

*Wireless Communication*

*Lecture 10*

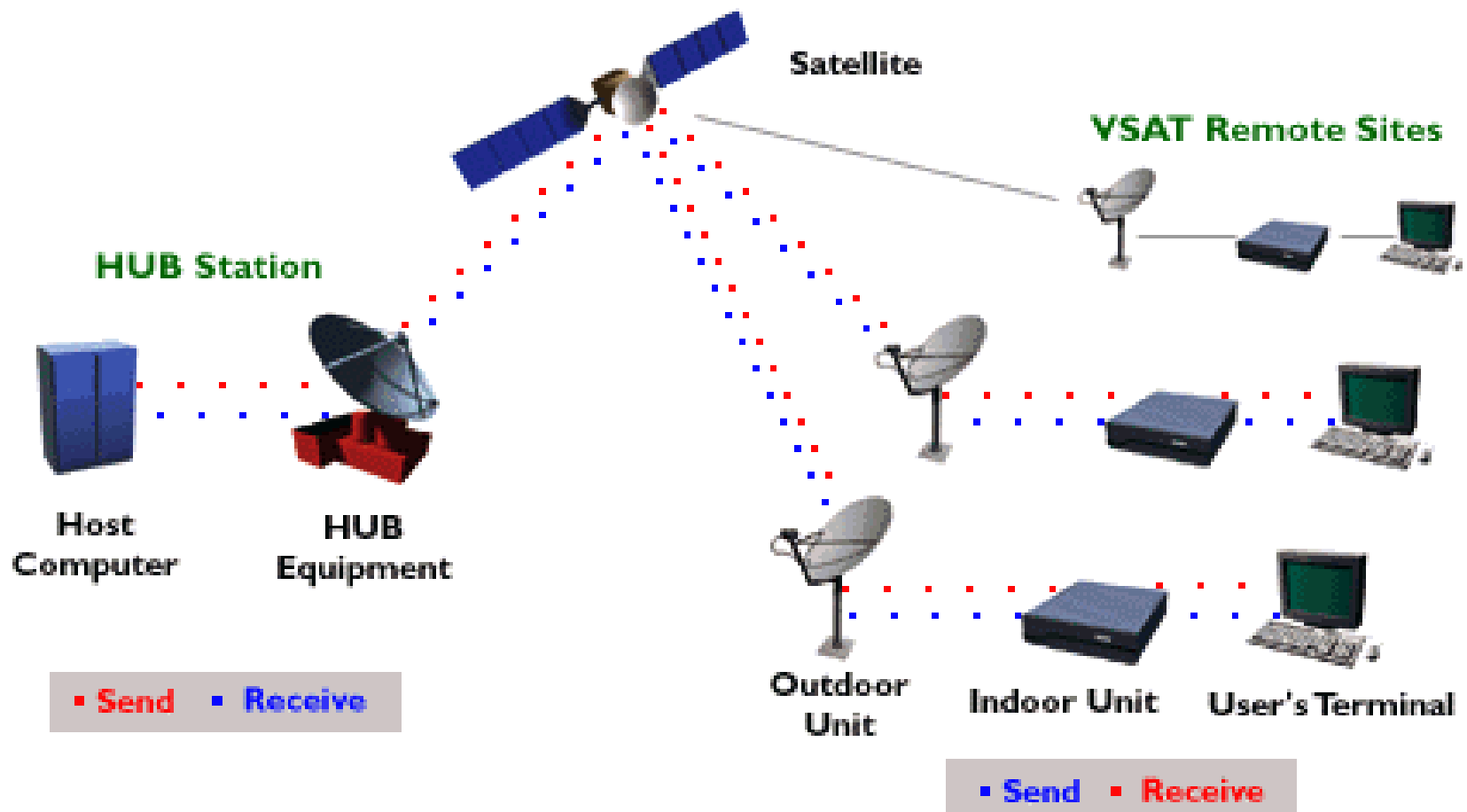
*Ghowr University  
Computer Science Department*

*Five- Semester*

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# VSAT(Very Small Aperture Terminal)



# **What is VSAT?**

VSAT stands for Very Small Aperture Terminal. It is a small satellite dish that is capable of both receiving and sending satellite signals. VSAT systems can be designed to serve both broadcast and interactive applications whether data, voice or video, which are now being served by terrestrial lines.

