

RURAL telecom

The Magazine
of Rural Telco
Management

MARCH - APRIL 2016

Making Health Care Accessible via **Telemedicine**



- 24**
Rural
Broadband
Experiments:
A Status Report
- 30**
Technology
@Work
- 34**
Online Gaming
Gains Traction



There's no better strategy
for impacting rural
telecommunications
policy than active,
consistent and focused
advocacy efforts.

> National Advocacy

Our National Advocacy professionals have more than four decades of experience in the Federal legislative and regulatory arenas. With this experience, GVNW's team of advocacy experts offer a valuable resource to help you achieve your company's policy agenda on both the National and State levels.

GVNW's National Advocacy Service team has been successfully advancing the policy agenda of our clients for years.

- Identify key issues confronting your business
- Develop proactive advocacy plans tailored to meet your concerns and needs
- Customize a communications strategy that anticipates issues and enables your company to advance its policy agenda
- Monitor legislation and Federal policies for potential impact on rural telecommunications issues affecting your company
- File comments with the Federal Communications Commission on your behalf
- Develop testimony for Congressional hearings

Midwest Division
Colorado Springs, CO
719.594.5800

Western Division
Tualatin, OR
503.612.4400

Springfield, IL
217.698.2700

Southwest Division
Kerrville, TX
830.896.5200



CONSULTING
Your goals, our guidance,
building success.



Take control of your network...

Take control of your business.

Our goal is to help you take full control of your business and ignite profitability & growth.

As a rural telco, you have your own unique challenges. Your customers are asking for the newest services, and there are pressures from the government to help close the digital divide. You recognize the need to invest in your network, but providing service to low density areas is incredibly costly. On top of that, your legacy infrastructure limits the capabilities of your business, and is quickly becoming a large risk.

As a subsidiary of a quad-play service provider (SaskTel) with over a century of experience expanding rural networks, SaskTel International is well-positioned to understand the challenges of your business, and how to move your company towards your strategic goals.

Visit our website today to schedule an Introductory Call!

www.sasktelinternational.com | info@sasktelinternational.com

Software Solutions

Customer Relationship Management
Billing
Order Management
Inventory Management
Activation
Assurance

Professional Services

Communications Consulting
Operational Effectiveness
Design & Deployment
Managed Services



OPTIMIZE YOUR NETWORK



TRANSFORM CUSTOMER EXPERIENCE



INCREASE REVENUE

SaskTel 
International
connecting the world

CONTENTS

In Every Issue

6 FROM THE TOP

8 SHORT TAKES

10 #RURALISSOCIAL

12 CONNECTIONS

The Road to Universal Service

By Shirley Bloomfield

14 PERSPECTIVE

Analysis Before Buildout:

Lessons From a Fiber Project

By William Trelease

37 ADVERTISERS INDEX

Departments

40 RISK MANAGER

How to Limit Your Cyberliability Risk

By Marilyn A. Blake

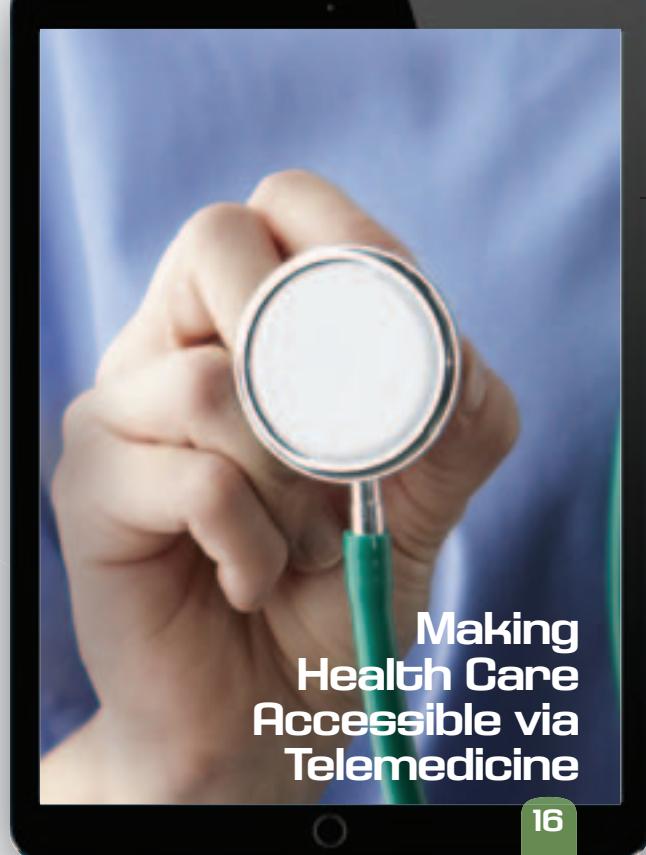
44 VISUAL DATA

Wireless Gets Easier. And Tougher.

46 CES RECAP

What I Saw at CES

By Joshua Seidemann



Making Health Care Accessible via Telemedicine

16

By Rachel Brown

Consumer health care advocates have long hoped that telemedicine can help rural Americans gain access to care they might not otherwise receive. Fortunately, numerous rural telcos have stepped up to the plate and are working with their local health care providers to deliver high-quality care via telemedicine systems and solutions.

COVER ILLUSTRATION BY SAM FERRO
IMAGES: BIGSTOCK

RURAL Telecom

Rural Telecom (ISSN: 0744-2548)

March•April 2016

Bimonthly, Vol. 35, No. 2

Subscriptions to Rural Telecom are \$35 for NTCA—The Rural Broadband Association members; \$135 for nonmembers. To order or for questions about a current subscription, email publications@ntca.org.

Change of address should include recent mailing label and new address with ZIP code.

4121 Wilson Boulevard, Tenth Floor,
Arlington, VA 22203

Phone: 703-351-2000, Fax: 703-351-2001

Email address: publications@ntca.org

Website address: www.ntca.org

Publisher:

NTCA—The Rural Broadband Association

Chief Executive Officer:

Shirley Bloomfield, sbloomfield@ntca.org

Director of Communications:

Laura Withers, lwithers@ntca.org

Editor:

Christian Hamaker, chamaker@ntca.org

Senior Content Specialist:

Tennille Shields, tshields@ntca.org

Advertising:

sales@ntca.org

Graphic Design by Ferro + Ferro Graphic Communication, Arlington, Va.

Printed by Colorcraft, Sterling, Va.

Rural Telecom, established in 1981, is the bimonthly magazine published by NTCA—The Rural Broadband Association, a nonprofit, cooperative corporation formed in 1954 under the laws of the District of Columbia.

NTCA's Mission: NTCA—The Rural Broadband Association, an association of small, rural, community-based communications providers, is dedicated to improving the quality of life in rural communities through the advocacy of broadband and other advanced communications infrastructure and services.

NTCA represents nearly 900 small, rural, locally owned and operated telephone cooperatives and commercial companies in the United States and abroad, as well as state and regional telephone associations and companies that are the suppliers of products and services to the small and rural telephone industry. Our readers are the managers, directors, attorneys and key employees of these telephone companies as well as consultants, government officials and telecommunications experts.



Features



Rural Broadband Experiments: A Status Report

By Joan Engebretson

Dozens of rural communities are set to be the beneficiaries of the FCC's rural broadband experiments—a one-time program that awarded \$100 million to providers to bring broadband to high-cost areas that currently do not have broadband availability. But the program has not been without controversy. Find out where the program stands, and what rural telcos think of it.

Technology@Work: Comfort and Collaboration in the New Work Environment

By Tara Young

Our use of devices like computers, phones and tablets is influencing our ability to work comfortably for extended periods of time, and can lead to repetitive-stress injuries. Ergonomics and recent innovations in office furniture have helped. Learn about the trends paving the path from soreness to workplace serenity.

The Next Netflix? Online Gaming Gains Traction

By Mike Riddle

Streaming video accounts for 77% of the traffic on home broadband networks today. But what if another popular form of consumer entertainment—online video game services—was about to potentially add another 77% of traffic to those networks? Find out what you need to know to ensure your telco is ready to handle the load.

NTCA Board of Directors, General Counsel and Chief Executive Officer

President: Doug Boone
Vice President: William P. Hegmann
Secretary/Treasurer: John Klatt
Central Region
Commercial: Doug Boone
Cooperative: Ron Hinds
North Central Region
Commercial: John Klatt
Cooperative: Kevin Beyer
Northeast Region
Commercial: Mark Bahnsen
Cooperative: James M. Dauby
Northwest Region
Commercial: Allen R. Hoopes
Cooperative: Mitchell A. Moore
Southeast Region
Commercial: H. Keith Oliver
Cooperative: J. Frederick Johnson
Southwest Region
Commercial: Janet Britton
Cooperative: William P. Hegmann

General Counsel Don Richards

Chief Executive Officer Shirley Bloomfield

The Editorial Purpose of Rural Telecom is threefold: to inform readers of public policy issues affecting the industry; to provide insight on developing businesses and technology; and to share expertise and experience on management, marketing and customer service.

Invitation to Contributors—Please email (publications@ntca.org) or fax (703-351-2088) an outline of a proposed article to the managing editor. All articles should be prepared according to our writer's guidelines, available on NTCA's website.

Statements of Opinion and Fact are the individual views of the authors and not necessarily the positions of NTCA, its officers, directors, members or staff.

© 2016 NTCA—The Rural Broadband Association



Editorial, advertising and subscription offices:
Periodicals postage is paid at Arlington, Va.,
and at additional mailing offices. Postmaster,
send address changes to "Rural Telecom,"
4121 Wilson Boulevard, Suite 1000, Arlington,
VA 22203-1801.

It is illegal under federal law to send facsimile advertisements without first obtaining the express written consent of all recipients. The inclusion of fax numbers any place in this publication does not mean that consent has been given to receive facsimile advertisements.



An Exchange of Ideas Continues

There's perhaps nothing more effective at providing perspective on current challenges than looking back on the issues of the day 20 years ago. I took a stroll down memory lane recently when planning the launch of the newest addition to our website, the Exchange blog (www.ntca.org/exchange), which replaces the newsletter of the same name once found in the pages of Rural Telecom.



Longtime NTCA members will remember that Exchange began as a newsletter that was mailed to members twice a month. An early issue from 1995 reveals that the news of the day can sound pretty familiar when read 20 years later: FCC efforts to review key provisions of universal service policy; the start of a new strategic plan; the one-year anniversary and branding of the new Foundation for Rural Service; and a project to collect information about members "taking the plunge" to help their customers access the Internet.

Exchange was incorporated into Rural Telecom in 2013, and now it has taken on a new life as a blog that will be updated regularly to highlight innovations in rural telecom and the latest NTCA happenings. This change also will give us an opportunity to better spotlight New Edge commentary about tech trends and the latest developments in broadband-enabled applications.

As we always have, we need your help to make Exchange a success. Share your successes, challenges and thoughts with us and we will share them with our membership. We know you have important stories to tell. Help us tell them.

Laura Withers
Director of Communications
lwithers@ntca.org

Technology at Work: It's Not Just About the IT Team

When you think of technology at work, what comes to mind? Probably computers, backend systems and the IT staff, right?



There's more—much more—to technology in the workplace, and Tara Young has a rundown in her article, "Technology@Work: Comfort and Collaboration in the New Work Environment." Young's article looks at the different ways technology is transforming today's offices, showing how lift-arms for monitors and other innovations are bringing relief to sufferers of carpal tunnel syndrome, migraines and neck strains.

The increasing use of technology is also spurring the layout of work spaces to better accommodate the expectations of younger workers, who dislike cubicles but value conference and lounge areas. And the burgeoning area of ergonomics is helping to reduce the physical strains and stresses that employees can experience in the workplace.

I've seen the benefits of ergonomics in my own office. An ergonomics expert recently visited NTCA and took the time to make some key adjustments to my work

space, including to the height of the chair I sit in for hours on end, and the angle and height of my computer monitor. I'm surprised at how such modest adjustments have improved my comfort throughout the work day.

Of course, technology also underlies the services you offer customers, and this issue of Rural Telecom explores the ways technology is transforming the entire industry. Learn how telemedicine is poised to transform rural health care (with the help of local telcos, of course), and get a status report on the rural broadband experiments. We also take a look at online gaming, and the growing demands it's placing on telco networks.

Technology can be a complicated subject—and one that changes fast—but I think you'll find these articles accessible and informative whether you're a new industry employee or a telecom veteran. You don't even have to be a member of the IT staff to benefit.

Christian Hamaker
Editor, Rural Telecom
chamaker@ntca.org

Who Wants a Better Wi-Fi Experience?



Add a Calix GigaCenter to any subscriber home for a world-class Wi-Fi experience.



844E GigaCenter

Calix is a leading global provider of broadband communications access systems and software. Learn how Calix GigaCenters and Consumer Connect Plus software help you deliver the best broadband experience possible.

Visit calix.com/WiFiexperience to learn more



Consumer CONNECT +

THE WORST PASSWORDS OF 2015

SplashData is out with its ranking of the year's worst passwords, and once again in 2015, "123456" and "password" top the list.

Those password choices have been the most commonly used passwords since SplashData's first list, in 2011.

Passwords beginning with "1234" account for six of the Top 10 worst passwords of 2015.

Rank	Password	Ranking in 2014
1	123456	Unchanged
2	password	Unchanged
3	12345678	4
4	qwerty	5
5	12345	3
6	123456789	Unchanged
7	football	10
8	1234	7
9	1234567	11
10	baseball	8

►Source: teamsid.com/worst-passwords-2015/

Telephone History Lost to Wildfires

Among the lives, homes and property damaged last year by the California wildfires was the JKL Museum of Telephony in San Andreas.

