



Telesat

Report

TELESAT CANADA

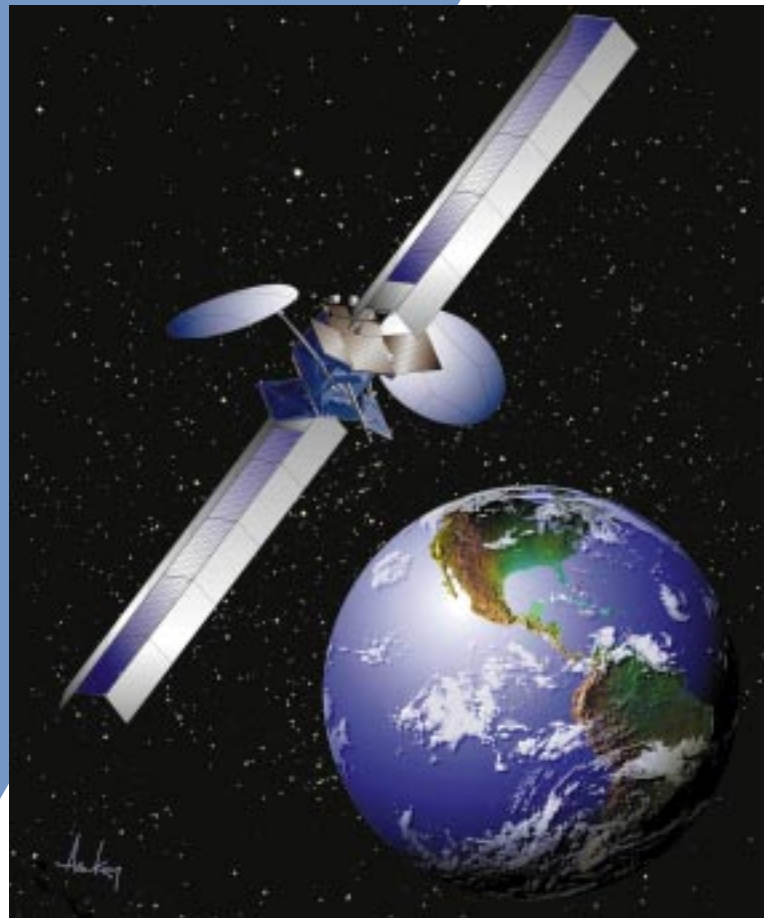
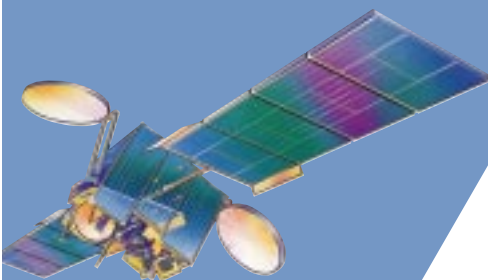
SATELLITE COMMUNICATIONS NEWSLETTER

SPRING/2000

XM Satellite Radio to introduce 100-channel U.S. satellite radio service

*Telesat to build satellite
control centres and
operate satellites*

Inside:



Some will say that the Golden Age of radio occurred in the 1920s and 1930s. Those familiar with XM Satellite Radio's forthcoming new band of satellite radio service, however, might be tempted to suggest that only now are we on the eve of radio's most lustrous era.

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BRINGING SATELLITE SOLUTIONS TO THE WORLD

Based in Washington, D.C., XM Satellite Radio is preparing to launch a unique national digital radio service in the United States that will offer up to 100 channels of music, talk, news, sports, and children's programming directly from XM Radio's two high-powered Hughes 702 satellites. For a monthly subscription fee of \$9.95,



customers will be able to receive this programming on their vehicle, portable, and home radios—no matter where they are in the continental U.S.

Telesat has signed a multi million dollar 15-year agreement with XM Satellite Radio to operate and control XM Radio's satellites. XM Radio also awarded Telesat a contract to build the ground-based satellite infrastructure.