# *Why VSAT?*

Early Earth Stations in commercial systems.

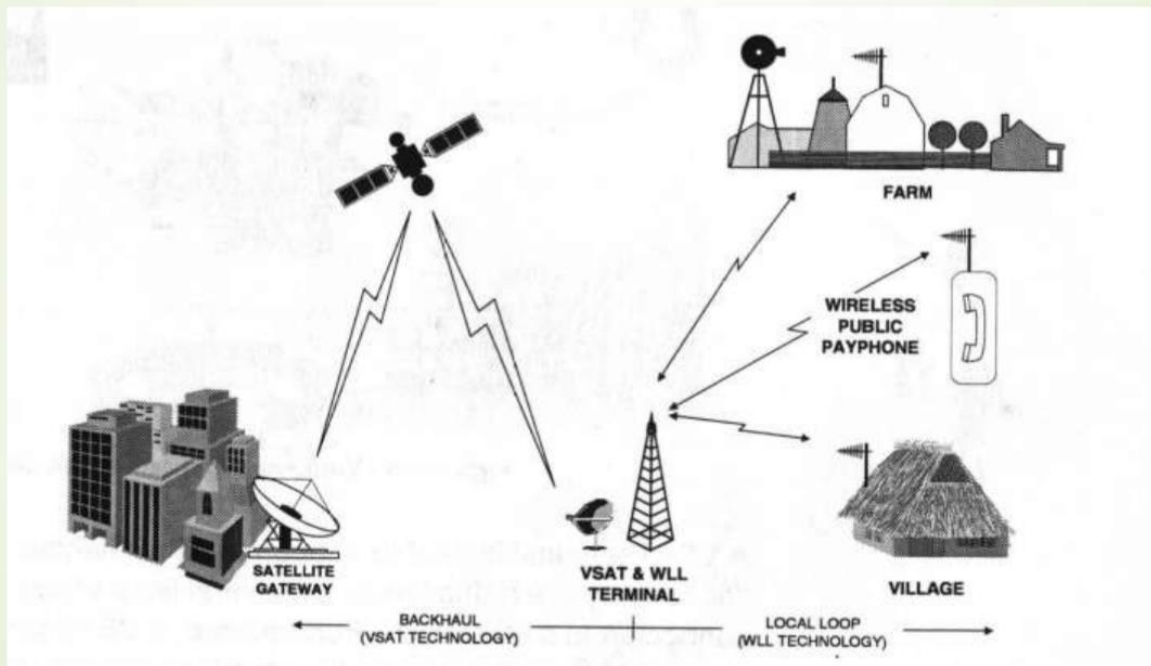
- Need to make system more affordable to end user:
- Increased transmit power from satellite.
- Higher frequencies

- The dish is small, easily transportable and installation lead-time is much shorter if compared to terrestrial links. In addition, VSAT network allows rapid, low-cost network re-configuration and expansion to meet new or unexpected business requirements.
- VSAT - 75 cm to 1.2 m.
- Data rates - 4 kbit/s up to 4 Mbit/s  
sometimes up to a max downlink of up to 16 Mbit/s with some upgraded modules and enhancements.

- Cost effective transmission and network operations are made possible by use of the C-band satellite frequency and frequency times division multiple access (FTDMA), Frequency division multiple access (FDMA) or Time division multiple access (TDMA) transmission techniques.

# VSAT SYSTEMS

- Underlying objective of VSAT Systems:  
**bring the service directly to the end-user**
- Major reasons for doing this
  - Reduce hierarchical distribution network (make more efficient and faster)
  - Reduce distribution costs





