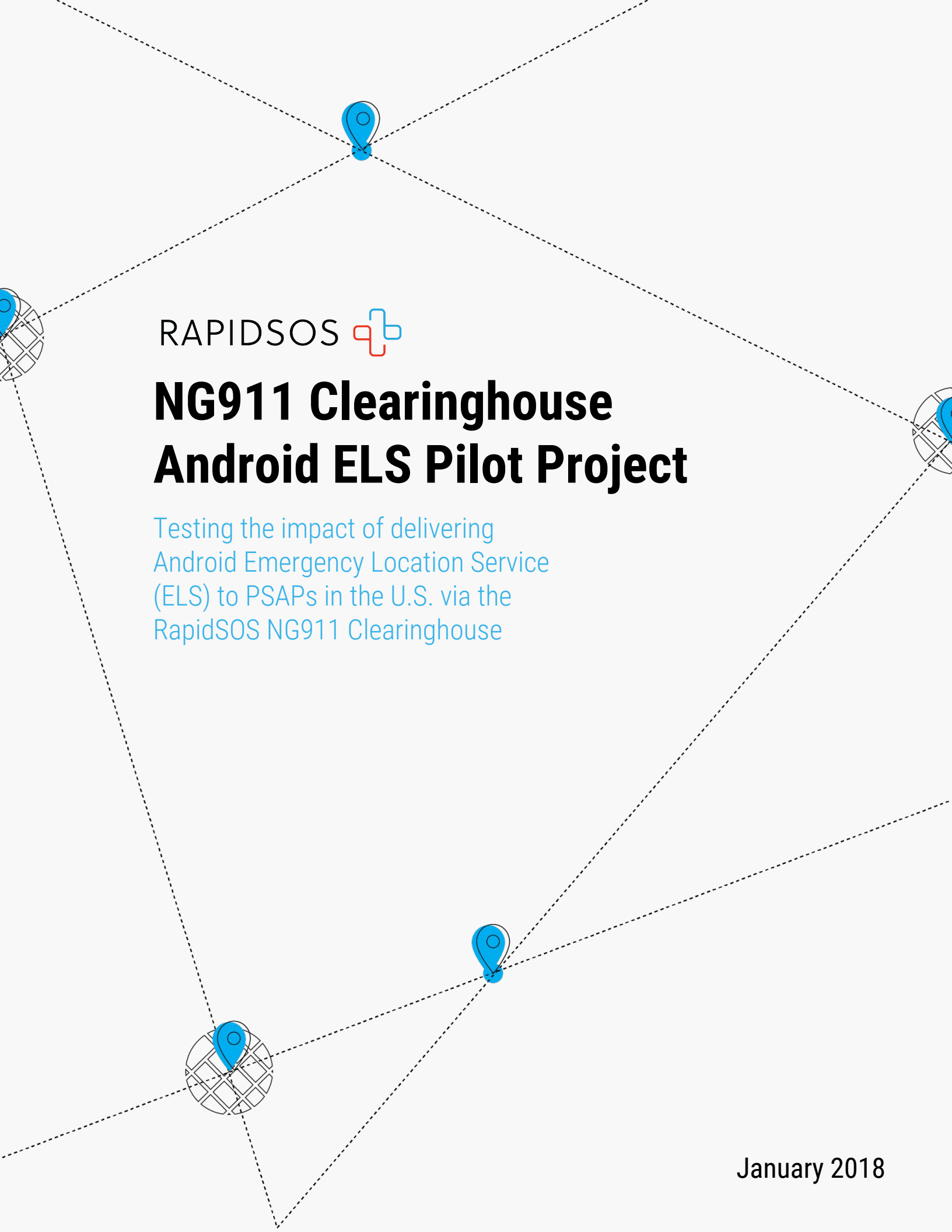




RAPIDSOS 

NG911 Clearinghouse Android ELS Pilot Project

Testing the impact of delivering
Android Emergency Location Service
(ELS) to PSAPs in the U.S. via the
RapidSOS NG911 Clearinghouse

January 2018

“Why can Uber find me but 9-1-1 can’t?”

Apps like Uber locate users with device-based hybrid location, whereas current E911 location services typically use a network-centric approach that often falls back to cell-tower triangulation when a GPS fix cannot be obtained (such as when the caller is located indoors).

With many 9-1-1 Centers across the country now receiving 80+% of their calls from wireless devices, and with citizens expecting 9-1-1 to be able to locate them just as their Uber can, it is imperative that 9-1-1 can receive the most accurate location available during an emergency.

This case study demonstrates what’s possible when modern smartphone location services meet Next Gen 9-1-1.

RapidSOS tested Android Emergency Location Service (ELS) with the NG911 Clearinghouse to examine the potential to more quickly and more accurately determine the location of wireless 9-1-1 calls.

At a Glance: Key Findings



Key Finding 1

ELS through the NG911 Clearinghouse was more accurate and faster than traditional E911 location.



Key Finding 2

PSAPs successfully received Android ELS supplemental location from the NG911 Clearinghouse, integrated into their existing software.



Key Finding 3

This location technology was used during real emergencies, saving lives.

Pg. 4	<u>The Wireless Location Challenge</u> Comparison of Traditional Network Location and Device Location Feedback from 911: Inaccurate & Slow Location Data Impacts Call-Takers
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Pg. 6	<u>Android ELS Meets NG911 Clearinghouse</u> Introduction to Android ELS and the NG911 Clearinghouse Description of the January 2018 Pilot Project NG911 Clearinghouse Detail
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Pg. 9	<u>Data Shows: More Accurate and Faster Location Delivery</u> Test Results: Reported Location Accuracy Test Results: Speed of Delivery
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Pg. 12	<u>Call-Taker Feedback: We're Ready to Go!</u> Call-Takers Embrace Technology to Locate Callers Majority of Call-Takers Noticed the Availability of Device Location & Found It Useful NG911 Clearinghouse Is Integrated into Existing Call-Taking/Dispatch Software
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Pg. 18	<u>Examples Show: Lives Are Saved</u> Real-Life Examples: Collier County, FL Real-Life Examples: Loudon County, TN Real-Life Examples: NCTCOG, TX
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Pg. 22	<u>Next Steps</u>
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Zooming in on the Wireless Location Challenge:

Network-Centric Location vs. Device-Based Hybrid Location

TRADITIONAL NETWORK-CENTRIC E911 LOCATION

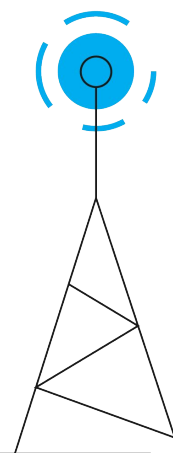
Phase 1

Generally not considered “dispatchable location,” Phase 1 location is the civic address of the nearest cell tower, or the coordinates of the cell tower or sector centroid.

Phase 2

Best practice is to use GPS location technology, with network-based mechanisms as a fallback when no GPS is available. While GPS is generally very accurate, it only works reliably in outdoor environments where a clear line of sight to satellites is available. Indoors, GPS will often fail and positioning centers will instead utilize less accurate network-based mechanisms, or fall back to Phase 1.

