

ABOVE GROUND LEVEL

agl

MAY 2009
agl-mag.com

TOWER LIGHTING

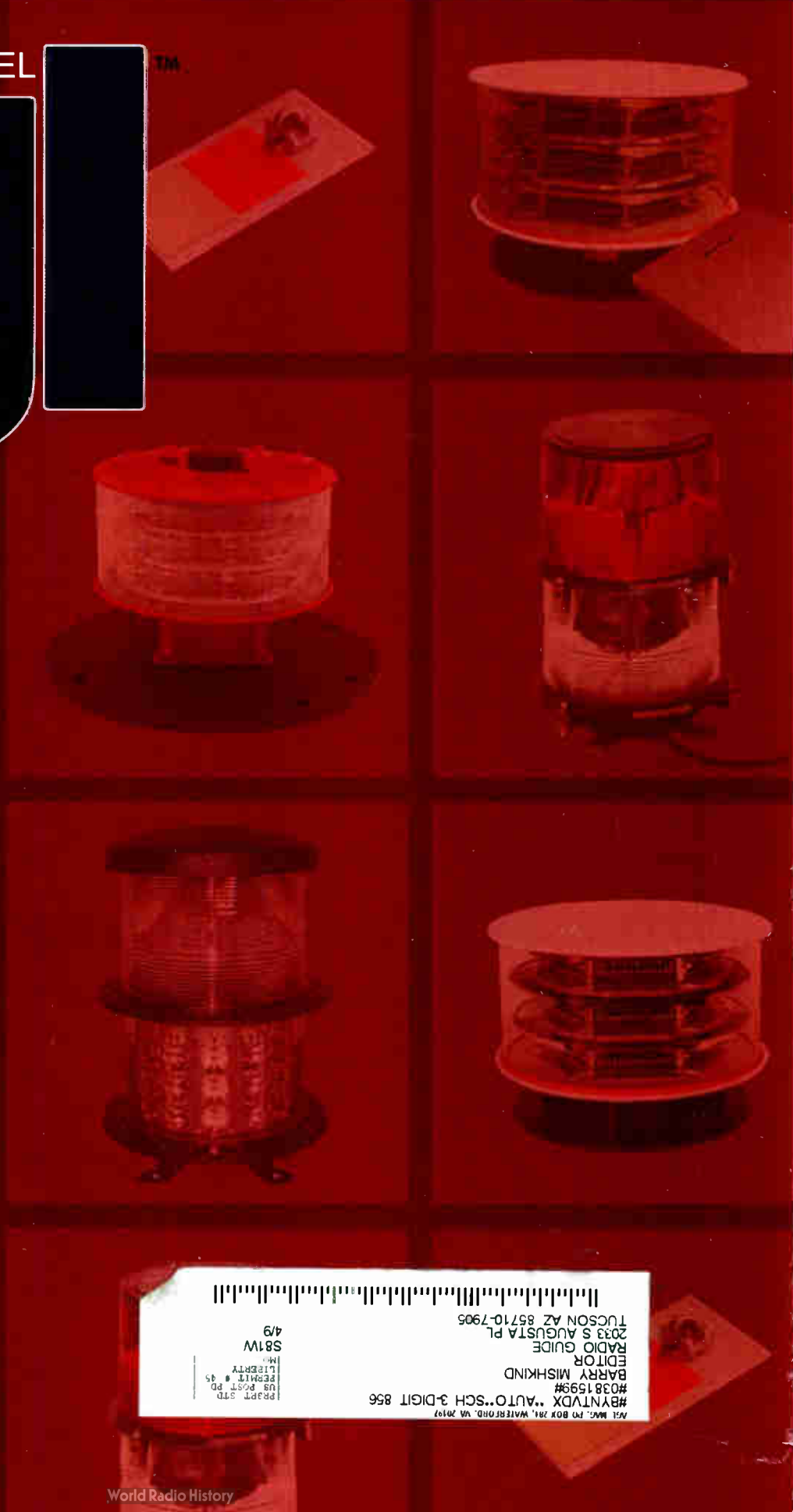
TRIBAL CONSULTATION AND THE FCC'S TCNS PROTOCOL

REPLACING AN ANTENNA ON A 2,000-FOOT TOWER

The official magazine for:
PCIA - The Wireless Infrastructure Association
SWAP - The State Wireless Association Program
A BIBY PUBLISHING, LLC PUBLICATION

World Radio History

#BYNTVDX **AUTO**SCH 3-DIGIT 856
 #0381599#
 BARRY MISHKIND
 EDITOR
 RADIO GUIDE
 2033 S AUGUSTA PL
 TUCSON AZ 85710-7905
 4/9
 S81W
 PREPRT STD
 US POST PD
 PERMIT # 95
 LIBERTY



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 www.atlanticrisk.com or email David Saul at dsaul@atlanticrisk.com

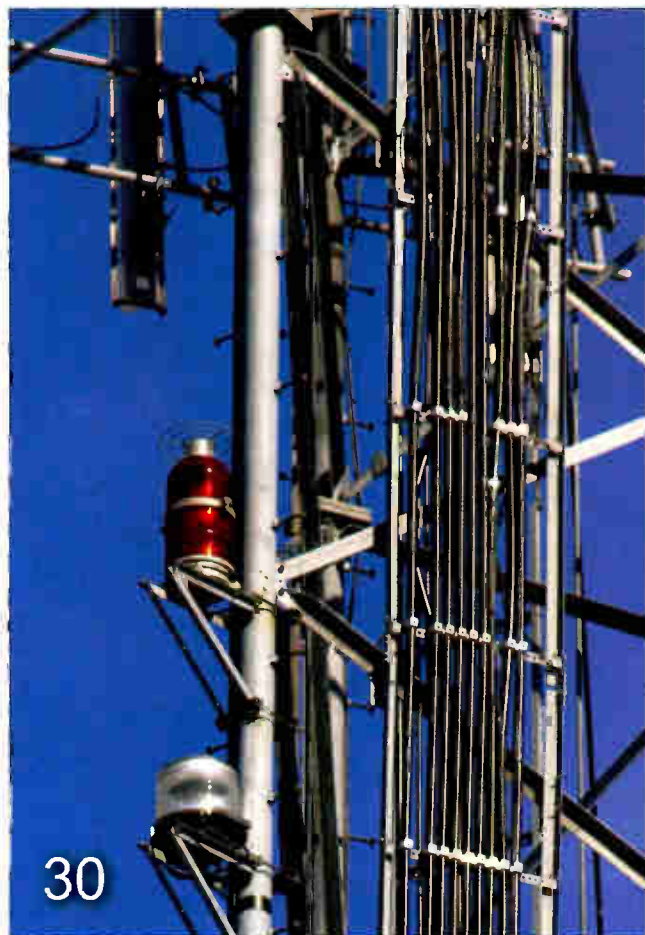
**Atlantic Risk
Management**
CORPORATION

Endorsed by:

PCIA
The Wireless Infrastructure Life Association

**THE
HARTFORD**





Features

16 RF Measurements Help to Win Lease Approvals

AGL Report

Show how a nearby cell site might be *helpful*.

20 NEPA 101: Tribal Consultation and the FCC's TCNS Protocol

James Duncan, P.E.

Early notification, proper documentation and an open sharing of information can speed the process of consultation.

30 AGL Tower of the Month

Described by one individual at Global Tower Partners as "a well-rounded tower," our leggy, 358-foot center spread boasts Verizon, AT&T, Sprint Nextel and i wireless as its carriers.

32 Stronger Towers With 10% of the Weight of Steel

Mike Kipp; Patrick Burke; Erich Wilson, Ph.D.; and Leslie Derrig

Carbon-fiber towers have less wind loading and stack faster than comparable steel towers.

36 Disaster Recovery for Wireless Communications

Robert Burchard

An innovative vehicle delivers on-site recovery to vital utility communications.

42 Nat'l Geo Channel Spotlights Workers on 'Big-iron' Towers

AGL Report

Cameras from the National Geographic Channel followed workers from Tower King II.

52 Fear and Loathing in Las Vegas or What I Learned Learned at the Tower Technology Summit

Jim Fryer

Nonlinear threads and observations from a gonzo journalist.

54 3G: 'Bread and Butter'; 4G: 'Nice Glide Path'

AGL Report

Equity research head Ric Prentiss expects consistent spending on 3G infrastructure while gradual investments are made in a transition to 4G, with data-only services leading the way.



on the cover

Pulitzer Prize-winning poet Charles Simic wrote, "Inside my empty bottle I was constructing a lighthouse while all the others were making ships."

Typically, *AGL* dedicates a good portion of our editorial to the "building ships" side of the tower industry. This month, we've dedicated our cover and committed a few pages to the "lighthouse" portion of it. Turn to our Product Showcase on page 56 for more information on tower lighting options and the companies that create them.

Cover photography courtesy of: *Bird Busters, Unimar, Farlight, ITL, TWR and Flash Technology.*

Departments

6 Publisher's Note

Master the application rules, and you may receive a share of the \$7.2 billion allocated from the federal economic stimulus spending for broadband wireless.

8 Editorial Comment

Support state wireless association — the associations operate thanks to the efforts of a large number of volunteers, and our thanks go out to them for making the meetings and other events possible. You can play a role, too, if only by attending association meetings.

10 PCIA Proactivities

Jackie McCarthy and Mike Saperstein

The American Recovery and Reinvestment Act is set to boost wireless infrastructure.

12 State Wireless Association Spotlight

Douglas W. Dimitroff

Known as "the Voice of New York," the New York State Wireless Association is reaching out to carriers, municipalities, and tower and infrastructure companies and is listening to what they have to say about the wireless industry in New York.

26 Quick-Guide to Engineers and Consultants

AGL Staff

A supplement to January's 2009 Buyers Guide, the Quick-Guide to Engineers and Consultants lists service providers with additional information on the types of services they offer.

56 Product Showcase – Lighting Systems and Equipment

The showcase includes medium-intensity red beacons, daytime white strobe light/nighttime red flashing beacon combinations and solar powered LEDs. Modern lighting technology features low power usage, products that can withstand extreme conditions and lights configured to reduce ground scatter.

58 Advertisers Index

58 Professional Directory

AGL (Above Ground Level) is published 11 times a year by Biby Publishing, LLC, 18331 Turnberry Drive, Round Hill, VA 20141, and is mailed free to qualified individuals in the United States of America.

POSTMASTER: Send address change to *AGL* Circulation Department, 18331 Turnberry Drive, Round Hill, VA 20141.

AGL is the official commercial magazine for PCIA 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*. Likewise, news items, product information, commentaries and featured articles produced by *AGL* do not necessarily represent the opinions, policies or endorsements of PCIA.

**AGL Editorial
Advisory Board**

Bruce McIntyre
Tower Innovations Inc.

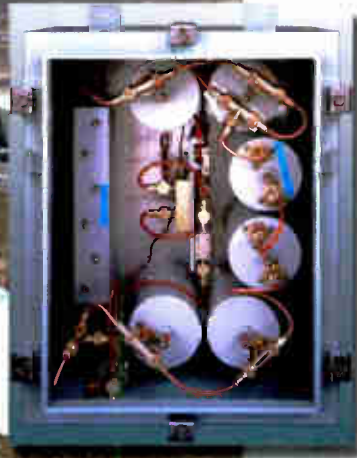
R. Clayton Funk
Media Venture Partners

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

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

Wacom is a registered trademark of Wacom Co., Ltd.



TELEWAVE, INC.

Wireless Communications Manufacturers Since 1972

World Radio History

Give Me the Money!

I've been sticking a toe into the broadband stimulus pool: \$7.2 billion in grants and loans to help bring broadband services to "the rest" of America. All eyes are on Washington to see how the folks at the National Telecommunications and Information Administration and the U.S. Department of Agriculture's Rural Utilities Service (USDA RUS) will give away your hard-earned tax dollars to jump-start the economy and provide ways to download pirated movies in



underserved parts of the United States.

The truth is that restrictions placed on what kind of project should be funded make sense, restrictions such as there must not be a high-speed Internet service in the area yet, and there must be reasonable

build-out obligations. There are other terms and conditions about what you would want to see if it were your own money. I've had the pleasure of sitting down with a USDA RUS general field representative to discuss the kinds of projects they have administered in the past and what the expected profile of proposed grant programs would be.

Some pretty straightforward rules are emerging. Broadband can be defined as about any data speed you wish, as long as it is above [768 kb/s, 1 Mb/s, 1.544 Mb/s or 10 Mb/s]. You [will/will not] be treated more favorably if you have received RUS money before. You [can, cannot] compete with existing high-speed service providers for a period of [0, 1 or 2 years] after an award of funds. Building towers for wireless networks to use [is/is not] eligible for stimulus money. The applicant has to provide end-user broadband services to qualify, not merely build high-speed microwave

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

or fiber backbone service [yes/no]. Anyway, you get the idea. Much money will be spent on many good projects. Many questions remain to be answered, and the Q&A process is progressing nicely. I've already run into projects to rent tower space and build some small towers — big light poles, perhaps.

Tower inventory

One of my FCC friends is looking at putting together a complete tower inventory to address concerns expressed by the Federal Emergency Management Agency and the Department of Homeland Security. The idea is that during a time of national need, such as a natural or man-made disaster, the available vertical assets otherwise might not be easily identified. Yes, you can go to the online portfolios of many companies and assemble a list of potential sites, but when the confetti is in the fan, there is no time to do that. Thus, it is important for a freely available, publicly accessible inventory to be made available.

Sorry if this is obvious, but it is worth saying that if a tower is shorter than 200 feet above ground level and it is not subject to FAA glide-slope and other rules, then the owner is not required to file federal notice of the tower. What about the tenants? Many carriers have area licenses, and thus are not required to file specific locations for sites within a given market area. As a result, a large number of U.S. towers are not in anyone's databases.

Jim Fryer started and ran TowerSource for many years, trying to capture that information. I owned that business for a few years, and it is alive and doing well under other ownership today. Despite such efforts to capture tower data, many sites remain unlisted in any national, publicly searchable database — especially rooftop sites, which may exist in larger numbers than towers. Does anyone have any way to identify these sites? Could we/should we volunteer to put all of our locations into a larger industry database?



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

Published 11 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

CONTRIBUTING EDITOR
Sharpe Smith
ssmith@agl-mag.com

PRODUCTION ARTIST
Scott Dolash
sdolash@agl-mag.com

CONTRIBUTING WRITERS
Jackie McCarthy
jacqueline.mccarthy@pcia.com
Mike Saperstein
michael.saperstein@pcia.com
William Sill
wsill@wbklaw.com

ADVERTISING MANAGERS
Mercy Contreras
mcontreras@agl-mag.com
Mary Carlile
mcarlile@agl-mag.com
Phil Cook
pcook@agl-mag.com

CIRCULATION MANAGER
circulation@agl-mag.com

CORPORATE OFFICE:
Biby Publishing LLC
18331 Turnberry Drive
Round Hill, VA 20141
(540) 338-4363

PRESS RELEASES and ADVERTISING MATERIALS MAILING ADDRESS:
Biby Publishing LLC
P.O. Box 4075
Overland Park, KS 66204-0075

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
18331 Turnberry Drive
Round Hill, VA 20141



COPYRIGHT ©2009 Biby Publishing LLC ALL RIGHTS RESERVED



S A F E T Y

Technology changes every few minutes this day and age. One thing that remains the same in the tower erecting industry is safety. Safety is a commitment and priority at Hutton and we share the same vision as NATE in regards to safety. At Hutton, we pride ourselves on offering top quality products that not only help improve safety but also aid in the deployment of high quality products which in turn equates to a safer work environment for those involved in the tower erecting industry.

Hutton stocks many high quality products for the tower industry including;



• **Trylon** –Cougar fall protection systems combine safety with performance. The Cougar Slider works on all 3/8" cable systems, featuring a double-locking stainless steel slider and reverse orientation protection for top-notch climbing security, while its precise design ensures the smoothest operation for climb and descent



Are you doing your part?

