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Business Media

WISPA PALOOZA SHOW DAILY

WISP Industry Projected to Nearly Double in Five Years

By **Martin Vilaboy**

A new report by analyst firm The Carmel Group forecasts robust growth for the U.S. fixed wireless broadband industry, with the nationwide number of subscribers projected to nearly double from more than 4 million at the end of 2016 to 8.1 million by 2021. During the forecast period, core broadband wireless access (BWA) industry revenues are expected to nearly double from \$2.3 billion to more than \$5.2 billion.

Likewise, The Carmel Group expects WISP per-customer monthly revenue also will continue to rise, in part because consumers will be willing to pay more for the improved

services and speeds that will flow from network upgrades, standards-based technologies and ancillary services. Indeed, as broadband wireless access providers expand in under-served areas and contend effectively in the burgeoning number of areas where they offer superior customer service and a local presence, the study finds lots of room for optimism for WISPs.

That includes how the economics of fixed wireless make it the most cost-effective broadband solution for rural and other under-served areas because networks can be built and upgraded faster and at a fraction of the cost of networks based on DSL, fiber or cable. Whereas

upgrade changes to networks and/or CPE can lead to payback periods of 21 to 60 months for mobile, cable and fiber access providers, BWA payback can be as short at 11.5 months, show The Carmel Group findings, with average revenue per user similar to cable or mobile.

"Based on a wealth of new data, The Carmel Group rates the BWA industry's growth prospects as stronger than those of cable, fiber, and satellite TV," says report author Jimmy Schaeffler. "Optimism is in short supply in today's pay TV and broadband markets, so the fixed wireless industry is an exciting success story."

(See WISP Story, page 4)



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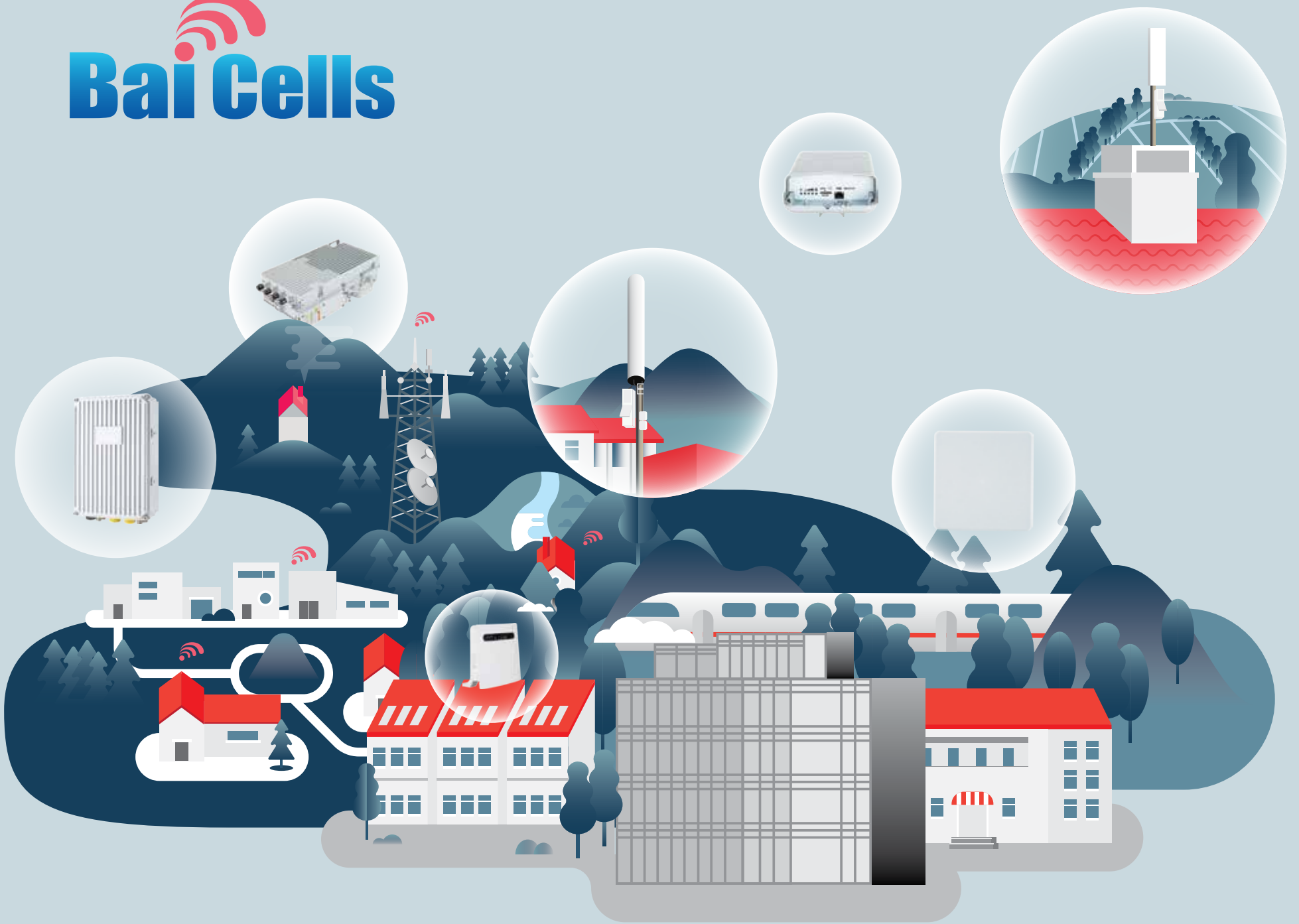
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(WISP Story, continued from page 1)

In addition to the favorable network economics, as well as the continually explosive demand for broadband services, especially video, and the corresponding pent-up demand in under-served areas, The Carmel

once available only to urban dwellers – available to rural and exurban customers. “We do not expect this trend will slow. If anything, we expect unbundling will accelerate as more consumers embrace Internet-based programming and watch programs on wireless

providers. The Federal Communications Commission and U.S. Department of Agriculture, for example, are eyeing plans to make broadband subsidy programs less oriented to incumbent telecom providers, more technology-neutral and more focused on cost-effectiveness and speed of deployment, says TCG. Spectrum sharing initiatives also are underway, and the new chairman of the FCC, Ajit Pai — having himself grown up in rural America — has developed a “Digital Empowerment Agenda” to prioritize expanded access to broadband in under-served areas of the United States.

The report also notes that while the overall outlook for the BWA industry is highly positive, there are significant challenges, including a bias in federal regulations toward the needs of national mobile wireless carriers and urban fixed wireline solutions such as cable and fiber.

According to the report, the U.S. BWA industry is composed of more than 2,000 mostly small- and medium-sized businesses in all 50 states, with an average of 1,200 customers each. The largest concentrations of

Group sees optimism for the market within spectrum trends. While relatively few spectrum bands support today’s BWA industry, “the FCC is exploring new bands that are expected to be well-suited for BWA networks, including the Citizens Broadband Radio Service band (3550-3700 MHz, called CBRS), TV white spaces, and several extremely-high-frequency, millimeter-wave bands,” says the report. Industry efforts are also underway to expand geographically licensed areas in the LTE-grade 2.5 GHz band, and the growing acceptance of spectrum sharing is further increasing availability and capacity for fixed wireless, with greater overall spectral efficiency.

At the same time, standards-based LTE, which originated in mobile standard bodies, is being deployed in fixed networks to give WISP providers greater speed and capacity, says the analyst firm.

There’s also good news among the “cord-cutting” trend within video entertainment. As a growing number of consumers are unbundling from pay TV services and replacing expensive programming bundles with less expensive “over the top” (OTT) access via broadband, BWA providers make this cost-saving option –

devices at times of their choosing,” says The Carmel Group.

