

APCO Project



Wireless 9-1-1 Deployment and Management Effective Practices Guide

APCO International
Association of Public-Safety Communications Officials - International, Inc.





Project LOCATE

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Letter from the Project Chair



As Chair of APCO Project LOCATE (Locate Our Citizens At Times of Emergency) and on behalf of the Project LOCATE Team, I am pleased to present to the Association of Public-Safety Communications Officials (APCO) International Board of Officers, the APCO Executive Council, and the APCO membership the Wireless 9-1-1 Deployment and Management Effective Practices Guide.

With funding from the Public Safety Foundation of America (PSFA), and with the knowledge gained from the performance tests in seven Public Safety Answering Points (PSAPs) across the country and in-depth discussions with the wireless service providers, this collection of Effective Practices is designed to increase the Public Safety Answering Point Managers' understanding of the technology application and, therefore, the ability to better manage the wireless calls received in their jurisdiction. Further, it is hoped that the Effective Practices provided herein will serve to increase the Manager's ability to deal with public and responder expectations in an effort to more effectively process the response to a wireless 9-1-1 call incident.

Project LOCATE and the wireless service providers (WSPs) serving each PSAP Test Area met often to discuss the testing results, trends, anomalies, and to analyze the actual performance in light of the expectations of the public and the "common consumer-type experience." It is from these discussions with the WSPs that majority consensus was reached on many of the jointly developed Effective Practices (EPs), which are included in this Guide. The Guide establishes a rationale and provides the background basis for the Effective Practice, outlines the stated practice that is recommended and also provides resource information to assist the PSAP Manager in further detail if desired. The benefits and value of greater understanding of wireless technologies and implementation of Effective Practices are clearly demonstrated among highly effective organizations.

Project LOCATE wishes to thank the APCO Board of Officers who shared the vision of Project LOCATE and provided the financial support to obtain the results necessary to educate our membership through this Wireless 9-1-1 Deployment and Management Effective Practices Guide.

A special thank you to the wireless service providers who participated in this project. Their willingness to share information about current systems helped us to better understand the unique applications of their technologies.

Thanks also to the Project LOCATE Team members, including staff and subject matter expert consultants, whose unwavering focus demonstrated in this multi-year project has been significant. They consistently sought to achieve the highest standards for development of the EPs with their eye on assisting our members - PSAP Managers, calltakers, responders and the public. They have been steadfast in their resolve to seek clarity in understanding and improvement in the end product because of the importance it holds to how we do our jobs effectively for the safety of the public we serve. The APCO membership is truly fortunate to have such dedicated individuals working on their behalf.

Thank you for the opportunity to work with such a fine group of professionals and for the chance to provide our membership with a useful management tool.

Nancy A. Pollock

Nancy A. Pollock
Chair



Project LOCATE

APCO Project LOCATE

APCO Project LOCATE gratefully acknowledges the support and assistance of many individuals especially the following in the production of this Effective Practices Guide:

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The production of this **Wireless 9-1-1 Deployment and Management Effective Practices Guide** was made possible by a grant from the PSAP Readiness Board to Project LOCATE.

Effective Practices

The Development Process of Effective Practices

Project LOCATE, was awarded a grant from the Public Safety Foundation of America (PSFA) in 2005 to conduct performance testing of wireless E9-1-1 systems at seven public safety answering point (PSAP) service areas across the country. The goal of assessing the possible consumer experience when using a wireless device to seek emergency assistance, as demonstrated by the actual usefulness of the location data for dispatch, has significant benefit for all public safety stakeholders. The selected service areas provided an independent opportunity to evaluate a variety of elements related to the wireless E9-1-1 location data delivered to the PSAP. In addition to providing experience with both national and regional wireless service providers, the diversity across the sites of demographics, topography, local exchange carriers, automatic location and automatic number identification equipment, computer aided dispatch interfaces and mapping products offered Project LOCATE a unique snapshot of how the elements mesh to provide location information on each wireless call for help.

Project LOCATE found that there continues to be a clear public expectation that the PSAP, as well as first responders, will have consistent and accurate location data delivered with all wireless 9-1-1 calls, not unlike that of wireline calls. This expectation, often shared by field responders within the service area, can cause frustration between callers and PSAP staff in many areas. Project LOCATE found, as reported in the Final Accuracy Report, April, 2007, that these expectations often exceeded the actual performance of many systems as deployed and evaluated as part of the designated PSAP Test Area. Public education programs regarding how to more effectively utilize a wireless telephone in an emergency should be developed and incorporated into the public information strategy of every PSAP. While such efforts should encourage consumers to report requests for public safety services and emergencies, it is important to also seek to improve the consumer's understanding of the current functionality, limitations and performance variables related to useful location data.

It should be noted, that PSAP staff are also frequently frustrated with the gap between needed location data accuracy and the actual data delivered; causing the location of the emergency and dispatch decision to be based solely upon the anecdotal information provided by the wireless caller in many cases. Wireless E9-1-1 call management processes that have general applicability rather than wireless service provider specific interpretations, must also be adopted. Project LOCATE understands that there are, and will continue to be, challenges in effective dispatch of wireless E9-1-1 calls. However, the need to provide useful location information to the PSAP for effective response to nearly half of the estimated 200 million 9-1-1 calls made annually cannot be ignored.

Project LOCATE released its Final Report, An Assessment of the Value of Location Data Delivered to PSAPs with Enhanced Wireless 9-1-1 Calls, in April, 2007¹. Among the positive results of that effort, Project LOCATE had frequent opportunities to meet with the wireless service providers to discuss the testing results, trends, anomalies and the gap between average consumer expectation and the actual performance of the systems tested. It is these productive meetings that provided Project LOCATE with the enhanced level of understanding that led to the Effective Practices presented here.

While some local variables may still be unresolved, it is clear that these Effective Practices will enhance both the deployment and post-deployment management experience for all PSAPs.

1 APCO Project LOCATE FINAL REPORT, available at www.locatemodelcities.org



Project LOCATE

Development Process of Effective Practices (cont)

Project LOCATE strongly recommends that the public safety community seek to develop a partnership with the wireless service providers within their service area. This effort to achieve a solid understanding of the technology and options available, as well as maintain open and candid communications regarding The performance and service, will greatly enhance the local PSAPs' ability to best manage the operational impact of wireless E9-1-1 calls.

On behalf of every caller in crisis, it is incumbent upon all public safety and wireless community stakeholders, supported by appropriate regulatory and legislative action, to continue the collaborative effort to maximize the usefulness and consistency of wireless location data provided to the PSAP.

The Effective Practices provided in this document serve as the first level of meaningful preparation and participation in such efforts by the PSAP. In the future, as more information concerning technology and operational impact at the PSAP becomes available, it is APCO's intent that the Effective Practices will be revised and updated to allow any PSAP Manager to access the most current information possible regarding these topics.

Effective Practices

Effective Practices, Categories and Numbering

Project LOCATE, using the lessons learned and related experience from the testing, analysis, supplemental testing and wireless service provider meetings created Effective Practices (EP) under nine separate topic areas. In the specific EP, the following acronyms are commonly found:

AHJ – Authority Having Jurisdiction. In some locations this authority may be at the local PSAP level, in others it may be at the County/Regional level, and in a few instances, it might exist at the state level.

PSAP – Public Safety Answering Point

WSP – Wireless Service Provider (also known as wireless carrier)

The numbering of the EPs allows for expansion within each topic area. As used herein;

The 38 refers to APCO Project 38 or Project LOCATE.

The 07 designates the year the EP was created.

The digit 1-9 references the topic area.

