

Network Solutions Division

GEOMETRIX® Wireless Location System



Andrew Corp. Wireless Caller Location System

Product: Geometrix® Wireless Location System

- Formerly a Product of Grayson Wireless Division of Allen Telecom

- Type: Network-Based (overlay) Caller Location System
- Technology: Time Difference of Arrival (TDOA, frequently referred to as U-TDOA)
- Compatibility: All Cellular and PCS Networks and Handsets (Digital and Analog)
- First Commercial Service: October, 2001
- Customers: Multiple Carriers in Each of Tiers I, II, and III
- Deployments to Date: Approx. 18,000 Cell Site Locations in 34 States
- Estimated Coverage: Approx. 20 Million Subs
- In Service With: GSM, TDMA, CDMA, 1xRTT, AMPS
- In-Service Environments: Urban, Suburban, Rural, Highway
- Provisioning: Turnkey. Includes System Design, Equipment, Software, Installation, Accuracy Testing



Andrew Location System Characteristics

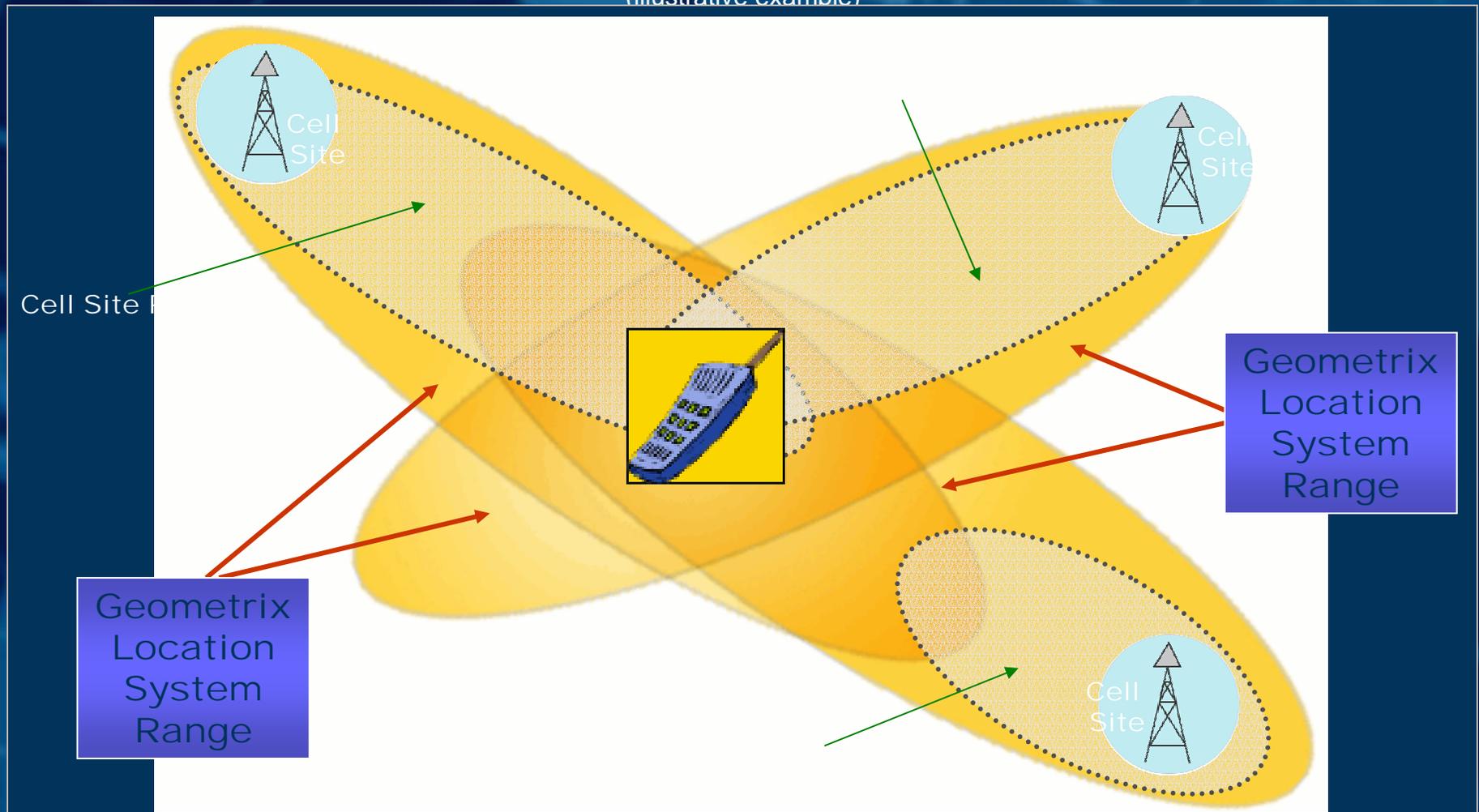
- Designed to be Installed at Wireless Network Cell Sites to Provide Caller Locations Within Carrier's Area
- Same Geometrix Equipment at Cell Site Can Support Any Combination of Wireless Technologies (e.g. GSM & TDMA & AMPS, GSM & CDMA, etc.)
- System Maintains Accuracy, Yield, and Latency Performance When Caller Is In Structures or Vehicles
- Many Times More "Sensitive" Than Host Wireless Networks
 - Signal Strength Required For Location Determination Much Lower Than That Required For Communications
 - Distant Geometrix-equipped Sites Can Detect and Measure 911 Caller Signals for Location Determination
- Fundamental TDOA Technology Requires Signal Measurement by Geometrix Equipment at 3 Cell Sites (uses existing antennas)
- Can Deploy Angle of Arrival (AOA) at Selected Cell Sites to Supplement TDOA if Required (e.g. when signal visible to Geometrix Equipment at only 2 sites)



