The Intersection of Consumer Demands & Wireless Technology:

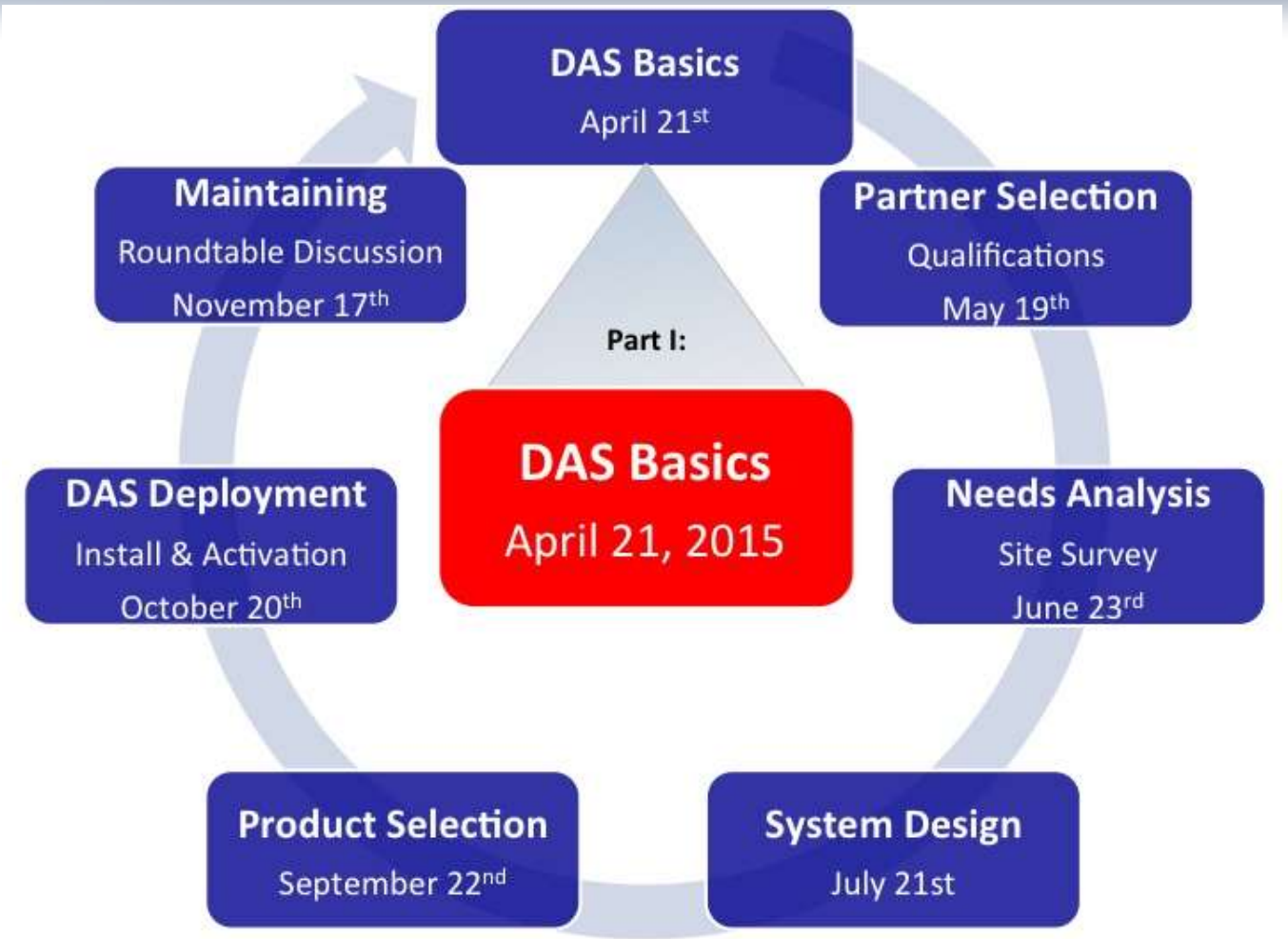
A Roadmap to the Lifecycle of a DAS Project

Presented By:

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Calendar of Events



VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Introduction to your Presenter

Ron Plecas
Manager, IBW Channel Sales, CommScope

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.