Even if Phase 2 location is available and accurate, it is often only available after a re-bid, which typically incurs a delay of 25-30 seconds.



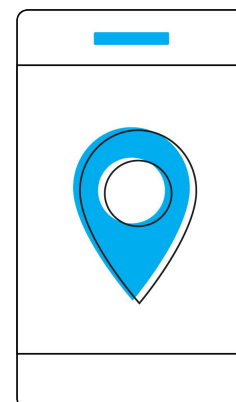
DEVICE-BASED HYBRID LOCATION

Combines all sensors on the device

- GPS
- WiFi Access Points
- Bluetooth beacons
- Barometric pressure
- Pedestrian dead reckoning, gyro sensors, accelerometers, etc.

"Hybrid" indicates that the device can fuse the different sources together and provide the best location based on context and environment, as opposed to having to choose "either/or" and waiting for one method to fail before trying the next.

Fused or hybrid location utilizes a combination of different methods to validate and determine the most accurate location possible. In indoor environments, the device typically relies on WiFi access points and enhances and validates the location with other mechanisms, whereas in outdoor environments the device typically relies heavily on GPS. In all cases, location is cross-referenced across sources to make it more robust and reliable.



Survey of call-takers and dispatchers from participating agencies.

"Sometimes it could mean that we don't find the person who needs help until it is too late. At best slow location data delays response to a minor event. At worst it could mean someone loses their life."



5

Wireless Location Solution:

Android ELS via the RapidSOS NG911 Clearinghouse



Android ELS

Device-Based Location Source

99% of Android devices (version 4.0 and upwards) support Android Emergency Location Service (ELS) – an Android service that transmits a more reliable emergency location both indoors and outdoors (by fusing Wi-Fi, GPS, cell tower data, and other sources) to emergency services during a 9-1-1 call.

This service has already been successfully activated in many countries in Europe and the [European Emergency Number Association](#) estimates that 7,500 lives and 95 billion euros could be saved if Android ELS is implemented everywhere in the EU.

[LEARN MORE ABOUT ELS](#)

NG911 Clearinghouse

Location & Data Platform for Public Safety

The NG911 Clearinghouse is a NENA i3 compliant Location Information Server (LIS) and Additional Data Repository (ADR) that is accessible to authorized Public Safety Answering Points (PSAPs) through integrations into all major call-taking, dispatch, and mapping software.

Simply put, the NG911 Clearinghouse integration is an easy way for PSAPs to receive device-based location and enhanced data for smartphone 9-1-1 calls through their existing PSAP software.

[LEARN MORE ABOUT THE NG911 CLEARINGHOUSE](#)

Pilot Project: Android ELS & NG911 Clearinghouse

In January 2018, RapidSOS and Google conducted a pilot project to evaluate Android ELS location accuracy and speed of delivery for wireless 9-1-1 calls. Three test regions participated in the pilot project and ELS location was captured via the NG911 Clearinghouse and transmitted for a fraction of 9-1-1 calls received in the pilot PSAPs.

Key Findings:

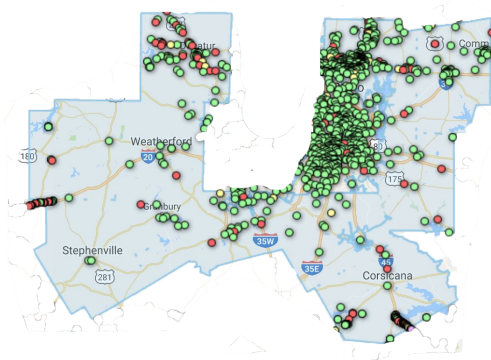
1. ELS through the NG911 Clearinghouse was more accurate and faster than traditional E911 location.
2. PSAPs successfully received Android ELS supplemental location from the NG911 Clearinghouse, integrated into their existing software.
3. This location technology was used during real emergencies, saving lives.

January 2018 Pilot Project Objective:

To evaluate the location accuracy and speed of Android ELS compared to existing 911 location systems and demonstrate the ability of the NG911 Clearinghouse to effectively deliver Android ELS data to PSAPs.

- **January 2018:** Data collection period
- Location only collected when within three geofenced areas of the pilot regions
- Location only delivered to call-takers when within PSAP jurisdiction

Participating Public Safety Agencies:

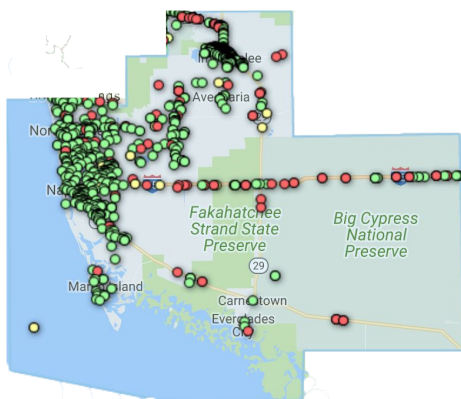
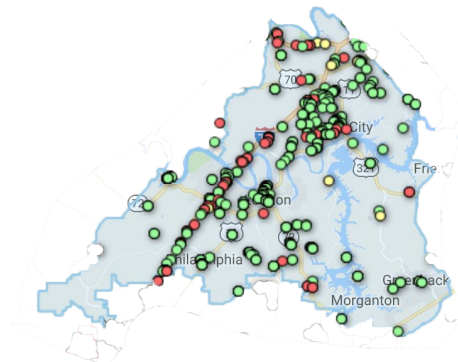


North Central Texas Council of Governments (NCTCOG)

- 44 PSAPs
- Population: ~2 million
- Morphology: Urban/suburban

Loudon County, TN

- 1 PSAP
- Population: ~50,000
- Morphology: Rural



Collier County, FL

- 2 PSAPs
- Population: ~350,000
- Morphology: Suburban

Note: Plots depict the cumulative number of calls in each spatial region for the entire time range.

NG911 Clearinghouse Integration Partners

PSAPs can access the NG911 Clearinghouse via integrations into their existing call-taking, mapping and dispatch software. More integration partners are always being announced; check [here](#) for more details.

