REMOTE SENSING
(REMOTE SENSING & GIS)

UNIT – II

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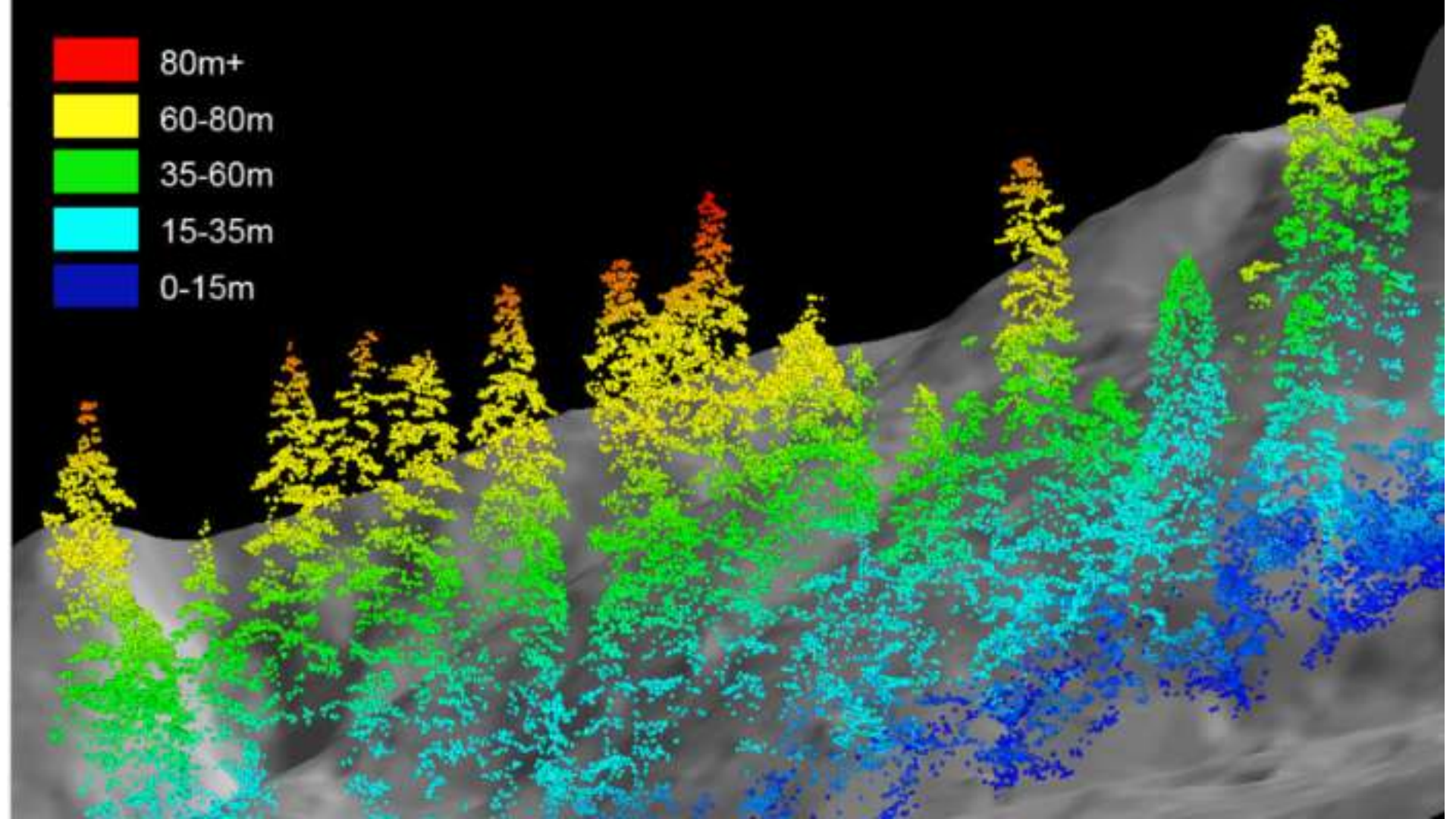
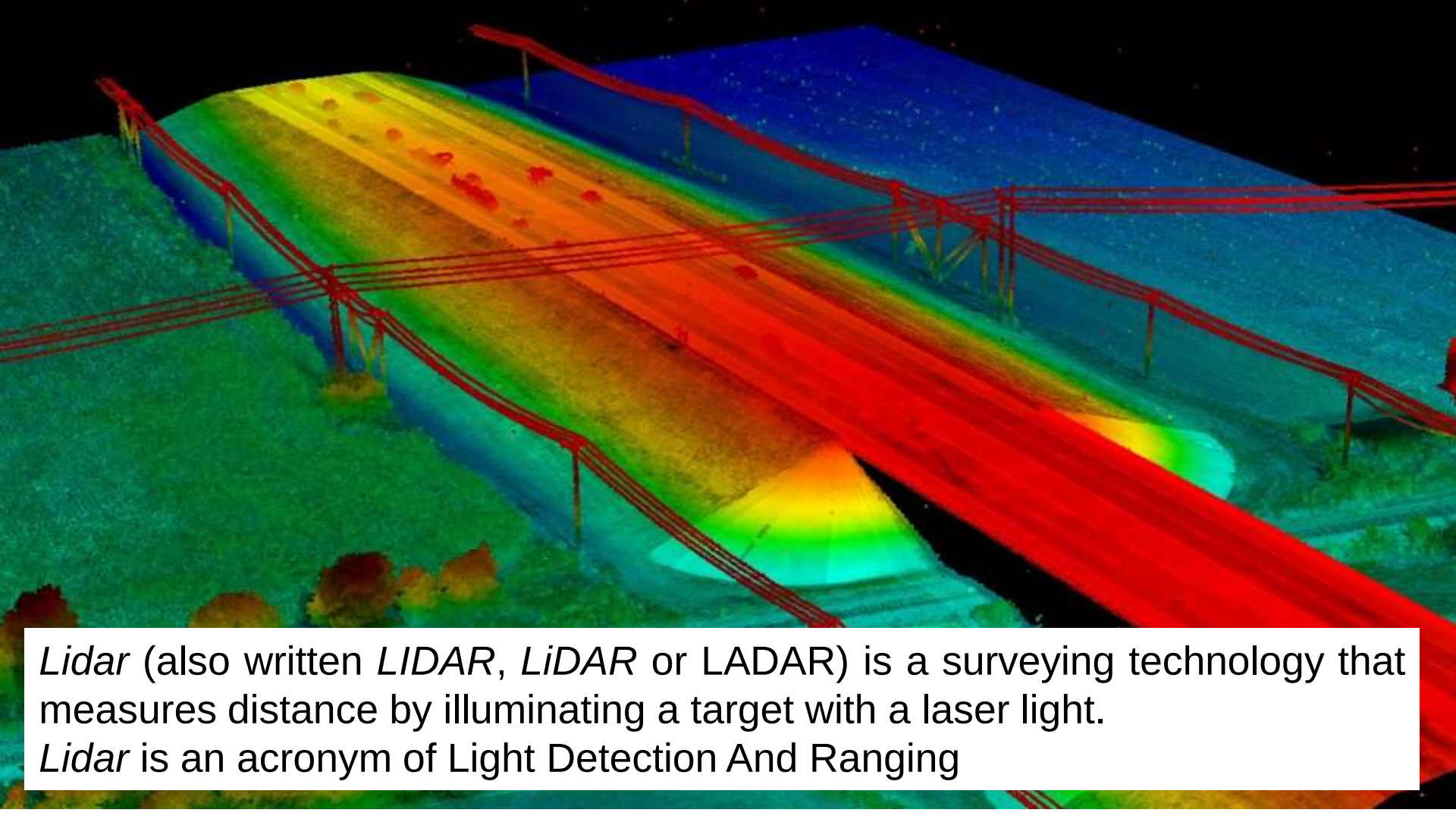