The John K. La Rue museum was home to hundreds of telephones, switchboards and other equipment dating back as far as the 1800s.

The museum has said it plans to rebuild, and has called for donations to replace lost items. If you're interested, email jkl2@jklmuseum.com.

►Source: gizmodo.com



PHOTOS COURTESY OF JKL MUSEUM OF TELEPHONY

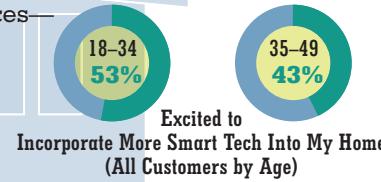
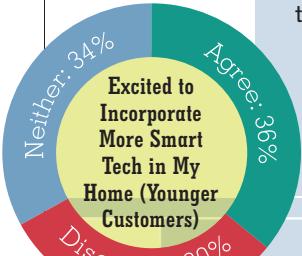
Smart-Home Fever? Sometime in the Future, Maybe

Smart-home technology—the ability to automate household devices like thermostats, home security and monitoring systems, and appliances—has become widely available, but enthusiasm for such products has not become widespread.

According to the Demand Institute American Community Survey 2015, only one in five U.S. households has a smart-home product, and barely more than one in three Americans are eager to incorporate smart products into their homes.

But demand for smart-home products could grow in coming years, thanks to stronger interest in the technology among younger customers.

►Source: Nielsen.com





Is 'Founders' a Keeper?

Quick, what's the name of the generation that's succeeding the millennials?

Time's up! You didn't know the answer, did you?

That's because kids born after 2000 have yet to claim a name for themselves, or accept anyone's assigned name for them.

Now MTV has taken a stab at naming the new generation. The network has gone with founders over other alternatives such as Gen Z, iGen, posts, homeland generation, reGen and plurals.

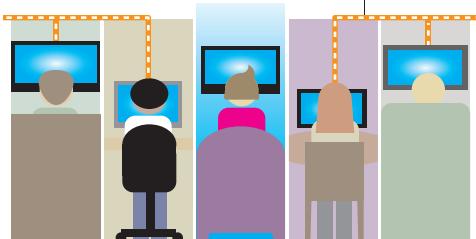
"[The founders are] are slightly more risk-averse. They've grown up without a safety net," said MTV Senior Vice President of Consumer Insights and Research Jane Gould. "You have a whole generation that is going to represent the extreme endpoint of where millennials were going in many respects: risk-averse, team-oriented, well-behaved."

MTV President Sean Atkins noted that the founders have never known a world that wasn't digital.

►Source: theweek.com

Nearly One in Five Young Adults Has Cut the Cord

Nineteen percent of 18–29-year-olds have cut the cord on their cable and satellite TV packages. Another 16% are "cord nevers" that haven't ever paid for TV service.



For all adults, the Pew Research Center's Home Broadband 2015 study shows that 24% don't have cable or satellite, and that 15% have cut the cord. Nine percent of all adults are "cord nevers."

►Source: variety.com

YOU DESERVE A BREAK TODAY. BUT WHEN?

What time of the work day is the best time to take a break?

A study of 95 administrative employees at universities revealed that mornings are better than afternoons for breaks, and that the most profitable break activities involved anything that the worker liked more than his or her job.

"We tested many assumptions that people commonly hold about breaks, like going outside or doing something that's low effort or something that's not work-related," said Baylor Professor Emily Hunter, who co-authored the study. "All these things did not matter as much as two things, really: doing something you prefer, and taking breaks earlier in the day."

As for the time of day for a break, Hunter said that by taking midmorning breaks, "we're not allowing ourselves to get so depleted that we're at the point where we want to just get to the end of the day."

►Source: washingtonpost.com



No Smartphone But Lots of Strong Opinions



Writer Alex Balk has a problem. He wishes smartphones hadn't caught on.

"I don't have a smartphone," wrote Alex Balk. "When I'm heading somewhere I have to plan my journey out in advance. I always need to remind people that if they're going to be late or they need to cancel plans they have to text me because I can't get email."

That's just the start for Balk, who turned his ire toward those who have capitulated to the smartphone trend.

For Balk, the tradeoffs of not having a smartphone outweigh any benefits of obtaining one. "I refuse to become a hostage to the Web," he wrote. "I refuse to be always available." Instead, "I spend a lot of time standing in line thinking about things instead of calming with crushable candy or whatever."

Balk knows his strong opinions on smartphones aren't widely shared. "I realize I am swimming against the tide of history here," he wrote. But he ends with yet another jab at smartphone owners: "I know you are reading this on your phone right now and shaking your head, but let me tell you something: YOU ARE THE REAL FREAK."

►Source: theawl.com

#RuralsSocial

Follow along at www.ntca.org/socialmedia



@LR_WiC

We are on a new member roll! Welcome to NTCA! To join our #womenincomms effort



@RepMarkPocan

Access to reliable, high-speed internet service is vital to economic growth in communities across America.



@BLConnect

An article in the @sstandardnews Sunday's edition on our recent @NTCAconnect recognition.



@cassidykersten

NDATC Annual Meeting in Bismarck begins with @NTCAconnect's David Hoover legislative update



@TV_Coalition

Excited to announce the launch of the Future of TV Coalition!



@EfrazeeDC

@BobLatta launches Rural Broadband Caucus with @TimmyDonovan of @CCAmobile, @USTelecom @CoBank @NTCAconnect



@TylerCampbellKY

Congrats to North Central Telephone Coop & @KTAOffice member on becoming a @NTCAconnect Gig-Certified



Rep. Harold Rogers (R-Ky)

It's a pleasure to have Federal Communications Commission Chairman Tom

Wheeler in E.Ky. today to discuss broadband-based opportunities in our region. Folks in Jackson County have welcomed our guest with a great turnout at Peoples Rural Telephone Cooperative this morning.

THE FIRST STEP STARTS WITH

FINLEY
ENGINEERING



TELECOM

COMPETE EFFECTIVELY AND EFFICIENTLY

Finley is one of the largest telecom network design companies in the United States. With speed and efficiency critical in today's technology-intensive landscape, we help our clients put innovative network solutions to work.

START THE CONVERSATION TODAY!
FINLEYUSA.COM

FINLEY
ENGINEERING
INTEGRITY INTO EVERYTHING

Connections

BY SHIRLEY BLOOMFIELD

The Road to Universal Service



In February, we celebrated the 20th anniversary of the passage of the Telecommunications Act of 1996. I remember so clearly working on the legislation during my time on Capitol Hill. More than two decades later, the words at the heart of the universal service codification still resonate with me and are as important now as they were back then.

As decreed by law, rural Americans should expect reasonably comparable services at reasonably comparable rates to those in urban areas. Those words were hard fought and sweetly won on behalf of rural Americans. You, as members of NTCA-The Rural Broadband Association, know firsthand how very difficult and expensive it is to deploy and sustain rural broadband networks in your territories, and you understand better than anyone that this national goal of broadband deployment is not something that can be achieved quickly or easily—it takes a great deal of commitment over the long haul.

After years of false starts or bad starts, we are on the cusp of change again with respect to these critical USF programs. The FCC is now

circulating an order that would set USF programs on a new course for the next decade-plus. As you are all well aware, NTCA and allied stakeholders have been fighting to obtain carefully crafted updates to the Universal Service Fund (USF) mechanisms to reorient them for a broadband world. We have also been working to dispel the regulatory uncertainty that has for years made it more difficult to plan. In 2014 and 2015, we saw over 150 members of Congress write to the FCC to demand targeted updates to USF, and we engaged with the FCC on what those could look like. At the same time, the FCC has made clear its own interest in not only updating USF but also following through on changes that have been under consideration for many years, even predating the 2011 reforms.

Shirley Bloomfield leads a policy roundtable at the 2016 RTIME show.



And so the order that is circulating now would represent the culmination of all of these debates.

NTCA has engaged in some very difficult debates about how USF reform should proceed. Some of Chairman Tom Wheeler's proposed changes would have posed real concerns for NTCA members and the customers they serve. But, NTCA policy committee members, board members and staff worked tirelessly to push back on the new proposals, to come up with alternative ideas and to seek better results reflective of the challenges of small carriers operating in the most rural parts of America.

As you all know with these sorts of things, "the devil is in the details." Will this order represent everything we might have wanted from reform? Certainly not. But, we hope that there are aspects of the order that will be seen as positives. Our hope is that the order will provide predictable and sufficient support as mandated by the 1996 Act and that it will help to restore regulatory certainty so that our members can focus on the business of building and providing broadband.

Shirley Bloomfield is chief executive officer of NTCA-The Rural Broadband Association. She can be reached at sbloomfield@ntca.org. You can also follow her blog at ntca.org/ceoblog.

THANK YOU for a great 2015!



NeoNova would like to thank its **189 Affiliate Partners** in **45 states** for a wonderful year.

- The NeoNova "Special Projects" Team

NeoNova's subscriber and network management services

Subscriber Services

- ✓ End-User Application and Self-Service Portal
- ✓ Telco- and Enterprise-Branded Email
- ✓ Multi-Screen IP Video Applications
- ✓ Security Suite & Data Backup
- ✓ Single Sign On (SSO) Solutions

Subscriber Management

- ✓ 24x7x365 Help Desk
- ✓ Subscriber Support, Management and Provisioning
- ✓ 360° Account View
- ✓ Full Web Services API for Integrations

Network Management

- ✓ Network Monitoring, Analysis and Reporting
- ✓ Network Design and Management
- ✓ Security and Threat Management
- ✓ AAA, IPAM, Radius, CALEA, DNS & DHCP
- ✓ Video Delivery Subsystems

Professional Services

- ✓ Application Development
- ✓ Marketing Programs and Support
- ✓ Network Engineering
- ✓ Project Management



CONTACT US TODAY to learn how we can help you **MAKE MONEY, SAVE MONEY** and **INCREASE CUSTOMER STICKINESS!**

www.neonova.net | ipsales@neonova.net | 877-NEONOVA

Perspective

BY WILLIAM TRELEASE

Analysis Before Buildout: Lessons From a Fiber Project

Delhi Telephone Co. (Delhi, N.Y.) decided several years ago to build out fiber in its service territory. When did you make the decision? Was there a specific trigger? The year was 1997. At that time it seemed obvious from the trends of xDSL that fiber "close to the premises" would be the future. You will recall that voice over data had come and gone (never getting off the ground), ADSL had gone through a couple iterations and VDSL was up for standardization. Faster rates at shorter distances. We were contemplating adding carrier serving areas (CSAs) to get to less than or equal to 18,000-foot lengths when it occurred to us that we were investing in fiber to get to the CSAs, investing heavily in the CSA electronics to connect to copper facilities that were 20 years or more old. That didn't seem like a good plan. We stopped investing in any copper-based facilities at that time.

So you have been deploying fiber since 1997?

We knew fiber would be the future, but we did not believe that fiber to the home (FTTH) was "ready for primetime" at that time.

What did your company do in preparation to deploy FTTH while you were waiting for FTTH to be ready for "primetime"?

Knowing that we were going to do something gave us a chance set up a "wish list" of what we would like to accomplish with the FTTx. We looked at our current situation and set some objectives:

- > Reduce the number of CSAs from more than 20 to six (our four buildings and a couple of special applications).
- > Change our headend from our VDSL MPEG-2 headend to the least expensive/more flexible of either analog or IPTV.
- > Eliminate our obsolete (more than 20 years old) 330 MHz, one-way analog hybrid fiber coax systems.
- > Minimize stranded investment.
- > Minimize customer impact and system integrations.

Once we had the objectives, we had a couple of FTTH design studies done.

I assume the results of the studies influenced your deployment decision.

What did you learn?

The studies were more enabling than indicative. We had assumed x-PON (passive optical network) would be considerably less expensive than fiber

to the premise. It turned out that due to distance limitations (CSA reduction and optical budget), population density and population distribution it was only 12% more to deploy point-to-point fiber from our central offices to the homes. The minimal difference in deployment costs allowed us to emphasize other objectives.

When did you deploy, what were your deployment parameters, and how did you finance your build?

We started our deployment in 2004. We knew we could not afford a wholesale changeout at one time, so we prioritized our build areas by relative population density (to reduce maintenance issues) and new service(s) opportunities. As previously noted, we had pretty much stopped investing in copper in 1997. That allowed us to build our cash reserves. We have built all of our in-territory FTTH with operating revenues.

What's the status of your deployment, and has it met its objectives?

We chose to deploy point-to-point Ethernet FTTH. To date, we have built about half of our route miles, putting fiber in front of over 60% of our customers. We have reduced our CSA minimally because we have not moved POTS customers to fiber yet. We changed our headend to an IPTV headend, significantly decreasing the component count and increasing flexibility. Our coaxial facilities have been shut down.

Do you think you made the right choice?

Given what we knew at the time, the technologies available at the time, and our objectives, yes.

Any parting thoughts?

Know what you want to accomplish with FTTx. FTTx is the enabler, not the objective. Compare your options, don't assume.



Our Position in Your Company: CWO (CHIEF WORRY OFFICER)

We worry about insurance and risk management matters.

