

July 14, 2010

By Electronic Filing

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

**Re: Ex Parte Presentations of Polaris Wireless, Inc.
PS Docket No. 07-114 and CC Docket No. 94-102**

Dear Ms. Dortch:

On July 13, 2010, Polaris Wireless, Inc. ("Polaris") representatives Martin Feuerstein, Chief Technology Officer for Polaris, and the undersigned met with Jeff Cohen, Patrick Donovan, Eric Ehrenreich, Aaron Garza, David Siehl, Brian Butler, and Zenji Nakazawa of the FCC's Public Safety and Homeland Security Bureau; Walter Johnston and James Miller of the FCC's Office of Engineering and Technology; and Tom Derenge of the FCC's Wireless Telecommunications Bureau regarding the above-referenced proceeding. Separately, Polaris also met with Charles Mathias, legal advisor to Commissioner Meredith Baker, and John Giusti, chief of staff and legal advisor to Commissioner Michael Copps.

During these meetings, Polaris distributed the attached presentation regarding recent wireless E911 developments and options for improving urban and indoor accuracy, noted the challenges that some wireless carriers operating in predominantly rural areas will have in meeting the proposed E911 county-level accuracy standard, and responded to questions about its Wireless Location Signatures ("WLS") and hybrid technology.

Pursuant to Section 1.1206(b)(2) of the Commission's rules, I am filing this notice electronically in the above-referenced dockets. Please contact me directly with any questions.

Respectfully submitted,

/s/ Michele C. Farquhar

Michele C. Farquhar
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Enclosures

cc: John Giusti
Charles Mathias
Jeff Cohen
Patrick Donovan
Eric Ehrenreich
Aaron Garza
David Siehl
Brian Butler
Zenji Nakazawa
Walter Johnston
James Miller
Tom Derenge



The Power of Signatures

Global Leader for High Accuracy Wireless Location Systems

About Polaris

Customers

US (23 Operators), APAC (3G), EMEA (2G/3G)

- Over 10 years in industry with location technology as core focus
- Emergency Services Customers: 23 US operators for E911 Phase II
- Government Customers: law enforcement agencies in APAC & EMEA
- Highly experienced R&D, management team
- IPR - 50 patents filed, 20 granted
- Headquarters in Santa Clara, California
- Satellite offices around the world



<http://www.polariswireless.com>

Software-Based Location Solution



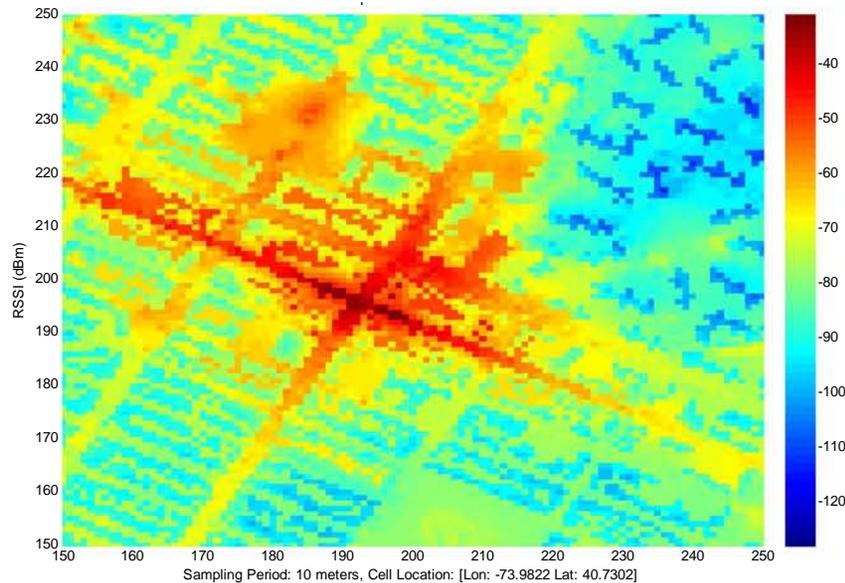
Wireless Location Signatures (WLS)

RF Pattern Matching Technology

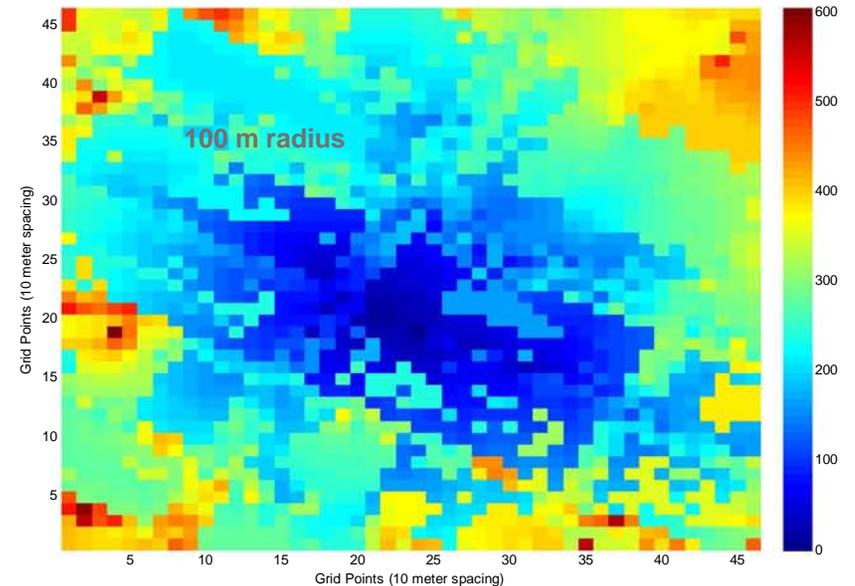
No Phone Changes & No New Hardware on Cell Towers

Why RF Pattern Matching

- Signatures based on standard radio network measurements (signal strengths, signal-to-interference ratios, time delays, etc.)
- Pattern match against a predicted signature database
- Signal strength and time delay maps possess significant local structure
- Captures shadowing and non-line-of-sight effects
- Models indoor/outdoor conditions not addressed in other methods



