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OFFICE OF THE SECRETARY

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June 29, 2001

BY MESSENGER (202.418.0303)
Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
Office of the Secretary
445 – 12th Street, S.W. – Room TW-A325
Washington, D.C. 20554

EX PARTE OR LATE FILED

Re: *Ex Parte* Communication, CC Docket No. 94-102

Dear Ms. Salas:

This is an *ex parte* communication pursuant to Subpart H of the Commission's Rules consisting of this explanatory cover letter and the attached power point document.

In December 2000, Rosum Corporation ("Rosum") through Dr Matthew Rabinowitz and Dr James Spilker, the architect of the Global Positioning System, began investigating a new idea for positioning mobile devices. The new idea is to use high power digital television ("DTV") signals, which were broadcast for the first time last year and which will soon cover the United States and several other countries. Today, Rosum's idea of using high power DTV appears to solve the E911 problem more effectively and more economically than any of the alternatives.

In April 2001, Rosum began proprietary discussions with the primary cellular service providers and handset manufacturers. As a result of these discussions, Rosum is convinced that its DTV-based solution to Phase II E911 is cheaper and will perform better than any of the existing technologies. We realize that our DTV-based technology is entering the E911 arena at a very late stage. However, it appears that most wireless carriers will be asking for an extension of the FCC's October 2001 deadline based on the cost and the limitations of the available technology. It also appears that our new technology provides the right solution to E911. We believe that if an extension is granted, giving the wireless carriers time to exploit the DTV-based technology, many lives will ultimately be saved.

What follows is an overview of our solution. Also included with this letter is a short PowerPoint presentation that highlights some key elements of our DTV-based technology and the people behind it. Detailed technical documentation is available upon request.

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In order to position wireless devices indoors and outdoors, throughout the United States, Rosum Corporation determines the range to high power DTV transmitters. The FCC has mandated that all Television stations broadcast a digital signal according to the ATSC (Advanced Television Systems Committee) format. The synchronization codes embedded in the ATSC DTV signals can be used for very robust, accurate ranging with low cost hardware, and very low computational requirements. In order to range from the DTV signal, it is not necessary to demodulate the actual DTV data. Consequently, the ranging receiver has a processing gain of roughly 50dB above that of a standard television receiver. As a result, signals may be used well beyond the standard DTV coverage areas, and the availability and geometry of signals for positioning is substantially better than that provided by GPS (Global Positioning System). The DTV signal has a huge power advantage over GPS, since DTV transmitters are broadcasting signals at the Megawatt level from a distance of roughly 100 kilometers, while GPS is broadcasting a signal of a few tens of Watts, from a distance of roughly 20,000 kilometers. Due to the high power and low duty factor of the DTV signal used or ranging, the receiver processing requirements are minimal. Consequently, the positioning technique can accommodate far cheaper, and lower power devices than a GPS technique would require. The signal has roughly six times the bandwidth of GPS, consequently the effects of urban and indoor multipath are substantially mitigated. The full rollout of the DTV is slated to occur by May 1 2002 for public broadcast stations, and by May 1 2003 for private stations. Our technique requires no changes to the digital broadcast stations.

Unlike the terrestrial AOA/TOA (Angle-of-Arrival/Time-of-Arrival) positioning systems for cell phones, this technique requires no change to the hardware of the cellular base station. When used to position cell phones, the technique is independent of the air-interface, such as GSM (global system for mobile communications) or CDMA (code division multiple access). Since a wide range of UHF frequencies have been allocated to DTV transmitters, there is redundancy built into the system to protect against deep fades on particular frequencies due to absorption, multipath and other attenuating effects. Since Rosum technology makes use of pre-existing infrastructure, pre-allocated spectrum, and does not become obsolete when the cellular protocols change, the cost of the system is far less than techniques requiring upgrades to the cellular network. Unlike the terrestrial AOA/TOA systems, our technique can achieve positioning accuracies of a few meters. The Rosum technology may be used to position cell phones, PDA's (personal digital assistants), pagers, cars, OCDMA (orthogonal code division multiple access) transceivers and a host of other devices.

We are filing an original plus one copy of this communication and providing courtesy copies to the individuals listed below. Thank you.

Very truly yours,

Matthew Rabinowitz
CEO, Rosum Corporation

Enclosure
cc: Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, (Rm. #3-C252)
Kris Monteith, Chief, Policy Division, WTB (Rm. #3-C124)
Thomas Stanley, WTB (Rm. #3-C460)
Daniel Grosh, WTB (Rm. #3-A221)
Patrick Forster, WTB (Rm. #3-A104)
Dr. William Lane, WTB (Rm. #3-C304)

[redacted]

Mobile Positioning Objectives

- Far exceed FCC requirements for E911 phase II
- Platform-independent solution
- Ubiquitous coverage
- Low cost solution
- Low power solution

