We Can't Forget the "L" in LBS, Dr. Martin Feuerstein
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The spread of 3G and the ongoing development of 4G networks are enabling powerful next-generation consumer and enterprise applications where location awareness is weaved throughout a range of new services and applications.

Imagine a manufacturing company being able to track assets through a mobile device as materials move through the supply chain and monitor delivery trucks in real time, using location information to map out the best route based on geography, traffic and even weather information. Or a retail store being able to send a 10 percent off coupon to any mobile device that gets within 50 feet of its storefront.

It's a changing world and these wireless location-based services (LBS) will help drive the rapid and cost-efficient roll out of high-bandwidth, low-latency location-aware applications that consumers and enterprises are going to expect from their wireless networks. However, in order to see mass adoption of LBS, carriers need to get the "L" part right.

In order to facilitate the proliferation of these powerful applications, location needs to be accurately determined to within tens of meters, have a Time to First Fix (TTFF) in less than five seconds and work in all sorts of environments from the concrete and steel urban canyons of large cities to the wide open prairies of open-sky settings.

While most location-based services rely on rudimentary wireless location technologies, solutions are getting better and determining location is becoming more accurate—especially in dense urban and indoor environments where the highest demand for emerging LBS applications is predicted to be. Performance in open-sky environments is also critical, particularly building on the great success of turn-by-turn navigation applications. Finally, GIS applications

should not be ignored, and GIS mapping solutions must be supported by highly accurate and highly reliable location information.

However, existing wireless location solutions do not provide the accuracy, latency, reliability or yield required by 4G LBS applications. For example, Assisted GPS (A-GPS) works well in open-sky environments but doesn't have the accuracy or reliability required in dense urban and indoor settings since blockages occur from large buildings and structures getting in the way. WiFi is a technology that has been widely deployed, but it is largely an unmanaged, unreliable network and the technology does not have the coverage required in open-sky environments. Other wireless location technologies, such as Time Difference of Arrival (TDOA), require hardware upgrades at radio towers—an expensive and time-consuming deployment strategy that doesn't fit with next generation networks where base stations could be small femtocells.

On the other hand, pattern matching location technology is a cost- and time-efficient approach that provides the accuracy, reliability and yield required of 4G applications. Like a fingerprint's pattern of lines and swirls, a location can be identified by a unique set of values including measurements of neighboring cell signal strengths, time delays and other network parameters, populating an extensive database of values. Pattern matching location technology can make use of GIS mapping data (terrain, roads, canopy/foliage, buildings, morphology, etc.) as its base layer, allowing the system to capitalize on radio effects from complex shadowed and obstructed environments to enhance location accuracy and reliability. Incoming signals are then pattern matched against the database to quickly and accurately determine location in real time. Other solutions, such as GPS and TDOA, are degraded by non-line-of-sight obstructions, while the performance of pattern matching is enhanced.

The solution can be enhanced further by combining it with another wireless location technology such as A-GPS—allowing the solution to leverage each technology's advantages while mitigating the other technology's weaknesses. This hybrid approach enables carriers to provide the accuracy, latency and yield required of 4G LBS applications from anywhere—regardless of the type of environment.

In addition, a solution that blends pattern matching location technology and A-GPS does not require equipment upgrades at either the tower or handset level, relying instead on a network-based approach to determining wireless location. Inherently an open architecture, solutions can be seamlessly added to the carrier's network and can be managed, monitored and updated easily.

Fortunately, the technology exists today, giving carriers the ability to deploy powerful wireless location solutions in their next-generation wireless networks. Getting the “L” right in LBS enables the accuracy, latency and yield required by these advanced 4G applications, allowing location to become ubiquitous throughout the wireless landscape and opening the door for truly game-changing technology.

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About Polaris Wireless
Polaris Wireless is committed to simplifying and improving the process of location of mobile phones for carriers around the globe by serving as the price/performance leader delivering accurate, reliable and flexible products to support a variety of applications. Since 2003 Polaris has been successfully deploying the only software-based location system that meets FCC E911 Phase II requirements. Polaris is backed by venture capital funds Draper Fisher Jurvetson, Draper Richards and Centre Palisades Ventures. For more information about Polaris Wireless please visit http://www.polariswireless.com.