"It makes sense for Telesat to handle these important elements of our operation," explained Derek de Bastos, XM Radio's Space Segment Vice President. "They've got the infrastructure, the experience, and the people to do the job well. We can concentrate on attracting customers and delivering excellent programming."

Under the terms of the agreement, Telesat will monitor and control XM Radio's satellites from its state-of-the-art Satellite Control Centre (SCC), located at its headquarters in Ottawa, Ontario. With the addition of some new computers and specialized equipment

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to accommodate the XM Radio service, the SCC will perform the manoeuvres that keep the satellites tucked in their geostationary orbital slots some 36,000 kilometres above the equator.

Telesat will build a backup SCC at XM's new Eckington Place complex, anchoring Washington, D.C.'s emerging high-tech corridor. The backup SCC, co-located with XM's broadcast center and corporate headquarters, will give XM Radio the option to control the satellites from this location if needed.

The primary tracking, telemetry, and command earth stations will be built in Mount Jackson, Virginia, west of Washington, D.C. Here, Telesat will locate the antennas and equipment required to transmit the station-keeping commands that the SCC generates.

Telesat has the expertise to design, construct and engineer all elements of a satellite ground system—an expertise that has evolved with each generation of its own Anik satellites.

And finally, Telesat will build the backup tracking, telemetry, and command earth stations at Telesat's Calgary Teleport. All ground segment work is expected to be in place by the fall of 2000, in plenty of time before XM Radio's first satellite is launched by Sea Launch Partnership at year-end. Telesat will then take over the day-to-day operations of the XM satellites.

Telesat has extensive experience in satellite operations, having successfully operated the Anik satellites—including spin- and three-axis stabilized types—for close to 30 years. The Company

has simultaneously managed multiple satellites and satellite generations, including satellites in normal operating assignments, collocated satellites, inclined-orbit satellites and satellites in storage orbits.

“Our next generation and sixth series of satellites, the Anik F1, is scheduled for launch later this year; and, like XM Radio’s satellite, is also a Hughes 702 spacecraft,” said Bruce Burlton, Director of Satellite Operations at Telesat. “We’re already extremely familiar with this satellite by virtue of our current procurement program, and by the time XM Radio launches its satellite, we’ll have several months’ worth of in-orbit experience our own Anik F1.”

XM Radio is one of only two U.S. companies that are licensed to use the “S-Band frequency” for Satellite Digital Audio Radio Services (SDARS). Customers will need to buy special XM-Ready radios, but signs suggest that they will be as common as the traditional FM and AM versions before long. The company already has agreements with nine leading consumer electronics companies to manufacture and distribute radios capable of receiving the XM Radio signal, including Sony, Alpine, Pioneer, Mitsubishi Electronic and Sharp.

XM Radio is backed by a group of industry-leading strategic investors, including General Motors, Clear Channel Communications and DIRECTV. XM Radio will offer listeners unparalleled choice and variety. Every format imaginable, including Rock, Blues, Folk, Classical, Reggae, American Standards, New Age, Urban, and more, will have its own channel.



SATELLITE RADIO

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of a satellite ground system*



“General Motors has chosen to provide XM Radio service for its cars and will begin to offer a 3-band satellite radio alternative to their traditional radio options in 2001,” said Mr. de Bastos.

“GM is just the first of many auto manufacturers that will take advantage of this leading-edge technology.”

Struggling with the frustrating ebb and flow of fading radio talk shows or baseball game signals will soon be a thing of the past for motorists throughout the continental United States. Once XM Radio is up and running, customers travelling from New York City to San Diego or Miami to Seattle will be able to tune their radios to their favourite channel and snuggle in for the long haul. And that convenience is a definite home run for radio.



