www.ijecs.in
International Journal Of Engineering And Computer Science ISSN: 2319-7242
Volume 7 Issue 10 October 2018, Page No. 24377-24391
Index Copernicus Value (2015): 58.10, 76.25 (2016) DOI: 10.18535/ijecs/v7i10.09

Remote Sensing Devices and Their Influences

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Abstract:
Today, several remote sensing sensor technologies are utilized to the purpose visualizing remotely sensed data, with special developed software sets. Hence, this essay provides Remote sensing techniques that expose range of applications to everything can be imagined, in the space, as soil investigations, human detection, weather, mineral discover, maladies symptom and whatever you imagine. This analysis uses aerial, wireless, satellite, and microwaves.

1.Introduction:

Remote sensing is the science of obtaining information about objects on Earth without any physical contact. This science begins in 1038 when an Arabian Mathematician Al Hazen (Hasen) explored the camera and explained the camera obscure in order to observe the sun eclipse, related to the word photography is derived from Greek from two assembled words "photo" which means "light" and "graphien" which means "writing". [1 2]

The sensed technologies as the satellite and the aircraft detect substance on the planet , including on the atmosphere , oceans , water , minerals , humans , military , vegetation ,weather , wetland , volcanoes , forest , forest fires, oil ,gas , mapping uranium, locations and items on outer space.

There are science and machine to study and sense a requested object related to its type, by example if you want to sense the weather, the usable science is meteorology which study the behavior of the incident that occur in the atmosphere within the time, and collect data then estimate some observations. For example, produce the amount of clouds in the sky or determine wind direction, the produced observations are called sensory observations. However, the touch is not enough and there is need to use some instruments to collect again data. For example, while a person can feel that the air pressure is rising of failing, he cannot know the quantity value of it, so a checkup by using of an instrument as in the follow Figure 1.

Figure.1 tansmissometer

A part of these devices are classical and can be used at home other are advanced meteorological materials. Some of them are listed down

2.Transmissometer:

Transmisometar is a creative machine to measure the degree of heat, it has a light source and detector, the source emits a certain quantity of light and the detector receives the light and produces electrical voltage proportional to the intensity of the light. The resulted measures travel trough water or air in order to make calculation about viability.

3. Water presence:

To discover the presence of oceans, seas and lakes, by using the remote sensing science techniques and their devices, also by utilizing some of the Features to examine air, land, water, and environment which point toward their existences. Furthermore there is necessity to check the quality of water so many methods applied to be sure of clarity.

4. Discovery of Gold:

Furthermore there is some of remote sensor machine also some of tool to find gold, the quartz vein which indicate toward the gold found in small sizes and it is sensed by these machines and tools , one of method to retrieve gold is through the alteration zone mapping; this is well known methodology in remote sensing prospecting. The second method is the LANDSAT enhanced Thematic Mapping (ETM+) of multispectral remotely sensing datasets, the third is the Advanced Space borne Thermal Emission and Reflection Radiometer (ASTER), the applied enhancements techniques methods are useful in identification, detection, color composite, band rationing, principal analysis, delineation of rock units, hydrothermal alterations, geologic structures, and spatial filtering in the research area of the Nuba Mountains, Sudan.

In addition in North east of Iran some of detected types of Gold, at first the workers detect the iron oxides which are volcanic and plutonic minerals by the ETM, the second stage is process the data by ENVI software, to analyze and produce color composites, Band Ratios, Principal Component analysis, and iron oxide minerals, after that and based on field observations the area covered by another very good iron oxides enhanced, as example in the follow Figure 2.

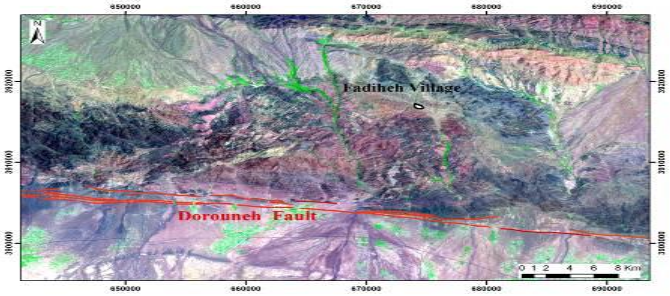


Figure 2

5. Weather Sensing:

In addition there are tools of sensing which can measure the weather by phenomena with electromagnetic energy such as:

i. Satellite (by light).
ii. Infrared Scanner on Satellites (by Heat).
iii. Doppler Radar (by Radar Waves).

