Emergency Services

Location-based Services

Location Surveillance

Polaris Wireless comments on the Commission's *Wireless E911 Location Accuracy Requirements* PS Docket No. 07-114

before the
Public Safety and Homeland Security Bureau
Federal Communications Commission

01 Dec 2015

Objective

Provide highlights of Polaris Wireless location solution activities over past year

- We continued to support the Commission's rulemaking process and the work of telecommunications standards bodies

- **Multi-technology Hybrid Solution:**
  - From capability discussion to a deployed system
  - U.S. Tier-1 launch scheduled for Q1/2016

- **Z-Axis:**
  - From capability demonstration to commercial product in an application designed for Public Safety

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Product Evolution

- Polaris Wireless and the mobile location industry continue to make rapid performance improvements
  - We have deployed our WLS/A-GPS position-domain hybrid solution on 2G & 3G networks domestically, and on 2G, 3G, & 4G networks internationally
  - We have a U.S. Tier-1 launch customer for our measurement-domain and position-domain hybrid solution (w/ A-GNSS, WLS, OTDOA, etc.), which will be deployed in Q1/2016
  - We have commercialized our accurate vertical height "Z-axis" solution for Public Safety applications, and have successfully completed live trials with federal, state and local law enforcement agencies and international security organizations

- Our domestic E911 customers are eager that we certify our location platform consistent with the Commission's 4th Report & Order
  - We continue to work with relevant industry groups to expedite the independent test bed process
  - We recognize that there may be challenges to fairly evaluating our deployed E911 platform in the 2 CTIA Regional Test Beds

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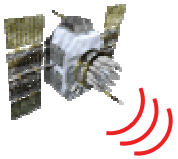
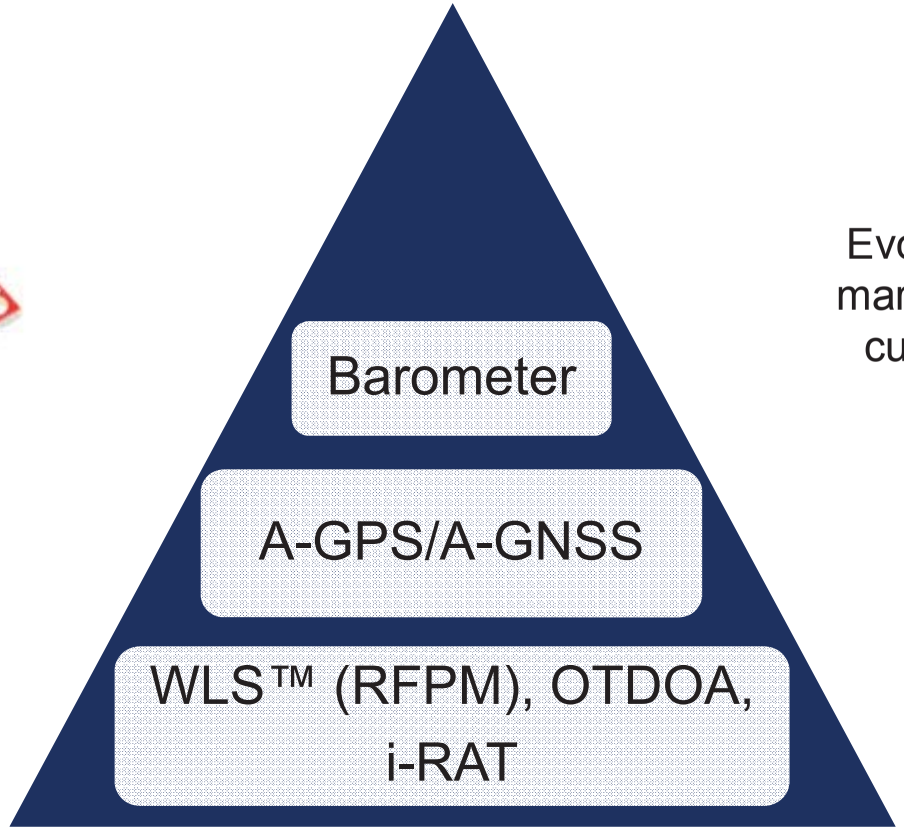
Polaris Multi-Sensor Location Stack for E911

Smartphone Sensors

A-GPS



Cellular



Evolving standards, new markets, and 21st-century customer expectations

Our high-accuracy solution for urban & indoor environments

All environments
All devices
➡ Guaranteed fix

- No specialized handsets
- No new infrastructure
- Deployed today and forward-compatible as network standards evolve

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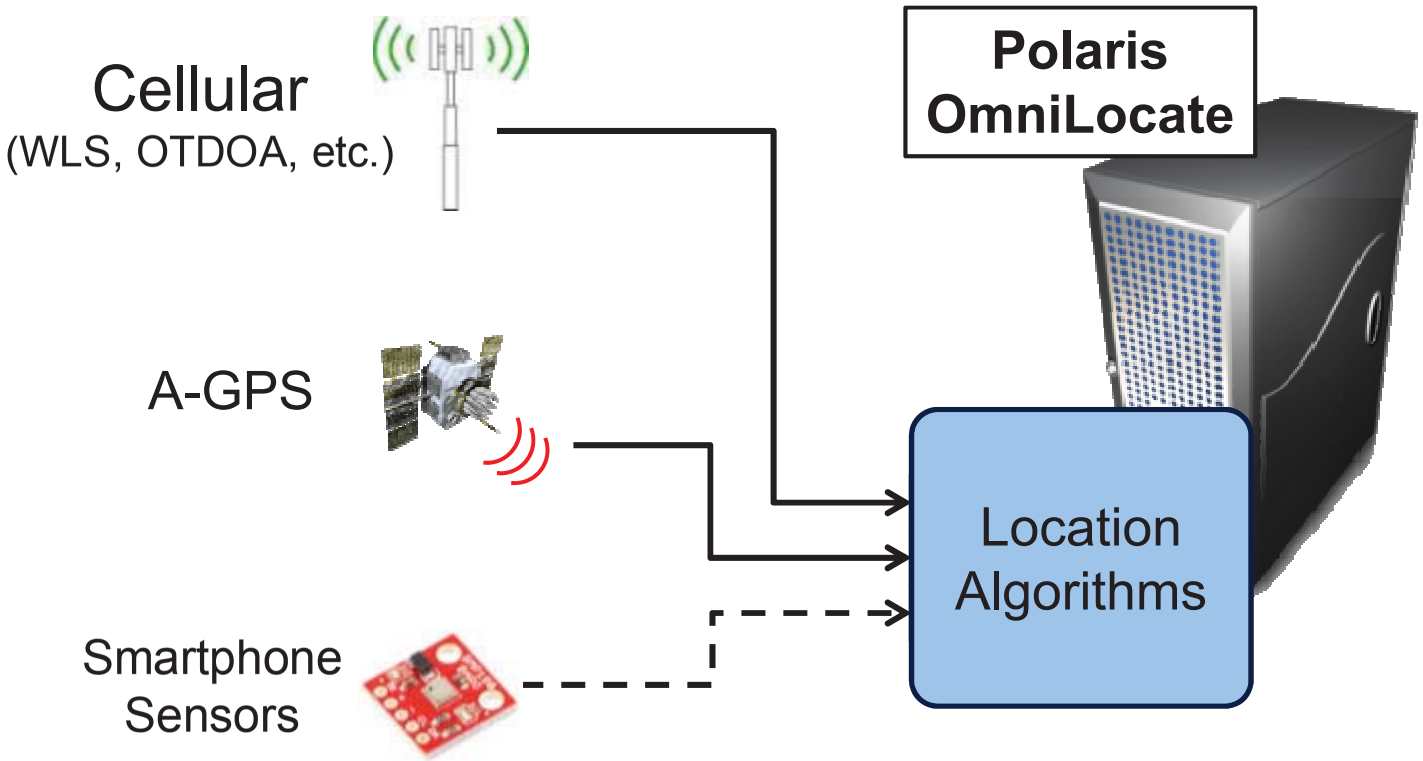
Multiple Sensors for E911 Location



