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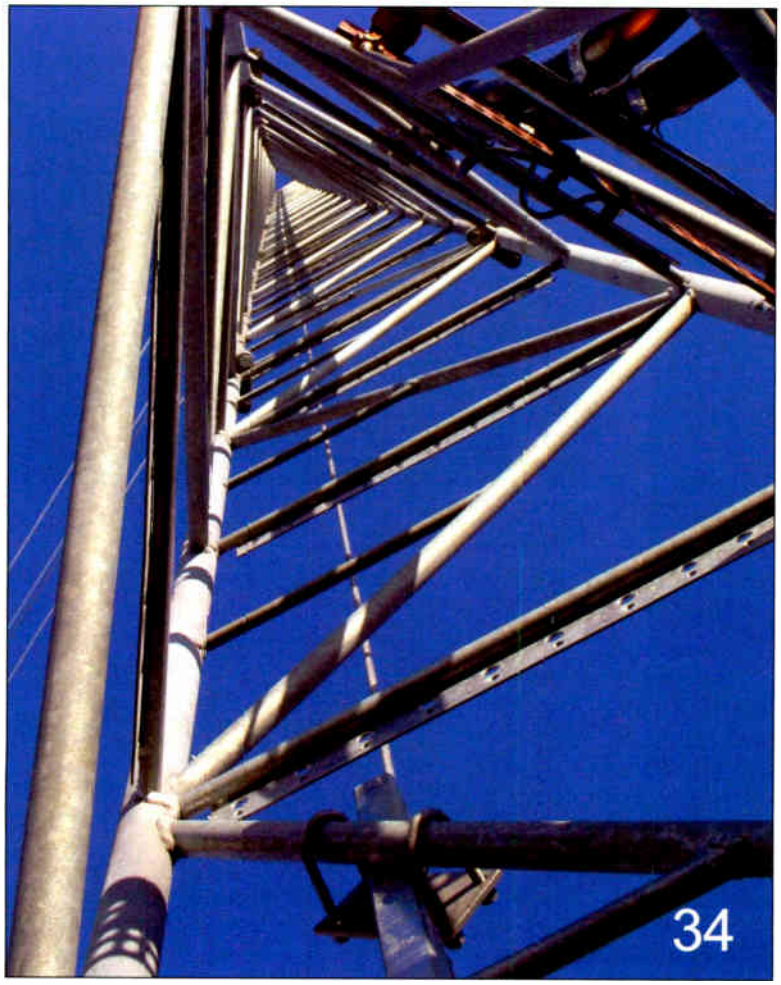

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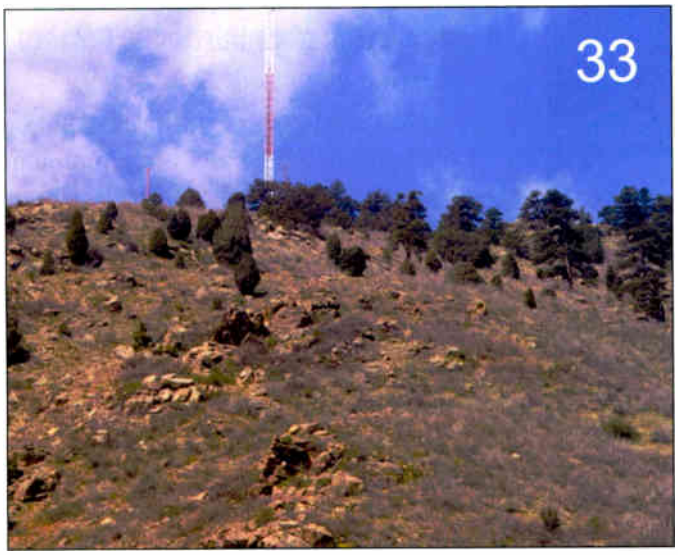

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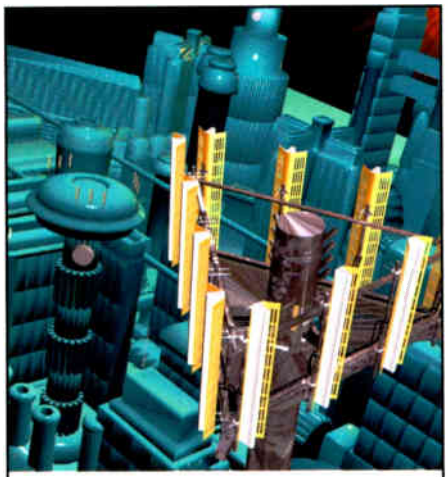

on the cover

The Amazing Criswell said, "We are all interested in the future, for that is where you and I are going to spend the rest of our lives." In "Horizons 2006," we examine trends to expect.

Cover art by Charlie Simone

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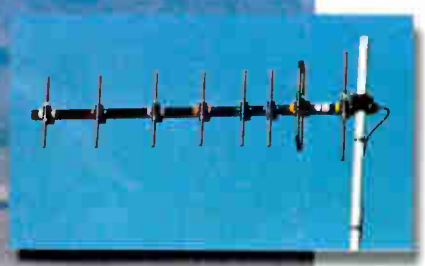

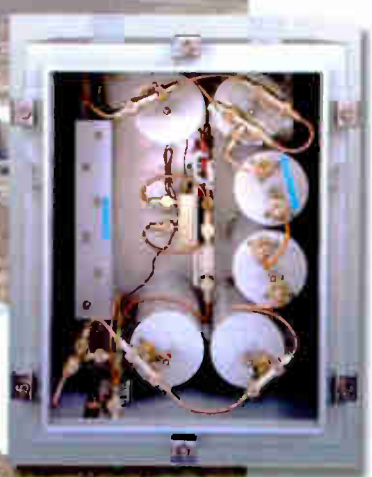

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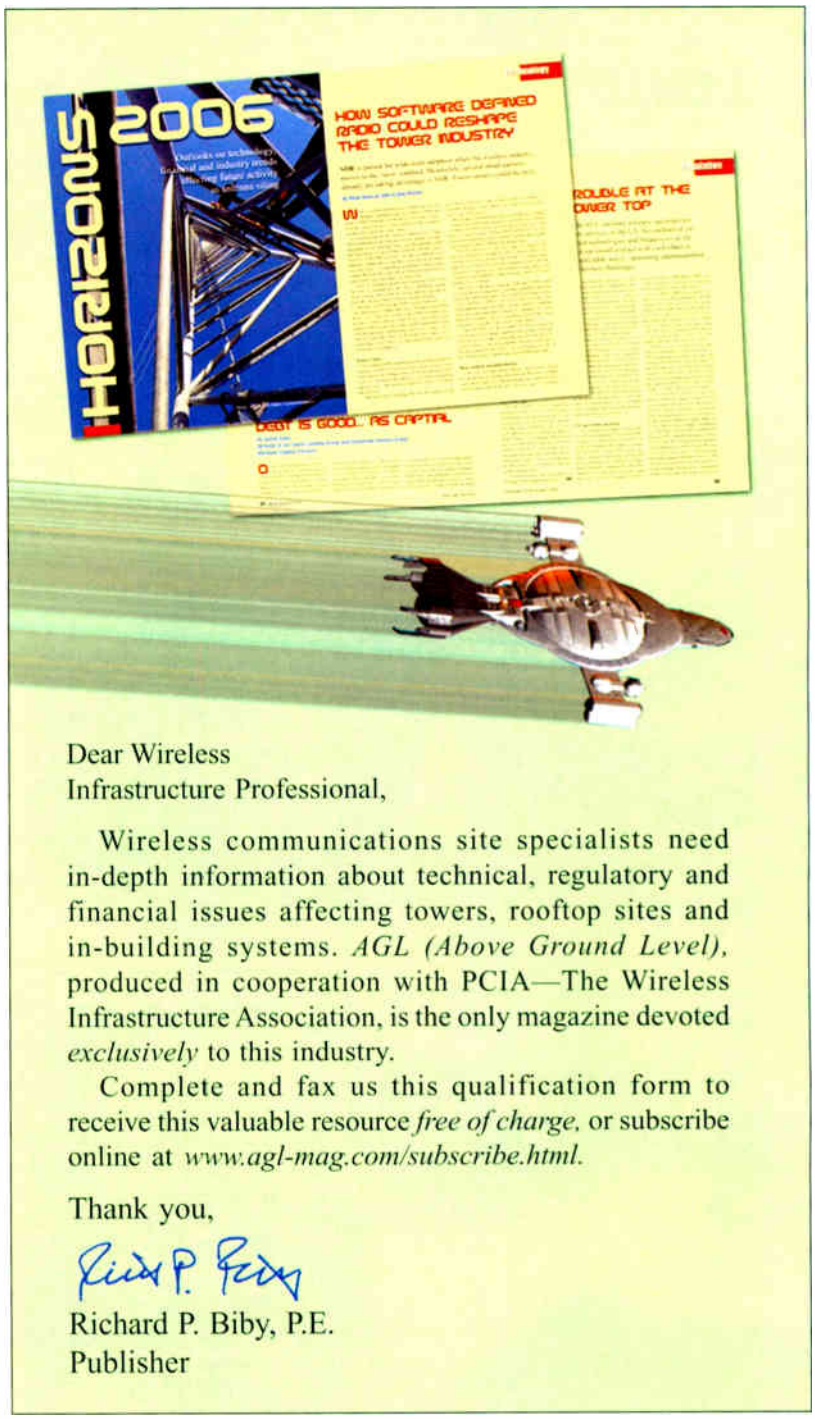

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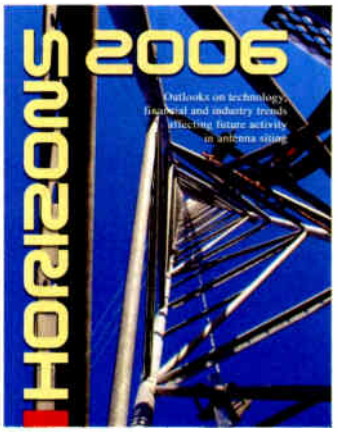
This issue we look behind yesterday's headlines—and anticipate tomorrow's news. Post-"Katrina" site recovery is described by **Fred Teichman,** Midwest director of Data Cell Systems. Prior to joining Data Cell, Fred served as an American Tower senior vice president, managing operations and special projects for the construction division. More complicated than managing a multitenant site—is doing it at a water tower. **Debbie Sullivan,** vice president of the Site Management Division of Utility Service Communications, describes safety and maintenance challenges. Debbie handles marketing, management and construction design for more than 1,600 program water tank sites. In our "Horizons 2006" section, we hear from **Vanu Bose,** scion of the Bose audio legacy and president of Vanu, Inc., which provides software and design services for software-defined radio systems. Vanu has a PhD in electrical engineering from MIT. The potential for in-building antenna systems for multitenant buildings is discussed by **Anand K. Iyer,** director of the Atlantic Region Communications Industry Group of PRTM. Formerly with Bell Northern Research and Nortel Networks, Anand has a PhD in electrical engineering and an MBA from Carnegie Mellon.



Giving us a carrier's perspective for the "Horizons 2006" section is **Nancy Garvey,** vice president and general manager of Cingular Wireless' Kansas and Missouri regions. Nancy oversees all wireless sales and operations for that area, including St. Louis, Springfield, Wichita, and Kansas City. She formerly served as vice president and general manager for Cingular's Arkansas and Oklahoma operations. She began her career with Southwestern Bell Telephone in 1980, working in the St. Louis market, serving as the manager of marketing and informational systems. Nancy has an MA in business from St. Louis University and graduated from the Fontbonne College with a BA in business administration.

Wireless customer satisfaction is inexorably linked to wireless reliability, which will continue to be an important industry topic. For views on that subject, we turn to one of the tower industry's most respected corporate technology officers, **Ted Abrams**. Formerly with SpectraSite and now serving as American Tower's senior vice president for technology, Ted is a licensed professional engineer with over 20 years of varied industrial experience. He designed and managed 450 MHz radio systems in the 1980s; was responsible for oversight of fiber-optic data highway projects, 800 MHz trunked radio and private microwave systems in the 1990s; and in 2000 became responsible for the largest multi-operator RF transport network in North America.

Joining *AGL's* roster of regular contributors is **Jarred Saba,** director of the Tower Lending and Corporate Finance groups of Wireless Capital Partners (WCP). Jarred manages WCP tower loan originations in the Western United States. He earned his BA in finance from the University of Southern California and received his law degree and MBA from the University of San Diego. Jarred is a licensed attorney and broker in California. If you have specific questions about debt and capital that you'd like to have him address in future issues of *AGL,* you can email him at *jsaba@wirelesscapital.com,* or write to him in care of: Wireless Capital Partners, Tower Lending Group, 2800 28th St., Suite 100, Santa Monica, CA 90405.

We've been tardy about spotlighting, on this page, a valued contributor since our first issue. "Risky Business" columnist **David Saul** began his career in the insurance industry in 1989. He became an accredited advisor in insurance in 1993. In 1994, he was hired by Atlantic Risk Management, where, starting in 1995, he focused his efforts on telecommunications. In 1999, he developed a successful insurance program specifically for independent towercos. Shortly thereafter, the program was endorsed by PCIA—The Wireless Infrastructure Association. The program has grown to include cellular carriers, two-way radio operators and regional telephone companies. David is now a vice president at Atlantic Risk Management and became a co-owner in 2004.

Other familiar and—new—contributors appear in this issue's columns. Returning as a guest contributor to our legal and regulatory "Law of Physics" column is **Mark N. Savit.** A partner in the Denver office of the Washington, DC, law firm Patton Boggs, Mark discusses efforts to organize a grassroots Colorado Wireless Association.

Taking over the reins of "PCIA Proactivities" is the association's new marketing manager, **Peter Melkonian** (not pictured). Echoing our lead article, Peter discusses the need for collaboration in the wireless industry on disaster preparedness and recovery efforts. He will also serve on *AGL's* editorial advisory board. Peter has a B.S. degree in business from Lehigh University. agl

World Radio History

The little mag that grew

It's that time again... I get to read the articles we've been working on, watch our ideas come to life, check layouts, giggle at the "Tower of the Month" and reflect how much fun this publication is.

This is a transition issue. We originally planned to publish only six times a year. I wanted to do a buyers' guide issue, but realized that my friend Jim Fryer already had been publishing a fantastic buyers' guide for many years, and there was no point in doing *that* within *AGL*. We are, in fact, expanding to eight issues in 2006, but we felt some trends and technology deserved immediate consideration as a year's-end/New Year's outlook. So, much of this issue is a foward-looking omnibus section wherein regular contributors and industry leaders provide insight on towers and antenna siting in 2006 and beyond.

We've also probed deeper into the avian mortality controversy with a followup on legal issues, and we present an "oral history"—converted to print—of the experiences of Fred Teichman, who relates to Don Bishop a first-hand account of recovery efforts "in the field" in the aftermath of Hurricane Katrina.

The year 2006 is going to be exciting for us, for two big reasons:

1) We're still here! It's a sobering statistic to a small magazine publisher, but over 80% of new publications don't last out the first year. Because I'm the owner of this business, I've got no other pockets to turn to... no Wall Street financing, no "more-profitable" publications, no "Martha Stewart's Towers Today" spin-off possibilities. So, we're thrilled to have the support we have had to date, and we're happy to have proven this industry segment deserved—and required—a magazine. We're honored by your many complimentary letters.

2) On Dec. 1, 2005, Biby Publishing acquired *Fryer's Site Guide*, and Jim's tower industry services. As many of you know, I am an old hand at online data, engineering analysis and similar services-based business. I'm honored that Jim was willing to consider me to take over the long-term care-and-feeding of his hard-won business.

I'm excited about the opportunity to provide more cutting-edge analysis to the industry, in addition to continuing Jim's annual *Tower Market Analysis Report* with its breakdown of the marketplace and the effects of new technologies. Jim will continue to work with us for some time to come, but now is a great time to send in your "Why don't you..." suggestions. What format of information, using all that data about all those sites that Fryer's has collected, massaged with some software engineering and datamining, would be most useful to your business or organization?

Speaking of information resources, we've been receiving many requests for back issues from newly minted subscribers. (See the annual index on page 44 to learn what you might have missed.) Our back-issue archive is not large, and it became clear we were going to run out soon. So, as our official Geek, I could not resist the temptation of digital publishing. Sometime in January, all previous issues of *AGL* will be available— with interactive navigation links—on our Web site. In the future, digital editions will be released concurrently with the print editions. If you would like to be notified by email when a new digital issue is available, visit *www.agl-mag.com* and click on "Subscribe Now" to update your subscriber profile information.

We love your comments —good and (thankfully, few) bad. Until next time... avoid dissimilar metals, ground things well—and *lock* the gate. agl

by Rich Biby, Publisher
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Telecommunications Transitions

AGL's publisher, Rich Biby, P.E., and I don't often comment about the same things in these pages. But I'd be surprised if he didn't say something in this issue about Biby Publishing acquiring the assets of *Fryer's TowerSource*, and how can I not, as well? It's the "elephant in the middle of the room."

In 1991, Robert H. Schwaninger Jr., one of the partners in *Fryer's*, told me about the plans he and Jim Fryer had to publish a list and descriptions of all the towers available in the United States for antenna site rental. I'm delighted that now, many years later, *Fryer's TowerSource* and its related products are together with Biby Publishing. The combination strengthens our ability to advance the work of the antenna site industry.

TowerSource expanded from its original site listings to include a buyers' guide that lists every type of company servicing the tower industry, and a market-analysis report that defines the size and shape of the industry.

AGL and *TowerSource* now are teamed up to deliver information and resources useful to wireless infrastructure businesses at an unprecedented level.

Fitch on radio

PCIA's president and CEO, Mike Fitch, was heard on "An Hour Off the Clock," a weekly radio program broadcast Oct. 26, 2005, on WBIS, Annapolis, MD, a station that covers Washington, DC, and Baltimore.

