

Distance Education:



by James Careless

SATELLITE DELIVERS A+ SERVICE TO UNIVERSITIES

IN REGIONS AS DIFFERENT AS AFRICA AND THE UNITED STATES, UNIVERSITIES AND COLLEGES RELY ON SATELLITES TO DELIVER DISTANCE EDUCATION TO REMOTELY-LOCATED STUDENTS, SOME OF THEM HUNDREDS, OR EVEN THOUSANDS, OF MILES AWAY. WHATEVER THEIR LOCATIONS, THE BENEFITS ARE THE SAME. THANKS TO SATELLITE-DELIVERED LEARNING, STUDENTS ARE SPARED THE OFTEN IMPOSSIBLY HIGH COST OF TRAVEL AND ACCOMMODATIONS. MEANWHILE, UNIVERSITIES AND COLLEGES CAN OPEN UP VAST NEW MARKETS OF POTENTIAL CLIENTS THROUGH SATELLITE TRANSMISSION.

SPANNING THE AFRICAN CONTINENT

Seven hundred million people, more than half of whom are under 20 years of age, are Africa's reality. Hampered by low incomes, civil unrest and AIDS, many Africans find

it impossible to attend universities in person. "The situation in Sub-Saharan Africa [SSA] is particularly dire," says Bolaji Akinboro. "In 2000 only five percent of the SSA higher education age group was in universities compared to a world average of more

than 16 percent. The issues of inadequate capacity, dwindling government support, low enrollments in the secondary system and the introduction of school fees have made access to higher education limited and unequal."

As business development and marketing manager for the African Virtual University (AVU), Akinboro knows what he is talking about. Established in 1997, the AVU's mandate is to provide distance education programs throughout Africa. The AVU delivers its courses using satellite services provided by Netsat Express. The signals are

technology and management.

Since 1997, about 25,000 students have enrolled in the AVU's short courses. By 2007, the AVU expects to have approximately 27,000 students actively enrolled in these three programs across Africa at 52 African institutions.

The students take their courses at special learning centers located across Africa. Typi-

with telephone talkback/Internet e-mail and chat during the programs 1997-2001 Proof of Concept (testing the system as designed, to see if the concept actually works) roll-out. "In its original form, the AVU network had many shortcomings including high cost of satellite bandwidth—because digital video requires large bandwidth—the high cost of telephone

communications and audio feedback and inadequate Internet access at our learning centers," Akinboro says. "Moving to a totally IP-based platform has significantly reduced our video

"The cost benefits of the one-to-many characteristics of satellite broadcasts are quite significant." —Bolaji Akinboro, African Virtual University

carried on Globecom's SkyBorne IP-based satellite network.

The AVU is currently available at 32 institutions of higher education in 18 African countries, Akinboro says. Through its partner universities, it offers African students a choice between two- and four-year programs in subjects such as computer science and business studies. Also offered are short courses (8-10 weeks) in information

cally, the instructor's live signal is sent to them as IP-based audio/video, which is received at the learning center using a video and Internet data receive-only earth station. The students view the incoming signal on a large TV monitor. They can ask questions to the teacher over local ISP links, either by e-mail, or during teacher/student online chat sessions.

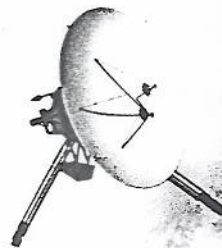
The AVU decided to switch to IP-based video after deploying digital video combined

costs, while significantly increasing the aggregate Internet access speed for the Learning Center."

Granted, there are still a few bugs to work out, such as slow Internet connections due to local ISP problems. Through the use of archiving servers, however, this "last mile" problem will be partially solved, notes Akinboro. "Still, satellite technology is the only technology that offers a pan-African dis-

