

Lecture 1.1:

Antenna Fundamentals

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Introduction

- Two broad categories of communication system
 - Use transmission line
 - Telephone service
 - Low data rate digital transmission
 - Use electromagnetic radiation

Transmission Line vs Antenna

Sr. No.	Transmission Line	Antenna or EM radiation
1	Loss is high as the distance increase	Beyond a certain distance loss is less
2	Used for telephone service, voice communication	Mobile communication
3	Attenuation is exponential in behavior.	The loss vs distance is algebraic in behavior.
4	Not economically feasible to install transmission line	Can be installed anywhere irrespective of the environment

Antenna Systems

- **Wire antennas**
- **Aperture Antenna**
- **Microstrip Antenna**
- **Array Antennas**
- **Reflector Antennas**
- **Lens Antennas**

Wire Antennas

- Automobiles
- Building
- Ships
- Aircrafts
- Spacecrafts

Aperture Antennas

- Used for higher frequencies
- Used for aircraft and spacecraft
- Can be covered with dielectric material
- Types
 - Waveguide aperture
 - Circular Aperture
 - Rectangular aperture
 - Horn Antennas

Microstrip Antennas

- Also referred as patch antenna
- Radiation patch may be square, rectangular, circular, elliptical, triangular or any other configuration.
- Applications:
 - Aircraft
 - Spacecraft
 - Missiles

Array Antennas

- Special geometrical arrangement of arrays
- Types:
 - Yagi uda array
 - Aperture array
 - Microstrip patch array
 - Slotted waveguide array

Reflector Antennas

- Used to communicate several million miles.
- Parabolic reflector which can have diameter as large as 305m.

Lens Antennas

- Used for divergent of energy spreading in undesired direction.
- Used for higher frequencies.

THANK YOU