

# Dallas Summit: New Strategies and New Technologies for Rural and MDU Deployments

At the jam-packed Broadband Properties Dallas Summit, attendees shared ways to expand FTTH despite the slowdown in greenfield construction.

By Masha Zager and Steven S. Ross ■ *Broadband Properties*



Summit 08 photos by Steve Ross

**Dan O'Connell, head of Verizon Enhanced Communities, details MDU plans.**

**F**iber-to-the-home deployments continue to expand despite a weak economy. Broadband Summit attendees and speakers agreed that the economic downturn has hurt greenfield deployments – the low-hanging fruit, because fiber costs about the same as

copper in new construction – but offers far more bandwidth and reliability, along with lower maintenance expense.

Picking up the slack are deployments at both ends of the population-density scale – rural and MDU. The increased pace of MDU deployments this year

was expected, thanks to the new wave of bend-tolerant fiber led by Corning Cable Systems. The fiber itself is easier to deploy, and also allows smaller junction boxes and other in-building equipment. But the scale of the ramp-up has been remarkable. The first FiOS MDU build, Dedham Junction, was reported in detail by this magazine in June 2006 and was lit that fall. As the Summit got under way in the last few days of April, Verizon was close to signing a franchise deal, since finalized, with New York City to bring FiOS to 3.5 million households, mostly MDU, by 2014.

More surprising was the interest in rural deployments. Lower cost of capital to build fiber networks was one reason. And so is the general realization among investors and lenders that fiber has no extra “technology risk” compared to copper – there are abundant contractors to do the design and construction work, and plenty of vendors ready to sell proven equipment. And municipalities now have quite a bit of documentation on the social and economic benefits of fiber to the home and to businesses.

But the biggest surprise is that rural

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### MORE SUMMIT COVERAGE IN UPCOMING ISSUES:

- Legal Affairs Panel
- MDU Low Voltage Workshop
- Municipal Success Stories



**Full house as Mike Render of RVA delivers the latest data on FTTH deployments. For the exciting details, see last month's cover story.**

fiber networks offer a strong business case on their own, at least at housing densities of more than about eight dwelling units per mile of roadway frontage. While there are areas in the Midwest and West that can't reach that threshold, many "rural" areas do. The biggest reason? With so little rural competition, rural take rates are often 40 percent or more – at least double what can be expected in a competitive suburban overbuild with 50 or 60 homes per mile. Rural builds can use aerial fiber, frowned upon in urban and suburban settings. And rural customers often want more services, at a higher monthly price, than do urban and suburban residents. Finally, small town centers in rural areas often have higher densities than suburbs – 100 dwellings per mile is not uncommon in older rural communities.

**RURAL SUCCESS**

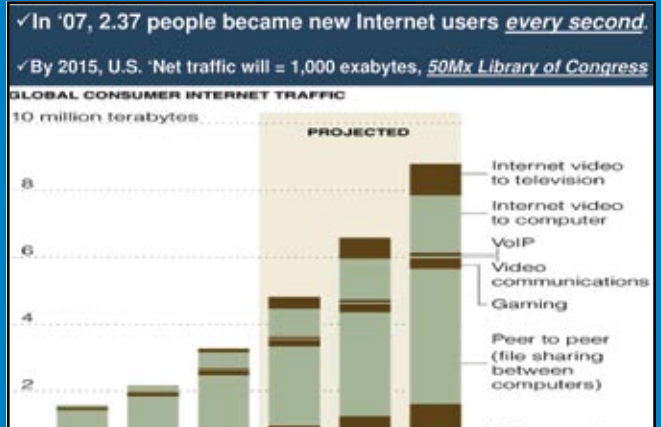
Dan Rogers, CEO of the Kendall County Economic Development Corporation, lauded the local telephone company, GVTC – the largest telephone cooperative in Texas and an early fiber deployer. Its service area spans 2,000 square miles and 11 counties, and includes more than 32,000 members with approximately 42,000 access lines. GVTC is willing to work with him to promise fiber to relocating or growing businesses. "If you don't have a provider that will work with you, either find one or change your outlook," he said.