 **HUTTON**
your *Broadband* wireless source
877.648.8866

 **HUTTON**

 **HUTTON**
your wireless product experts
EAST 800-265-8685
WEST 800-463-4793

ALBERTA • CALIFORNIA • COLORADO • ILLINOIS • NEW JERSEY • ONTARIO • TEXAS

www.HUTTONONLINE.com

World Radio History

Support State Associations

This is the time of year when state wireless associations have evening social hours, luncheons and, depending on the latitude, golf tournaments. Many

state associations sponsor golf tournaments, and their communities benefit as they donate thousands of dollars in proceeds to local charities. Some associations conduct extended meetings as daylong affairs with multiple educational

sessions and exhibits of one form or another for vendors.



With state and local regulation and legislation high on the list of state wireless association involvement, many of the luncheons feature speeches by state legislators. The more the legislators know about people in the wireless infrastructure industry and vice versa, the more likely it is that laws affecting antenna sites will reflect community desires for aesthetic appeal, but also help communities compete for the best employers and that support the best public safety communications.

To keep informed of meetings and other state wireless association activities, whether they're near you or even across the country where you may travel, check our *AGL Bulletin*

email newsletter. Every two weeks, we list all the state wireless association meetings that we can. You can look at issues already published by clicking on the "view past issues" button on our website home page, www.agl-mag.com, and you can receive issues by email by requesting a subscription at www.agl-mag.com/signup.

State wireless associations operate thanks to the efforts of volunteers, and our thanks go out to them for making the meetings and other events possible. You can play a role, too, if only by attending association meetings. You're sure to be welcome. **agl**

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

Picture of the Month

It puzzles us when we see a camouflaged tower near one that isn't camouflaged, as with this pair of towers on either side of a filling station and convenience store. We suppose the difference involves whatever it took to obtain a permit at the time. From this angle, the monopine seems more obvious, but the reverse is true when approaching on the highway from the side closer to the other tower.



Put **YOUR MONEY** back where it belongs,
in **YOUR POCKET**

Flash Technology introduces
the **FTB 362 Dual LED Lighting System**

**Giving you the Lowest Cost of
Ownership through:**

- 100% serviceable components and controls at base of tower
- Most advanced diagnostics and controls
 - Quarterly inspection waiver compliant hardware
 - 10 year expected life



332 NICHOL MILL LANE, FRANKLIN, TN 37067 • 888-31FLASH • www.flashtechology.com

Economic Stimulus Bill to Boost Wireless Infrastructure

—By Jackie McCarthy and Mike Saperstein—

President Barack Obama signed the economic stimulus bill, formally known as the American Recovery and Reinvestment Act, into law on Feb. 17, 2009. The ARRA allocates a total of \$7.2 billion for broadband development. Of that, \$4.7 billion goes to the Broadband Technology Opportunities Program (BTOP) administered by the Commerce Department's National Telecommunications and Information Administration, and \$2.5 billion goes to the Department of Agriculture's Rural Utilities Service (RUS).

The final version of the law offers different combinations of grants, loans and loan guarantees. Under the BTOP, those entities eligible for stimulus money include "any ... entity, including a broadband service or infrastructure provider" that is found to be in

"wireless carriers ... backhaul providers ... and tower companies."

The RUS funding is dedicated for broadband infrastructure projects in any area of the country so long as 75 percent of the area to be served is rural and is without sufficient access to high-speed broadband service to facilitate rural economic development. Though preference will be given to current and former RUS borrowers, a number of factors will be considered in deciding who can receive funding. There are preferences for projects that will deliver end users a choice of more than one service provider, that can commence quickly and that can be completed with the funds dispersed.

Many of the specifics associated with applying for federal funds have yet to be developed. The law does specify, however, that an entity applying for BTOP funds should be able to fund 20 percent of the project itself and should be able to demonstrate that the project would not have been

completed but for the funding. Also, the law notes that there should be at least one project awarded in each state.

Despite the fact that much of the process is unknown, ARRA establishes an aggressive deployment schedule. NTIA and RUS must award all grants by Sept. 30, 2010. Projects developed with ARRA funding must be substantially completed by Sept. 30, 2012. As anyone who has been involved in a contentious zoning process knows, the 2012 deadline for project completion (and more generally, the rapid deploy-

ment of much-needed infrastructure improvements) may be thwarted by local zoning processes that can take years. To that end, PCIA continues to urge policy makers at all levels of government to expedite final decisions on siting applications. Specifically, PCIA leverages the ARRA's ambitious time lines to articulate how burdensome and unpredictable local zoning practices may threaten the goals of broadband deployment and job creation. We point out that federal intervention in furtherance of "by-right" treatment of collocations and enactment of time lines for final zoning decisions are revenue-neutral ways to spur private-sector wireless infrastructure projects that are "shovel-ready," without impeding on concepts of home rule and federalism. In our discussions with Congressional and FCC leadership (and their staff members), we find general support for the basic principle that local governments should not take months (or years) to approve collocations on existing structures.

The enactment of the ARRA is a significant indicator of the Obama administration's commitment to next-generation infrastructure, and may lead to some interesting developments for wireless infrastructure providers. Please stay tuned to the latest developments at pcia.com, or contact us at advocacy@pcia.com if you have any questions about the stimulus program. **agl**

Jackie McCarthy is director of government affairs at PCIA – The Wireless Infrastructure Association. Mike Saperstein is a public policy analyst with PCIA.

The enactment of the ARRA is a significant indicator of the Obama administration's commitment to next-generation infrastructure

the public interest. PCIA advocated for the wireless infrastructure industry throughout the drafting and compromise process, meeting with influential members of the Senate and House of Representatives, as well as key committee staff. These efforts paid off with the conference report's specific recognition of wireless infrastructure providers as entities eligible for federal funding. The conference report, which contains the legislative notes to the law, makes clear that Congress intended the definition of eligible entities to include

**IN SOME AREAS OF THE COUNTRY, A BRIGHTLY COLORED
BALLOON MUST BE FLOWN PRIOR TO
APPROVAL OF A NEW TELECOMMUNICATIONS TOWER.**



WE REALLY, REALLY KNOW TELECOMMUNICATIONS SITING LAW.



Talk to us about Telecommunications or any one of our 45 practice areas.



New York State Wireless Association: The Voice of New York

By Douglas W. Dimitroff

While many newly formed trade associations often take small steps, that was not the case with the New York State Wireless Association. With its inaugural meeting held in Albany, N.Y. on March 6, 2007, NYSWA drew 225 attendees right from the start. From that moment on, NYSWA continued to plan programs that were of interest not only to its members, but also to various industry audiences. Programs in 2007 included:

- A June 2007 quarterly meeting at the Yale Club in New York City, focusing on statewide and New York City-area wireless network projects
- A September 2007 golf tournament at the Park Country Club in Buffalo, N.Y.
- A November 2007 quarterly meeting in Albany, N.Y., featuring New York State Senator Elizabeth O'Connor Little
- A joint holiday social with the New Jersey Wireless Association

While 2007 was a busy year, 2008 was busier. NYSWA hosted an event in New York City focusing on FCC auctions; attended the Association of Towns of the State of New York trade show; and held its own trade show and conference — the first of its kind to be put on by a state wireless association. The one-day trade show and conference, held in March 2008, drew nearly 30 exhibitors and 25 sponsors. In keeping with its mission to educate communities and the public about our industry, NYSWA



Officers

- President Douglas W. Dimitroff,
ddimitroff@newyorkstatewireless.org
- Vice President Tim Conte, *tconte@global-towers.com*
- Secretary Adam Walters, *awalters@phillipslytle.com*
- Treasurer Chris Fisher, *cfisher@cuddyfeder.com*

Directors

- Paul Fettuccia ANS Advanced Network Services
- Tim Conte Global Tower Partners
- Douglas Dimitroff Phillips Lytle
- Chris Fisher Cuddy Feder
- Scott Olson Cooper, Erving & Savage
- Tom Erwin Pyramid Network Services
- Joe Tassone HPC Development
- Tom Smith Jacobs Telecommunication
- Kenneth Summers Tech Data
- Alexandra Townson Phillips Lytle
- Adam Walters Phillips Lytle
- Robert Holliday AT&T Mobility
- Kevin Russ Black & Veatch
- Steve Ruzzo
- Deborah Burke Independent Site Acquisition Specialist

Events

- May 6–7 Trade Show and Conference
- June Wireless Telecom Investors' Conference
- Fall Golf Tournament
- Winter Holiday Social

www.newyorkstatewireless.org



Experts in Regulatory Compliance

AM Detuning

- Screen your sites for free on our website
- Manage all of your jobs online
- Affordable prices & reliable service
- Request a quote today at
<http://waterfordconsultants.com/login.asp>

EME Compliance

- Ensure your rooftops are compliant
- Multi-site discounts available
- Track your projects online
- Request a quote today at
sales@waterfordconsultants.com

waterfordconsultants.com phone: 703.782.0007



AM Coordination Services provides FCC compliance services in accordance with 47 C.F.R 22.371 for towers constructed or modified near AM broadcast stations.

- Pre- and postconstruction field strength measurements
- Tower detuning readjustment and repair
- Tower detuning hardware manufacturing
- RF Intermodulation Studies
- RF Safety Studies



P.O. Box 6065
Martinsburg, WV 25402
304-229-6307
www.amcoordination.com

hosted nearly 30 municipal and other government officials at educational sessions specifically programmed for them. Also in 2008, NYSWA hosted its second annual golf outing at Lake Shore Country Club in Syracuse, N.Y., and co-sponsored a December holiday social event in Lennox, Mass., with the New England Wireless Association.

Trade show

Having generated momentum for the association, NYSWA decided to make the 2009 Trade Show and Conference bigger and better than ever. This year, it will feature two full days of programming including 12 educational sessions for industry and government officials, over 50 exhibitors, a site tour and time for important networking.

Strategic plan

Key to all of these activities is the clarity that comes from a sound stra-

tegic plan, one that is the heartbeat of the association. With four components to the plan, the NYSWA Board has the vision to continue to move the association forward:

- Help facilitate infrastructure deployment within New York state.
- Act as the driving force behind unifying and mobilizing the entire wireless industry within New York state.
- Promote and encourage capital investment and job creation in, and for, the wireless industry within New York state.
- Build an effective and sustainable organization.

The Voice of New York is reaching out to carriers, municipalities, and tower and infrastructure companies and is listening to what they have to say about the wireless industry in New York.

agl

When It Comes to Local RF Safety, the Best Solutions Are Always Global



Global RF Solutions provides FCC Compliance surveys using Narda's SRM-3000 as well as MPE analysis utilizing RoofView® and TowerCalc® software. The SRM-3000 stands alone in the industry for its capability to analyze contributors to the RFR

environment. We have been surveying sites with this equipment since its release!

If you would like more information on our web-based training or any of our products and services, please contact us at:



Global RF SolutionsSM
PREDICT, DETECT, PROTECT

1990 N. Alma School Road, #122, Chandler, AZ 85224 • Tel: (480) 814-1393 • Fax: (509) 275-0709 • E-mail: info@grfs.net

**The #1 Online Vertical
Asset Market Exchange.**



Search For Assets Online_

 Search



FREE 24 Hour Search of the largest database of sites available for co-location. Search, collect, save and manage premium tower data.

Valid through June 2009.

Call us at: 610.284.9289

GO TO: www.towersource.com

RF Measurements Help to Win Lease Approval

Showing how placing a cell site near a high school would reduce RF emissions from wireless handsets used by students helped to persuade a board of education to leave in effect a previously approved lease for a tower at an athletic field.

AGL report

Members of the Marshalltown (Iowa) Community School District Board of Education voted in the majority to keep in place an agreement with U.S. Cellular for a proposed cell tower that would take the place of, yet resemble, a light pole at the Marshalltown High School football field. The vote, taken on

January 5, came about as a result of concerns brought to the board by residents near the school regarding the possible effect upon health that radio-frequency emanations from the tower might have.

Although the Telecommunications Act of 1996 does not allow government agencies to take into account the health

effects of RF emitted from cell towers and other radio transmitters when making decisions about site approval, landlords may consider health effects when deciding whether to lease.

U.S. Cellular asked Marv Wessel of Global RF Solutions, Chandler, Ariz., to speak to the board members about the



Cell towers near schools sometimes raise questions about possible health risks.

possible health effects. Afterward, *AGL* asked Wessel about his presentation.

Wessel said that in addition to local activists promoting a website against the proposed site, one or more board members and residents made reference to the “BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF),” which is published on the web at www.bioinitiative.org.

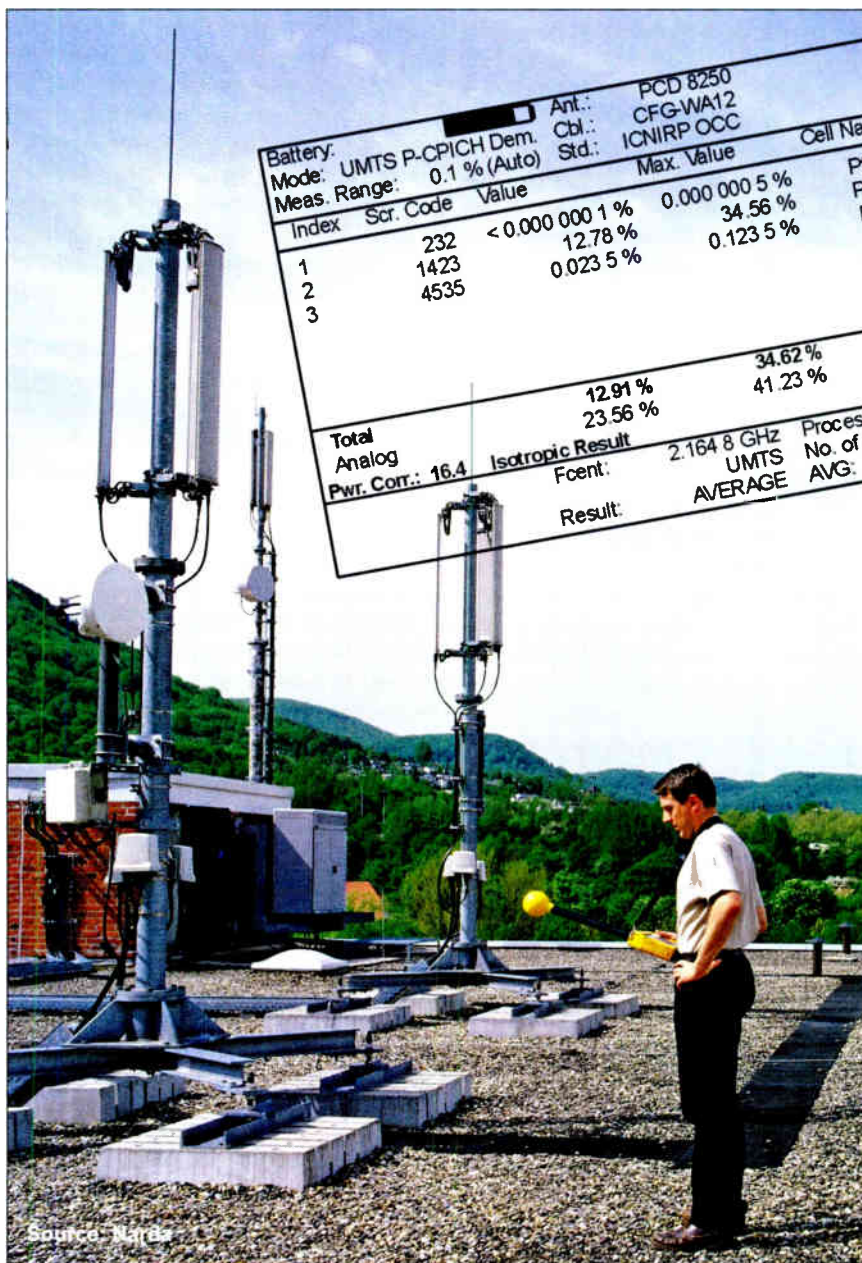
BioInitiative report

“The report claims there is a diverse range of adverse health effects related to RF emissions,” Wessel said. “The Bio-Initiative Report seems to completely dismiss the Nationwide Cohort Study in Denmark by Christoffer Johansen, John D. Boice Jr., Joseph K. McLaughlin, and Jørgen H. Olsen that included 420,095 cell phone users and found no significant link to cell phone use and cancer.

