Mithu
030032

Remote sensing

Remote sensing is a method for getting information about of different objects on the planet, without any physical contacts with it.

Remote sensing is a technology for sampling electromagnetic radiation to acquire and read non-immediate geospatial data from which to pull into more or less features and objects on his earths land surface, seas and air. – Dr. Nicholas short

Advantage of remote sensing

(I) provides a view for the large region

(II) offers Geo-referenced information and digital information

(III) Most of the remote sensors operate in every season, every day, every time and even in real tough weather.

What is the principle?

Energy source → Target —Transmission→ Sensor

Components of a remote sensing system

(I) Target

(II) Energy source

(III) Transmission path

(IV) Sensor

Target: The object or material that is being studied. Remote sensing system measure and record information about the target without actually coming into physical contact with it.

Energy source

It illuminates or provides electromagnetic energy to the target and will act as a medium for transmitting information from the target to the sensor.

Sensor

A remote device that will collect and record the electromagnetic radiation.

Process involved in Remote sensing

(I) Energy source or illumination
(II) Radiation and the atmosphere
(III) Interaction with the target
(IV) Recording of Energy by the sensor
(V) Transmission, Reception and Processing
(VI) Interpretation and Analysis
(VII) Application

Process of weather satellite imaging of the Earth

① At first satellite is focussed on the target which is the Earth's surface.

② Energy is given off in the form of infrared radiation (or heat energy)

③ Energy travels through the atmosphere and space and reaches the sensor, which is mounted on a satellite platform.

④ Varying levels of energy are recorded, transmitted to ground stations on the Earth and converted into images that depict differences in temperature across the planet's surface

Familiar forms of remote sensing medical imaging technologies

① Magnetic Resonance Imaging (MRI)

② Sonograms

③ X-Ray imaging

These produce images of the inside of the human body.

Remote sensing

Remote sensing is not limited to investigation within our own planet. Most forms of Astronomy are example of remote sensing. Astronomers collect and analyze the energy given off by these object in space by using telescopes and sensing devices. The information is recorded and used to draw conclusions about space and our universe.

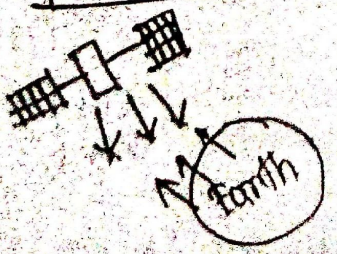
Example

(i) Ocean and atmospheric observing
(ii) Magnetic resonance imaging (MRI)
(iii) Positron Emission Tomography (PET)
(iv) Space probes.

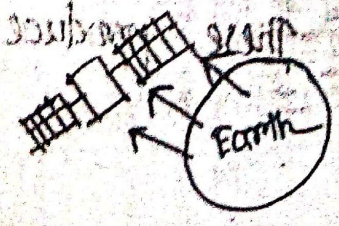
Type of Remote sensing

Based on source of energy

- Active

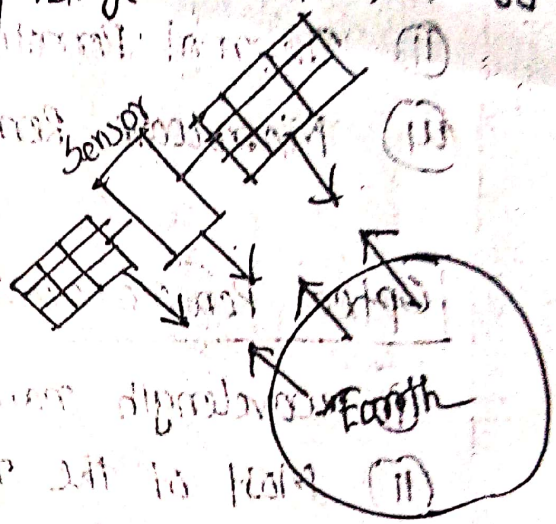


- Passive



Acting sensing

(I) The sensor emits radiation which is directed towards the target.
(II) The radiation reflected from that target is detected and measured by the sensor.
(III) It requires the generation of fairly large amount of energy to adequately illuminate target.



Advantages

the ability to obtain measurements anytime, regardless of the time of day or season.

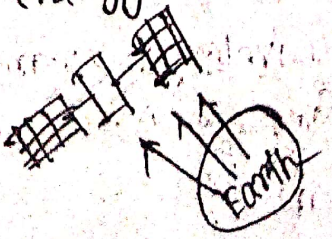
Example

(I) A laser fluorosensor
(II) A synthetic aperture radar (SAR)

Passive sensing

Remote sensing systems which measure energy that is naturally available are called **passive sensors.** It is used to detect energy when natural occurring energy is available.