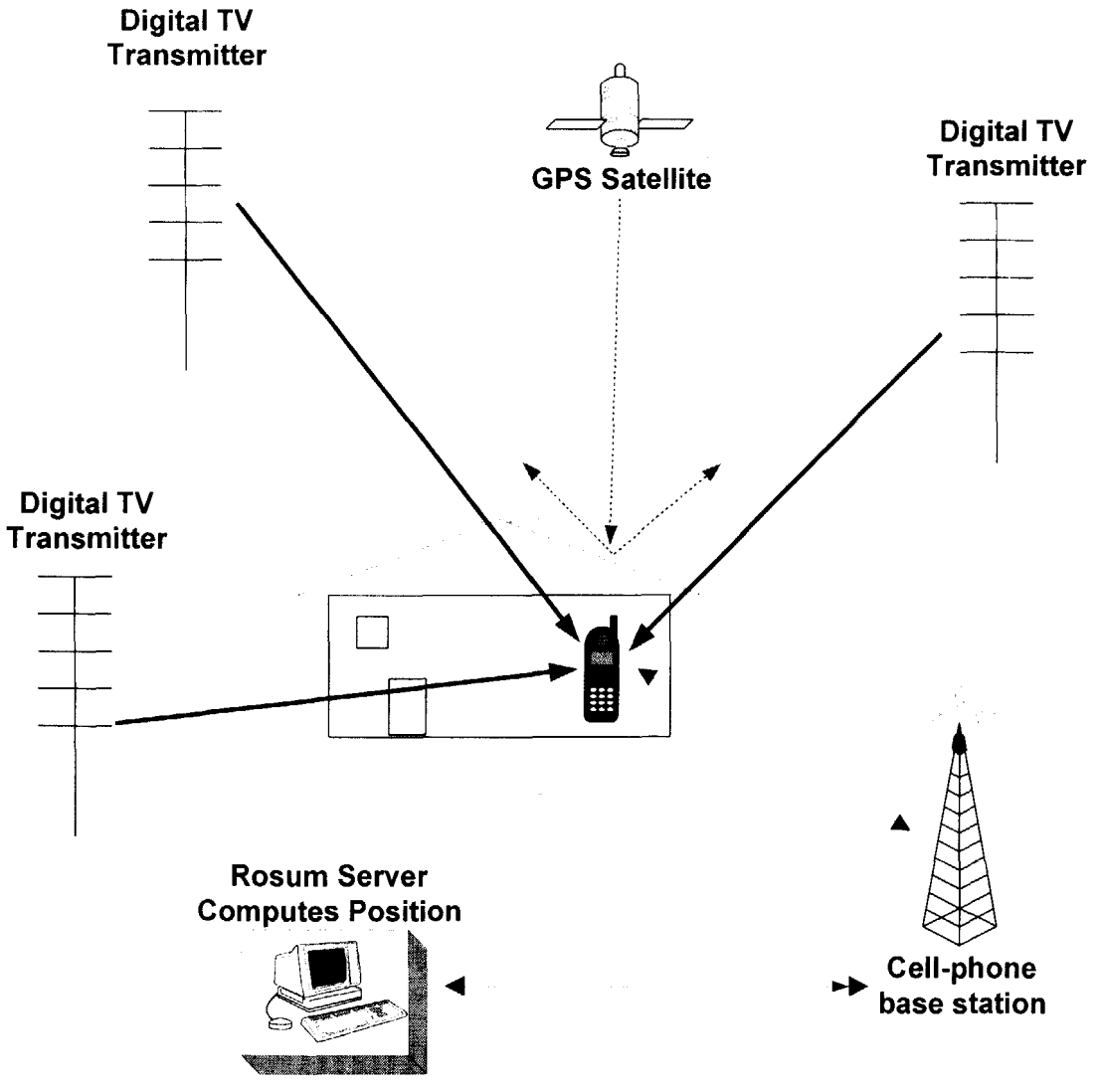
[redacted]

The Solution

- High-power DTV (several MegaWatts)
- Embedded synchronization signal
- 6MHz bandwidth
- Better geometry than GPS
- No ionopshere, no transmitter Doppler
- Prime UHF spectrum
- 1600+ DTV stations coming online

[redacted]

System Architecture



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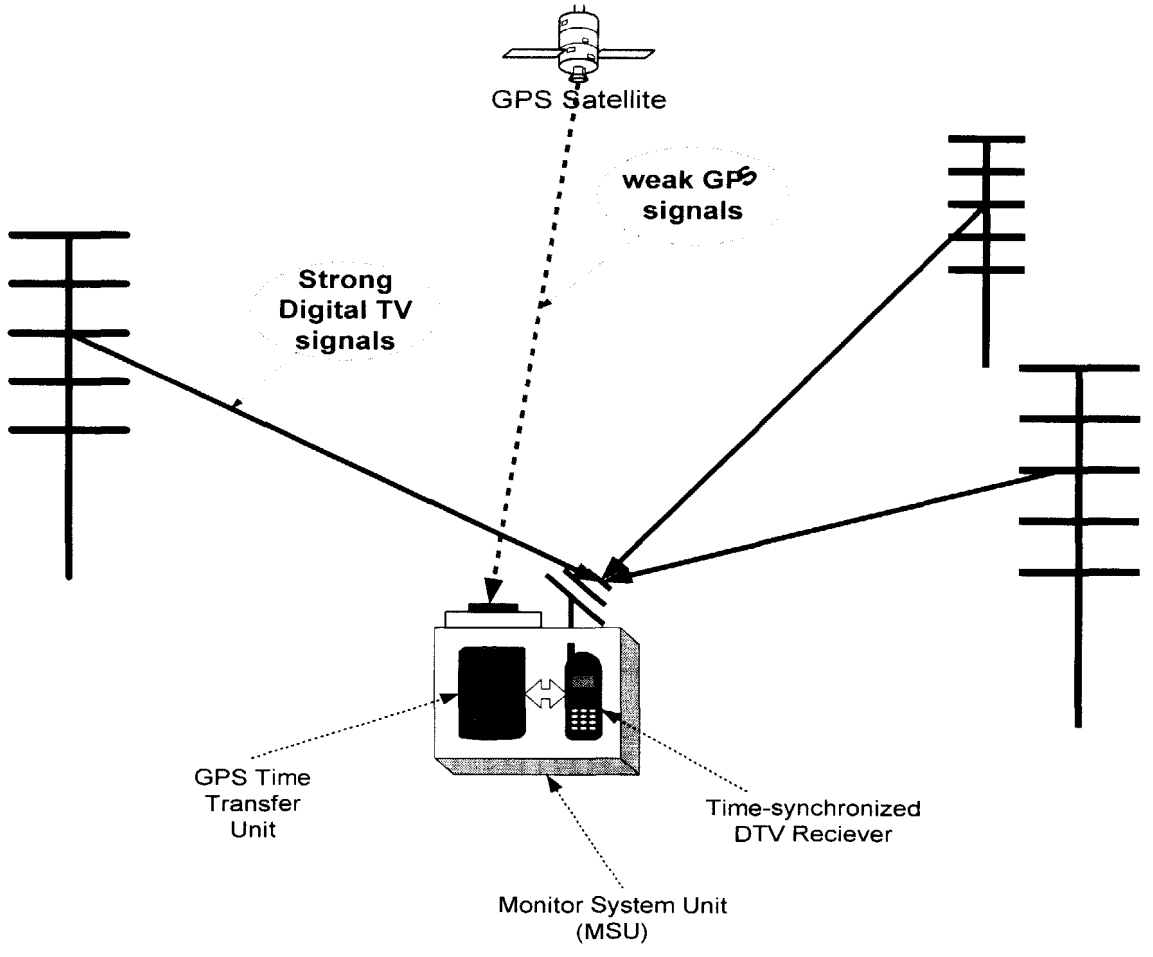
Monitor System Unit