CBC wins Emmy for pioneering satellite television in Canada

Telesat acknowledged for instrumental role

The CBC recently won its second technical Emmy from the National Academy of Television Arts and Sciences in the United States in recognition of its pioneering work distributing TV signals via satellite.

In making the presentation at a special ceremony in New York City in October 1999, the Academy lauded the initiative displayed by the CBC and its partner, Telesat Canada, in launching Canada's national television network in April 1973.

George Jackson, executive director of corporate engineering for the CBC, accepted the Emmy on behalf of the corporation. "CBC has been broadcasting television services by satellite for almost 30 years now," said Mr. Jackson. "The longevity of the service is a testament to both our relationship with Telesat and the excellent fit of satellite technology with our broadcast application."

The launch of Anik A1 in late 1972 provided the CBC with the potential to overcome Canada's vast distances and establish a true national television network. Before the first live images of Canada's national television network flickered onto TV screens in the Far North, the CBC would fly tapes to remote communities such as Moose Factory, Inuvik, and Iqaluit and transmit them locally on a delayed basis. The CBC achieved national coverage at the time using terrestrial microwave links and chains of off-air transmitters.

Mike Ligeza, who joined Telesat in 1972, recalls spending a Saturday in Whitehorse, Northwest Territories, before the advent of the national television network. "I was watching a tape of a football game that had been played the day before," said Mr. Ligeza. "I already knew the outcome, but the men watching the game with me didn't. They knew that I knew the final score, but I kept asking if they wanted to bet on it anyway." The launch of the satellite network meant that viewers in the Far North received real-time news and information and were never again at the mercy of more informed sports enthusiasts.

With its vast geographical and linguistic coverage requirements and network of 25 production centres in six time zones, the CBC recognized that Anik A1 was the ideal solution to its broadcasting challenges. Telesat and the CBC worked together to come up with an economically viable plan that would provide the CBC with the coverage it required. The corporation acquired three transponders (later adding a fourth) capable of providing both French and English network programs to regional locations and allowing production centres to gather and exchange news by satellite.

E Today, a sophisticated cue and control system allows the CBC to automatically switch satellite feeds across the country, for instance, bringing viewers a news report from Vancouver one minute and one from Winnipeg

or Toronto the next. But in the early days, Telesat handled such switching manually, a practice that required staff at various stations to press buttons at the precise command of CBC's master control in Toronto. "We would count down: 'Three, two, one, now!' and individuals in different locations across the country would each hit a button," recalls Mr. Ligeza. "This certainly made for some nervous moments, because if you missed your cue, the CBC would end up with dead air."

Did Mr. Ligeza have any sense at the time that Telesat and the CBC were creating history? "There were small events that led us to realize that our accomplishments were firsts," he explains. "For example, after the CBC started broadcasting via satellite, I recall an air traffic controller in Resolute, Northwest Territories, saying with glee that he had been able to relay the score in the Grey Cup game to commercial pilots overhead en route to Europe. He got a real kick out of that."

By bestowing the CBC with its recent technical Emmy award, the National Academy of Television Arts and Sciences has shown that it, too, considers the CBC's accomplishment special indeed.



IBM partners with Telesat to maintain 5,500 site Ford satellite network in U.S.

Leveraging more than a decade's worth of Canadian VSAT (Very Small Aperture Terminal) experience, Telesat recently signed a three-year service contract with IBM to maintain Ford's VSAT network, which links 5,500 dealerships throughout the United States.

VSAT networks allow organizations to employ small, easily installed outdoor antennas to transmit and receive data by satellite. Ford uses its FORDSTAR™ VSAT network to authorize credit card transactions, to conduct Interactive Distance Learning (IDL) sessions with automotive technicians, to send data between head office and dealerships, and to distribute technical bulletins.

"Telesat is emerging as an important player in the North American market for VSAT and other satellite services," said Gord Fraser, vice president of Network Services at Telesat. "The IBM contract signifies that the American market now recognizes that Telesat has both the expertise and the infrastructure to provision and maintain large VSAT networks in the U.S."

