Emergency Services

Location-based Services

Location Surveillance

Comments of Polaris Wireless, Inc. before the Federal Communications Commission Workshop on E911 Phase II Location Accuracy

PS Docket No. 07-114

Nov. 18, 2013

The FCC's Phase II Mandate

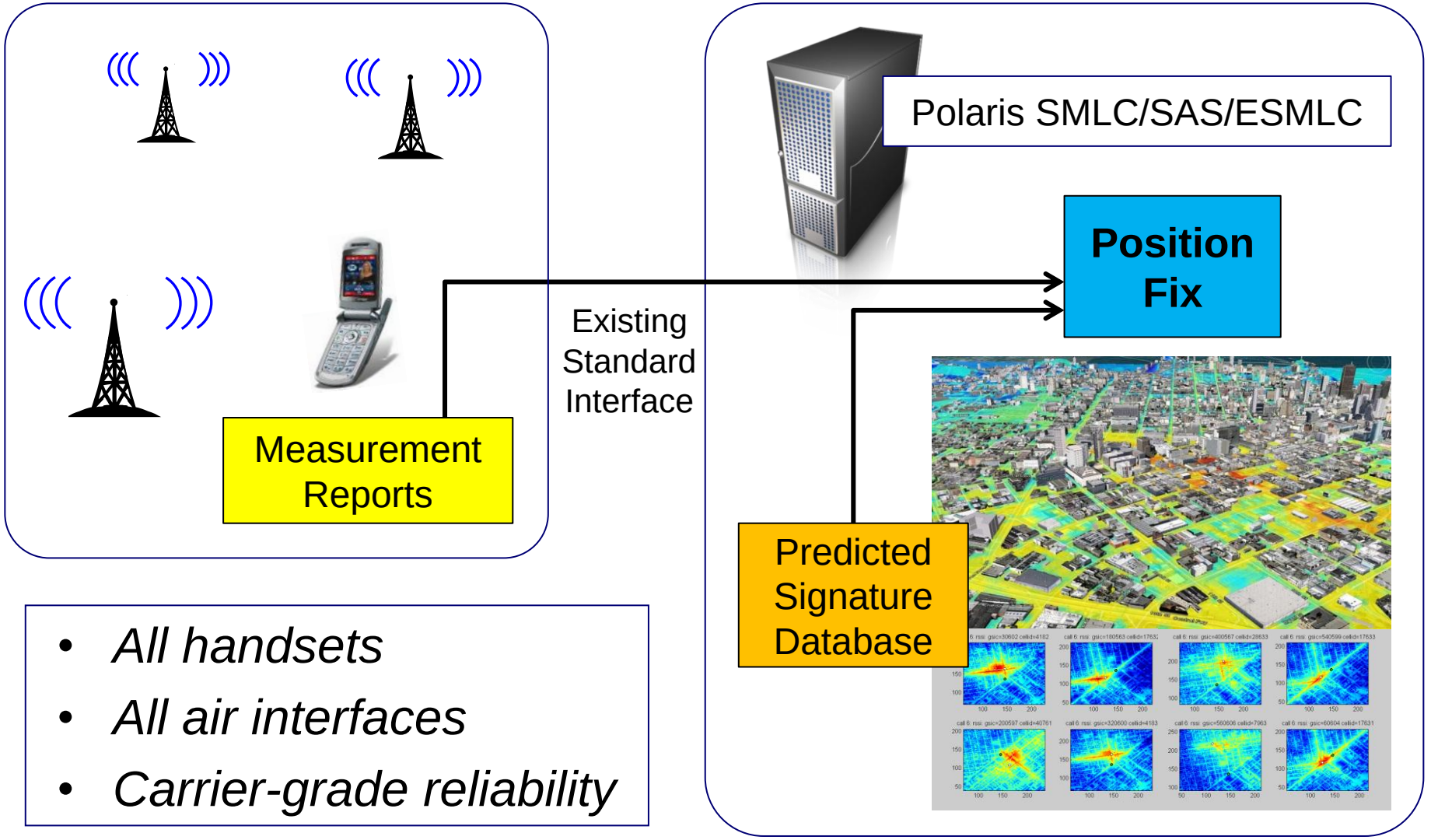
- Wireless Operators and E911 Location Providers take FCC Phase II Performance Very Seriously

  – "… the public expects the dispatcher to know the caller's location … regardless of the device the caller is using."