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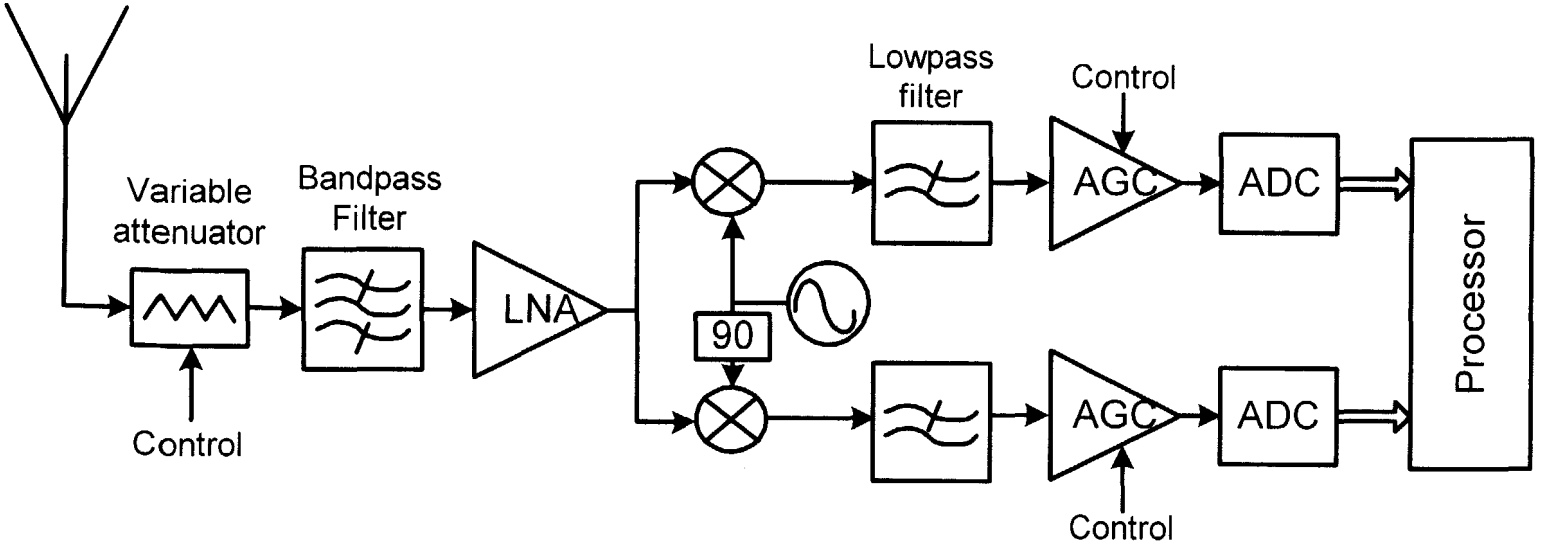
The Rosum Positioning Solution

- Simple
  - Elegant solution, Low cost chipsets, Low processing requirements, No base station changes
- Robust
  - Ubiquitous coverage, High signal power, Low GDOP
- Additional Applications
  - Driving directions, Maps, Targeted advertising, Location-based information, Cellular ICQ, Mom market

[redacted]

Simple Front End Architecture for VLSI Integration



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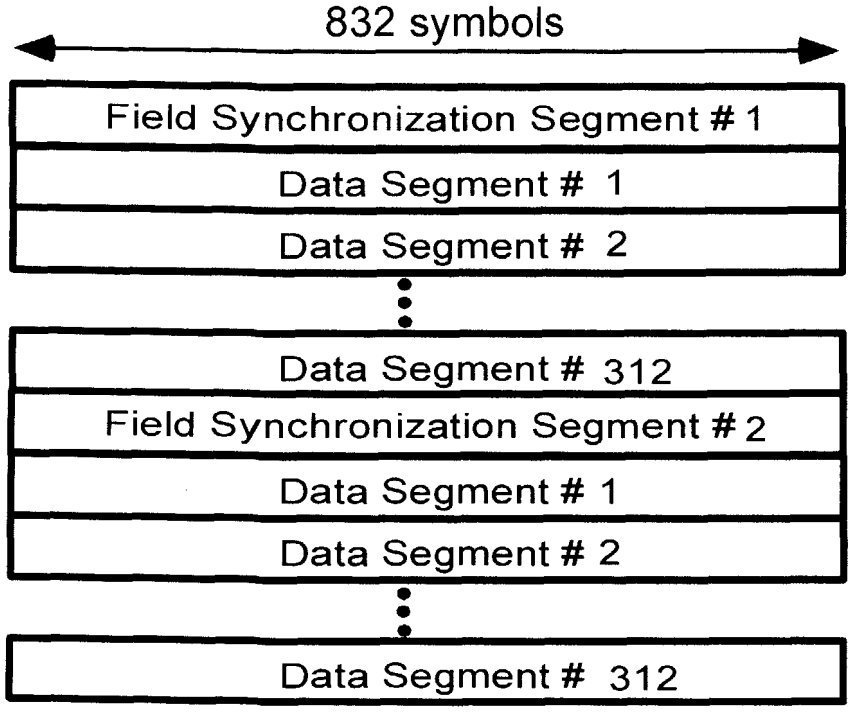
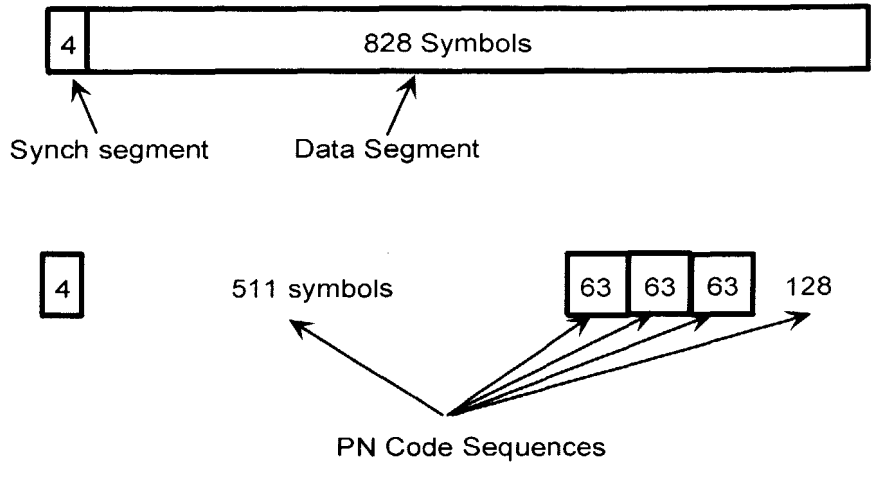
Simple Signal Processing: DTV Frame Structure





