

## SATELLITE COMMUNICATION TRAINING COURSE INFORMATION

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**TRAINING DURATION** 30 Hrs / 3 Weeks / Customized

**TRAINING CHARGE** 12,000+ Service Tax

### **Overview of Satellite Systems**

- Introductions
- Frequency Allocation for Satellite Services
- Intelsat
- U.S. Domsats
- Polar Orbiting satellites

### **Orbits and Launching Methods**

- Introductions
- Kepler's First, Second, Third Law
- Definitions of Terms for Earth-Orbiting satellites
- Orbital Element
- Apogee & Perigee Heights
- Orbital Perturbations
- Inclined Orbits
- Sun-Synchronous Orbit

### **The Geostationary Orbit**

- Introduction
- Antenna Look Angles
- The Polar Mount Antenna
- Limits of Visibility
- Near Geostationary Orbits
- Earth Eclipse of Satellite
- Sun Transit Outrage
- Launching Orbits

### **Radio Wave Propagation**

- Introduction
- Atmospheric losses
- Ionospheric Effects
- Rain Attenuation
- Other propagation Impairments

### **Polarization**

- Introduction
- Antenna Polarization
- Polarization of satellite signals
- Cross-Polarization Discrimination
- Ionospheric Depolarization
- Rain Depolarization
- Ice Depolarization

### **Antennas**

- Introduction
- Reciprocity Theorem for Antennas
- Coordinate System
- The Radiated Fields
- Power Flux Density
- The Isotropic Radiator & Antenna Gain
- Radiation Pattern
- Beam Solid Angle & Directivity
- Effective Aperture
- The Half-Wave Dipole
- Aperture Antennas
- The Parabolic Reflector
- The Offset Feed
- Double-Reflector Antennas
- Shaped Reflector Systems
- Arrays

## **The Space Segment**

- Introduction
- The Power Supply
- Attitude Control
- Station Keeping
- Thermal Control
- TT&C Subsystem
- Transponders
- The Antenna Subsystem
- Morelos
- Anlk-E
- Advanced Tiros-N Spacecraft

## **Module 8: The Earth Segment**

- Introduction
- Receive-Only Home TV Systems
- Master Antenna TV System
- Transmit-Receive Earth Stations

## **Analog Signals**

- Introduction
- The Telephone Channel
- Single-Sideband Telephony
- FDM Telephony
- Color Television
- Frequency Modulation
- Problems

## **Digital Signals**

- Introduction

- Digital Basebands Signals
- Pulse-Code Modulation
- Time-Division Multiplexing
- Bandwidth Requirements
- Digital Carrier Systems
- Carrier Recovery Circuits
- Bit Timing Recovery

### **Error Control Coding**

- Introduction
- Linear Block Codes
- Cyclic Codes
- Convolution Codes
- Interleaving
- Concatenated Codes
- Link Parameters Affected by Coding
- Coding Gain
- Hard Decision & Soft Decision Decoding
- Automatic Repeat Request (ARQ)

### **The Space Link**

- Introduction
- Equivalent Isotropic Radiated Power
- Transmission Losses
- The Link Power Budget Equation
- System Noise
- Carrier-to-Noise Ratio
- The Uplink
- Downlink
- Effects of Rain
- Combined Uplink & Downlink C/N Ratio
- Intermodulation Noise

## **Interference**

- Introduction
- Interference between Satellite Circuits(B1 & B2 Modes)
- Energy Dispersal
- Coordination

## **Satellite Access**

- Introduction
- Single Access
- Predefined FDMA
- Demand-Assigned FDMA
- Spade System
- Bandwidth –Limited & Power-Limited TWT Amplifier Operation
- TDMA
- On Board Signal Processing for FDMA/TDM Operation
- Satellite-Switched TDMA
- Code-Division Multiple Access

## **Satellite Services & the Internet**

- Introduction
- Network Layers
- The TCP Link
- Satellite Links & TCP
- Enhancing TCP over Satellite Channels Using standard Mechanisms
- Requests for Comments
- Split TCP Connections
- Asymmetric Channels
- Proposed Systems

## **Direct Broadcast Satellite Services**

- Introduction
- Orbital Spacings
- Power Rating & Numbers of Transponders
- Frequencies & Polarization
- Transponder Capacity
- Bit Rates For Digital Television
- MPEG compression Standards
- Forward Error Correction
- The Home Receiver Outdoor Unit(ODU)
- The Home receiver Indoor Unit(IDU)
- Downlink Analysis
- Uplink

### **Satellite Services**

- Introduction
- Satellite Mobile Services
- VSATs
- Radarsat
- Global Positioning Satellite System
- Orbcomm