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SPACE SATELLITES GET A CANADIAN BROTHER

At 3.53 p.m. Eastern Standard Time on November 13, Canada's *Anik I**, the space segment of the world's first commercial domestic-communications satellite system, blasted into a circular, equatorial orbit some 22,300 miles above the earth's surface. The satellite achieved its "geostationary" orbit after being launched on November 9 by the United States National Aeronautical and Space Administration (NASA) from Cape Kennedy, Florida.

The command to fire *Anik's* "apogee" motor was given from Telesat, the Satellite Control Centre in Ottawa, and relayed to the satellite high above the Pacific Ocean by the company's main telemetry, tracking and command station at Allan Park, 35 miles south of Owen Sound, Ontario.

The apogee motor, containing 576 pounds of solid propellant, burned for 40 seconds changing *Anik's* elliptical orbit to a synchronous one a uniform 22,300 miles above the earth at the equator. During the next several days, *Anik I* drifted eastwards at a

* *Anik* (pronounced *ah-nick*) means *brother* in Eskimo.

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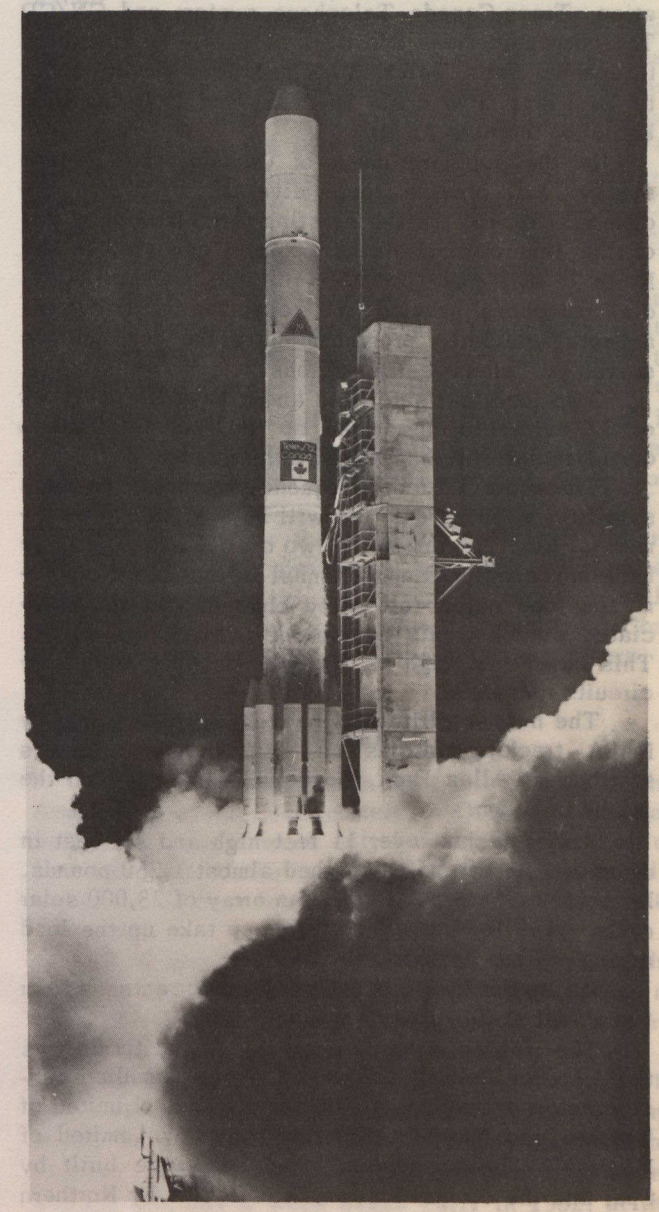


Anik I *is launched from Cape Kennedy on November 9.*

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 subcontractors 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.

NEW WHEAT SALE TO CHINA

A new sale of wheat involving a maximum of 62.7 million bushels, to the People's Republic of China was announced on November 10 by Mr. Otto Lang, Minister responsible for the Canadian Wheat Board.

