GPS Technology

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# Introduction

GPS is the acronym of Global Positioning System and is a utility owned by the United States that provides users with navigation, positioning and timing services. GPS is a receiver which receives radio waves and indicates the exact location of an element in a particular space. The satellites of GPS provide services to military and civilian users based on the requirements. Services related to the civilian use are available freely to all the users internationally while the military services are provided to the American and other allied forces for various purposes. The GPS is a satellite-based system of navigation which comprises of 24 satellites which are orbiting almost 26,600 kilometers above the earth surface. These satellites are put into the orbit by the United States department of defense. In the year 1980, the government decided to extend the services and applications of GPS for civil purposes as well. The service is available 24/7 all over the globe in all the weather conditions with no charges of setup and subscription fee. GPS has revolutionized communication and has a great impact on our daily lives.

# Discussion

The global positioning system consists of three segments namely space segment, control segment and user segment. Space and control segments are developed, operated and maintained by Airforce of the United States (The Global Positioning System, 2005). The space segment is made up of 24 satellites and provides the position and time of the current GPS satellite by transmitting one-way signals. The control segment of the Global Positioning System is very important as it serves to maintain the satellite in its fixed orbits by using command manoeuvres. This segment is also used to adjust clocks of the satellites. Also, the control segment of GPS uploads navigational updated data helps in tracking other GPS satellites and maintains the status and health of the satellite constellation. The third segment is user segment which is receivers and receives the signals from satellites to determine the velocity, position of the user and time. To ensure accuracy and reliability, the receiver on the user side segment of the GPS satellite systems uses the timestamp to from the other four satellites at one time to calculate the delay in the transmission. After receiving all the signals from the satellites, the receiver carries out a comparison between the time the signal was sent by satellite and the time at which the signal is received at the user segment of the GPS navigation system. The position of the target is then calculated by comparing the difference obtained between the two signals and the process is called Trilateralization (Dempster, 2013).

# Impact of GPS on our lives

GPS has an undeniable impact on our daily lives as this is the leading system in the world which provides efficient navigation and tracking. The devices and applications that use GPS are rampant these days because there are no special charges and regional restrictions other than a few specific restrictions. GPS is not only used for megaprojects, in huge machinery and operations but also has paved its way in domestic use as well. It has cast a huge impact on the way people live and communicate. GPS has rendered our society and environment a safer and easier place to work and live. It is used to assist parents to maintain a track of their little kids and the installed apps in mobile phones and cars help people to their locations on maps. In case of emergency, it becomes easier now to update rescue teams and relatives about the current position so that speedy treatment and first aid is provided well in time. It is used to keep track and locate law offenders, dangerous criminals and terrorists and many other such applications.

In academia, the use of GPS has a great impact on learning and understanding of the students. Students use GPS modules which are available in the markets and can easily be integrated with computer programmable chips to obtain the desired results. This technique can e used to locate any hidden radio, target and other sources of transmissions as it gives the results up to 3m accuracy. The output from a GPS module is in the form of coordinates in longitudes and latitudes which makes it easy to locate any entity or object. The applications of GPS are equally successful and promising in the fields of engineering and businesses including geodetic research, route surveying (utility lines, cables, pipelines and roads) and surveying in engineering and construction.

# Security concerns.

There are humongous benefits and merits of the GPS navigational system, however, there are some associated security threats and risks too. With GPS it is possible to track thieves and defaulters but there are circumstances where people don’t want to be tracked. Tracking of the location has become an increasing issue with each new gadget and device is aimed at further constricting oneself and his privacy. Also, according to a study, the constant use of GPS for navigational information and other uses can prevent our brains to develop a normal hippocampus which is the part of the brain responsible for space and memory (Santiago, 2017). Hence there are demerits of this technology too.

# Conclusion

GPS is used in many applications and has become an integral part of the technology and information security. With very good accuracy and free of charge services all around the globe has made GPS a successful and essential thing use. Although there are some concerns related to its use and other moral considerations but the beneficial use of GPS and its impact in our life are so powerful that it cannot b avoided even in our daily use.

# References

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