

Carlsbad 9-1-1/GIS Training

November 13, 2007

Wireless Location Standards



FCC Changes in Wireless Location Standards

May 31, 2007

FCC commissioners approved a notice of proposed rulemaking (NPRM) that tentatively concluded wireless and voice-over-IP (VoIP) location accuracy and reliability standards should be based on performance within each public safety answering point (PSAP) service area, not averaged on a statewide or multistate basis.



Current Wireless Location Standards

Association of Public-Safety Communications Officials (APCO) recently released a report demonstrating that automatic location information associated with 911 calls from wireless carriers' customers often was inaccurate in rural PSAP service areas.



Current Wireless Location Standards

Under the FCC current rules, wireless carriers are required to meet location and reliability benchmarks, but carriers are allowed to average the results over large regions. As a result, strong location accuracy statistics in a populous urban area can let a carrier offset poor location performance in rural areas.



Current FCC Wireless Location Standards cont.

Handset-based solutions: 67% of calls within 50 meters and 95% of calls within 150 meters

Network-based solutions: 67% of calls within 100 meters and 95% of calls within 300 meters



The Current Standard cont.

“For example, meeting location accuracy standards on average in the entire state of New York by providing enhanced 911 capability in Manhattan does not help first responders in Buffalo.”



The Current Standard cont.

Typically, cellular carriers today use handset-based GPS technologies that do not work well inside urban buildings or network-based triangulation that does not produce accurate results in rural areas, where towers are scarce.

Solution? Hybrid solutions to overcome the limitations of existing location technologies.

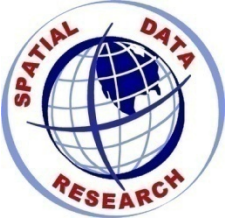


The Changed Standard

Carriers now must demonstrate PSAP-level compliance in areas served by Phase 2-ready PSAPs by Sept. 11, 2012

Provisional benchmarks have been established to ensure carriers are moving toward compliance with the new location-accuracy requirements.

Carriers also must submit progress reports on each economic area in which they operate by Sept. 11, 2008.



Testing the Accuracy Of Wireless 9-1-1 Call Location

1. Make test call from known location
2. Record transmitted coordinates
3. Chart/Map transmitted coordinates
4. Compare transmitted location to actual location
5. Repeat for each carrier
6. Repeat in thousands of locations



The Testing Team

Test Caller—equipped with one phone for each carrier that has towers/service in the PSAP’s response areas. May also have GPS/GIS in the field.

Call “Receiver” at the PSAP to log the call information, rebid as needed and collect screen capture of mapped ALI.



Deciding Test Call Locations

Inside/Outside

Urban/Rural

Differing topography, elevations

Use grid and select X number of locations per grid page



Goals of Wireless 9-1-1 Test Calling

To assess the overall accuracy of the coordinates transmitted with Phase II wireless 9-1-1 calls in relation to actual coordinate locations of callers (verified with differential GPS) and to grade each call and carrier based on FCC mandates for wireless 9-1-1 calls

To compare the mapped locations of Phase II wireless 9-1-1 calls in the Orion MapStar and PowerMap software environments to the actual coordinates of the caller (as per differential GPS location). These software programs can interpolate call locations to the nearest intersection and do not always display the call according to the transmitted coordinates.