AIRBUS

GEQCOMM

HEXAGON

INdigital

MOTOROLA SOLUTIONS

PULSIAM

SOLACOM

TRITECH
SOFTWARE SYSTEMS

ZETRON

GeoConex
Your Connection for Life

RapidDeploy
MISSION CRITICAL DISPATCH

RAVE
MOBILE SAFETY

Adashi

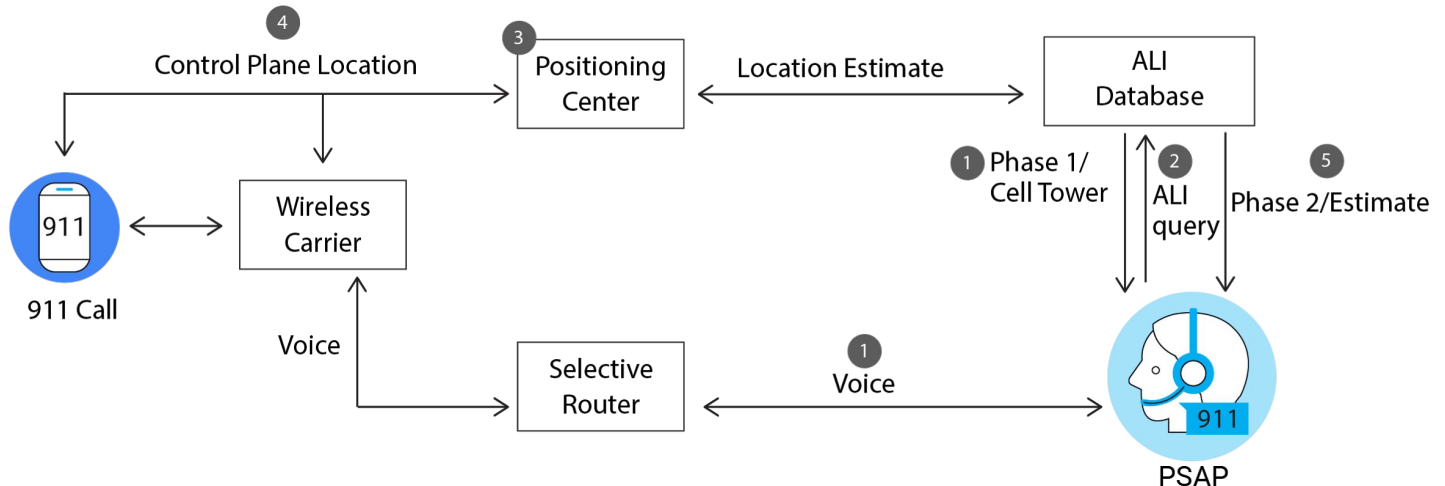
911
Datamaster

Digital Data
Technologies Inc

Mutualink

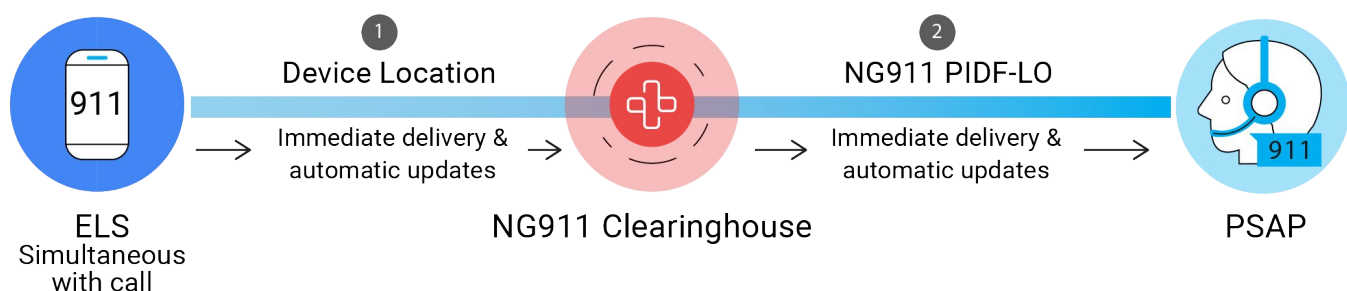
Primary Wireless Location Delivery through the ALI/E911 Mechanism:

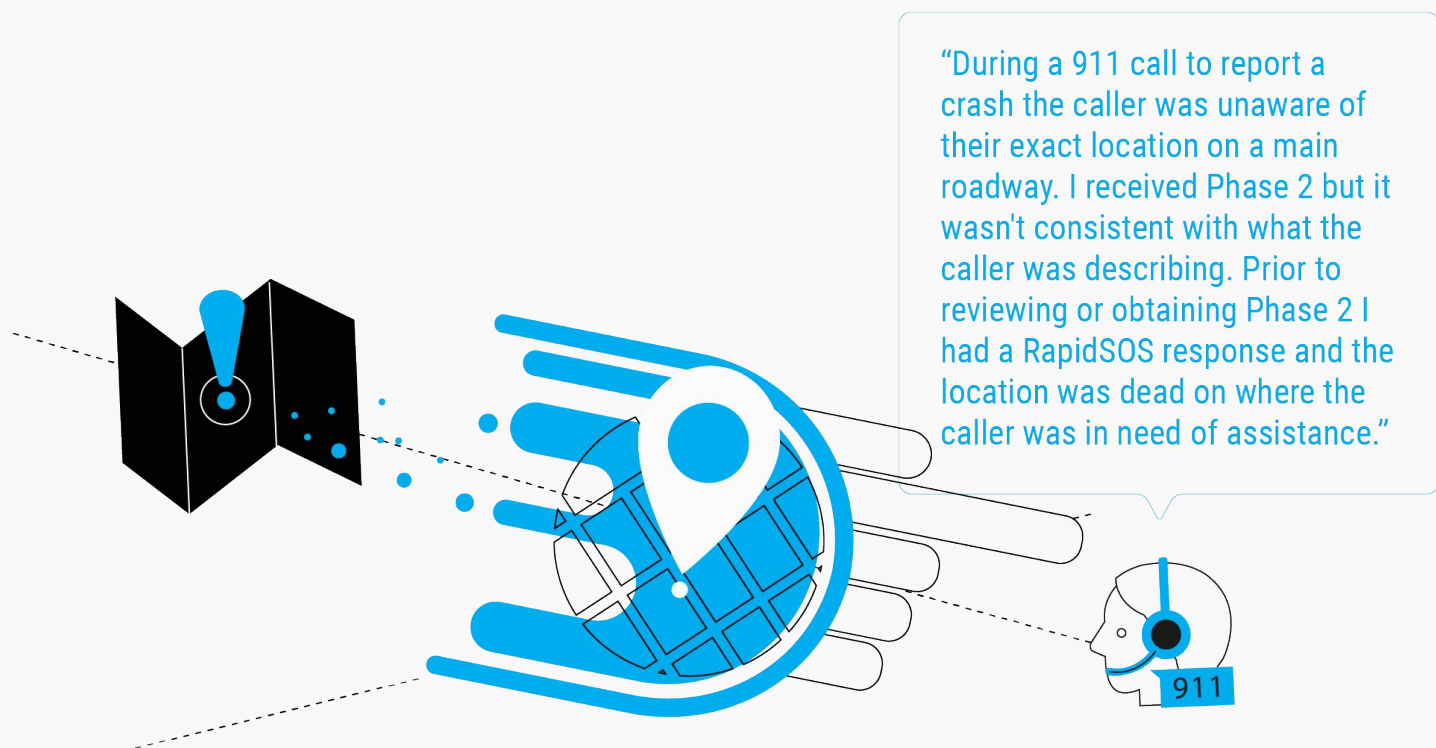
Complicated process largely based on landline paradigm, typically rebid required



Supplemental Device Location Delivery through the NG911 Clearinghouse:

Designed from the ground up for Wireless & NG911, delivers immediately and updates automatically





"During a 911 call to report a crash the caller was unaware of their exact location on a main roadway. I received Phase 2 but it wasn't consistent with what the caller was describing. Prior to reviewing or obtaining Phase 2 I had a RapidSOS response and the location was dead on where the caller was in need of assistance."