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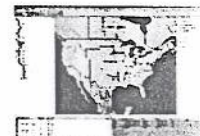
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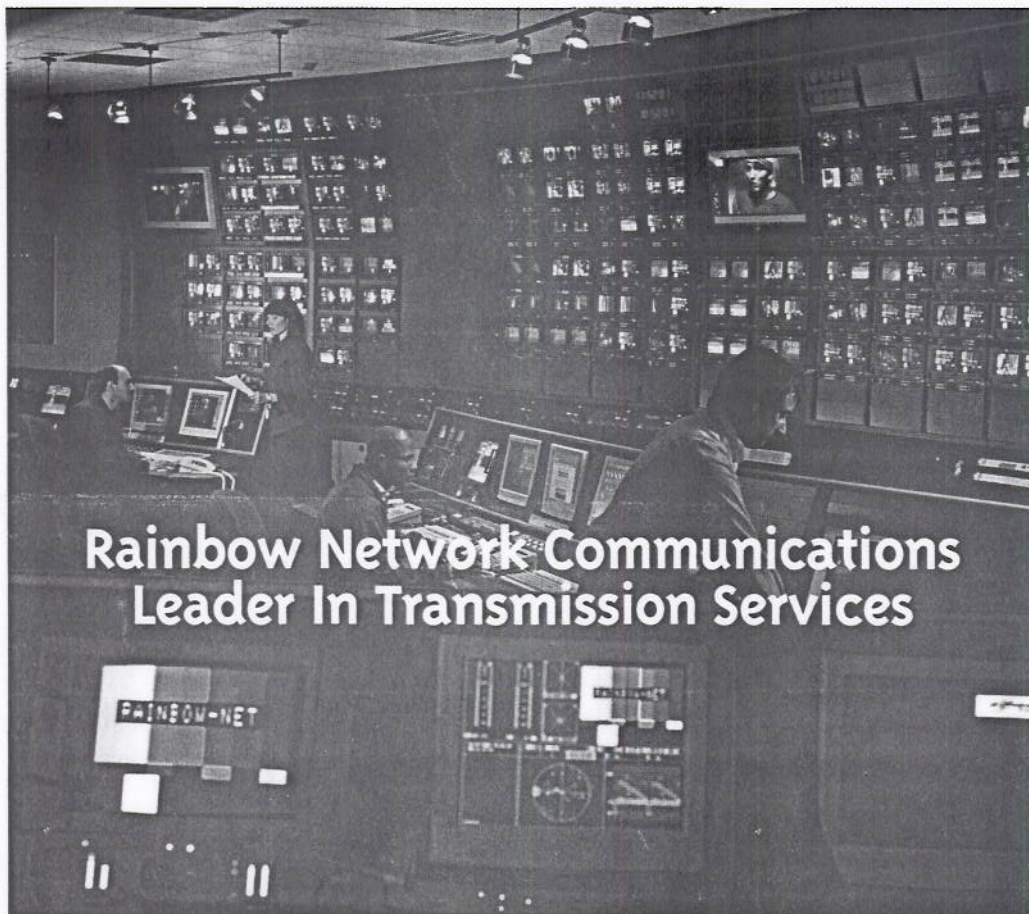
tance education network the capability to deliver video broadcasts and Internet data traffic at acceptable quality to the entire continent," he says. "Moreover, the cost benefits of the one-to-many characteristics of satellite broadcasts are quite significant."

EXTENDING UNIVERSITY EDUCATION TO ALL

Based in Norfolk, VA, during the Great Depression, Old Dominion College began as a branch of Williamsburg's William and Mary University—the United States' second oldest college (after Harvard). The need for this institution soon became apparent, as enrollment swelled and Old Dominion's offerings grew from two-year diplomas to four-year degrees. By 1962, Old Dominion College was big enough to become a stand-alone, state-supported institution. By 1969, it became Old Dominion University (ODU) with a full range of undergraduate, masters and doctoral programs.

Mindful of its origins, ODU has been extending its reach through distance learning since the 1980s, initially through microwave and occasional satellite broadcasts. In 1994,

Photos courtesy of Tecnológico de Monterrey.



Rainbow Network

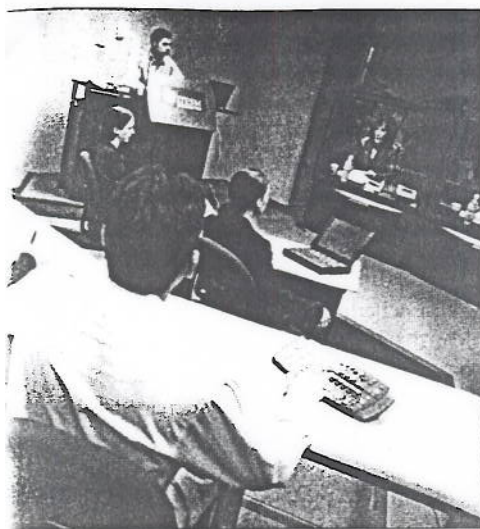
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Tecnológico de Monterrey's Virtual University, presided over by President Patricio Lopez del Puerto (left), provides undergraduate, graduate and continuing education courses to 17 countries in Latin America.

however, ODU committed to regularly scheduled satellite-based distance learning with the startup of its Teletechnet program. Teletechnet is an interactive distance education program that enables students who live in remote locations to earn bachelors and masters degrees from a fully-accredited university, without actually coming to Norfolk.