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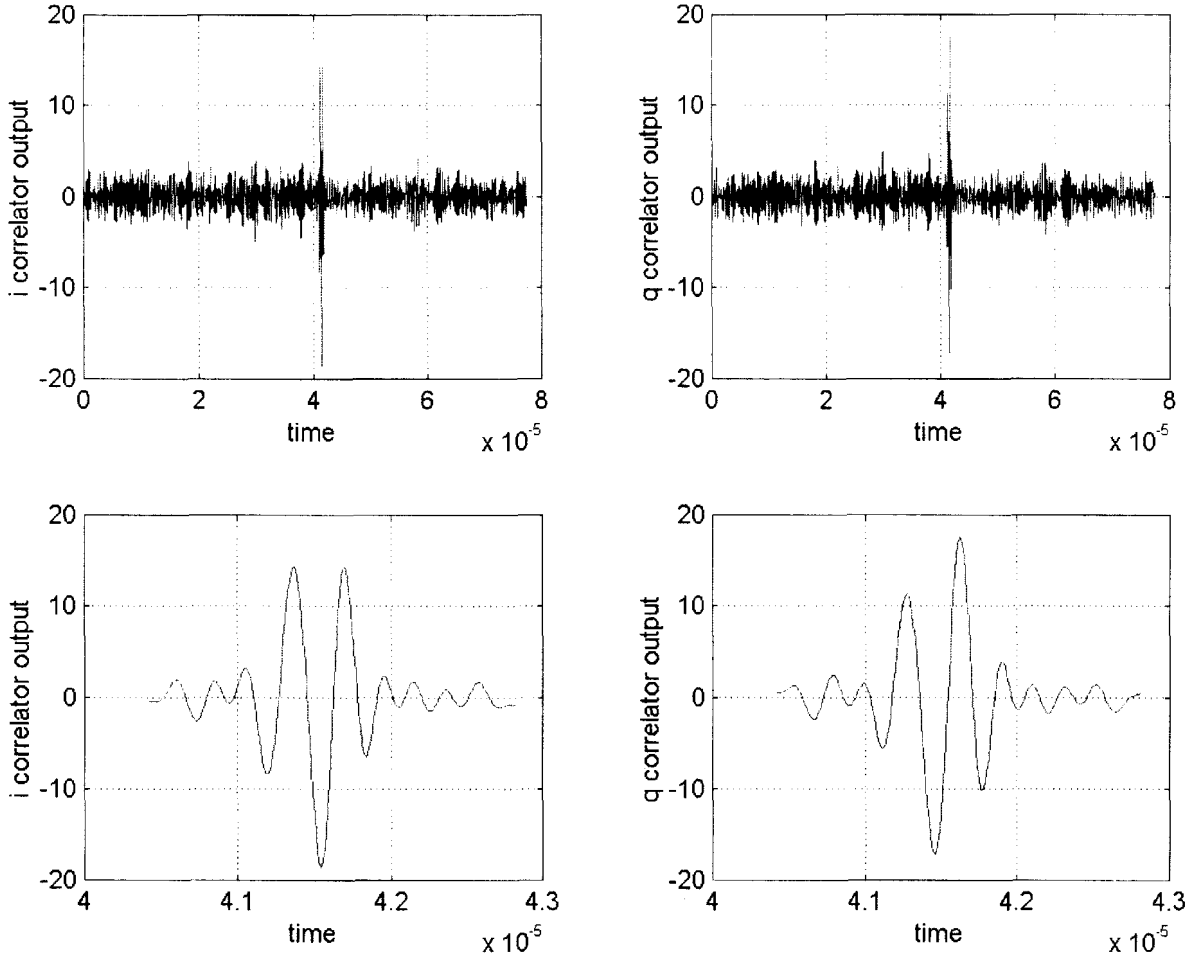
Simple Signal Processing: I and Q Correlator Output, 4-Symbol Segment Synch