  – Danita L. Crombach, CALNENA President

- *There are no technological or monetary barriers to achieving the location accuracy and yield requirements in the Commission's Phase II E911 location mandate.*

Polaris' Implementation of 3GPP-standardized RF Pattern Matching



- *All handsets*
- *All air interfaces*
- *Carrier-grade reliability*

Accuracy

Polaris Wireless

Indoor Location Accuracy Performance – Three Years & Beyond

Indoor Environments	67% Accuracy	90% Accuracy	Yield
Dense Urban	50m	150m	100%
Urban			
Suburban			
Rural			
With indoor infrastructure (e.g., DAS antennas)	30m	100m	

Notes:

- System architecture: control plane solution with a hybrid of A-GNSS & Polaris WLS™
- Environment categories are as defined by CSRIC
- Deployment of LTE with O-TDOA measurements will have a positive impact on future indoor accuracy (the 2012 CSRIC test on upper floors was GSM only)
- Increased availability of Inter-RAT measurements and greater density of indoor antennas (e.g., DAS, metro cells, femto cells) will enable improved indoor location accuracy performance

Vertical (Z axis) Accuracy Performance – Three Years & Beyond

Indoor Environments	67% Accuracy	90% Accuracy	Yield
All environment categories: Dense Urban, Urban, Suburban, Rural	<5m	<5m	100%

