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March 21, 2013

BY ELECTRONIC DELIVERY

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

Re: Progeny LMS, LLC
Permitted Oral *Ex Parte* Presentation
WT Docket No. 11-49

Dear Ms. Dortch:

On March 19, 2013, representatives of affiliated companies, NextNav, LLC and Progeny LMS, LLC ("Progeny") met in separate meetings with Commissioner Ajit Pai and his Legal Advisor, Nicholas Degani; Erin McGrath, Legal Advisor to Commissioner McDowell; and David Goldman, Senior Legal Advisor to Commissioner Rosenworcel. Attending the meetings on behalf of Progeny were Gary Parsons, CEO of Progeny, Ganesh Pattabiraman, President of Progeny, and the undersigned.

The meetings were focused primarily on the very impressive results of indoor position location tests that were recently released by Working Group 3 of the Commission's Communications Security, Reliability and Interoperability Council III ("CSRIC"). Despite the very challenging test conditions, Progeny's location technology delivered an indoor position fix that was significantly and consistently more accurate than other available technologies, reducing first responder search rings on average by 90% and identifying the test location either in or adjacent to the target building in more than 80 percent of the tests conducted. Progeny's service was also the only technology able to demonstrate very precise vertical accuracy across all locations, with a median accuracy of 2 meters (essentially "floor level"), even in large multistory buildings. These combined results document the significant ability of Progeny's service to assist public safety by dramatically reducing search rings for E911 wireless callers in indoor locations, including challenging urban, multistory structures.

Progeny's E911 location service responds directly to the needs of the public safety community. The Part 15 Coalition, however, claims in a letter filed on this date that the CSRIC test report found that "none of the systems tested, including Progeny's, provides E911 location accuracy anywhere near the level required by public safety."[1] The Coalition's claim is contradicted directly by the Forward to the report that was prepared by the public safety members of CSRIC Working Group 3. The public safety representatives explained that:

> Public Safety desires reliable and consistent caller location information to a specific dispatch-able building (and floor in multi-story environments**).** *Lacking the specific building and floor, the desire would be for the smallest possible search ring,* but still with the underlying requirement for confidence in the reliability and consistency of the data…
>
> …the current results involving [Progeny] demonstrate the ability to achieve improved search rings in the horizontal dimension (often identifying the target building, or those immediately adjacent). Substantial progress in the vertical dimension (67th percentile of 2.9 meters, or approximate floor level accuracy) was also demonstrated by [Progeny] through the use of locally calibrated barometric pressure sensors in the handset. *The availability of such functionality would be an important factor in locating indoor callers in urban and dense urban multistory buildings.*[2]

In other words, although the public safety community still desires even more accurate indoor location capabilities, including the ability to identify consistently the correct building location of an individual in distress, the highly accurate location capabilities presented by Progeny's service represent a vast and valuable improvement over both the status quo and other available technologies. As the public safety community notes, these capabilities could greatly assist emergency first responders in saving lives and in ensuring their own safety in hazardous environments. Therefore, the public interest would be disserved by any further delay in authorizing Progeny to begin providing its location service to the public safety community and to the public.

The Part 15 Coalition further argues that no urgency exists in making Progeny's service available to support emergency first responders because Progeny as well as other technology providers are developing improved location service capabilities and further CSRIC testing may

[1] *See* Letter from Laura Stefani, Counsel for the Part 15 Coalition to Marlene H. Dortch, Secretary, Federal Communications Commission, Ex Parte Notice, WT Docket No. 11-49, at 2 (March 21, 2013) ("*Part 15 Letter*").

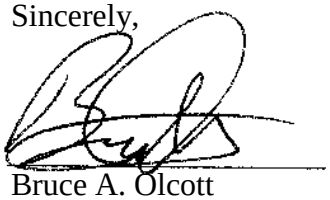
[2] *Indoor Location Test Bed Report,* The Communications Security, Reliability and Interoperability Council III, Working Group 3 – E9-1-1 Location Accuracy, at 9 (March 14, 2013) (*emphasis added*).

be needed on those services.[3] Granted, Progeny is working on enhancements to its service that will even further reduce first responder search rings. For example, Progeny is working to integrate its terrestrial location service with the location capabilities of GPS satellites. Progeny's efforts in these regards should not be permitted to delay the availability of Progeny's current generation service in light of the dramatic improvement in indoor location accuracy that Progeny's current service provides as compared to existing technologies.

Progeny's meeting with Commission Pai and with the legal advisors also addressed the results of joint and independent tests of Progeny's network that were conducted during an eighteen month period in cooperation with Part 15 device manufacturers and users. The Progeny representatives explained why the Commission is fully justified in now concluding that Progeny has demonstrated that its network does not cause unacceptable levels of interference to Part 15 devices. The Progeny representatives also discussed the Commission's substantial prior deliberations and orders addressing the development and definition of its unacceptable levels of interference standard for M-LMS licensees. The details of that discussion were consistent with Progeny's prior filings in this docket and with the attached presentation, which was distributed during the meetings.

Thank you for your attention to this matter. Please contact the undersigned if you have any questions.

Sincerely,



Bruce A. Olcott
Counsel to Progeny LMS, LLC

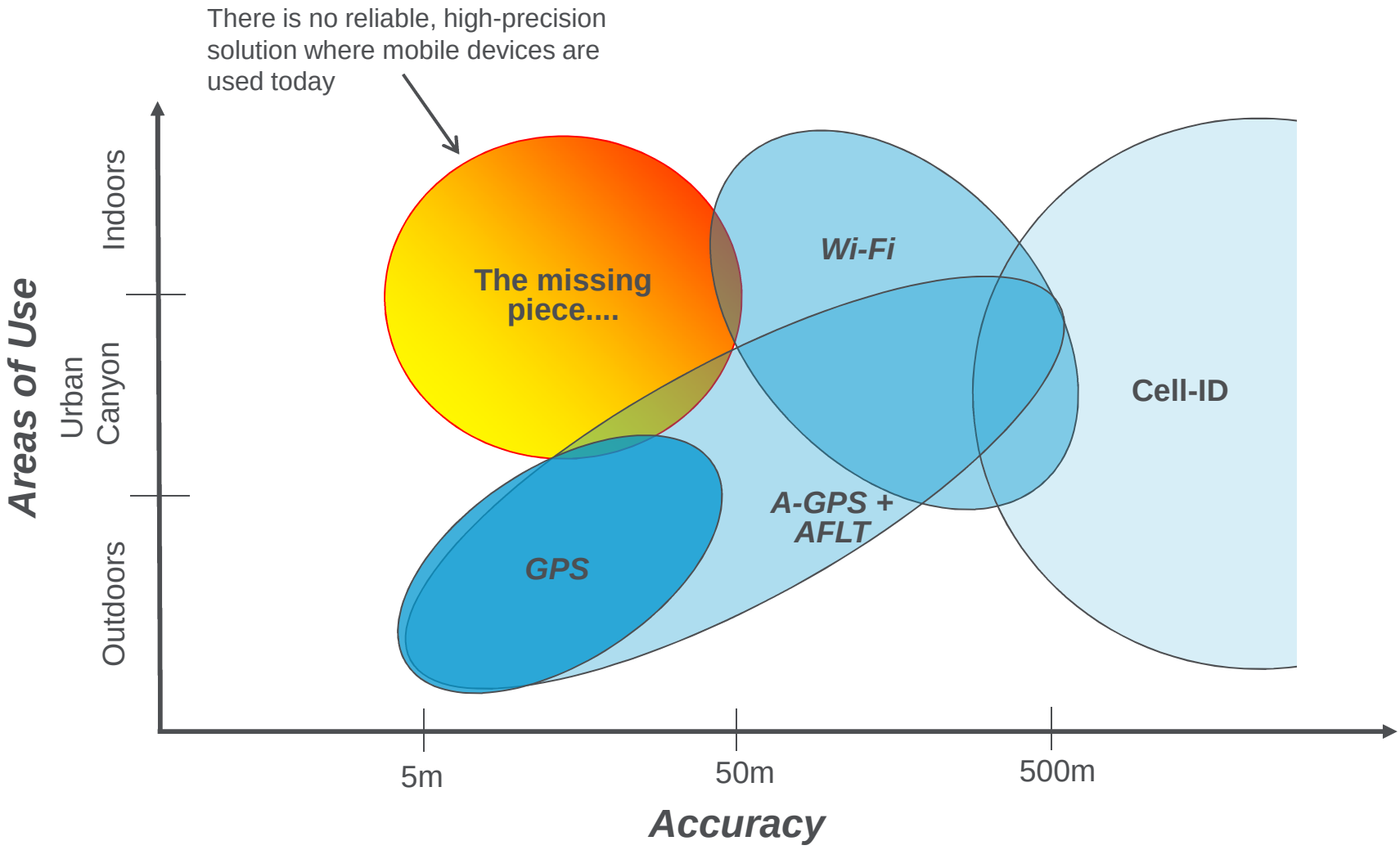
[3] *See Part 15 Letter* at 2-3.

