

Infrastructure, regulatory and financial information for the antenna-siting community

ABOVE GROUND LEVEL™

DECEMBER 2006

# agl

www.agl-mag.com

In this Issue

# Looking Toward the Future >>

AGL MAG PO BOX 620111, LITTLETON CO 80162-0111  
#BYNTV DX \*\*AUTO\*\*ALL FOR ADC 856  
#0381599#  
BARRY MISHKIND  
EDITOR  
RADIO GUIDE  
2033 S AUGUSTA PL  
TUCSON AZ 85710-7905

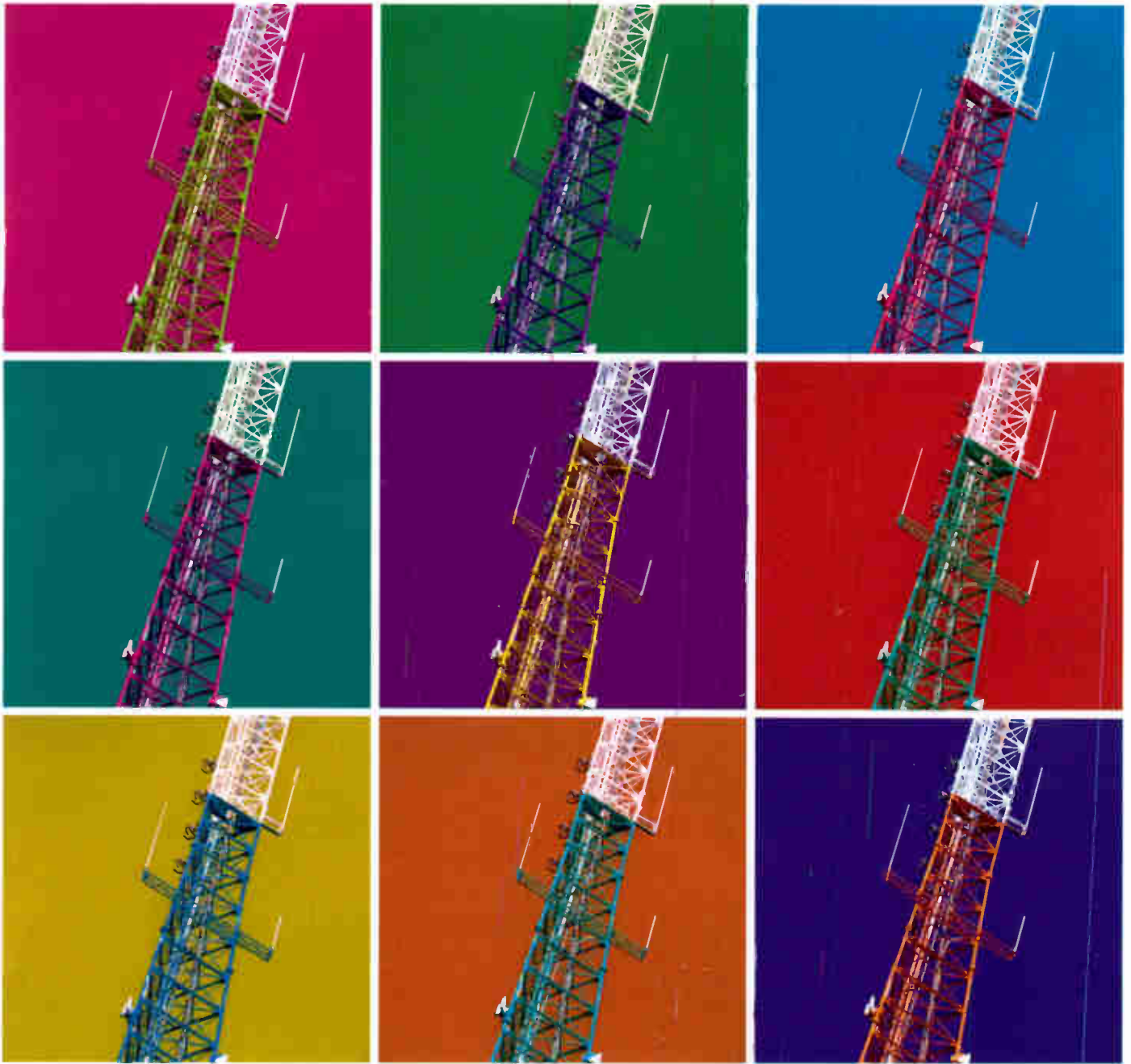
PSPT STD  
US POST PD  
PERMIT # 45  
LIBERTY  
MO  
S28  
10/5



The official magazine  
for PCIA—  
The Wireless  
Infrastructure Association

A BIBY PUBLISHING, L.L.C. PUBLICATION

# WE UNDERSTAND EVERY TOWER OWNER FACES UNIQUE RISKS.



Atlantic Risk Management is a large independent insurance agency and an expert in protecting tower owners from unexpected risks. We offer complete, competitively priced programs, endorsed by PCIA and tailored to suit your specific exposures, including: self-supporting, guyed, or monopole towers; support equipment; shelters and fencing; plus general liability, business auto, workers' compensation, umbrella and more. **Find out why we protect more tower owners than any other agency, call 866-226-0555, visit [towerinsurance.net](http://towerinsurance.net) or e-mail [Zabrina Kelly](mailto:Zabrina.Kelly@atlanticrisk.com) at [zkelly@atlanticrisk.com](mailto:zkelly@atlanticrisk.com) or [David Saul](mailto:David.Saul@atlanticrisk.com) at [dsaul@atlanticrisk.com](mailto:dsaul@atlanticrisk.com)**

Backed by the underwriting  
and claim excellence of



One or more of the CNA insurance companies underwrite the products and services described. Information is for illustrative purposes only and is not a contract. This document is intended to provide a general overview of products and services described. Remember that only the policy can provide the actual description, terms, conditions and exclusions. All coverages not available in all states. CNA is a service mark registered with the United States Patent and Trademark Office. Copyright © 2006 Centennial Casualty Company. All rights reserved.

## Atlantic Risk Management

CORPORATION

Endorsed by:





18

## Features

### 18 Base Station Antennas: "Evolution of Integration"

*Chuck Powell*

The ubiquitous wireless network base-station antenna takes the next step in its evolution—one that sees the 'antenna' become an 'antenna system,' with integrated functionality that transforms it beyond its passive roots.

### 26 Detuning: A Non-standard and Situational Discipline

*Richard P. Biby, P.E.*

Distance calculations, correspondence with affected broadcasters and FCC regulations are all part of the mix.

### 30 Centerspread: Tower of the Month

*Mono-pine photography courtesy of Sabre Communications.*

What's December without a Christmas tree? An aesthetically pleasant solution to tower concealment, replica trees are one of several options that provide coverage while maintaining the natural visual environment.

### 32 Horizons 2007

AGL looks at the coming year and beyond. Trends among trade associations and major towercos, as well as opportunities offered by new technologies, markets and business strategies, are examined in this special section.

# Departments



16



## on the cover

It may *look* like December, but this photo shows *August* at Mt. Mansfield, Vermont's highest peak, where it's *always* a bit snowy. Radian Communication Services built two towers here for WCAX-TV, Stowe, VT, that will host other TV and FM stations as well.

*Photography/courtesy of Radian Communication Services.*

### 6 Line of Site

Some year-end industry observations.

### 8 Built to Suit

Besides high fences, do sites need anti-aircraft batteries?

### 10 PCIA Proactivites

The NEPA process cannot be taken lightly.

### 12 Vertical Assets

Like Santa, Clayton Funk gets lots and lots of letters.

### 14 Risky Business

The littlest things can endanger your business—*really* little.

### 16 The Noise Factor

More site owners are becoming victims of a pandemic crime.

### 52 Backscatter

Acquisitions and association news.

### 55 Products

### 56 Index to AGL 2006 Features and Columns

### 58 Advertising Index

### 58 Editorial Index

### 58 Professional Directory

AGL (ABOVE GROUND LEVEL) is published nine times a year by Biby Publishing LLC, P.O. Box 284, Waterford, VA 20197, and is mailed free to qualified individuals.

POSTMASTER: Send address change to AGL Circulation Department, P.O. Box 620189, Littleton, CO 80162-9950.

#### AGL Editorial Advisory Board

Anne Perkins  
PCIA

Bruce McIntyre  
Tower Innovations

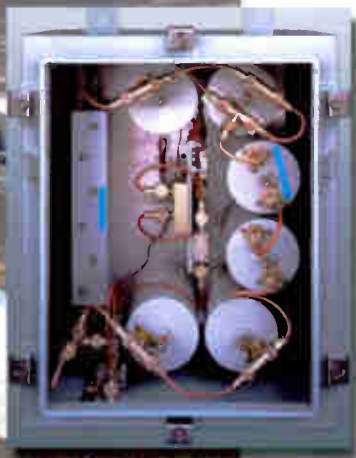
R. Clayton Funk  
Media Venture Partners

Keith Kaczmarek  
Cyren Call  
Communications

Tam Murray  
Community Wireless  
Structures

**"COMING THROUGH  
LOUD AND CLEAR ..."**

- **Antennas**
- **Combiners**
- **Wattmeters**
- **Duplexers**
- **Filters**
- **System Design**



**FORMER WACOM CUSTOMERS:**

Telewave can support Wacom commercial and amateur products. Many Telewave products share a common design heritage with Wacom, and most of our cavity and isolator products are drop-in replacements for Wacom. We can repair, rebuild, and expand most existing Wacom items or systems without a complete change-out.

Telewave, Inc. delivers high performance ... everywhere, everytime.

We bring 33 years of product engineering and system design expertise to the table for every customer, large or small.

With a full line of standard products, and the ability to quickly create custom designs for special projects, Telewave provides unmatched support for Public Safety, Government, and Business radio systems.

Call us today at 1-800-331-3396 or +1 408-929-4400 and discuss your requirements with our expert sales engineers, or visit us at [www.telewave.com](http://www.telewave.com)

Telewave, Inc.  
660 Giguere Court  
San Jose, CA 95133



Wireless Communications Manufacturers Since 1972

# Oh, What Fun It Is To ...

As we conclude the second full year of publishing AGL, I say, "Oh, what fun it has been." AGL brings us many encouraging compliments. I love receiving comments from those of you who have learned something new, gained valuable insight on finance or regulatory



issues, or become better acquainted with technical issues associated with your jobs. It warms the cockles of this Scrooge's cold heart.

But it is not all silly reindeer games here at Team Biby. No, we're serious business folks. For

example, after continuing it this past year as a separate publication, we're integrating the former *Fryer's Tower Owner Buyer's Guide* (TOBG) as a regular issue of AGL. This special first 2007 issue will mail in mid-January. Our second issue of 2007, the February/March issue, will return to our normal mix of articles and columns. Previously, the TOBG went to about 4,000 industry readers. By making it a regular issue of AGL, we're able to increase its circulation to the entire AGL subscriber list. Putting this resource in the hands of more people in the industry means more bang for the advertiser dollar, increased exposure for company listings and extended accessibility for users as a digital edition. Let us know how you like it and what you think we could do to make it better for you.

Additionally, we're working diligently on a couple of new tower-industry surprises for next year. First, we'll have an online, interactive site for equipment manufacturers and service companies in the industry to list their companies (for free), making it easier

for those who need those products and services to find vendors. (Sorry, but I can't do anything to make the *process of becoming* a qualified vendor any easier—I've been through that painful process myself lately.)

Over the river and through the woods, we're off to find the camouflaged tower. We're also reworking the Fryer's Online Site Database. We've radically changed the look and feel, and we've gone to extraordinary efforts to find as many communications sites as possible and to have them all available for your perusal. I'll have further updates on that in 2007.

As noted at the end of Jerry Black's "Horizons" section article on page 40, in 2007 we'll have a new column devoted to DAS and in-building systems. We'll also be tracking all kinds of challenges and successes in site maintenance, power, security and regulatory issues in next year's features.

Last but not least, we're making our lists and we're checking them twice. Why? Because we're drafting the annual *Tower Market Report* (TMR)! All new for 2007, we're completely rewriting the report, to include new discussions of market opportunities, better analysis on each tower company and, of course, the witty commentary and extraordinary insight you've come to expect from all of us.

On with the holidays! I hope that 2007 will be a great year for everyone—with all of the new buildouts, how could it be anything but? One last concern: I've hashed out an exclusive deal with Santa this year, so if your red beacon should fail, I have a reliable backup for you. I am, however, worried about steady-state red lighting—my four-year-old will be crushed if any of the other reindeer have a collision. On the other hand, I understand that reindeer can become confused and continuously fly around high-intensity white strobes, never making it to their destination. We'll be working on a *Petition for Rule Making* in January. **agl**

by Rich Biby, Publisher  
rbiby@agl-mag.com

6 above ground level

ABOVE GROUND LEVEL™  
**agl**

www.agl-mag.com

Infrastructure, regulatory and financial  
information for the antenna-siting community

Published nine times a year: January, February/March,  
April, May/June, July, August/September, October,  
November and December.

**PUBLISHER/CEO**  
Richard P. Biby, P.E.  
rbiby@agl-mag.com

**EXEC. EDITOR/ASSOC. PUBLISHER**  
Don Bishop  
dbishop@agl-mag.com

**MANAGING EDITOR**  
David A. Keckler  
dkeckler@agl-mag.com

**ART DIRECTOR**  
Scott Dolash  
sdolash@agl-mag.com

**ADVERTISING MANAGERS**  
Mercy Contreras  
mcontreras@agl-mag.com  
Karen Clark  
kclark@agl-mag.com

**MARKETING MANAGER**  
Diane Weidenbenner  
dweiden@agl-mag.com

**CIRCULATION MANAGER**  
Karen Clark  
kclark@agl-mag.com

**CORPORATE OFFICE:**  
Biby Publishing L.L.C.  
P.O. Box 284  
Waterford, VA 20197  
540-882-4290

**PRESS RELEASES AND  
ADVERTISING MATERIALS  
MAILING ADDRESS:**  
Biby Publishing L.L.C.  
P.O. Box 1578  
Liberty, MO 64069-1578

**SUBSCRIPTION INFORMATION:** AGL  
(Above Ground Level) is mailed free to qualified  
persons in the United States working in the  
antenna-siting industry and related services.

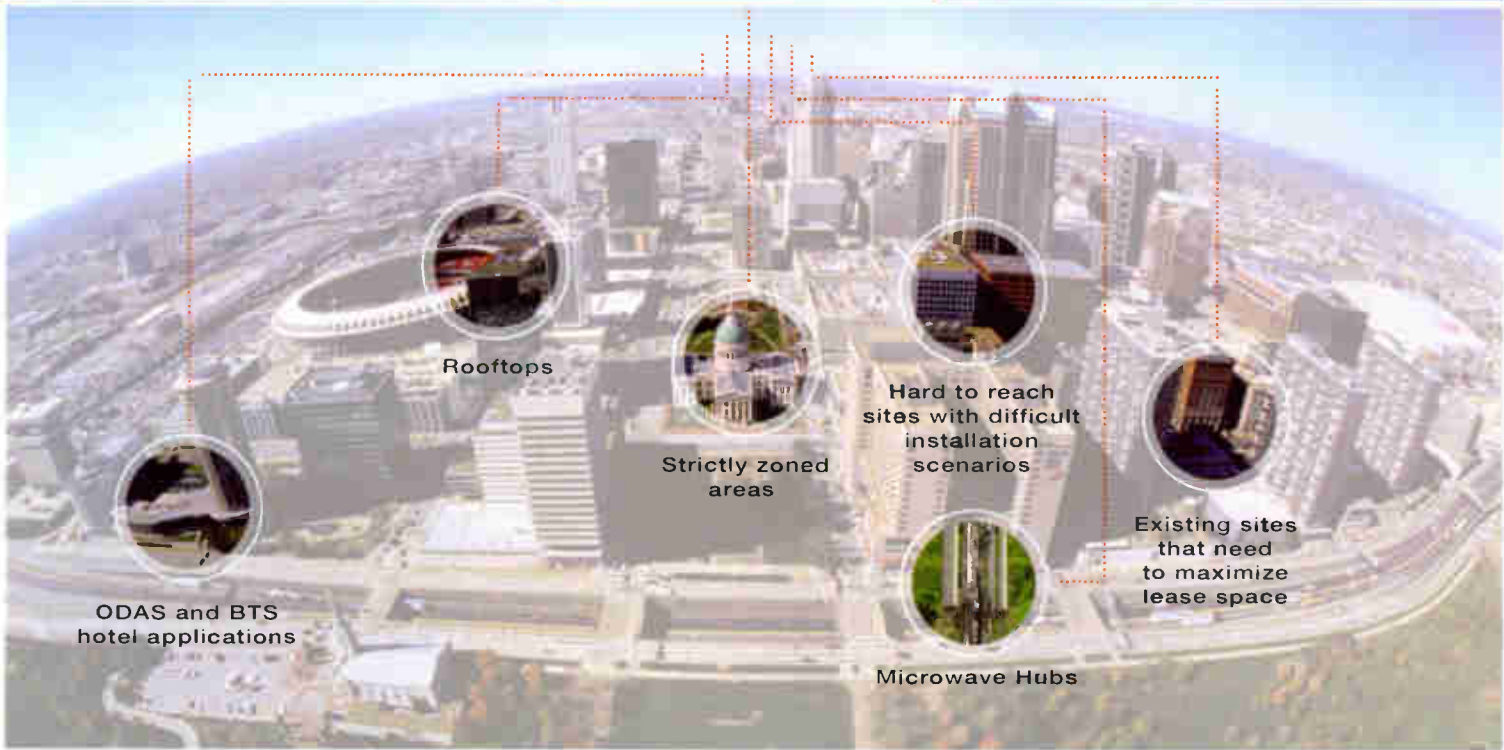
**To subscribe online, go to:**  
<http://www.agl-mag.com/subscribe.html>

**To subscribe by mail:**  
ATTN: Circulation Department  
AGL magazine  
P.O. Box 620189  
Littleton, CO 80162-9950

**COPYRIGHT ©2006 Biby Publishing LLC  
ALL RIGHTS RESERVED**



www.agl-mag.com



**WHAT'S NEXT!**

\* VersaFlex shown without sliding doors for clarity.

# New VersaFlex™ Enclosure Solutions fit everywhere.

Change the way you think about siting. You can deploy a fully functional base station in just 13' x 7.5' x 8' – half the space of conventional enclosures. VersaFlex Solutions from Powerwave are the next generation in cabinets/enclosures. You spend less on site acquisition. Less on site lease payments. Less on transportation, construction, installation and operating expenses. But you still get all the rack space and security you require in a fully functional base station cabinet/enclosure. What's more, the revolutionary thermal management system precisely balances temperature and humidity to totally eliminate hot spots, enhancing equipment reliability and lengthening the life of the HVAC system which helps further lower cost of ownership for the site.

- Half the size of other base station enclosures
- 100% of the capacity and functionality
- On-site assembly for difficult installs and hard to reach sites
- High tech thermal management
- Modular design
- Proprietary movable equipment carriages

Find out how we do it. Email: [VersaFlex@pwav.com](mailto:VersaFlex@pwav.com) or call 1-888-797-9283. [www.powerwave.com](http://www.powerwave.com)



Powering the Next Wave of Growth in Wireless

© Copyright 2008 Powerwave Technologies, Inc. Powerwave, Powerwave Technologies, and the stylized 'P' logo are trademarks of Powerwave Technologies, Inc. All rights reserved.

# Barbed Wire and Radar

In the October issue, I said one thing tower owners *don't* need is BASE jumpers climbing their towers, launching themselves into space and descending with parachute after a short freefall.

Perhaps it should be no surprise that some young men and women, teenaged or perhaps somewhat older, like to trespass at tower sites and free-climb towers for the thrill. Most of us eventually become conscious of our mortality and stop taking risks we might have taken when we were ...

uh ... younger. As a teenager, I would free-climb the amateur radio tower in my back yard.

Young men and women outside the tower industry are not likely to read these words. If they were, I would think twice before telling you where to find what I found. I'm not interested in giving ideas to potential trespassers.

I found a 10-minute video of two young men climbing over a barbed-wire-topped fence around a T-Mobile tower compound in Pembroke, GA. They then scale the 250-foot cell tower all the way to the top. This video is on the Internet for anyone to see. But I caution anyone who chooses to view it: This is an amateur recording, and it has vulgar aspects, both in video and audio.

What's on the Internet one day could disappear the next, but at press time, it was still there at:

<http://video.google.com/videoplay?docid=-3664867662782357185&q=cell+tower&hl=en>

The video was posted in May 2004.

So, we have trespassers scaling towers for BASE jumping *and* because they like the thrill of free-climbing. Is that all? Not quite.

by Don Bishop, Exec. Editor  
dbishop@agl-mag.com

8 above ground level

How about someone who uses an unmanned aerial vehicle to carry a video camera close to the antenna cluster on a celltower?

I found a video taken by a camera mounted on a small, remote-controlled airplane that the controller directed to fly close to a Sprint Nextel tower. The controller commented that he wanted to see how close he could come to the tower, and he wondered whether the airplane might interrupt calls. The video was posted to YouTube. By press time, it had been removed.

Jay Mealy, the programs director at the Academy of Model Aeronautics (AMA), explained to me that model aircraft are free from airspace regulation because care was taken years ago to define what they are and how they may be operated.

"The AMA defines a model aircraft and operation as follows. 'A non-human-carrying device capable of flight in the atmosphere not exceeding the limitations established in the official AMA national model aircraft safety code, exclusively for recreation sport or competition activities'," Mealy said, quoting the AMA's definition.

"The operators of radio-controlled aircraft shall control the aircraft from the ground and maintain unenhanced visual contact with the aircraft throughout the entire flight operation. No model aircraft shall be equipped with devices that would allow for autonomous flight," Mealy said, concluding his recitation of the definition.

The AMA representative said that model airplane hobbyists should use designated flying sites that are established and chartered for the purpose. "Because model aircraft are not a part of interstate commerce, they are considered to be infringing on property rights if they fly over a neighbor's property," Mealy said.

"Within that area, a model airplane with a camera can take pictures of that area without breaking laws," he said.

No one wants to see anyone get hurt. No one wants the potential liability

involved with trespassers who are injured—or worse—on a tower site. Sadly, trespass is more likely than violation of airspace, and an antenna probably is more rugged than a model airplane, should the two collide and nothing more than impact is involved.

What more can be done? Higher and stronger fences? More barbed wire? More video surveillance? *Radar*? The situation could be laughable if the potential consequences weren't serious.

Maybe we should recruit trespassers as tower hands, and remote controllers of model aircraft as NOC staffers to put all that energy and imagination to a positive use. agl

## Picture of the Month:



This tower alongside a freeway in Winter Park, FL, belongs to WESH-TV. It combines form and function in the way it identifies the TV station and promotes the station's news and weather coverage, all while supporting a radar antenna and some microwave dishes. AGL did not find anyone at the station willing to answer questions about the tower, such as whether cellular antennas were concealed behind the signage or possible faux-concrete panels.





PCTEL Antenna Products Group is

# BIGGER, STRONGER, BETTER

PCTEL Antenna Products Group's industry-leading brands, MAXRAD® and Antenna Specialists® offer a multitude of antenna designs used for wireless applications in the broadband and cellular infrastructure, mobile radio, GPS satellite communication and Wi-Fi markets.