Telesat has maintained Ford's Canadian VSAT network at more than 640 dealerships since 1994.

Under the latest agreement, IBM maintains the FORDSTAR terminals—which are Local Area Network servers located at the dealerships; and Telesat looks after the remainder of the dealership communications system. Should dealers encounter a problem, they contact Ford's help desk in Dearborn, Michigan, and the help desk notifies IBM of the situation. IBM assesses whether the trouble lies with their

hardware or with the satellite system and involves Telesat accordingly. Telesat remotely interrogates the site through the Ford VSAT hub in Dearborn and, if necessary, dispatches a technician to repair the problem.

Telesat conducted a trial of the proposed maintenance arrangement in Texas during the fall of 1998. The results of the trial convinced IBM to award the FORDSTAR satellite maintenance contract to Telesat. "The pilot went extremely well," said Patrick Hensler, senior sales specialist with IBM Global Services, "largely because Telesat dedicated a number of top-notch people to the project. The company clearly demonstrated that they wanted the pilot to succeed."



Ford is now benefiting from a new VSAT Control Centre (VCC) that Telesat has established. By allowing Telesat to concentrate on the special requirements of its North American VSAT clients, the VCC enables the Company to focus in on network problem management issues specific to VSAT.

Patrick Hensler sees other advantages to working with Telesat as well: "First, Telesat does a really good job of managing their projects. And second, they're very responsive. Adds Mr. Hensler, "I'm extremely

happy with what we've accomplished in the last six to nine months, and so is Ford."

Maintaining Ford's VSAT network is a substantial enough endeavour in itself, but Telesat is also responsible for moving, adding, and changing Ford's VSAT sites, a job that falls to Brian Ford, manager operations, customer support. Operating from Telesat's office in Atlanta, Georgia, Mr. Ford and his Atlanta staff also work to improve the reliability and performance of the FORDSTAR network. And they're not finished... In the near future Telesat will be adding a web accessible move, add, change status system that will allow customers to instantly determine scheduling and progress for the thousands of design and facility changes that take place yearly in large networks such as Ford's.

"We bring better troubleshooting tools to the technicians in the field," explains Mr. Ford. "For instance, Telesat Allan Park staff developed a software program that emulates a credit card reader and which helps agents discover and repair faults. We're also looking for ways to improve environmental conditions for the equipment, to create better surge protection and thereby limit the devastating impact of lightning strikes. Telesat's overall knowledge and creativity in VSAT had not previously been seen by U.S. clients".

By making the FORDSTAR network more robust and addressing issues in a timely fashion, Telesat assists Ford in ensuring they can serve their dealership customers in a similar way.



European Space Agency invests \$1.25M in multimedia satellite project

Telesat establishes telehealth and telelearning networks in Newfoundland and Labrador

The European Space Agency (ESA) is investing more than \$1.25 million in two multimedia satellite research projects that the Telemedicine and Educational Technology Resource Agency (TETRA) of Memorial University, the Communications Research Centre, Telesat, and other Information Technology companies are conducting in Newfoundland and Labrador. Collectively the projects have a value over \$2.5 million.

The ESA is an association of 14 European countries that pool their resources to develop advanced technologies and equip the European space industry to compete globally. Canada, an associate ESA member represented by the Canadian Space Agency, is conducting one of more than a dozen ESA-funded research projects under the "ARTES 3" Multimedia Program designed to gain a better understanding of interactive multimedia satellite applications.

"The ESA wants experience that it can apply to developing successful telehealth and telelearning commercial ventures," says Abdul Lakhani, senior specialist, applications and networks at Telesat. "They want to learn about bandwidth requirements, costs, systems development, and community participation—

information that they can use to take similar solutions to the market."