Progeny LMS, LLC & NextNav, LLC

High Precision Urban and Indoor Positioning Services

March 19, 2013

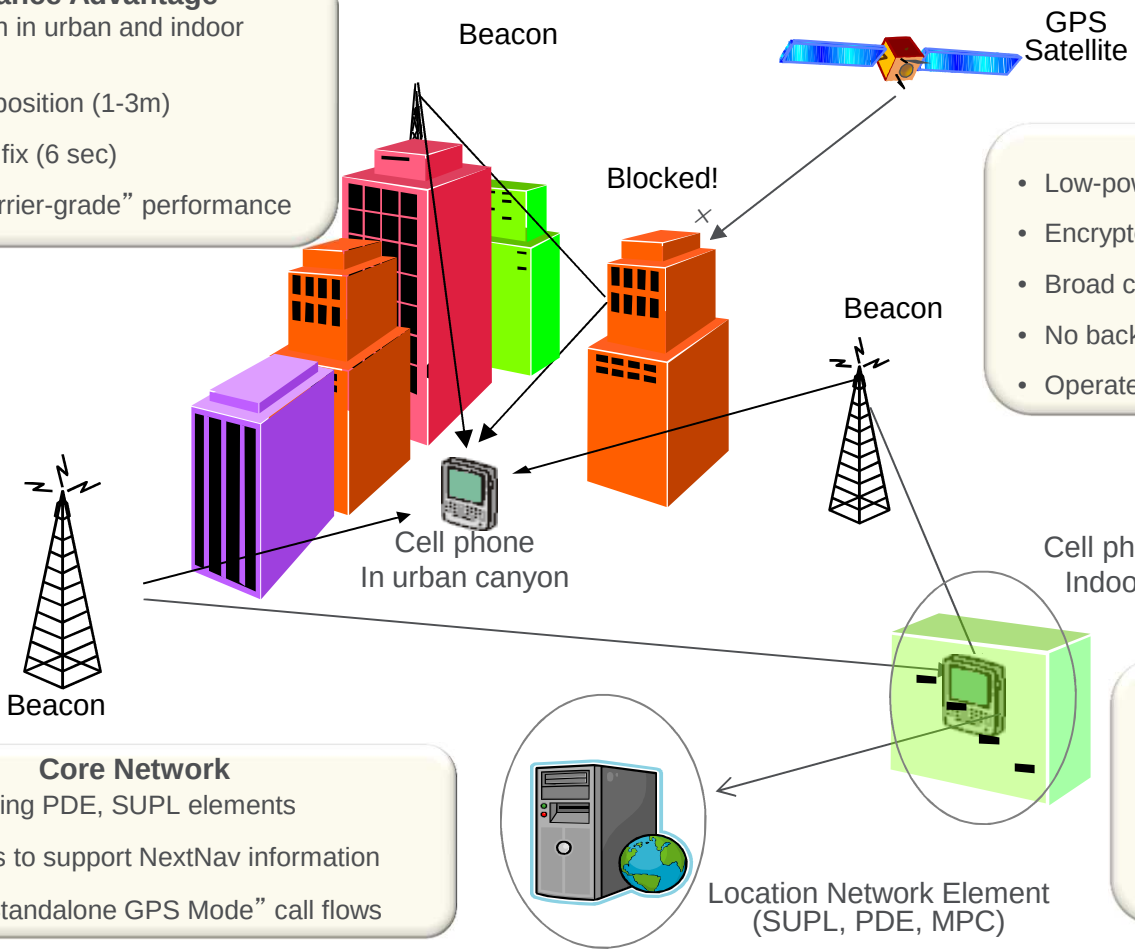
Positioning Technology State of Affairs



NextNav Metro Overlay Deployment

Performance Advantage

- Accurate location in urban and indoor environments
- Precise vertical position (1-3m)
- Fast time to first fix (6 sec)
- Dependable "carrier-grade" performance



Broadcast Beacons

- Low-power, highly synchronized
- Encrypted signal
- Broad coverage from minimal sites
- No backhaul, small form factor
- Operate on licensed spectrum

Core Network

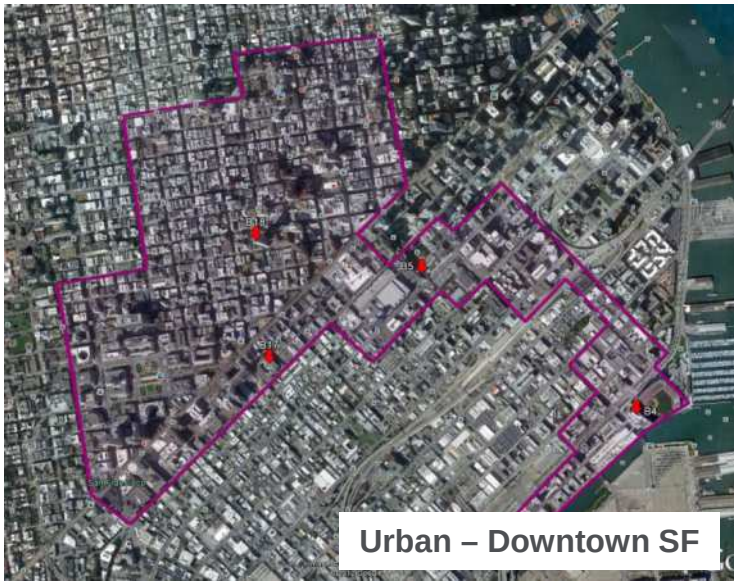
- Utilizes existing PDE, SUPL elements
- Modifications to support NextNav information
- Similar to "Standalone GPS Mode" call flows