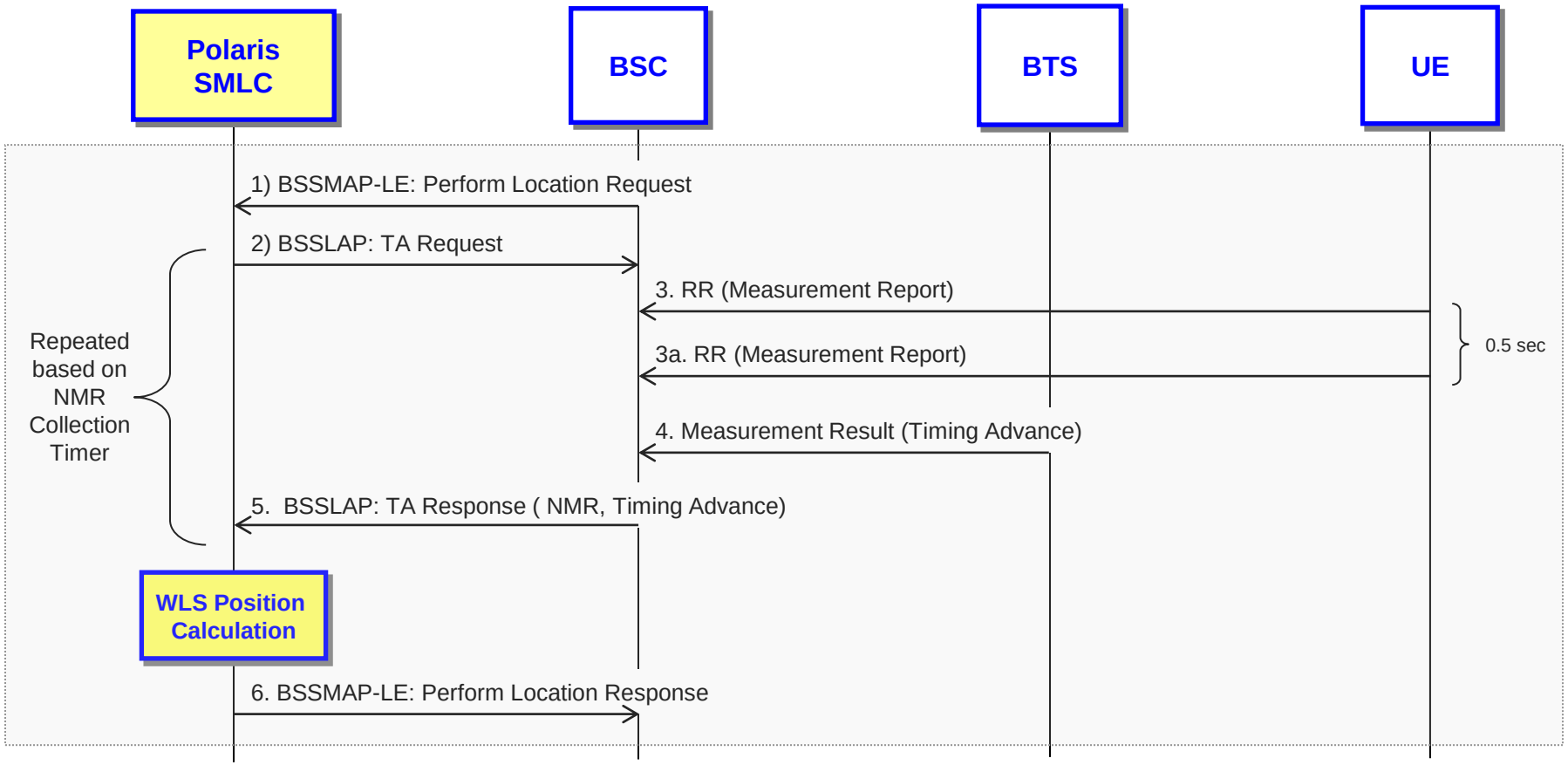
- Projected improvements in vertical location accuracy, over current performance, will be driven by:
  - Higher penetration of indoor antennas, e.g., DAS, metro cells, femto cells etc.
  - Higher penetration of sensors in smart phones, e.g., altimeters etc.
  - Migration to/integration with user plane technologies such as Wi-Fi
  - Further optimization of the hybrid solution, A-GNSS and WLS, to account for multiple satellite constellations will enable improved horizontal & vertical accuracy

- With the projected improvements, Polaris Wireless expects to achieve floor-level vertical location accuracy performance across all indoor environments