The last digit(s) represent the specific EP within that Topic Area

Example: **380711** represents APCO Project 38, Created in 2007, Topic Area 1 (Policy) and the first or number one EP



Project LOCATE

Policy Issues:

- **380711 The AHJ should designate a wireless 9-1-1 deployment coordinator per PSAP service area.**

This Effective Practice seeks to encourage the formal designation of a wireless deployment coordinator per AHJ or PSAP.

The Coordinator would be expected to have the requisite level of specific knowledge and skill set to work in a cooperative manner with the stakeholders including the wireless service providers or their third party contractor(s), the local 9-1-1 service provider, the PSAP customer premise equipment provider, the PSAP Computer Aided Dispatch (CAD) service provider, and the provider(s) of base map development and services (including the addressing responsibility within the service area).

The Coordinator also would serve as the single point of contact within the PSAP Service Area for resolution of issues related to standard ALI display formats, tower site/sector call routing, default call routing decisions, the liaison for local testing and maintenance issues as well as providing documentation of all interactions and any local performance testing conducted by the PSAP/AHJ.

In addition, the Coordinator would be responsible for assuring wireless call processing training materials include relevant information regarding the actual performance of the WSPs within the service area in relation to the usefulness of location data delivered to the PSAP.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, some of which is open to the public, also visit www.atis.org/esif/index.asp

Effective Practices

Policy Issues:

- **380712 The AHJ should consider a comprehensive effort to fully inform PSAP service area decision makers of the nature and dynamics of Wireless 9-1-1 deployment practices of the WSPs and the impact upon delivery of consistent and usable dispatch information to the PSAP.**

This Effective Practice supports the PSAP or AHJ in its efforts to inform all agency managers and executives of the actual performance of wireless systems within the service area.

The failure to invest in a better understanding of the nature and dynamics of wireless E9-1-1 calls exposes the PSAPs and their leadership to an expanding source of risk associated with the possibility that staff would not be able to provide adequate service to wireless 9-1-1 callers. It is important to properly and fully inform such managers and executives of the challenges that are common to wireless E9-1-1 deployment along with the recommended means for resolution, relevant costs, and the impact upon PSAP operations.

Furthermore, there is a need to regularly assess the continuing issues related to location data delivered to the PSAP, including what the PSAP can do to assist wireless service provider efforts toward improvements, appropriate regulatory changes as well as consumer and responder experiences.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, some of which is open to the public, also visit www.atis.org/esif/index.asp



Project LOCATE

Policy Issues:

- **380713 The WSPs and the AHJ within each PSAP service area should develop and maintain a documentation process which defines the roles and responsibilities of each (i.e., a simple checklist). As appropriate, the timeline of all testing activity including end-to-end assessments and processes to resolve issues related to deployment and testing efforts should be included.**

Becoming an active partner in the deployment preparations, testing and post deployment management of wireless E9-1-1 systems is a legitimate role for the AHJ within each PSAP service area.

Often restrained by the lack of time, understanding and perceived authority, the AHJ may not have taken a sufficiently active and responsible role in either the initial or follow-up deployment efforts by the wireless service provider(s). When first becoming aware of any request by wireless carriers or their contractors, or other service providers (9-1-1 system, CPE, CAD, Mapping) who are instrumental in delivering the wireless location data to the PSAP, the AHJ should eagerly seek out the opportunity as a chance to better understand and have influence on the final product as delivered to the PSAP. It is recommended that the AHJ recognize the role of the PSAP as the end user of the location data per wireless E9-1-1 call and seek to maximize its value to the calltaker.

Being part of the management effort involves understanding where responsibility lies, accepting the tasks that are best performed by the AHJ, coordinating the timely and effective participation by others as well as properly documenting and reporting both the activity and the results. It is particularly important, when testing is planned, to replicate, as much as possible, actual end-to-end performance testing through to the PSAP. Use this early opportunity to provide feedback on the actual performance of the deployed system, focusing on the usefulness of the location data for dispatch purposes at present.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- For industry information visit www.atis.org/esif/index.asp

Effective Practices

Policy Issues:

- **380714 Each WSP and the AHJ over the PSAP(s) within any service area should define and develop in writing the process to resolve issues related to deployment and all related testing efforts.**

As the primary user of location data, when needed to effectively dispatch appropriate resources to a reported emergency, the AHJ should promptly establish in writing, the process by which issues can be resolved among the participants. The process should include directions on dealing with identifying and reporting trouble or anomalies by the calltaker/dispatcher, internal procedures for documenting how the problem was discovered, management responsibilities, directions on contacting the WSP, follow up requirements and ultimate resolution and closure of the issue.

Any testing of deployed or about to be deployed systems is of particular interest to the AHJ and a well understood set of expectations and responsibilities is the most effective means to monitor activity and results within current technical and regulatory parameters.

Since all wireless deployment efforts involve a number of participant entities, it is easy to let the confusion about which entity has responsibility for what element to impede the effort to seek resolution. In nearly every case, the wireless service provider is the legitimate first point of contact for questions and issues regarding wireless E9-1-1 location data, tower or sector routing and overall system services.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, some of which is open to the public, also visit www.atis.org/esif/index.asp



Project LOCATE

Policy Issues:

- **380715 The AHJ and the WSPs, in order to sustain a professional partnership to achieve the optimum level of wireless E9-1-1 service, should maintain open and candid communications. The effort should include developing and maintaining current contact information for the primary contact personnel within operations and management.**

The AHJ regularly maintains contact with a variety of entities involved in the effort to deliver service to 9-1-1 callers. The need to learn more about a greater number of elements which influence call processing in the wireless E9-1-1 configuration should not prevent the common and accepted practice of maintaining current contact information for the representatives of all the wireless service providers within the service area.

Both the wireless service provider and the calltaker are involved in the effort to deliver the best level of service to wireless callers amidst an emergency. At that moment, the wireless subscriber is a shared customer in need of prompt, effective and competent service. The fact that the call was completed via wireless E9-1-1 should not negatively influence the delivery or the outcome of that service.

As with so many other daily activities, knowing who to contact when needed is the best means of maintaining a high level of service on every call.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- ESIF Emergency Trace Form and Request at www.atis.org/esif/index.asp

Effective Practices

Policy Issues:

- **380716 The AHJ should consider consistent processing of required information to develop the Memorandums of Understanding (MOUs) between all WSPs in the jurisdiction of the AHJ.**

The AHJ may find that a written memorandum of understanding regarding the roles, responsibilities and the processes for interaction between the AHJ and the WSP may be an appropriate means of recording the nature of the relationship. The advantage of such written documents includes the opportunity to discuss, in advance, the underlying issues and expectations of the parties.

A sample of such a memorandum is provided within the Appendices of the Project LOCATE Final Report, An Assessment of the Value of Location Data Delivered to PSAPs with Enhanced Wireless 9-1-1 Calls.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf



Project LOCATE

Policy Issues:

- **380717 The AHJ should be aware of any cost recovery parameters, restrictions, and requirements in their state.**

The wireless service providers and their contractors are working in many states and are aware of multiple cost recovery, regulatory restrictions and requirements. The AHJ should be well aware of the local and state funding definitions, restrictions and allowances. The cost recovery issues should not erode the working relationship between the AHJ and the WSPs within the PSAP service area since the maintenance of a positive partnership affords the best opportunity to make improvements in service to the wireless E9-1-1 caller.