Receivers

- Firmware upgrade to "typical" GPS chipsets
- Minimal handset integration cost
- On-device computation of location
- Reduced power consumption

Test Area Overview

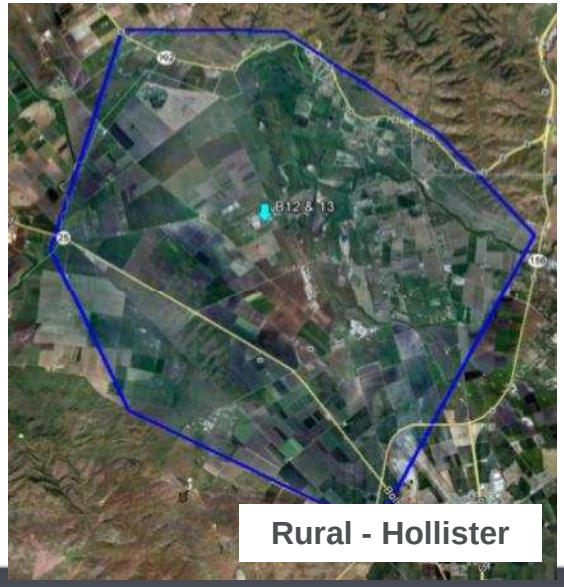
Dense Urban – Downtown SF



Urban – Downtown SF

Urban – San Jose

Suburban – Santa Clara County



Rural - Hollister

Test Environments and Buildings

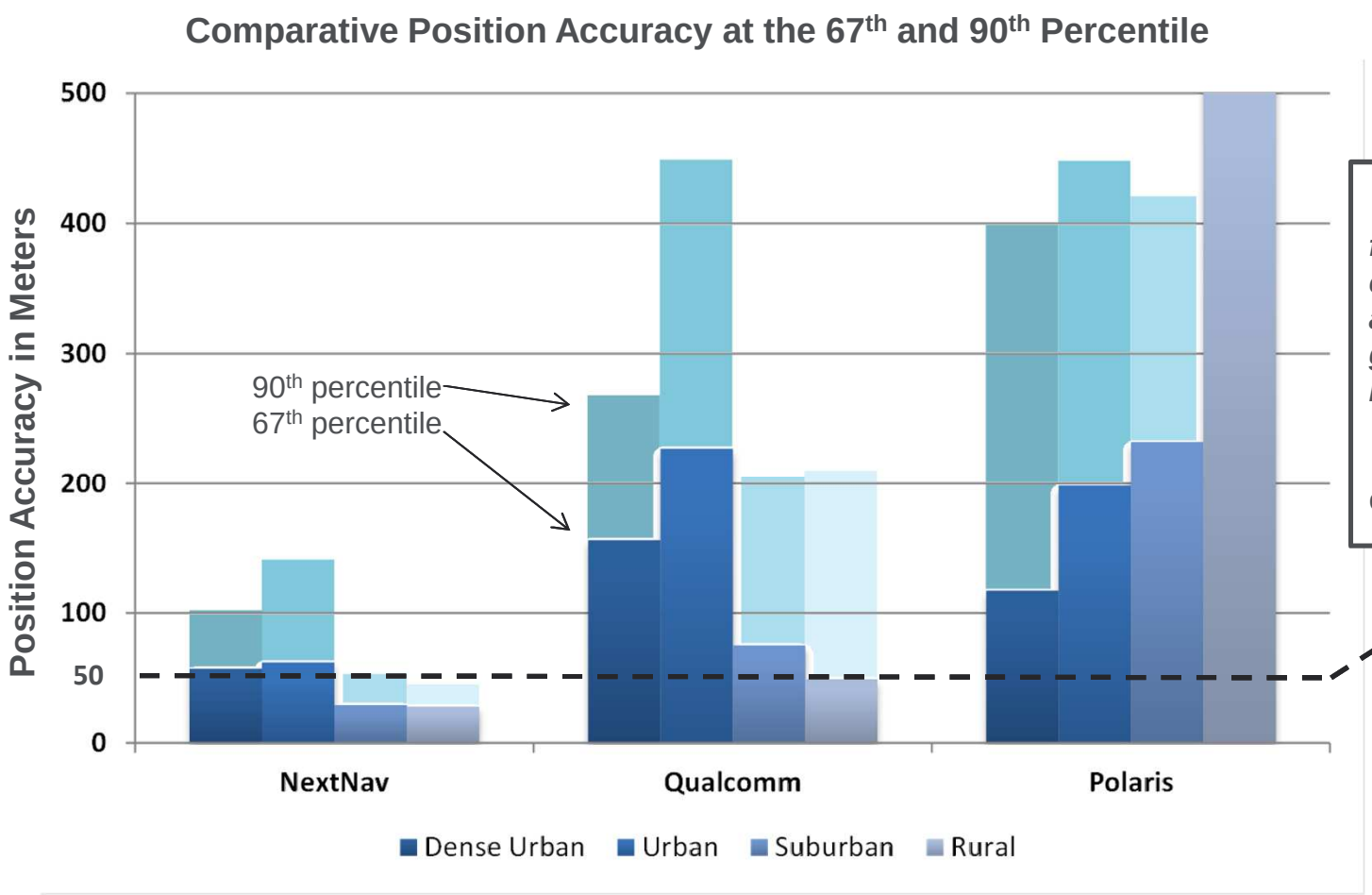
Dense urban
Downtown Financial District
San Francisco
(6 bldgs)

Urban
Downtown
San Francisco
and San Jose
(5 bldgs)

Suburban
Santa Clara
and Sunnyvale
(6 bldgs)

Rural
San Benito County
(2 bldgs)

