Natasha Ernst, Director
Wireless Communications Initiative
natasha@jointventure.org

• Who We Are
• Why We Are Necessary
• How We Solve Problems
• What We Are Doing
• Where We Are Going
Who We Are

• A steering committee of the wireless industry and local governments

• We convene to resolve contentious issues preventing infrastructure improvements

• Our goal is faster, cheaper, and more wired & wireless broadband connectivity in Silicon Valley
Why We Are Necessary

• Silicon Valley’s wireless coverage lags behind many other parts of the country

• The iPhone 6 has more technologies than current wireless networks support

• Local governments are often the “gate keepers” over aesthetics
Educational Awareness

• Much confusion and misinformation about radio frequency

• In 2014, the FCC Chairman Wheeler spoke at the Computer History Museum in Mountain View
  – “This fourth network revolution is the one you all here in the Valley are leading and will continue to lead” of equal importance to the printing press, the railroad and electronic communications that began with the telegraph
Growing Demand For Wireless Broadband

People

- Wireless penetration in the U.S. now exceeds 104%, and 97% of consumers may choose from at least three carriers.
- Nearly 90% of households use wireless, and 39% are wireless only.
- Forty-five million Americans use mobile phones as their primary internet device; 10% of Americans using smartphones only.

Data

- U.S. mobile data use doubled from 2012 to 2013 and will increase 650% by 2018.
- About 56% of all mobile data is data-intensive video.
- Smartphones are driving traffic increase: 49 times more than a basic handset.
- Tablet use generates 127 times more network traffic than a basic handset.
- Wireless Internet of Things (IoT) connections are expected to increase from 36 million in 2013 to 263 million in 2018.

Source: CTIA
Increased Wireless Speeds

- 4G LTE v. 3G: 10 times faster
  - 3G: 144 – 400Kbps
  - 4G LTE: 5 – 12Mbps
Network Densification: Small Cells

- Once macro cells reach capacity, small cells (aka oDAS, pico, micro) must be used to increase capacity.
- Small cell antennas are shorter to avoid interference.
- Coverage areas are limited in size, but greatly increase high speed broadband.
- Handsets are only as good as the antenna they are talking to.
Different Types of Infrastructure have Different Coverage Capabilities

- Macro Cells: Towers/Rooftops
- Micro Cells: Smaller Macro Cells
- oDAS/Small Cells: Right-of-Way
- iDAS/Small Cells/Wi-Fi: In-Building
- Femto Cells: Consumer Homes

Ways to Increase Network Capacity

- Upgrades to existing Macro Cells, oDAS, in-building DAS/Small Cells
- New oDAS/Small Cells
- New In-Building Systems/Wi-Fi

<table>
<thead>
<tr>
<th>Type</th>
<th>Max Users</th>
<th>Radius (miles)</th>
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<tbody>
<tr>
<td>Macro Cell</td>
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<tr>
<td>Micro Cell</td>
<td>200</td>
<td>0.800</td>
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<tr>
<td>oDAS</td>
<td>75</td>
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<td>Femto Cell</td>
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What We Have Done

• Targeted key Silicon Valley cities to develop new local ordinances for cutting edge technology
  – Palo Alto: new DAS system
  – Los Altos: new ordinance
  – Mountain View: new process
  – San Jose: work in progress
  – Santa Cruz County: new guidelines

• Provide annual educational seminars on changing federal laws
Fiber optic connectivity is necessary for high-speed backhaul.

- Small antennas, radios, and battery backup on poles

**Small Cells & Backhaul in the Right of Way**
Small Cell/oDAS Technology: Antennas

Antennas are identical for both:

Panel Antenna

“Cantenna” Quasi-Omni
Small Cell/oDAS Technology: Radios

» Radio form factors are similar:

DAS: CommScope ION-M  Alcatel Lucent RRH  Alcatel Lucent Metro Cell
What We Are Doing

• FCC Report & Order 14-153
  – Decreased regulatory barriers for small cells and temporary towers
  – Upgrades & improvements to existing infrastructure
  – Clarification of “reasonable time” for local approval
  – Educational outreach for ordinance changes

• CPUC Pole Attachment Rulemaking
  – Just and reasonable rates for pole top attachments

• City of San Jose Streetlights
  – Frozen infrastructure in large geographic areas
  – Working with city staff & elected officials to find a resolution & aesthetic solutions
Streetlights and traffic signals are the best options in urban underground areas, but require an agreement with the jurisdiction (ideal fee $1000/annually).
Stealth poles are being manufactured for areas with high aesthetic concerns and no existing appropriate structures.
High end residential areas are often the most challenging areas to cover.
Where We Are Going

• We will be working with two national organizations on educational outreach for the new FCC regulations
• We will continue to be an expert in the CPUC rulemaking
• Expanded scope into wired broadband—AT&T, Comcast, etc.
• Internet of Things
The Internet Will Vanish

- Google executive chairman Eric Schmidt: “It will be part of your presence all the time.”
- Wearables gain traction. Our homes become connected. Our cars drive themselves.
- Everything will run on wireless networks, which run on fiber.
Questions