The peculiar thing about the BioInitiative Report is that it suggests that RF exposure limits be reduced to increase the safety margin of the possibility of nonthermal effects on humans. However, it doesn’t offer specifics on what these limits should be. It merely suggests that “a precautionary limit of 0.1 $\mu\text{W}/\text{cm}^2$ (which is also 0.614 volts per meter) should be adopted for outdoor, cumulative RF exposure.” The ironic thing, Wessel explained, is that any properly designed cellular and PCS site, which would have antennas at least 10 meters above ground level, already contributes less than what the BioInitiative Report proposes as a precautionary limit to areas surrounding these cellular and PCS sites. However, Wessel pointed out, commercial TV and FM broadcast levels typically exceed this precautionary limit in every major metropolitan location in the country. “Curiously, they choose to ignore an RF source that has been present for several decades,” he said.

Better science

Wessel said that although the Bio-Initiative Report appears to have as its objective making the case for eliminating or reducing wireless communications, in several places the report admits



A selective radiation meter such as the Narda SRM-3000 can be used to make safety measurements for RF compliance and to provide evidence that energy levels may be many times less than the safety minimum.

there is no definitive link between cell phones and cancer. As part of preparing for his presentation, Wessel viewed a website built by one of those opposed to the tower. “He had the BioInitiative Report on his site along with other information depicting a one-sided view against cell towers.”

Wessel presented the board a different perspective based on quantitative RF measurements taken with a selective

radiation meter, which consists of a spectrum analyzer and an isotropic antenna — the Narda SRM-3000. He said this meter is one of a few portable spectrum analyzers designed and calibrated specifically to make safety measurements for RF compliance.

“It has a dynamic range much greater than broadband equipment specifically designed to perform RF compliance measurements,” he said. Additionally,



Source: Marv Wessel

Although a worker on a tower may come close enough to an antenna, especially FM or TV broadcast antennas, to require protection in the form of an RF suit, the inverse-square law shows that the intensity of RF from an antenna rapidly diminishes as the distance from the antenna increases. Away from the tower, energy levels rarely surpass the health limit, especially for cellular antennas. Above, Marv Wessel is shown using a selective radiation meter to take measurements.

“you can discriminate these measurements by frequency from 50 to 3000 MHz. This enables us to specifically measure each license holder’s contribution to the overall RF environment.”

Wessel also described the RF measurement data that was persuasive for the Marshalltown board. “They were

concerned about the RF level that would be present at the high school if they allowed the cell site to be built. Actually, the larger risk of RF exposure comes from the cellular handset itself, even though it’s still greatly below the FCC limits. The inverse-square law says that ‘the RF energy at a distance

of times. A nearby site actually helps the issue.”

Wessel said that one parent made an observation that students have handsets near their heads all the time. “Our measurements proved that with a nearby cell site, RF exposure from the handsets would be reduced from a level

from a source drops by the square of the distance from the source.’”

The RF specialist explained that at the Marshalltown school, cellular service is provided by sites a mile or two away, which causes the handsets used at the school to emit their highest RF power output. The reason is because the distant cell site controls the handset power and raises or lowers it according to the received signal (uplink) at the cell site.

Handsets

“I took measurements at the school, and they indicated the handsets were powered up to full power during a call because of the distance to the serving cell site,” Wessel said. “I told the board that it could reduce the RF exposure to students using phones by putting a site nearby because then the handsets would operate at significantly lower power. If you have a quarter-watt handset next to your head, it delivers significantly more energy to the user than does a 100-watt cell site 100 feet away and 100 feet above the ground, because of the inverse-square law.”

But, Wessel said, “no one ever looks at it that way. They see the cell site as an RF radiation problem next to the school. But ironically, when you put the cell site next to a high school, where kids are huge users of handsets, the handset’s power is significantly reduced by thousands



Marv Wessel is shown taking RF measurements near a cellular antenna disguised as a saguaro cactus. A person would have to scale the cactus to the antennas hidden near its top to receive unsafe RF exposure.

1,000 times (peak) below the FCC-defined safety limit to a level 1 million times below the safety limit,” Wessel said. “A majority of the board members were persuaded by this approach. But some people are never satisfied.”

Actual measurements

Wessel said the fact is that the handsets are going to be powered down if the cell site is nearby, and the RF exposure from the handset is the greater risk. He said that despite the evidence, some people don’t want to look at the actual measurements. He said their objection sometimes is based on hysteria. “The cell sites look ominous, but the power reaching the ground in the vicinity of the site is insignificant,” he said.

Wessel also described measurements he made in a New York City neighborhood where RF energy that reaches the

neighborhood from FM and TV broadcast signals is a greater percentage of the overall RF energy than the portion delivered by a cell site across the street. “They don’t want to hear that, either,” he said, speaking of residents who are in opposition to a neighborhood cell site. “They fear the long-term effects of RF exposure from cell sites, yet FM and TV signals have been on the air for a lot longer than cellular signals, they represent a higher percentage of the overall RF exposure than the cellular signals do, and the total is still well below the safety limit.”

Common-sense approach

Wessel said the idea is to present the information in a common-sense approach. “You’re never going to change the opinion of a skeptic or of the conspiracy theorists who want to believe that the

explosion in cell site growth will cause significant health risks,” he said. “They call it new technology, but it’s merely a new application of old technology. You can rarely change their minds. You try to present a common-sense approach to people who have become emotional by the surrounding hysteria. The cellular site opponents get people worked up and cite possible children’s health effects in an effort to convince them that the cellular sites are harming the kids.”

Narrowband selectivity

With measurement equipment capable of narrowband selectivity, Wessel said it is possible to select a frequency and measure the power density levels down to the picowatt per square centimeter level. “It allows you to demonstrate that cell sites are not a big deal,” he said.

agl

NEPA 101: Tribal Consultation and the

By James Duncan, P.E.

The FCC's Tower Construction Notification System (TCNS) has markedly improved, streamlined and standardized the process for identifying and receiving replies from Indian tribes and native Hawaiian organizations interested in commenting on planned telecom and radio broadcast facilities. However, early notification, proper documentation and an open sharing of information with these tribes can speed up the process of consultation that may be required subsequent to the TCNS notification.

This is the second of six articles in a series outlining the federal National Environmental Policy Act (NEPA) regulations and their effect on the telecommunications and radio broadcast industries. In the April 2009 issue, we explained the eight areas of concern under NEPA that must be properly evaluated as part of the FCC's licensing and registration process for telecommunications and radio broadcast antenna facilities. These areas of concern include assessing the impact of the proposed facility on the following:

1. Officially designated wilderness areas
2. Officially designated wildlife preserves
3. Threatened and endangered species and critical habitats
4. Buildings, districts, sites or objects significant in American history, architecture or archaeology
5. Indian religious sites
6. Flood plains
7. Wetlands and deforestation
8. The use of high-intensity white lights in residential neighborhoods

The following information explains the regulations, procedures, and anticipated response time lines for consulting with interested parties under Area 5 – Indian religious sites.

Applicable federal regulations

Addressing area 5 of the FCC's site-screening guidelines for implementing NEPA falls under the guidelines of Section 106 of the National Historic Preservation Act (Federal Regulations 36CFR Part 800). Section 106 requires federal agencies, such as the FCC, to take into account the effect of their actions on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory

Council on Historic Preservation (and its consulting parties) a reasonable opportunity to comment on such actions. With respect to the FCC, these actions include the licensing of telecom and radio broadcast facilities.

The NEPA screening process requires licensees or applicants to consider the effect that their proposed actions might have on historic properties with tribal, cultural and religious significance. Furthermore, the FCC's 2005 Nationwide Programmatic Agreement (47 CFR Part 1) states that the agency has a responsibility to carry out consultation with any Indian tribe or NHO that attaches religious and cultural significance to a potentially affected historic property.

Other regulations that may require consideration when evaluating Area 5 of NEPA include the Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act.

The regulations, as a whole, require the FCC to identify and involve consulting parties who may have an interest in the possible effects that proposed actions might have on historic properties and cultural resources. These parties may include the state historic preservation officer (SHPO), Indian tribes and NHOs, representatives of local governments, and the general public, among others.

Response time lines and consultation

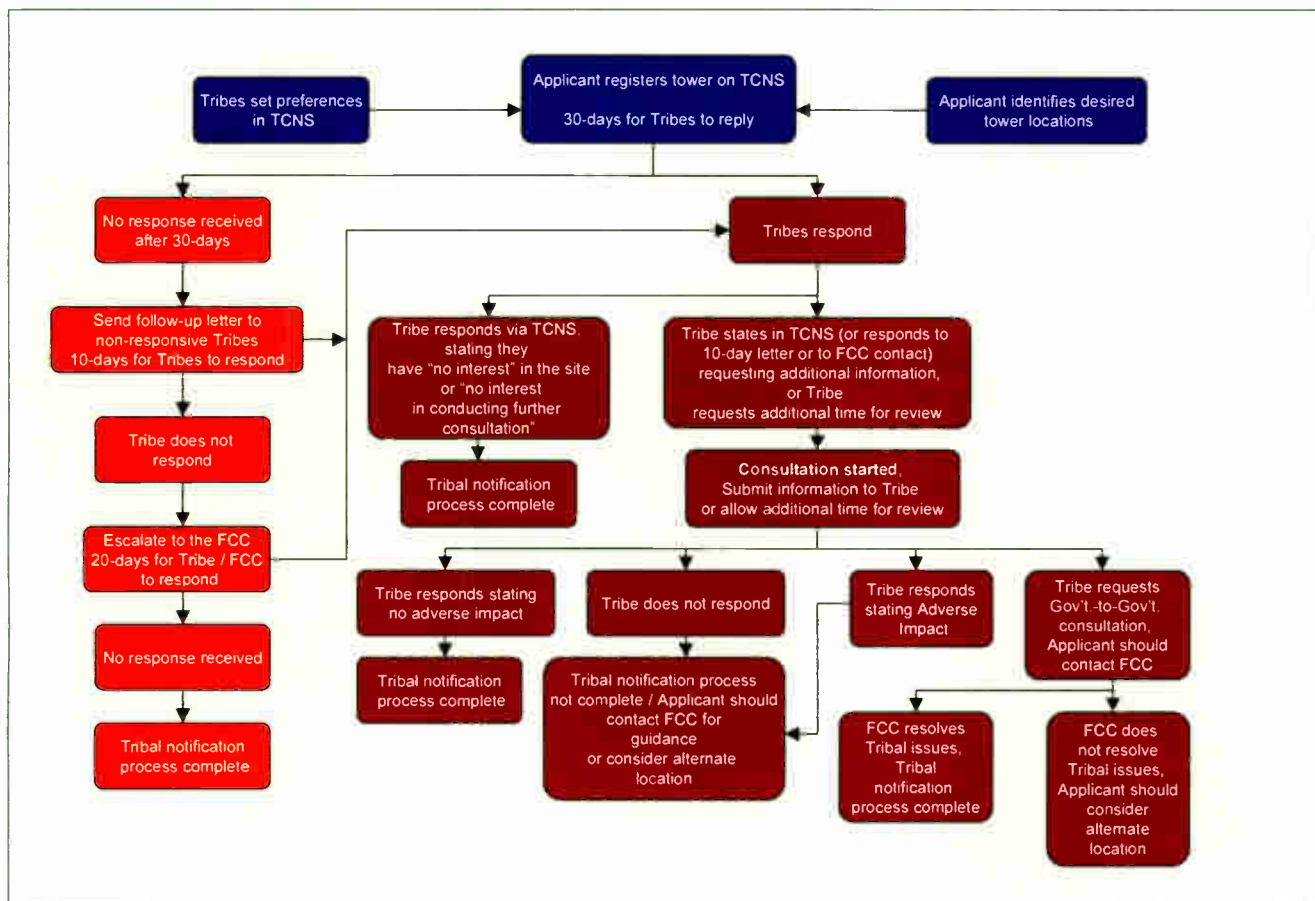
Once the consulting parties are identified, the FCC is required to provide the parties adequate time to review and respond to the proposed action. The Section 106 regulations state, "The agency shall involve the consulting parties ... in findings and determinations made during the Section 106 process."

FCC's TCNS Protocol

Unfortunately, the regulations can be somewhat confusing regarding what constitutes an adequate response time. Section 106 states, "If the SHPO or Tribal Historic Preservation Officer (THPO) fails to respond within 30 days of receipt of a request for review of a finding or determination, the agency official may either proceed to the next step in the process based on the finding or determination or consult with the Advisory Council in lieu of the SHPO/THPO." Elsewhere,

however, the regulations state that the SHPO and THPO may rejoin the Section 106 process at any time, and the agency official shall continue the consultation. The regulations continue further, stating that although some situations within the regulations specify a 30-day period for review of certain findings and determinations, there is no formal time clock on consultation. In other words, there is no set time line for the completion of consultation with an interested party.

The trick to understanding when these time lines apply, and to understanding their effect on time to market for the telecom and radio broadcast industries, is knowing when "consultation" is required and when it is not. The regulations define consultation as "the exchange of views that occurs when the agency consults with various parties during the Section 106 process." Consultation occurs after a consulting party has responded to the "request for review of findings and determinations." And



Communication flow chart for the FCC's Tower Construction Notification System process.

consultation occurs when the consulting party requests any of the following: (1) additional information regarding the planned undertaking or its impacts, (2) additional time for review of the findings, or (3) government-to-government consultation (in the case of Indian tribes).

Currently, most telecom and radio broadcast facilities obtain approval

and receive responses from the interested consulting parties (SHPO, Indian tribes, the public, and the local government, etc.) within 30 days and, typically, these facilities have little or no effect on properties of historic or cultural significance. So, in these cases, consultation is generally not required. However, in cases in which impacts to historic properties are anticipated,

the interested parties may want to, and typically do want to, consult on the planned project, thus starting the consultation process.

We have seen the consultation process with interested parties take one year, two years, and even as long as five years to complete. In some cases, the consultation process is *never* completed because the telecom carrier or tower

How to Speed Section 106 Reviews: A Tribal

On May 14, 2002, the late William Day, who at that time was chairman of the Culture and Heritage Committee of the United South and Eastern Tribes (USET), testified before the U.S. Senate Committee on Indian Affairs and the Communications Subcommittee of the Senate Committee On Commerce, Science & Transportation Regarding Telecom Carriers, Tribal Governments, and the Siting of Communications Towers. Day also was at the time the tribal historic preservation officer (THPO) for the Poarch Creek Indians.

Day testified regarding USET's contention that the FCC was failing to comply with federal law when it came to consulting with tribal governments before cell towers were constructed. USET questioned the legality of what it called the FCC's purported delegation of its tribal governmental consultation obligations to private entities (the cell tower companies). He spoke of the appropriateness of tribes charging fees of cell tower companies when those companies seek unique tribal expertise in evaluating tower sites in order to comply with a host of laws including the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA).

Day's successor as USET Culture and Heritage Committee chairman and THPO for the Poarch Creek Indians, Robert Thrower, spoke with *AGL* on Feb. 5. He explained the current situation and offered suggestions as to how those seeking to construct towers might speed the processing

of their proposals that now are submitted to tribes via the FCC's Tower Construction Notification System (TCNS) that resulted from USET's negotiations with the federal agency.

Here, edited for length and clarity, are Thrower's remarks.

Robert Thrower:

What tower owners can provide is, if there is going to be any ground disturbance, take care of the surveying and provide maps because that makes our job easier. When THPOs are called

full-bore excavation, just Phase I testing, which is standard procedure. If tower owners do a Phase I and there is no significant finding, it will not impede their process. Generally, we're more interested if there is going to be ground disturbance. I don't care about an antenna being collocated on a water tower.

If Phase I test results are not included and the tribe has a concern, the tribe can request that Phase I testing be done anyway, under consultation protocol. If someone has done the preliminary work of a survey, I usually have no reason to impede them. There have been cases where they would find something. That necessitates some additional surveying and perhaps relocating the tower site. But that is rare. Usually the survey doesn't find anything.