Polaris deploys today a robust hybrid of cellular positioning plus A-GPS/A-GNSS for domestic E911 customers and overseas public safety & homeland security services.

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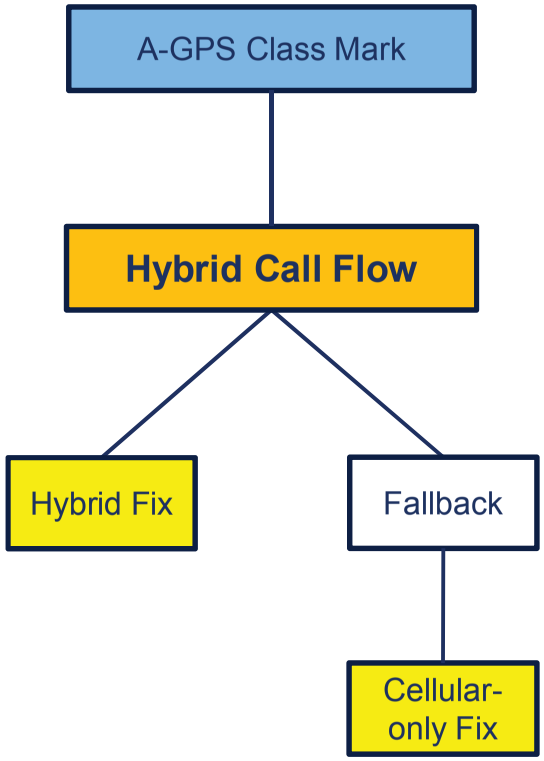
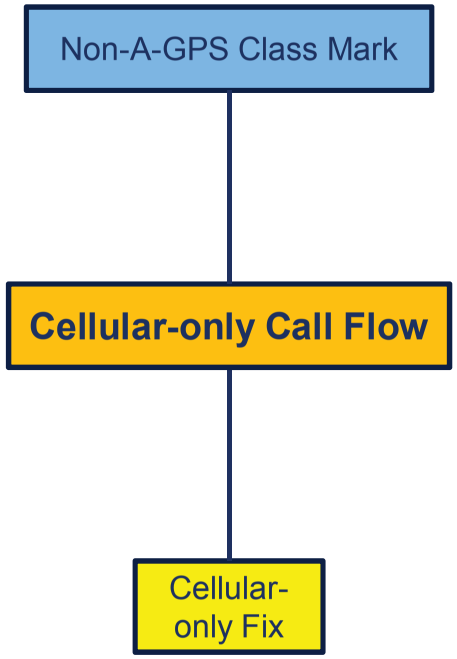
Polaris Wireless Cellular & A-GPS Call Flows

- Position-domain hybrid solution deployed today:
  - 2G & 3G domestically (E911 customers)
  - 2G, 3G, & 4G internationally
- Measurement-domain hybrid solution has a U.S. Tier-1 launch customer, will deploy in Q1/2016



- On 2G, we still see a sizable fraction of non-GPS capable devices
- Also, many int'l handsets do not support U.S. network-initiated emergency location response
- *This is an important capability for continued legacy service & support*



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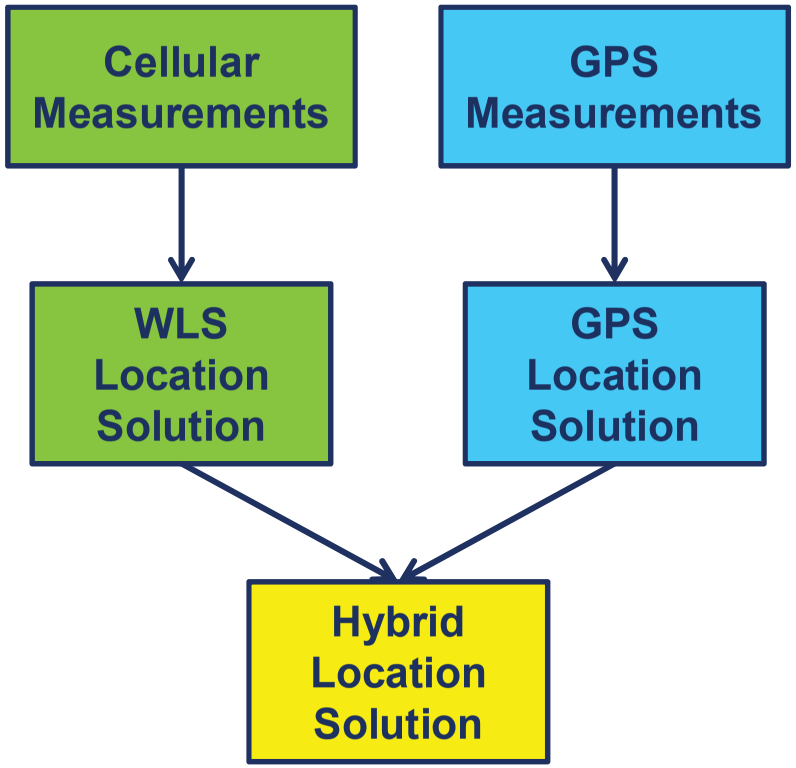
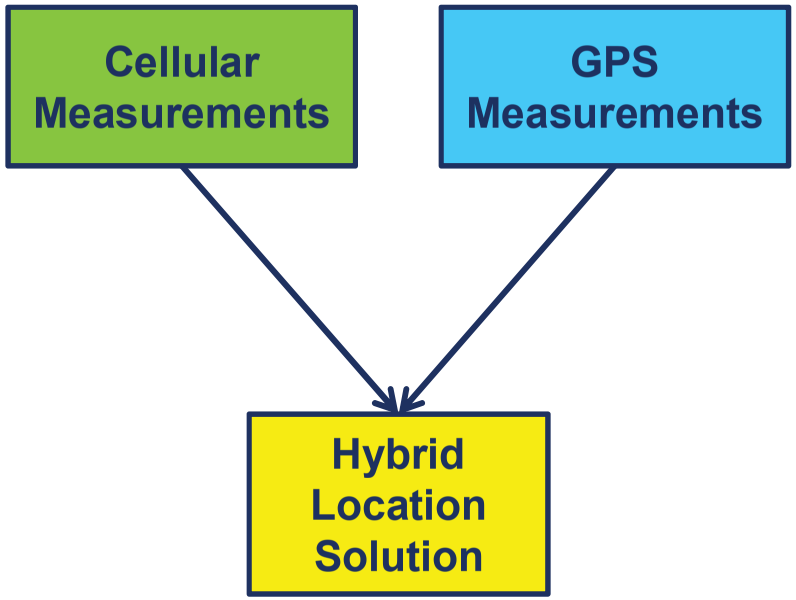
Position-domain vs. Measurement-domain Hybrid