"The value of the sale, at about $150 million, reflects the sharp increase in wheat prices which has occurred in the last few months," Mr. Lang said. "Negotiations for the new sale were concluded in Peking this week by representatives of the Canadian Wheat Board and the China National Cereals, Oils and Foodstuffs Import and Export Corporation."

Shipments under the new contract will start in April 1973, after deliveries under the present contract are complete, and will continue until October. All shipments will be made from Canada's West Coast ports.

The grades to be shipped will consist of No. 1 Canada Western Red Spring Wheat 12½ percent protein and No. 2 and No. 3 Canada Western Red Spring Wheat.

As in previous contracts with the People's Republic of China, the terms of the new sale call for the payment of 25 percent cash when each vessel is loaded and the balance in 18 months with interest. The credit terms are made possible under a guarantee to the Canadian Wheat Board by the Federal Government.

POSSIBLE RAISE IN PHONE RATES

Bell Canada filed two applications with the Canadian Transport Commission on November 10 for higher telephone rates over the next two years. If the applications are approved, basic residential telephone service, for instance, would go up 5 cents a month in 1973 and an additional 6¼ per cent in 1974.

Bell says that an increase in costs, which are in large part beyond its control, will offset the benefits gained from the increased rates the Commission granted the company last May.

Earnings this year have shown improvement, Bell admits, owing partly to the last increase granted, partly to a generally-improving business climate, and partly to the keeping down of expenses and the keeping up of productivity. But, says the company, there would be a sharp drop in earnings next year without a rate increase, impairing Bell's credit and its ability to secure capital on reasonable terms.

The new rates would cover most aspects of Bell's business, and would be applied in two stages.

SERVICES AFFECTED

General increases that would take effect next January include a 5-cent-a-month increase for residence and hotel extensions, and a 1½ percent increase – with a 5-cent minimum – for most other local services. The charge for the initial period of all long-distance calls within the territory Bell serves would go up 2 cents for calls dialled by the customer, 5 cents for station-to-station calls handled by the operator and 10 cents for person-to-person calls.

The company also proposes to increase most service charges 50 per cent in 1973 and another 33 1/3 per cent in 1974. This would put the present charge of $11 for installation in a residence up to $16.50 next year and to $22 in 1974.

Beginning January 1, 1974, the basic residential telephone bill in the Metropolitan areas of Montreal and Toronto would go up 40 cents a month to $6.80 from $6.40. In smaller towns, such as Arnprior and Sturgeon Falls in Ontario and Arundel and Trois-Pistoles in Quebec, the increase would be 30 cents – to $4.85 from $4.55.

Smaller towns still, such as Drumbo and Rigaud, would be reclassified under a proposed plan to create a new minimum-rate group, and their increase on a $4-a-month bill would be 45 cents, bringing it to $4.45.

Rate groups are classified according to the number of telephones a customer can reach without having to pay a long-distance charge. Bell's new minimum-rate group would be up to 5,000 telephones.

Other increases to take effect January 1, 1974, would include 5 cents a month for Contempra telephones and residence Touch-Tone service, 5 cents on residence and hotel extensions and 1 cent on each minute of overtime on all long-distance calls.

Further changes proposed for 1974 include increasing the pay-phone rate from 10 cents to 20 cents and initiating a 25-cent charge for some calls to directory assistance, which Bell hopes to include for calls to directory assistance for numbers listed in the caller's directory. Handicapped persons, such as the blind, would be exempt, as would calls from hospital and hotel rooms, and pay-phones.

Bell says more than 680,000 calls a day were made to directory assistance in 1971, and that at least 70 per cent, or half a million of these calls were for numbers listed in callers' directories. Cost of the service now is being borne by all customers.

UNIFORM POLICY CHANGES

The 20-year practice in most directorates of the Armed Forces at Headquarters in Ottawa of wearing uniform one day a week only has been dropped as of November 20. Under new regulations all ranks will appear in uniform four days a week, from Monday to Thursday.

Other members of the Armed Forces across the country and overseas, including those serving at nearby Uplands and Rockcliffe, wear the uniform during the normal five-day duty period each week.

The reason for servicemen adopting the alternate uniform-multi schedule at the end of the Second World War is lost in dust-covered policies of the postwar period. However, the practice of wearing uniform one day a week began early in 1952, at the time of the death of King George VI.