There is a matter of inadvertent discoveries. Test holes might bypass something. In the process of disturbing the ground, say you hit a burial or concentration of artifacts. In that case, you are supposed to stop work immediately and notify the consulting parties. We figure out a solution from there.

Some tower owners prefer to use regular mail and some, email. The most effective way to do it is by email to get a response.

With TCNS, THPOs can specify counties or states of interest to their tribes. For example, I don't need to see tower proposals from Michigan from the Creek Tribe perspective. There are some states I am interested in.



Robert Thrower, tribal historic preservation officer, Poarch Band of Creek Indians. USAF photo by Jerron Barnett.

upon to review areas at a distance from their tribal lands, a map helps.

It also helps to include results of a site examination. I'm not talking about

owner drops the project in favor of finding a more readily acceptable location.

Tower Construction Notification System

To meet its obligations under Section 106 and properly identify Indian tribes and NHOs with a possible interest in acting as a consulting party to a planned antenna facility, the FCC developed the Tower Construction Noti-

fication System (TCNS) – a Web-based registry of planned towers and antenna facilities. When a tower is registered on TCNS, the system notifies all tribes and NHOs that indicated the location of the tower (city, county, state) as an area of preference. The tribe is notified of the location, height and type of facility planned, and it can be provided with additional documentation regarding the

planned project through FCC Forms 620/621, which include the SHPO determination letter, archaeological survey and architectural surveys.

TCNS is set up with a 30-day response time line, and some tribes have opted to respond automatically through TCNS by indicating that, “If the applicant does not receive correspondence from the Tribe within 30-days, the applicant can assume

Historic Preservation Officer's Perspective

The Creek Nation historically encompassed half of Alabama and three quarters of the Florida Panhandle. If you asked me what would be the geographic areas with Creek interest, from my perspective, that would be anywhere the Creek Nation was.

The Poarch Creek Indians is the only federally recognized tribe in Alabama. There is a Creek nation in Oklahoma and a couple of tribal towns. These were their ancestral lands, so they are as interested in these sites over here as we are.

Under Section 106, federally recognized tribes can have an interest far outside their geographic location. The Muskogee Nation, for example, was forcibly removed. Georgia and Alabama are their ancestral lands. Under Section 106, they are to be notified of anything in Georgia and Alabama of interest to them. With other tribes, relocation came through migration and a shifting of populations.

If a cell tower were to go up in the outer proximity of Moundville Archaeological Park in Moundville, Ala., many tribes might have an interest because that site predates the naming of the five civilized tribes. The Choctaw, Cherokee Chickasaw and Creek all might have an interest in that area because our collective ancestors came from there. With the entire state of Alabama, there are potentially 17 tribes that might have an interest, depending on the exact location.

The TCNS has facilitated better communication and response time.

But a problem is the sheer volume. Some tribes receive hundreds of Section 106 review requests every month.

THPOs who deal with cell towers also deal with myriad other things. With USET, we have a system whereby if the cell companies don't hear from the THPO within 30 days, it means the tribe involved doesn't have a direct interest.

My mail is a foot and a half every two days. For tribes with minimal staff it is a challenge to respond to every request directly. I receive tons of requests from the military, from building a new range to moving a building. THPOs hear from all of the major federal agencies such as FEMA, the U.S.



Moundville Archaeological Park.

Forest Service, and let us not forget the Department of Transportation. We are contacted every time there is a bridge replacement or road enlargement or construction of a roadway.

We receive a tremendous load of Section 106 material. You can imagine what happened when the cell towers took off. I saw a doubling of my mail,

and half of it involved cell towers. To be blunt about it, the processing has to be done, but historically, we already dealt with a large volume of Section 106 matters, and with the advent of cell towers, our workload increased. One tribe has three people who work just on cell towers. Some tribes receive compensation for reviewing Section 106 items. At USET, we haven't gone in that direction yet.

Sometimes a review is just a review of the literature. But what if it requires a site visit? Or say a discovery occurs. Those are reasons compensation was discussed. Otherwise, the programs have to absorb the cost of Section 106 reviews.

Before cell towers, we already had a complex system of consultation with the agencies we deal with, the military and federal agencies. When the cell towers came in, that was a whole new ball game and a rather complex one. USET's original contention was that the FCC was delegating its tribal consultation duties to the providers. What we said was that as the responsible agency, the FCC should be doing the tribal consultation. As a compromise, we signed an agreement with the FCC such that we would come up with this delivery system sponsored by the FCC. This way, the Section 106 requests for cell towers come through the FCC. It gives cell tower companies a way to input their information for transfer to the tribes.

the Tribe has no interest in consulting on the planned undertaking.” And thus the consultation time line issue is resolved. When a tribe requests additional information as part of the TCNS process (for example, if it requests Forms 620/621, a SHPO concurrence letter, etc.), this constitutes the start of consultation. As previously mentioned, there is no set time line for receipt of response from the Indian tribe once consultation begins.

Experience shows that most tribes, however, even after requesting additional information, still respond within the TCNS 30-day time line, a credit to the adequacy and general acceptance of TCNS by the tribes.

In establishing TCNS, the FCC put in place processes to address tribes that do not respond within the 30-day timeframe, this includes a 10-day tribal notification requirement and the abil-

ity to escalate the project to the FCC to request a government-to-government consultation when the tribe does not respond to the 10-day notification. Upon escalation to the FCC, if the applicant (the telecom carrier or tower owner) does not receive a response from the tribe or the FCC within 20 calendar days, the applicant can assume concurrence and proceed with the project. However, this escalation rule applies only if the tribe has not started consultation. If consultation has started, there is no time clock for response.

Consulting with Indian tribes

The FCC has identified a total of 561 federally recognized U.S. Indian tribes, and the FCC has done a tremendous job in getting all 561 tribes to subscribe to and use TCNS. These tribes deserve credit for accepting and using TCNS, because more than 100 of the federally recognized tribes have submitted TCNS statements indicating that the applicant can assume that the tribe has no interest in consulting if a response is not received within 30 days.

When a tribe requests consultation beyond TCNS, the FCC, through its government-to-government relationship with the tribe, should conduct this consultation. The Section 106 regulations (and other regulations) state, “A Tribe may request that consultation as an interested party be conducted directly with the agency on a government-to-government basis” and that as a sovereign nation recognized by the federal government, it is completely within the tribe’s rights to request this method of consultation.

Once the government-to-government consultation process has begun, the tribe or the FCC may request the applicant (the telecom carrier or tower owner) be involved. If so, the applicant should conduct the consultation in a manner sensitive to the concerns and needs of the tribe and should recognize the government-to-government relationship between the tribe and the FCC.

In completing the consultation process with the tribe, be willing to answer the tribe’s questions openly and honestly, provide the documentation requested when it is requested, and be

Save Money Every Year
with a *farLight* LED Obstruction Light



farLight
L-864 LED

- Uses 95% less power than incandescent units
- No regular maintenance or bulb to replace
- Smallest L-864 on the market (10.3" D x 9.7" H)
- Lightest L-864 on the market (18 lbs.)
- 24/48VDC, solar, wind, and GPS models available
- 5 year warranty



FarLight's LED L-864 and L-810 obstruction lights are direct replacements for old-fashioned incandescent lights. They are energy efficient, lightweight, compact, and affordable. Everything you would expect from a leader in tower lighting.

(310) 830-0181 • www.farlight.com

willing to give the tribe adequate time to review and comment on the materials provided. Being patient and not harassing the tribe for a determination can go a long way toward obtaining a favorable outcome. Forcing the issue only makes the process more difficult for both the applicant and the tribe, for both current and future consultations. Understand that you are not the only applicant with whom the tribe is dealing, and understand that tribes are asked to consult on numerous projects for numerous federal agencies. Your project might not be on the top of the list. And remember, under the regulations, the tribe has no required timeframe for response.

The government-to-government consultation process may result in some form of mitigation (such as lowering the tower height or the use of stealth techniques), moving the planned antenna facility to a location with little or no effect on historic properties or some other form of resolution mutually agreed upon by the tribe and the FCC — with input from the applicant. We are typically seeing that this consultation process ends favorably for all parties involved, resulting in an antenna facility that meets the needs of the telecom carrier and tower owner, yet protecting the interests of the tribe and the FCC while meeting the intent of the rules established by the applicable regulations.


When a tribe requests consultation beyond TCNS, don't be alarmed. The FCC has minimized the occurrence of these consultation requests with the procedures and processes put in place by TCNS, so these requests should be few and far between. However, when they do occur, be sure to meet the concerns of the tribe by being open and honest with information about the project. Be understanding of the concerns of the tribe. Understand that there is no time clock for receipt of responses from the tribe. And be cognizant of the government-to-government relationship that tribes have with the FCC. Following these guidelines can significantly reduce the time it takes for the tribe to respond and can result in an outcome favorable to all parties involved.

In the next installment in this article series, we will offer some insight from the state historic preservation officers' perspective regarding the Section 106 process, insight on how to speed up their review of your project, and a discussion of their favorite strategies to mitigate the effect of projects on or near historic locations. We will also discuss the FCC's new E106 process.

agi

James Duncan, P.E., is the environmental department manager and a principal in Terracon's Nashville, Tenn., office. He has 18 years of experience in dealing with NEPA issues in the telecom industry and 22 years of experience in the engineering and environmental fields. He is a member of the Tennessee Wireless Association. His email address is jaduncan@terracon.com.

Connecting the World

<p>Components</p> 	 <p>Monopoles</p> 	<p>Structural Analysis</p> 
<p>Self-Supporting Towers</p> 		<p>Guyed Towers</p> 

Your only choice for everything WIRELESS

valmont

STRUCTURES

<p><i>West</i> 3575 25th Street SE Salem, Oregon 97302 Ph: 1-888-880-9191 Fax: 1-888-689-9555</p>	<p><i>East</i> 1545 Pidco Drive Plymouth, IN 46563 Ph: 1-877-467-4763 Fax: 1-574-936-4763</p>
-------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------

Valmont towers now available on the WSCA contract

Quick-Guide to Engineers & Consultants

As a supplement to January's 2009 Buyers Guide, here is a listing of engineering firms with additional information on the types of services they provide.



Aarcher

910 Commerce Road
Annapolis, MD 21401
Sales Contact: Mark R. Serio, PG
mserio@aarcherinc.com
Phone: (410) 897-9100
Fax: (410) 897-9104
www.aarcherinc.com
Environmental, NEPA, Cultural and Natural Resources Investigations

Company Description

Aarcher provides Phase I Environmental Due Diligence, NEPA Screening, and Cultural & Natural resources support services for antenna and tower installations throughout the US. Since 1997, our team of environmental scientists and conservation specialists, and architectural historians has supported thousands of installations from offices in Colorado, Georgia, Maryland and Texas.

Advanced Frequency Engineering

13194 U.S. Highway 301 South, Ste. 314
Riverview, FL 33578
Sales Contact: Dana Dulabone
dana_rfawareness.com
Phone: (813) 495-0038
Fax: (727) 872-6644
RF Systems Design, RF Propagation, Site Design, RF Safety, RF Competitive Tower Site Analysis

Aerial Spectrum

599 North Ave., Ste. 8
Wakefield, MA 01880
Sales Contact: Andrew Turner
aturner@aerialspectrum.com
Phone: (781) 295-0818
Fax: (781) 295-0825
www.aerialspectrum.com
RF Systems Design, Site Design, RF Propagation, Environmental, RF Safety, Geotechnical, Electro Magnetic Compatibility, Structural, Electrical, Architectural, Power Systems

AeroSolutions

5500 Flatiron Parkway, Ste. 100
Boulder, CO 80301
Sales Contact: Jim Lockwood
jlockwood@aerosolutionsllc.com
Phone: (720) 304-6882
Fax: (720) 304-6883
Site Design, Structural, Environmental, Architectural, Monopole Extensions, Construction Management Services

AM Coordination Services

P.O. Box 6065
Martinsburg, WV 25402
Sales Contact: Butch McBride
AMcoordination@aol.com
Phone: (304) 264-5941
Cell: (304) 263-1391
RF Systems Design, RF Propagation, RF Safety, Electro Magnetic, Compatibility, AM Pre- and Post-Measurements, Tower Detuning

Company Description

AM Coordination Services provides FCC compliance for coordination with AM broadcast stations, pre- and post-construction field strength measurements and tower detuning.

See ad on page 14

Arc Environmental

1311 Haubert St.
Baltimore, MD 21230
info@arcenvironmental.com
Phone: (410) 659-9971
(800) 999-5323
Fax: (410) 962-1065
Phase I Environmental Site Assessment, Transaction Screen, Geophysical Surveys

Arthur K. Peters Consulting Engineers

5422 NW 91st Blvd.
Gainesville, FL 32653
Sales Contact: Art Peters
akpce@cox.net
Phone: (352) 331-0149
www.akpce.com
RF System Design, RF Propagation
Software services including antenna radiation pattern distortion analysis

Associated Engineering

2705 N. Main St.
Omaha, NE 68022
Sales Contact: Gautam (Tom) Medhi
tmedhi@aepc-clc.com
Phone: (402) 289-5040
Fax: (402) 289-5045
www.aepc-clc.com
RF Systems Design, Site Design, Environmental, Geotechnical, Structural

BCI Communications

97 Linden Ave.
Elmwood Park, NJ 07407
Sales Contact: Lorin A. Perow
perowl@bcisites.com
Phone: (201) 791-3200 x145 or
mobile: (201) 927-4801
Fax: (201) 794-8974
www.bcisites.com
RF Systems Design, Site Design, RF Propagation, Environmental, Geotechnical, Structural, Electrical, Architectural, Power Systems

Black & Veatch

10950 Grandview Drive
Overland Park, KS 66210
Sales Contact: Kevin Travelstead
TravelsteadKD@bv.com
Phone: (913) 458-4287
Fax: (913) 458-7677
www.bvtelecom.com
RF Systems Design. Site Design, RF Propagation, Environmental, RF Safety, Geotechnical, Electromagnetic Compatibility, Structural, Electrical, Architectural, Power Systems

Collins Engineers

123 N. Wacker Drive, Ste. 300
Chicago, IL 60606
Sales Contact: Daniel G. Cecchi, P.E.
dcecchi@collinsengr.com
Phone: (312) 704-9300
Fax: (312) 704-9320
www.collinsengr.com
Structural, Consulting Engineers; structural inspection of towers

Commdex Consulting

5880 Live Oaks Parkway, Ste. 100
Norcross, GA 30093

Sales Contact: Prince Niyyar

sales@commdex.com

Phone: (770) 349-0400

Fax: (678) 379-0400

www.commdex.com

RF Systems Design, Site Design, RF Propagation, Environmental, RF Safety, Geotechnical, Electro Magnetic Compatibility, Structural, Electrical, Architectural, Power Systems

CMX Engineering

200 State Highway Nine

P.O. Box 900

Manalapan, NJ 07726-0900

Phone: (732) 577-9000

(800) 220-4055

Fax: (732) 577-9888

Site Design, Structural, Electrical

Deep South Communications

17555 George O'Neal

Baton Rouge, LA 70817

Sales Contact: Rhett Westerman

rhett@deepsouthcommunications.com

Phone: (225) 802-9000

Fax: (225) 296-3000

www.deepsouthcommunications.com

RF Systems Design, Site Design, RF Propagation, Structural, Architectural, Helical Anchor Foundation Design and Installation



DYNAMIC ENVIRONMENTAL ASSOCIATES, INC.

Dynamic Environmental Associates

P.O. Box 7058

Lake Worth, FL 33466

Sales Contact: Tracy Brittain

Tbrittain@DynamicEnvironmental.com

Phone: (877) 968-4787

Fax: (561) 968-6847

www.DynamicEnvironmental.com

Company Description

Dynamic Environmental Associates is the industry recognized source for: NEPA compliance; environmental site assessments; permitting, auditing and reporting. DEA has achieved recognition from both the tower industry and competitors alike as being leading experts in environmental assessment and compliance. For over 15 years, DEA has been providing the communications industry with expert professional environmental services.