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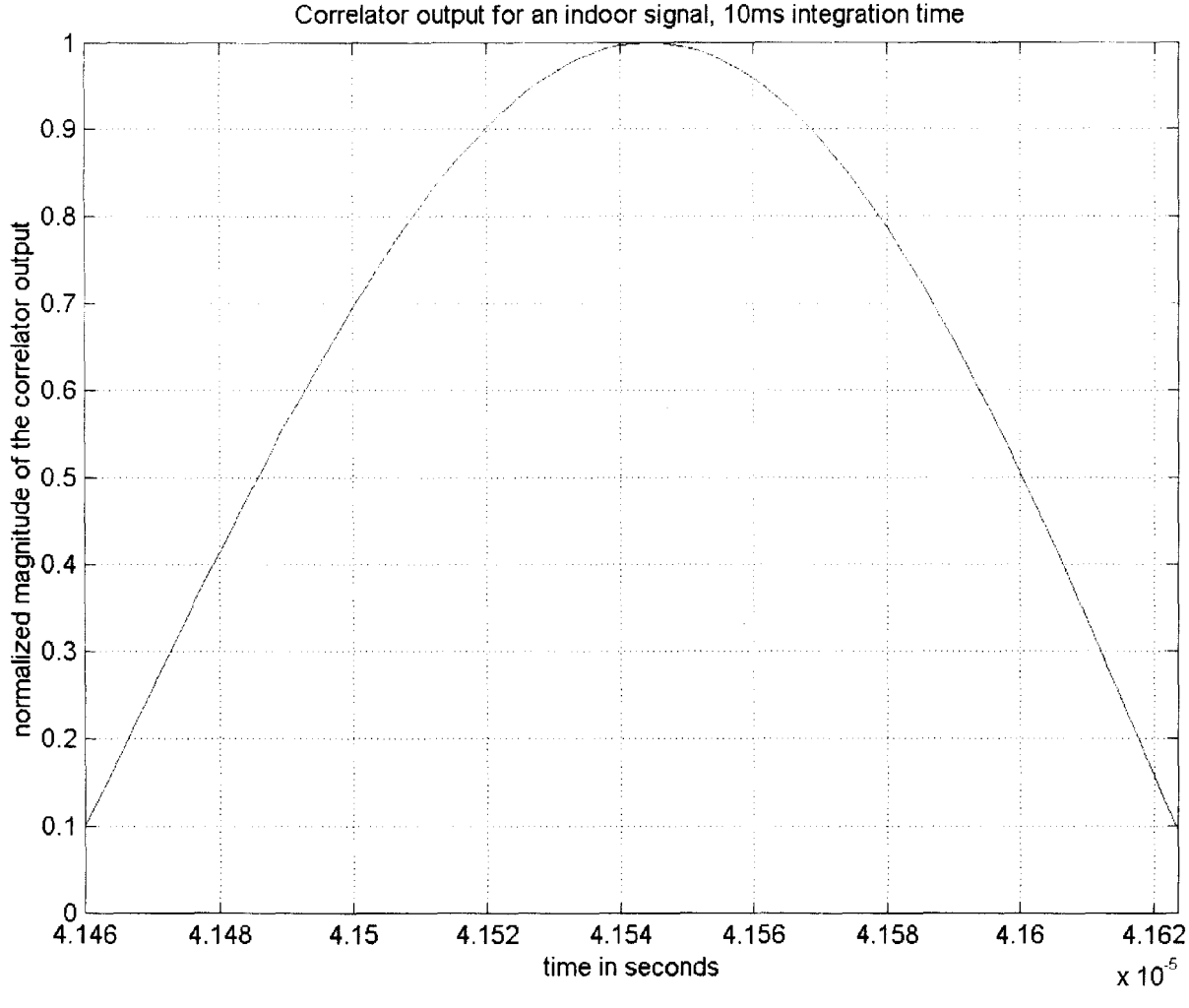
Robust: Indoor Signal Correlation Peak Showing High SNR, Wide Bandwidth



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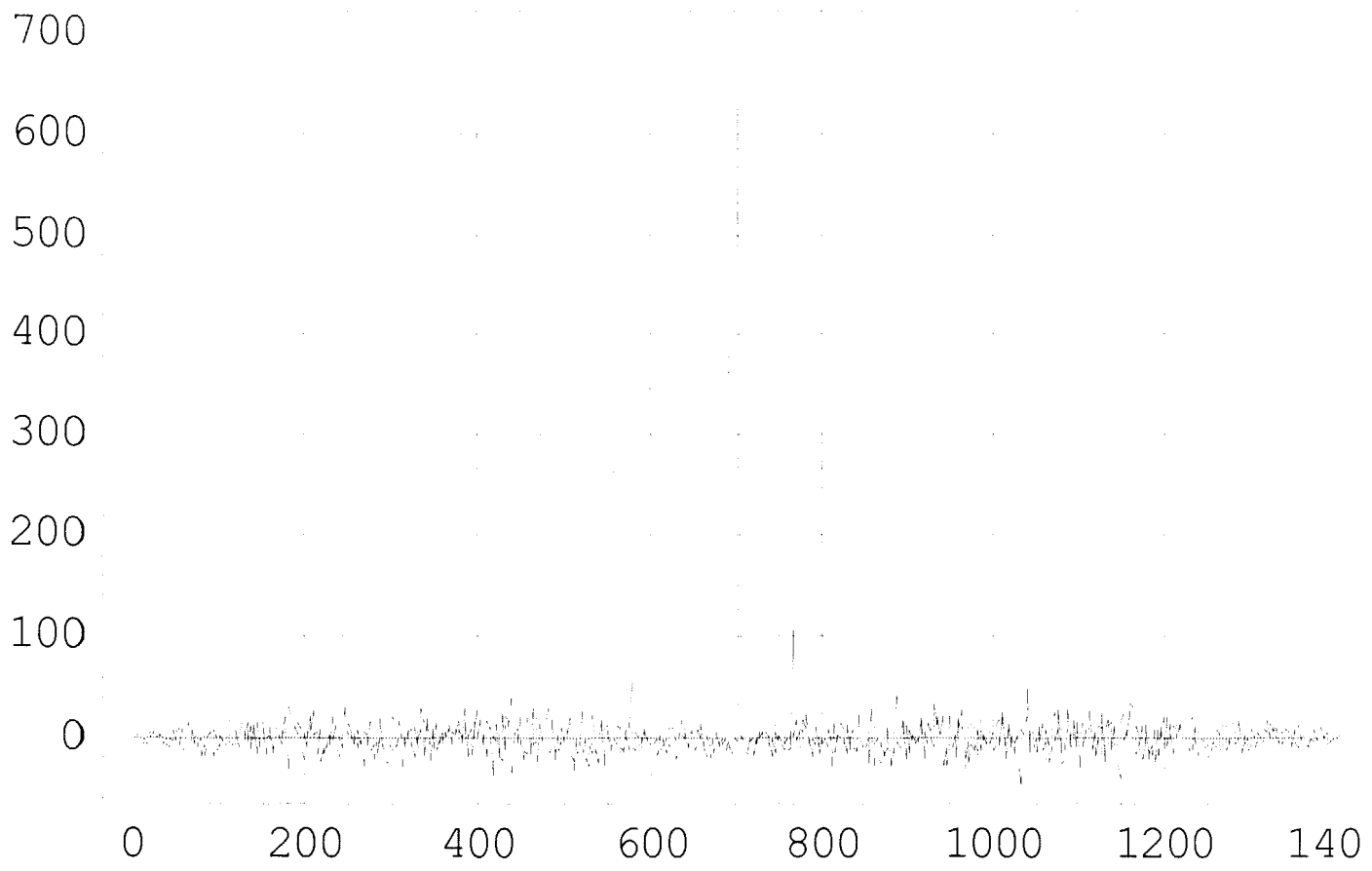
Simple Signal Processing: Auto-correlation of Segment Synch