Remote Sensing offers us overview which determines the state of forecast and the global warnings of environment in large regions. These tools can measure energy at wavelengths which are beyond the range of human vision. For example one method which helps the subscriber to derive forecasts, weather watches, and warning is using weather satellites.

6. Weather Satellites:

Polar Orbit Satellites

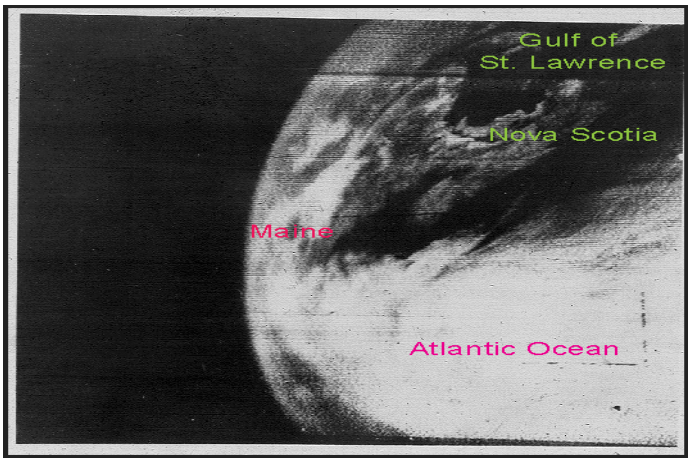


Figure 3. First television picture from space. TIROS-1 Satellite, April 1, 1960.

On April 1, 1960 the first meteorological satellite, is launched from Cape Canaveral. The satellite called TRIOS for Televesion Infrared Observation Satellite; it studied the earth's cloud.

TRIOS showed clouds lined and assembled together in unexpected ways. As result of TRIOS showing from the surface, no interpretation of the cloud patterns and no forecast results prepared, so requirement to observe from an orbiting satellite have to show.

A TRIOS was a polar orbiting satellite which orbits in a latitudinal motion over the north and south poles. Nowadays, polar orbiting satellite round the Earth 14 times daily.

Now in the space there are morning and afternoon satellites passes, which offer global coverage four times daily.

The advantages of polar orbiting satellites are different some of them closer of orbit which provide clear and detailed images, and excellent views of the Polar Regions.

The disadvantages are that, first of all the satellites cannot explore the entire earth's surface at one time; second reason of change of orbits path on each earth's rotation so no two images are from the same location, third limited images and high costly to orbit satellite which is out of observation most the time cause the earth's horizon.

7. Geostationary Satellites:

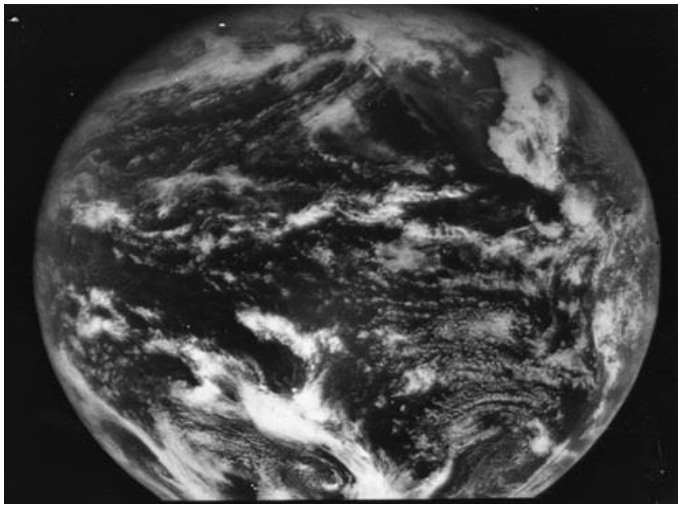


Figure 4 NASA image from ATS-I, December 11, 1966, the first geostationary satellite.

After that some changes are made, in 1966 invent of geostationary satellite as example the above Figure 4. Unlike polar orbiting satellite, geostationary satellites orbit fixed over equator at highest altitude 22,237 miles above the earth's surface, and it runs complete orbit of the earth in 24 hours.

In the past geostationary were "spin stabilized" means were positioned at a point by rotating, hence it watching the earth for only 10% of time. But nowadays satellites are stabilized in a way that they always view the earth.

