



Lenn Marella / Ron Rapp

FEFPA DAS Presentation

An Introduction to Public Safety
Distributed Antenna Systems

FEFPA DAS Presentation

2021 FEFPA Summer Conference

Your presenters today are

Ron Rapp and Lenn Marella.



DAS Presentation Agenda

- I. What is DAS?
- II. Why is DAS Required/Needed?
- III. What is Radio Frequency (RF)?
 - A. RF in the Electromagnetic Spectrum
 - B. What affects RF?
- IV. Types of DAS Systems
 - A. Classifications
 - B. Passive
 - C. Active
- V. DAS Process
- VI. DAS Potential



What is DAS?

- Distributed Antenna System (DAS) - A solution that distributes RF signals throughout a building, or other defined area. It can be used to distribute cellular, public safety or other RF signals. RF sources can either be from the outdoor network (for coverage) or directly from base station radios (for both coverage and capacity).
- DAS systems include terms and acronyms like BDA, ERRCS, In Building Repeater System, Enhanced First Responder Radio System, etc.



Types of DAS

- Three kinds of DAS: Carrier (cellular), Public Safety and Private Radio
- A Public Safety DAS is focused on distributing First Responder radio signals throughout a building or structure.
- Private Radio DAS is focused on distributing a facilities radio system throughout a building or structure.
- **DAS systems are NOT electrical systems! They are radio frequency systems and do NOT carry any amount of voltage or amps.**



Why is DAS required?

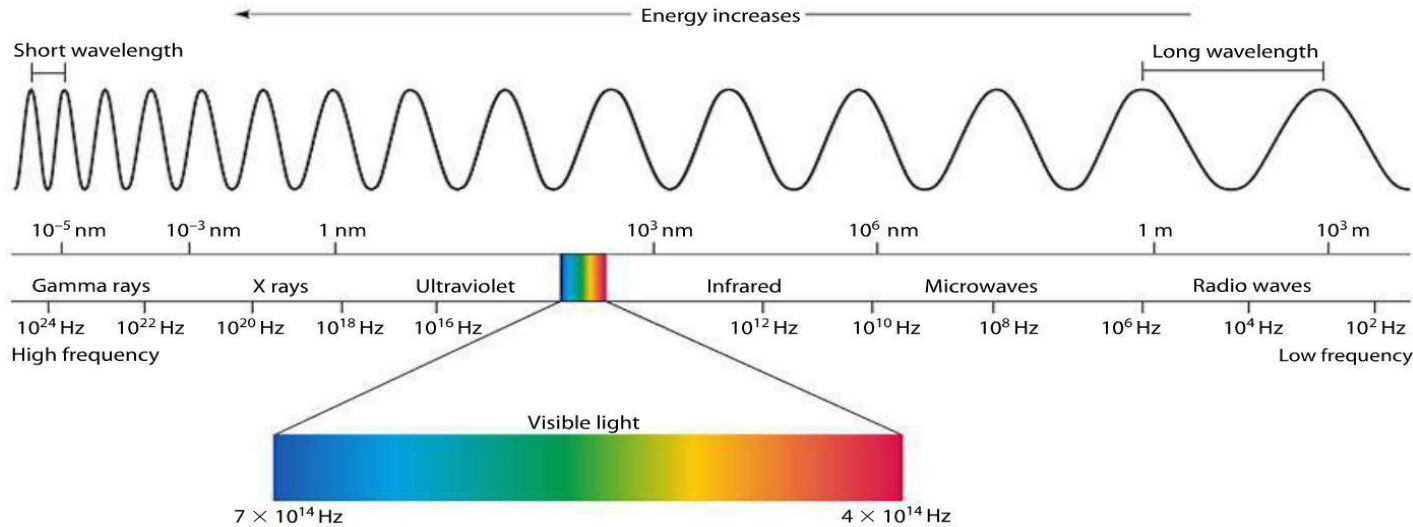
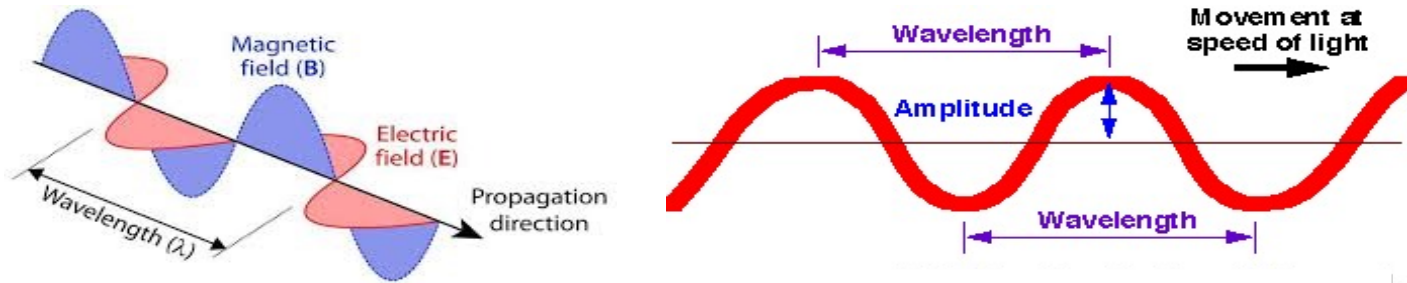
2001 – With the advent of the 9/11 attacks Public Safety becomes a priority to everyone in the World.