See ad on page 15



EBI Consulting

21 B St.

Burlington, MA 01803

Sales Contact: Jeffrey C. Previte

jprevite@ebiconsulting.com

Phone: (617) 308-4484

Fax: (617) 715-6547

www.ebiconsulting.com

RF Systems Design, Site Design, RF Propagation, Environmental, RF Safety, Electromagnetic Compatibility, Structural, Architectural

Company Description

EBI Consulting specializes in providing flexible and cost-effective due diligence and compliance solutions for telecommunications sites. We understand that attention to detail and quick turnaround times are essential. EBI offers: Phase I and II ESAs, NEPA Reports, Lead-based Paint and Asbestos Testing & Remediation, RF Safety Reports, and A&E Services.

Engineered Aeroacoustics

14920 27th Ave. N

Plymouth, MN 55447-4813

Sales Contact: Larry Hansen

larry.hansen@eainoise.com

Phone: (763) 535-0102

Fax: (763) 535-0131

www.eainoise.com

Site Design, Environmental, Power Systems, Noise Control/Aerodynamic Systems and Engineering Services

Environmentex

6060 N. Central Expwy., Ste. 560

Dallas, TX 75206

Sales Contact: Brian McCallister

brian@environmentex.com

Phone: (214) 793-7317

Fax: (214) 367-3861

www.environmentex.com

Site Design, Environmental Geotechnical, Architectural

EPB Associates

12850 Spurling Road, Suite 160

Dallas, TX 75230

Sales Contact: Edgardo P. Brandao

ebrandao@epbassociates.com

Phone: (972) 239-5495

Fax: (972) 239-5496

www.epbassociates.com

Structural



Site Development, Project Management, Construction & Real Estate Brokerage

Excell Communications

6247 Amber Hills Road

Trussville, AL 35173

Sales Contact: Janet Gill

janetgill@excellcommunications.com

Phone: (423) 648-9800

www.excellcommunications.com

Site Design, Environmental, Geotechnical, Structural, Architectural

Company Description

Excell Communications is one of the largest site development and construction firms serving the wireless industry throughout

the Southeast and Midwest. Our experience in self-performed services has made us a leader in A&E as well as all other turnkey offerings. This success is attributed to our combining subject matter expertise and procedural excellence together in one company. We invite you to contact us and learn more about how we may assist you with your engineering needs.



French & Parrello Associates

1800 Route 34, Ste. 101

Wall, NJ 07719

Sales Contact: Sean Kroeper

info@fpaengineers.com

Phone: (732) 312-9800

Fax: (732) 312-9801

www.fpaengineers.com

Site Design, Environmental, Geotechnical, Structural, Architectural, Electrical, Surveying

Company Description

Since 1984, French & Parrello Associates has been providing architectural and engineering services for the telecommunications industry. We have been involved in over 5,000 wireless communication-related projects. Whether your needs are for one service or "one-stop shopping," French & Parrello can provide a broad range of services.



Fullerton Engineering Consultants

Fullerton Engineering Consultants

9700 W. Higgins, Ste. 800

Rosemont, IL 60018

Sales Contact: Frank DiVito

fdvito@fullertonengineering.com

Phone: (847) 292-0200

Fax: (847) 292-0200

www.fullertonengineering.com

Site Design, Structural, Architectural

Company Description

Fullerton Engineering has been providing quality engineering services to the telecommunications industry for more than 11 years in 40 states across the country. We have designed and audited more than 5,000 cell sites and have a full complement of in-house structural engineers. Fullerton is DBE/MBE certified so please consider us for teaming opportunities!

GlenMartin

13620 Old Highway 40

Boonville, MO 65233

Sales Contact: Tom Ferguson

Tom.Ferguson@glenmartin.com

Phone: (800) 486-1223

Fax: (660) 882-7200

www.glenmartin.com

Site Design, Structural, Installation, Tower Design, Foundation

Granger Telecom

Telecommunications Systems Specialist

Granger Telecom

22 Corgey Road
Pleasanton, TX 78064
Sales Contact: Joe Mendoza
sales@grangertelecom.com
Phone: (830) 569-8088
Fax: (830) 569-8091
www.grangertelecom.com

RF Systems Design, Site Design, RF Propagation, Power Systems, Turnkey Site Build-out
Company Description

Granger Telecom is a turnkey provider of microwave and fiber-optic systems nationwide. Granger has been in business for more than 52 years. Granger Telecom has personnel and equipment to install microwave equipment, fiber-optic systems, ancillary equipment, DC power systems, tower, antenna, line systems, and complete site and civil services.

See ad on page 38

Hatfield & Dawson Consulting Engineers

9500 Greenwood Ave. N
Seattle, WA 98103
Sales Contact: Benjamin F. Dawson
hatdaw@hatdaw.com
Phone: (206) 783-9151
Fax: (206) 789-9834
www.hatdaw.com
RF Systems Design, RF Propagation, RF Safety, Electromagnetic Compatibility

History

1375 Union Hill Industrial Court, Ste. A
Alpharetta, GA 30004
Sales Contact: Dina Bazzill
info@historyinonline.com
Phone: (770) 667-2060
Fax: (770) 667-2041
www.historyinonline.com
Cultural Resources: Archaeology, History



IVI Due Diligence Services

106 Corporate Park Drive
White Plains, NY 10604
Sales Contact: Adrian Berezowsky
adrian.berezowsky@ivi-intl.com
Phone: (800) 704-2650
Fax: (914) 368-4634
www.ivi-intl.com

Company Description

IVI offers a wide spectrum of services for nationwide telecommunications infrastructure development, ranging from environmental site assessments to FCC/NEPA Screenings and Section 106 Consultation. At IVI, we understand your program and schedule constraints and use our expertise to realize your goals in a cost-effective and timely manner.



LBA

Lawrence Behr Associates

3400 Tupper Drive
Greenville, NC 27834
Sales Contact: Silver Miller
silver.miller@lbagroup.com
Phone: (252) 757-0279
Fax: (252) 752-9155
www.lbagroup.com

RF Systems Design, RF Safety, Electro Magnetic Compatibility, AM Collocation

Company Description

Since 1964, LBA has specialized in wireless infrastructure services: with AM detuning, new FCC AM reradiation studies, antenna modeling & AM collocation systems. We offer RF hazard audits, EME surveys, safety plans, RF awareness training and RF environmental testimony. Our expertise includes propagation, intermodulation studies, interference resolutions and RF shielding.

Lockard & White

14511 Falling Creek Lane, Suite 507
Houston, TX 77014
sales@lockardandwhite.com
Phone: (281) 586-5700
Fax: (281) 586-0044
www.lockardandwhite.com
Electromagnetic Compatibility, Structural

Malouf Engineering Int'l

17950 Preston Road, Ste. 720
Dallas, TX 75252
Sales Contact: Mark Malouf
mmalouf@maloufengineering.com
Phone: (972) 783-2578 x106
Fax: (972) 783-2583
www.maloufengineering.com

Company Description

A national structural engineering consulting firm specializing in telecom structures for the wireless, broadcast and government industries.



Martin & Associates

Environmental Services, Inc.
www.MartinEnviro.com

Martin and Associates Environmental Services

8823 San Jose Blvd., Ste. 3
Jacksonville, FL 32217
Sales Contact: Tom Martin or Sherrie Leman
tmartin@martinenviro.com
sleman@martinenviro.com
Phone: (904) 737-1034
Fax: (904) 737-8650
www.martinenviro.com

Environmental, Geotechnical, NEPA-SHPO Compliance and Mediation

Company Description

Martin & Associates Environmental Services is a diversified company offering integrated environmental consulting services that has provided clients nationwide with a broad range of professional services geared towards compliance with environmental regulations, due diligence and the resolution of environmental issues.

Noble Engineering Consultants

123 E. Railroad St.
Flora, IL 62839
Sales Contact: Eric Seals
eseals@nbleng.com
Phone: (618) 662-5800
www.nbleng.com
Site Design, Environmental, Geotechnical

RCC Consultants,

100 Woodbridge Center Drive, Ste. 201
Woodbridge, NJ 07095
Phone: (732) 404-2400
Fax: (732) 404-2400
www.rcc.com
RF Safety, RF Systems Design, RF Propagation, RF Safety, Electromagnetic Compatibility, Site Design, RF Compliance

Tectonic Engineering

70 Pleasant Hill Road
Mountainville, NY 10953
Phone: (845) 534-5959
Fax: (845) 534-5999
Sales Contact: Richard Kummerle
rpummerle@tectonicengineering.com
www.tectonicengineering.com
Site Design, Structural, Geotechnical, Environmental, Surveying, Zoning and Construction Drawing, Photo Simulations, Network and Switch Facility Design

Terracon

Terracon Consultants

18001 W. 106th St., Ste. 300
Olathe, KS 66061

Sales Contact: Craig Pruett

cspruett@terracon.com

www.terracon.com

Phone: (303) 423-3300

Fax: (303) 423-3353

www.terracon.com

Environmental, Geotechnical, Construction
Materials Engineering and Testing

Company Description

Terracon is an employee-owned engineering consulting firm providing geotechnical, environmental, construction materials and facilities services from nearly 100 offices nationwide with more than 2,500 employees. Telecommunications services include environmental site assessments, NEPA studies, environmental regulatory compliance, geotechnical engineering, construction monitoring, testing and inspection services.

See ad on page 13

Tower Innovations

107 Dunbar Ave., Ste. E

Oldsmar, FL 34677

Sales Contact: Bruce McIntyre

bruce@towerinnovationsinc.com

Phone: (727) 439-3683

Fax: (813) 925-0999

www.towerinnovationsinc.com

RF Systems Design, RF Propagation, Site
Design, Structural



TriVis

180 Chandalar Place Drive

Pelham, Alabama 35124

Sales Contact: Scott Landreth

hslandreth@trivisinc.com

Phone: (205) 621-0106

Fax: (205) 621-1108

www.trivisinc.com

Site Design, Environmental, Geotechnical,
Structural, Electrical

Company Description

TriVis is the complete solution provider in the wireless industry. Incorporated for 10 years, we have maintained a staff of diverse experienced professionals. Providing turnkey services from site acquisition through construction and providing maintenance and modification of existing sites. We give you more than you thought you purchased.

WATERFORD CONSULTANTS

Waterford Consultants

18331 Turnberry Drive

Round Hill, VA 20141

Sales Contact: Ian Maxwell

sales@waterfordconsultants.com

Phone: (703) 782-0007

Fax: (540) 242-3195

www.waterfordconsultants.com

FCC AM Compliance, RF Health & Safety
Training, NIER Theoretical Analyses, Onsite

MPE Studies, Intermodulation Studies, Public
Safety and Municipal Network Consultation,
FAA Determinations

Company Description

Waterford Consultants represents a new approach to regulatory compliance, based on a core team of experienced, respected, professional experts in the field. Our team's demonstrated skills combined with state-of-the-art, cutting-edge technology lets you make proper, timely decisions avoiding construction delays and unexpected costs. Let us be part of your team; together, we will beat the competition every time.

See ad on page 13

The Nucleus of Your Site

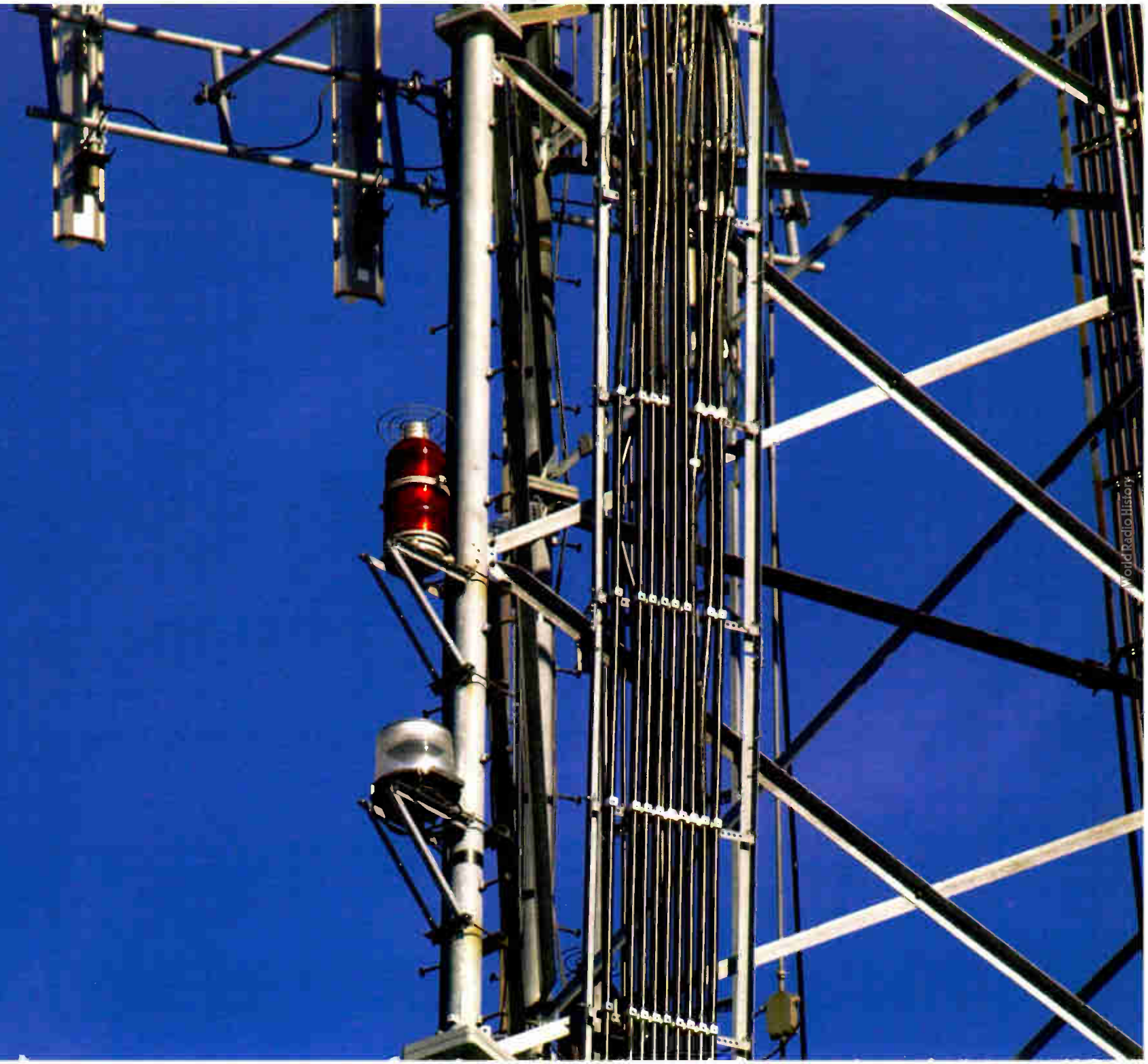
Towers Components Shelters Turnkey Construction

Sabre
Industries, Inc.

www.SabreIndustriesInc.com

Sabre Towers & Poles CellXion Sabre Site Solutions

AGL TOWER OF THE MONTH MAY





SITE NAME

Marion

OWNER

Global Tower Partners

MANUFACTURER

Rohn Industries

TOWER TYPE

Self-supporting

HEIGHT

358 feet

BUILT

1997

APPLICATION

Cellular, PCS, Paging

LOCATION

Marion, Iowa

Stronger Towers With 10% of the Weight of Steel

Carbon fiber offers an alternative in the manufacture of telecommunications towers that yields lightweight structures with less wind loading that can be stacked much faster than comparable steel towers.