PCTEL offers:

- More than 28 years of antenna design expertise
- Sophisticated design, manufacturing and test tools
- Extensive selection of mobile, base station and portable antennas in frequencies from 27 MHz to 5.8 GHz
- On-going Research and Development Activities
- Superior quality at fair prices
- Worldwide reputation for first-class customer service
- Speedy ordering and delivery cycles
- World-class distributors like TESSCO Technologies

For more information, call TESSCO today at 800-305-9772  
or visit us online at [www.tessco.com/go/pctel](http://www.tessco.com/go/pctel)

 **TESSCO**

**MAXRAD**

  
antenna specialists



Antenna Products Group

  
PCTEL™  
simplifying mobility

# Enforcement and Environmental Assessment: The Process Matters

by Anne M. Perkins

On Oct. 19, 2006, the FCC released two *Notices of Apparent Liability for Forfeiture (NALs)* sanctioning two wireless carriers for violation of Section 1.1307 of the Commission's *Rules*. Section 1.1307 of the *Rules* identifies those actions that require the preparation of an environmental assessment.

These two *NALs* highlight the various challenges faced by wireless carriers and tower companies in meeting the requirements of the National Environmental Policy Act (NEPA). In addition, these enforcement actions foreshadow further future activity by the Commission and should be borne in mind by anyone responsible for regulatory compliance.

Section 1.1307 falls under the Commission's rules implementing NEPA, and it requires licensees, permittees and applicants (collectively, "licensees") to assess proposed facilities to determine the environmental impact. The construction requirements associated with NEPA can be extremely burdensome and uncertain, thus creating a challenging process for siting. T-Mobile Northeast and Panhandle Telecommunications Systems experienced this at first hand, as they both received forfeiture actions by the Commission.

T-Mobile was held liable for constructing a facility prior to the completion of an environmental review under Section 1.1307(a)(4) requiring the company to prepare an environmental assessment for facilities that might affect historical properties. This provision, in effect, requires companies to coordinate with the State Historic Preservation Office (SHPO) and to

provide the office with a proposal explaining the effects of the site on historic properties in the area. The SHPO then has 30 days to review the proposal. If the licensee determines in its report that there is no impact, and the SHPO does not *respond* within the 30 days,

However, the company began construction *before* submitting a report to the Pennsylvania SHPO. After realizing construction was premature, T-Mobile stopped construction and notified the SHPO and the FCC, but it was still fined \$11,000.



**Even in Eastern, urban cities, licensees must still notify all federally recognized Indian tribes in the area of a proposed construction. For example, there are 17 tribes in Philadelphia that licensees are required to contact prior to construction of non-exempt facilities.**

then the review process is complete, and the licensee may begin construction.

Alternatively, if the licensee does determine there is an impact, but it is not adverse, and the SHPO does not respond, then the licensee may begin construction after it provides the Commission with a copy of the proposal and allows the FCC time to review it.

T-Mobile was in the process of collocating antennas to a church bell-tower roof in Philadelphia, and was not exempt from environmental assessment under the collocation agreement. T-Mobile, through outside consultants, determined that the proposed facility would not affect historic properties.

Panhandle began construction of a facility in Hough, OK, without first commencing any form of environmental review. Subsequent to its construction, Panhandle hired a consultant to conduct a full review of the facility. The review found no significant effects on the environment, historic properties or cultural resources. In addition, Panhandle did reach out to the affected Indian Tribes and either received a response of no interest or did not receive a response at all. Panhandle took all the necessary steps to meet the requirements of the Commission's rules but still was fined \$5,600.

There are several lessons in the forfeiture actions against T-Mobile and Panhandle.

## First, the process matters

The Section 106/NEPA process is an extremely involved process that cannot be taken lightly. As indicated in the *NALs*, every element in the environmental review process *must* be completed *prior* to commencing construction. As demonstrated in the Panhandle *NAL*, the construction of the facility was completed within two weeks (Oct. 21–Nov. 3, 2005); however, the environmental review process takes at least 30 days, *plus* additional time if tribes fail to respond.

Regardless of the delay, licensees

must still engage in the review process to avoid a rule violation.

### Tribal concerns exist in urban areas

The T-Mobile *NAL* demonstrates that even in urban areas, such as downtown Philadelphia, licensees must still notify all federally recognized Indian tribes in the area of the proposed construction. Furthermore, there are 17 federally recognized tribes in Philadelphia that licensees are required to contact prior to construction of non-exempt facilities.

### Good-faith effort

The *NALs* demonstrate that the good-faith efforts of licensees are recognized when the FCC assesses liability, but they cannot be relied upon to mitigate a violation altogether. T-Mobile and Panhandle both engaged in some form of mitigation to reduce the effect of construction prior to the completion of the environmental study. T-Mobile immediately notified the

SHPO and the Commission of its error, and Panhandle immediately engaged in a review process.

As a result of these efforts, both companies received reduced fines. Panhandle was originally assessed \$7,000, but this was reduced to \$5,600, based on Panhandle's voluntary disclosures and prompt efforts to address environmental concerns. T-Mobile was originally assessed \$14,000. This was reduced to \$11,000 for T-Mobile's voluntary disclosures and prompt efforts to address environmental concerns.

Importantly, in the T-Mobile *NAL*, the Commission stated that companies are *not* entitled to any mitigation of a forfeiture amount because an employee "mistakenly authorizes" construction. Licensees are liable for their employees.

### More to come?

The T-Mobile and Panhandle *NALs* are potential harbingers of similar

enforcement actions by the FCC. The D.C. Circuit upheld the authority of the Commission to regulate tower construction in its October decision in the case of *CTIA v. FCC*. Operating under the reaffirmation of its authority, the Commission is likely to reengage on issues surrounding tower construction, making it even more important for all companies to ensure that all requirements of the Commission's rules are satisfied. **agl**

Perkins, who is also a lawyer, is manager of Industry Affairs for PCIA.

AGL magazine is the official commercial magazine for PCIA—the Wireless Infrastructure Association and provides a forum for commentary, news and information for that trade group. However, opinions, policies and information submitted to the magazine by PCIA do not necessarily reflect the opinions or news judgment of Biby Publishing, the publisher of AGL magazine. Likewise, news items, product information, commentaries and feature articles produced by AGL magazine do not necessarily represent the opinions, policies or endorsements of PCIA.

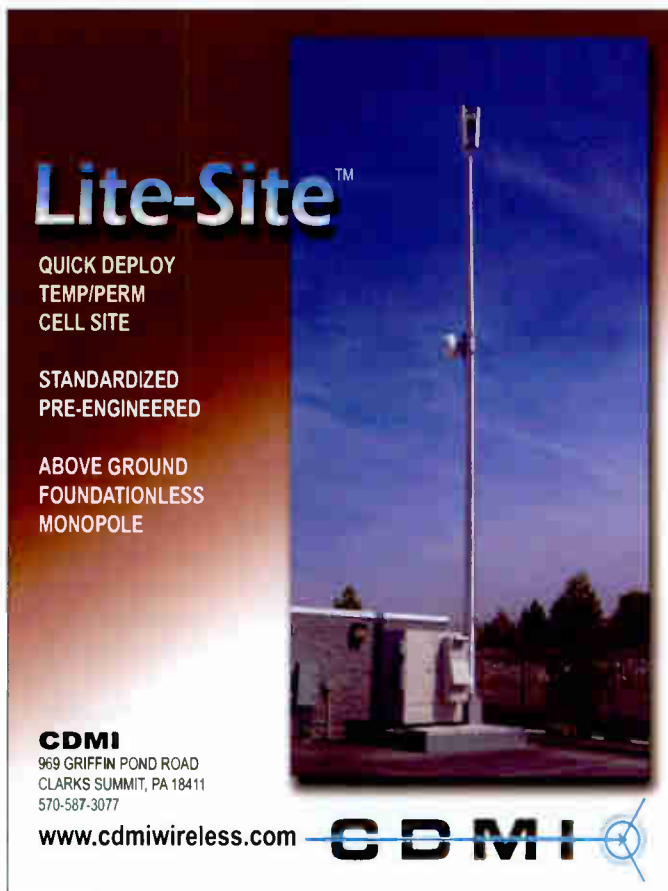


## TAKING LIGHTS TO NEW HEIGHTS

Specialty Tower Lighting offers a diverse line of high-quality obstruction lighting products. Custom systems can be designed and manufactured at competitive prices.

**STL**  
SPECIALTY TOWER LIGHTING

SPECIALTY TOWER LIGHTING, LTD.  
1630 Elmview Drive  
Houston, TX 77080  
Tel: 713-722-8123  
Fax: 713-722-8744



## Lite-Site™

QUICK DEPLOY  
TEMP/PERM  
CELL SITE

STANDARDIZED  
PRE-ENGINEERED

ABOVE GROUND  
FOUNDATIONLESS  
MONOPOLE

**CDMI**  
969 GRIFFIN POND ROAD  
CLARKS SUMMIT, PA 18411  
570-587-3077

[www.cdmiwireless.com](http://www.cdmiwireless.com)

**CDMI**

# You've Got Mail

by R. Clayton Funk

Writing regular columns for AGL is a great experience with a bit of downside—the second-guessing and criticism of those columns. Although loyal AGL readers have been incredibly kind, some have questioned past columns, and it's about time their comments and questions were answered:



**Dear Clayton:**

Nice articles, but you could have at least used my real name when talking about my experience building a company from scratch, working with investors and selling my portfolio to a larger company. I want royalties!

**Johnny Multiple**

*Dear Johnny:*

*I'm sorry you aren't receiving deserved credit. Although you might believe the column is about you, the adventures of our hero "Johnny Multiple" represent a wide range of companies and the experiences of many tower-industry entrepreneurs during the past several years. If you can find one tower developer who has experienced everything Johnny Multiple has faced in our series of columns, I'll deliver a 100-tower, build-to-suit deal from a major carrier tomorrow.*

**Dear Clayton:**

Gee, thanks. You put in your latest column a range of valuations from 13× to 17× tower cash flow, and now all my clients with Rohn 25s filled with paging and two-way customers all want those valuations. Nice work, jerk.

**Befuddled Broker**

*Dear Befuddled:*

*The important thing to note—for*

**12** above ground level

*tower owners and others in the industry who follow valuations—is that the range of 13×–17× is a very general rule of thumb because not all towers are created equal. Tower acquirers examine the types of tenants on the towers, the capacity remaining, location, future tenant potential and many other factors. So, "How much are Rohn 25s loaded with paging and two-way tenants worth?" Whatever someone will pay for them.*

**Dear Clayton:**

Your suggestion that someone should build "spec" towers in hopes of making a business plan work is incredibly stupid and irresponsible. Developers will see the result Johnny Multiple had in making money and start erecting empty steel, creating more potential "eyesores," from the public's perspective.

**Carlos Carrier  
at Worldwide Wireless**

*Dear Carlos:*

*In the case of Johnny Multiple, he thought he had a carrier committed to the sites he was erecting, and the carrier ended up not honoring their build-to-suit agreement—something entirely out of Johnny's control. I agree: Building empty towers can create more difficulty for tower developers—and for carriers who actually need sites developed, if there is a "glut" of towers in a market but not in the right locations for carriers to offer service. Empty towers should be avoided at all costs—after all, what can they be used for? A sundial? A deer stand? A tetherball pole?*

**Dear Clayton:**

Nice articles, but why keep talking about towers? The future of wireless is satellites, hot-air balloons and high-altitude drone aircraft filled with antennas. You really need to be more forward-thinking as you write your columns.

**Sammy Satellite**

*Dear Sammy:*

*I had a tower client in the late-1990s who told me how his friends, dating back to the 1970s, made fun of him for owning towers. They kept telling him that towers were going to be obsolete one day, and he should stop developing sites for his two-way customers. Well, Sammy, check out the evolution of wireless. Every new, emerging, well-capitalized wireless service offering has needed more and more towers at increasingly lower elevations due to the propagation characteristics of the signals. Although all the options you mentioned have been tried—and in some select situations have worked—there is still no better means to deliver a broadband wireless signal than a terrestrial network of towers. Good luck with those satellites though, Sammy—better luck than those who have tried before you.*

**Dear Clayton:**

How can I make sure I pay no taxes when I sell my towers? I don't want the government to take any more money.

**Teddy Tax Avider**

*Dear Teddy:*

*Hmmm ... you can elect to do a 1031 like-kind exchange when you sell your towers as a way to roll over your sales proceeds into a "like-kind" investment, but I would make sure you consult with your accountant or a tax attorney first. Theoretically, you could choose not to pay taxes, but you might burn through all your proceeds either paying attorneys to keep you out of jail or fighting extradition back to the United States. It might be easier to pay taxes and appreciate the paved roads, street lights and bridges those taxes bought over the years.*

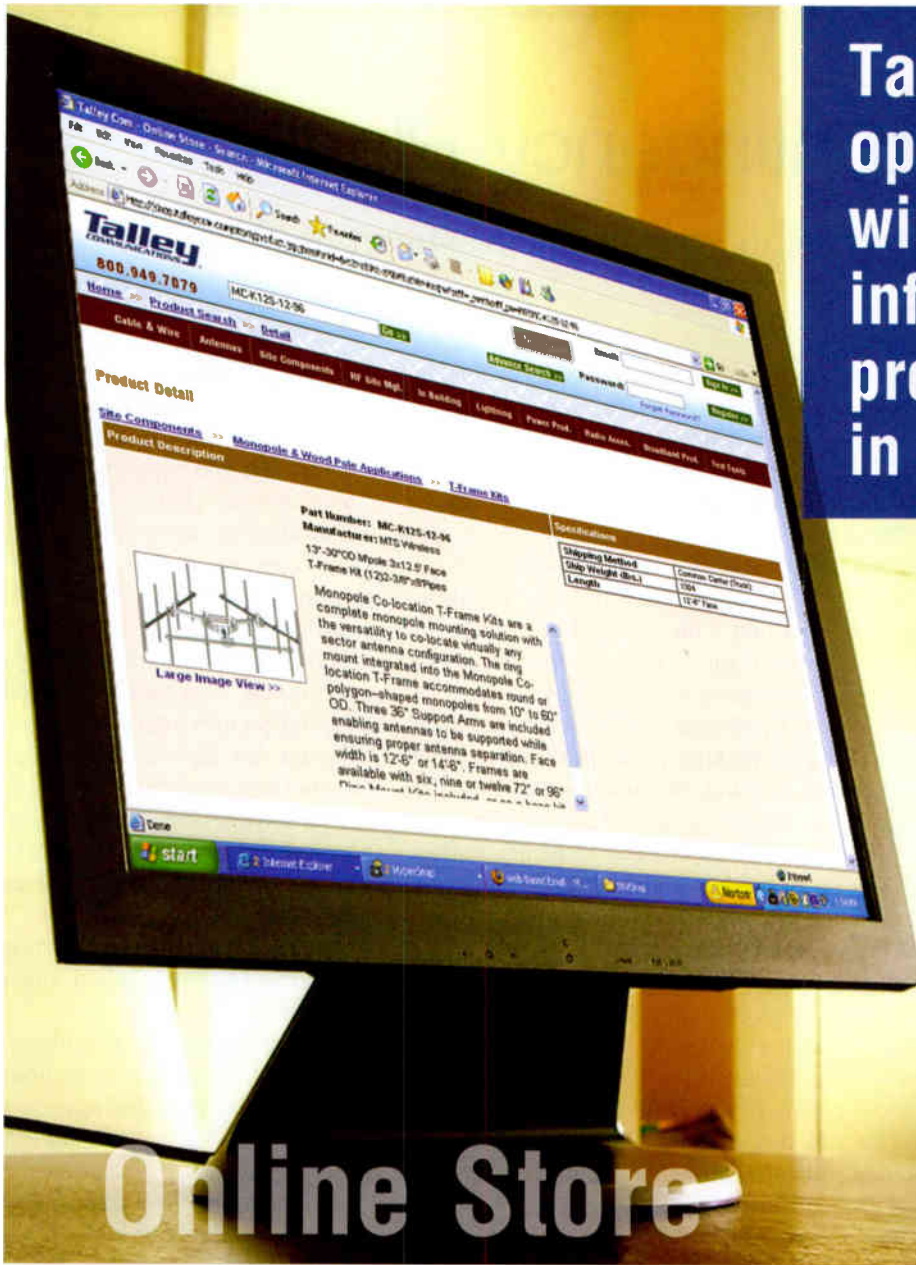
Thanks for reading!

**agl**

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

www.agl-mag.com

Talley just opened a wireless infrastructure products store in your office.



Online Store

**Talley**  
COMMUNICATIONS

You connect the world.  
We make it easy.™

**800.949.7079**

sales@talleycom.com  
www.talleycom.com

Talley's Online Store comes to you: [www.talleycom.com](http://www.talleycom.com).

Experience Talley's extensive inventory of wireless infrastructure products and trademark customer service right from your PC. Everything Talley sells is at your fingertips. Search for and research products with detailed specs for comparison. Maintain favorites worksheets, view invoices and place orders in minutes. Of course, your friendly Talley wireless expert is always just a phone call away to help you with all your product questions and orders. Now you get the best of Talley both live and online.



*A family-owned business*



**WIRELESS**

Infrastructure ▶ Communications ▶ Mobile products.

Los Angeles

Kansas City

Phoenix

Sacramento

Seattle

# Business-contingency Plans

The smallest things can derail your business—*microbially* small.

by David Saul, AAI

For several months, avian flu was in the news almost daily. On Oct. 22, 2006, a statement at [www.kentucky.com](http://www.kentucky.com) said “media attention drops, but avian flu threat spreads.” Avian flu, caused by the



H5N1 virus, has experts concerned because the virus has completed two of the three steps needed for a pandemic: Infection has spread from wild birds to other species, including poultry raised for food, and to humans; and it is a

deadly strain to which humans lack immunity. The missing step for a pandemic to begin is for the virus to become communicable from person to person as easily as normal influenza, such as through coughing and sneezing.

According to the World Health Organization (WHO), past influenza pandemics have led to high levels of illness, death, social disruption and economic loss. Today, our world is vastly more populated, and worldwide travel is commonplace, so the effect of a pandemic could be substantial.

Predicting the size of the threat is difficult. According to U.S. Health & Human Services Secretary Michael O. Leavitt, without the widespread availability of an avian-flu vaccine, the disease has the potential to kill up to as many as 1.7 million people in the United States and as many as 7.4 million people worldwide. Estimates of the economic effect range from \$71.3 to \$166.5 billion. Experts advise these are only *estimates*—much depends on how severe the virus would be, how rapidly it would spread, and the effectiveness of pandemic prevention and response efforts worldwide.

*What can businesses do to prepare for a disaster?* — According to the U.S. Small Business Administration (SBA), companies often get cracking on a business recovery plan *after* a disaster strikes—when it’s too late. Secretary Leavitt stressed that although the threat of a pandemic looms, planning shouldn’t be specific to H5N1, but rather on the need for business-contingency planning in general.

Every area in the country is subject to some kind of natural disaster, such as a flood, hurricane or earthquake. Even man-made disasters, such as oil spills, bio-terrorism incidents or fires, can be devastating. Preparation *today* helps you plan for your business’s survival *tomorrow*.

*What can businesses do to prepare for an influenza pandemic?* — The first step is to create or update a business-continuity plan. It must address a range of issues that includes planning for disasters, such as an influenza pandemic, and it must be integrated into business processes. When planning specifically for a pandemic, your business needs are unique, so you’ll need to conduct a risk-management assessment on your own operations to ensure business continuity.

Here is a sampling of things to review and to consider:

- To minimize business disruptions, review how you work with employees, customers, consumers, contractors and media.
- Do you have the infrastructure you need to run your operations with as much as 40 percent of your staff out ill or caring for sick family members?
- Consider building up inventories in case foreign or domestic suppliers and transport services are interrupted.
- Consider your supply chains. Source backups for suppliers, essential work functions or both.

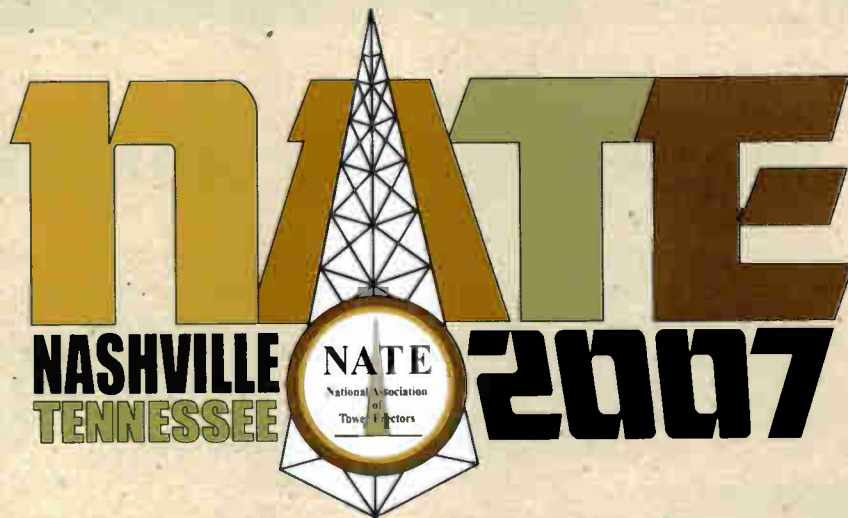
- Keeping people apart to limit the disease’s spread will be crucial. Consider supplying employees with the equipment and support they need to telecommute, if their jobs allow.
- Consider expanding your online business opportunities.
- Promote awareness of the problems associated with pandemic flu: Alert employees about what steps you’re taking and what they can do to limit the pandemic’s effect.
- Review sick-leave and pay policies to ensure they don’t discourage workers from staying home when they’re ill.
- Make backup plans if you need to pull people out of countries where an epidemic strikes.
- Develop a travel policy that restricts any travel to areas where the virus is active.
- Stock up on masks and sanitizers, and consider staggering work hours to limit the size of gatherings.

## Planning ahead

Regardless of your company’s size, business-continuity planning is a must. According to the Insurance Information Institute, the survival rate for businesses without a plan, following a disaster, range from 5 percent for small businesses to about 30 percent for large ones. A business-continuity plan’s success lies in the ability to accurately review your capabilities and to identify potential hazards. Once your true exposures are known, your insurance agent can help you to develop or update your plan accordingly. Contact me to learn more about the resources we have available for you. **agl**

David Saul is vice president of Atlantic Risk Management, Columbia, MD, and an accredited advisor in insurance (AAI). His email address is: [dsaul@atlanticrisk.com](mailto:dsaul@atlanticrisk.com).

**Make  
your  
plans  
today!**



The Annual NATE Conference & Exposition is widely regarded as the most comprehensive and up-to-date event in the broadcast and telecommunications tower erection, service and maintenance industry.

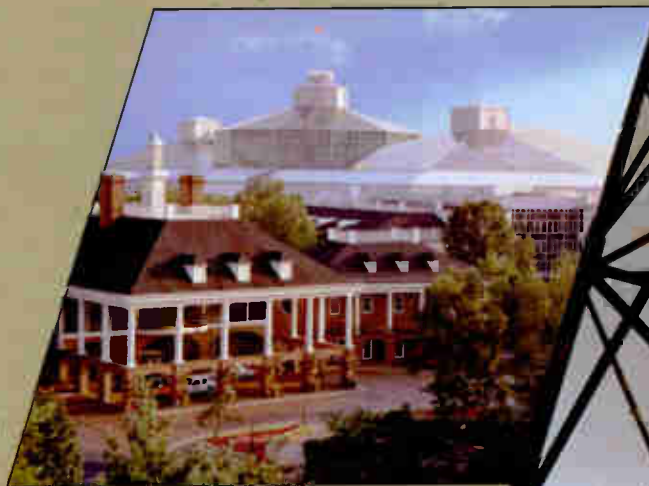
12<sup>th</sup> Annual Conference & Exposition

**February 12-15, 2007**

*Gaylord Opryland Resort  
& Convention Center*

*Nashville, Tennessee*

[www.natehome.com/AnnualEvents/](http://www.natehome.com/AnnualEvents/)



***Safety  
First...  
Safety  
Always!***

***Are you doing  
your part?***

## **National Association of Tower Erectors**

8 Second Street SE

Watertown, South Dakota 57201

Tel: 605-882-5865 or 888-882-5865

Fax: 605-886-5184

Email: [nate@natehome.com](mailto:nate@natehome.com)

[www.natehome.com](http://www.natehome.com)

# Copper Kleptos and Orange Warblers

Why is this column called “The Noise Factor”? After more than two years of shepherding AGL’s editorial space, I decided we need a periodic soapbox for times when our industry *should* make some noise, our readers *do* make some noise—or all I *hear* is noise. Accordingly:



Metal markets and tower lighting might seem unrelated, but life is full of scant “degrees of separation.” These two issues affecting the tower industry have a peculiar common denominator: China. In one case, it’s what is going *into* China; in the other, it’s what is coming *out*.