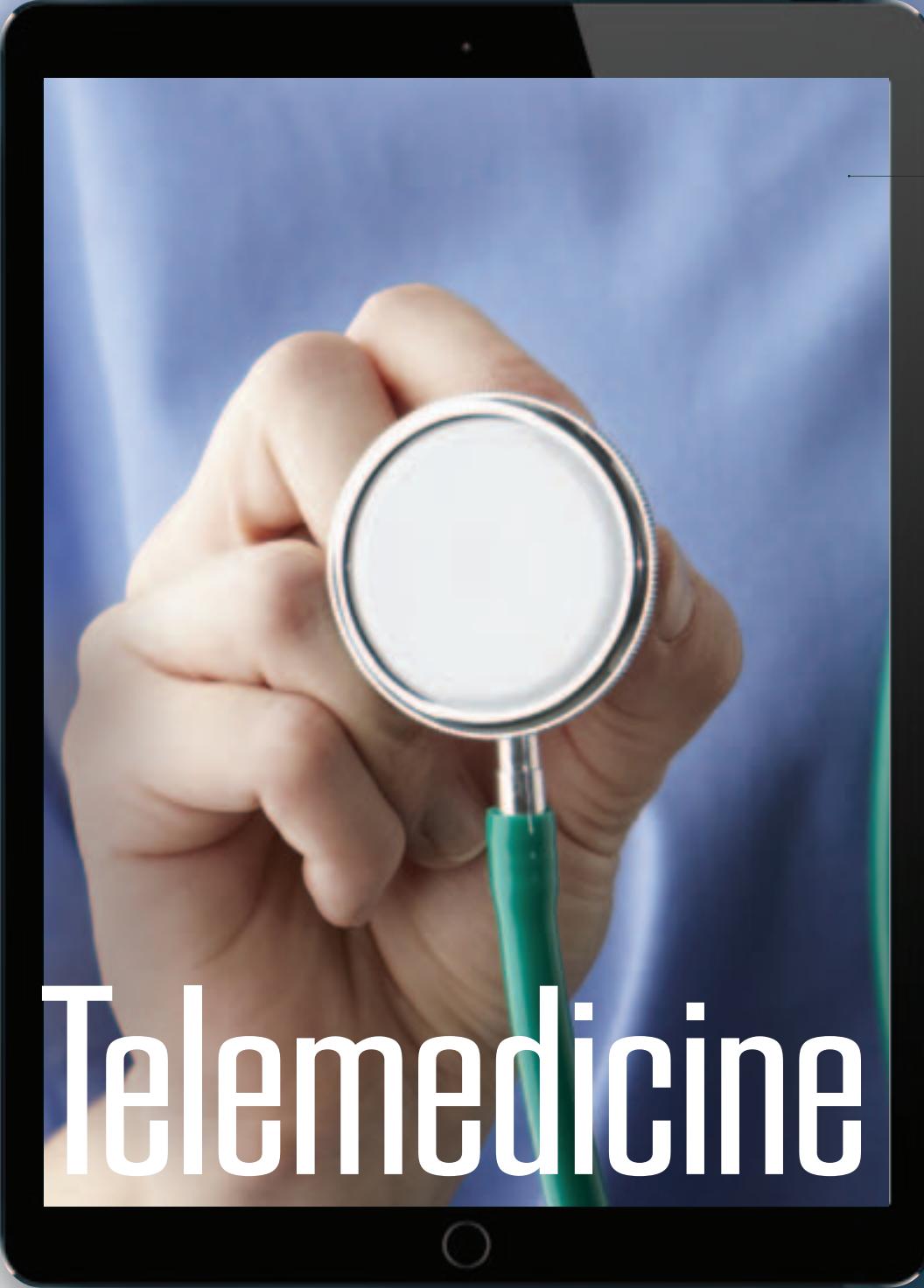
So, you don't have to worry about:

- Sending your employees home safely to their families every day
- Finding the right coverages for your evolving liabilities. So, you aren't left unprotected
- Getting the best coverage at the most affordable price
- Having peace of mind that at the time of a claim, you KNOW you'll be protected



"Because it's always been a matter of trust"

Making
Health
Care
Accessible
via



Telemedicine

A photograph of a person's hand holding a stethoscope, with the circular diaphragm held towards the camera. The hand is positioned as if presenting the device. This image is displayed on the screen of a black smartphone, which is oriented vertically. The background of the image is a blurred blue and white, suggesting a medical or professional setting.



BY RACHEL BROWN

ere's an interesting trivia question: Space travel gave us what innovation—Tang or telemedicine? Surprisingly, the answer is telemedicine. In the 1960s, at the launch of the U.S. space program, NASA developed technology to monitor the physiological health of its astronauts in outer space.

While rural America is closer to earth, consumer health care advocates have long lamented that it may as well be outer space when it comes to access to health care (see "Rural Health Snapshot," p.22), but many are hopeful that telemedicine can help bridge that gap.

"There are great disparities between urban health care and rural health care," said Alan Morgan, chief executive officer for the National Rural Health Association, a national nonprofit membership organization. "Rural America is being forced to be innovative to deal with this, and telemedicine is a great example of that. There will have to be collaborations between rural health care providers and the local community telecommunications providers."

Fortunately, there are numerous examples of rural telecommunications companies stepping up to the plate and working with their local health care providers to deliver high-quality care via telemedicine systems and solutions.

Five years ago, Vernon Communications Cooperative (Viroqua, Wis.) built a private Ethernet connection to connect a local hospital to four outreach clinics, two pharmacies and a hospice center, explained Emily Rozeske, member relations manager. It also ties into a larger hospital in Madison, Wis. (two hours away) and a hospital in La Crosse, Wis. (35 minutes away).

This fiber broadband connection has sped up processes for all of the health care providers, Rozeske said. "In the radiology department, it used to take an hour and a half to transfer images. Now, it takes less than 10 minutes," she said. "This means that a patient can be diagnosed and treated in the hospital versus being transferred by ambulance to another hospital." 

Telemedicine/Telehealth Definitions



The American Telemedicine Association (ATA) defines telemedicine as "the use of medical information exchanged from one site to another via electronic communications to improve a patient's clinical health status." ATA said this includes a growing variety of applications and services using two-way video, email, smartphones, wireless tools and other forms of telecommunications technology.

While the group uses the terms "telemedicine" and "telehealth" interchangeably, other health care professionals often make a distinction between the two, delineating that "telemedicine" involves the delivery of medical services, while "telehealth" refers to health-monitoring services and applications.

Kristy Wiltrot—chief operating officer for Vernon Memorial Healthcare—said the hospital's telemedicine system is equipped with medical tools like electronic stethoscopes to allow long-distance consultants and specialists to see and hear the same things as the on-site physician or nurse. "They can hear the heart beating. It's so much more effective than a phone conversation. Plus, it's costly for us to have specialists on staff," she said, adding that health care professionals value a second opinion. "If you're the only physician working after hours in the ER [emergency room], it's great peace of mind to have that resource."

On the patient side of the equation, telemedicine allows people to see a specialist without traveling a long distance, Wiltrot said. "It's especially beneficial to older folks and people who aren't able to drive," she said, explaining that this could include teens without driver's licenses and people without reliable transportation or gas money.

Other demographic groups benefit as a matter of convenience, Wiltrot said. "If they have an appointment here at the hospital, it's not three hours out of their day, so there's less time out of school or work," she said. "For our cancer patients, they often feel nauseated between chemotherapy sessions and are not up to a long car trip."

Wiltrot noted that she appreciates all that Vernon Communications has done and continues to do for the hospital. "They're amazing. They're always there to meet our needs and help us problem solve," she said.

Vernon's Rozeske said the cooperative has worked hard to have a good relationship with the hospital. "We go to every hospital golf outing; we work with their foundation; we are engaged," she said. "When we get new technology, we make sure they know about it so that we're the first ones they go to when they're ready to use it."

Connectivity and Reliability

Doug Boone, chief executive officer of Premier Communications (Sioux Center, Iowa), agreed that these relationships and partnerships are key. "Sioux Center Health is a small community hospital, and it was first

established in 1951. So that's the year that we started working with them," he said. "Obviously, we began with simple services and have transitioned to advanced services over the past 60 years."

In 2013, the Iowa hospital raised \$12 million and built a \$48 million new facility. "I served on their finance committee," Boone said, adding that Premier Communications not only made a sizable financial contribution to the hospital but also made a technological contribution. "We built a redundant fiber optic Ethernet connection to allow them to connect to larger hospitals. This also allows them to have an electronic ICU [intensive care unit] and conduct patient monitoring. When an ambulance rolls in, there's all the cameras and monitors there. They can connect with specialists in Sioux Falls."

For his part, Boone said the real focus is on connectivity and reliability. "Our number one goal is to provide connectivity no matter what the emergency is—weather-related, ice storms. We want to have all the redundancy that they need."

Derrick Van Roekel, information technology supervisor for Sioux Center Health, noted that its redundant networks have been put to the test. "We've had a few major power issues just recently, but a hospital must be 24/7 365 days a year," he said. "We were still able to operate during those downtimes because Premier recognizes how important it is to us."

Van Roekel added that if an alarm goes off at the hospital, one of Premier's techs will call or text. "Even if it's in the middle of the night, I'm hearing from them," he said. "They really do take care of us."

Van Roekel explained that he's seen telemedicine really take off in the past three to four years. "This is an area that's just now blossoming and opening," he said. "There's tremendous potential for more services."

Boone agreed and pointed out that the most common health care model in the Midwest is a system of large regional hospitals that provide administrative and managerial help to smaller community hospitals, making telemedicine services between all of them more prevalent.



Supporting Rural America

Comprehensive Portfolio of Solutions & Services for Rural Operators

- Radio Access Network Solutions
- Core Network Equipment
- Data Center Solutions
- Operation & Management Solutions
- FTTx Solutions
- Microwave Solutions
- Power Systems
- Enterprise Solutions
- IP Solutions
- Small Cell Solutions
- Optical Networking Solutions
- Managed/Professional Services

- Commitment to our rural customers
- Global experience with end-to-end expertise
- Comprehensive line of communication solutions
- Dedicated local services partner

For more information,
please contact:
Bill Gerski
702-493-6142
bill.gerski@huawei.com
www.huawei.com/us
Huawei Technologies USA



For rural telecommunications companies that are considering entering the telemedicine arena, Boone said there are multiple avenues. "Even if your area doesn't have a hospital, go to the doctors' clinics and make sure they know what you can give them," he said. "Knock on the door and introduce yourself and let them know that you're concerned about health care in the local community."

A Legacy to a Grandfather

In 2013, shortly after the death of his grandfather, Dave Wolf, chief executive officer and general manager of Gardonville Telephone Cooperative Association (Brandon, Minn.), went knocking on the door of Knute Nelson, a nonprofit faith-based corporation that provides senior housing and health care throughout central Minnesota.

Wolf explained that his grandfather was 94 and lived alone in an urban area. "He fell in his home, but he had a Life Alert pendant and pushed a button," he said, adding that help reached the house within four minutes. "So he didn't have to lie there and suffer. He died later that day, but he died with dignity. That pushed me to call the local nursing facility here and ask about what type of services we have around here."

That partnership with Knute Nelson led to Gardonville offering in-home services to hospice clients. "With hospice clients, many of them are coming out of a nursing home or hospital because their terminal illnesses are to the point that they will soon die; and they want to go home and be surrounded by family and a familiar environment," Wolf said.

To accommodate this move home, Gardonville deploys wireless broadband and gives the hospice client a large tablet that allows for Skype sessions with health care providers, caregivers and family members. The tablet can also issue reminders to take pills, as well as play music and provide entertainment.

Wolf said GrandCare Systems, a health-monitoring software firm, supplies the tablets. "These are very simple and intuitive and designed for someone who may be a little foggy and on meds," he said, adding that it's also easy to lock out unintended users. "We don't want family visitors jumping on the tablet and clogging it up with games or videos."

Another important business consideration is installation times and contracts. "Hospice clients often don't have long to live—it may be a matter of days or it may be six months—so you can't have an eight-week wait for installation with a multiyear contract," he said. "That model is not going to work."

Instead, Gardonville's installation can be done within days and there is no contract—clients pay on a monthly basis. Wolf noted that the actual data usage is relatively small, but it's still not a highly profitable service. "You're not going to get rich doing this, but it will teach you how to deploy telemedicine," he said.

FRS Awards Two Telemedicine Grants

The Foundation for Rural Service (FRS)—the foundation arm of NTCA—The Rural Broadband Association that seeks to sustain and enhance the quality of life in America by advancing an understanding of rural issues—recently awarded two telemedicine grants to community hospitals in rural Kansas, both endorsed by Nex-Tech (Lenora, Kan.).

"The Foundation for Rural Service is proud to award these grants to organizations helping to enable telemedicine," said Jessica Golden, executive director of FRS. "Broadband plays an empowering role in today's society, and these grant recipients have demonstrated both the need for their programs and the impact that access to technology will have on their community."

Nex-Tech said it was proud to endorse its local rural hospitals and health care providers. "They are finding unique and effective ways to use high-speed broadband to assist patients," said Mendi Alexander, economic development specialist with Nex-Tech. "Using technology to advance their telemedicine programs is a win-win for patients and providers. By receiving an FRS grant, these programs will benefit many patients for years to come."

Wolf pointed out that this is a good time to learn about the regulatory and economic factors of elder care and telemedicine. "The elderly population in the United States is set to double within 30 years," he said. "We don't have enough hospitals, nursing homes or assisted living places to take in everyone. The physicians aren't out there. Technology will help absorb our aging population."

Positive Patient Outcomes Will Spur Reimbursement

Daphne Karpan, a clinical adviser for GrandCare, agreed wholeheartedly. "We can use technology to keep seniors at home and safe," she said, adding that this is less expensive than caring for people in hospitals or facilities. "If people are home, there's less risk of infection and people are happier at home, meaning they'll recover quicker."