Rogers said the county, just outside San Antonio, is growing fast. "What's critical for us is not being eliminated by corporate site selection committees," he said. "Quality of life is necessary to attract businesses, and the business

community is looking to all the utility providers to help. If I don't have fiber, I'm eliminated – not just fiber to the business, because the executives are commuting to San Antonio and want to work from home because of gas prices. Fiber allows throughput and security."

"To us in small-town America, fiber is becoming the most important thing," Rogers noted. "Advanced technology companies and medical companies are looking for fiber." He cited three examples:

- A small software company relocating from Houston – "we were able to get them because we had fiber. Otherwise they would have gone to San Antonio."
- A software company in Boerne [in Kendall County] would have had to move to San Antonio, but they



**Bruce Mehlman says annual Internet traffic will reach 1,000 exabytes by 2015. At current investment rates, networks won't have enough bandwidth.**



**Richard Holtz of InfiniSys leads the MDU low-voltage workshop. Watch for full coverage in an upcoming issue.**

stayed because of fiber. Their big client is FedEx.

- An aerospace company in Boerne asked for a package to compete with four states. It was the largest project in the history of Kendall County, and they won it. The company is moving into a new facility with fiber.

**WIRING MDUS FOR FIBER**

In his keynote, Daniel O’Connell, National Sales Director for Verizon Enhanced Communities, sounded at times more like an old-style private cable operator than an executive of one of the world’s largest telecommunications companies. “Our process is consistent but the designs are unique,” he said. “Every MDU is different. Each owner has control over the way FiOS is implemented in their building.”

Verizon recently reorganized the deployment process, O’Connell said. Now, sales managers negotiate with owners for permission to build the MDU system and market services to residents. Also, sales engineers have become “liaisons, troubleshooters, coordinators” for both MDUs and MTUs. As before, a separate staff of network engineers actually designs the network. Verizon is constantly trying to identify MDUs where it is possible to build out FTTP and contacting owners. If an MDU owner agrees, Verizon:

- Does a site survey to verify FiOS capability
- Designs a solution

- Signs the agreement
- Prepares a detailed design
- Gets the owner’s design approval
- Builds the system
- Trains the staff
- Launches and supports the service.

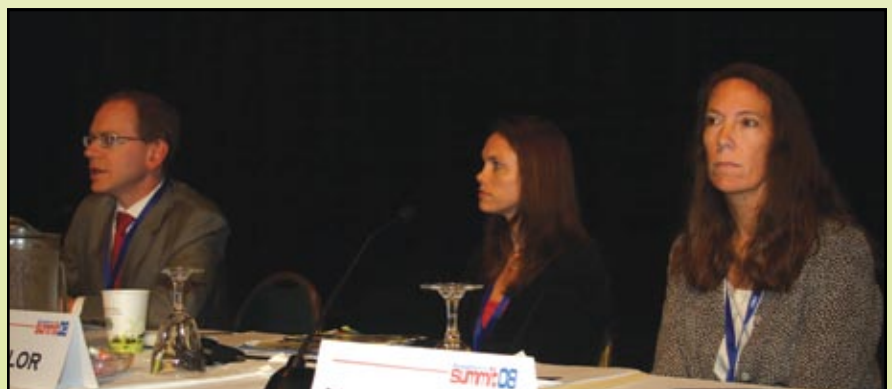
Verizon “almost always” uses existing in-unit wiring, except for the run from the ONT to the first jack. Even Cat 3 wiring in the unit is OK, O’Connell said, if the ONT is inside the living unit. “If not, it’s more of a problem.”

The tenant has to be there for the installation, but Verizon tries to get the tenant to agree to entry for maintenance, even if no one is home.

Verizon prefers the ONT to be inside the living unit, but it’s not necessary. In highrises, Verizon brings the fiber to the property and puts the hub in the basement. Usually, fiber distribution terminals lead to an ONT in each unit. Verizon, like the cable company, wants to use cove moldings in the hallways to cover coax and fiber. But it uses separate raceways for each.