There are many advantages of staying of satellites above fixed on the surface relative to the earth, one they offer an overview of severe weather such as tomatoes, flash floods, hail storms, and hurricanes, second they film images every minutes, third they observe the clouds and study their behaviors, fourth they also receive remote automatic data collected from balloons and other meteorology tools around the world.

Some disadvantages of geostationary satellites as the position of geostationary is very far in the space which provides less detailed views of the earth.

8. Remote Sensing of fire:

Vegetation burning is global environmental phenomenon, which is happen in the forest everywhere within the globe, an estimation that during the year approximately 3500 km^2 of green are burning, resulting ,emission of co2, increasing in temperature, loss of photosynthetic signal, decrease in vegetation and highest of others warning. So a big needs to monitor the nature, and interpret the expected burning area as in the below Figure 5.

Remote sensing of fires, runing by observable from the space, there are four types of spectral signal to discover the presence of burning, direct radiation from the flame front ,from the heat and light presence, aerossols from smoking ahead, altered vegetation, live fire analysis relies on thermal signal, burned area analysis is based on burn and scratch signals. Some of problems which involve the remote sensing of fires, signal resolution, clouds, smoke, vegetation cover, and target spatial pattern.

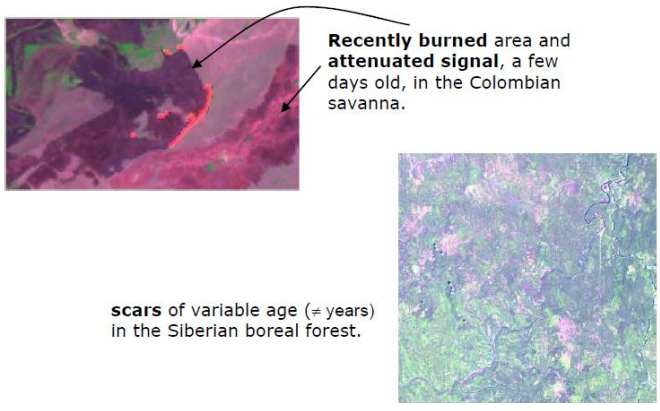


Figure 5. Remote sensing of the fire.

9. Remote Sensing of vital signs- protect health care workers from pathogens:

Figure 6. Vital-protect sensor

West Africa Ebola is dangerous sickness which attacks the people, how the health care workers can save their lives across the disease. Several workers have died in Guinea, Liberia, and Sierra Leon since the start of outbreak, so a necessity to the new invention, wearable wireless sensor vital sign which monitor the presence of Ebola malady to highlights the dangerous conditions which conduct their life-saving. There are several advantages of using remote sensing of vital signs, for health care staffs as in the below Figure 6. Also, for patients who achieved vital signal result every 6 to 8 hours. To acquire these results, health care workers have to cover themselves by special dress in PPE, which alarm by ring in infection control measures.

10. Detect Human presence with specific tools:

Sensor or technique that used to detect human presence in a place which as on fire, take as example First tool, Infrared, which finds the cooler object, or human-shaped the hotter object in cooler rooms. Second tool, PIR/ pyroelectric sensors which detects the human motion , there is no ability for these instruments to sense the human without movement. Third tool, Audio sensor, the device can sense the audio noise of the fire, or fetches for pattern of talking, screaming, shouting, and breathing and even heartbeats. Fourth tool, Radio waves, the device can detects human by utilizing wireless internet, MIT creates a way to sense moving persons through walls using wireless signals. Fourth tool, Radar , also can fetches person existence or group of person, by detect motion. Fifth tool, Microwave sensors, their work is similar to the radar instruments. Sixth tool, Cellphone or mobile signals, it is not really sensing, but the device fetches for human through his mobile phone with him, it may be an indicator of individual presence.

11. Example of device for fetching human presence with or without motion:

Take example of tool, typical pyro-electric which is sensor to detect human presence that rely on motion detection, additionally the D6T thermal sensor is capable to detect the presence of immobile humans by detecting body heat as the below example in the follow Figure 7, and can therefore be used to switch off unnecessary lighting, air conditioning, etc automatically when people are not present either they move or not.

As the D6T sensors are also able to monitor the temperature of a room, they can also be used to maintain optimal room temperature levels, instantly sense unusual changes in temperature, thereby detecting factory line stoppages, or discover areas of overheating for early prevention of fire bursts, etc.

