The Challenge

Indoors and Outdoors

Wireless service and neutral host providers are faced with deploying and operating indoor and outdoor DAS networks to enhance their end-user’s experience by providing better coverage and higher bandwidth – all while maintaining the reliability and up time expected from a conventional macro cell site.

### CHALLENGES

<table>
<thead>
<tr>
<th>Deployment speed slowed by:</th>
<th>Operation and maintenance costs impacted by:</th>
<th>Equipment integrity impacted by:</th>
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<tbody>
<tr>
<td>• Critical infrastructure not in place</td>
<td>• Improper solution dimensioning</td>
<td>• Harsh environment</td>
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<td>• Availability of design and installation experts</td>
<td>• Lack of site visibility post-installation</td>
<td>• Vandalism</td>
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<td>• Calendar-based maintenance dispatch</td>
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### CONSEQUENCES

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<td>• Scheduling setbacks</td>
<td>• Reduced profitability</td>
<td>• Environmental ingress</td>
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<td>• Lost revenue</td>
<td>• Increased downtime</td>
<td>• Loss of equipment</td>
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### OPPORTUNITIES

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<td>Standardizing on a single-source provider capable of providing AC and DC power systems, rugged enclosures, as well as design and installation services will speed up deployment and provide an easy migration path for future sites</td>
<td>Leverage cost-effective AC and DC power systems with growth capacity to achieve maximum ROI, even as operating conditions change</td>
<td>Ensure electronics are protected by selecting a quality line of enclosures with proven thermal systems that withstand the environment and keep out vandals</td>
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As society grows to expect smarter functions, more interactive features and ever-present coverage from their mobile devices, networks are becoming more complex.
DISTRIBUTED ANTENNA SYSTEMS (DAS) SOLUTIONS

We understand your operating challenges
Vertiv™ has the technology and expertise to meet and overcome operating challenges like these.

High-End Infrastructure Solutions
The head-end is the ‘heart’ of the Distributed Antenna System. At this point, the radio interfaces with the host unit and is distributed throughout the entire antenna system. In order to assure the entire network is functioning properly with zero down time, the head-end must operate with the highest integrity.

NetSure™ DC Power Systems
Increase Reliability, Minimize Operating Cost and Reduce Energy Consumption
NetSure DC power systems deliver the highest reliability and efficiencies on the market, reducing energy usage, carbon emissions and ultimately total cost of ownership.

NetSure™ 7100 Series
The versatile NetSure 7100 DC power system offers single or three-phase input up to 277/480 VAC and is now available as an indoor enclosure in the row. Designed for 3500 watt or 2000 watt rectifiers and 1500 watt DC to DC converters this modular design provides up to 4000 amps of current at -48 volts. The basic components of the power system include an intelligent NetSure Control Unit (NCU), a module mounting shelf assemblies which house the rectifiers and converters, and a modular distribution cabinet.

NetSure™ 5100 Series
The NetSure 5100 Series, a compact -48 volt DC power solution, features an intelligent NCU controller, a high efficiency rectifier, converter, solar converter and multiple distribution options to meet a variety of application demands. The system is available with integrated and external distribution panels and is ideal for network edge applications requiring reliable, high power density.

High-efficiency eSure Rectifiers
Reduce OpEx and CO₂ Emissions
Designed to offer superior performance and uncompromised reliability, eSure rectifiers offer the highest density form factor in the DC power industry. In addition to saving space, they are designed to operate extremely efficiently over a wide input voltage range in the most demanding environments.

AC & DC power systems installed by ‘general contractors’ are not configured for optimal performance
Existing DAS network doesn’t scale to support upgraded radios with faster throughput rates
Lack of post-sale engagement by equipment vendor leads to unplanned downtime and costs
Environmental challenges create undesirable operating conditions
Head-end resides in a public area increasing the need for remote security and operational monitoring
Improperly sized power system leads to downtime or wasted capacity

Enclosures & Shelters
Vertiv XTE 800 Enclosures
Rapid Deployment
The walk-in Vertiv XTE 800 Series is ideal for rapid deployment at the network edge. This enclosure solution provides an optimal environment for your head-end equipment that keeps you on schedule and on budget. Choose from a variety of sizes and finishes to meet any deployment scenario.