80m+
60-80m
35-60m
15-35m
0-15m



Lidar (also written *LIDAR*, *LiDAR* or LADAR) is a surveying technology that measures distance by illuminating a target with a laser light.
Lidar is an acronym of Light Detection And Ranging

Topics

1. Basic Concepts
2. Data and Information
3. Electromagnetic Spectrum
4. EMR Energy Interaction with Atmosphere and Earth Surface Features
5. Indian Satellites and Sensors
6. False Color Composition (FCC)
7. Introduction to Digital Data and Visual Interpretation Techniques
8. Advantages and Limitations

Introduction

Remote Sensing is the science and art of acquiring data **(spectral, spatial, and temporal)** about objects, area, or phenomenon, without coming into physical contact with the objects, or phenomenon under investigation.

Electro-magnetic radiation which is reflected or emitted from an object is the usual source of remote sensing data.

A device to detect the electro-magnetic radiation reflected or emitted from an object is called a **"remote sensor" or "sensor".** Cameras or scanners are examples of remote sensors.

A vehicle to carry the sensor is called a **"platform"**. Aircraft or satellites are used as platforms.

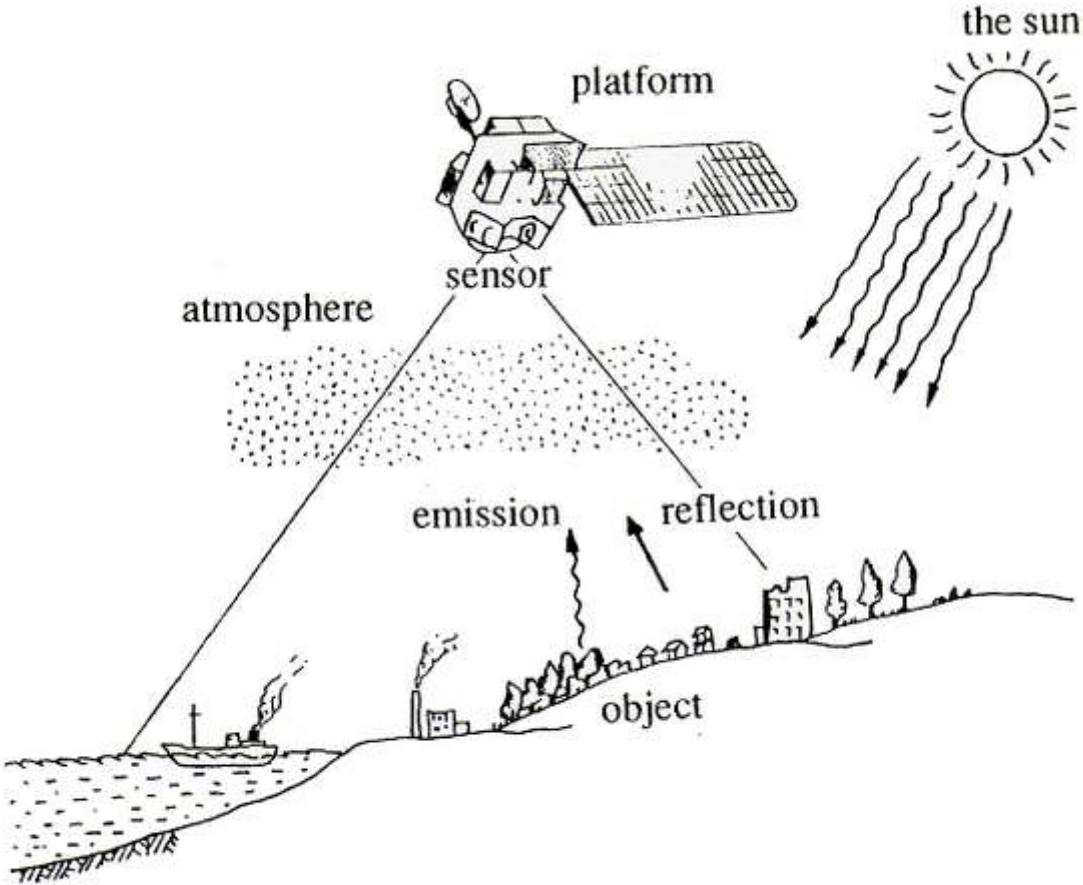
Data vs Information

Data can be any character, text, words, number, pictures, sound, or video. Data usually refers to raw data, or unprocessed data.