Thermal sensors utilize the see-beck result in which thermoelectric force is generated due to the temperature difference at the contact points between two different kinds of metal. A thermopile is created by serially connecting thermocouples consisting of N+ poly Si, P+ poly Si, and Al. By creating hot junctions on highly heat-resistant dielectric membranes, and cold junctions on highly heat-conductive silicon, it is possible to achieve high-speed response and high-energy conversion efficiency to infrared rays, to temperature, or thermo-electric force. While standard thermal sensors are only able to measure temperature at one certain contact point, the D6T can measure the temperature of an entire area. Signals generated by infrared rays are usually extremely weak, and high-sensitivity detection is therefore very difficult to achieve.

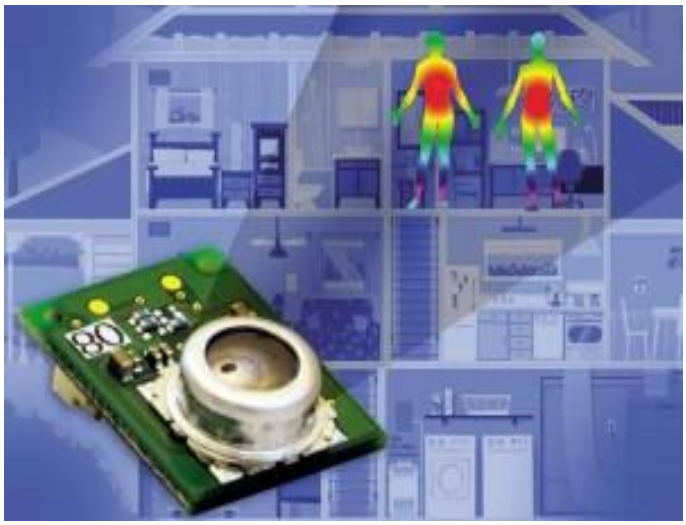


Figure 7. Device to fetch human without motion.

12. Arial photography for military surveillance:

Bavarian pigeon corps which is method uses their pigeons to carry messages, for aerial reconnaissance and it was utilized by German military in order to spy on enemy positions.

13. Map Remote Sensing:

Remote Sensing is utilized to map land cover and land use changes with different techniques and data sets. Landsat images are serving a great deal which cover the entire globe at a larger different scale. Recently several change detection techniques have been developed that make use of remotely sensed images. A diversity of detection techniques and algorithms have been established and appraised for their advantages and disadvantages.

14. Usage Examples of Map Remote Sensing as in the below Figure 8.:

Diversity remote sensing and GIS application is developed to address a wide range of transportation issues below some examples of:

i. Building map for visual reference, diversity *mapping technologies are produced by using of Remote Sensing take examples Google maps, Bing maps, open street maps, NASA's Globe view, etc.*

ii. *ANALYSIS OF ROAD TRAFFIC WITH SAR IMAGERY AS, BELOW IN THE FIGURE EXAMPLE OF LARGE NUMBER AND VARIETY OF EXTRACTED FEATURES AT M-5 AND 12 MILE ROAD.*

Figure 8. Example of features extracted at a Road.

iii. Land Use/Land Cover Classification Map as such, below MTRI is exploring of green areas which appear with contrast and red areas are rough in the Figure 9.

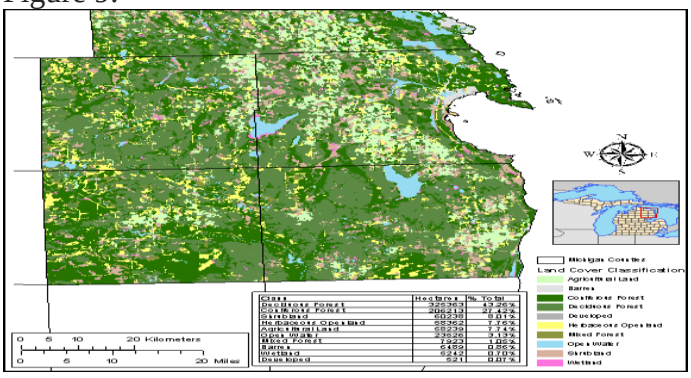


Figure 9. Example of Land Use / Land Cover Classification Map

Data visualization Synthetic Aperture Radar (SAR) can catch images day or night under clear or cloudy conditions. SAR imagery contains a wealth of information, including material composition, texture, and water content. Radar images also contain a certain level of noise, which may relate to surface roughness. As such, MTRI is exploring the use of noise as an indicator of road surface conditions as shown in this example Figure where green areas appear relatively smooth and red areas are relatively rough.

