

THE MAGAZINE FOR THE PEOPLE
WHO BUILD NORTH AMERICA

CONSTRUCTION

TODAY

JUNE 2016

KEEPING CONNECTED

CTS PROVIDES ESSENTIAL WIRELESS SUPPORT TO BUILDING OWNERS. → p.14



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Max South Construction is reviving
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helped it reach its 25th anniversary.





THE NEW UTILITY

Communication Technology Services helps property owners integrate wireless communications.

In the United States today, it is estimated that more than 85 percent of adults between the ages of 18 and 49 own a smart phone. This percentage will continue to grow each year until traditional landlines and cell phones are obsolete. We expect and depend on wireless voice and data to be available everywhere all the time in both our personal and professional lives. It is estimated that 80 percent of all wireless voice calls originate inside a building. As a result, most commercial properties need to make sure that they are providing exceptional wireless communications infrastructure to their tenants and/or customers. This is no longer a luxury, but a necessity, much like electricity or running water.

The best way for a building owner to provide the necessity of wireless commu-

nication service is through the installation of a distributed antenna system, commonly referred to in the industry as a DAS. Simply put, a DAS is a collection of antennas placed in strategic locations throughout a building or outdoor space, designed to provide enhanced coverage and reliability than that offered by the wireless service providers' cell towers. Communication Technology Services, known in the industry as CTS, is the industry leader and a trusted integrator for all of the major wireless service providers, having successfully deployed over 6,000 distributed antenna systems nationwide. With almost three decades of history, CTS is designing, building, managing, servicing and consulting on DAS projects, large and small, across all vertical markets nationwide. Building upon its

robust experience and knowledge in general contracting, project management and structured cabling, CTS has evolved into the premier provider of services the wireless industry including DAS, wireless LAN, and small cell solutions integrating public safety, commercial cellular and other wireless technologies to provide world-class communication systems.

Verizon, AT&T, T-Mobile, Sprint and other wireless service providers, have long been employing the use of DAS in large, high-profile spaces like sports stadiums, class-A office space, airports and large hospital complexes. But with the explosive growth and high demand for bandwidth, it is impossible for wireless services providers to provide DAS to all of the venues looking to improve their mobility infrastructures,



Communication Technology Services LLC

www.ctsllc.com

- *Headquarters: Marlboro, Mass.*
- *Employees: 400+*
- *Specialty: Mobility Infrastructure Solutions*

thus the responsibility is falling heavily onto the venue owners directly.

Why Install a DAS?

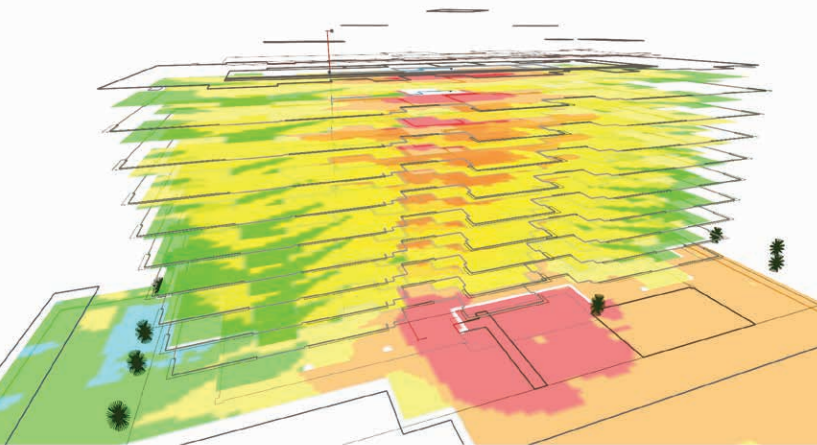
When contemplating the answer to this question, it is paramount to consider the implications of poor wireless service. Industry studies have estimated that half of meeting organizers would likely not return to a venue with inadequate wireless service. Likewise, more than 50 percent of office tenants have indicated the need to move to a new location if their voice calls were distorted or dropped on their cell phones. Almost 60 percent of hotel guests would choose a different hotel and even hotel brand after a bad experience with cell phone reliability in both the private and public areas of the hotel.

