IBW
IN-BUILDING WIRELESS
ADVISORS

THE #1 TASK THAT CAN MAKE OR BREAK YOUR IN-BUILDING WIRELESS DEPLOYMENT

The Wireless Needs Assessment is the Vital First Step for a Successful DAS Deployment

You hear complaints from your tenants…. "the cell phone coverage in our office is poor, and it's beginning to impact our business." That is tough news when you are negotiating a lease to add or retain a tenant. Alternatively, you may operate a hotel, and your guests are posting online reviews that express frustration regarding their struggle to access the internet or make a cellular call. Occupancy rates begin to be impacted. And hopefully, you will not be a developer that faces a delay in receiving their certificate of occupancy because first responder radios will not work in your building.

A decision is then made to explore a solution to resolve the wireless coverage and capacity issues in your building. You soon make a shocking discovery. These solutions, commonly known as distributed antenna systems (DAS), are expensive, complicated and tough to install. The technology is complex and ever-changing.

The DAS procurement process can be daunting. Design considerations, vendor selection, carrier approvals, installation, and testing are common elements of implementing your in-building wireless solution. How can you be assured that what you buy today will be a cost effective, right-sized solution for your current and future needs?

The key to a successful deployment is linked to the completion of a thorough wireless needs assessment (WNA). The WNA is the vital first step in a procurement process that will help reduce the DAS investment, minimize potential deployment pitfalls and streamline the time needed to complete the installation.

For example, the WNA can mitigate the negative implications of over-building or under-building the DAS. The cost of over building a system can occur when you fail to seek input from internal stakeholders (typically the IT department) to uncover the possibility that your coverage solution can share existing or planned communication infrastructure. You may be able to avoid the expense of a very costly standalone DAS.

Conversely, under-building a system can add to an expensive retrofit if you have not evaluated future growth plans at the venue or have overlooked vital coverage areas. Some, but not all, equipment manufacturers offer system components that allow for the cost-effective expansion of the antenna system. Add labor costs into the equation, and it becomes clear that early planning and assessment activity can significantly reduce the cost of the project.

The wireless needs assessment is also a vital precursor to the development of a detailed construction specifications document. Provided to stakeholders, contractors, carriers and equipment manufacturers, this document, aka the scope of work, or"scope" provides procurement managers with a means to establish a consistent set of standards for evaluation of bids, post-installation testing, and acceptance of the system before final payment to the installation vendors.

An added benefit of the WNA is that it can reduce annoying and costly change orders. The WNA will proactively address potential construction issues that result in requests for additional funding. Use the wireless needs assessment process to create the framework for defining the parameters of the DAS design and installation.

ELEMENTS OF THE WIRELESS NEEDS ASSESSMENT

Understand the wireless communication requirements of your stakeholders

Your starting point is understanding the wireless communication requirements of your internal and external stakeholders. Perhaps it's your facility management team that depends on their smartphones for real-time connectivity to building automation systems. Identify the current and future applications utilized by the end user. What percent of their smartphone or laptop time is used to access applications requiring internet connectivity versus voice and text messaging? That inquiry will impact decisions related to the selection of the appropriate coverage and capacity solution.

Similarly, for many landlords, the primary need for coverage and capacity is driven by visitors or tenants in the building.

Since on-premises WiFi may typically allow access to the Internet, voice communications and texting will usually be the most used smartphone application. In those instances, a DAS that principally supports multiple carriers and voice and text messaging services may be required to meet their needs.

Other items to address:

- Estimate the number of smartphone/mobile laptop users in your facility and, where possible, poll those users to obtain an estimate of which wireless carriers they are using. Will the number of wireless users be changing in the future?
- Are you considering a bring your own device (BYOD) policy? If so, when will it be adopted? Potential funding of the DAS system by the wireless carriers is impacted by the certainty of revenue coming from commitments made by the enterprise. A BYOD policy challenges carrier revenue forecasts because individuals now control the selection of the carrier and the rate plan. BYOD policies also drive the demand for a DAS system that supports all the major carriers (AT&T, Verizon, T-Mobile, and Sprint). These multi-carrier systems have equipment characteristics that impact deployment and operating expenses.
- Voice Over IP or Wi-Fi calling may be an option for a workforce that is relatively immobile or that occupy smaller spaces but need voice communications between workgroups or customers.
- Your community may have adopted an ordinance that requires verification of first responder radio coverage in new and existing buildings. Penalties for non-compliance can include delay in issuance of a certificate of occupancy.

Where is wireless coverage and capacity needed?

An essential element of any network design will be identifying the required coverage and capacity at the venue. Prioritization of those areas will impact the type and placement of the DAS equipment. One means to reduce the cost of the project is to reduce the coverage area. Focusing on crucial coverage areas can help down-scope a plan to fit your budget.

Be sure to document any future plans to expand the coverage area or add additional buildings. A system proposed to meet current needs can be designed and built in a way that anticipates future expansion of the system. For example proactively anticipating the power, space, pathways, and cable needs to support a Phase Two expansion is a cost-effective strategy when developing the Phase One scope.

The cost of a system expansion can also be impacted by selecting equipment that scales to meet growing mobile connectivity requirements. Typically, vendors that utilize fiber as the backbone of their systems offer the most flexibility. However, there are hybrid systems that work very well, and new technologies are emerging that allow for highly flexible system expansion capabilities. The critical point is to look beyond your current coverage and capacity needs.