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The Competition

- **Network Solutions (TDOA, AOA) such e.g. Allen Telecom's "Geometrix"**
  - Expensive:
    - Overhaul existing base stations and build new ones
    - Hardware becomes redundant with changes in protocol
  - Ineffective:
    - Does not work indoors
    - Poor coverage in rural areas
    - Does not meet FCC requirements

[redacted]

The Competition cont...

Hybrid Network/Handset Solutions (E-OTD) e.g. CPS

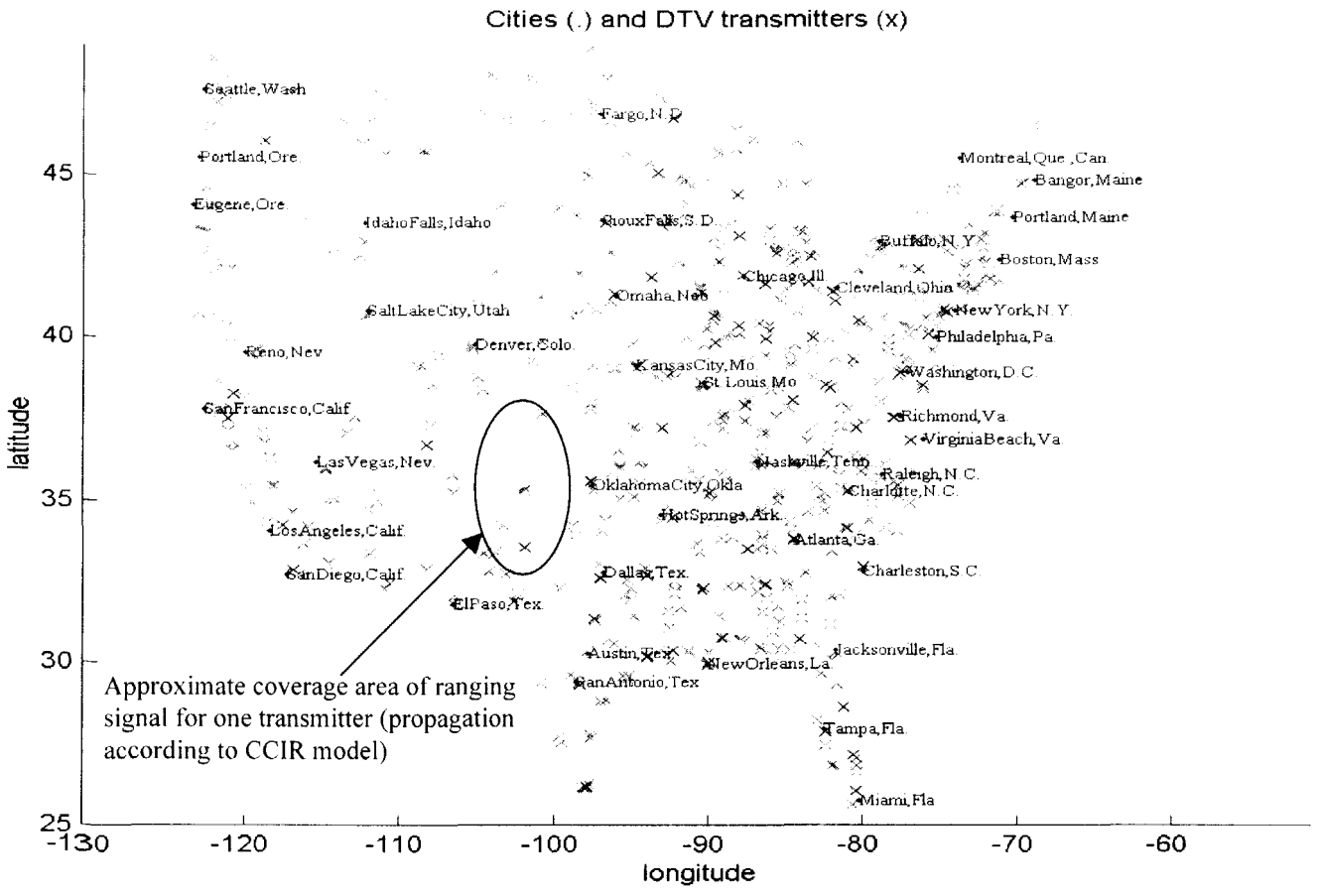
- Expensive:
  - Increase in cost-per-handset
  - Overhaul base stations
  - Hardware becomes redundant with protocol
- Ineffective:
  - Does not meet FCC requirements

Handset Solutions (A-GPS) e.g. Snaptrack

- Expensive:
  - Increase in cost-per-handset
- Ineffective:
  - Power, processing constraints
  - Not robust indoors, in cars, in urban areas

[redacted]