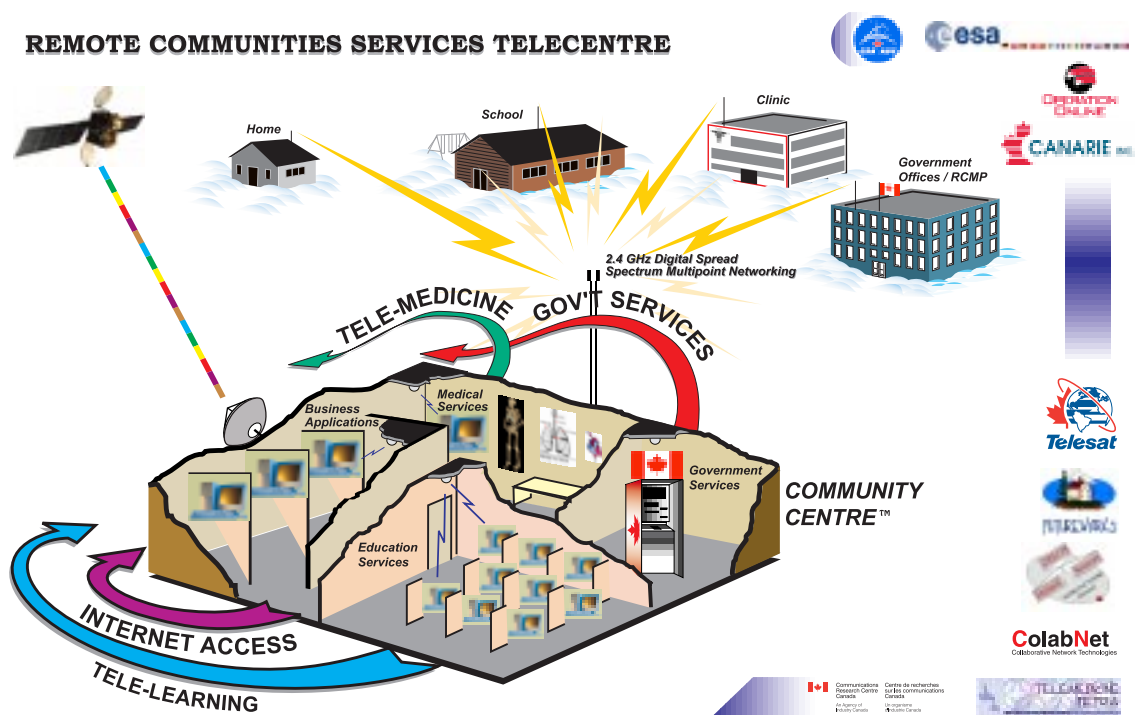
The first Newfoundland project, underway since late 1998, links telecentres in Happy Valley-Goose Bay, Forteau, Nain, and Twillingate with St. John's and Ottawa using broadband satellite technology. The program focuses on new ways to integrate health, education, and information services for small business and government agencies in rural communities.

Under the program, satellite provides Remote Communities Services Telecentres (RCSTs) with the bandwidth for such bit-hungry applications as videoconferencing, high-speed Internet access, and digital imaging. For instance, using the system, a doctor at the telecentre in Port aux Basques on the western edge of Newfoundland can transmit

images of a young boy's infected ears to an ear, nose, and throat specialist in St. John's more than 450 kilometres to the east. Examining the images on a monitor, the specialist can diagnose the boy's condition and can either prescribe treatment or request a personal visit. In this regard, the satellite system saves patients the inconvenience and cost of travelling substantial distances for standard consultations.