"Using satellite, students at one of 50 sites within Virginia, Indiana, Illinois, Washington, North Carolina, Arizona and Georgia, not only see and hear their Teletechnet professors, but they can interact with the class by means of satellite and/or video streaming," says Andy Casiello, assistant vice president for academic technology services. "In addition, students that are not in one of the above locations can take part in one of our six programs offered by way of video streaming." In total, about 25,000 students annually register for Teletechnet courses.

"Satellite technology was, and still is, the only way to deliver the educational environment that we demanded for our program, including broadcast-quality video and audio, to an audience as large and geographically dispersed as ours," Casiello adds. "We have 44 locations just in the Commonwealth of Virginia, and more throughout various locations around the United States, including six Navy ships at sea, which we link with for live, synchronous instruction. Satellite technology allows us to create those live links in a very reliable and high-quality way."

The courses originate in 12 classroom studios, each equipped with three video cameras. In each classroom studio, there is

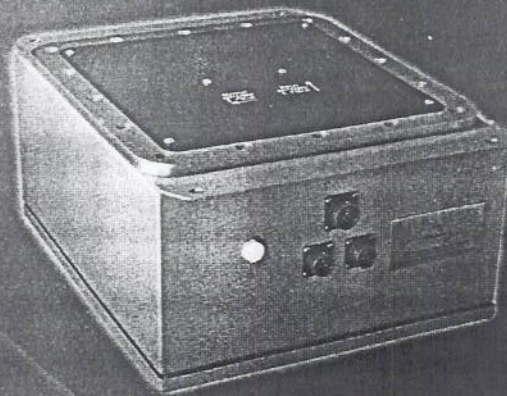
an instructor presentation center with computer, microphones, whiteboard, electronic writing tablet and other origination equipment such as VCRs, DVD player/recorders and slide and scan converters. All of these are controlled by the instructor using an AMX touch screen control system.

"Professional control room operators work with the individual instructors to control cameras, switching and other related

technologies connecting the classrooms to our transmission system," Casiello says. "Students at the remote locations are connected throughout the class session via return audio path to the origination studio. A large audio bridge run by the Commonwealth is used to link all sites throughout all courses. Students in the origination studio also have microphones on their desks so the remote students will hear their comments and questions."

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Intriguingly, ODU operates its own satellite network. It is based on the Tandberg System 3000 MPEG-2/DVB transmission equipment for transmission and reception. "This is a state-of-the-art satellite system with six channel capability 24/7," says Casiello. "We have full time space segment on Loral's Telstar 6 satellite, transponder K6. We operate two Ku-band uplink earth stations, one being a 5.5-meter Com-

sat/RSI and the other a 4.8-meter Vertex."

In the future, ODU plans to expand the number of Teletechnet sites in its network. "Within the Commonwealth, we are expecting growth of more than 34,000 more students who will soon be seeking education through institutions of higher education," Casiello adds. "Teletechnet will be able to help. Satellite offers all the capacity we need."

REACHING LATIN AMERICA

Mexico's privately-run Tecnológico de Monterrey is a true child of satellite-based distance learning. Thanks to satellite, Tecnológico de Monterrey's Virtual University (known by the Spanish acronym UV) is able to provide undergraduate, graduate and continuing education courses to 17 countries in Latin America.

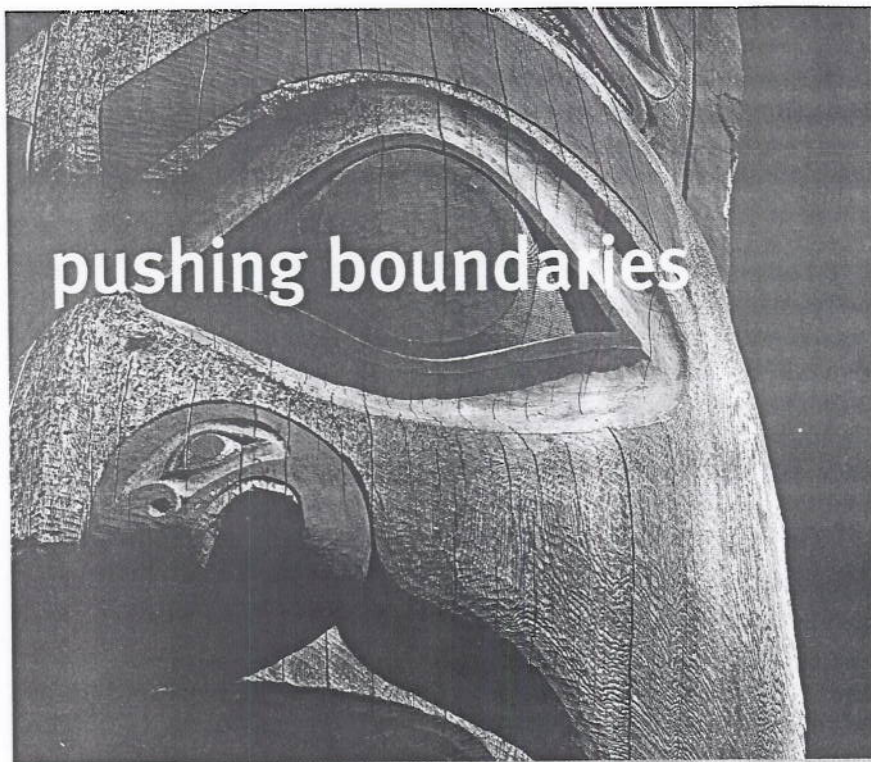
Launched in 1996, the UV teaches more than 70,000 students via satellite each year. Moreover, the number of graduate programs available to them has increased from nine in 1996 to 17 in 2003.