Questions may arise that can best be answered by the official point of contact for the agency that actually controls the dispersal of cost recovery funds. However, the AHJ will be better served if its coordinator has a strong understanding of the current local, state and federal regulations.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- FCC Decisions regarding PSAP and WSP cost demarcation and PSAP Readiness Criteria, King County and Richardson, TX matters, respectively at www.locatemodelcities.org/library/index.htm
- State specific statutory language, as amended. A summary report of state funding legislation is also at www.locatemodelcities.org

Effective Practices

Managing Public Expectations:

- 380721 The AHJ should document and provide (such as on the AHJ website or via brochures) the assessment of wireless E9-1-1 service performance within the AHJ service area, which might include service description by topologies, but should avoid WSP-specific detail. Since deployed systems change over time, the assessment effort should be continually reviewed and updated to identify changes in system performance.

The AHJ is urged to invest in helping potential wireless E9-1-1 callers better understand the nature of wireless calls in general. Specifically, the differences in terms of location data reporting capability throughout every PSAP service area. Public awareness and education is critical to the PSAP and the caller as the percentage of total 9-1-1 calls continues to shift toward wireless as the primary choice of accessing emergency services. In addition, the AHJ may find assistance and support for such public information from the wireless service providers within their service areas as well as the CTIA, “The Wireless Association tm”

Generally, the consumer is not in a position to adequately assess the differences in the value of location data provided to the PSAP in times of emergency. The AHJ, therefore, has a valuable opportunity to aggressively engage in candid, well developed public education efforts for the sole purpose of alerting consumers to their role in assisting in the effective response of appropriate emergency services.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- For more Consumer Wireless E9-1-1 information, visit: www.fcc.gov/pshs/911/consumer.html
- The Wireless Association, www.ctia.org/aboutCTIA



Project LOCATE

Managing Public Expectations:

- **380722 The AHJ and the WSPs should work in a collaborative manner to develop and distribute informational materials to assist consumers in understanding there may be differences between wireless E9-1-1 expectations and the actual wireless 9-1-1 service performance within the PSAP service area.**

The AHJ, in a continuing partnership with the wireless service providers within any PSAP service area, should seek information and support for public education efforts. The WSPs are equally interested in having their subscribers be intelligent users of the system in times of emergency. It is fair to report that every current technology has some limitations. For example, the ability to transmit voice does not assure the transmission of location information that can be used to effectively dispatch emergency resources.

Public awareness and education should document, as appropriate, that actual performance of systems, as deployed in many locations, simply does not provide the calltaker with adequate location information which can lead to delayed responses, or notification of resources that due to service area boundaries, are not able to respond or even no response in some infrequent cases.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

Managing Public Expectations:

- 380723 The AHJ and the WSPs should jointly identify any environments which may reduce the delivery of useful location data to the PSAP and include this data on the AHJ's and WSPs' websites.

Project LOCATE recommends using agency websites, informational brochures, Public Service Announcements and other methods/forums to alert consumers of the performance variances by location typology within the service area. The value of location information can be influenced by an array of factors, with differences observed between indoor and outdoor calls, calls made from both moving and stationary vehicles as well as the influence of local topography and typology.

The AHJ, through well developed and documented performance testing from such diverse sites and circumstances, can begin to develop valuable information. It is important that performance testing be conducted regularly and updated and that the information be shared with the public in a timely manner.

The AHJ, as part of the positive partnership with area wireless service providers, may be able to provide additional documentation of differences of location data value for dispatch purposes by location solution type, that reach the PSAP service area. In some service areas, specific geographic locations may be particularly vulnerable to poor service in general and thus, even more diminish value of location data delivered to the PSAP.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Project LOCATE developed PSA, Public Service Announcements, which are also available at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Managing Public Expectations:

- **380724 The WSPs should collaborate with APCO Project LOCATE to develop and regularly update information for public outreach (i.e., a message related to non-initialized wireless telephones or donation of pre-owned wireless telephones). Jointly developed information should be posted on APCO's and the WSPs' websites for access by public policy-makers and public safety professionals.**

Project LOCATE, on behalf of the AHJ and consumers of wireless E9-1-1 services, will continue to work with the wireless service providers to encourage better management of public expectations, through effective and broad reaching public awareness and education efforts. The expansion of wireless technology and its everyday use requires regular review and refreshment of any public statements at least quarterly.

The same commitment to work together and regularly revise public information, based upon performance testing, is recommended to all AHJ entities.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- For more Consumer Wireless E9-1-1 information, visit: www.fcc.gov/cgb/cellular.html

Effective Practices

Managing Public Expectations:

- **380731 The AHJ should agree to a wireless ALI format.**

The AHJ should embrace its role in the partnership with stakeholders to improve wireless location data as delivered to the PSAP. To provide both calltakers and dispatchers with a consistent presentation of the location data provided with wireless E9-1-1 calls, the AHJ should fully participate in the definition of what format that data will appear in the automatic location information (ALI) display.

The AHJ should be in regular contact with the 9-1-1 System Service Provider, local exchange carrier, third party representatives of the wireless service providers, as well as the local CPE and CAD providers to assure close coordination and clear expectation concerning this important implementation element.

- **380732 The WSP in a jurisdiction should comply with the selected ALI format.**

The consumer of wireless E9-1-1 service is best served when the AHJ and wireless service providers have cooperated in reaching agreement with the 9-1-1 System Service Provider and local exchange carrier to deliver the location data in the agreed manner.

The AHJ may find it helpful to discuss with other AHJ representatives who have similar CPE, CAD and service providers to learn more about the benefits of this management process. In addition, Project LOCATE has in each state a designated AHJ that has served as a resource point of contact and information throughout their wireless E9-1-1 deployment and management experience. The list of these participating agencies is also available on the Project LOCATE webpage.

Recommended Reference Materials:

- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For wireless industry information, see www.atis.org/esif/index.asp



Project LOCATE

Managing Public Expectations:

- **380733 The AHJ should educate calltakers and responders that there are many variables that affect routing, COS and location data presented to the PSAP.**

Utilizing relevant, accurate and timely training and information, the AHJ can provide staff and responder agencies an adequate level of understanding of how wireless location data differs from wireline location information. The differences and the multiple variables which create them are important to all call processing and response efforts.

Particular attention should be given to the interpretation of wireless location data as delivered to the PSAP by wireless service provider and specific areas within the PSAP service area. Such variables may, by carrier, include topography, inside and outside building issues, current status of carrier infrastructure, system capability within service area as well as foliage, weather and other conditions. This level of understanding will allow calltakers to better manage the impact of the information on dispatch decision making. Responders must also better understand the variances of wireless location data in order to maximize their effective response.

In addition, the AHJ should monitor, define and provide appropriate explanation of the Class of Service (COS) differences often displayed with wireless calls within the PSAP Service Area.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

Managing PSAP & Responder Expectations:

- **380734** The AHJ should educate calltakers and responders regarding the current FCC rulings and requirements for PSAP Service Area measurement and reporting of accuracy compliance. As of the date of this publication, the duty to provide FCC defined compliance measurement and reporting was not required at the PSAP level by the WSP. This reinforces the need to better understand the current system performance in terms of usefulness and consistency of location data delivered to the PSAP as necessary for effective dispatch of emergency services and locating the wireless caller.

The AHJ should continue to emphasize the value of understanding and adjusting for variances in the value of wireless location data by PSAP staff as well as responders. Appropriate training should include a summary of the most recent action by the FCC in regards to PSAP level measurement and reporting of compliance within the current accuracy parameters. (Full Details in FCC Report and Order, FCC 07-166, Released 11.20.07, www.fcc.gov/headlines.html)

Project LOCATE provides access to the most recent FCC Orders and related summary information for use by the AHJ. The consistency and correctness of such information within any training or education effort is critical. The AHJ is encouraged to assure that the responsibility to monitor the activity and decision making in this area is clearly assigned to a designated individual.