# ➡ **Implementations of VSAT**

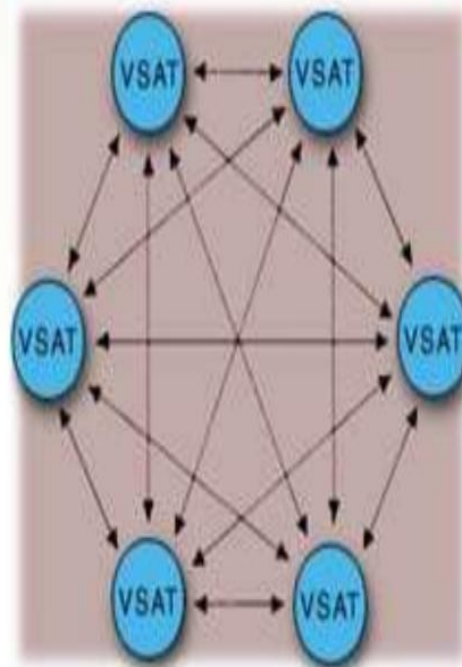
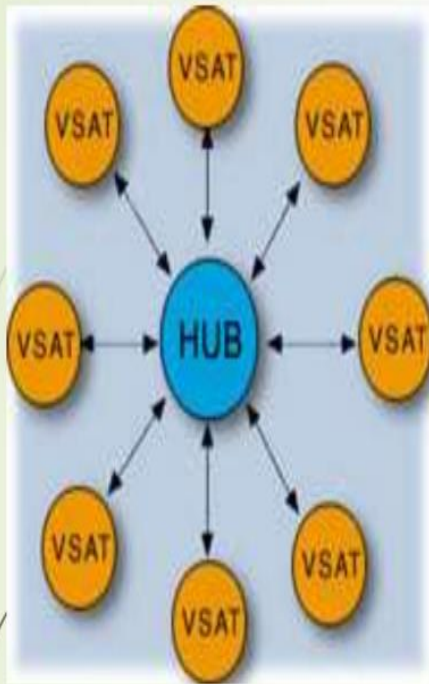
# VSAT IMPLEMENTATION

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- There are basically two ways to implement a VSAT Architecture
- **STAR**
  - VSATs are linked via a HUB
- **MESH**
  - VSATs are linked together without going through a large hub

# VSAT IMPLEMENTATION

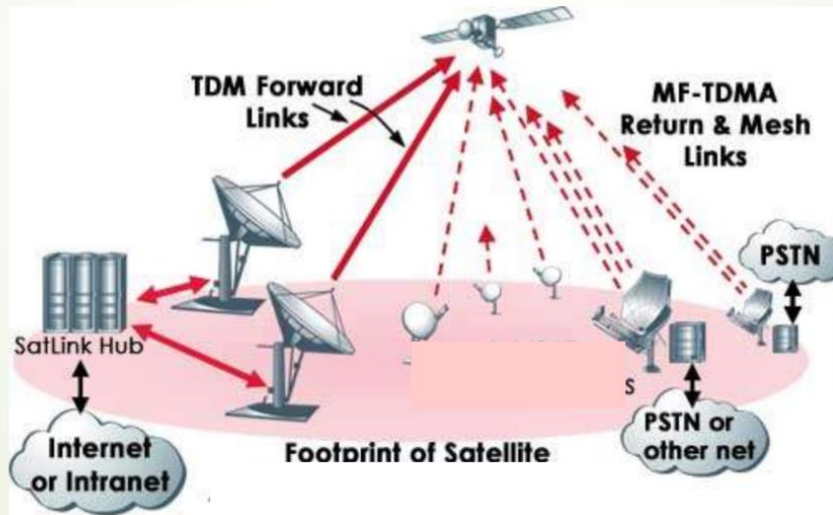
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# VSAT Network Topologies