Example Signal Strength Map



Example Time Delay Map

Wireless Location Signatures (WLS) Accuracy

Tokyo



WLS Indoor Accuracy
UMTS
<60m, 67% of cases
5 second fix time

Toronto



WLS Urban Accuracy
UMTS
<50m, 69% of cases
<150m, 96% of cases

New York City



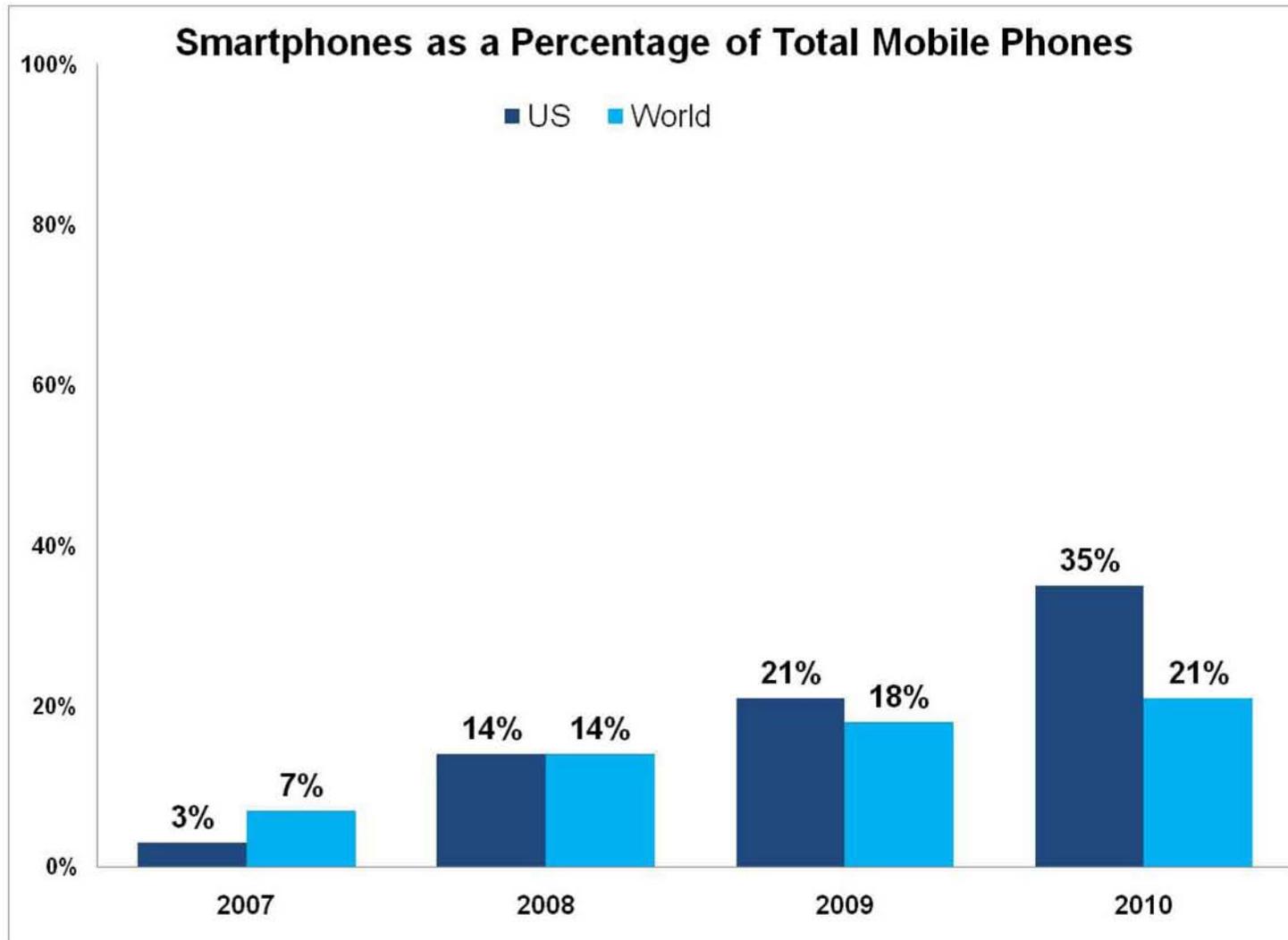
WLS Urban Accuracy
iDEN
<50m, 74% of cases
<150m, 99% of cases

San Francisco



WLS Urban Accuracy
GSM
<44m, 67% of cases
<135m, 95% of cases

Smartphones – US & World Markets

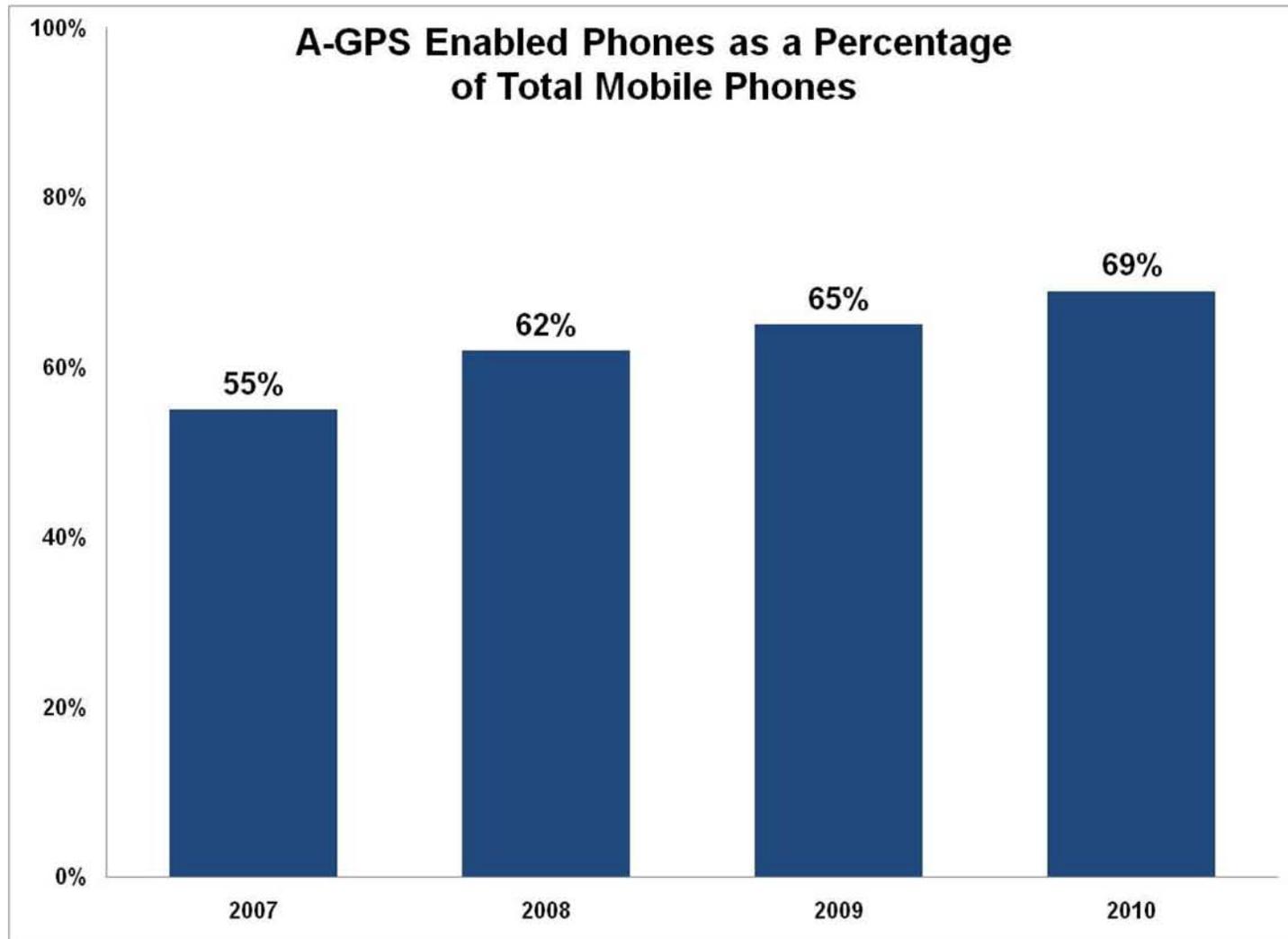


Smartphone Penetration is Increasing, but it is Not a Mass Market yet!