Time-to-Fix and Yield

Polaris Wireless

WLS Positioning Call Flow – Example in a GSM Network

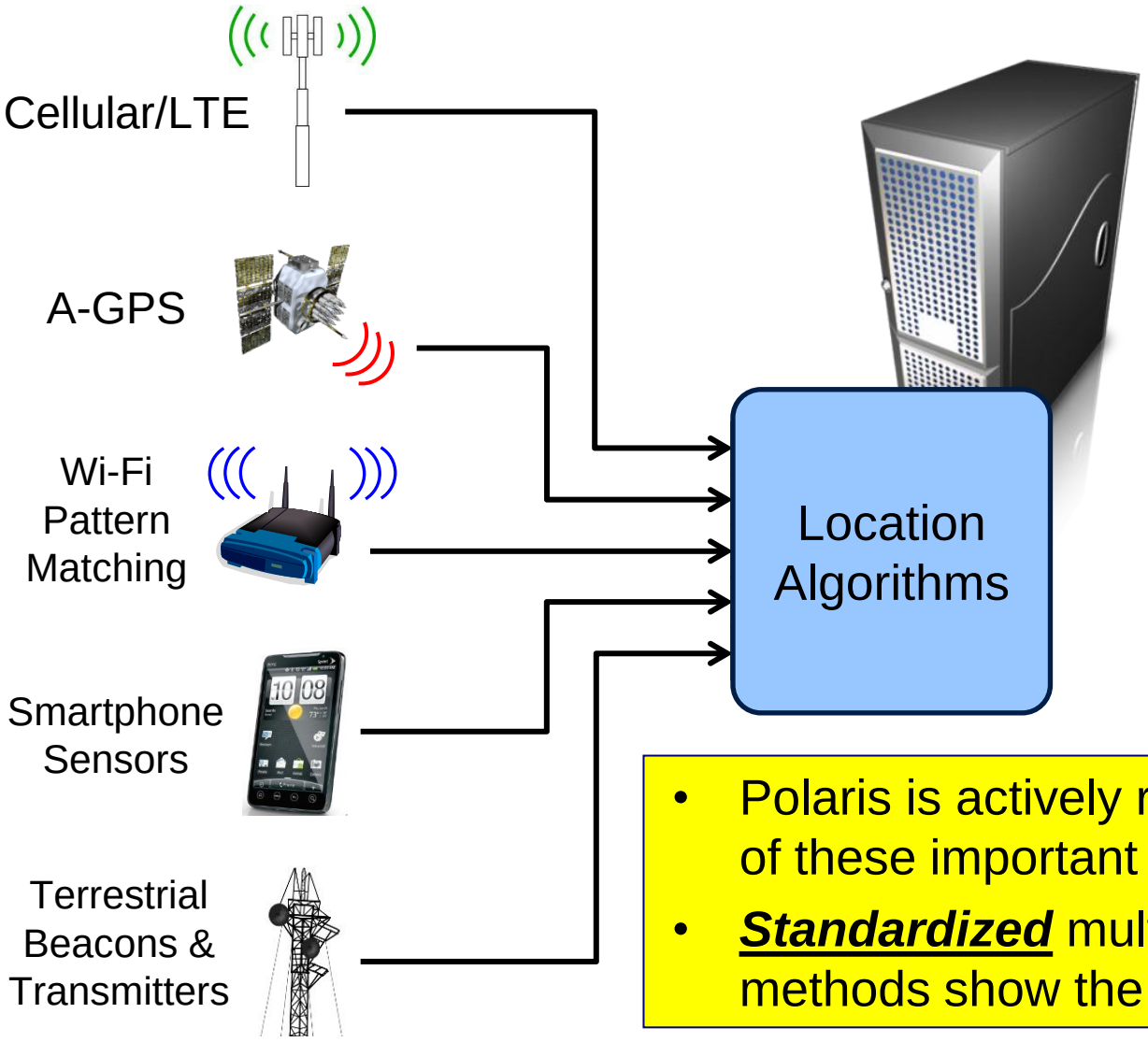


- The `NMR_Collection_Timer` is controlled at the Polaris SMLC, and is ***always*** set to achieve a 30-second response time target.
- Network-based location delivers essentially 100% Phase II yield.

Research Programs at Polaris Wireless

Polaris Wireless

The E911 Location Technology Landscape, 3-5+ years out



- Polaris is actively researching each of these important technologies
- ***Standardized*** multi-sensor hybrid methods show the greatest potential

Example Technologies for E911 Location Data

There are no technological barriers to meeting the FCC's Phase II Location Accuracy Mandate

3GPP-standardized RF Pattern Matching

A-GPS & A-GNSS

Overlay networks to sniff handset uplink signals

Wi-Fi and other user-plane technologies

Overlay networks of terrestrial beacon transmitters

Conclusion

- Wireless operators and E911 location providers take FCC Phase II location accuracy performance very seriously
- Polaris' implementation of 3GPP-standardized RF pattern matching will achieve 50m accuracy at the 67th percentile across all environments with <30-sec TTF and 100% yield in the 3-year timeframe
- Polaris and the wireless location industry have a number of new technologies under development; our experience shows that standardized multi-sensor hybrid methods have the greatest potential

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