

Improving 9-1-1 Location Accuracy

Jeff Cohen, Chief Counsel

Jay English, Director of Comm Center & 9-1-1 Services

APCO International

November 17, 2015

- The road to get here
- Highlights of new FCC rules
- What this means for APCO members
- What to expect next
- Q&A

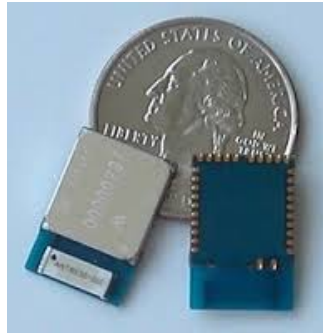
- Consumers are replacing traditional landline phones with wireless devices, and more calls are being made while indoors
- Even where a wireline telephone is available, the first device reached for to call 9-1-1 is often a cell phone
- The location information currently available for wireless calls from indoor locations lacks any of the address-specific information provided with most wireline calls, and is generally inferior to location information available for outdoor wireless calls

- February 2014 – FCC proposal
 - Addressing both outdoor and indoor calls
 - Built on existing regulatory/technical models (outdoor tech producing estimates in horizontal plane only)
 - Invited public safety/others to develop alternate proposals
- November 2014 – APCO, NENA, & major carriers submit Roadmap for Improving E911 Location Accuracy
 - Major outreach; additional assurances in December
- January 29, 2015 – FCC adopts Order

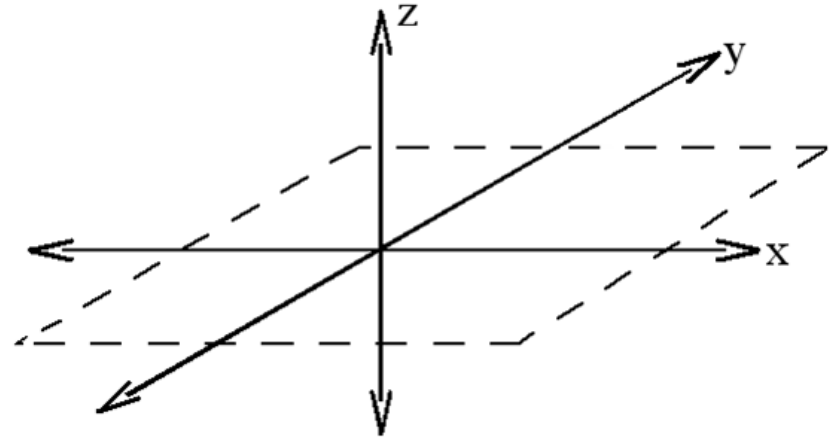
- Meaningful, dispatchable location information for wireless 9-1-1 calls
- Objective testing in realistic environments (Test Bed)
- Verifiable with real world performance monitoring (Actual 9-1-1 call data)
- Take advantage of technology and innovation available in the consumer marketplace (vs. specialized, proprietary)
- Technology-neutral

Contemplated Solutions

Dispatchable Reference Points



Z-Axis



What is a “Dispatchable Location”?

- “[A] location delivered to the PSAP by the CMRS provider with a 911 call that consists of the street address of the calling party, plus additional information such as suite, apartment or similar information necessary to adequately identify the location of the calling party”
 - Example - 100 Main Street, Apt. 504
 - (Preferable to a position estimate of: 38.80489, -77.05631, + 10m above sea level)
- Equivalent to wireline location information

What's In and What's Out

IN

- Dispatchable location solution for indoor 9-1-1 calls
- Setting PSAPs on tech-neutral path using competitive sources
- Fully transparent test bed
- Compliance measure with actual 9-1-1 data

- Indoor problem not yet solved
- Specialized, static, single-source proprietary solutions
- Limited test bed
- Compliance measure by carrier drive-testing

OUT

- Benchmarks
- Indoor Performance:
 - Test bed
 - Test regions
 - Actual 9-1-1 call data
- Solutions: DL (NEAD) & Z-Axis
- Reports and certifications
- Confidence and uncertainty information