2009 – 1st Public Safety Codes are released to the US – NFPA and World - IFC

- Code Committee Created “Public Safety Codes”
- Codes were turned into City Ordinances
- Ordinances are enforced by Fire Chiefs, Fire Marshals.
- ***Now Mandatory in most municipalities and counties in Florida and around the country.***

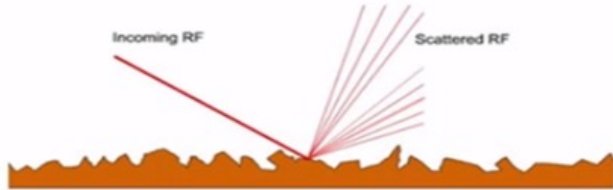


What is Radio Frequency (RF)?

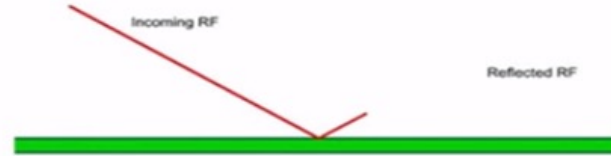


What affects RF?

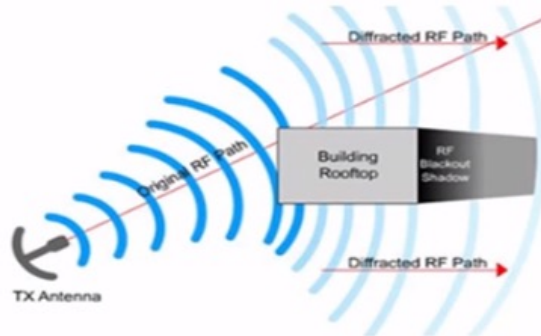
Scattering



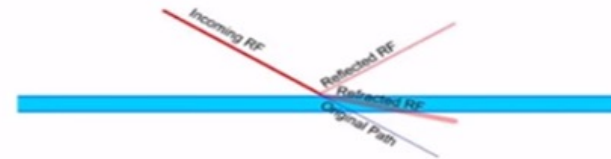
Reflection



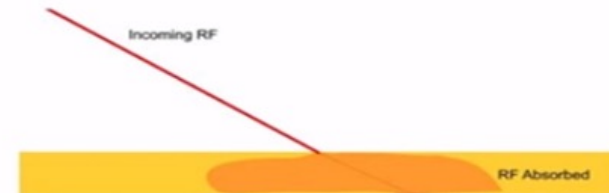
Diffraction



Refraction



Absorption



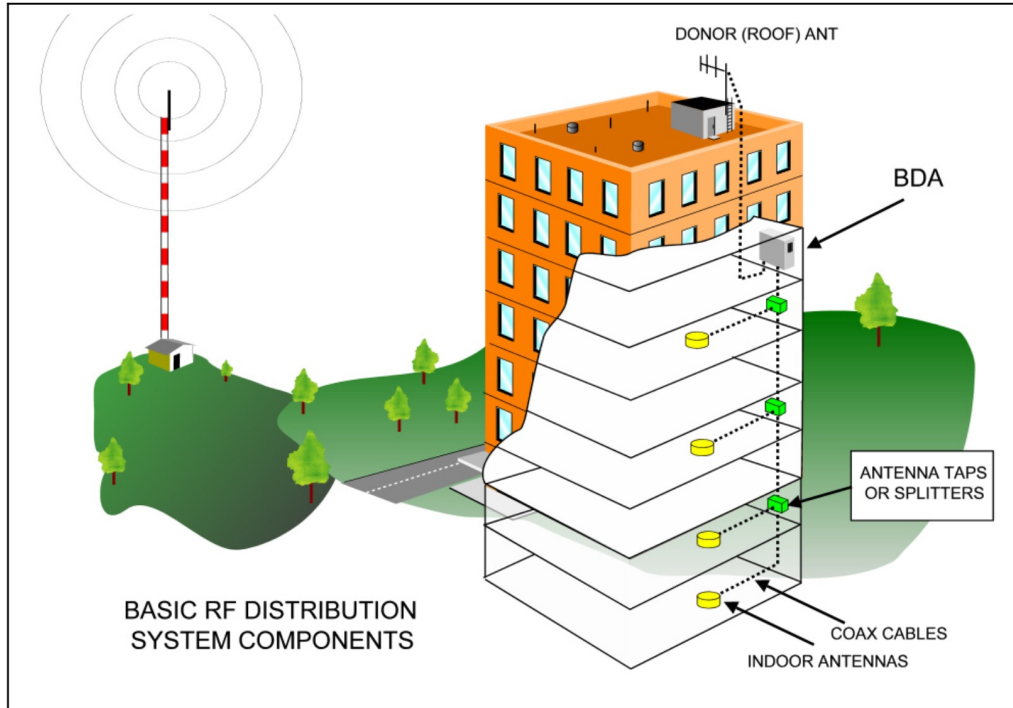
DAS System Classifications