Verizon also uses MDU ONTs in the basement, with each ONT serving more than one unit. The units have a network interface, but cross connection to other wiring is done in the basement. Distribution can be via VDSL or Ethernet. “Distance limitations come into play,” said O’Connell, who brought a technical expert with him but handled questions about the technology with aplomb. “We place enough ONTs for an early launch, then add more as service orders come in. Or, we can put MDU ONTs in the riser closets, also with NIDs in the units.” The engineering drawing specifies all of this for the MDU owner – how many fiber distribution terminals, which units, and so forth.

In a garden-style MDU, the hub is outdoors with a trench to the FDT, then molding up the outer wall. The fiber enters the unit through the wall under the eaves, or through the attic. Verizon matches the molding to the wall “if pos-



**Drew Clark (far left), executive director of BroadbandCensus.com, chaired a session on how rural America is “mapping its way to advanced broadband.” Laura Taylor, chief analyst for Connected Nation, detailed the way her organization – an offshoot of ConnectKentucky – gathers information from providers. Brenda van Gelder (far right), director of the eCorridors program at Virginia Tech, says her organization has been accepting such data as speed and reliability from customers themselves, and mapping the data in real time.**

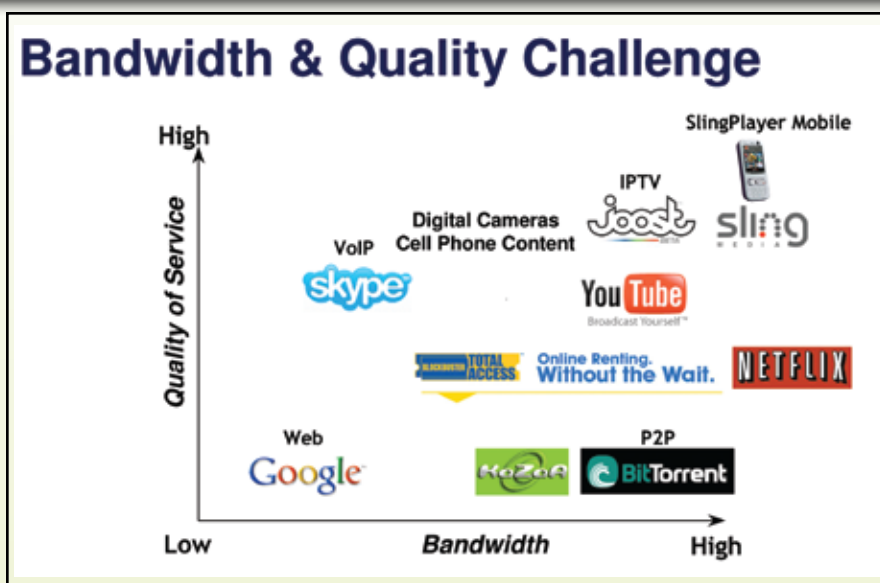
sible,” O’Connell said. If a storage shed exists, the conduit can be inside. Or, there can be an external hutch for an MDU-ONT. The FDT may be buried underground.

O’Connell said most subscribers take the premium video package with 200+ channels, widgets, HDTV, and the potential for interoperability of devices within the home, media management, and other converged services. Service of 10 Mbps down and 2 Mbps up is basic nearly everywhere, and there are options for 20/2, 50/5 and 20/20. “We can actually deliver the advertised speeds if we’ve designed the network correctly,” O’Connell said.

Local insertion of video for video surveillance and similar needs like telemedicine are “a challenge,” said O’Connell, because FiOS is a passive network. “We’re well aware of the need and are working on solutions,” he said.

**MDU OWNERS’ VIEWS**

How do MDU owners cope? Chris Acker, director of the building technology services group for Forest City Resi-



This graphic by Mark Boxer of AFL explains various services’ demands on quality as well as bandwidth. Search engines are easy to handle. Web video is not. But file transfer by BitTorrent protocols – now about a third of all bandwidth demand – does not require a particularly clean connection.

dential Management, chaired a blue-ribbon panel on MDU technologies and trends. They found that excitement over new amenities should not replace common sense about business cases.

