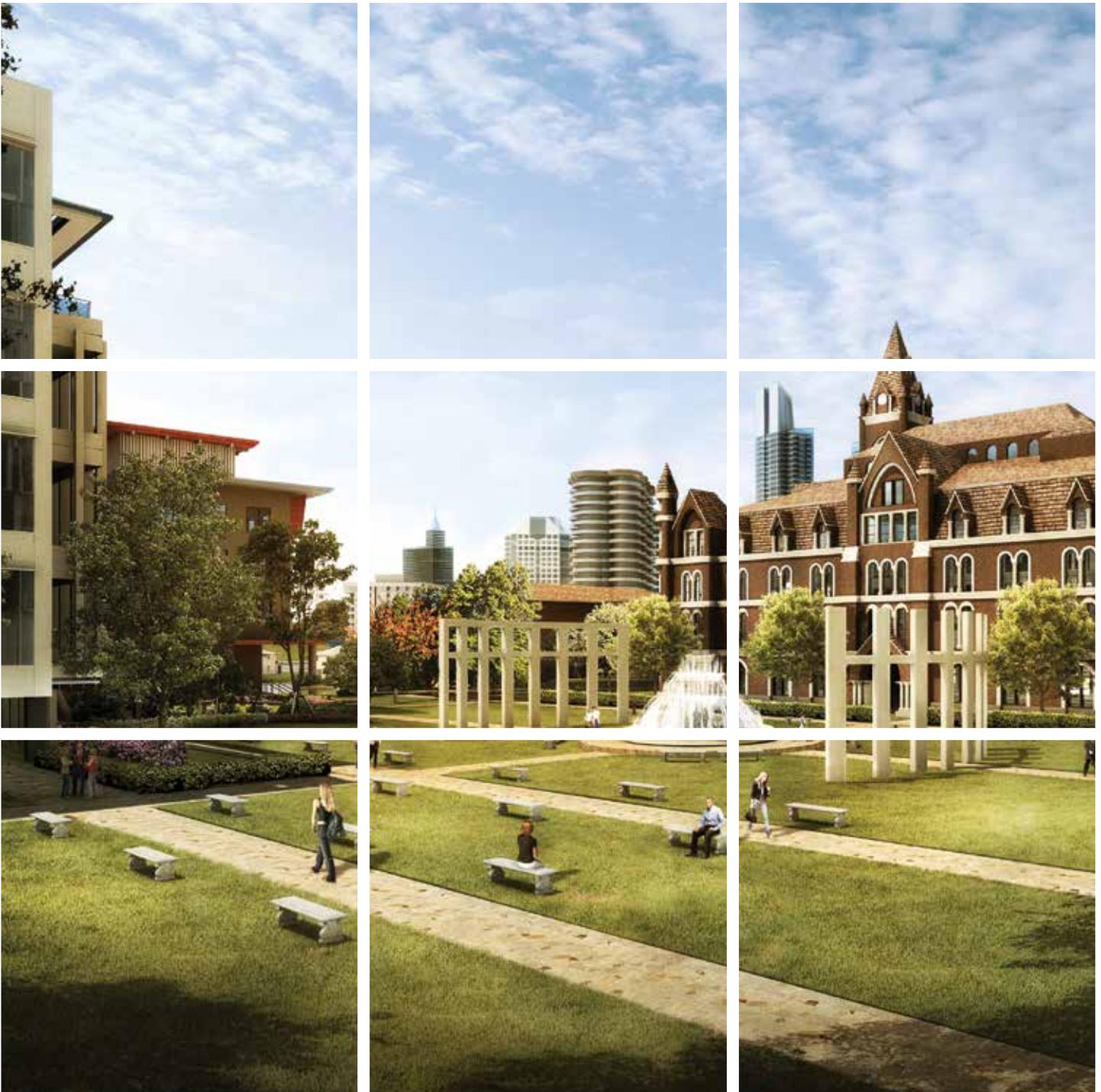


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MobileAccess  
Wireless Solutions

## Quads Without Wires: The Realities of the Wireless Campus



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Wireless, and in particular 4G LTE cellular, has become the standard of choice for public Internet browsing and data transfer, especially in open areas like university campuses. The growing demand for wireless data from end users means that connectivity is king, regardless of the challenges posed by campus location or topography.

