

Case Study**Southern California Tech School Accelerates Backbone Network with Free Space Optics**

For an innovative California charter school focused on math and science, technology is essential to its teaching, learning and daily operations. And because this school is spread out across a multi-building campus, the backbone network connecting these buildings is critical for performance and functionality. As the campus community grew and bandwidth demands increased, backbone network speeds slowed significantly. With nightly backup procedures and file transfers requiring 90 minutes or more for completion, the IT staff decided to implement a free space optics (FSO) solution from MRV that would significantly increase network speed.

Background

On an old military training center in a seaside community of Southern California, navy barracks were transformed into a charter school campus providing education to students in grades K-12. Focused on preparing its students for real world situations through research and internship opportunities, the school takes pride in delivering an advanced learning environment with access to a variety of cutting edge technologies and educational tools.

Because the campus community consists of multiple buildings serving more than 2,000 students, there is heavy data traffic flows between the various locations. Additionally, in order to maintain and secure important school records, campus IT personnel prepare nightly backups. The growth over time in the amount of data flowing across the school's leased line backbone network, meant campus IT personnel were faced with incredibly slow file transfers and backups that could take hours to complete.

In order to meet network demands and speed up the backup process, the IT staff considered expanding network capacity by either implementing additional leased lines or digging trenches across the campus and installing its own fiber optic network capacity. However, the team determined that neither solution would be a fit, as additional leased lines would increase monthly telecom costs and building a network would be too costly and time consuming. The

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charter school needed to find a solution that could be quickly implemented, so that the network would be prepared for the next semester of classes. With about a month left before students returned from summer break, the staff chose an FSO solution from MRV.

MRV Solution

Campus IT administrators chose to build the network using MRV's TereScope 700G (TS700/G) for two campus links. MRV's TereScope product line is the market's leading FSO solution for data, voice and video transmission, which provides ultra high bandwidth using technology similar to that found in fiber optics communications. The TereScope product family provides high speed, point-to-point campus networking at speeds up to 10 Gbps across distances up to 492 yards. Providing full-wire data rate using optical signals, the TereScope's narrow and nearly invisible laser beam makes it the most secure wireless solution, nearly impossible to intercept.

Within the TereScope family, the TS700/G is part of the TereScope 700 series (TS700), which provides high speed FSO connectivity for a variety of last mile applications and is specially designed for short distance connections. Operating at full wire speed data rates of up to 1.25 Gbps, the TS700 series is rapidly deployable, without requiring right-of-way or government permits for installation, providing communication links in hours instead of weeks or months.

The TS700/G model operates at Gigabit Ethernet and Fibre Channel speeds and features an optional RF back up transmitter that can instantly start if the primary link goes down.

Implementation

The fact that MRV has deployed more than 8,000 links worldwide made the decision to implement the TereScope very easy for the IT staff. MRV's partner NetCom International, Inc. worked with the school to install two FSO links to connect three buildings. The first link was installed between a middle

TereScope Optical Wireless Systems

TereScope systems provide the most comprehensive FSO wireless solutions, ranging from short to long distances and narrow to ultra-high bandwidth.

