

Polaris Wireless Proposes Low-Cost Location Service to Japanese Network Operators

Polaris Wireless, a privately held Silicon Valley company is marketing a unique location technology for mobile, wireless handsets. Polaris's technology, Wireless Location Signatures (WLS), works best in dense urban environments and does not require any hardware investment. WLS meets the U.S. E911 public safety standard for mobile phones in the United States.

Since its founding in 1999, Polaris Wireless has operated from headquarters in Santa Clara, California. Its Chairman of the Board is Manlio Allegra, who also serves as President and Chief Executive Officer. The company owns seven patents for its location algorithms, and has filed for 17 other related patents.

On Sept. 29, the company conducted a roundtable presentation at Hotel New Otani in Tokyo, to explain its technology to Japanese business reporters and technical writers. Speakers included Thomas Wrappe, Senior Vice President of Marketing and General Manager for Asia; Akira Kawashima, Advisor for Japan Market Development; and Dr. Joseph Ho, Director of Research.

Wrappe led the presentations, saying that WLS does not require any change to the handset hardware or software, and has a centralized server capability. Wrappe noted that Global Positioning System (GPS) services work best in so-called open-sky environments, where population densities are relatively low and there are no tall buildings to block the GPS signal. On the other hand, WLS works very well in high-rise areas with large, dense populations. Therefore, WLS and GPS (especially Assisted GPS or A-GPS) complement each other quite well.

One of the biggest differences between GPS and WLS, says Kawashima, is that GPS requires the addition of an extra chip to every handset, and sometimes involves an extra antenna, too. WLS works without any changes in handset design, network design, or hardware infrastructure.

"We're just getting started here in Japan," Wrappe acknowledged. "We respect and understand that Japan is a unique market. We respect and understand that we will be adapting this technology to the market in Japan."

WLS works by knowing the strength of the radio frequency (RF) signals that each handset receives at each point along the network (Fig. 1). Service providers first build a database (the Predicted Signature Database or PSD) of all the received RF signal strengths from each base station in the network (Fig. 2). A distinctive combination of RF signal strengths identifies the RF signature of a specific geographic spot within the network (Fig. 3). All the phones in the network serve as probes, reporting their individual RF signatures in real time to the network server. The system has an accuracy of within 50m, and can detect a location in 10 seconds or less.

Thus, if handset A reports an RF signature of (-50, -85, -95, -70), then handset A must be in location 1. If two handsets report the same RF signature, it means two people are close to each other (within 50m) at location 1. Right now, the system works only in two dimensions (X and Y, flat plane), but additional technology refinements will enable WLS to identify individual locations along a Z (vertical axis) as well. In other words, it will be able to distinguish among different locations within the same skyscraper.

Wrappe says that WLS does not require induction loops or any other changes to the existing infrastructure. He estimates that WLS' total cost of ownership is about 50 percent lower than competing location systems.

"The biggest investment for carriers is getting their network information together," said Wrappe. "We also have to do a lot of data validation." Thus, he says, the company can put together a trial system in about one month, but nationwide WLS deployment for any given service provider generally takes about a year.

The most obvious use of WLS location is in emergency services, where ambulances, firefighters and police must be able to find a caller's location quickly and accurately (Fig. 4). According to Kawashima, the system offers a number of benefits to service providers. For instance, the ability to locate every phone in the network helps providers identify dropped calls. They can then use this information to optimize their networks. Additionally, the detailed information about handset locations can help pinpoint spots where network upgrades will be most beneficial.

WLS also enables value-added services like zone pricing, road traffic monitoring, and selective advertising (Fig. 5). In particular, says Kawashima, WLS has huge potential in regionally targeted push advertising (Fig. 6), because there is an installed base of 80 million handsets in Japan. Unlike personal computers, those handsets are with their owners all the time, everywhere. Furthermore, the display screen is increasingly important in Japanese mobile phones, and is ideal for delivering advertising messages.

For now, though, Polaris is focusing on the first step of gaining a toe-hold in the Japan market. For at least the next six months, said Kawashima, "We have to focus on discussions with carriers," and on explaining WLS technology to potential customers. According to Wrappe, the target customers include carriers, portal providers, and Internet service providers, as well as companies offering peer-to-peer and workgroup services.