Historically, wireless services on university campuses have been limited to a select area: stadiums and arenas. On college game days, thousands of data-hungry consumers can pack one of these structures, negatively impacting the already-limited wireless ecosystem and leading to dropped calls, failed texts and slow data transfers. Universities want to remain attractive to the modern (data-hungry) student, so enhancing the overall wireless footprint of the institution is key. As such, universities and stadium operators have turned to distributed antenna systems (DAS) to boost indoor cellular strength and bring indoor service quality up to, and potentially exceed, what's available on the outdoor macro network.

While the initial push for enhanced cellular services focused on stadiums and arenas, the need for improved service quality is no longer limited to campus sports venues. Carriers and universities have begun improving connectivity in transitional areas (entryways/gantries) as well as surrounding parking lots and garages to handle the wireless usage that occurs leading up to the event; sometimes even several days prior to the game. From there, it was only reasonable to continue the extension of wireless improvements to the entire campus, creating the need for an inclusive, dedicated wireless network.

There is only one problem – preparing a cavernous structure like a stadium and its environs for improved cellular services is completely different than wiring a wide-open campus. Stadiums and other sporting venues utilize a relatively homogeneous mixture of low-power radio frequency (RF) antennas and high sector counts to serve cellular users. The mixed topologies of a campus, however, which may include wide-open quads, amphitheaters and parking structures along with dormitory, classroom and administration buildings, means that addressing outdoor wireless needs is anything but straightforward.

With campuswide wireless a far more complex problem than wiring a stadium, should universities and other campus operators even consider an outdoor wireless solution? In short: Yes.

### **(Beyond) The Need for Wireless and the Student Data Boom**

The need for wireless is not a fad – according to Cisco's VNI Global Mobile Data Traffic Forecast Update from February 2012, mobile data growth doubled for the fourth year in a row and was eight times the size of the entire global Internet from 2000. Another telling statistic issued by the report is the sheer growth of mobile devices – by 2016, mobile devices like smartphones and tablets will number 10 billion, well exceeding the world's population.

The popularity of mobile technologies has infiltrated the hallowed halls of academia in a major way. According to the Pew Internet Project's 2011 report on College Students and Technology, 92 percent of undergraduate students actively consume data wirelessly, trending more towards smart phones/tablets over cellular networks than laptops over Wi-Fi. The current generation of students is incredibly data hungry, meaning that not only is cellular connectivity something that they expect, but a necessity. A university that fails to provide effective wireless coverage on a campus runs the risk of being seen as a learning establishment that is not up to current technology standards.

Interest in enhanced mobility and cellular services is not just limited to student populations, however. Administrators, professors and researchers as well as campus visitors are increasingly relying on mobile technologies, like e-text books, collaboration and messaging applications in their daily lives – many universities, including Abilene Christian and Seton Hill, have gone so far as to issue tablets and other ultra-mobile devices to students and faculty, increasing the importance of campuswide wireless coverage and bandwidth just for educational and operational effectiveness.

Wide-area wireless connectivity also serves university students and staff from a security perspective. The tragedies at Virginia Tech and Northern Illinois University have led to the creation of campus alert systems, which use text messaging as opposed to email to notify students and faculty of potentially dangerous situations. Additionally, various smart phone apps exist that allow mobile devices to act as “panic buttons,” helping threatened students to instantly alert authorities via cellular services when in danger, making ubiquitous campus wireless coverage a priority beyond the classroom.

The wireless boom and campuses’ need for improved wireless services will only grow in the coming years. This means that campuswide wireless deployments must take future growth and services into account – any deployed networks must be flexible and scalable enough to support additional users and data traffic as well as emerging cellular services, such as 4G LTE.

## Keys to the Wireless Quad

To meet the growing, ravenous demand for campuswide cellular solutions, universities need to turn to a tried and true solution, albeit in a slightly different form factor: DAS, but a version that is modified to meet the needs of an inclusive campus. Unlike low-powered, highly sectorized stadium/arena DAS solutions, DAS for open space areas requires a heterogeneous mixture of high-, medium- and low-power solutions, laid out according to the topology of a campus.

Topology is a key consideration to any DAS deployment, but one that can be easily overlooked by universities eager to enhance wireless service without proper planning. Campus environments are anything but open, despite the wide expanses of quads and fields. These spaces aside, there are also numerous buildings, parking structures and other geographic anomalies to contend with coupled with areas of a high concentration of cellular users all of which requires a unique blend of wireless technologies working in unison to provide the necessary coverage.

Theoretically, a properly designed outdoor DAS system should be able to cover more than 70 percent of all campus buildings, eliminating the need for individual locations to have their own indoor DAS installations. Covering approximately 50 percent of campus buildings, however, is

far more realistic – extremely dense structures, like most dormitories and libraries, will require individual indoor DAS solutions which are either integrated with or replace entirely the outdoor systems, ensuring seamless coverage.