Recommended Reference Materials:

- APCO Project LOCATE provides access to the FCC Orders, Notice of Proposed Rule Making as well as related information via its website at www.locatemodelcities.org
- APCO Project LOCATE has developed Public Service Announcements, regarding the impact of the current value of wireless location data which are available at www.locatemodelcities.org
- APCO Project LOCATE Final Report at www.locatemodelcities.org



Project LOCATE

Managing PSAP & Responder Expectations:

- **380735 The AHJ should establish baseline performance and conduct regular assessments and comparisons to the baseline.**

Project LOCATE recommends that every AHJ develop a baseline assessment of current wireless location accuracy as delivered to the PSAP. The purpose of this evaluation is to determine actual performance of each WSP providing services within the political boundary of the AHJ. The comparison of delivered location data versus the actual known ground truth of a fixed location reference point provides empirical data regarding the value of the delivered location data from such areas under like-conditions, for dispatch and responder purposes.

This documentation, based upon consistent performance testing processes, can provide the AHJ with sufficient reference data to quickly detect any degradation of current system capability and performance. The results of such performance testing should be regularly reviewed, revised and updated prior to publication for PSAP staff and responders. The same data and results will also be beneficial as informational reference to the average wireless E9-1-1 consumer, reinforcing the need to know the location of the emergency being reported.

Recommended Reference Materials:

- See also, EP 380781-785 for more information on PSAP Level Performance Testing
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- For more Consumer Wireless E9-1-1 information, visit: www.fcc.gov/pshs/911/consumer.html

Effective Practices

Managing PSAP & Responder Expectations:

- 380736 The AHJ should educate calltakers and responders to use all available resources to validate location data presented by the WSP.

The location of the emergency is generally the most important informational element of any 9-1-1 call. The calltaker/dispatcher should use all the tools available to verify the actual location, including local mapping resources, local databases, known reference points and their own experience within the AHJ boundaries.

The benefits derived from understanding the variables that may influence the value of wireless E9-1-1 location data, as well as documenting the current actual performance of deployed services within the AHJ, are critical elements of the effective dispatch decisions made daily. In addition, the AHJ should reinforce and encourage through adequate training, the additional resources available to calltakers/dispatchers to assist in determining the actual location of a reported emergency.

Recommended Reference Materials:

- APCO Project Locate Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Public Safety Telecommunicator I Training Manual at www.apcointl.org



Project LOCATE

Managing PSAP & Responder Expectations:

- **380737 The AHJ should incorporate the results of its local testing program into its PSAP training program. The training program should provide the 9-1-1 calltakers with an enhanced understanding of the strengths and weaknesses of the Phase II wireless E9-1-1 systems throughout the PSAP service areas and the operational impact on responders.**

Project LOCATE recommends that the results of local baseline performance assessments, informational materials provided to both first responders and the public, should be included in the basic training of all calltaker/dispatcher staff. The inclusion of this information supports the effective use of the location data delivered to the PSAP on all wireless calls as well as facilitates a shared understanding of expectations and understanding by responders.

The percentage of wireless E9-1-1 calls arriving at PSAPs across the country now account for over 50% of the total 9-1-1 call volume in many locations. The need for improved training is especially relevant to performance within the AHJ and is essential to successful call processing and effective dispatching of emergency services.

Recommended Reference Materials:

- APCO Project Locate Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Public Safety Telecommunicator I Training Manual at www.apcointl.org

Effective Practices

Managing PSAP & Responder Expectations:

- **380738 The AHJ should have a formal internal process in place for timely reporting, tracking and resolution of any wireless performance anomalies.**

Conducting the assessment of actual performance can identify degradation of wireless E9-1-1 capability within the PSAP service area as well as document anomalies that create concern by the public safety entities. The AHJ should use its well managed and documented performance testing processes to provide the basis of inquiry to the wireless service provider regarding performance.

Project LOCATE recommends that in addition to assuring that such changes in system performance, resulting in a more significant deviation in location data value for dispatch purposes, be routinely shared with PSAP Staff and all response agencies. The same information should be provided to and discussed with the identified wireless service provider who may not be aware of the problem and has an interest in resolving performance issues as well.

The AHJ is strongly encouraged to work in a cooperative manner with the wireless service providers on a regular basis to improve service within the current definition of reasonableness and requirements.

Recommended Reference Materials:

- APCO Project Locate PSAP Performance Testing Guide at www.locatemodelcities.org
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Public Safety Telecommunicator I Training Manual at www.apcointl.org



Project LOCATE

Managing PSAP & Responder Expectations:

- **380739 The AHJ should be aware of ATIS 05000010 (Maintenance Testing) troubleshooting parameters and make them part of the AHJ formal internal process.**

The Emergency Services Interconnection Forum (ESIF) is a committee of the Alliance for Telecommunication Industry Solutions (ATIS). ATIS is a United States based body that is committed to rapidly developing and promoting technical and operations standards for the communications and related information technologies industry worldwide using a pragmatic, flexible and open approach. ESIF is comprised of wireless and wireline network service providers, manufacturers and providers of support services that facilitate the identification and resolution of technical issues related to the interconnection of telephony and emergency services networks.

ESIF members are predominately wireless and wireline industry individuals. However, public safety is represented by a relatively small number of AHJ or PSAP, APCO and NENA staff. The Maintenance Testing document cited above in its ATIS standard format was created by a subcommittee of ESIF. The document provides information regarding potential system problems which can affect service in general as well as location data delivery to the PSAP.

APCO Project LOCATE, an ESIF participant for many years, recommends the review of this standard by the AHJ staff involved with conducting performance testing.

Recommended Reference Materials:

- ATIS 05-000010 Maintenance Testing at www.atis.org/esif/docs.asp

Effective Practices

Rebids / Re-Query:

- **380741 The AHJ should not rebid (automatically or manually) less than 30 seconds after the call is first presented to the calltaker. Any subsequent rebids should be at 30-second intervals. If automatic rebid is used, only the first rebid should be automatic.**

Project LOCATE represented the critical need for the best location data available on every wireless E9-1-1 call to be promptly delivered to any PSAP. The WSPs, understanding the need, shared industry documentation that indicated rebids were not frequently done. All the parties recognize that often the wireless E9-1-1 caller may be able to describe the location or use a locally known reference point to assist the calltaker to determine the approximate location of the emergency. The frequency of actual response decisions being made based on the location data provided may be low. However the criticality of the event in which the caller cannot describe their location during an emergency is extremely high.

Project LOCATE has previously urged the AHJ to not utilize automatic rebids, since in some instances, such action resulted in the temporary loss of voice path between the calltaker/dispatcher and the wireless E9-1-1 caller. As a result of these joint public safety and industry discussions, Effective Practice 380741, was created and approved. Across the nation, the term to describe the action by a calltaker to seek a second location data estimate may vary, Rebid, Re-Query, Re-Inquiry, and others are used.

For a variety of reasons, the best location data may not be delivered with the initial wireless E9-1-1 call. Therefore, the revised common practice for calltakers should include a Mid-Call Location Update aka Rebid or Requery, after an appropriate interval. The optimum interval between the arrival of the first location data and a rebid for updated location data, regardless of the COS or Class of Service reported, should not be less than 30 seconds. In most situations, additional Rebids beyond that have not been shown to add significant value.