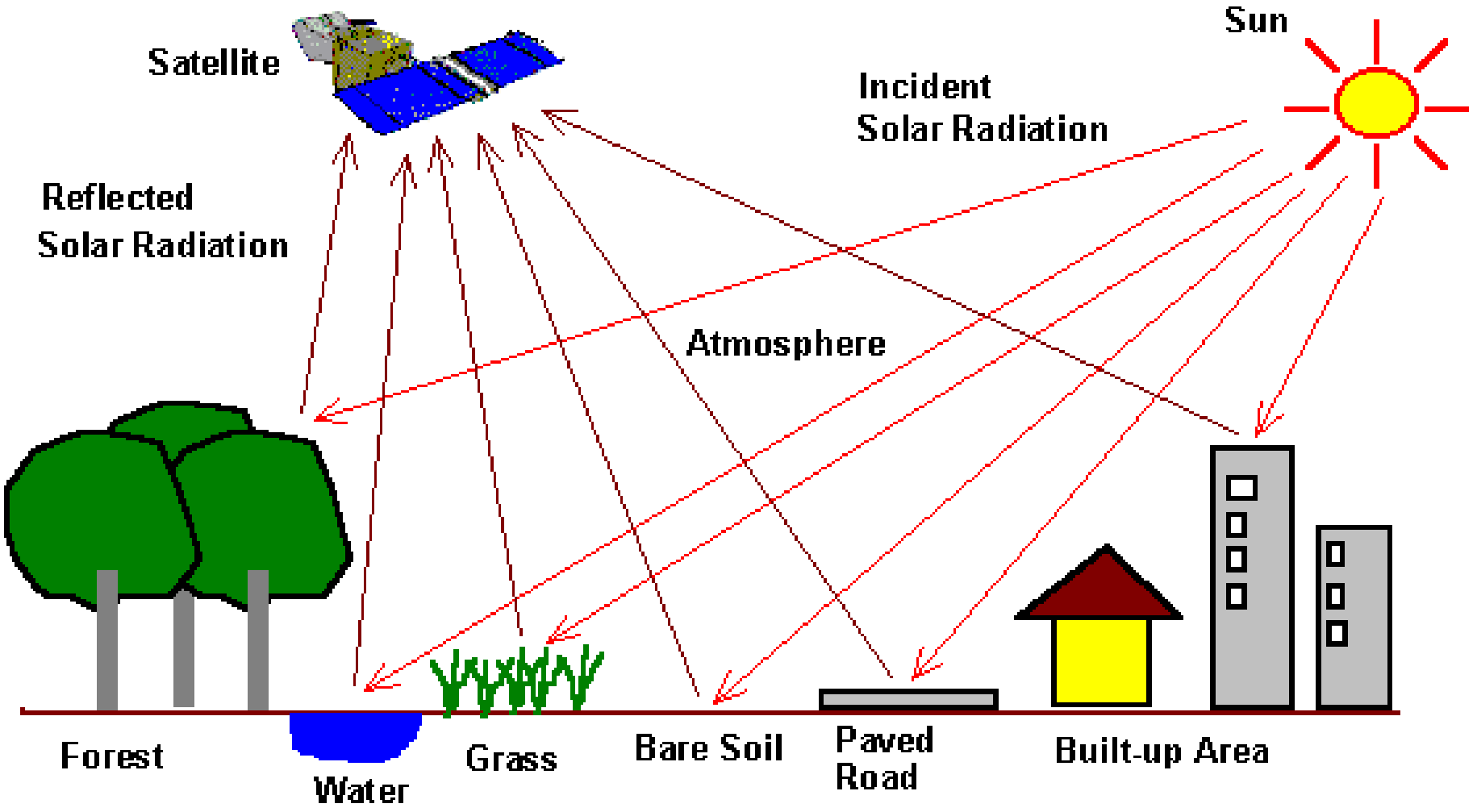
Ex.: Aerial Photograph, Satellite Image etc.,