Not only are home-based telemedicine services a valuable public service, it makes good business sense for the rural telecommunications providers, Karpan said. "Right now, the folks who are in their 70s, 80s and 90s don't normally have Internet service, so this is a whole new market



Competition

Your list of competitors is growing.

Beat them to the punch with NISC apps. Allow customers to pay bills, manage usage and add new services on the fly. Empower staff to perform operational and sales tasks in the field.

Harness the power of NISC apps and increase efficiency and customer satisfaction while putting the competition on the ropes.

Who powers you?

follow us



866.999.6472

www.NISC.coop

powered by





share for the telephone companies," she said, pointing out that the baby boomers will demand these technologies as they age so it makes sense to have these in place.

"So many health care agencies are coming online to offer in-home services," Karpan said. "If you get the package and system figured out, you'll be the one to get that business."

All small telephone companies should have a telemedicine connectivity package that involves a lower connectivity fee and no long-term contract, Karpan advised, pointing out that Gardonville is a great example of this. "Gardonville has a seamless process," she said. "They've got a low package rate, a system to handle inquiries. They've got the staff to handle everything. They are leaps and bounds ahead of everyone else."

Karpan conceded that this is by no means a get-rich-quick scheme because sometimes older people who need the most care tend to also be the poorest. "Because they're poor, they might not seek care or they might not be able to afford their medications, so you have to realize that you may not get paid," she said. "If they can't pay their bill, who does? Figure that out ahead of time."

In time, Karpan said she is hopeful that Medicare will start to pick up that bill. "Medicare is doing pilot programs on telemedicine and home-based care, and it's starting to do some limited reimbursements," she said.

While this is a slow-moving regulatory process, Karpan said the fact that Medicare reimbursements are now based on patient outcomes is good news. "Telemedicine works, so when they [Medicare] see[s] that, that will speed its adoption," she said.

Gary Capistrant, chief policy officer for the American Telemedicine Association (ATA), agreed that there has been significant progress at the federal level in terms of reimbursement payments to Medicaid and Medicare. "Right now, Medicare does not reimburse for services in a person's home,

Rural Health Snapshot

Here are some alarming facts and statistics from the National Rural Health Association (NRHA):



For every 100,000 rural residents throughout the country, there are only



In the last 25 years, more than



To make this medical shortage of health care professionals and hospitals even worse, rural areas tend to have populations that are older and poorer, as well as more people who describe their health status as poor.

Alan Morgan, chief executive officer of NRHA, noted that a higher percentage of rural Americans go to the emergency room than urban residents. "Instead of addressing medical conditions early on, they often wait until it's too late and wind up in the hospital," he said.

but there are proposals to change that," he said. "For patients who are home-bound, in hospice care or able to do in-home kidney dialysis, they shouldn't be expected to travel to receive services."

For rural Americans, Capistrant pointed out that this travel often involves a long car trip. "To get in the car and drive or ride for an hour or more is a real hardship and leads to a great deal of discomfort," he said. "Now we have alternatives, so it's unconscionable to require this."

Capistrant also agreed with Karpan about the cost savings conveyed with telemedicine and said this will spur reimbursements and adoption rates. "In health care, there's the 80/20 rule, which is that 80% of the people use primary care but that only costs 20% of the total expenditure," he explained. "Three-fourths of Medicaid costs is for chronic care, so there's a dire need to do a better job of delivering chronic care."

Karpan pointed out that part of the federal reimbursement for telemedicine service will hinge on whether the platform is secure enough to handle the medical privacy rules spelled out by HIPAA (Health Insurance Portability and Accountability Act of 1996). But Premier's Boone said his network, like other NTCA member networks, are more than secure for HIPAA. "Our networks carry confidential data for many customers," he said.

This level of network security and professionalism from the small rural telecommunications providers does not surprise Karpan. "Meeting the folks at Gardonville and working with other small telephone companies over the years has given me a newfound respect for this group," she said. "They work hard, and they care about people."

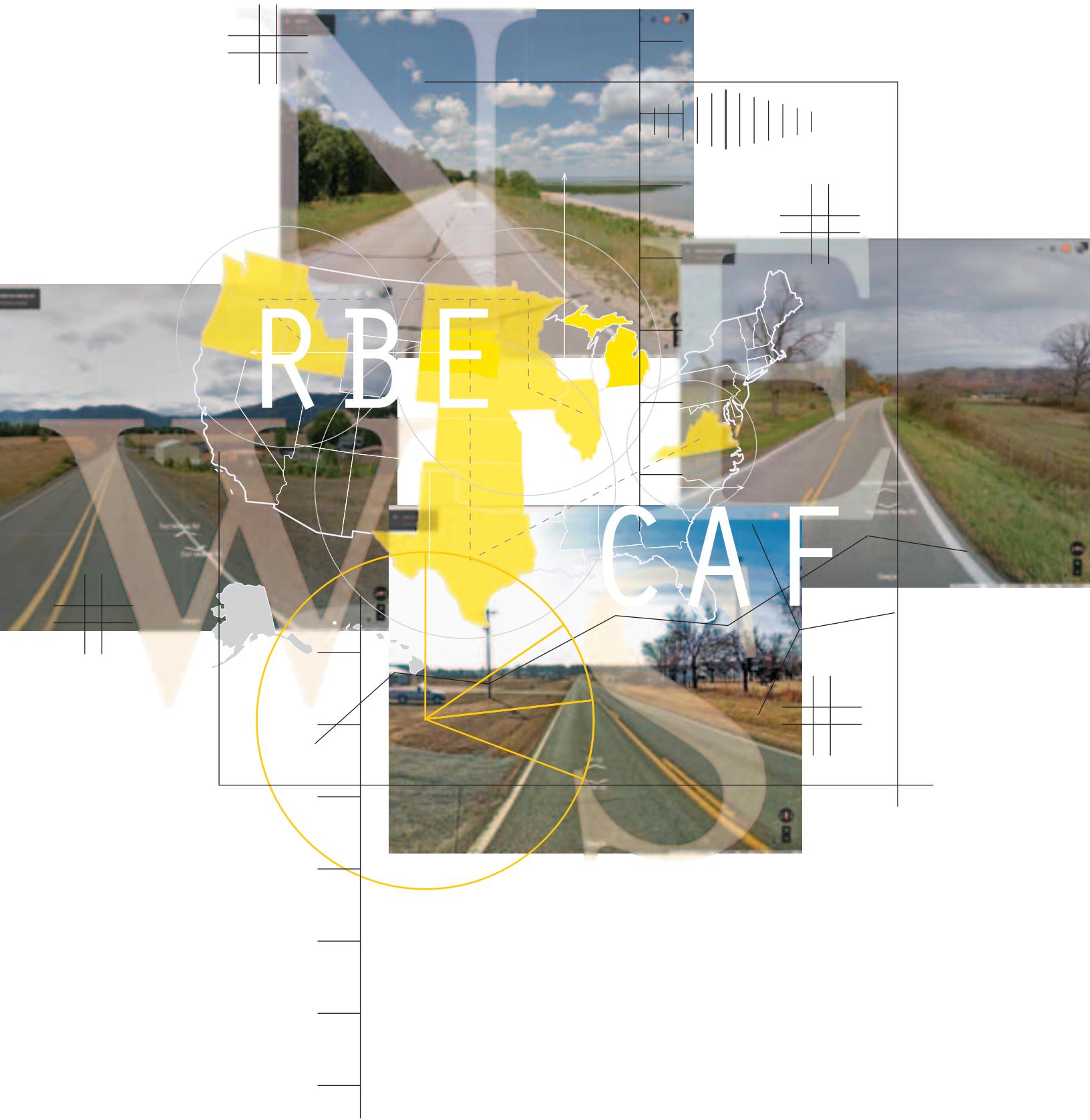
ATA's Capistrant echoed these sentiments. "The rural telephone companies have created all this infrastructure," he said. "We need to use it to its maximum potential."

Rachel Brown is a freelance writer. Contact her at rachelsb@aol.com.

Ultimate Interoperability. Unrivaled Reliability.

*Proudly serving North American
rural telcos for more than 35 years.*

REDCOM® 
Essential Communications



RURAL BROADBAND EXPERIMENTS

STATUS REPORT

BY JOAN ENGBRETSON

DOZENS OF RURAL COMMUNITIES ARE SET TO BE THE BENEFICIARIES

of the FCC's rural broadband experiments (RBE) program—a one-time program that awarded \$100 million to traditional and nontraditional communications service providers to bring broadband to high-cost areas that currently do not have broadband availability.

"We wouldn't have done these areas on our own dime or with a Rural Utilities Service loan; that's how rural they are," said Brian Bissonette, marketing supervisor for Paul Bunyan Rural Telephone Cooperative (Bemidji, Minn.), which was awarded \$1.9 million as part of the experiments to help cover the cost of bringing fiber-to-the-home to portions of rural Minnesota.

The experiments are a small piece of a broader initiative to bring a greater broadband focus to today's voice-focused, high-cost Universal Service Fund (USF). For purposes of the experiments, "broadband" is defined at speeds of 3 Mbps downstream and 768 Kbps upstream. High-cost locations that do not have service at that speed are targeted for funding.

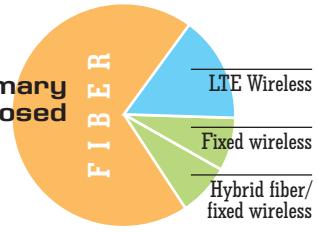




SUMMARY OF AUTHORIZED RURAL BROADBAND EXPERIMENT PROJECTS



Fiber is the primary technology proposed



Project	State(s)	Total Support Awarded	Total Census Blocks (CBs) Covered by Project(s)	Total Price-Cap Locations Within Total CBs	Category	Technology
Allamakee-Clayton Electric Cooperative, Inc.	IA	\$1,453,593.00	209	665	2	Hybrid fiber/ fixed wireless
BARC Electric Cooperative	VA	\$239,918.00	64	801	1	Fiber
Consolidated Communications Networks, Inc.	ND	\$3,096,810.00	103	171	3	Fiber
Daktel Communications, LLC	ND	\$875,000.00	109	508	1	Fiber
Delta Communications LLC	IL	\$2,196,000.00	78	122	3	Fiber
Douglas Services, Inc.	OR	\$2,375,000.00	325	2,495	1	Fiber
Federated Telephone Cooperative	MN	\$1,455,961.71	95	344	1	Fiber
First Step Internet, LLC	ID, WA	\$415,855.00	116	453	2	LTE Wireless (3.65 GHz)
Midwest Energy Cooperative d/b/a Midwest Connections	MI	\$211,532.00	31	421	1	Fiber
Northeast Rural Services, Inc.	OK	\$3,465,610.30	314	2,115	1	Fiber
Northern Valley Communications, LLC	SD	\$2,022,120.00	258	411	3	LTE Wireless (4 GHz)
Paul Bunyan Rural Telephone Cooperative	MN	\$1,962,000.00	134	1,839	1	Fiber
Skybeam, LLC	IA, IL, KS, NE, TX	\$16,942,886.93	3,877	16,751	1	Fixed Wireless

The bid amounts as well as the census blocks and location counts were adjusted to account for the one census block that was removed from each of these bids because the two blocks were deemed to be served by an unsubsidized competitor in the Phase II challenge process. See Connect America Fund, Connect America Phase II Challenge Process, WC Docket Nos. 10-90 and 14-93, Order, 30 FCC Rcd 2718 (Wireline Comp. Bur. 2015).

RBE and CAF

Even as the FCC continues to evaluate ways to update USF mechanisms for broadband in areas served by smaller rate-of-return-regulated incumbent carriers, the Connect America Fund (CAF) program is being implemented in areas served by the nation's largest price cap carriers. Those carriers had a choice of agreeing to bring broadband to target areas within a state at the model-based level of support or to reject funding, in which case funding will be awarded through a competitive bidding process.

The purpose of the RBE program was to gain information to help in shaping that competitive bidding process. RBE funding was awarded to network operators that agreed to bring broadband to unserved portions of price cap territories for the lowest level of support. The network operators were not allowed to bid more than the model-based level. Over 1,000 companies initially expressed interest when the experiments were first announced, although just under 200 ultimately submitted paperwork seeking to participate in the program.

A commission spokesman declined to reveal the cutoff point for projects selected. But Keith Larson, chief executive officer and general manager for RBE awardee Dakota Central Telecommunications (Daktel; Carrington, N.D.), said his company bid to deploy fiber-to-the-home service at about 50% of the model-based funding. Considering that Daktel was not selected until the second RBE funding round, that revelation suggests that those winning in the first funding round bid to deliver service at less than 50% of the model-based support level.

Bissonette noted that Paul Bunyan, which also won funding in the second round, bid between the 40% and 50% level. "We already have a lot of infrastructure in place" near the project areas, which enabled the company to submit such a low bid, Bissonette said.

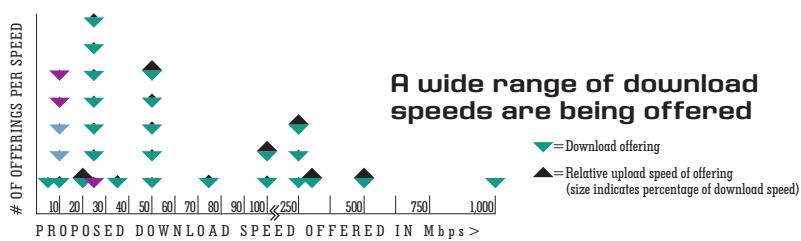
Daktel also bid on areas near its local service territory, and some other awardees are in a similar situation.