Beyond the capacity of the DAS itself, universities need to consider the design, in particular the cabling involved in building out a campuswide wireless deployment. Next-generation cellular services require more than just standard coaxial deployments – fiber now becomes a very real necessity for universities looking to not only build a DAS but to build a network infrastructure for the future.

As the information boom continues and bandwidth becomes a higher and higher priority for both professional and personal uses, backhaul capacity is a network component that can no longer be taken for granted. As technologies like wireless LANs (WLANs) trend towards high-bandwidth applications and uses, fiber backhaul becomes a necessity, not just a luxury add-on.

It is unrealistic that the student body, faculty and visitors of a university will be using a single wireless carrier, so why should a campus DAS be limited to a single carrier? The wireless campus solution should be able to encompass ALL carriers and technologies, so the DAS must be designed with this in mind. Engaging carriers at the onset of a wireless coverage project enhances the likelihood a carrier would agree to plug and join the system. Using a DAS technology that is preferred by the carriers for multi-carrier systems will enhance the likelihood even more.

## The Tools of the Trade

When it comes to creating a campuswide DAS, universities need to find solutions that can not only provide the range of power needed to cover their unique topologies, but also remain flexible and scalable enough to support future needs, such as adding wireless carriers and technologies to expanding the scope of the system.

For the vast majority of campus implementations, space is at a premium for the hardware that runs a DAS, whether it’s a server closet, basement areas or even a separate sheltered enclosure. Ideally, the selected solution should have a unified headend infrastructure, which means that the same radio interface that connects to a carrier’s signal source can support a variety of remote amplifiers that

range from low to high power. When it comes to amplifiers, flexibility is king – being able to mount a remote anywhere (flagpole, wall, etc.) is vital to the deployment and future success of an outdoor DAS (and in truth, indoor DAS solutions as well).

Finally, in terms of wireless coverage technology, campuses need to look towards solutions that not only extend cellular coverage, but can also help save money at the same time. This means that a DAS solution must be flexible enough to meet current and future needs, without extensive redesigns or expensive add-on modules.

Form factor of a remote amplifier is extremely important for outdoor DAS installations – the solution must be able to handle the weather elements, from heavy rain and snow, to high temperatures and dust storms. National Electrical Manufacturers Association (NEMA) certifications are key here, ensuring that an outdoor node can be mounted anywhere, from an underground server closet to a flagpole, regardless of the conditions.

Solution providers like Corning MobileAccess fully support DAS installations, offering everything universities need to wire their campuses, from low-power nodes that support stadium and arena installations to medium and high-powered solutions that can help universities cover more square footage – indoor and out - with less expense. Additionally, the company can also provide the necessary cabling, fiber solutions and connectors to meet the demands of even the most rigorous installations while simplifying and shortening the overall installation process.

But more than just technology, Corning MobileAccess provides the right expertise when it comes to complex, heterogeneous wireless systems encompassing both indoor and outdoor environments, including wireless carrier coordination, site surveys, design, project management, implementation, commissioning and ongoing maintenance.

On the design side, Corning MobileAccess understands the complexity of providing mixed topology coverage, a primary aspect of any campuswide DAS deployment. The company is highly successful in developing sectorization

plans (the division of wireless coverage areas into discrete units for better coverage) with minimal overlap, which, if not done properly, can waste network capacity as well as project resources. Additionally, Corning MobileAccess provides the tools needed to model and replicate “virtual” indoor and outdoor DAS coverage systems, helping universities and other organizations better predict real-world performance.

From a services perspective, Corning MobileAccess has extensive experience in designing and deploying DAS in campus settings. This expertise provides a deep understanding of academic calendar constraints and how to coordinate, schedule, manage and quickly deploy installation and test teams to accommodate these common campus restrictions. Campus installations are a completely different animal than “simple” in-building DAS implementations, so finding a partner with the right mix of experience, skills and technology is key to success.

To perfect the wireless campus, universities need to install the right solutions, not just systems that meet their needs “right now.” DAS forms the backbone of the world without wires, providing a buffer between the macro network and the end user, ensuring that capacity is always there and that dropped calls and slow data are a thing of the past. Universities need to prepare now, not later, to truly cut the wires for students, faculty and visitors.

*For more information on Corning MobileAccess solutions and how they enable wireless everywhere, regardless of topology or venue, please visit [www.totaldas360.com](http://www.totaldas360.com).*