In this case, sun provides a very convenient source of energy for remote sensing. The sun's energy is either reflected or absorbed or then reemitted.



Types of Remote sensing

Based on range of Electromagnetic spectrum

(I) Optical Remote sensing
(II) Thermal Remote sensing
(III) Microwave Remote sensing

Optical Remote sensing

(I) Wavelength range: 300nm to 3000nm
(II) Most of the remote sensors record the EMR in this range.

Thermal Remote sensing

(I) Wavelength range: 3000 nm to 5000 nm
8000 nm to 14000 nm
(II) Record the energy emitted from the earth.

Microwave Remote sensing

(I) wavelength range: 1mm to 1m
(II) Most of the microwave sensors are active sensors having their own source of energy. Ex. RADARSAT

What is satellite imagery?

Satellite imagery consists of photographs collected by satellite.

What does satellite imagery give you?

(i) satellite offers a global view.
(ii) It provides information on land cover, land use, habitats, landscape
(iii) multiple engagements by time series.
(iv) Mapping and monitoring changes and predict future.

Application of Remote sensing

(a) In Urbanization and Transportation
  (i) Urban planning
  (ii) Roads network and transportation planning
  (iii) city expansion
  (iv) Still city boundaries by time
  (v) Wetland declination
(b) Agriculture
  (i) Soil sensing
  (ii) Farm classification

(III) Farm condition assessment

(IV) Agriculture estimation.

(V) Mapping of farm and agriculture land characteristics.

(c) Natural Resource Management

(I) Forestry: biodiversity, forest, deforestation

(II) Waters source management

(III) Habitat analysis

(IV) Environmental assessment

(V) Pest outbreaks

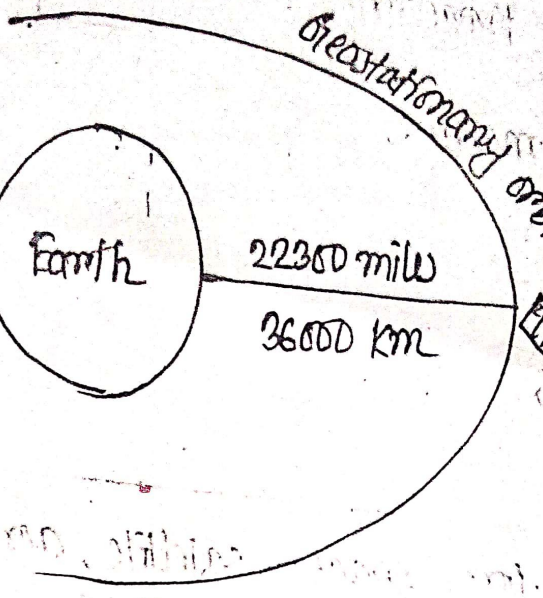
(VI) Hydrology

(VII) Geomorphology

Types of satellite

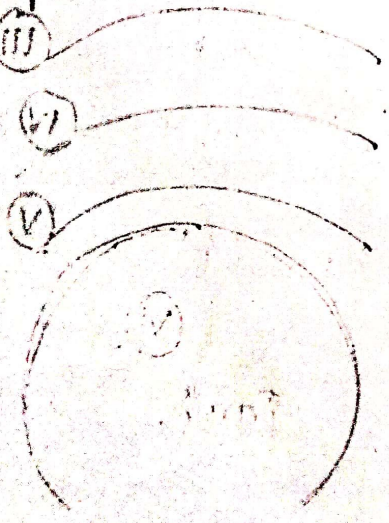
(I) Geostationary satellites

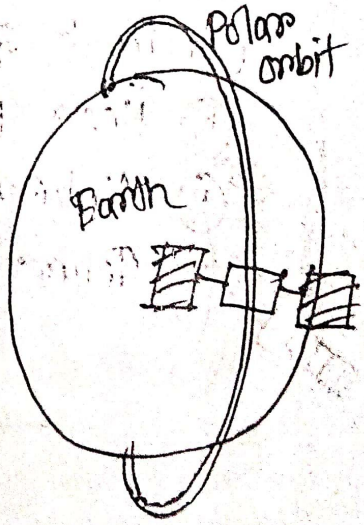
A geostationary satellite is one of the satellites which is getting remote sense data and located satellite at an altitude of approximately 36000 kilometres and directly over the equator.



(II) Polar-orbiting satellites

A polar orbit is a satellite which is located near to above the pole. The satellites mostly use for earth observation by time.





some image Processing software

(I) ERDAS Imagine
(II) ENVI
(III) ILWIS
(IV) ArcGIS

Area divided for space satellite, aeroplane.

From ground to above

(I) Inter planetary space
(II) Cislunar space
(III) Earth space
(IV) Near space
(V) Airborne
(VI) Terrestrial