Both Bissonette and Larson noted that the funding they will receive through the RBE program will not cover the full cost of their buildouts; instead the companies will have to contribute additional funding of their own. That's different from what we're seeing from price cap carriers that accepted CAF funding. Several of them—including CenturyLink, Frontier and Windstream—have stated that CAF funding will cover buildout costs, and they will not have to allocate additional capital expense budget to the projects for which they accepted funding.

Nontraditional Operators

Some new players also were among the RBE awardees. Rise Broadband, for example, won a total of \$16.9 million in funding to deploy broadband wireless in portions of several states. Rise, formerly known as JAB Broadband, is playing the role of consolidator in the broadband wireless market and has acquired several providers, including Skybeam, the name under which the awards were made.

The RBE program did not specify which technology network operators should deploy. Instead, for the majority of funding, it set a target network capability of 100 Mbps downstream and 25 Mbps upstream (although initially recipients



Speeds Offered (Down/Up Mbps)

10/1
25/5; 35/10; 50/15; 75/25; 120/25; 250/35; 1,000/50
10/1
25/5; 50/5
10/1
50/10; 100/25; 250/25
20/20; 50/50; 100/100; 300/300
10/1
25/10; 50/20; 100/25
25/5 (up to 1,000)
25/3
25/5; 250/250; 500/500 (up to 1,000)
5/1; 10/2; 25/5

Source: fcc.gov/general/rural-broadband-experiments

are only required to offer speeds of up to 25/5 Mbps). Paul Bunyan, Daktel and Rise all won funding in that category. Some funding also was directed toward projects supporting speeds of 10 Mbps downstream and 1 Mbps upstream.

Several rural electric cooperatives also were among the RBE awardees. Michigan-based Midwest Energy Cooperative has been awarded \$211,000 for two communities where the company is the local power provider, explained Dave Allen, Midwest Energy vice president of regulatory compliance. When the company investigated the possibility a few years ago of modernizing its power distribution network, the engineering firm it consulted suggested that the company consider simultaneously deploying fiber to the home. Midwest Energy now has begun that task, which is envisioned as a 10-year project. While the RBE funding will cover only a small portion of the costs for an area, it will enable the company to build out the project areas sooner, Allen said.

Midwest Energy did not win RBE funding for all of the areas it bid on. But as Allen explained, the door is still open. Any areas that received formal RBE bids were removed from price cap carrier CAF target areas and will be included in the competitive bidding process for areas that the price cap carriers rejected, even if they are in a state where the price cap carrier accepted funding. Midwest Energy plans to participate in that competitive bidding process.

The Letter of Credit Conundrum

The RBE program has not been without controversy. One of the most controversial aspects of the program is a requirement for awardees to obtain a letter of credit

RBE FUNDING CATEGORIES

Category	Target Speed	\$ Allocated
1 High-Cost	100 Mbps Down/ 25 Mbps Up	\$75 Million
2 High-Cost	10 Mbps Down/ 1 Mbps Up	\$15 Million
3 Extremely High-Cost	10 Mbps Down/1 Mbps Up	\$10 Million

Recipient of rural broadband experiment support must:

■ **For category one projects**, deploy a network capable of delivering 100/25 Mbps and offer at least one service plan that provides 25/5 Mbps to all eligible locations. For that service plan, recipients must provide usage that is reasonably comparable to usage available for comparable wireline offerings in urban areas, at a price that meets the commission's reasonable comparability benchmarks, and latency no greater than 100 milliseconds.

■ **For category two projects**, offer at least one service plan that provides 10 Mbps downstream/1 Mbps upstream with at least 100 GB of usage, latency no greater than 100 milliseconds, and at a price that meets the commission's reasonable comparability benchmarks.

■ **For category three projects**, offer at least one service plan in extremely high-cost census blocks that provides 10 Mbps downstream/1 Mbps upstream with at least 100 GB of usage, latency no greater than 100 milliseconds, and at a price that meets the commission's reasonable comparability benchmarks.

(LOC) from one of the nation's 100 largest banks.

The goal was to safeguard public funds collected from telecom service providers to support the program. But as Mike Romano, senior vice president of policy for NTCA—The Rural Broadband Association, put it, the FCC's LOC requirements illustrate a "disconnect between how rural networks get built and the view from Washington on this." As Doug Jarrett, a partner with law firm Keller & Heckman LLP, sees it, the LOC requirements are "backfiring."

Many rural telcos and electric cooperatives traditionally borrow from the Rural Telephone Finance Cooperative (RTFC) or its affiliate National Rural Utilities Cooperative Finance Corp. (CFC). According to a letter filed with the FCC by CFC's law firm, CFC is unable to meet one of the FCC's requirements—that it be insured by the Federal Deposit Insurance Corp. (FDIC)—because CFC is not a depository institution and is therefore ineligible for FDIC insurance.

Companies that traditionally borrow from CFC typically do not have relationships with other banks and are finding it difficult to obtain LOCs from banks that would meet FCC requirements, the letter notes. CFC has asked the commission to adopt a modified version of the bank eligibility requirements for the RBE program in order to permit CFC, and perhaps some other lenders, to issue LOCs on behalf of awardees.

In the meantime, some companies that were provisionally awarded funding were subsequently rejected or withdrew funding because of difficulties obtaining LOCs.

Southwest Arkansas Telephone Cooperative (Texarkana, Ark.), for example, withdrew its RBE project from consideration because its bank, Arvest, does not





participate in the credit rating system, even though it is one of the top 100 banks. "We believe the letter of credit is unnecessary for established companies," said Lane Bowers, vice president of network services for Southwest Arkansas Telephone Cooperative.

Several other provisional RBE awardees are still pending review and are hoping the FCC will adjust the LOC requirements.



AMERICA IS GROWING

Our commitment to serving rural America has never been stronger. Every day CoBank supports rural communities with reliable, consistent credit and financial services. We can be your trusted advisor to offer solutions and lending strategies if you are considering expanding through acquisition or construction/upgrade of your network.

We stand ready to partner with you on forward-looking projects that help rural America stay competitive.

Contact CoBank today.



800-542-8072
www.cobank.com

Jarrett noted that winners in the CAF competitive bidding process also are expected to meet the same LOC requirements used for the RBE program and that he would like to see requirements adjusted for that program as well.

Additionally, he expressed concerns about the size of the LOC that awardees must maintain, which grows over time. Awardees receive their funds over a period of 10 years, even though they must begin offering service within 100% of the buildout area within five years.

Moving Forward

Several other open issues remain with regard to the RBE and the CAF competitive bidding program it was meant to inform.

One question is whether incumbent carriers will want to continue to provide voice service in RBE areas or areas where a competitor wins support through the CAF competitive bidding process. RBE and CAF awardees are required to offer voice as well as broadband service, so potentially some incumbents may want to withdraw if regulators allow them to do so.

Another issue is whether the FCC will use the same selection criteria for CAF competitive bids that it used for the RBE. The process used for the RBE will inherently direct most funding toward projects that are relatively easier and less costly to complete. And as Romano noted, this could encourage "cherry picking" and create "a checkerboard across rural America," with the net result that the remaining squares will become more costly to serve.

"In the past you had the benefits of averaging," he noted.

Another irony of the checkerboard effect, he said, is that for years some policymakers have expressed the opinion that small carriers should be encouraged to achieve greater scale. Yet, he said, "Now you're setting up a system that ... sets up pockets of little incumbents all over the map."

With RBE support ending after 10 years, another question will be whether the networks will be sustainable once they are built, Romano said.

Ultimately, Romano argued, "It will be hard to tell if the experiments or bidding worked for years to come."



Joan Engebretson is executive editor for Telecompetitor, a website offering broadband news. Contact her at joanengebretson@cs.com.

The NTCA Shipping Program – a free member benefit!



**Partner
Ship**
Your Shipping Connection

Enroll today at PartnerShip.com/NTCA



The NTCA Shipping Program, managed by PartnerShip®, helps you save on every shipment you send or receive. From envelopes up to large truckload shipments, PartnerShip allows you to save on your shipping with the most trusted carriers in the country.



UPS Freight®



and many more ...

Technology

BY TARA YOUNG



"I stand all day long now... I haven't had the issues with headaches I had before."

Judy Hinman
Norvado
(shown here at
her workstation)

@WORK

Comfort and Collaboration in the New Work Environment

Judy Hinman's introduction to technology and ergonomics in the workplace began with a migraine.

As a business sales consultant with Norvado (Cable, Wis.), Hinman was used to long hours and matching her schedule to her customers' needs. But she noticed her in-office time was often what prompted her headaches. Hinman suspected prolonged sitting times and desk posture might be to blame.

She discussed her suspicions with a physician from a local hospital who suggested she visit the hospital's administrative offices to see examples of standing workstations. After seeing the standing

workstations in action, Hinman thought it was worth a try in her own environment. As a trial, and to see how comfortable she would be while standing and working, she created her own standing desk solution using boxes and leftover materials from the company warehouse.

It wasn't the most aesthetically appealing solution, but it was enough to prove her prolonged-sitting hypothesis true, and to allow Hinman time to grow used to standing for long periods. After she had used her makeshift solution for nearly a year, her former chief executive officer (CEO) broached the subject of installing a more formal and better-looking solution. A \$450 standing lift arm retrofitted to her existing desk elevated both of Hinman's monitors, her phone, a small work area and her keyboard to standing level. The addition of a small rubber mat beneath her feet provided her with the cushion needed to stand comfortably for long periods. ➤





Ergonomics is really about creating environments that sustain the worker's ability to do his or her job efficiently, with a minimum of physical stresses and strains.

Shane Goldsby,
Great American
Insurance Group

workplace-related claims over a five-year period within the industry average just under \$9,300 per incident, a significant loss from a financial and human resource perspective.

"In every industry, we're asking our employees to increase their efficiency, decrease their downtime and improve their productivity. In many cases, this means longer hours, more repetitive movements and greater periods of immobility. This can lead to more strains and cumulative traumas," Goldsby said. "By educating employees about the mechanics of good work habits, we're helping

It's been two years since Hinman converted her workstation, and she's happy with the results. "I stand all day long now," Hinman said. "I have a regular desk chair in my office for meetings with customers or co-workers, but otherwise I'm on my feet. I haven't had the issues with headaches I had before. Since I started standing, a few other co-workers here have also adopted the same setup."

Human Resource Protection

Our continued use of devices like computers, mobile and traditional landline phones, and tablets is influencing our ability to work comfortably for extended periods of time. Repetitive stress and motion issues in the workplace, like Hinman's, can have significant impact on a company's bottom line, according to Shane Goldsby, loss prevention manager and telecom industry ergonomics expert at Great American Insurance Group.

"Ergonomics is really about creating environments that sustain the worker's ability to do his or her job efficiently, with a minimum of physical stresses and strains," Goldsby said. "In today's telecom environment, there are lots of technical solutions for common issues like carpal tunnel syndrome, migraines and neck strains, including floating monitor arms, wireless keyboards and Bluetooth headsets for desk and mobile phones."

Great American Insurance Group's trend data for the telecom industry highlights the importance of better ergonomics and increased employee and employer mindfulness about

companies avoid costs like downtime, absences and cross training to fill vacancies."

Goldsby said that the telecom management personnel he's worked with have been very proactive about contacting their insurance companies for on-site ergonomic assessments, and about implementing suggestions to improve workspaces. He sees the same proactive attitude as being important for avoiding incidents at the outset.

"An open door policy [for reporting and discussing ergonomic issues] with managers or supervisors is very helpful, because it gives management a chance to make accommodations before they become claims," Goldsby said.

Planning For Innovation

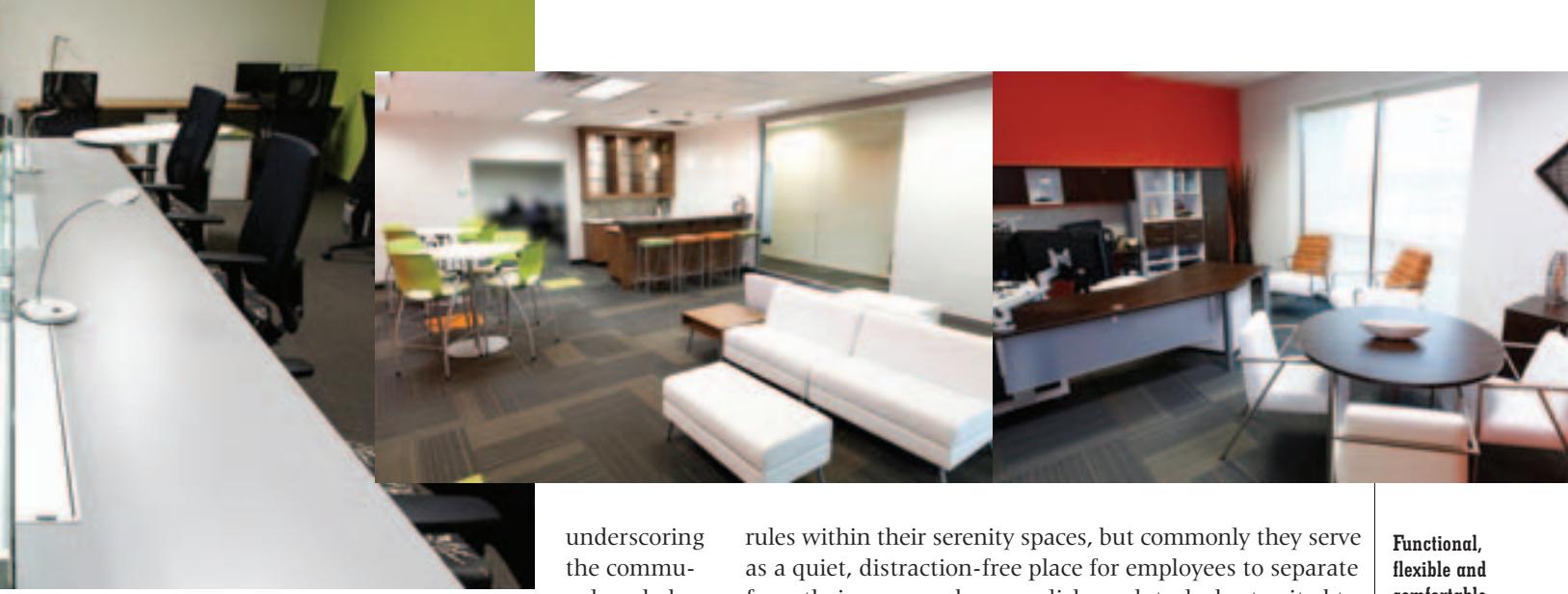
For many telcos, making retrofit accommodations for individual employees, like those needed by Norvado's Hinman, are a process of coordination and communication between management and employee. But increased use of technology is also influencing whole-office design and workplace furnishing. Technology is driving these changes not only from a worker comfort standpoint, but also from a work/life balance and community-building perspective.