Key Finding 1

ELS through the NG911 Clearinghouse was more accurate and faster than traditional E911 location.

Test Results: Reported Location Accuracy

To compare location accuracy between ELS and the ALI, uncertainty data was captured. The results show that ELS via the NG911 Clearinghouse provides more accurate location data than the ALI.

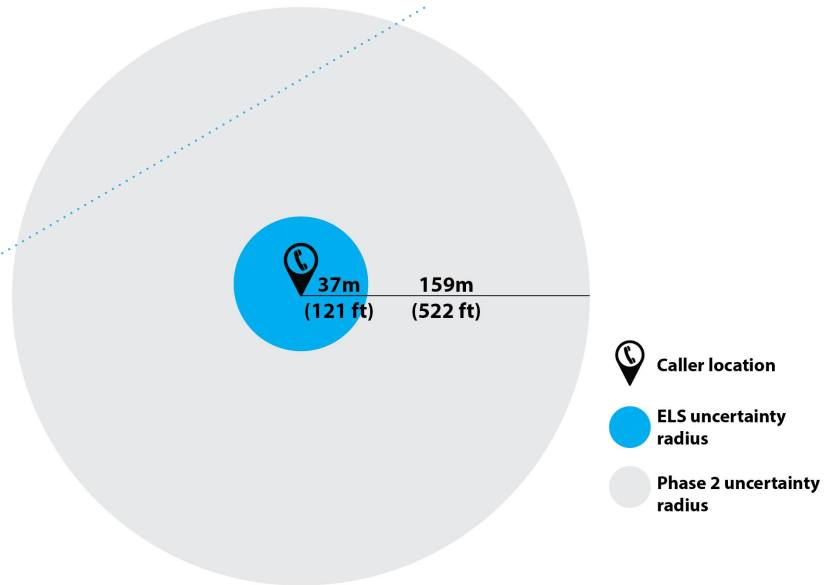
76%

Reported Uncertainty <50 meters

ELS reported an uncertainty of 50 meters or less for 76% of calls.

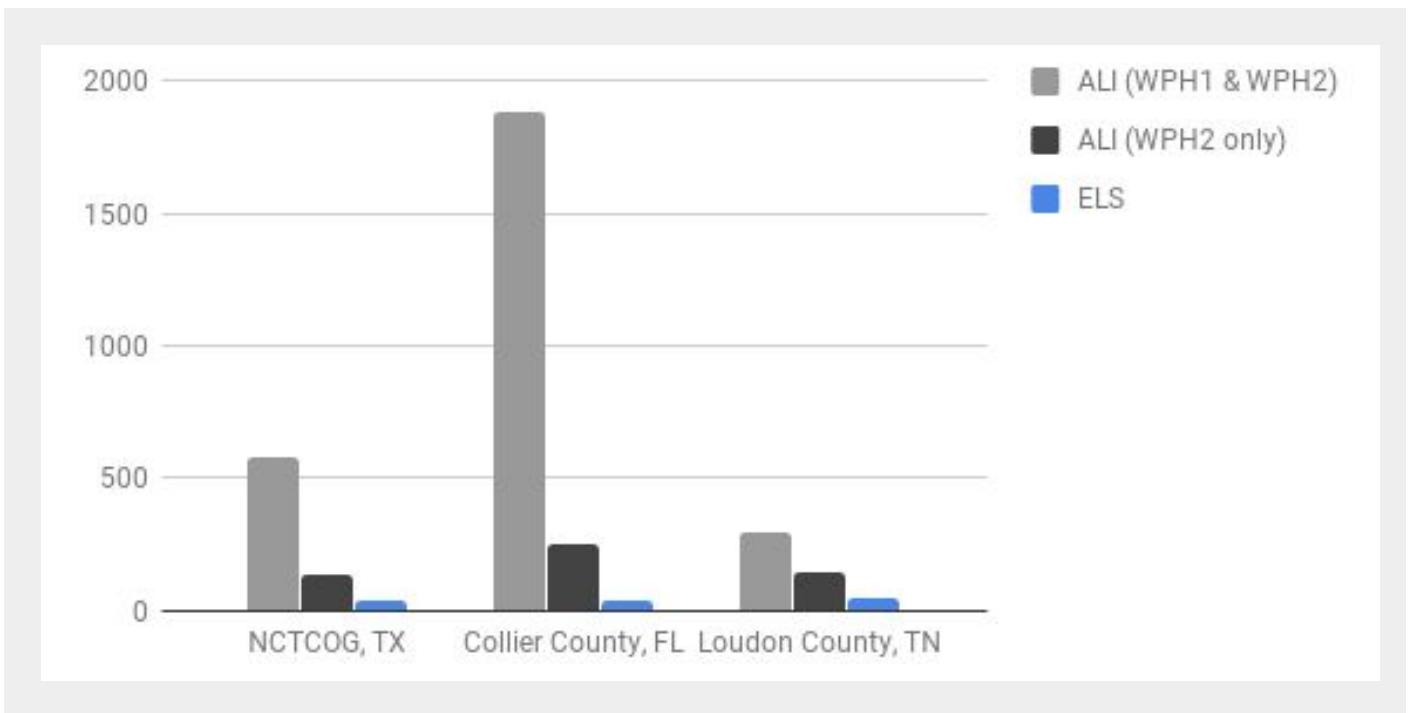
Average Reported Uncertainty (all calls)

