

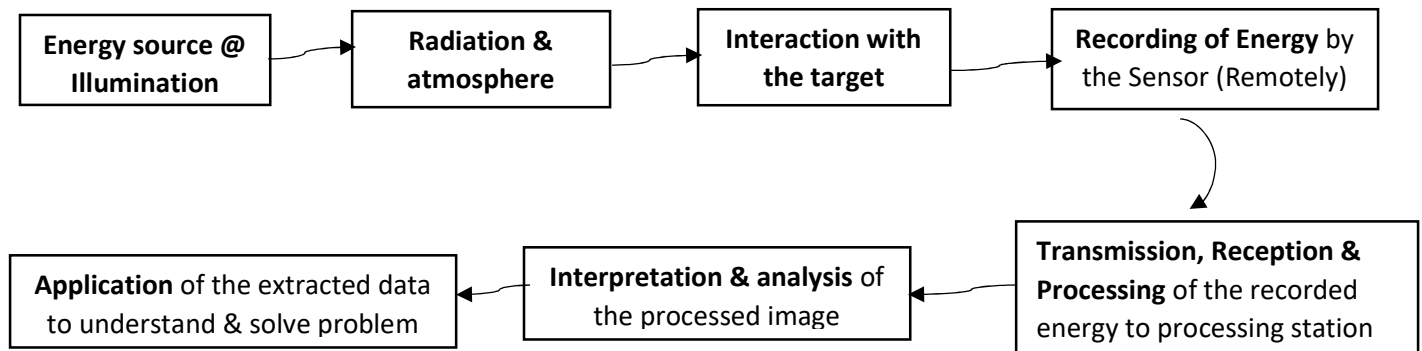
Introduction to Remote Sensing

REMOTE - Something that is far away; not physically in contact

SENSING – Getting information, input, data.

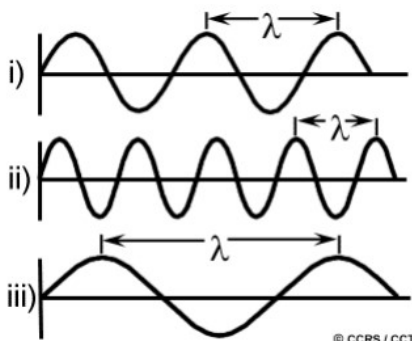
REMOTE SENSING: Getting data w/out actually being in contact physically. E.g.: X-ray

Process of remote sensing: involves the interaction between incident radiation & targets of interest. – this process involves 7 elements:



Note: Remote Sensing includes also the sensing of emitted energy and the use of non-imaging sensors

- Energy source to illuminate the target is in the form of **electromagnetic radiation** which involves two important characteristics in understanding remote sensing: **1) wavelength 2) frequency**



where:

$$c = \lambda \nu$$

λ = wavelength (m)

ν = frequency (cycles per second, Hz)

c = speed of light (3×10^8 m/s)

- The only electromagnetic (EM) **wavelengths** which can be associated with colors:

- **Violet:** 0.4 - 0.446 μm
- **Blue:** 0.446 - 0.500 μm
- **Green:** 0.500 - 0.578 μm
- **Yellow:** 0.578 - 0.592 μm
- **Orange:** 0.592 - 0.620 μm
- **Red:** 0.620 - 0.7 μm

- Practical spectrum for remote sensing:

- 1) Ultraviolet (UV)

-The spectrum with shortest wavelengths for practical remote sensing

- 2) Infrared (IR)

- i- Reflected IR

- ii- Thermal IR

- 3) Microwave

-Recent interest spectrum for remote sensing

- Radiation used for remote sensing has to travel in some distance in the Earth's atmosphere. Particles & gases in atmosphere can affect the incoming light & radiation which is caused by the mechanisms of **scattering & absorption**
- **Passive Remote Sensing:** measure energy that is naturally available. Used only when the naturally occurring energy is available *E.g.: Sun illuminates the Earth which reflected to the satellite's sensors*
- **Active Remote Sensing:** Provide their own energy source for illumination. Sensor emits radiation which is directed toward the desired target. *E.g.: Camera capturing photo with flash (lights) emitted from its own body*
- Spatial Resolution in a nutshell: **what** is the smallest object (size) on ground which a single pixel in the sensors can detect.
 - 10m Resolution gives more details than the 100m Resolution