Among other things, program host David Reader, from the Washington law firm of Keller and Heckman, talked with Fitch about statewide wireless associations. Fitch explained how the associations help tower companies with the state legislative matters affecting the placement of wireless infrastructure. He talked about PCIA's role in helping the state associations with information about best practices and federal legislative and regulatory matters.

You can still listen to the interview via streaming audio. Click the link on PCIA's home page (*www.pcia.com*). Or you can enter *http://pcia.com/MP3/PCIA%20interview.mp3* in your Web browser to download the 34 MB computerized audio file.

Reader said that he is happy to have guests from the telecommunications industry because Keller and Heckman is heavily involved in that area. He already has another such guest scheduled for January 2006.

'Marconi, can you hear me?'

"Marconi," a name that has been associated with wireless telecommunications since its inception, is about to disappear from that company, which traces its roots back to Marconi Wireless Telegraph, founded more than a century ago by Guglielmo Marconi. At press time, the Marconi Corporation was set to close on a transaction to sell most of its assets to Ericsson. Then, the company plans to change its name to "telent" (with a small "t"), and its venerable connection to Marconi will become obscure.

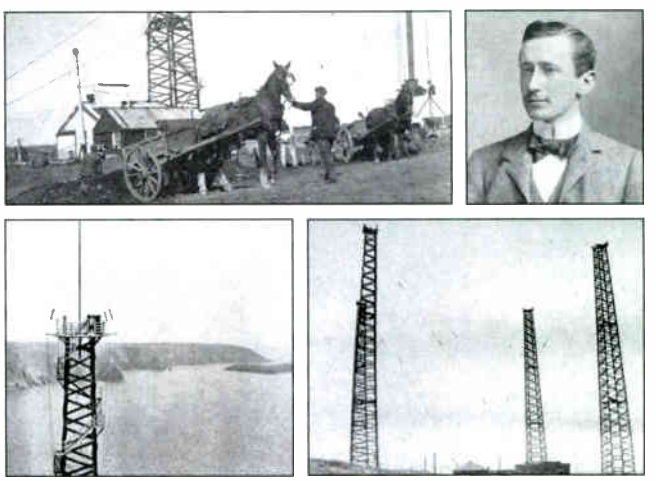
Maybe the tower industry can lay claim to a part of the Marconi legacy. Marconi Wireless Telegraph built towers in the United States as early as 1902 *(see below)*. History buffs can view other artifacts of the Marconi legacy at *www.marconicalling.com*. But hurry, because once the assets change hands, that Web site might not continue.

It fits to a 'T'

Signaling that local telephone companies have won their competition with long-distance companies, SBC Communications closed its acquisition of AT&T.

A former "Baby Bell," one of AT&T's former regional Bell operating companies (RBOCs), SBC has changed its name to that of its former parent, becoming AT&T. And it has adopted its former parent's trading symbol on the New York Stock Exchange, the legendary, single letter "*T*."

Where it made sense, to some, to disassemble AT&T in the 1980s, it makes sense, to others, today to reassemble local and long-distance telcos, combine them with wireless carriers, and get ready to meet competition with cable TV companies and other telecommunications providers. agl



Clockwise from top left: **(1) Reconstruction of towers at Poldhu, Cornwall, England, circa 1912; (2) Guglielmo Marconi, circa 1901; (3) Aerial towers at South Wellfleet, Cape Cod, MA, circa 1902; (4) View across Mullon Cove, Cornish Coast, from the top of another of the towers at Poldhu Station, circa 1901.** ***Source: Marconi plc***

by Don Bishop, Exec. Editor
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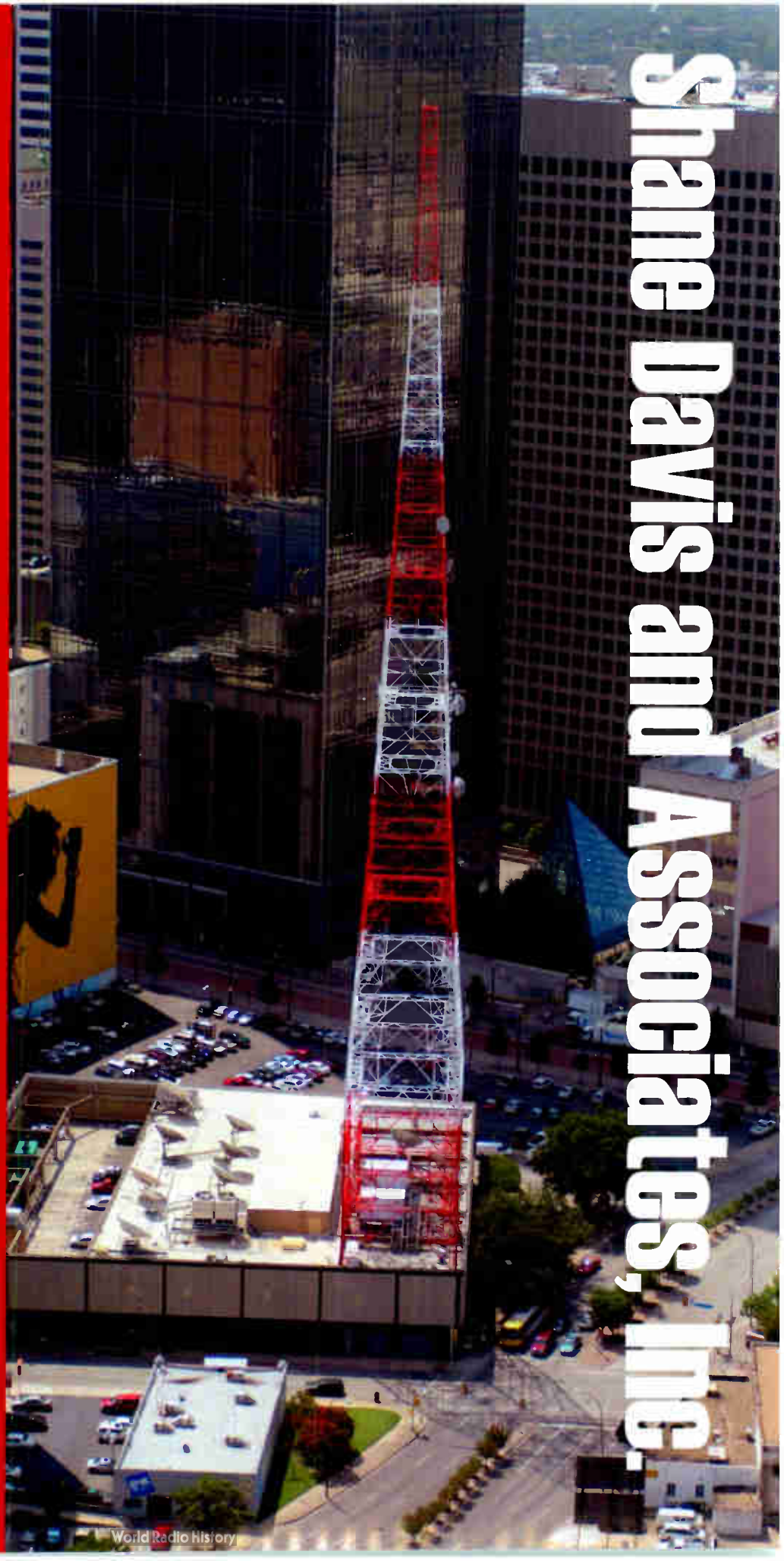

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Working Collaboratively to Revive Communications During a Disaster

by Peter Melkonian
PCIA Marketing Manager

Natural and man-made disasters in recent years have greatly affected wireless communications. Hurricanes Katrina, Rita and Wilma, and the 9/11 attacks, put a spotlight on emergency response and the ability to communicate in a disaster area. Governments, tower operators and carriers must work collaboratively to minimize breakdowns during critical times.

The wireless industry has learned much and is constantly improving. Several entities help with communications issues during a catastrophe.

The Network Reliability and Interoperability Council (NRIC) has been effective in developing best practices to enhance emergency-communications networks. NRIC partners with the FCC, the communications industry and public-safety agencies. More than 800 best practices are now listed on its Web site at *www.nric.org*.

The Wireless Emergency Response Team (WERT) was founded on the night of Sept. 11, 2001, to coordinate wireless industry mutual-aid support to rescue possibly trapped survivors in the World Trade Center rubble. Since then, WERT has provided vital help in national crises by combining advanced wireless expertise, technology and infrastructure support for search-and-rescue operations. WERT comprises volunteers from the wireless infrastructure industry, wireless service providers, network equipment suppliers, and federal, state and local government entities. More information on WERT can be found at *www.wert-help.org*.

In addition to formal groups, individual companies have established their own emergency-response plans. Wireless infrastructure providers and carriers mobilized efforts prior to the onslaught of Hurricanes Katrina and Rita to minimize disruptions and to quickly restore service to affected areas.

"PCIA members helped restore critical network operations during Hurricanes Katrina and Rita within a matter of hours. Teams from all the major tower companies immediately acted to assess and repair damage," said Ted Abrams, senior vice president of technology for American Tower and chair of PCIA's Technology Committee.

Because equipment and resources were already in the Gulf states, providing relief after Katrina, generators and light trucks were quickly mobilized to South Florida in preparation for Wilma. Verizon Wireless pre-arranged fuel delivery to the its network-switching facilities in Southwest Florida. Nearly 80 percent of its individual transmission sites had their own on-site generators, and it positioned mobile generators for ready access to rooftop cellsites along the Florida coast before Wilma hit.

Another solution is to improve cellsite hardening. Unfortunately, those efforts are often hindered by local zoning concerns about aesthetics and noise pollution. Some jurisdictions have prevented wireless operators from installing generators at wireless facilities. Without generators, wireless operators must rely only on backup batteries with a limited capacity of four to eight hours when the power goes out. Zoning ordinances have also prevented towers from being built in areas where reliable wireless communications would have been useful in times of emergency.

"We should be working with local emergency-planning agencies to determine what the best sites are to improve and to identify what resources need to be hardened. Once we identify the sites we want to make robust, the local zoning committee should streamline the permitting process for the benefit of public safety," said Robert Smith, National Zoning Compliance manager at Crown Castle International and chair of PCIA's Local Zoning Committee.

Multiple carriers collocate on many towers, so at sites that do have generators, site owners and operators can work together to avoid duplication of effort. "In times of emergencies we do not need to have service people from all of these carriers servicing the tower," said John Vivian, corporate accounts manager for telecommunications at Caterpillar. He supports a united effort in the tower, carrier and vendor communities. In areas where a tower has a backup generator, it is more economical to have one large generator with a large tank as opposed to several small generators with small tanks servicing the carriers. Additional steps, such as an accounting of Cells on Wheels (COWS) and Cells on Light Trucks (COLT) can be provided.

Responsibility for robust wireless communications during national emergencies is shared by industry, first responders and government. A national framework for emergency-communications preparedness will ensure appropriate measures are in place to provide reliable communications to those most in need during a catastrophe. agl

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What Happens if the Music Stops?

by R. Clayton Funk

Ever played musical chairs? As a refresher (if it's been too many years or if you've never played), cheerful music is played while people (OK... *kids*) prance around a circle of chairs with the seats facing outward. The concept is that when the music stops playing, you rush to grab a seat and sit down. Why rush?

The trick is that there is always one less chair than there are participants. If you don't get a seat, you are "out" of the game. The game resumes with more cheerful music and one less participant, and yet another chair is removed—guaranteeing that when the music stops again, another player will be eliminated.

As I write this article in November 2005, the tower industry has cheerful music wafting over a frothy merger-and-acquisition environment. This situation is fueled by a large number of deep-pocketed acquiring companies, a limited quantity of quality inventory on the market, low interest rates, and carrier buildout plans that should continue the "boom" the tower industry has experienced over the last couple years.

But what happens when the cheerful music stops and everyone rushes to find a seat? There is always a look of astonishment on the face of the one who is kicked out of the game.

"Johnny Multiple," a recurring character in this column, has lived a charmed life thus far in his tower-building adventures. He developed a carrier relationship to build towers, found a good financial partner to assist him with his dream, sold for a substantial profit and executed the perfect business plan. But life doesn't always follow a textbook. Even the best plans and ideas can be torpedoed by things out of our control.

To set the stage, Johnny Multiple has the itch to start another towerco, which he decides to call "20x TCF Tower Company." (Johnny reasons that if you have a goal in mind of what you want to sell for, you might as well put it out there for everyone to know.)

Johnny signed a regional non-compete agreement when he and his investors sold to 800-Pound Gorilla Tower Company (ticker symbol: GRRRRR), so now he has to build towers in the next state over, the State of No Zoning. While it doesn't offer the same protection as the State of Restrictive Zoning, where he built his first group of assets, Johnny is confident he can develop and eventually sell towers there. After all, he *is* Johnny Multiple.

Johnny's buddy over at Perfect Coverage Wireless tells him that Perfect plans to build 100 towers in the State of No Zoning next year. Perfect won't give Johnny an exclusive contract to build towers, but his buddy tells Johnny that he'll give him a lead on where the carrier plans to build towers. With this verbal commitment, Johnny lines up a new investor, Hard-nosed Capital, and they set out, hand-in-hand, to build another tower company that will again make everyone money.

Upcoming articles chronicling Johnny Multiple and his new tower company will focus on the proverbial train wrecks that occur at every turn in Johnny's new business ventures. What are the ramifications when a carrier makes a commitment to build 100 new towers and then chooses to *halt* their build plans? How does Johnny handle picking the wrong financial partner? What happens to Johnny's stake in the company if he can't leverage his assets and instead is using equity to fund growth? Finally, what is the effect on Johnny's company if he has to sell at the bottom of the market instead of in an overheated transaction environment?

Can Johnny Multiple stay in the game once the music stops? agl

Funk is vice president of Media Venture Partners, San Francisco.

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Power—and Problems—from Email

by David Saul

The powers of email, voice mail and the Internet are considerable. Email is well established as a primary means of communication for business purposes. It is quicker and cheaper than more traditional methods, yet it brings with it the necessity to have a corporate policy.

The probability of your employees abusing their computer access is on the rise. The same features that make computer transmission an attractive and efficient tool for employees may also lead to abuse of the system—by employers as well as employees.

As an employer, you cannot be present at every computer, every hour of every day. You cannot rely on managers or employees to exercise judgment, civil behavior and good taste 100 percent of the time. What you *can* do is to take the initiative. Combat abuse in employee email by developing and implementing a *written* email policy.

Having a written policy can reduce your company's exposure to sexual harassment, discrimination and defamation suits. A responsible organization operating in the age of email requires a written "e-policy." An email policy that is well written and effectively communicated to all employees is one of the best ways for employers to protect themselves from the risks associated with employees sending nasty, or not-so-nice email messages.

A 2005 report from the Bureau of National Affairs (BNA), a Washington, DC–based publisher and analyst of legal and regulatory developments, concluded that, under current laws, employers who fail to address the issue of employees receiving pornographic emails at work face potential liability for a hostile work environment.

"For example, a worker who forwards pornographic email to a co-worker contributes to a hostile work environment as does an employee who makes lewd comments to a co-worker. The employer, if it knows or should have known about the behavior, is obligated to stop it," said BNA.

Consider that cubicles, the standard configuration of modern American offices, afford no privacy whatsoever. Anyone walking past a cubicle can see whatever appears on a computer screen.

'Hostile Work Environment'

Hostility is a form of sexual harassment occurring when such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile or offensive work environment. Coverage for such claims is provided under an Employment Practices Liability policy.

A few helpful hints in preventing having to file Employment Practices Liability claims:

- Remind employees that the hardware and networks for voice mail, email and Internet access are *company-owned* systems, as is all data stored or transmitted with these systems.
- Remind employees that voice mail and email messages are the same as drafting a letter, and should be handled with the same degree of care and formality. Professional, business language should be the *only* language.
- Conduct routine self-audits of your system to assess the degree of compliance with your company's policy.
- Have a written policy covering voice mail, email and Internet use.

Two key goals of the policy are to put the employee "on notice" of the policy and to unequivocally deny any expectation of privacy by the employee with regards to use of voice mail, email and the Internet.

Employers can meet these goals by requiring the employee to sign an agreement attesting to the fact that the employee has read and understood the company's policy and procedure. Employers can also review the policies and procedures as part of a training session.

Finally, the policy should contain procedures for confidentially handling, within the company, complaints of system abuse, especially those related to harassment or discrimination.

The policy should contain a statement that the company has the right, but not the obligation, to monitor employee use of voice mail, email and the Internet, and will conduct monitoring on a routine basis. The policy should indicate that voice mail, email and Internet systems are to be used for the *business only*, and no exception will be made.

In the policy, include specific guidelines about what, when and how to properly retain information received, including client records. Call your agent for a sample voice mail, email and Internet use agreement.

It should come as no surprise to anyone with either a personal or professional email address that offensive emails are rampant. In fact, according to a 2003 survey, nearly 55 percent of U.S. employees with Internet access have received racist, sexist or otherwise inappropriate email at work. Some inappropriate messages are solicited. Other offending messages arrive unsolicited, unwanted and unappreciated.

Regardless of how it finds its way into an employee's mailbox, this type of message is an employment practices liability claim disaster waiting to happen.

David Saul is vice president of Atlantic Risk Management Corp., Columbia, MD, and an accredited advisor in insurance. His email is *dsaul@atlanticrisk.com*.

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The Nuts and Bolts of 'Cheap and Dirty' Grounding

by Harold Kinley

For many years, I was a two-way radio technician, and eventually the communications manager, for the South Carolina Forestry Commission. During the era of "lookout" towers, the tower attendants were communications' "line of defense" from thunderstorms. Prior to a storm's arrival, the procedure was for them to go down to the equipment box located at the foot of the lookout tower and physically disconnect the radio from the antenna, control line and power line. For various reasons, this didn't always work.

