Satellite Communication

By

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Terms and Definitions

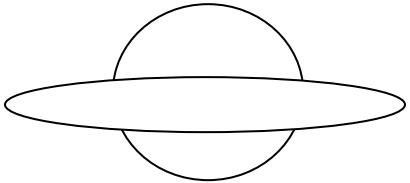
- ✓ Orbit: Path of a Satellite above the Earth
- ✓ Footprint: Coverage area of a Satellite Signals
- ✓ Frequency Bands: Range of Frequencies for Uplink and Downlink for a Satellite
- ✓ Period: Time required to make a Complete Trip around the Earth for a Satellite

Terms and Definitions

- ✓ Dwell Time: Amount of time a Beam is pointed to a Specific Area from a Satellite
- ✓ Altitude: Height of the Satellite
- ✓ Radius: Length of the Orbit
- ✓ Van Allen belts: Regions High energy charged particles (Protons) above Earth
- ✓ LoS: Line of Sight Communication

Types of Orbits

Equatorial:



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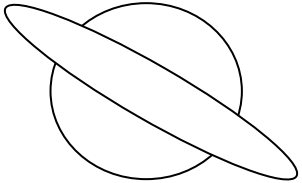
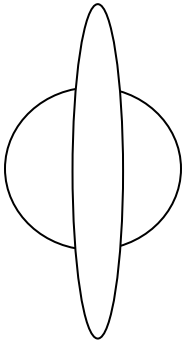


Polar:



Types of Satellites

- ✓ Low Earth Orbit satellites (LEO)
- ✓ Medium Earth Orbits satellites (MEO)
- ✓ Geostationary Earth Orbit satellites (GEO)

Types of Frequency Bands

- ✓ LoS: Line of Sight Communication
- ✓ Microwave Frequency Range

Band	**Downlink Frequency GHz**	**Uplink Frequency GHz**	**Bandwidth MHz**
L	1.5	1.6	15
S	1.9	2.2	70
C	4	6	500
Ku	11	14	500
Ka	20	30	3500

Types Van Allen belts

- ✓ Lower Belt: Above 3000 to 5000 kms
- ✓ Higher Belt: Above 15000 kms

Types of Antennas

- ✓ Different types of antennas are used in satellites
- ✓ Phase direct antenna: Footprint can be dynamically changed - it can be small/ large/ controlled
- ✓ Sectorized, Omni Directional

Foot Prints

- ✓ Power will be maximum here at the central part
- ✓ Varies with respect to movement of Satellite

References

- ✓ Books:
  - ✓ Data communication and Networking, 4th Edition, Behrouz A Forouzan
  - ✓ Computer Networks, 4th Edition, Andrew S. Tanenbaum

- ✓ Various relevant Websites

Thank You