Recommended Reference Materials:

- See also, Appendix A of this Report, Mid-Call Location Update aka ReBid



Project LOCATE

Rebids / Re-Query:

- **380742 The AHJ should educate the calltakers that when rebids are implemented, a momentary intermittent disruption of the voice path may occur in some cases (also known as “audio blanking”). The calltaker should advise the wireless caller of the possible momentary interruption and instruct them not to end the wireless telephone call and stay on the line.**

The AHJ should direct staff that on all wireless calls, just prior to requesting the rebid, the calltaker should advise the caller that there may be a brief interruption of the voice portion of the active call. This is known as “blanking” and may be experienced in some WSP networks and not others. The caller should be directed not to disconnect but to stay on the call until the brief interruption is over. This per call recommendation, although perhaps unnecessary for some callers, is a simple and general approach to reducing the anxiety of the caller as well as allowing the calltaker to maintain contact during the seconds it will take to retrieve another set of location data elements.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- See also, Notes ref Audio Blanking, Page 5, State of Connecticut, Enhanced 9-1-1 Commission Meeting, at http://www.ct.gov/dps/lib/dps/office_of_statewide_emergency_telecommunications_files/oset_minutes/Apr06_Minutes.pdf

Effective Practices

Rebids / Re-Query:

- **380743 The AHJ should rebid all wireless calls when the wireless caller is not able to provide a location, even if the call is initially presented to the calltaker as a WPH2 call.**

Project LOCATE, based on the post testing evaluation of its wireless E9-1-1 call data, as well as discussions with all the Tier I wireless service providers, offers the AHJ the following recommendation.

The AHJ should establish, as a standard operating procedure, a requirement that for every wireless E9-1-1 call received, during which the caller cannot provide adequate location data, a rebid shall be made even if the original class of service reported indicates it is a WPH2 call.

Regardless of the reported class of service on the initial call, the simple rebid effort, at the appropriate time may provide access to updated location data by the calltaker/dispatcher

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Rebids / Re-Query:

- **380744 Each WSP should provide the AHJ with the current definition of quick fix/pre-fix or similar process if used to initially route a call.**

The AHJ should seek to fully understand if any wireless service provider within their service area, due to the challenges of rapidly obtaining the best possible location data in just a few seconds of a wireless E9-1-1 call, uses a solution approach known as a quick fix to route the call to the perceived appropriate PSAP. This approach, based mainly on the timing issues related to associating the call data with the call voice, may yield a call for which the location data will need to be updated, regardless of class of service reported.

The AHJ should evaluate the potential impact of such approaches and include the information in basic calltaker training materials. The relevance and currency of such information has significance to all PSAP staff.

Recommended Reference Materials:

- APCO Project LOCATE provides access to the FCC Orders, Notice of Proposed Rule Making as well as related information via its website at www.locatemodelcities.org
- APCO Project LOCATE has developed Public Service Announcements, regarding the impact of the current value of wireless location data which are available at www.locatemodelcities.org
- APCO Project LOCATE Final Report at www.locatemodelcities.org

Effective Practices

Rebids / Re-Query:

- **380745** The AHJ should be aware that the exact same latitude and longitude presented after multiple rebids indicates improved location is not available. When rebidding, the calltaker would normally expect a change in latitude/longitude. The calltaker should check the COS, if it is WPH2 and it continues to be the same latitude/longitude, a note should be made of the information and then referred to the WSP.

Project LOCATE, recommends that every AHJ include in the basic training of all calltakers/dispatchers information and appropriate guidance through an agency SOP in order to effectively deal with wireless E9-1-1 calls for which no improved location data is available despite the rebid effort. The manner in which various wireless service providers configure their internal systems can impact the outcome at the PSAP.

The AHJ should ensure that all calltakers have the most updated and complete information regarding wireless E9-1-1 call delivery per wireless carrier providing services within the boundaries of the AHJ.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- See Appendix A of this report. Mid Call Location Update aka Rebid
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Confidence and Uncertainty:

- **380751 The WSP should fix the confidence value in the location determining algorithm at a value greater than or equal to 90 percent and vary the Uncertainty value. This value may change over time as more research and understanding of networks are conducted and analyzed.**

Definitions

- Confidence: Information identifying the confidence by which it is known that the calling party lies within the associated shape description; expressed as percentage.
- Uncertainty: Information that indicates the level of Uncertainty inherent to the associated longitude/latitude information; expressed in meters.
- See also Appendix A.

Project LOCATE participated in the ATIS/ESIF discussion of Confidence and Uncertainty when the topic was accepted in May, 2002 as an appropriate ESIF issue. This issue sought to create a consistent national representation of the Uncertainty factor accompanying the location estimate. The issue remained within ESIF through July, 2005 and reached ESIF Final Closure in August, 2005.

The delay in resolution was in part due to the fact that one Tier 1 Wireless Service Provider reported that their company did not fix Confidence at 90% as had been recommended by the ESIF Study Group and accepted by the other Tier 1 wireless service providers. A document subsequently submitted as a contribution to the Issue contained this warning to public safety: "Because Uncertainty is often expressed as a circle radius, when the algorithms that are used to produce the location do not generate circles; there are some inherent errors in the calculation of Uncertainty, overall". APCO and NENA as members of ESIF were polled and responded that confidence should be set at 90% and need not be displayed. It was recommended that Uncertainty be displayed. The AHJ should continue to work with each WSP to determine how best to utilize the Uncertainty value as delivered to the PSAP.

Recommended Reference Materials:

- For additional industry information, visit www.atis.org/esif/index.asp
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- Review also, ATIS-0500004 (Recommendation for the Use of Confidence and Uncertainty for Wireless Phase 2) at www.atis.org/esif/index.asp

Effective Practices

Confidence and Uncertainty:

- **380752 The AHJ and the PSAP(s) should jointly decide on the display/usage of the confidence value in order to specify to the WSP the suppression (or sending) of the confidence value to the PSAP. It is recommended that the confidence value be suppressed and not displayed.**

The AHJ should utilize their working relationship with all the WSPs to more fully discuss and reach a locally applicable agreement as to the usefulness of both Confidence and Uncertainty as displayed with wireless E9-1-1 calls delivered to the PSAP. The AHJ is encouraged to document the frequency and utility of such data elements at present, especially on those calls that require additional caller questioning about actual location.

Recommended Reference Materials:

- For additional industry information, visit www.atis.org/esif/index.asp
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- Review also, ATIS-0500004 (Recommendation for the Use of Confidence and Uncertainty for Wireless Phase 2) at www.atis.org/esif/index.asp



Project LOCATE

Confidence and Uncertainty:

- **380753 The WSP should deliver an Uncertainty value to the PSAP along with the location information on all WPH2 calls.**

Project LOCATE, based upon the post-testing evaluation of its wireless E9-1-1 call data, as well as discussions with all the Tier I wireless service providers, encourages the AHJ to work with the appropriate WSPs to have Uncertainty included in the data associated with each Phase 2 call delivered to the PSAP. The variance of location data value associated with particular wireless service providers should also be cited in the development and distribution of public information, PSAP training and Responder Awareness materials.

Recommended Reference Materials:

- For additional industry information, visit www.atis.org/esif/index.asp
- APCO Project LOCATE Final Report at www.locatemodelcities.org
- Review also, ATIS-0500004 (Recommendation for the Use of Confidence and Uncertainty for Wireless Phase 2) at www.atis.org/esif/index.asp

Effective Practices

Confidence and Uncertainty:

- 380754 APCO and the WSPs should seek to define Uncertainty value thresholds / trends in order to provide PSAPs with guidelines for additional (two or more) rebids.

The AHJ should continue to review and evaluate the usefulness of the Uncertainty data associated with wireless E9-1-1 calls. Some WSPs have maintained it is the Uncertainty value that offers the calltaker the best tool available to assess the validity of the location estimate per wireless call.

The AHJ in the recommended cooperative manner should engage the appropriate WSPs in determining as many tools as possible to enhance the value of all location data delivered to the PSAP.