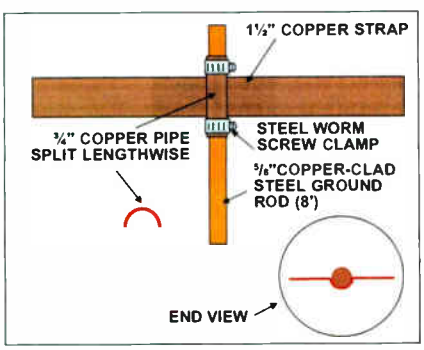

Figure 1. To connect the underground radials to the ground rods, a ¾" copper pipe is split in half, lengthwise. The copper strap is then sandwiched between the ground rod and one of the pieces of split pipe. The copper strap is formed around the ground rod, as shown in the inset top view. A copper-based anti-seize compound is then applied between all the surfaces to prevent corrosion. Stainless-steel worm screw clamps are then tightened over the split pipe and ground rod at top and bottom to secure the connection.

As lookout towers were phased out, plans were laid to build a statewide repeater system, using many of these old sites. The repeater system had to be in continual service and would have to withstand strong thunderstorms without being disconnected. It was obvious that a single ground rod, even with associated lightning-protection devices, would not make the system robust enough to withstand the strong storms that occur frequently in South Carolina. The repeater system had to include an elaborate grounding system with proper protection devices installed in a manner consistent with maximum protection—at minimum cost.

To help accomplish this, we had plenty of human resources scattered all over the state, representing talent in different areas. There was also a well-equipped shop at the central headquarters in Columbia. These resources were our saving grace, without

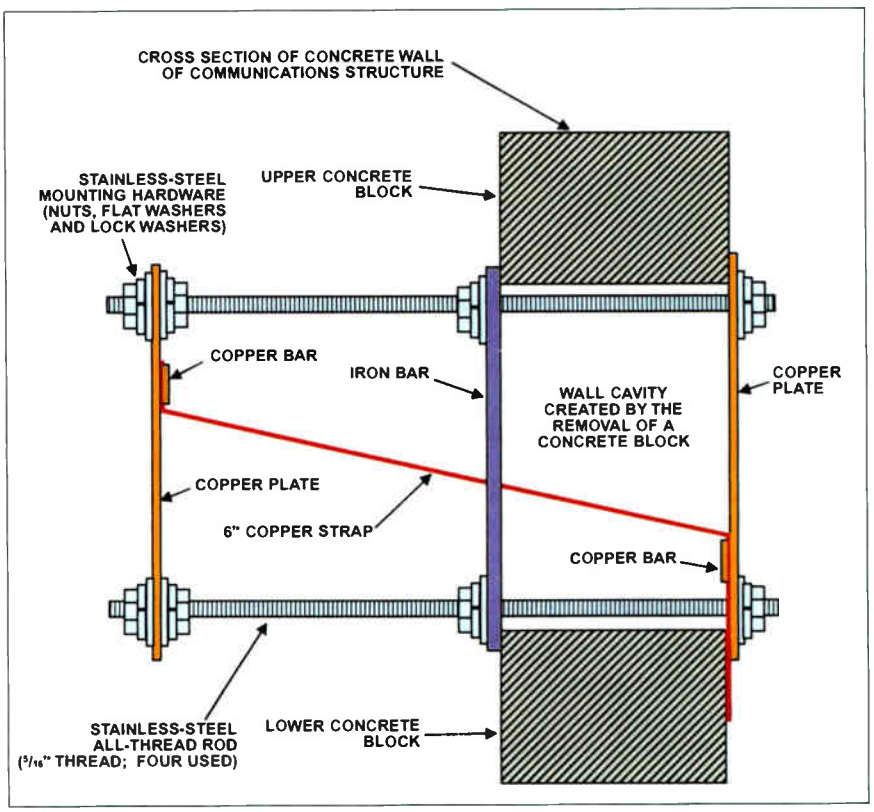

Figure 2. This shows a cross section of the concrete wall in a communications shelter. To install the homemade bulkhead and common grounding plate, a single concrete block is removed. The bulkhead/grounding plate is installed through the cavity and locked into place using stainless steel, 5/16" all-thread rods. Two six-inch copper straps are used to connect the inside plate to the outside plate and continue on down the outside wall to ground. The inside copper plate is used as the common ground mounting surface for the lightning-protection devices. The equipment cabinets are connected to this plate via 1½" copper straps.

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which the job would have been impossible, given our budgetary constraints.

The first step was to get educated on proper grounding and lightning-protection techniques, devices and equipment. That need was largely satisfied by one of the major manufacturers of lightning protection and grounding equipment. One of their representatives conducted a detailed seminar that got us off to a good start. As the process got underway and additional questions arose, they assisted us further by exchanging phone calls, emails and faxes. Although we did buy some of that manufacturer's products, no promises of purchases were made in return for the seminar.

We then purchased large rolls of copper flashing (20 inches wide) and had the central shop cut this wide roll into narrow strips. Some of these strips were 1½ inches wide while others were six inches wide. The 1½-inch strips were used to fasten equipment to the common grounding plate and for underground connections between ground rods. The six-inch strips were used to connect the common grounding plate to ground and to the peripheral ground strap. Two of the six-inch strips were used on each of the common grounding plates.

To provide a proper, low-resistance ground system, radials made of the 1½-inch copper straps were buried. One end was connected to the tower leg(s) and connected to eight-foot ground rods spaced at 16-foot intervals along the length of the radials. The method of connection to the ground rods is shown in Figure 1 on page 16. (Note: When

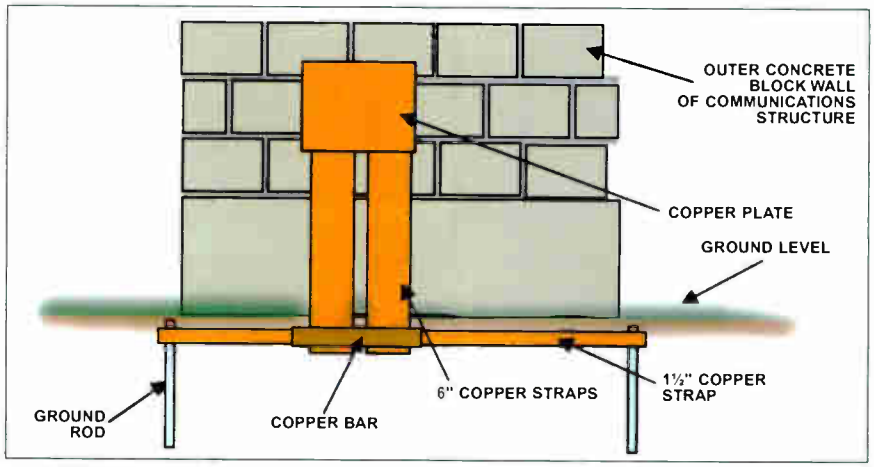

Figure 3. Two six-inch copper straps are continued on to ground below grade and connected to the peripheral ground system and to the antenna tower ground. Copper bars are used to connect the copper straps sandwiched between the copper bars. A copper-based anti-seize compound is used between all joints to resist corrosion.

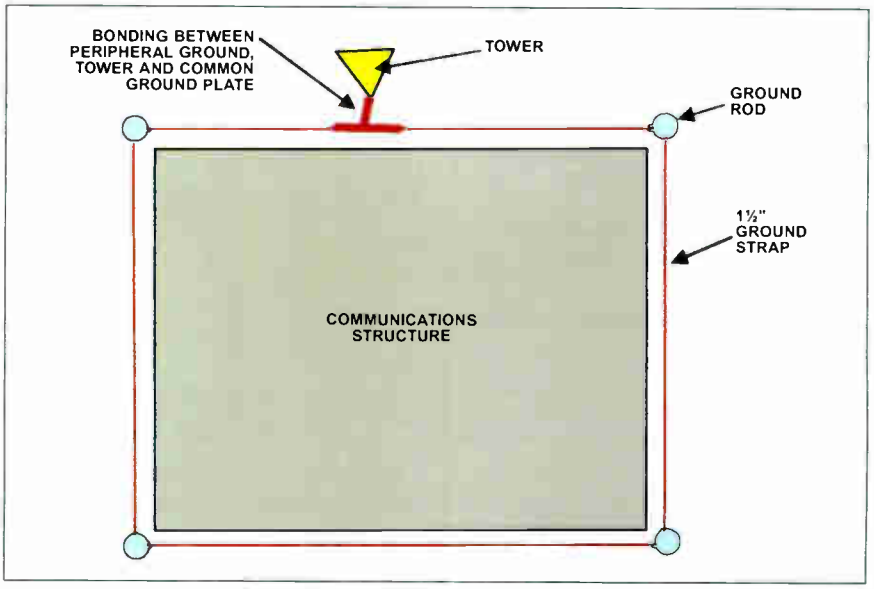

Figure 4. A peripheral ground system is installed around the shelter and grounded to the common point. Ground radials (not shown) are run from the tower legs away from the shelter.

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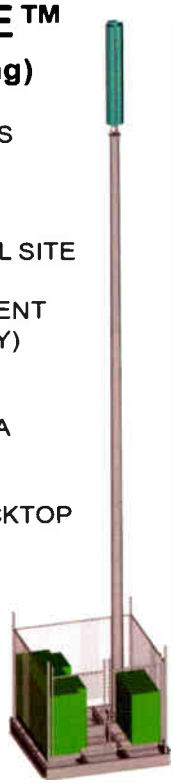

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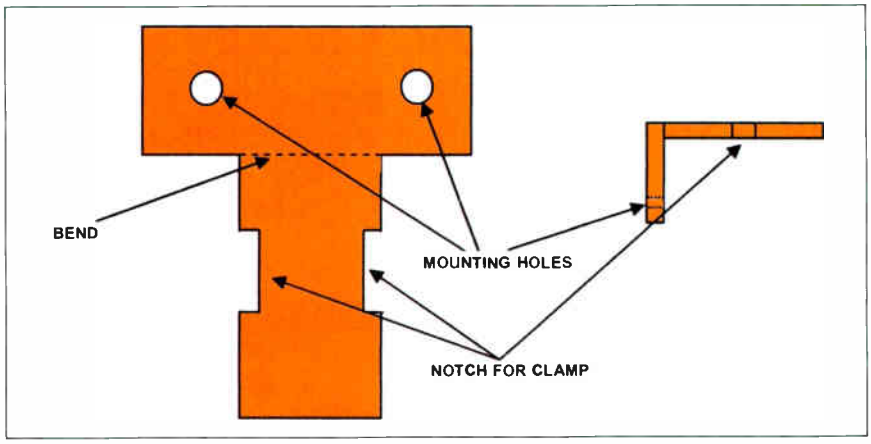

Figure 5. Copper bars are fashioned into a "tee" shape and bent at a right angle at the dashed line to form an "L" bracket on which to mount and ground the coaxial cable as it enters the shelter. *(See Figure 6 for more details.)*

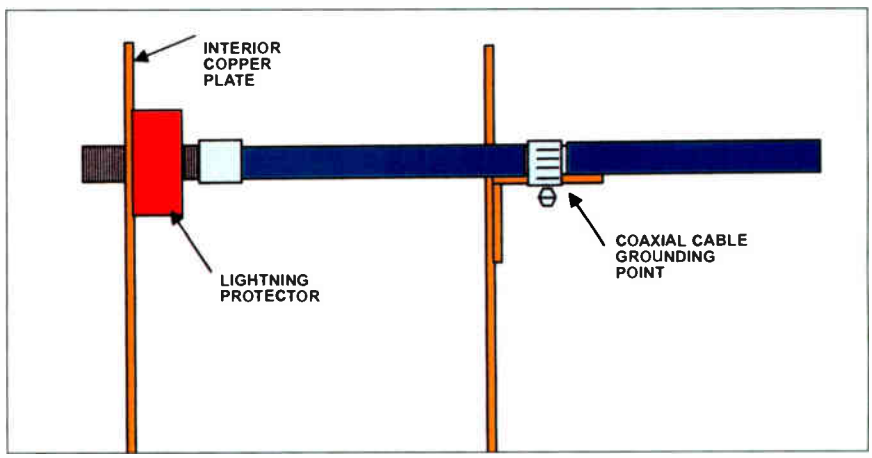

Figure 6. Coaxial cable entering the shelter is grounded at the outside plate and connected at the inside plate to a lightning surge protector.

installing the grounding straps to the tower legs, copper should not touch galvanized metal. We used stainless steel square wafers to transition between copper and galvanized metal. Jet Lube was also used between the layers to prevent water from seeping into the joints.)

The bulkhead and the inside common grounding plate were made together, as shown in Figure 2 on page 16. A single concrete block was removed from the equipment building to accommodate the bulkhead plate. The bulkhead copper plates were cut out of 4' x 6' sheets of copper, 1/8 inch thick.

For each plate, four all-thread stainless steel 5/16" rods were used—one at each corner. Two iron bars on the inside wall were used to pull the outside copper plate securely against the wall. (The ends of the rods were hammered down on the outside plate to prevent removal of the plate from the outside.)

The inside copper plate was then attached near the end of the steel rods. Two six-inch copper straps were then attached to the inside plate, connected to the outside plate and then against the wall on down below ground where they were connected to the peripheral ground straps. *(See Figures 3 and 4 on page 17.)*

The toughest part of the job was digging the trenches for the ground radials and driving the ground rods. A Ditch Witch was rented to do the trenching jobs and a pneumatic jack hammer was used to drive in the eight-foot ground rods. A trailer was fitted with an air compressor to run the pneumatic hammer. A long air hose allowed the pneumatic hammer to be used all over the site where ground rods were to be driven. The same crew was used all over the state to drive the rods, and this crew

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A finished common-ground mounting plate inside an equipment shelter.

quickly became proficient at the job.

We did encounter various degrees of difficulty in driving the ground rods at different locations around the state, depending on the soil type. In some locations in the low country (near the ocean) the soil was sandy and easy to drive rods through. Other locations featured clay-bearing or rocky soil.

In the rocky locations, it was impossible to get all the ground radials buried underground. Sometimes it was necessary just to lay the radials on the rock surfaces. Smaller rocks were placed over the copper straps to hide them from view.

A copper-based anti-seize compound was applied to all of the joints where various parts of the grounding system were connected. Jet Lube SS-30 was used for this purpose. (Another product that can be used for this purpose is Loctite C5-A.) These products come in various sized containers and have an appliqué brush attached to the container lid. These products inhibit corrosion.

To bring the coaxial cable through the bulkhead, a piece of copper bar was fashioned as shown in Figure 5 on page 18. This copper bar was mounted just beneath a hole just large enough to allow the coaxial cable to pass through. The outer jacket of the coaxial cable was removed, and a stainless-steel worm screw clamp was used to attach the coaxial cable shield to the special mounting bar. *(See Figure 6 on page 18).* Care was taken to ensure that the clamp wasn't tightened to the point of collapsing the coaxial shield on the hard line. The connection was sealed with a pliable coaxial sealing tape and a final layer of electrical tape. Any remaining air gap at the hole was filled with silicone rubber.

The photo at the left shows a finished inside common-ground mounting plate.

The job of installing the grounding systems at these communication sites was quite laborious and labor intensive. However, the hard work and effort paid off. When I retired from the agency in 2002, we hadn't lost a single repeater to a lightning strike, after several years of service. Some of the lightning protector devices were sacrificed to lightning, but that was their job. Replacing those devices was a small price to pay for the protection they offered.

Until next time—*stay tuned!* **agl**

Kinley, a frequent author of radio telecommunications technical articles, is a certified electronics technician. His most recent book is the Radioman's Manual (Noble Publishing, 2004).

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Recovering from Hurricane Katrina

The Midwest director for Data Cell, a general contractor in the wireless telecommunications industry, recounts what it was like to restore cell sites in the New Orleans area following Hurricane Katrina.

by Fred Teichman, as told to Don Bishop

After Hurricane Katrina damaged cell sites in the New Orleans area, the first things carriers asked were, "Tell us what we have left. Is a site down because of power interruption? Are any antennas left? If there is at least one sector left? Could we restore one vs. none at all?"

In some cases, the logistics of getting to the sites was the first problem because of the water level and military control of some areas. Our customers, Sprint Nextel, Verizon Wireless and T-Mobile, did a good job of obtaining access authorization for us. That allowed us to do the initial work on behalf of tower owners, which was to clear debris and secure the sites, so additional work could be performed on behalf of the carriers.

The tower companies had responsibility to clean away debris for the carriers to get in. If a carrier had to get in for reconnaissance and to send a crew to the site, the tower company would ask us to give them access. It was common to remove trees and damaged equipment for the tower companies.

On our first visit to a site, we would repair what we could. If an antenna was found dangling, we would decommission it. We secured what we could, realigned antennas and turned on what equipment was functional. At the same time we identified what replacements were needed. Sometimes the wind had swung the t-booms around, damaging an antenna or two and jumper cables.

The next trip out was to take the materials to make the site more operational. Acquisition of some equipment ran a little behind, but we installed what was available to make temporary fixes.

As an example, if a site operated at a level Nextel said was sufficient, we would wait for materials. If not, we would go back for the temporary repair—and then a third time to finish. That approach may not *sound* efficient, but it worked to get as many coverage holes filled as possible.

We had comments from the military giving us "thumbs up" on getting Nextel up and operating because the push-to-talk service was popular with them.

We did so much work in hurricane recovery because the position of our office is 14 miles west-northwest of New Orleans. That was at the ending point of the major damage. The location became a logistical hub because it's at the intersection of I-10 and I-55. We shut down operations for two days during the hurricane and resumed operations quickly.

The facility became a hub for material, temporary generators and field resources. Our two buildings in Laplace both are office-warehouse combinations with a fenced yard, and

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it normally is under-utilized. During the repair effort following the hurricane, the facility's capacity was put to the test. Every square inch was put to use: for temporary storage of generators and replacement materials for damaged antennas and lines, for feeding the workers and even housing some of them. Many employees' homes were destroyed. They couldn't go back to their homes.