COMMUNICATIONS CONFERENCE

The Commonwealth Communications Conference, which began on November 13 in Ottawa, will last for three weeks, with 26 member countries participating in this first such meeting at government level since the formation of the Commonwealth Telecommunications Organization.

The CTO, which came into being in 1969 as a result of recommendations made at a London conference in 1966, replaced the Commonwealth Telecommunications Board, which had existed since 1949 and of which Canada was a founding member.

The Canadian delegation is headed by Mr. Allan Gotlieb, Deputy Minister of Communications. Mr. Jean-Claude Delorme, the deputy head, is President and General Manager of the Canadian Overseas Telecommunication Corporation and is Canada's representative on the Commonwealth Telecommunications Council. The Council's responsibility is to develop recommendations for periodic conferences of governments and to implement their decisions.

Delegates to the Ottawa conference are reviewing progress made since 1966 and are also studying future telecommunications needs of the Commonwealth, particularly in the light of changing international traffic patterns and requirements, and in the light of new technological developments such as high-capacity submarine cables and satellites. One of the major items is the matter of a unified system of accounting that would embrace all telecommunications media, including satellites.

This is the first time that Canada has been host to a conference of Commonwealth telecommunications representatives.

The Commonwealth Telecommunications System is one of the world's largest commercial networks. It comprises a global configuration served by ten earth stations for communication through the satellites of Intelsat; more than 26,000 miles of submarine wideband cable system, 86/HF radio stations and 115,000 miles of submarine telegraph cables. The gross revenues earned by these installations amounts to some $500 million.

DEATHS AND CAUSES, 1971

Statistics Canada reports that 157,272 Canadian residents died last year, slightly more than the 155,961 who died in 1970. Deaths increased in Quebec, Manitoba, Alberta and British Columbia, but declined in the other six provinces. The national death-rate for both sexes was 7.3 a 1,000, unchanged from 1969 and 1970. Provincial and Territorial death-rates varied from 5.7 in the Yukon to 9.0 in Prince Edward Island.

Of the 157,272 deaths recorded, 77,730, or 49.4 per cent, were from diseases of the heart and circulatory system, 31,036 or 19.7 per cent from cancer, and 12,031 or 7.6 per cent from accidents. The corresponding figures for 1970 were 77,343, 30,483 and 11,378, respectively. These having been the three leading causes of death since 1951, their relative importance has changed little in recent years. Deaths from diseases of the respiratory system declined to 10,286 from 10,698.

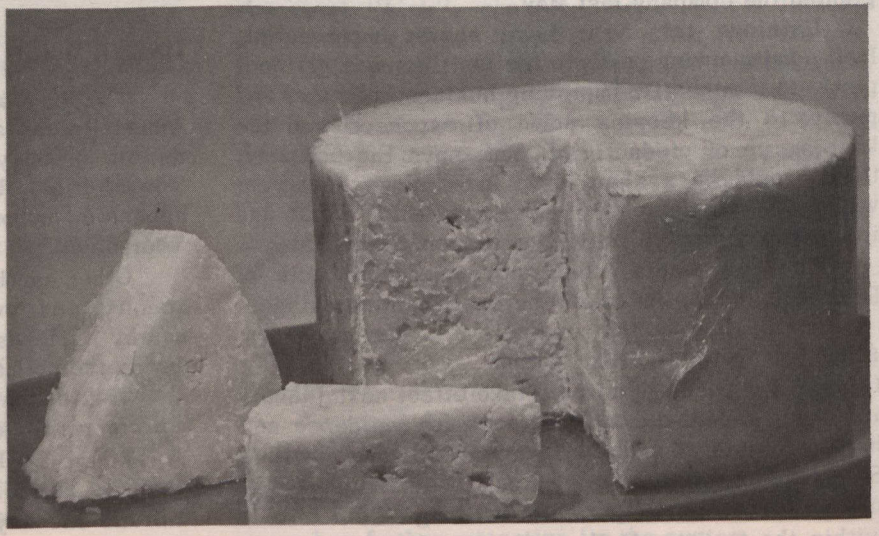
Fatalities from motor-vehicle accidents increased to 5,690 from 5,312, falls to 1,774 from 1,609, fire to 647 from 634, and poisonings to 699 from 720, but drownings decreased to 1,064 from 1,173. Suicides increased to 2,559 from 2,413 in 1970, advancing the rate for each 100,000 of population to 11.9 from 11.3. There were 458 homicides in 1971 compared to 421 the previous year, and the rate for each 100,000 of population rose to 2.1 from 2.0.

