

daily rate of some 3½ degrees until it reached its final station at 114 degrees West longitude.

The successful injection into "synchronous" orbit (one in which both the satellite and the earth complete a full revolution every 24 hours) ended over 91 hours of tense concentration by the more than 120 members of Telesat Canada's satellite-control teams in the Satellite Control Centre and at the tracking stations at Allan Park, Cowichan Lake, British Columbia, and the Pacific island of Guam.

COUNTRY-WIDE LINK-UP

With the advent of the Telesat system, it will be possible, for the first time, to pass all forms of telecommunications between any points in Canada from east to west and from the United States border to the Arctic Ocean.

Initially, the Telesat system will be used by its first customers – the Canadian Broadcasting Corporation, Trans-Canada Telephone system and CN/CP Telecommunications and Bell Canada – to distribute telephone, data, Telex, TWX and network television to locations from coast to coast and from the U.S. border to the high Arctic.

In the southern parts of Canada, the Telesat system will provide route diversification and additional capacity for the existing terrestrial networks of the telecommunications common carriers. In the North it will make possible reliable, 24-hour-a-day, dial telephone service and reception of live CBC network television programming to the communities served by Telesat earth stations.

Two identical satellites and a base-line network of 37 earth stations make up the Telesat Canada domestic satellite-communications system.

There are 12 radio-frequency channels on each satellite, although only ten will be available for commercial use. The remaining two channels will provide back-up capacity. Each channel is capable of transmitting one colour-television channel and its associated audio, or its equivalent in message traffic. This can be as high as 960 simultaneous telephone circuits a channel.

The new satellite will be tracked down range by NASA tracking-stations as well as by Telesat's stations at Allan Park, Cowichan Lake, and on the island of Guam.

Anik I is just over 11 feet high and six feet in diameter. At lift-off it weighed almost 1,250 pounds. Its systems were powered by an array of 23,000 solar cells, with "on-board" batteries to take up the load during eclipse periods.

Its optically transparent 60-inch antenna can "see" all of Canada at a glance.

The Hughes Aircraft Company of California was the prime spacecraft contractor. Major Canadian sub-contractors were Spar Aerospace Products Limited of Toronto and Northern Electric Company Limited of Montreal. The spacecraft structures were built by Spar and the communications electronics by Northern Electric.



Anik I, the space segment of the first commercial domestic-communications satellite in the world.

LAUNCH VEHICLE

The launch vehicle was a thrust-augmented, three-stage, *Thor-Delta* rocket, which stood 116 feet high, was eight feet in diameter and had an all-up weight of 204,500 pounds on the pad. The three stages and nine solid-propellant booster rockets provided a total accumulated thrust of 644,400 pounds.

While it was in transfer orbit (with an apogee of 22,300 miles and a perigee of 120 miles), the satellite circled the earth approximately every ten hours. During the ninth transfer orbit, the apogee motor was fired on command from Ottawa. Powered by some 500 pounds of solid fuel, the apogee motor provided the final "kick", changing the elliptical transfer orbit into a circular one, 22,300 miles from the surface of the earth at the equator. At this altitude, *Anik's* orbital velocity approximately coincided with the speed of rotation of the earth and, following further orbit refinements by Telesat, it appeared to be stationary from any given point in Canada.

Anik I is now stationed at 114 degrees West longitude and 0 degrees latitude – approximately the longitude of Calgary, Alberta, at the equator. The satellite will be maintained on station for a minimum of seven years. Station-keeping corrections will be effected by firing short bursts on the satellite's reaction-control thrusters.

A second *Anik* satellite, which will be launched in April 1973, will be stationed at 109 degrees West longitude, where it will serve as "in-space" back-up for the system. A third spacecraft will be held on the ground as further protection for the system.