Andrew Leddick, director of furniture sales, design and operations at Innovative Office Solutions, a workplace and office solutions firm located in Minnesota, sees this as a result of the blurred line between work and home.

"We're seeing the emergence of residential elements in the workplace," Leddick said. "People have phones and tablets that go between home and office. These devices change frequently, every two to three years in most cases. Because people want their work space to be compatible with their devices, they're leading us to more flexible and anticipatory office and furnishing design—trying to create forward-migrating solutions that acknowledge new technologies and the way people use them."

Leddick said that design is moving away from standard, stationary desk and cube designs and "toward small collaborative areas that look like my kitchen table, or to non-permanent spaces that allow people to move around with their work and devices in ways they couldn't before."

Leddick noted that business spending on office design and furnishings reflects this shift. Ten years ago, the breakdown was a 70/30 split of desks and cubes to conference and lounge areas. Today, that split is closer to 50/50,



our new mobile and wireless technologies allow us to cultivate. Designs of this type are particularly appealing to new talent, especially younger workplace entrants, who are deeply attached to their devices and who value collaborative, team-based design.

Innovative Office Solutions CEO Jennifer Smith sees this collaborative trend affecting the way people work within the office environment.

"Before, cubes and walls were physical barriers that created cognitive and communicative barriers between groups. It's possible now—with things like modular tempered glass, overhead white noise, keyhole cutouts in cubes and flexible, unassigned work areas—to bring together functional and operational groups for long- and short-term projects. These design elements help companies build collaborative spaces that promote employees' health and sense of community while still maintaining traditional organizational hierarchies and work structures, controlling noise and preserving confidentiality of information," Smith said.

Both Smith and Leddick said new workplace technologies lend themselves well to "try before you buy" experimentation. New modular solutions can be easily implemented for small groups, key employees or in specific areas before being rolled out to larger spaces or teams. Conference or communal areas can be retrofitted into "technology campfires," informal areas with a variety of ports and chargers that allow users to bring their own devices and work collaboratively away from their primary seating area.

Serenity Now

Smith and Leddick also acknowledge the emerging trend of serenity rooms as a direct response and counterpoint to the overabundance of collaborative and technological forces at play in the modern workplace. Companies impose different

underscoring the communal workplace

rules within their serenity spaces, but commonly they serve as a quiet, distraction-free place for employees to separate from their peers and accomplish work tasks best suited to quiet, individual creation.

"The key to planning for technology in the workplace is to know who you are as a company and what goals you want to achieve," Leddick said. "Just like carpentry, the best advice is to measure twice, cut once. Tour different spaces, get an idea of what you think will work for you and then try it out on a small scale. By focusing on the process, rather than the end result, you can be more creative and responsive to how collaborative, tech-forward solutions might work in your environment."

Tara Young is a freelance writer. Contact her at tara.jacqueline.young@gmail.com.

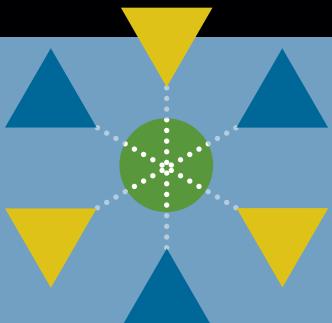
**Functional,
flexible and
comfortable.
Welcome to
the new
workplace.**

**ALL ROOM
PHOTOS
COURTESY OF
INNOVATIVE
OFFICE
SYSTEMS.**

DOMINATE
PARTNER WITH COMMSOFT, A TEAM OF BSS/OSS EXPERTS

CUSTOMER CARE | BUSINESS INTELLIGENCE | WORKFORCE MANAGEMENT
CRM | FINANCIALS | BILLING | SERVICE ACTIVATION | WEB SELF-CARE

COMMSOFT.NET • 1.888.COMMSOFT
96 THOMPSON HILL ROAD, RENSSELAER NY 12144



BY MIKE RIDDLE

Streaming video accounts for 77% of the traffic on home broadband networks today, with Netflix accounting for 35% of activity, according to Recode.net. NTCA—The Rural Broadband Association's rural providers are already acutely aware of the challenges faced with increasing usage of streaming video services among their customers. But what if another popular form of consumer entertainment was about to potentially add another 77% of traffic to their networks? With a growing reliance on online connectivity and a bevy of new online services and features, could online video game services be the next streaming video?

Gaming Moves Online

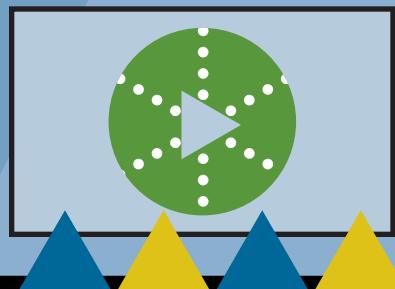
In 2014, the worldwide video game industry generated \$84 billion in revenue, more than twice as much as the film industry, according to games market researcher Newzoo and the Motion Picture Association of America.

The gaming industry's Entertainment Software Association (ESA) reports that 51% of American households own a dedicated game console, like a Sony PlayStation 4 or Microsoft Xbox One, and that 42% of Americans play video games for three hours or more per week. The average gamer is 35 years old.

Since the middle of the last decade, these popular gaming consoles have been highly online-dependent devices, and that dependency has only increased with the latest generation of machines. Today's gamers are accustomed to going online to download digital versions of full retail games (52% of American



The Next Netflix?



Online Gaming Gains Traction

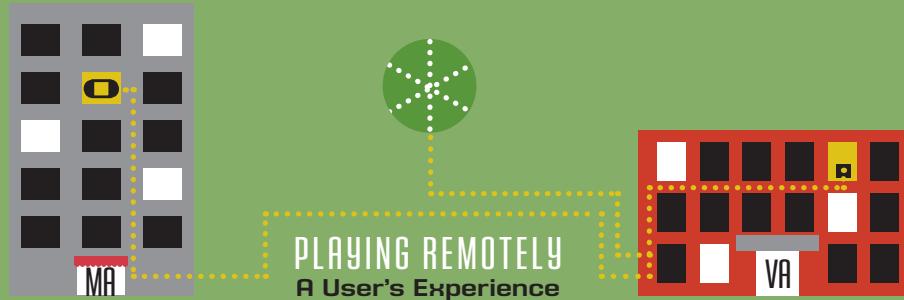


game industry revenues were digital sales in 2014), purchasing large downloadable updates for their games, and connecting online to play with friends. Soon the traditional physical disc alternative may not even be an option.

An increasing move to online gaming features like digital distribution and cloud gaming will change the landscape of the games industry, and that, in turn, could have a huge impact on the telecom industry as well.

As broadband providers today contend with huge and growing demand for bandwidth-hogging video streaming, they may soon find themselves dealing with even more network-intensive new online gaming services, requiring fast speeds for both downstream and upstream and low latency. While many of these services are now in their infancy, they are likely to see widespread adoption in the future as they make accessing and playing games a vastly simpler and more flexible experience.

Tomorrow's gamers could exclusively stream games from Netflix-like on-demand services to their tablets, Smart TVs or Rokus, forgoing the need for expensive dedicated gaming consoles (see "Cloud Gaming," p. 38). When playing the latest popular video games becomes as easy for consumers as streaming video, more and more broadband customers could become potential gamers, forcing providers to adapt to their usage demands on top of those already presented by video streamers. >



The growing phenomenon of online gaming—and the challenges it's bringing to telecom networks—can be illustrated by a recent experience I had while traveling.

While attending NTCA's 2015 Fall Conference in Boston, Mass., I decided to bring along some portable gaming devices to entertain myself on the plane or in the off hours at the hotel. Video games are one of my favorite hobbies, so I like to have access to some kind of gaming experience even when out of town.

In the past, my options would have been limited to handheld game consoles like the Nintendo Game Boy or Nintendo DS. In Boston, thanks to the latest technology, I was able to play cutting-edge games on my PlayStation 4 while it sat in my Arlington, Va., apartment, more than 400 miles away.

Through Sony's Remote Play service, I used my handheld PlayStation Vita device over the hotel's Wi-Fi to connect to and play on my home console. The service used the PlayStation 4 as a host to run the game and stream the video and sound over the Internet to my Vita. In turn, my controller inputs from the Vita were streamed back to operate the game in real time. This required a good connection on both ends, with a speed of at least 5 Mbps and low latency. It worked with minimal delay and was an essentially seamless experience.

This and similar online gaming features and services could become the norm for gamers in the not-too-distant future.

Gamer Necessities

Dedicated gamers are among broadband providers' most demanding customers, and their needs will become even greater as online-dependent gaming features become ubiquitous.

To take full advantage of gaming services' online features today, customers need reliable Internet connections with fast downstream and upstream speeds. Latency that is as low as possible is also important for a quality online gaming experience—especially for streaming games.

Any kind of monthly data restrictions from an ISP would be untenable for many gamers, especially those who download several large game files a month. Many games released today will not even work properly without downloaded updates, even for on-disc games purchased at retail.

take full advantage of their expensive gaming purchases.

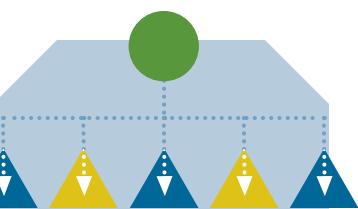
Is the Network Ready?

In 2013, Microsoft sparked controversy when it announced that its new Xbox One console would be always-online. The console would be designed with features that could be used only if users were always connected, so a consistent and fast connection would be required to use the device.

Many angry consumers complained that their Internet connections simply weren't reliable enough for such a feature. Facing an overwhelmingly negative response, Microsoft reversed itself. The company realized that the market landscape wasn't quite ready for mandatory always-online gaming machines.

Gaming Trends

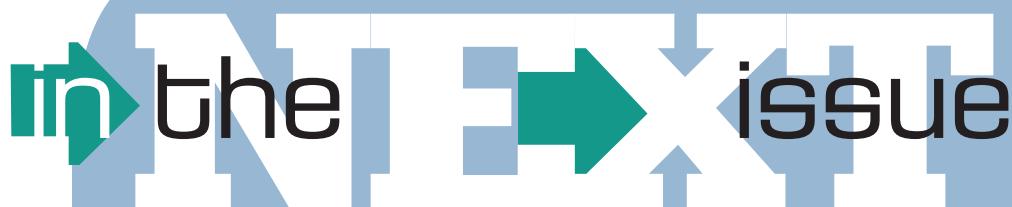
Despite Microsoft's setback, game companies ➤



Whereas games in the past have usually been purchased from retailers as boxed physical copies (either on discs or proprietary cartridges), digital downloads of entire game files directly to the gaming device are slowly overtaking sales of traditional physical copies. For some games, these file downloads can be massive, reaching as much as 60 GB for a single game. In addition, post-release update downloads to games have become commonplace, either to fix bugs or to add more content for players to enjoy.

ADVERTISERS INDEX

Advertiser	Telephone	Website
7 Calix	707-766-3000	www.calix.com
28 CoBank	800-542-8072	www.cobank.com
33 CommSoft	888-COMMSOFT	www.commssoft.net
11 Finley Engineering Co.	417-682-5531	www.fecinc.com
2 GVNW Consulting, Inc.	503-612-4400	www.gvnw.com
19 Huawei Technologies USA	702-493-6142	www.huawei.com/us
48 Innovative Systems, LLC	605-995-6120	www.innovsys.com
42 Mid America Computer Corp. (MACC)	402-426-6222	www.maccnet.com
21 National Information Solutions Cooperative (NISC)	866-999-6472	www.nisc.coop
13 Neonova	877-636-6682	www.neonova.net
38 Power & Telephone Supply Co.	901-324-6500	www.ptsupply.com
43 QBE Farmers Union Insurance	800-669-0622	www.farmersunioninsurance.com
23 REDCOM Laboratories, Inc.	585-924-6500	www.redcom.com
3 Sasktel International	877-242-9950	www.sasktelinternational.com
15 Telcom Insurance Group (TIG)	800-222-4664	www.TelcomInsGrp.com
41 Toly Digital	561-694-8655	www.tolydigital.com
42 Zyxel Communications	714-632-0882	www.zyxel.com



- **Marketing to Cord Cutters and Traditional TV Viewers**
- **'Giga-huh?' Educating Customers Through Marketing**
- **Innovative Uses of Wi-Fi**

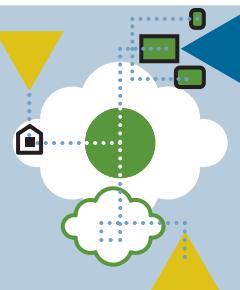
To submit article ideas, send proposals to the editor at publications@ntca.org.