Dispatchable Location

50m (x, y), or a dispatchable location for:

- 40% of calls within 2 years (April 2017)
- 50% of calls within 3 years (April 2018)
- 70% of calls within 5 years (April 2020)
- 80% of calls within 6 years (April 2021)

Non-nationwide carriers have more time at years 5 and 6 tied to VoLTE deployment

Z-Axis

- Uncompensated barometric within 3 years (Aug. 2018)
- Develop z-axis metric within 3 years (Aug. 2018)

Deployment

- In top 25 CMAs within 6 years (April 2021) and top 50 CMAs in 8 years (April 2023):
 - Populate NEAD with ref points = 25% of population of CMA,
OR
 - Deploy z-axis technology to cover 80% of population of CMA

- Open, transparent, competitive- and technology-neutral
- Real world environments/all morphologies
- Managed by non-governmental entity
- Will demonstrate and characterize performance for existing and new tech
- Launch by August 2016 and subject to various FCC requirements

- Beginning in February 2017, aggregate data reported quarterly
- Will show percent of time each location method was used (satellite, DL, z-axis, other technologies or hybrids) to meet accuracy requirements

Six geographic test regions & diverse morphologies

- San Francisco Bay Area
- Chicago
- Atlanta
- Denver/Front Range
- Philadelphia
- Manhattan

Compliance Data

Technology	Test Bed Performance	Delivery with Actual 9-1-1 Calls	Carrier Performance	FCC Requirements
A	<50m for 90% of tests	Technology A was delivered for 50%	$90\% \times 50\% = 45\%$	
B	<50m for 100% of tests	Technology B was delivered for 20%	$100\% \times 20\% = 20\%$	
			$45\% + 20\% = 65\%$	2 Year Benchmark: 40% 3 Year Benchmark: 50% 5 Year Benchmark: 70% 6 Year Benchmark: 80%

At 18 months (February 2017):

- Start reporting actual 9-1-1 data
- Initial implementation plan for meeting indoor requirements generally
- Progress report on deployment plans and implementation of indoor requirements
- NEAD privacy and security plan

At 3 years (August 2018):

- Progress report on implementation plan and assessment of DL deployment efforts
- Submit z-axis metric

- Compliance
 - Within 60 days of each horizontal & vertical location benchmark
- Deployment
 - Technology deployed across carriers' networks is consistent with test bed deployments AND deployments in test cities for actual 9-1-1 data
- NEAD
 - Prior to use of the database, CMRS providers must certify they will only use NEAD for purpose of responding to 9-1-1 calls

Confidence and Uncertainty

- Set confidence level at 90%, allow uncertainty to vary
- Standardize the way this information is delivered and presented to PSAPs
- Delivered for all wireless calls if requested by PSAP

- Assist with development of the test bed and NEAD
- Participate in standards development
- Stakeholder outreach
- Assessment of z-axis and dispatchable location solutions
- Assess location accuracy based on actual 9-1-1 call data and test bed performance
- Participate in the Advisory Group and Working Groups

- Mission:
 - Provide advice and input from a diverse body of interested stakeholders to assist the activities of the Working Groups
- Participants include:
 - NASNA, PCIA, Telecommunications for the Deaf and Hard of Hearing, NCSL, NGA, Natl League of Cities, CEA, CCA, American Foundation for the Blind, etc.

