

IMPROVING K-12 EDUCATION

Amarillo Independent School District



Amarillo Independent School District (AISD) Uses Dark Fiber to Transform e-Learning, Campus Security, and Campus Connectivity



The [Amarillo Independent School District](#) (AISD), based in the city of Amarillo, Texas, is a district spanning nearly 70 square miles of land in Randall and Potter County with 58 locations and serving over 32,500 students. With a network of locations that encompass every phase of the K-12 learning lifecycle as well as

specialized instruction locations, AISD is dedicated to helping students comprehensively prepare for college and beyond.

In response to an expanding digital world, AISD was looking to take advantage of opportunities for improving education and safety through technological means. The [2019 State of the States report](#) from EducationSuperHighway notes that 94 percent of surveyed schools say digital learning is happening in at least half of their classrooms, while 96 percent of school leaders state that they believe digital learning has a positive impact on instructor effectiveness and student outcomes. These K-12 EdTech and security capabilities include the use of tablets and laptops, video-based lectures and distance learning programs, as well as phones in every classroom and additional campus-wide security cameras. However, additional applications and devices put a strain on existing district networks due to increased traffic from students and instructors. To deliver these IT use cases in schools, a powerful network must first be in place to deliver the bandwidth capacity and heightened speed that support these applications, and often, campuses must be redundantly connected to a trusted data center as well.

[E-Rate](#), a program created by the Federal Communications Commission (FCC) in 1996, has helped bridge this gap by making deployments more affordable and increasing access to the internet. Ultimately, the FCC is working to meet [short-term goals](#) of 100 Mbps internet access per 1,000 students and staff and long-term goals of 1 Gbps per 1,000 students and staff. The program also continues to modernize, integrating new subsidizing options for more up-to-date network solutions. For instance, the [Second E-Rate Modernization Order](#), adopted in 2014, equalized the treatment of lit and dark fiber, anticipating that funding for dark fiber would benefit many E-rate applicants both by increasing competitive options for broadband construction and deployment and lowering recurring costs. With opportunities like these in place, AISD—and many educational institutions like it—are seeking ways to augment their networks to open up new opportunities for e-learning.



Network Bottlenecks and Price Limitations Prohibit e-Learning Opportunities

The existing AISD network from AT&T included 1Gbps connections to each of the schools. With this low bandwidth, the network experienced limitations, bottlenecks and networking issues prohibiting administrators, students and staff from effectively utilizing e-learning and other administrative applications. Not only were capabilities such as campus-wide broadcasting and streaming hindered, but the number of devices at each campus was limited as well. This existing network inhibited the planned addition of 2,500 live-recording security cameras across AISD's campus and telephone capabilities in every classroom in lieu of the traditional Public Address (PA) system, both of which are crucial for enhanced security. This device limitation also impacts the potential expansion of AISD's 1:1 student environment—which currently encompasses 9th through 12th grade—to include every academic level down through the 1st grade. This expansion would mean a load of approximately 14,000 additional devices on top of what the network is currently handling.

Looking to the future, AISD also required a network that would empower the development of a new elementary school, as well as a new and specialized career academy that will offer exciting educational opportunities across programming, graphic design, audio visual, software development, clinical health and more.

Due to changes in the Texas State Legislature funding at the time, AISD's current network service charges were increasing from \$14,000 per month for 1Gbps connections to almost half a million. With its existing infrastructure, the level of robust bandwidth and on-site hosting capabilities necessary to support these learning and security measures was unavailable and not financially viable.

Luckily, the school district was already working on the business case for dark fiber through the E-rate process. "As e-instruction grew and more applications moved online, we knew we were going to be needing more bandwidth," said Jeff D. Roller, CTO of AISD. "We realized that building our own network would protect our budget and bottom line as well as provide new levels of flexibility needed to expand schools, increase bandwidth and remove restrictions—giving us free rein to do what we wanted with our network."

