A Timeline of GPS Technology

Robert J. Hall, Track Your Truck

As we tool around the countryside under the direction of that helpful box on the dashboard, it's easy to believe that GPS is the latest and greatest invention to hit the pike. It may come as a surprise to learn that the idea actually got off to its rocky start back in 1959.

Travelers have always required some means of finding their way around, but for years, not much was available. The North Star is not always visible, and car compasses can have a habit of pointing north when they really mean south. Gas station maps have been an option, but try unfolding one of those and turning the wheel at the same time.

The Beginnings

In 1958, along came Sputnik. It didn't take scientists long to see the potential of satellites as navigational aids. However, the initial attempts went less than smoothly. A 1959 effort, intended to aid in locating submarines, operated in a painfully slow manner. Years of testing eventually led to the launch of the first fully operational GPS satellite in 1989, and by 1994, a complete constellation of 24 orbiting satellites was in place. Thus was born a modern means of navigational assistance.

What Are They Doing in the Sky?

Each one-ton, 12-foot-wide GPS satellite circles the earth once every 11 hours and 58 minutes at a distance of about 12,500 miles. A deliberate arrangement of four satellites in each of six separate planes provides complete coverage. Complete, that is, unless you're traveling at the poles.

How GPS Works

The GPS receiver on your dashboard will communicate with whatever satellites happen to be in range at the time. Transmitting in the UHF region of the frequency spectrum, the GPS signal itself carries three specific types of information. These include:

- Almanac data: This divulges a satellite's precise location within the constellation at any particular moment.
- Ephemeris data: This transmission provides date and time to assist in calculating the current position of the vehicle that carries the GPS receiver.
- Pseudo-random code: On systems that let you see it, this code will tell you which satellite is currently transmitting your information as well as its current signal strength.

Of course, these satellites do not operate on their own. They require ground-level control, which is provided by remote stations around the globe.

Turn Right. Turn Left. Recalculating…

Although not perfect, the accuracy of most GPS systems today is quite high. However, there is a difference between accuracy and precision. In order to get you where you want to go, both must be functioning at adequate levels. When the sky is blue, the terrain is open and there are sufficient satellites in range, a GPS with differential capability can provide accuracy down to as few as 17 feet.

Unfortunately, conditions are rarely ideal. Errors can result from:

- A slow transmission signal.
- An inhibiting proximity to buildings, mountains and other obstructions.
- Errors in a satellite's on-board atomic clock.
- Inaccuracies in a satellite's orbit.
- Insufficient numbers of satellites in range.
- A poor angle of one satellite in relation to the others.

The Now and Future GPS

In the future, the tracking capabilities of GPS are sure to have ramifications that are both legal and political. Will someone's trip to the doctor, the casino or local pub be easily discoverable by anyone who cares? Will law enforcement have free rein to follow your movements? If such activities should prove illegal, what will be the consequences?

The fact remains that this technology, once unheard of a few decades ago, is now a familiar part of the daily scene. In addition to serving as an aid to navigation, today's satellites play a major role in communication, Earth surface imaging and a host of other applications. The capabilities of GPS technology provide 21st-century

users with advantages that were once impossible to imagine.

What will its future mean to you?

For more information visit http://www.trackyourtruck.com/systems [1]

Source URL (retrieved on *11/28/2014 - 2:29pm*):
http://www.wirelessdesignmag.com/blogs/2014/03/timeline-gps-technology

Links:
[1] http://www.trackyourtruck.com/systems