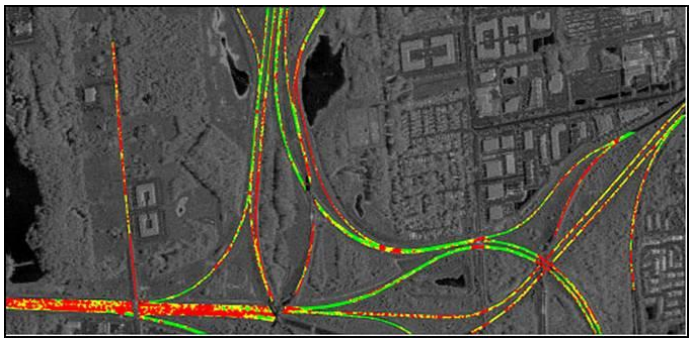


Figure 10. Night thermal image of road city

iv. Night-time Thermal infrared image as in the above Figure 10, High resolution remote sensing imagery may be used to count the vehicle for studies of traffic queues and calculate the delay and for producing the Average Daily Traffic evaluations. Thermal imaging offers the ability of detecting vehicles even at night as shown in this example Figure

Figure 11. Night Figure.

15. Assessment of fuel economy:

Nowadays, Satellites has ability of measuring vehicle emissions containing CO, HC, NO, etc…. Governments are utilizing this technique for forcing the vehicle owners to make their vehicles emission within the standards.

16. Fishing activities:

Fishermen can use remote sensing technology which detects the surface color and the temperature and produces the zones full of fishes.

17. apping out ocean floors:

There are some remote sensing applications which use NASA's Jason1 and ESA's Cryostat-2 Satellites to monitor the seafloor by mapping the mountains and the objects of ocean floor.

18. Mapping soil types:

Global soil resource and information center uses MODIS imagery remote sensing technology to draw soil types for agricultural estimates and planning to advance the future results.

19. Observing groundwater activities in well:

Remote sensing technology observers rock types, soil, land use and rainfall, etc. This data is then used to estimate the well sites on zone maps.

20. Observing live volcanoes:

Remote sensing technologies such as thermal sensing and mid infrared sensing are utilized to observer the activities of active volcanoes. AVHRR and MODIS are the principal satellites involved in this activity.

21. Optimizing telecom network capacity:

Remote sensing technologies serve as a tool to reduce the cost and to track of network requirements for telecommunication companies. In addition proper antenna, location and direction are used to augment radio frequency coverage.

22. Predicting famine:

Government's employments utilize Remote sensing satellites SMAP and SMOS to control affected areas by flooding and drought, and determine early signs of famine so can convey food to these areas.

23. 1.Advantages of Remote Sensing:

Several advantages of remote sensing, first of all is cheap and rapid way of obtaining data over a large geographical area. Take as example Landsat 5 covers each area of 185x160km at a ground resolution of 30m every 18 days , and examines each hectare approximately 11 observations, cost of the original digital data is $ 5 000. Hence, the cost is very economical. Secondly it is the only practical way to obtain data from *inaccessible* regions, as example Antarctica, Amazonia. Thirdly at small scales, regional phenomena which are invisible from the ground are clearly visible. Examples: faults and other geological structures, another example of scaling seeing the forest instead of the trees. Fourthly, Cheap and rapid method of constructing base maps in the absence of detailed land surveys. Fifthly, easy to develop with the computer, and combine with other geographic coverages in the GIS.

23.2 Disadvantages of remote sensing:

There are some of disadvantages of Remote Sensing, once, they are *not direct samples* of the phenomenon, so must be *adjusted* against reality. This adjustment is never exact; a classification error of 10% is excellent. Second, they must be *adjusted geometrically* and *geo-referenced* in order to be useful as maps, not only as pictures. This can be sometimes easy and sometimes yet. Thirdly distinct approach can be *confused* if they look the same to the sensor, leading to classification error by using other tool with different characteristics. Example: artificial or natural grass in green light which require sensing by using infrared light to distinguish them. Fourthly, Resolution of satellite imagery is too crude for detailed mapping and for distinguishing small contrasting areas. Map a land use must occupy at least 16 pixels (picture elements, cells) to be reliably identified by automatic methods. However, new satellites are being proposed with 1m resolution, these may will have big data capacity but surly will be suitable for land cover mapping at a detailed scale.

