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## *Golden Research Thoughts*

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# Golden Research Thoughts

**GRT**

**GPS SYSTEM WORKING; ELABORATIVE PROCESS**



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## ABSTRACT

Global Positioning System was developed by the United States' Department of Defense. It uses between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals. This enables GPS receivers to determine their current location, time and velocity. The GPS satellites are maintained by the United States Air Force. GPS is often used by civilians as a navigation system. On the ground, any GPS receiver contains a computer that "triangulates" its own position by getting bearings from at least three satellites. The result is provided in the form of a geographic position - longitude and latitude - to, for most receivers, within an accuracy of 10 to 100 meters. Software applications can then use those coordinates to provide driving or walking instructions. Getting a lock on by the GPS receivers on the ground usually takes some time especially where the receiver is in a moving vehicle or in dense

urban areas. The initial time needed for a GPS lock is usually dependent on how the GPS receiver starts.

**KEYWORDS** : Knowledge Process Outsourcing Services, Navigation, information.

## INTRODUCTION:

Definition:" A navigational system using satellite signals to fix the location of a radio receiver on or



above the earth's surface; also: the radio receiver so used."

## OBJECTIVES:

1. The different approaches and theoretical traditions that have contributed to the historical development of psychology, along with their influence on the production of knowledge and professional practices, for the purposes of promoting the quality of life of people and of society.
2. The biological foundations of human behavior and of psychological functions.
3. The cultural and anthropological factors and psychosocial principles involved in the behavior of

individuals, groups and organizations.

4. The designs, methods and techniques of research, the procedures for formulating and contrasting hypotheses, and the interpretation of results.

5. The diverse applications of psychology and the knowledge necessary to promote quality of life in individuals, groups and organisations in different contexts: educational, clinical and health, work and organisations, and community.

### **RESEARCH METHODOLOGY:**

The survey data was analyzed using Microsoft Excel. Numbers have been rounded to the nearest whole number, so some charts may not equal 100%. Mentions analyses have been used to quantify qualitative open-ended responses by grouping them into themes. Each mention represents one respondent, but respondents may have mentioned more than one issue. In Poland, survey respondents were given a list of items to select from; given the difference in survey methodology, these results are excluded from the mentions total.

### **Source of Data Collection:**

The data is collected for the study which was secondary data in nature

- 1) Annual Report
- 2) Internet
- 3) Newspaper
- 4) Research paper
- 5) Journal & Articles

### **GPS DEVELOPMENT PROCESS:**

Prior to the development of the GPS system, the first satellite system was called Transit and was operational beginning in 1964. Transit had no timing devices aboard the satellites and the time it took a receiver to calculate its position was about 15 minutes. Yet, much was learned from this system. GPS is a great improvement over the Transit system. The original use of GPS was as a military positioning, navigation, and weapons aiming system to replace not only Transit, but other navigation systems as well. It has higher accuracy and stable atomic clocks on board to achieve precise time transfer. The first GPS satellite was launched in 1978 and the first products for civilian consumers appeared in the mid 1980's. It was in 1984 that President Reagan announced that a portion of the capabilities of GPS would be made available to the civil community. The system is still being improved and new, better satellites are still being launched to replace older ones.

### **MATHEMATICAL BASIS:**

Each of the GPS satellites transmits radio signals. GPS receivers pick up these signals and measure the distance to a satellite by multiplying the speed of the signal by the time it takes the signal to get there. The speed of the signal is the speed of light and the time is encoded within the signal. The satellites also send information on their exact location. In order to find longitude; latitude, and altitude, four satellites are needed. If a measurement is taken using just one satellite, then all that is known is that the receiver is on the surface of a sphere with radius equal to the distance to the satellite. If two satellites are used, then the receiver must be on the surface of both spheres which is the intersection of the two spheres or the perimeter of a circle. If a third satellite is used, then the location of the user is narrowed down to the two points where the three spheres intersect. Three measurements are enough

for land receivers since the lower of the two points would be selected. But when in the air or space, four satellites are needed: the intersection of all four spheres will be the receiver's location.

### SERVICES:

There are two types of GPS services. Precise Positioning Service (P-code) is more accurate and reserved for the U.S. military and select government agency users. The other service is the Standard Positioning Service which is freely available to all users. The SPS code (C/A code) has errors purposefully encoded into it for U.S. national security reasons and is used for non-military applications. One source of error is Selective Availability (SA) and is implemented into the signal in order to keep non U.S. military users from attaining high accuracy. The errors in the signal are constantly changing. SA affects signals concerning the satellite's clock and thereby gives false information on how far the satellite is from the user which makes the receiver give less accurate values. The following table compares PPS and SPS:

Accuracy in:	PPS	SPS
horizontal plane	22 meters	100 meters
vertical plane	27.7 meters	156 meters
time transfer	200 nanoseconds	340 nanoseconds

**Applications:** The applications of the Global Positioning System fall into five categories: location, navigation, timing, mapping, and tracking. Each category contains uses for the military, industry, transportation, recreation and science.

**Location:** This category is for position determination and is the most obvious use of the Global Positioning System. GPS is the first system that can give accurate and precise measurements anytime, anywhere and under any weather conditions. Some examples of applications within this category are:

1. Measuring the movement of volcanoes and glaciers.
2. Measuring the growth of mountains.
3. Measuring the location of icebergs - this is very valuable to ship captains helping them to avoid possible disasters.
4. Storing the location of where you were - most GPS receivers on the market will allow you to record a certain location. This allows you to find it again with minimal effort and would prove useful in a hard to navigate place such as a dense forest.

**Navigation:** Navigation is the process of getting from one location to another. This was the what the Global Positioning System was designed for. The GPS system allows us to navigate on water, air, or land. It allows planes to land in the middle of mountains and helps medical evacuation helicopters save precious time by taking the best route.

**Timing:** GPS brings precise timing to the us all. Each satellite is equipped with an extremely precise atomic clock. This is why we can all synchronize our watches so well and make sure international events are actually happening at the same time.

**Mapping:** This is used for creating maps by recording a series of locations. The best example is surveying where the DGPS technique is applied but with a twist. Instead of making error corrections in real time, both the stationary and moving receivers calculate their positions using the satellite signals. When the roving receiver is through making measurements, it then takes them back to the ground station which has already calculated the errors for each moment in time. At this time, the accurate measurements are obtained.

**Tracking:** The applications in this category are ways of monitoring people and things such as packages. This has been used along with wireless communications to keep track of some criminals. The suspect agrees to keep a GPS receiver and transmitting device with him at all times. If he goes where he's not allowed to, the authorities will be notified. This can also be used to track animals.

**CONCLUSION:**

The technology of the Global Positioning System is allowing for huge changes in society. The applications using GPS are constantly growing. The cost of the receivers is dropping while at the same time the accuracy of the system is improving. This affects everyone with things such as faster Internet speed and safer plane landings.

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