In addition to the potential loss of business resulting from buildings with insufficient wireless coverage, DAS improve the safety of the building's tenants through the better location determination for 911 calls and increased coverage and capacity to handle the volume of simultaneous calls that would take place in an emergency situation. Further, public safety officials rely heavily on wireless communication devices to communicate with both internal and external personnel.

Navigating the DAS World

You might be thinking you probably do need a DAS in your building and realizing that there is a lot to consider. 3G, LTE, small cells, wireless access points, how does this all fit together?

At this point, prudence suggests that you should use a well-established wireless service integrator and turn to CTS, one of the best in the industry. CTS has successfully installed DAS for the wireless service providers for more than a decade. Examples of CTS' work across the country can be found at venues such as the Staples Center, Las Vegas Motor Speedway, Kenan Memorial Stadium on the campus of University of North Carolina, Sunlife Stadium – home of the Miami Dolphins, the Rose Bowl, Chicago City Hall, Petco Park, Methodist Medical Center and Ronald Reagan Washington National Airport, along with hundreds of hotels, multi-tenant high-rises and university campus buildings. Through this experience, CTS understands the carriers' standards and requirements and their highly qualified professionals make all the difference in getting the carriers to support their designs. It is important to note that a DAS will only benefit the building if the service providers agree to retransmit their signals on it. The wireless service providers have final say as to whether the system can be used to connect to their networks, thus making an integrator's experience with the service providers all that more important. When a building owner



CTS uses state-of-the-art tools for designing, which offer 3-D imaging outputs.



CTS installed caged cable routing concealments for large venues.

chooses CTS, they know the carriers will approve the design.

“CTS has grown to hold the market position it has today through an unwavering commitment to superior customer service and the technical know-how it brings to each

to differentiate itself from the pack of wireless service integrators by weighing all factors of the project including OEM selection, cabling standards and carrier-grade acceptance process. Often the most appropriate solution is one that looks to the future offering a convergence of all wireless needs on a shared highway.

‘There’s a lot of loyalty in this company – you can’t really do anything without loyalty.’

project,” says John Tegan, CEO of CTS. CTS’ design and installation engineers are the top in their field and have the experience, expertise and foresight to propose a superior solution to today’s problem, as well as propose the infrastructure to accommodate changes to technology down the road. CTS has managed

Foundational Strength

Willingness to evolve and embrace change has been the core of CTS’ success from its very beginning. Founded in 1990 by the Tegan family, CTS started as a provider of voice, data and video infrastructure solutions. The company was successful performing work for local firms in and around the Boston area, but CTS’ big break came in the mid-1990s, when Sun Microsystems contracted the company to perform work on a new campus in Massachusetts. CTS’ high-quality work and customer service excellence made such an impression on Sun Microsystems that they selected CTS as a national supplier for the company as it continued to expand.

Throughout the 1990s, CTS continued to work with some of the leading technology firms in the country, including NorthPoint Communications Group, which at the time was a leading provider of DSL systems.

AT&T purchased NorthPoint’s assets in 2001, and the telecom giant became aware of CTS’ strong reputation. Although at the



» CTS Design Center operates 24/5 to turn out designs in record time.

time CTS was much smaller than many of its competitors, the strong dedication and passion of CTS' team made a strong impression on AT&T, resulting in a large multi-year national contract to install DSL and voice lines throughout the country. "Gaining a top service provider as a customer had a tremendous impact on CTS, allowing us to expand our footprint and become a truly national company," Tegan says.

CTS continues to make its mark across the country by building the information infrastructure to serve into the future. The increasing need for wireless service have made it necessary for enterprise customers to take matters into their own hands, rather than wait for the wireless service providers to enhance their networks. CTS is helping building owners navigate the complicated world of wireless technology thanks to the extensive expertise it has developed over more than 25 years serving the information technology sector. The company's strong general contracting and construction management approach has proven a significant advantage for enterprise customers.