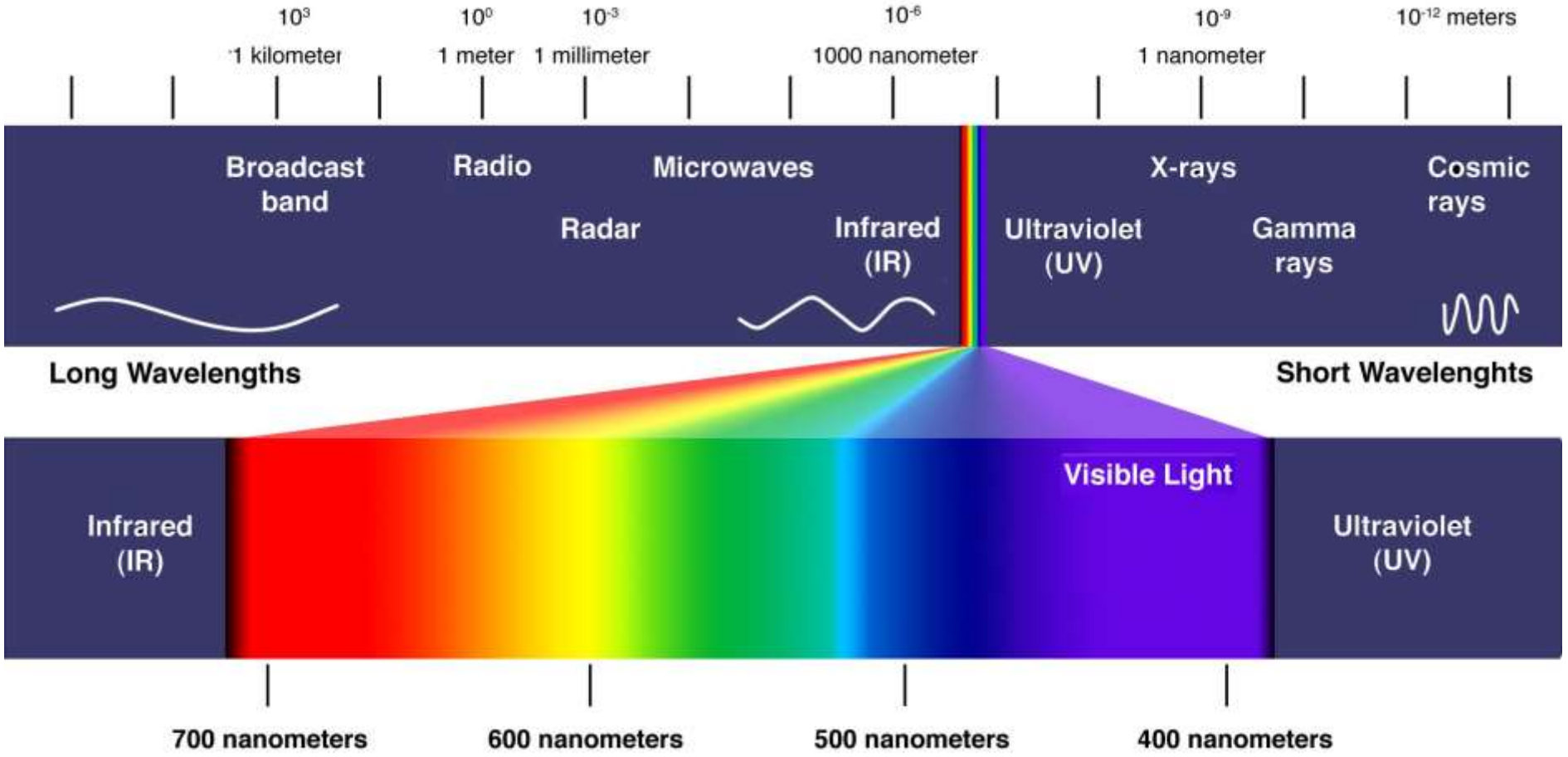
Once the data is analyzed, it is considered as information.