The great equalizer

Carriers were asking for warehouse space and lodging for some of their crews, as well. T-Mobile brought in crews, and we provided crews for Sprint Nextel and Verizon. We built temporary showers and brought in security guards to police the compounds. The first week, family members did the cooking. Access to food was limited; we sent people to shop for food in cities to the north.

Most of our own operations were compressed into half of our facility's space, and Sprint Nextel leased the other half. They worked hand-in-hand with us in reconnaissance work to determine access to sites affected by flooding, to identify what the damage was and to assess how quickly could sites could be powered up and restored.

Nextel's was one of the first networks to become operational. Our company didn't do all the work, but we were one of the lead contractors.

During the first week, it was common for some workers to carry firearms because of security. Guards and security escort services were used in the first and second weeks. Then the nature of the problem became less about security issue and more about logistics.

We looked at sites for Global Signal and American Tower, among others. American Tower lost a number of towers in the southern portion of the area. Venice, LA, was one town where sites were wiped out. Shelters were taken off the foundations and towers were knocked down. You could see the different water levels at the sites. When the crews started getting access to determine the damage it was amazing.

In the Data Cell yard, crews would prepare new shelters with base station equipment and perform swaps in the field,

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almost a plug-and-play substitution.

By the third week, temporary generators were in extensive use. Generators would arrive at our Laplace, LA, facility 40 and 50 at a time. We would hook them up to pickup trucks and deploy them to sites. Many of the trucks carried 100-gallon fuel tanks for refueling generators, but sometimes the generators were swapped out. It was easier to do that sometimes than to fuel them. Generators were changed out so frequently that there was a line of semis waiting to have generators off-loaded and pickups waiting to take them to sites.

Our company used our own employees and employees from a network of contractors who work for us 90 percent of their time. To our customers, our contractors looked like our employees. We had to bring some workers from outside the area, and we had an aggressive recruiting effort.

Right at the time of the hurricane, Sprint and Nextel were in the process of merging their businesses. A conversion of antennas for both systems on some sites was in progress. In some instances, the hurricane caused a delay in returning to work on some of those sites, and in other instances, it speeded the timing of the carriers coming together. During the repair, we changed out the antennas because we would have needed to later, anyway.

Because so much of the population evacuated, the demand for network capacity was reduced. Some carriers adjusted their restoration schedules according to the reduced demand. In some cases, the use of a temporary repair for an extended period was justified.

We've returned to finish repairs to sites with hurricane damage, but sometimes the last bit of work wasn't a high priority because the population wasn't there. As people move back in, the sites become more critical to the network.

As an example, I inspected three sites owned by Global Signal where towers fell. They were older sites without much activity, it turned out that the company was better off not replacing the sites. Elsewhere, they lost valuable assets that we're replacing. Most of the storm's effects were negative, but in a few instances, the storm eliminated sites that might as well have been decommissioned.

It wasn't the norm for towers to fall, though. Usually the attachments and the equipment down along the sides of the structures were subject to damage from wind and flying debris, and the equipment at the base would be damaged by floodwater. Lots of base stations were ruined. When coaxial cable was damaged, it usually was because apparatus was blown into it. It was more common to replace antennas and jumpers than the coax, though.

The work required employees with a variety of skills, including tower climbers, electricians, warehouse workers, logistics specialists and project managers. Field operators ran smaller equipment such as bobcats and trucks. Some electricians worked for us, and some directly for the carriers. In the temporary warehousing area, I met Nextel employees who had come from six or seven states.

Because we were all under the same roof, we had a lot of "face time" for planning sessions. Having everyone in the same place created a lot of energy, as opposed to using e-mail. The camaraderie was a great experience. Everyone worked, ate and relaxed together— and slept under the same roof. Despite the nature of the emergency, the late- night poker games and different groups telling stories about what they saw was a good experience. You got to know your customers better than you normally would.

Once Nextel's network was restored, there was a sense of relief. Then, with all the resources we had put in place, we said, "Let's go find some work." We quickly marketed ourselves and found additional work restoring microwave services for Harris, Verizon and Alltel. We quickly marketed ourselves as "We're here and here's how can we help you."

The additional work extended our efforts and, as it turned, out, positioned us for work following more destruction soon caused by Hurricanes Rita and Wilma. Because of our work following Hurricane Katrina, we had the price points, equipment and resource skill sets ready.

Johnny King, the vice president of operations for Data Cell, said that the best-kept secret of the project is the safety record. "No accidents, no near misses— not even a cut finger," King said.

"Safety does not just happen. Thanks to Sprint Nextel we were encouraged

Project statistics

- Responded to more than 85 damaged sites
- Installed 23 temporary microwave hops
- Replaced 10 shelters complete with base stations
- Off-loaded 65 trailer loads of mobile generators
- Replaced 7,000 feet of 1-5/8-inch coax
- Replaced 10,000 feet of 7/8-inch coax
- Set up and moved four COWS

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to have our morning safety meetings. First-aid kits, gloves, ladders and countless other items were provided by the logistics operation of Sprint Nextel to ensure that every precaution was taken to help eliminate accidents. That effort was key to a successful safety program. We did a safety analysis on every job before the crews were allowed to climb the towers. Data Cell was running 10 to 14 crews in addition to Sprint Nextel's own technicians and support personnel. The challenges we met in the effort to restore New Orleans communications were monumental. To really understand the gravity of the situation, and the effort required, you had to be there," King said.

Data Cell's Chris Gansemer was the lead project manager, and John Burnett was responsible for all of the company's project managers. The CFO, Steve Harmon, handled documentation that let everyone know what was going on. We were on time with materials, and we incentivized our people in several ways so they would benefit from their extra effort. The operation was going as much as 12 and 16 hours a day, and sometimes 24 hours a day.

Even an ill wind blows some good

The local employees had incidents of personal devastation of their own to deal with, yet they focused on work to help the carriers more so than their own property. On Sundays, some would return to their homes after spending a week or two working out of the Laplace facility. I was amazed at the commitment to the customer over and above their personal problems and tragedies to help carriers get back on the air.

With some of the workers' families staying at the Laplace facility for a time, there were fish fries and home cooking. (I probably gained weight instead of starving on the military rations.) They created a relaxed and comfortable environment so that no matter what was going on from stress on the outside, base camp became comfortable.

By mid-November, things had settled down. People are taking a breather. Our company performed well in hurricane recovery. We're launching a new Web site to market and support the activity we've been a part of and to prepare for growth in the future. We have an office in Knoxville, TN; two in Louisiana; one in Chicago and two temporary offices in Florida pending the selection of a permanent office there.

Data Cell is focused on a level of customer service of the old days, where it becomes relationship-driven. Everyone has been through the massive growth where you could make mistakes and still succeed. Everyone went through the downturn. Data Cell has taken its experiences and created an environment people want to be a part of. They become part of the family.

If you want to, you could call it "old school." agl

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Orchestrating Tanktop Harmony

Managing tank tower sites requires expertise in peaceful coexistence.

by Debbie Sullivan

The world has gone wireless, and we all enjoy the convenience and freedom that come with cellphones. The demand for antenna sites continues to increase dramatically, and with growing community resistance to antenna towers, water tanks are becoming more attractive to the telecommunications industry.

A high level of expertise is required to balance the structural, health and maintenance requirements of the supporting structure against the technical and maintenance requirements for communications carriers' equipment. This is a complicated equilibrium because, unlike the situation at most tower sites, communications is not the primary use of a water tank. The typical initial term for a license agreement is five years with renewal terms to extend the agreement for as long as 25 years. This siting phenomena has created a role for long-term, specialized management services.

Our own company, Utility Service, with more than 40 years' experience in the water-tank maintenance industry, has met this demand by undertaking marketing, managing, and construction for carrier antenna collocation on water tanks as a separate "business within the business." Our Utility Service Communications division has now enrolled over 1,600 water tanks across the country into its Antenna Site Management Program. Due to the demand for sites, we have successfully negotiated hundreds of license agreements for carrier collocation on enrolled program tanks.

The goal of enabling collocations that can support multiple carriers has required developing expertise in site design. Effective site design includes selecting the optimum ground space location for housing the carriers' cabinets and other ground equipment as well as designing balcony or corral installs to maximize the water tank's collocation potential. In addition to marketing the tanks and negotiating the license agreements, the Site Management Division oversees all aspects of the construction phase. These duties include requiring and approving a gross structural analysis of the tank, designing the site and approving the construction drawings.

Specialized standards

Because the primary use of the structures is for a potable water supply, the site manager also has to ensure that all work is performed according to American Water Works Association standards as well as being compliant with federal communications and lighting regulations of the FCC and the FAA. Because a water tower site is frequently accessed for maintenance by both the water utility and the communications companies, the site manager has to ensure that OSHA regulations affecting both uses are complied with, and that the activity of one use does not impede the safety of the other.

Besides juggling these issues, the site manager also has to address the technical needs of the carrier, ensuring the proper installation of carrier equipment on the water tank. Supporting structures for the carrier's equipment must be installed in a manner that complies with industry standards, protects the structural integrity of the water tank and keeps increased maintenance costs to a minimum.

In addition, technical services must be made available for tasks ranging from providing gross structural analysis of the tank to making available complete sets of construction drawings.

Resolving uses and safety

In our experience in the water tank maintenance and antenna management business, we have seen the pitfalls of improper antenna installations. Some of these installations are so problematic that professional retrofits are necessary. One example was the installation of coaxial cables on a water tank located in a mid-sized Georgia city. The cables had been banded to the outside of the tank leg and then routed along—and through—the balcony handrail of the water tank.

First of all, both the banding of coax to the leg and routing the coax on the handrail create serious maintenance problems. Coax attached directly to the tank surface at any point makes it impossible to blast or recoat the surface without removing and then reinstalling the cables. In addition, coax and banding attached adjacent to the surface of a tank can trap water and cause corrosive action on the tank coatings. Furthermore, there may be OSHA violations present if the coax on the handrail inhibits access onto or around the catwalk.

These problems are easily avoided by installing a messenger pipe system on standoffs, with cluster brackets to neatly house the coax as it runs up the tank leg. To avoid problems on the handrail, the coax should be routed underneath the catwalk, thus eliminating the need to attach cables to the handrail itself.

Both of these techniques not only allow routine maintenance on the tank to be accomplished more easily, but also help reduce or eliminate maintenance costs to the tank owner. These types of installs also keep the tank in compliance

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with industry standards as well as with government regulations.

Anticipating antennas

Many knowledgeable tank owners under site management are now requiring that their new tanks under construction be designed as "carrier ready." There are different levels of carrier readiness that tank owners may choose from. They can choose to go "all the way" with complete messenger pipe systems on the tank leg and a full sized corral custom-fitted to the top of the tank. Or they can choose to simply weld plates onto certain strategic areas of the tank, thus eliminating the risk of burning the interior coatings of the tank at a later date when a carrier has decided to collocate on the tank.

There are many factors to be considered when planning an antenna installation on a water tank. A proper design and install will not only ensure that the carrier's equipment performs properly, but that the water tank is protected as well. Some factors that should be considered include:

Structural damage. Poorly designed installations can overload the tank. Particularly susceptible to overload are the handrails and balconies of legged tanks. Penetrations in shells, and risers can be dangerous if not properly designed. Existing cross bracing may be undersized for the increased loads.

Foundation overload. Too many attachments create increased wind loads, which can overstress foundations and anchor bolts.

Access restrictions. Cables, brackets and other attachments can create interference with ladders, platforms, vents and manholes—sometimes in violation of OSHA and other standards.

Welding. Improper welding techniques (including stud welding) or epoxy attachments are often in violation of proposed standards and create corrosion-prone areas.

Coating issues. Lack of proper painting and touch-ups creates rusting and scaling problems on the interior and exterior of the tank.

Maintenance issues. Improper antenna and cable mounts can make it difficult to maintain and paint the tank. Telecommunications equipment, if poorly located, can cause difficulty in rigging a tank for maintenance purposes and makes the electronics and cable susceptible to damage. Straps and chains around legs, ladders, and handrails create corrosion sites, which are impossible to maintain without removal of the offending attachments. The questionable practice of painting coax cables can lead to unsightly scaling within months of the application.

Simplifying the chain

Many of these problems are caused by inexperience in dealing with water tanks. The designers and installers are often unfamiliar with OSHA and other standards as they apply to elevated tanks. An unfamiliarity with tank operations and maintenance issues leads to layout and design flaws, which increase the complexity of operation and the costs for the tank owner.

Dealing with the telecommunications industry can be complex. Often, the wireless company is not directly involved but will work through site acquisition companies, network developers, attorneys, construction mangers, site developers or engineering firms. This complex chain can make communication with all the parties extremely difficult. Many tank owners have found that using a professional site management company can alleviate the hassle and solve the problems associated with antennas on water tanks. This is particularly true when the site manager is also experienced in water tank operations, maintenance and antenna installations. A professional site management company can bring the following expertise to communications sites and antenna installations:

- market knowledge to ensure revenue is at current fair market values with appropriate escalators.
- expertise to make sure the design and installation workmanship meet OSHA and other appropriate standards.
- knowledge to ensure FCC and FAA compliance.
- administrative support for billing, collections and reporting.
- technical expertise to coordinate the needs of multiple telecommunications companies.

Despite the potential problems, a good design, beginning with a professional structural analysis, and a carefully managed program—that considers the needs of both the wireless provider and the tank owner—can turn a water tank into a revenue-generating asset for the community.

By virtue of being their necessary situation on the highest available elevations in communities, water tanks also provide carriers with attractive siting options when community resistance or land availability preclude the erection of a new tower. agl

Sullivan is vice president of the Site Management Division of Utility Service Communications, Perry, GA.

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AVIAN LEGALITIES

Federal legislation, petitions, lawsuits, regulatory proceedings and criminal prosecution make avian mortality at communications tower sites the next great law school career path.

by D.A. Keckler

Journalist and historian Theodore H. White once remarked in a TV interview that "What *history* is *about*, is the *absence* of decision as well as the *consequence* of decision."

As 2005 winds to a close, several court cases and regulatory proceedings concerning avian mortality—bird strikes at tower sites—are left twisting in the wind. There is an absence of decision—by the FCC and by the judiciary.

A pending lawsuit charges that the Commission violated the Endangered Species Act by failing to consult with the U.S. Fish and Wildlife Service (FWS) to protect two species of birds from collisions with seven towers located on the islands of Kauai and Hawaii.

A *Petition for Writ of Mandamus* filed by the American Bird Conservancy and the Forest Conservation Council asks a federal appellate court to force the FCC to act on a 2002 petition. They demand that the Commission enforce environmental compliance on a huge inventory of towers along the Gulf Coast.

Environmental lobbies have been unsuccessful at challenging the Commission's tower-siting policies, either procedurally within the FCC or the within the federal judiciary. But they keep trying.

Hurricanes Katrina, Rita and Wilma wiped out, or seriously damaged, many winter nesting grounds and waterways used by some migratory birds that environmentalists want to protect. What the migratory patterns along the Gulf Coast might be in the future concerns bird lovers a lot more now than tower strikes. The need for a ruling by the FCC may now be academic.

The FCC for its part, in its opposition to the petition for mandamus, paraded its open (since 2003) *Notice of Inquiry* (NOI) proceeding on migratory birds and towers as evidence that regulatory wheels are indeed turning, and that the "extraordinary remedy" of mandamus is unwarranted. The FCC asserted that the whole proceeding is moot because "...the Commission's staff anticipates that the agency will be in a position to take action no later than the end of the calendar year."

Well, at this writing, that gives the FCC about 15 working days to make good on that promise. It is unlikely they will bring an action "home for Christmas." This is unfortunate, not because it inconveniences environmentalists, but because the tower industry is not a plant that thrives in the soil of uncertainty.

While the FCC decides whether to fish or cut bait, it may be useful to review laws, proceedings and verdicts that may affect the FCC's eventual decisions.

Law and the FCC's 'bird's-eye view'

The National Environmental Policy Act (NEPA), the Endangered Species Act and the Migratory Bird Treaty Act (MBTA) are particularly germane.

NEPA —NEPA requires federal agencies to establish procedures to identify and address environmental effects of their regulatory actions. The Act

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established the Council on Environmental Quality (CEQ) to oversee their environmental programs, policies and actions. The FCC issued its own rules for conforming to NEPA, and generally those rules must jibe with CEQ's rules.

To accomplish this, the FCC created a three-level set of Part 1 rules based on CEQ's model. At the "top" level, an environmental impact statement (EIS) is required for "any Commission action deemed to have a significant effect upon the quality of the human environment." An EIS is the most rigorous environmental assessment. However, the Commission has no "litmus test" for requiring an EIS. The necessity is determined case by case.

At the "middle" level is an environmental assessment (EA). The FCC rules identify categories of actions regarding facilities that "may significantly affect the environment and thus require the preparation of EAs by the applicant." As obvious examples, if a site is proposed within a national park, a wildlife preserve or an historic site, or if constructing the site would entail significant fill, drainage or deforestation activity, then the applicant must file an EA. Information in that filing must be sufficient to allow the Commission staff to determine whether the proposed facility will have a significant environmental effect.

At the lowest, or "softest," level, the FCC rules consider facilities that do not automatically fall into categories that would require an EA as "innocent until proven guilty." They are assumed to have no significant effect on the quality of the human environment and are therefore "categorically excluded" from environmental processing.

This free pass is voided if an interested party (or the Commission staff, of its own volition) *challenges* that exclusion with a petition that demonstrates a need does exist to consider environmental effects (an *Application for Review*). Once a challenge has been made, the Commission staff reviews the facility proposal, determines if an EA is warranted and, if it is, requires the applicant to submit an EA.