The company strives to provide "white glove" customer service, which is a term not typically associated with the construction sector but is one of the major distinctions between CTS and its competitors. "CTS has been able to build relationships with customers lasting more than two decades because the company understands the customer is looking for a solution to their problems not just an answer to their RFP," says COO Tom McCloskey. "We understand the quality of our delivery is really what keeps us in business."

CTS' expertise, flexibility and dedication are just a small part of the company's DNA. "Our differentiator is we focus on hiring smart, aggressive people who are willing to evolve, willing to embrace change, and share our integrity and passion," Tegan explains. "There's a lot of loyalty in this company and you really can't do anything without loyalty." The loyalty and camaraderie within CTS helps to bind the various elements of the company together, and such diversity is another one of the company's strongest advantages. As CTS Vice President of National Wireless Services Shane Rubin puts it, "We're a service company – our product is people. Keeping our people happy, trained and motivated is paramount."

The Offering Plate

Beginning with an unparalleled structured cabling service set and serving as licensed general contractors in a number of states, CTS understands buildings. They know the requirements and design specifications can vary from one area to the next and can take on the challenges of customer projects from the ground up. Pulling



cable is not as simple as it may sound. There is a new influx of demand for fiber-based infrastructures. Testing and certification of these installations also has become much more demanding.

DSL and landlines were once state-of-the-art when it came to telecommunications, but today's information infrastructure is far more sophisticated. CTS adapted with the changing technology to offer customers the most advanced solutions available on the market. A DAS places several smaller antennas in strategic locations throughout a building or outdoor space to provide better coverage and energy efficiency, rather than needing to boost the power of a single antenna to overcome signal penetration issues and loss of signal strength over greater distances. The presence of multiple antennas gives a line-of-sight channel more frequently, which means signals fade and/or delay less frequently.

CTS' turnkey design and deployment of DAS and small cell solutions for in-building and outdoor applications has positioned them as one of the nation's leading experts. Capabilities include everything from site surveying and engineering through installation and testing to commissioning and optimization.

Enterprise customers in particular are making up a substantially larger portion of CTS' customer base. They are finding themselves now requiring in-building cellular coverage as their needs are far outweighing the capacity provided by cell towers. Many do not have a total understanding of the solutions or the requirements from the wireless service providers to retransmit their signals and are coming to CTS for help. CTS is responding with an educating and consulting approach.

Another industry problem is that the majority of the newer wireless infrastructure companies offering DAS integration services do not possess the experience and carrier understanding to design a solution that meets the carrier's requirements for participation.

Understanding and receiving approval from the carriers for an in-building solution takes the proper industry design and installation certifications, use of the approved DAS OEMs as well as an in-depth understanding of the carriers' requirements. "When a venue owner is contemplating the development of a DAS for their venue, they should check with their local carrier representatives to vet out the integrators vying for the work to ensure they receive the solution they require to service the venue properly," McCloskey says. With the combination of technical expertise and construction management know-how, CTS can get a full appraisal of a building's layout, design



» CTS installed cellular antennas and concealed cables at the Las Vegas Motor Speedway stadium bowl.





'There's nothing more important than gaining the trust of the customer.'

a system meeting the customer's needs and satisfy all of the carriers' requirements, while positioning the building to be able to grow their wireless communication infrastructure. Tegan says, "CTS' portfolio of experience far exceeds those of our competitors and CTS prides itself in protecting the venue owner's investment."

CTS has dedicated groups handling specific industry required specialties, such as its Design Center and National Engineering Group. The equipment-agnostic approach the company takes, along with its dedicated specialized groups allows the design and engineering professionals to focus on the correct system and dig as deeply into the newest available technology as possible. The benefits to the customer are CTS' expertise and experience will ensure their project is done right the first time. Rubin says, "The amount of design and engineering expertise within CTS is unique in the industry, especially in terms of the company's Design Center." CTS' design center has the capability to create a 3-D model of a DAS for a large stadium – typically the most difficult types of projects to model – in the span of only a few days when the industry standard is a few weeks. The Design Center even allows CTS to standardize the aesthetics of a DAS design in such a way the equipment can blend in better with its surroundings and be less intrusive.