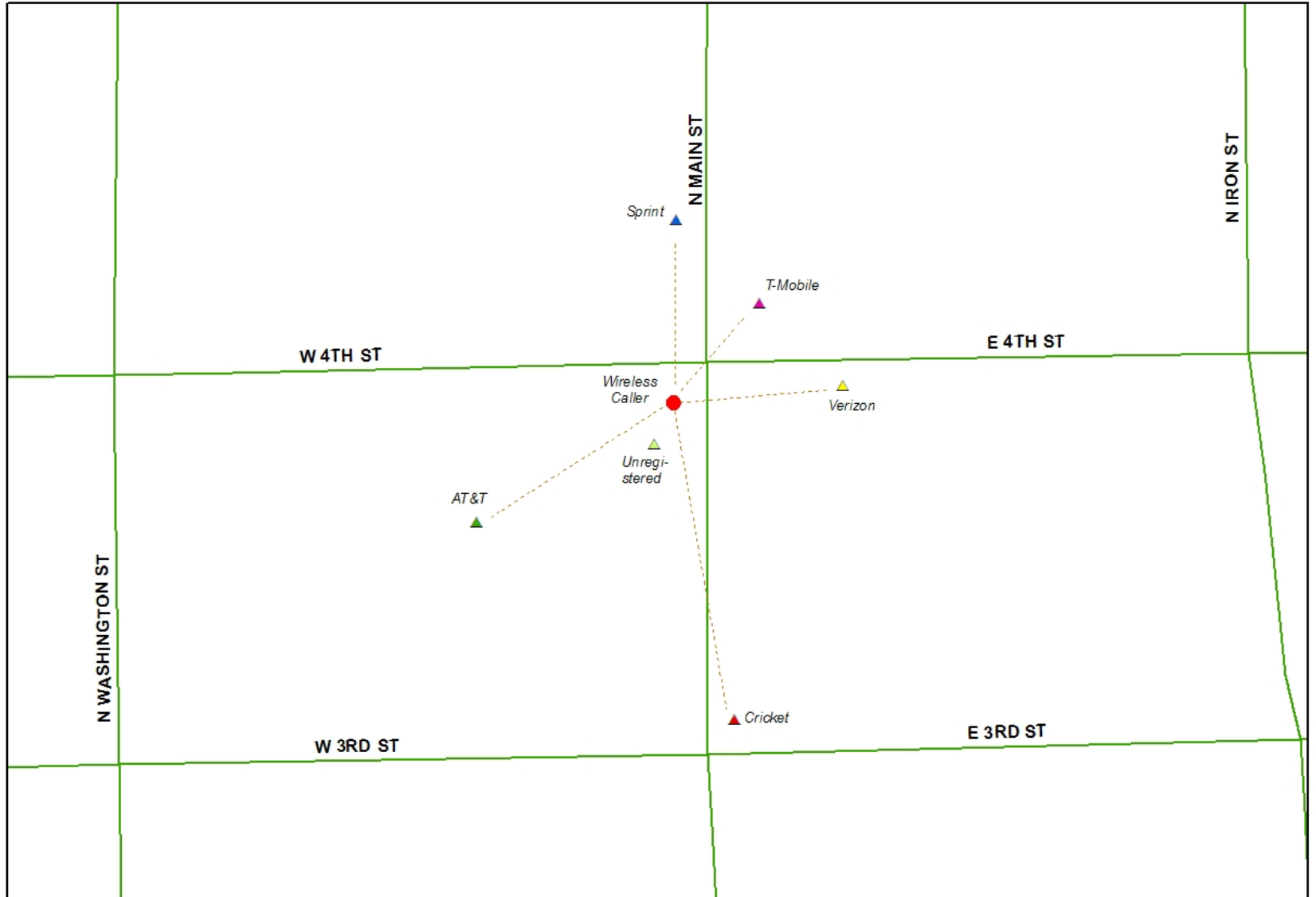
To identify problems relating to the GIS data being used at each PSAP to map calls, specifically problems with accuracy and completion of the road centerline layer.

To identify problems associated with the display of Phase I and Phase II wireless ALI data, specifically relating to each carrier's adherence to the 30W ALI format.

To identify issues, problems and irregularities relating to the routing of Phase I and Phase II wireless 9-1-1 calls.

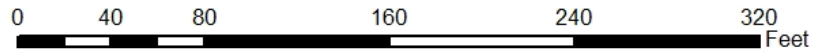
To provide input to DFA on how call mapping software is being used at each PSAP studied.

To present all results in GIS and report formats with relevant maps, analysis, interpretation and recommendations.



Nov. 5, 2007
Springfield PSAP
Wireless Test Call 001
Caller Location: 4th & Main
Phase II on 1st rebid

Lat: 37.6453
Long: -91.5364



Nov. 5, 2007



Tarrant County, TX Wireless Testing

Objective of Phase 2 Call Testing

The objective of this round of Phase 2 testing is to determine if the wireless carrier is meeting the FCC mandate for accuracy.