Meanwhile, analysts at The Carmel Group cite potential federal regulatory changes that could open up more opportunities for BWA

Residential Consumer Broadband Comparative Economics

| | Fiber | Cable | Satellite | Mobile | BWA |
|----------------------------------------|-----------------------------------|---------------------------------------|--------------------------------------------------------|------------------------------------------|---------------------------------------------------|
| Capex/sub relative to BWA ¹ | 70 | 45 | 10.5 ² | 21 | 10 |
| Speed ³ | 1 Gbps | 150 Mbps | 12-35 Mbps ⁴ | 10-12 Mbps | 100 Mbps |
| Upgrade costs | MODEST Only fiber remains same | HIGH Complete CPE & network change | LOW/HIGH Incremental upgrades until satellite fails | HIGH Complete device & network change | MODEST Incremental upgrades in CPE and network |
| Broadband ARPU | \$69 | \$42 | \$61 | \$59 | \$51 |
| Payback period | 60 months | 38 months | 12 months | 21 months | 11.5 months |

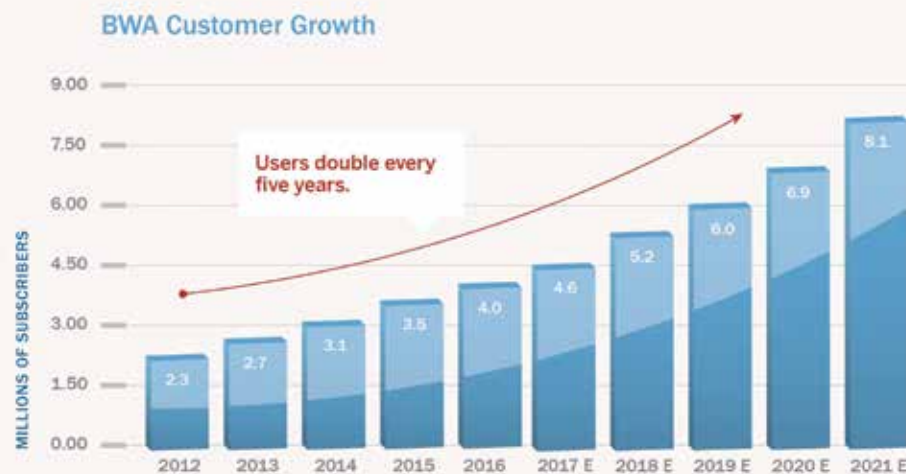
(1) This is a relative presentation comparing all of the technologies to BWA, which is set to an index value of 10. See above for explanation.

(2) Does not include the cost of satellites.

(3) Max speeds; most service providers are not yet offering max speed. For cable, the DOCSIS 3.0 standard is capable of 1 Gbps. For BWA, point-to-point links and millimeter-wave, point-to-multipoint connections can provide more than 1 Gbps to end users.

(4) Anticipated typical speed.

Sources: Wisper ISP; National Rural Telecommunications Cooperative; The Carmel Group



Source: The Carmel Group



Source: The Carmel Group

BWA providers are found in the Midwest, Northwest and Southwest, as well as the central and northern parts of California. Many BWA leaders interviewed for this study indicated their “ideal” deployment occurs in residential clusters of 100 to 1,500 locations per square mile, areas that wired technology platforms often ignore because of the higher per-location cost to deliver service across sparsely populated areas.

The report is based on independent research conducted in 2016, including 30 two-hour interviews with representatives of wireless broadband service providers, vendors and thought leaders. Other sources included the Wireless Internet Service Providers Association (WISPA), Wireless Communications Association International (WCAI), bankers and financiers, other groups and telecom companies, and filings at the U.S. Securities and Exchange Commission. ○

The report is available from The Carmel Group or at www.WISPA.org. Detailed survey data is available for sale by contacting The Carmel Group.

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WISPA's Public Policy Team: Building a Stronger Future for Our Industry

With all the partisan rancor that's occurring in Washington, D.C. these days, it's tempting to look the other way and focus solely on one's own businesses.

But that would be a big mistake for the wireless Internet service provider (WISP) industry.

Since its founding, WISPA has always devoted significant resources to cultivating relationships with government officials and advocating on its members' behalf because so many policy debates – in Congress and at the Federal Communications Commission (FCC) – have major impacts on the industry.

WISPA's federal legislative and regulatory efforts are focused on four primary objectives.

Gaining access to additional spectrum. Spectrum is the lifeblood of the fixed wireless broadband industry. WISPs have traditionally relied on unlicensed or lightly licensed spectrum, and if it weren't for the sector's innovation in these bands, millions of Americans would still lack broadband access.

WISPA was an early adopter of the principle of "spectrum sharing," and the association continues to believe that hierarchical spectrum-access regimes and "use it or share it" rules will expedite broadband deployment and improve the customer experience.

WISPA also is advocating for spectrum auction rules that allow bidding in smaller geographic areas. Auctions covering large areas tend to concentrate control over the airwaves in the hands of the largest companies serving the densest markets.

Eliminating FCC regulations that disproportionately burden small broadband providers.

In recent years, the FCC adopted a "grand slam" of new rules that had a disproportionately adverse effect on small broadband providers. WISPA led the way in Congress and at the FCC to win an exemption from these rules for smaller companies.

Reforming broadband subsidy programs. WISPA believes Congress should adopt legislation that refocuses universal support programs on subsidizing broadband deployment, and eliminates the requirement that recipients offer voice service. Support should not depend on whether a provider uses a particular technology or is categorized as one type of provider; instead, federal policy should prioritize cost-effectiveness, speed of deployment, and performance criteria such as throughput speed, data usage restrictions, and latency.

WISPA has been deeply involved in advocating for rules in the FCC's upcoming Connect America

Fund reverse auction that would enable fixed wireless and small businesses to compete.

Modernizing the Communications Act.

Finally, WISPA is working for legislation to bring telecom policy into the 21st century. For example, federal law should no longer regulate broadband providers on the basis of the access technology they use; to the greatest extent possible, the legal framework should be the same for all broadband providers.

How does WISPA carry out its advocacy work? WISPA's elected board determines our overall strategic direction and priorities. Volunteers on WISPA's FCC and Legislative Committees provide feedback on specific policy proposals, regulatory filings, and draft legislation, and a team of several board members and outside professional advisers manage our day-to-day advocacy efforts. Our activities are recapped and shared with our members via emails, social media, and the WISPA website, and the WISPA D.C. team presents detailed updates at WISP America and WISPA-PALOOZA each year.

There is no doubt that WISPA's advocacy efforts are paying off. Since the start of 2017, both Congress and the FCC have taken action on WISPA-supported measures to roll back burdensome regulations. WISPA representatives have been invited to meet with FCC commissioners, White House staff, and key members of Congress to educate them on our industry and advocate for our priorities.

For example, WISPA had the opportunity to provide input on the AIRWAVES Act before it was introduced, and was able to achieve modifications that would preserve GAA access in the CBRS band and protect investments WISPs have already made.

Earlier this year a WISPA-led coalition filed a petition at the FCC to open access to an additional 500 megahertz of mid-band spectrum that is perfectly suited for fixed wireless broadband.

WISPA members who are interested in learning more and getting involved with the association's advocacy efforts should attend today's session at 4:30 p.m. entitled "Legislative Update and WISPA's Policy Priorities," and contact Jimmy Carr or Mark Radabaugh, chairmen of WISPA's Legislative and FCC Committees, respectively. ○

Additional information and a detailed version of WISPA's policy priorities are available at www.WISPA.org.



Trina Coffey

Director of Operations
260-622-5775
866-317-2851 ext 102
trina@wispa.org

Arielle Coffey

Administrative Assistant
260-622-5773
866-317-2851 ext 100
arielle@wispa.org

Gary Helmers

Sales/Membership Coordinator
260-622-5774
866-317-2851 ext 103
ghelmers@wispa.org

Will Peterson

Marketing Associate
260-622-5772
866-317-2851 ext 101
wpeterson@wispa.org



Martin Vilaboy

Editor-in-Chief
martin@bekabusinessmedia.com

Percy Zamora

Art Director
percy@bekabusinessmedia.com

Berge Kaprelian

Group Publisher
berge@bekabusinessmedia.com

Rene Galan

Associate Publisher
rene@bekabusinessmedia.com

Anthony Graffeo

Associate Publisher
anthony@bekabusinessmedia.com

Miki Takeuchi

Marketing & Digital Media

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A Dinner with a Purpose

There are still a few seats left at tonight's "Dinner with WISP PAC," to be held from 7:30 p.m. - 9:00 p.m., right here in the Rio Hotel's Masquerade Village at the famed Wine Cellar Restaurant. Come for the food and company and to support the important work of our WISP political action committee. Minimum donations for the dinner are \$50.