Adding wireless local area networking (WLAN) services brought a new customer base to CTS' purview. As it does for DAS installations, CTS handles all aspects of a wireless LAN project, offering customers complete turnkey service, from the design of the system all the way through to the testing and certification stages. It's CTS' technical knowledge base that has given it the strength to take on new markets and new capabilities with little difficulty.

Most everyone these days knows there is a massive and accelerating demand for mobile access. It is estimated by the year 2020 the Internet of Things will add the equivalent of six devices per person. Just look around – almost everyone young and old is carrying a smartphone, tablet, wearable or similar wireless-capable device. All these devices are just additional strains on the WLAN. "Take a peek at the number of Wi-Fi capable devices connected to the WLAN in your home and you might be surprised at the numbers. I know that I was," shared Executive Director of WLAN Brian Casto.

Along with the increase in the number of devices is a growing demand for additional data capacity to support these mobile thirsty devices. The trend is moving upward for the number of connected mobile users, mobile connection speeds and the number of exa-

bytes consumed by the devices is astronomical. New technologies and application development is putting further strain on already overloaded networks. The demand for voice over Wi-Fi is taking off dramatically, too, meaning for many enterprises there are exploding bandwidth requirements and with a sinking refresh gap. Much of this demand is not actually for voice service, but data. Proper WLAN deployments can offload the data demands on the carrier networks and can deliver an even-better user experience.

Historically, WLAN deployments came with a three- to five-year life estimate. However, many customers have systems older than seven years. Standards are changing every one to three years now and legacy equipment is going end of life (EOL) much faster than has traditionally been the case. The current standard is 802.11 AC, and

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the second wave of AC is gaining popularity now. With proper planning and the right resources these challenges can be mitigated.

The CTS WLAN team has more than 150 years of combined experience and proudly works with the top OEMs in the industry using state-of-the-art tools to survey, design and certify wireless networks for all types of in-building and outdoor environments such as stadiums, campuses and even parking structures. CTS considers the customer's network needs whether for just data, video inclusion or even voice grade capacity. Special design considerations are even taken for facilities such as hospitals and stadiums where cabling and mounting limitations are typical.

CTS also counts security and public safety systems among the products it can provide customers. Primarily, there are two national

agencies with publications to serve as construction requirement guidelines regarding public safety and first responder efficiency and effectiveness within structures. Recently, both agencies have added suggested in-building communication requirements for the first responder radio systems. The focus of both being the continued, uninterrupted operation of the public safety communication radio's in buildings in which they are responding.

It is important to remember these are "guidelines" which have been developed for distribution, review, consideration and adoption by states and local municipalities or authorities having jurisdiction (AHJs). The AHJs' responsibility in each municipality can be different, with the building division participating in part of it, and possibly one or more of the first

responders in the network providing another layer of review and/or approvals. Understanding and navigating first responder requirements for in-building communications systems is essential

PCTEL PCTEL's Network Engineering Services provides design, testing, commissioning, optimization, and consulting services for cellular, Wi-Fi, and public safety networks. With advanced knowledge and industry leading tools, RFS engineering services can perform and deliver critical milestones on the path to maximize the effectiveness of a network's design and configuration. Specializing in intricate indoor and outdoor testing across multiple technologies, PCTEL has a proven success record delivering a wide range of engineering services that increase network performance and Quality of Experience. For more information, please visit rfsolutions.pctel.com or email services@pctel.com.

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to the successful, on-time completion of today's construction projects.