Check out the
Rural Telecom
Solution Providers
Directory at
www.ntca.org.

**Visit our
website at
ruraltelecom.org**

The Rural Telecom website includes the digital edition of the magazine, exclusively for subscribers, and articles that can be enjoyed by all visitors.

**FOR ADVERTISING INFORMATION, CONTACT
703-351-2089 OR SALES@NTCA.ORG.**



•• GAMING TREND ••

Cloud Gaming

Remote Play > Thanks to exciting new features, gamers can use a variety of devices to connect with and play their powerful home consoles or gaming PCs over either local Wi-Fi or from miles away over the Internet. The home console handles all of the processing, streaming the picture and audio to the player's device, while the user's button inputs are streamed back.

Gaming on Demand > Like Netflix, but for games, several services have appeared that allow players to stream games from a service provider to their consoles or other devices. On-demand services could potentially transform the industry, allowing consumers to play the latest cutting-edge gaming experiences on any device capable of streaming video, without the need for a powerful dedicated gaming console.

Cloud-Based Computing > Online connections to the cloud are allowing console manufacturers to expand the computing power of their machines without the need for any physical upgrades whatsoever. With a consistent and fast connection, games running on a home console can offload some of their computing processes to servers many miles away. This allows user experiences to go beyond what their home gaming device would be capable of on its own, opening up seemingly limitless possibilities.

may soon decide to stop waiting for faster networks to embrace an all-online future. When online gaming services become the next Netflix, broadband providers may find themselves playing catch-up with customer demands.

Mike Riddle is member services coordinator for NTCA—The Rural Broadband Association. Contact him at mriddle@ntca.org.



•• GAMING TREND ••

Gaming Video

Live Streaming > Surprisingly popular, many people are watching live streams of other people playing video games on services like Twitch and YouTube. Such streams can be communal activities, allowing participants to chat with their favorite gaming personalities while they play. Competitive eSports events are also widely viewed. The most-watched live streaming event, the 2013 League of Legends championship, garnered 32 million viewers worldwide.

Let's Play > Prerecorded videos of popular personalities playing games also generate heavy online traffic. One such personality, PewDiePie, has 39.6 million YouTube subscribers.

The Power & Tel Perspective

Power & Tel helps you get the most out of your supply chain by combining our dedicated, customer-first approach with years of experience and innovative technologies. We fulfill your ever-changing inventory needs, allowing you to concentrate on what's really important — **your customers**.

Power & Tel, your premiere supply chain partner in the global communications marketplace.

Learn more about our full range of products and services: Visit hub.ptsupply.com, or email marketing@ptsupply.com

Scan here to learn more about our full range of products and services.



IP VISION CONFERENCE & EXPO

**TO BE SUCCESSFUL,
IT'S IMPORTANT TO SEE WHAT'S COMING.**

The transition to an IP environment is challenging for rural providers. IP Vision can help your company along the way.

- Hear the real-world experiences of small companies finding success.
- Learn about the latest transformative technologies and service offerings.
- Discuss business and operational approaches that work.

Register your team at www.IPVisionShow.com.

APRIL 6-8, 2016

TROPICANA LAS VEGAS | LAS VEGAS, NEV. | WWW.IPVISIONSHOW.COM

PRODUCED BY:



How to Limit Your Cyberliability Risk

Cyber risk is generated when your business uses the Internet as a tool for ecommerce or general business operations. That being said, most companies have a cyberliability risk by virtue of their day-to-day operations. Insurance policies address exposures like website publishing, data/security breaches, data corruption from a virus, cyber extortion, public relations and credit monitoring services for those who have had their data compromised, and firewall and network attacks, among other things. The policies are set to help you with expenses that happen as a result of a cyberliability claim, but there are some best practices to help you before a claim.

A 2015 Verizon Data Breach Report says 29.4% of all security incidents are attributable to employee errors.

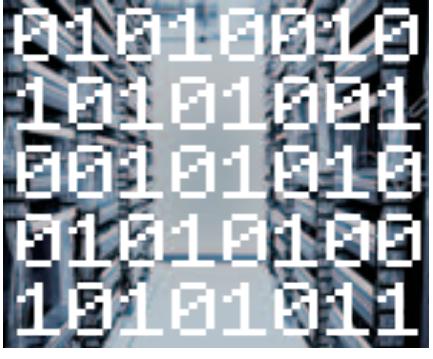
Step by Step

The first step in addressing cyber risk management begins with the hiring process. While many companies hire telecom employees from within communities they may know, it is common for some network and IT positions to be recruited from outside the local community. Background checks, in general, are a good practice to use before hiring employees. This is no different for those who maintain your cyber exposures.

Once you have the right employees on staff, training becomes important. A 2015 Verizon Data Breach Report says 29.4% of all security incidents are attributable to employee errors.

After you've hired the employees, you need to address the physical controls to your data/network. Your networks should be behind locked doors; have alarms and surveillance; have admission only from authorized personnel, either through biometrics or badges; and have a fire-suppression system. You also should have procedural controls set-up to address:

- > Passwords (including for laptops and mobile devices): These should contain numbers and letters with capitalization and symbols and should be required to be changed every 90 days.
- > Antivirus/Malware Application/Firewalls: These should be updated and monitored and required on all devices with access to the network.
- > Data encryption: Important for stored data and data in transit.
- > Procedures for monitoring the network and reporting and responding to issues.



•LOCKED DOORS•ENCRYPTION•SEGREGATION OF CONTROL•
•TRAINING•WEBSITE POLICIES•BACKGROUND CHECKS•
•NETWORK MONITORING•SURVEILLANCE•
•FIREWALLS•SHREDDING•OFFSITE DATA BACKUPS•
•ALARMS•CONTRACTS•STORAGE DEVICE CONTROL•
•AUTHORIZATION•VPN/HTTPS NETWORK CONNECTION•

> Document storage and retention: These should include shredding paper documents with personal information.

> Removal of all storage devices when disposing of computers and smart copiers and SIM cards for cellphones.

> Secure connection to the network through a controlled and monitored VPN/https for telecommuters and remote access. Remote users should have to supply a secondary authentication besides passwords to log in. An example is a pin or a security token.

> Segregation of duties so that no one individual has the physical and system access to control all phases of a business process.

> Full back-ups of data, including at an alternative off-site location. These back-ups should be tested.

> Website governance policies should address whether the work of others could be subject to copyright laws; if there is a privacy policy disclosed on the website; and whether a formal user agreement should be in place.

> Contracts with third parties that share your data, like data centers and billing companies, should address who is responsible for your customers' data. They should also have a cyberliability insurance policy to address breaches.

Forty-seven states (all but Alabama, New Mexico and South Dakota) have data breach notification laws. So, as part of your business continuity/busi-

Time to Talk to Toly...

...about
Hosted VoIP
Solutions.



Are You Ready?

Hosted VoIP
Designed Just for You!

Time to Talk to Toly at
IP Vision Conference & Expo

April 6-8, 2016

Las Vegas, NV
Las Vegas Tropicana Hotel



TOLYDIGITAL.NET

ness resumption/emergency preparedness plan, you should address a post-data-breach rapid recovery program. It should restore operation functionality, as soon as possible and focus on the ability to preserve and sustain operations. It should address the effects on customers and the public relations component of preserving your reputation in the community and your relationship with your customers. This is a post-event risk management plan.

Cyber threats are constantly changing and could have a major financial impact on your company if there is a breach. These threats are everyone's responsibility; it's not just an IT issue. Unfortunately, there is no silver bullet to stop these risks. We reduce our risks only by exercising proper internal controls, by transferring some of the risk through insurance policies and by employee training.

Marilyn A. Blake is chief operating officer at Telcom Insurance Group. Contact her at mab@telcominsgrp.com.

CONNECTING THE BEST OF BOTH WORLDS
... At the speed of 11AC

AC2050 Bonded VDSL2 Combo Gateway
VMG4825
VMG9823 (VoIP)

COPPER NETWORKING
FIBER NETWORKING

AC1600 VDSL2 Combo Gateway
VMG3925

AC2200 Wi-Fi Router with Gigabit Ethernet, TR-069 and Optimized for IPTV
EMG3425

Zyxel
Progress Toward Wi-Fi Excellence
Learn more at zyxel.com/us

CSSA
celebrating 40 years
Contact your CSSA representative today for more details



Billing Solutions for Today's Telecom Industry

Flexibility in Focus

Get the flexibility your company needs with a BSS/OSS solution from MACC. Our products are developed with open architecture, giving them the ability to integrate with software and equipment already in use at your company.

Proven solutions for the challenges of today's telecom industry.

Reduce cost when you integrate, not eliminate, your company's existing equipment and software.

You control the level integration needed in your operation.

Broadband Beat

with Shirley Bloomfield

Tune in to the latest policy news as NTCA Chief Executive Officer Shirley Bloomfield discusses hot topics with industry leaders and lawmakers who are working to drive the rural broadband industry forward.



Sen. Heidi Heitkamp
(D-North Dakota)

Watch the latest episodes at
www.ntca.org/broadbandbeat.



THE RURAL
BROADBAND
ASSOCIATION®

**MOVING?
OTHER CHANGES
TO YOUR
SUBSCRIPTION?**

Let us know at
publications@ntca.org.

Your company's future is riding on your insurer's financial strength!

In a world of volatility, our expertise with managing risk gives telecommunications businesses the reassurance they need to invest and grow without gambling on their security.

Backed by one of the world's 20 largest insurance and reinsurance companies, we're rated A+ by Standard & Poor's and A (Excellent) by A.M. Best.

With worldwide gross written premium of \$16.3 billion and shareholder funds of \$11 billion, our capital will be there when you need it.

We're QBE Farmers Union Insurance.
Why trust your network to anything less?

For more information contact:
800.669.0622, Ext. 842123
farmersunioninsurance.com



**QBE FARMERS UNION
INSURANCE**



UNITEL

QBE and the links logo are registered service marks of QBE Insurance Group Limited. Coverages underwritten by National Farmers Union Property and Casualty Company, California Company ID #3078-4. © 2013 QBE Holdings, Inc.

Wireless Gets Easier. And Tougher.

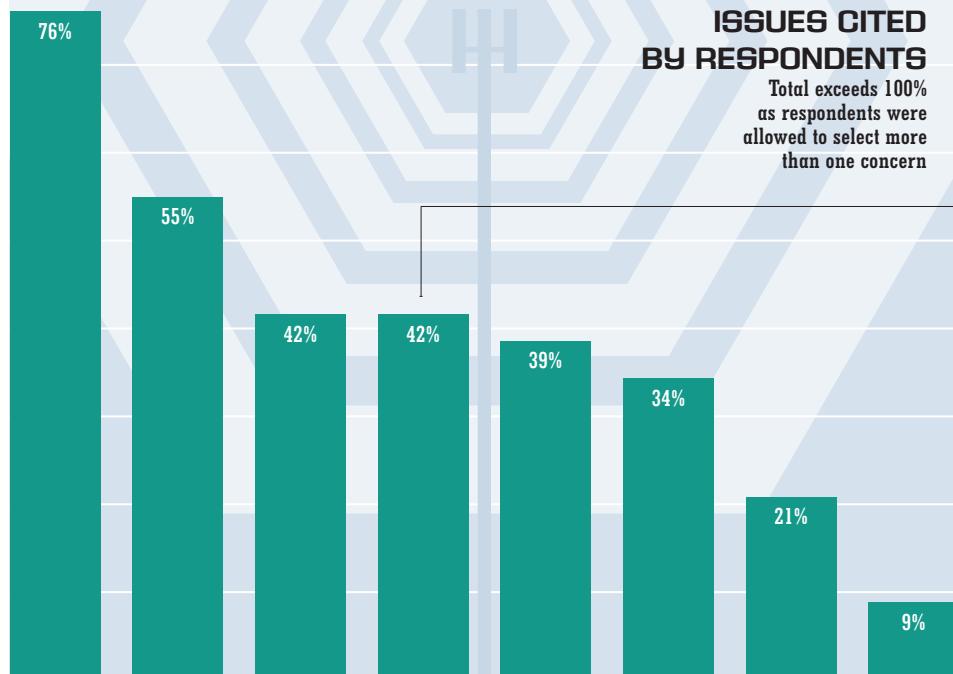
Findings from the "2015 Wireless Survey Report" from NTCA-The Rural Broadband Association. For full details of the survey, go to www.ntca.org/newsroom.

