

## Summary of Location Based Technologies and Services Workshop

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### Backgrounder:

Yankee Group tele-briefing report on Location Based Services and Technologies:

<http://viodi.com/2008/06/13/location-based-services-and-technologies/>

### Speaker Remarks

**1. Dave Reid**, Director of Business Development, SiRF Technology Inc. <http://sirf.com/>

The world is on the go (which implies that mobile telecom services and devices will grow rapidly). SiRF believes that location awareness brings convenience to our lives. SiRF is predominantly a (fabless) semiconductor company- with the largest market share of **discrete GPS** chips and related intellectual property. SiRF powered mobile devices include personal navigation devices (PNDs), handheld GPS receivers, smart phones, feature phones, personal media players (PMPs), and in-dash car navigation systems.

There are many types of Location Based Services (**LBS's**) being deployed and being considered by network operators: navigation, social networking, location based advertising, mobile commerce, transportation, child locator, pet tracker, etc. New mobile broadband networks like WiMAX will be location enabled. So will new devices, including Mobile Internet Devices (MIDs) and even location aware watches.

Applications and content are intersecting and this will lead to innovative new mobile services with location awareness. Enterprise customers have led applications in location for a long time, but the consumer market for LBS could now be poised for faster growth.

**Verizon Navigator** (offered by VZ Wireless) is the most popular LBS and most successful navigation service in the world (5M subs). VZ Navigator offers audible turn-by-turn directions for \$10 per month.

<http://www.verizonwireless.com/b2c/splash/turnbyturn.jsp>

LBS's (mostly navigation) will continue to command a pricing premium over other wireless add-on services, e.g. music, ring tone, games. In the future, LBS will be a key revenue generator for network operators. Nokia announced they would have location awareness in all their devices (Nokia uses TI processors).

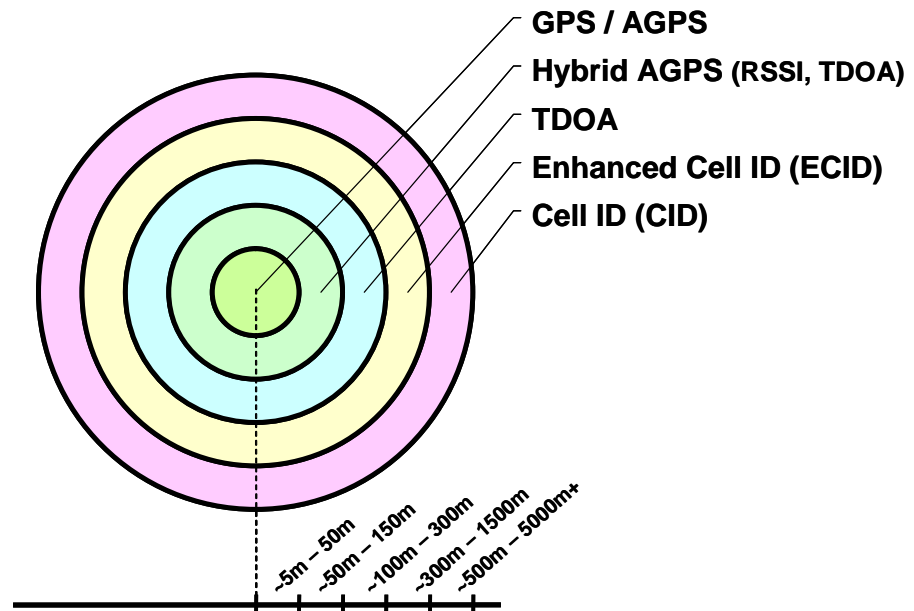
**Location Based Technologies:** While GPS is only one of several location-based technologies (others include cell site location, broadcast TV signals, WiFi AP locations, RF signatures- see graphic below), its accuracy is better than the others. **Assisted GPS** may be used to enhance performance when signal propagation conditions are poor (e.g.

when surrounded by tall buildings or when the satellite signals are weakened by being indoors or under trees). In pure GPS location tracking, it typically takes 30 or 40 seconds for a GPS device to compute a location if it does not have recent ephemeris data for the GPS satellite network. Otherwise, locations are computed once a second or faster.

Sky Hook Wireless (<http://www.skyhookwireless.com/>) creates a database of WiFi Access Points (APs) as the basis of its WiFi Positioning System. It uses the native IEEE 802.11 radio (already on mobile devices) to deliver accurate positioning worldwide.

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Dave Reid was kind enough to provide this chart of **Location Tracking Technologies**:



**Notes:**

**RSSI** = Received Signal Strength Indicator

[http://www.birds-eye.net/definition/r/rssi-receive\\_signal\\_strength\\_indicator.shtml](http://www.birds-eye.net/definition/r/rssi-receive_signal_strength_indicator.shtml)

**TDOA** = Time Difference of Arrival

<http://encyclopedia.thefreedictionary.com/Time+Difference+Of+Arrival>

**Cell ID** will assume location is in the midpoint of the cell (this could be inaccurate if person is at the cell edge or on the border of adjacent cell?)

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SiRF has proposed a **LBS Systems Architecture**. They have an ecosystem in place to develop, test and market location based applications. SiRF provides end- to- end solutions and has engaged in partnerships with various companies.