In 1971, 6,356 infants (under 1 year) died, reducing the infant death-rate for each 1,000 live births to a record low figure of 17.5. The provincial infant death-rates varied from 15.3 in Ontario to 22.9 in Newfoundland.

CHEDDAR CHEESE CHASE

Canadian cheddar cheese is popular in many countries – yet no one knows for sure what makes up its flavour and aroma, or how they are formed in the cheese-making process. So far, a total of 150 compounds have been spotted in cheddar volatiles, but no combination of these compounds has been found to reproduce the original aroma.

Scientists at Agriculture Canada's Food Research Institute in Ottawa, hope to trap the flavour constituents of Canadian cheddar to give the nation's dairy industry a clue for better control of its cheese-manufacturing processes.



ARMED FORCES BASES MERGE

Two Ottawa bases of the Canadian Armed Forces, Rockcliffe and Uplands, have been amalgamated into one establishment, effective November 1, under the designation Canadian Forces Base (CFB) Ottawa. Both are former Royal Canadian Air Force stations possessing historic connections with the city of Ottawa. The effect of the change, officials say, is "a streamlining of management and support functions".

No major changes are planned for occupancy of buildings or property at the two locations, nor are any units scheduled to be moved out.

Details of staff reductions, to be made over a period of a year, are still being worked out. Some transfer of military personnel is expected, however, and civilian employees within the new configuration will number only slightly fewer than before. Some 2,800 servicemen and 1,800 civilians work at the two locations now. Normal turnover will take care of reductions in civilian employees, although some shifting between the two installations may be necessary. Transfers to other locations will absorb surplus military personnel.

Advantages of the amalgamation include the consolidation of functions such as accounting, transportation, administration and the management of a number of common base facilities.

The old Rockcliffe air-station, comprising 930 acres, has a complement of about 1,400 armed forces members and 1,500 civilian employees, most of whom belong to staffs at National Defence Headquarters. Uplands contains 279 acres, and has 1,400 military personnel and 300 civilian employees.

Rockcliffe came into being in 1919; its major activities for the next 40 years included aerial photography for charting much of Canada, air transport and aeronautical experimentation.

In 1954 it became the headquarters of Air Matériel Command. Several units are situated on the base today, with main activities centering around logistics and supply, photography and intelligence operations. No military flying has taken place at the station since 1964.

WARTIME FLYING SCHOOL

Uplands, which shares airfield facilities with Ottawa's civil airport, was chosen as a site for a British Commonwealth Air Training Plan flying school in 1939. Flying stopped in 1945, and Maintenance Command moved away in 1947. Service association with the station then ceased until 1950, when an RCAF expansion came about.

Since that time it has been part of both Air Defence and Air Transport Commands, housing various flying units over the years. Until 1971 it was also the location of the Aeronautical Evaluation and Test Establishment, now operating out of Cold Lake, Alberta.

The largest flying unit at the base today is 412 (VIP) Transport Squadron. Other elements include 450 Tactical Helicopter Squadron, 2 Aircraft Field Maintenance Squadron, the Canadian Airborne Sensing Unit, and No. 3 Air Movements Unit, one of the busiest military passenger terminals in Canada.

SOVIET SCIENTIST AT McGILL

A visitor to McGill University, Montreal, is Dr. Victor P. Korobeinikov, Senior Research Scientist in the Section of Mechanics and Doctor of physico-mathematical sciences with the Academy of Sciences of the U.S.S.R. and now employed at the V.A. Steklov Institute of Mathematics in Moscow.

Dr. Korobeinikov is in Canada in connection with an exchange program organized by the National Research Council in Ottawa. In order to acquaint himself with research programs, other than those of NRC, he visited the Universities of Toronto and Alberta before going to McGill, where he is to spend the remainder of his two-month visit.

