

Paper-- REMOTE SENSING, GIS AND GPS

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Topic:- Unit-1 (CONCEPT OF RESOLUTION AND THEIR TYPES OF REMOTE SENSING SYSTEM)

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Sensor Resolution

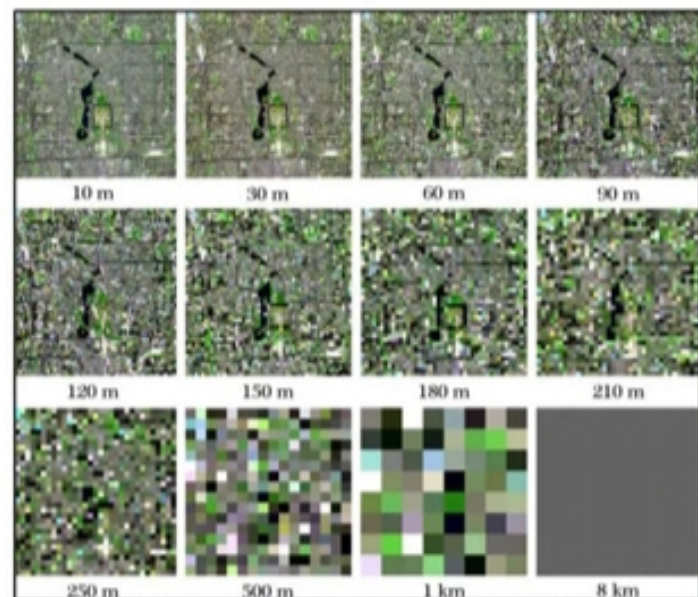
- Data collection system has four major resolutions associated with it(Spatial, temporal, spectral, and radiometric resolution). Resolution or resolving power is defined as a measure of the ability of an optical system or other sensor to distinguish between signals that are spatially near or spectrally similar.

TYPES OF RESOLUTION:-- Resolution of Remote Sensing System has been divided into four major types. These are -

1. Spatial Resolution.
2. Spectral Resolution
3. Radiometric Resolution.
4. Temporal Resolution

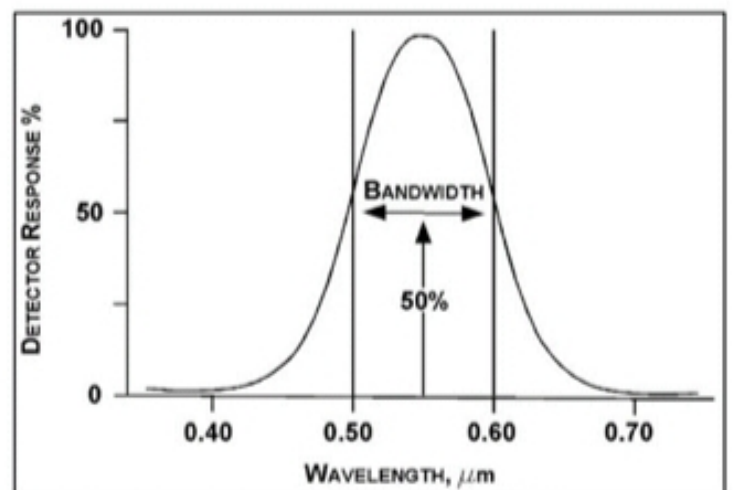
Spatial resolution

- The detail discernible in an image is depend on the spatial resolution of the sensor and refers to the size of the smallest possible feature that can be detected.
- The **IFOV**(instantaneous field of view) is the angular cone of visibility of the sensor and determines the area on the earth's surface(represented by a pixel in the image), which is seen from a given altitude at one particular moment of time. This area on the ground is called the **resolution cell** and determines a sensor's spatial resolution.



Spectral resolution

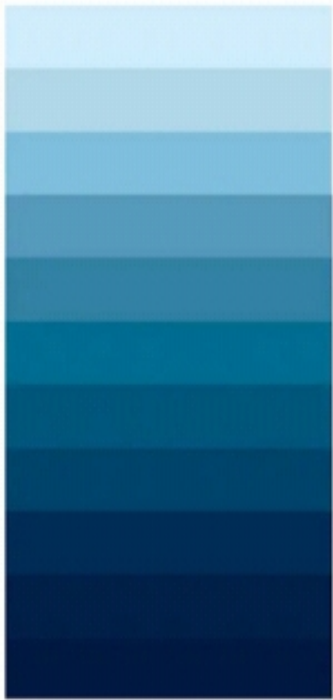
- The spectral resolution refers to the number of spectral bands, individual bandwidths, and the entire range of EMS covered by the bands.
- High spectral resolution is achieved by narrow bandwidths which, collectively, are likely to provide a more accurate spectral signature for discrete objects than broad bandwidths.



Radiometric resolution

- As the arrangement of pixels describes the spatial structure of an image, the radiometric characteristics describe the actual information content in an image. Whenever an image is acquired on film or by a sensor, its sensitivity to the magnitude of the EME determines the radiometric resolution.
- The finer the radiometric resolution of a sensor is, the more sensitive it is for detecting small differences in reflected or emitted energy.
- The number of radiometric level (may also be referred to as brightness level or grey level) is commonly expressed in terms of the number of binary (base two) digits (bits).

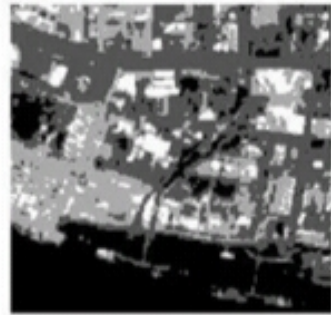
Bits	shades
2^1	2
2^2	4
2^4	16
2^6	64
2^8	256



2 - levels



4 - levels



8 - levels



16 - levels



Temporal resolution

- The temporal resolution of a remote sensing system refers to how often it records imagery of a particular area, which means the frequency of repetitive coverage. For e.g. IRS-1A sensors had 22 days temporal resolution.
- Hence, low temporal resolution refers to infrequent repeat coverage, while high temporal resolution refers to frequent repeat coverage.

