



DISTRIBUTED ANTENNA SYSTEM GUIDE:

Everything You Need To Know About DAS

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Introduction

If you're struggling with stubbornly spotty cell phone coverage, limited two-way radio range and the resulting frustration, a distributed antenna system — or DAS — could be the solution you need.

A properly installed DAS can bring dead zones back to life for cell phones and two-way radios no matter how large the area or how densely populated the crowd that needs to be covered.

This eBook will help you learn more about what a distributed antenna system can do for your building, property or facility. It covers:

- How a distributed antenna system works
- DAS use cases
- Installation tips
- Next steps if a DAS sounds like the right solution for you

Section 1: How a DAS Works



POOR CONNECTIVITY is more common in reinforced areas such as tunnels, stairways or garages.

WHY POOR CONNECTIVITY HAPPENS

Cellular and public safety transmissions, as well as other types of wireless radio communications, originate from a fixed location that's outside of any building or facility experiencing poor coverage. If the origination point is nearby and the signal is strong, coverage will be passable, but not great.

If the point of origination is far and/or the signal is weak, cell coverage and radio range will be unreliable and inconsistent. Poor connectivity is more common in certain types of structures, including:


- Large, older buildings made of dense materials, including steel or concrete
- Reinforced areas such as tunnels, stairways or garages
- Oversized facilities with the capacity to hold large crowds, for instance, arenas or airports
- Secluded or rural areas surrounded by natural barriers such as hills
- Any combination of the above

HOW A DAS HELPS

A distributed antenna system works by picking up the wireless signals that come into buildings and delivering them to hard-to-access spots. The key to a successful DAS is to have a good donor signal into the amplifier that can be redistributed. A poor signal in will equal a poor signal out.

The core of the DAS is the “distributed antenna network,” a series of cabling that’s placed throughout a facility. The cabling has splitters that divert sections of the distributed antenna system to locations that are experiencing connectivity issues. Different kinds of cables can be used: RF Coaxial or Fiber Optic, the latter of which is lighter and can go greater distances.

One common term users may hear in relation to a DAS is bi-directional amplifier, or BDA. A BDA works by amplifying the existing signals to a level that will allow redistribution via the DAS.



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Section 2: Use Cases

An effective distributed antenna system can be designed for all types of situations. A typical DAS successfully boosts coverage in 85 to 90 percent of a building, and 100 percent coverage can be achieved, just at a greater cost.

Here are some sample use cases for three key sectors: **Public Safety, Healthcare and Facilities Management.**

PUBLIC SAFETY

Particularly in Illinois, more police and fire departments are disbanding their individual dispatch centers to consolidate into larger regional centers. Distributed antenna systems can ensure those centers provide the most comprehensive coverage possible for the first responders who rely on them.

In addition, public safety agencies are changing their radio systems and addressing coverage issues that they may not have prioritized in the past. Those changes and reprioritization can lead to an increased need for Distributed Antenna Systems, especially at existing dispatch centers or departments.

Non-public-safety spaces also have a huge impact on first responders, of course, and some municipal ordinances now mandate that developers ensure reliable radio communications in all new construction buildings in order to protect their safety. It isn't just existing older buildings that can present coverage challenges. Imagine a firefighter needing assistance in a burning building and not being able to communicate with the Command Post outside the building because of coverage and range issues.

Properly installed DISTRIBUTED ANTENNA SYSTEMS can keep the lines of communication open when first responders need them most.



HEALTHCARE

Doctors and other medical personnel are in constant communication for either emergency needs and/or consultations that require them to be instantly available. But many hospitals or healthcare facilities have locations within their structures that don't allow signals from cellular carriers to penetrate the building.

Distributed antenna systems bridge the gap by enhancing the ability for doctors and medical staff to communicate and share critical information that's needed for patient care.



DISTRIBUTED ANTENNA SYSTEMS allow doctors and medical staff to communicate and share critical information.