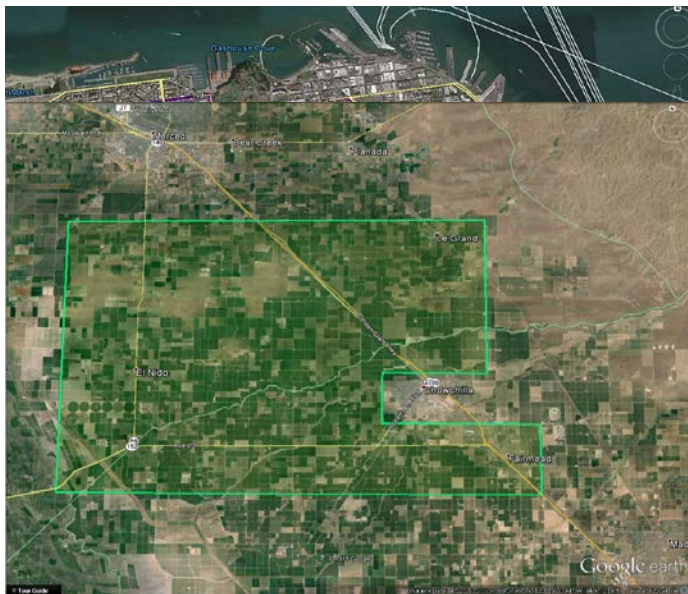
Working Groups:

1. Test Bed
2. NEAD
3. Z-Axis
4. Standards
5. PSAP Implementation
6. Demonstration
7. Outreach

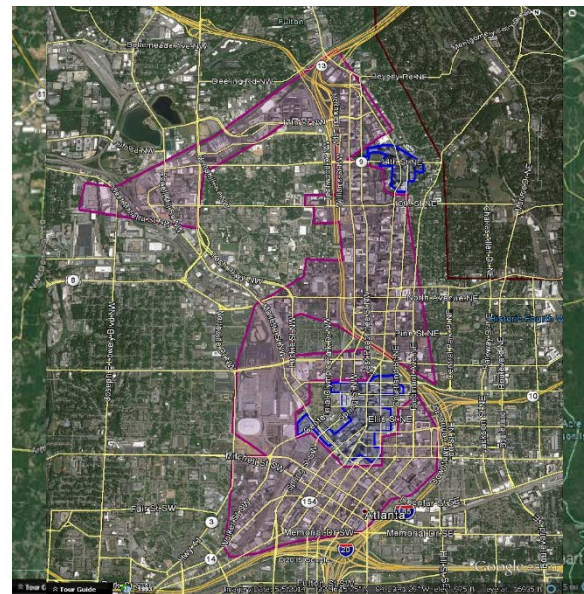
Schedule	Date
RFP available for release	September 1 st , 2015
Confirmation of "Intention To Submit" a Proposal by email	September 14 th , 2015
"Last Day For Questions" or comments related to RFP	September 21 th , 2015
Response to questions and comments due	September 28 th , 2015
Proposal "Due Date"	October 16 th , 2015
Selection of one or more Vendors to present Proposal and SOW	November 6 th , 2015
Selection of Vendor, if one is selected	December 31 st , 2015

- Atlanta and San Francisco areas selected by ATIS ESIF as a representative environment
 - First phase of testing expected Q2 and Q3 of 2016 for existing and deployed technology

Dense Urban ~~Rural~~ and Urban:



San Francisco Test Region



Atlanta Test Region

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General Parameters

Regions

- San Francisco, CA & Atlanta, GA

Buildings

- At least 20 per test region

Morphologies

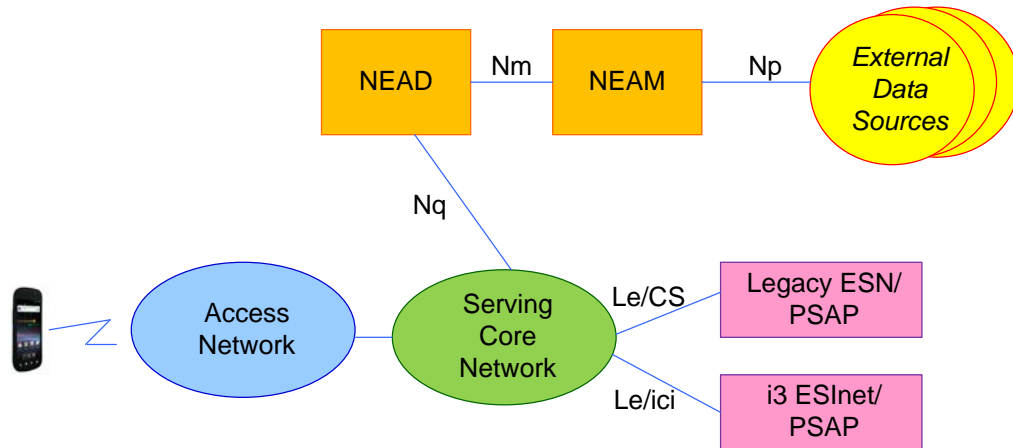
- Dense-urban, urban, suburban, rural

Indoor Test
Cases

- 100 per test region

9-1-1 Test
Calls

- 100 per test case, using one or more test device per technology under test as needed