Larry Kessler, president of Intellible, noted that “It’s easy for us to be tech junkies. There’s lots of great technology out there that can improve the business model. The hurdle is spending time up front to ask ‘why.’ You’ll reach a big hurdle during implementation if you don’t know why you’re doing it.”

Kessler said, “There’s so much to buy and learn, it’s overwhelming. Can you implement it all? Can your infrastructure handle it? Does your maintenance guy need to be a techie? What kind of partnership do you have with providers? Are they the only ones who can fix it if something goes wrong? How can technical services change the way you run your business, in a positive way? What data needs to be presented to whom?”

Joe Bousquin, contributing editor at Multifamily Executive, put the question this way: “Is the technology you’re planning to install going to attract more residents?” He pointed out that in today’s market, MDU owners are getting competition from house owners who are renting out their houses.

Henry Pye, Assistant Vice President of Resident Services and Technology at JPI Partners, said, “People want to install the ‘technology of the month’ without finding out whether residents want it.

Strategic Telecommunications Planning Matrix			
Planning Component	Technical	Business/Financial	Governance, Management & Regulatory
Strategic Plan	<ul style="list-style-type: none"> <li>Identification of incumbent and potential competitive service (backhaul) providers</li> <li>Capabilities / assets / services of potential partners</li> <li>Restrictions on use of assets / capabilities of any potential providers</li> <li>Assessment of actual vs. perceived relationship with service (backhaul) providers</li> <li>Definition of technical desired outcomes of project</li> </ul>	<ul style="list-style-type: none"> <li>Definition of vision and purpose of the project</li> <li>Desires economic development outcomes</li> <li>Create high level business model</li> <li>Identify funding sources and associated requirements/restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Investigate applicable federal, state, and local regulatory issues</li> <li>Identify potential stakeholders</li> <li>Evaluate alternative organizational structures</li> </ul>
Tactical Plan	<ul style="list-style-type: none"> <li>Detailed network (and backhaul) design/engineering RFP (Request for Proposal) development</li> </ul>	<ul style="list-style-type: none"> <li>Initial funding plan and budget</li> <li>Projected revenue model</li> </ul>	<ul style="list-style-type: none"> <li>Memorandum of understanding re: organizational structure</li> <li>Necessary legal work</li> </ul>
Operational Plan	<ul style="list-style-type: none"> <li>Implementation project management</li> <li>Network management</li> </ul>	<ul style="list-style-type: none"> <li>Customer service and billing/front-office operations</li> <li>Financial management/back-office operations</li> <li>Marketing</li> </ul>	<ul style="list-style-type: none"> <li>User group forums</li> <li>Rate setting and analysis</li> </ul>

**Brent Engle and Jim Goldman of InfoComm Systems and Stephen Mayo of Intelconnect argued in prepared remarks that standardized processes to discover, evaluate, deploy and manage strategies can provide consistent results. They also warned that distance from major metro connectivity will have a significant impact on service capabilities and costs. Even cities located along major fiber routes may not have access to the fiber. Examples include Plymouth, LaPorte, and South Bend, Indiana, as well as Clemson, SC.**

### Customer Training



### ODF and splice training



### Testing and measuring



### Calibrating blowing equipment



### Quality control



How training is done in Denmark. Ian Gordon Fudge, trainer with Fiberdk Aps, has taught more than 6,000 fiber optic installers, mainly in Scandinavia, in three different languages. He developed eight fiber optic courses for the Danish state training system, as well as the fiber optic courses for Iceland. In several of his FTTH courses, students have built complete towns with 350 houses.

Owners have installed iPod docking units or 42-inch plasma screens in apartments, and found that they didn't offer enough value to tenants to make it worthwhile."

He added that there's no "average" resident. "There are many segments of the market, and you have to understand each of them."

Bob Faitz, vice president for ancillary services at AMLI Residential, said first cost is only part of the equation. "What will it cost us to maintain? Will the de-

### RBR Standards

G.657 Bend Performance and Compatibility

- G.657 distinguishes two different classes, A and B.