CSRIC Test Results by Morphology



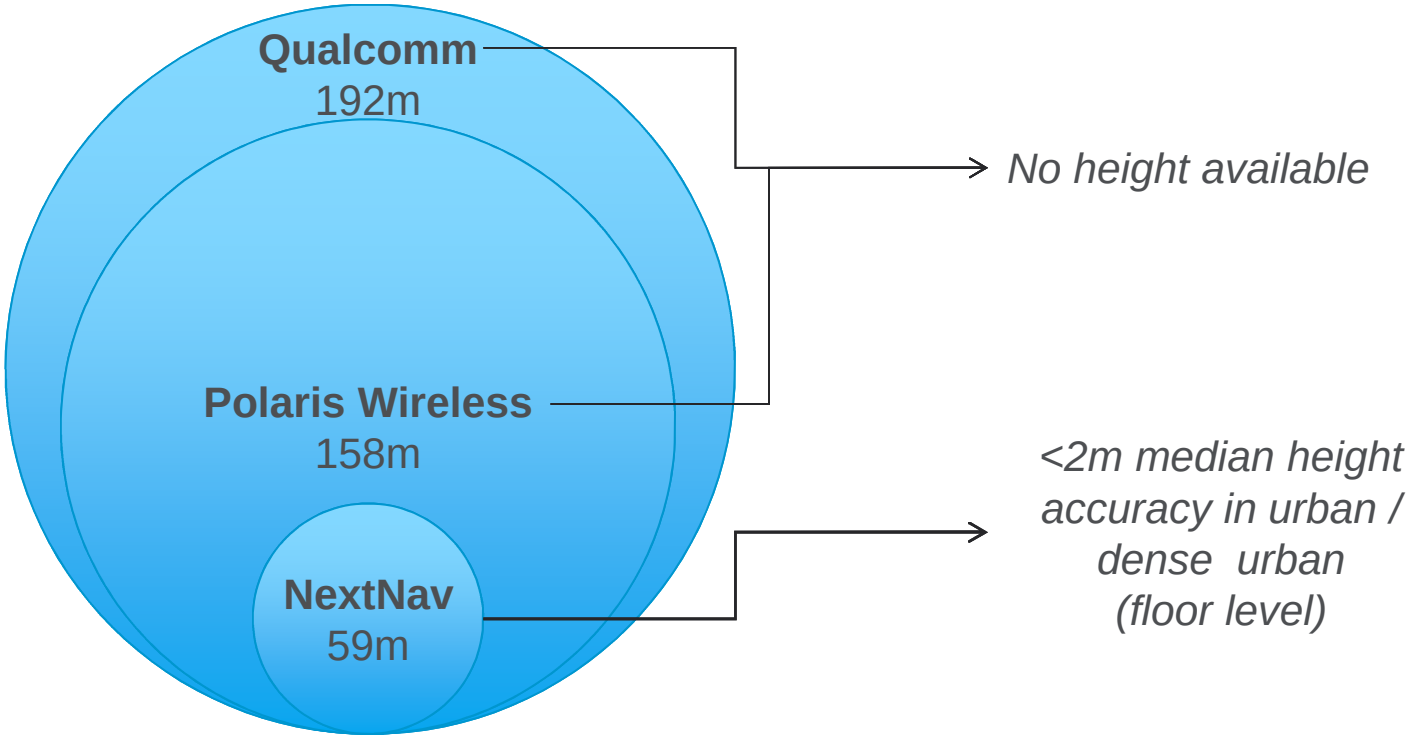
"Horizontal position fixes that substantially exceed 50 meter accuracy provide only general location information…"

- from the conclusions of the CSRIC report

NextNav delivered median height accuracy of 2m

Implied Urban Search Rings

Average of Urban / Dense Urban
67th Percentile

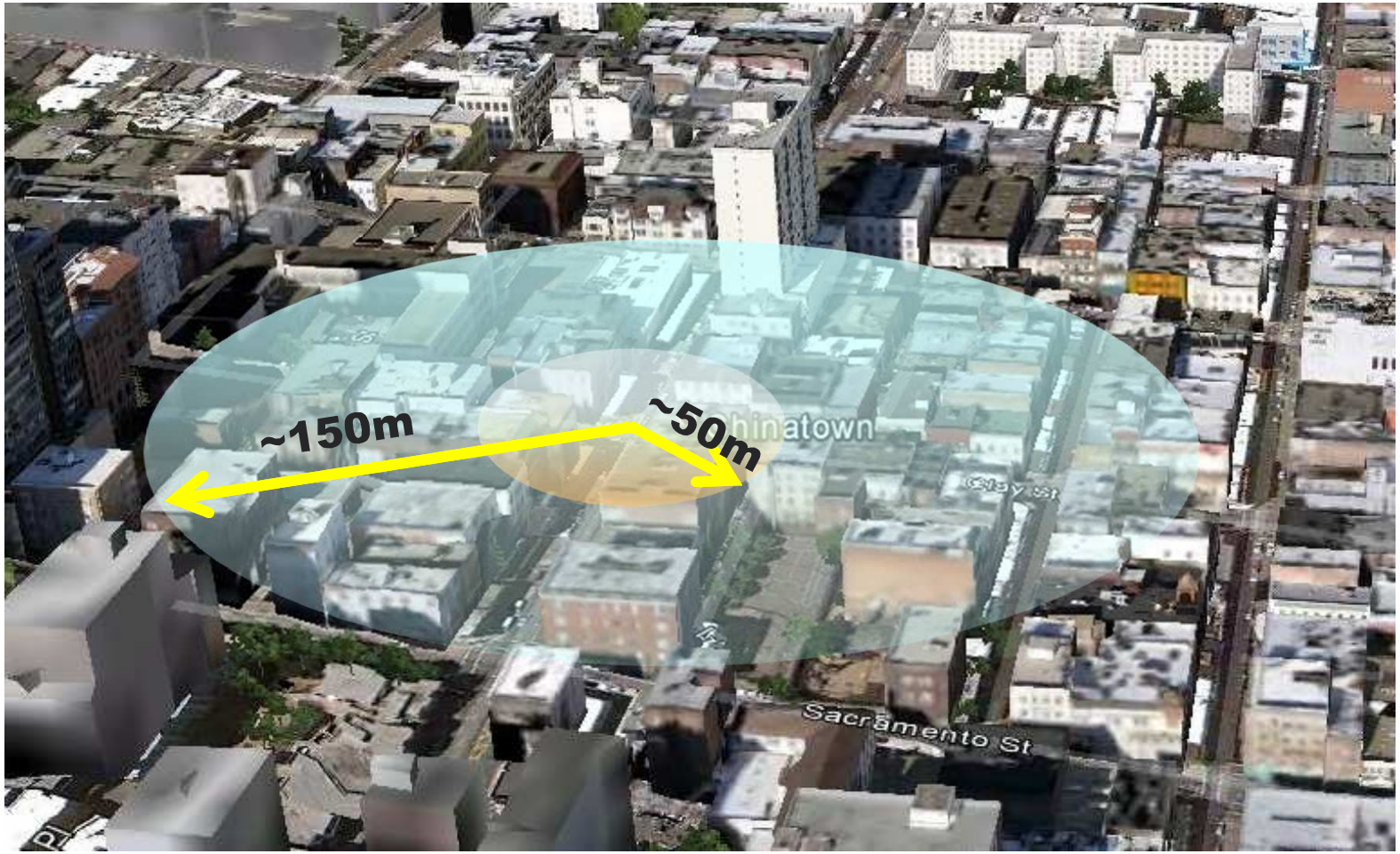


NextNav's horizontal search rings are approximately 1/10th the size of those delivered by other location technologies.