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Today's Agenda

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

VISION TECHNOLOGIES
Making Vision Reality

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:

IBW SYSTEM

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.)

IBW SYSTEM

Signal Source Options:

Dedicated Cell Site

Off-Air Repeater

VISION TECHNOLOGIES
Making Vision Reality

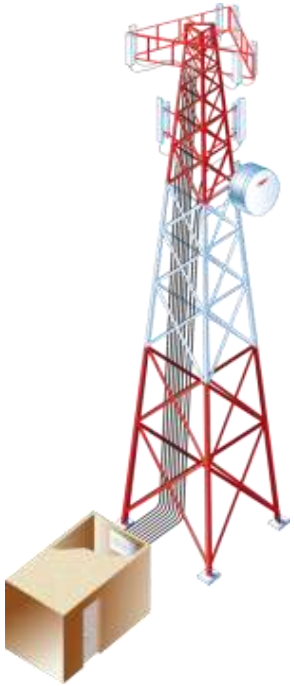
COMMSCOPE®

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



VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

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

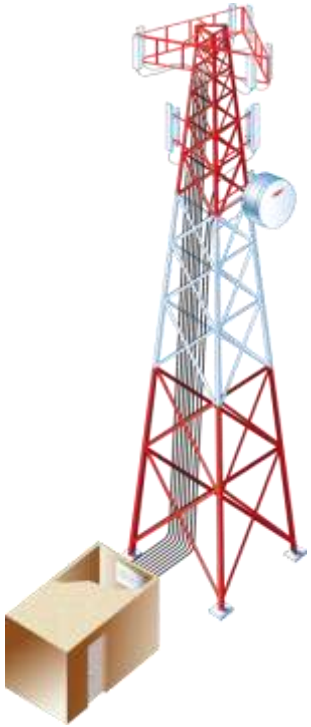
VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

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.



VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Wireless Carrier Interface

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

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

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

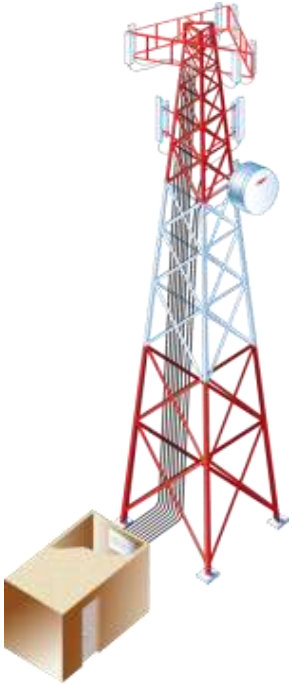
- Space available

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Distribution System

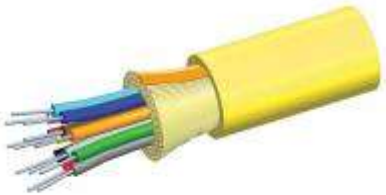
Fiber Head-End- converts the RF signal to Radio-over-fiber (RoF), which is then transmitted down single-mode fiber-optic cable to the fiber remote unit