Recommended Reference Materials:

- APCO Project LOCATE provides access to the FCC Orders, Notice of Proposed Rule Making as well as related information via its website at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Towers:

- **380761 The WSP should secure and provide to the AHJ a MSAG valid address for all towers within and adjacent to the service area of the AHJ for wireless E9-1-1 systems. The AHJ should verify the tower address provided by the WSP is MSAG valid and reply to the WSP in a timely manner.**

An effective partnership between the WSP and the AHJ, on behalf of the consumer of wireless E9-1-1 services, is recommended by Project LOCATE. This partnership allows both public safety and industry representatives to work together on the multiple aspects of the wireless deployment and management effort. All WSPs should ensure that every tower location has a MSAG valid address. Upon request, the AHJ should act promptly to verify the address and reply to the WSP or their representative in order to expedite the deployment process.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

Towers:

- **380762 The WSP should provide the AHJ with sector identification on the towers (such as east, west, north, south, southeast, etc). Omni-directional towers should be so identified.**

The AHJ should work with the WSP to assure that sector identification values are assigned to each sector, enhancing the value to the AHJ during location data value assessment on Phase 1 wireless calls. This sector designation may also be used with Computer Aided Dispatch (CAD) digital mapping to present an image of the estimated area, in which the caller is likely to be at the time of the transmission of the data, to the calltaker/dispatcher.

All omni-directional antenna tower sites should also be identified and reported to the AHJ for the similar reporting value to the calltaker. The AHJ that has accurate tower site location data from the WSP is able to more effectively utilize these reference points within the system to assist callers during times of emergency.

Recommended Reference Materials:

- For additional industry information, visit www.atis.org/esif/index.asp
- APCO Project LOCATE Final Report at www.locatemodelcities.org



Project LOCATE

Towers:

- **380763 The appropriate AHJ(s) shall define and provide routing instructions to the WSP for all tower sites and default PSAP(s) within an agreed time frame.**

It is well recognized and accepted that wireless tower service coverage does not normally follow the political subdivisions of an AHJ, County or even state. The AHJ should utilize their working relationship with all the WSPs to provide the most accurate and public safety agency accepted set of routing information per tower site and/or sector face.

The AHJ should accept, as part of this same effective practice, the need to report to the WSP the accepted default routing plan for each tower face and/or site which impacts the delivery of service within the AHJ territory.

Any delay by the AHJ to effectively share the necessary information with the WSP or their third party contractor for new tower and interim routing while additional upgrades are in progress, could lead to wireless E9-1-1 calls being routed in a manner inconsistent with the needs of the callers or current requirements of the effected AHJ (s).

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For additional industry information, visit www.atis.org/esif/index.asp
- Visit the ATIS/ESIF website, review specifically, Issue 35
- Post Deployment Cell Site Additions
- Visit the ATIS/ESIF website, review specifically, Issue 36
Deployment Cell Site Additions – Provisional Routing

Effective Practices

Towers:

- **380764 The WSP should provide contact information to the AHJ prior to any new tower being placed into service for testing. The AHJ should compile contact information and provide it to the appropriate operations staff. The AHJ must keep contact information lists current as information is provided by the WSP.**

Project LOCATE, supports meaningful partnerships between the AHJ and WSP for effective wireless E9-1-1 service. The WSP, should through their contractors, make direct contact with the AHJ and provide appropriate contact information to facilitate the effective practices cited in this Guide. The AHJ should likewise seek to open such contacts and maintain a positive working relationship during site development and construction of any tower site. It will also be important to determine actual ownership of the tower and any other potential users, if not totally dedicated to a particular wireless service provider.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Towers:

- **380765 The AHJ should establish a productive working relationship with WSP representatives responsible for implementation and maintenance. The WSP should provide the current appropriate representatives' contact information to the AHJ.**

The AHJ should take responsibility for developing an effective relationship with all WSPs, their contractors and agents that have impact on the operational and technical capability of deployed systems with the overall service area. The discussions must be broad enough to cover not only the coordination of deployment requests, but also tower development, system maintenance, baseline performance and access to contact information to resolve, as defined, issues related to services in general and emergency events.

Project LOCATE recognizes that the commitment of staff resources to such aggressive coordination and cooperative efforts may appear demanding. However, the evolution of wireless use and its impact on the AHJ cannot be ignored. The expectations of PSAP staff, the public consumer and first responders require a revised approach to managing AHJ – Service Provider relationships, in which the quality of service is so critical to the wireless E9-1-1 caller in crisis.

Recommended Reference Materials:

- APCO Project LOCATE provides access to the FCC Orders, Notice of Proposed Rule Making as well as related information via its website at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

Towers:

- **380766 The WSP and the AHJ should collaborate on a data and routing maintenance process and commit to continual review with associated follow-up.**

The most effective means of avoiding routing problems and thus enhancing service to callers is to actively participate in discussions and decision making throughout the deployment process. In addition, post-deployment adjustments and processes to define and cause valid changes should be well developed prior to the first instance of a problem that may have caused a delay in response to a wireless E9-1-1 caller.

The responsibility to provide the most effective service is shared between the AHJ and the WSP and their contractors. This obligation continues long after the initial deployment and becomes part of the expected quality of service management function of the AHJ, on behalf of the consumers and responder groups.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- Review also ATIS 05000010 (Maintenance Testing) at www.atis.org/esif/index.asp



Project LOCATE

Towers:

- **380767 The AHJ and the WSP should collaborate on a process for the reconciliation of identified misrouted wireless E9-1-1 calls and other system anomalies.**

Early in the relationship with the WSPs, the AHJ should clearly define the process for the resolution of routing issues. The process should include well-defined responsibility for notice of problems with specific action items as well as reasonable timelines for remedy. Post-deployment adjustments and processes should be expected as the experience of wireless call volume, consistency and value of location data are continually assessed by the AHJ.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- Review also ATIS 05000010 (Maintenance Testing) www.atis.org/esif/index.asp

Effective Practices

Towers:

- **380768** The AHJ should request cell and routing data contained in the Mobile Positioning Center (MPC) or Gateway Mobile Location Center (GMLC) for their service area and perform annual reviews. Upon completion, results should be furnished to the WSP for their review and response if appropriate.

Project LOCATE recommends that the AHJ seek to review the cell and routing data maintained at the Mobile Positioning Center (MPC) or the Gateway Mobile Location Center (GMLC) or current equivalent within the deployed system of each WSP on a regularly scheduled basis. The review should be viewed by all parties as a legitimate/responsible inquiry and effective practice by the AHJ to maintain service quality.

The AHJ and WSP should also have a well-defined process developed for resolving any issues that arise from such reviews.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp
- APCO Project LOCATE Deployment Handbook at www.locatemodelcities.org/documents/Handbook0806.pdf



Project LOCATE

Cache:

- **380771 The AHJ should be aware that cache has an operational impact on the accuracy of the wireless location data delivered.**
- **380772 The WSP should provide to the AHJ an engineering description of cache sufficient to allow the AHJ to determine the operational impact within the jurisdiction.**

Project LOCATE offers two effective practices regarding Cache which are discussed together in this Report. In general, Cache refers to the retention of specific location data associated with a wireless E9-1-1 call within certain elements of the system. It has been reported that there are some variances between WSPs as to the length of time such initial call location data is associated with the call and upon what activity that data is updated by the caller and/or the calltaker.