- Passive: Bi-Directional Amplifier (BDA) connected to a passive network of coax and splitters.
- Active: Solution that uses optical fiber to transfer RF signals between a head-end (RF signal sources) and remote units located throughout a facility or group of buildings.



Passive DAS System

- Donor antenna
- Lightning protector
- Coax from donor antenna to BDA
- BDA/Repeater
- More coax
- Splitters, couplers, tappers
- Indoor antennas

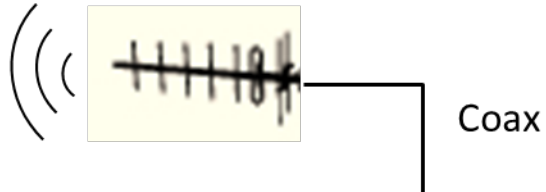


Passive DAS Configuration

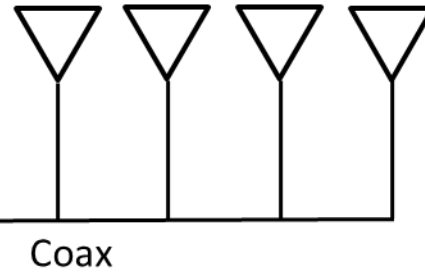
Public Safety
Radio Network



Outdoor Donor Antenna



Indoor DAS Antennas



DAS System Configurations



Passive System: BDA (Bi-Directional Amplifier) connected to a passive network of coax and splitters.