**Class "A"** – Roughly 10 times better in macrobending performance than traditional single-mode fiber, with full backward compatibility to traditional fiber (meaning the fiber is compliant to G.652.D)

**Class "B"** – A truly bend-insensitive class, showing roughly 100 times better bending performance than traditional single mode fiber, and about 7 to 10 times better performance than "Class A". Backward compatibility to G.652D fiber has not been required, since one of the implementations included in this class B is a fiber design using very low mode field diameter (about 6 to 8.5  $\mu\text{m}$ ).

Bend Radius (mm)	Class A dB/turn	Class B dB/turn
7.5	~1.0	~0.1
10	~0.3	~0.03
12.5	~0.1	~0.01
15	~0.03	~0.003

### RBR Fiber Types and Performance

- Small Diameter Core Design**
  - G.657 Table A compliant and G.652D compatible
  - OTDR directional testing issues
- Extreme Small Core Design**
  - G.657 Table B Compliant
  - Not Table A compliant due to splice loss with G.652D fibers
- Optimized Matched or Depressed Cladding Designs**
  - G.657 Table A compliant and G.652D compatible
  - Bend Performance is marginal and 1550 & 1625 wavelengths show high IL around a 10mm and 15mm radius' respectively
- Void Assisted Design**
  - G.657 Table A and B compliant (G.652 compatible)
- Trench Assisted Design**
  - G.657 Table A and B compliant (G.652 compatible)

### RBR Performance

Example - Typical G.657 A & B compliant RBR cable vs. SMF

- A zeroed 1550 test setup below demonstrates the Insertion Loss performance of both a Standard SMF and a typical table A&B Compliant RBR cable when wrapped around a pencil

Setup	Insertion Loss (dB)
1550 Reference	0.00
Standard SMF	-1.24
RBR Fiber	-0.19

Tom Leblanc, ADC Product Manager for FTx-MDU products, notes that RBR – reduced-bend-radius – fiber has vastly simplified MDU deployments. Here, he summarizes the various technologies for making such fibers, and the standards that apply to them. Not all fibers are easy to splice into existing systems or connect to standard network feeds.

vice disappear when the tenant leaves? How does it compete with what the other guy down the street is offering?" As an example, Faitz noted that residents want to be able to control energy costs if they have to pay them. "People are seeing escalating costs and asking us questions about utility bills and com-

mon charges. We do put in Energy Star appliances and metering."

Sustainable technology takes more time and money, and operating expenses go down. But Pye said the savings in the common areas aren't yet enough to pay for energy monitoring, a frequently cited use of broadband. "You have to charge

extra rent as well. It amounts to a 3-to-4-percent price increase. You need to get third-party verification that you can get the higher rent – in some metropolitan areas, you can. Air quality ranks high on resident preferences. You need to put a LEED flag on the front door [showing Leadership in Energy and Environmental

Welcome to Berkshire Broadband

You are signed on as Test Account 2

## WORKSHOPLIVE

### Professional Guitar, Keyboard Bass and Drums Lessons

- Over 2,200 Lessons featuring 16,600 videos with notation, tab and chord charts and diagrams
- Songs from Zeppelin - Green Day - Elvis - Clapton
- Complete courses for Beginner - Advanced
- 50+ Professional Teachers
- Interactive Practice Player
- Printable Lessons Exercises
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A Steeplechase Network

## Steeplechase Video

LOG IN

EMAIL: [input]  
PASSWORD: [input]  
[login] [reset]

Forgot your password?

SIGN UP

NAME: [input]  
EMAIL: [input]  
PASSWORD: [input]  
CONFIRM PASSWORD: [input]  
[sign up] [reset]

Record, Edit & Share Videos

Transfer Videotapes

SIGNING UP IS EASY!

It's easy. Share now!

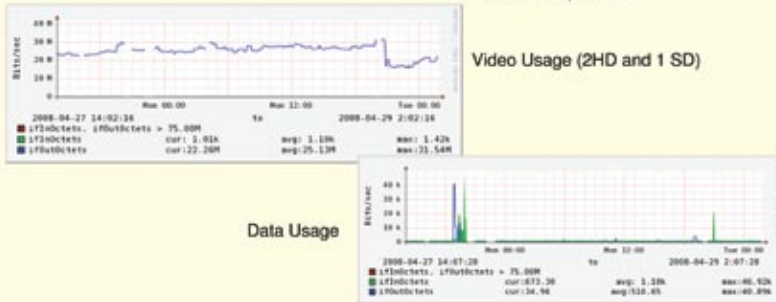
- 1 Sign Up & Install
- 2 Add Video
- 3 Share!