Position-domain combination of WLS and GPS *location estimates*



Measurement-domain combination of Cellular and GPS *measurements*



The superior accuracy performance of our implementation won out over lessor proposals in a multi-vendor competitive-bid process

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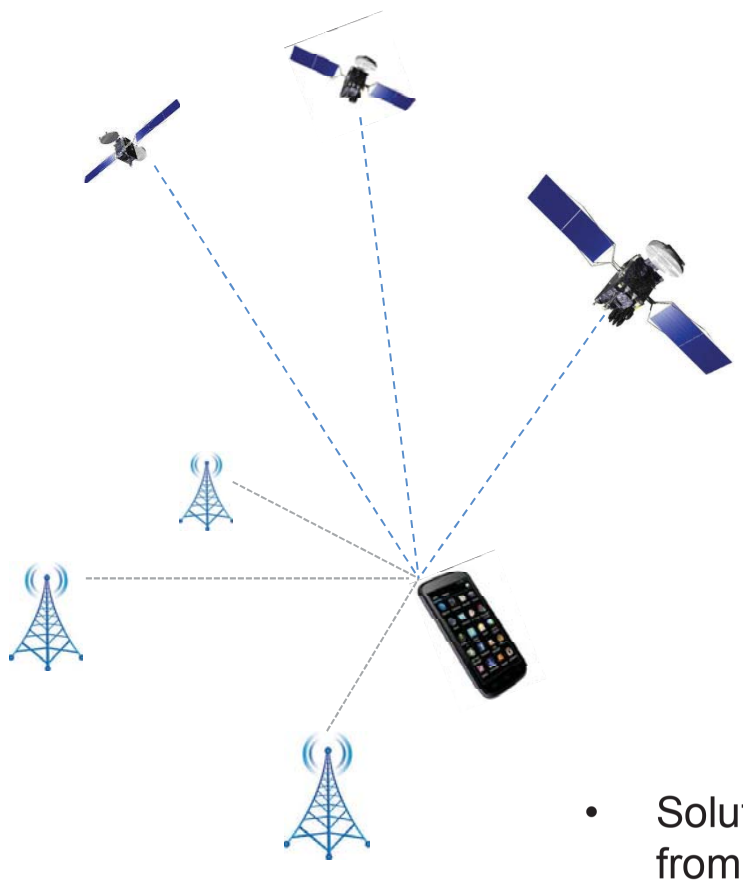
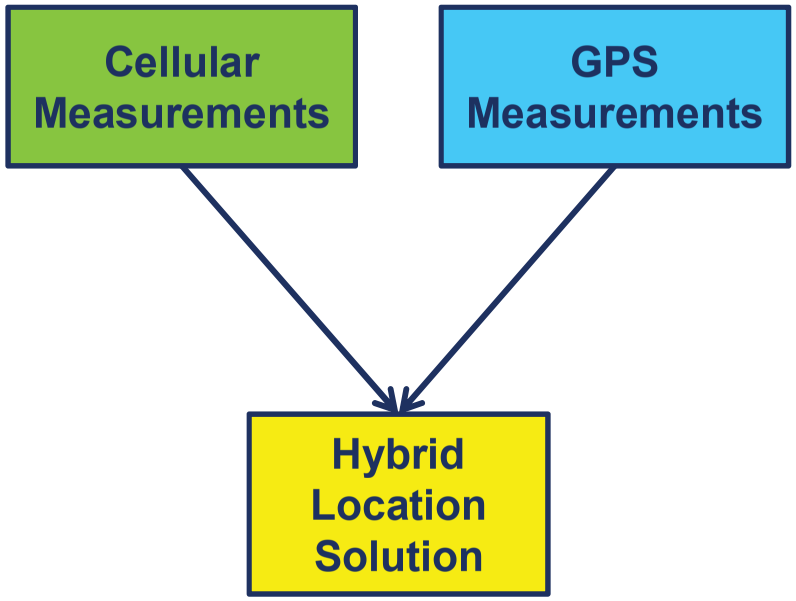
Measurement-domain Hybrid: WLS, OTDOA, A-GPS



Measurement-domain combination of Cellular and GPS *measurements*



- Solution can "mix-and-match" timing measurements from cellular base stations *and* GPS satellites
- RF signal-strength measurements provide robustness and ensure 100% yield across all morphologies

