



## **VSAT (Very Small Aperture Terminal) TRAINING**

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A very small aperture terminal (VSAT), is a two-way satellite ground station or a stabilized maritime VSAT antenna with a dish antenna that smaller than 3 meters. The majority of VSAT antennas range from 75 cm to 1.2 m. Data rates range from 4 kbit/s up to 4 Mbit/s; some upgraded modules can even reach a max downlink of up to 16 Mbit/s. VSATs access satellites in geosynchronous orbit to relay data from small remote earth stations (terminals) to other terminals (in mesh topology) or master earth station "hubs" (in star topology). VSAT Training includes following modules:

<b>TRAINING DURATION</b>	25 Hrs / 2 Weeks / Customized
<b>TRAINING CHARGE</b>	12,000+ Service Tax

### **Details of VSAT Training Modules**

#### **1. INTRODUCTION**

- VSAT network definition
- VSAT network configurations
- User terminal connectivity
- VSAT network applications and types of traffic
  - Civilian VSAT networks
  - Military VSAT networks
- VSAT networks: involved parties
- VSAT network options
  - Star or mesh?
  - Data/voice/video
  - Fixed/demand assignment
  - Frequency bands



- Hub options
- VSAT network earth stations
  - VSAT station
  - Hub station
- Economic aspects
- Regulatory aspects
  - Licensing
  - Access to the space segment
  - Local regulations
- 1.10 Conclusions
  - Advantages
  - Drawbacks

## 2. Use of satellites for VSAT networks

- Introduction
  - The relay function
  - Transparent and regenerative payload
  - Coverage
  - Impacts of coverage on satellite relay performance
  - Frequency reuse
- Orbits
  - Newton's universal law of attraction
  - Orbital parameters
- The geostationary satellite
  - Orbit parameters
  - Launching the satellite
  - Distance to the satellite
  - Propagation delay
  - Conjunction of the sun and the satellite



- Orbit perturbations
- Apparent satellite movement
- Orbit corrections
- Doppler effect
- Satellites for VSAT services

### 3. Operational aspects

- Installation
  - Hub
  - VSAT
  - Antenna pointing
- The customer's concerns
  - Interfaces to end equipment
  - Independence from vendor
  - Set-up time
  - Access to the service
  - Flexibility
  - Failure and disaster recovery
  - Blocking probability
  - Response time
  - Link quality
  - Availability
  - Maintenance
  - Hazards
  - Cost

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## 4. Networking aspects

- Network functions
- Some definitions
  - Links and connections
  - Bit rate
  - Protocols
  - Delay
  - Throughput
  - Channel efficiency
  - Channel utilisation
- Traffic characterization
  - Traffic forecasts
  - Traffic measurements
  - Traffic source modelling
- The OSI reference model for data communications
  - The physical layer
  - The data link layer
  - The network layer
  - The transport layer
  - The upper layers (5 to 7)
- Application to VSAT networks
  - Physical and protocol configurations of a VSAT network
  - Protocol conversion (emulation)
  - Reasons for protocol conversion
- Multiple access
  - Basic multiple access protocols
  - Meshed networks
  - Star-shaped networks
  - Fixed assignment versus demand assignment

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- Random time division multiple access
- Delay analysis
- Conclusion
- Network design
  - Principles
  - Guidelines for preliminary dimensioning
  - Example
  - Conclusion

## 5. Radio frequency link analysis

- Principles
  - Thermal noise
  - Interference noise
  - Intermodulation noise
  - Carrier power to noise power spectral density ratio
  - Total noise
- Uplink analysis
  - Power flux density at satellite distance
  - Effective isotropic radiated power of the earth station
  - Uplink path loss
  - Figure of merit of satellite receiving equipment
- Downlink analysis
  - Effective isotropic radiated power of the satellite
  - Power Flux density at earth surface
  - Downlink path loss
  - Figure of merit of earth station receiving equipment
- Intermodulation analysis
- Interference analysis
  - Expressions for carrier-to-interference ratio



- Types of interference
  - Self-interference
  - External interference
  - Conclusion
- Overall link performance
  - Bit error rate determination
  - Power versus bandwidth exchange
  - Example

**TRAINING SCHEDULE** - Please contact us for latest training schedule

## **TRAINING MODE**

We give flexible learning options to trainees

- Instructor Lead (REGULAR / ONLINE / WEEK-END / PART-TIME / COMBINED-FLEXIBLE)
- INSTRUCTOR LEAD LIVE ONLINE TRAINING MODE - You can join the training from any part of world

## **CONTACT DETAILS**

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