**COURSE : DISASTER MANAGEMENT (MA/ MSc PART I)**  
**Paper : IV**

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**Topic : Applications of GPS**

**INTRODUCTION**

The global positioning system is a satellite-based navigation system consisting of a network of 24 orbiting satellites that are eleven thousand nautical miles in space and in six different orbital paths. The satellites are constantly moving, making two complete orbits around the Earth in just under 24 hours. If you do the math, that's about 2.6 kilometers per second. That's really moving!   
  
The GPS satellites are referred to as NAVSTAR satellites. Of course, no GPS introduction would be complete without learning the really neat stuff about the satellites too! The first GPS satellite was launched way back in February, 1978.

Each satellite weighs approximately 1 tonne and is about 5 metres across with the solar panels extended. Transmitter power is only 50 watts, or less!

Each satellite transmits on three frequencies. Civilian GPS uses the 'L1' frequency of 1575.42 MHz. Each satellite is expected to last approximately 10 years.

Replacements are constantly being built and launched into orbit. The satellite orbits are roughly 25,000 kilometers from the earth's centre, or 20,000 kms above the earth's surface.

The orbital paths of these satellites take them between roughly 60 degrees North and 60 degrees South latitudes. What this means is you can receive satellite signals anywhere in the world, at any time. As you move closer to the poles (on your next North Pole or Antarctic expedition!), you will still pick up the GPS satellites. They just won't be directly overhead anymore. This may affect the satellite geometry and accuracy but only slightly.

One of the biggest benefits over previous land-based navigation systems is GPS works in all weather conditions. No matter what your application is, when you need it the most, when you're most likely to get lost, your GPS receiver will keep right on working, showing right where you are! 

**APPLICATIONS**

GPS has in the last few years been intensively used as receivers for directions and as navigations app that tells us where we are and how to move between points. They have also been used to make digital maps. However, GPS apps are not only used by civilians but also by different organizations for different purposes. For example, it is useful to pilots, surveyors, farmers, boat captains, military and scientists among others. Apart from the usually GPS that we use in our phones, other highly advanced apps are incredibly accurate and are used for specific tasks in different industries. Some of the industries that use this application include;

1. **Aviation**

Most of the modern aircraft use GPS receivers to provide the pilots and passenger with real-time aircraft position. They also provide a map of various destinations depending on where the aircraft operates. They also use the app to track the aircraft and direct the pilot in the case where there is a change in the weather conditions or any other issue that may arise.

**2. Marine**

Highly accurate navigation app is needed by boat captains to enable them to navigate through waters to their destinations. These applications ensure that the channels are clear and there are no obstacles that can hinder their navigation.

**3. Military**

The US Department of Defense was the first to develop the GPS app system, and since then the system has been adopted by numerous military forces around the world. Other countries have even decided to develop their satellite navigation networks as a defense mechanism during war times. Today, there has been a diverse use of the app, and it can be used to map the location of vehicles and other machinery such as missiles during a war. This is a technique used purposely to protect the soldiers and also manage resources.

**4. Road Transportation**

Majority of users of this technology are taxi services, emergency vehicle location, commercial fleet management and freight tracking, public transport monitoring, dispatch, and navigation. Private car owners also use the app, and most of the new car models come with a factory-fitted GPS.

**5. Locating Positions**

GPS navigation system is commonly used to designate positions. It is used by travelers, researchers and the everyday citizens. More so, you can use it to locate websites that offer certain services in your country. Certain websites block access by people from a specific location. For example, if you are looking for a website that offers academic assistance in your area such as online custom writing service, then as long as your GPS location is allowed into the website, you will get a list of recommendable website.

**6. Tracking for Law Enforcement**

The police also use it during investigations to catch suspects and criminals. They also use it to keep track of people who feel that their lives may be in danger.

**7. Easy Access to Emergency Roadside Support**

In case of an accident or an emergency, you can seek assistance using the pre-programmed emergency numbers on your smartphone. The best thing about using this app is that the emergency crew can trace your current location without having to provide any details.

**8. Public Safety and Disaster Relief**

The best thing about GPS is that it can be used in any weather or environmental condition which is the reason why is preferred for use during disaster management. The emergency vehicles and supplies are tracked using GPS.

**9. Can be used by Disabled People**

People with special needs are at times left on their one when their caretakers and loved ones have to work. The GPS tracker is not only used to track their location, but it can be of great importance in the case of emergencies.

**10. School Bus Tracking**

School Bus GPS tracking system is used in gathering information about which route is most efficient. It also provides the bus drivers with real-time directions whenever they get lost.

**11. Geo-Mapping and Land marking**

This system provides integrated and accurate landmarking and mapping information. It is known to be highly accurate and faster than any conventional strategy. There is minimal labor required and less amount of equipment to be used.

**12. Track Family and Friends in Crowded Gatherings**

When visiting places with huge crowds, it is easy to get separated from your loved ones which could be scary. In this case, carrying a tracking system will help track where they are with ease.

**13. Setting up a Geo-Fence**

GPS technology has not only enabled us to track and know directions, but it has also been utilized in geo-fencing which alerts you whenever a person or object enters or exits from a chosen area. A Geo-fence is a virtual border that is set up within seconds and you are notified through text or email whenever a GPS tracker crosses the chosen region.

**14. SOS Alarm in case of Emergency**

The SOS alarm utilized the navigation system that can be installed in either your mobile phone or computer and that notifies you when your loved one presses it. You can use it for your children or the elderly.

**15. Direct Fault Motion Measurement in Earthquakes**

This app is also used in measuring earthquakes by measuring the millimeter-scale movements of the crust between earthquakes. Although it does not measure the actual shaking of the ground caused by the earthquake, it records displacement of stations during earthquakes.

**16. Tracking Environmental Disasters Such as Fires and Oil Spills**

It is efficient is tracking disasters conditions in real time which could have taken much time without its application. Fires and oil spills can happen in areas with adverse weather conditions, and it is essential to monitor the location so as to offer fast relief.

**17. Improving Accuracy of Weather Forecasts**

Upholding the accuracy of the weather focus is among the many uses of GPS. The technology is used in projecting temperature levels both on the ground and that of the atmosphere.

**18 Drone has Made Aerial Studies Much Easier and Effective**

Aerial studies are one of the most impenetrable studies that have been boosted by the use of GPS. It has been intensively been used in studying wildlife, terrains and human infrastructure. This has been made possible by tagging imagery with the help of GPS coordinates.

**19. Monitoring the Migration Patterns of Endangered Species**

It is easy to use the app to identify the migratory patterns of endangered species, for example, the mountain gorilla of Rwanda. This can help prevent their reducing populations.