

REMOTE SENSING BASICS

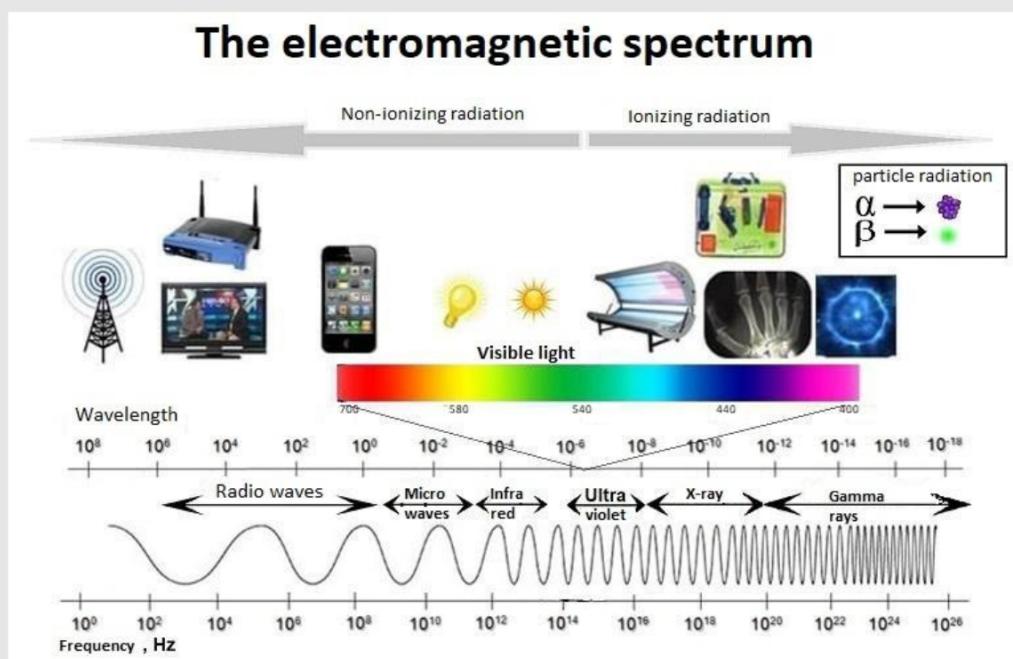
Notes Week 2

Remote sensing

- Measurement of some property of an object by a recording device that is not in physical contact with the object
- composed of :
 - sensor**
 - platform to carry sensor**

Sensor System

- records **electromagnetic (Em)** radiation detected as a combination of reflected solar radiation & emitted radiation by an object

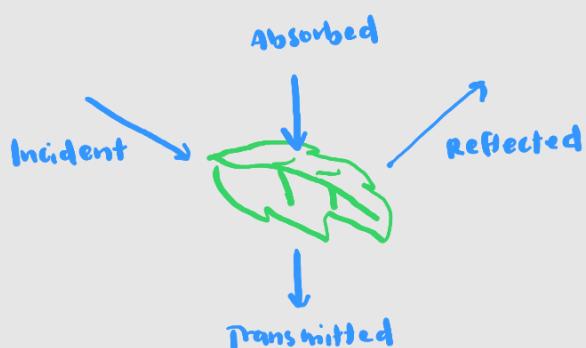


λ = wavelength (m)

f = frequency
(cycle/s, Hz)

c = speed of light
(3×10^8 m/s)

Light Interaction:



Types of Platforms:

Satellites Aircraft Ground systems

Why Remote sensing?

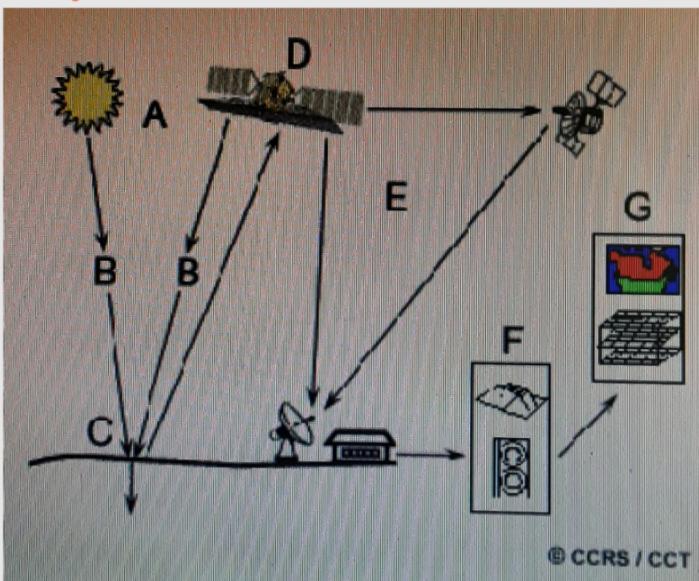
- Less expensive than ground data
- Provides 'bird's eye' (synoptic) view
- senses data that humans are incapable of measuring
- Allows for various spatial & temporal scales

time

Sensor Types:

Land Observing Sensors and their Features					
Weather, Global Coverage Satellites					
Sensor Name	Pixel Resolution	Swath Width, km	No. Spectral Bands	Spectral Coverage	Temporal Repeat, days
AVHRR	1.1km	2700	5	VNIR, TIR	4/day
SPOT Vegetation	1.15km	2250	4	VNIR, SWIR	26
MODIS	0.25, 0.5, 1km	2330	36	VNIR, SWIR, TIR	2* day
Regional Satellites					
Sensor	m	km	bands	Spectral	Repeat
ASTER	15, 30, 90	60	16	VNIR, SWIR, TIR	16
Landsat TM	30, 120	185	7	VNIR, SWIR, TIR	16
Landsat ETM+	30, 60, 15	185	8	Pan + TM	16
SPOT HRV	10, 20	60	4	Pan, VNIR	26
SPOT HRVIR	10, 20	60	5	SWIR + HRV	26
Local Coverage Satellites					
Sensor	m	km	bands	Spectral	Repeat
Quickbird	0.61 Pan, 2.44	16.5	5	Pan, VNIR	2 to 11
IKONOS	1.0 Pan, 4	11.3	5	Pan, VNIR	3
AIRCBORNE Instruments					
Sensor	m	km	bands	Spectral	Repeat
AVIRIS, Hypmap	4, 20	2 km, 10 km	168 - 224	VNIR, SWIR	on demand
CASI-2	5-Jan	1 km - 2.5 km	48-288	VNIR	on demand
ADAR-5500	0.5 - 3	1 km - 2.5 km	4	VNIR	on demand

Interaction between Incident Radiation & Targets of Interest



(A) Energy Source / Illumination

-provides electromagnetic energy to target of interest

(B) Radiation & Atmosphere

-as energy travels from source to target, it will come in contact with & interact with atmosphere it passes through

(C) Interaction with Target

-energy interacts with target depending on properties of target & radiation

(D) Recording of Energy by Sensor

-sensor collects & record EM radiation

(E) Transmission, Reception, Processing

-energy to be transmitted in electronic form to a receiving & processing station (data processed into image)

(F) Interpretation & Analysis

-processed image is interpreted to extract information about illuminated target

(G) Application

-Apply information extracted from imagery about target to better understand, reveal new information, or assist in solving a particular problem