24. Conclusion:

Remote Sensing helps the observation of different ranges as, the Earth observation, water presence observation, Mineral Discovery, Weather Sensing, Fire detecting, screen the presence of disease to highlights the unsafe circumstances which conduct their life-saving, and Identify Human presence with specific tools, in addition of publish of results on posts, sciences, applications, and technology of remote sensing studies. Thoroughly interdisciplinary, RSE distributes on terrestrial, oceanic and atmospheric sensing. In additional some websites and journals center on biophysical and quantitative methods to remote sensing at local and global scales. Fields of interest contain Agriculture, forestry a, Biophysical-Spectral models, Ecology, Geography and Land information, Geology and Geoscience, Hydrology and Water Resources, Atmospheric Science and Meteorology, Oceanography, Natural hazards, Image Processing and Analysis, Sensor Systems and Spectral-Radiometric Measurements. Remote sensing can be either passive or active and obtain their data without touching from aircraft, and satellites.

25. Terminologies:

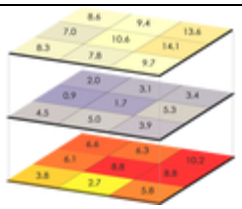
Term	Definition	Application
Aerial	Aerial magnetic study that records variations in the earth's magnetic field.	
Aerosol	Particles of liquid or solid isolated as a suspension in gas.	
Aircraft	Aircraft platforms range from the very small, slow, and low flying, to twin-engine and small planes capable of flying at altitudes up to 35,000 feet. They can be positioned wherever and whenever weather conditions are. Aircraft on site can answer within moments to take advantage of clear conditions, while satellites are locked into a schedule dictated by orbital parameters.	As example Aircraft can be positioned in small or large numbers, making it possible to collect imagery seamlessly over an entire county or state within period of days or weeks by having lots of planes in the air at the same time.
Alert	A message that calls attention to a notable situation or informs users of changes in the state of a monitored situation.	
Altitude	1. The height above the horizon, measured in degrees, from which a light source illuminates a surface. Altitude is used when calculating a hill	

	shade, or for controlling the position of a light source in a scene.	
ASTER	***1)*** *Advanced Space-borne Thermal Emission and Reflection Radiometer (ASTER) is an imaging instruments onboard the earth.*	ASTER is a cooperative effort between NASA, Japan's Ministry of Economy.
Atmosphere	***2)*** *Atmosphere-Layer of gases that surrounds some planets.*	
Band	In radio, a continuous sequence of broadcasting frequencies within given limits.	
Band Ratios	A digital processing technique that enhances disparity between features by dividing a measure of reflectance for the pixels in one image band by the measure of reflectance for the pixels in the other image band.	
Band with	The total range of frequency required to pass a specific modulated signal without alteration or loss of data. The ideal bandwidth allows the signal to pass under conditions of maximum AM or FM adjustment. Too narrow a bandwidth will result in loss of data during modulation peaks. Too wide a bandwidth will pass extreme noise along with the signal. In FM, radio frequency signal bandwidth is determined by the frequency deviation of the signal.	
Brightness Theme	In 3D Analyst and Spatial Analyst for ArcView 3.x, a grid theme whose cell values are used to vary the brightness of another grid theme. The cell values in one grid can be visually plotted against those in another. Most commonly, hillshade grids are used as brightness themes for elevation grids. The effect is to display the elevation surface in relief.	
camera	In ArcScene and ArcGlobe, an object that defines the perspective of a scene or globe's display.	
compression	The process of reducing the size of a file or database. Compression improves data handling, storage, and database performance.	Examples of compression methods include quadtrees, run-length encoding, and wavelets.
Color	An image produced from	Compare false color and true

Composite	three bands or channels of data, by assigning the intensity values of each band/channel to intensities of red, green, and blue in the output image.	color images.
Data	A collection of facts or instructions in a formalized way suitable for communication.	
data capture	Any process that converts GIS data into computer-readable form. Geographic data can be captured by being downloaded directly into a GIS from sources such as remote-sensing or GPS data, or it can be digitized, scanned, or keyed in manually from paper maps or photographs.	
data element	The smallest unit of information used to describe a particular characteristic of a spatial dataset. the data element cannot be subdivided.	
Data Set	A logically meaningful grouping or collection of similar or related data. Data having mostly similar characteristics source or class of source, processing level and algorithms.	
Detector	***3)*** *Component of a remote sensing system that converts electromagnetic radiation into recorded signal.*	
Digital image processing	***4)*** *Converting an image to digital form and enhance it or prepare it for analysis by computer or human vision. In the case of an infrared image or thermo-gram, this could include temperature scaling, spot temperature measurements, thermal profiles, image addition, subtraction, averaging, filtering, and storage.*	
ETM+	***5)*** *The **Landsat Multispectral Scanner (MSS)** was carried on Landsats 1-5, and images consist of four spectral bands with 60 meter spatial resolution.*	LandSat 7, Enhanced Thematic Mapper Plus.