Phase 1 radius too large to be displayed at scale



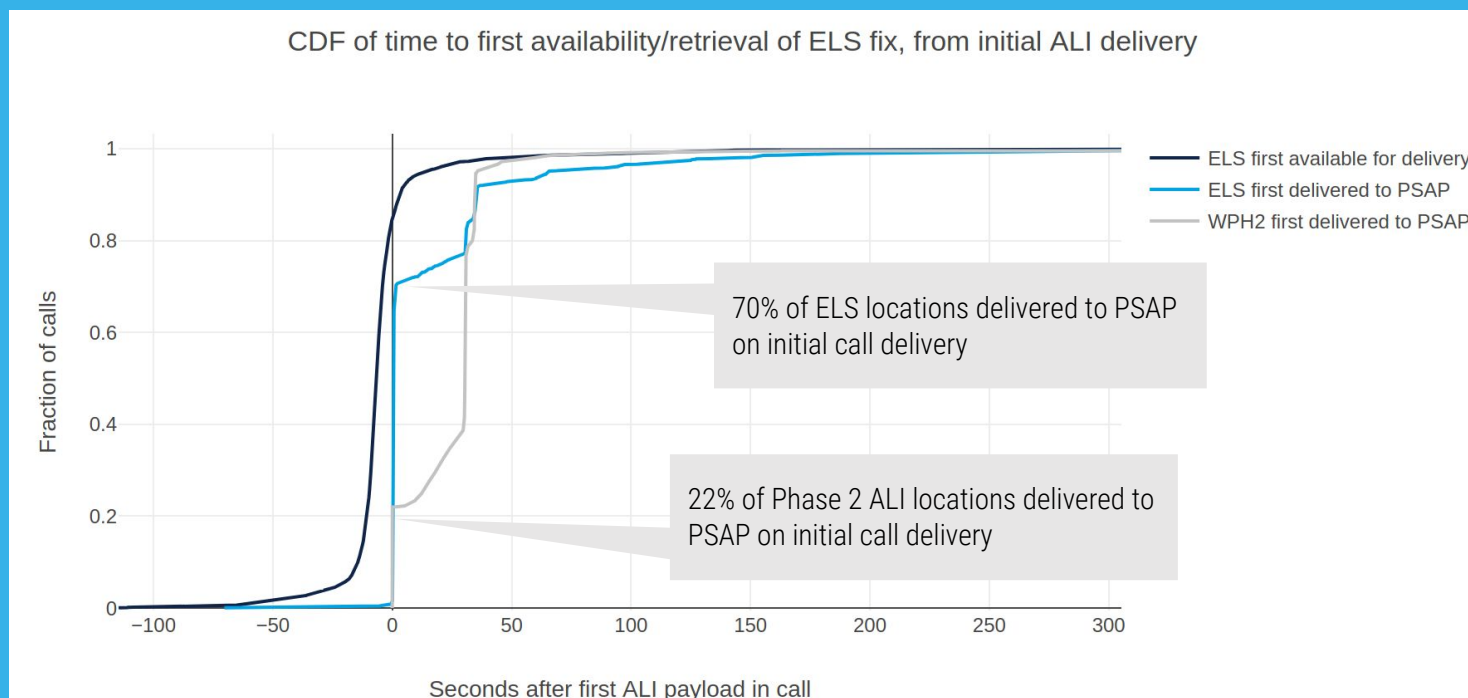
On average, significantly lower uncertainty radius

Average Reported Meters Uncertainty (best in call)



Test Results: Speed of Delivery

To compare speed of delivery between ELS and the ALI, availability of ELS location was compared to the availability of Phase 2 location to the call-taker. The results show that ELS via the NG911 Clearinghouse typically arrives 25-30 seconds faster than the Wireless Phase 2 location.



When Seconds Count: Legacy E911 ALI vs. NG911 Clearinghouse

The pilot data demonstrates how ELS location, delivered via the NG911 Clearinghouse, gets more accurate location data to the call-taker's screen faster than Phase 2.

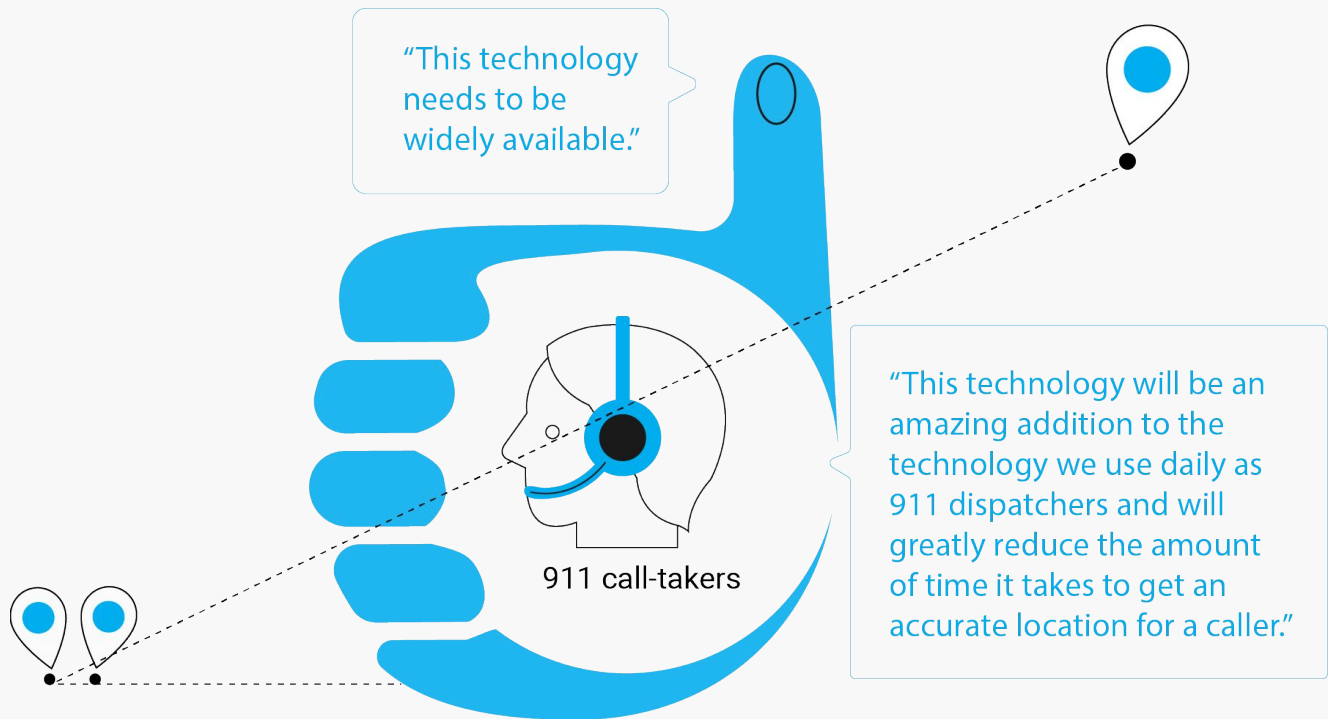
This is driven by two main factors:

- 1) **ELS is calculated directly on the device, instead of in the wireless network**

A precise location may already be available on the smartphone before the 911 call, and if necessary calculation starts immediately when the call is placed

- 2) **The Clearinghouse uses IP-based delivery mechanisms, instead of legacy ALI databases**

There's no need to wait for a Phase 2 re-bid, requests are returned in milliseconds, and location is updated periodically