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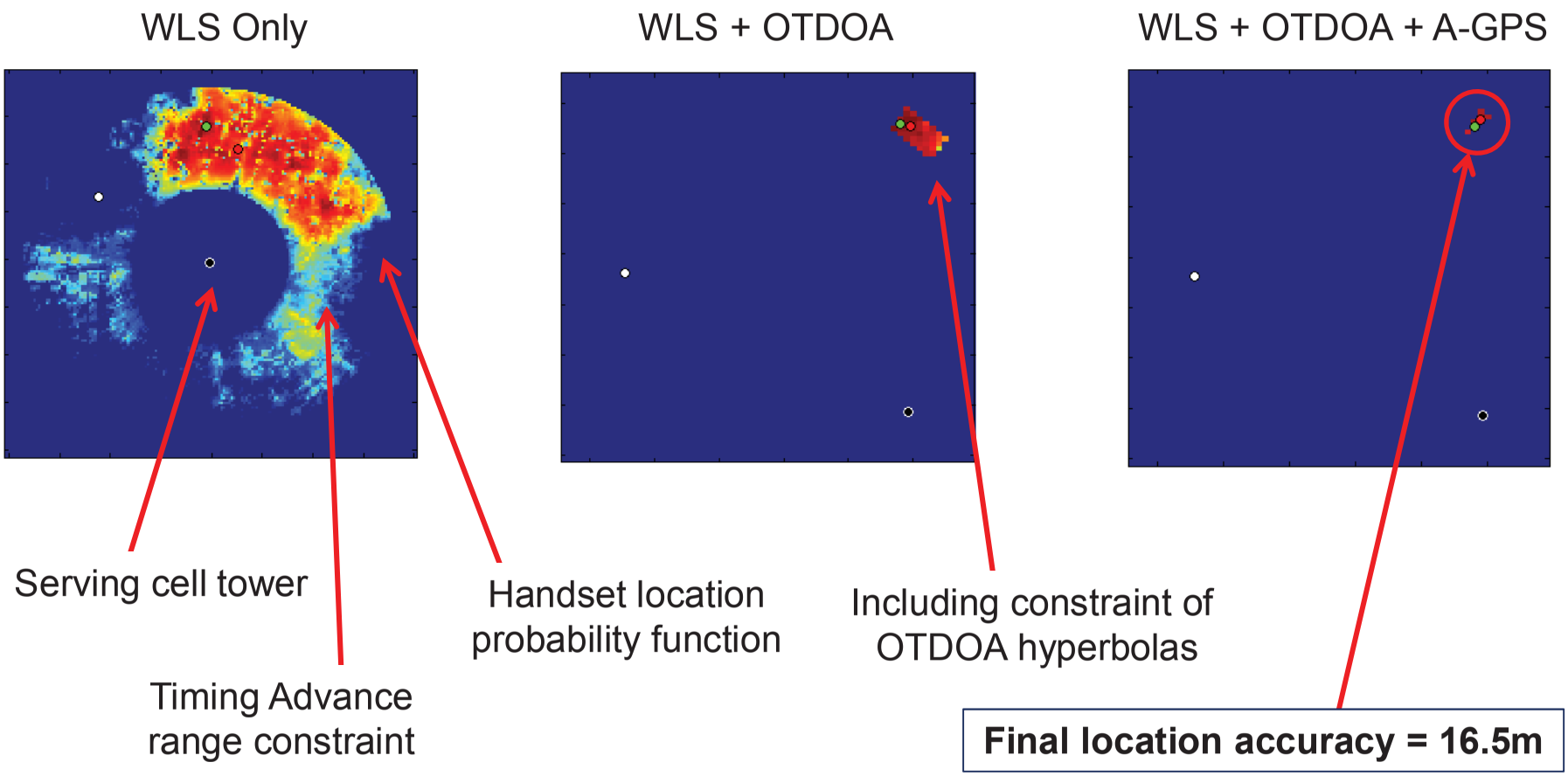
Example Data from Live Measurement Campaign



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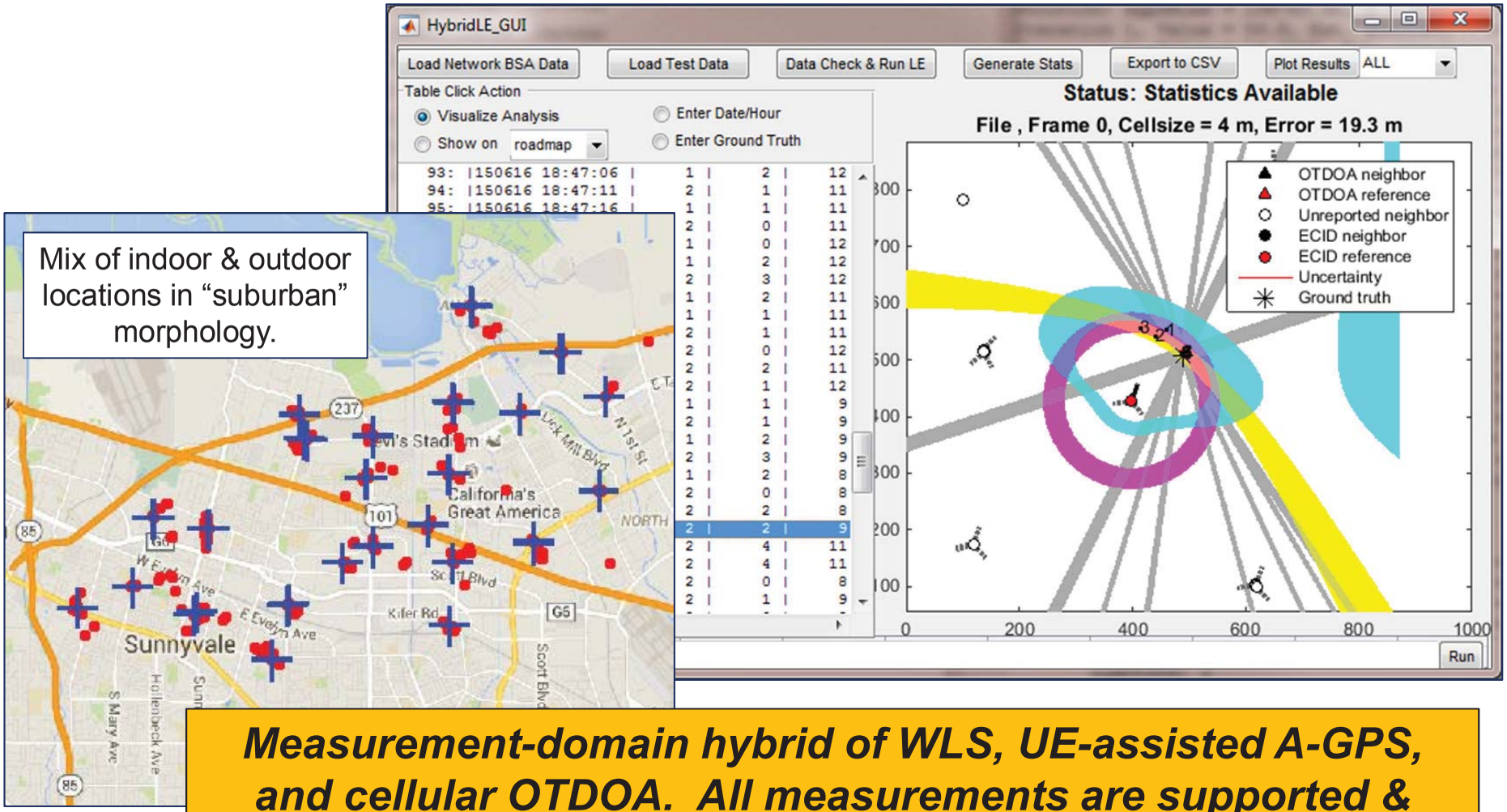
Field Trial Results of Measurement-domain Hybrid



Measurement-domain hybrid of WLS, UE-assisted A-GPS, and cellular OTDOA. All measurements are supported & standards-compliant under LTE release 10+.