Ex: Topography, Contours, Elevation, Roads, Buildings etc.,

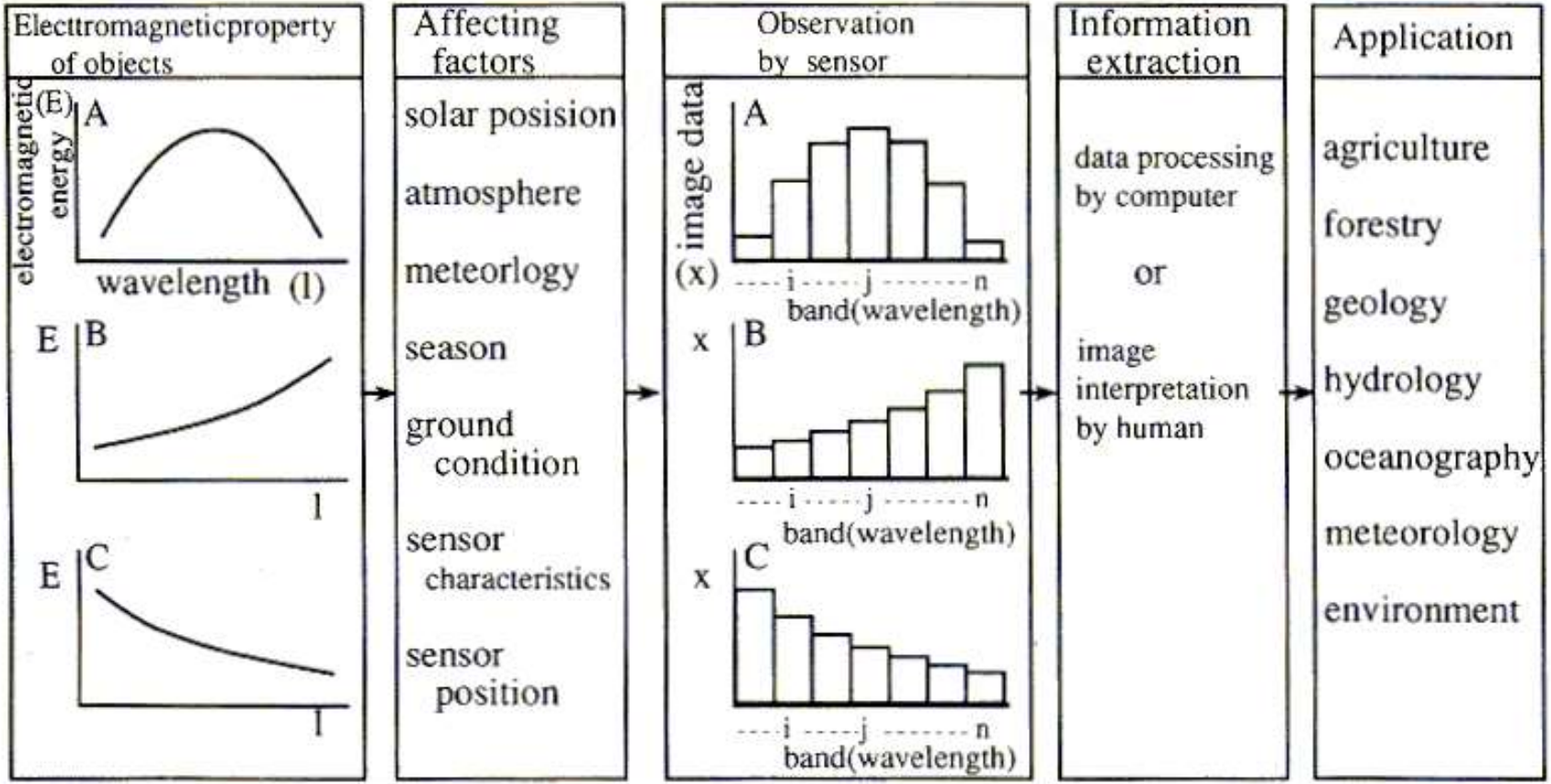


Data collection by remote sensing


Satellite
Sun
Incident
Solar Radiation
Reflected
Solar Radiation
Atmosphere
Forest
Water
Grass
Bare Soil
Paved
Road
Built-up Area



Medium = Electro Magnetic Radiation (EMR)