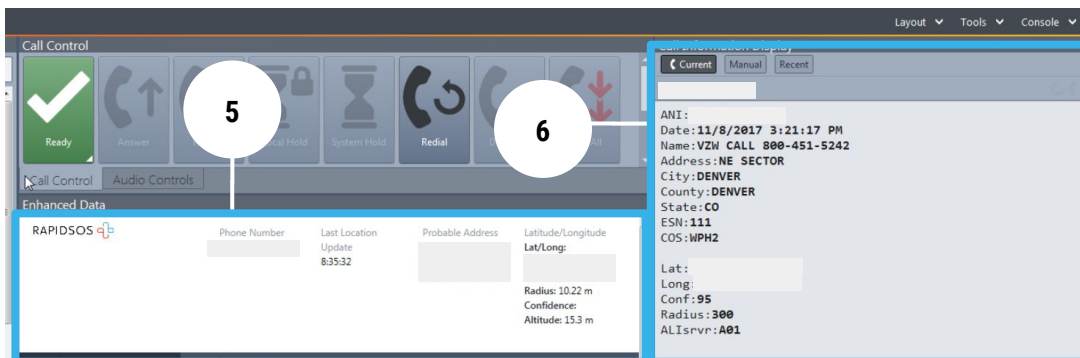
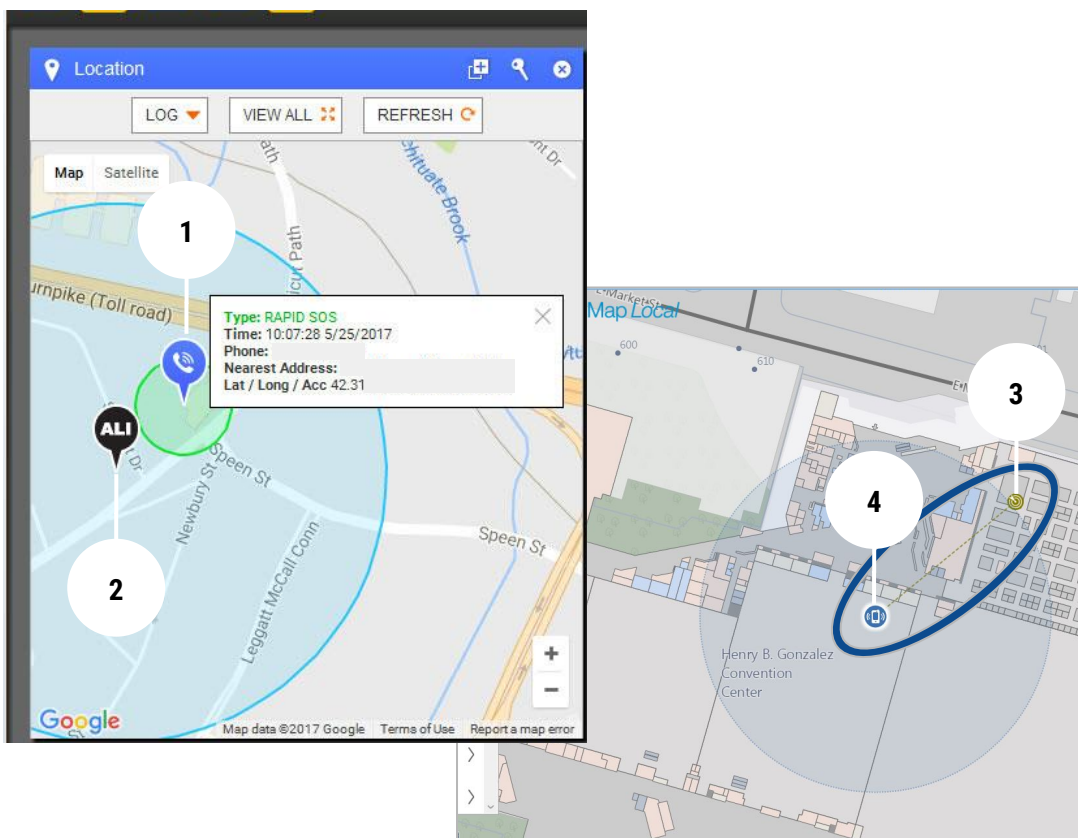
Key Finding 2

PSAPs successfully received ELS supplemental location from the NG911 Clearinghouse, integrated into their existing software.

Location Delivery: Collier County, FL

The NG911 Clearinghouse integrates with any call-taking, dispatch, and mapping software.

During the pilot, Collier County received the supplemental ELS location from the NG911 Clearinghouse via three different software systems: 1) Smart911, 2) VESTA Map Local, 3) VESTA 911.



RAVE Smart911

1

ELS location plotted on map in existing supplemental data feed tool

2

E911 ALI Phase 2 also displayed

RAVE
MOBILE SAFETY

VESTA Map Local

3

ELS location plotted on existing call-taker map as supplemental data

4

E911 ALI Phase 2 also displayed

VESTA 911

5

ELS location displayed in call-taking software

6

E911 ALI Phase 2 also displayed

AIRBUS

Location Delivery: Loudon County, TN

Loudon County received the supplemental ELS location from the NG911 Clearinghouse via their Zetron MAX CT, integrated into their CAD Mapping.



ZETRON MAX CT / CAD INTEGRATION

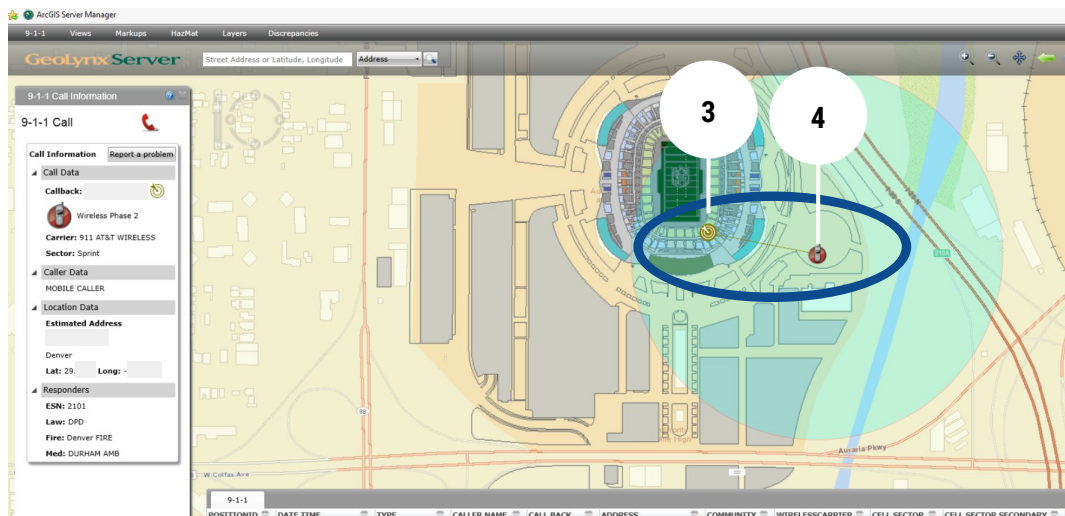
- 1**
ELS location plotted in existing CAD map
- 2**
User can toggle back and forth between ELS location and Phase 2 location

ZETRON

Josh Fields
Computer Services

Location Delivery: NCTCOG, TX

NCTCOG PSAPs received the supplemental ELS location from the NG911 Clearinghouse via GeoComm's GeoLynx Server mapping product.



