operational in 1980. Alberta Government Telephone (AGT) Systems is installing a 53 km long fibre optic cable to connect Calgary and Cheadle, Alberta. The cable has 12 fibres with a capacity for handling 20,160 telephone calls simultaneously. It can also carry video and data signals. The cable can carry 274 million bits per second. The \$2*million contract for provision of the fibre optic cable was awarded to Canstar Communications of Montreal and was the largest of its kind in the world.

In October 1978, British Columbia Telephone (BCTel) installed a 7.4 km long fibre optic cable linking a switching centre in Vancouver to one in North Burnaby. The cable was provided by GTE Lenkurt (Canada) and Phillips Cables Ltd. BC Tel is evaluating the fibre optic transmission system. The cable has been operational since March 1979 and is being used for transmission of voice and data signals and has a capability for video signals.

In December 1978, Bell Canada inaugurated a two-year fibre optics project involving residential homes in Toronto's Yorkville district. For the first time in North America, telephone subscribers were linked by optical fibres to the switched network.

The fibre optic system provides voice, data and video distribution over a number of subscriber loops. The system demonstrates the capability of simultaneous and two-way transmission of telephony, data and video signals over a single fibre as well as the feasibility of providing high quality switched video signals over the fibre optic system.

Bell inaugurated the project with the world's first two-way video conference call between Toronto and London, England, via a fibre optic link to and from earth stations on both sides of the Atlantic.

London, Ontario, is the site of the world's first operational fibre optic cable TV super trunk system using digital TV transmission. The 7.8 km long super trunk cable connects a local TV station to the hub of London Cable TV. The fibre optic cable is less than one centimetre thick and contains eight optical fibres with transmission capacity of 15 TV channels. The system provides for full duplex (two-way) video communications. The \$1.65 million project cost is being shared equally by the federal Department of Communications and BCN Fibre Optic Inc., a consortium of several major Canadian CABLE TV companies. The cable was provided and installed by Canstar Communications.

In a field trial in the province of Manitoba provision of a wide range of new communications, entertainment, educational and social services is under consideration. These include Telidon, fire and burglar alarms, farm management services, on-request video programs, meter reading, polling and auction services, video games, educational TV, pay TV and so on.

Saskatchewan Telecommunications (Sask Tel) will begin construction this autumn on a fibre optic network that will extend cable television and eventually other communications services to more than 50 centres in the province.

The \$56-million, four-year project to install fibres along 3,200 kilometres across the province will connect communities of 500 or more households. A 200-kilometre link between Regina and Yorkton is expected to be completed late next year with the final links ready for service by 1984.

Northern Telecom Canada Ltd. of Montreal has been awarded a \$22-million contract to supply fibre optic cable and equipment.

The Sask Tel system, composed of 12 fibre strands, will initially be able to carry 4,032 simultaneous phone conversations with each strand able to handle 45 million bits of information a second. The system, Sask Tel said, can carry signals up to ten kilometres without being boosted and can carry voice, television and data signals at the same time.

*All figures in this publication are in Canadian dollars unless otherwise specified.