**Beyond the triple play: Two services offered by Steeplechase Networks – music lessons and personal media.**

Setting the Standard

## Remote Management

- Invest and implement an SNMP mgmt system
  - Solarwinds
  - Zenoss
  - HPOpenView
- OSS/BSS and NMS Integration
  - Monitor from desktop to demarc to headend
  - Visibility of Ecosystem
    - IP box stats
    - Edge and Core Switches
    - RF Issues/Variables
    - Bandwidth per unit



**YRT2 ([www.yrt2.net](http://www.yrt2.net)) is one of a new class of comprehensive, full-service providers for essential telecommunication utilities such as digital telephone, digital television programming, high-speed Internet and 24/7 monitored security.**

Design certification]. And what do you do if [making your new buildings energy-efficient] devalues your existing units?"

Communicating the value of a green building to prospective tenants isn't easy. Residents say they'll pay more, but

they rarely will. Banks won't give you money for sustainable technology. Pye recommended submarket analysis. "On the East and West Coasts and in places like Austin, the value is more evident. Also, LEED certification is something

you can promote. But it is a challenge. You need 40 percent more design time and better architects."

Ashley Chaffin Glover, president of Velocity Utility and Billing Services, said online billing systems should present enough information for customer action, and must be constantly refreshed. "Interactivity is important," she said. "It should allow service requests and enable residents to get alerts. And it should align with the other messages the residents are getting."

### CONSERVATIVE CASE FOR A NATIONAL BROADBAND POLICY

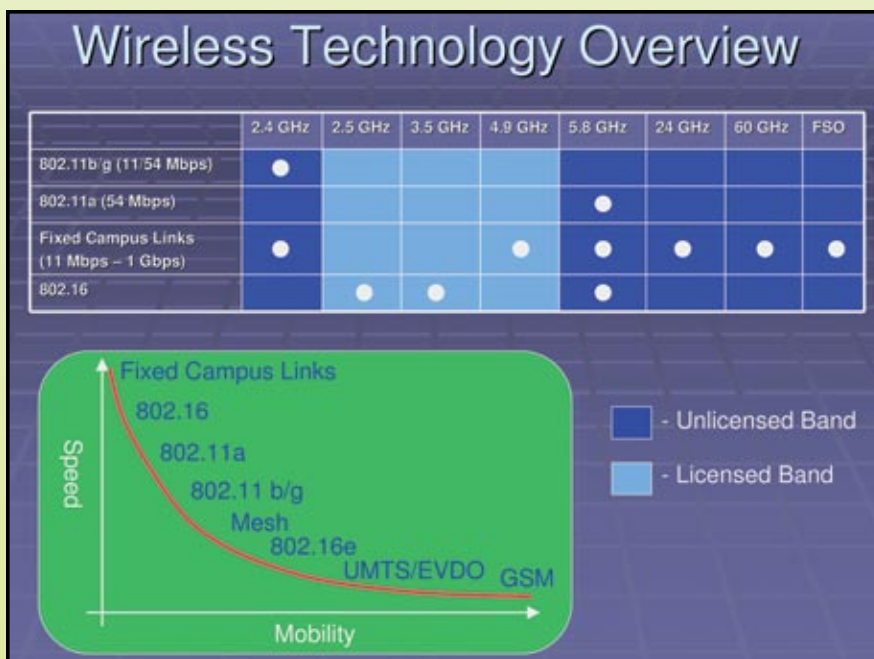
A national broadband policy would accelerate the deployment pace even faster, conferees predicted. Bruce P. Mehlman, cofounder of Mehlman & Vogel, Inc. (a public affairs consulting firm – think "lobbyist"), former Assistant Secretary of Commerce for Technology Policy, and cochair of the Internet Innovation Alliance, made what he called a "conservative case for broadband policy" at the federal level.