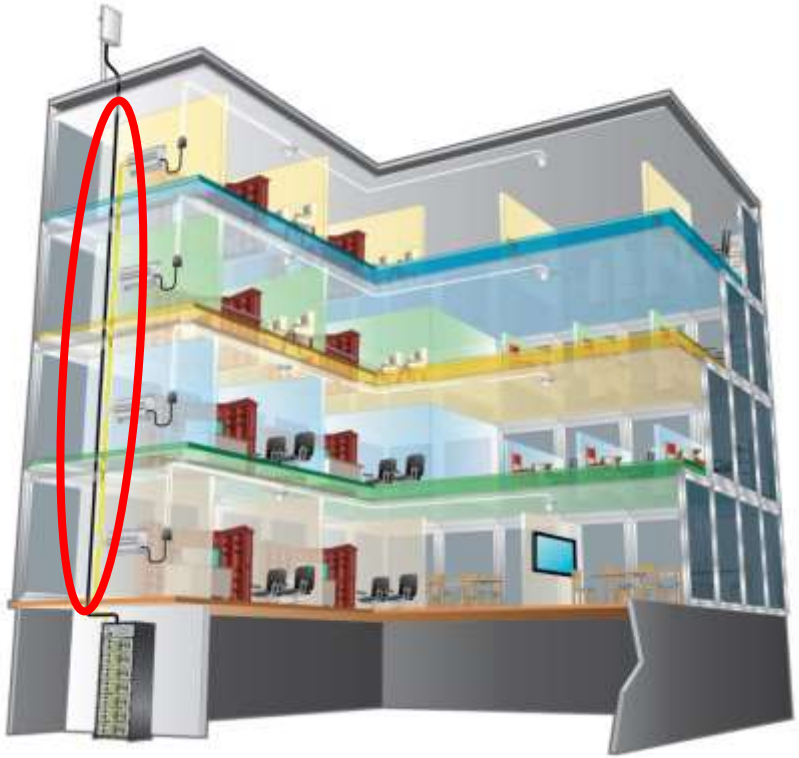
VISION TECHNOLOGIES
Making Vision Reality

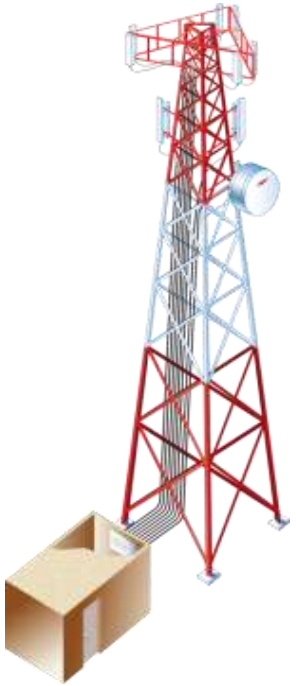
COMMSCOPE®

Antenna System



Single-Mode or Multi-Mode Fiber- carries the converted RF signal to the fiber remote unit





VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Distributed Antenna System

Remote Units- converts the RFoF transmission (Public Safety, Cellular, PCS, AWS and SMR) back to an RF signal

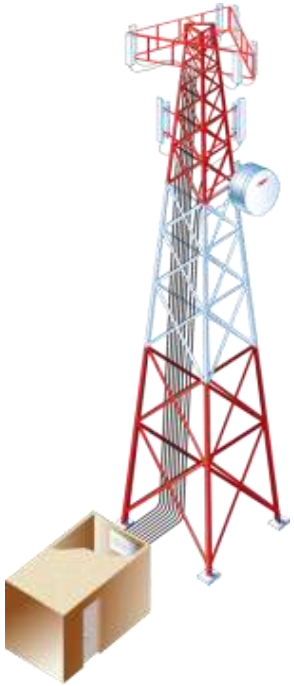
VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

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



VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Antenna Selection

CELLMAX-D-CPUSE
Directional

CELLMAX-O-CPUSE
Omni directional

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®


Head End Equipment
Off-Air Signal Source
Fiber Optic Backbone
Remote Unit
Horizontal Cabling
Interior Antennas
Micro/Pico Cell
To/From Carrier(s)
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 :http://wireless.fcc.gov/signal-boosters/industrial-boosters/index.html

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

DAS Considerations

- 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

May 19, 2015

More Information:

http://www.das-cell.com

http://www.commscope.com/Solutions/Wireless-Solutions/

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®

Contact Information

Ron Plecas

ronald.plecas@commscope.com

Manager, IBW Channel Sales

CommScope

Rick Baldasarre

rbaldasarre@visiontech.biz

Sr. Mobility Solutions Architect

Vision Technologies

VISION TECHNOLOGIES
Making Vision Reality

COMMSCOPE®