Although effects on *endangered and threatened* bird species are categorically *included* among circumstances whereby the FCC will require an EA, the potential effects on *migratory* birds, in general, are not. However, for more than a decade, migratory birds, and the effects of construction projects on them, have been on the FCC's "radar screen." Even when EA requirements for categorically protected wildlife have been fulfilled, the Commission has on occasion required further application modifications, as will be discussed.

ESA — The conservation of species of fish, wildlife and plants that are considered threatened by extinction is promoted by the ESA, which is implemented by the Department of the Interior (DOI). Similarly to NEPA compliance, the FCC's rules require the preparation of an EA whenever facilities may affect endangered species or their habitats—or are *likely* to jeopardize any species or habitats *nominated* to be enrolled on the list by the DOI.

The ESA requires consultation with the Secretary of the Interior to ensure that tower facilities will not harm endangered species. In turn, the FCC's rules require it to seek and to consider comments from the FWS. However, the DOI's rules allow a federal agency to *delegate* the consultation to a "non-federal representative" as long as the agency is ultimately responsible for ESA compliance. This representative can be a "permit or license applicant," so the FCC has issued a wholesale authority to all its licensees, applicants, towercos and their representatives to address ESA issues directly with the FWS.

Essentially, it's "self-service regulation"—as long as you keep the FCC in the loop when you're done.

MBTA — This 88-year-old criminal statue is at the heart of some current litigation regarding migratory birds and tower siting. To stave off real (or imagined) avian mortality caused by birds flying into structures, environmentalists have pinned their hopes on the MBTA being a "granny's nighty" (covers almost everything). It is in the interest of the tower industry to have the powers and applicability of this Act defined consistently and comprehensively by regulators and the courts.

In 1918, the United States and Great Britain (acting for Canada) entered into a convention, codified by law, to protect migratory bird species. (International partners in MBTA conventions with the United States now also include Mexico, Japan and Russia.) At the time, demands for feathers, for everything from ladies' hats to pillows to golf balls, as well as bird eggs, had created black markets for hunters and poachers that threatened to wipe out many species.

As written into law, the MBTA makes it "...unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell..." any migratory bird enrolled in the treaty lists, or its nest, eggs and so forth.

On the surface, the MBTA appears to be a good prohibition of an intentional crime—and who likes poachers, anyway? However, for many years, bird enthusiasts have tried to posit the notion to regulatory bodies that "kill" and "take" apply equally to unintentional and indirect activities. In the case of the tower industry, their premise is simple. If you erect a tower, and a migratory bird does a kamikaze into it, you violate the MBTA.

The FCC General Counsel's office deals with this notion on two fronts:

1) *Some* circuits of the Courts of Appeals have determined that the MBTA does *not* apply to federal agencies, or by extension, to their licensees or policies. (This concept mainly surfaced because of intentional wildlife management—exterminations—performed by the Department of Agriculture.)

2) The language of the law should be narrowly interpreted in the spirit of its legislative history: It was to stop hunting and poaching. It should not be broadly read as including otherwise-lawful conduct that indirectly results in the death of migratory birds. For

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example, the forestry industry would practically have to be shut down under a strict prosecution of the MBTA, a consequence that was deflected by the 8th Circuit Court of Appeals in 1997.

PCIA also supports the view that the MBTA does not apply to the FCC, and therefore posits the notion that the Commission is not obligated to consider MBTA issues when granting an authorization. (PCIA also contends that the FCC has no obligation to consider NEPA issues in tower-siting decisions, either.)

Lawyers for towercos and carriers point out that if you extend the "take–kill" argument ad absurdum, anyone who ever hit a bird with a car, plane or kite, or anyone who ever erected a tall building with glass windows, would be liable for prosecution.

A shocking development

So, if the concept is so patently ludicrous, why does the industry care so much, and why do environmentalists think "granny's nighty" might prevail? There have been just enough court decisions to keep it dicey. Preeminent on the list may be the case of Moon Lake Electrical Association (MLEA).

In 1998, a U.S. attorney charged the Utah-based electric utility with 13 misdemeanor violations of the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA. What were these heinous acts? Over a two-year period, 17 hawks and eagles landed on MLEA's power poles, closed a circuit by brushing contacts with their wingtips—and electrocuted themselves.

Although these occurrences were classified as misdemeanors, they were costly. MLEA entered into an agreement whereby it pled guilty to three counts each under the BGEPA and MBTA, accepted three years of probation, agreed to retrofit its equipment under FWS supervision to mitigate future electrocutions—and paid a $100,000 fine.

That's nearly $17,000 a bird.

This was the first time a court agreed that BGEPA or MBTA could be the basis for criminal prosecution of a utility for birdkills of this type. The district court judge denied a motion by MLEA that lack of deliberate or harmful intent mattered. He ruled that "take," as described in the laws, includes *any* act of killing *without respect to method or intent.* Hence, this case is favored by some environmentalists as a garden path down which they can drag communications towers that intersect with migratory bird flight paths.

Several aspects of the MLEA case might make its application as a precedent harder than that. First, the government made a case for negligence, in that there were existent, known and available materials and devices for insulating the utility equipment. There is no "crash-avoidance device" for a tower, so the connection becomes more specious. Also, the government's case started with eagles—a high-profile

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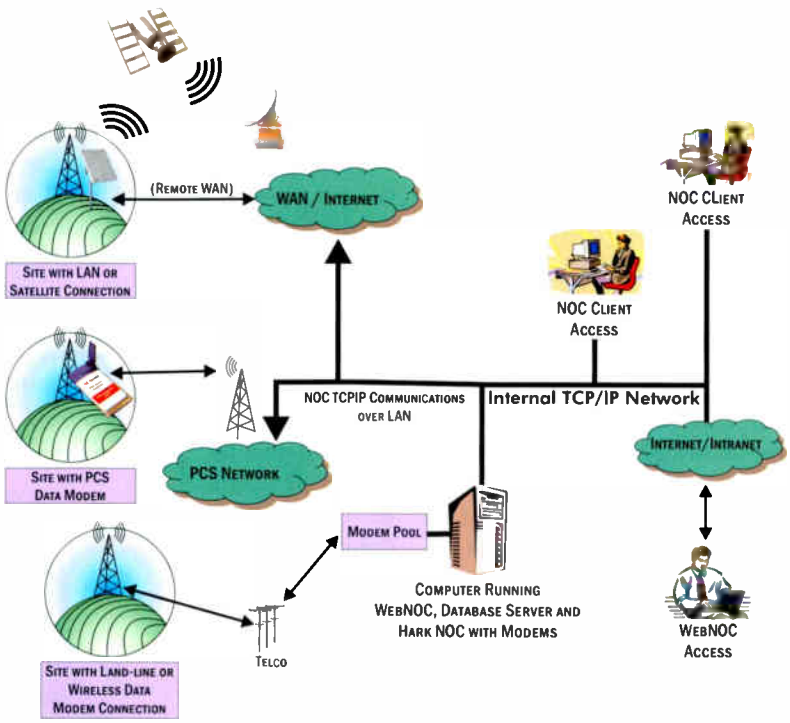

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species—covered by the BGEPA. The question remains whether a case could be successfully prosecuted on the strength of an MBTA violation alone. Finally, because the case went to plea agreement and was not appealed, there has been no opportunity for judicial review.

Still, the path from one type of utility to another is not that lengthy.

The Leelanau County precedent

Even when a law or regulation seems clear, the FCC has hedged its bets. A quintessential model for an FCC *Memorandum Opinion and Order* (MO&O) requiring modifications for bird protection was the resolution of a challenge to a 1993 set of applications by Leelanau County, MI. The applications were for land-mobile and microwave facilities to upgrade the county's public-safety communications network, including a new 480-foot guyed tower.

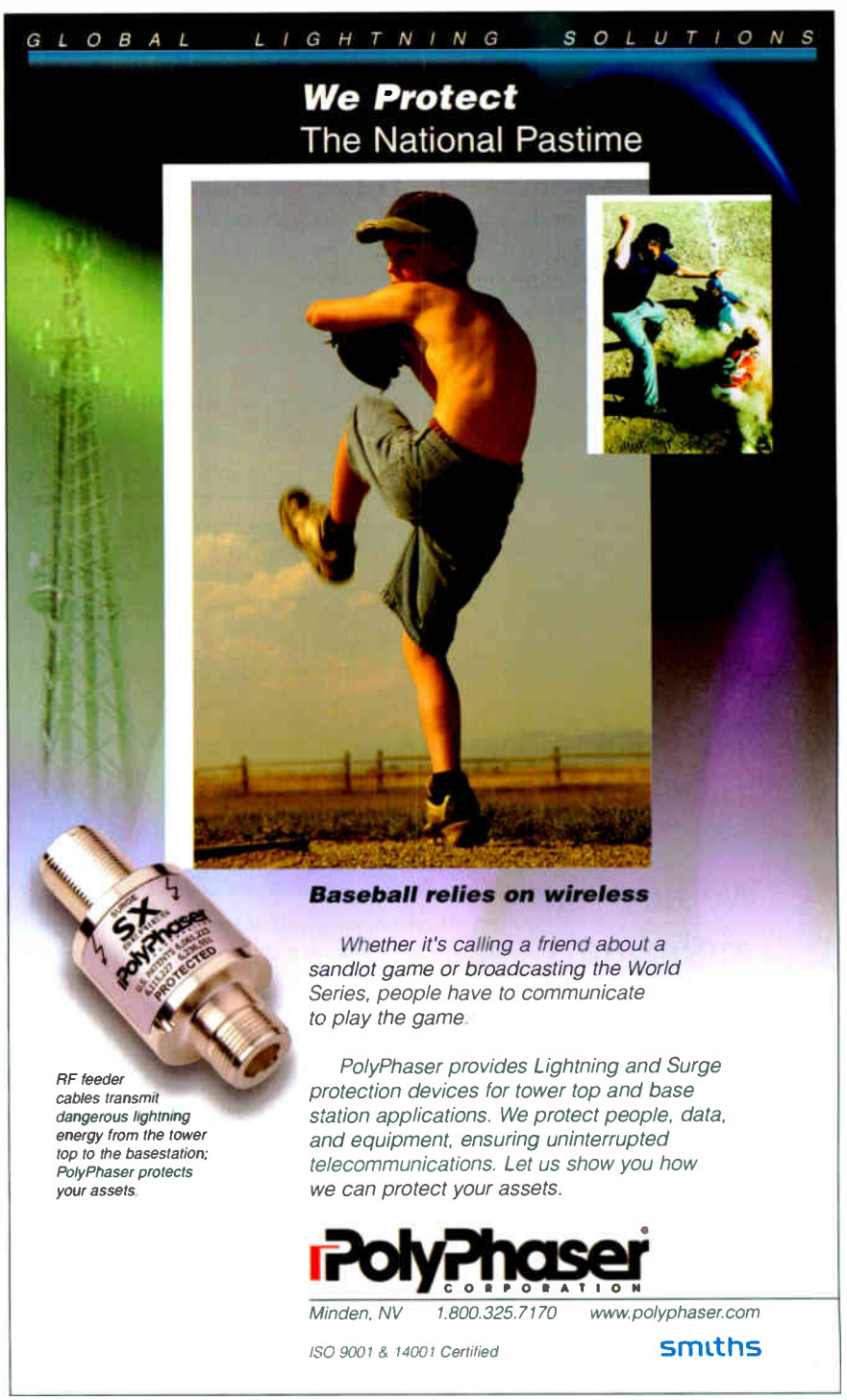
That the proposed tower site was in a recognized "migratory-bird corridor" did not automatically trigger an EA, but the presence of three endangered or protected species in the area (piping plovers, bald eagles and peregrine falcons) did.

In accordance with its rules, the FCC required Leelanau County to prepare an EA, and the agency made inquiries of the FWS. At that agency's recommendation, Leelanau County conducted an extensive study of the potential effects on the three designated species, and on migratory birds in general. After reviewing that data, the FWS advised the FCC that adverse effects on the three species were "not likely" and that the probability of those species colliding with the tower was "insignificant." FWS conveyed no explicit findings to the FCC about effects on migratory birds in general.

The FWS did recommend that the county monitor and report the loss of any threatened or endangered species, and the FCC made that monitoring a stipulation for authorizing the county's application. With that caveat, the Private Radio Bureau (PRB; precursor to today's Wireless Telecommunications Bureau) issued the requested permits and granted the system applications at the end of 1993.

Despite this, early in 1994 several environment groups jointly filed an *Application for Review* of the FCC's authorizations for Leelanau County on environmental grounds. They claimed that the tower location, in a migratory-bird corridor, would inherently result in "taking" birds in violation of the MBTA and that the PRB had not issued a formal *Finding of No Significant Impact,* in violation of NEPA and the Commission's own rules.

In its *MO&O* issued at the end of 1994, the FCC admitted to the technical error of not issuing a formal finding at the time of the licensing. It healed that error by therein stating categorically, "We further explicitly find that the action will not have a significant environmental impact." (So there. Applicants are not allowed



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"do-overs," but the FCC apparently is.)

As to the migratory bird question, the FCC noted that the environmentalists' speculations about the rate of bird loss were based on conditions and circumstances from an avian mortality study nearly 15 years out of date. The Commission also sagely observed, "Moreover, it is not clear whether the MBTA, which is primarily a 'hunting' statute that prohibits the 'pursuing, hunting, taking, capturing and killing' of migratory birds, would even *apply* to a federally authorized tower structure."

No firm conclusions can be drawn, based on the existing literature, regarding the importance and effects of lighting color, duration, intensity and type.

The FCC denied the *Application for Review* and upheld Leelanau County's application grants. Nevertheless, "consistent with our overall obligations to consider the impact of our authorized facilities on the environment" (or hedging its finding of no impact), the Commission imposed additional modifications on the tower authorization to mitigate possible effects on migratory birds. Based on the presentations of both opposing parties, the Commission determined that "any appreciable danger to the migratory bird population" at the Michigan site would be "during periods of low visibility, when the birds become disoriented."

Accordingly, the FCC required Leelanau County to mark the tower and guy lines with balls or streamers, "which, as we have found in the past, increases the structure's visibility and thus ameliorates the impact of a tower on the migratory bird population."

Lucy in the Sky with Diamonds

Ironically, one last modification imposed by the FCC in this 1994 proceeding was *lighting type*. The FCC declared "...recent studies have indicated that bird casualties would be dramatically reduced by the utilization of red beacon flashing lighting on towers. Apparently, the alternating periods of light and darkness enable the birds to adjust, become aware of their surroundings, and avoid tower structures. Accordingly, we will further condition Leelanau County's authorization on the installation of such lighting features."

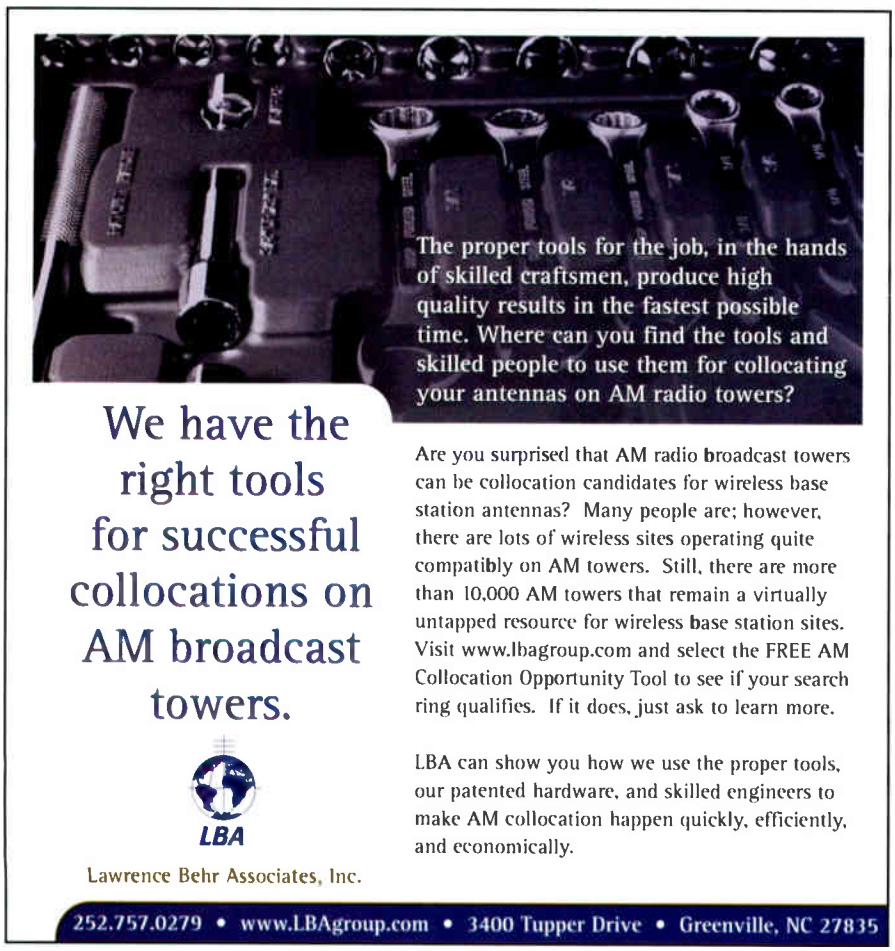
That assumption (and its polar *opposite*), continues to be an integral part of the ornithology–tower conflict today. Some environmentalists support the reverse case, that some tower lighting is an attractive nuisance, disorienting birds and drawing them into towers (depending on color and whether the lamps are flashing or steady-burning).

The *Avatar Environmental Report* commissioned by the FCC and released in 2004, stated that "no firm conclusions can be drawn, based on the existing literature, regarding the importance and effects of lighting color, duration, intensity and type (e.g., incandescent, strobe, neon or laser)." Nevertheless, the FCC was so sure of its lighting facts 10 years earlier that it imposed a modification on a tower authorization it had already granted. If the FCC adopts the premises of the Avatar report, it would effectively nullify the Commission's rationale for the Leelanau County modification.