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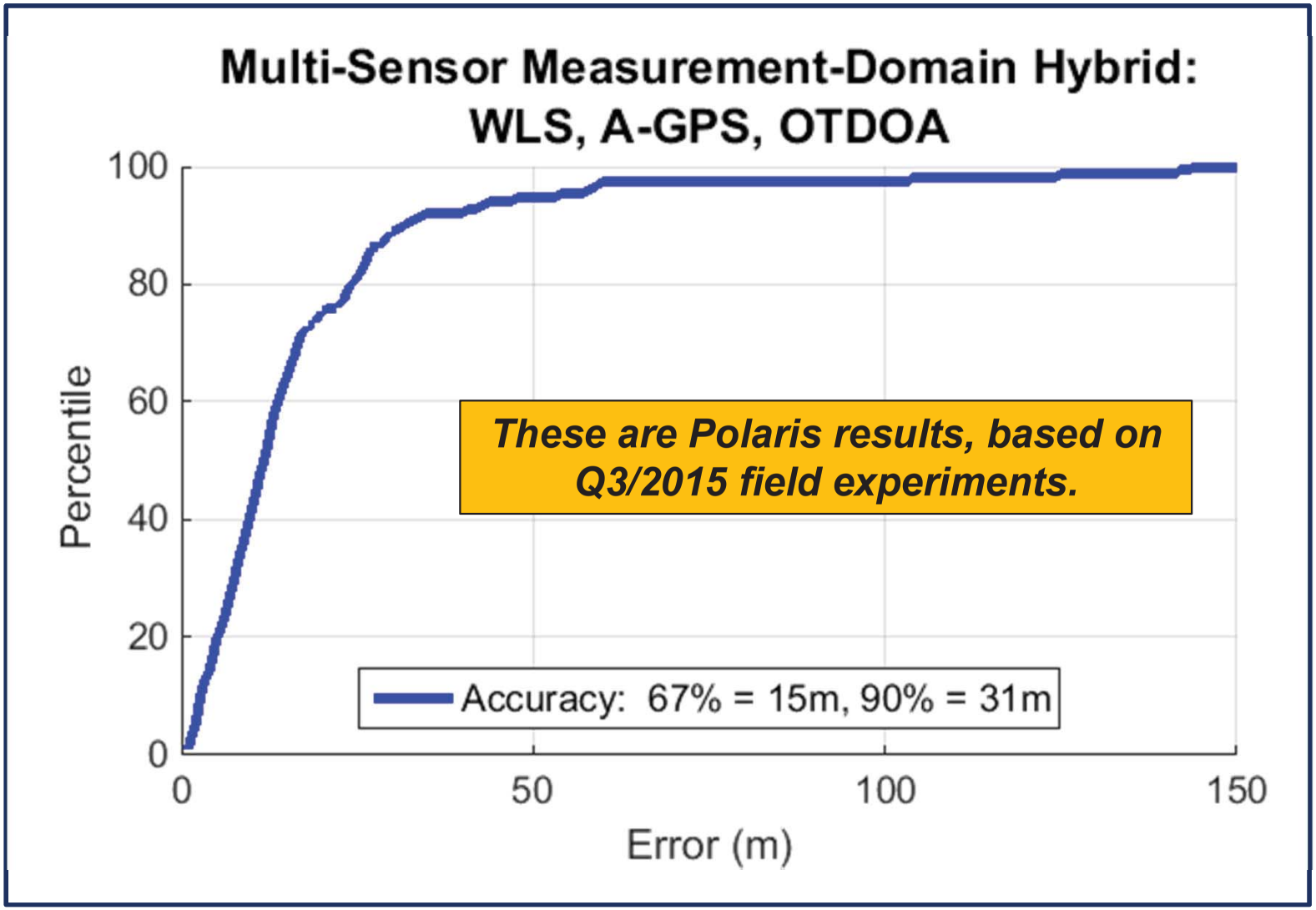
Field Trial Results of Measurement-domain Hybrid



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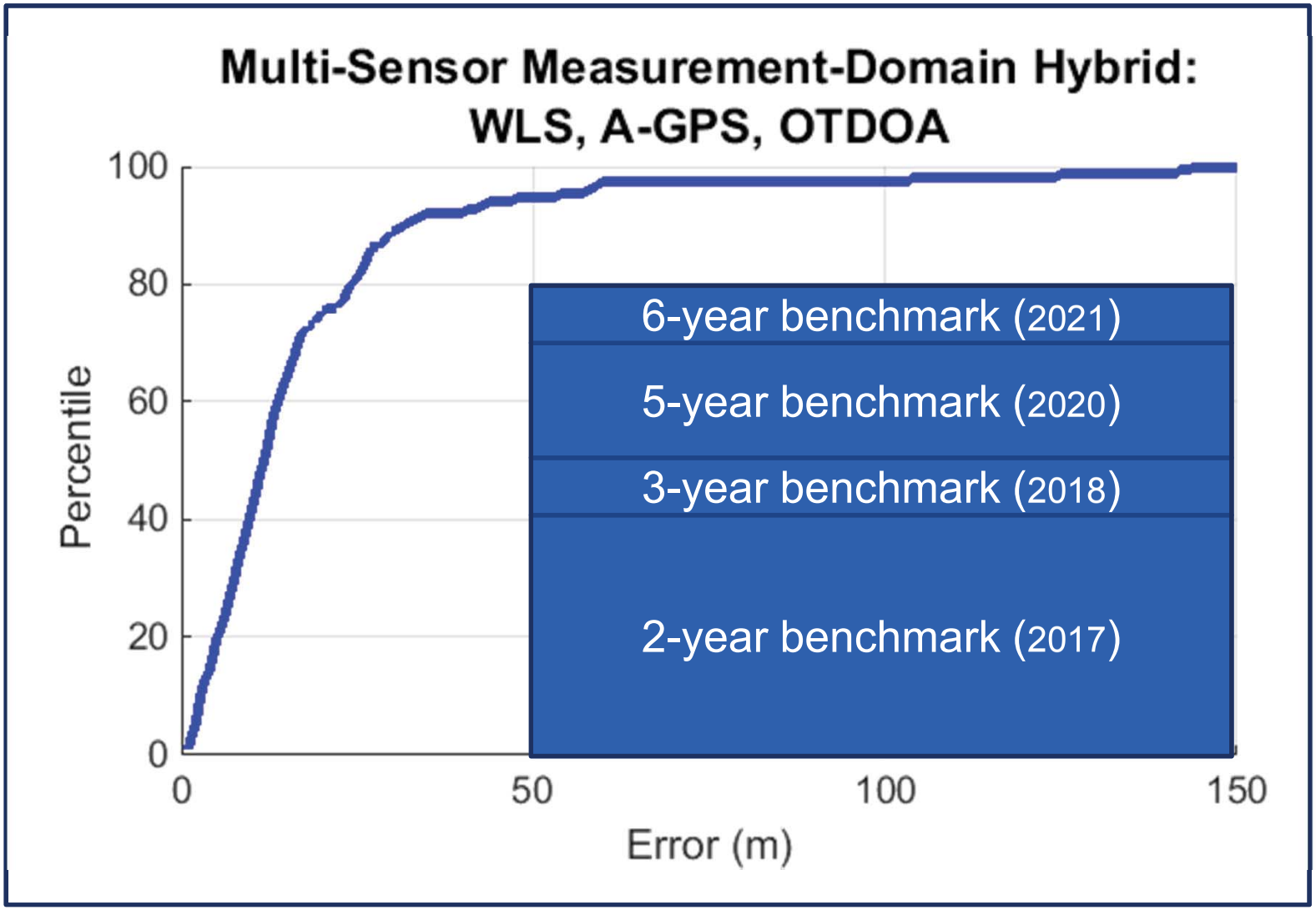
… and the FCC's wireless location accuracy mandate