Source: Nielsen Mobile, Frost & Sullivan

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A-GPS Enabled Phones – US Market

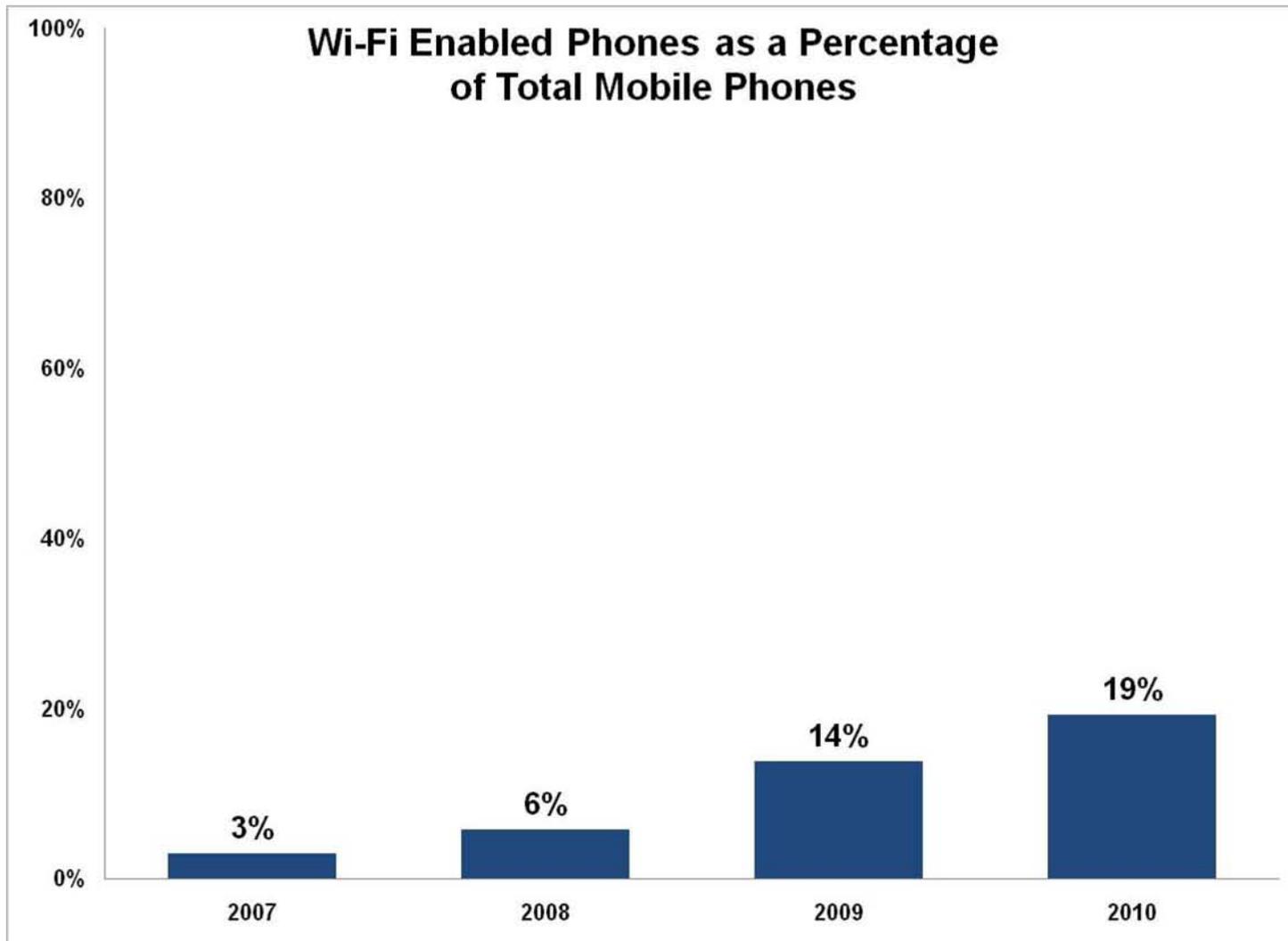


After 8 years since its introduction in the US, A-GPS has still not completely penetrated the market

Source: Frost & Sullivan

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Wi-Fi Enabled Phones – US Market



