CPS has several advantages over GPS, but its low accuracy severely limits its application. However, CPS has the capacity to self-calibrate, increasing in accuracy where people congregate, and this can enhance the user experience of location-based services

Kevin MacDonald
kmac@loxcel.com

OFFERING SERVICE WHERE IT MATTERS MOST

When Selective Availability was turned off in 2000, GPS accuracy improved ten-fold and helped the nascent location industry grow to a multi-billion dollar industry. A similar improvement is happening again, which might help this industry to grow even more.

For the past five years, Apple, Google and others have used millions of GPS-enabled connected devices, like smartphones and tablets, to crowdsource databases of cell tower locations. Other connected devices then download this database to provide an approximate location service, without a GPS.

This cellular positioning system (or CPS) is as accurate as the size of the tower's cell, which is typically a few kilometres wide. Its accuracy is adequate for some apps, such as weather and local time that only need to know the nearest city.

CPS lacks GPS' accuracy, but it uses less battery, provides instant time-to-first-fix and works indoors, where people spend 90 per cent of their day and consume 70 per cent of their data. It has many advantages over GPS, but its low accuracy severely limits its application. With a smaller cell size, CPS would be able to replace GPS for building-level proximity or zone detection. Your Facebook app could then know that you exited your subway stop, and entered a mall. Your friends who are already at this mall would be informed of your arrival. You meet and go for tea. It is these consumer-centric apps, not GPS' sweet spot at surveying and military navigation, where CPS will shine.

How to reduce cell size?

Every day 700,000,000 smartphones and tablets launch apps that demand more data than the day before. 140+ carriers are responding by deploying new LTE cellular technologies worldwide (LTE is an Internet-centric cellular technology that offers higher bandwidth and much lower latency).

Carriers face a number of challenges as they deploy LTE in urban areas: The first comes from not-in-my-back-yard (NIMBY) citizens who will march to city hall, the minute they hear about plans for a 50-m tall macro cell site in their community.

The second challenge is that all connected devices within the same LTE cell share a fixed 100 mbps of bandwidth. As bandwidth demand per customer increases, assuming no change to cell size, quality of service will suffer. Carriers respond by supplementing existing macro sites with new technologies, like pico sites and femtostations, which offer a reduced cell size between 20-500 m, increased bandwidth per device, and can conveniently be hidden from public view.

A residual benefit to cellular densification is the construction of a medium-accuracy location sensing fabric that avoids many disadvantages of GPS. Carriers face other challenges as they drape their networks across cityscapes, like strings of Christmas lights. They will need to act strategically as they acquire site leases and increase partnerships with facility management companies. Carriers continually optimise their network, which means CPS will self-calibrate, increasing in accuracy where people congregate, such as shops, bus stops, town squares. This will improve the user experience of location-based applications and services for consumers where it matters most to them.