Providing the locally required public safety communication enhancement systems has become an important part of any new construction project and can require an extensive effort to correctly understand, plan, budget, schedule and deploy. Remodeling an existing building can similarly require these enhancements be retrofitted into the venue and the additional challenge in this scenario is understanding the elements of a proposed remodel which might trigger an upgrade. Knowing these triggers up front can potentially influence the level of remodeling which could then eliminate the need of the upgrade. CTS has installed security and public safety systems for a variety of customers across the country partnering with leading contractors.

In more recent years, small cells have been the topic of conversation for the smaller to more medium sized enterprise customers. The things that make small cell so unique are its small form factor, it runs on standard category and/or fiber optic cables, and that it's priced to fit these smaller spaces. A small cell is simply a self-contained mini base station. For these reasons, small cells are the most versatile coverage and capacity solution for small-to-medium businesses (SMB) and can be easily married with WLAN to provide a comprehensive solution for in-building wireless.

Additionally, CTS offers its full-service Maintenance & Monitoring (M&M) Program to every customer, which can be scaled to fit virtually every customer's needs and requirements. CTS' M&M program provides services including time and materials management, turn-key preventive maintenance, 24x7 monitoring, emergency dispatch and repair services, firmware upgrades, alarm trending analysis, periodic progress reports and other related services. Customers can choose a standardized M&M package or create a custom package based on their specific needs or the needs of their facility.

As the carriers provide less and less in-building DAS support the customers are becoming exclusively responsible. "Our M&M program



» Associates in the CTS 24/7 Network Operations Service Center maximize systems' uptime.

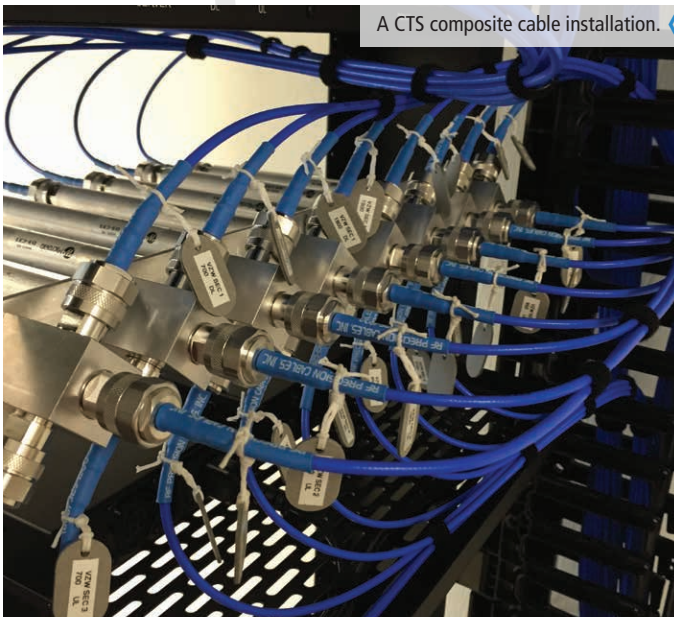


» One of CTS' customers is World Market Center in Las Vegas.



is seeing a large influx of customers who are needing systems support, monitoring and maintenance which they are not equipped to provide," shared Kely Davis, vice president RF engineering & post deployment services.

A CTS composite cable installation. <<



Assisting customers with inventory management for in-building sites in a given geographic region is just another service CTS can provide. Over time, systems can degrade, documentation becomes unavailable or out-of-date, hardware becomes obsolete, sites are decommissioned, personnel changes occur and the like, making things difficult for customers. CTS can help by storing these important documents, including; site surveys, system configuration audits, system "as-built" documentation and remote alarming recommendations all available through a web-accessible database. Combined with CTS' M&M, customers can get a comprehensive solution for managing all its in-building systems and requirements.