Caller Visibility to Geometrix® System

Location system is able to use weaker/more distant signal than is usable by cellular network

(illustrative example)



Preliminary System Design/Accuracy Projections

- Uses:
 - Provided Without Charge to Carrier Potential Customers
 - Key Component of Andrew Design Process for Andrew Customer Location Systems
 - Provide Basis for Accuracy Performance Warranty
- Modeling Process Factors Cellular Network Geometry and Structure, Design Area Topology, Morphology, Cellular Network Technology, Andrew Location System Functional Characteristics
- Produces Coded Map of Design Area and Calculations Indicating Expected Accuracy of Location System Designs.
- Allows Exploration of Design Alternatives and Associated Costs



Preliminary System Design/Accuracy Projections

- Andrew Informs Potential Carrier Customers As To the Results of the Performance Projections. Andrew Advises Carriers If Projections Indicate That An E911 Phase II-Compliant Solution Is or Is Not Feasible With Location System Implementation Limited to Carrier Sites.
- Andrew Warrants the Accuracy of Geometrix Systems Implemented According to Andrew Designs for E911 Phase II Compliance.
- If Customer Specifies Design/Design Parameters Other Than for E911 Phase II Compliance, Andrew Provides Customers With Accuracy Projections for the Design(s). Andrew Advises Customers When Projections Indicate That a Customer Design Is Not Likely To Be E911 Phase II Compliant.



Andrew Experience To Date

- Andrew Has Deployed and Designed Systems for Many Rural Applications
- Each Deployment Situation Has Its Own Characteristics; Each Must Be Studied and An Appropriate Solution Determined
 - Most rural situations studied can have a Phase II-compliant Geometrix solution
 - There is no “standard” case for rural
 - Andrew informs carriers in cases where Andrew believes Phase II compliance cannot be attained by installing Geometrix at carrier sites.
- All Geometrix Installations To Date Have Been at Existing Carrier Sites (no location-only sites)
 - TDOA alone sufficient in 98% of installations to-date (2% supplemented with AOA)
- Oft-Cited “String of Pearls” In Actuality Rarely Encountered.
 - Highway curvature the norm, cells generally not in straight line
 - Inter-site geometry usually sufficient for TDOA solution
 - AOA can be employed for true “strings”
- Rural cellular systems tend to be clustered around customer groupings (towns, etc.)
 - Geometrix TDOA can cover majority of rural users (existing site antennas)



Summary

- Andrew's Geometrix network-based caller location system has been successfully deployed in numerous challenging rural environments for Tier I, II, and III carriers.
- Andrew employs a sophisticated means of predicting Geometrix accuracy for system design alternatives.
 - Andrew guarantees accuracy of Geometrix systems implemented according to Andrew designs for E911 Phase II compliance.
 - Andrew informs carrier if a E911 Phase II-compliant solution would require extraordinary deployment (beyond carrier sites).
 - Andrew informs carrier if non-compliance is predicted for customer-stipulated designs.
- Andrew studies each potential deployment case and determines an appropriate Geometrix location system design.
- Andrew will continue to provide Geometrix performance projections to all Tier III carriers that request same.