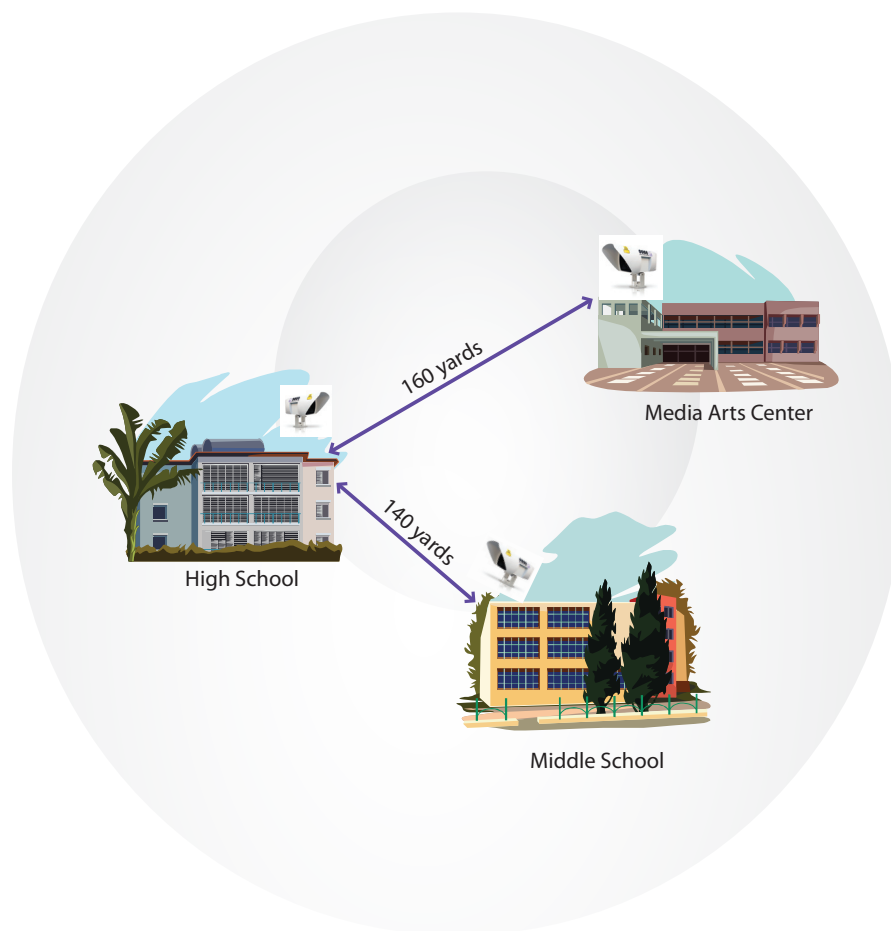
- **Ultra High Wireless Bandwidth —**
Can provide 1 Mbps to 10 Gbps wire-speed connectivity for distances of up to 5 km
- **Most Secure Wireless Transmission —**
The data transmission beam is very narrow and invisible, making it nearly impossible to intercept.
- **License free operation —**
No need to obtain frequency licenses.
- **Versatile Protocols —**
Supported protocols include 10BaseT/ Fast Ethernet/ Gig Ethernet/10G Ethernet, ATM, FibreChannel, SONET, SDH, HDTV and ESCON.
- **Safe to Use—**
Systems are eye and skin safe at the aperture and meet all safety standards including IEC60825-1 Class 1M.
- **Major Cost Savings —**
By avoiding the recurring costs of leased lines and licensing costs, an ROI can be realized in just a few months
- **Reliable Communication —**
Use of multiple transmit apertures helps long range TereScope models ensure high performance under adverse weather conditions. The receivers are designed to overcome atmospheric noise in hot or cold weather.
- **High MTBF —**
Extremely reliable with an MTBF (Mean Time Between Failures) of more than 10 years.

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school and high school (approximately 140 yards apart) to serve as an Internet and backup connection. The second link was installed between the same high school and a media arts building (approximately 160 yards apart) to serve as a file transfer and backup connection.

Before installation began, NetCom International worked with the school on a site survey to first understand if the wireless solution would be a good fit. The school provided information on the three buildings, whether they have line of sight, and what the weather conditions would be like. Dense fog can interrupt FSO transmissions, but when the school reviewed meteorological information it determined that the incidence of fog was so low that they could live with any potential downtime. The school could have implemented an RF back-up network to take over in a heavy fog, but because the links were to be primarily used for backup and file transfers, the school determined that redundancy would not be necessary. Additionally, with a leased line already in place, the school had the option to keep that line as backup for the FSO solution.

The school IT team particularly liked the MRV solution because it could be installed in areas of the infrastructure that would not interfere with the aesthetics of the campus' existing architecture. NetCom International worked with campus architects to determine the best placement for the modules and found that the small size of the units allowed them to be they could be placed behind a fixture inconspicuously on the rooftop and underneath a wall overhang so that its campus community would never notice the solution was in place.





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Success

After the installation of the first TereScope module, campus IT staff were so pleased that they decided to implement the second link. The result was a backbone network that was easily installed on time and is virtually unnoticeable to the school community, except that they notice a dramatic increase in network speeds. By implementing the FSO solution, the school was able to increase network speeds from 1.5 megabits per second to 1.25 gigabits per second, resulting in increased productivity and significantly reduced operating expenses. Now, instead of waiting hours for nightly backup procedures to be completed, campus IT personnel can facilitate backups within minutes.

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