

the Department of Transport. In 1966 two proposals for a Canadian domestic satellite system—one by a private broadcaster and space electronics company and the other by the Trans-Canada Telephone System and CN-CP Telecommunications—were put before the Federal Government. Both proposals were based on recent forecasts of the telecommunications needs of all of Canada with particular attention to the Far North and both suggested that Canada act as soon as possible before the limited number of good orbital positions were lost by default to other countries. The whole of Canada is visible in space only from that part of the equatorial orbital plane lying between 96° and 116° West Longitude. This forms a 20-degree arc and contains the satellite positions most desirable for Canadian domestic service.

The proposal made by the Trans-Canada Telephone System and CN-CP Telecommunications calls for a three-pronged program for full coverage of Canada by 1970 which would be achieved with a Canadian-owned and -operated space system to be fully integrated with the nation's existing telecommunications network and would cost approximately \$80,000,000. The system would carry television, telephone calls, data and other telecommunications services and would involve the construction and equipping of 54 earth stations, the purchase of three communications satellites and the launching of two of them into stationary orbit at an altitude of 22,300 miles. The stationary orbit and altitude of the satellites means that they would rotate with the earth every 24 hours and therefore at any particular time of the day be over the same spot on earth. The system would have three satellites—two in orbit with one active and the other as standby, and one ready in reserve for launching. Each satellite would be capable of 12 operating channels and each channel would carry either one television program or 1,200 voice circuits. Of these channels, three would be allocated to telephone calls and other message types of service and the remainder would be available to expand national television coverage of all types. The basic network of the 54 earth stations would include: six heavy-route transmit-receive stations; nine network receive-only; one remote area transmit-receive; and 38 remote area television receive-only. Bell Canada, one of the sponsors of the proposal, began to implement plans in 1966 by building an experimental earth station at Bouchette near Ottawa, which could serve as a key element in a common carrier system to bring television to the Far North via satellite.

Basically, satellite communications is just one long microwave link. The clarity and strength of transmission provided by such a satellite would be comparable with that of existing microwave systems; only with respect to time required for transmission from an originating earth station to a satellite and back to another receiving earth station would there be a noticeable difference. Because of the 22,300-mile altitude of the satellite, the two-way transit time would be about 600 milli-seconds or six tenths of a second. This delay would be of no concern for one-way transmission services such as television, but must be taken into account in the case of two-way voice circuits. To minimize the time effects, the proposal calls for the avoidance of tandem connections on space facilities and, wherever possible, the operation of voice circuits with one direction via satellite and the other via ground facilities.

By 1975 the first generation of communications satellite would be nearing the end of its life cycle and undoubtedly additional satellite capacity would be required by then. The scope, capacity and design of the second generation of Canadian satellite would depend on technical developments and traffic requirements during the intervening years. Canada's microwave, land-line and troposcatter systems will continue to be the backbone of telecommunications services for many years to come but satellite communications, properly integrated with land facilities, will make it possible to reach all areas to which service has not yet been economically feasible.