Dr. J.H. Lee, Department of Mechanical Engineering, is collaborating with Dr. Korobeinikov, and from their combined research they are producing a book to be entitled *Recent Progress in the Gas Dynamics of Explosions*.

Drs. Lee and Korobeinikov met in Brussels in 1967 at an international conference of engineers, and in 1970 Dr. Lee was an exchange scientist visiting the Steklov Institute in Moscow.

When asked for his impressions of research in Canada. Dr. Korobeinikov said that, as far as he could see, Canada was "a small country" and "not all branches of science have been developed to the same level". He felt that there had been considerable achievement in the area of gas dynamics and was greatly impressed with the wide range of research being carried on in environmental studies. He remarked that the Soviet Union had "only just started in this field".

RESEARCH IN THE U.S.S.R.

According to Dr. Korobeinikov scientific research is constantly growing in the U.S.S.R. with new universities opening each year and, as many positions are available, graduates do not have problems in finding work. There is no discrimination against women, equal pay applies, and with many well-supervised day-care centres, working mothers have no difficulties in obtaining adequate child-care.

An interesting feature of the Soviet educational system is its method of keeping students informed of possible careers. Professionals, researchers, directors of study programs etc., meet with students from the high-school level upwards to discuss their work and to answer questions that may be put to them.

FOOTBALL AND HOCKEY NEWS AS AT NOVEMBER 26

CANADIAN FOOTBALL LEAGUE PLAYOFFS

Eastern Conference – November 26

Hamilton, 23; Ottawa, 8 – for a two-game series score of 30-27, Hamilton.

Grey Cup will be played between Saskatchewan and Hamilton, December 3, at Hamilton.

NATIONAL HOCKEY LEAGUE

Results

November 25

Toronto, 11; California, 0.
NY Islanders, 2; Pittsburgh, 2.
Detroit, 6; Philadelphia, 4.
Chicago, 4; St. Louis, 2.
Minnesota, 3; Los Angeles, 0.

November 26

NY Rangers, 7; Toronto, 4.
California, 8; Detroit, 4.
Minnesota, 3; Vancouver, 1.
Atlanta, 6; Pittsburgh, 2.
Chicago, 3; Montreal, 2.
Boston, 6; Philadelphia, 4.

Eastern Division

	P	W	L	T	F	A	P
Montreal	23	15	3	5	100	50	35
NY Rangers	22	15	6	1	92	60	31
Boston	22	13	7	2	100	76	28
Buffalo	22	9	6	7	69	62	25
Detroit	20	10	8	2	73	66	22
Toronto	21	7	11	3	68	67	17
Vancouver	23	7	14	2	70	95	16
NY Islanders	20	3	15	2	45	99	8

Western Division

Minnesota	22	12	7	3	66	53	27
Chicago	22	12	8	2	76	65	26
Pittsburgh	23	11	10	2	87	73	24
Los Angeles	24	10	11	3	82	82	23
Atlanta	24	10	11	3	54	71	23
Philadelphia	23	10	11	2	80	84	22
St. Louis	19	4	10	5	45	65	13
California	22	4	14	4	57	96	12

WORLD HOCKEY ASSOCIATION

November 25

Chicago, 4; Philadelphia, 3.
Houston, 3; Cleveland, 1.
New York, 4; Alberta, 2.

November 26

Alberta, 2; Ottawa, 1.
Los Angeles, 6; New York, 2.
Winnipeg, 4; Quebec, 1.
Minnesota, 3; New England, 1.

Eastern Division

Cleveland	21	14	6	1	80	54	29
New England	20	12	7	1	81	64	25
New York	22	11	11	0	93	79	22
Quebec	20	10	9	1	67	67	21
Ottawa	19	8	10	1	70	81	17
Philadelphia	20	4	16	0	58	96	8

Western Division

Winnipeg	26	15	10	1	95	79	31
Minnesota	20	12	7	1	67	63	25
Alberta	24	12	11	1	76	80	25
Los Angeles	24	10	13	1	76	86	21
Houston	20	9	10	1	62	68	19
Chicago	18	5	12	1	48	57	11

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(Over)