WISP PAC is dedicated to supporting those Members of Congress who support the legislative agenda of the fixed wireless industry. Financial contributions to WISP PAC are used to support members of Congress from both parties who are friends to the fixed wireless industry and small businesses and to counter messages delivered by incumbent PACs. For more information or to make a contribution, please visit our website at www.wisppac.org or call 202-618-5639.



When: Tuesday, October 10, 2017, 7:30 p.m. - 9:00 p.m.

Where: The Wine Cellar at The Rio Hotel - Masquerade Village

CONTRIBUTION LEVELS

All contribution levels will receive a WISP PAC ribbon.

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|---------------|-------------|---------------------------------------|
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In the weeks after Hurricane Harvey brought terrible flooding to the Houston metro area, employees at BKD CPAs & Advisors, which has a location in Houston, along with three other Texas offices, donated more than \$100,000 to relief organizations and to assist Houston co-workers affected by the storm.

"Several came to firm leaders right away asking how they could help," said BKD CEO Ted Dickman. "I was touched by their desire to lend a helping hand and amazed at their generosity."

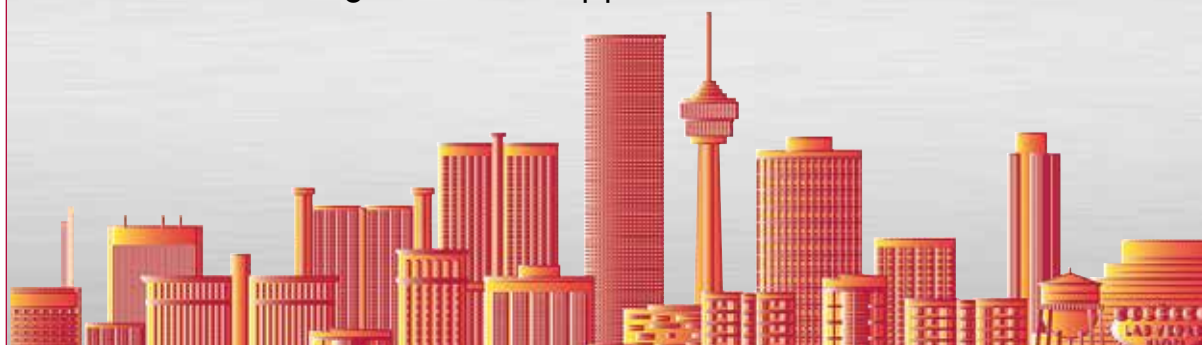
The BKD Foundation, which supports charitable organizations throughout the firm's footprint and beyond with financial contributions and volunteerism, gave more than \$75,000 to four different charitable organizations. The foundation matched contributions dollar for dollar up to \$40,000 total to The American National Red Cross Hurricane Harvey Fund, United Way Harvey Recovery Fund, Houston Food Bank Harvey Disaster Relief or Convoy of Hope Hurricane Harvey Response.

In addition, BKD employees throughout the firm raised \$28,445 for Houston colleagues displaced by the flooding. The campaign, organized through charitable crowdfunding website

YouCaring, gave funds directly to Houston employees and their families. Firm partners matched contributions dollar for dollar up to \$10,000 total. ○

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WISPAPALOOZA 2017 AGENDA

| TIME | TRACK LEVEL | MONDAY, OCTOBER 9, 2017 | ROOM |
|-----------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 8:45am - 9:00am | | Coffee | Brasilia 1 |
| 9:00am - 12:00pm | | Morning Session | |
| | Technical Business | BGP Traction - A Deep Dive into How to Run Your Company Day-to-Day | Brasilia 6 Brasilia 2 Brasilia 7 |
| | Technical Regulatory | Learn Grounding from the Experts CBRS Opens New Shared Spectrum with Competitive Use Options for WISPs (Part 1 of 2) | |
| | Technical | Installer Training | Brasilia 4 |
| 12:00pm - 1:00pm | | Lunch | Brasilia 1 |
| 1:00pm - 5:00pm | | Afternoon Session | |
| | Technical Business | IPv6 Rollout Financial Fundamentals for Your Business | Brasilia 6 Brasilia 2 |
| | Technical Regulatory | RF Network Design CBRS Opens New Shared Spectrum with Competitive Use Options for WISPs (Part 2 of 2) | Brasilia 3 Brasilia 7 |
| | Technical | Off-Grid Power for Towers | Brasilia 4 |
| TUESDAY, OCTOBER 10, 2017 | | | |
| 8:00am - 9:00am | | Breakfast | Amazon Ballroom |
| 8:30am - 9:30am | | Opening Remarks/ Breakfast / Sponsor Intros | Amazon Ballroom |
| 9:30am - 9:45am | | Intermission | |
| 9:45am - 11:15am | | Speed Dating | Amazon Ballroom |
| 11:15am - 11:30am | | Morning Refreshment Break | Amazon Ballroom |
| 11:30am - 12:30pm | | State of WISPA | Amazon Ballroom |
| 12:30pm - 3:00pm | | Exhibit Hall (Lunch Served 12:45 - 2:00) | Rio Pavilion |
| 3:00pm - 4:00pm | | Session One | |
| | Technical 101 Business HR Regulatory 201 | Battery Backup / Off-Grid Electric Selling to Multi-Dwelling Units (MDUs) Hiring the Right People for the Right Position Acquiring 2.5ghz Spectrum and Working with Educators | Brasilia 2 Brasilia 3 Tropical Brasilia 4 |
| | Business 101 Vendor Spotlight | ABC's of Starting a WISP (Part 1 of 2) RF Elements | Palma Miranda 5 |
| 4:00pm - 4:30pm | | Intermission | |
| 4:30pm - 5:30pm | | Session Two | |
| | Technical 201 Business 201 HR Regulatory Business 101 Vendor Spotlight | Moving from IPv4 vs IPv6 Operations Management Employee Technical Training Legislative Update and WISPA's Policy Priorities ABC's of Starting a WISP (Part 2 of 2) Hana Wireless | Brasilia 3 Brasilia 2 Brasilia 4 Tropical Palma Miranda 5 |
| 5:30pm - 7:45pm | | Exhibit Hall Reception | Rio Pavilion |
| 9:00pm - 12:00am | | CEO Roundtables | Brasilia 4 |
| 9:00pm - 12:00am | | Technical Roundtables | Brasilia 2 |
| WEDNESDAY, OCTOBER 11, 2017 | | | |
| 8:15am | | Coffee | Brasilia-Miranda Hall |
| 8:30am - 9:30am | | Session Three | |
| | Technical 201 HR 201 Regulatory Business 101 Technical 101 Vendor Spotlight | DNS: Authoritative vs. Resolver vs Forwarder: Why and How Developing/Becoming an Effective Manager Net Neutrality - Understanding Internet Governance Entrepreneurial Operating System Point to Point Deployments SolidPhone Communications | Brasilia 4 Brasilia 3 Brasilia 2 Palma Tropical Miranda 5 |
| 9:30am - 10:00am | | Intermission | |
| 10:00am - 11:00am | | Session Four | |
| | Technical Business 201 HR Regulatory 101 Technical 101 Vendor Spotlight | QOE A Better Customer Experience Building a Strategic Plan Team Building What Forms Should I Be Filling Out? Network Monitoring Options BillMax Billing Solutions | Tropical Brasilia 2 Brasilia 4 Palma Brasilia 3 Miranda 5 |
| 11:00am - 11:30am | | Intermission | |
| 11:30am - 12:30pm | | KEYNOTE | Amazon Ballroom |
| 12:30pm - 3:00pm | | Exhibit Hall (Lunch served 12:45 - 2:00) | Rio Pavilion |
| 3:00pm - 4:00pm | | Session Five | |
| | Technical Business HR 101 Infrastructure 101 Regulatory Vendor Spotlight | Troubleshooting Grandma Customer Retention Employee Benefits Keeping Your WISP Grounded 5G and LTE-U RADWIN, Inc. | Brasilia 4 Tropical Palma Brasilia 3 Brasilia 2 Miranda 5 |