## The ‘inbound’ Chinese connection

Our readers tell us they are alarmed about copper-component thefts from their tower sites. Grounding-system straps and bars, air-conditioner tubing and the odd reel of coax are vanishing over the fence. It’s not just at antenna sites.

Copper theft, driven by a booming salvage/recycling market and thieves’ usual lack of scruples, has risen to

---

by **D. A. Keckler, Managing Editor**  
dkeckler@agl-mag.com

epidemic proportions worldwide. Besides communications sites, victims include power transmission-and-distribution infrastructure, transportation systems, construction sites and your local grade schools (for their guttering and downspouts.)

The adage “If its not nailed down ...” doesn’t apply anymore, either. Thieves are vandalizing *active* grounding systems, *live* power grids and *operational* transport systems to get at the much-sought metal. In May, 400,000 Nevada AT&T customers’ phones went silent when 1,000 feet of rural cable were cut out of a line. Italy suspended rail service in mid-November when thieves ripped up copper wires connecting signaling and safety devices.

Why all this freebootery? Infrastructure materials demand from China has driven world copper prices well past the \$3.50/lb. mark; most salvage yards have a user-friendly “don’t ask, don’t tell” policy; and then there’s—initiative.

If you think metal pilferers are “too lazy to *work* for a living,” you’re wrong. Stupid, yes; lazy, no. There is a lot of plenum-crawling, structure-climbing and risk-taking activity. Organized “rings” to fence copper are sprouting like—cellsites. Costs to site owners can reach thousands of dollars.

The scope and consequences of copper theft aren’t limited to property loss. There are safety issues if grounding

systems are rendered ineffective, tower lights go dark or damaged transformers leak biohazardous PCBs. When liability for worker safety is mixed up with joint-use agreements, it can be a legal nightmare. In one case, copper thieves cut out parts of a power line’s neutral and ground wires, thereby energizing the remaining ground wire. When a telecom worker came along later to service equipment collocated on the pole, he contacted that “ground,” became part of the path—and was killed.

It may lessen. In November, Merrill Lynch predicted a 30 percent falloff in copper prices in 2007, owing to diminished demand and broader availability of substitute components, such as aluminum coax. So, you may be able to just keep filing insurance reports and wait it out. Meanwhile, remote sites need security anyway, so this might be the time to install those postponed motion sensors or surveillance cams and link them to your NOC. Post a notice that you *will* prosecute—and do it.

Any law-enforcement success is going to be localized. Federal effort (read, “Fidelity, Bravery, Integrity”) to combat copper theft is notable by its absence. That is what happens when too much time and money is spent on “homeland security” mandates and not enough on good-old-fashioned “coppers and robbers” (ouch). The states’ attorneys general don’t seem to

*The Leader in Microwave  
Antenna Innovation®*

The logo for Radio Waves, featuring a stylized red and white wave graphic above the text "RADIO WAVES" in a bold, sans-serif font.

**RADIO WAVES**

[www.radiowavesinc.com](http://www.radiowavesinc.com)

978-459-8800

World Radio History



be on top of this, either. The only significant efforts are by metropolitan police agencies, so swamped by copper-thefts that they're forming multi-jurisdictional task forces to profile thieves and stake out the salvage yards.

Combatting copper theft is a cause regional/state wireless associations can use to network with local contractors, utilities, elected officials and law enforcement. They can underwrite rewards (as some major telecom carriers have done). They can propose (or endorse already-proposed) local ordinances requiring salvage and recycling operators to keep transaction/customer records and to require proof of identity.

#### The 'outbound' Chinese connection

As noted in our news section, the FCC resuscitated its NPRM on migratory bird collisions with towers, with more-specific proposals relating to lamp types and a possible decision on accepting NEPA responsibility to enforce the

Migratory Bird Treaty Act (a law to stop poaching kills 100 years ago that some would extend to stationary objects a bird might fly into). The Commission also wants technology comments on any Rube Goldberg device—visual, sonic or smelly—that would make birds steer clear of a tower. Filing of public comments closes soon: Jan. 22.

Download and read this NPRM. Read the comments on the FCC's website as they are posted (WT Docket 03-187) and acquaint yourself with the technical ignorance of well-intentioned bird lovers. File comments of your own; don't make the trade associations carry all the water on this one. If you're a site owner, developer, manager, engineer or attorney, tell the FCC what you know about the business and operations ramifications. Otherwise, the FCC will have 300 form letters from ornithological ditto-heads on which to base rules.

Now, a tongue-firmly-in-cheek observation: While the FAA and FCC scramble

to protect migratory birds, the USDA and the Center for Disease Control are monitoring them too—to possibly keep them out of the country. Why? Because they're one of the likeliest vectors of *avian flu* (see the preceding column) from the Orient, particularly from—China.

I'm *not* saying if towers *do* kill a disproportionate percentage of migratory birds (compared to tall buildings, cars and USDA death squads) that it's good for public health and capitalism; just that government seems at cross purposes—again.

I'm also not saying that all migratory birds pose a livestock—or human—health risk. *That* would be a stupid and careless exaggeration—like saying all cellular towers threaten wildlife. **agl**



### Path Align-R™ Models 2200, 2201 2240, 2241

Antenna Path-Alignment made simple

The *Path Align-R™* is a high performance, affordable and complete test solution designed to quickly and accurately optimize the transmission path between microwave antenna sites...all in a matter of minutes!



Each *Path Align-R™* (set of two) contains 4 bands (to 23.5 GHz) and is both a synthesized source, that directly drives the site's antennas, and a narrow-band receiver. The instruments provide continuous 2-way voice communication between antennas!

Models 2201/2241 contain an internal data logger, with GPS receiver, which records frequency, path-loss in dB, and GPS position/date/time from a single button push.

The *Path Align-R™* is battery powered (4-5 hrs operation / 3 hrs recharge), and weighs 7 lbs, including the Instrument Back-pack.

Pendulum Instruments, Inc.  
(Incorporating XL Microwave)

510-428-9488 sales@pendulum-instruments.com



When it comes to  
RF compliance,  
the **big dog**  
has something  
to say.  
**LBA**



Lawrence Behr Associates, Inc.

For over 40 years, wireless operators large and small have called upon **LBA** to resolve their evolving RF compliance challenges... nationwide.

Using the most experienced professional team in the industry, **LBA** provides you cost effective AM detuning and pattern protection solutions, FCC/NEPA RF safety surveys, intermodulation studies, RF interference remediation, and innovative AM tower -wireless antenna collocation.

Call the **LBA** RF experts at **800-522-4464** for an on-time, in-budget response to your system needs!

252.757.0279 • www.LBAGroup.com • 3400 Tupper Drive • Greenville, NC 27835

**BASE  
STATION  
ANTENNAS  
'EVOLUTION OF  
INTEGRATION'**

**The ubiquitous wireless network base-station antenna takes the next step in its evolution—one that sees the ‘antenna’ become an ‘antenna system,’ with integrated functionality that transforms it beyond its passive roots.**

|||| by **Chuck Powell**

Leveraging the advantage of fiber-optic cabling, the remote radio head (RRH) solution permits BTS-to-antenna distances as great as 10 miles, thus allowing BTS to be located in more easily acquired sites.



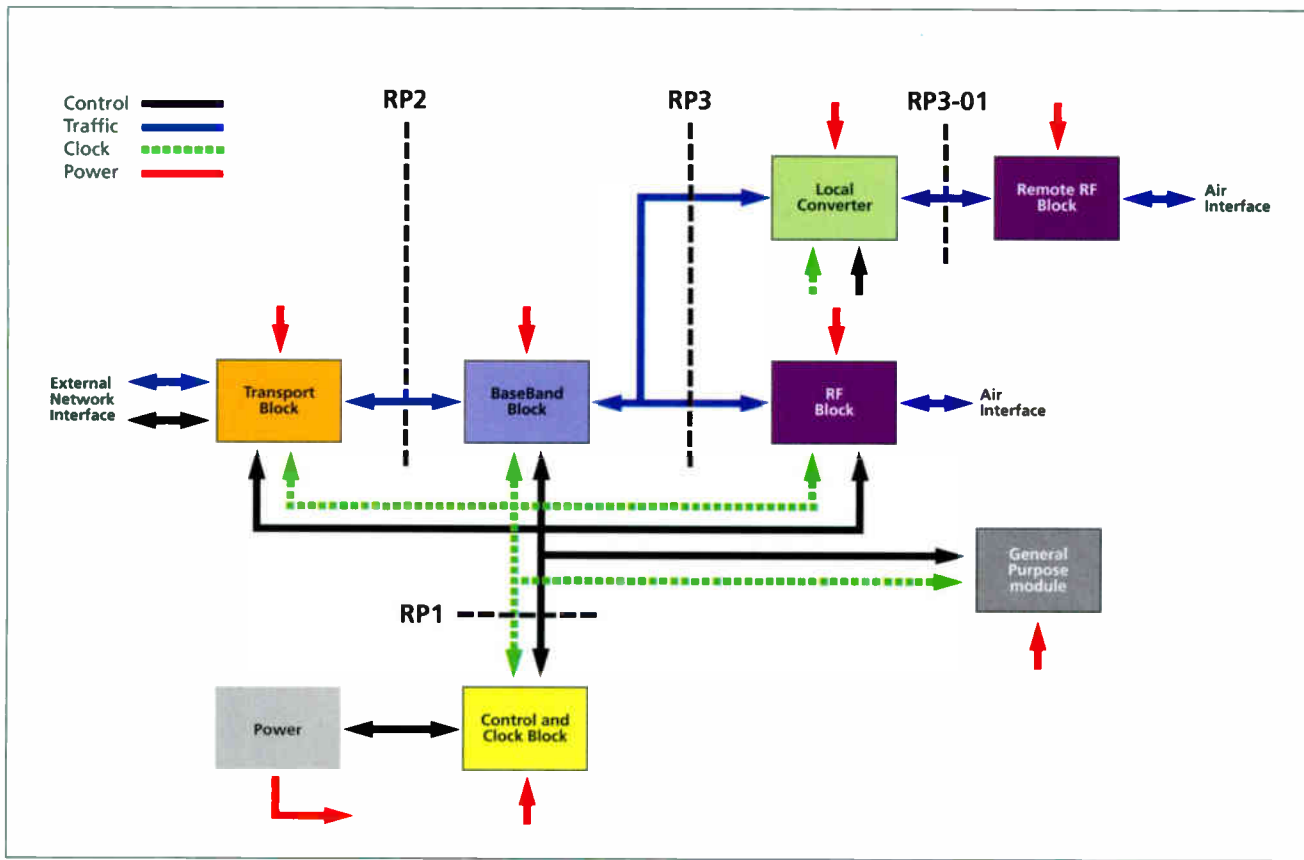


Figure 1. The OBSAI base-station architecture model.

**N**ext to the mobile handset, the wireless network base-station antenna is probably the most visible evidence of the ubiquitous growth of mobile communications. The sheer number of base-station sites found in cities, towns and rural centers around the globe testifies to the increasingly wireless nature of modern communications. Yet, in many respects, the base-station antenna itself—essentially a passive element for transmitting and receiving RF—has changed little over the past few years.

“In effect, we have reached the limits of the laws of physics for the passive element itself,” explained Patrick Nobileau, vice president of Strategic Marketing and Alliances with wireless technology group Radio Frequency Systems (RFS). “But this doesn’t mean development has stalled—quite the contrary. What we are seeing now is entirely new functionality being

integrated into the base-station antenna, so that the antenna—the core passive element—is evolving into a very powerful ‘antenna system.’”

This integration of active and intelligent elements with passive elements has spawned the development of a range of important next-generation antenna systems. These include compact cluster assemblies combining multi-band passive and active RF elements, a wide range of so-called ‘smart’ antennas, the much lauded multiple-input/multiple-output (MIMO) solutions and even fiber-to-the-tower-top antenna systems, or remote radio head (RRH).

**Integration drivers**

The drivers behind the push to the next stage in base-station antenna evolution are entirely market-related and primarily target wringing more capacity and coverage from existing base-station infrastructure. Commercial pressures—particularly in the more mature wireless markets—are top of the

list, said Tero Mustala, director of Industry Cooperation in the Strategy & Technology Division of Nokia, a wireless sector original equipment manufacturer (OEM). Mustala also chairs the Open Base Station Architecture Initiative (OBSAI) industry group.

“There is great cost pressure on everybody. The whole industry is seeking ways to be more cost competitive. Carriers are heavily looking at operational costs but also demanding increasing efficiency in investments,” Mustala said. “From an OEM point of view, standardization of the basic building blocks of base-station architecture is a clear and important way of addressing this situation, as it helps reduce the R&D costs.” This, he pointed out, is a core objective of the OBSAI group, with the base-station antenna being incorporated within this standardization.

From this cost-reduction perspective, there is a general push from the carriers to achieve “more from what they have,” particularly with respect to

base-station sites and spectrum. This optimization push is made all the more challenging by the ever-increasing need for more capacity from existing network infrastructure.

“First, the total number of subscribers in almost all parts of the world is still growing,” Nobileau said. “But there is also a shift from voice traffic to data services. Wireless data, by its very nature, is dramatically increasing the bits per second throughput demand on wireless networks.”

In addition to this increase in capacity demand, the move from voice to data has created a noticeable change in the specific nature of the mobile traffic being supported.

“Voice is essentially statistically predictable in terms of throughput demand,” explained André Doll, RFS chief technology officer, Wireless Infrastructure Solutions. “High-speed wireless data, by contrast, creates unpredictable peak demands.” These peaks can lead to base transmitter station (BTS) saturation, if not adequately accommodated.

“It is a double-edged sword for today’s carrier,” Doll said. “This data-driven peak traffic represents revenue, but is also the source of an unpredictable capacity demand and network pressure. They [the carriers] need to find ‘tricks’ to optimize the use of their existing sites and spectrum.” The new generation of base-station antenna systems with integrated functionality is a vital part of such optimization solutions.

#### Changes in technology and attitudes

Three distinct developments—two technical, one attitudinal—have paved the way for new antenna system functionality. The first is the long-awaited development of reliable, high-performance and compact outdoor electronics.

The second is the dramatic reduction of the cost of data-processing power that enables increasingly elaborate signal-processing algorithms. The third is a wave of cooperation across the industry that is permitting BTS interface standardization, both at the macro and elemental levels.

The improvement in performance of outdoor electronics over the past few years—most particularly component reliability—has caused a noticeable shift in the attitude of carriers toward *active tower tops*.

“Carriers plan very carefully what they build in the tower structure. They look very closely at the reliability of products when they are mounted on the tower,” Mustala pointed out. “Historically, they have been very apprehensive about building active electronics at the tower top, because they know that if there is maintenance needed, it will be costly.”

Key in this area has been the improvement achieved in power-amplifier (PA) efficiencies, which have permitted new levels of miniaturization and reliability. The power amplifier is central to tower-top active technologies, including tower-mount boosters (TMBs) and the RRH. “Five years ago, a multi-carrier power amplifier (MCPA) had an efficiency of between 8 and 10 percent,” said Doll. “As a result, a booster offering 20 W RF output power would have required around 400 W of power dissipation, considering the additional loss of the passive elements of the booster.” The inherent heat generated within such devices would have demanded oversized casings, external cooling and made the mean time between failures (MTBF) unacceptably low.

Improvements in design efficiencies

and electronics have resulted in PAs with efficiencies between 15 and 25 percent. “This means you can divide the power dissipation by three,” said Doll, “which means one-third the quantity of silicon, roughly one-third the unit size and more than three times the reliability.”

**High-speed wireless data, by contrast, creates unpredictable peak demands. These peaks can lead to base transmitter station (BTS) saturation, if not adequately accommodated.**

This has permitted the development of compact tower-top active equipment offering extremely high levels of reliability. It has also permitted the development of all-in-one antenna



**Advances in base-station antenna and RF-conditioning technologies have permitted the development of ‘all-in-one’ antenna assemblies, featuring passive and active components all within a single radome.**



**Advanced 'cluster'-antenna assemblies accommodate the active and passive RF elements required for a complete tri-sector tower top, in a low-profile and visually low-impact package.**

assemblies—antennas with built-in RF amplification and filtering, plus electrical tilt and azimuth-beam control systems, all within a single radome. This, in turn, has inspired the development of advanced “cluster” antenna assemblies, accommodating the active and

passive RF elements required for a complete tri-sector tower top, in a low-profile and visually low-impact package. This represents a powerful shift in attitude across the wireless industry. Inaugurated in 2002, OBSAI set out to establish a more open base-station market, based on pre-determined standard modules and interfaces.

Today, Nokia and nearly 130 other OEMs, carriers and technology suppliers to the wireless industry form the membership of this important industry group. Its company members have produced and made available a complete set of open interface and module hardware connectivity specifications addressing the four key base-station subsystems: transport, control and clock, baseband and RF/radio (see Figure 1 on page 20).

multiple bands at the tower top.

“Quality base-station sites the world over are increasingly difficult to secure, so the need to concurrently support multiple bands and multiple services from a single site is great. This is particularly so with the advent of 3.5-generation (3.5G) technologies such as WiMAX,” said Nobileau. “Multi-band active and passive RF antenna systems have truly relieved this situation.”

#### **Industry cooperation and the RRH**

Streamlining and simplifying such site overlays is one aspect that drives the OBSAI industry group. The development of pan-industry groups such as OBSAI—which are

Importantly, the model defines not only the modules, but also the interfaces between these modules. The model is also “technology-neutral” and aims to be equally applicable to the entire spectrum of wireless platforms, including CDMA 2000, GSM, W-CDMA and WiMAX.

In the simplest of terms, such a cooperative venture base-station model helps cut the R&D development time and effort for all players involved in base-station deployment and upgrade. This, according to Mustala, is particularly important for the active base-station component chip-set developers.

“R&D investment at the silicon interface can be sizeable. If a vendor doesn’t see enough prospective sales volume for a chip set, it is hard to justify the R&D. As a result, one of the great successes of the OBSAI has been to bring in and assist the silicon companies,” Mustala said.

Significantly, the OBSAI-inspired spirit of cooperation is behind one of the great recent successes in the realm of antenna functionality integration—a remote radio head. This RRH is the result of a joint-development initiative between four OBSAI members: RFS, programmable silicon solutions provider Altera, broadband communications and storage semiconductor provider PMC-Sierra, and measurement company Agilent Technologies.

Working strictly to the defined OBSAI model, the new RRH provides “3 Gbps plus” fiber-optic cable connectivity between the base station and the tower top by relocating a portion of the “RF block” module from the base station to the tower top. This permits BTS-to-antenna separation distances as great as 10 miles and allows the BTS to be located in more easily acquired sites, remote from the mast and radio head/antenna assembly.

In addition, the RRH fiber-optic link offers ongoing opex savings, courtesy of the almost loss-free “BTS-to-tower-top” fiber link.

The new unit’s “3 Gbps plus” total throughput capacity ensures that the RRH is well-placed to support powerful RRH networking topologies, such as

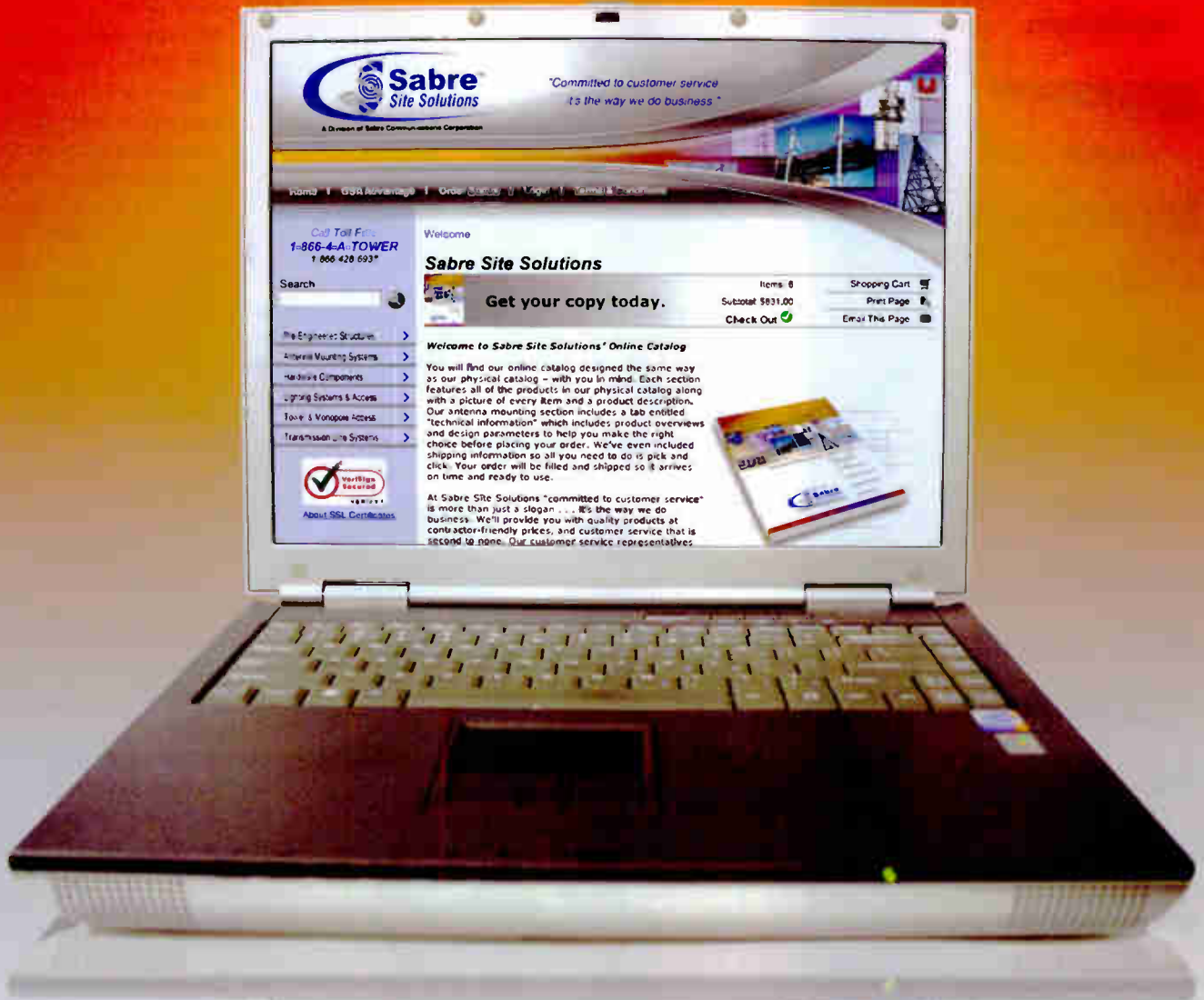
## **Quality base-station sites are increasingly difficult to secure; the need to concurrently support multiple bands and services from a single site is great.**

passive RF elements required for a complete tri-sector tower top, in a low-profile and visually low-impact package.

The general improvement in the performance and packaging size of active tower-top components, coupled with compact multi-band and broadband antennas, has facilitated the support of

# Shop. Click. Ship.

Order and pay for your tower parts online.