60%
are providing wireless service to their customers

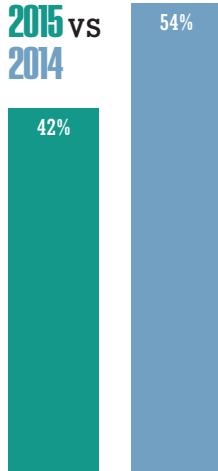
6%
are considering doing so

\$1.3
MILLION

is the median total (cumulative) investment in wireless facilities excluding spectrum

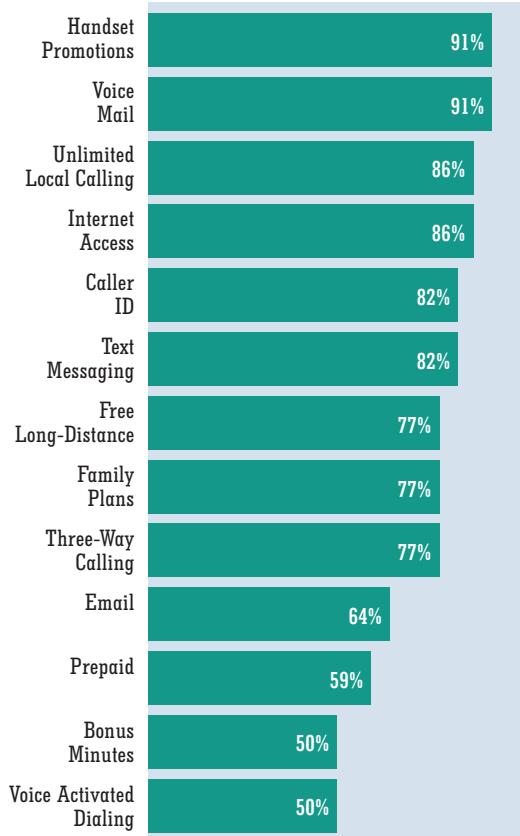


HANDSET AVAILABILITY CONCERN HAS DECREASED



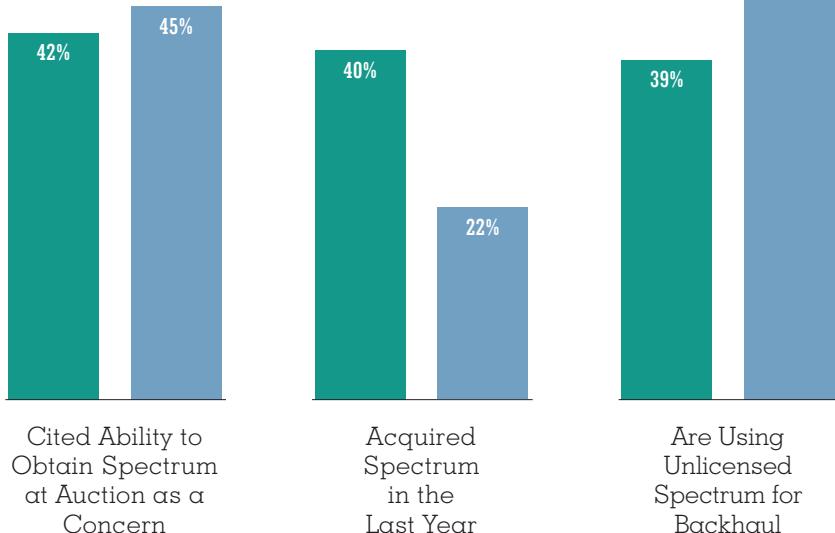
Indicated That Handset Availability Was a Concern

MEMBERS OFFER A VARIETY OF FEATURES TO WIRELESS CUSTOMERS

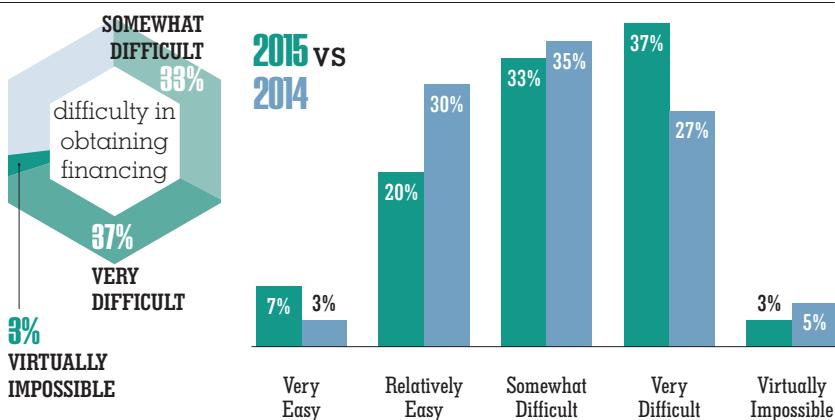


OBTAINING ACCESS TO LICENSED SPECTRUM SEEMS TO BE GETTING SOMEWHAT EASIER

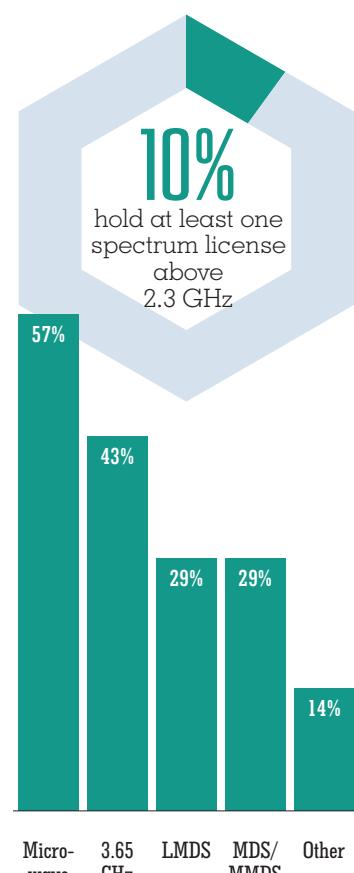
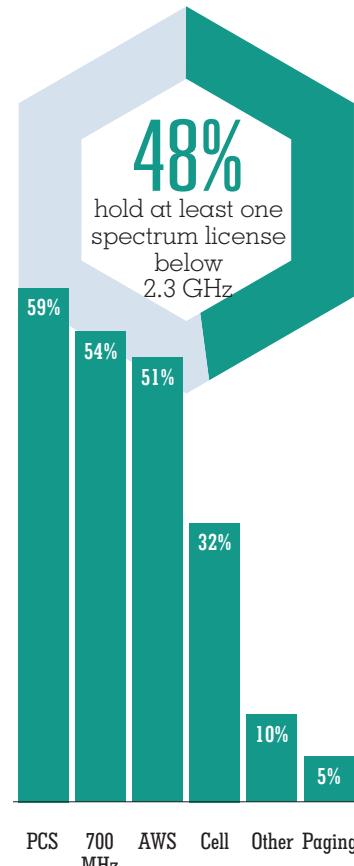
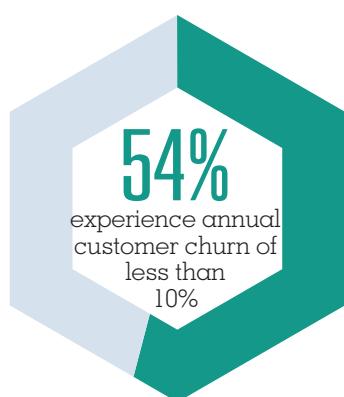
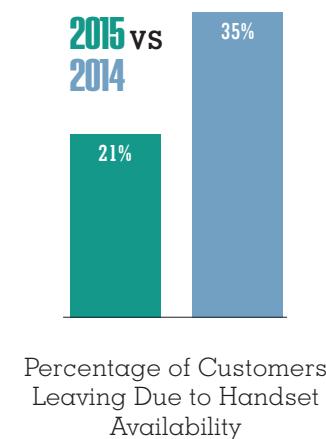
2015 vs 2014



FINANCING: EASIER FOR SOME, TOUGHER FOR OTHERS



WIRELESS CUSTOMERS ARE STAYING WITH THEIR CARRIERS



BY JOSHUA SEIDEMANN

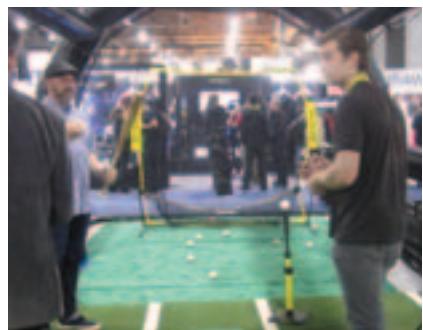
What I Saw at CES

Las Vegas is the perfect home for CES 2016.

The glitz and bright lights of the strip mirror the flash of the exposition halls, where the latest consumer and industrial products compete for attention. These offerings can be sorted into various broad categories: aspirational, or market changing or fantastical. And only a few product categories did not feature some type of device that relied upon broadband connectivity.



I saw many smart-home displays featuring everything from security systems to appliances. This display offered an array of connected light bulbs that can be activated remotely for convenience and security, and whose colors can be changed for mood and ambience.



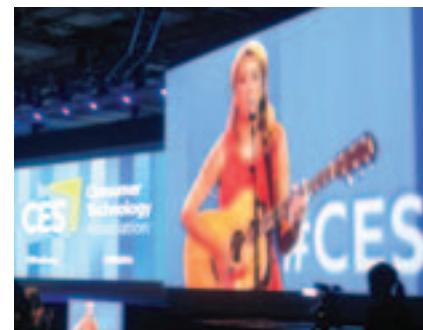
This product display featured a baseball bat attachment that measures swing type and speed. The vendor explained that many players, particularly in high school, might be reluctant to absorb a coach's critique, but that there can be no arguing with the data displayed on a nearby phone or screen to which the bat sensors communicate.

Fleet vehicle managers can use this and similar products to track usage, maintenance and performance, as well as driver behavior.



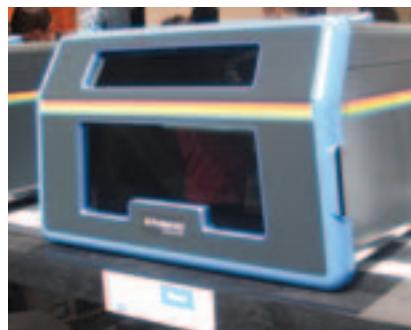
The slim attachment atop these eyeglasses "read" text, such as that found on menus or on grocery products, and then vocalize the words for users with poor eyesight, bringing an entirely new definition to the term "reading glasses."

The rainbow is so '70s, yet the idea is so "now": Polaroid is in the 3-D printing business, demonstrating that even as digital photography, Facebook, Instagram and texting may have cut into the market for instantly developing photographs, the category of "image production" is broad indeed.



Yes, CES has its own theme song.

That which may appear mundane is quite smart. This hot water tank attachment is one of several types of devices that can alert users to leaks, floods or other unwanted moisture. They are particularly suitable for vacation homes or other properties from which residents might be absent for extended periods.



2016 PR & Marketing Conference

May 1–3 • Francis Marion Hotel • Charleston, S.C.

PLAN.

DO.

GROW.

The road to a prosperous future starts here.

Visit www.ntca.org/PRMarketing to register today.

Register by March 25 and save.

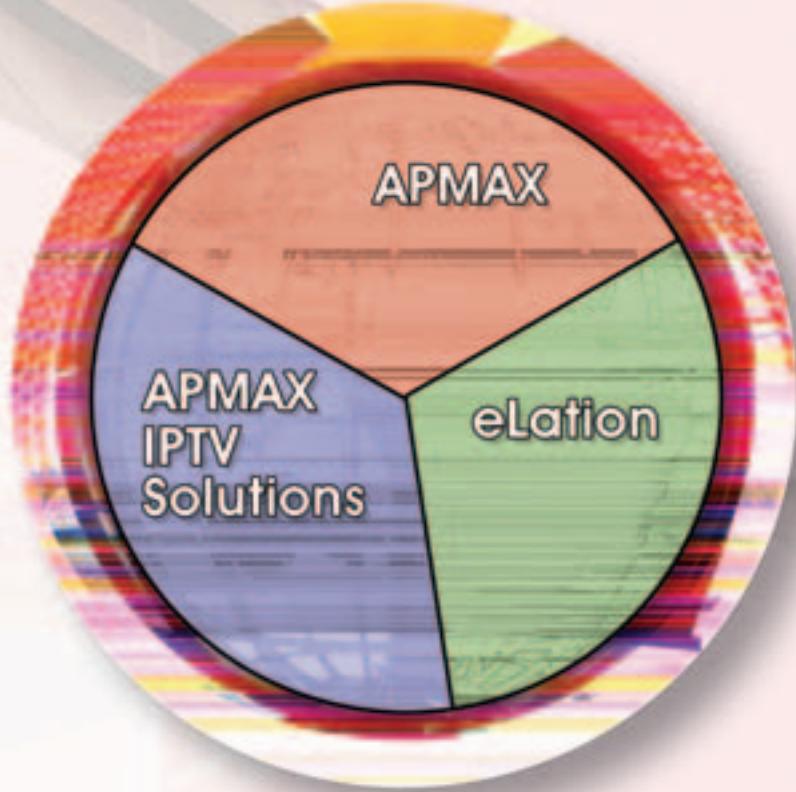
A black tablet is shown from a slightly elevated angle, displaying the "Exchange" blog homepage. The screen shows a header with the NTCA logo and the word "EXCHANGE". Below the header, there's a main article titled "TECO Reaches Milestones in 2015" and a sidebar with "Recent Posts" and "Social Media" links. The background of the tablet screen is a light teal color.

**Have You Seen
the Latest?**

- > RTIME Recaps
- > PRTC Hosts FCC Chairman Wheeler
- > Recent New Edge Posts

ntca.org/exchange

- Unified Messaging
- Automated Notification
- SIP Feature Server
- Many Advanced Features
- Middleware & Encryption
- Blended Services
- Video Quality Monitor
- Video Streaming & Ad Insertion
- Billing CABS
- Automated Provisioning
- Financial System
- Staking Mapping



More Integrated Solutions for the Tier 3 Telco Market Than Any Other Vendor!

We have deployed over 1,200 advanced, pre-integrated TDM Voice, SIP, IPTV and OSS/BSS solutions to the ILEC market.



Innovative Systems