



Going the Extra Mile with Distance Learning

Australia's Northern Territory Government Partners with Australian Satellite Communications and iDirect to Expand Educational Reach in the Outback

For the Australian government, providing education in the nation's expansive Northern Territory (NT) is a significant challenge. Students are spread across more than 500,000 square kilometers. Many do not have the opportunity to learn in a traditional classroom setting—interacting directly with teachers and peers.

Today, a satellite network implemented and managed by Australian Satellite Communications (ASC), and based on the iDirect platform, is bridging the gap. The Northern Territory Government (NTG) is able to bring education to students everywhere in the region with the networking power to support rich features like two-way video and interactive applications—making distance learning more engaging and productive.

New Connections

ASC and iDirect teamed to increase the interactivity of the NTG's distance learning network:

- ◆ Added inbound video so peers and teachers can interact with each other in real time
- ◆ Boosted audio and video quality for better presentation
- ◆ Increased data rates for application and file sharing

Taking Education Further

Higher Objectives

The NT Department of Education and Training (NTDET) first launched its distance learning program in 2003. A satellite IP network supported the NTDET's Remote Education and Conferencing Tool (REACT), which facilitated multicast video, synchronous audio, file sharing and other applications that connect interactive teaching studios to remote classrooms and homes in real time.

The initial network fell short of the NTDET's educational objectives. While students could learn from home, they still lacked the collaboration and discussion abilities with their peers and teachers that a traditional classroom setting provides.

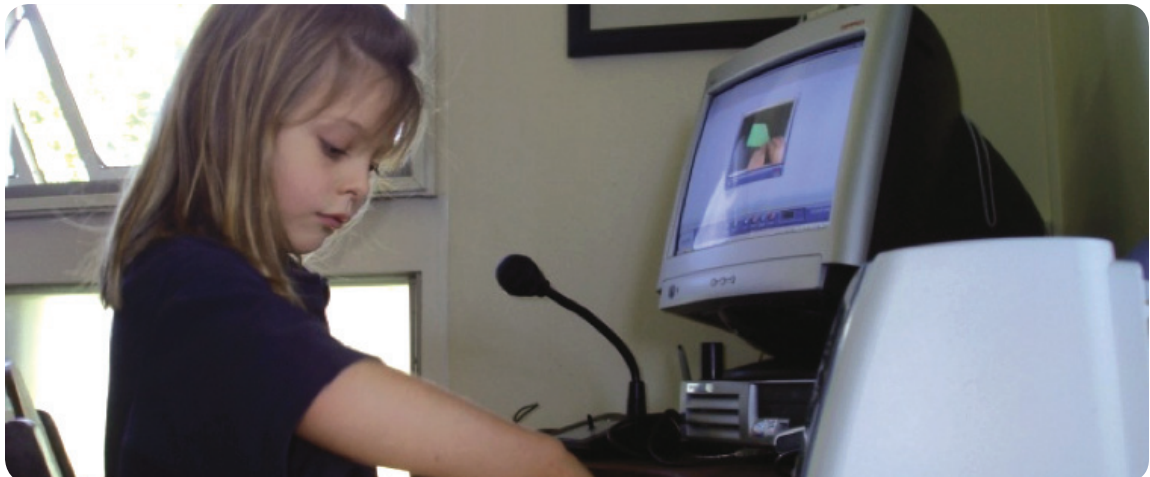
In 2008, the NTDET unveiled an ambitious list of new features it wanted to add to its distance learning application to increase its effectiveness. These included:

- Adding an inbound video capability to the network and significantly increasing the number of Interactive Distance Learning (IDL) lessons available so students could interact more directly with teachers and peers.

- Supporting real-time collaborative tools, such as a digital whiteboard where content can be modified in real time.
- Increasing application sharing and file transfer to make lessons and tools more available to students.
- Improving audio quality, especially for English as a Second Language (ESL) classes and for students with a hearing impairment, and boosting video quality so teachers could better present instructional materials.

The department also needed to address the impact of the NT region's tropical climate on network performance. Adverse weather conditions, which are common in Northern Australia's tropical areas during the five month wet season, can jeopardize network performance.