[www.sabresitesolutions.com](http://www.sabresitesolutions.com)



A Division of Sabre Communications Corporation

# WINDTOWER

Like the real estate your tower sits on, it's a matter of location. For a county-by-county listing of minimum basic wind speeds, see Standard TIA-222. [www.tiaonline.org](http://www.tiaonline.org)

24 above ground level

## top of the tower



Highly compact multi-band RF conditioning solutions—such as this dual TMA—are revolutionizing the tower-top and streamlining roll-outs.



Adaptive, 'semi-smart' and 'smart' antenna solutions—such as this WiMAX adaptive antenna—leverage the data-processing power resident in the BTS to realize optimized beam patterns that maximize subscriber throughput and minimize interference.

“daisy chain,” “ring” and “tree-and-branch.” Mustala said the OBSAI model was a vital element in allowing this particular development—and others like it—to proceed to completion.

“The OBSAI specifically devised the interface standard needed to support the RRH,” Mustala said. “We initially had one version of the baseband-to-radio module interface for the classical construction—our RP3 interface. Then, two years ago, we devised what we called the RP3-01 interface, which made allowance for a remote tower-top-mounted RF block, with all the data and controls identified through an optical interface. This was specifically with the RRH solution in mind.”

### Getting smarter

The third—and potentially the most important—base-station antenna technical advancement is one that is actually far removed from the antenna itself—the improvement in data-processing power and costs.

“We are seeing data processing at the ‘back end’ of the base station being used to provide extremely powerful solutions—simply with the existing antennas that the carrier has in place—all courtesy of low-cost processing power,” Nobileau explained. This, he pointed out, is what is behind the new wave of MIMO antennas and smart antennas.

“Today, every carrier has its own site for its own system. In the future, we can foresee a situation where these antennas are

[www.agl-mag.com](http://www.agl-mag.com)



'mutualized' among the carriers. By using data-processing power, multiple carriers could obtain optimal performance from a select shared antenna group," Nobileau said. MIMO, he pointed out, is an example of such reuse of multiple signals received by multiple antennas on a site. Multiple inputs and outputs are "regrouped"—via software—to contribute to one optimal signal. The essential element of such systems will always be the complex signal-processing algorithms at the antenna system "back end."

Similar is the so-called "smart antenna." Founded on back-end signal-processing algorithms equally elaborate as MIMO, these emerging solutions optimize beam patterns from one antenna, or a group of antennas, on a real-time basis to maximize subscriber throughput and minimize interference.

A core driver of these more advanced, software-powered antenna solutions is WiMAX—a platform that will

exhibit entirely unique coverage requirements and equally unique carrier profiles, Doll said.

"With WiMAX, carriers will seek 'hot-spot' rather than national coverage," Doll said. "You are really trying to optimize where the people are going to use the service. Similarly, WiMAX carriers may not be traditional mobile phone carriers. From this perspective, they will not have the luxury of leveraging an existing suite of sites."

These unique differentiators make WiMAX deployment an entirely different challenge in the wireless world, and set new demands in RF optimization. Almost certainly, there will be specific needs for RF boosters, RRHs and "smart" or MIMO solutions at many sites. Further cooperation and joint venturing will also be a must—and this collaboration is something for which the OBSAI group is ready. The most recent addition to its model is the WiMAX-specific detail. The group is

now looking to the future, where the next logical amendment to the model would be one supporting the 3GPP long-term evolution (LTE) platform.

Emerging broadband wireless platforms, such as HSPA, WiMAX and LTE, will almost certainly spawn currently unthought-of levels of antenna system functionality and integration.

"My belief is that MIMO may actually compete with entirely new antenna standardizations, due to the emerging needs of such 3.5G technologies," Nobileau said.

The antenna "system" is now clearly a reality, and in some respects, the stand-alone "passive antenna" is fast becoming a thing of the past, supplanted by the relentless demands of the wireless broadband world. **agl**

Powell is an antenna design engineer for Radio Frequency Systems (RFS). He has a BS in Electrical Engineering and an MS in Engineering Management.

**YOU WON'T FIND THIS KIND OF FINANCING PROGRAM AT YOUR BANK**

Wireless Capital's new tower lending program is tailored specifically to meet the financial needs of the tower industry.


Whether you own one or several hundred towers, you will find these features and lending criteria attractive:

- ◆ Non-recourse (no personal guaranty)
- ◆ Advances up to 8 times cash flow
- ◆ Up to 15-year amortizations including interest-only period
- ◆ Minimal covenants
- ◆ Flexible structures

Call our Loan Officers today to find out how your company can benefit from the latest innovation from Wireless Capital.

Toll-free 866-432-2274 (nationwide), or  
310-593-2840 (Los Angeles office);  
212-297-6251 (New York office)  
Email: towerloan@wirelesscapital.com

**WCP**  
Wireless Capital Partners, LLC | LOS ANGELES | NEW YORK  
Tower Lending Group  
© 2006 Wireless Capital Partners, LLC



## AM Coordination Services

### One Stop Solution for AM Compliance:

- Free instructional training
- Free initial AM screening
- Station notifications and coordination
- Pre- and Post-construction field strength measurements
- Detuning skirt manufacturing
- Repair of any manufacturers Detune system



Experience-Responsiveness-Quality-Price

304-229-6307

[www.amcoordination.com](http://www.amcoordination.com)

Challenges in AM detuning of cellular towers include varying distance calculations, correspondence with affected broadcasters and federal regulation. Proper measurements *before* construction will save you from a world of headaches.

# DETUNING: A NON-STANDARD AND SITUATIONAL DISCIPLINE

— by Richard P. Biby, P.E.

**D**escribing the minutiae of detuning cellular towers to prevent them from disturbing the signals of nearby broadcasters (affecting AM radiation patterns) can be a dry subject—if you let it be. So, in this case, it’s good to be the king. The nice thing about being the publisher of this magazine is that I can occasionally pull rank and get away with writing informal articles, like this one.

We received many responses and inquiries about my previous article on AM detuning (AGL, October 2006). I’ll try to answer questions raised by readers in this and subsequent articles. Most questions group around three particular topics: the distance requirement for action; “waiver letters” from the AM station; and the FCC Enforcement Bureau’s ability to understand and evaluate detuning issues.

## Equal confusion under the law

First, a quick review: Depending on which section of the FCC’s rules a licensee operates under, different rules or policies apply. This is a long-standing

concern (read, “peeve”) of mine and of many other engineers and technicians who deal with compliance within the industry.

Why should a PCS carrier be any different from a cellular carrier, from the perspective of disturbance to an AM station? From a structural standpoint, they are absolutely the same. However, the cellular folks licensed under Part 22 have a specific rule that dictates what measurements must be made and, unfortunately, specifies the more-stringent measurement procedure documented in the Part 73 broadcast rules [47 CFR 73.154(a).]

To make things worse, some licensees have a rule governing their compliance with AM-pattern protection. Why? There is no good reason, actually. For example, public-safety licensees have no obligation to protect AM stations, although they might build new towers that could cause even more disturbance to an AM station than a cellular operator.

(Suggested action: The *appropriate* place for an AM pattern-protection rule is in either Part 1 or Part 2 of the rules, where it would apply equally to *all*

licensees, not just some. Placing it in an early section is more sensible for a measurement procedure for *all* licensees.)

## Action thresholds

What is the distance threshold (nearness) for a licensee constructing or modifying a tower in the vicinity of an AM pattern that requires action? It is either 1 km (0.6 miles), for non-directional stations, or 3 km (1.9 miles) for directional AM stations—unless it is 3.2 km, instead.

Huh? Why are there two different thresholds, 3.0 km or 3.2 km?

Split personality is the simple reason. The FCC speaks with two different voices in this case. The FCC has separate and distinct bureaus to deal with regulation and control of different industry sectors within the telecommunications industry.

The Media Bureau deals with the mass media, such as cable systems, TV, direct-broadcast satellite and radio (AM and FM). In the conversion within federal agencies from English to metric measurement standards, different

bureaus converted with different standards. When the 2.0- to 10.0-mile-measurement standards are properly converted to metric, the distances would be 3.2 km to 16.1 km. However, some bureaus rounded those numbers to read “3.0 to 16.0 km.” The broadcast folks use 3.0 km, while others of us (say, those of us who know how to multiply) in the non-broadcast side of the house use the 3.2 km figure.

For the Part 22 licensees, the Media Bureau (or Mass Media Bureau, as it was called prior to 2002) had a heavy hand in having the rule adopted. Meanwhile, the Part 24 (Personal Communications Services) licensees only have a public notice to require their compliance, and use the 3.2 km standard.

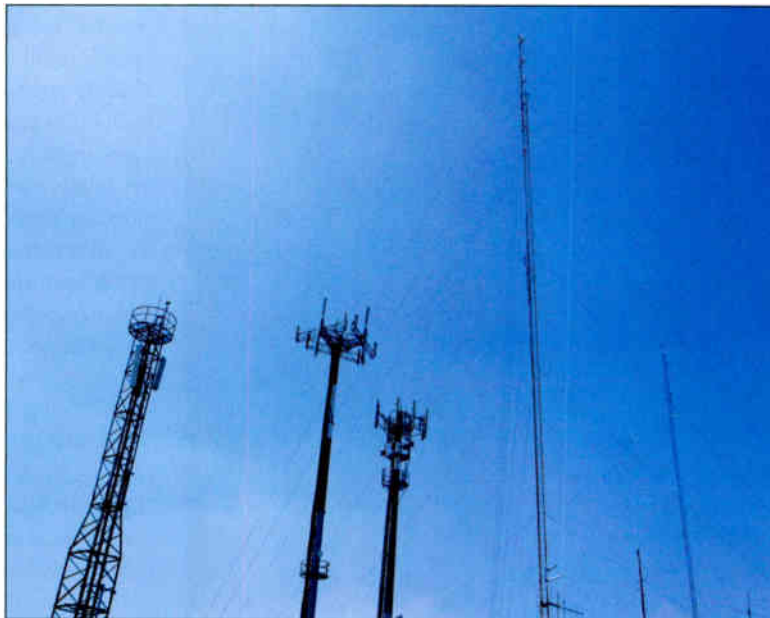
“OK, Rich,” you say, “This is fun, but what should I *do*?” Well, I’ve made my living at being technically conservative and trying not to give lawyers too much unnecessary money. I would recommend that all licensees employ the 3.2 km distance threshold for directional stations. You might end up doing work, in some particular instance, that is not absolutely necessary, but no one can *argue* with you. Unfortunately it is almost impossible to turn back the hands of time with any construction. If you don’t capture the radio-frequency environment *before* the construction, you will never be able to conclusively prove whether your construction or modification has a negative or a non-significant effect on an AM station.

Some consultants recommend protecting AM stations that are even further away than 3.2 km. Why? While everyone can agree that 3.2 km is the maximum distance to which a station should be protected by FCC standards, there is a solid engineering reason why construction could have a significant effect

beyond 3.2 km. There is also some case history where construction has resulted in civil litigation. The risk is small; however, given the litigious nature of our society, we all appreciate due caution represented by the acronym “CYA.” There are some rare instances where significant negative effects can be predicted; however, I would consider them to be rare. Don’t be surprised to see recommendations for action where AM stations are further away than 3.2 km; however, it will be an exceptional situation where action is really necessary or appropriate.

#### Waiver letters

Most of us (consultants) believe that a written concurrence from the AM station in question can eliminate the need for field measurements—even when the rules (or public notice) specifically state that *at least some* measurements shall be



made. While I routinely recommend this, the industry has loosened its position on this in recent years. If you can get actual written concurrence from the AM station, then most carriers (even their legal divisions) appear to be comfortable that field measurements can be skipped. However, written concurrence is becoming increasingly rare.

For minor changes or modifications on the tower, standard industry practice now is to send the AM station a letter that the change is about to occur and to

state that no measurements will be taken. For simple changes, (e.g., changes in antennas, replacement of transmission lines and some other modifications—especially when the height of the tower does not change and other physical characteristics of the tower remain unmodified) the possibility for significant disturbance of AM patterns is negligible. So while the rules say we need to “do” something, as a practical matter, every reasonable engineer (cellular and broadcast) knows that measurements only place unnecessary burdens on the AM stations and on the service provider.

#### Compliance and the FCC

The old “Compliance and Information Bureau” had a much friendlier title before becoming the more stern-sounding “Enforcement Bureau” back in 1999. Regardless of what their business cards say,

I’ve not been overly impressed with reports of the technical knowledge base among some—not all—of the folks in the field doing inspections. Admittedly, these poor folks have a job that requires them to deal with a lot of technologies and to know a little bit about *all* things wireless. (I know *I* would love the job, but we also know I’m not “normal”).

Enforcement action should be thought of in three distinct areas or disciplines: in the field, at the Commission and

in the courtroom. One action can often lead to another, and the one you think you want is not necessarily the best one for you.

*Field inspectors* — Field-enforcement folks are typically from a local field office, and they investigate just about any kind of complaint. They supposedly run around “just checking” on things to make sure we’re all compliant with the rules. Nevertheless, I’ve found that field personnel often don’t have the background to understand a lot of the technical issues

with problems that arise. They often seem to gather some information and refer things “to Washington.”

*Commission staff*—As a general rule, I’m usually happiest when the staff at the Portals gets involved. Washington (and by extension, the Gettysburg, PA, office) folks usually know pretty well what the real deal is. They often can take necessary and appropriate actions to solve issues or enable the right thing to be done by applying a little pressure in the right places. However, regarding AM detuning

issues and many of the subtleties of AM facilities, few members of the FCC staff have both the in-the-field experience and the theoretical knowledge to really understand the issues. Few are able to make helpful suggestions to defuse a situation or to take a concrete position supporting one side or the other in a dispute.

Nevertheless, some really excellent folks who have the appropriate background remain. A few were even AM-detuning consultants themselves. They can and will help with difficult

situations. You should always feel comfortable calling the FCC staff and asking for help. Pose your problem as a hypothetical, if you think you might have made a “boo-boo” (or you’re just suspicious of bureaucrats). Otherwise, feel free to share the details, particularly when you are comfortable that you are in the “clear” regarding liability.

*Meanwhile, in the “People’s Court”*—So many comments have been written about attorneys that I will not even *try* to insert a cynical remark here. However, typically, by the time attorneys get involved, things are getting ... complicated. AM detuning is not an easy subject. There are so many exceptions to any clear rule, it can be difficult to get a clear legal handle. I’ve never been involved in a civil suit over AM detuning; however, I have heard of some.

I have been involved in cases where towers had to be removed, when constructed too close to an AM station, to clearly establish negative effect. As previously mentioned, this has typically been in cases when “before construction” measurements were not made (prior to my involvement with the site). Thus, the stance of the AM station always has been that the cellular structure was responsible for substantial disturbance to the AM station’s pattern, and therefore proportional financial compensation from the structure owner was appropriate. The cellular company determined it was less expensive to remove the tower and lose the investment than to continue to fight it. (I came into that project after the tower was built; what I would definitely call a “short” cycle to decommissioning.)

**Avoiding the next level**



So, how do these three things—consistent calculation, correspondence and regulation—interplay? Each is a higher-stakes level of complexity, cost and potential negative effect to your operation. If you can defuse a problem at each level before it advances to the next, you’ve definitely done yourself a favor. **agl**

Biby (also publisher of AGL magazine) is president of Waterford Consultants, Waterford, VA. His email is: [rbiby@agl-mag.com](mailto:rbiby@agl-mag.com).

**Biby Publishing Presents:**  
**The 2007 Tower Market Report**

Stay on top of the Tower Industry with the latest in Market Trends and Issues as well as our Projections of where the tower industry is headed.

New Authors  
 New Perspective  
 New Format  
 New Contents  
 Same Price: \$475

To order call  
 610 284-9289  
 or visit  
[www.TowerSource.com](http://www.TowerSource.com)  
 Major Credit Cards  
 Accepted

**DECEMBER**  
**AGL TOWER OF THE MONTH**

**MANUFACTURER:**

Sabre Towers & Poles

**TOWER TYPE:**

Mono-pine

**HEIGHT:**

93 feet

**APPLICATION:**

Cellular Network

**LOCATION:**

Applegate, California

Outlook on technology and industry trends affecting

# HORIZONS 2



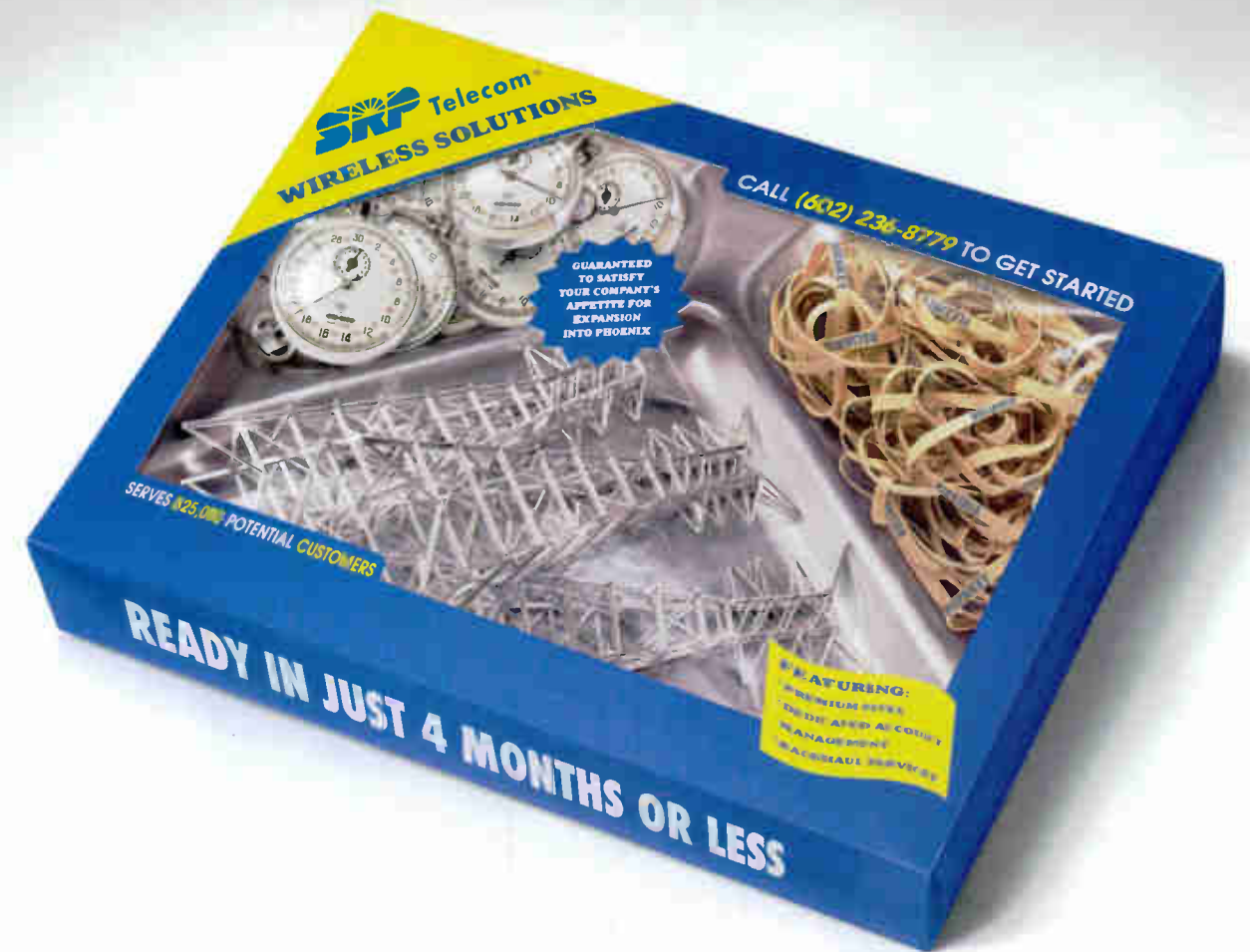
Photo Courtesy of Structural Components, LLC

## SWAP Continues to Make a Difference

by Janet Gill  
PCIA Marketing and Member Relations Director

**F**rom legislation to business opportunities, from networking to charitable giving, SWAP is leading the way in the wireless industry. SWAP—the State Wireless Association Program facilitated through PCIA, has proven to be a successful and viable venue through which wireless industry professionals can come together and advance our industry in many ways.

The first State Wireless Association began 7 years ago in Tennessee. The



### EVERYTHING YOU NEED

### TO EXPAND YOUR COVERAGE IN PHOENIX.

With SRP Telecom, improving your coverage may be the easiest, most convenient thing you've done since heating up a TV dinner. As part of an electric utility, our hundreds of existing vertical elements provide far-reaching geographic coverage of the fast-growing Valley of the Sun. We're likely to have a site opportunity just about anywhere you need coverage. And our sites often get favorable zoning treatment.

That means your time-to-turn-up is faster than building additional towers or with other site options.

We even offer pre-zoned and pre-built sites, and since SRP makes site clearance decisions quickly, our customers have found they can expand their market presence fast. Since our turnkey approach allows us to manage the entire process, you can be more confident of the on-air date and face fewer project management worries. Before you know it, your company's expanded wireless coverage will be ready to serve to your customers quicker than you ever thought possible.

For more information, visit [srpnet.com/telecom](http://srpnet.com/telecom) or contact us at (602) 236-8779.



future siting activity

2007

purpose was to gather together carriers, tower owners, vendors, service providers and others being affected by tough zoning ordinances in Knox County so that a unified voice from our industry could be heard.

Why would we all face these problems as individual companies when a consistent message from the industry could have a greater effect? Competition was laid aside for the common good, and the Tennessee Wireless Association was formed. Being the social people we are in the Southeast, this association proved to be much more than a "zoning army" alone. We enjoyed meeting one another for the first time, learning all we had in common and decided that networking could mean more business opportunities as well as some fun.

The association invited speakers to the quarterly lunch meetings to address issues affecting us. These provided an opportunity to better relationships with local officials as well as to hear from industry leaders. With a primary goal of positively promoting the wireless industry to our communities, it seemed fitting to work together and support a local charity. Although our industry provides an invaluable service to our communities every day through wireless technology, charitable giving was an added value and we felt good about working hard and participating in a golf event or a holiday social to benefit worthy causes. Looking back to how this simple, yet powerful idea affected Tennessee, I continue to be amazed at how this concept has grown and matured over a few short years.

## PCIA Gears Up

by Michael T. N. Fitch  
PCIA President and CEO

**T**he year 2007 will be a busy one for PCIA—The Wireless Infrastructure Association. After our biggest and best show so far in Nashville in 2006, we are already hard at work on the 2007 show scheduled for Oct. 1–4 at the brand new Rosen Shingle Creek resort in Orlando, FL. The PCIA Show is the event to advance your business interests in this industry.

There are important new initiatives, begun in 2006, which will continue to have influence in 2007. At the 2006 Show, we launched the Distributed Antenna Systems Forum, which is a new membership group. The mission of the DAS Forum is to promote the understanding, acceptance and deployment of distributed antenna systems. This group is a neutral, non-profit organization that includes a broad base of industry professionals. (More information about the DAS Forum is available in the article beginning on page 41 by its first chairman, Allen Dixon, of Corning Cable Systems.)

PCIA also has been selected by the FCC to serve as a cost-sharing clearinghouse for the transition of the 2.1GHz bands to the Advanced Wireless Services (AWS). These are the bands that the FCC auctioned in August and September, and that auction raised almost \$14 billion. AWS is expected to provide mobile broadband and other capabilities throughout the United States. Before the AWS can be implemented, legacy users in the band must be relocated. The FCC has a detailed system governing how the AWS licensees must share the costs of relocation, and that is what we will administer as a clearinghouse. PCIA operated the first successful clearinghouse for the entry of PCS at the 1.9

GHz band, so the FCC's confidence in us is well founded.