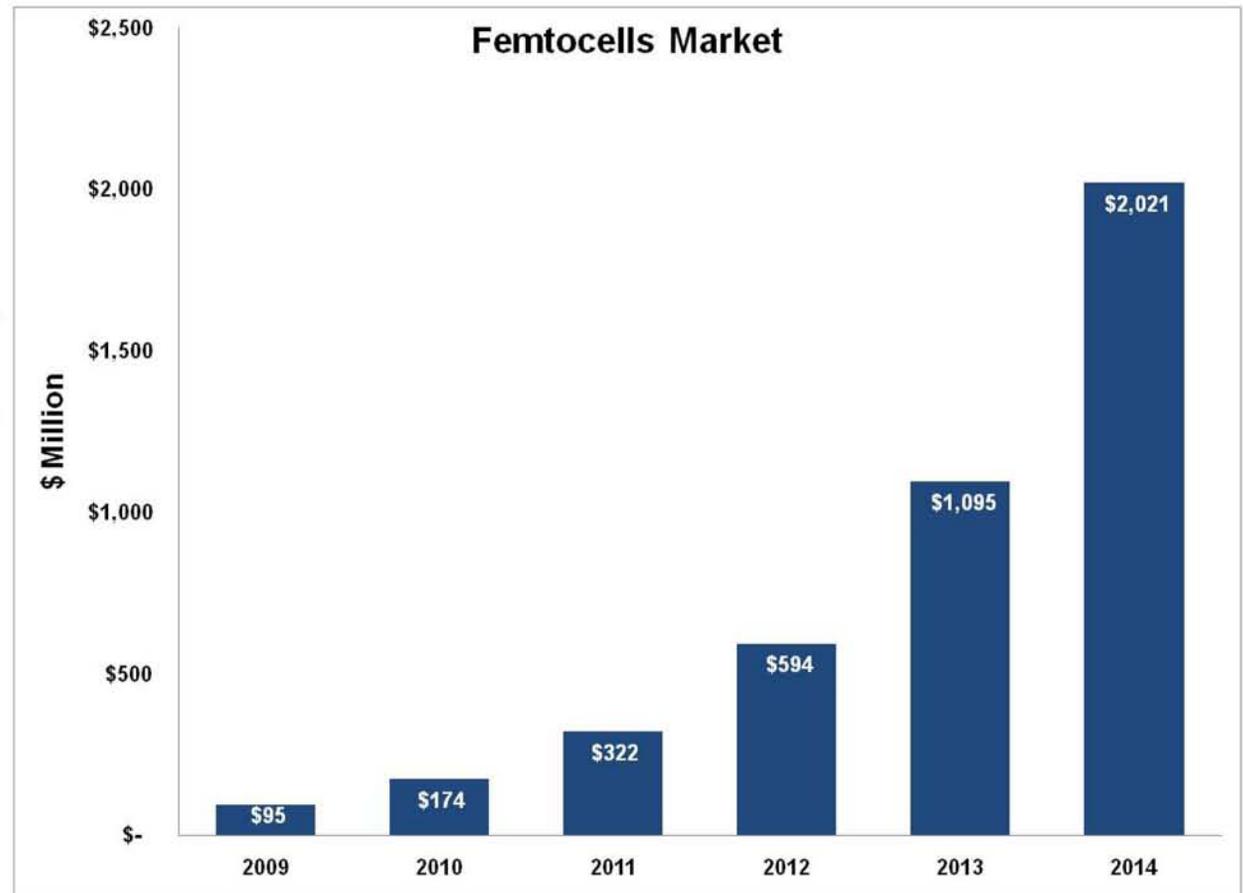
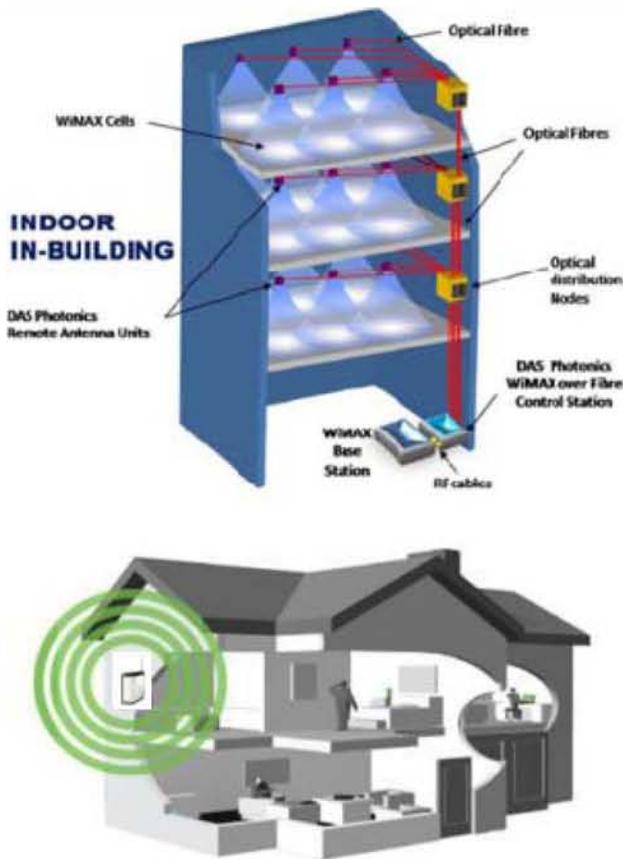
Wi-Fi Enabled Phones Have A Long Way To Go