SOLACOM GUARDIAN / GEOCOMM GEOLYNX

- 3**
ELS location plotted on existing call-taker maps
- 4**
E911 ALI Phase 2 also displayed

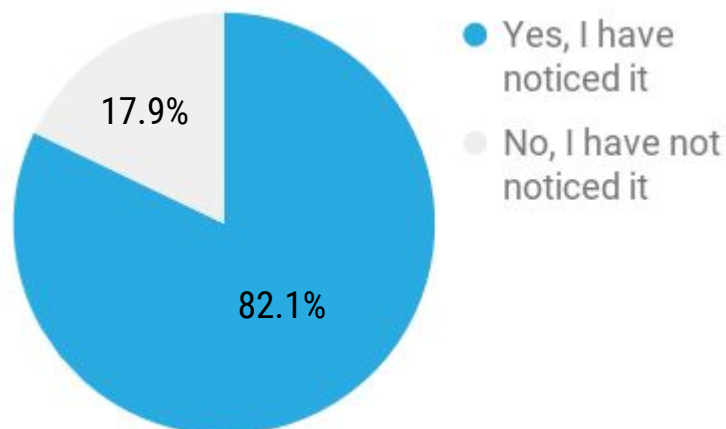
GEOCOMM
SOLACOM

Majority of Call-Takers Noticed the Availability of [ELS-Transmitted] Device Location from the NG911 Clearinghouse and Found It Useful*

Survey of call-takers & dispatchers from pilot agencies; n = 168

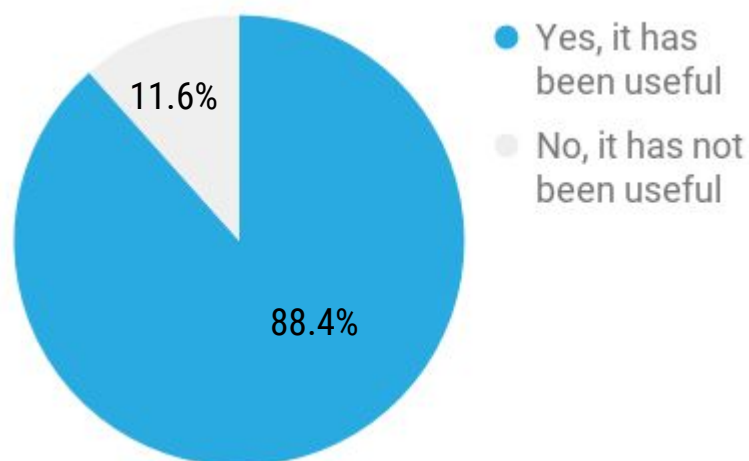
82% Have Noticed Device Location via RapidSOS

Have you noticed device-based RapidSOS location information?



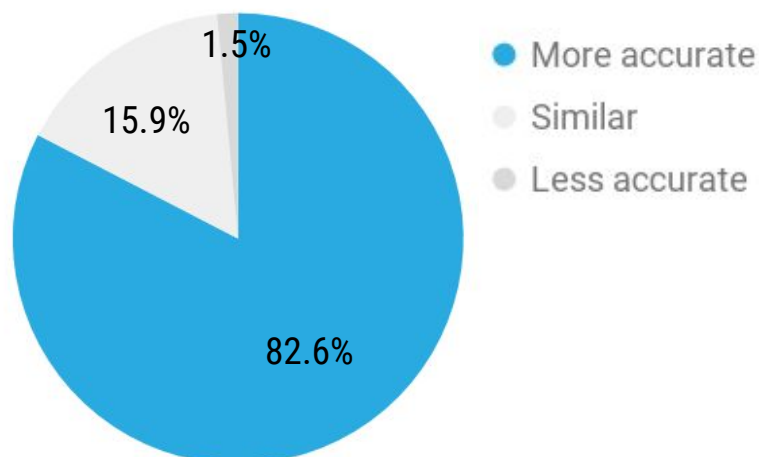
88% Found Device Location via RapidSOS Useful

Has it been useful?



83% Found Device Location via RapidSOS to Be More Accurate than Phase 2

When available, has RapidSOS location been more or less accurate than Phase 2 ALL information?



*Call-takers & dispatchers were not informed that ELS location would be available to them during the course of the pilot, but noticed enhanced location on the percentage of calls with ELS location data.

Call-Takers Embrace Technology to Help Locate Callers

Survey of call-takers from participating agencies; n = 168

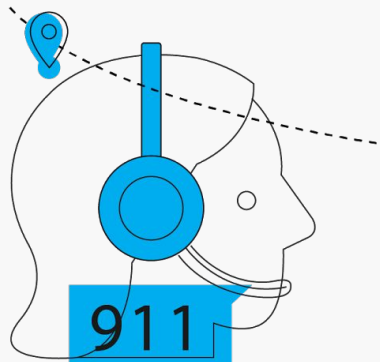
Is there anything else you would like to share about wireless location accuracy?



"As a 9-1-1 Supervisor I am incredibly pleased with the location information we are getting with RapidSOS."

"With more and more people using cell phones and not having house phones wireless location is very important to 911."

"Location is the most important information we need above all else!"



"It is great to see the advances in technology that will help us give the public better and faster service."

"The faster and better the location, the faster that we can dispatch the call."



"I really like this; it is going to be a great asset."

"For far too long we have had to rely on highly unreliable wireless location data. During this pilot we have been amazed at how accurate the RapidSOS location data has been. Also, it arrives much faster than Phase 2 (and again more accurate). This means time saved which equals lives saved."

“

I've been in 911 for over 20 years and for the longest time we had to tell everyone that there's nothing we can do about the wireless location challenge, and we had to wait for someone else to fix it.

Being able to see accurate location at the 911 call-taker position, through existing software systems that the call-takers and dispatchers are already used to, has been very encouraging.

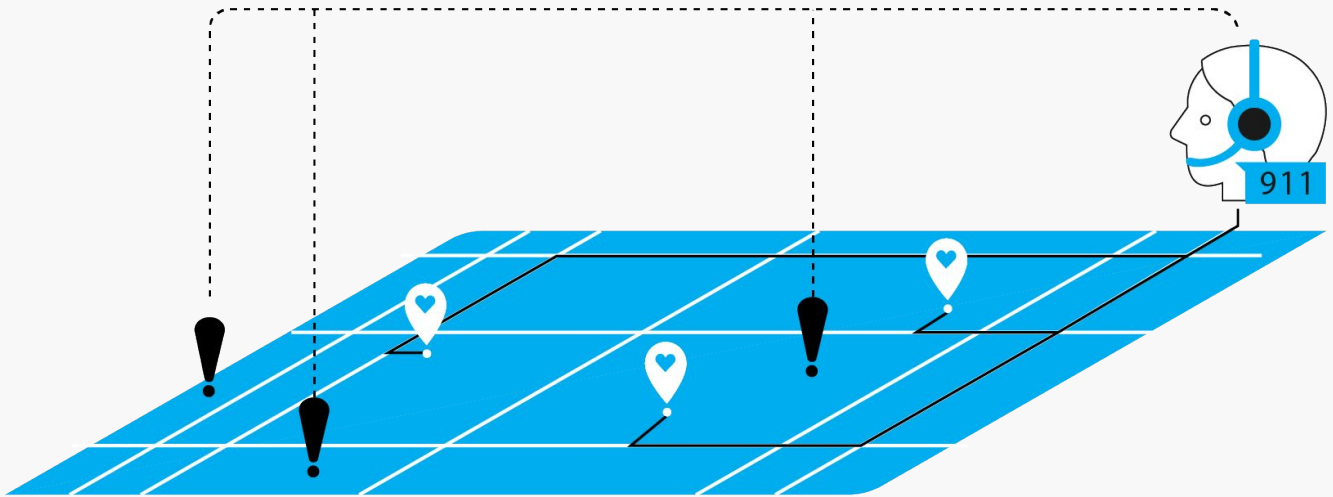
With RapidSOS, we can actually take action in the PSAP to improve the safety of our citizens today.