The coming year will also be a busy one for industry advocacy. There are major proceedings underway at both the FCC and FAA. We will participate fully in those and make sure that industry interests are understood and that any new regulations are as practical and unobtrusive as possible. As always, we will be active on priority local-siting proceedings, bringing understanding of the industry to local authorities that often do not have it. We are also working on legislation in selected states to try to improve the siting-authorization process, such as the successful 2006 legislation in California.

PCIA will continue our energetic support of state wireless associations. There has been rapid growth in the number of associations this year, and that will continue in early 2007. By mid-2007, nearly 30 states will have wireless associations. Recent and upcoming launches include some of the largest and most challenging states, which means there is a real need for the associations and opportunity for them to help improve the operating environment.

Those are just a few of the highlights of the 2007 agenda for PCIA. With all these new opportunities in the wireless industry come many challenges and the important work to meet them. PCIA and its members will be leading that activity. If you are a PCIA member, we welcome your participation and expertise. If you are not a PCIA member, you should consider joining us. Working more effectively with your colleagues and customers in PCIA will enable the wireless future.

agl

This growth was evident at the 2006 Wireless Infrastructure Show this past September in Nashville, TN. If you attended the show, you probably noticed the recognition PCIA gave to the existing state associations. The major networking area on the show floor, Center Stage, was hosted by these associations. Thanks to the support of the many companies involved, each organization had their own space at Center Stage to promote their states and answer questions about SWAP. PCIA also hosted a Presidential Roundtable Dinner for the existing and forming state presidents to show our appreciation for the many volunteer hours they have dedicated to their industry through their state wireless associations. The evening was educational, as the newly forming association presidents had an opportunity to ask questions and learn from others. We also heard from PCIA Chairman Jeff Stoops about the commitment PCIA has to SWAP.

The interest in SWAP was at an all-time high at this year's show. Many of those involved volunteered their time to answer questions and to provide resources to those wanting more information. To address many of the questions, PCIA created an educational panel session: "SWAP—Behind the Scenes." Panelists included Janet Gill, Membership/Social co-chair, Tennessee Wireless Association (PCIA); Andy Rotenstreich, AWA president (Haskell Slaughter LLP); Lee Ann Fager, AROK Legislative Committee chair (Cingular Wireless); Cathy Piche, Illinois Wireless Association (American Tower); Betty Johnson, PR & Media chair, Carolinas Wireless Association (Verizon Wireless); and Paul Estes, CEO, Cequel3. This panel featured the various components and roles that make a state wireless association

operate successfully. Representatives working within the associations, from supporting companies to the board and committees working behind the scenes, joined the panel discussion to explain their role and how everyone works together to accomplish the goals of each association. This was the second year PCIA held a SWAP session, and it was well attended once again and generated lots of questions and interest.



One final highlight was the first annual Towering Achievement Award for Individual Achievement given by AGL magazine. The recipient of this award was Pat Tant, senior vice president, Marketing and Customer Relations, with Cequel Sites. She was given this award for her vision, dedication and formation of the SWAP program.

As I look back over SWAP in 2006, the accomplishments are tremendous. We will end this year with 13 state wireless associations encompassing 22 states. Associations that have launched since the show serve Texas, New England, Arizona and Kentucky. These associations have

worked hard and volunteered many hours to see their states organize.

Over the last few months, we have seen important legislation passed in Tennessee which now allows collocation by right—a true milestone for our industry. This same legislation is also being pursued in other states, through the state wireless associations and PCIA, and is an example of how we can bring change by working at the grassroots level.

Of course, I would be remiss if I did not take time to congratulate the state wireless associations that hosted golf outings for charity over the past few months. Through much planning, sponsorships from our industry companies, hard work and fun, SWAP contributed nearly \$60,000 to various charitable organizations this year. Some of the recipients include, Make A Wish Foundation, Big Brothers and Big Sisters, and The Minnie Pearl Cancer Foundation. Our industry is making a difference, not only through our wireless contributions, but by supporting those less fortunate through our giving.

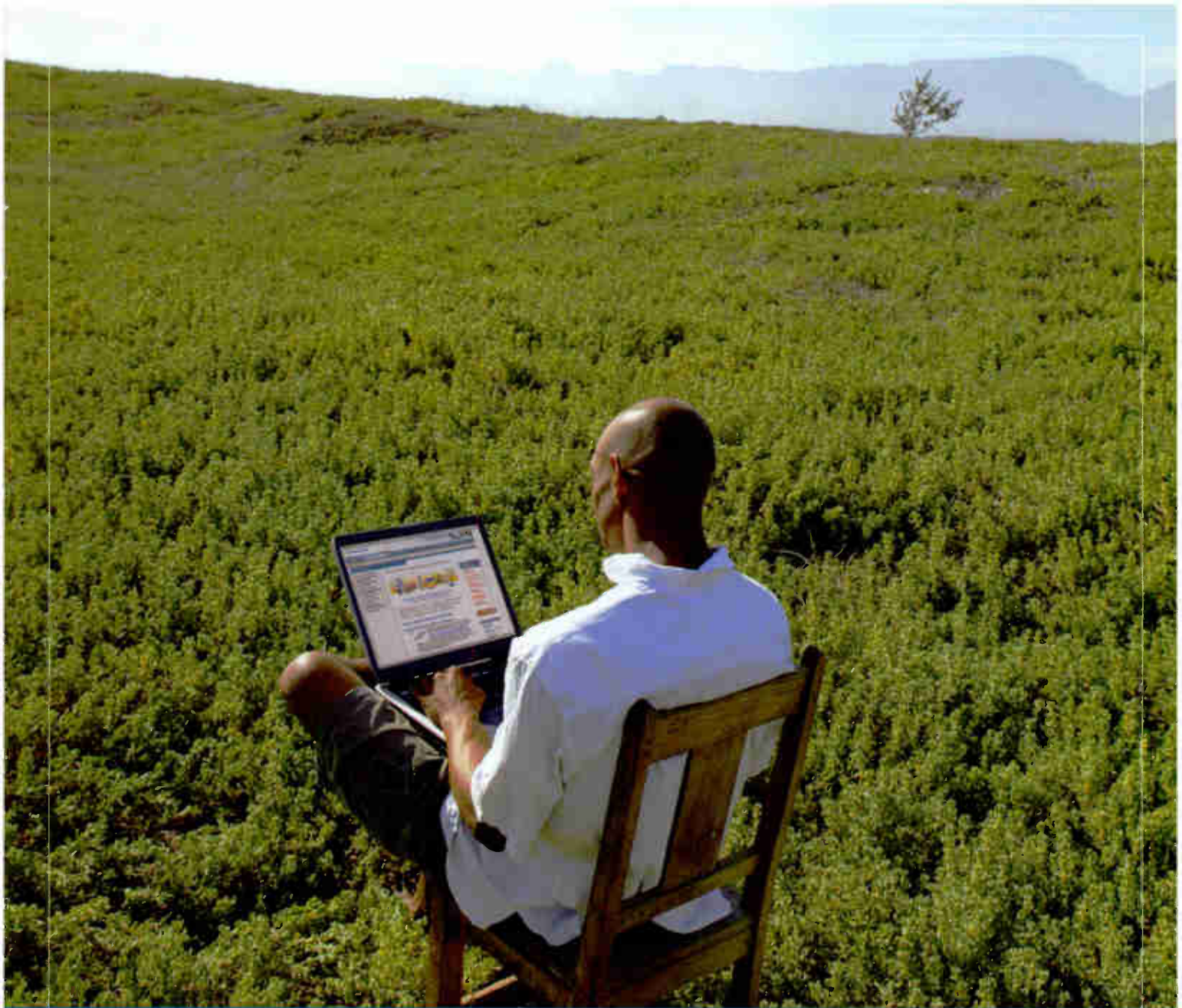
As I look to 2007, the momentum is still growing. We are laying the groundwork, organizing and planning for more state wireless associa-

tions. In the first quarter alone, we will see at least five new associations host their initial kick-off meetings, and many others will follow close behind.

Hopefully your question now is: "How can I become involved?" The first step is to visit our website, [www.swapprogram.net](http://www.swapprogram.net). You will find links to the existing association websites as well as a link to those preparing to launch soon. If you do not find your state listed, please contact me for more information at [janet.gill@pcia.com](mailto:janet.gill@pcia.com).

I encourage you to get involved. Join with PCIA as we enable the wireless future...one state at a time. **agl**





## Relax. When it comes to wireless, we're experts in the field.

Since our nation's first site build out, TESSCO has been the leader in wireless infrastructure. Access our 25 years of expertise on TESSCO.com, a gold mine of comparative product information, a marvel of purchasing efficiency. Worksheets, our Standard Site Materials List, our Cable Connector Accessory Compatibility Matrix, our How-To Applications, and all the infrastructure solutions you need. **It's all at TESSCO.com.**

**Supplying the framework of wireless**

**800.472.7373 | [www.tessco.com/go/infra](http://www.tessco.com/go/infra)**

Antennas | Cables | Tower Site Support | Power Systems

**TESSCO**

World Radio History

# How the Top-tier Players View the Infrastructure Market

by Don Bishop  
Executive Editor

**S**peaking to an audience at the annual PCIA Show session titled "Titans of Towers" in September, Jeffrey Stoops, president and CEO of SBA Communications, said his company is "bullish" on the wireless infrastructure industry.

"We have seen, over the last couple of years, a settling in of steady carrier improvements to their networks fueled by uptake on consumers to wireless devices as we move to data," said Stoops, who is also the current elected chairman of PCIA.

Stoops cited the Advanced Wireless Services auction this fall, where \$13 billion spent for spectrum means that construction by licensees will fuel investment in infrastructure. "As we look at key indicators, minutes of use grow, data use grows. More infrastructure is needed and, there is a focus on network quality. We expect a good several years going forward," Stoops said.

John Kelly, president and CEO of Crown Castle International, offered a

statistical roll call that supported his view of continued growth. He said cellular carriers reported another 25 million subscribers for the six-month period ending in June, nearly matching the record of 25.7 million in the previous half-year. He



said carriers reported 850 million minutes of use, up 27 percent from last year. "It shows how Americans are migrating from wired to wireless," he said.

"Data services were up 70 percent year-over-year and now represent 11 percent of the overall \$60.5 billion. It's growing 7 percent year to year," Kelly said.

James Taiclet, chairman, president and CEO of American Tower, looked around the stage and commented, "The four companies here got larger last year. AAT was purchased by SBA. Crown Castle made a couple of acquisitions. We merged with

SpectraSite, and Jerry [referring to Jerry Elliott, CEO and president of Global Signal Partners] bought Sprint Towers. We're getting bigger and more stable and anchoring the industry," he said.

Asked about the ability to handle rapid growth, Stoops said, "We're well situated to build out and service the needs of our carrier customers for data and whatever they need. We won't be the

holdup in any data deployments. We're interested and excited about the development, and we think it will continue to grow. We're ready."

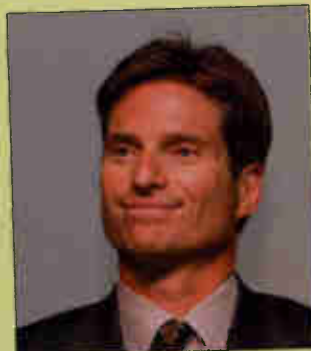
Asked about risks the wireless infrastructure industry might face, Elliott said that he "couldn't come up with risks." He said the growth rate wouldn't be



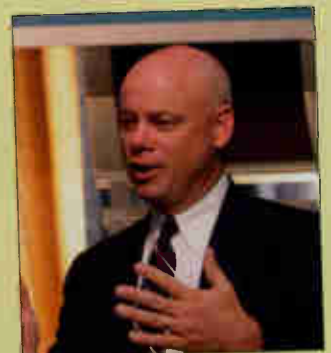
Jeffrey Stoops, president and CEO of SBA Communications



John Kelly, president and CEO of Crown Castle International



James Taiclet, chairman, president and CEO of American Tower



Jerry Elliott, CEO and president of Global Signal Partners

“straight to the Moon,” and that it would depend on spectrum availability, market launch drivers and new entrants.

Taiclet said the risk he sees involves the three waves that characterize the customer base: moving voice from wired to wireless; growth of data services; and entertainment delivery via wireless devices. He said the risk is in a possible disruption of those waves. “That could come in the course of. ‘Can these carriers and other providers create a business plan that their investors support to get the investment to take those three waves one to another?’ If it plays out well, we will have continuity of growth in this industry for some time to come,” he said.

Stoops added, “My colleagues talk about risk. It’s refreshing. You’re talking about small risks, as risks go. We are at the point where we are worried about things that are going to dictate whether we grow 10 percent to 14 percent. I don’t feel there is a big risk out there. We’re not going to be “8-track tape recorders” in 10 years. There is nothing to attack the fundamental stability of our business. I don’t worry about technology changes that could obsolete our industry as a channel for wireless communications,” he said.

The assembled tower company executives were asked about consolidation among carriers, not their own companies, as Kelly and Elliot awaited the outcome of a pending acquisition of Global Signal by Crown Castle that was not public knowledge at the time of the session.

Taiclet commented that he wasn’t sure that mergers among wireless carriers would be beneficial to the tower

companies. He foresaw some possible decommissioning of sites among the merged companies. But he said the two most recent mergers (Sprint Nextel and Cingular with AT&T Wireless) have created organizations with size and scale to launch 3G data at a pace none of the original companies could have achieved.

“It gave Sprint the vision to look beyond that,” Taiclet said, referring to Sprint’s WiMAX initiative.

Taiclet said the mergers resulted in sizable wireless players that can plan and build for the long run, “and that’s the business model we’re built to support. Further consolidation is less likely than in past years.” He said possibilities that often come up are mergers among Alltel and T-Mobile or Verizon. “There may be regulatory antitrust concerns, and they may not be what the companies want to do,” he said. **agl**

## Connecting the World

Components



Monopoles



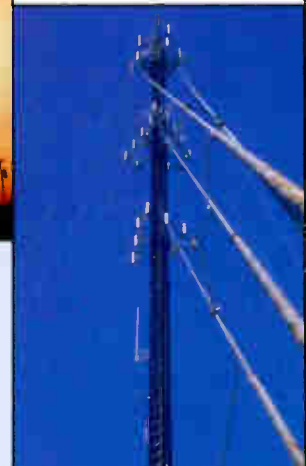
Structural Analysis



Self-Supporting Towers



Guyed Towers



Your only choice for everything WIRELESS

**valmont** 

STRUCTURES

Northwest  
3575 25th Street SE  
Salem, Oregon 97302  
Ph: 1-888-880-9191  
Fox: 1-888-689-9555

Midwest  
1545 Pidco Drive  
Plymouth, IN 46563  
Ph: 1-877-467-4763  
Fox: 1-574-936-4763

Valmont towers now available on the WCSA contract



**Mike Fitch, president of PCIA, and Jeff Stoops, who chairs the association, see a bright future for towercos.**

# Carrier Views Outdoor DAS with Guarded Optimism

by **Esme Lombard**  
Sr. Manager of National External Affairs  
T-Mobile National Development Group

**W**ith respect to outdoor distributed antenna systems (DAS), from the perspective of a carrier, a cautiously optimistic approach needs to be taken. Outdoor DAS can be an effective technology, at the option of the carrier, for unique siting applications or as a supplement or complement to the existing technology deployed.

Outdoor DAS is fundamentally different and must be applied with careful consideration of the often-complex factors involved in technology deployment.

Through T-Mobile's leading-edge advocacy identification and proactive siting efforts, we have learned that our customers are not only willing to be an advocate for the infrastructure necessary for the services they have come to rely on and expect, but that they want this service today. Or, put more bluntly, *now*.

Through proactive efforts consisting of education and transparency, T-Mobile has begun consulting with municipalities to discuss our system needs and technological options early on. We have played an active role in helping to shape ordinances that are in the best interests of both the constituents who rely on our services and our customers who want and need service. This partnership has begun to change the paradigm of the relationship between municipalities and carriers from one of perceived enemy to ally.

Wireless is no longer a convenience. We heard this reiterated many times during the PCIA Wireless Infrastructure Show in September, we experience it in our daily lives and we often hear of life-saving examples of wireless in the news. A reference was made by a government official attending PCIA's convention that first responders agree that *lives are saved by wireless*. Customers

who rely on wireless as their primary or even backup method of communication serve as proof of the need for carriers to maximize benefits to both consumers and first responders.

How does DAS fit into all of this? What are the barriers to entry with respect to DAS deployment? Finally, how can we ensure that our customers are served with the best service, using the best technology option?

When considering regulatory barriers to entry, a look at how technology is *diffused* or adopted is valuable. Some key points adapted from Rudi Volti's text *Society and Technological Change* are central to the discussion and consideration of the diffusion of outdoor DAS as a technology. They are:

- Technology is a *system*. There are *many components* required to make it work.
- Technology needs the support of *human beings who understand its workings*.
- When technology is transferred from one area to another, modifications are most likely required to make it work; thus, *it is not the exact same technology*.
- Applying equal use of technologies can have a devastating effect.
- Technology for one area *may not make economic sense* for another.
- Technologies are often chosen by small power groups that represent their interests rather than the interests of those who they are serving.
- People with knowledge of technology are key to the diffusion of technology.
- As with countries, technology that works in one environment may fail in another.

Regulatory barriers to entry and how a technology is diffused, adapted and ultimately accepted as an industry and by

consumers are not mutually exclusive of one another. The above points are raised as we consider the implications of outdoor DAS from various perspectives.

Outdoor DAS can be a viable technology when deployed by a wireless carrier in the right circumstances. Federal law grants wireless carriers the exclusive right to choose the technology applicable to the circumstances and based upon the needs of their consumers.

Systems can be complicated, based on the numerous components required to make them work. Outdoor DAS presents, or has the potential to present, complex issues related to deployment when it comes to local, state and federal regulations. Outdoor DAS systems often require the use of public rights-of-ways (ROWs) that are controlled both at a state and local level and often involve the use of the existing utility's infrastructure (e.g., transmission poles, telephone poles and light poles).

Municipalities often do not know how to treat a carrier's proposal to install an outdoor DAS system under their codes. Some local jurisdictions require a full land-use permitting process, treating each node as a new or independent site. Some local jurisdictions require franchise agreements. In some cases the state's Public Utility Commission (PUC) becomes involved in a lengthy review process that often is longer than most permitting processes.

Carriers are beginning to experience occasions when local jurisdictions encourage the deployment of an outdoor DAS system during the permit-review process on a carrier's application for another proposed wireless facility.

Apart from the legal prohibition of local jurisdictions trying to make

technology decisions for a carrier, there are other issues that such inquiries can engender. Due to the lack of a common understanding about outdoor DAS and its fundamental operational and technological differences in conjunction with the deployment barriers surrounding the land-use and regulatory process, deployment of any kind is often stymied.

This not only affects the diffusion of outdoor DAS as a technology, it negatively affects our customers, constituents and emergency service providers who rely on wireless service as their primary or backup method of communication.

The implementation of DAS as a technology is in its infancy. It is a technology in a critical cycle in its diffusion. As previously stated, outdoor DAS presents various difficulties that the following examples demonstrate:

First there is the case of Philipstown, NY. In that matter, after T-Mobile and another carrier had been in zoning for over a year for two wireless facilities, the town decided to host a DAS forum where the carriers were not invited or permitted to speak. A consultant was hired by the town, and the forum was advertised via fliers proclaiming that the town's consultant would make the following presentation to the zoning, planning and town boards on DAS: "A New Technology that Would Make Cell Towers Obsolete."

While we, as carriers, were unable to present during the DAS discussion, we did attend, and we listened, and we learned. We learned that an inordinate amount of misinformation exists about outdoor DAS, its applications, uses, operability and, most importantly, its ability to be implemented. We have since been working with Philipstown in an effort to correct the misinformation.

In the case of Airmont, NY, the municipality hired a consultant 18 months into an existing review of an application for a wireless facility. The consultant raised the use of DAS as an alternative to the proposed site. Without offering supporting documentation or proof of analysis, the town's consultant claimed that a large municipality like Airmont could be completely covered with five DAS nodes. This leads us back to the

diffusion point of applying the equal use of technologies from one area to another and the devastating effect it can have. Simply stating something is not the same thing as actively deploying it. The town's consultant failed to take into consideration many things in making this claim, such as the utility company's extensive review and approval process with respect to collocation, the PUC's review process, the absence of existing infrastructure necessary to support such a system in some areas of the town and the viability of obtaining the necessary easements and/or franchises that could be required for the system locally.

Finally there is the example of proposals received to deploy an outdoor DAS system in Long Island, NY, more than four years ago. I was tasked with the analysis and evaluation of various proposals for an outdoor DAS system. We reviewed three proposals, each of which failed to take into account the regulatory aspect of the project with respect to underlying agreements that must be in place in addition to addressing the question of the land-use process. When we inquired about this to the companies, we were met with non-answers and resistance to verification of the facts.

As a carrier and holder of valuable

FCC licenses, it is our responsibility to minimize risk to ourselves as well as our customers. We cannot afford to leave critical questions surrounding outdoor DAS implementation unanswered. In this case, there were no leasehold interests or further agreements in place, or answers regarding the regulatory details of implementation. It was speculative at best. To date, there is no DAS system in the area in question. Recent inquiries have led to the findings that a DAS system is still in its infancy and is at least three years away from mobilization despite years in the process already.

The examples raised above are counter-productive to both the diffusion of outdoor DAS as a technology and also to the ability of carriers to provide services to their customers. Use of DAS as a delay tactic, prematurely releasing information which ultimately gets into the hands of those who not only do not understand the technology but who have never actually deployed a system is counterproductive to DAS providers, carriers and most importantly consumers.

Recall that diffusion is contingent on key people in key positions who understand the technology. Municipal consultants and officials are often not in a position to understand DAS implementation from a practical or technological standpoint.

The Professional Tool for Radio Frequency Interference Analysis

**COMSITE**  
PRO

**Identify and  
Prevent RF  
Interference**

- Maximize Inbound Radio Coverage
- Resolve Interference Issues Before They Affect System Capacity
- Evaluate Non-Ionizing Radiation for MPE Compliance
- Assess Rebanding Comparable Facilities Interference Objectives

Sign up for a web seminar on  
"Solving RF Interference Issues" at  
[www.rcc.com/csp](http://www.rcc.com/csp)

**RCC**

RCC Consultants, Inc.  
100 Woodbridge Center Dr. Woodbridge, NJ 07095  
800.247.4796 [comsite@rcc.com](mailto:comsite@rcc.com)  
[www.rcc.com](http://www.rcc.com)



# The Network *Inside* the Network

by Jerry Black

Director, In-Building System Solutions  
Talley Communications

Today, with little or no end-user discrimination between *wireline* and *wireless* services, voice and all other feature-rich data services are expected from *all* service providers. In-building markets, which include workplaces; shopping, dining and entertainment venues; and our homes, are *strategic hot spots*. These locations are no longer "optional" or "secondary" coverage areas within the macro network.

Whether service providers use GSM or CDMA for 3G technology, their systems were primarily designed to serve deliver service throughout the *outdoor* or *macro* cellular network. Whatever amount of signal happened to penetrate inside structures—all the better. Today, the workplace represents a sizable market which, if not served, will lead to lost revenue or churn—or both. Nowhere else within the network do so many subscribers spend as much time, five days a week.

With enormous data telecommunication power and capability in the palm of a hand, who can resist exploiting it 24 hours every day, whether we need it or not? Previously, "voice" *ruled* (well, for many, it still does), but voice isn't as exciting as the data payloads now with our reach that will be parts of calling plans and service packages.

