

Remote sensing

- ❖ **Remote sensing** is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to in situ observation.
- ❖ In modern usage, the term generally refers to the use of aerial sensor technologies to detect and classify objects on Earth (both on the surface, and in the atmosphere and oceans) by means of propagated signals (e.g. electromagnetic radiation).
- ❖ It may be split into active remote sensing (when a signal is first emitted from aircraft or satellites) or passive (e.g. sunlight) when information is merely recorded.
- ❖ **Earth observation** is the gathering of information about the Earth's physical, chemical and biological systems via remote sensing technologies.
- ❖ **Earth observation satellites** are satellites specifically designed for Earth observation from orbit, similar to spy satellites but intended for non-military uses such as environmental monitoring, meteorology, map making etc.

History of Remote Sensing

- Up to the present time, the remarkable development in remote sensing as a science and as instrumentation and software is mainly controlled by the military research.
- Remote sensing started at 1909, based on aerial photography.
- Through several stages, the first satellite to collect data on the Earth's natural resources was Landsat-1, launched on 1972.
- It is followed by the landsat series up to landsat-8, launched 2013.
- ASTER satellite launched at 1999.
- Since then, a large number and advanced types of remote sensing systems of very high resolution have been developed.
- The Spot Satellite series: SPOT-1 launched 1986, up to SPOT-7 launched 2014.
- *IKONOS* satellite was launched on 1999.
- GeoEye satellite launched in September 2008
- QuickBird-I and II were launched in 2000 and 2001, respectively.
- OrbView-2 and 3, launched 1997 and 2003, respectively.
- WorldView-1, 2, and 3, launched at 2007, 2009, 2014, respectively.

details about landsat

Instrument	Launched	Terminated
Landsat 1	23 July 1972	6 January 1978
Landsat 2	22 January 1975	25 February 1982
Landsat 3	5 March 1978	31 March 1983
Landsat 4	16 July 1982	14 December 1993
Landsat 5	1 March 1984	5-June, 2013
Landsat 6	5 October 1993	5 October 1993
Landsat 7	15 April 1999	Still active
Landsat 8	11 February 2013	Still active

Most popular satellite images

Type		Bands	Resolution	Max. mapping scale
			m/pixel	at full size view
Landsat	MSS	4	60	1:100,000
	TM	7	30	1:70,000
	ETM	9	15	1:50,000
	ETM	11	15	1:50,000
Spot-4 (Panchromatic)		1	10	1:40,000
Spot-5 (Multi spectral)		4	10	
			5	1:20,000
			2.5	1:10,000
GeoEye (Panchromatic)		1	2 upto 0.5	up to 1:500
GeoEye (Multi spectral)		4 or 8		
Quickbird (Panchromatic)		1		
Quickbird (Multi spectral)		4 or 8		
World wiew (Panchromatic)		1		
World wiew (Multi spectral)		4 or 8		

Remote sensing Software :

1-ENVI.

2- ERDAS Imagine.

3- PCI Geomatics.

4- ER Mapper.

5- IDRIS.

Remote sensing applications

- 1- In regional and detailed geological mapping and interpretation.**
- 2- In mineral exploration.**
- 3- In Archeology.**
- 4- In agriculture.**
- 5- In environmental studies.**
 - In change detection.**
 - In water pollution.**
 - In sea surface temperature changes.**
 - In ice cover changes.**
- 6- In land use and development planning.**
- 7- Height measurements based on Digital elevation data (DEM).**

Black and white TM lanst-band 1



TM landsat-band combination 3,2,1



TM lansat-band combination 7,4,2