There are nearly as many opinions about lighting and avian mortality as there have been studies. A technical comment by Woodlot Alternatives, incorporated into PCIA's February 2005 comments to the Commission regarding the Avatar report, noted that overarching comments are unwarranted. Woodlot noted that the discussion sections of the Avatar report generally closed with a statement that more research is required before any conclusion can be drawn.

PCIA has agreed with this caution, and has urged the FCC that, given "the singular importance of lighting to aviation safety," the Commission shouldn't jump to conclusions (or issuing *MO&Os*), until the facts are in, whenever that will be.

Absence of decision is not always a good thing, but deliberation often is. agl



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The State of the State

by Mark N. Savit, Esq.

It's that time of the year when everyone starts thinking about what they want to do in the upcoming year that perhaps they didn't spend enough time on in the past year.

We usually do this on a personal basis, but I think that we might want to take some time now to do that collectively on an industry-wide basis. My New Year's resolution this year is to make sure that there is a strong, resourceful, and meaningful State Wireless Association here in Colorado, where my office is located.

Frankly, I was a little surprised to learn that there wasn't one yet. I was surprised because every time I get into a conversation with virtually anyone from any sector of the wireless business, the talk turns to the latest horror story about zoning, or construction and/or use restrictions.

Of course, each of us needs to fight our own battles for our own towers: the general issues of access, effects of RF, the need for improved service and the public safety benefits of improved service are common among us all, at least in each state. No state or local official wants to hear from the Washington folks about this. Most of them take pride in their independence from federal—or even statewide—regulation.

For that reason, it is through a state association that we can best educate the most critical regulators—local ones—regarding how beneficial wireless can be as well as best address concerns about health, aesthetics and the environment.

Local folks talking to local officials about local problems has always proven to be much more effective in addressing local concerns. In addition, state organizations can be far more nimble than the large national "umbrella" groups of which they are an integral part. They can respond to single state or multicounty issues in ways that a national association simply cannot.

Finally, and maybe most importantly, state associations make national associations stronger. In the case of policy, numbers can be everything. Having PCIA and ten concerned state association weigh in on an issue is always better than having PCIA do it alone. Having, for instance, the President of the Texas Wireless Association come along with a national association representative on a visit with the senators and congressmen from Texas can greatly enhance both the value and effectiveness of that visit.

Will Colorado soon join the ranks of states with their own state wireless trade associations?
Photo by Thomas Gibson, Studio 1 www.studio1kc.com

We have recently been witness to an object lesson about the value that a local association could have added on a statewide issue. A few months ago, I used this space to describe a number of issues that arose in connection with the new North Carolina OSHA rules about fall protection on cell towers.

While a number of objectionable requirements were removed as the result of industry action, one provision—a training requirement that may well mandate the use of three man crews in some instances where two man crews had been used—remained in force when the North Carolina Legislature failed to act on a compromise before the end of the session.

Of course, I am not suggesting that this result could have been avoided had a state wireless association been in place. However, one has to wonder whether it might have made a difference.

We all know that towers are subject (at least *hypothetically*, see my August/September column) to a standard that not only meets the necessary requirements for good signal transmission or reception, but also so as to provide support for anticipated equipment that will be placed on it, under a variety of strains and stresses.

The same is true with the apparatus we use to influence policy on the issues we care most about. We need to build a *support* system that will allow us to maximize efficacy on the issues which effect us most—even when, as individual companies, the strains and stresses of business conditions make that difficult. The best support system for that effort is a state wireless association. Let's all make establishing one in our home state, or supporting one if it exists, our New Year's resolution. **agl**

Savit is a partner with Patton Boggs LLP, Washington, DC. He is currently in the midst of establishing the Colorado Wireless Association. Further information about establishing state wireless associations is available from PCIA.

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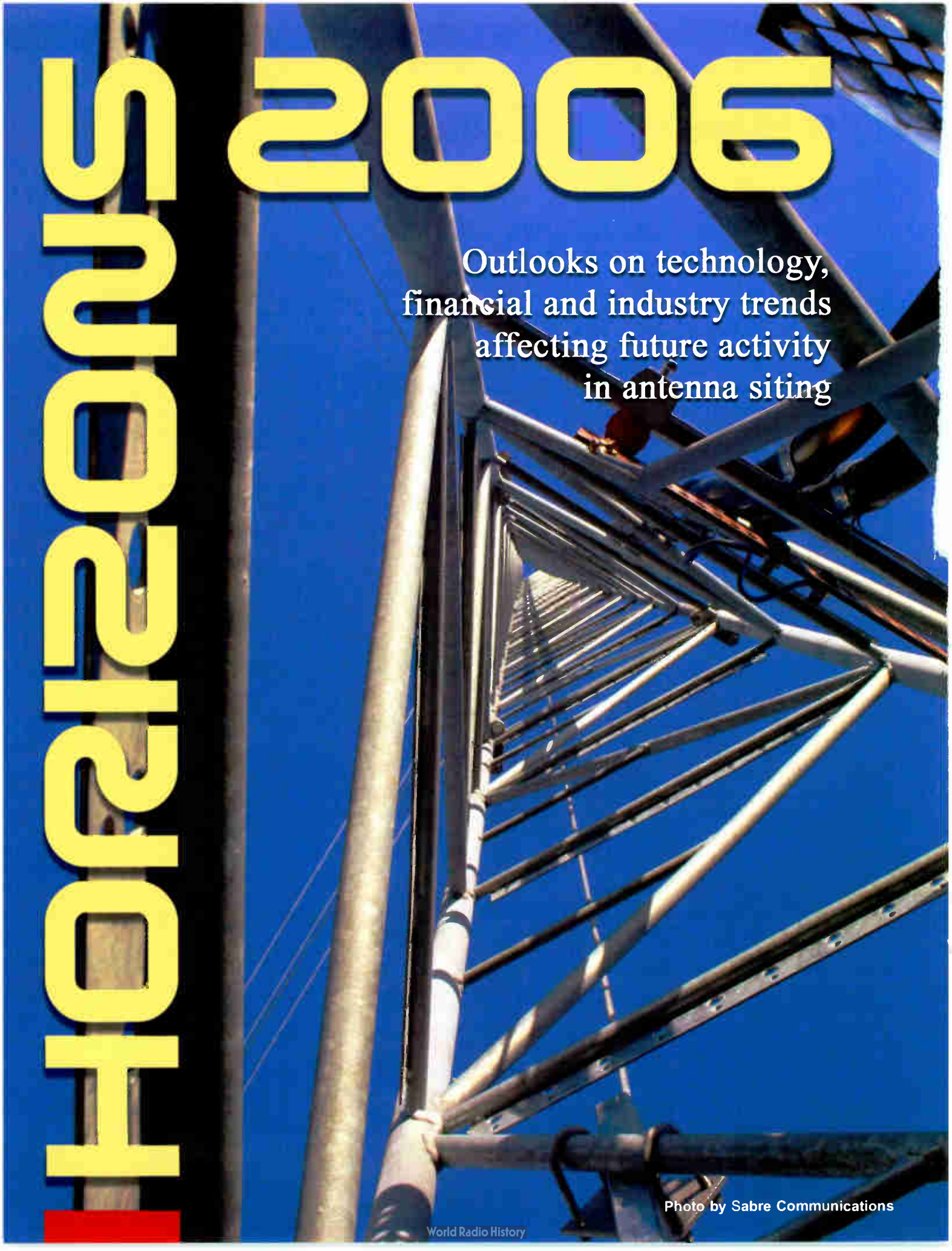
HORIZONS 2006

Outlooks on technology, financial and industry trends affecting future activity in antenna siting



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HOW SOFTWARE-DEFINED RADIO COULD RESHAPE THE TOWER INDUSTRY

SDR is poised for wide-scale adoption when the wireless industry moves to the 'next' standard. Meanwhile, several small carriers already are taking advantage of SDR. Tower owners could be next.

By Vanu Bose as told to Don Bishop

With a software-defined radio (SDR) that can run multiple standards such as CDMA, GSM and maybe TDMA installed at the base of the tower, theoretically you could move consolidation of the resource another step down the value chain.

It was a big fight for the carriers to share towers. Today they're reluctant to let someone own and operate the radio equipment in the network. They own the antenna, cable and base station as part of their network, and they run it. However, with SDR you may one day see that the cost structure—being able to run three networks in the space and cost of one—is compelling enough that it makes sense to share the network, especially in distributed antenna systems (DAS) and other places to begin with.

There is a business model that transitions from "neutral host" to "neutral network." But we should be careful about running ahead with the model until we get buy in from the carriers. That would be a slower process.

Initially, you'll see the SDR neutral network concept deployed in niches that are constrained such that there is no other choice but to use SDR. Probably not in macro towers, but in a DAS in an airport where the airport authority provides only a small equipment closet without much air conditioning, and carriers share a distribution network. There, SDR makes more sense: in a small place with lower cooling requirements and less electricity consumption.

Tower value

An eventual SDR neutral network would expand the business model for the tower owner. Now a tower owner is not merely providing a stake in the ground and a platform for antennas, the owner is providing equipment and services. That step leverages the tower to broaden the services.

The hard part is figuring out what the carrier would pay. Most of them we talk to aren't currently willing to consider having a base station in a network that they don't own and operate.

But we have commercially deployed SDR for a couple of carriers in traditional operations. At Mid-Tex Cellular, we deployed GSM at some sites the carrier owns and some that the carrier leases. Putting SDR technology in conventional architecture saves capital expense and operating expense, which validates the technology.

Then we can move to the next stage of changing the business model and giving the tower owners a more significant role. This changes the model of a tower company from a "steel and concrete company" to a "network operations company" as well. It makes sense when you centralize and multiplex base stations, where cost per minute is everything.

Mid-Tex Cellular is running GSM and GPRS, and we're looking to upgrade to another standard later this year with additional sites. The carrier is looking at possibly adding CDMA, which would validate the multistandard approach. Mid-Tex also handles roaming. Once the multistandard version is validated on a live network, it makes a more compelling case for the tower operators to say they can run the same thing.

Take MVNOs for an example. MVNOs operate as virtual carriers to target markets and groups with specific services. It makes sense that the network itself becomes virtual—one network that anyone could use to run any standard they want. The tower operators are in the best position to build and operate that network.

Base station manufacturing

The way we build things changes the business model for producing and selling base stations. We built a cellular network for Mid Tex without building any hardware. It involved front ends from ADC because they're a repeater

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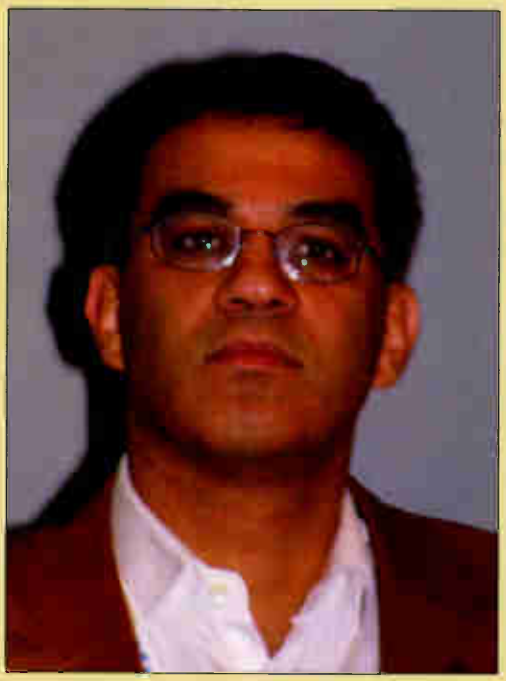
unit. It involved HP and Cisco for computer equipment, servers and routers. We put it together with our software to make it a network.

If you look at traditional base station manufacturing business, it's about selling hardware. All our hardware comes from third parties, and we make the software. Carriers can ride the price-performance ratio.

With SDR, equipment pricing is not driven by how many base stations the manufacturers produce or what we are doing, but by the tens of millions of units made for the IT industry. We track Moore's Law, which says processing power doubles every 18 months. What that means is that compared to the PC you buy this year, the one you buy next year is about the same price, but twice as fast.

Each server that Mid-Tex now has supports four carriers. Next year, each server being sold at that time will support eight carriers. We designed the software to be portable and ride back.



Vanu Inc. CEO Vanu G. Bose

That's a change in the industry, and a difference in our approach compared to conventional base station manufacturers. We see the future as not a customized hardware business, but as a software and commodity hardware business.

Deployment milestones

In November 2004, we were granted the first FCC certification for SDR. Not long after, the deployment with Mid-Tex went live, then an upgrade to GPRS, and we'll soon be announcing a second and third carrier using SDR.

Next year, we will deploy SDR that supports additional standards, including IDEN that Nextel uses, and SDR that supports push-to-talk. We'll be focusing on cost-effective IDEN for rural areas where users are thin and hardware is expensive. We can make it cost-effective to support IDEN in rural areas.

In rural America, SDR makes sense now. Wireless coverage is not built out because it's not cost effective, but land area coverage is an effective marketing tool. I would like to talk with tower owners in rural areas. That might be a good example for a multi-standard system.

Another milestone is field trials with CDOT in India focused on multi-standard coverage for India.

Project 25

We implemented a Project 25 system. About three years ago, after 9/11, we designed a system called virtual patch. The major problem in public safety is radio interoperability for large-scale disasters where a combination of local police, fire departments and federal law enforcement officials respond and bring with them radios that use different standards in different frequency bands.

You can't afford to replace the radios, that's $25 billion. Nor can you deploy a system that requires registration and modification. You fight the fire first. We designed a system that enables interoperability among analog, P25 and GSM cell phones in a desktop-size computer box with icons on the screen for radios and channels. On screen, you could drive two icons into a box, and the system enables interoperability between the radios the icons represent. We did analog VHF to UHF P25. It listened to both, hearing a transmission on one that it demodulated and then remodulated to the other. This enabled interoperability on the scene.

We built the system with funding from AGILE, a part of the U.S. Department of Justice. Where we demonstrated the capability to technical personnel, they said it solved the problem. But selling the system into the field is another matter. Every agency down to police and fire departments makes its own buying decisions. And no two have the same definition of interoperability and the solution.

The major issue to solve, perhaps at the federal level, is the concept of operations at a major disaster. Who is in command at the scene? Command traditionally has followed communications. Whoever can talk is in defacto command. I spoke with a fire chief in New York and he said, "My guys talk to me; I talk with police."

Who's in charge, the chain of command, and what line of interoperability needs to be enabled needs to be defined. Then we can build a workable system. Now it's too varied and tied up with political issues. Every time there's a big disaster, the fact that public safety agencies can't talk with each other gets highlighted.

Political climate

We get reports and publicity about interoperability failures, but the problem doesn't get solved. That will happen again in the wake of communications problems associated with Hurricane Katrina. Some money will be allocated, and the controversy will die down. The money tends to be used to buy more equipment for the legacy systems, and the problem doesn't get solved.

We can build a system to enable communications for whatever they want to support, but the organizations involved have to agree on the interoperability. Without that agreement, a manufacturer faces building a product to an undefined need, which is not possible. The activity and publicity for interoperability gets money allocated but it gets spent on legacy

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systems. We see it over and over again.

Standards development

SDR frees us from the journey of evolutionary standards development. Technology moves quickly. We talked about Moore's law. The Internet has moved quickly. Software gets upgraded quickly. But cellular evolves at one standard *every decade*. First there was analog, then digital, and now maybe 3G.

That's slow, but it's not because of the technology. New modulation, coding and network protocol are developed all the time. What limits deployment is *return on investment*. When AT&T upgraded from TDMA to GSM, it spent $10 billion on base station equipment, and that didn't even cover the rural areas. When you spend $10 billion, what you buy has to remain in service for seven to 10 years to get a return on the investment. Unless your new technology comes with a $5 billon check, it won't be deployed for years.

GSM is an example. The old standard has to stay around for a while. As 3G deployment starts, we're looking at a technology that's seven years old from when it was conceived.

With SDR, we hope to decouple the standards upgrade from the hardware upgrade. We can deploy a new standard at Mid-Tex with a software download, provided it's in the same cellular band. We can speed the upgrade cycle that brings new services to customers faster.

There are only two cases where SDR needs to add hardware. One is if you license new spectrum. When we set up networks, we digitize the entire spectrum the licensee owns. If they buy new spectrum, they have to add new front ends to digitize the spectrum. That doesn't happen often.

The other upgrade is scalability as you add channels. At Mid-Tex, for example, some sites support two GSM carriers, and they can upgrade to four carriers. If the operator goes beyond four carriers, another server has to be added. But the new server can be the latest and greatest, and the operator only pays for it when it is needed.

Making a difference

We have to get the first network deployed. We have to get to an upgrade cycle where they are using new technology anyway. Then the next upgrade will be faster with SDR. We're close to that now, as carriers look at either 2.5G or 3G.

3G is being deployed, and it isn't reaching the promised data rates. I think carriers will use a hybrid, 2G voice with a 2.5G data network. That kind of flexibility is ideal for SDR. That's one of the things I think can make a difference in the future. **agl**

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WIRELESS RELIABILITY

by Ted Abrams
Senior VP Technology
American Tower

In 1983 my mobile telephone calls were operator-assisted. Person-to-person service from the mobile operator was friendly, but neither private nor secure. Although reliability was poor and coverage was scarce, I usually kept complaints to myself because I was conscious of the privilege. And a significant privilege it was, to travel along the highway, completing calls through the magic of a telephone in the vehicle. Others probably recall similar experiences, perhaps symbolized for all of us by the rooftop antenna that whipped against low-clearance garage portals.