| | | | |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 4:00pm - 4:30pm | | Intermission | |
| 4:30pm - 5:30pm | | Session Six | |
| | Technical 101 Business 201 Marketing 101 Infrastructure | Introduction to Dynamic Routing Key Performance Indicators Marketing and Selling Value Added Services Practical Guide to Safety - Roof, Ladder and Driving Spectrum Update Mimosa | Palma Brasilia 3 Tropical Brasilia 4 |
| | Regulatory Vendor Spotlight | | Brasilia 2 Miranda 5 |
| 5:30pm - 7:00pm | | Exhibit Hall | Rio Pavilion |
| 7:30pm - 10:00pm | | ANNUAL AWARDS DINNER | Amazon Ballroom |
| THURSDAY, OCTOBER 12, 2017 (THINK PINK - WEAR PINK) | | | |
| 8:15am | | Coffee | Brasilia-Miranda Hall |
| 8:30am - 9:30am | | Session Seven | |
| | Marketing 101 Finance 101 | Managing Your Image on Social Media and Elsewhere Financing 101 | Brasilia 2 Palma |
| | Technical 201 Business 201 Regulatory 101 | Automation: Saving Time on Common Tasks Strategic Peering for WISPs Why Effective PR Is Critical to Your Success and Ours | Tropical Brasilia 4 Brasilia 3 |
| | Vendor Spotlight | KP Performance Antennas | Miranda 5 |
| 9:30am - 10:00am | | Intermission | |
| 10:00am - 11:00am | | Session Eight | |
| | Marketing 201 Finance 101 Technical Regulatory Business Vendor Spotlight | Social Media as a Business Development Tool Accounting 101 Dealing with Subscriber's WiFi/Router View from Capitol Hill ABCs Of Fiber HughesNet | Palma Brasilia 3 Brasilia 2 Tropical Brasilia 4 Miranda 5 |
| 11:00am - 11:30am | | Intermission | |
| 11:30am - 12:30pm | | Session Nine | |
| | Marketing Finance 201 Technical Business Regulatory | Sales and Marketing Automation Accounting 201 IPTV- To Do or Not to Do Why You Should Stop Selling Routers Connect America Fund | Brasilia 4 Tropical Brasilia 3 Brasilia 2 Palma |
| 12:30pm - 4:00pm | | Exhibit Hall (Lunch served 12:45 - 2:00) | Rio Pavilion |
| 4:00pm - 5:00pm | | Session Ten | |
| | Business 201 Technical 301 Marketing Finance 201 Regulatory | How to SWOT a WISP: Analysts' Perspectives Choosing Your Core Developing Your Value Proposition Finance from An Equity Perspective CBRS Operator Roundtable & Regulatory Review | Brasilia 2 Palma Tropical Brasilia 3 Brasilia 4 |
| 5:00pm - 5:30pm | | Intermission | |
| 5:30pm - 6:30pm | | Session Eleven | |
| | Business 101 Technical 201 Marketing Finance Regulatory | Hybrid Fiber / Wireless Networks MPLS / Metro Ethernet Marketing in a Competitive Environment Budgeting and Forecasting Broadband Privacy - Separating Fact from Fiction | Brasilia 2 Tropical Brasilia 3 Palma Brasilia 4 |
| FIBER FRIDAY, OCTOBER 13, 2017 | | | |
| 8:15am - 8:30am | | Coffee | Brasilia-Miranda Hall |
| 8:30am - 9:30am | | Session Twelve | |
| | Fiber Business 101 Fiber Infrastructure 101 Fiber-Regulatory | Tools Needed for Building Your Fiber Network Fiber Construction in a Subdivision | Brasilia 1 Brasilia 2 |
| 9:30am - 9:45am | | Right of Way | Brasilia 3 |
| 9:45am - 10:45am | | Intermission | |
| | Fiber-Business Fiber-Construction Fiber-Regulatory | Capex Vs Opex of Fiber Hands On With Fiber | Brasilia 1 Brasilia 2 |
| 10:45am - 11:00am | | Working with HOA's and Municipalities | Brasilia 3 |
| 11:00am - 12:00pm | | Intermission | |
| | Fiber-Business Fiber-Infrastructure Fiber-Construction | What's New in Fiber Boring, Trenching and Digging | Brasilia 1 Brasilia 2 |
| | | Troubleshooting Fiber | Brasilia 3 |
| 12:15pm - 1:45pm | | Lunch and Closing | Amazon Ballroom |



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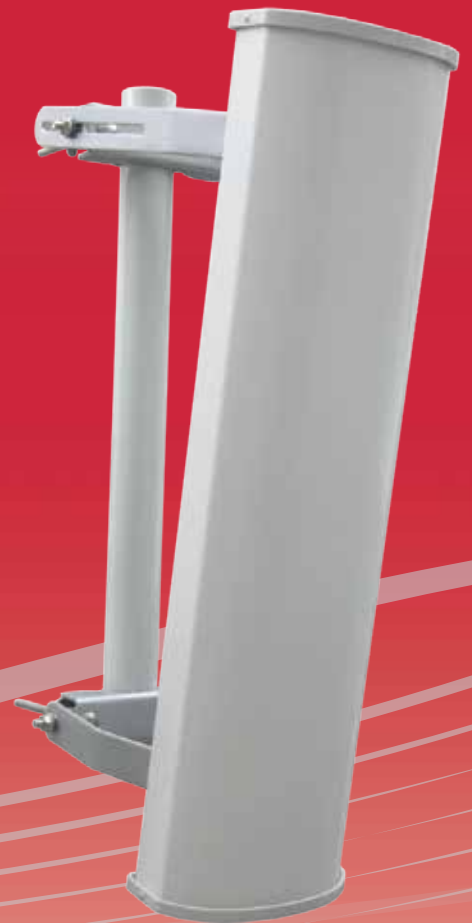
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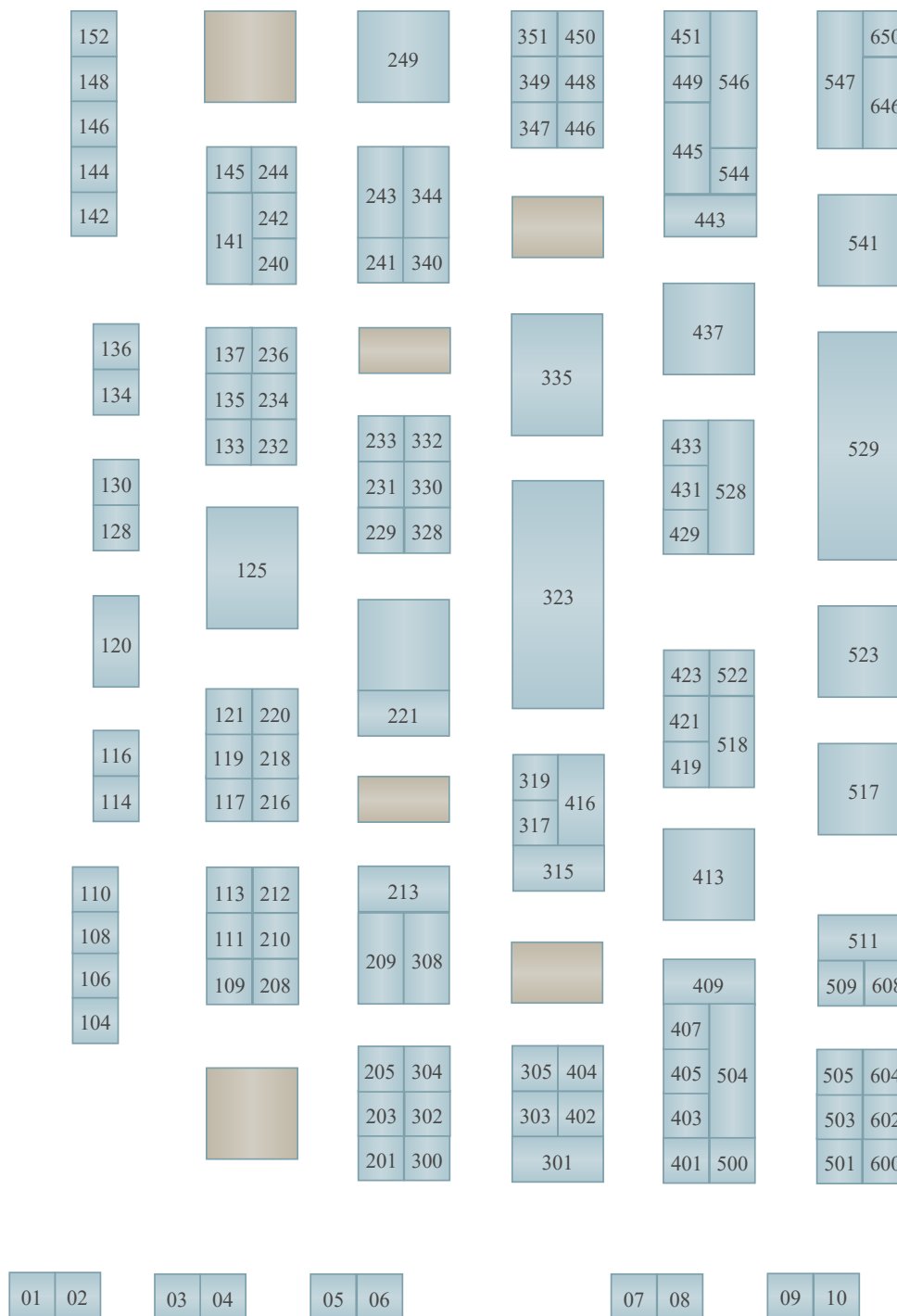
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EXHIBITORS AT-A-GLANCE