The AHJ should first understand the potential impact this system element can have on wireless E9-1-1 call processing and impact on dispatch of appropriate resources. In the infrequent but worst case scenario, the location data from the last call may be presented as the ALI with a later call. The Rebid action forces a new data retrieval process. The influence of cache timing parameters within the deployed system should be recognized and understood as part of the total wireless call management responsibility of the AHJ. The potential influence on call processing (specifically the interpretation of location data delivered to the PSAP) should be included in all wireless calltaker/dispatcher training materials. In addition, the AHJ should seek to identify a means to detect instances in which potential cache issues have created a problem during call processing.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

PSAP Performance Testing:

- **380781 The AHJ should (in an effort to better understand any potential disparity caused by multiple factors throughout its service area) implement a program to test the performance of the WPH2 systems to include routing, usable data presented at the PSAP, and location performance in the various topologies in the PSAP Service area.**

The AHJ should engage in a regular and consistent testing process to assess the performance of wireless systems as deployed within their service area. The establishment of such baseline performance of deployed systems, across the topologies of the service area, can provide the AHJ with particularly useful information. In addition, evaluating the consistency and accuracy of location data delivered to the calltaker with wireless E9-1-1 calls, enhances the dispatch decision making value of such location data. The cost of conducting performance testing is the responsibility of the AHJ.

Project LOCATE believes it is unnecessary for all baseline performance testing to meet the rigorous practices, as defined within OET 71 or ATIS 0500001. The requirement to determine actual compliance with current FCC location accuracy and frequency parameters is the responsibility of the WSP, not the AHJ. The AHJ should also consider that such compliance level testing per PSAP area, as a result of existing regulatory decisions, is a usual and customary cost of the WSP associated with offering such services.

More appropriately, the AHJ should focus on conducting well defined and consistent empiric testing processes that use known ground truth reference points or their base mapping reference point equivalent to assess the value of the location data delivered to the calltaker. This level of practical field performance assessment, when conducted in a regular and consistent manner, can provide information that has implications for training, dispatching and overall system status at the time of the testing. Complete and competent documentation of conditions and processes used during such testing can also assist the AHJ in future discussions with the WSP(s) concerning performance and potential system improvements.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guidebook at www.locatemodelcities.org



Project LOCATE

PSAP Performance Testing:

- **380782 The AHJ should communicate with the WSP to inform the WSP of testing to be conducted, the methodology to be utilized, and the specifics of the service deployed in the service area.**

The AHJ should continue its effective partnership with each WSP during all performance testing efforts and clearly distinguish them from any FCC compliance testing efforts. It is reasonable to share with each WSP, the performance testing methodology being used throughout the AHJ service area. This recommended approach reinforces the level of commitment and desire to understand the systems as deployed by the AHJ and also provides characteristic results for consideration in training, response decisions and for managing consumer awareness. Some groups may argue that an empiric testing of performance, in terms of location data delivered to the PSAP, is not adequate to assess the overall performance of such a dynamic system. However, the regularity and the consistency of the performance so determined can provide an adequate basis for further discussion and anticipated action by the parties toward improvement.

- **380783 The AHJ and the WSP should discuss specific testing methods and expectations for each location technology (i.e., testing in moving vehicles, indoor testing, rural versus urban, etc.).**

Project LOCATE also recommends that the AHJ should alert first and then discuss with each WSP, the performance testing effort to be conducted within the jurisdiction. Since these efforts are not based on compliance issues, the number and location of test call origination can in fact better represent real life use patterns of wireless E9-1-1 callers. It is also appropriate to test within areas that have high frequency of use, as determined by AHJ records as well as those areas from which wireless E9-1-1 calls are commonly the dominant source of emergency event information.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guidebook at www.locatemodelcities.org

Effective Practices

PSAP Performance Testing:

- **380784 Both the AHJ and the WSP should work together to interpret the testing results and agree on a plan to address identified deficiencies to ensure that the system is performing as optimally as possible in the service area. Correction plans should include retesting to allow assessment of improvements in system optimization.**

The AHJ is representing all the public safety disciplines and the general public. It is best served by a cooperative effort with the WSP(s) to recognize, interpret and respond to the performance testing results. The goal of such efforts, supported by complete and competent documentation of conditions and processes used during such testing, is to improve understanding of the deployed systems as well as to improve the response capability of emergency services. Any non-parallel, collateral issues should be deferred until another more appropriate opportunity.

Project LOCATE recommends that the AHJ consider feedback regarding the performance testing process as appropriate and consistent with its goal of not serving as a measurement of accuracy compliance for FCC regulatory purposes.

Based on such post-performance testing discussions, the AHJ may determine that re-testing is appropriate. At that time it will be essential to document any modified actions which are different from the original testing effort.

This level of practical field performance assessment, when conducted in a regular and consistent manner, will provide the AHJ with information that has implications for training, dispatching and overall system status at the time of the testing.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guidebook at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

PSAP Performance Testing:

- **380785 The AHJ should incorporate the results of its local testing program into its PSAP training program.**

The effort, cost and commitment to conduct a well defined performance testing process, to share the results with each WSP, and to candidly discuss both, has value only if the outcomes are well understood by the parties. The AHJ should seek to develop from such efforts, the best level of understanding possible for systems deployed within the service area. This level of knowledge then must transfer to those directly providing the service everyday.

The implications of such testing must be translated into performance measures that can be assessed at the calltaker and dispatcher level, everyday. The impact upon wireless E9-1-1 call processing as well as the dispatch of emergency services must be evaluated fairly and uniformly to best determine the value of these efforts. This level of improved direct service delivery requires relevant, complete and effective training materials/sessions for all staff engaged in the AHJ commitment to better service.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guidebook at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp

Effective Practices

WSP- PSAP Area Testing:

- **380791 If call through performance testing to the PSAP will be conducted, the WSP should provide a mutually agreed upon notification to the AHJ prior to any testing in its jurisdiction.**

The WSP and the AHJ, as partners in the delivery of effective wireless E9-1-1 service, should coordinate any testing being planned by the WSP that seeks to deliver calls directly to the PSAPs within the AHJ. The AHJ should understand the range of testing options the WSP may use, some of which do not include actual delivery of voice and location data through to the calltaker. The WSP often seeks not to impact the PSAP with its testing efforts. However, whenever possible and with coordination, the actual inclusion of the PSAP can have additional benefits to both parties.

Project LOCATE supports call through testing that includes the PSAP whenever possible with adequate notice and coordination. The benefits of such a cooperative effort provide improved understanding of how each deployed system actually works, how call information will be presented at the PSAP as well as the opportunity to capture the per call data for subsequent review and analysis.

The wireless industry has defined and created standards for a number of testing classifications.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guide at www.locatemodelcities.org



Project LOCATE

WSP- PSAP Area Testing:

- **380792 Compliance accuracy testing methodology used by the AHJ or the WSP should fall within the guidelines set forth in OET-71 or ATIS 0500001 (Accuracy Testing).**

Project LOCATE recommends that the AHJ take responsibility for reviewing and developing an understanding of and sharing with PSAP staff, responders and the public the current Memorandum and Orders of the Federal Communications Commission (FCC) regarding accuracy parameters, timeline and responsibilities upon both the AHJ and the WSP. The AHJ should include a brief but adequate explanation of such Orders in calltaker/dispatcher training materials to better manage expectations of staff as well as responders.

- **380793 During the call through performance testing to the PSAP testing process, the AHJ should monitor the process to ensure there is consistency between the pANI sent by the WSP and the information displayed at the PSAP.**

The AHJ also has a responsibility to monitor any end-to-end testing or its functional equivalent to assess the consistency between the pANI sent and the information displayed at the PSAP. This effort provides the opportunity to assess the impact of several processes, including cache and re-bid value as well as the coordination of system elements in support of overall system performance.

Recommended Reference Materials:

- APCO Project LOCATE Performance Testing Guide at www.locatemodelcities.org
- For additional industry information, visit www.atis.org/esif/index.asp
- APCO Project LOCATE Final Report at www.locatemodelcities.org

Effective Practices

WSP- PSAP Area Testing:

- **380794 Call through performance testing to the PSAP testing should be designed in such a way to validate routing and delivery of format and content of ALI display at the PSAP as defined by the AHJ.**

The AHJ should continue the coordination effort with the WSP conducting testing to assess both routing and location data format presentation to the PSAP. The resolution of ALI display format may also involve the AHJ 9-1-1 system service provider, which should be part of the coordination effort during such testing process. Project LOCATE again reinforces its recommendation that the ALI display for every WSP be consistent to minimize any need for a variable interpretation, per WSP.