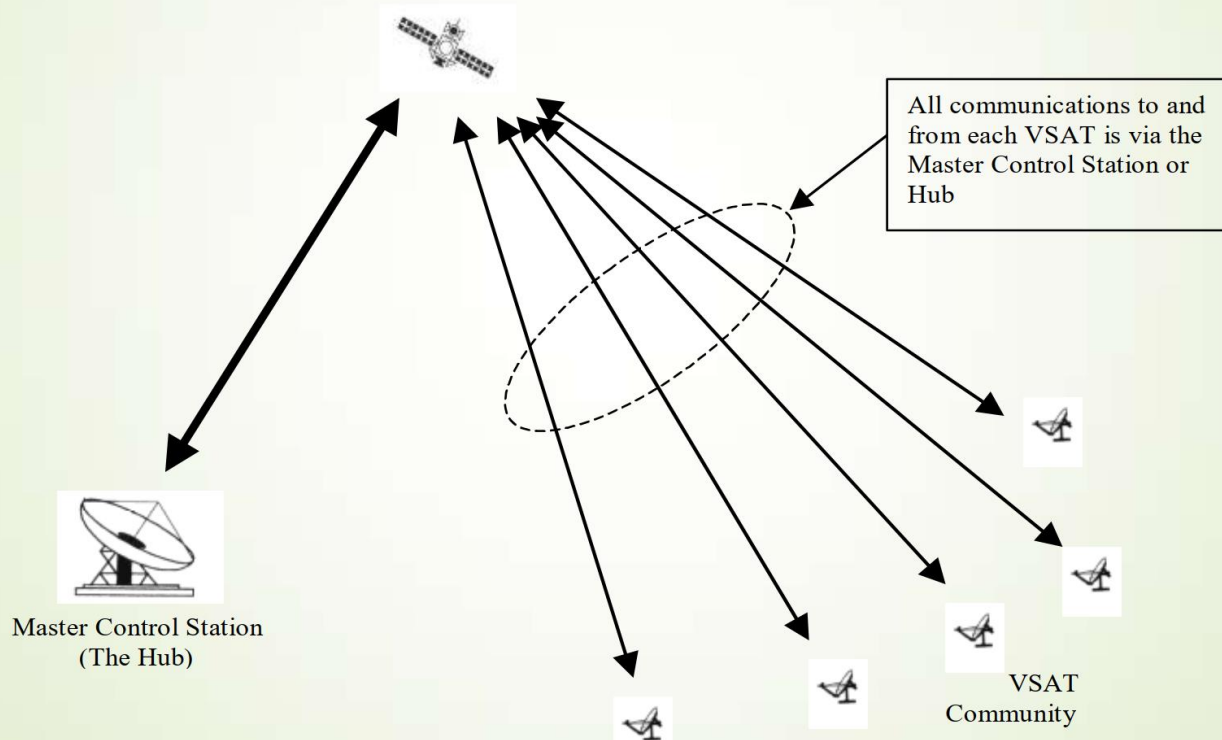
## ► Star network:

The VSAT terminals communicate each other through Hub.

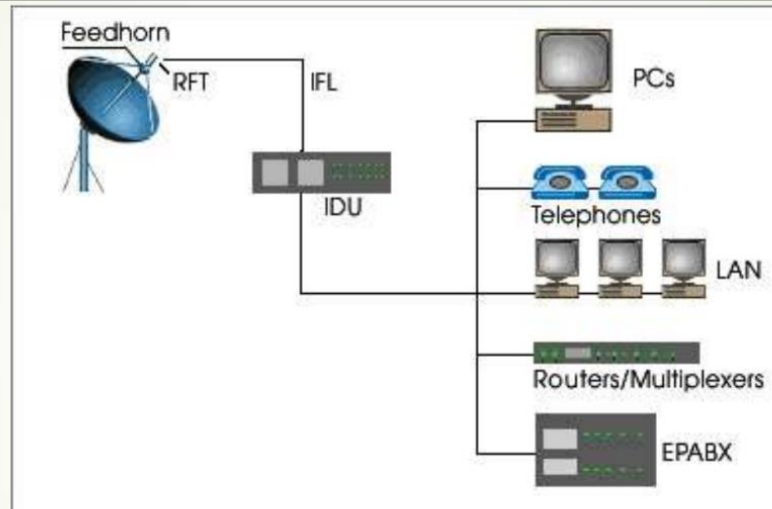


# VSAT STAR ARCHITECTURE

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# VSAT Earth Station



- Outdoor Unit (ODU)
- Inter-facility link (IFL)
- Indoor Unit (IDU)