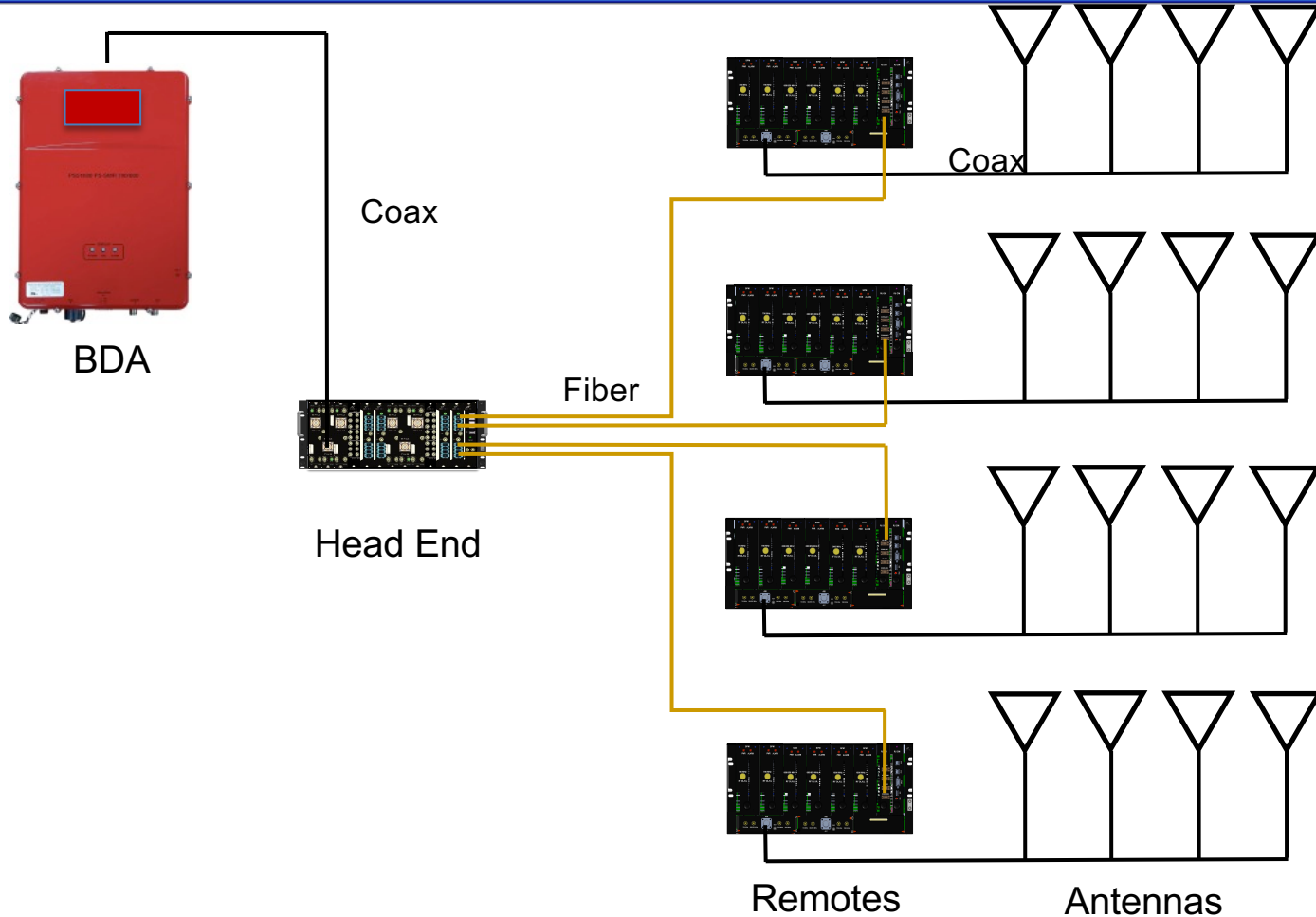


Active DAS System

- Donor Antenna
- BDA
- Master Unit / Head End
- Optical Distribution Unit
- RF to Optical Conversion
- Optical Fiber
- Remote Unit / Field Unit
- Coaxial Cables
- Indoor Antennas