E-Rate Funding and Dark Fiber Networks: A Match that Empowers

To position AISD for long-term growth, deliver network agility and control, enable student access to digital opportunities, enhance security and pave the way for new developments, FiberLight was chosen to deploy a 70-mile dark fiber network expansion.

With the FCC's Category 1 E-rate program and the Texas State Legislature's matching funds, the dark fiber network buildout was 100 percent subsidized. With networking equipment also eligible under Category 1, 80 percent of the equipment was covered as well.

The year-long construction project was completed in June 2018 and was designed as a ring topology between the main high schools and the two buildings that house the district's main and alternate data centers. Each campus building off of the ring was constructed with two pairs of dark fiber that connect to two buildings on the backbone ring for added resiliency. The result is a powerful network foundation, built mostly underground, that provides increased uptime, faster connections and ultimate resiliency and network protection to keep the district's campuses up and running 24/7/365.

Dark fiber offered the most advantageous array of benefits for AISD's goals, provisioning virtually unlimited bandwidth, which ensures optimal connectivity and reliability for data-intensive applications, as well as rapid expansion capabilities and scalability. By offering multiple wavelengths through DWDM (Dense Wavelength Division Multiplexing), dark fiber ensures that users have plenty of space to grow and meet evolving bandwidth needs.



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CTO, AISD

Network Performance and Control That Suits Today's Needs and Tomorrow's Opportunities

Offering a significant bandwidth increase, the dark fiber network resolved the bottlenecks in network capability and performance the district was experiencing and allowed easier control over the speed of the network.

"We've moved to another level because of this network," continues Roller. "With all the educational instruction that's now online from YouTube, Google and other providers, the network is the gateway to get us to the internet and provide instruction back to our classrooms at a very high speed and in an efficient way. It's really changed the way we think about networking. The network never flinches, and there is enough there to meet the district's needs not only now but for years to come as we have the flexibility to grow that network."

By enhancing the AISD network across its entire footprint with greater control, enhanced security and high-capacity connectivity, each of the district's unique goals were met with a highly capable and reliable network environment provisioned by FiberLight. Furthermore, with the district looking into building a private LTE network that would provision connectivity to student and staff homes and offer important remote education opportunities, this dark fiber created a necessary foundation for a potential development that otherwise would not be possible.

Building a Network with Room to Grow

With bandwidth needs continuing to rise—especially with increased cloud computing and new IT projects on the horizon—AISD is already looking at increasing bandwidth to some locations. The technology team, including a team of four on the data center/systems side and a team of five on the network side, has already upgraded wavelengths to the high schools from 40Gbps to 80Gbps in the two years the network has been up and running. "The beauty of the network flexibility and control we now have is that every bandwidth increase is just a software upgrade; no new equipment is needed," adds Roller.

Whether it's incorporating a diverse array of digital and online learning applications, ensuring greater security for students or expanding their specialized schooling to prepare future generations, AISD is fully enabled with the capacity, speed and scalability it needs. Furthermore, this augmented fiber footprint facilitates overall community growth and support, creating a positive economic impact in Amarillo by attracting additional business partners to the area.



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"The goal of AISD is to prepare students for life beyond high school, making college readiness top of mind. Reliable connectivity is critical for gaining access to classroom technology that takes college preparedness to new levels," concludes Roller. "Through our partnership with FiberLight, we feel confident in achieving our goals and look forward to the opportunities that FiberLight may afford other businesses in town and the future growth of Amarillo."

To learn more about FiberLight's suite of high-performance connectivity options, visit fiberlight.com

About FiberLight

FiberLight designs, builds and deploys mission-critical high bandwidth networks to ignite our client's digital transformation. With 14,000 route miles of deep fiber networks and 78,000 pre-qualified near-net buildings, FiberLight operates in over 30 metropolitan areas in the U.S. Our service portfolio includes high-capacity Ethernet and Wave Transport Services, Cloud Connect, Dedicated Internet Access, Dark Fiber and Wireless Backhaul serving domestic and international telecom companies, wireless, wireline, cable and cloud providers as well as key players across enterprise, government and education. For more information, visit fiberlight.com.