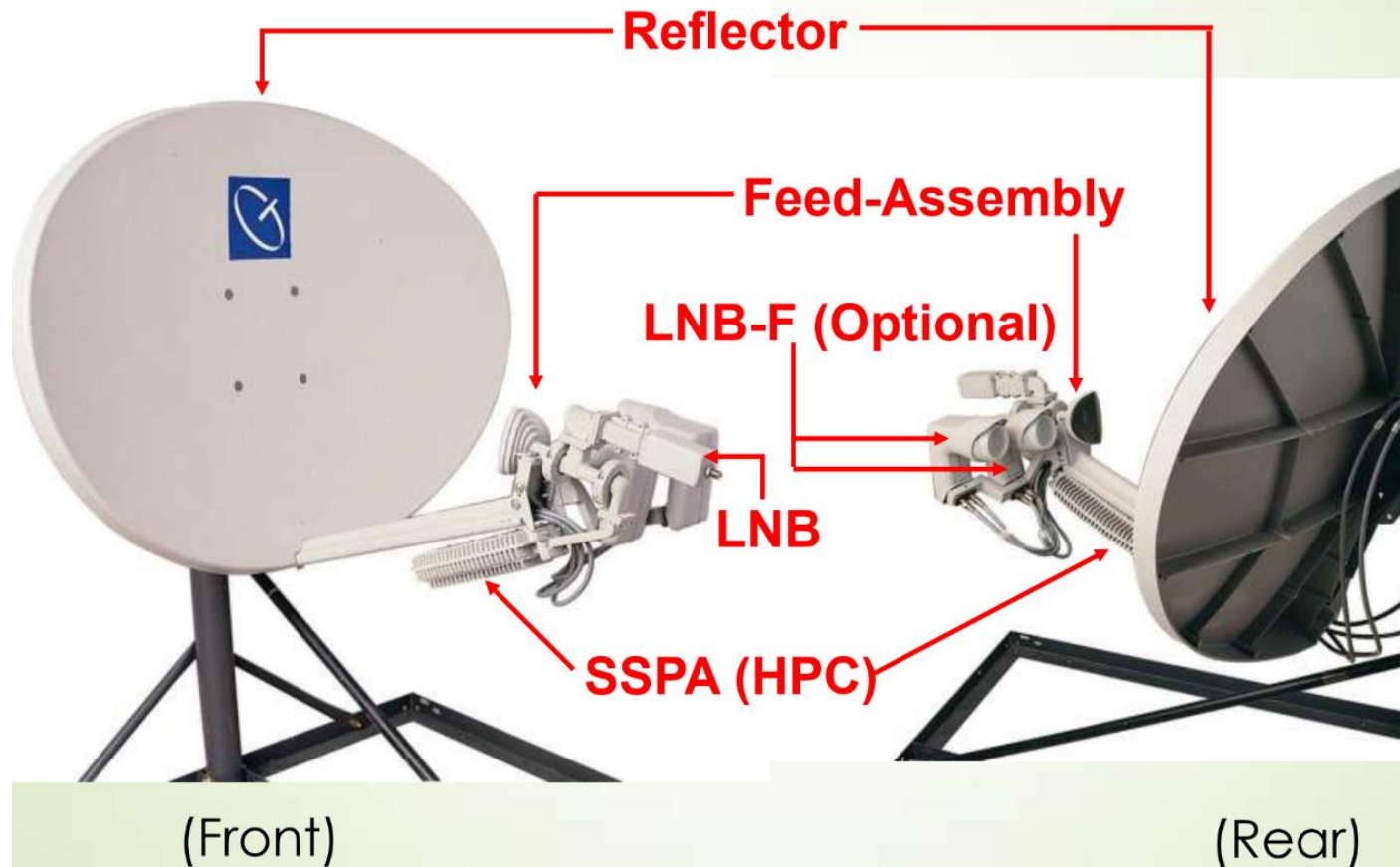
# VSAT Earth Station

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- The VSAT Outdoor Unit (ODU) is located where it will have a clear line of sight to the satellite and is free from casual blockage by people and/or equipment moving in front of it. It includes the Radio Frequency Transceiver (RFT).
- The Inter Facility Link (IFL) carries the electronic signal between the ODU and the Indoor Unit (IDU) as well as power cables for the ODU and control signals from the IDU.
- The IDU is normally housed in a desktop computer at the User's workstation and consists of the baseband processor units and interface equipment (e.g. computer screen and keyboard). The IDU will also house the modem and multiplexer/demultiplexer (mux/demux) units if these are not already housed in the ODU.