From the Public Safety Forward to CSRIC WGIII Report

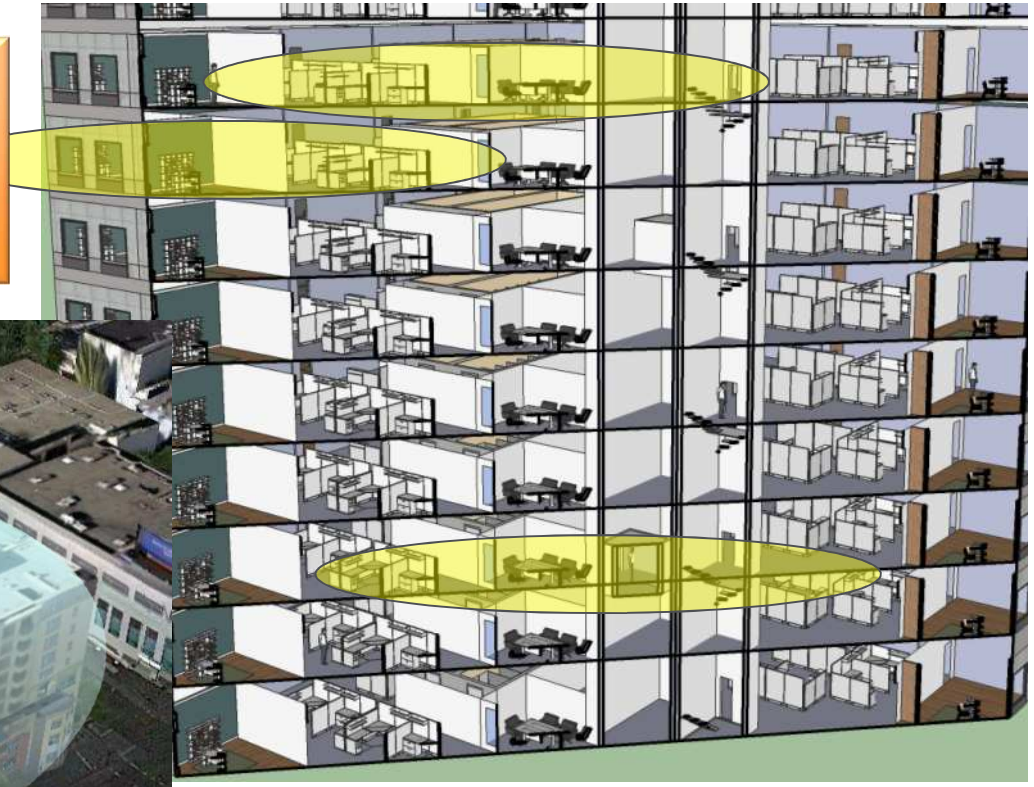
- **Public Safety desires reliable and consistent caller location information to a specific dispatch-able building (and floor in multi-story environments)**
  - **Lacking the specific building and floor, the desire would be for the smallest possible search ring**
  - **Tighter performance [than 50 meter accuracy] is required, particularly in urban and dense urban environments to narrow the search ring to a single building or a more reasonable number of adjacent buildings**
- **Substantial progress in the vertical dimension (67th percentile of 2.9 meters, or approximate floor level accuracy) was also demonstrated by [NextNav]**
  - **The availability of such functionality would be an important factor in locating indoor callers in urban and dense urban multistory buildings**

Existing E911 Rules (Outdoor)



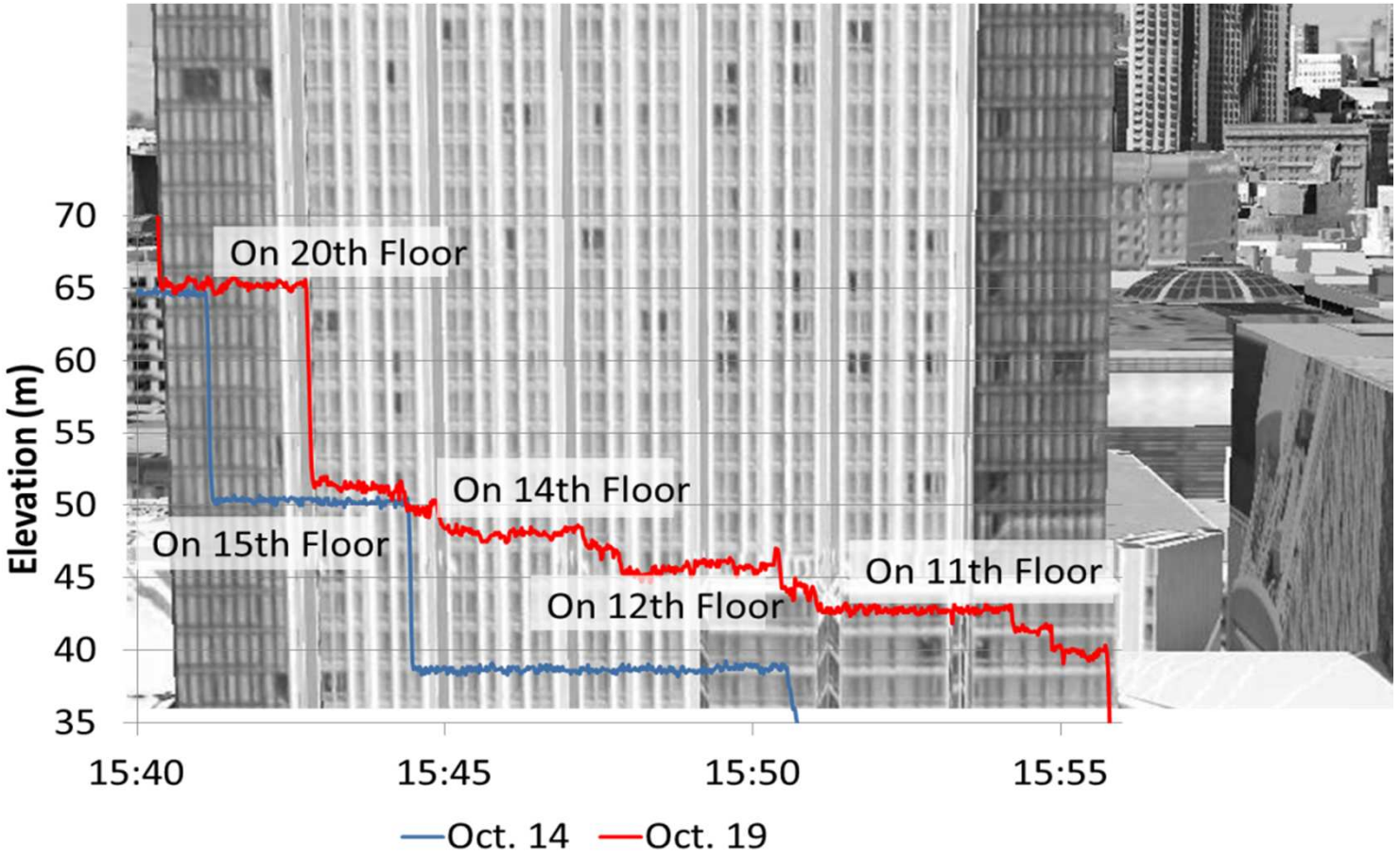
In-Building Requires High Performance Location – and Height

Across all morphologies, in the CSRIC test bed NextNav delivered 37m of accuracy (population-weighted) 67% of the time and was able to identify the building or an adjacent building over 80% of the time.