Source: Coda Research, Frost & Sullivan

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Coverage Trends – US Market

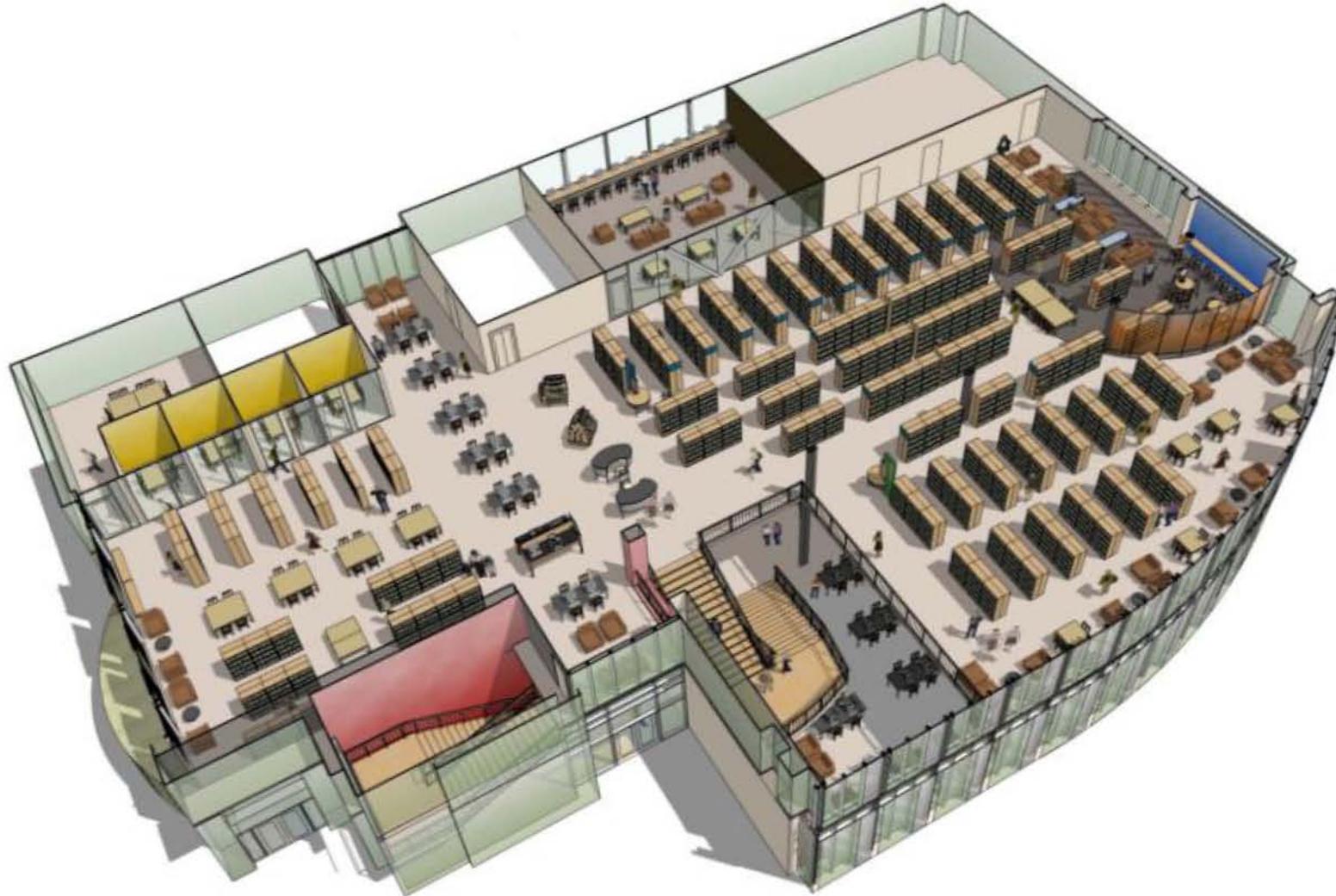
DAS & Femtocells



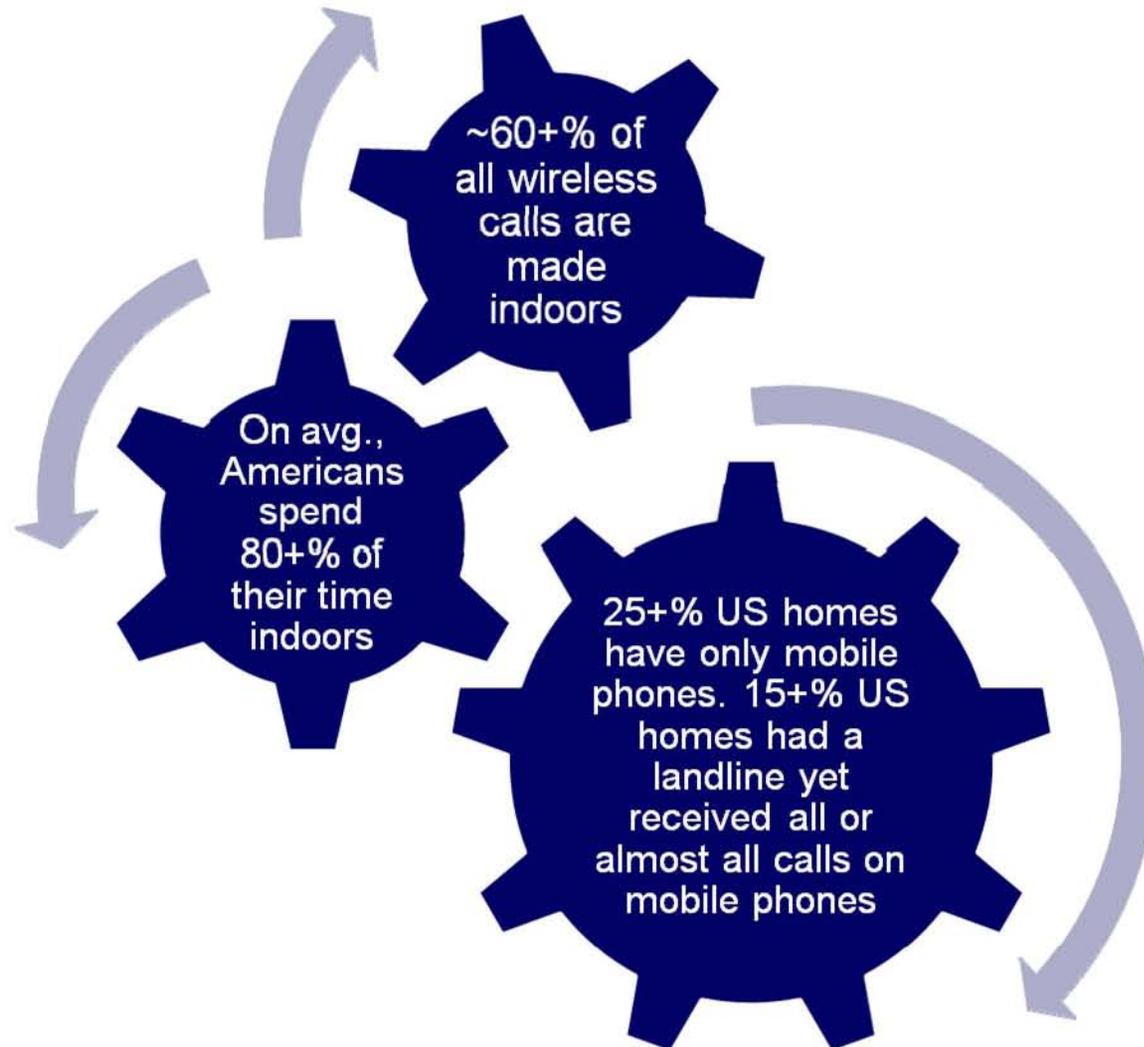
Denser Networks → Higher Location Accuracy

Source: Markets & Markets

The Challenge of Indoor Location



Key Drivers for Indoor Location



Indoor location will become more and more important in the future

Source: epa.gov, cdc.gov, J.D. Power

Licensed vs. Unlicensed Bands

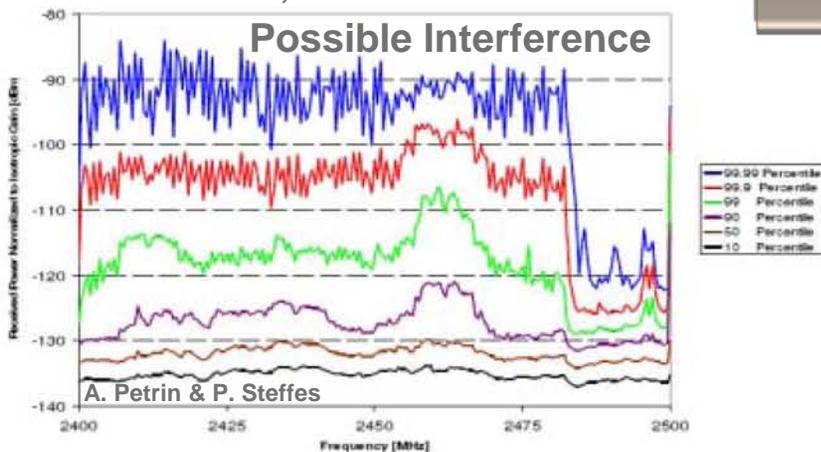
Licensed (Cellular, PCS)

- Planned, managed, wide area networks

Unlicensed (2.4 GHz Wi-Fi)

- Unplanned, unmanaged, local networks
- Dynamic, unpredictable changes
- Uncontrolled interference (microwave ovens, Bluetooth, cordless phones)

2.4 GHz Industrial, Scientific & Medical Band



Mobile Hotspots



Phone Hotspots

Future Vehicle Hotspots

Wi-Fi Positioning Systems

- ▶ Wi-Fi is a local-area, unlicensed-band, unplanned, unmanaged, dynamic network
- ▶ Wi-Fi Access Point (AP) database must be mapped from war driving or crowd sourcing
- ▶ AP database validity ages over time → accuracy, yield and reliability continually degrade
- ▶ War driving to measure database does not capture many indoor APs (a common scenario)