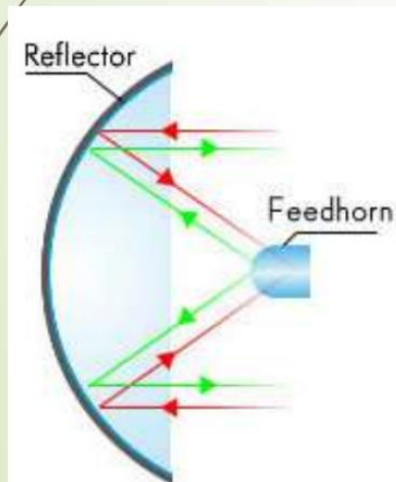
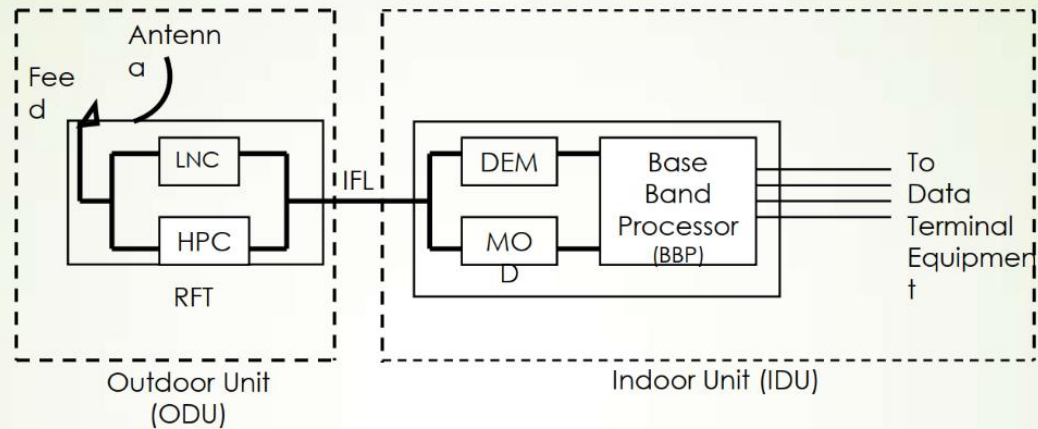
# Typical VSAT Outdoor Unit/Antenna