Vertiv XTE 600 Enclosures
Withstand Harsh Environments
The Vertiv XTE 600 Series utilizes a proven structural system, integrated mechanical components, and a sealing system that withstands rain, dust, snow and hurricane winds. When combined with a NetSure power system, they are a perfect power hub solution for multiple remote DAS units.

Vertiv XTE 400 Enclosures
Economical Solution
The Vertiv XTE 400 Series economically houses a wide variety of access electronics. These enclosures offer numerous options and are ideal for inconspicuous deployment of DAS remote units and power solutions.

Indoor Racks and Enclosures
Enhance Security
Vertiv makes world-class indoor racks/cabinets and accessories ideal for housing DAS infrastructure equipment securely in an un-secured environment. Optional thermal systems are also available for poorly ventilated locations.
With Vertiv™, you can achieve greater operational efficiency and rapid deployment while increasing your network’s reliability.

**Remote Units**

Remote units in the DAS network can be deployed in extremely different conditions, from an environmentally controlled office building with limited security concerns, to a light or telephone pole in a dense urban setting where environmental control and security are paramount. Regardless of the situation, reliable infrastructure solutions are required to assure worry-free operation.

**Small Systems Designed to Power the Remote Units of Your Critical DAS Infrastructure**

- **NetSure™ 211 DC Power Systems**
  - *Speed Deployment*
  
  The NetSure 211 offers an efficient solution for powering remote units. This compact -48V system combines reliable rectifiers with an advanced Ethernet-accessible controller. Centralized control, flexible distribution and high power density are all available in this small package.

- **Liebert® GXT4 UPS**
  - *High Reliability*
  
  If your DAS remotes require uninterruptible AC power, the Liebert GXT4 true on-line uninterruptible power system (UPS) is a reliable solution, combining low cost of ownership with rich functionality, small size and high capacity. The UPS offers internal batteries, optional external batteries, and internal bypass capability, resulting in continuous uptime for the connected equipment.

- **NetSure 5100 DC Power Systems**
  - *Enable Centralized Control*
  
  If powering many remote units from a central location is desired, the NetSure 5100 functions well as a power hub for multiple DAS remote units. When coupled with a remote DC distribution panel, the system provides overcurrent protection for multiple small loads. Panels accept either fuses from 1A to 20A or load breakers up to 150A.

**Design, Deployment and Optimization Services**

From project launch to ongoing maintenance and performance optimization, Vertiv strives to keep your network infrastructure highly available, efficient and adaptable.

**PROJECT**

When launching new facilities or powering up new equipment, you want to do it right – right from the start

- Plan
- Design
- Engineer
- Integrate
- Commission
- Project management

**MAINTENANCE**

Services to ensure that your business-critical infrastructure operates reliably, safely and efficiently

- Preventive and corrective maintenance
- Remote services and monitoring
- Cap / fan / battery replacements
- Repair
- Spare parts

**PERFORMANCE**

Full range of services designed to optimize infrastructure performance and reduce complexity

- Assess
- Audit
- Model
- Configure
- Upgrade
- Train
Vertiv™ DAS Capabilities

- High quality AC and DC power systems with proven low failure rates
- High-efficiency rectifiers to minimize operational costs
- Variety of power systems to support all head-end/host unit and remote unit
- Flexible, secure, environmentally controlled enclosures protect your investment
- Speeds network deployment through single point of contact coordination of head-end infrastructure engineering and installation
- Maintenance solutions to keep your infrastructure operating at peak efficiency
- Vertiv is a proven infrastructure solutions provider with vast experience in a wide variety of telecommunications environments

As expectations for constant wireless network availability regardless of location continues to grow, the demand for DAS will follow accordingly. Both coverage and capacity requirements need to be addressed; both rely heavily on the dependability of their AC and DC power and enclosure infrastructure. Rest assured, Vertiv has your needs covered. We deliver proven AC and DC power and enclosure expertise and a vast understanding of existing network infrastructure design.

Nationwide, Vertiv has a team of network infrastructure experts standing by to help you rapidly deploy a flexible, yet affordable DAS solution.