By Mike Kipp; Erich Wilson, Ph.D.; Patrick Burke; and Leslie Derrig

Steel towers are arduous to construct and costly to manufacture, and they use valuable resources that many say are in short supply. An alternative to using steel to manufacture towers is to use carbon fiber. It is noncorrosive and has low electrical conductivity. It weighs less than 10 percent of the weight of comparable steel towers. And the light weight of carbon fiber reduces the time required to erect towers to a matter of hours versus the days or weeks required for steel. In addition, stacking the sections does not require the use of a heavy lift crane. (See Figure 1)

American Consulting Technology & Research (ACTR) is the designer and owner of the core technologies involved and is co-developing, along with GlobeLink Telecom, the first heavy-load structure made from carbon fiber. This new support member is configured for tower applications assembled in three- or four-leg self-supporting, guyed, monopole, telescoping and transportable models. The structure is manufactured in a round lattice matrix of carbon-fiber strands layered in a geometric pattern named GeoStrut. (See Figure 2)

The strut lattice configuration has half of the wind load of a solid surface, yet it maintains a high antenna load capacity. In some cases, the reduced wind load permits up to a 40 percent reduction in the foundation requirement, a major cost item in tower erection. Carbon fiber excels in abrasion resistance, disaster survivability (fire, hurricane and earthquake) and maintenance because it doesn't corrode.

In addition to the economic considerations, the carbon-fiber tower is environmentally friendly because it uses readily available raw material and eliminates hot-dip galvanizing, a process that is more costly and comparatively not as environmentally friendly. The carbon-fiber raw material is extracted and processed in all areas of the United States with no negative impact on the environment.

The carbon-fiber composition survives dramatic temperature extremes while maintaining extremely high tensile strength, as evidenced by its use on the NASA space shuttle, the F-35 fighter and the Boeing Dreamliner.

Table 1 compares the tensile strength, elasticity and density of several types of construction materials.

As a high-end material, carbon fiber has performance characteristics well beyond those of standard materials. The tensile strength of the carbon fiber is more than nine times the strength of Grade 304 stainless steel. The elasticity

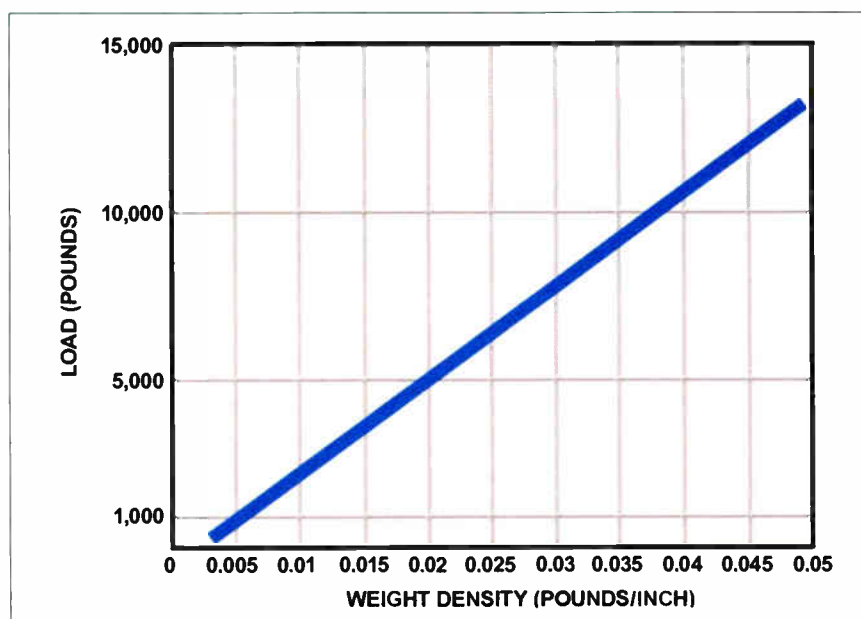


Figure 1. GeoStrut carbon-fiber tower member weight characteristics.

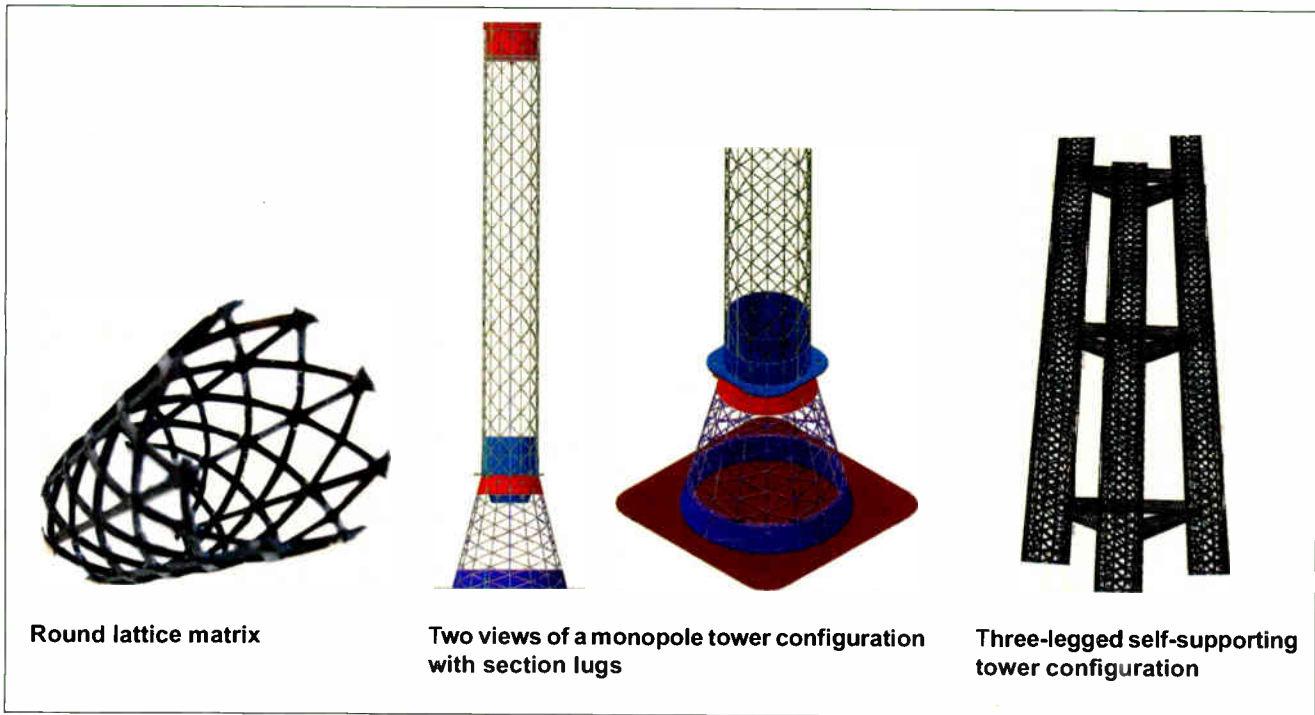


Figure 2. The structure is manufactured in a round lattice matrix of carbon fiber strands layered in a geometric pattern. Section lugs mate diameter changes.

of the carbon fiber is another way of viewing material stiffness. Carbon fiber is the stiffest material listed in Table 1.

These material properties are combined with light weight in the final product. Grade 304 stainless steel is more than five times as dense as carbon fiber. Carbon fiber's lower density and higher tensile strength allow the designer to create new structures to carry the same loads as steel.

The combination of lower density and higher tensile strength of the carbon-fiber members allows the design

of structures to carry higher loads on a support system that has been reduced 90 percent in overall dead weight.

Table 2 is a direct comparison of properties of two 100-foot-tall, 36-inch-diameter wind-turbine monopoles made of different materials. The table shows that the structures exhibit the same projected area and are subjected to the same wind load (40 psf = 100 mph wind speed). The lattice design of the carbon-fiber members allows air to pass through the structure, as indicated by the lower drag coefficient. The result of this 50 percent

reduction in drag coefficient without cables is a 50 percent reduction in wind-load forces. This reduced load reduces the foundation required to resist the load reactions. The actual foundation reduction varies as a function of the amount of cabling required because cables have their own drag coefficient, which is unaccounted for in this analysis.

The steel tower in this example would be made with 1/8-inch-thick self-supporting sheet metal, which is comparable to a tower with a steel frame coated with 1/32-inch-thick sheet metal. The

GeoStrut Technology Advantages

- Lightest mass-production-capable carbon fiber structure in the world
- Comparable unit pricing
- Highest weight-to-strength ratio
- Highest antenna load capacity
- Lowest shipping and handling cost
- Lowest installation labor cost
- Shortest installation time
- Lowest maintenance
- Longest lifespan

Carbon-fiber Applications

- Telecommunications antennas
- Wind turbines
- Utility and telephone pole (environmentally safe for direct-bury applications)
- Building framing
- Pier and platform supports
- Highway barrier (yields w/strength-absorbing impact forces, saving lives)
- Fence post or flagpole

Material	Tensile Strength	Modulus	Density
	ksi	ksi	g/cc
Carbon Fiber	685	85,000–120,000	1.56
Fiberglass	30	18,000	1.53
304 Stainless Steel	90	30,000	8
1018 Mild Steel	64	30,000	7.87
6061-T6 Aluminum	45	10,000	2.7
Wood (Douglas Fir)	0.33	1,936	0.55

Table 1. Material comparison.
Tensile strength: The higher the number, the greater the force required to cause structural failure.
Modulus: Elasticity is an indicator of a material's ability to deform and return to original size and shape. The lower the number, the greater its elasticity.
Density: A physical characteristic and a measure of mass per unit of volume.

carbon-fiber tower would weigh 275 pounds. The steel tower would weigh 4,873 pounds, 17.72 times as much.

A carbon-fiber monopole can be transported and delivered with a pickup truck or easily flown by small helicopter to remote locations. At the end of the first day, the tower crew can have the carbon-fiber monopole assembled and erected

in place. The standard steel monopole requires heavy equipment for transport, delivery and erection. Additionally, the steel monopole foundation is twice the size of its carbon-fiber counterpart.

Designs are available to use carbon fiber for three- or four-leg stand-alone towers extending as much as 400 feet high. Using a helicopter, the lightweight tower

can be set into place with snug-fitting collars. A 400-foot tower would weigh about 2,000 pounds, and its load-bearing capacity compared with steel would be about two to one, allowing more antennas to be affixed to the structure.

Designs are available to use carbon fiber for guyed towers as tall as 300 feet with a base diameter as wide as 24 inches, weighing less than 1,000 pounds. Generally, the higher the tower, the larger the diameter for guy cable required to resist the forces. The paradox is that as the guy-cable diameter increases, so does the dead weight. Thus, the tower size must increase to support the compression load from the dead weight of the guy cables.

The carbon-fiber tower, with half the wind load and twice the load-bearing strength, allows the size of the guy cables to be dramatically reduced. Taken together, all these factors relate directly to material cost and the cost of labor

STL
SPECIALTY TOWER LIGHTING

**Taking Lights to
NEW HEIGHTS**

Call now for a copy of our new brochure
SPECIALTY TOWER LIGHTING, LTD.
 713.722.8123 • sales@specialtytowerlighting.com

SEE OUR
GO GREEN
ENERGY SAVING
LIGHTS

1630 Elmview Dr. Houston, TX 77080
 www.specialtytowerlighting.com

Your search is over!

U.S. Title Solutions

- Title Search Services**
 - Wireless Industry Specialists
 - Raw Land Builds
 - Co-locations
 - Tower Acquisitions
- Document Filing Services**
- Title Insurance**
- Nationwide Coverage**

Contact us: 908.849.4823
 erin@ustitlesolutions.com
 www.ustitlesolutions.com

Wind Forces	Solid-steel Monopole	GeoStrut Monopole
OD in (m)	36 (0.914)	36 (0.914)
Height ft (m)	100 (30.48)	100 (30.48)
Protected Area ft ² (m ²)	300 (27.87)	300 (27.87)
Drag Coefficient Cp	1.063	0.536
Total Weight Lbs (kg)	4873 (2215)*	275 (125)
Wind Load psf(MPa)	40 (39.71)	40 (39.71)
Total Wind Force kips (kn)	108.6 (483.1)	54.8 (243.8)

Table 2. A comparison of wind forces on a 100-foot wind turbine tower made as a solid cylinder and of GeoStrut tube.

*** The tower weight is based on an equivalent 100-foot steel cylinder of 1/8-inch wall thickness.**

to stack the tower. They allow heavier antenna loads with the potential for greater profit for the tower owner.

The rigidity of the material of which towers are made has an effect on construction cost. When the carbon-fiber strand layers are increased, the structure becomes considerably more rigid than steel. Increased rigidity allows a reduction in the number of guy-cable elevation points that affect twist and sway.

A telescoping carbon-fiber tower that collapses within itself for transport or storage and that can be quickly extended for set up has been designed for heights as great as 100 feet. Such a tower would weigh 150 pounds and would be easy to transport in the back of a pickup truck. A 60-foot telescoping tower made of steel with comparable strength would require an 8-foot-square base, whereas a 60-foot carbon-fiber tower's

base would be only 18 inches, and the tower would weigh 128 pounds.

Carbon fiber is known throughout the world as a superior material. Previously, high cost and a low production rate hampered its potential for wider use. The lattice structure maintains carbon fiber's strength while reducing the amount of material used to keep the cost under control. The result is a product that outperforms other carbon-fiber structures and that can be built and erected at a fraction of the price. **agi**

Mike Kipp is chief technology officer of American Consulting Technology & Research, Provo, Utah. His email address is mkipp@actr.com. Erich Wilson, Ph.D., is an engineer with ACTR. Patrick Burke is chief technology officer at GlobeLink Telecom, Anchorage, Alaska; pburke@globelinktel.com. Leslie Derrig is GlobeLink's director of business development; lderrig@globelinktel.com.

Survivability

Your towers are built to withstand tough conditions. Your Environmental Compliance and Reviews should withstand tough scrutiny.

If you are building a new tower you must comply with the National Environmental Policy Act (NEPA) and the FCC National Programmatic Agreement (NPA) for Impacts to Historic Resources. In many cases, modifications to existing towers must also comply with the NPA.

Dynamic Environmental Associates, Inc. is the Industry Recognized, Source For:

- ◆ NEPA & NPA Compliance
- ◆ ASTM Environmental Site Assessments
- ◆ Permitting, Auditing & Reporting

We have been working with the tower and wireless industries since 1993. Our track record speaks for itself.

We don't cut corners. We cut risk.

Nationwide Toll Free 877.968.4787 info@DynamicEnvironmental.com www.DynamicEnvironmental.com



DYNAMIC ENVIRONMENTAL ASSOCIATES, INC.



Photo 1. A disaster-recovery vehicle arrives and engineers assess on-site needs.

Disaster Recovery for Wireless Communications

An innovative vehicle delivers on-site recovery to vital utility communications. Built by Arcadian Networks in collaboration with Television Engineering Corporation, the vehicle anticipates virtually any communications platform.

By Robert Burchard

Though now a fragment of history, the slow-motion image captured on Sept. 11, 2001, of communications towers falling into churning clouds of debris that moments earlier had been the World Trade Center North Tower lingers as a reminder of the urgency of disaster recovery for communications. As utilities increasingly use wireless networks to link their widely distributed assets to a national energy smart grid, the need for preparedness is more clear than ever.

Recovery in smart grid era

Utility communications are undergoing a revolution in America. Seventy-three years ago, when the Rural Electrification Act transformed communities with electrical power delivery, utilities built systems on then state-of-the-art telephone communications technology. Today, there's a consensus that the utility sector needs a major overhaul to address aging power infrastructure, environmental concerns, national security issues and more. The computer revolution must take root in revitalized and reinforced utility network communications to transform the entire power grid to a smart grid. Wireless communications are poised to play a leading role.

With network telemetry, utilities could monitor their power delivery and

consumer needs with real-time data, allowing them to reduce wasteful excess capacity and inaccurate demand estimates and send production directives back to substations over high-speed wireless networks. The potential is tremendous. Edison Electric Institute (EEI) and research body Electric Power Research Institute (EPRI) estimate that U.S. electrical usage could be cut by

10 percent through smart grid technologies, according to a 2008 report.

