

Article reprinted from *Wireless Magazine*

Perfect timing. These two words describe more than is apparent. Together, they describe the highest achievement for synchronization; a flawless union of time and action. Timing is defined as the observation or recording of time. But what is timing to the everyday person? How does timing effect our daily lives and what would happen without perfect timing?

Time in our daily routine is a universal marker: "This happened on Monday at noon". It is also a method to synchronize activities: "Meet me here at 6:00 p.m." Though these fundamental concepts appear basic, they lend themselves to the most technical applications of GPS (Global Positioning System); time synchronization.

GPS:

There are 24 satellites orbiting the sky; each containing four atomic clocks, each transmitting information of their location. The information they transmit is modulated onto the carrier frequency and repeated at very precisely controlled time intervals regulated by the atomic clocks. The GPS receiver on the ground receives and decodes these signals, effectively synchronizing itself to the atomic clocks on the satellites. Atomic clocks are synchronized to UTC—better than 100 nanoseconds.

A relatively low-cost GPS receiver can provide time accuracy of atomic clocks and synchronize over the world to UTC. This accuracy is widely and rapidly being integrated into a variety of applications; one such use is in the wireless world.

A "smart" usage of timing:

Synchronization is vital to today's wireless infrastructure, efficiently controlling the flow of network information data to maximize the use of bandwidth. A GPS Smart Antenna provides a low-cost, easy to use, highly accurate alternative to conventional timing methods.

A GPS antenna is a GPS receiver, antenna, serial data interface and power supply all-in-one unit that mounts like an antenna. The weather-sealed enclosure is designed to withstand the elements of nature, as well as the hostile RF environment of communication towers. Once an antenna is mounted, it self-initializes, acquires satellite signals, computes a position, course speed and time and automatically outputs this data to the host system.

Benefits:

A smart antenna allows OEMs and system integrators to quickly and easily add GPS capability to their product lines without becoming GPS experts. Presented below are a few of the benefits of integrating with a GPS smart antenna.

- **Ease of integration**

In wireless synchronization applications, GPS antennas are usually placed on transmission towers or building tops in order to maximize satellite coverage. Long cable runs of over 600 feet are easily supported with an RS-422 PPS, eliminating the need for bulky setups.

- **Self contained enclosure**

The GPS solution is an all-in-one receiver combining a high performance GPS engine with a matched antenna and interface.

- **High level of accuracy**

With the 8 channel GPS receiver found in a smart antenna, continuous tracking of weak satellites in severe jamming environments allows for a higher level of accuracy. The more satellites tracked, the better the position fix.

- **Automatic operation**



Operation is automatic; simply apply power and use the outputs. An automatic self-survey mode adds to the ease of integration.

Time and More Time

GPS gives accurate time to the nanoseconds - all without high-cost equipment. Timing applications are appearing in a variety of industries, from investment banking to the Hollywood movie industry. Current users of GPS technology include paging systems, power utilities and CDMA cellular communication systems. The ultimate applications for GPS are hard to predict. In a world that changes with each new day, one universal truth remains. Time. We can always rely on time.