GPS (Global Positioning System):

The <u>Global Positioning System (GPS)</u> is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more <u>GPS satellites</u>. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

The <u>GPS</u> is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Défense. <u>GPS</u> was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. <u>GPS</u> works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS.

GPS Signals:

GPS satellites broadcast beams in two carrier frequencies; L1 (1,575.42 MHz) and L2 (1,227.60 MHz). Beams that can be accessible to the general public are encoded in C/A (Coarse/Acquisition) code, and the beams that can be used only by the US military force are encoded in P (Precise) code. C/A code consists of identification codes of each satellite and is broadcast together with navigation messages

The data of the orbit of each satellite is called the **ephemeris**, and the data of orbit of all satellite is called the **almanac**. The navigation messages are broadcast at a rate of 50 bits per second. Utilizing this collection of data, GPS receiver calculates distance between satellites and the receiver in order to generate position data.

Global Positioning System (GPS) Architecture:

The Architecture of Global Positioning System consists of three segments or units namely:

- GPS Space Segment
- GPS Control Segment
- GPS Receiver (User) Segment

Space segment



Global Positioning System (GPS) Space Segment

The Space Unit consists of 24 active satellites which are assembled with huge solar panels with rechargeable batteries that act as a power source. The function of the satellites in space is to route or navigate the radio signals received from the control unit to store and re-transmit the message to the respective Receiver Unit.

Global Positioning System (GPS) Control Segment

The Control Unit consists of several monitoring and control stations. The monitor stations monitor the GPS satellite signals. These signals are then sent to the master control station where operational specifications are checked and revised before transmitting the control signals back to the GPS satellites. They are sent back through ground antennas.

Global Positioning System (GPS) Receiver (User) Segment

The User Unit is the term given to all GPS receivers like mobile phones, laptops, PC or any other device. The devices receive the signals from the GPS satellites and determines how far away it is from each satellite.