The Intersection of Consumer Demands & Wireless Technology:

A Roadmap to the Lifecycle of a DAS Project

Presented By:
Calendar of Events

Part I:

DAS Basics
April 21st

DAS Basics
April 21, 2015

Maintaining
Roundtable Discussion
November 17th

Partner Selection
Qualifications
May 19th

DAS Deployment
Install & Activation
October 20th

Needs Analysis
Site Survey
June 23rd

Product Selection
September 22nd

System Design
July 21st

COMMSCOPE
Ron Plecas
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Ron has been engaged in the in-building wireless marketplace for 14 years. His knowledge and expertise stem from working for carriers, integrators and manufacturers. Ron’s current position within CommScope has allowed him to wear several hats. His roles have included business development, technical support for wireless carriers, and channel management for in-building wireless partners.
Today’s Agenda

• Definition of Terms
• What is a DAS?
• Carrier Interface
• Components
• Considerations
Common DAS Terms

• IBW: In-building Wireless
• WSP: Wireless Service Provider (Carrier)
• HetNet: Heterogeneous Network
• DAS: Distributed Antenna System
  ▪ Cellular Enhancement
  ▪ Radio Frequency Repeater System
  ▪ Neutral Host: Multi Carrier
• Technology: 2G, 3G, 4G/LTE, 5G
• RF Signal Sources
  ▪ Booster
    ➢ Cellular Repeater
    ➢ BDA (Bi-Directional Amplifier)
  ▪ BTS = Base Transceiver Station
  ▪ Small Cell
What is a DAS System?

A System that takes a Donor signal or a local Wireless Service Provider (WSP) Base Station signal and re-broadcasts it within the interior of the building while:

- Enhances the signal to ensure it is dominant compared to the outdoor signal's
- Hand-off a call (both ways) transparently to the Outdoor / Macro network
- Non impacting to the WSP’s network

**IBW SYSTEM**

The subsystem
- Receives the Radio Frequency (RF) signals
- Consolidates all RF
- Transports them down a common infrastructure

**DAS Applications**
- Public Safety
- Land Mobile Radios
- Commercial (cell phones, tablets, etc.)

**Signal Source Options:**
- Dedicated Cell Site
- Off-Air Repeater
DAS Building Blocks

• Wireless Carrier Interface
  – Bring in wireless signal

• Distribution System
  – Distribute Wireless Signal
Wireless Carrier Interface

Roof/Building mounted CellMax Donor Antenna:
Capture RF signal from WSP Tower
Wireless Carrier Interface

Option 1: Repeater/Bi-Directional Amplifier

PURPOSE:
- Bring in wireless signal(s) from outside wireless network
- Feed distributed antenna system (DAS) with wireless signals to improve indoor wireless services
- Each Wireless Service Provider requires a dedicated Repeater
Wireless Carrier Interface

Option 2: Cellular Base Station

**Base Station**- Instead of using the nearby cell tower as a signal source, the wireless carriers may provide a base station on premise, which generates the RF signals. The base station is connected via T-1 lines back to the carriers MSO.
Who Decides?

Option 1
Repeater

Option 2
Base Station

Selection Criteria:

• Number of wireless subscribers
  • Can the outside macro-network support this additional traffic?
    • If Yes, then Option 1 is choice
    • If No, Option 2 is choice
Wireless Carrier Interface

Client Considerations

Option 1
Repeater

- Ambiance – Antennas on the roof
- Roof penetrations for cabling
- Available outside signal from each WSP

Option 2
Base Station

- Space available
Distribution System

**Fiber Head-End** converts the RF signal to Radio-over-fiber (RoF), which is then transmitted down single-mode fiber-optic cable to the fiber remote unit.
Antenna System

**Single-Mode or Multi-Mode Fiber** carries the converted RF signal to the fiber remote unit.
Distributed Antenna System

**Remote Units** convert the RFoF transmission (Public Safety, Cellular, PCS, AWS and SMR) back to an RF signal.
Antenna System

**HELIAX** ½” 50 Ohm cables carry the RF signal from the remote to the coverage antenna

**CAT 6A cable** carries the RF signal from the remote to the coverage antenna
Antenna Selection

- CELLMAX-D-CPUSE Directional
- CELLMAX-O-CPUSE Omni directional
Active Distributed Antenna System
w/Optional Signal Sources
DAS Considerations

• Different that Wi-Fi which is unlicensed frequencies.
• The Wireless Service Providers own these frequencies—licensed.
• Use of these frequencies are...
  – Regulated by the FCC
  – Requires formal (explicit) approvals for use
• Failure to follow these “rules of engagement” may result in...
  – Possible legal action
  – System being turned off by the Wireless Carrier
  – It does not matter who PAYS for the DAS

For more Information regarding FCC Regulations:
The System Design for the DAS must be approved by the Wireless Service Provider based upon their specific design requirements regarding:

- Defined Frequencies both present and future
- Approved Products
- Required Signal Strength (bars on phone) and quality of signal within the building to insure a positive caller experience
- Dedicated RF Source
- Acceptance Package For Approval
  - Must be done in approved SW – iBwave
  - Design layout of components and cable paths on top of floor plans
  - Link Budget showing loss from RF Input throughout the system
  - Propagation Analysis of signal strength within the complex
Summary

- There are different options when deploying a DAS solution:
  - Passive vs. Active
- There are two components to a DAS Deployment:
  - Carrier Interface (Bringing Signal In)
  - Distribution of the signal
- The Wireless Service Providers are stakeholders in the process regardless of who is paying for the solution.
- Licensed Frequencies require specific requirements for deployment.
- Who is responsible for the deployment of a DAS?
Our Next Session

How to Select a Trusted DAS Partner:
CommScope VAR Qualifications & Key Attributes of a Valued DAS Partner

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More Information:
http://www.das-cell.com
http://www.commscope.com/Solutions/Wireless-Solutions/
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