

# Cellular Enhancement

Boost your signal, connectivity, reliability and productivity  
in any environment.



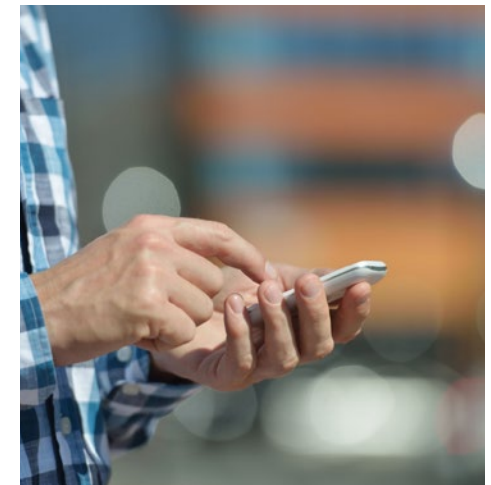
[piersonwireless.com](http://piersonwireless.com)

# What is a Distributed Antenna System?

Put simply, a distributed antenna system (DAS) is a wireless solution that provides reliable cellular communication within a defined space.

More specifically, a DAS is a network of spatially-separated antennas connected to a common signal source and distributed throughout a defined coverage area to support and enhance the transmission of public cellular network signals.

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# Why Deploy a DAS?



The preponderance of steel, concrete, and low-emissivity (Low-E) glass in construction creates many challenges for a reliable cellular signal in large venues or multiple-level buildings. The density of the materials, coupled with the square footage within the structure **make it difficult for outside cellular signals to penetrate and populate the entirety of the space**. Other factors that can negatively impact public cellular reception are altitude and a location's distance from cell towers. As carriers introduce 5G coverage, the frequencies that carry that service are higher, and even more likely to be obstructed by building materials.



These suboptimal wireless conditions create many issues for the occupants who not only count upon reliable, high-performing network coverage, but expect it. Wireless industry analysts state as much as **80% of all cellular network demand occurs inside buildings** and structures, and demand and data consumption will continue to increase exponentially as (1) carriers roll out 5G coverage and (2) innovators tap into the additional bandwidth and speed made available by the generational advancement in the network.



# Why Deploy a DAS?




For anyone (building owner, venue management, enterprise organization) facing these challenges, a distributed antenna system is the perfect solution to extend public cellular network coverage and connectivity into all areas of your property. **Eliminating dropped calls** and **increasing the speed and capacity** of the network experience will result in higher productivity and greater user satisfaction by those onsite. Pierson Wireless cellular enhancement solutions are **5G ready**, meaning your network users will experience faster speeds and ultra-low latency.



The distributed antenna system can also be leveraged to **improve public safety** in the event of an incident requiring the onsite presence of first responders or other safety officials. To learn more about how an Emergency Responder Radio Communication System (ERRCS) works and coordinates with a DAS, visit our Public Safety page:

[piersonwireless.com/public-safety-communication-systems/](https://piersonwireless.com/public-safety-communication-systems/)



# How Does a DAS Work?

Every DAS has two key elements – a **signal source** and a **distribution system**. There are three kinds of signal sources that receive cellular signals from mobile carriers, and they are (1) off-air antennas, (2) on-site base transceiver stations (BTS), and (3) small cells. Once the signal is secured from the carrier, it is distributed throughout the environment via different types of solutions, notably **active**, **passive**, **small cell**, or **picocell** distribution systems.

The choice of distribution system is driven by a number of factors:

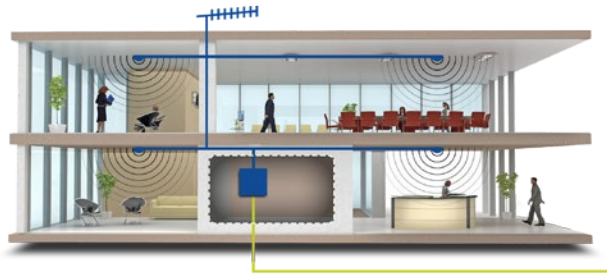
- How big is the coverage area?
- How many devices and users are expected to utilize the enhanced cellular network (commonly referred to as density)?
- What mobile carriers do you need (Verizon, T-Mobile, AT&T, US Cellular, Dish, regional carriers)?
- What is the performance goal of the enhanced network? Does the DAS need to solve for issues like capacity, frequently dropped calls, and/or speed and latency issues?

Pierson Wireless can guide you through an analysis of these factors to determine which distribution system best fits your use case.

