

Satellite Systems Turn Challenges to Opportunities for North Dakota and West Virginia Students and Educators

Children in the schools of West Virginia and North Dakota are enriching their educational experience thanks to two-way satellite videoconferencing. Using inTELEconference™ from HNS, this very small aperture terminal (VSAT) system allows students to access classes not available in their own schools, by conferencing them into schools that offer courses in everything from foreign languages to advanced science.

Getting students and their teachers together is not always a simple matter. Geography and finances often conspire to make it difficult, if not impossible, to provide all the classes and training that students and educators need. Hiring additional teachers is often too costly. Students cannot travel hours each day to attend a class not offered at their own school. Requiring teachers to travel four, five, or more hours to attend critical teacher training is expensive and impractical.

These and similar issues challenge educational systems everywhere, and the Washburn, Kenmare, and Divide County public schools in North Dakota and West Virginia's Department of Technical and Adult Education are no exceptions. While the specific issues these two systems face are quite different, the solution is the same — a Hughes Network Systems (HNS) inTELEconference™ videoconferencing system that brings remotely located students and teachers together via satellite.

Based on very small aperture terminals (VSATs), inTELEconference allows both point-to-point and multipoint videoconferencing.

Satellite Videoconferencing Erases Distance Learning Limits

Although West Virginia and North Dakota arrived at their decisions by different routes and for different reasons, both decided to use satellite videoconferencing to offer a full curriculum to all students and comprehensive training to every teacher.

For North Dakota, the driving issue was the limited range of the state education network's existing interactive fiber-optic terrestrial system. Designed to provide rural students access to foreign language classes and advanced math and science courses not offered in their local schools, this terrestrial network only reaches schools within a 125-mile radius of Bismarck. Before introducing inTELEconference into the North Dakota school system



students beyond this 125-mile radius often had little or no access to these classes. This limitation posed many problems, particularly for college-bound students who must pass certain high-school classes to enroll into college.

According to Bill Strasser, distance learning director for the North Dakota Education Network's fiber-optic and VSAT satellite networks, several alternatives for meeting the needs of these students were considered. "We looked at extending the existing terrestrial network, but the cost was prohibitive and the distances it had to cover were too far. We then evaluated the HNS system and we found that was it specifically designed for this kind of application and precisely met our needs."

Now that the videoconferencing network is in place, more than 600 students attending three rural secondary schools outside the 125-mile-terrestrial-line access area are receiving instruction in previously unavailable subjects via satellite. The VSAT

satellite system supports point-to-point as well as multipoint interactive video- and audio conferences between schools. These features make it possible for an instructor to hear student discussions and questions from all the classrooms. Students can see and interact with the instructor simultaneously via monitors and microphones located in the classrooms. Likewise, instructors can hear questions and discussions from all classrooms and, by simply switching from one view to another on their monitor, interact visually with any of the classrooms, one at a time.

Each site's equipment includes cameras, a monitor, microphones, and an inTELEconference station. Scheduling for the entire network is handled through a Network Control Center (NCC) located in Washburn, North Dakota. Here conferences can be scheduled in advance and then the connected schools enter their conference choice at the appropriate time without any operator action at the NCC. To maintain the network's health, this single NCC also polls all remote sites and monitors the status of the entire network 24-hours a day. The interactive nature of the videoconferencing network makes the experience for both teachers and students very much as it would be if they were all in the same classroom.

Former Medical System Becomes New Distance-Learning Network

In West Virginia, the state's Department of Adult and Technical Education satellite

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videoconferencing system began in a very different manner. The inTELEconference system was originally implemented as part of a NASA program testing interactive satellites for use in the medical field. The system was installed at several technical education (Vo-Tech) training centers throughout West Virginia to give physicians in rural areas access to the expertise of specialists at the Scott and White Medical Center (the medical branch of Texas A&M University) in College Station, Texas. Interactive satellite videoconferencing quickly proved a success for medical consultation and diagnostics, and the medical school upgraded its system to accommodate more sophisticated graphics and other specialized capabilities.