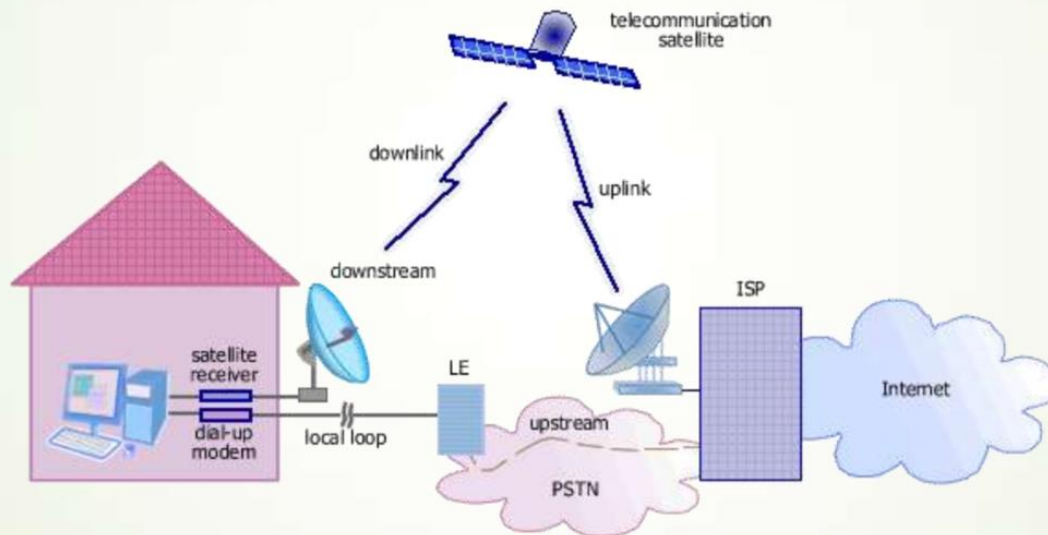
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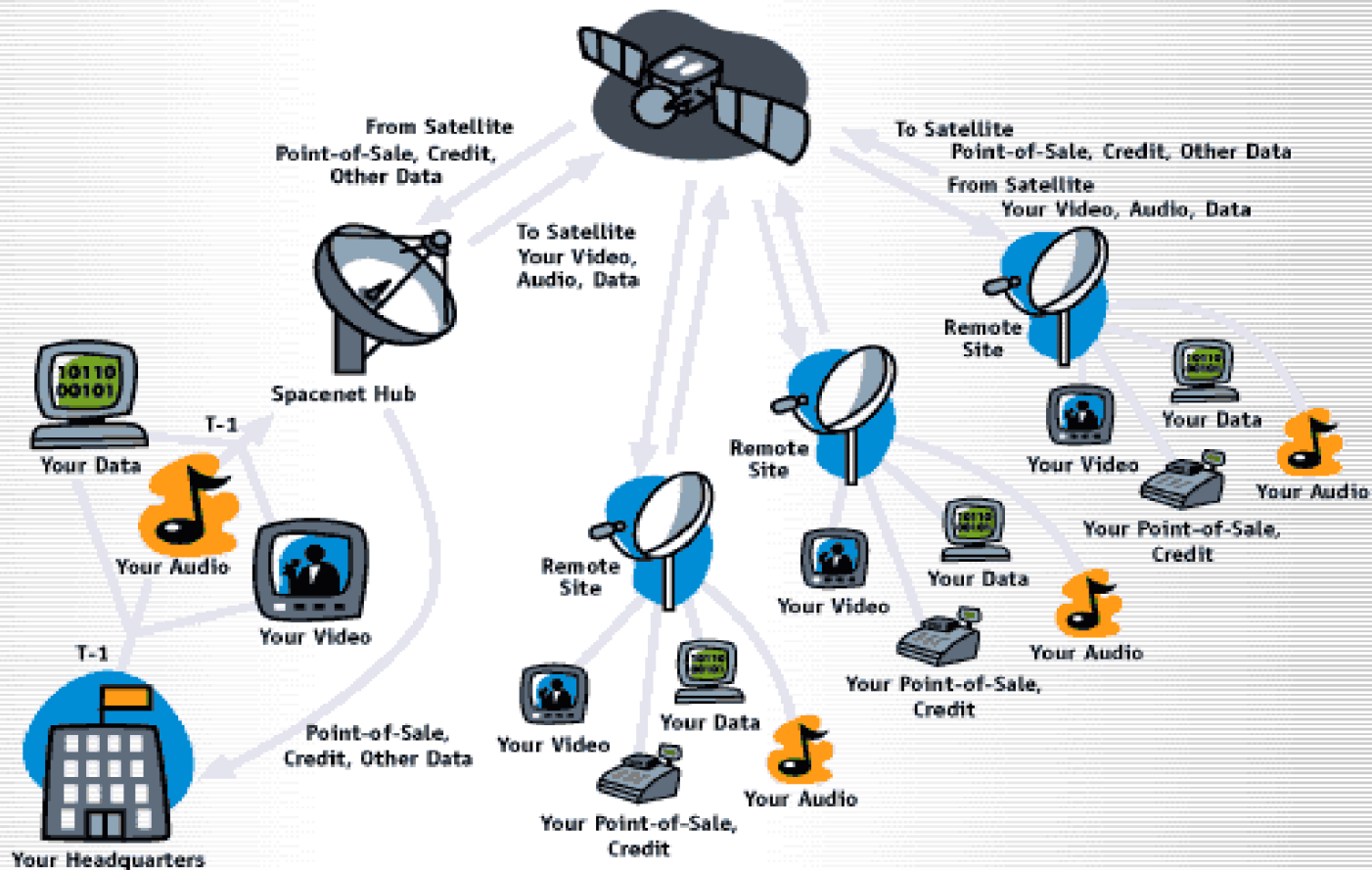
# VSAT Earth Station - Block Diagram