The First 1038 Transmitters

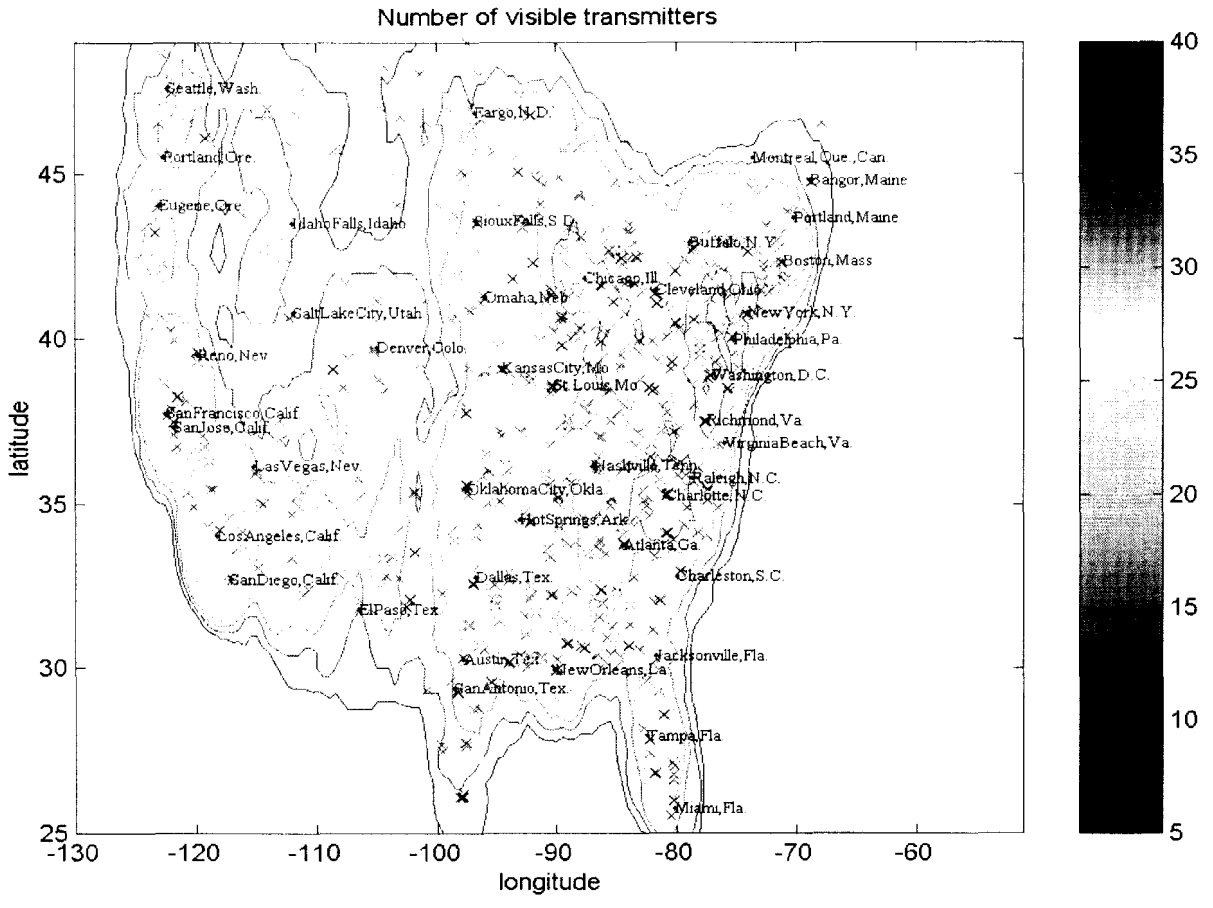


Example: Positioning in the Bay Area

- Areas without DTV positioning coverage are shown in red
- Analysis includes geographic features
- Generated by the same consultants that analysed propogation for FCC

[redacted]

Contours of the Number of Visible UHF Signals for First 1038 Transmitters. (Assumptions in Text Below)



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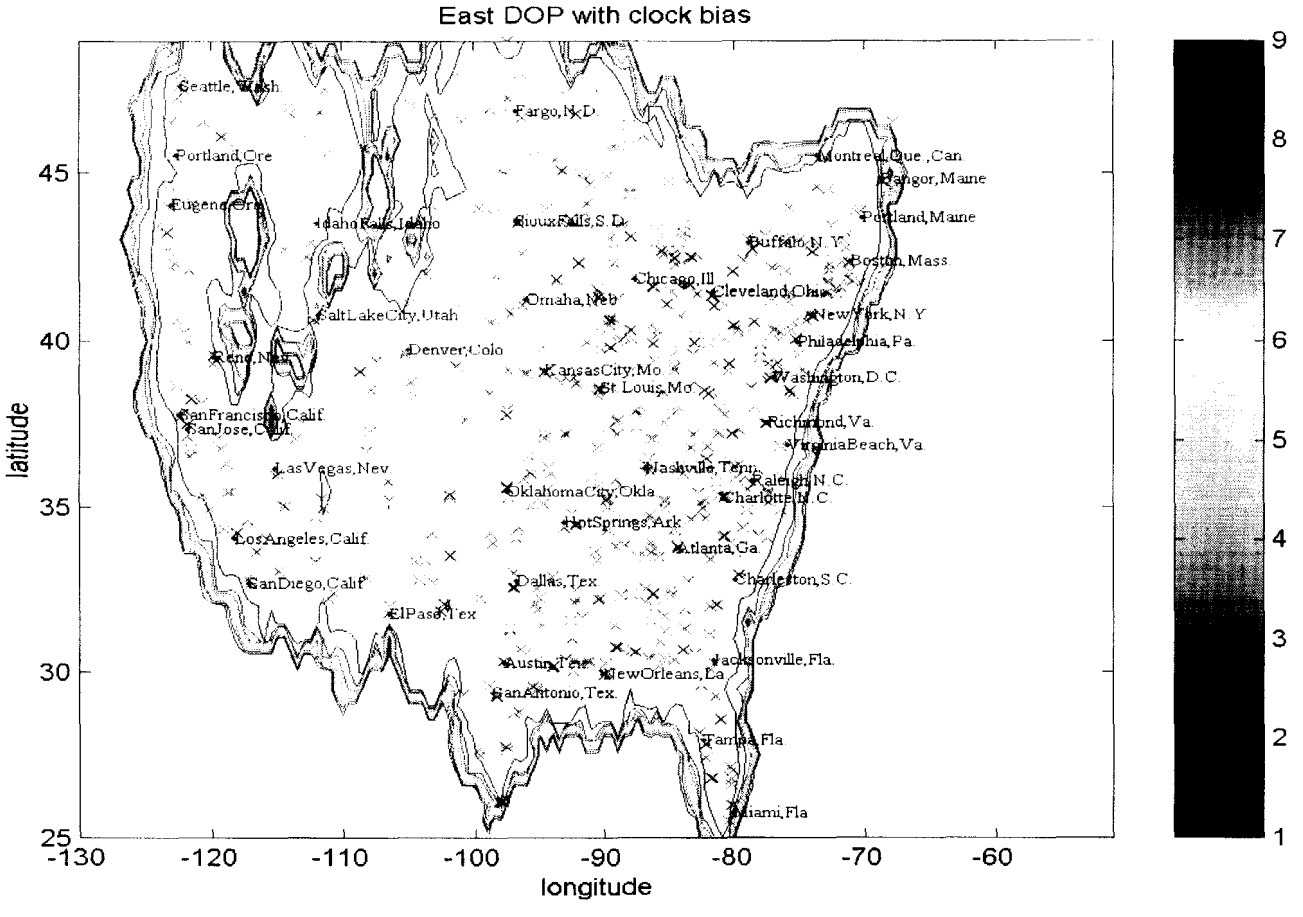
East DOP (Dilution of Precision) for First 1038 Transmitters, CCIR Propagation Model