Wireless enables smart grid

Wireless networks provide a link between old and new technologies for utility communications. In Minnesota, 16 electrical cooperatives linked to power generator and distributor Great River Energy have implemented a 700-MHz

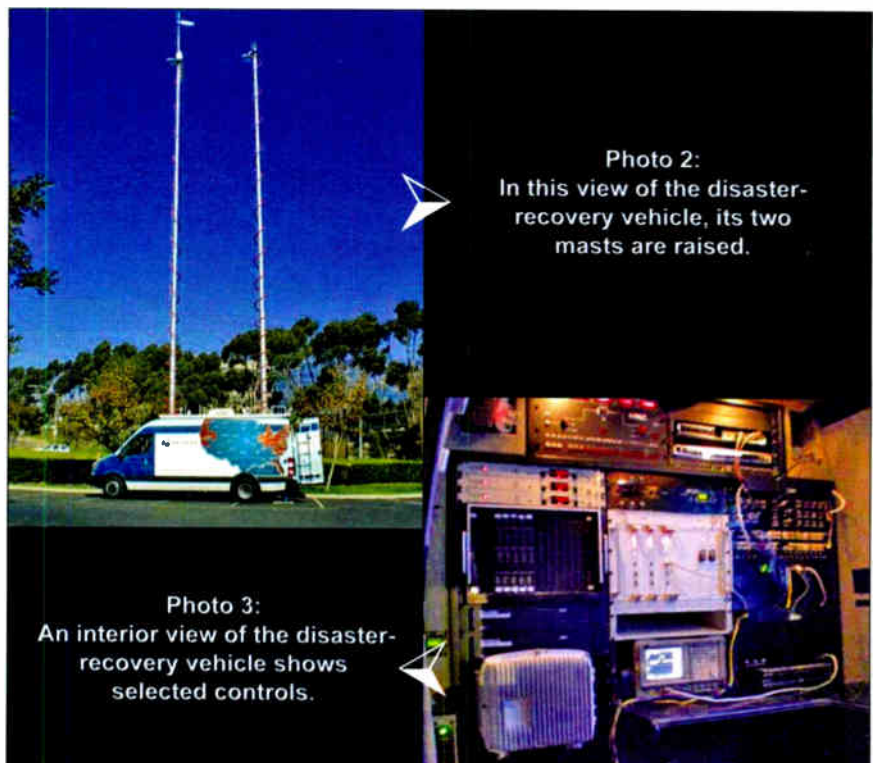


Photo 2:
In this view of the disaster-recovery vehicle, its two masts are raised.

Photo 3:
An interior view of the disaster-recovery vehicle shows selected controls.



Photo 4. The disaster-recovery vehicle delivers emergency communications wherever needed. Climate controls and emergency mechanisms equip it to perform in almost any terrain.

licensed wireless IP communications network from Arcadian Networks. These cooperatives, many serving rural areas with only seven customers per mile of power line, have wirelessly linked even their most far-flung substations back to their headquarters and, thus, to the regional power grid. With the simple installation of wireless communications, these rural power companies find themselves on the cutting edge of smart grid technology.

This trend continues. Arcadian Networks has acquired FCC licenses allowing it to provide secure, private networks in all or part of 30 states and in the Gulf of Mexico. With smart grid technologies in place, disasters can be more effectively prevented as well as recovered from. Real-time data transmitted wirelessly from substations can alert engineers to potential problems and allow remote deactivation or adjustments before problems arise. In the event of an unavoidable

**Growing to Meet
YOUR NEEDS**

Introducing the latest NELLO division in Fort Worth, TX.
Manufacturing pole-based products and accessories.
For more information, call 800-80-NELLO or visit www.nelloinc.com.

Granger Telecom Telecommunications Systems Specialist

- Turn-key Microwave and Fiber Optic Systems
- 2.1 GHz AWS Relocation Services
- Path and Systems Engineering
- Installation and Testing
- Commissioning, Acceptance, and Documentation
- Tower Erection, Inspection, and Repair Services
- E-911 Public Safety Support

22 Corgey Road, Pleasanton, TX 78064
Phone: 830.569.8088 Fax: 830.569.8091
E-mail: Sales@grangertelecom.com or
visit us at www.grangertelecom.com

man-made or natural disaster, Arcadian has initiated a proactive approach.

Recovery pre-smart grid

In the old days, or wherever the old legacy communications remain, disaster recovery involved finding the thing that broke and going and fixing it. Technicians work on one end of the communications route or the other. Smart grid support involves a more comprehensive event management. If a tower falls, for example, Arcadian can drive a disaster recovery vehicle to the site and replace the tower functions to a predetermined percent of capacity based on network RF design.

In the post-9/11, post-Katrina world, the implications are significant. Any utility linking its communications wirelessly has the foundation for a smart grid strategy, with its capacity for self-healing and greater resilience. When the disaster-recovery vehicle rolls onto a site, it delivers a continuous stream of vital, reliable, real-time critical data — until the tower damage or other disaster effects have been repaired. (See Photo 1)

Tricked-out service van

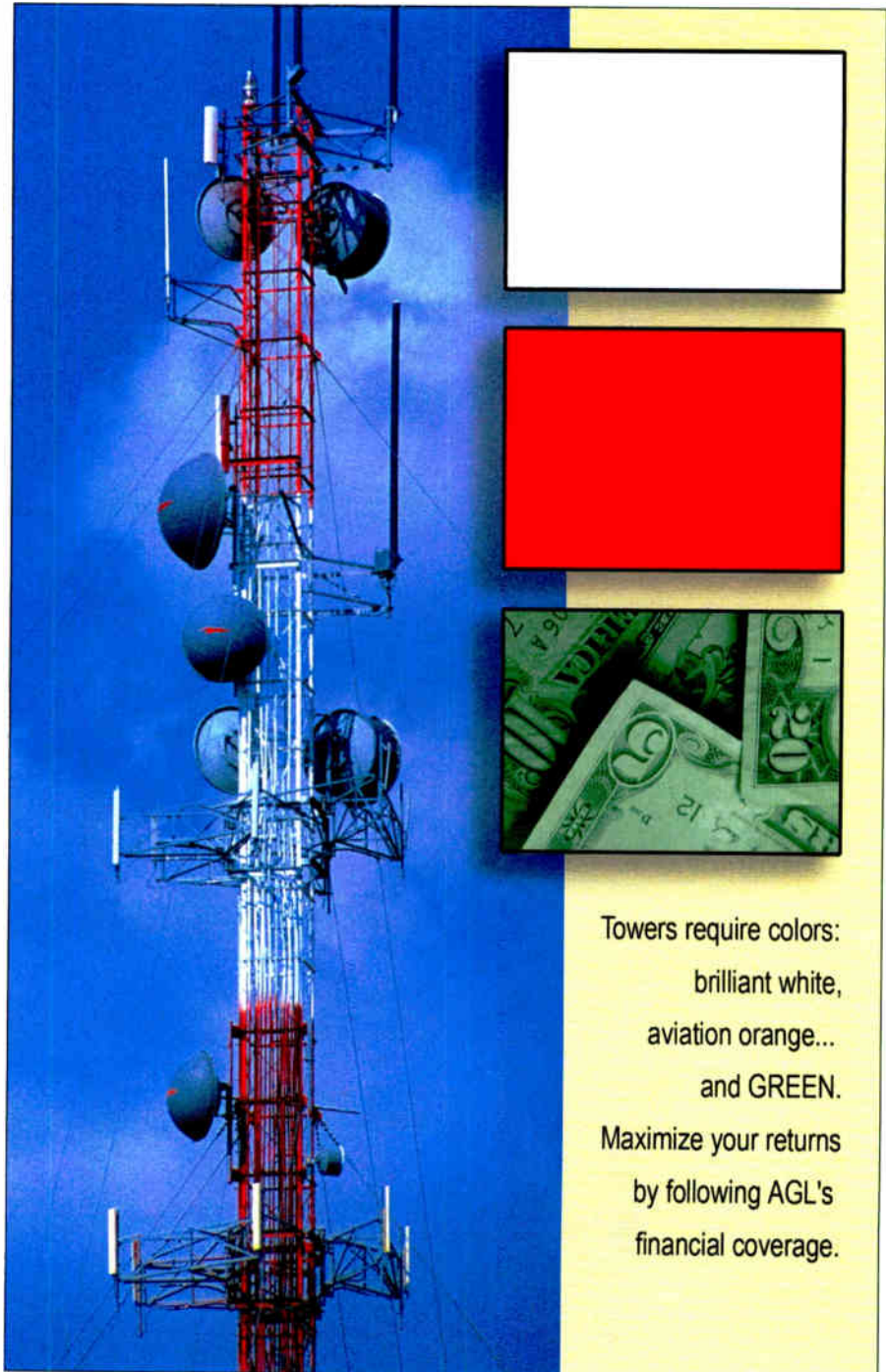
One of the disaster-recovery vehicle's key strengths is the multiplicity of technologies it can connect. Built in collaboration with Television Engineering Corporation (TEC), the vehicle anticipates virtually any communications platform and is equipped to connect with it. Built on a 2007 Dodge Sprinter 3500 with a stable wheelbase, the vehicle is a rolling communications command post.

The vehicle includes dual 56-foot pneumatic masts. One delivers fixed broadcasts. The other is for backhaul and link testing. Each mast can support 200 pounds and can be extended up to 20 additional feet over the pneumatic height with fixed masts. Three transmission lines as well as Ethernet and power run to the top of each mast. A camera and antennas mounted atop one can be remotely manipulated through 360 degrees of azimuth, which is useful for visually inspecting the path to, and zeroing in on, distant towers. (See Photos 2 and 3)

When the vehicle — all 11,000 fully loaded pounds of it — arrives on site, it's prepared to stay. The crew sets up the truck's stabilizers, activates emergency flashers, and kicks on the 8,000-kilowatt Oran brand generator. The generator shares the fuel tank with the 6-cylinder diesel motor, which can operate for 20 hours on a single tank of gas. The truck carries spare gas cans to refuel, if needed.

A custom-built heat-management system can be set to optimal temperature for a variety of hardware platforms. The equipment and its crew can operate in desert or blizzard conditions. (See Photo 4)

Because disaster scenarios present unpredictable and potentially unstable environmental hazards, the disaster-recovery vehicle has extensive safety mechanisms and safeguards built into its



Towers require colors:
brilliant white,
aviation orange...
and GREEN.

Maximize your returns
by following AGL's
financial coverage.



Photo 5. The disaster-recovery vehicle can restore network capacity in an emergency situation through comprehensive management of problems with smart grid-ready technology.

Ever Wondered What is Happening in the Tower Industry Between Issues of AGL?

Have you ever wanted your own tower industry news service? Free of Charge? AGL Bulletin provides you with all the important developments in the tower industry from coast to coast, compiled and reported to your email in box twice a month.

- Stay on top of the news
- Find out about new products
- Stay informed on industry meetings
- Sign up for AGL Bulletin!

www.agl-mag.com/signup



COMTRAIN
Tower Technology & Safety Training
808-329-4840 www.ComTrainUSA.com

Tower hazard issues aren't always about falling...

Tower Construction
Safety & Rescue
Non-Climber TS&R
Advanced TS&R
Instructor Training
CASH Contests!

equipment and software. For example, the van cannot be moved once the masts are up. And handheld remotes allow the crew to control antenna functions from inside or outside the vehicle, as needed.

Diagnostics and communications

Inside the van, it's a utility communications command center on wheels. Virtually everything a communications engineer would need to read data, send commands and communicate machine-to-machine or person-to-person is here. A 40-inch LCD display connects to multiple data sources, including the entire network-management system, and can intake multiple feeds simultaneously. The patch panel can connect "anything to anything" with its outlets for USB, Ethernet, cable and more. (See Photo 5)

The disaster-recovery vehicle is provided with a full-service agreement to customers, but is also available for service in event of a disaster resulting in a humanitarian need in local

communities. On site, the vehicle can run diagnostics to assess needs and deliver wireless communications until full recovery plans can be put in place.

Readiness: For good or bad

Since it was built in mid-2008, the vehicle has not been called upon to deliver disaster recovery, but has proved useful in demonstrations and diagnostics on-site at potential customers. It also attracts a crowd at trade shows, where engineers appreciate the important assistance the vehicle could provide in an emergency scenario.

"Working in Manhattan in September 2001, I saw for myself the vital need for proactive, responsive, resilient communications — and the challenges of delivering wireless signals in an emergency," said Jake Rasweiler, Arcadian Networks' vice president of engineering and network operations. "We're proud to have built a solution that's ready to serve in any scenario, while upgrading

communications to a more secure and reliable smart grid-ready platform."

The disaster-recovery vehicle is a sign of the times. Not only of a greater awareness of the role of wireless networks in community response to emergencies, but also of their role in the changing technologies that are revolutionizing the energy sector. **agi**

Robert Burchard is director of technology for Arcadian Networks. He has 22 years experience in the wireless industry. Burchard's work as a system operator and field engineer for specialized hardware design includes microwave systems in 16 countries and UHF systems in the United States and South America. A co-designer and sometime operator of the disaster-recovery vehicle, his only regret is not including a coffeemaker and plush, ergonomic recliners in the van. For more about Arcadian Networks and the smart grid transformation, see www.arcadiannetworks.com.

IN TOUGH TIMES \$\$\$DOLLAR\$\$\$ THAT MAKE SENSE!

LOWEST INITIAL COST OF OWNERSHIP

- TWR's Dual LED/Strobe System – **25%** cost savings\$\$\$ by comparison to Flash/Dialight

LOWEST COST OF OWNERSHIP OVER 10 YEARS

- TWR's Dual LED/Strobe System – **14%** cost savings\$\$\$ by comparison to Flash/Dialight

LOWEST SYSTEM POWER CONSUMPTION, MEANS LOWER UTILITY BILLS

- TWR's Dual LED/Strobe System – **35%** cost savings\$\$\$ by comparison to Flash/Dialight

LONGEST FULL SYSTEM WARRANTY FROM SINGLE SOURCE MANUFACTURER

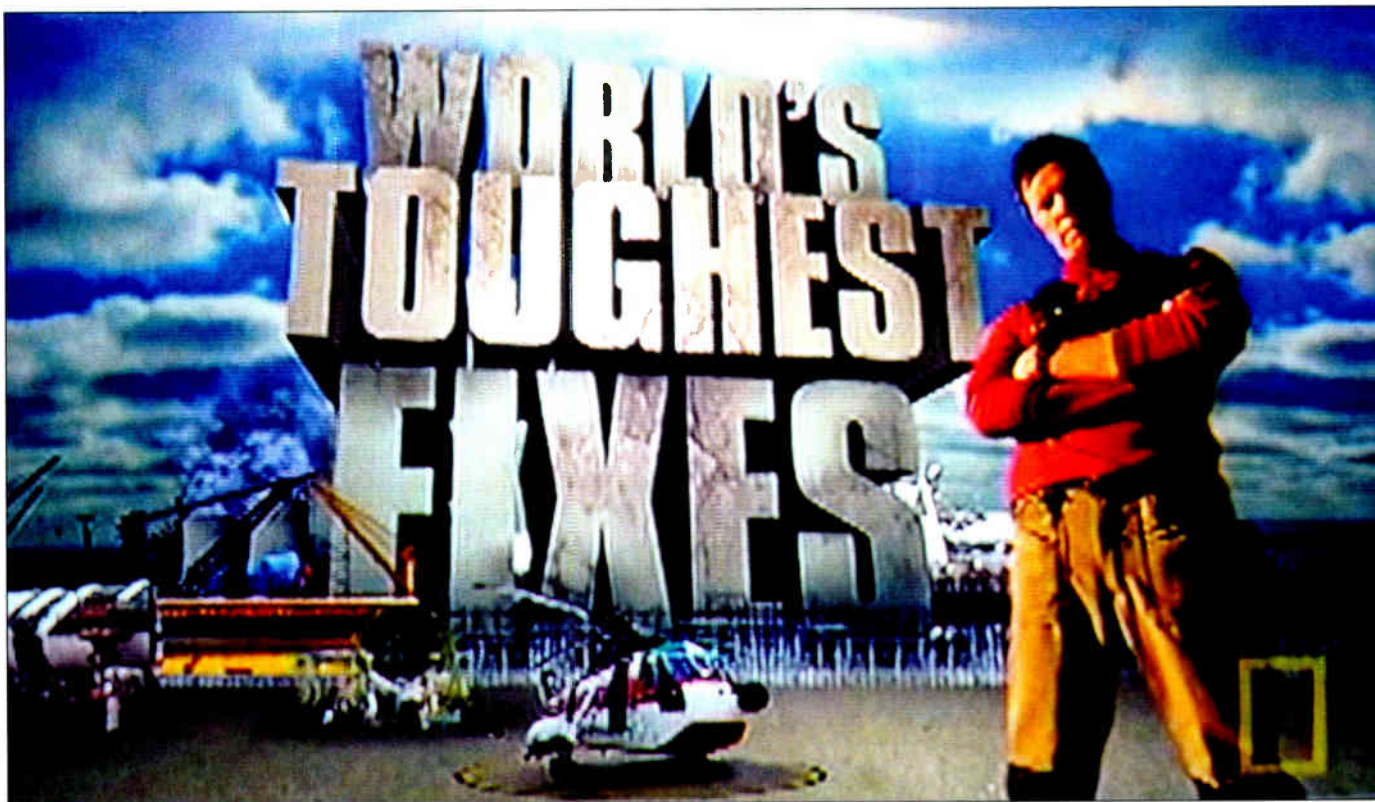
- TWR's Dual LED/Strobe System has a 5 year full warranty versus Flash/Dialight at 2 year electronics/5 year LED

For information on comparison, or to request a quote, please give us a call, 713-973-6905, or visit our website: www.twrlighting.com

TWR Lighting, Inc.TM
Enlightened TechnologySM



Nat'l Geo Channel Spotlights



AGL report

Cameras from the National Geographic Channel followed workers from Tower King II as they replaced a 7,000-pound TV broadcasting antenna atop a 2,000-foot tower in South Dakota. The tower maintenance company specializes in tall towers, and its owner was part of the crew that erected the tower 12 years ago.