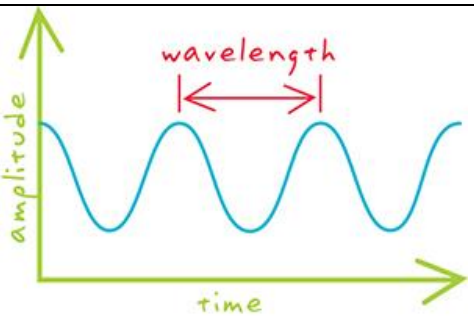
B. Field observations	Data collected by remote-sensing techniques contain satellite images of sea surface temperature, seafloor bathymetry derived from multi-beam sonar systems, and environmental acoustic signals from bottom-mounted and portable hydrophone arrays.	Field observations include seafloor geologic mapping and giant sightings.
C. Frequency	The rate at which the electric and magnetic fields in a **photon** alternate directions. Photons with higher frequencies have greater energies.	
D. Forecast horizon	The **forecast horizon** is the length of time into the future for which forecasts are to be prepared. These generally vary from short-term forecasting horizons, less than three months, to long-term horizons or more than two years.	
E. Geostationary satellite	Satellite in the space above the earth's surface by thousands of miles, locates in orbit which moves in time around the Globe.	Global mobile communications network uses geostationary satellites.
Geographic Information Systems (GIS)	GIS is a computer-based tool that analyzes, stores, manipulates, and visualizes geographic information on a map. GIS links geographic locations on Earth with attribute information enabling users to envisage patterns, realize relationships and trends.	
Geostationary	Describes an orbit in which a satellite is always in the same position with respect to the rotating Earth. The satellite travels around the Earth in the same direction, at an altitude of approximately 35,790 km because that produces an orbital period equal to the period of rotation of the Earth (actually 23 hours, 56 minutes, 04.09 seconds). A worldwide network of operational geostationary satellites provides infrared images of Earth's surface and atmosphere.	
Graphien	Photo taken by media.	
Global Warming	An increase in the near surface temperature of the Earth. Global warming has occurred as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases.	Scientists generally agree that the Earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years.
GIS	A larger concept than often believed, GIS	

	(geographic information systems) is the hardware, software, data, personnel systems, etc., involved with geographical coordinate data.	
GPS	Global Positioning System, the broadcasting satellites, receiving hardware, and software used to locate coordinates on or near the surface of the Earth.	
Image size	The dimensions of an image in either **pixel** dimensions or in bytes of disk space.	
Imager	A satellite instrument that measures and maps the Earth and its atmosphere. Imager data are converted by computer into pictures	
Interpretation	The process in which a person extracts information from an image	
Interpretation key	Combination of characteristics that enable an interpreter to identify an object on an image	
Infrared Radiation(IR)	IR Radiation within the portion of the electromagnetic spectrum which extends from 0.75 to 1000	
Information System	Mechanisms for data receipt, processing, storage, retrieval, and analysis.	
Intensity	Brightness ranging from black to white	
High-Resolution Infrared Radiation Sounder (HIRS)	Instrument carried by NOAA polar-orbiting satellites that detects and measures energy emitted by the atmosphere to construct a vertical temperature profile from the Earth's surface to an altitude of about 40 km. Measurements are made in 20 spectral regions in the infrared band.	
Horizon	Noun line or circle that forms the apparent boundary between earth and sky.	
LIDAR	An acronym meaning "Light Detection and Ranging". This is similar to **rangefinding**, in that an active sensor produces a laser beam to sense distances to objects. However, the data product is a two dimensional surface map of an area instead of a point distance.	
Light	In common usage this refers to **electromagnetic radiation** in optical **wavelengths**. However, in the	