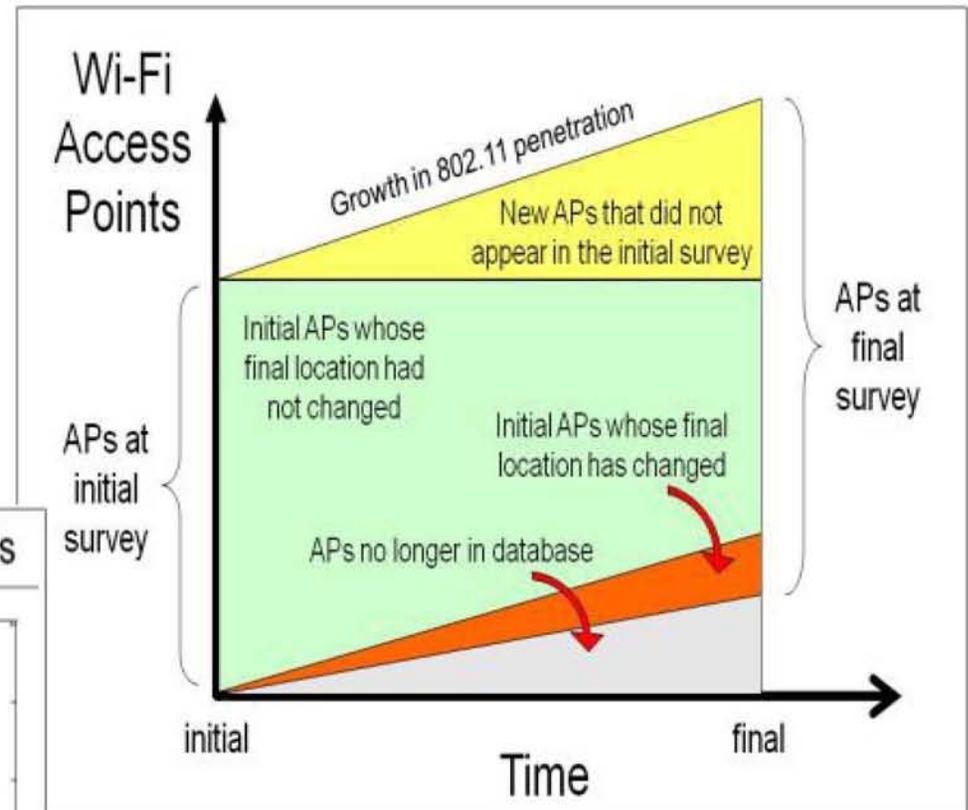
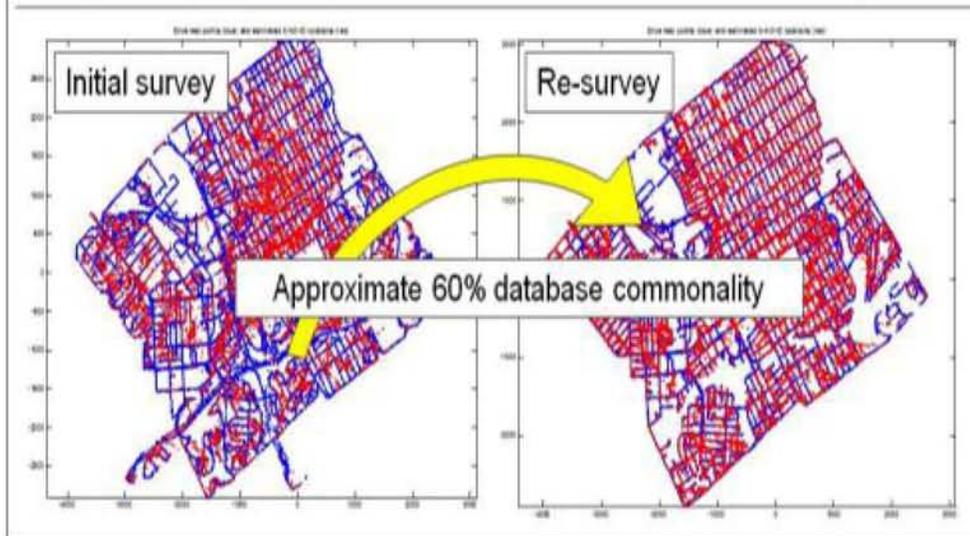


Wi-Fi Location Dead Zones Indoors → Poor Yield

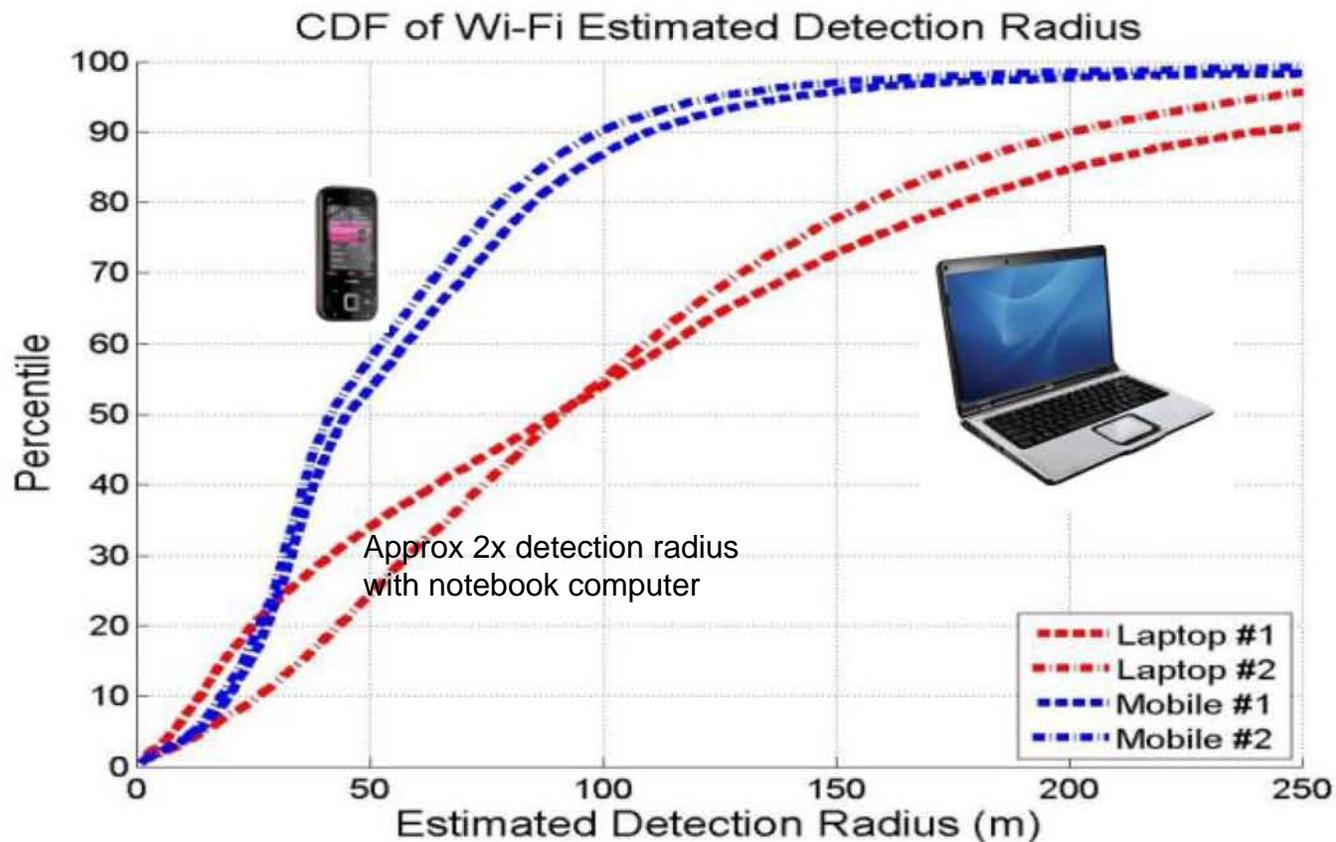
Wi-Fi Access Point Database Aging: Chasing an Ever Changing Network