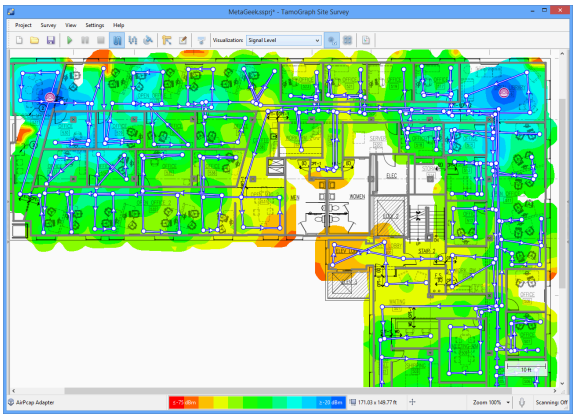
Know the IT and Wireless Infrastructure Initiatives at the Venue

It has been common practice for stand-alone DAS systems to be installed to support cell phone and public safety radio users. Concerns about radio frequency interference, space requirements and ownership of maintenance obligations contributed to this policy. Indoor turf wars existed between the IT department and telecom managers that kept LAN systems separate from DAS networks. These stand-alone , often parallel systems, add a separate layer of equipment and associated costs.

Modern indoor wireless system architectures are utilizing converged or unified network topologies. Lines are blurring that separate traditional LAN from networks supporting mobile wireless users. These systems allow for the aggregation of multiple services over a single network backbone. The advantages include reduced space requirements, energy and power efficiencies, less cable, scalability and the ability to transport various frequencies needed to support a variety of applications. The net result is a reduction of the total cost of deployment and operation of systems.

Collaboration between IT and telecom managers can yield significant benefits. When conducting the needs assessment be sure to inform those stakeholders of plans to enhance the indoor mobile radio network. Identify programs to expand the LAN network and understand the applications that those networks will support.

Conduct a benchmarking study that measures the indoor and exterior RF environment



The impetus for exploring options to improve coverage at your building is usually anecdotal comments/complaints from end users. That feedback often provides an inconsistent description of the coverage at the facility. A radio frequency benchmarking study provides quantifiable verification of the existing signal strength, the carriers impacted and where additional antennas may be needed.

The study is conducted by a radio frequency (RF) technician who uses a spectrum analysis tool to measure the signal strength and signal quality of the wireless carriers or first responder radio frequency in the venue. That data is recorded and mapped on building floor plans. The result is a propagation or signal strength map with detailed documentation of existing signal strength.

It is essential to understand that the coverage requirement for a public safety radio system can be entirely different from the coverage needs of a smartphone user. This impacts the areas that are to be benchmarked. For example, first responder radio coverage ordinances require coverage in stairwells. Review both high priority cellular and first responder radio coverage areas with the RF technician prior to starting the benchmarking study. Exterior RF measurements where antenna may be located will be part of the benchmarking scope. Also, the RF Technician should survey signal quality around the perimeter of the building. These outdoor or macro environment readings influence the indoor system design.

Indoor mobile wireless users are increasingly using their handsets, laptops, and applications to access the internet. Capacity limitations of in-building network systems that provide internet connectivity can impact the quality of service to the end user. A benchmarking study should also include a speed test that measures the uplink and downlink speeds between the wireless devices and the internet. The speed test data, along with information about the number of users in the building and applications, provide data needed to establish both

The benchmarking study provides you with the following benefits:

- The benchmarking study provides your system designer with empirical data necessary to design a DAS system that meets your coverage needs and expectations. Shortfalls in coverage at critical areas are confirmed , and in many cases, the landlord discovers that a coverage enhancement is not needed in certain areas. Guesswork is minimized about where system components are required, and the accuracy of estimates to build the project is improved.
- A wireless carrier or the Authority Having Jurisdiction (AHJ) overseeing public safety radio deployments may need to review existing coverage and approve the system design before starting the project. The diagnostic data provided by the benchmarking study is a crucial resource for the wireless carrier engineer or AHJ in evaluating the DAS design. In addition, the benchmarking study, combined with information regarding the number of wireless users in the venue, assists in establishing what signal source will be needed to support the system.
- The benchmarking study provides a baseline for evaluating the impact of the coverage solution upon completion of the project. After installation of the system, an RF Tech returns to the site to conduct a follow-up coverage test to verify system performance. The results of that test are compared to the data gathered at the pre-deployment benchmarking study. This before and after review is used to validate that the new system is meeting the expectations of the venue operator.

BUILDING A SUCCESSFUL IN-BUILDING WIRELESS NETWORK

A Wireless Needs Assessment is Step #1

Start with understanding the number of end users in the building and the applications they use. Investigate where, when and how your building occupants are using their mobile devices. Early engagement of your internal stakeholders will significantly influence a positive outcome. Benchmarking studies are the basis for verifying where coverage is needed and confirming that the new network meets the requirements of the project. Using the WNA process will help you deploy a cost-effective, right-sized solution that fits your current and future in-building wireless needs.

About the author:

IBW Advisors founder Mike Altman has 18 years of experience facilitating the turn-key deployment of cellular and public safety distributed antenna systems (DAS). The projects he has been involved with have provided enhanced in-building wireless coverage and capacity to venues ranging from executive residences to NFL and MLB stadiums, hospitals, corporate offices and college campuses. Mike created IBW Advisors to help building owners navigate the challenges associated with designing, procuring and implementing these systems.

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