”

Bob Finney,
911 Communications Director,
Collier County Sheriff's Office



"On a suicide call the location is vital, and this zoomed directly to the house straight away. Worked excellently!"



Key Finding 3

This location technology was used during real emergencies, saving lives.

Real-Life Example: Collier County, FL

The Situation:

911 caller had a traumatic injury that severed two of her fingers. The caller gave an address, WPH2 showed a location a few houses over, and ELS via the NG911 Clearinghouse showed a third location on the other side of the street.

The Response:

1. Responders went to the address given by the caller
2. They were unable to locate the patient and proceeded to the ELS location
3. The ELS location was accurate

**1**

Control Plane/ALI:
Location Source: N/A
Reported Uncertainty: 51m

3

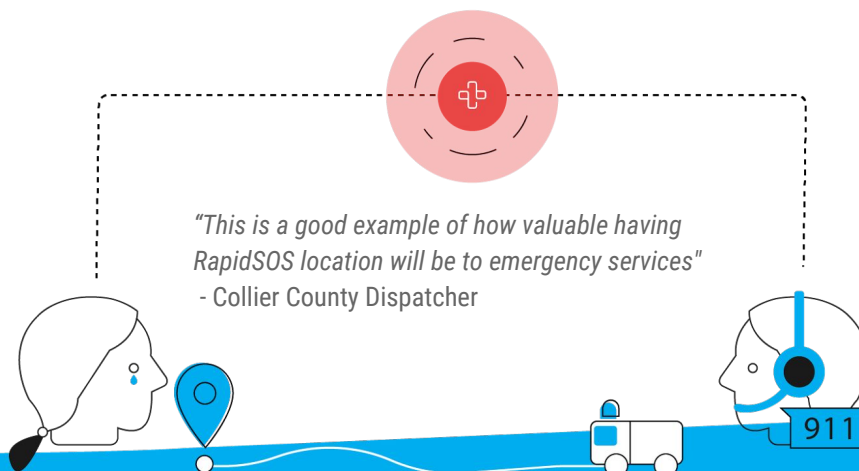
ELS/RSOS Location:
Location Source: WiFi
Reported Uncertainty: 42m

2

Actual Caller Location:
Inside This House

The Result:

In the panicked emergency, the caller gave an incorrect location to the 911 call-taker and first responders were unable to locate her. Fortunately, the ELS location was available and accurate – providing first responders with another source of data to quickly locate the caller.



Real-Life Examples: Loudon County, TN

The Situation:

The Response:

MEDICAL PRIORITY

911 call for an unresponsive patient

1. Call-taker confirms ELS location with caller instead of waiting for caller to describe location
2. Call-taker dispatches ALS ambulance immediately
3. Call-taker proceeds to Medical Priority questions and phone instructions as per protocol

FOREIGN LANGUAGE

The caller doesn't speak for the first minute of the call, and afterwards struggles with English

Call-taker immediately sees caller's ELS location, including the apartment number, and is able to dispatch the first unit before getting any verbal information regarding the location or the incident

FASTER CALL TRANSFER

Call comes in from outside Loudon County's jurisdiction

Call-taker immediately recognizes ELS location out of jurisdiction and confirms county with caller; saves multiple seconds in transferring the call quickly

Real-Life Examples: NCTCOG, TX

The Situation:

Caller is in a major accident with injuries and verbally provides incident location as XXX St. & Main St. (several miles west from actual incident).

0 sec

ELS location came in immediately with the call.

30 sec

Phase 2 location took 30 seconds to arrive.

“

911 Call-Taker:

“Are you at XXX and Main?
Because I am showing you
at a different location...”

Caller:

“I’m not sure of the cross
street...”

”

The Response:

1. Call-taker had location on screen before caller could verbalize address
2. Call-taker was able to confirm location with caller as the ELS location; units were dispatched correctly
3. When Phase 2 was available, call had already been dispatched

The Situation:

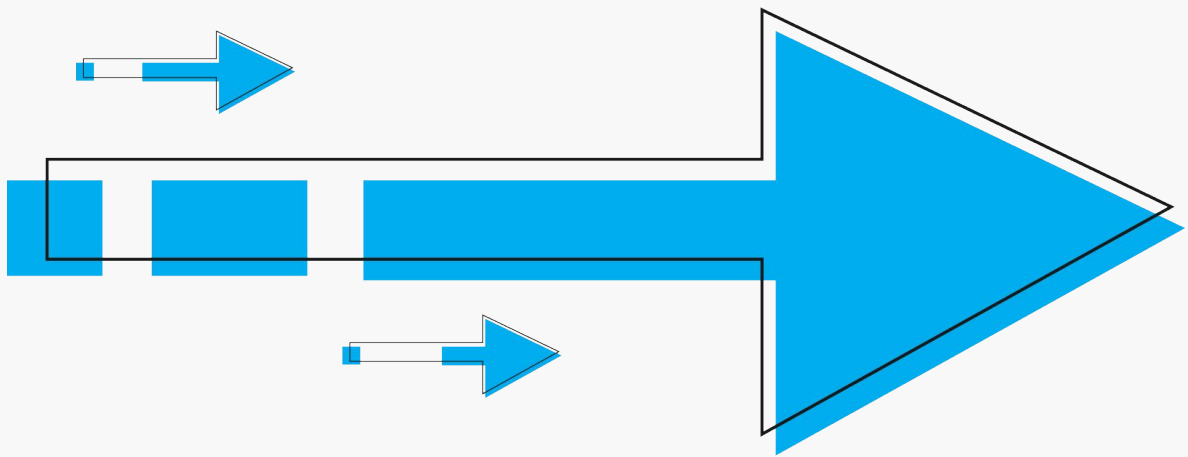
Verbal disturbance in an apartment building. ELS location pinpointed the location down to the exact building in the apartment complex.

The Response:

Officers were able to respond immediately to the right apartment.

“In my opinion the [ELS location] works great when it comes to apartment complexes - especially the larger ones, because it breaks down the separate buildings. This allows us to send officers to an exact building to check versus a whole complex.”





Next Steps

GET READY TODAY

Follow 3 simple steps to connect your PSAP to the NG911 Clearinghouse:

1

Request your free access credentials from RapidSOS

GET STARTED

2

Contact your vendor/service provider to ensure your call-taking/CAD/map is on a RapidSOS-enabled version

3

Start testing with the RapidSOS Beacon tools to become familiar with device-based location



Faster, more accurate location using the NG911 Clearinghouse

Interested in learning more?

Learn more about the NG911 Clearinghouse:
www.rapidsos.com/ng911clearinghouse

Learn more about Android ELS:
www.crisisresponse.google/els

Get in touch with your regional RapidSOS 9-1-1 Liaison:
www.info.rapidsos.com/psap-integration

Business contact for integration partners:
Reinhard Ekl, rekl@rapidsos.com

Press & media inquiries about the NG911 Clearinghouse:
Michelle Cahn, mcahn@rapidsos.com