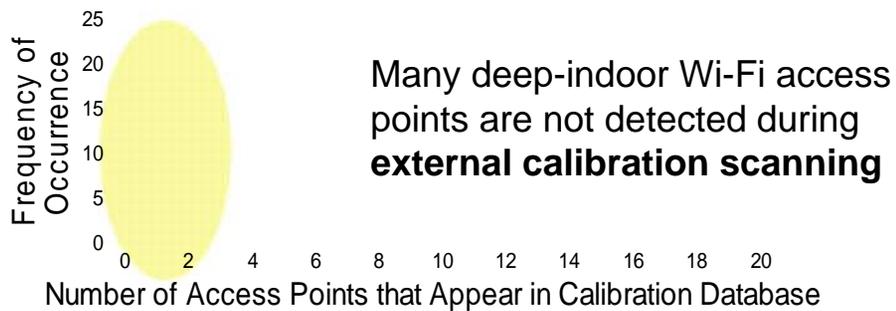
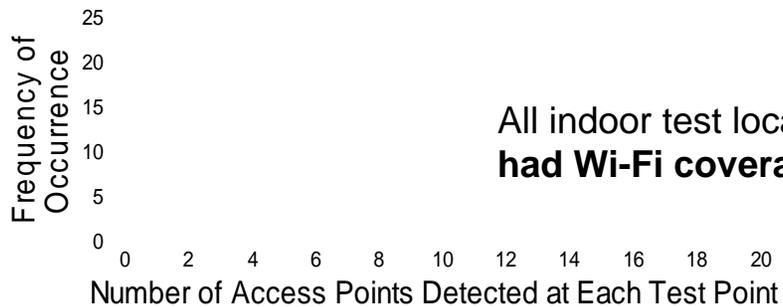
Depletion, addition, and movement of Wi-Fi access points



Laptops Far More Sensitive to Wi-Fi Signals Compared to Mobile Handsets

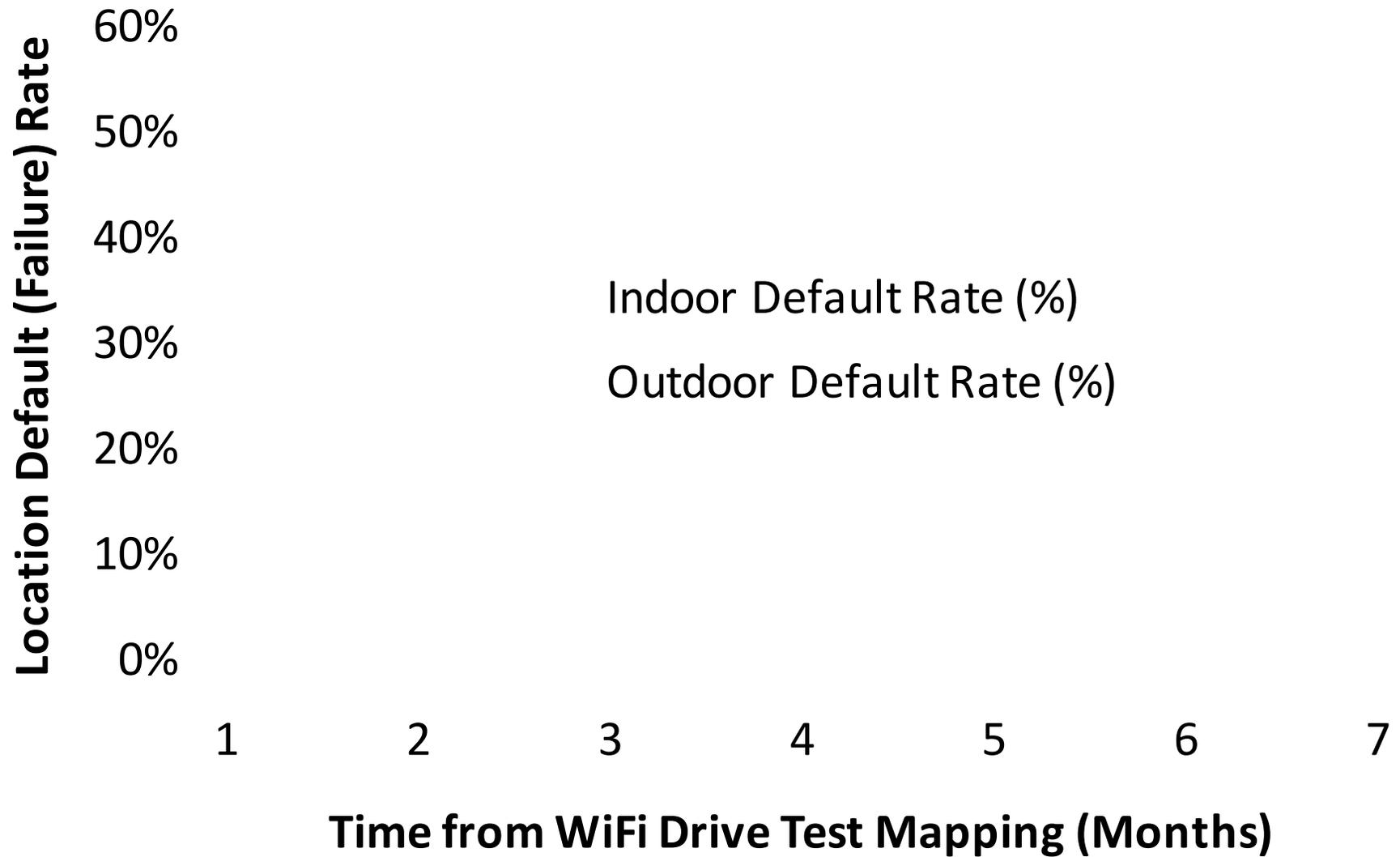


Wi-Fi Alone Has Indoor Dead-Zones: Does Not Solve The Indoor Problem



- Wi-Fi location alone has challenges deep indoors where only unmapped Access Points can be measured
- Need to hybrid combine with cellular signals (and GPS) for demanding applications, such as E911 emergency calls