Booth # Company Name

| | |
|-----|-------------------------------------|
| 104 | Preformed Line Products |
| 106 | LEAF Commercial Capital |
| 108 | UNITEL Insurance |
| 109 | PacketFlux Technologies, Inc. |
| 110 | Tower One Inc. |
| 111 | BridgeWave Communications |
| 113 | Redline Communications |
| 114 | Vapor WiFi |
| 116 | Innovative Circuit Technology Ltd. |
| 117 | BKD CPAs & Advisors |
| 119 | ExteNet Systems |
| 120 | Bicom Systems |
| 121 | SolidPhone Communications |
| 125 | KP Performance Antennas |
| 128 | PBX-Change |
| 130 | SWG Inc. |
| 133 | Multilink, Inc. |
| 134 | Fiber Broadband |
| 135 | MTI Wireless Edge |
| 136 | Raycap |
| 137 | ARIN |
| 141 | ET Fusion |
| 142 | VETRO Fiber Map |
| 144 | ROHN Products, LLC |
| 145 | Altelix LLC |
| 146 | DragonWave Inc. |
| 148 | PCS Technologies Inc |
| 152 | Flytec Computers |
| 201 | Crossover Distribution.com USA Inc. |
| 203 | Subsentio |
| 205 | Freeside Internet Services |
| 208 | Brink Networks |
| 209 | Saisei Networks, Pte Ltd |
| 210 | Cayman Wireless, Inc |
| 212 | Vitality |
| 213 | American Tower |
| 216 | DirectlinkAdmin - Video Direct |
| 218 | AT&T Connected Communities |
| 220 | Communications Data Group |
| 221 | Mimosa |
| 223 | Baicells Technologies N.A. |
| 229 | Compliance Solutions |
| 231 | Comtrend |
| 232 | Alliance Corporation |
| 233 | COS Systems |
| 234 | Clearfield, Inc. |
| 236 | Comsearch |
| 240 | Grandstream Networks, Inc. |
| 241 | Adaptrum |
| 242 | BillMax Billing Solutions |
| 243 | MBSI WAV |
| 244 | TeleDynamics |
| 249 | Cambium Networks, Inc. |
| 300 | InSite Support Services, Inc. |
| 301 | ReadyNet Solutions |
| 302 | Calix |
| 303 | ispMint |
| 304 | Technologies Management, Inc. |
| 305 | Azotel Solutions4ebiz |
| 308 | Millennium |
| 315 | netsapiens, Inc |
| 317 | LinuxMagic Inc |
| 319 | IgniteNet |
| 323 | Powercode |
| 328 | 1-VoIP Enhanced Services |
| 330 | The FiberSmith Company |
| 332 | MarketBroadBand.com/Lorex, Inc. |
| 335 | Baltic Networks |
| 340 | Eupen Cable, USA |
| 344 | WAV, Inc. |
| 347 | DoubleRadius, Inc |
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| 401 | Multilink Solutions Inc |
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| 404 | Solutions4ebiz |
| 405 | Huawei Technologies USA, Inc. |
| 407 | Pace International |
| 409 | ISP Supplies |
| 413 | RF Elements North America |
| 416 | ViaSat |
| 419 | Microcom Technologies |
| 421 | Select Spectrum LLC |
| 423 | Last Mile Gear |
| 429 | ZTE (USA) Inc |
| 431 | AmCom Solutions |
| 433 | Ritalia Funding |
| 437 | Telrad Networks, Ltd. |
| 443 | SAF |
| 445 | Wireless Connections |
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| 450 | Graybar |

STAGE



Booth # Company Name Booth # Company Name

| | | | |
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| 451 | Siklu | 547 | Winncom Technologies |
| 500 | Mission Critical Energy, Inc. | 600 | StreamVision, LLC |
| 501 | Hutton Communications of Canada Inc. | 602 | Newmar Power/Power Products |
| 503 | Safety One Training International, Inc. | 604 | Morningstar Corporation |
| 504 | Sonar Software, Inc | 608 | Ooma, Inc. |
| 505 | The Fusion Network/Ping Marketing | 646 | Tycon Systems, Inc. |
| 509 | Link Technologies, Inc. | 650 | DASAN Zhone Solutions |
| 511 | Visp.net | 01 | Aviat Networks |
| 517 | Convergence Technologies Inc. | 02 | Rodeo Internet/Rodeo Networks LLC |
| 518 | Convergence Technologies Inc. | 03 | MCP Networks LLC |
| 522 | ServerPlus, LLC | 04 | IsoTruss Industries, LLC |
| 523 | Convergence Technologies Inc. | 05 | EPCOM |
| 528 | RADWIN Inc. | 06 | Windstream Communications, Inc. |
| 529 | Ubiquiti Networks | 07 | Itelite Antennas, Inc |
| 541 | Streakwave | 08 | AFL |
| 544 | Micronet Communications, Inc. | 09 | Aterlo Networks |
| 546 | Winncom Technologies | 10 | Hughes Systique Private Limited |