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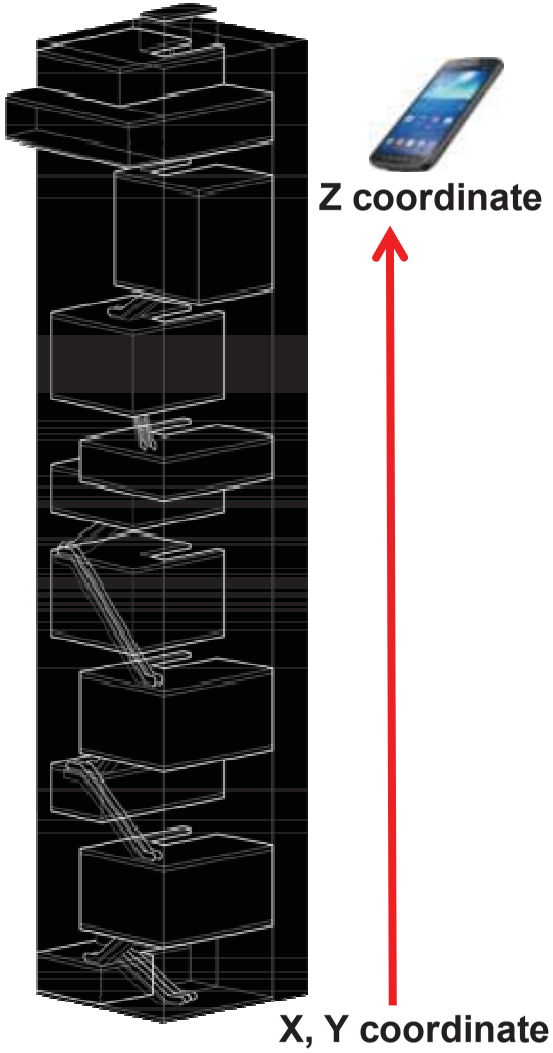
Polaris Wireless – First to Commercialize "Z"

- Today, barometric pressure sensors are a common feature on modern Smartphones
- Polaris Wireless uses software-only compensation models and does ***not*** require specialized hardware or ground stations
- Demonstrated capability to FCC 24 Sept. 2014
- Capability commercialized in Public Safety application
- Live trials completed for local PD's, U.S. Federal agency, and non-U.S. security agency



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Altus Blue Force – Designed for First Responders

Law Enforcement | Search and Rescue | EMS | Fire | Emergency Management

FirstNet®
First Responder Network Authority

Altus Blue Force:

- ✓ Designed from first responder perspective
- ✓ Multi-agency collaboration
- ✓ Real-time situational awareness
- ✓ Smart device application
- ✓ Secure on premise or cloud based
- ✓ Real-time horizontal and vertical location

iOS/Android
smartphone or tablet

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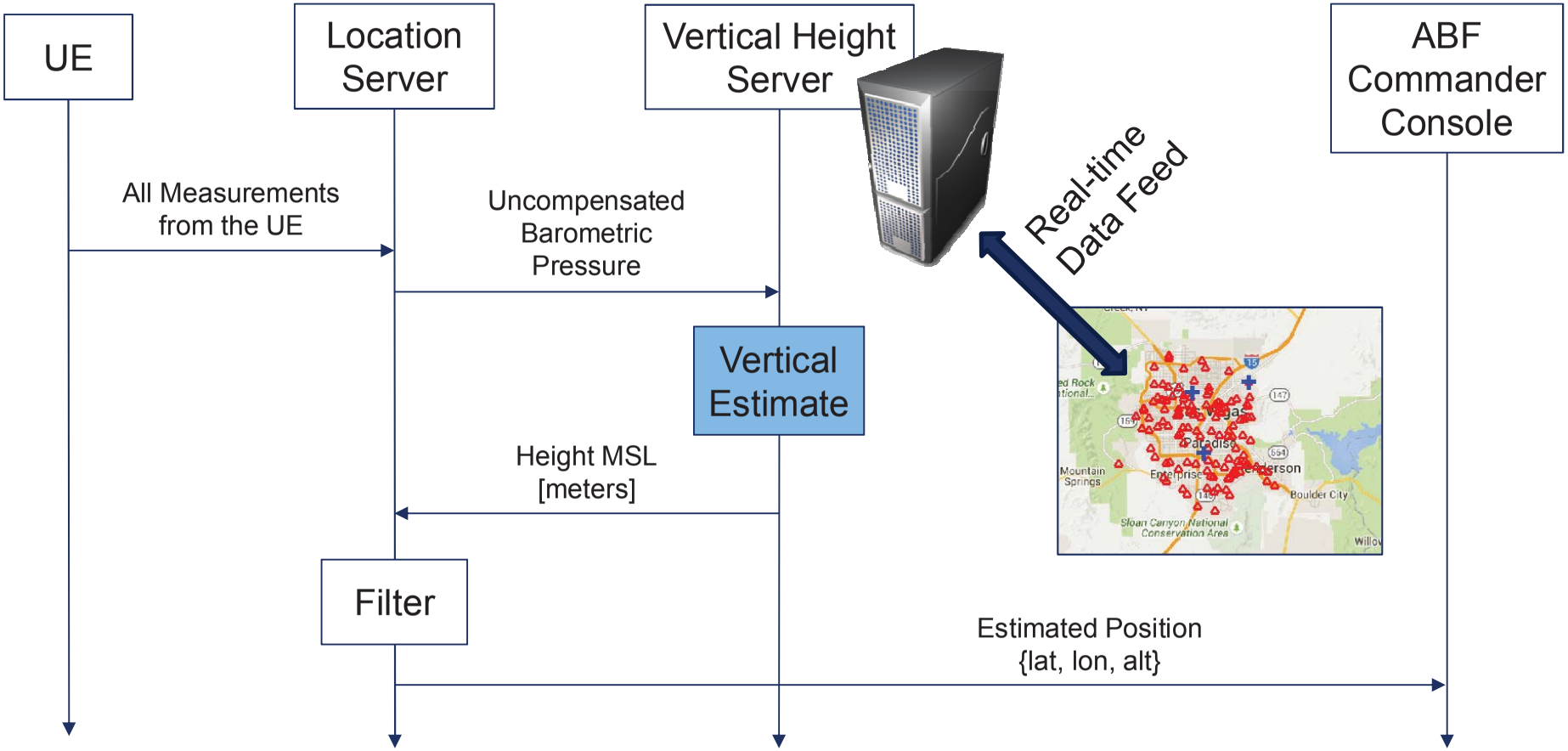
Polaris ABF Vertical Height Estimation Signaling