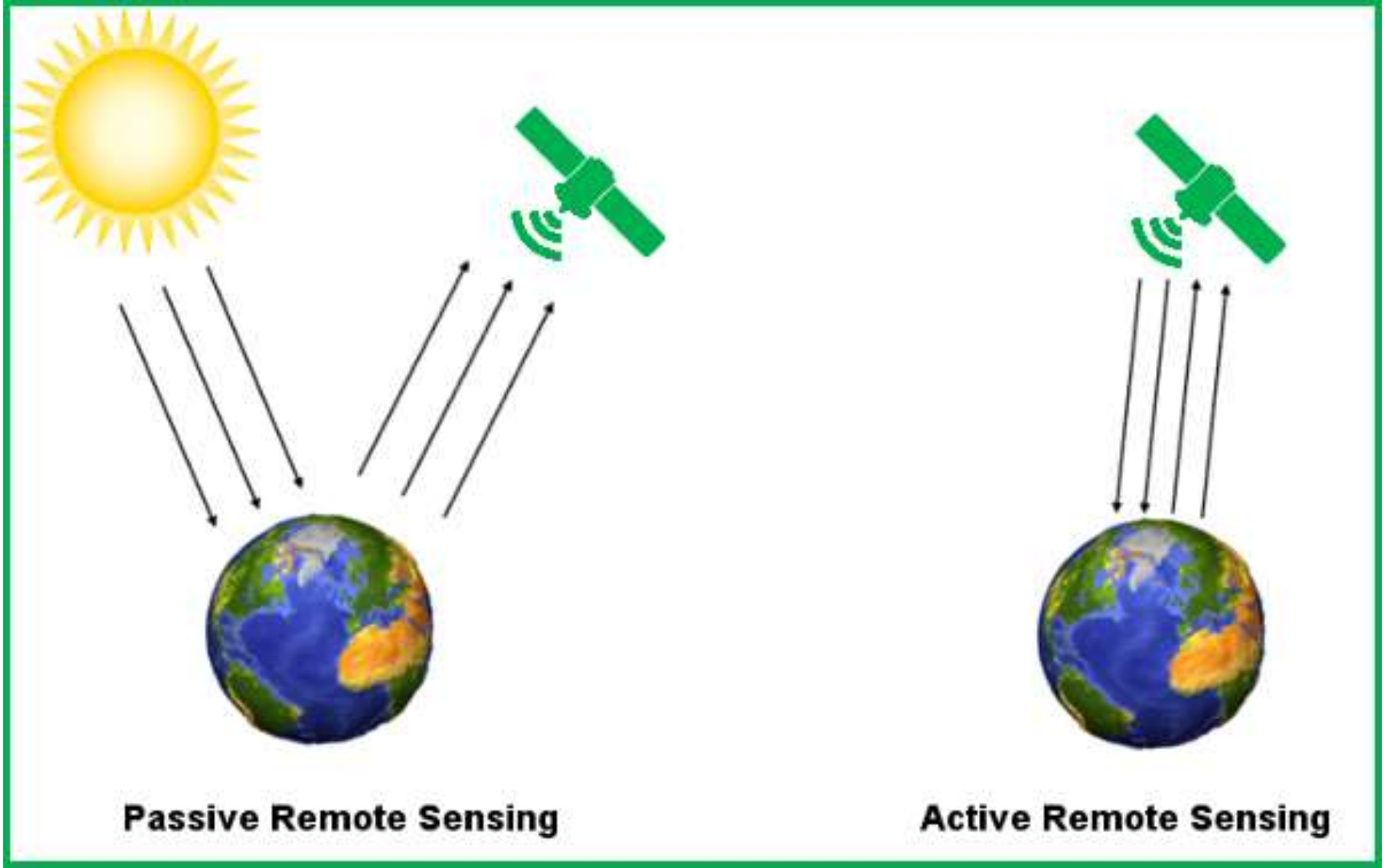
Flow of remote sensing

Types of Remote Sensing

1. **Visible and Reflective Infrared Remote Sensing**
   The energy source used in the visible and reflective infrared remote sensing is the sun. The sun radiates electro-magnetic energy with a peak wavelength of 0.5 m

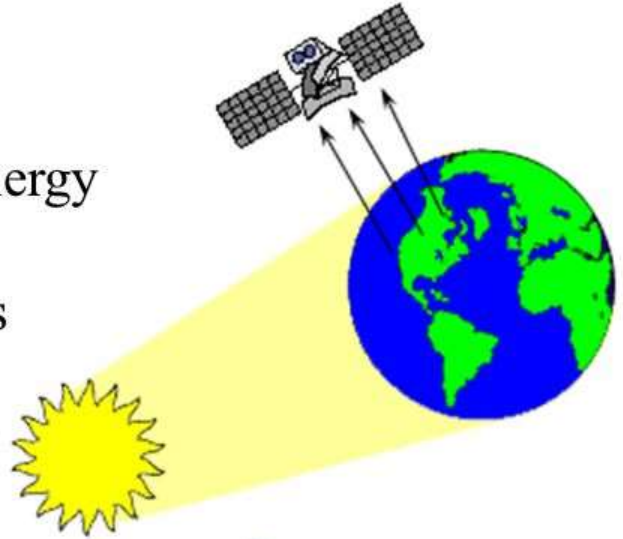
2. **Thermal Infrared Remote Sensing**
   The source of radiant energy used in thermal infrared remote sensing is the object itself, because any object with a normal temperature will emit electro-magnetic radiation with a peak at about 10 μm

3. **Microwave Remote Sensing**
   a) Passive Microwave Remote Sensing
   b) Active Microwave Remote Sensing. Ex. Radar


Passive Remote Sensing
Active Remote Sensing

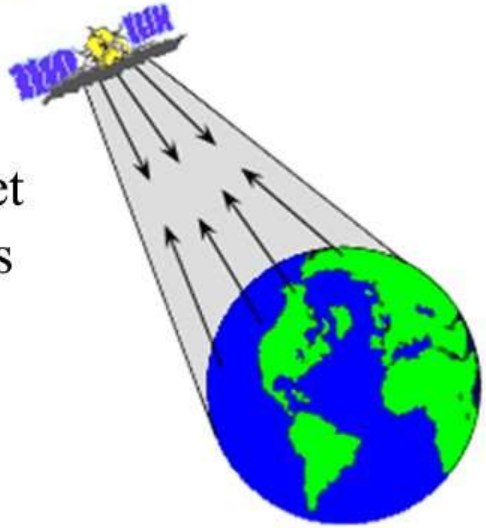
Passive Sensors

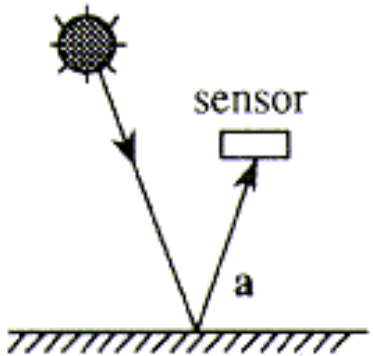
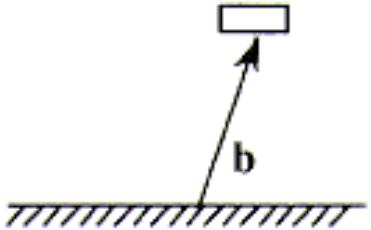
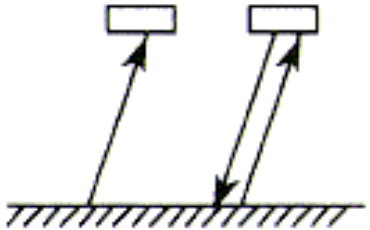
Measure ***naturally-available*** energy (eg. thermal infrared radiation emitted from the Earth 24 hours per day, but solar reflected radiation only during solar day)