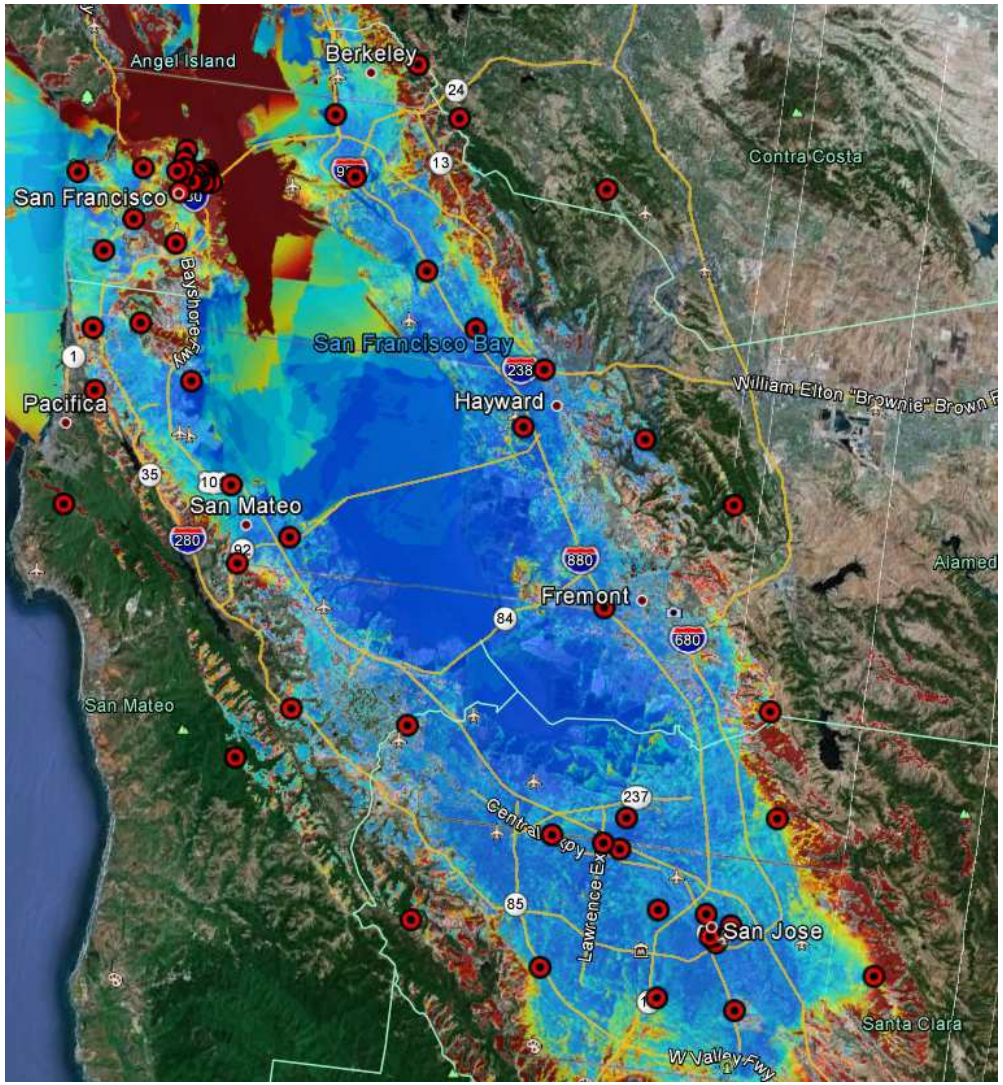
In the CSIRC test bed, NextNav delivered floor-level precision, with median vertical accuracy of 2 meters.

Floor-Level Height Accuracy



NextNav is building the nation's first high precision, real time barometric pressure calibration network

San Francisco Initial Market Coverage



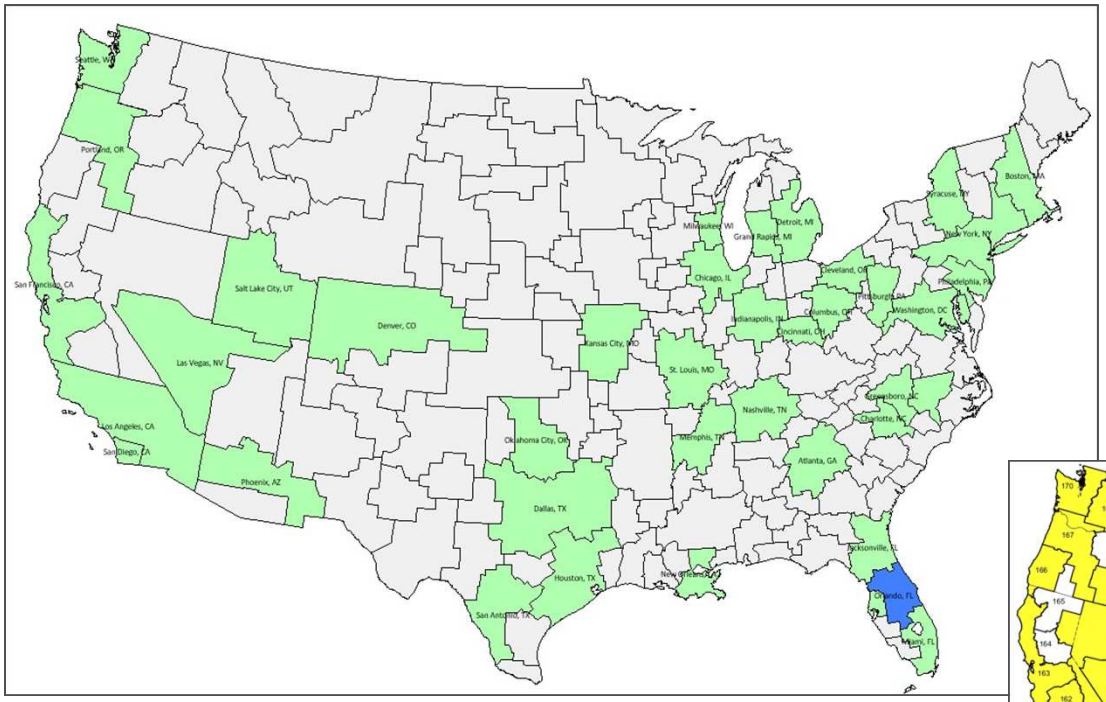
- 900+ square miles of coverage
- Average beacon separation 8 - 10km
- Network optimized for coverage and location accuracy

Performance Key

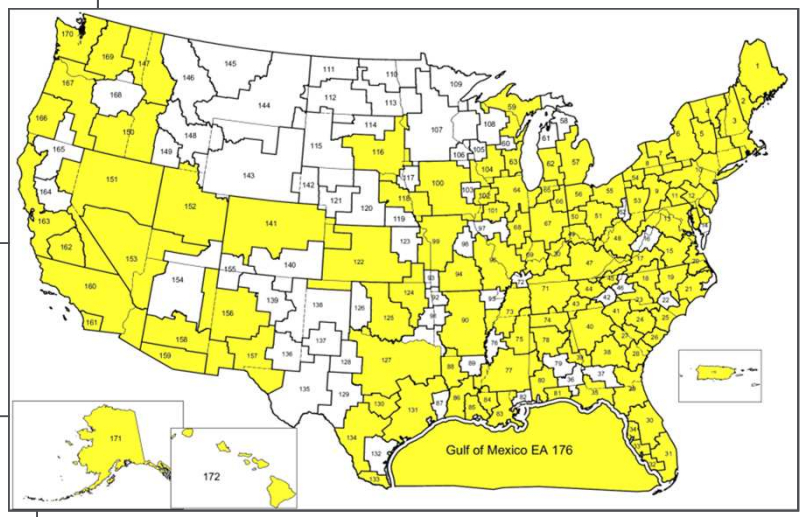
Good — Best

NextNav Beacons

Deployment Status – Initial 40 Markets



- Complete & On-air (39 EAs)
- Complete, Pending Power (1 EA)
- Licensed Markets (115 EAs)



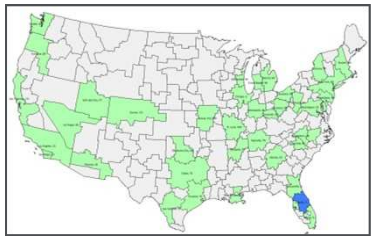
- Initial deployment complete in top 39 licensed EAs
- 40th EA (Orlando) waiting on power at one site (nesting eagle)
- Average population coverage exceeds 45 percent in top 40 EAs