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332**

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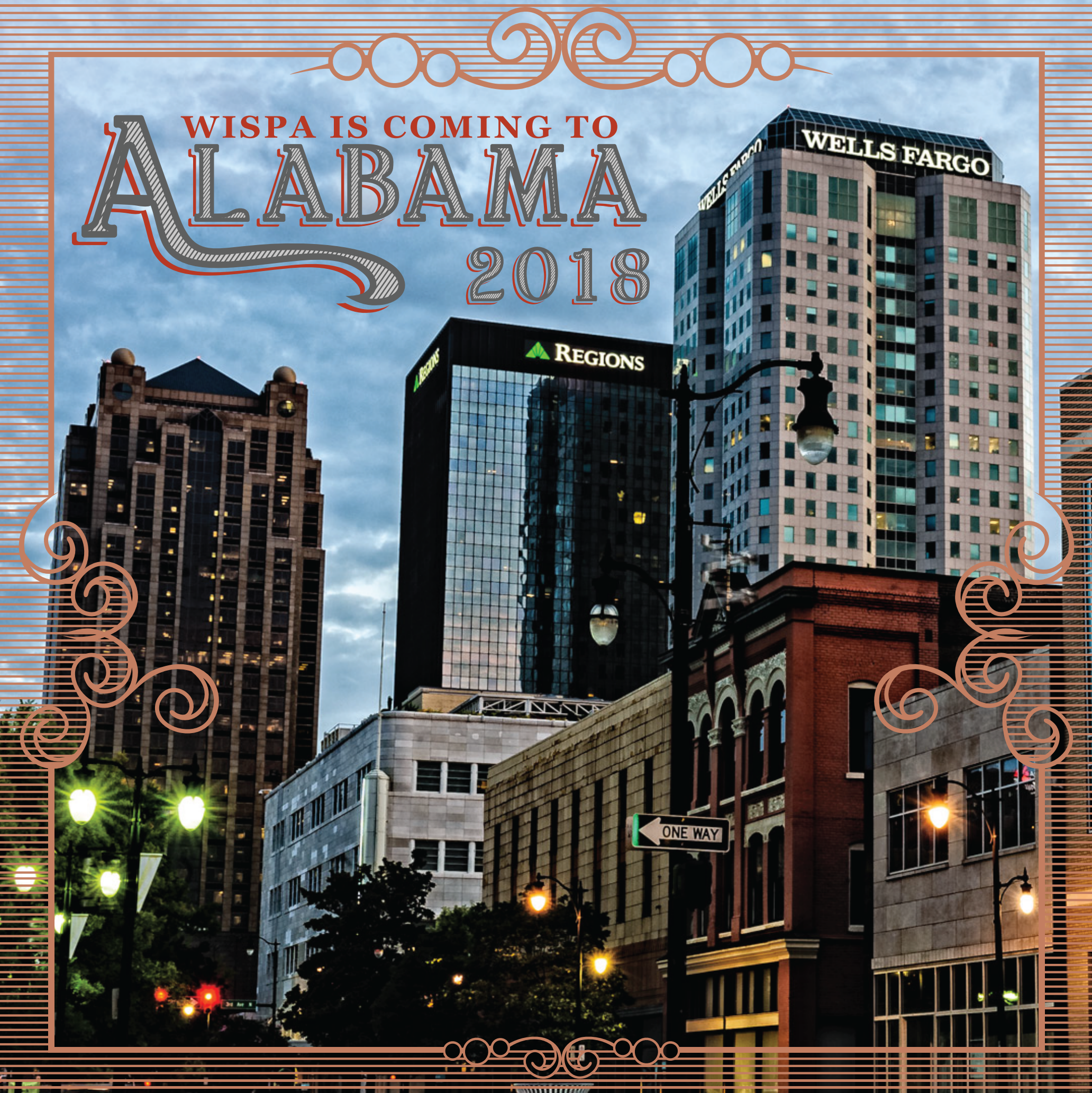


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Baicells Technologies Hits WISP Milestone

Baicells Technologies, a provider of disruptive global LTE solutions, announced today that at WISPA's annual WISPAPALOOZA show that it has crossed the 300 operator mark in North America. More North American wireless internet service providers (WISPs) have chosen Baicells LTE solutions than any other LTE brand, said the company. The milestone was achieved in mid-September 2017, with less than one year of commercial availability that began in October 2016.

Baicells LTE solutions are available for a variety of markets, from IoT to small cell and neutral host, however, the relevant products for the WISP market are its Nova outdoor LTE base stations and Atom family of customer premises equipment (CPE) operating in the 3.65 GHz (and future CBRS) and 2.5 GHz (EBS/BRS) band ranges.

Nova base stations range from a 250 mW model for microcells (e.g. RV parks, campuses, apartment clusters) to a 1 watt model supporting cell ranges up to 14km, and a high power 10 watt model for both the U.S. 2.5 GHz and Canadian 3.5 GHz bands. Atom CPE choices include a zero truck roll indoor modem, as well as 11 dBi and 19.5 dBi outdoor models.

"WISPs face several major challenges only our LTE solution collectively solves," explained Patrick Leary, President of Baicells Technologies North America. "Bandwidth needs have sharply increased in the past few years. WISPs have to keep pace with demand, yet most wireless technologies can't deliver high bandwidth where line of sight is obstructed by trees. LTE as a technology does this much better, but other LTE solutions are costly and complex, being based on products and business models ported over from the mobile carrier market. Basically, they're asking WISPs to cram a platinum round peg into a square steel hole. Baicells built a solution and business model from scratch from the code on up wrapped around and catering to the unique needs of fixed operators, whether they're rural WISPs or private network operators like utilities. We're honored this effort has so quickly resulted in over 300 North American operators choosing Baicells, which I think may be double any other LTE vendor."

"To thrive in this space, WISPs need the right tool for the job, and when it comes

to connecting NLOS customers with high capacity broadband without breaking the bank or requiring a PhD to run it, Baicells has proven to us to be the obvious choice," commented Joshua Powell owner of Illinois-based Rocket

Communications and an early Baicells adopter. "Baicells has even staffed key senior positions with former WISPs to keep them grounded on our needs, and it shows in how their team supports its customers." ○



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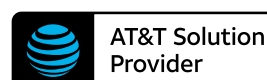
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BridgeWave Unveils Multi-Gigabit All-Outdoor Licensed Microwave Radio Systems

BridgeWave Communications, a provider of wireless backhaul systems, announced the NAVIGATOR single and dual-transceiver licensed all-outdoor gigabit microwave radio systems supporting the 6GHz-42GHz

frequency bands. Built on the company's proprietary custom ASICs, NAVIGATOR delivers ultra-high capacity and features that exceed microwave radios manufactured using off-the-shelf chipsets, said the company.

At prices that "are unmatched in the market," said Bridgewave, the features and flexibility allow operators to optimize networks for the highest capacity and range, while minimizing both upfront investment costs and the ongoing costs to maintain and service networks.

Among the unique features, NAVIGATOR includes the ability to combine dual subcarriers in each transceiver to transport up to 2.75Gbps in the single transceiver radio and 5.5Gbps in the dual transceiver radio; modulations up to 4096QAM with ultra-wide channel bandwidths up to 112MHz (ETSI) and 160MHz (ANSI) to maximize capacity and range; field-replaceable diplexers to minimize product lead times and inventory stocking costs; a dual 10GbE interface that enables a simple, single fiber run to the radio; and an adaptable antenna interface that allows operators to upgrade legacy networks with minimum investment and disruption.

Cost-saving advantages include integrated combining elements that eliminate bulky and pricy external couplers, and OMTs for various multi-channel configurations; a no-touch maintenance port that simplifies upgrades or troubleshooting; and a zero-footprint configuration that makes it ideal for mounting on towers, rooftops, or other structures without the need to shelter equipment and maintain temperature-controlled environments.

NAVIGATOR is available in single and dual transceiver models. NAVIGATOR ST can achieve capacities up to 1.5Gbps per radio using a single carrier, and 2.75Gbps using dual sub-carriers, without requiring any additional equipment. NAVIGATOR DT can achieve capacities up to 3Gbps per radio using a single carrier per transceiver and 5.5Gbps using dual sub-carriers per transceiver, without requiring any additional equipment. NAVIGATOR DT also includes XPIC and MIMO frequency re-use technologies to double capacity using a single licensed channel. XPIC and 2+0 operation are supported using just a single radio. Both the NAVIGATOR ST and NAVIGATOR DT feature field-replaceable diplexers that easily and inexpensively convert to different sub-bands, eliminating the costly need to spare radios in specific sub-bands.