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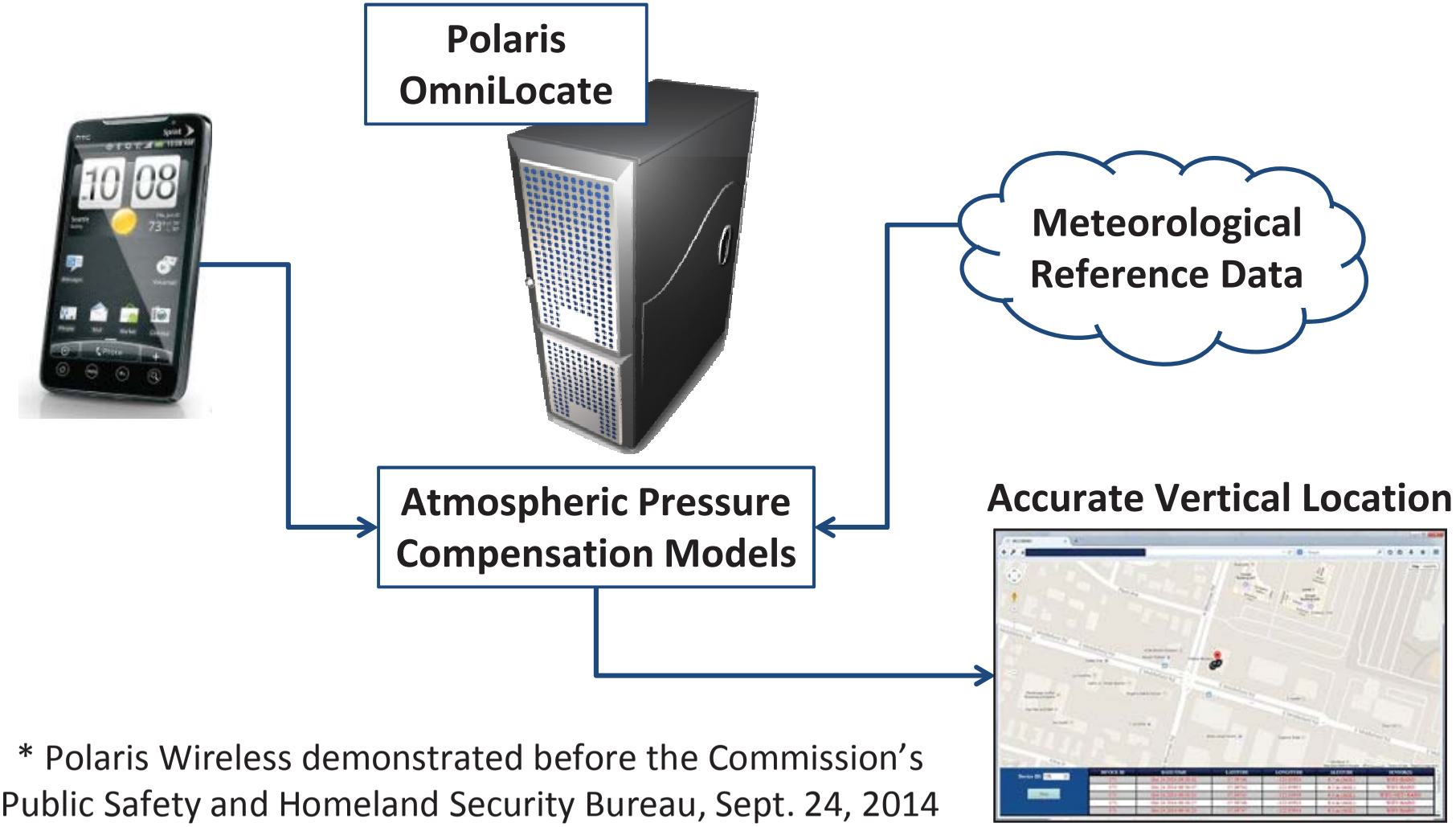
Polaris Has Demonstrated Floor-Level Vertical Estimation



* Polaris Wireless demonstrated before the Commission's Public Safety and Homeland Security Bureau, Sept. 24, 2014