Progeny Testing Process

18 Months of Rigorous Testing Using Virtually Every Type of Part 15 Device

3 years of operating history in SF Bay area

More **than 6 months in Top-40 US Markets**



Substantial Spectrum Sharing Concessions

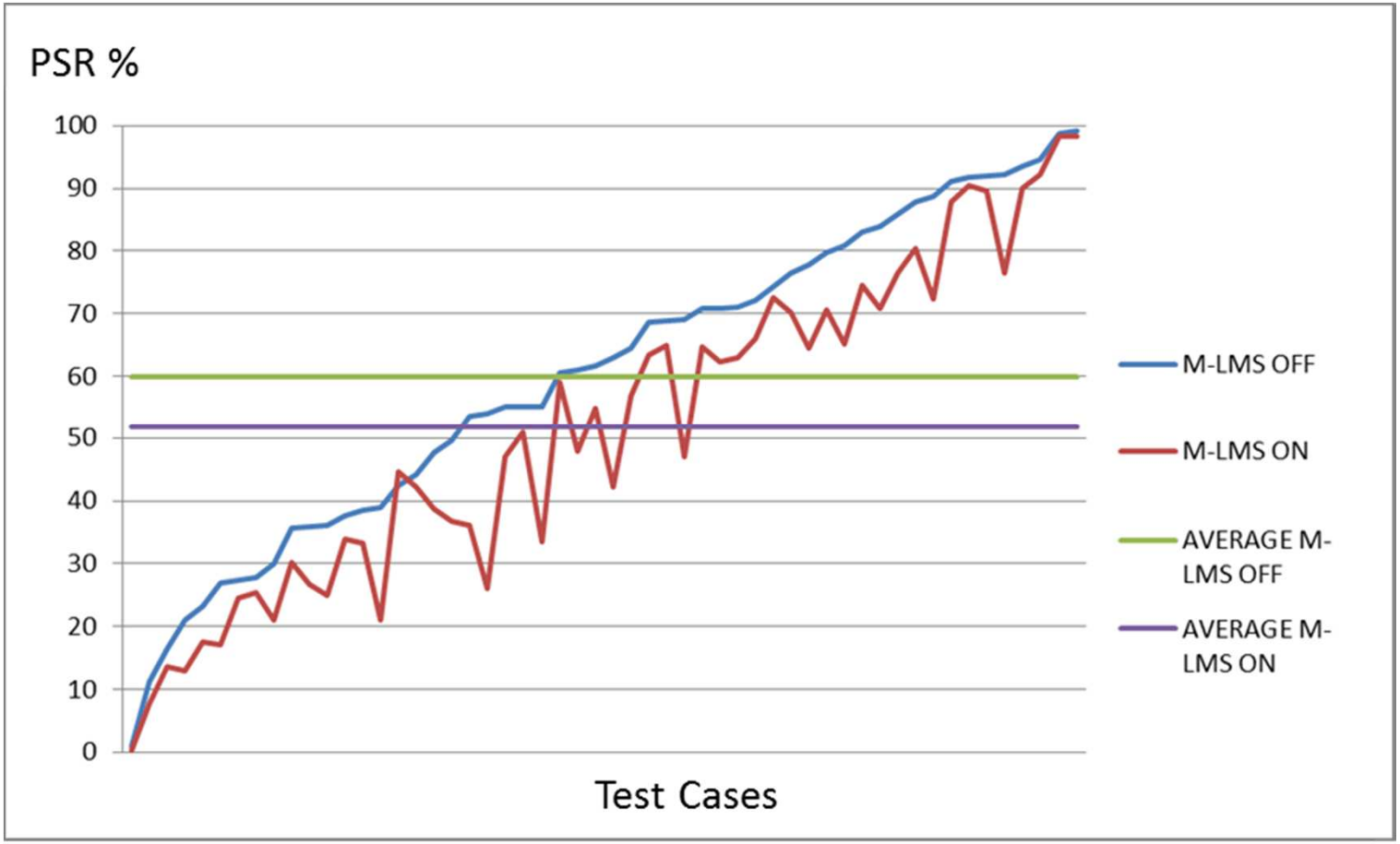
- **Broadcast only**
- **Eliminated licensed return path links**
- **10-20% duty cycle**
- **Will work with rural WISPs to ensure sharing**
- **Will not collocate on towers used for utility monitoring**

RESULTS

- **NO Impact at all outside 4 MHz of beacon operation**
- **NO instance of "overload" in or out of band**
- **Minimal impact even within 4 MHz in normal operations**
- **Moderate impact even in "forced co-channel" and worst case "collocation" tests**

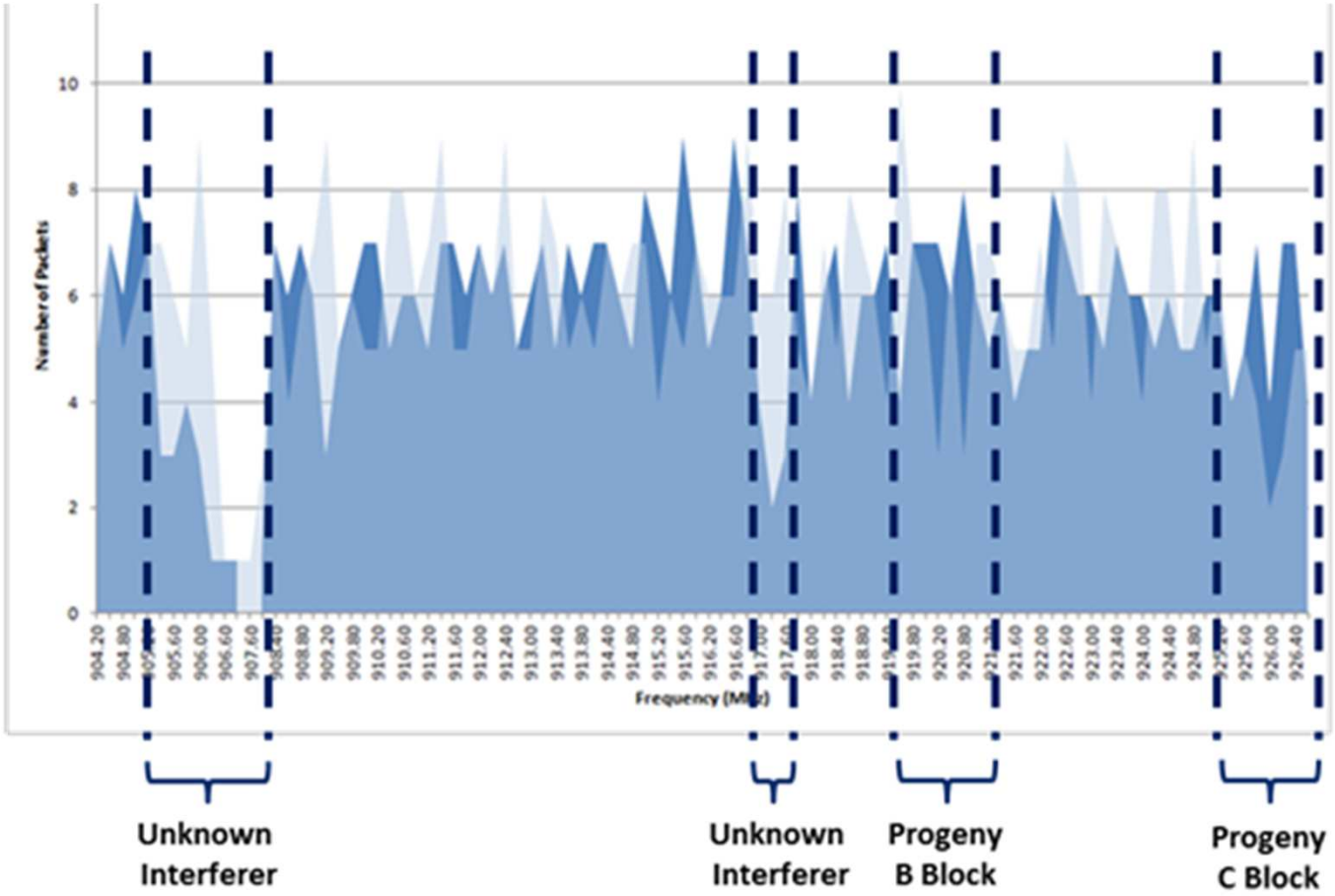
Progeny's M-LMS network **shares** the 902-928 MHz band with Part 15 devices **in the same way** Part 15 devices share with each other