Dr. Carl Robbins, chair of Telemedicine at Memorial University in St. John's, believes the system has enabled his organization to advance health services in rural communities. "We've had a cardiologist provide consultations with patients in Twillingate and Goose Bay; we've carried out medical education activities for residents in Twillingate; and we've

REMOTE COMMUNITIES SERVICES TELECENTRE



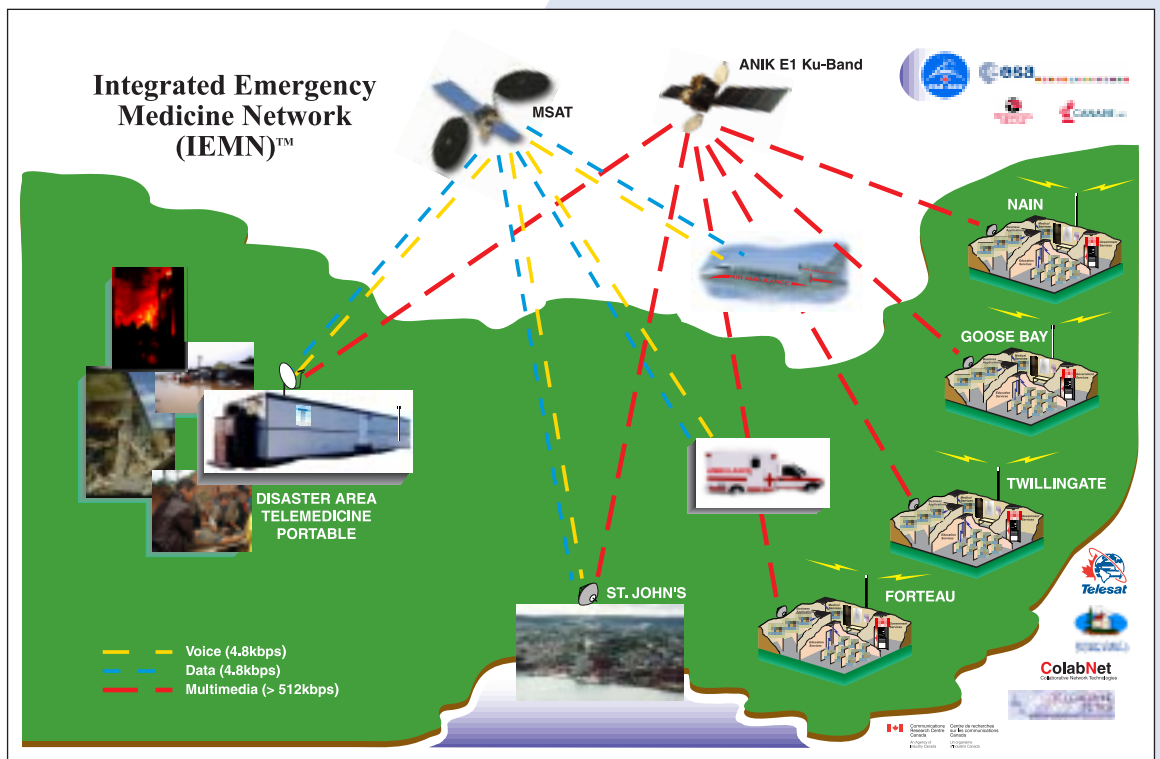
held innumerable nursing education sessions—all helpful things that would have been impossible without the broader bandwidth that Telesat and satellite are offering. We're very satisfied with the service and with Telesat."

Andrea Battcock, associate director of programs, planning, and development with Telemedicine, adds that telecentres will also help students in remote areas earn credits for high school, college, or university courses. "When we started with this project," she says, "it was almost phenomenal to think about what we could do with that kind of broad bandwidth. For us to be able to deliver distance education and telehealth services over broadband greatly enhances what we've been doing for 20 years now."

Other applications abound. Community groups, like the Tourism Association, can learn tricks of the trade by video-conferencing with other associations; employees of a company can upgrade their skills without going back to school; local committees can use the Internet to research new government programs; and job-seekers can use it to find work. "The system allows people in rural areas to have access to the same services and opportunities that those who live in urban centres take for granted," says Mr. Lakhani.