With many potential customers such as hospitals, real estate trusts owning high-rise commercial buildings and retail chains looking for guidance as they attempt to navigate the waters on their own, CTS recognized an opportunity to serve as a lighthouse for them, with the formation of its Consulting Services Group. Although this initiative is still relatively young, CTS already has been instrumental in helping numerous clients determine the exact type of system for their wireless needs. "Every consulting service is always going to start off with listening," shares Kern Davis, vice president of consulting services. Other challenges from a consulting standpoint are related to engineering, as no two buildings are exactly alike and CTS' designers and engineers have to negotiate all the architectural and structural idiosyncrasies of each building while consulting with



» CTS has hundreds of trucks on the road nationally to provide quick dispatch when customers call.

customers. In a perfect world one could say, “I need to put these antennas in these locations,” during the design phase, but in reality it’s usually not possible.

Providing the level of expertise CTS does through its consulting group has proven to be crucial for many of its customers due to the lack of experience most property owners have with wireless infrastructure. So far, the biggest challenge for CTS from the consulting side is when customers have come to consulting only after installing a system that turned out to be inadequate for their needs. One of the biggest obstacles for this new wave of enterprise customers is that wireless infrastructure represents an entirely new form of construction for them.

In today’s highly competitive world, building owners are required to offer their tenants the best available amenities, and data has become an increasingly important element for attracting and retaining tenants. No longer is it acceptable for a building to have a merely functional wireless infrastructure

because tenants expect the best. It is not unheard of for business, to rely entirely on cell phones, not wanting to deal with land lines. “We’re getting calls from [property owners] who have an AAA-rated tenant and they’re in an AAA-rated building, but the tenant is saying they won’t renew their lease unless they get can use their cell phones on the 40th floor,” Kern says.

In addition to educating its customers about the technology involved in wireless infrastructure, CTS finds itself frequently educating customers regarding budgeting and cost controls. Because so few building owners have budgeted for wireless infrastructure the same way they budget for other utilities and overhead costs, they are susceptible to contractors who offer a lowball price and substandard work, sometimes resulting in building-wide systems needing to be pulled out and replaced in order to fully satisfy the building’s needs. Working as consultants, CTS approaches each project looking for the wireless infrastructure solution offering the most efficiency, cost-effectiveness and future-conscious solution for each customer’s specific requirements. After presenting the suggested potential solutions, CTS can provide customers with a full construction management package, if the customer requires, to then serve as the eyes and ears of the property owner during the entire installation process. CTS will even facilitate the coordination of connecting all service providers on the site. Afterward, CTS can consult regarding the maintenance and monitoring packages the new system may require.



Customer can feel confident in CTS' recommendations for any solution because it doesn't have any exclusive agreements with equipment manufacturers. This allows CTS to design and install equipment from any manufacturer and means engineers and technicians are well-versed and fully certified in the product lines from all leading OEMs. "We've always been an OEM-agnostic group," Kern says. "We do not really favor any one piece of gear over another, but find the best piece for the project." CTS states its goal is to provide each system owner a customized solution offering a predictable cost of ownership and peace of mind, enabling the customer to focus on its core business matters.

Seeing Into the Future

In addition to the constantly changing technology and customers' rapidly evolving requirements, the nature of the business has undergone substantial changes, as CTS'

dealings with enterprise customers have clearly shown. According to Tegan, as CTS looks into the future it expects things to continue to change and evolve around the company, and although the company anticipates evolving with those changes as it has always done, the core elements of the company's success should remain the same.

CTS has an unparalleled ability to learn new technology as it enters the market and integrate it into its offerings and Tegan is confident CTS will continue to gain the trust of its customers into the future, no matter who those customers might be. In everything it does, CTS is able to deliver for its customers because of the experienced and highly qualified personnel working at every level of the company. "Our advantage is the expertise of the people who are in the company," Tegan shares.

The continued success of the company will be based in large part on the ongoing dedication its people have to providing the highest-quality service in the industry. By bringing customer service up a notch in this rapidly growing and changing market segment, CTS believes it will continue hold its edge in the industry by holding strong partnerships with the wireless service providers, equipment manufactures and building owners. "There's nothing more important than gaining the trust of the customer and delivering on that trust," McCloskey says. ♦



A CTS Radio Head installation. <<



>> A CTS Head End installation.