The Department of Education folks jumped at the opportunity to put the existing system to use for educational purposes. "Satellite videoconferencing offered us a very cost-effective way to meet some of our special needs," says Bill Halstead, RESA III public relations specialist, who works closely with the system. "We especially like the

fact that we only pay a small maintenance charge plus usage fees that are based on the amount of time we actually use the system. Landlines would cost us five to six times as much as the satellite network."

The department now uses its interactive videoconferencing capabilities for teacher training and to provide students at Shepherd College's campuses with access to the same instructors and courses. The HNS satellite distance learning system has eliminated much of the need for Shepherd College students and instructors to travel between campuses and has reduced the number of instructors the college must hire in order to deliver courses to students on both campuses.

Satellite network teacher training also has proven to be a significant time and money saver for teachers already in the classroom. Training courses via videoconferencing are available to local schools approximately every six weeks and eliminate the substantial travel expenses previously incurred as well as reduce the amount of time that teachers are out of the classroom.

The Department of Education's network consists of 10 sites, eight of which are permanent installations in technical education centers throughout the region. Teachers at different locations are able to provide instruction simultaneously from any of the centers. Each classroom has two cameras, one to capture video images and the other, mounted above the system's video monitor, either provides a view of the entire room or zooms in on a particular section or individual. A few strategically located microphones complete the classroom setup. In addition to the indoor equipment, every location also has a VSAT antenna that is situated somewhere outside the building and is pointed towards the satellite from which it receives and transmits the signals.

West Virginia has also taken advantage of the VSAT system's easy portability and its trailer-mounted system provides additional flexibility for the system. This trailer is equipped with video apparatus as well as a VSAT satellite antenna. This mobile system can be towed behind a vehicle and set up virtually anywhere to provide immediate access to the network.

Hassle-Free Operation Means No Need for Extra Technical Staff

Strasser and Halstead agree that satellite technology has proved its worth in their distance learning programs, providing access that was not previously available as well as saving time and money. Of key importance to the success of both networks



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is its simplicity. Neither system has found a need to employ specially trained technicians to operate the system as teachers can easily operate the equipment themselves.

For its network management services, both the North Dakota and West Virginia networks use the HNS shared-hub network controlled in Germantown, Maryland. Both Strasser and Halstead like the reliability, cost savings, and convenience that this provides, as well as the flat-fee monthly charge. Because HNS offers end-to-end service, monitors network performance, and provides maintenance and troubleshooting, there has been no need to hire extra staff to perform these tasks.

System set up and operation is simple and efficient. In fact, the mobile unit in use in West

Virginia can be up and working in a matter of minutes, Halstead says. This makes it possible to gather students in temporary sites to participate in extracurricular events, special classes, and training. In the permanent locations that make up the majority of both networks, regular school staff members operate the system, its cameras, and microphones.

Expanded Horizons without Expanded Costs

The flexibility of VSAT satellite videoconferencing has enabled both school systems to offer innovative and unusual learning experiences æ giving school-aged children access to real-world illustrations of their course work that they might otherwise never encounter. As an example, in West Virginia one of the network's technicians, a spelunker, carried a

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network camera during an expedition into a cave and was able to show students cave formations as he explained their various geological features. Most students had never been inside such a cave and the impact of actually seeing the real geological formations and listening to the enthusiastic spelunker's explanations was more dramatic and memorable than anything that they could have read in a book about stalactites and stalagmites.

For both West Virginia and North Dakota, distance learning via satellite is expanding the horizons of students and teachers as it helps to control costs and maximize use of scarce resources. Both Halstead and Strasser agree that the applications for which their VSAT systems are now being used have already delivered substantial benefits and offer them significant room to expand. Providing the best possible educational opportunities to all their students and

teachers is the goal for both systems, and satellite video-conferencing has helped them move closer to achieving this.

Hughes Network Systems

A world leader in satellite products and network systems for more than 25 years, HNS is the global VSAT market leader and has shipped more than 300,000 terminals. Headquartered in Germantown, MD, near Washington, DC, the company has sales and support offices worldwide. HNS offers communications network solutions that include a complete line of integrated satellite, enterprise networking products, and fixed and mobile wireless networks. HNS is a Hughes Electronics Corporation company and an ISO-9001-certified manufacturer. The earnings of Hughes Electronics are used to calculate the earnings per share attributable to GMH (NYSE symbol) common stock. HNS can be found at www.hns.com.



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