At that time, private radio networks were often superior to the commercial mobile-telephone system provided by "Ma Bell." VHF, UHF and, later, 800 MHz trunked radio all provided adequate in-network connections. When a phone patch was available, dialing a landline number from the DTMF microphone was feasible, if somewhat awkward.

So, what is different now—what changed over time?

For starters, attitudes changed. People now expect the phone to work, all the time, everywhere, easily. Users have no particular regard or respect for the magic of wireless technology. Subscribers take for granted the complexity behind the protocols, the modulation schemes, the switching and routing necessary to initiate, complete, and sustain each call. I still marvel at the fact that my digital wireless phone can easily complete a call without the aid of a live operator or tower access codes and repeater tones in the dialing sequence.

Modern wireless professionals do the heavy lifting necessary to provide high-quality, secure communication services so that subscribers *can* take the network for granted. Wireless improved dramatically over the past 20 years, but customer satisfaction issues still trouble the industry. Today, when wireless doesn't work, one of the first questions asked is "where's the tower?" Towers support large receiving-antenna panels needed for network performance. Where the receiving-antenna panels are attached to a tower located near the subscriber, the network can better receive what the subscriber is transmitting.

In the past, "mobile" telephone meant "connected to the car." Then, towers were needed only for transportation corridors. Now, wherever people travel, live, work and play, wireless coverage is needed. If the tower is far away, the subscriber's handset must work harder to transmit over the distance to the fixed network. As the handset works harder, the battery loses charge, and the handset temperature rises.

Where the antenna for the fixed receiver is closer to the mobile subscriber, handsets transmit less energy. When that happens, the network is better positioned to satisfy rising demand for digital wireless, service is more reliable, batteries last longer and handsets stay cooler.

Higher data rates meet increasing demand for features, but aggravate the problem. High bit-rate wireless service requires higher site density for outdoor capacity and more margin in the link budget for building or vehicle penetration. Those requirements add up to one thing: The fixed antenna needs to be closer to the subscriber.

What is needed for wireless networks to be more reliable?

Reliable, on-demand wireless is a tool for safety and convenience. Changes that allow more people to connect wirelessly, more of the time, will improve reliability. Future changes can take many forms, including spectrum and technology enhancements. History shows that wireless reliability improved as equipment was attached to more towers located near subscribers. agl

EXPANDING INTO MULTI-

The tower industry has done a good job of aggregating in the macro network. Companies formed to buy towers from the carriers, thereby recapitalizing the value chain. Aggregation allowed carriers to shed some of their capital-investment burden and focus on the value-added service play.

Is there now an opportunity to extend the macro network inside the building? It seems so, if, when you go inside an elevator, you always have to tell your caller, "I'll call you back" because you *know* the call will drop.

Although in-building infrastructure providers introduce new technologies and capabilities, the real area of interest is not the technology but the *business value* that the technology can unlock.

When you look inside a multi-tenant, high-rise facility and take a picture of all the stakeholders of information inside the building, it is revealing. There are several threads of *value chains* of users.

1. You and I, who want to make our phone calls or get content on PDA.
2. Public-safety providers, who want ubiquitous, interoperable emergency communications.
3. Building owners who want to extract value and differentiate real estate A and B. And maybe there's a value proposition to the tenant.

For example, when oil hits $100 per barrel, and energy to heat and cool the building costs more, and Johnson Controls says the building owner should hang sensors in the building to tell whether people are in the conference room and to turn lights off and to turn down HVAC accordingly, wireless infrastructure can make it all work.

That's an intersection of multiple value chains. No one on their own can pay for an in-building wireless

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NEUTRAL-HOST SYSTEMS TENANT BUILDINGS

By Anand Iyer as told to Don Bishop
Director, Atlantic Region
Communications Industry Group
PRTM

infrastructure and get a return on investment. But together they can—*if* they collaborate around the infrastructures that can be provided by the tower companies. Collaborations between public and private stakeholders take advantage of the ubiquitous network inside the building for public safety, reduced energy costs and value for the carrier.

We engaged members of the four value chains almost a year ago and said, "We have to prove to ourselves there is value in collaboration. If we can show a value proposition, a business value, a tangible value proposition and amortize it on a square foot basis and convince the building owner to invest in it, what's the story going forward?"

Our study of the industry players demonstrated without a doubt that the ROI was 10× the investment. We are now at the point where the path forward has three components.

First, these industry payers must define a common product and service vision. It's shame wireless has so many flavor choices, whereas water comes in two flavors—hot and cold; HVAC, the same two flavors; and electricity is on or off. Building owners say, "Come up with a common product roadmap."

Second, continue to educate the market. People need to hear why in-building wireless infrastructure is valuable.

Third, get the right public private collaboration. On the public side, Homeland Security Presidential Directive 8 identifies 17 categories of infrastructure to protect. All of those fall within facilities. It is of keen interest to the Department of Homeland Security that they figure out how to create situational awareness and surveillance, inside a building. In-building wireless infrastructure can deliver societal value as well as business value.

Tower companies

What does a wireless telecom user

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care what about kind of antenna or bi-directional amplifier or repeater has been installed in a building? A consumer only wants the call to go through and information that's sent and received to be accurate, scalable and secure.

The tower company doesn't want to become "Pipes 'R Us," where the consumer relates to the product and not to the infrastructure. It will become a dog-eat-dog world to make any money. As a tower provider, where you see the next year or two going is how to move up the value chain—how to move out of the "Pipes 'R Us" business model. We'll provide the pipe, but how can we do value-added services and provide unique developments that attract and retain wireless carriers?

Wireless solutions consultant Anand K. Iyer

On the other side, if you *are* a wireless carrier, you want to own the customer and work with as many tower providers as possible to have the signal well presented in the building. You'll want the tower companies to consolidate so you have a neutral host model, the model of choice.

At the end of the day in a multitenant facility, it will be difficult to force one carrier over another. To the extent a Cingular wants in one building and Sprint wants the same, it's facilitated by a homogenous footprint provided by the tower company. The carriers will want consolidation, as with the acquisition of SpectraSite by American Tower, because it takes them to a common infrastructure and platform. The carrier *wants* "Pipes 'R Us."

Thus, the interests of the tower companies and the carriers are not necessarily aligned, because the question is, "Who makes the money?"

Then, consider the public-safety interests. Public safety has precedents in Singapore and Asia where the government mandates that tower aggregators and infrastructure providers enable all buildings as RF-ready to a minimum specification. From the safety and security perspective, a possible objective is to require wireless infrastructure compliance in multitenant buildings. Both the tower industry and carriers will fight a mandate because such a mandate comes without a business model—unless there's a private-public collaboration and federal funding can be provided for the mandate.

In an effort to move the construction of wireless infrastructure in multitenant buildings forward, PRTM is bringing many of the stakeholders together during December. Stakeholders include carriers, infrastructure vendors, tower owners, building owners, public safety agencies and the Department of Homeland Security. The meeting will spell out the principles and structure for how these stakeholders can cooperate to accomplish the three objectives (consumer wireless coverage, public safety coverage, and real estate differentiation and operational advantages for the building owner).

Through the years, the players, on their own, haven't been able to demonstrate a good business rationale for installing wireless infrastructure in multitenant buildings. That barrier has been broken, and the infrastructure providers are seeing a way to take a smaller portion of a bigger market instead of all of a non-existent market. **agl**

CINGULAR FOCUSES ON FILL-IN

by Nancy Garvey as told to Don Bishop
Vice President and General Manager
Missouri, Kansas and Southern Illinois
Cingular Wireless

Every market has unique, specific requirements for any additional antenna sites. In the Cingular region of Missouri, Kansas and Southern Illinois, we're following a normal build plan. In any year, we usually add sites at a rate of 10 percent to 15 percent. We've been building systems in the Kansas City and St. Louis markets for almost 20

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years. What's needed where systems are mature can differ from a start-up—say, compared to Southwest Missouri, Springfield and Joplin. Cingular has been there for six years. The needs differ, depending on market maturity penetration.

Cingular acquired AT&T Wireless a year ago. Among other assets, we wanted the network. Their being GSM made integration easier than it would with a different technology, such as CDMA. The acquisition reduced Cingular's network build needs in this region because we integrated the AT&T network into what we owned.

As the acquisition was nearing last year, we adjusted our build program, knowing we would pick up sites, but not knowing where they were. Our network team looked at overlap, especially collocation. Where AT&T had sites that we needed, we wouldn't have to build. We refocused our build plan to include what we needed from AT&T, sites that could be decommissioned and what was left that we needed to build to serve an unmet need after the integration.

Building vs. renting

We add sites to the network in three ways: one is leasing from third parties; another is leasing from another carrier. If neither of those is available, we do a build-to-suit. As we integrate with the AT&T acquisition, keeping some AT&T sites and decommissioning some, the mixture will change somewhat.

The total capital build for 2005 for the Missouri, Kansas and Southern Illinois region is about $200 million. That includes everything, the new build-to-suits and all the new Mobile Telephone Switching Offices (MTSOs) we have to build. That's what we call "core": new platforms, all the new radios and new MTSOs; more than the sites themselves.

The number of sites being added this year is about 137 in those two-and-a-half states. We'll project numbers for 2006 and 2007 sometime this quarter for St. Louis and mid-Missouri as we finalize the AT&T integration there, and sometime in the first quarter next year for Kansas City.

Video and data are becoming a huge factor in network growth. After carriers saying for years that customers would use them—it's happening. With Cingular's GSM technology, we carry voice and data over the same network. Some other technologies have different networks. We look at total minutes-of-use (MOU). We see a 30 percent increase in MOU. There are other things besides towers we have to put in place to carry the data; the towers themselves really don't affect the data.

In most of Missouri and Kansas, Cingular operates on the 850 MHz frequency. As a result, we don't need as many sites to cover the area. In Southwestern Missouri, we use the 1900 MHz frequency. We've been building in Kansas for 20 years, so we don't need much expansion. We want in-building coverage, and we want to roll out our Universal Mobile Telephone Service offerings. We are doing some builds in rural areas, but the majority of the build is in metro in-fill.

When it comes time to select a tower to rent, it doesn't matter who the owner is, whether it's a large company or a "mom-and-pop" owner. Because more of our build is in metro areas, we wouldn't necessarily expect mom-and-pop tower owners, but all it depends on whether they have a site where we need it. I don't know how competitive the business is, but if there's a mom-and-pop tower near another one we might use, the comparison would make the difference. **agl**

As the acquisition was nearing last year, we adjusted our build program, knowing we would pick up sites, but not knowing where they were.

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PRICING PRESSURE DOWNWARD

by R. Clayton Funk
Vice President
Media Venture Partners

In a frothy merger-and-acquisition environment, you rarely hear the term "pricing pressure downward," but in less-heady times, you will hear it on a frequent basis—typically to the benefit of the buyer. The term is typically used in a macro sense with larger, tangential issues affecting pricing more than industry-specific dynamics. What causes there to be "pricing pressure downward"? While there are many factors that are examined when pricing a tower, the actual "value drivers" of a tower site rarely cause such a large market ripple.

It is easy to determine a tower's location, tenant base, capacity remaining, future revenue potential in the marketplace and the state of the supporting documentation. The larger set of factors is more market driven:

What is the "health" of the tower market? Are the public towercos experiencing rising stock prices? Is Wall Street confident in the future financial performance of the public towercos? Are there concerns about the future of towers, the tenants utilizing the towers, or the future of the wireless industry? If there is some concern that wireless carriers won't spend money on their networks or that they are not adding subscribers or revenue per user as rapidly as before, there could be some pricing pressure downward. Typically, higher prices are paid when carriers are spending money on their systems.

The final, and largest, set of factors would be much more macro in scope. What is the country's overall financial health? Are interest rates high or low, rising or falling? Are there whispers of inflation? Will high gasoline prices or increased energy costs affect consumer spending on wireless applications? Are there any natural disasters that could affect the country's financial strength? There are still-uncertain effects of multiple hurricanes, high gas prices, rumored high energy costs this winter, and upward creep of interest rates. So, there continue to be rumors of some "pricing pressure downward," a general fear of what the upcoming next several months might hold for the entire economy, which will have a trickle-down effect onto tower pricing.

Is the business model solid? Absolutely. Will there continue to be a demand for tower space? Absolutely. But while the industry might be incredibly healthy and the fundamentals solid, keep an eye on big-picture developments to see if—and how—they affect the tower industry's recent upswing in valuations and strong pricing. agl

DEBT IS GOOD... AS CAPITAL

by Jarred Saba
Director of the Tower Lending Group and Corporate Finance Group
Wireless Capital Partners

Over forthcoming issues of *AGL*, I am going to walk through all of the benefits of using debt capital to expand your tower portfolio. Somewhere over time, the thought of "borrowing money" became a "bad" thing. I don't know where or how this misperception began, let me assure you, *debt is good*. Properly structured debt can take your tower business well beyond your dreams. Unless you have millions of dollars at your disposal, it is virtually impossible to grow a tower portfolio at a pace to keep up with the market demand. With more opportunities to build now than in the recent past, access to capital is crucial. Think of debt in these terms: Would you rather

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receive 100 percent of $1 million in tower rent or 50 percent of $3 million in tower rent?

Through subsequent issues of *AGL*, articles are going to show tower companies of all sizes how to venture down the path to the next level. It is not always an easy road, but with new insight and a little guidance you will be there sooner than you imagined. Each article will focus on a different topic:

- the basics behind *borrowing* money.
- why local banks *dislike* lending to tower companies.
- how to *value* the tower's cash flow in today's dollars.
- personal guaranties: How valuable *are* they?
- Does the cash flow *justify* building a tower?
- which lease terms add *value*.
- how to *grow* with debt.
- *case* studies.

Also, each article will have a separate section that is focused on answering your questions. Use the contact information below to send questions. All questions will be answered in a Q& A section. No question will be too basic—or too complicated.

For example, here is a question I was asked as a panelist at the Small Tower Forum at PCIA:

Q: What is the real difference between the loan payments in a five-year amortization and a 15-year amortization loan for $500,000? Is the difference *really* that big?

A: In a word: *yes*. Assuming the interest rate is 10 percent on both loans, the monthly debt service on the five-year loan is just over $10,700 per month. For the same $500,000, the 15-year loan debt service is about $5,400—almost half. That leaves an extra $60,000 a year in cash flow which could be in your pocket or re-invested back into the business. Structuring the proper loan is as important in this industry as structuring the proper tenant leases.

I look forward to the opportunity of helping tower companies grow. **agl**

TROUBLE AT THE TOWER TOP

As the FCC auctions spectrum for future services, the collocated technologies and frequencies at the tower top could interact unpredictably—spawning unprecedented interference challenges.

The demand for communications mobility is putting pressure on wireless spectrum. New technologies and services—such as WiMAX and mobile TV—are joining third-generation (3G) cell-based mobile services in the jostle for bandwidth. Spectrum regulators are having to assess—and quickly—how best to reassign and redeploy spectrum and services for future applications.

An added complexity is the concurrent trend toward collocation of base station sites. Premium sites are in demand, leading to physical congestion of tower structures and rooftops, as more antenna systems are deployed. What can result, says David Kiesling, director of marketing and technical services for Radio Frequency Systems (RFS), is a cocktail of frequencies and technologies at the tower top that interact in unpredictable ways—in many cases causing significant interference and degradation of services.

U.S. spectrum auctions

Kiesling says a better understanding of potential interactions and interference is required to minimize the effect on quality-of-service. "There have been scenarios where a particular service has been operating successfully for years, then is suddenly affected by the introduction of a new service to the same site," he said. "An example of this is the collocation of 800 MHz CDMA and GSM 900 MHz services in countries such as Brazil, China and India."

The CDMA/GSM collocation scenario is well documented, he said, and the solution lies in the deployment of RF filters with sharp selectivity responses. However, Kiesling added, the situation in the United States is about to get interesting with the FCC's planned 2006 spectrum auction in the 1.7 and 2.1 GHz bands and, later, the 2.4 GHz band.

"There's a real possibility that carriers adopting 2.1 GHz spectrum for UMTS transmission will collocate with existing PCS services," said Kiesling. "If the antennas are positioned too closely together on the tower, the third-order intermodulation (IM) harmonic created by the two signals stands to fall in the vicinity of the 1.7 GHz UMTS receive band."

The problem is that the IM signal is likely to be much stronger than the desired receive signals, leading blocking and receiver sensitivity problems. If the IM signal falls out of the UMTS receive band, installation of a RF filter on the UMTS uplink will mitigate these interfering signals. However, an interfering IM signal falling in-band becomes more challenging. Kiesling said a recourse for carriers may be cooperation to better manage frequencies. Equipment vendors will also be under pressure to create designs minimizing passive IM sources.

Ownership shifts

Kiesling added that the issue is influenced by a shift in base station site ownership: In the United States, around 70 percent of sites are now owned by independent tower real-estate companies. "The site owners don't necessarily come from a wireless background and they don't necessarily understand all the issues," he said. **agl**

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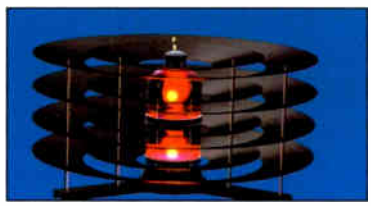
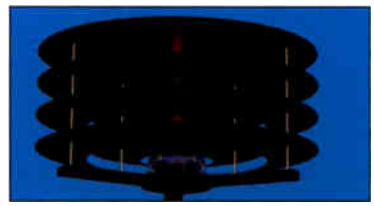
agl

World Radio History

Shade combats 'ground light pollution'

To aid tower owners and municipalities to combat nuisance "ground light pollution," **TowerTEX** has designed TowerSHADE to mitigate ground-level intrusion from tower lighting. The shade is designed to uphold FAA and Transport Canada tower obstruction light requirements while eliminating more than 97 percent of nuisance ground-light pollution within a wide radius of the tower (about two miles for a tower light at the top of a 250-foot tower, given a relatively flat geography). A series of parallel circlular vanes shades lights from the ground but allows an unrestricted view from aircraft. The attachment upholds FAA specifications on most certified obstruction-lighting systems.
www.towertex.com





A tower to admire—every month

The Tower Site Calendar 2006 created by ***NorthEast Radio Watch*** features more than a dozen images from the *fybush.com* collection never previously printed. Sites featured in this year's calendar include New York City station WMCA, WSB in Atlanta, KTAR in Phoenix, KCMO (the historic WHB) in Kansas City, MO, the former CBV in Quebec City, and WEJL in Scranton, PA.
www.fybush.com.