"Today, the Virtual University offers 10 masters degree programs and specialty programs, in the areas of education, administration, engineering and human studies, plus a doctoral program in education innovation and technology," says UV Rector Patricio Lopez del Puerto. "In addition, we also offer continuous education programs in the areas of administration, productivity, sales, accounting and finance, computers, languages, sustainable development, education and social programs for training public officials, elementary education teachers, elementary education principals, non-governmental organizations officials and journalists."

Satellite has been part of Tecnológico de Monterrey's teaching strategy since 1989, when the institution's "Interactive Education System by Satellite" (SEIS) was launched to provide faculty members with continuing education. As a result of SEIS' success in upgrading faculty qualifications, Tecnológico de Monterrey extended distance learning to the general public through the UV. Not only did this allow Tecnológico de Monterrey to expand internationally, but it also improved the level of teaching the institution provides to all its students.

"The Virtual University's mission is to provide quality education by incorporating innovative educational models, learning networks and advanced information technologies in order to contribute to the integration and development of Spanish-speaking communities," del Puerto says. "This is not an easy task, but we are motivated by our commitment with Tecnológico de Monterrey to work in the development of the community and society in general."

Here is how the UV's satellite-based system works. First, the distance learning class is captured in real time using video, either from one of Tecnológico de Monterrey's



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eight transmitting sites (via studios in four Mexican cities), or the institution's 42 videoconferencing-equipped classrooms that are distributed across its 33 Mexican campuses.

"The transmitting sites have four professional video cameras and microphones for the professors and the students," says del Puerto. "Each of these transmitting rooms is equipped with its own production room, much like a TV studio. Meanwhile, the videoconferencing rooms have a camera, codec and microphones that can produce semi-professional video quality."

Tecnológico de Monterrey's video signals are uplinked to Satmex 5 on the Ku-band, either from Monterrey or Mexico City. "At this moment, the UV has five distance learning channels broadcasting from the Monterrey Campus, and two channels from the Mexico City Campus," del Puerto says. In all cases, the channels are compressed into DVB data streams and protected using Irdeto Access' encryption system.

Each receiving site has a Ku-band antenna ranging in diameter from 0.9 to 2.4-meters, depending on the earth station's location in the Satmex 5 footprint. The earth station also has a digital decoder activated by a smart card. This is controlled remotely by Tecnológico de Monterrey's administrative and billing center in Monterrey, again via satellite. In addition, all remote learning sites are equipped with Internet-connected computers that, when online, allow real-time communications between teachers and students. "With the help of a facilitator located in the same studio, the remote students are able to send their questions through this system," says del Puerto. "Once the facilitator receives them, he sends the ones related to that day's activity to the teacher's computer for immediate action. The rest of the questions regarding homework and other topics are answered by the professor right after the class via the course Web page."

After seven years of operation, Tecnológico de Monterrey is very satisfied with distance education via satellite, as are its students. "The quality of the video sent through satellite is very good, and a minimum infrastructure is required at the receiving site, which gives access to a greater geographical coverage," del Puerto observes. "In addition, the best professors of Tecnológico de Monterrey are now available to all our campuses and remote

sites in Mexico and Latin America."

DISTANCE LEARNING VIA SATELLITE MAKES THE GRADE

Whether in Africa, the United States or Latin America, the conclusion remains the same. Delivering distance learning by satellite works. In fact, virtually no other technology can provide more students with better educational opportunities at a more reasonable

cost, either for infrastructure or ongoing operation. Clearly, this is a lesson worth heeding, and one that educators in Africa, the United States and Mexico must put in their lesson plan. ♦



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