With a laptop computer and a network service provider high-speed card,

we send email, surf the web and do nearly anything wirelessly that we could do in the office. But simply because wireless devices carry voice sessions indoors doesn't guarantee data sessions will be successful.

Historically, data speeds have varied widely. As a rule, if the data rate isn't at least *twice* as fast as a dial-up Internet connection, *it's just not "data."* Why would the speed be less? Isn't every service provider offering data rates capable of much more than this minimum limit? Of course they are—in *theory*.

Although many system characteristics govern wireless data throughput, *signal strength* on the forward *and* on the reverse path has much to do with the throughput *you* have at any specific location. Even with high-speed-*capable* networks, *your* connection could end up loping along at the 2x dial-up minimum rate. That is neither what you are paying for, nor what service providers want you to experience.

Because users are largely concentrated inside buildings, these venues become a *network inside the network* that must deliver nothing less than the best the service provider has to offer. Everyone answers to customers, and there is a lot of competition. Churn, along with as customer "DIS-SAT" ratings, does some ugly things within the service provider's organization. I'll leave it at that.

Because consistent voice quality is the primary network qualifier for any service provider, the service provider must have that factor covered solidly if there is any hope to attract and retain data-hungry subscribers. This means that voice-signal penetration must be quite good, in turn, to provide reliable, consistent and, yes, *maximum* data throughput. I am trying not to be too subjective or relative with such terms as *quite good* and *solidly*, but I refuse to refer to a certain number of "bars"—which is just about useless, considering the variables. I'll discuss specific signal levels in future issues of AGL.

When signal levels fall below a certain threshold, how do the service providers address this problem, given the cost of infrastructure and the time, effort and expenses connected with zoning approval for sites? The answer comes from the gene pool where these solutions were developed in the earlier days of cellular for treating areas of poor coverage within the macro cellular network. *That* discussion continues in the next installment in this series. **agl**

---

Jerry Black will be joining AGL's columnists on a recurring basis in 2007 to discuss these and other topics relating to in-building antenna systems. Watch for his next article in the February/March 2007 issue.—Editor.

much less able to require its application under federal, state or local regulations.

As an industry, and as carriers, we have a long way to go with respect to the diffusion of DAS as supplementary use, much less a mainstream use. There are still many questions left to be answered with respect to both the benefits and limitations associated with outdoor DAS deployment from regulatory, technical, interoperability and cost perspectives.

We have learned that there are many different types of DAS technology and ways in which to deploy it. We must exercise care in the dissemination of information, and be transparent about the advantages, drawbacks and the practical applicability of the technology. We must remain aware of regulatory challenges, and work with state and local authorities to lift barriers where it makes sense to deploy outdoor DAS.

While it is true that outdoor DAS is currently deployed in some geographic areas, it is not ready for general, everywhere deployment. As a carrier, we look forward to the day when we can say with confidence that municipalities understand its application and that outdoor DAS providers and carriers have partnerships that enable this technology to be used in the right circumstances. **agl**

# What is DAS, and Why Does It Need a Forum?

by Allen Dixon, DAS Forum president

Market Development Manager for Wireless Networks, Corning Cable Systems

The latest numbers released by wireless service providers indicate the United States is approaching 225 million subscribers, or 75 percent market penetration. Widely reported, those numbers reflect the effort providers are putting into marketing their services. Less widely noted is a second effort undertaken by the carriers.

Carriers today are re-vamping their network infrastructure to provide superior service to each of those subscribers.

The evolution of the cellphone into an integrated communications device has been well documented. What started as an extension of the traditional telephone network has morphed into an indispensable tool of daily life. The convergence of video, voice and data, thus enabling real-time access to information and the sharing of knowledge, anywhere at anytime, has profoundly changed the way we live our lives.

The effect of this evolution on the service providers' nationwide wireless networks has not been documented nearly as completely. The advanced capabilities of the 3G networks are not easily achieved. Wireless bandwidth is *shared* bandwidth, and the customer experience is a function of both distance from the cellsite and the number of users in the cell. To ensure a consistently positive user experience, service providers must both reduce the distance and subdivide cells to accommodate increasing numbers of subscribers.

Adding conventional wireless

towers, though, is not as easy as it once was. The preceding 30 years of growth have already claimed most of the attractive cellsites, and contemporary zoning regulations severely constrain both the number of sites and types of infrastructure that can be deployed. It is becoming increasingly expensive and difficult to install and operate conventional sites for 3G services, especially in dense urban cores and residential areas.



An emerging architecture called distributed antenna systems (DAS) offers service providers an attractive alternative for adding service. In DAS installations, conventional

tower sites are augmented by a series of smaller, lower-powered, remote-antenna nodes (RANs) placed on existing infrastructure, such as light standards, utility poles and billboards. These smaller nodes are a cost-effective method of providing service coverage, including 3G, in targeted areas. Used in concert with conventional site deployments, these nearly invisible networks offer an effective method for providing targeted coverage, especially in dense urban or suburban areas (see photo, above).

DAS deployments are a recent development and, despite the potential benefits they offer, that newness means complete and reliable information is not readily available. Potential users find it difficult to get answers to basic

questions on current deployments, costs involved and best practices or technology.

Amid lively discussions and numerous questions about DAS during PCIA's 2005 Wireless Infrastructure Show in Hollywood, FL, several DAS providers and vendors began to ask themselves—and each other—if there was a platform to enable interested parties to obtain accurate, reliable information. The question was answered during PCIA's 2006 PCIA Wireless Infrastructure Show in Nashville, TN with the launch of the DAS Forum.

The DAS Forum serves as an open and neutral forum dedicated to advancing, developing and shaping the future of DAS. The group will foster a free and open exchange of information and ideas on the role of DAS as a complement to existing wireless network infrastructure.

In addition to advocating responsible public-policy decisions at all levels, the group is focused on the development, adoption and deployment of interoperable technologies, uniform requirements and best practice methodologies.

**The DAS Forum will be open and neutral, aiming to foster a free and open exchange of information and ideas on the role of DAS as a complement to existing wireless network infrastructure.**

Already active, the group is presenting its message at the National League of Cities' Congress of Cities and Exposition in Reno, NV (Dec. 5–9). In

# Mobile TV: Better Than Being There

by Michael Higgs, esq.  
Higgs Law Group

**T**ired of surfing through your 500 channels of digital cable and finding “nothing on”? Wouldn’t it be great if you could take that fun and excitement on the road? According to my crystal ball, it’s coming.

There has been a great deal of excitement in the tower industry lately about new spectrum allocations. Re-allocated television spectrum in the 700 MHz band, the AWS spectrum release and a reshuffling of the EBS/MDS decks have left tower owners with visions of dollar signs dancing in their heads. Unlike previous spectrum allocations that helped put tenants on towers, it will not be voice that drives the next generation of wireless services, it will be data.

Data, however, is not all about emails, text messaging and file transfers. Those ones and zeros zipping thru the air can also be compiled to create video signals. We have all seen the hype with PCS carriers pushing video onto cell phones as proof of the power of their 2.5/3G networks. Today’s cell phones, however, were not designed with streaming video in mind. With tiny screens and controls built for telephony, the interface has created a major stumbling block to widespread acceptance of wireless video. Creating overlays to stream video over existing voice-centric networks has also proven to be unwieldy.

The solution is to create both a device and a service that are focused on delivering mobile video. With the latest in today’s digital video-compression technology, a broadcaster with a single 6-MHz-wide channel can

effectively stream 15 to 20 channels of high-quality video intended to be viewed on 3- to 7-inch screens.

For an example of a company putting this type of technology to the test, look at *Time* magazine’s list of Best In-



ventions 2006. Kangaroo.tv has created a hand-held scanner that includes video, audio and data capabilities. Its NASCAR product combines the race telecast and up to seven in-car camera channels, direct audio feeds of live driver and team conversations and the event radio broadcast. The scanner also taps directly into NASCAR’s timing and scoring system, providing fans with real-time race data and statistics. The company is currently offering the

DirecTV Sunday Ticket to fans using its scanners at NFL games in Miami and Washington. Using a single 6-MHz-wide channel, Kangaroo.tv delivers audio and video from every NFL game. Having used the service twice myself, I can attest that the fans sitting around me were more interested in the information available on the device than in the live game.

If you build it, they will come. But who, exactly, is going to build it? Let’s start with the satellite TV companies. A service of this nature would be a natural adjunct to their television offerings, a service ad-on, or upgrade, if you will. How about the satellite radio companies? They already have a vast network of terrestrial infrastructure on top of which to build a video network. The business model is relatively similar, and a television monitor integrated into the satellite radio units may just strike a chord with consumers. How about portable video game manufacturers? Sony’s Playstation Portable is the perfect size for this type of application, and it already has some limited wireless communications capability built into it. The tie-ins for a device that helps sell both video games and monthly subscriptions (not to mention pay-per-views and game content-related downloads) might prove quite lucrative for its manufacturer.

Tower owners need not fear consolidation in the cellular/PCS industry. New technologies and applications are already on the horizon that soon will have new tenant types signing leases and pumping more ones and zeros into the air. **agl**



addition to providing information about DAS, the group plans to distribute a model zoning ordinance for municipal use. The objective of the model ordinance is to strike a balance by allowing carriers to deploy infrastructure that will best meet their coverage objectives while still allowing municipalities to maintain control over land use and address any concerns of their citizens.

Another educational event is in the works for January 2007, complete with a case study site visit to an operating Crown Castle DAS installation on Hilton Head Island, SC. The event is open to anyone interested in DAS deployment and is free to DAS Forum members.

The forum currently has three committees at work: The Advocacy committee, headed by Catherine Blue



DAS antennas, like the one atop this median lighting standard, can target coverage in urban areas.

(Donohue and Blue), is responsible for outreach and liaison with governments and inter-governmental groups. One of its work products will be the model zoning ordinance. The Technology committee, led by Sunil Prasad (Sprint Nextel), will establish requirements and sponsor the development of interoperability standards for active equipment. The group will also publish tutorials on DAS technology as well as best practices for design and deployment. The Market Development and Communications committee, chaired by Hunter Stuart (Crown Castle), is responsible for the public face of the Forum, including event planning, website development and maintenance, and press releases. This group will also undertake research projects and develop business

tools, templates and processes.

As inaugural president of the forum, I encourage you to join this group today. The forum welcomes new members at any time. If you have any interest in DAS, in any role—contractor, consultant, carrier, municipality or educational institution—we value your input and look forward to your participation. This is an exciting opportunity to shape and drive the

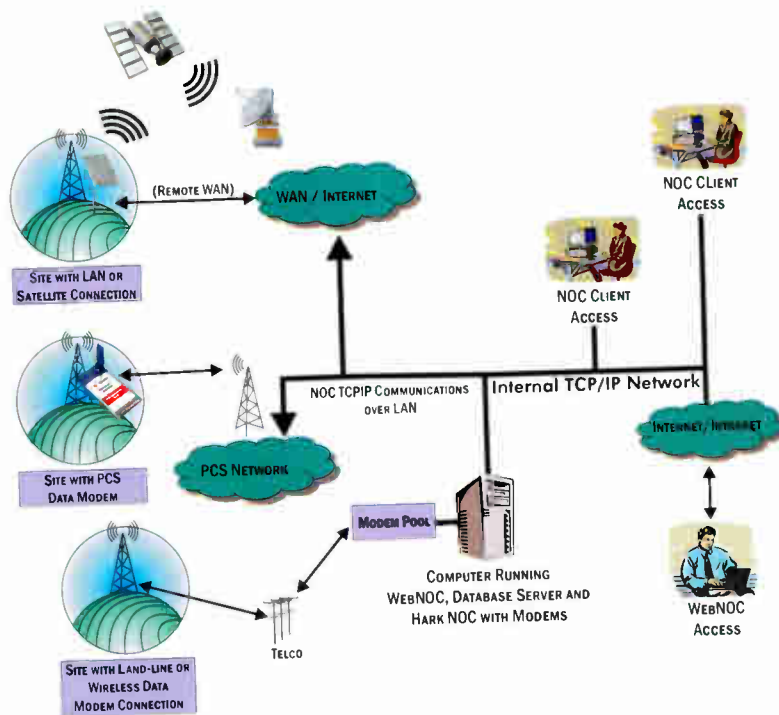
adoption of a technology that provides benefit to every member of the wireless ecosystem.

The DAS Forum website ([www.thedasforum.org](http://www.thedasforum.org)) will be launching soon. To get immediate information on the group, contact any of the DAS Forum members or send an email to:

[connie.durcsak@thedasforum.org](mailto:connie.durcsak@thedasforum.org) or [allen.dixon@corning.com](mailto:allen.dixon@corning.com). agl

## Universal Site Monitoring

Hark Tower Systems has a solution for every make and model of light system. Our Site Management software lets you setup your own in-house, automated monitoring center.



### Wireless Backhaul Options



PCS/CELLULAR



SATELLITE PACKET MODEM



SATELLITE DATA MODEM

(843) 764-1560 PHONE  
 (800) 367-4275 TOLL FREE  
 (843) 764-3692 FAX  
[www.harksystems.com](http://www.harksystems.com)

**HARK**  
 TOWER SYSTEMS, INC.

# Executives Predict Thousands of New Sites Will Be Needed

**S**peaking in Nashville, TN, at a Radio Club of America (RCA) dinner meeting in September, three wireless industry executives estimated antenna sites numbering in the thousands would be required for projects they discussed.

TerreStar Networks needs 5,000 sites for its initial buildout; a proposed nationwide broadband public-safety system requires 37,000 sites; and carriers using spectrum awarded in the Advanced Wireless Services auction will need three times the number of existing sites, the speakers explained.

Richard P. Biby, P.E., CEO and publisher of AGL magazine and Fryer's TowerSource; Bruce McIntyre, president of Tower Innovations; and Keith Kaczmarek, president of Cyren Call Communications, spoke to RCA members and guests at the meeting scheduled in conjunction with PCIA's Wireless Infrastructure Show convention.

Biby explained reasons why the number of antenna sites will multiply, perhaps by a factor of three. TowerSource estimates the number of existing towers and rooftop sites used for cellular and

PCS at about 204,000. McIntyre gave some details about TerreStar's satellite-and-cellular network. Kaczmarek talked about Cyren Call's vision for a public-safety/private partnership to deliver advanced public safety communications in the 700 MHz band.

"The number of sites needed to cover any particular area is a function of frequency and power. If you go up in frequency, you need more sites. If you go down in power, you need more sites. The number of sites is proportional to frequency and inversely proportional to power of each site," Biby said.

Biby also said that more power—or a closer antenna site—is needed to cover wireless devices inside buildings.

"You need the RF much closer to where people are, and you do that with a much greater number of smaller sites. As a result of the Advanced Wireless Services spectrum auctions, service providers will need three sites for every site you now have for a traditional cellular/PCS system," Biby said.

Biby added that an antenna site is not always a tower or rooftop. "You have to include distributed antenna systems in

how you think of a site," he said.

Biby said that public-safety antenna-site users need *reliability, preemption, hardened sites and equipment.*

"I have taken a long, hard look at site-security needs. Site hardening, as public-safety people talk about it, is not that much more than what people are doing in cellular and PCS," Biby said. "It includes data and backhaul security and encryption. That's what will be involved, along with procedures for site access and maintenance, to address the needs of the public-safety community."

Biby said that some tower companies do not favor providing antenna space to traditional public-safety users because they use so much of the tower asset for so little income, compared to cellular and PCS. But he said that the alternative proposals for public safety begin to look more like cellular and PCS, and won't use as much antenna-space resource.

McIntyre spoke on behalf of Doug Sobieski, a senior vice president of TerreStar Networks, who was at first scheduled to speak but who could not attend the meeting. McIntyre is consulting TerreStar on site acquisition.



## Tubular Antenna Mounts

- The new tubular antenna mounts reduce the affected wind loading on the mounts.
- Meet new revision "G" standard for wind loading that will withstand 140 MPH wind.
- 80% preassembled at the factory.
- Constructed using 6061-T6 Aluminum which is 35,000 psi material.
- Half the weight of a comparable steel mount.



[www.alumaform.com](http://www.alumaform.com)

Aluma-Form, Inc.

P.O. Box 18555 • Memphis, TN 38181-0555 • 901-362-0100

McIntyre said TerreStar has a license for 10 MHz of S-band mobile satellite frequencies. "The system they are going to build out is going to incorporate the largest, most powerful civilian geostationary satellite ever launched and a terrestrial component that will be like a cellular system in 20 major markets in the United States," he said.

In TerreStar's first phase of construction, the company will deploy about 5,000 sites.

"That's good news for everyone in the site business," McIntyre said. "We're looking at getting the first search rings in November and starting site acquisition. Right now we're talking to tower companies about sites and site lists."

The nationwide system is being designed primarily for customers with headquarters in the Washington, DC area.

"This system has full preemption, not just priority. If a customer needs it, they get it 100 percent. It is not being designed as commercial or consumer-based system," McIntyre said.

The system is being designed with data primary and voice secondary. Because of the high data rates, cellsites will have to be close together. The engineering calls for an edge-of-cell data rate, at 80 percent loading, of 384 kbps. Closer to the cell, the data rate will approach 1.5 Mbps. In addition to the IP-based cellular system, TerreStar is building a Voice-Over-Internet Protocol network to connect it and backhaul all the traffic.

"It is an ambitious project that places pressure on Nokia and other suppliers to procure equipment with the specifications, including handsets with a

custom-built chipset to handle terrestrial traffic and switch to the satellite in a way that the user won't realize it happens," McIntyre said.

TerreStar is privately funded. Motient Communications is a 65 percent owner, McIntyre explained. He said the company is raising money through various sources and had scheduled a November funding of \$500 million, on the way to \$3 billion when the system is fully funded.

"The reason the feds are so interested is it is the kind of system they would like to have, but it would take them 10 or 15 years to build it. Private enterprise said, 'We'll build it in three.' They're real excited about it," McIntyre said.

Kaczmarek told the audience about Cyren Call's proposal for a public-safety broadband trust that would hold the license for 30 MHz of spectrum in the 700 MHz band—if Congress and the FCC can be persuaded to withhold it from an auction now scheduled by law to be conducted no later than 2008.

[Editor's note: In the intervening weeks since Kaczmarek's presentation, the FCC put the Cyren Call proposal out for public comment. Then days later, the acting chief of the FCC's Public Safety and Homeland Security Bureau ruled that the proposal was contrary to auction law. Nevertheless, Cyren Call's chairman, Morgan O'Brien, pointed out that public comment was still open on the proposal until Nov. 29, and that Congress would have the final voice on using spectrum resources for public-safety resources. This observation was particularly prescient. In the national elections the following day, Democrats recaptured

the majority in both houses of Congress. Early announcements regarding their legislative program for 2007 have emphasized adopting recommendations of the 9/11 Commission Report and improving public-safety communications.]

"Our goal is to put enough coverage in place terrestrially for 99 percent population coverage and 65 percent terrestrial coverage, and cover the rest with a satellite overlay. We have talked with a number of satellite companies that could provide the satellite coverage," Kaczmarek said.

He said that the idea for such a network only works with a public/private partnership building a network for both public-safety users and mission-critical users.

"You leverage the commercial user base and user revenues to offset the overall cost of deployment and operations," Kaczmarek said. "The reality of public safety is 2.5 million to 3 million first responders. It's too small a user base to build a network as we have proposed [without combining it with commercial use]. You need 37,000 sites to support the depth and breadth of coverage. That's a significant undertaking, and if you only serve 2.5 million users, you can't cost justify it."

The RCA offers opportunities for members and guests to address audiences at meetings held in conjunction with several conventions each year. It conducts a Technical Symposium and hosts a banquet every year; this year's symposium and banquet were held on Nov. 17 at the New York Athletic Club in New York City. **agl**

## Elk River, Inc.

Personal Fall Protection



Drawstring Bolt Bag

safety & convenience



NEW Eagle Tower QC-XT

www.elkriver.com

800.633.3954

# 2007 Business Strategies

Numerous manufacturers, consultants and service providers discussed their marketplace positioning, outlooks, and menus of products and services with AGL during PCIA 2006. Following are their snapshot comments about their companies and the antenna-siting industry.



## **TECTONIC**

Richard Kummerle, P.E.  
Managing Principal

[www.tectonicengineering.com](http://www.tectonicengineering.com)  
[rpkummerle@tectonicengineering.com](mailto:rpkummerle@tectonicengineering.com)

We handle deployment from site acquisition to construction. We don't sub things out. We offer national service, and we're licensed in 45 of 50 states. We have 10 major telecommunications projects ongoing at one time. We serve all the major tower companies and program managers at carriers. We also manage rooftops. We manage American Water's elevated tanks in 21 states from New York to Hawaii. We manage sites for the New York City Economic Development Corporation. The company is privately owned; we've been doing telecommunications for 25 years.

## **PENNSUMMIT TUBULAR**

Darren P. Emma  
Sales Manager, Wireless & Accessories

[www.pennsummit.com](http://www.pennsummit.com)  
[darrenemma@pennsummit.com](mailto:darrenemma@pennsummit.com)

We focus on concealment monopoles and flagpoles. Every soccer mom wants a monopole, but doesn't want to see one from her house. Many people think we don't do specialty projects, but we do. We also are undergoing a \$9 million expansion, taking our manufacturing

space from 85,000 square feet to 160,000 square feet by the end of 2008. We do everything in-house. We have an unroller, which cuts down on scrap, and we do long-seaming in-house. We're the only self-sufficient wireless provider east of the Mississippi.

## **HARK TOWER SYSTEMS**

Randy Hargenrader  
President

[www.harksystems.com](http://www.harksystems.com)  
[randyh@harksystems.com](mailto:randyh@harksystems.com)

We provide monitoring and alarm systems for the tower site. We send the alarm any way you want. Our product is superior—it's in the details. For example, with backhaul, we work with packet modems, PCS modems, phone lines, IP networks—you name it. One feature is programmable hysteresis, which means there is a programmable delay before the alarm activates. A customer said, "I don't worry about a power outage less than five minutes." Programmable monitoring is useful in detecting malfunctioning photocells. If a photocell doesn't change state in 16 hours, we report a bad photocell. That's a common problem that isn't otherwise always detectable. You can activate an output based on an input, such as turning on a fan if the air conditioning fails. Or every Wednesday at 2 p.m., you can power up a generator and report that it ran.

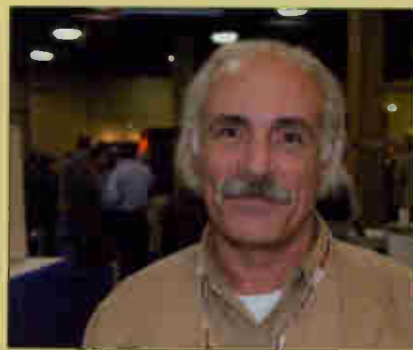
## **VOLT TELECOM GROUP**

Mark A. Shake  
National Account Manager

[www.volt-telecom.com](http://www.volt-telecom.com)  
[Mshake@volt-telecom.com](mailto:Mshake@volt-telecom.com)

We are a service provider in the customer premises and carrier arena, including Wi-Fi applications, such as

in manufacturing facilities and hospitals. We survey the facility and then make a design. We are a contractor for wireless carriers such as T-Mobile and general contractors such as General Dynamics. We don't sell equipment or a product. Many manufacturers want companies like us who are certified in their product so we can be an installation force for them. We work nationwide and do some work overseas. Most of our workforce consists of full-time employees, with some contract workers. We currently are hiring, especially tower hands.



## **SHAYAM TELCOM**

Andrew Nanaa

[www.coveragesolutions.net](http://www.coveragesolutions.net)  
[marketing@coveragesolutions.net](mailto:marketing@coveragesolutions.net)

Shayam is an Indian company with headquarters in New Delhi. Shayam makes the most reliable and cost effective fiber-optic extensions for in-building deployments and tower extensions. Most of the wireless industry is driven by data on dropped calls. The carriers' sales and marketing departments identify problem spots. If they can't put a tower for every coverage hole of 100 meters, these become expedient solutions. We act as a system integrator for in-building installations.