FACILITIES MANAGEMENT

Seamless smartphone coverage is now something that's expected in every area of our lives, from work to play to home. For facilities management professionals, that means keeping up with evolving demand, particularly when it comes to attracting – and keeping – tenants.

A DAS, by providing strong cell coverage and radio range, can set buildings apart from the competition in the commercial and residential real estate markets, particularly for large-scale office buildings and high-rises.

Section 3: Purchasing and Installing a DAS

DAS TYPES AND OPTIONS

As with most sophisticated wireless communications implementations, distributed antenna systems are tailored to meet the needs of the buildings they're in. The size and scope of the system and the type of DAS will depend on what kind of coverage is required.

There are three main types of DAS:

- **Active:** Fiber optic cable is used to distribute signal between a central source and nodes placed around a building. Active systems provide the most expansive coverage of the three (think Super Bowl-sized or larger venues).
- **Passive:** Components such as coaxial cable and splitters are used to distribute signal, as well as bi-directional amplifiers for rebroadcasting. The maximum coverage area is approximately 500,000 square feet.
- **Hybrid:** Some fiber is used for signal distribution, but passive coaxial cable is more heavily relied upon. Hybrid systems are a good choice for medium-sized coverage areas.

Some of the top-selling brands for distributed antenna systems in the United States are CommScope, Cobham, Corning and Bird Technologies. The largest growth in the DAS market is in spaces that are between 100,000 and 500,000 square feet, as most larger structures such as arenas and airports already have DAS solutions in place.

We all know that it's not always the case that the more you pay, the better the product. But it is the case with a DAS. The lower-cost options generally correspond to lower quality and shorter lifespan, resulting in larger costs in the long term due to early replacements and repairs.

INSTALLATION

In general, the larger the building, coverage area or crowds, the more complex the DAS installation. An Active DAS requires the most involved installation, but that doesn't mean a Passive system is necessarily easy.

Unlike other, smaller-scale solutions for connectivity issues, a DAS should be professionally installed by an experienced professional. Placement and design of the system matters, as does the proper maintenance and upkeep.

A properly installed DAS takes into account factors such as:

- The number of people served in a particular location and variations in their wireless usage patterns — for instance, meeting rooms vs. hallways
- The need for discretion in antenna design in places such as hotel lobbies and guest areas
- The potential for signal interference

An improperly installed DAS won't work correctly and won't provide the correct signal distribution throughout the building. Even worse, a bad design, installation or maintenance can lead a DAS to interfere with the corresponding signal it is trying to rebroadcast.



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Section 4: Next Steps

If a DAS sounds like a good fit for your property or situation, the best next step is to have a professional conduct an assessment and provide recommendations.

Same goes for an existing DAS that isn't quite performing the way that it used to – having an experienced set of eyes on your system will help pinpoint problem areas and possible remedies.

Systems will require ongoing maintenance and upkeep to continue keeping your voice conversations and data transmissions flowing, so find out if your retailer or installer also offers service for what they sell.



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Conclusion

Sturdy structures built to pass the test of time with flying colors are an incredible asset, but their impact on technology that didn't exist when they were developed can be a liability. And even newer construction buildings can present communications challenges if developers aren't thoughtful about coverage from the very beginning.

Fortunately, a distributed antenna system is an effective way to modernize older and densely populated buildings and facilities.

To find out if DAS is the right solution for you or to have an existing system examined, [contact Chicago Communications and request a free consultation with one of our DAS experts](#). We've been providing better cell phone coverage and reliable two-way radio range to clients across public safety, the private sector, education, healthcare, manufacturing and more.



Chicago Communications is your wireless communication integrator of voice and data solutions. Our products and services help the public contact first responders through our dispatched 911 and radio solutions. We improve operations and safety in businesses by getting information to those who need it when they need it. We expand your connectivity by enhancing cellular and WiFi coverage within buildings. By servicing what we sell, we extend the lifespan of your equipment purchases.