Wi-Fi Database Aging



Bluetooth Positioning Systems

- ▶ Bluetooth is not a network, it is a personal area system
- ▶ Modules are transient and portable (e.g. wireless headsets, mouse, speakers) without fixed locations
- ▶ Tags can be manually deployed in specific buildings for a proprietary location system
- ▶ Accuracy may be good in the manually deployed buildings but **no** fixes elsewhere



Major Issues with Scalability and Yield

The Solution: Hybrid Systems



A-GPS

- Excellent outdoor accuracy

- Poor indoor accuracy
- Slow Time to Fix (TTF)
- High battery consumption
- Moderate accuracy in dense urban areas



Hybrid algorithms can optimize accuracy, time to fix and battery consumption based on application's Quality of Service needs

WLS (Cellular, WiFi)

- Robust indoor performance
- Fast Time to Fix (TTF)
- Low battery consumption
- High accuracy in dense urban areas

- Poor accuracy in sparse areas



The Comparison

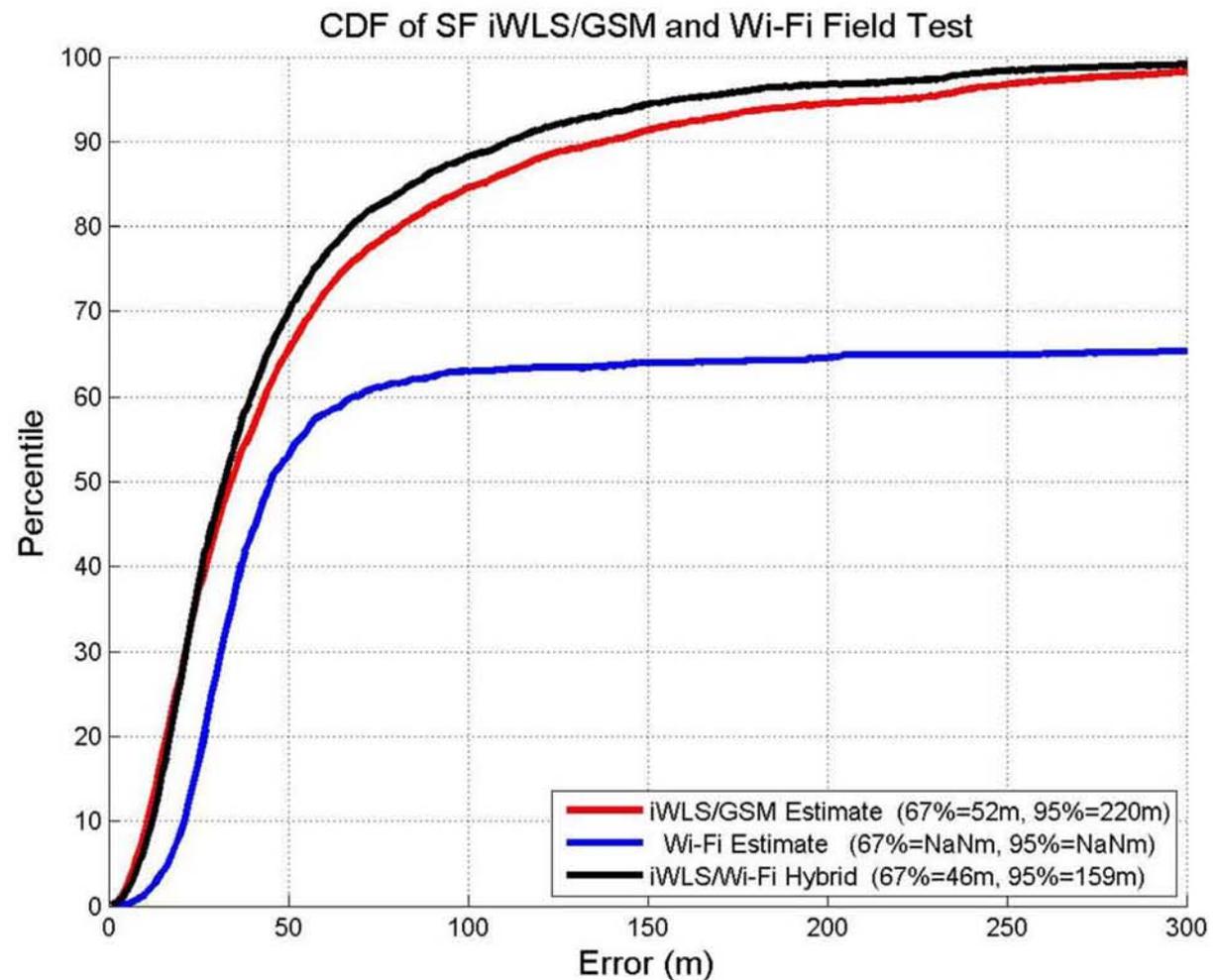


	Accuracy	Latency (Time to Fix)	Reliability	Battery Drain
ECID CID	Poor	Low	Poor	Low
A-GPS	Excellent, except indoors	High	Good	High
WLS	Good, except rural	Low	Good	Low
Wi-Fi	Good, where mapped AP's are detected	Low	Poor	High
Bluetooth	Good, only where manually deployed	Low	Poor outside manually deployed areas	Moderate

Hybrid Indoor Positioning Systems: WLS Cellular + Wi-Fi

Indoor Scenario:

- Wi-Fi yield is poor deep indoors
- WLS with cellular (GSM) signals performs well alone
- When Wi-Fi can get a fix, the information is useful in hybrid combination with cellular
- Hybrid makes use of all available information to improve accuracy and reliability



Summary

- ≠ A-GPS is not a viable indoor location solution since it falls back to low accuracy location solutions such as Cell ID/Enhanced Cell ID
- ≠ Wi-Fi penetration in mobile devices is low, accuracy performance is highly unreliable and does not function in deep indoor environments → not a viable indoor location solution
- ✓ Network-based solutions such as Polaris WLS provide the accuracy, reliability and ubiquity for mass market indoor applications
- ✓ Hybrid approaches provide consistent performance across the range of environments