The trend is away from service providers installing their own and more toward turnkeying it. Shayam also is a telecommunications operator in India. It has businesses in the United States, Latin America and Europe. The company bought a GSM license in the United Kingdom.



**DYNATEK  
TELECOMMUNICATIONS  
SERVICES**

Mike Dunfee  
General Manager  
[www.dynatektelecom.com](http://www.dynatektelecom.com)  
[mikedunfee@dynatektelecom.com](mailto:mikedunfee@dynatektelecom.com)

We have done nothing but wireless architectural and engineering for 10 years involving cell site design. We are told what locations to use, and what attracts customers to us is our turnaround and attention to detail. We have highly trained employees. We are licensed in 50 states. We have large

projects in Portland, OR; Kansas City, MO; El Paso, TX; San Diego and Pittsburgh. We work for carriers, tower aggregators, program management firms and general contractors.

**SAUL EWING**  
George Asimos Jr.  
Partner  
[gasimos@saul.com](mailto:gasimos@saul.com)  
[www.saul.com](http://www.saul.com)

We have been representing the wireless industry going back to the 1990s. We have lawyers in four states—New Jersey, Pennsylvania, Delaware and Maryland—and clients who use our services a lot. We love getting towers approved. We work for most of the major companies in the four states. We offer experience, insight and efficiency that come from experience with a lot of sites. We often do a large package of sites because that provides efficiency. We handle leases, infrastructure amendments and term extensions, along with zoning approval, litigation and the acquisition of large portfolios of towers.

**POWDER RIVER  
DEVELOPMENT SERVICES**  
Andrew Dewhirst  
Owner/Partner  
[drewd@powderriverdev.com](mailto:drewd@powderriverdev.com)  
[www.powderriverdev.com](http://www.powderriverdev.com)

We offer national site acquisition,

zoning and construction management exclusive of the Northeast. Our company is young and rapidly growing; we started in 2003. We're based in Wyoming, and the name reflects our heritage without limiting us to Wyoming. I was a city planner with a degree from Wyoming University. I got to know people and went to work for SBA. Through those contacts we branched out on our own. We also provide a similar scope of services to the retail world, as with coffee drive-through kiosks and ATMs. That gives us some diversification and makes us unique. We go to the location and often open regional project offices.



**CELLXION**  
Jerry Maxwell  
Vice President, Sales and Marketing  
[jerrymaxwell@earthlink.net](mailto:jerrymaxwell@earthlink.net)

Towers will be the cutting edge, especially stealthing them. WiMAX will be all about stealth. Imagine park benches

# LED OBSTRUCTION LIGHTS



70-watts - 18 lbs.  
L864 BEACON

(310) 830-0181

LOWEST POWER CONSUMPTION IN INDUSTRY  
EXTREMELY COMPACT and LIGHT WEIGHT

ETL Certified to FAA AC 150/5345-43E

DIRECT REPLACEMENT L810

COMPETITIVE PRICE

**farLight** LLC

HIGH DEFINITION LIGHTING™



8-watts - under 2 lbs.  
L810 MARKER

[www.farlight.com](http://www.farlight.com)

containing base stations with a flip-up lid for access, next to light poles. We can control the market only when you standardize. The shelter business is a stable business. I've heard that carriers may need as many as three times the number of sites for AWS. The AWS auction made T-Mobile an attractive takeover. We are eight partners who run the company; we've been together for 20 years. Our products are the net results

of the conversations about our customers' needs. We provide shelters, self-supported and guyed towers, and transportable cell site equipment driven by disaster recovery. We do some boutique turnkey services out of Oklahoma.

**PPC**

Bruce Carlson  
www.ppc-online.com

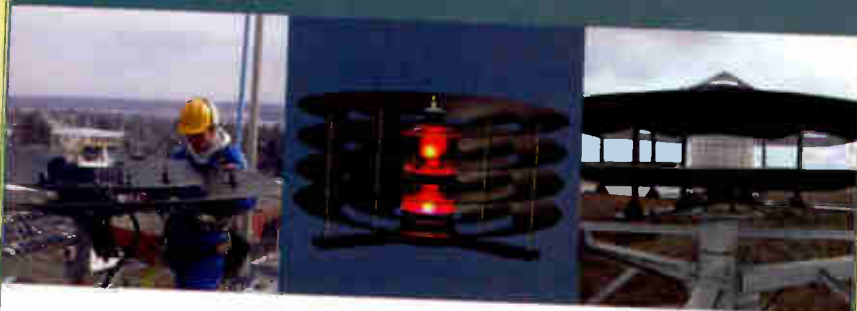
Our approach differs. We solve

*network reliability* issues. The worst enemy is water in the system, when the connector is not installed correctly. We do nationwide rollout training. The customer wants an improvement to some level, eliminating improper procedures. We certify installers. Some people think if you *show* them, they're *trained*. Not necessarily. We teach, and then test the connectors, and certify the students who do well. There is a heavy turnover among contractors, and they bring in new people quickly. The cable has to pass 2 GHz; a lot of information enters the network through the cable. The cable itself is perfect, but you have to have cable splices and put on connectors. That means decibels of loss. RF doesn't take to the environment well. Water resonates at 2 GHz and attenuates signal and causes corrosion. We educate people on how the environment affects cable and connectors. We are RF connector experts, with all the science that goes with that. We do assemblies, surge arrestors and filters. PPC's business for 65 years has been how to make an RF connection work, the first day and every day. We also offer tools. A new installer has to do RF. We give him cable and connectors to start. We give him tools and step-by-step instructions. It works if you don't deviate from that.

# TowerSHADE™

## THE RIGHT SOLUTION FOR LIGHT POLLUTION

Introducing TowerTex's innovative all-composite TowerSHADE™ line of products – the only effective solution on the market today to control nuisance light from FAA-mandated tower obstruction lighting.



[www.towertex.com](http://www.towertex.com)  
1-877-873-5100



**JRH ARCHITECTS**

James Winters  
President

[www.jrg-architects.com](http://www.jrg-architects.com)

We're a full-service entity for carriers and carrier groups. They can get everything, including site acquisition, environmental, surveys, drawings, structural engineering and construction, all done in-house. We're licensed in 50 states. We can handle site bills for one or two sites to 1,000 sites. That's what we do. We were

regional for 20 years, but we're emerging as a national company during the past two years for carriers and their subcontractors. Turnaround is quick, but with great quality. Timeline is everything we do. With everything in-house, we can be fast. We have done tens of thousands of sites.



**VQS**

John E. Patton  
 Managing Partner  
 John@vqs.net  
 www.vqs.net

VQS offers tracking and forecasting

program management solutions. It's all about tracking and forecasting. We offer a database configurable by you to manage your work. The way we sell it is how you have a program manager. We are on a monthly basis. If it works for you, you keep it. We take care of the details in between. If your project ends, you can let us go. If you are in 10 markets, we will make you more efficient and save head count. We started with Bechtel in 2002. Our genesis is with a group of guys 15 years ago who worked for BellSouth International in Brazil. We have had the same architects on this for 10 years. We take geographically dispersed work across multiple disciplines with no critical path. Companies only want to know when is the market ready. They don't pay for enough for the project manager to go out and inspect. As a result they are dependent on data that's a whole sphere called program management,

and we're defining the market.



**STRATEGIC WIRELESS NETWORKS**

Rick Gilman  
 Managing Partner  
 rgilman@strategicwirelessnetworks.com  
 www.strategicwirelessnetworks.com

A lot of spectrum between 216 MHz and 225 MHz is not used. We offer opportunities to use the spectrum, such as containerized-freight tracking. We use a robust compression algorithm and

**itl,LLC**™  
 International Tower Lighting, LLC

**Strobe Light Replacement Parts**

P.O. Box 41875  
 Nashville, TN 37204  
**Phone: (615) 256-6030**  
 Fax: (615) 256-6032

Visit our website at  
 www.itl-llc.com

**M SERIES DEHYDRATORS**

**Product Features**

- Microprocessor Controls (Standard)
- Virtually Maintenance Free
- Unparalleled Customer Support
- 3-Year Warranty / 3,000 Hours (Compressor)
- Very Competitively Priced
- Flexible Alarm Options
- Ultra Quiet Operation (54 dBA @ 6')
- "Plug & Play" Setup / Installation
- High Quality, Industrial Grade Components

For over 40 years McIntire has dominated the cable pressurization industry by providing cutting edge yet remarkably refined, high-quality products backed by unmatched customer service. McIntire's tradition continues in its new M-Series Microwave Dehydrators.

Ideal for waveguide, cellular, and wireless applications

**McIntire**™  
 WWW.MCINTIREWIRELESS.COM

745 Clark Avenue • Bristol, CT 06010 • Phone: (800) 437-9247 • Fax: (860) 314-4500 • sales@mcintireco.com

forward-error correcting in narrowband spectrum. We have taken two lanes of road and made it into 40 lanes. It's like a superhighway with tollbooths. We use two-way radio to track anything. For infrastructure, in Miami we use three towers. In rural areas, we use aircraft. We provide RFIDs, and we provide streaming video for hospitals on their private networks. People come to us and say, "Find me a way to build a back-up emergency network."



**AFL NETWORK SOLUTIONS**

Ron Deese  
Vice President, Professional Services  
[www.afltele.com](http://www.afltele.com)

We provide services for wireline, wireless and enterprise markets, including engineering and technical. On our professional services side, we provide manpower, both contract and permanent. We self-perform project work. We refer some products and install them, such as Wi-Fi and WiMAX. We run cabling and hang antennas. We rack and stack towers, building them from raw land, setting the generators and placing the batteries. The only thing we don't do is move earth. We're working

**We rack and stack towers, building them from raw land, setting the generators and placing the batteries. The only thing we don't do is move earth.**

with General Dynamics in Nashville on a Verizon project. We supply tower climbers, development crews and warehouse people, building a network for Verizon. Business looks good, and we're seeing some manpower shortages, especially among tower climbers.



**FAULK & FOSTER REAL ESTATE**

Scott Edmundson  
Project/Field Office Manager  
[www.faulkandfoster.com/towers](http://www.faulkandfoster.com/towers)

We offer services from site identification to a vendor and all the way through leasing. Also construction management services. We work with carriers to put sites on the air. Among our customers are Clearwire and Sprint. We have been in real estate for 60 years, and telecom for about 15 years. The company's work is national. We have a family environment and a willingness to do whatever it takes to make the client happy.



**BLACKDOT WIRELESS**

Tim Brown  
Vice President of Business Development  
[www.blackdotwireless.com](http://www.blackdotwireless.com)  
[tbrown@blackdotwireless.com](mailto:tbrown@blackdotwireless.com)

Blackdot has been in operation for three years. Optimization: We built our name on it. With the mergers that happened, the industry may be affected by optimization. We are involved in negotiating leases. We look to optimize leases and assets. It could be some language for expansion or swapouts on the tower. We forayed into helping analyze assets and

execute programs internally. We needed to send letters to landowners of 4,000 sites to get abstractions done. Some land users built on a lease from a previous owner. We read the lease in detail to understand the implications and write abstracts. We originally were a site acquisition firm involved in land use planning. We have 100 employees, and the company is bi-coastal with headquarters in Orange County. Three of the four major carriers are under contract.



**TOWER INNOVATIONS**

David Nicholson  
[www.towerinnovations.net](http://www.towerinnovations.net)

We provide engineered solutions for the market for guyed, self-supported towers. We offer structural analysis, construction and turnkey services for the design and manufacture of towers, including construction services, analysis and modifications for anyone's product. In self-supported towers, we took the technology from bigger broadcast towers with 30-foot legs to the industry standard of 20-foot legs. In other words, we use 30-foot legs in cellular towers. That means fewer parts, which helps the price and makes for overall project cost reduction because the tower can be stacked in less time and has fewer parts for future maintenance. We have a new product, Tri-Pole, with a patent pending. It competes with monopolies. It has step-down triangular sections. After installation, you close the structure with Lexan to give it the appearance of a monopole. During installation, you have the advantage of the lattice structure for hanging cables. **agl**



# AM TOWER TOO CLOSE?

Achieve AM compliance at:  
[www.waterfordconsultants.com](http://www.waterfordconsultants.com)

- Free online screening
- Easy to use
- Immediate results

When detuning is needed, our new, proprietary approach cuts construction delays and avoids unexpected expenses.

Call Ian Maxwell today: 519-937-1893

Also:  
NIER/MPE Studies  
Experienced engineers – Industry leaders

Waterford Consultants  
540-882-4290



**WATERFORD**  
CONSULTANTS

## Optasite announces \$150 M credit facility via Morgan Stanley

Westborough, MA-based Optasite, a developer, owner and operator of telecommunications tower sites, announced on Nov. 9 the closing of a new \$150 million credit facility.

Morgan Stanley Asset Funding was the agent bank for the transaction. The deal itself closed on Nov. 1.

Optasite said it will use this new capital to continue the expansion of its tower portfolio both through the development of new towers and the acquisition of existing towers and tower portfolios. The company also announced the completion of nine separate tower acquisitions. The transactions range in size from a single site to a 28-tower deal, and are strategically located within Optasite's existing geographic footprint in the Northeast, Eastern seaboard and Gulf Coast.

Along with towers currently under definitive agreement, Optasite now has

more than 400 sites in its portfolio. "This is an exciting step in Optasite's financial growth," said M. Beau Paradowski, CFO of Optasite. "Morgan Stanley is extremely well respected in the tower industry and has both the expertise and financial capacity to help Optasite grow well into the future."

Optasite currently owns towers in 25 states, with a concentration along the Eastern seaboard and the Gulf coast. Optasite is funded by leading financial investors, including Centennial Ventures, Columbia Capital, Highland Capital Partners, Key Venture Partners and Babson Capital Management.

## SBAC acquires SunCom Wireless domestic towers

Berwyn, PA-based SunCom Wireless Holdings announced on Nov. 13 that it had agreed to sell 69 wireless communications towers to SBA Towers II, a wholly owned subsidiary of SBA Communications (SBAC).

The \$18 million transaction is expected to close during the first quarter of 2007. Media Capital Advisors represented SunCom in the transaction.

The towers are located throughout SunCom's markets in North Carolina,

South Carolina and eastern Tennessee.

As part of the agreement, SunCom and SBA will also sign, at closing, 10-year site-lease agreements for each of the 69 towers, with four five-year lease-renewal options. SunCom has also agreed to prepay rent for the first four-year-term to SBAC.

At the conclusion of the deal, SunCom will no longer own any domestic U.S. towers. SunCom still retains sites in Puerto Rico and the U.S. Virgin Islands.



# Utility Service Communications Co.

I N C O R P O R A T E D

- Over 1600 Water Tower Sites Available for Co-Location
- Fast Turnaround Times
- Expert Construction Services Available

*Use our expertise in the Water Tank Industry to facilitate and expedite your buildouts.*

Utility Service Communications Co.  
535 Courtney Hodges Blvd.,  
Perry, GA 31069  
[www.utilityservice.com](http://www.utilityservice.com)

Contact: Debbie Sullivan,  
Vice President Site Management  
Toll Free: 800-679-7819  
Email: [dsullivan@utilityservice.com](mailto:dsullivan@utilityservice.com)

## FCC seeks comments on mitigation of bird/tower collisions

On Nov. 22, an FCC *Notice of Proposed Rulemaking* (NPRM) on the impact of communications towers on migratory birds was published in the *Federal Register*. Comments on the NPRM (Docket WT 03-187) must be

filed by Jan. 22, 2007; Reply Comments to those Comments by Feb. 20, 2007.

The FCC has tentatively concluded that its National Environmental Policy Act (NEPA) obligations may provide a basis for rules to diminish migratory

bird collisions with communications towers. The FCC has tentatively concluded that, consistent with a FAA guidance memorandum, medium-intensity white strobes should be preferred over red obstruction-lighting systems.

## Reese assumes chair of tower structural standards committee

Brian Reese of AeroSolutions, Boulder, CO, was elected chairman of the TIA-222 structural-standard formulating committee, TR14.7, during the Telecommunications Industry Association TR14.7 subcommittee meeting in San Francisco on Oct. 10.

Reese was elected to replace outgoing Chairman Craig Snyder of Sioux Falls Tower and Communications, Sioux Falls, SD.

As part of the TIA's TR14 Microwave Point-to-Point Communications engineering committee, the TR14.7

subcommittee is the author of the TIA-222 revision G Standard, "Structural Standard for Antenna Supporting Structures and Antennas."

The standard is intended to set minimum criteria for the design, fabrication and construction of antenna-supporting structures and is one of the TIA's most recognized Standards.

Reese has served as vice chairman and secretary of the TR 14.7 committee since 2001. He has worked with the leadership of the committee during the G revision of the standard, the

largest revision of the 222 Standard since its release in 1959.

Reese is vice president of operations at AeroSolutions and has 15 years of experience in engineering and the tower industry in engineering, manufacturing, sales and management.

A registered professional engineer, Reese has a BS in civil engineering from Penn State University. He is a founding board member of the Pennsylvania Wireless Association and also serves as secretary of ASCE's Telecommunications Facilities Committee.

**GO!**

Go to [www.agl-mag.com](http://www.agl-mag.com) and register your subscription to keep AGL coming

**MY-TE Winch-Hoists**  
**Won't Let You Down**

**My-te's utility capstan series with full winch-hoist capabilities won't let you down.**

‡/LIWV XS WR OEV  
‡:RUP JH DU V\W WHP  
IRU VDIH SRV  
ORDG KROGL  
‡ 9 '& 9 \$&  
RU K\GUDXOL  
‡ ' SHQGDQW ZLWK  
IRUZDUG DQG UHYH  
FRQWURO  
‡3RUWDEOH DQG  
OLJKWZHLJKW  
RQ D GRXE OH OLOH

&DOO RU ZULWH  
WRGD\ IRU RXU  
**FREE** FRPSOHWH  
OLQH EURFKXUH

**My-te Products, Inc.**  
9880 E. 30th St.  
Indianapolis, IN 46229  
FAX: 317-897-9811

**800-840-9880**  
[www.myte.com](http://www.myte.com) • [sales@myte.com](mailto:sales@myte.com)

# State associations get active

## Alabama Wireless Association

**Birmingham, AL** — The Alabama Wireless Association (AWA) donated \$10,000 in November to The Bell Center for Early Intervention Programs. The mission of The Bell Center is rooted in today's understanding of young children. The Bell Center is dedicated to maximizing the potential of children from birth to three years of age who are at risk for developmental delay.

Funds for the donation were raised through the AWA's third annual charity golf tournament. The AWA has raised funds for the Bell Center, a local Birmingham charity, in each of its golf tournaments. AWA has donated more than \$21,000 to the Bell Center over the past three years.

## Arizona Wireless Association

**Chandler, AZ** — The Arizona Wireless Association (AZWA) held its kick-off event in November, forming the 12th state wireless association. John Stevens, Crown Castle, serves as the president of AZWA. The launch featured keynote speaker Michael Fitch, PCIA president & CEO, PCIA.

"Each state wireless association is unique, representing local interests and priorities, and that's the way it should be," Fitch said. "State associations are real 'grass roots' efforts—using volunteered time and relying on cooperation of people who work together in the industry."

The AZWA launch drew more than 135 attendees. For more information about the AZWA, visit [www.azwa.org](http://www.azwa.org).

## Carolinas Wireless Association

**Cary, NC** — The Carolinas Wireless Association (CWA), a business association of members of the wireless industry, held its fourth-quarter event on Oct. 12 at the Cary Embassy Suites. The event featured Jeffrey Steinberg, deputy chief of the FCC's Spectrum and Competition Policy Division, as the speaker. Carolinas Wireless Association also recognized its first anniversary.

"We are very proud to have just held our fourth-quarter luncheon event," said Brian Hurley, CWA president. "Not only did we have a great speaker, but we also were able to recap the first year

of the association and to recognize our past achievements."

Steinberg spoke about the impact of the FCC on wireless telecommunications and infrastructure, giving an overview on several aspects of each sector.



Hurley summarized activities in the association's first year, mentioning highlights of the four quarterly luncheons, the organizational launch, CWA's participation in the SWAP Centerstage at the PCIA show, the efforts of CWA's membership committee and the evolution of CWA's website.

Hurley also spoke of CWA events that then were upcoming, including the association's participation in the IWCE/MRT Wireless Summit in November and the 2006 holiday party.

## Kentucky Wireless Association

**Louisville, KY** — The Kentucky Wireless Association (KWA) held its kickoff event at Churchill Downs, forming the 13th state wireless association. Mike Meadows, Crown Castle, serves as the president of KWA.

PCIA President & CEO Michael Fitch said, "The Kentucky Wireless Association can help to educate decision-makers about the needs and benefits of the wireless industry."

The KWA event featured over 100 attendees. For more information about the KWA, visit [www.kentuckywireless.org](http://www.kentuckywireless.org).

## MoKan Wireless Association

**Kansas City, MO** — The MoKan (Missouri-Kansas) Wireless Association was scheduled at press time to hold its Holiday Social here on Dec. 6. In addition to socializing and wine/spirits tasting, the association designated the event to collect charitable toy donations to the Toys 4 Tots program.

## New England Wireless Association

**Boston** — The New England Wireless Association (NEWA) held its kick-off event on Nov. 8, becoming the 11th state wireless association. Jeff Previte, EBI Consulting, serves as president of the NEWA. The launch featured keynote speaker Michael Fitch, PCIA president and CEO.

"We at PCIA understand how much work goes into setting up a new state wireless association," Fitch said, "and we want to congratulate all of your officers and your attendees today. Based on the experience in other states, you can look forward to a lot of work, a lot of fun, and accomplishing a great deal—personally, for charity, for your companies and for the industry."

The NEWA launch featured over 180 attendees. It is currently the largest regional association, representing Massachusetts, Rhode Island, Maine, Connecticut, Vermont and New Hampshire.

For more information on the NEWA, contact [jprevite@ebiconsulting.com](mailto:jprevite@ebiconsulting.com).

## Texas State Wireless Association

**Irving, TX** — The Texas State Wireless Association (TXWA) held its kick-off event on Oct. 26, making Texas the 14th state to form a state wireless association. Jeff Peters, market manager, C. Faulkner Engineering, serves as the president of TXWA.

The launch featured keynote speaker Michael Fitch, PCIA President and CEO, and Hunter Stuart, president of the Tennessee Wireless Association and director, New Site Development—DAS, for Crown Castle International.

"PCIA is proud to support the State Wireless Association Program," Fitch said. "I am here today to emphasize the importance of the Texas Wireless Association. You are a key component in the larger effort to expand wireless communications across the country. Your work is essential to enabling the wireless future that our country wants and needs."

The TXWA Launch boasted the largest attendance yet for a state wireless association launch, with over 250 individual participants. For more information on the Texas State Wireless Association, visit <http://txwa.org/index.htm>.

agl



**Alarm monitor**

The DM-900 Alarm Monitor has eight inputs that can be configured for contact closure or voltage alarms. The monitor, from **Hark Tower Systems**, has a built in photocell monitor that works with 110 Vac photocells, has selectable day/night alarm timers and logs when the photocell changes from day to night and back to day. The DM-900 can be interrogated using either terminal emulation software or optional Windows-compatible PC software. Alarm conditions can be viewed and logged at any time. Reports can be generated from the logged data on a per-site basis.

