

→ Remote sensing

* Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object in contrast to in situ or on-site observation.

* The term is applied especially to acquiring information about the earth and other planets. This is done by sensing and recording reflected or emitted energy and processing, analysing and applying that information.

→ Components of remote sensing

- * Energy source or illumination
- * Radiation and the atmosphere
- * Interaction with the target
- * Recording the energy by the sensor
- * Transmission, reception and processing
- * Interpretation and analysis
- * Application.

Remote sensing are two types:

- 1) ~~Active~~ Passive remote sensing
- 2) Active remote sensing.

* In case of passive remote sensing source of energy is that ~~naturally~~ naturally available such as the sun. Most of the remote sensing systems work on solar energy.

* In active remote sensing the energy is generated and sent ~~to~~ from the remote sensing platform towards the target. Most of the microwave remote sensing is done through active remote sensing.

→ Application of remote sensing1) Resource exploration

To study the information of sedimentary rocks and identify deposits of various minerals, detect oil ~~identify~~ underground storage of oil field and identify underground storage of water.

2) Environmental study

use to study cloud motion and predict rains.

3) Land use

mapping of larger area is possible in short time

4) sight investigation

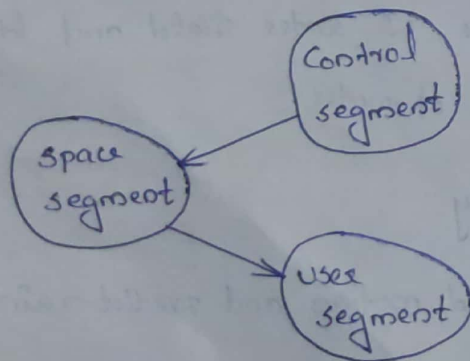
5) Archeological investigation

6) Natural hazard study.

→ Global Positioning System (GPS)

- * The GPS is the satellite based investigation system made up of a network of 24 satellites placed into orbit by the US department of defense.
- * GPS was originally intended for military application but in the 1980 the govt made the system available for civilian work.

→ Principles of GPS



The GPS consist of 3 major segment

1) space segment

2) control "

3) user "

* The space and control segment are operated by US of military and administrated by the US space command of the US air force.

* GPS provides specially coded satellite signal that can be provided in a GPS receiver.

* Enabling the receiver to compute position, velocity and time.

* 4 GPS satellite signals are used to compute position in 3 dimension.

→ Application

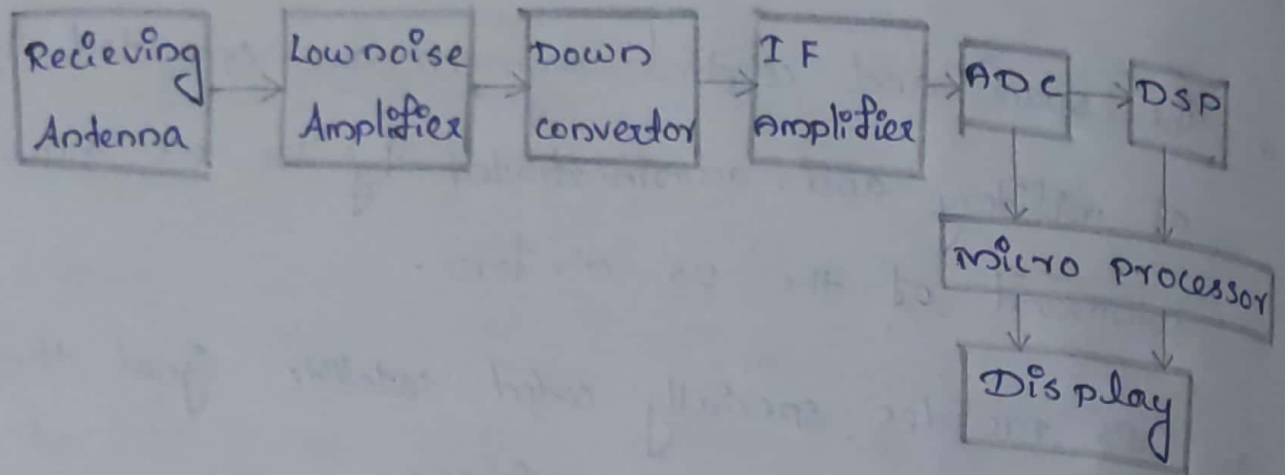
* GPS technology is now in everything from cellphone, wristwatch, shipping container.

* GPS boost productivity across a wide growth of the economy include farming construction, mining surveying package delivery, & logistical supply chain management

* It is used as a tracking device.

- Provide latitude, longitude and altitude information
- Aids navigation in vehicle, aircraft and ship.

GPS receiver



Receiving Antenna

Receives the satellites signals and it is mainly a circularly polarized antenna.

Low noise amplifier (LNA)

Amplifies the weak received signals

Down convertor

converts the frequency of received signal to an intermediate frequency (IF) signal.

IF Amplifier

Amplifies the intermediate frequency signal

ADC

perform the conversion of analogue signal which is obtained from IF amplifier to digital. Assume the sampling and quantization blocks are also present in ADC (Analog to Digital converter)

DSP (Digital signal processor)

Generates C/A codes

Microprocessor :- perform the calculation of position and provides the timing signals in order to control the operation of other digital blocks. It send the useful information to display unit in order to display it on the screen.

Advantages