- **380795 The WSP and the AHJ should mutually agree to an end-to-end field-testing schedule to minimize the impact of and disruption to the PSAP operations.**

The AHJ should understand the importance of all WSP testing and accept that some impact upon the PSAP staff is likely to occur. Every reasonable accommodation should be made to facilitate the opportunity for the WSP to conduct testing, including that, which includes calls through to the calltaker. The AHJ, based upon actual call data, should be able to provide optimum times of the day for such testing processes. It is however, appropriate for all parties to understand that even with effective coordination, the dynamic nature of actual emergency events may cause the participation of the PSAP staff to be terminated.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For additional industry information, visit www.atis.org/esif/index.asp



Project LOCATE

WSP- PSAP Area Testing:

- **380796 The WSP and the PSAP should ensure that all individuals involved in the testing process have appropriate contact information prior to the beginning of the testing process (i.e., WSP Team Leader and the PSAP 24/7 supervisor number).**

The AHJ as a partner in the delivery of effective wireless E9-1-1 service should establish and maintain accurate contact information for each WSP and their contractors. The level of cooperation and coordination is greatly enhanced by the ability of both parties to make direct contact with the appropriate individuals (often known to them) to discuss the issues, answer questions and prepare for testing of any type. The ability to reach appropriate persons on a 24/7 basis also provides the AHJ or the WSP the opportunity to alert each other of potential testing schedule changes.

- **380797 The WSP and the AHJ should mutually agree to a field-testing process that tests tower locations, sectors, and commonly available handset models in the PSAP service area.**

The effectiveness and overall importance of testing within the AHJ may be defined by the value it has to the specific AHJ and potential consumers within the service area. Project LOCATE recommends that the AHJ specifically request that all towers and sectors be tested. The AHJ should also seek to determine what wireless devices are being used to make the test calls, if not being computer generated. In those cases, in which a particular handset has been found to be common within the AHJ and concerns have been noted with the WSP previously, testing by the WSP or the AHJ should include calls from that specific handset.

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- For additional industry information, visit www.atis.org/esif/index.asp

Effective Practices

WSP- PSAP Area Testing:

- **380798 The WSP and the AHJ should independently document and record the results of testing. Subsequent to the completion of the testing, the WSP and the AHJ should meet to review and discuss testing results and agree to the methodology for any possible retests.**

Project LOCATE, based upon the post-testing evaluation of its wireless E9-1-1 call testing data, as well as discussions with the WSP(s), asserts that testing has little value to the AHJ if there is no opportunity to review the results and discuss their implication for effective wireless E9-1-1 call processing at the PSAP level. Despite some concerns raised by the WSPs, the power of knowledge based upon an understanding of how the systems actually operate and perform across the particular service area is critical to successful call management. The sharing of test data and a candid discussion of same should be a fundamental element in all such efforts.

- **380799 The WSP and the AHJ should mutually agree upon notification to the PSAP prior to any network changes which may have impact on PSAP operations.**

Project LOCATE recommends that the partnership between the AHJ and the WSP(s) include a well defined process which allows the AHJ to be alerted to any network dynamics which are taking place, or have occurred, which will likely have impact on the system for a period of time. In addition, significant changes to any network element should be defined by the parties and notice thereof provided to the AHJ, in order to understand the impact on the delivery of service to the wireless E9-1-1 caller and the first responders.

Recommended Reference Materials:

- APCO Project LOCATE Final Report at www.locatemodelcities.org
- For industry information, see www.atis.org/esif/index.asp



Project LOCATE

Acronyms

AHJ	Authorities Having Jurisdiction
ALI	Automatic Location Identification or Automatic Location Information
APCO	Association of Public-Safety Communications Officials - Intl, Inc.
ATA	American Trucking Association
ATIS	Alliance for Telecommunications Industry Solutions
CAD	Computer Aided Dispatch
CPE	Customer Premise Equipment
COS	Class of Service
DCU	Data Collection Unit
DHS	Department of Homeland Security
E9-1-1	Enhanced 9-1-1
ESIF	Emergency Services Interconnection Forum
FCC	Federal Communications Commission
GMLC	Gateway Mobile Location Center
MOU	Memorandum of Understanding
MPC	Mobile Positioning Center
MSAG	Master Street Address Guide
NRIC	Network Reliability and Interoperability Council
OET	Office of Engineering and Technology
pANI	pseudo-Automatic Number Identification
PCS	Personal Communications Service
Project LOCATE	Locate Our Citizens At Times of Emergency
PSAP	Public Safety Answering Point
PSFA	Public Safety Foundation of America
SMR	Specialized Mobile Radio
TCS	TeleCommunication Systems, Inc.
WPH1	COS for Wireless Phase I
WPH2	COS for Wireless Phase II
WRLS	COS for Phase 0, usually provides no location coordinates
WSP	Wireless Service Provider

Effective Practices

APPENDIX A: 001

Mid-Call Location Update aka Re-Bid April 3, 2003

SG C Recommendation to ESIF - Contribution G-37 (6/16/06)

Re: Mid-Call Location Update, ESIF Issue 19

Mid-Call Location Update (MCLU) is the capability for a PSAP to query (rebid) for updated WPH2 Position Information of a mobile caller. Although MCLU is not required by the FCC Phase II mandate (but is implied in OET-071), there are a couple of legitimate reasons why the PSAP may have to re-query for Position Information. First, the caller's location may not have been determined by the location technology by the time the emergency call was delivered to the PSAP and the PSAP makes its initial bid for location. In this case the PSAP will receive Phase I information and may be prompted to rebid for Phase II information. If the time between the initial bid and rebid is sufficient, the location technology should have been able to locate the caller's position and it can be returned to the PSAP. Second, the PSAP calltaker may determine that the caller is moving and because of the situation may have a need to obtain the current location. In this case the network will re-locate the caller and return their position to the PSAP. If a new location cannot be obtained by the network, the "last known" position may be returned.

While further experience is needed to determine the optimum interval for the rebid, the ESIF recommendation is to wait 30 seconds after the initial bid if it is determined that a position update is required. There are two of reasons for this. First, an additional 30 seconds should be sufficient time for the location technology to determine a Phase II compliant location fix. Second, some network elements will actually throttle PSAP requests and if they occur too frequently will return the last known address rather than requesting a new location fix.

There have been some requests that CPE vendors develop into their systems repetitive automatic re-bids. That is, without calltaker intervention, the CPE would repetitively request an updated location. ESIF strongly recommends against this implementation. Not all calls require an accurate location of the caller. For example, callers reporting the same traffic accident need to be handled quickly so that the calltaker can be ready for the next call. Not only is an initial location not needed, but clearly a rebid is not required. If every wireless call resulted in a rebid, the number of ALI bids would be twice that of a wireline call. And, if for an example, wireless calls rebid every thirty seconds for two minutes, the number of ALI bids would quadruple over wireline calls. This data traffic represents a real concern relating to the sizing of network elements and data networks that would have to be upgraded to accept this increased load.

Finally, early on in the discussions regarding WPH2, there were concerns expressed that location updates of a caller may lead to privacy concerns. It is ESIF's position that when a caller makes a 9-1-1 call they give up their right to privacy and the location of the caller may be delivered to the PSAP without any regards for screening.



APCO International
Association of Public-Safety Communications Officials - International, Inc.