He started by saying that the market is working: Broadband use and capacity is growing rapidly in the US. But "it isn't as good as in many other countries." Although the benefits from potential broadband use are enormous, he said, in such fields as "economic development, education, retraining, energy conservation, health care... social benefits are greater than the private returns on investment."

To discourage cream-skimming by big operators, he insisted that "conservative public policy would say public investment might make sense in areas that are not going to get served by the private sector."

"Clearly there is some level of market failure," he said. Mehlman praised ConnectKentucky's data-gathering on behalf of all potential broadband providers and local governments, and One Economy for expanding broadband into low-income housing. He also praised the FCC for finally implementing a better definition of broadband. Next, he said, we should:

- Get more spectrum for mobile, wireless communication into private hands.
- Provide tax credits for investment in next-generation networks.

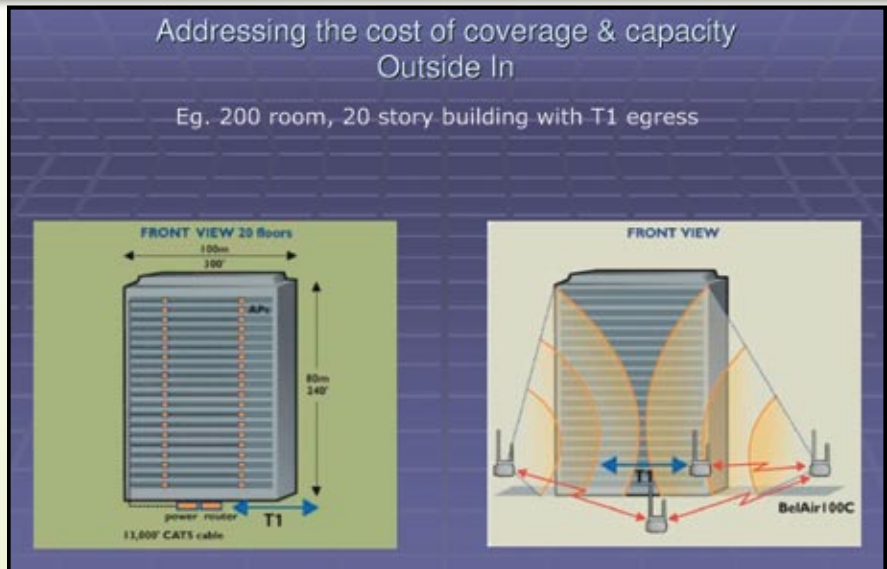


**Sometimes wireless is the only practical choice to deliver broadband, said Dave Park, vice president for product marketing at BelAir Networks; here he summarized wireless technologies.**

- Require public housing to have broadband.
- Encourage community support for digital literacy and education.
- Encourage deployment of what he called “transformational” applications in such areas as energy conservation and health care.
- Encourage community leaders to help make the business case for private providers.
- Protect consumers from Internet abuse.

He also said there is a role for cities, rather than the federal government, in putting themselves online and helping to aggregate demand. He added that cities could help by lowering taxes on communications installations and by being more accommodating with rights of way. He claimed that the effective tax rate on telecom companies is around 13 percent, double that for American business as a whole.

Mehlman called public open access networks “useful as a threat [to incumbents],” but said he is “worried about communities borrowing to build a low-end network, then being eclipsed by the private sector and losing the money.” That brought jeers of derision from the crowd. One audience member suggested following the model used to deregulate the electric industry, where infrastructure and service are separated, to at least defuse the net neutrality debate. But Mehlman said the IIA “has stayed out of the net neutrality debate – we have people on both sides. But I worry about separating infrastructure from services. The infrastructure owner would have no incentive to upgrade.” **BBP**



**Dave Park shows how external WiFi transmitters penetrate structures rather imperfectly; wireless hotspots must be carefully engineered.**



**Henry Pye of JPI Partners assembled much of the Summit’s enthusiastically received MDU program.**



**Alloptic specializes in combining conventional passive optical networks with analog video.**



**This battery backup from Alpha just flush-mounts to a wall.**