AT&T Mobility and T-Mobile are using the network solution – 67% within 100 meters and 95% within 300 meters.

Metro PCS, Nextel, Sprint PCS and Verizon are using the handset solution – 67 % within 50 meters and 95% within 150 meters.

We will issue a report card for each of the 6 major carrier in each of the 2 categories stating the actual % of calls in each of the 2 mandates.

For example:

T-Mobile delivered 72% of calls tested within 100 meters.

T-Mobile delivered 93% of calls tested within 300 meters.



Tarrant County, TX Wireless Testing

Methods and Procedures for Phase 2 Call Testing

Geographically diverse test sites

The base map of the territory covered by Tarrant County 9-1-1 District consists of 159 MAPSCO grids. There will be at least 2 test sites per MAPSCO grid. This will provide a base of at least 318 geographically diverse test sites.

Number of test calls per carrier

We will make 2 calls from each carrier's phone at each of the 318 test sites. This will provide a base of at least 636 test calls per carrier.

Location of caller at each test site

The call tester will be standing at the corner of an intersection.

A later round of call testing will be conducted from various "environments" such as inside a building, inside a car and in an urban canyon. These results will be compared to the base line results established by this round of testing.



Tarrant County, TX Wireless Testing

Measuring the deviation distance

The measurement tool in the mapped ALI display at the PSAP is used to determine the accuracy of the location.

Since the caller will always be located at an intersection, one point of measurement will be the intersection.

The other point of measurement will be icon on the map.

The measurement tool displays the number meters to 2 decimal places.

All measurements will be rounded to the nearest whole meter.



Tarrant County, TX Wireless Testing

Time between initial call delivery and 1st re-bid

The tester in the PSAP will wait at least 15 seconds after initial call delivery before a re-bid is launched.

Number of re-bids per test call

Every test call will consist of the initial call delivery to the PSAP and one re-bid (if needed).

The call will be graded as pass or fail based on the location after the 1st re-bid.

If the distance deviation is over (fail) the FCC mandate after one re-bid a second re-bid will be made and the data recorded, but this **will not change** the pass or fail grade after the 1st re-bid.



Tarrant County, TX Wireless Testing

Determining Pass/Fail for each call

Every location will be given a +/- 10 meter halo to account for the fact that the call tester is standing at the corner instead of the middle of the intersection.

Locations that are within the +/- 10 meter halo are considered “conditional” data points.

Locations that are not within the +/- 10 meter halo are considered “absolute” data points.

There are 4 possible “grades” for each call:

AP = Absolute Pass

CP = Conditional Pass

CF = Conditional Fail

AF = Absolute Fail

For the 100 meter goal:

0 – 90 m = AP

91 – 100 m = CP

101 – 110 m = CF

111 + m = AF

For the 50 meter goal:

0 – 290 m = AP

291 – 300 m = CP

301 – 310 m = CF

311 + m = AF

For the 50 meter goal:

0 – 40 m = AP

41 – 50 m = CP

51 – 60 m = CF

61 + m = AF

For the 50 meter goal:

0 – 140 m = AP

141 – 150 m = CP

151 – 160 m = CF

161 + m = AF



Tarrant County, TX Wireless Testing

DATE: _____ Phone 4
TIME: _____ SPRINT PCS
PSAP ID: _____ 817-723-2182
MAPSCO GRID: _____ INTRADO
P/F @ 50 _____
P/F @ 150 _____

INITIAL CALL DELIVERY

DID CALL ROUTE TO THIS PSAP (Y/N): _____

IF NO, WHICH PSAP GOT THE CALL: _____

ESRK: _____

CARRIER NETWORK: _____

ROAMING (Y/N) IF Y WHAT NETWORK: _____

CLASS OF SERVICE: _____

IF WPH2, LOC DEV (METERS): _____

IF WPH2, UNC: _____

REBID DELIVERY

CLASS OF SERVICE: _____

IF WPH2, LOC DEV (METERS): _____

IF WPH2, UNC: _____

NOTES: