

DAS Training – Distributed Antenna System

DAS Training

We provide DAS Training or Distributed Antenna System Training, Seminars and Education Worldwide.

DAS (Distributed Antenna System) Training course covers the concepts behind network of spatially separated antenna nodes connected to a common source via transport medium that provides wireless service within a geographic area or structure. Our DAS Training Course is a comprehensive technical course that covers the fundamental concepts, recent advances and open issues of the DAS and in-building cellular.

A distributed antenna system (DAS) is a shared-infrastructure or neutral host model for expanding a wireless network footprint such as WiFi, GSM, CDMA/1x-EVDO, UMTS, and LTE by adding coverage and capacity in hard to reach areas. It increases the wireless quality with minimum capital investment. Our course covers both indoor and outdoor DAS solutions for the private and public sector including:

- Densely populated urban areas
- Tunnels
- Colleges and universities
- Hotels, resorts, and convention centers
- Venues: stadiums, convention centers and theme parks
- Hospitals and medical centers

DAS training course explored with various key challenges in diverse scenarios, including architecture, capacity, connectivity, scalability, medium access control, scheduling, security, dynamic channel assignment and cross-layer optimization.

The primary focus of this course is the introduction of concepts, planing, design, effective protocols, system integration, performance analysis techniques, simulations and experiments, and more importantly, future research directions in the DAS.

Course Book: Distributed Antenna Systems: Open Architecture for Future Wireless Communications Editor(s): Yan Zhang; Honglin Hu, Shanghai Research Center for Wireless Communications, China; Jijun Luo, Siemens AG Communications, Munich, Germany

Who Should Attend

§ Engineers, Analysts, Engineering Managers, DAS Technicians, DAS Project Planners

Pre-Requisites

Outline

Introduction to Distributed Antenna Systems (DAS)

- What is DAS?
- Overview of Wireless Communication Systems
- Broadband Wireless Communication Systems
- Challenges of Broadband Wireless Access Networks
- Improve Wireless Capacity and Coverage for 3G/4G Broadband Data Services
- Benefits of DAS Technology
- Limitations of DAS Technology
- Applications of DAS Technology
- Advantages of using a DAS
- Reliable in-building communications
- Availability and usability of RF signals in the intended coverage areas (coverage)
- Ability to support the demands of the system users and recipients (capacity)
- RF Distribution Technologies

Basic concept of a DAS

- RF Fundamentals
- Antenna Theory
- Fundamentals of Antennas
- DAS as a Simple Repeater
- DAS as Complete Infrastructure (indoor and outdoor wireless services)
- Passive and Active DAS
- Network Requirements
- Shared Buildings
- Shared Access Approach

Elements of Cooperative Communications

- Physical Layer Model for Cooperative Radios
- Network Models
- Cooperative Contention-Based MAC Protocols
- Distributed Organization of Cooperative Antenna Systems
- Experimental Study of Indoor Distributed Antenna Systems
- A Case Study on Distributed Antenna Systems

DAS Technologies, Frequencies, Planning, DESIGN, and Deployments

- DAS in GSM/GERAN, CDMA/1xEV-DO, WCDMA/HSPA/HSPA+, LTE, WiFi, WiMAX, PMR
- DAS versus Metro-Femto
- DAS versus Domestic/Small Business Femtocell
- Practice and Methodology
- Cost Requirements
- Site Survey
- Building Types
- In-Building Tools
- Documentation
- Components and Materials
- Antennas
- Coax
- Connectors
- Couplers and Taps
- Bidirectional Amplifiers
- Repeaters
- Diversity and Multiplexing for DAS
- Channel Modeling Perspective
- Distributed Antenna Processing
- Theoretical Limits of Wireless Systems with Distributed Antennas
- Cooperative Communications
- Distributed Antenna Systems
- Distributed Signal Processing in Wireless Sensor Networks
- Outdoor-indoor interference for indoor DAS and femtocells
- Evolution of Multi-Carrier DAS
- Configuration of MIMO antenna system in DAS
- MIMO distributed antenna system
- MIMO vs SISO signal analysis
- MIMO, SDR and CR

DAS Components

- DAS System Components
- Radios and Radio Repeaters
- Amplifiers and Filters
- Cabling
- Cabling Distribution
- Towers and Mounts

- Antennas

DAS Network Topologies

- Point-to-Point
- Point-to-Multipoint
- Mesh (peer-to-peer or multipoint-to-multipoint)

Antenna types in DAS configurations

- Omni Directional
- Broadcasts in all directions
- Examples are whip, helical and dipole
- Directional
- Broadcast in a single direction
- Examples are Yagi, and parabolic
- Leaky Coax

Main Antenna Systems

- Lighting Protection
- Cabling
- Cabling Distribution
- Building or Tower Mounts
- Antennas

In Building-Das Infrastructure components

- Antenna Systems
- Omni Directional
- Directional
- Leaky Coax
- Active Distribution Equipment
- Head End
- Back End
- Passive Distribution Equipment
- Directional Couplers
- Active Distribution Equipment
- Active distribution equipment
- Electronics associated with DAS
- Separate input power, usually 110 V AC or 220 V AC
- Transceivers

- Power Supply Units
- Amplifiers
- Back-End Equipment
- Head-End Equipment
- BiasTees
- Hybrid Couplers
- Power Splitters
- Equal amplitude
- Unequal Splitters
- Cable distribution
- Single-mode fiber optic cable
- Multi-mode fiber optic
- Unshielded Twisted Pair cable
- Coaxial cable
- Leaky Coax

Outdoors-Das Infrastructure components

- Antenna Systems
- Omni Directional
- Directional
- Towers and Mounts
- Self Supporting
- Monopoles
- Guys
- On buildings and other structures
- Cabling Systems
- Coax
- Single-mode Fiber
- Amplifiers and Couplers
- Directional Couplers
- BiasTees
- Hybrid Couplers
- Power Splitters
- Back Haul Antenna Systems

IN-BUILDING DAS Network Design Options and Considerations

- Site survey
- Site Location

- Location Type (Building or Tower)
- Location Infrastructure
- Path Analysis
- Survey Documentation
- Size and location of building
- Number of tenants
- Building architecture
- Wall and floor composition
- Floor layout
- Interior partitions and other impediments to signal coverage
- Asbestos presence
- Aesthetics
- Availability of infrastructure (Fiber, telco rooms, conduits, cable trays)
- Local codes
- Direct feed from base station or off the air
- Avoiding interference from outdoor signals penetrating the building
- Estimating signal propagation within the building initially, then measuring
- Antenna location and placement
- Antenna types

DAS System Engineering

- DAS Systems Requirements
- Fiber Cabling
- Coaxial cable called Heliax / Radiax
- Couplers, power dividers
- Internal spot antennas
- Signal Boosters
- Bi-Directional Amplifiers, BDA's
- Roof Top Antenna Systems
- External Antenna Arrays
- Antennas
- Antenna Mounting Components
- Cabling Distribution
- Active Distribution Equipment
- Passive Distribution Equipment

Installation, configuration, commissioning, maintenance and troubleshooting of a DAS

- DAS Configuration

- DAS Installation
- DAS Testing
- DAS Troubleshooting and Maintenance