"The pressure on network operators to increase network capacity while reducing costs is unrelenting, and our new NAVIGATOR radios address

(See BridgeWave Story, page 19)

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Customers Drive Innovation for Visp.net's Billing and Automation Systems

Customers get frustrated with their vendors' lack of action in response to their complaints. Often vendors won't even bother to give feedback.

In fact, most companies have no clear plan to make customer suggestions a part of their product improvement cycles. But Visp.net is not your ordinary company. The Visp.net weekly CEO Roundtable meetings for clients take customer feedback to a whole new level because the people that use the platform drive product innovation.

Held on Tuesdays each week, the sessions are designed to uncover what WISPs need to better manage their businesses. Requirements are specified and improvements developed in a team environment, ensuring that released features are what WISPs want, said the company. It was in these sessions that the new HyperRADIUS with SmartSession feature was engineered.

"We learned from clients during our weekly meetings that their inability to control subscriber access in real-time was a problem," said Todd Grannis, CEO of Visp.net. "That's what drove the advancements to HyperRADIUS, which streamlines WISPs' ability to collect past due payments. SmartSession gives the billing managers better control over speeds and usage."

Improvements such as HyperRADIUS with SmartSession further automate payment enforcement. HyperRADIUS gives WISPs greater control over the suspension of past-due accounts and directs

subscribers to make a payment to maintain their service. SmartSession enhancements allow billing and support managers to control speeds and usage limits in real-time, without requiring assistance from network technicians. ○

To learn more about Visp.net, call Dave Thomas at 541-955-6905 or email success@visp.net.



(BridgeWave, continued from page 18)

both," said Sanjay Nagpal, senior vice president, global sales and marketing, REMEC Broadband Wireless Networks, BridgeWave Communications, and SAGE/Satcom. "Our custom ASICs have enabled us not only to deliver breakthrough technology and lower hardware costs to our customers, but to substantially cut the costs of network operations, maintenance, and inventory. Looking ahead, we will continue to drive technology to deliver more of these benefits. NAVIGATOR is the first of several ultra-high capacity, low cost radio systems that BridgeWave will offer in 2018 and beyond." ○

NAVIGATOR is currently in customer trials and will be available for delivery in Q4 2017.

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Bicom Focuses on WISP Growth with New UCaaS Suite

This morning at WISPAPALOOZA 2017, Bicom Systems unveiled the updated version of its tried-and-true UCaaS product suite for WISPs. New releases include Bicom's desktop and mobile UC app, IPPBX UC platform, and Cloud Services Delivery platform.

"We designed COMMSware with WISPs in mind," said Stephen Wingfield of Bicom Systems, "so that you can add new technologies like VoIP and UCaaS easily and affordably." Wingfield further explained that "WISPs have a unique advantage over other companies – you already have a customer and product base. You are perfectly poised to jumpstart the growth of your business and market by adding new technologies like unified communications."

The COMMSware UC product suite encompasses all of the technology and services that companies such as WISPs need to expand, grow or even just get started, said the company. With

seven natively integrating solutions, COMMSware includes a scalable business foundation, a feature-rich communications platform, a provisioning platform for billing and other operations, a UC desktop and mobile app, security, key systems, customer support and more.

PBXware is a turnkey IP-PBX communications platform designed for scalability, flexibility and reliability. Head developer of PBXware Sergej Kasumovic, explained that "PBXware 5.0 unites the latest technologies and in-house innovation in a brand new GUI. We are excited about the fresh design, but the real changes to PBXware are anything but superficial."

SERVERware, a virtualization platform dedicated to communications, is a Cloud IP Services Delivery Platform with 99.999% redundancy and an easy-to-use GUI administration. SERVERware 3.0 is a more powerful and functional update to its predecessor. In keeping pace with

advancing technologies, SERVERware 3 developers updated the underlying virtualization technology to Linux Containers (LXC) and moved to Shared Storage in lieu of Duplication.

But the icing on the Bicom cake, said the company, is its UC desktop and mobile app. The latest release of gloCOM is all about features and ease-of-use. The new desktop version includes improved voice quality for users on limited bandwidth, multi-device support and integration with a range of other applications. gloCOM GO is a mobile app available for iOS and Android. With more features than ever before, the latest version of gloCOM GO certainly lives up to its tagline of "your office in the palm of your hand." Basic communication capabilities have expanded to include transfers to another device, contact, or number, as well as voicemail and individual or group chat. One particularly interesting new feature is geo-location to automatically detect whether the user is in the office or elsewhere and adjust call behavior accordingly. ○

Bicom Systems is showcasing all seven of its unified communications products for WISPs at its WISPAPALOOZA 2017 booth #120.

Think Pink this Thursday

Thursdays at WISPAPALOOZA are always Pink Day, and the folks at WISPA are asking event attendees and exhibitors to wear pink on Thursday October 12, in support of breast cancer research and awareness.

Pink Day is also done to recognize and raise money for METAvivor (www.metavivor.org), a research non-profit that directs 100 percent of all donations to competitive peer-reviewed research with the goal of ending death from metastatic breast cancer. The popular breast cancer fundraising movements give on average only 2 to 5 percent of their research funds to researching metastasis, despite that 6 percent to 10 percent of initial breast cancer diagnoses are metastatic, while 100 percent of breast cancer deaths occur because of metastasis, and almost 100 percent of people whose breast cancer has metastasized will die from it.

WISPAPALOOZA participants that would like to make a donation in honor of Pink Day can head to <https://secure.metavivor.org/page/contribute/Wispapalooza2017>, with all proceeds going to METAvivor.



DASAN Zhone Regains NASDAQ Compliance

DASAN Zhone Solutions, Inc. (formerly known as Zhone Technologies, Inc.) (NASDAQ: DZSI), announced that on October 4, 2017, the company received a letter from The NASDAQ Stock Market LLC stating that the company has regained compliance with Nasdaq Listing Rule 5250(c)(1) and is in compliance with other applicable requirements required for listing on the Nasdaq. Accordingly, Nasdaq has determined to continue the listing of the company's securities and has closed this matter.

As previously reported, on April 6, 2017, May 17, 2017 and August 21, 2017, the Listing Qualifications Staff of Nasdaq notified the company that it was not in compliance with Nasdaq Listing Rule 5250(c)(1) due to its failure to timely file its Annual Report on Form 10-K for the year ended December 31, 2016 and its Quarterly Reports on Form 10-Q for the periods ended March 31, 2017 and June 30, 2017, respectively. ○

KP Performance Displays 'Total WISP Solutions'

KP Performance Antennas, a manufacturer of WISP antennas and accessories, is exhibiting this year at WISPAPALOOZA alongside additional complementary brand-name companies from its parent company Infinite Electronics' portfolio of businesses.

Joining KP in booth #125 will be RadioWaves Inc., an industry supplier and manufacturer of microwave back-haul antennas; L-com Inc., a supplier of wired and wireless connectivity solutions; Pasternack, a provider of in-stock RF, microwave and millimeter-wave components; Kaelus, a manufacturer of T&M and RF conditioning equipment; and PolyPhaser, maker of lightning and surge protection products.

Each company being represented at this booth holds a unique position in the WISP and telecom supply chain. Having all six companies in the same booth helps demonstrate a complete competency and solution to WISPs requiring both front- and back-end products and everything else in between, said the company. Customers and potential customers visiting the booth will be able to see firsthand the many products and solutions offered by these companies, such as various antennas from parabolics, reflector dishes, sectors and feed horns, to cables and connectivity options, to portable PIM analyzers and RF conditioning products, to surge protection.

"WISPAPALOOZA provides the perfect venue to demonstrate to this industry that our companies can provide a complete product solution for WISPs and telecoms alike. As longtime WISPA members and exhibitors at this great show, we are excited to show off a complete product offering from our sister companies, an opportunity that being part of a larger organization affords us," said Ken Caird, Vice President and General Manager of KP Performance Antennas. ○

Siklu Booth #451

Siklu will be raffling off three terminal units to anyone purchasing a starter kit. Stop by for special WISPAPALOOZA pricing on a base unit + 3 x terminal units.