[www.harksystems.com](http://www.harksystems.com)



**AWS-band transmission line**

Coaxial transmission line designed to address attenuation challenges in Advanced Wireless Services (AWS) spectrum is available from **Radio Frequency Systems (RFS)**. Cellflex 'A' Premium Attenuation line is designed to improve AWS-band attenuation as much as 8 percent over conventional transmission line. The new coaxial line addresses challenges for broadband wireless data applications, particularly signal-to-noise ratios and minimal bit-error rate. The cable is available in 7/8", 1 1/4" and 1 5/8" diameters and incorporates a choice of UV-resistant polyethylene and fire-retardant jacket options.

[www.rfsworld.com](http://www.rfsworld.com)



**Power amplifier for wideband**

The SM2040-37 high-linearity amplifier is designed for multipurpose use in military and commercial applications. The unit, from **Stealth Microwave**, operates from 2 to 4 GHz with a P1dB of +37 dBm and OIP3 of +47 dBm. Gain is 37dB with a flatness of ±0.75 dB across the band. Standard features include a single +12 Vdc supply, thermal protection with auto reset and over/ reverse voltage protection. In module form, the unit measures 5.0" × 2.5" × 0.056". An integral heatsink is also available. The amplifier is available in lab-unit and 19" rack configurations.

[www.stealthmicrowave.com](http://www.stealthmicrowave.com)

**Type N Connector for 50 Ω cables**

The EZ-400-NMC-2 male (3190-1906) two-piece, Type N connector for LMR-400 low-loss flexible 50 Ω coaxial cables is available from **Times Microwave Systems**. The two-piece design connector uses a no-solder, spring-finger, center-conductor contact and simple clamp-style outer contact attachment to eliminate the need for a crimp tool. Installed with either a set of 5/8" or adjustable wrenches, the EZ-400-NMC-2 uses a dual hex/knurl coupling nut to allow tightening by hand or with a wrench. The connector is suitable for wireless applications including spread spectrum and ISM bands.

[www.timesmicrowave.com](http://www.timesmicrowave.com)



**FEATURE ARTICLES INDEX**

**AM Detuning**

"Detuning: A Non-standard and Situational Discipline," Richard P. Biby, Dec. 2006, page 26.  
 "You Can Tune a Tower, but You Can't Tuna Fish," Richard P. Biby and Laurence R. Giessman, Oct. 2006, page 28.

**Anchors and Guy Systems**

"Loose 'Lifts' Sink Ships," Matthew Arps, Aug./Sept. 2006, page 38.

**Antennas and Antenna Installation**

"Advanced Array Antenna Design and Beamforming," Thomas Ginter, Nov. 2006, page 34.  
 "Base Station Antennas: 'Evolution of Integration,'" Chuck Powell, Dec. 2006, page 18.  
 "The Robotic Arm Solution," Doug Haberman and Lynn Parker, May/June 2006, page 20.

**Distributed Antenna Systems**

"Carrier Views Outdoor DAS with Guarded Optimism," Esme Lombard, Dec. 2006, page 38.  
 "The Network *Inside* the Network," Jerry Black, Dec. 2006, page 40.  
 "What Is DAS, and Why Does It Need a Forum?" Allen Dixon, Dec. 2006, page 41.

**Enclosures/Environments**

"The Incredible Shrinking Enclosure," Christian Mackin, Aug./Sept. 2006, page 26.

"Options for Cooling Communications Sites," Susan E. Merrell, May/June 2006, page 28.

**Fiber Optics**

"Wireless Lights Up!" Allen Dixon, July 2006, page 16.  
 "Wireless Lights Up II: Cable Designs and Applications," Allen Dixon, Aug./Sept. 2006, page 32.

**Finance and Markets**

"2007 Business Strategies," AGL staff, Dec. 2006, page 46.  
 "Does the CCI/GSL Deal Represent a New Market High?" R. Clayton Funk, Nov. 2006, page 30.

"Executives Predict Thousands of New Sites Will Be Needed," AGL staff, Dec. 2006, page 44.

"How the Top-Tier Players View the Infrastructure Market," Don Bishop, Dec. 2006, page 36.

"Mobile TV: Better Than Being There," Michael L. Higgs, Jr., Dec. 2006, page 42.

"Valuation: A Worthwhile Endeavor," R. Clayton Funk, Nov. 2006, page 28.

**Grounding and Lightning Protection**

"Grounding Practices for Wireless Telecom Sites," Alan Rebeck, April 2006, page 40.  
 "Selecting Coaxial Lightning Protectors," George M. Kauffman, April 2006, page 42.  
 "Strike Out Lightning with Single-point Grounding," William O'Keefe, April 2006, page 46.  
 "Tower-grounding System Design for the 21st Century," John Howard, May/June 2006, page 32.

**Industry Awards**

"The AGL 'Towering Achievement Awards,'" AGL staff, July 2006, page 9.

"Announcing the AGL 'Towering Achievement' Awards," AGL staff, May/June 2006, page 43.  
 "Excellence by An Individual," AGL staff, Oct. 2006, page 39.

**Intellectual Property**

"Copyright Protection—Exclusivity of Expression," John Bradshaw and Delaney DiStefano, Nov. 2006, page 32.  
 "Patent Basics—Rewarding Innovation," John Bradshaw and Delaney DiStefano, Aug./Sept. 2006, page 28.  
 "Trademarks—An Ounce of Prevention," John Bradshaw and Delaney M. DiStefano, July 2006, page 28.

**Lighting Systems**

"Light Tech—The Next Generation," Alexander Rizkin and Robert Tudhope, May/June 2006, page 38.

**Network Operating Centers**

"NOCs: One Way to Save—or Make—Money," Donald Koehler, Feb./Mar. 2006, page 38.

**Power Systems**

"Best Practices, Batteries and Backup Power Systems," Donald Koehler, April 2006, page 28.  
 "Cells Within Cells," AGL staff, April 2006, page 36.  
 "Generating Some Respect," D. A. Keckler, April 2006, page 38.

**RF Field Measurements**

"A View to a 'NAL,'" Richard Strickland, Feb./Mar. 2006, page 20.  
 "Proper Surveillance Techniques," Richard Strickland, Feb./Mar. 2006, page 27.

**Safety Procedures and Training**

"Accident Investigations: A Means to Improve Safety," Steve Wilder, April 2006, page 50.  
 "FCC [MPE] Regulations," Richard Strickland, April 2006, page 24.  
 "Raise the Tower," Winton Wilcox, Feb./Mar. 2006, page 32.  
 "RF Hazard Protection Equipment," Richard Strickland, April 2006, page 22.

**Service Continuity**

"Katrina—Lessons to Learn, Plans to Make," Richard P. Biby, Aug./Sept. 2006, page 40.

**Site Development**

"HOLA Migration: One to Many," Sean Heath, Oct. 2006, page 34.

**Site Security**

"Access-control Technology: New Problems or New Solutions?" Donald Koehler, Aug./Sept. 2006, page 20.

**Siting**

"How Federal Preemption Helps Tower Owners," Charlie Lemley and Brendan Carr, Oct. 2006, page 22.  
 "Successful Tower Siting: The Proactive Approach," Robert Gaudio, July 2006, page 24.

"There is a Spirit in the Woods," John P. Hebb, Feb./Mar. 2006, page 42.

**Tower Collapses**

"The Legal Landscape When a Tower Collapses," Vincent F. O'Flaherty, Nov. 2006, page 20.

**Tower Upgrades and Augmentation**

"Protecting Your Investment," Brian R. Reese and David W. Hawkins, July 2006, page 30.

**Trade Associations**

"Genesis of State Wireless Associations," Don Bishop, April 2006, page 53.  
 "MoKan Voices," Don Bishop, April 2006, page 53.  
 "MoKan Wireless Association Marks St. Louis Launch," Don Bishop, April 2006, page 52.  
 "PCIA Gears Up," Michael T. N. Fitch, Dec. 2006, page 33.  
 "SWAP Continues to Make a Difference," Janet Gill, Dec. 2006, page 32.

**FEATURE AUTHORS INDEX**

**AGL Staff**

"2007 Business Strategies," Dec. 2006, page 46.  
 "The AGL 'Towering Achievement Awards,'" July 2006, page 9.

"Announcing the AGL 'Towering Achievement' Awards," May/June 2006, page 43.

"Cells Within Cells," April 2006, page 36.

"Excellence by An Individual," Oct. 2006, page 39.

"Executives Predict Thousands of New Sites Will Be Needed," Dec. 2006, page 44.

**Arps, Matthew**, "Loose 'Lifts' Sink Ships," Aug./Sept. 2006, page 38.

**Biby, Richard P.**

"Detuning: A Non-standard and Situational Discipline," Dec. 2006, page 26.  
 "Katrina—Lessons to Learn, Plans to Make," Aug./Sept. 2006, page 40.

— and **Laurence R. Giessman**, "You Can Tune a Tower, but You Can't Tuna Fish," Oct. 2006, page 28.

**Bishop, Don**

"Genesis of State Wireless Associations," April 2006, page 53.

"How the Top-Tier Players View the Infrastructure Market," Dec. 2006, page 36.

"MoKan Voices," April 2006, page 53.

"MoKan Wireless Association Marks St. Louis Launch," April 2006, page 52.

**Black, Jerry**, "The Network *Inside* the Network," Dec. 2006, page 40.

**Bradshaw, John, and Delaney M. DiStefano**

"Copyright Protection—Exclusivity of Expression," Nov. 2006, page 32.

"Patent Basics—Rewarding Innovation," Aug./Sept. 2006, page 28.

"Trademarks—An Ounce of Prevention," July 2006, page 28.

**Dixon, Allen**

"What Is DAS, and Why Does It Need a Forum?" Dec. 2006, page 41.

"Wireless Lights Up!" July 2006, page 16.

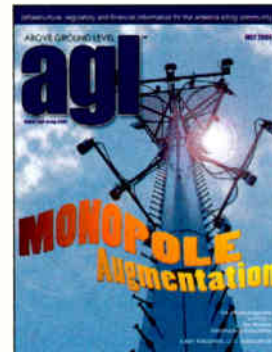
"Wireless Lights Up II: Cable Designs and Applications," Aug./Sept. 2006, page 32.

**Fitch, Michael T. N.**, "PCIA Gears Up," Dec. 2006, page 33.

**Funk, R. Clayton**

"Does the CCI/GSL Deal Represent a New Market High?" Nov. 2006, page 30.

"Valuation: A Worthwhile Endeavor," Nov. 2006, page 28.



## COLUMNS INDEX

**Gaudio, Robert**, "Successful Tower Siting: The Proactive Approach," July 2006, page 24.

**Gill, Janet**, "SWAP Continues to Make a Difference," Dec. 2006, page 32.

**Ginter, Thomas**, "Advanced Array Antenna Design and Beamforming," Nov. 2006, page 34.

**Haberman, Doug, and Lynn Parker**, "The Robotic Arm Solution," May/June 2006, page 20.

**Heath, Sean**, "HOLA Migration: One to Many," Oct. 2006, page 34.

**Hebb, John P.**, "There is a Spirit in the Woods," Feb./Mar. 2006, page 42.

**Higgs, Michael L. Jr.**, "Mobile TV: Better Than Being There," Dec. 2006, page 42.

**Howard, John**, "Tower-grounding System Design for the 21st Century," May/June 2006, page 32.

**Kauffman, George M.**, "Selecting Coaxial Lightning Protectors," April 2006, page 42.

**Keckler, D. A.**, "Generating Some Respect," April 2006, page 38.

**Koehler, Donald**

"Access-control Technology: New Problems or New Solutions?" Aug./Sept. 2006, page 20.

"Best Practices, Batteries and Backup Power Systems," April 2006, page 28.

"NOCs: One Way to Save—or Make—Money," Feb./Mar. 2006, page 38.

**Lemley, Charlie, and Brendan Carr**, "How Federal Preemption Helps Tower Owners," Oct. 2006, page 22.

**Lombard, Esme**, "Carrier Views Outdoor DAS with Guarded Optimism," Dec. 2006, page 38.

**Mackin, Christian**, "The Incredible Shrinking Enclosure," Aug./Sept. 2006, page 26.

**Merrell, Susan E.**, "Options for Cooling Communications Sites," May/June 2006, page 28.

**O'Flaherty, Vincent F.**, "The Legal Landscape When a Tower Collapses," Nov. 2006, page 20.

**O'Keefe, William**, "Strike Out Lightning with Single-point Grounding," April 2006, page 46.

**Powell, Chuck**, "Base Station Antennas: Evolution of Integration," Dec. 2006, page 18.

**Rebeck, Alan**, "Grounding Practices for Wireless Telecom Sites," April 2006, page 40.

**Reese, Brian R., and David W. Hawkins**, "Protecting Your Investment," July 2006, page 30.

**Rizkin, Alexander, and Robert Tudhope**, "Light Tech—The Next Generation," May/June 2006, page 38.

**Strickland, Richard**

"FCC [MPE] Regulations," April 2006, page 24.

"Proper Surveillance Techniques," Feb./Mar. 2006, page 27.

"RF Hazard Protection Equipment," April 2006, page 22.

"A View to a 'NAL,'" Feb./Mar. 2006, page 20.

**Wilcox, Winton**, "Raise the Tower," Feb./Mar. 2006, page 32.

**Wilder, Steve**, "Accident Investigations: A Means to Improve Safety," April 2006, page 50.

### Built to Suit by Don Bishop (commentary)

"Stuck in the Eye of the Beholder," Feb./Mar. 2006, page 10.

"All It Takes Is ... Billions," April 2006, page 10.

"The Tower Industry is a Motion Picture," May/June 2006, page 10.

"Going Underground," July 2006, page 11.

"It's About Coverage ... or Not," Aug./Sept. 2006, page 10.

"Throw Them Out at First BASE," Oct. 2006, page 10.

"You Can Ask, but They Won't Tell," Nov. 2006, page 10.

"Barbed Wire and Radar," Dec. 2006, page 8.

### Capital Ideas by Jarred Saba (capitalization)

"The Basics Behind Raising Capital for Tower Company Expansion," Feb./Mar. 2006, page 18.

"Why Local Banks Dislike Lending to Towercos," April 2006, page 16.

"How to Value a Tower's Cash Flow in Today's Dollars," May/June 2006, page 18.

"Personal Guarantees," Aug./Sept. 2006, page 16.

"Does the Cash Flow Justify the Build?" Oct. 2006, page 21.

"What Gives Tenant Leases Higher Value?" Nov. 2006, page 18.

### Law of Physics (legal and regulation)

"The NC-DOL Tower Safety Standard," David G. Sarvadi and Jeremy W. Brewer, Feb./Mar. 2006, page 29.

"That Tower Has a Great Personality," Michael L. Higgs, Jr., April 2006, page 17.

"Is Quarterly Inspection Necessary?" Thomas B. Magee, May/June 2006, page 19.

"Where's the Next One Coming From?" Mark Savit, Oct. 2006, page 50.

### Line of Site by Richard P. Biby (commentary)

"Divining the New Year," Feb./Mar. 2006, page 8.

"Getting Stronger, Wiser," April 2006, page 8.

"Growth Requires Gentility," May/June 2006, page 8.

"Adding a Little Artistry," July 2006, page 8.

"Thanks; See You Soon," Aug./Sept. 2006, page 8.

"Nash-vegas!," Oct. 2006, page 8.

"Ooooh! My Ribs!," Nov. 2006, page 8.

"Oh What Fun It Is To ...," Dec. 2006, page 6.

### Materials and Forces (engineering & technology)

"Antenna Arrays: Impedance Matching," Harold Kinley, Feb./Mar. 2006, page 44.

"Antenna Arrays: Phasing," Harold Kinley, April 2006, page 18.

"Improve Your Tower," Ted Abrams, May/June 2006, page 58.

"Stamp' Collecting is a Hobby," Simon Weisman, Aug./Sept. 2006, page 18.

"An Introduction to EME Compliance," Richard P. Biby, Oct. 2006, page 18.

"How Ice Load May Reduce Wind-load Stress," Dan Simmonds and Pete Jernigan, Nov. 2006, page 16.

### The Noise Factor by D. A. Keckler (commentary)

"Copper Kleptos and Orange Warblers," Dec. 2006, page 16.

### PCIA Proactivites (trade association issues)

"Declaratory Ruling Breaks Tribal Consultation Logjam," Connie Durcsak, Feb./Mar. 2006, page 12.

"Swap Marks Its First Anniversary," Connie Durcsak, April 2006, page 12.

"PCIA Launches Forum for Distributed Antenna Systems," Connie Durcsak, May/June 2006, page 12.

"A Not-so-enlightened Zoning Trend," Anne M. Perkins, July 2006, page 12.

"Some Lawsuits Are for the Birds," Anne M. Perkins, Aug./Sept. 2006, page 11.

"New Entrants, New Services and New Opportunities," Anne M. Perkins, Oct. 2006, page 12.

"Balancing the Interests," Anne M. Perkins, Nov. 2006, page 12.

"California Wireless Facilities Siting Bill Is Enacted Into Law," Andrea Bruns, Nov. 2006, page 12.

"Enforcement and Environmental Assessment: The Process Matters," Anne M. Perkins, Dec. 2006, page 10.

**Risky Business by David Saul (insurance)**

"Cybercoverage for Your Business," Feb./Mar. 2006, page 16.

"What Is Pollution?" April 2006, page 15.

"An Haughty Spirit Before a Fall," May/June 2006, page 16.

"Hurricane Watch, 2006," Aug./Sept. 2006, page 14.

"Managing Fall Hazards and Protection," Oct. 2006, page 16.

"D&O Liability Insurance," Nov. 2006, page 14.

"Business-contingency Plans," Dec. 2006, page 14.

**Vertical Assets by R. Clayton Funk (finance)**

"If You Build It, Will They Come?" Feb./Mar. 2006, page 14.

"Swirling Down the Drain," April 2006, page 14.

"Stop the Bleeding," May/June 2006, page 14.

"Money Never Sleeps," July 2006, page 14.

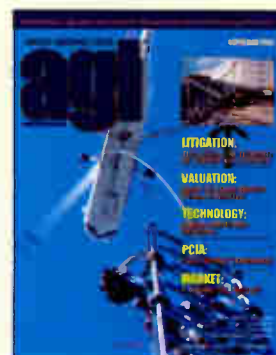
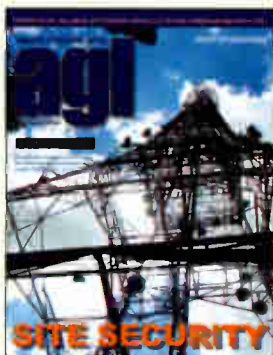
"Do Your Thing, Outsource the Rest," Aug./Sept. 2006, page 12.

"Gazing Into a Sparkling Globe," Oct. 2006, page 14.

"You've Got Mail," Dec. 2006, page 12. agl

**Back issue search tip:** AGL digital editions can be opened in Acrobat Reader and searched for *specific* words, names or phrases, such as "tenant lease."

The digital edition is available for free to subscribers at [www.agl-mag.com/subscribe.html](http://www.agl-mag.com/subscribe.html).



## advertisers index

AM Coordination Services .....	page 25	Pendulum Instr./XL Microwave .....	page 17
Atlantic Risk Management .....	page 2	Powerwave Technologies .....	page 7
Aluma-Form .....	page 44	Radio Waves .....	page 16
Biby Publishing .....	pages 28, 53	RCC Consultants .....	page 39
CDMI .....	page 11	Sabre Site Solutions .....	page 23
Elk River .....	page 45	Specialty Tower Lighting .....	page 11
FarLight .....	page 47	SRP Telecom .....	page 29
Hark Tower Systems .....	page 43	Subcarrier Communications .....	page 60
Higgs Law Group .....	page 58	Talley Communications .....	page 13
ITL .....	page 49	Telewave .....	page 5
Kenny Walker .....	page 58	Tessco Technologies .....	pages 9, 35
Lawrence Behr Associates .....	page 17	TowerTex .....	page 48
McIntire .....	page 49	Utility Service Communications .....	page 52
My-te Products .....	page 53	Valmont Structures .....	page 37
NATE .....	page 15	Waterford Consultants .....	page 51
PCIA .....	page 59	Wireless Capital Partners .....	page 25
PCTEL Antenna Products Group .....	page 9		

## editorial index

AeroSolutions .....	page 53	Optasite .....	page 52
AFL Network Solutions .....	page 50	Panhandle Telecom. Systems .....	pages 10
Alabama Wireless Association .....	page 54	PCIA .....	pages 10, 33, 36-37, 38, 41, 54
Alltel .....	page 37	Pennsummit Tubular .....	page 46
American Tower .....	pages 36-37	Powder River Development Services .....	page 47
Arizona Wireless Association .....	page 54	PPC .....	page 48
Biby Publishing .....	pages 6, 44	Radio Club of America .....	page 44
Blackdot Wireless .....	page 50	Radio Frequency Systems .....	pages 20, 55
Carolinas Wireless Association .....	page 54	Sabre Towers & Poles .....	page 31
Cellxion .....	page 47	Saul Ewing .....	page 47
Corning Cable Systems .....	page 33	SBA Communications .....	pages 36-37, 52
Crown Castle International .....	pages 43, 36-37	Shayam Telcom .....	page 46
Cyren Call Communications .....	page 44	Sprint Nextel .....	page 43
Donohue and Blue .....	page 43	Stealth Microwave .....	page 55
Dynatek Telecom. Services .....	page 47	Strategic Wireless Networks .....	page 49
Faulk & Foster Real Estate .....	page 50	SunCom Wireless .....	page 52
Global Signal .....	page 36-37	SWAP .....	pages 32-34, 54
Hark Tower Systems .....	pages 46, 55	T-Mobile .....	pages 5, 10, 37, 38-39
JRH Architects .....	page 48	Tectonic .....	page 46
Kangaroo.tv .....	page 42	TerreStar Networks .....	page 44
Kentucky Wireless Association .....	page 54	Texas Wireless Association .....	page 54
MoKan Wireless Association .....	page 54	Times Microwave Systems .....	page 55
Morgan Stanley Asset Funding .....	page 52	Tower Innovations .....	pages 44, 50
New England Wireless Association .....	page 54	Verizon Communications .....	page 37
Nokia .....	page 20	Volt Telecom Group .....	page 46
OBSAI .....	page 20	VQS .....	page 49

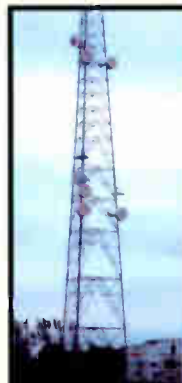
## professional directory

### Higgs Law Group LLC

Full-service telecommunications law firm with an emphasis on towers. Contact HLG for assistance with: Ground & Site Leases, FCC Enforcement & Licensing, Evaluation & Brokerage, Litigation & Insurance Claims, and all other tower-related transactions.

*- Counseling clients to reach their best strategic advantage for a vibrant future*

Ph. (301) 762-8992  
Fax (301) 762-8993    [www.higgslawgroup.com](http://www.higgslawgroup.com)



### TOWER FOR SALE

**Naperville, IL**

**Latitude: 41-48-02**

**Longitude: 88-14-10**

- 300 ft Self-Supporting Lattice Tower
- Located on leased property
- Tower can be bought and used in its present location or dismantled and erected at your site

**Call: Kenny Walker 469-951-1957**

Put the power of AGI's circulation list to work for you with a professional card advertisement.  
Call Karen Clark at 303-979-0621; email [kclark@agl-mag.com](mailto:kclark@agl-mag.com)



THE WIRELESS INFRASTRUCTURE SHOW



# **ORLANDO**

**October 1-4, 2007**

**Rosen Shingle Creek**

**Brand NEW Resort!**

SITING THE FUTURE

# PCIA

# Towers That Mean Business

*Building today's high capacity co-location towers*



**SUBcarrier  
COMMUNICATIONS**

*Owners, Developers and Managers*

139 White Oak Lane  
Old Bridge, NJ 08857  
732-607-2828  
[www.subcarrier.com](http://www.subcarrier.com)