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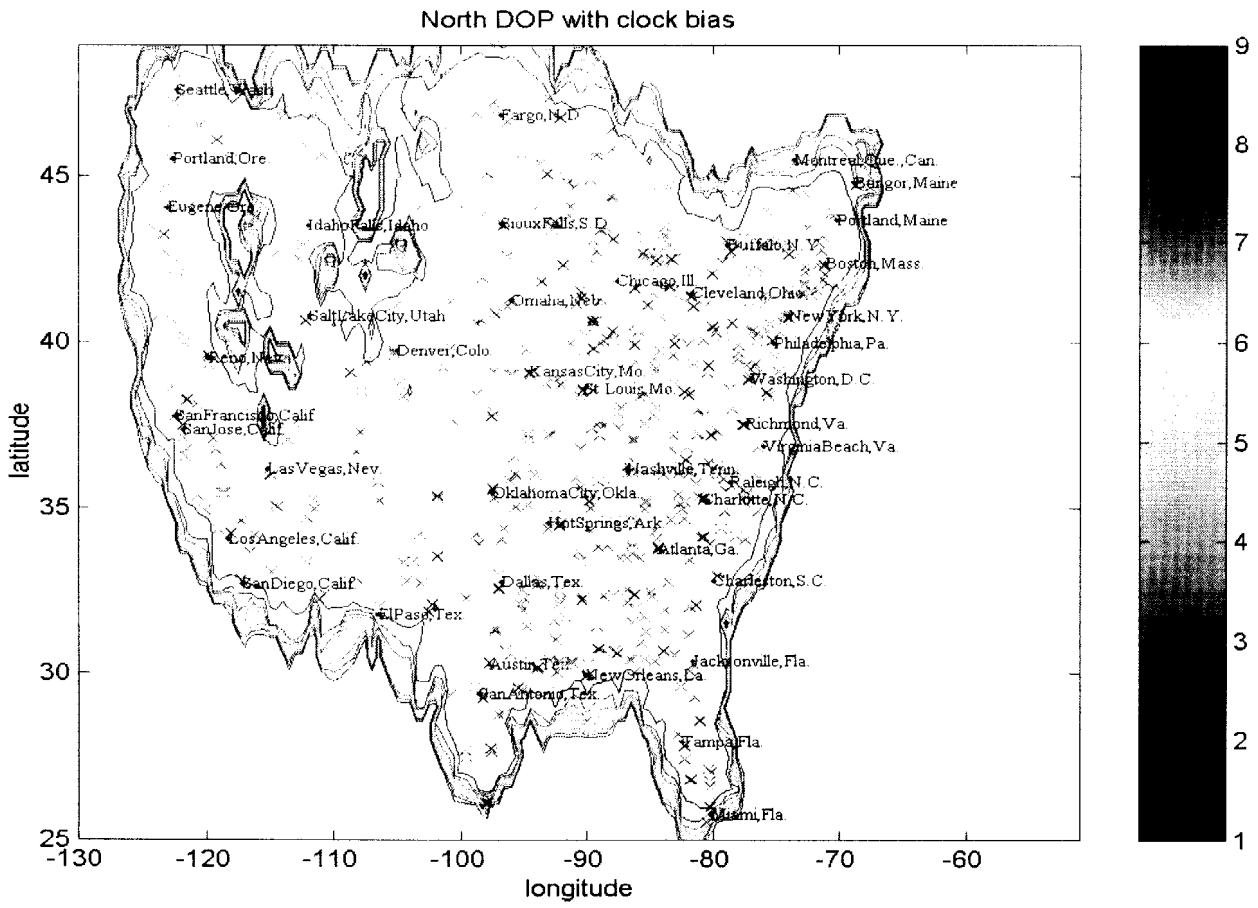
North DOP for First 1038 Transmitters, CCIR Propagation Model



[redacted]

Additional Applications

- The Rosum System is accurate and robust enough to support an array of additional features and services for cellular users
  - Driving directions
  - Maps
  - Targeted advertising
  - Location-based information
  - Cellular ICQ
  - Mom market

Rollout Milestones

- System
  - Server Software and Data Base
  - Base Station Software
- Handset Hardware and Firmware
  - Reference design from off-the shelf parts, allowing for easy VLSI integration
  - Reference signal processing for cellular handset processors
  - Integrate with handset firmware and hardware

[redacted]

Rosum's Technology Team

World experts in Navigation, Data Transfer and Digital Television. All founders of succesful technology companies.

- Jim Spilker, Ph.D. – Architect of GPS – Inventor of next-generation "Spilker Spectrum"
- Matthew Rabinowitz, Ph.D. – Specialist in centimeter-level navigation
- Paul Baran – Inventor of Packet-Switched Data – "The Father of the Internet"
- Jim Omura, Ph.D. – Specialist in DTV and author of canonical signal processing texts