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Sindelar Named Calix CFO

Calix, Inc., the world leader in Subscriber Driven Intelligent Access, announced that Cory Sindelar was named Chief Financial Officer, effective immediately. Calix engaged Sindelar as interim CFO in May and he has made significant progress in bringing increased operational rigor to Calix. Sindelar brings extensive experience leading finance teams at high-growth software and technology companies.

"Cory has done an outstanding job working with our leadership team to establish new processes that are already increasing our financial visibility and control of operations. In particular, Cory has partnered with Greg Billings, our senior vice president, services, as we set our services business on a path to success," said Carl Russo, Calix president and CEO. "As Calix transforms into a cloud, software, systems, and services company, Cory's experience in software and systems businesses will be a tremendous asset. We are fortunate that he has stepped in so effectively over the last few months, and we are confident that he will help accelerate our transformation."

Prior to joining Calix, Sindelar served as Chief Financial Officer at Violin Memory where he helped Violin transition from a privately held to a public, multi-national technology leader. Prior to his time at Violin Memory, Sindelar was CFO of Ikanos Communications, where he led an aggressive growth strategy. He also has served as Vice President, Corporate Controller, and Principal Accounting Officer at Legato Systems. Following EMC's acquisition of Legato, Sindelar held a variety of senior financial positions.

"I'm truly excited to join Calix as CFO at this critical point in the company's history," said Sindelar. "We are building a new company – one ready to seize the opportunity created by the massive growth in subscriber demand for bandwidth and the explosion of IoT devices. I've already seen the differentiable value that Calix is delivering to our customers every day. I look forward to leading our finance team and guiding our efforts to optimize our execution so we can scale and drive shareholder value." ○

Rodeo Puts the TV Into the Wireless Triple Play

In conjunction with the launch of Rodeo TV, Rodeo Internet is now Rodeo Networks. The new name represents the introduction of true fully licensed television programming over Rodeo's new IPTV service designed for multi-platform delivery systems.

"Finally, we can deliver TV for wireless operators who have been looking for a way to deliver their customers the TV aspect of the Triple Play," said Frank Befera, Vice President of Video Services at Rodeo Networks. "From the Big 4 Networks to ESPN, Discovery, History Channel, HDTV, and HBO, we have the programming covered."

In addition to content delivered via fiber, wireless, or satellite, Rodeo Networks is providing a complete hardware complement (set top boxes and head end), the availability to use licensed and unlicensed spectrum, consulting, engineering, marketing, and management. In conjunction with WISPAPALOOZA, Rodeo Networks is providing "white label" branding at no cost (a \$1,400 value). Market exclusive territories are also available on a first come first served basis. Operators who sign up for market exclusivity during the show will receive their first 90 days of content for free. ○

AMCOM Solutions Booth #412

Check out AMCOM's booth for a chance to win its popular "Bottle-a-Day Giveaway." AMCOM is also a 50/50 Sponsor so get your ticket stamped while visiting.



WISP Industry's Elizabeth Bowles to Head FCC Broadband Committee

A former leader of the Wireless Internet Service Providers Association has been named to head a Federal Communications Commission (FCC) advisory committee on broadband deployment.

L. Elizabeth Bowles, president and chairman of Arkansas-based Aristotle, Inc. and a former board member of WISPA, was appointed by FCC Chairman Ajit Pai to serve as chair of the agency's Broadband Deployment Advisory Committee (BDAC).

In the announcement, Chairman Pai said Bowles "has made great contributions to the BDAC and its working groups already, and she brings to the table a combination of talents and expertise that will serve her well in this new role. I thank her in advance for her leadership

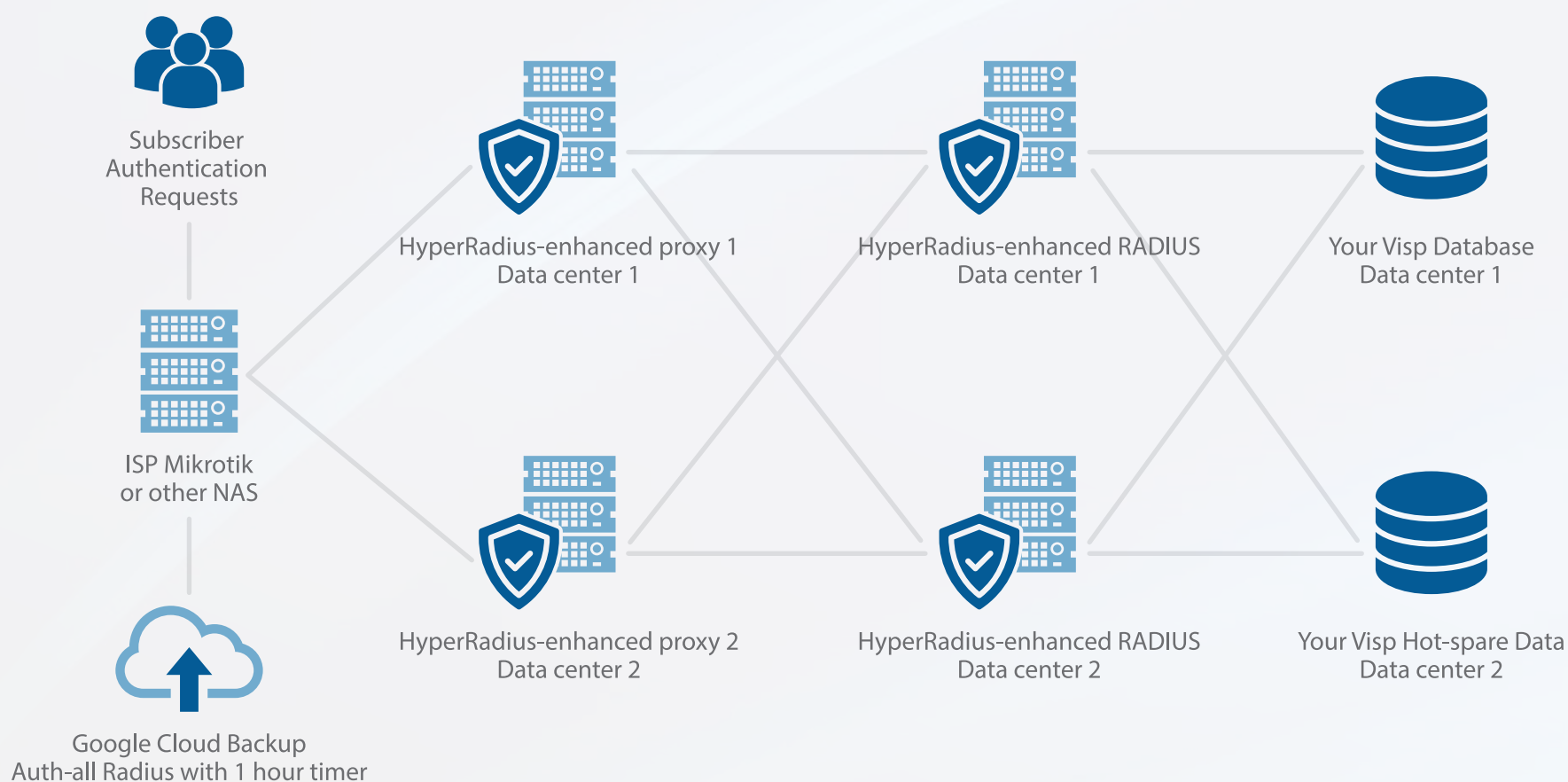
of the BDAC as it develops recommendations to accelerate broadband deployment and close the digital divide."

"WISPA congratulates Elizabeth on her appointment to this important role," said Jimmy Carr, CEO of Virginia-based All Points Broadband and Chairman of WISPA's Legislative Committee. "Elizabeth is a consensus builder who will bring valuable perspective to advance the important objective of delivering connectivity to all Americans."

Chairman Pai formed the BDAC in January 2017 to provide advice and recommendations to the Commission on how to accelerate the deployment of high-speed Internet access. The BDAC will offer recommendations to the Commission for a two-year period. ○

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