**2. Jon Metzler**, Director of Strategic Initiatives, Rosum Corp. <http://www.rosum.com/>

Location determination capability is becoming a "table stakes" requirement for device makers and semiconductor companies. LBS's should be considered as a utility - like electricity that can be turned on and off.

Rosum is the first and only company to harness over the air, broadcast TV signals for position location. The key advantage of this approach is that TV frequencies were designed to penetrate walls, ceilings and trees, in order to deliver a good video signal indoors. The company was founded by original GPS architects to deliver always-on location awareness where GPS fails – indoors and in urban canyons. Rosum is a provider of location, timing and frequency calibration solutions for **Mobile TV Device** and **Home Telecommunications markets**. In particular:

- Mobile TV Devices: cell phones, notebook PCs, and PND/PMPs equipped with TV tuners
- Home Telecommunications: femto cells for the home, and E911 (E112) for Wireless and VoIP subscribers

Among recent milestones for the company:

- Rosum Announces Successful DVB-H Positioning Trial with UK's National Grid Wireless (6/25/08)
- 2Wire Selects Rosum TV+GPS Location and Timing Solution for E911/ Home Telecom products using femto cells (3/31/08)
- Rosum Signs Collaboration Agreement with Intel - Will Enable TV-Location on Mobile Devices (10/07)

**But why use Broadcast TV signals for position location?**

The TV signals offer high power (1 MW ERP typical), low frequency (50-750 MHz), frequency diversity (wide 6 to 8 MHz channels, multiple channels per tower), and horizontal signals (less attenuation from roofs and walls). Moreover, the terrestrial TV infrastructure is highly correlated with population density and broadband penetration in the U.S. In a one on one test of TV Positioning vs. GPS based location tracking, GPS failed at three of six indoor locations in the SF Bay Area.

**Editors Note:** GPS vendors, such as SiRF, would likely question those test results. However, Rosum uses third party testing in order to address concerns of competing technology vendors.

The best of both worlds might be a hybrid approach - where GPS and TV based positioning are combined in one device. In that case, GPS would be used outdoors, while TV positioning would be used indoors and in canyons (where GPS often fails).

The location technology and device market is consolidating, with many mergers and acquisition of key players, e.g. Nokia acquiring mapmaker Navteq. Other market themes of note:

- Online mapping arms race between Google, Microsoft, Yahoo
- Combination Personal Navigation Device / Portable Media Players (PND / PMPs)
- Convergence of PNDs and Communications devices (i.e., cell phones)

Two popular hand held devices with LBS and positioning technology:

- Blackberry with Google Maps and GPS positioning
- Apple iPod Touch with Google Maps and 802.11x (WiFi) based positioning

### **What Comes Next for LBS's?**

1. Connected (not silo'd) use of location information with two categories foreseen:

-Groups: self-chosen affiliations, such as Social Networks

-Swarms: (anonymous) use of location for ITS enhancements

2. Resolution of privacy issues (TBD)

3. Growth in new LBS's such as: Social Networks, Intelligent Transportation Systems (ITS), Connected Navigation, and Local Search/ Advertising (Google and Yahoo)

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### **Panel Session**

The author chaired a panel session with the two speakers. It consisted of a few pre-planned questions for discussion, audience Q and A, and a wrap up question about the nature of future devices for LBS's (cell phones, iPods, other gadgets, or Mobile Internet Devices=MIDs). The panelists agreed that the big software companies (including Microsoft, Yahoo, Google, Oracle) all had LBS initiatives underway. They also believed that the smart phone (cell phone + Internet + LB technology) would dominate the LBS market, especially over non-voice capable MIDs.

Jon later amended his panel session remarks regarding MIDs: "If you define MIDs as including devices with integrated WiFi, such as the mylo or iPod Touch, then yes, I believe that market will develop. With that said the overall cell phone market will still remain much larger."

The author thanked the panelists and the audience (35 attendees) for their participation in this very enlightening and informative workshop. We also thanked IEEE SECON for sponsoring the workshop in conjunction with their annual conference.

### **Addendum: Critical issues for mobile network operators**

At a VoiceCon- Spring 2008 panel on LBS's, the critical issues for mobile network operators were identified:

- Security and privacy-authentication, authorization, encryption, etc.
- Application integrity - to prevent apps from harming network or users
- Power dissipation and utilization
- Flexibility and customizability
- Integration of new value added services (e.g. location)
- Billing: What to charge for a new service? Flat rate vs. Usage based (metered)

### **Postscript: Location Based Social Networking from Verizon Wireless**

On June 26, 2008, Verizon Wireless announced that its location based social networking service- known as **loopt** - is now available to its subscribers. The original announcement this past March anticipated an April launch for the service, but according to Verizon Wireless spokesman Jeffrey Nelson, "technical issues, pricing issues and running the application through some traps before launch," caused the delay. Regarding security and privacy, Nelson said: "We've strengthened the privacy capabilities even further. We will be pinging customers on a regular basis to let them know their loopt account is active and that they can be tracked."

Loopt's CEO Sam Altman had previously stated that privacy had been one of the biggest issues facing the uptake of location-based mobile social networking and that solving them is a key step toward achieving inter-carrier LBS services. Evidently privacy is no longer a problem- at least not for Verizon Wireless.