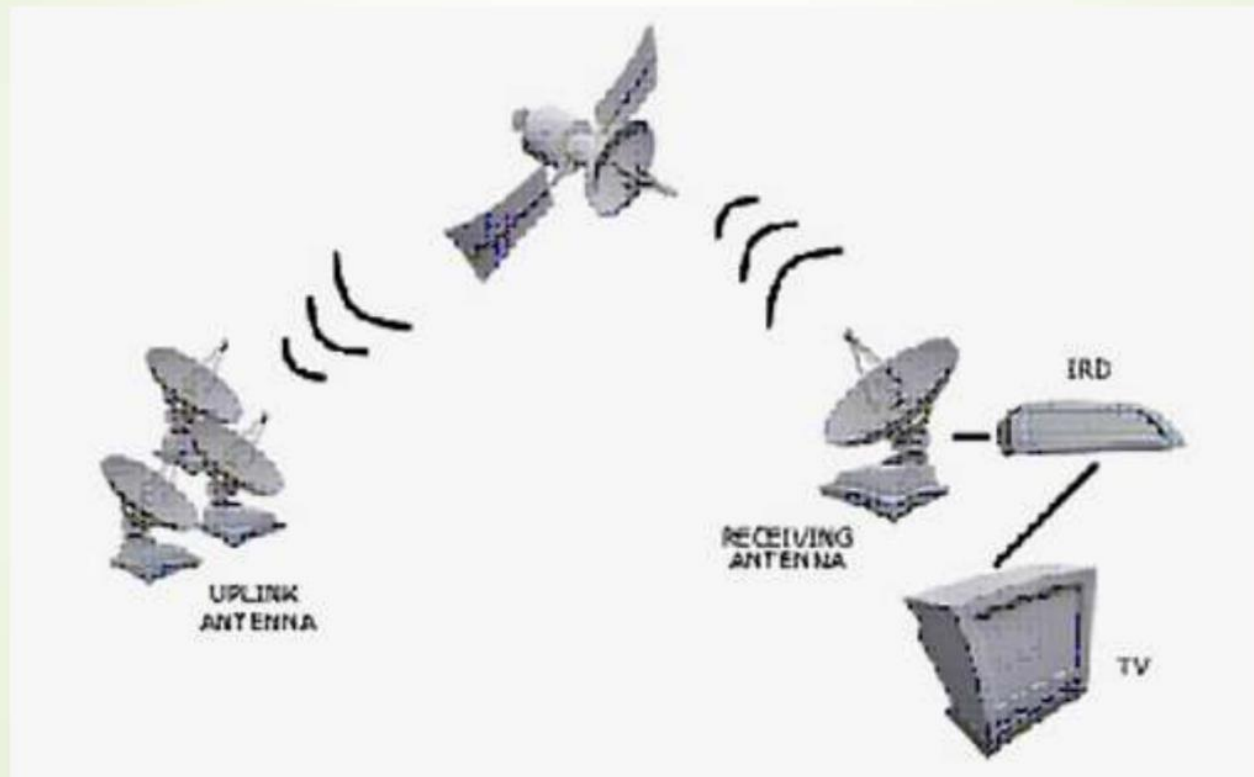
# VSAT for Internet



# VSAT Network



# From TV station to home



# **What are the applications of VSAT?**

VSAT is an ideal satellite network that provides communications support for a wide range of applications: -

- Point-of-sales transaction
- Order-Entry Billing
- Inventory Control
- Financial Management
- Data processing
- Reservation System
- Telemetry & Data Collection
- News Wire Services
- Private-Line Voice
- Virtual Private Networks
- Distance Education
- High Speed Internet Access

# Advantages of VSAT

- Access in Remote Locations
- Internet Access
- Rapid deployment
- VPN
- Qos
- Mobile Access
- Bandwidth Allocation

# Limitation of VSAT

- ✓ Large antenna
- ✓ Cost
- ✓ As mentioned it requires clear Line of Sight between VSAT dish and satellite in the space.
- ✓ As information transmitted by VSAT goes over the air till it reaches destination, it is prone to intrusion by hackers. Hence encryption-decryption units are needed to have secure communication. This increases the overall VSAT terminal cost.





ANY  
QUESTIONS?

See u later ☺