Wide-band lightning suppression for remote-controlled ALDs

The DAS product platform from **PolyPhaser** combines lightning suppression and 3G/AISG functionality. The fully AISG-compatible DAS product line is designed for the remote-controlled antenna-line device (ALD) market for UMTS 3G equipment. The DAS-HY is a wide-band (800–2,500 MHz) device comprising a bias-tee current injector, lightning protector and an RS-485 AISG modem. It receives an RS-485/dc signal from a remote-control unit on the RCU/DC port and multiplexes it onto the RF feeder cable. The DAS-HY incorporates an EMP-protection device that protects the dc circuit separately from the RF/Data stream protection.
www.polyphaser.com.

LED-based obstruction light

Xcel Controls' L810-type LED-based obstruction light can be modified with an optional thermostat-controlled Arctic kit to conform to FAA Engineering Brief No. 67. The model XL54S-LED obstruction light is certified as meeting the requirements of FAA Advisory Circular 150/5345-43. Units are manufactured in accordance with the FAA Airport Lighting Certification Program (ALECP). The XL54S-LED fixture is designed for energy efficiency and comprises a compact LED array with a thermal conduit to extend the life of the LEDs. The 120 Vac fixture has industry-standard mounting and can be used for either steady-burning or flashed operation.
www.xcel.com

Data surge protector covers six T1 lines

A compact surge protector from **Transtector Systems** protects as many as six T1 data lines. It is designed for use at a cellsite between the wireless transceiver and the network signal using RJ 48C (RJ 45-compatible) connectors. The space-saving unit (6.2" × 4.5" × 1") weighs only eight ounces. Silicon avalanche suppressor diode (SASD) technology used in the 12 V surge protector safeguards sensitive data applications. The unit features field-replaceable surge modules and a single ground connection.
www.transtector.com

World Radio History

Biby Publishing acquires Fryer's Tower Source

Biby Publishing, the publisher of *AGL* magazine, announced on Dec. 1 the purchase of Fryer's Tower Source, which includes the award-winning online site-location tool TowerSource, *Fryer's Site Guide*, the *Tower Owner Buyers' Guide*, the annual *Tower Market Analysis Report* and the Tower Data Warehouse.

"This was a perfect fit for us," said Richard Biby, publisher of *AGL*. "Fryer's name has been synonymous with the tower industry for as long as I can remember, and over that time they continued to expand their delivery systems for publications and data."

Biby said he hopes to expand the utility of the Web site and data products for related markets tangential to the tower industry.

Fryer's Site Guide's four regional directories now list over 200,000 tower and rooftop sites nationwide, the largest collection of sites in the country, covering activity not only by large site management and acquisition firms but the still-significant market of small independent tower owners.

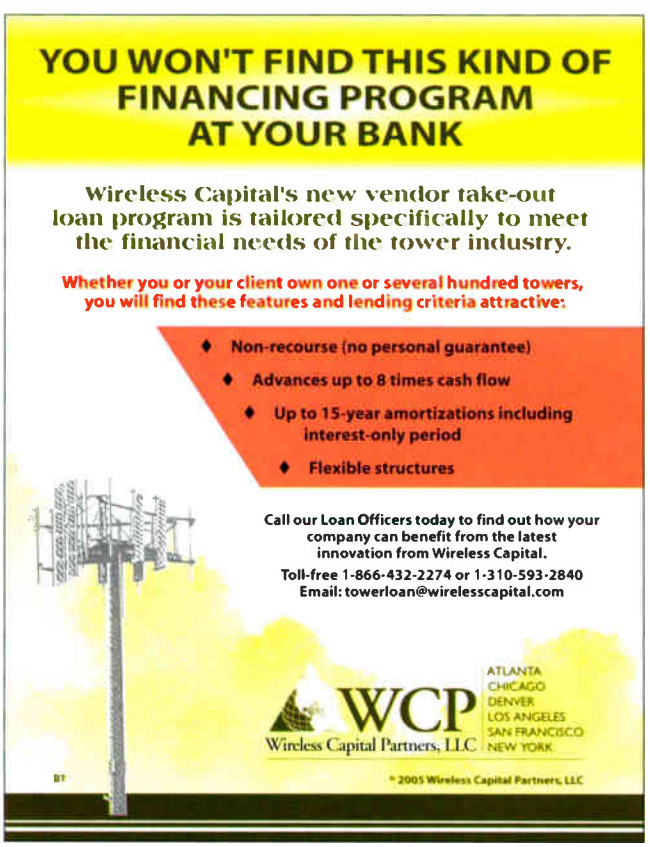
"It's always been said that towers are the backbone of the telecom industry, and Fryer's has targeted them better than anyone," Biby said. Fryer's Tower Source twice received the Tower Technology Summit annual industry award for "Best Online Site Location Tool."

Fryer's President Jim Fryer, who founded the company in 1990, will remain with the market analysis and research group in a consulting capacity. The price of the acquisition was undisclosed.

Victory to head panel analyzing Katrina response

FCC Chairman Kevin J. Martin announced on Nov. 29 that Nancy Victory will chair a panel tasked with reviewing the effects of Hurricane Katrina on communications networks and making recommendations on improving future preparedness and response. The panel will include public-safety and telecom industry representatives. Victory, currently a partner at the Washington law firm of Wiley Rein & Fielding, was the administrator of the National Telecommunications and Information Administration during President Bush's firm term. She also chairs the FCC's Advisory Committee for the 2007 World Radiocommunication Conference.

Victory is the author of *Homeland Security and Communications: A Compendium of Federal Programs.*



World Radio History

PCIA, Pike & Fischer present NPA conference for new tower construction

A conference outlining the ramifications of the FCC's National Programmatic Agreement (NPA) regarding tribal and historic lands and new tower construction will be hosted in March by PCIA—The Wireless Infrastructure Association and the firm of Pike & Fischer.

The conference will take place Mar. 2, 2006, at the Bellagio Hotel and Casino, Las Vegas.

The FCC has called the NPA a "streamlined process [that] will provide certainty and ease burdens on everyone involved in the review process while continuing to protect historic properties."

The conference is designed for carriers, tower companies, site owners and operators, environmental consultants, site-acquisition professionals others involved in the siting of wireless telecommunications facilities. Speakers include John Clark, partner, and Amos Loveday, history and preservation specialist, Sonnenschein Nath & Rosenthal.

Conference information and online registration is available at *www.pcia.com/NPAConference* or *www.pf.com/NPAconference*.

Registration is $349. A copy of *NPA Owner's Manual: First Edition* by John Clark is available to registrants for $89, a discounted price. For hotel reservations, contact 1-888-987-3456 and mention the PCIA and Pike & Fischer NPA Conference.

Presentation on DTF testing at NATE 2006 conference

Distance-to-fault (DTF) transmission-line testing procedures will be discussed at the National Association of Tower Erectors (NATE) annual conference and exposition in February 2006. Radio Frequency Systems (RFS) Manager of Technical Services Charlie Spellman will deliver a presentation on the practical functionality and limitations of DTF transmission-line testing procedures.

The presentation will take place at 1 p.m. on Feb. 14. NATE 2006 will be held from February 13 to 16 at Disney's Coronado Springs Resort, Lake Buena Vista, Florida.

Business activity

Glenn Swiderski has been named chief technician for Greenvile, NC–based **LBA Technology**. Swiderski will be responsible for electronic fabrication, testing, and quality control of LBA antenna systems and related radio-frequency products for the broadcasting, military and public-safety sectors. Swiderski was formerly with Emmis Communications Group station WIBC, Indianapolis. Previously, he held field and test engineering positions with Harris Corporation working with AM systems to the million-watt level. He holds the Certified AM/FM Broadcast Engineer and Certified Television Operator designations from the Society of Broadcast Engineers and licenses from the Federal Communications Commission.

Andrew Corporation, has signed a WCDMA infrastructure patent license agreement with **Qualcomm**. Under the terms of the worldwide royalty-bearing agreement, Qualcomm has granted Andrew a license to develop, manufacture, and sell WCDMA picocell and microcell base station systems. The agreement provides for the use of certain Qualcomm intellectual property in the Andrew OneBaseTM Pico, a complete single-carrier picocell wireless base station serving small, coverage limited data hotspots for up to 80 channels, and the Andrew OneBase Micro, a further development of OneBase Pico that features single-carrier operation for larger areas. Both Andrew "BTS in a box" offerings are designed to complement an original equipment manufacturer's (OEM) existing base station transceiver product portfolio.

Global Tower Partners (GTP) announced on Nov. 1, 2005, the definitive closing of certain wireless communication tower assets from **Mesa Communications Group**.The Mesa tower acquisition will contribute 222 towers (78 of which are located in Maine) and 117 developmental sites in Maine to GTP's national tower portfolio. With the closing of the Mesa acquisition, GTP owns, manages and master leases about 7,200 U.S. sites, including 1,800 owned communications towers. Two weeks prior to the Mesa announcement, GTP acquired the site management division of **Tower Resource Management (TRM)**. That acquisition contributed 3,676 new rooftop sites and seven new wireless communication towers to GTP's portfolio. TRM will now focus exclusively on providing value-added site acquisition, construction and turnkey development services to wireless carriers nationwide.

News releases and photos may be sent to the *AGL* editorial office, P.O. Box 1578, Liberty, MO 64069-1578, or emailed to the editors at *departments@agl-mag.com*.

Siting news

Contrary to **Perry Township, OH,** zoning codes, **SprintCom** began construction of a cellphone tower. In response, township trustees filed a lawsuit against the company which will be heard in Stark County, OH, Common Pleas Court. Township officials are asking the court to void the plans for the site. SprintCom claimed that as a utility it was exempt from local zoning. However, the town has a separate section on towers in its zoning code that prohibits them in areas zoned for single-family homes or duplexes. The land where SprintCom started building the 262-foot-high tower is in such an area. Neighboring residents signed a petition asking the trustees to permanently halt construction. The land is owned by Waikem Realty, which is a co-defendant in the lawsuit. Waikem Realty has a 20-year lease with SprintCom, which suspended work on the tower after the township issued a stop-work order.

World Radio History

The **Kentwood, MI,** Planning Commission approved a 155-foot **T-Mobile** cell tower on city-owned property. The site, near the city's water tank, was among those identified in a list of preferred cell tower locations. In approving the site plan, commission members stipulated that the base be built strong enough to support a tower of up to 195 feet in case it ever needs to be extended. They also asked that fences and key-card access be used to protect the tank.

A **Milford, NH,** planning board hearing that focused on replacing a communications tower on the historic Town Hall roof drew fire from both planners and the town Historical Commission. Selectmen have signed a lease agreement with **US Cellular,** which has proposed replacing the town's two aging towers with one higher tower that would also carry cell phone antennas. The 70-foot tower would be 20 feet higher than the current towers. The company would turn ownership of the new tower over to the town and then pay rent for use of the tower and a room on the top floor for telephone equipment. Planning board members complained that selectmen's zeal to replace the tower free of charge was bypassing the town's telecommunications ordinance.

Town meeting voters approved a lease agreement with US Cellular in 2002 session, but according to board member Steve Sareault, they thought equipment would be placed on the existing towers. The communications towers service town departments as well as the regional police and fire dispatching consortium. Selectman Noreen O'Connell, who also serves on the planning board, said moving the towers would cause havoc in obtaining new FCC licenses and frequencies, and would diminish the coverage area for the Milford Area Communications Center.

The Town Hall is listed on the National Historic Register. Charles Worcester of the Historical Commission said that the current towers are pulling the bricks apart and there will be more stress from a new tower. Following a lengthy discussion, the planning board opted to follow the advice of town counsel William Drescher and refer the matter to the zoning board of adjustment to rule on one historical consideration: visibility of the tower in the surrounding area. Following the zoning board action, the matter will return to the planning board for final site plan approval.

The **Pitkin County, CO, Board of Commissioners** unanimously approved the erection of two new Cingular cell phone transmitters. The equipment will be located inside small turrets on top of the new aircraft rescue and firefighting facility at the Aspen/Pitkin County Airport. The turrets will be made from stealth materials, which will blend in with the rest of the building.

Vandalism

In a Dayton, OH, story reminiscent of an old Jack Webb/Johnny Carson skit about "copper clappers," Police arrested four men for stealing copper bars from cellphone towers. The suspects planned to trade them for cash at a recycling center. Possibly part of the sites' grounding systems, the copper bars' absence could have led to serious lightning and electrical damage. agl

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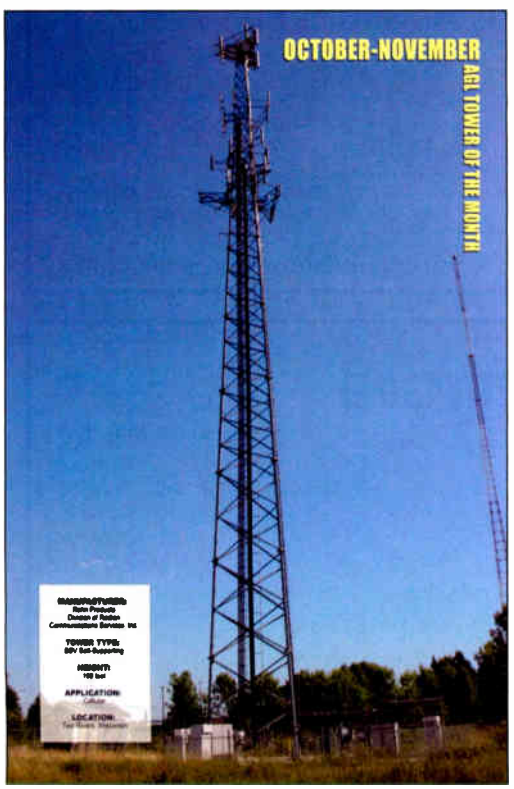
Rave reviews

Sincere thanks for highlighting our PCS tower in your October-November edition. We received rave reviews from industry managers who called and e-mailed us. In fact, we were able to track the progress of the U.S. mail and the delivery of *AGL* to us, by the geography of the calls. Illinois, followed by Philadelphia, then Wisconsin and New Jersey. One thing is for certain, people in high places are reading *AGL*, and they're not all on the top of towers! Keep up the good work, and please continue with the great quality centerfold "Tower of the Month" features.

Your article on collocation of cellular and PCS clients with AM towers also was well-written, and I only wish that every AM operator in the country would have received this issue. We've benefited for almost eight years as good neighbors with our five clients, and appreciate the extra income it produced.

Mark Heller
President
WTRW Inc.
Two Rivers, WI



Grateful and satisfied

I am a proprietor of a single-crew, high-end radio tower services business, and trade as Tim D. Mills, licensed in Virginia. I have performed, and offer, raw land developments of cellular tower sites complete as well as network analyses, and commercial radio and television site work, such as antenna R&R, transmitter rebuilds after lightning hits, coax replacement, guy tensioning/tower plumb, and paint and lighting and grounding maintenance and upgrades, among other comprehensive site services.

Although I have only been exposed to *AGL* magazine with one issue so far, I have found its subject matter and advertisements to be pointed directly toward my business's market needs, and its articles to address the exact issues I face day to day in the field. Actually, it has stirred such personal interest that I have requested a mailing of back issues to see what I've missed!

There are few industry magazines that give any attention to my niche industry's priorities, but *AGL* seems to lend itself in entirety to the radio tower and related equipment portion of wireless, and for that I am a grateful and satisfied subscriber, and look forward to receipt of more issues of *AGL*.

Tim Mills

Towers ... over my head

Recently some one sent me a copy of your magazine; I was amazed at the information I was able to garner from it.

I read it from cover to cover in a few hours, and though some parts were over my head, there was a lot I can use in my day-to-day job of managing a trunked radio system for my city.

The articles of special interest to me were about site acquisition and leasing space on towers. I have a 300-foot tower with antennas and a single microwave dish, leases for two cell companies, and I also control a 150-foot tower with only a few antennas and a single microwave dish on it. That tower is located in a notorious dead zone for cell coverage. Only one company ever expressed interest in leasing tower space and then never followed through, even though no zoning or special permits are needed.

Once again thank you for a great magazine, I have requested a subscription.

Robert A. Plant
Asst. Systems Administrator
800MHz. Radio/Communications Systems
Supervisor-Fleet Radio Maintenance
City of Warren, Ohio

Issues and information

A few years ago I had sites in South Carolina with detuning devices. I had the pleasure of working with several people from the Biby Engineering office. These were people that I trusted, respected and relied on to make sure my job was done effectively.

Through the article by Richard Strickland and a conversation about RF safety and signage with him, I learned that Rich Biby, P.E., the magazine's publisher, is offspring from Dick Biby, a longtime industry consultant of Biby Engineering. Imagine my excitement! Now I have a magazine that is not only informative, but published by the offspring of some of the best in the business.

Unfortunately, I missed the first year of the magazine. The first I received was dated August/September 2005. Never have I read a more informative magazine. This is one that identifies the issues and provides information to rectify the situation while keeping us to date with the latest standards.

Sincerely,
Debra Elliott
Cell Site Administrator
Carolina West Wireless
1307 Curtis Bridge Rd.
Wilkesboro, NC 28697

Just ... thanks

"Thanks – enjoy every issue of *AGL*!"

Randy Muirhead
Operations/Station Manager
KJRF 91 FM
Lawton, OK

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