Overall Itron Joint Test Results



Itron Tests 16 & 20 (average case)

Loc. 2: Suburban, 25 ft. ht., no close proximity or colocation

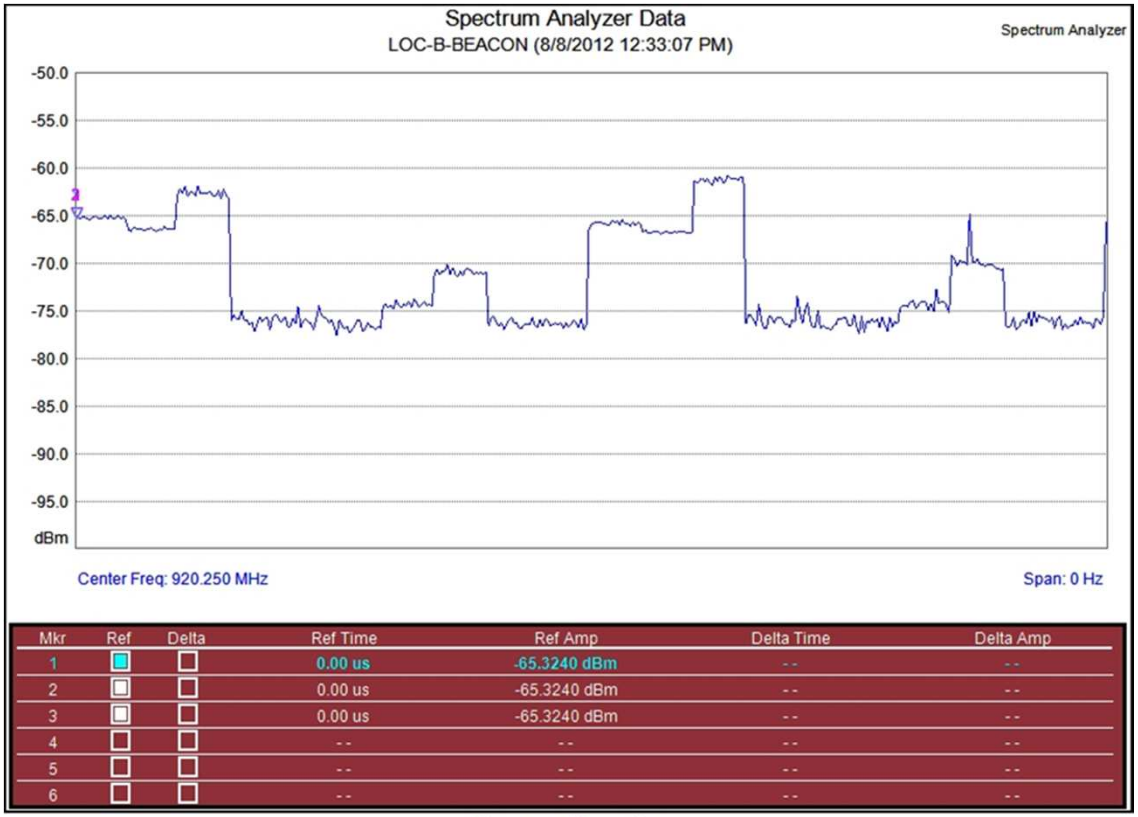


Landis+Gyr Joint Test Results

Two Way Equipment Test Results
Total Packet Success Rate

Test Configuration	Throughput Reduction %
Location A Narrow Band	0.31%
Location A Wide Band	-0.85%
Location B Narrow Band	-0.01%
Location B Wide Band	0.05%

Landis+Gyr/Progeny Duty Cycle Chart



Mkr	Ref	Delta	Ref Time	Ref Amp	Delta Time	Delta Amp
1	☐	☐	0.00 us	-65.3240 dBm	--	--
2	☐	☐	0.00 us	-65.3240 dBm	--	--
3	☐	☐	0.00 us	-65.3240 dBm	--	--
4	☐	☐	--	--	--	--
5	☐	☐	--	--	--	--
6	☐	☐	--	--	--	--

Measurement Parameters

Trace Mode	Average	Start Frequency	920.250 000 MHz
Trace Average	1	Stop Frequency	920.250 000 MHz
Preamp	OFF	Frequency Span	0.000 000 Hz
Min Sweep Time	--	Reference Level	-50.000 dBm
Reference Level Offset	0.0 dB	Scale	5.0 dB/div
Input Attenuation	0.0 dB	Serial Number	409173
RBW	1.0 MHz	Firmware Version	V5.32
VBW	300.0 kHz	Date	8/8/2012 12:33:07 PM
Detection	Peak	Device Name	S332D
Center Frequency	920.250 000 MHz		

FWB Link Joint Test Results

Test Configuration	Canopy		Ubiquiti	
Adjacent Channel **(Multiple Adjacent Channels Available)**	Downlink Uplink Avg.	-0.5% -0% -0.25%	Downlink Uplink Avg.	2.0% -2.3% -0.15%
Overlapping Channel	Downlink Uplink Avg.	-14.9% -8.3% -11.6%	Downlink Uplink Avg.	-47.9% -41.5% -44.7%
Full Co-Channel	Downlink Uplink Avg.	-49.0% -13.2% -31.1%	Downlink Uplink Avg.	-2.5% -17.6% -10.1%

In Conclusion

- Progeny's position location service does not cause unacceptable interference to Part 15 devices
- Progeny designed its network to reduce interference potential by one-way operation and 10-20% duty cycle
- Most Part 15 devices, when used in a typical manner, will never detect or experience interference from Progeny's M-LMS network
- Frequency hopping and spread spectrum technologies, combined Progeny's small (4mhz) bandwidth and low duty cycle, result in minimal impact to Part 15 equipment even when overlapping Progeny's signal
- Progeny has successfully co-existed with all manner of Part 15 equipment for over 3 years in Progeny's Bay Area network