



Training Program:

Advanced VSAT Terminal Installation

COURSE OVERVIEW:

Very Small Aperture Terminal (VSAT) comprises of high speed broadband satellite communications system utilizing small diameter antenna dishes of about 0.5 meters - 2.4 meters, for home and business users. A VSAT terminal interfaces between the user's computer and the outside antenna with a transceiver. The transceiver receives or sends a signal to a satellite transponder in the sky. VSAT system is ideal for mining camps, distance learning, satellite news gathering, ship-board communication, emergency and disaster responders, oil and gas camps or any application that requires a broadband Internet connection at a remote location. VSAT is an excellent way to enhance your remote business processes by interacting with your remote site workers and employees via Internet communications for email, web access, video transmissions, Voice over IP telephone services, and other IP applications for field operations.

This course provides intensive technical VSAT Training to the attendees with an in-depth learning to VSAT techniques and technologies for satellite communications. This training course focuses on VSAT network configuration, planning, internet services, network architecture, link budget, coverage, ground equipment hardware, terminal installation and optimization, access methods and operating principles, trouble shooting and maintenance.

KEY BENEFITS FOR PARTICIPANTS:

This course will provide the following key benefits to the attendees:

- Understand the VSAT system fundamentals and application areas
- Understanding the satellite communication network
- Deep insight to VSAT network features, protocols, network management and service provision
- Learn about VSAT Network Architecture, Topologies and Multi-cast Internet Services via Satellite Communication
- Explore Terminal Equipment, antenna types and operating principles for VSAT Systems
- Discuss VSAT Access methods and modulation techniques
- Understanding VSAT Terminal installation, commissioning and configuration

- Understanding VSAT Terminal troubleshooting, monitoring, networking and management
- Practical experience of VSAT terminal installation and troubleshooting

WHO SHOULD ATTEND?

- Communications technicians who have basic understanding of satellite technology and require exposure to the principles and methods for putting VSATs into service.
- Operations engineers, Network managers and VSAT installers who need in depth experience of VSAT system installation, operations, support and troubleshooting.

COURSE OBJECTIVES:

This course has the following major objectives:

- Provide comprehensive knowledge about Satellite Communications and VSAT Technology
- Deliver insights about VSAT systems, network architecture, data transmission and protocols
- Provide detailed insight to Multiple access and Assignments Strategies for VSAT Systems
- Detailed insights to VSAT-based IP Communications Technology, Voice, Data and Video Applications
- Comprehensive knowledge about Multicast Internet Services via Satellite Communication
- Provide deep understanding of Large Earth Stations and VSAT terminal operations
- Explain VSAT Indoor and Outdoor Antenna Mounting, system installation and configuration and Grounding in detail

- Providing insight to Link Budget Estimation, Troubleshooting and Interference issues for VSAT Systems
- Practical training on VSAT terminal installation, frequency calculation, configuration and troubleshooting

COURSE OUTLINE:

In “Advanced VSAT Terminal Installation Course” we cover the following course contents:

Satellite Communications (SATCOM) Overview

- Satellites and Earth Stations
- Frequency Bands (C, X, Ku and Ka)
- Satellite Access Techniques
- Data Transmission and Protocols
- Propagation Review
- Modulation and Coding
- Ground Stations
- Very Small Aperture Terminal (VSAT) Networks
- Introduction to VSAT Systems
- Data Transmission and Protocols
- Internet Protocol Support
- VSAT Systems and Applications
- VSAT Network Architecture
- Deployment Options
- VSAT Network Architecture
- VSAT Regulatory Issues
- Military VSAT Systems
- Multicast internet services via Satellite

- Star and Mesh Topologies for VSAT Networks
- Star and Mesh networks
- Multiple access and Assignments Strategies
- VSAT-based IP Communications
- VSAT Service Provision and Quality
- VSAT-based IP Communications Technology
- VSAT Voice, Video and Data applications
- Voice and Video over IP
- VPN and Data Services
- Multicast Internet Services via Satellite
- High-speed IP VSAT
- Military vs. Commercial Terminals
- VSAT Performance
- Operational support systems for SATCOMs
- Commercial VSAT systems and services.
- VSAT Terminal Equipment
- BUCs, LNBs
- Antenna and Feed Systems
- Modems
- Large Earth Station Equipment
- Typical Block Diagrams
- VSAT Antennas
- VSAT Access Methods and Modulation
- Fixed Point-to-Point Links
- Bandwidth Sharing
- TDM, TDMA, FDMA, SCPC, DVB-RCS, DAMA, CDMA
- Modulation and Coding
- Analog and Digital Modulation
- BPSK, QPSK, 8PSK, 16QAM, 64QAM

- Overview of Shannon's Theory
- Symbol Rate and Bit Rate
- Intersymbol Interference (ISI)
- Forward Error Correction (FEC)
- Large Earth Stations and VSAT Terminals
- Antenna and Feed Systems
- Modems
- Large Earth Station Equipment
- Typical Block Diagrams
- VSAT Antenna Types and Operating principles
- Gain
- Antenna Patterns
- Beamwidth and Diameter
- VSWR and Return Loss
- Sidelobes and Effects
- VSAT Dish Pointing Concepts
- Latitude
- Longitude
- Azimuth
- Elevation
- GEO Arc
- AZ-EL Beam Movement Across the Arc
- Installation and commissioning of VSAT Terminals
- VSAT Installation and Commissioning
- The key installation steps
- Antenna AZ-EL Pointing
- Mounting the Outdoor Equipment
- Testing the Link
- Dish Pointing and Cross-Pol

- Carrier Lineup and Cross-Pol Checks
- Antennas for VSAT Systems
- High Power Amplifiers (BUC, SSPA)
- TCP/IP for VSATs
- EIRP, G/T and Gain Budgets
- IFL and Grounding
- Indoor Electronics Installation
- Configuration & control of equipment
- VSAT Monitoring, Control and Network Management Systems
- Link Budget and Link Margins
- Signal power and noise power bandwidth
- Troubleshooting of VSAT Terminals
- Antennas issues
- Alignment on the Satellite
- Amplifier saturation
- Maintenance of RF and Baseband
- Blockage and gain compression
- Elevation Effects
- Troubleshooting Network, and Interference issues
- Issues the DC Voltage Drop on Cables
- Common Field Mistakes
- Uplink alignment
- Preventive Maintenance
- Case Studies of VSATs
- Broadband VSAT
- Finding the Terminal IP address
- Troubleshooting VSAT Link
- Study of New VSAT Systems
- System level & frequency calculation

- Configuration & control of equipment
- Graded Practical Exercises