	discussion of remote sensing I tend to use this to indicate any kind of photon energy beam.	
Mapping	Map algebra is the combination of spatial data using spatial and mathematical, statistical and trigonometric operations to generate new raster outputs.	
Meteorology	The study of the physics, chemistry, and dynamics of the earth's atmosphere, in addition to the correlated effects at the air earth boundary over both land and the oceans.	In popular usage, the accurate prediction of atmospheric phenomena and weather forecasting.
Meteorological	*Adjective* science to study phenomena of the atmosphere to forecast the weather.	
Microwave	Microwave is remote sensing that uses electromagnetic radiation, to display property of clouds, fog and bursting of volcano, in any climate condition.	
Multispectral	A data product in which the data are binned into as few as two, or as many as approximately fifteen.	
National Aeronautics and space Administration NASA	U.S. Civilian Space Agency produced by Congress in 1958, NASA belongs to the executive branch of the Federal Government. NASA's mission to plan, direct, and conduct aerospace and space activities by NASA Headquarters in Washington, D.C., and by nine major centers spread throughout the United States. The agency administers and maintains the facilities; designs aircraft and spacecraft; sends satellites into Earth orbit and outside; and processes, analyzes, and distributes the resulting data and information.	
National Oceanic and Atmospheric Administration (NOAA)	NOAA was started in 1970 within the U.S. Department of Commerce to ensure the safety of the general public from atmospheric phenomena. NOAA includes the National Ocean Service which maps the oceans and waters of the U.S.; the National Marine Fisheries Service which maintains the world's marine fisheries management system.	
LANDSAT	A collections of NASA satellites that obtain multispectral images in different visible and IR	

	bands.	
Photons	Discrete packets of electromagnetic energy. Ensembles of photons are called **light.**	
Polar Orbit Satellites	Polar orbit an orbit that passes close to the poles, thereby Enabling a satellite to pass over most of the surface, except the immediate vicinity of the poles themselves.	
Pixel	Picture element (point).	
Radar	Advanced Earth surveillance satellite to monitor environmental change. With a planned of five years, RADARSAT-1 is equipped with a synthetic Aperture Radar, and includes a beam, which offers a wide selection of image scales. It operates at 5.3 GHz.	Example RADARSAT-1
Radio Wave	An electrical impulse sent through the atmosphere at radio frequency.	
Reflectance	The ratio of the radiant energy reflected from a surface to that incident on the surface.	
Remote Sensing	The science of collecting information about an object from a distance, by using tools as a satellite or infrared photography.	Example of usage is to map or monitor features of an environment.
Resolution	A measure of the ability to separate observable quantities. In the case of imagery, it describes the area represented by each pixel of an image. The smaller the area represented by a pixel, the more exact and detailed the image.	
Sun Eclipse	A phenomenon in which the Moon's disk passes in front of the Sun, blocking sunlight.	A total eclipse occurs when the Moon completely obscures the Sun's disk, leaving only the solar corona visible.
Satellite	An artificial body placed in orbit round the earth or another planet in order to collect information.	Space station, space craft, and a communications satellite.
Sensor	Device that produces an output in response to stimulus such as incident radiation. Sensors obtain information about objects on Earth by detecting radiation reflected in different bands of the electromagnetic spectrum. Analyzing the transmitted data provides valuable information	

	about Earth.	
Spatial	A characteristic that refers to a location which may be a specific location on the Earth's surface.	
Spatial Filter	Spatial frequency filtering the analysis of the spatial variations of an image and the separation of selected frequency ranges	
Synthetic	Synthetic-aperture radar in which high resolution is achieved by storing and processing data in such a way as to give the effect of a much longer antenna.	
Target-object	Target-object on terrain of specific interest in remote sensing investigation	
Terra	The flagship of the Earth Observing System, a series of spacecraft role to observe the Earth from the unique point of space.	
Transmisometer	An instrument for measuring the transmittance of light between two points in the space over a path.	
Thermal	Thermal model uses to predict temperature for given properties and conditions.	
Thermal Infrared	Electromagnetic radiation with wavelengths between about 3 and 25 micrometers	
Thermatic Mapper	A scanner deployed on Landsat that records seven bands of data from the visible through the thermal IR regions.	
II. PATOGEN	Greek *pathos*, a disease causing. All substances that can cause a disease are summarised as pathogens.	
III. PROSPECT	An apparent probability of advancement, and success.	
Visualization	1. The representation of data in a viewable medium or format.	
Warn	Give a sign to a person or group of danger or anything else critical.	

Wavelength	***1)*** *The distance between two successive crests on a wave, calculated as the velocity of the wave divided by its frequency.*	
Weather Sensing	***2)*** *A forecast provides a description of the most significant weather conditions estimated during period of days.*	

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