Active DAS Configuration



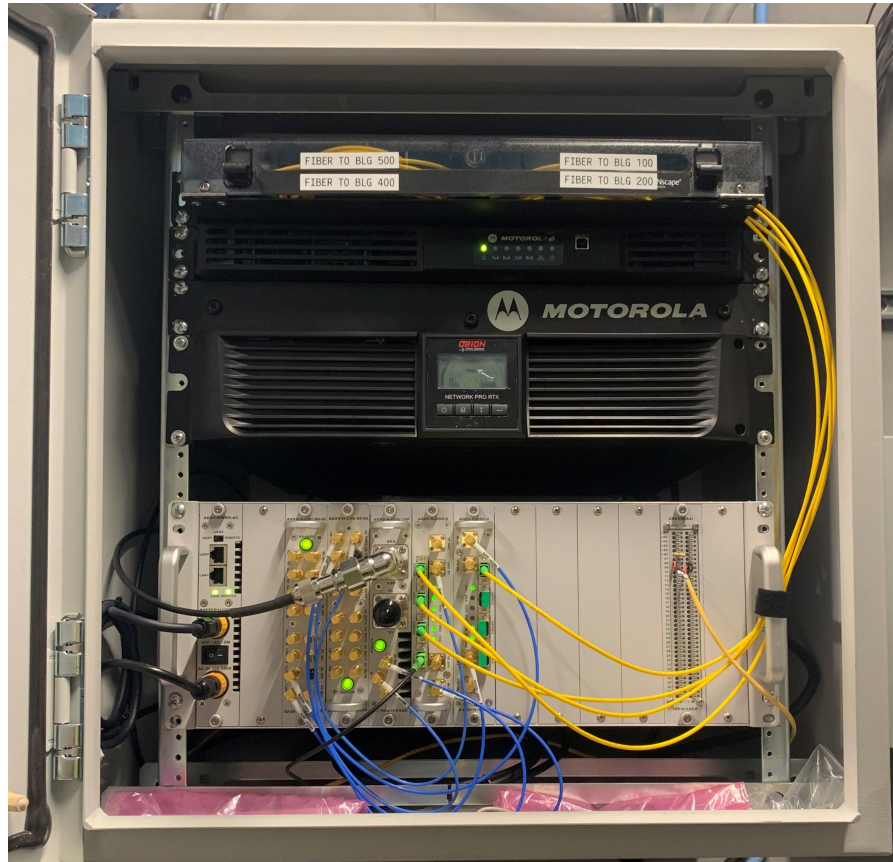
Active DAS System



- Active System: Solution that uses optical fiber to transfer RF signals between a head-end (RF signal sources) and remote units located throughout a facility or group of buildings.

Combined DAS System

- Active System with Combined System: Solution that uses optical fiber to transfer RF signals between a head-end (RF signal sources) and remote units located throughout a facility or group of buildings.



DAS Process

- Engage an integrator early in the construction project.
- Create a design criteria.
- Create guidelines for the contractors and the DAS integrators to follow, in writing.



DAS Process – cont.

- Create guidelines for your inspection teams to follow.
- Provide training for your inspection teams, in writing.
- Be accessible for the integrators.
- Once the guidelines for DAS and/or permitting are created be sure to make them readily available to integrators!



DAS Potential

- Guaranteed radio coverage in-building for first responders: fire fighters, police, EMT's.
- Increases safety for everyone in the building(s).
- Provides a potential to combine the school private radio system with the DAS network enhancing school staff communication. Combined, this provides an extra layer of safety and security.



FEFPA DAS Presentation

Thanks for attending today's presentation!

Your presenters today were

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