Remote Sensing

***Remote Sensing is a technology that is used to collect information and examine an object, place, or phenomenon without making any physical contact with it.*** It is used in several fields like geography, geology, ecology, glaciology, hydrology, and oceanography.

# Definitions of Remote Sensing

Geographical techniques involve numerous aspects in it, and among these, one of the most important technique is Remote Sensing. The definitions of **Remote Sensing** are as under.

Eminent scholars Ralph W. Kiefer and Thomas M. Lillesand defined remote

sensing as-

> *Remote sensing is the science and art of obtaining information about an object, area or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area or phenomenon under investigation.*

India's National Remote Sensing Agency, which is now renamed as **National Remote Sensing Centre** or **NRSC** gave the definition (in 1995) of remote sensing as follows

> *Remote sensing is the technique of deriving information about objects on the surface of the earth*

*without physically coming into contact with them.*

If the term is broken down into syllables, then you can get two words– first one is *'remote'* which means *'distance'* (here *distant object* or *phenomenon*), and the second one is *'sensing'* that means *to sense* or *acquisition of information.*

## *Components of remote sensing*

## 1 Energy Source or Illumination (A)

The first requirement for remote sensing is to have an energy source of electromagnetic radiation to illuminate the target. Sensors can use either external Energy source(Sun) or have their own energy source of illumination. *•Sensors using external source of energy are called Passive remote*

*sensor.•Sensors Sensors using their own energy source called Active remote sensor.*

> *2 Energy Interactions with Atmosphere (B)The energy travels from the source to the target, It passes through the earth's atmosphere which contains obstacles such as haze, clouds, smog etc.*

## 3 Interaction with the Target (C) The electromagnetic

**Radiation that is not absorbed or scattered in the atmosphere can reach and interact with the Earth's surface.**

## 4 Recording of Energy by the Sensor (D)

When the energy has been scattered by, or emitted from the target, It is collected through a sensor (remote – not in contact with the target) and record the electromagnetic radiation.

## 5 Transmission, Reception, and Processing(E)

The energy recorded by the sensor has to be transmitted, often in

electronic form, to a receiving and processing station where the data are processed into an image (hardcopy and/or digital).

## 6 Interpretation and Analysis (F)

The processed image is interpreted and analyzed, visually or digitally or electronically, to extract information about the target which was illuminated.

## 7 Application (G)

- Geology: it is used for geological mapping;
- Hydrology: Used in monitoring wetlands and snow cover;

- Agriculture: Helps in identification of type of crop , crop condition monitoring, soil moisture measurement, and soil tillage and crop residue identification.

- Forestry: Useful clear-cuts and linear features mapping, biomass estimation, species identification and fire scar mapping;

- Oceanography: sea ice identification, coastal wind field measurement, and wave slope measurement.

- Shipping: for ship detection and classification. Coastal Zone: for shoreline detection, substrate mapping, slick

detection and general vegetation mapping.

- Military/Security Applications: Helps in detecting or locating metal objects.