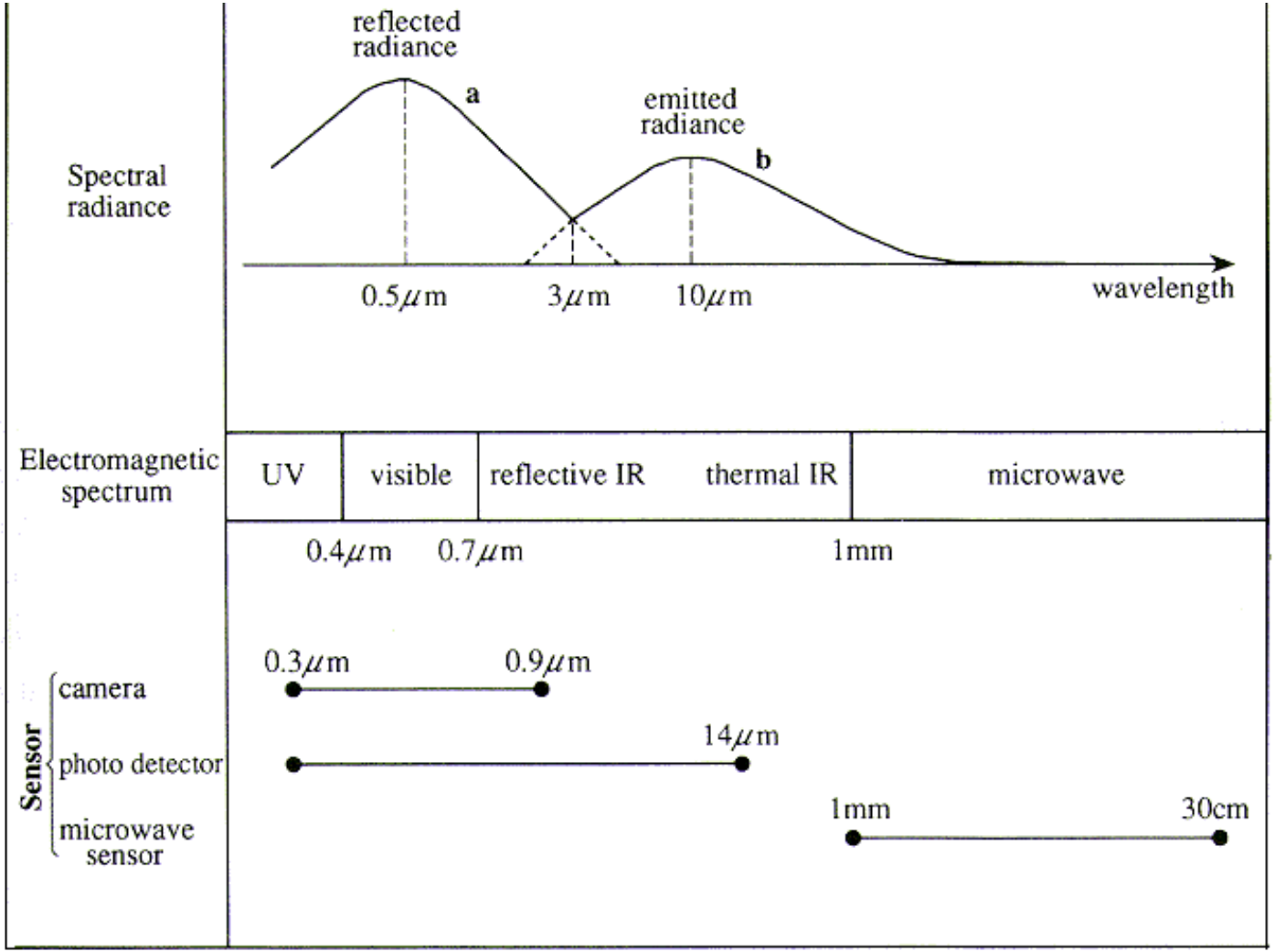


Active Sensors

Sensor ***emits radiation*** toward target
Reflected radiation in emitted bands are detected and measured (eg. microwaves emitted)



	Visible · reflective IR remote sensing	Thermal IR remote sensing	Microwave remote sensing	
				
Radiation source	the sun	object	object	radar
Object	reflectance	thermal radiation (temperature, emissivity)	microwave radiation	backscattering coefficient


reflected radiance
a
emitted radiance
b
Spectral radiance
0.5μm
3μm
10μm
wavelength
Electromagnetic spectrum
UV
visible
reflective IR
thermal IR
microwave
0.4μm
0.7μm
1mm
Sensor
camera
photo detector
microwave sensor
0.3μm
0.9μm
14μm
1mm
30cm