A final challenge was sharing the network's satellite capacity with other agencies, including the Department of Health and Families, which was eager to expand its own operations. This meant that the network needed a way to dynamically allocate bandwidth among different agencies on the network, as well as prioritize usage based on agency and application.



A student receives an interactive lesson at her home computer

A Next Generation Network

A Stronger Connection

With the network contract due for renewal, local satellite service providers and network operators were invited to submit proposals for an alternate solution. ASC was selected to redesign and manage the distance learning network.

Leveraging its in-house engineering and design capabilities, ASC developed a replacement for NTDET's existing network to expand its distance learning program. ASC chose to work closely with its partner iDirect to build a next-generation satellite network based on iDirect's Evolution DVB-S2 platform. After initial testing of the REACT software on an iDirect network via ASC's Adelaide teleport, the NTDET realized that the iDirect system would provide much greater flexibility and capability compared to its original system.

Each participating site in the NTDET program was supplied with a 1.8m VSAT antenna, an RF transceiver and iDirect's Evolution X3 Satellite Router.

Once the network design was completed, ASC installed teleport infrastructure in Darwin. It included an iDirect DVB-S2 universal hub, a 6.2m Ku-band earth station and an earth station building with a power system, generator and UPS. ASC secured Ku-band space segment on the AsiaSat4 satellite and established a dedicated Service Management Centre (SMC) to provide 24x7 maintenance and technical support.

Leveraging the DVB-S2 standard's significant gains in bandwidth efficiency and data throughput, the iDirect network was able to increase the NTDET's IP data rates up to the current 33 Mbps outbound and 9 Mbps inbound. The larger inbound carrier sizes, together with iDirect's Time Division Multiple Access (TDMA) shared bandwidth platform, enabled the NTDET to expand its network from strictly audio return to also include video return.



ASC installed teleport infrastructure in Darwin

Peak Performance

To combat the NT's adverse weather conditions, the network features iDirect's Adaptive Coding and Modulation (ACM) technology. When rain fade threatens to compromise data quality, ACM automatically adjusts the modulation settings on a satellite router to optimize link performance. This feature, together with uplink power control, is critical to ensuring a highly reliable system, despite housing the iDirect hub in one of Australia's highest rainfall regions. When ASC implemented this feature, initial tests revealed a 400 percent increase in capacity while operating under heavy rainfall, common in Northern Australia's tropical regions.

ASC implemented iDirect's Group Quality of Service (QoS) technology to manage traffic across multiple sites and a wide variety of end users. Group QoS prioritizes traffic by data type, site, router, application and other criteria. With this feature, the NTDET can categorize and prioritize all network traffic according to its own usage criteria. This is a critical requirement for ensuring the integrity of real-time applications. In addition, the network allows each government agency to be separated on the hub using VLANs to provide secure access between their sites.

Greater Interaction

"The iDirect platform delivers several critical differentiators that help us meet the program's rigorous demands," said Chris Joseland, managing director of Australian Satellite Communications. "Technologies like Group QoS and ACM enable the network to easily handle a wide range of real-time applications and operate at peak performance in any geography."

Expanding the Program

In January 2009, in the middle of the tropical wet season, more than 200 remote sites were transitioned from the incumbent satellite system to the new network. Since the transition, there has been a steady growth of sites.

In the virtual classroom, students are enjoying improved social interaction. While previously they could only interact with the teacher, now they can collaborate with their peers. Some classes even start as much as one hour early to allow students to use online chat facilities. The program set a new attendance record of 65 students in a single REACT classroom session.

By March 2009, the Australian Telecommunications Users Group (ATUG) recognized the success of the network and awarded the NTG a National Award for Effective Use of Broadband.

Today, with a next generation iDirect network implemented by ASC, the NTG is able to ensure that students in remote parts of Australia have the same educational benefits as those in traditional classroom settings.

Australian Satellite Communications (ASC)



ASC offers a wide range of satellite broadband services throughout Australia and the Asia Pacific region. This iDirect partner is a strategic service provider to the education, corporate, government, maritime, oil and gas, and mining industries.



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