

A quick guide to GPS

What, why, who, how explained

by Rob Kerr published on 17 February 2009

What is it?

Standing for Global Positioning System, it is a radio based technology that measures the distance from a device with access to GPS onboard such as satellite navigation products (sat nav), then calculates that distance to the satellites in orbit sending out these radio signals.

From this, a GPS device can provide details of exactly where it's located nearly anywhere on Earth.

This technology is free to use, apart from the additional cost of the device itself, using it, and general upkeep. Think of these devices as being a map, a compass and the world's best navigator all rolled up into one.

GPS has been in the development process over the past 50 years, and is used by many all over the world for various reasons and purposes.

It was developed by the United States Department of Defence, with its general upkeep now being maintained by the United States Airforce. This network of satellites amounts to a figure in between 24 and 32 in total, in what's known as a medium earth orbit and higher orbits within the skies. Its official name is NAVSTAR GPS, although it's more commonly known as just GPS today.

What are the variations of the technology?

There really aren't any variations of the technology, other than alternatives and future expansion of GPS - both of which we'll go into later.

The only real variant is how GPS is actually used and interpreted by the device that's utilising it, these range from sat nav products to mobile phones.



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Why should I care?

As an alternative to using a plain old Ordnance Survey Map for navigating GPS technology is much more reliable, the devices can be frequently updated where maps cannot and it goes without saying the location can be provided, even when the location is unknown.

The service is free to use, it's only the device that costs and the software it accommodates. There isn't any likely hood of the GPS service not being able to be used anymore, which creates a good solid platform for future expansion on the system.

What's a good example in practice?

There are a wide range of sat nav devices in use today, all using GPS. The company's are known to most, with products from established names such as TomTom and Garmin.

How they differ from each other is not related in any way to the GPS service obtained, but how the device operates.

This can be balanced out and brought down to the price of the unit, as they all vary as much in cost as they do in feature sets from device to device with the GPS being a standard offering to all.

These feature sets can relate to the physical aspects of the sat nav products, down to what's actually onboard in terms of accessing and utilising the GPS data. Starting from the highest downwards, there are widescreen abilities on offer and maps that list many countries which are all features seen in a more costly device. With the lower costing units having just a single country map and an older looking screen, similar to the 4:3 shaped televisions that came before widescreen.

Companies such as TomTom, can also provide their mapping software for mobile phones that have GPS access from their built in chipsets.

These also use and utilise the same level of service as an actual stand alone sat nav product, in relation to how they use GPS to provide navigational abilities.

Just proving how useful and versatile GPS can be is the technology geotagging, on mobile phones. This is where the image taken with an onboard camera also has the data provided of where it was exactly taken from GPS, for use in conjunction with the likes of Google maps. This offers up another added dimension to the resourcefulness of GPS and its usage today.

Is there a competing technology that I should be aware of?

Apart from future expansion of the GPS system which we'll cover next, there really is only one other service that could be seen or interpreted as a competing technology. This is known as A-GPS, or assisted GPS.

This is more commonly known and seen in mobile phones, and is becoming more and more of a regular feature inside a great deal of handsets coming out in the market place today.

Instead of using the satellites orbiting the Earth to obtain the location, this uses cellular network towers, the same ones used by a mobile phone to gain a signal for communication purposes. From there, the location can be roughly worked out by triangulating the location from a series of towers and finding out where the phone is in relation to all of those cellular towers.

It's a good alternative to GPS, with a number of benefits. Instead of using an expensive chipset for the phone with actual GPS capabilities onboard, it's a low cost effective way of deploying this type of technology on handsets. Whilst at the same time it doesn't use the same amount of CPU processing power as GPS, this in turn can extend the battery life of the mobile.

There is also another key benefit, which comes from the GPS signal obtained in built up areas. It's common to find with densely populated areas

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surrounded with large tall buildings that normal GPS signals can be hard to obtain, or next to impossible.

A-GPS as an alternative can offer nearly the same level of service as GPS, as for one it doesn't need to access those satellites, just as long as the phone can obtain a signal it's okay to use.

There are even mobile phones around which use both GPS and A-GPS, in order to gather a much more accurate and precise signal for location finding and navigation. As both can complement each other and work from their own strengths to bring a better level of service to a device.

What is in store for the future?

Besides the usage of RDS to deliver up to date traffic information, by means of FM radio which provides digital information to a sat nav device - there is another set to take its place. With RDS the data is taken on board and used to update, if and when necessary, the car's journey when there are traffic issues on the planned route ahead. There are flaws in this service, as the frequency of the data is polled and delay in providing can be as long as 20 minutes.

TomTom has developed a system they're calling HD Traffic which is the next evolution of this service, adding to the usefulness of GPS by providing better on ground services.

They partner with the leading mobile network provider in that country, where they in turn provide anonymous data from the likes of discovering denser population of their mobile phones on the roads in relation to the car. This in turn shows when and where the traffic hot spots are and offers a much better service that RDS could ever provide. HD Traffic is then delivered every 3 minutes straight to the device, which contains a SIM card itself effectively turning it into a mobile phone for all intents and purposes.

Also in the future more satellites will be launched, to improve the quality and sensitivity of the devices.

There has even been ground made on a European civilian satellite network named Galileo. When this launches in 2010 it will provide a network of 30 satellites and is set to give the Europeans greater independence and lessen the need to rely on the USA, whilst at the same time providing a much more accurate service than is already in place.