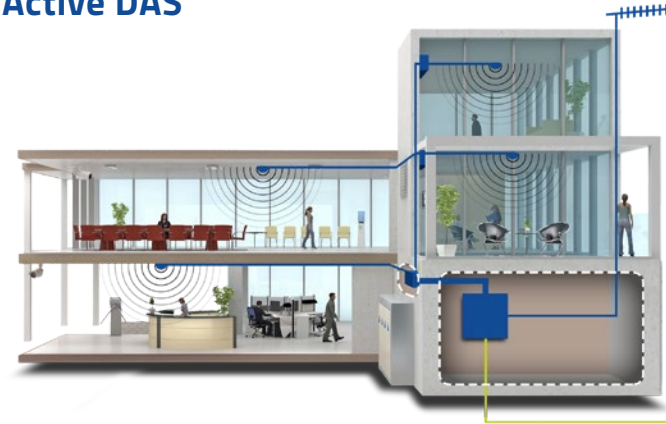
# Distribution System Options Explained

Solution Types

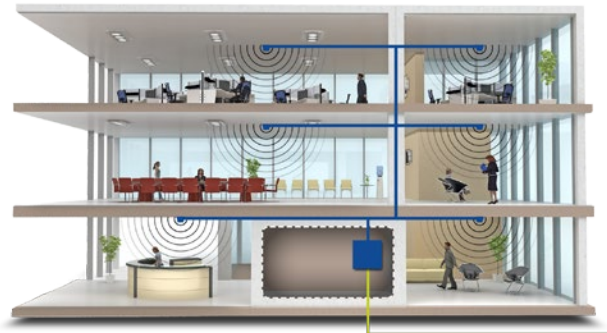
## Passive DAS



## Active DAS



## Distributed Small Cells

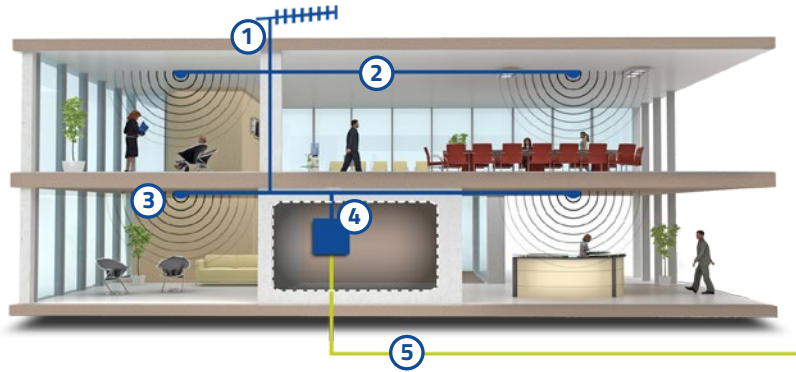


## Picocells



# Distribution System Options Explained

## Passive DAS



- ① Off Air Signal Source    ② Coax RF Cable
- ③ Antenna    ④ Repeater
- ⑤ Fiber-Fed Signal Source

Passive DAS utilize an antenna to collect cellular signal sources from outside the building, which are then amplified and redistributed throughout the building using a network of coaxial cables and antennas. As the solution's name implies, a "passive" DAS distributes these signals without the use of devices that require AC or DC power.

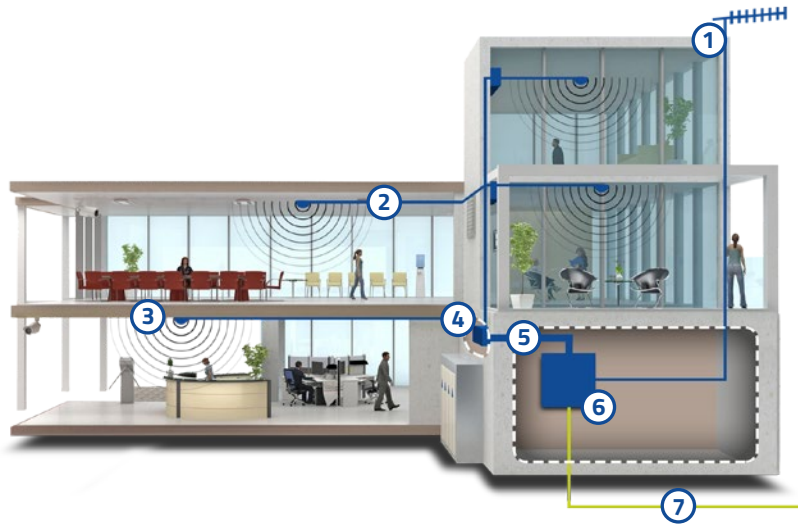
Most passive DAS utilize a bi-directional amplifier (BDA), small cell or base station transceiver (BTS) to supply the outside source signal to a distribution network of coaxial cable, power splitters, couplers, and antennas.