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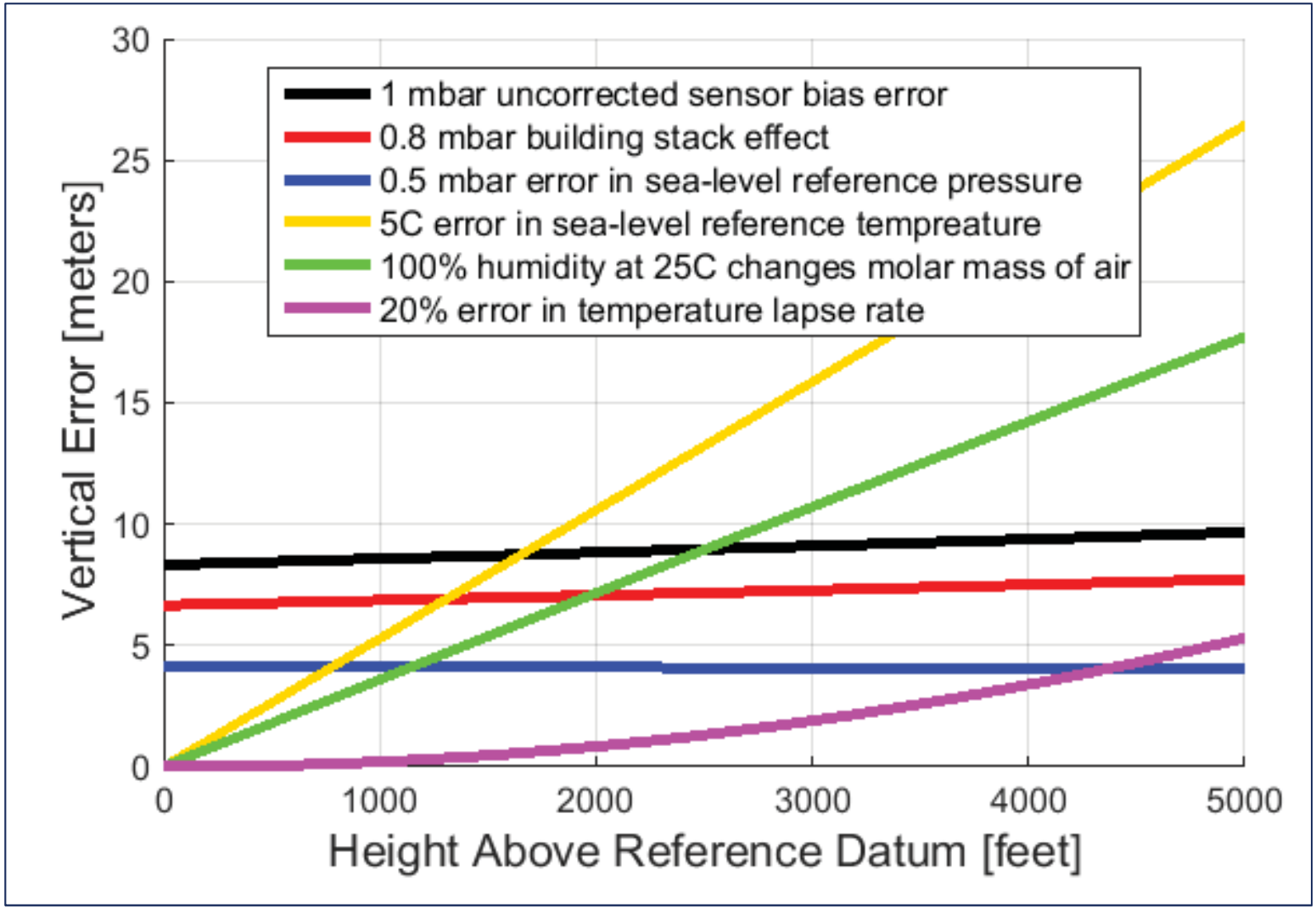
Vertical Errors Sensitivity Study



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Rulemaking Summary

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
)
Wireless E911 Location Accuracy Requirements) PS Docket No. 07-114

FOURTH REPORT AND ORDER

Adopted: January 29, 2015 **Released: February 3, 2015**

Metric	Requirement				
Dispatchable Location or 50m Horizontal Accuracy	Percentage of Calls	40%	50%	70%	80%
	Nationwide carriers	2 yrs	3 yrs	5 yrs	6 yrs
	Regional carriers			6 yrs*	7 yrs*

* Based on regional carrier VoLTE deployment

Certification: Solutions must be tested and validated in an independently-administered location accuracy test bed

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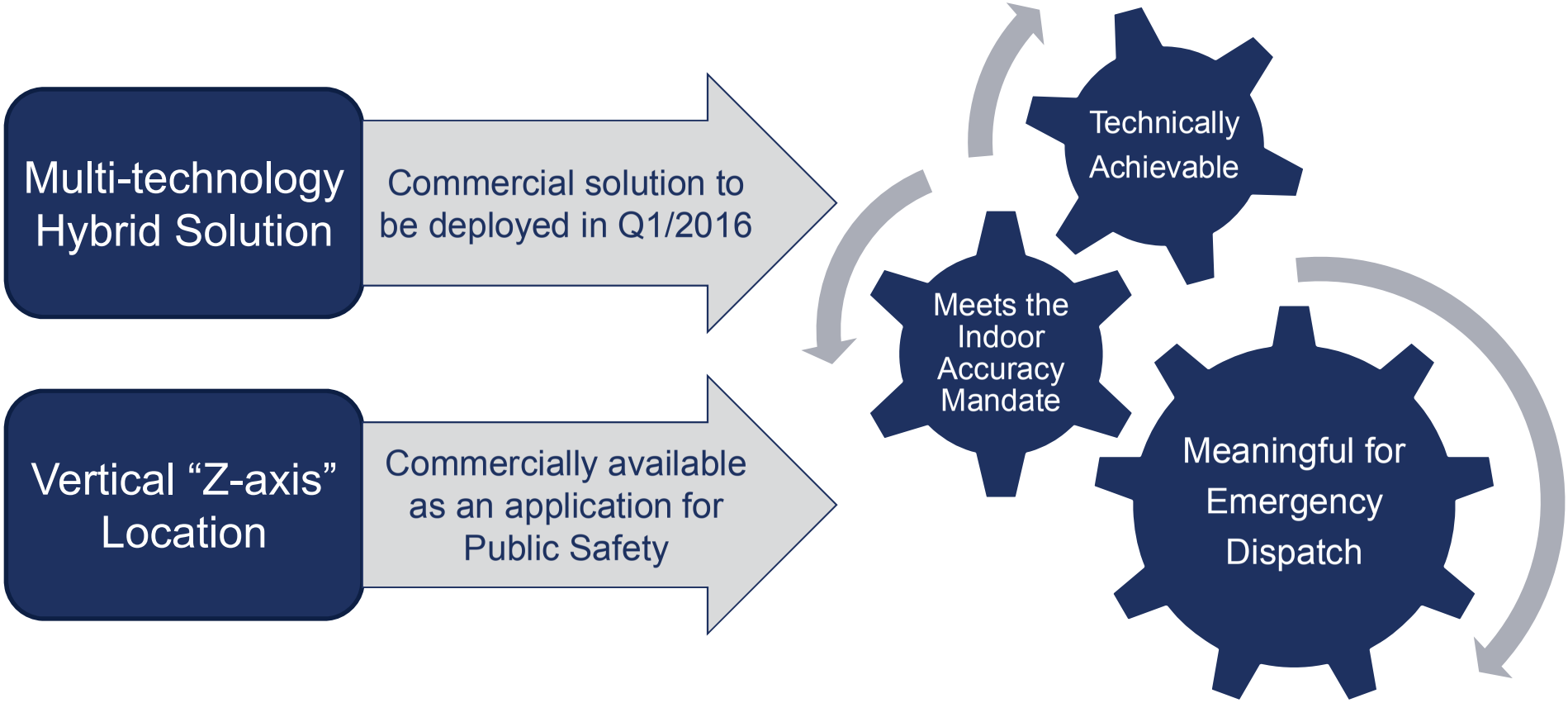
Conclusion



Polaris Wireless will continue to support the Commission's rulemaking process and the work of telecommunications standards bodies

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