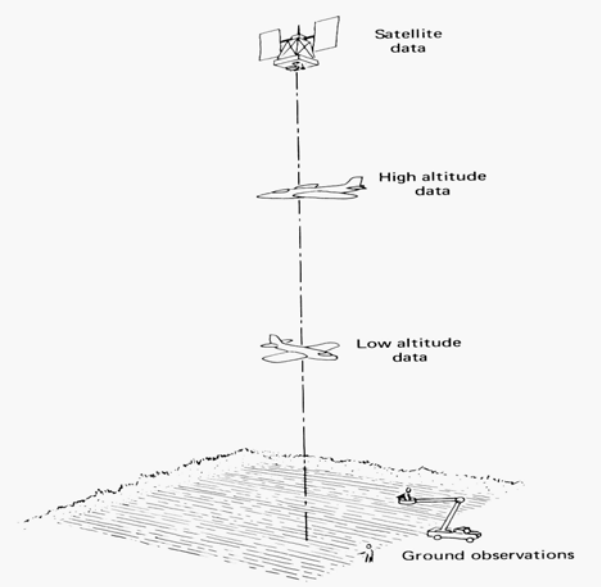
The Major Components Of Remote-sensing Technology

1.**ENERGY SOURCE** (PASSIVE SYSTEM): sun, irradiance from earth's materials; (ACTIVE SYSTEM): irradiance from artificially-generated energy sources such as radar)
2.PLATFORMS (Vehicle to carry the sensor) (truck, aircraft, space shuttle, satellite, etc.)
3.SENSORS (Device to detect electro-magnetic radiation) (camera, scanner, etc)
4.DETECTORS (To convert electro-magnetic radiation into recorded signals) (film, etc)
5.PROCESSING (Handling signal data) (photographic, digital)
6.INSTITUTIONALISATION (Organization for execution at all stages of remote-sensing technology: international and national organizations, centers, universities, etc

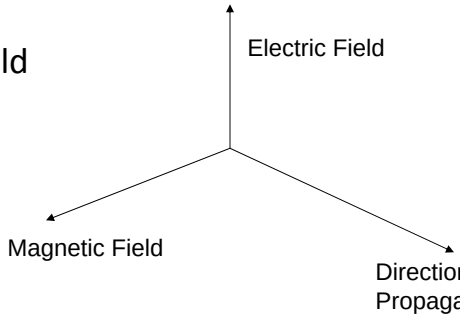
Platforms



- Ground based
- Airborne
- Space borne

Electromagnetic Radiation (EMR)

- In 1860s Clark Makwell conceptualized that light is consisted of two kinds of fields
  - Electric Field
  - Magnetic Field



- Cosmic Rays
- Gamma Rays
- X-Rays → < 0.01µm
- U – V Rays → 0.01 - 0.1 µm
- Visible → 0.4 – 0.7 µm (Near IR, Middle IR, Thermal IR)
- Infra red Rays → 0.7 µm – 1 mm
- Micro Waves → 1 mm – 1 m
- Radio Waves → > 1m

- Absorption is the process in which energy is absorbed and converted into other forms of energy. The absorption takes place both in atmosphere and on the earth's terrain. The tree major constituents of the atmosphere which are responsible for absorption are :
  - Ozone (O3) : absorbs the harmful U.V Rays in the atmosphere
  - CO2 : It mainly absorbs the far IR (Thermal IR) portion of the energy
  - Water : Water also absorbs thermal IR and short wave microwaves.

Atmospheric Window

- The part / portion of EMR which is least or unaffected by the atmospheric absorption are called " Atmospheric Window"
- This include visible portion, almost all part of Infra Red IR, Microwaves and Radio waves.

Most remote sensing systems have more than 3 channels or bands of data – However, using color display monitors or photographic reproductions, one can only use 3 channels or bands

Band	Spectral Resolution (µm)	Color
1	0.45-0.52	Blue
2	0.52-0.60	Green
3	0.63-0.69	Red
4	0.76-0.90	Near IR
5	1.55-1.75	Shortwave IR
7	2.08-2.35	Shortwave IR

Landsat Thematic Mapper

Band	Spectral Resolution (µm)	Color
1	0.402-0.422	Violet
2	0.423-0.443	Blue
3	0.480-0.500	Blue/Green
4	0.500-0.520	Green
5	0.445-0.465	Green/yellow
6	0.670-0.690	Red
7	0.745-0.785	Near IR
8	0.845-0.885	Near IR

SeaWIFS

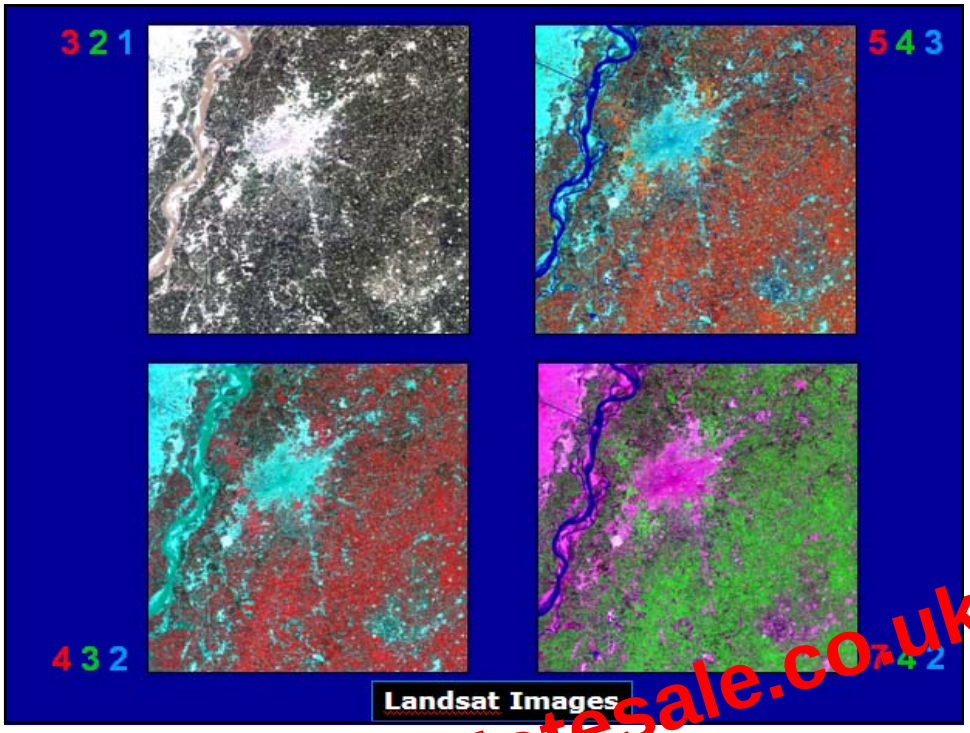
Band Combinations

– True Colour images:

- Image Red through Red Gun
- Image Green through Green Gun
- Image Blue through Blue Gun

– False Colour images:

- Image Infrared through Red Gun
- Image Red through Green Gun
- Image Green through Blue Gun



AERIAL PHOTO