The second ESA-funded project, the Integrated Emergency Medicine Network, augments the RCST project. Doctors first use the broadband RCST satellite network to consult with patients and the attending medical personnel.

equipped with broadband and MSAT voice and data services, the Integrated Emergency Medicine Network (IEMN) could also save lives in the event of floods, fires, avalanches, or other disasters. Given the frequency of



If patients' conditions warrant, doctors can then send them to hospital by ambulance, including the airborne variety. Outfitted with mobile satellite (MSAT) voice and data service provided by TMI Communications, these special ambulances allow doctors to monitor the vital signs of patients in transit and better prepare for their arrivals. Better preparation means faster treatment, and that expediency can save lives.

Connected to a portable telemedicine satellite terminal

environmental disasters worldwide, a system that offers victims a better chance of survival stands to have global appeal.

The Remote Communities Services Telecentre project will wrap up in April 2000, and the Integrated Emergency Medicine Network project will conclude approximately one year later.



FCC opens doors to U.S. market for Telesat

U.S. customers to have more satellite service options

The U.S. Federal Communications Commission recently issued a landmark ruling that makes it much easier for U.S. customers to subscribe to fixed satellite services from Telesat.

Under the ruling, the company's Anik E1 and E2 spacecraft earn the historic distinction of being the first non-U.S. satellites to be placed on the FCC's Permitted Space Station list. Authorized earth stations in the U.S. are allowed to communicate with satellites on the Permitted Space Station list without special regulatory action from the FCC. With Anik E1 and E2 on this list, Telesat can now compete on a par with U.S. satellite operators.

"The FCC's announcement means two things," explained Larry Boisvert, Telesat's President and CEO. "First, U.S. satellite users get an attractive new service alternative, and second, Telesat now has improved access to the most lucrative satellite market in the world."

The FCC established the permitted satellite list to streamline the process by which foreign-licensed satellites serve the U.S. market, paving the way for U.S. customers to use foreign satellites for services liberalized under a World Trade Organization (WTO) agreement implemented in 1998. By lessening regulation, the FCC will accommodate competition in the United States, to provide consumers with more communications choice, to reduce prices, and to encourage technological innovation.

"Canada won access to the U.S. market under the WTO agreement, but only now do our satellites enjoy the same regulatory treatment as that of our



U.S. competitors," said Mr. Boisvert. "Telesat looks forward to bringing high-quality, reliable satellite service to new customers across America."

While satellite operators can provide service to U.S. earth stations without having their birds on the Permitted Space Station list, there are regulatory processes that must be overcome each time. Earth station licensees have to provide the FCC with technical details pertaining to the satellites they intend they use so that an assessment as to whether transmissions from the satellites in question are likely to cause interference problems.

Telesat first approached the FCC in April 1998 and requested that the Commission allow U.S. earth station licensees to access Anik E1 and E2 without filing new applications. Citing that many U.S. earth station licenses permit customers to communicate unhindered with "all U.S.-licensed satellites," Telesat asked the FCC to broaden this definition to include the Anik E1 and E2.

"The FCC agreed with Telesat's proposal," says Bob Power, director, Regulatory Matters at Telesat. "They looked at its implications, and in the end agreed that the proposed rule change was consistent with the U.S. WTO commitment and, therefore, that it made sense to create the Permitted Space Station list and include E1 and E2 on it."

Telesat will have to apply to get future satellites on the list, but Mr. Power thinks that the FCC will process these applications routinely. "The approval framework for WTO-member satellites is in place," he says. "The FCC has dealt with the issues now, so we look forward to securing U.S. market access for our future satellites, as well."



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Patricia Kube

Editor, Telesat Report

Telesat Canada, 1601 Telesat Court,
Gloucester, Ontario K1B 5P4

Phone: (613) 748-0123

Toll-Free: 1-800-267-1870

Fax: (613) 748-8712

E-mail: info@telesat.ca

Home Page:

<http://www.telesat.ca/>



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