- Delivers a Beacon Location to participating service providers to enable delivery of available location information of 9-1-1 communication to an appropriate PSAP
- Core Functions:
 1. Receives, accepts, and stores verified information
 2. Responds in real-time to 9-1-1 call-related requests

- RFP issued October 30, 2015
 - Solicits potential vendor to design, develop, build, deliver, and operate the NEAD
 - List of technical requirements/standards
 - Real-time access for 9-1-1
 - Networks must flag suspicious locations and respond for verification
 - Focus on resiliency and redundancy
 - Entry/access requirements
 - New additions posted within 24 hours and audit process to validate
 - ATIS standards
 - ATIS selected as Project Manager

NEAD RFP Dates

Schedule	Date
RFP available for release	October 30, 2015
Email confirmation of "Intention To Submit" a Proposal	November 16, 2015
"Last Day For Questions" and comments related to RFP	November 30, 2015
Response to questions/comments due	December 11, 2015
Proposal Due Date	December 18, 2015
Selection of one or more Vendors to present their solution	January 18, 2016
Selected Vendor Notification	No later than February 19, 2016

Beacon Location Request

Batch Data Entry

Data Integrity & Reporting

Real-Time Data Entry

Beacon Location Request Use Case

NEAD Platform Users	NEAM	NEAD	Comments
① A wireless carrier sends a Beacon Location request over the Nq connection. The request includes a single MAC address.	The NEAM is not involved with this transaction.	② The NEAD looks up a record (in real-time) that matches the MAC address field, and returns the information in the street address field of that same record.	Only authorized entities can request a Beacon Location from the NEAD Platform.

- Z-Axis
 - Requirements analysis for uncompensated baro to PSAPs
- PSAP Implementation
 - Requirements analysis for additional location data to PSAPs
 - Using confidence and uncertainty data
- Standards
 - Coordination with ATIS ELOC
- Demonstration
 - APCO 2015
- Outreach
 - Develop educational materials for stakeholders

Standards Development

Location Tracking at the Atlanta Airport



GeoMetri Platform: <https://www.youtube.com/watch?v=mWSb4mHPRJo>

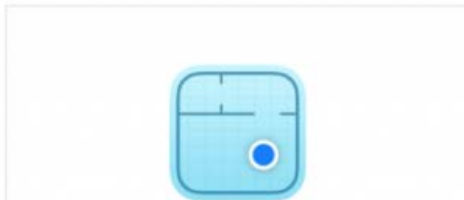


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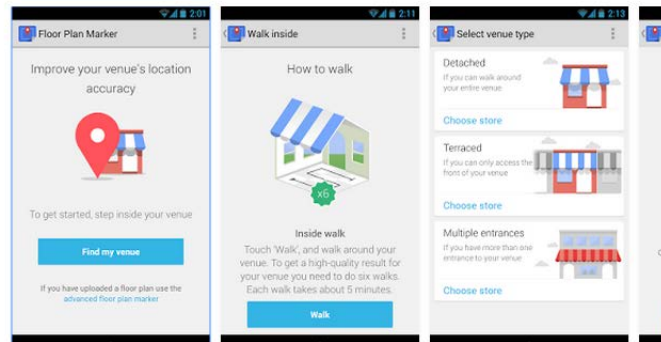
Everyone

★★★★★ 191

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- Additional information and updates:
 - Government Relations Webpage
<https://www.apcointl.org/advocacy/topics/911-location-accuracy.html>
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