Passive DAS are carrier agnostic, supporting multiple carriers via one solution, ensuring users of various carriers an equal experience. They are ideal in small or medium applications (up to 100,000 square feet) with the appropriate signal source. Passive DAS are less expensive than active DAS solutions, can be installed in less time.



# Distribution System Options Explained

## Active DAS



- ① Off Air Signal Source    ② Coax RF Cable
- ③ Antenna    ④ Remote
- ⑤ Fiber or CAT6    ⑥ Head End
- ⑦ Fiber-Fed Signal Source

Active DAS are the go-to cellular enhancement solution for medium-to-large buildings (100,000+ square feet) with a high density of users tapping into the cellular network. Active DAS components require a power source to operate, and its use of fiber optic cables permits the highest-efficiency delivery of cellular signals through the building. If ubiquitous coverage and additional capacity are the top requirements, an active DAS is the choice.

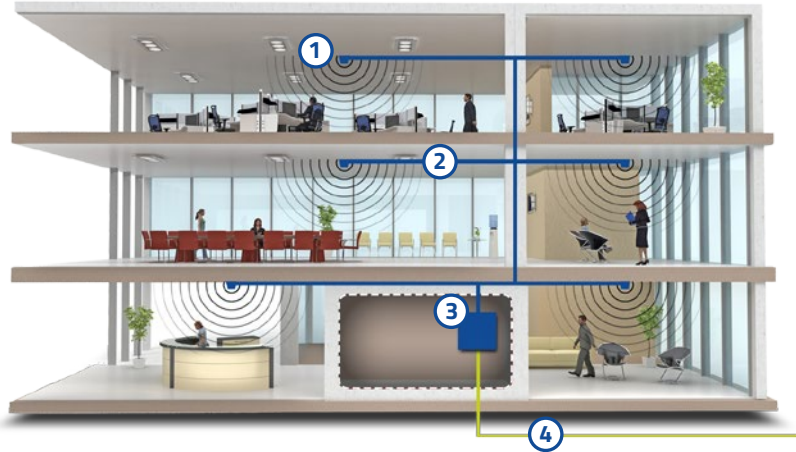
Active DAS receive analog radio frequencies (RF) from the carrier signal source, and then a master unit converts the signal from analog to digital. The digital signal is distributed throughout the property by fiber optic or ethernet cable to remote radio units (RRU), where the signal is converted back into an analog RF signal for use by mobile devices.

Active DAS solutions require coordination with carriers to facilitate integration into their network signals. Pierson Wireless has considerable experience facilitating carrier integration for active DAS solutions with the three national carriers and all regional network operators.



# Distribution System Options Explained

## Distributed Small Cells



① **Antenna with Radio Module**

② **Fiber / Ethernet Wire**

③ **Head End**

④ **Fiber-Fed Signal Source**

Distributed Small Cells (or Distributed Radio Systems) are low-powered nodes that enhance the cellular signal within smaller footprints and can be scaled into a coordinated network that provides blanket coverage and increased cellular performance for small, medium, and large venue applications.

Distributed small cells deliver signals using components that integrate the radio unit and antenna into one node. Each integrated unit uses self-optimizing network (SON) algorithms to optimize coverage, capacity, and performance, and is connected by ethernet or fiber optic cabling to a master unit leading directly to a carrier's signal source and network.

# Distribution System Options Explained

## Picocells



Picocells are standalone units that connect to the carrier network via a broadband internet connection. Multiple units can be deployed within the same building, however, each unit is deployed independently. Each unit is limited to serving only one carrier. Picocells are suitable for small applications.

### 1 Antenna with Radio Module

# Notable Industries for Cellular Enhancement



Commercial Real Estate



Education



Healthcare



Hospitality



Logistics (Warehouses, Ports)



Manufacturing



Retail



Sports & Entertainment

To read more on each industry, please visit: [piersonwireless.com/cellular-enhancement/](https://piersonwireless.com/cellular-enhancement/)





# Monitoring & Maintenance

Your organization depends on the performance and reliability of your cellular enhancement solution to provide reliable connectivity and performance for system users. Pierson Wireless offers a variety of programs that provide 24/7/365 peace of mind and confidence your distributed antenna system is operating optimally.

Through our programs, Pierson Wireless technicians proactively identify issues and outline solutions BEFORE your critical functions are interrupted. Active monitoring solutions result in reduced expenses related to service visits, improved system performance, and reliable communications during an emergency situation.

Pierson Wireless' programs assign highly-skilled technicians to quickly and efficiently resolve issues with your system.



# THANK YOU!

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