

GLOBAL POSITIONING SYSTEM (GPS)



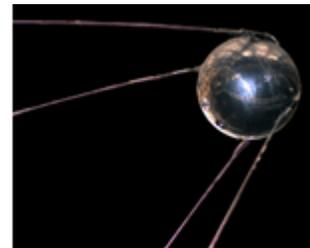
The Global Positioning System, commonly known as GPS, is a network of satellites that determines a ground based user's specific latitude, longitude, and altitude. GPS devices have become more integrated in our daily lives through navigation computers in cars to emergency locators in cellular phones. GPS can even keep the time accurate on watches and VCRs. Portable

GPS receivers are becoming increasingly popular for young and old alike.

For the GPS to work there are twenty-four satellites in Earth's orbit. Each satellite is spaced so that at least four can be used by any given receiver on the ground. The satellites each contain a computer, radio, and an atomic clock. Because it uses the frequency of atoms rather than quartz or gears to keep time, an atomic clock is more accurate than a normal clock. The satellites transmit radio signals to a receiver on the ground and the receiver calculates its position in relation to the satellites. A minimum of three satellites are needed to provide latitude and longitude information using a process known as triangulation. If a fourth satellite is in range, then the user's altitude can also be determined. The more satellites that are available, the more accurate the receiver's calculation will be. GPS receivers come in a variety of technologies, from handheld devices to geological monitoring stations.

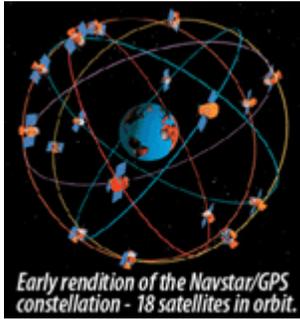
The History of GPS

Global positioning grew from the use of radar tracking at the end of World War II when radar stations were placed along the coastlines and inshore for ships and planes to orient themselves. But data and distance were limited and subject to weather and atmosphere interference. With the launch of the Sputnik man-made satellite



program by the Soviet Union in the late 1950s, American scientists learned they could precisely locate the satellite by the frequency of its signal. The Doppler effect (define) of the signal grew stronger as the satellite approached and grew weaker as it flew away. They also realized that the opposite would be true and several satellites would be able to precisely locate items on the ground.

Through the 1960s, the first navigation systems went into orbit but were limited in function and accuracy.



In 1978, the first of several NAVSTAR GPS (NAVigation Signal Timing And Ranging Global Positioning System) satellites was launched with military use as the primary purpose. NAVSTAR proved to be more accurate and resilient than radar and unlike radar, NAVSTAR did not rely on ground stations being nearby. It was not hampered by weather and was also harder for enemy units to jam the signals. The full constellation of satellites as we know them today was achieved in 1994.

Although originally designated for military use only, GPS was later opened for civilian use with restrictions on usage and accuracy.

Portable GPS Uses

The primary user of the Global Positioning System is still the United States military and its allies. GPS technology allows for precise locating of troops, ships, aircraft and their targets. GPS satellites help smart missiles precisely hit enemy positions while at the same time avoiding civilians.



Civilian use of global positioning has grown over the last decade as the cost of GPS receivers declined. Though civilian GPS gear is deliberately “de-tuned” (define) and less accurate than that used by the military, it is still extremely beneficial. The modified signals allow non-military GPS users to obtain navigational readings that are accurate to approximately 100 meters. Today many new cars come standard with GPS locators that can be activated if the vehicle is stolen or involved in an accident. These locators can also be integrated with navigation computers that help drivers navigate to their destinations. Many systems show locations on a map and audibly announce when to turn. Some can even help drivers avoid heavy traffic and many units will also provide guidance to nearby restaurants, movie theatres and other places of interest and business.



GPS has revolutionized the airliner industry by allowing pilots and air traffic controllers to more accurately know the locations and altitudes of their planes. Airliners can better avoid restricted

airspace and find other nearby aircraft from their GPS transponders (define). Since GPS is not hampered by weather like radar, it is much safer. If an aircraft does crash, the GPS transponder can lead rescuers to the crash site faster.

Land surveying and agriculture have also benefited from GPS technology. Many gas, water, and electrical lines can be found more accurately if their location is measured and logged at the time of burial. This helps future diggers avoid the buried lines or tap into them for new houses and buildings. Distances can be more accurate for landscape planning and road building. Farmers are turning to GPS to help locate cattle herds, find property lines, and locate where to dig wells for water.

Games involving GPS have also emerged, with geo-caching (define) being one of the most popular. Geo-caching is a game where people leave clues about treasures they have hidden. The treasure is usually small, and when a treasure is found, it is to be replaced with a new treasure or new treasure added to it. A geo-cache website will identify where local treasure hunters have hidden their loot by their geo coordinates. By using a portable GPS receiver, goodies that are hidden, generally in a park, library, or other public area, can be found.

Since all of the global positioning satellites have highly accurate atomic clocks within them, electronic products are being designed to tap into their frequencies to update time. Several lines of new watches and clocks now automatically update themselves from the GPS network. This synchronization helps users by giving them a more uniformed time structure. Changes for daylight savings can happen automatically for all clocks that use this technology. In case of a power failure, clocks and VCRs will automatically reset to the proper time as soon as power is restored.



The Future of GPS



While the use of Global Positioning has expanded within the last decade, there are many new uses being still being developed. Some new GPS products are being marketed to parents to track their teenage drivers. This allows parents to know if they really went to see a movie or if they went to a party at a friend's house. And since a GPS can determine speed, parents can also know if the teens are engaged in any dangerous driving. GPS can also come in handy in emergency situations such as car-jacking. This technology is becoming available as a transponder for cars, an add-on for phones, or as carry-along units.

Many cell phones are now coming with limited GPS receivers to help with Enhanced 911. Enhanced 911 sends the caller's address to emergency operators, but to date it has only worked with traditional land line phones. Since a cell phone can be used to make a call from anywhere, global positioning is being added to quickly locate distressed cell phone callers.

Source : <http://www.geeks.com/techtips/2006/portable-gps-receivers.htm>