42 above ground level

Several months after the NBC TV network broadcasted a *Dateline Presents* episode, "Tower Dogs," the National Geographic Channel cable TV network carried a program that used a camera to document a project involving a 2,000-foot tower. "Whatever you do, don't look down," said host Sean Riley in introducing the program. "We're scaling new heights to swap out a faulty antenna. One wrong move, and the show's over."

A TV production crew of five, including Riley, who is a professional rigger, two field producers/camera operators and an audio engineer spent seven days at the site of a tower used by KDLT-TV, Sioux Falls, S.D., to record the steps taken to remove a TV broadcasting antenna from atop the tower and replace it with another. A fifth production crew member, a pilot, was at the site with his helicopter for five days. As part of a series called

World's Toughest Fixes, the episode "2,000-Foot Tower" showed the placement of a shackle and pulley at the top of the tower; how first a rope and then a steel cable is drawn through the pulley; the assembly, lifting and installation of a gin pole at the top of the tower; and the removal of one antenna and its replacement with another.

Unlike "Tower Dogs," "2,000-Foot Tower" did not highlight the workers' personal lives or conflicts among them. The program focused on the technical and safety requirements connected with the task. "It takes a special breed of person to rig a heavy load at extreme heights around a fairly fragile structure," Riley said. "That's what makes this one of the most dangerous jobs in America. Dangerous, but crucial. There are over 100,000 communications towers in the U.S.A. Nearly 1,000 of them are between 1,000 and 2,000 feet tall."

www.agl-mag.com

Workers On 'Big-iron' Towers



Kevin Barber



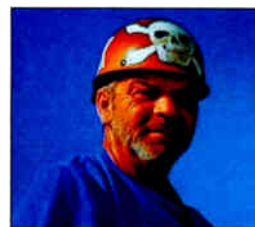
Shane Best



Dave Sills



Tommy Rosell



Bob Watkins

Defective antenna

The 7,000-pound antenna to be replaced had been installed three years ago, and Riley said it never had worked properly. To remove the antenna required placing equipment that could reach above the antenna to lift it off. A portable crane arm called a gin pole is just that piece of equipment.

Riley introduced the crew of workers from tower erection and maintenance company Tower King II of Cedar Hill, Texas. The crew consisted of company owner Kevin Barber, the team leader; Shane Best, the foreman; Dave Sills, Tommy Rosell and the winch operator, Bob Watkins. Riley said it was Watkins' responsibility to get everything up and down the tower in one piece. "It's stressful," Watkins said. "That's the biggest part of my job, taking care of the guys that I take up the tower every day."

Together with the antenna, the hardware lifted up the tower weighed 11,000 pounds. The winch placed near the base of the tower weighed 49,000 pounds.

Towerspeak

The first step shown by the program was the assembly of the 160-foot mobile crane arm, the gin pole. During the gin pole assembly, the crew taught Riley "towerspeak," the three commands used to signal Watkins in his operation of the winch. "'Whoop' is 'up,' 'bang bang' is 'down' and 'wah' is 'stop,'" Barber explained.

The camera captured a few seconds of a safety meeting that Barber con-

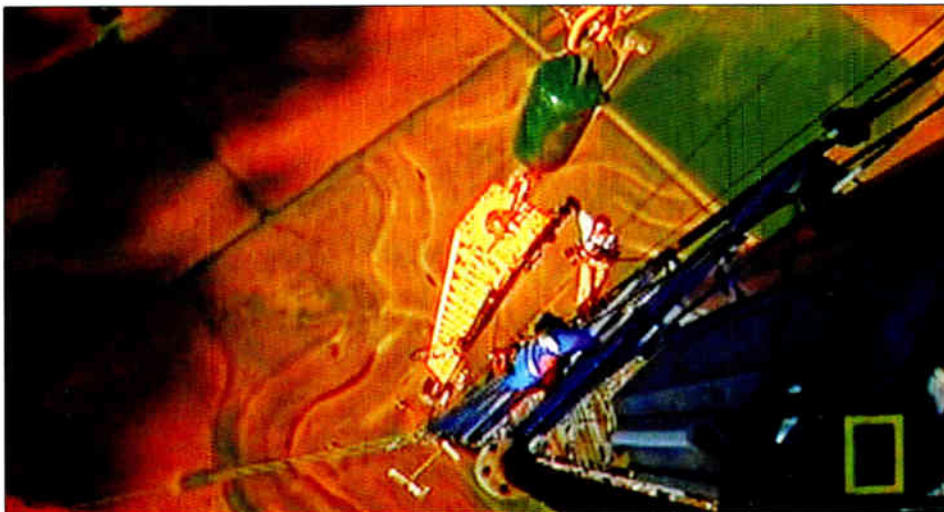
ducted and that included information regarding rescue operations, should they be made necessary by accident or illness on the site. Then the program showed the placement of a 3/4-inch steel cable on the tower for use in hoisting equipment and, when necessary, workers up and down the tower. Within its frame the tower has an elevator that the workers used to reach the top of the tower to place a shackle and pulley. The elevator also pulled a rope up to the pulley. But the workers' body weight was needed first to pull down a rope on the outside of the tower and then to pull down the steel cable that followed the rope. Barber gave Riley the

job of riding the end of the rope down the outside of the tower as the camera followed on the elevator. "There's not a rigger in the world who wouldn't jump at the chance," Riley said.

The assembly of the gin pole into three sections, placement of the shackle and pulley, and placement of the rope took all of the first day. The second day's work involved raising the three sections of the gin pole to a position near the top of the tower and bolting the sections together at 2,000 feet in the air. "This is where winch operator Bob starts to earn his money," Riley said. "Before we can lift anything heavy, we need to replace the rope we hung with



Pictured in the helicopter used for aerial camera work is program host Sean Riley, a master rigger with a theatrical background. 'I got to hand it to Kevin, Shane, Dave, Tommy and Bob. Every day they go to work, they put their lives on the line,' Riley said.



The cable from the winch operated by Bob Watkins raised a section of gin pole up the tower where workers assembled the sections into what amounted to a 160-foot portable crane.

the wire cable.” But because the cable is heavier, this time both Riley and Sills acted as a counterweight, climbing down the tower as Watkins played out the cable from the winch.

For the thrill

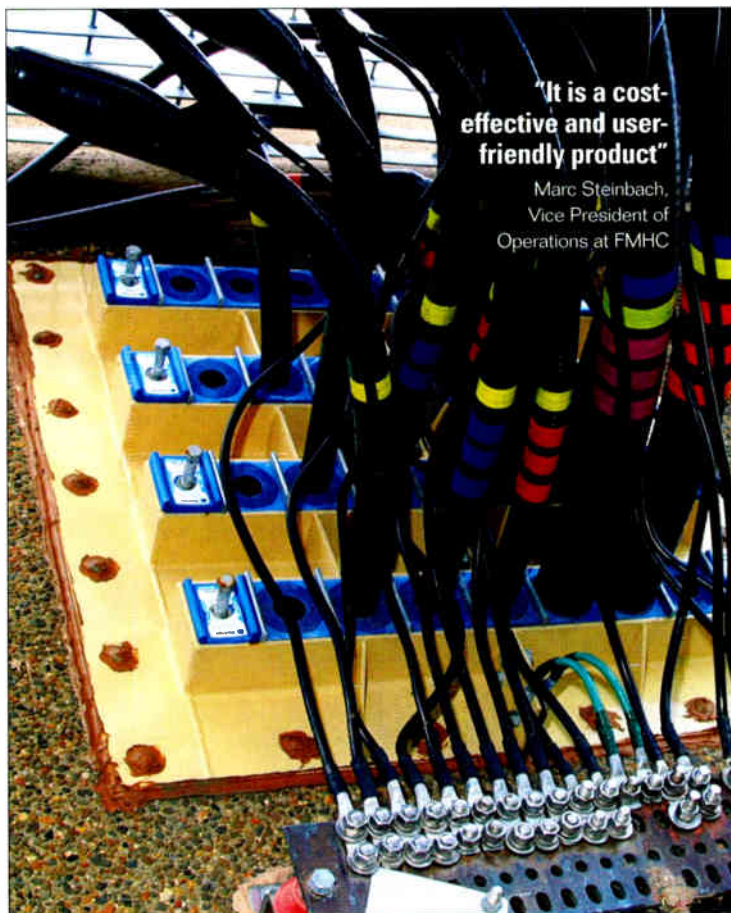
Riley took a moment at the top of the tower to talk with Sills. “This isn’t a job for everybody. How come you’re up here?” Riley asked.

“I just love it,” Sills answered. “I like big rigging. I don’t like doing anything small. If it’s little towers, then it’s not for me. I just like the big iron. You do it for the thrill, I guess.”

The program showed another step, the lifting and attachment of a tag line to the steel cable. Watkins uses the tag line to pull the load away from the tower so it doesn’t come in contact with it and cause damage.

The third day’s work involved raising the pole higher, closer to its working position. The gin pole slides along a track that keeps it in position as the winch raises it in increments. “This makes everything else we’ve done so far look easy,” Riley said. “Lifting the gin pole is like a high-stakes game of leapfrog. The guy who is doing all this heavy lifting is winch operator Bob. He’s positioning tons of steel to within inches, and he is doing it all sitting nearly half a mile away.”

On the fourth day, the crew raised the gin pole into operating position, extend-



“It is a cost-effective and user-friendly product”

Marc Steinbach,
Vice President of
Operations at FMHC

Why cut another hole? — Retrofit instead!

Eliminate the need to cut a new hole in the shelter, triple existing cable capacity within the same space and install without shutting the site down. The Roxtec cable sealing system drastically reduces overall costs because the work can be performed during the day rather than the maintenance window at night!

For more information, please call LeAnn Garrett at 918-362-0226.

- Quick and easy to install
- On-site installation training
- Built-in spare capacity for future changes
- Multidiameter™ by Roxtec – adaptable modules with removable layers
- 50% cost savings compared to cutting a new hole!

www.roxtec.com



ing 120 feet above the top of the tower. Positioning it that high above the tower required fashioning a brace to secure it to a lower antenna so it would not peel away from the tower when the gin pole is under load.

Critical moment

With the cable from the top of the gin pole secured to the antenna, the crew loosened bolts at the antenna base to allow it to be lifted free from its mount and swung to the opposite side of the gin pole in preparation for lowering it to the ground. "This is another critical moment," Riley said. "If the antenna swings the wrong way, it could crush any one of us."

Best climbed to the top of the gin pole to position his body between the antenna and the pole to help push the antenna to swing to the outside of the gin pole and prevent it from slamming into the pole. Barber, Sills and Rosell also pushed the antenna from their



The gin pole lifted the top antenna off of its mounting and the antenna began its descent to the ground, 2,000 feet down.

position near its base. To show Best at work, the unseen camera operator actually had to climb to an even higher position above the gin pole's rooster head (a pulley on a swivel), which at

that moment was the highest possible position on the tower.

The antenna was lowered to the ground, where the new antenna had been delivered that day. The lifting cable was

Is Safety Your Priority?



3600 lb.
Gate Connectors

Elk River has a full line of lanyards that meet the demands of ANSI Z359
Now that's a serious source for fall protection!

Elk River, Inc.
Personal Fall Protection

800.633.3954 256.739.3105 fax
www.elkriver.com



One last bolt on the antenna being removed required leg power applied to the ratchet wrench to dislodge it.

attached to the new antenna, and Watkins began raising it to the top of the tower. Riley commented, "It really was a full day's work, this morning, already. But once we shut down the antenna, we're committed. We have to go nonstop until

we have the new one back in position and broadcasting again."

Bolt-hole alignment

With the crew perched on the gin pole atop the 2,000-foot tower, Watkins low-

ers the antenna as the workers struggle to align the bolt holes on the antenna with the bolt holes below. "The situation is shaky," Riley said. "Finally, we manage to muscle the new antenna into place."

With the antenna bolted down, Barber and Best reattached coverings to it that had been removed for attaching the rigging. With the sun going down, Riley said that the gin pole still had to be lowered to a position below the antenna before the TV station could resume broadcasting. "Getting the gin pole down is almost as hard as getting it up," he said. "We're leapfrogging it down, and every jump puts pressure on the top of the tower."

With about 10 minutes to go for the gin pole to pass below the antenna, Riley said, "Over the past 10 years, demand for this type of work has skyrocketed. But there is still only a handful of people working on the really tall towers. To get a chance to join a team like this has been an honor and a blast."

The program concluded with the project not entirely done: that is, the gin pole

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

**From CB to 5.8 Ghz,
We Have An Answer**

- High Quality
- Lower Prices
- 2 Year Guarantee

For more than 15 years Generic Antennas, a division of UltraTek, Inc., has been involved in wireless communication plus wireless ISP equipment importation.

Owner Jim Tucker has been involved in wireless communication since 1974. References provided if needed. Visit web site for complete product list.

GENERIC ANTENNAS

508 Waldron Street
P.O. Box 1472 Corinth, MS 38835
Ph 662-284-6724 Fax 662-287-8596

www.generic-antennas.com
jim@generic-antennas.com

Behind *World's Toughest Fixes*: Producer Kerr, Host Riley

Rob Kerr produces the National Geographic Channel's *World's Toughest Fixes* program series. Information published by NGC about Kerr quotes him as saying that the program researches by every means possible, from news stories to word of mouth, to find real situations that could be featured in each episode. Then the program contacts global brand-name companies, such as Siemens and Boeing, to find out who specializes in the large-scale repair and replacement jobs they need to get the job done.

"Understandably, there is a reluctance to grant access to certain areas on each fix because, for the most part, these are very dangerous work environments," Kerr said. "There is extremely heavy machinery, adverse conditions and, in many cases, lethal hazards at these sites. Every move is precise and extremely well choreographed by the crews that do these jobs on a regular basis. Project managers are quite rightly concerned

about having to take on the additional responsibility for a film crew."

In an NGC interview, Kerr said the program has been able to secure rare, and at times exclusive, access to places the audience has probably never seen before and will probably never get to, from the inside of a nuclear turbine to riding in a helicopter and working on live electrical wires. "Though the series title is *World's Toughest Fixes*, we focus on how diligently, how creatively and how expertly the crews repair the damage — not on who or what caused the damage," he said.

The biography made available by NGC said that Kerr has been in television production for nearly 25 years and producing nonfiction for more than 10, covering a diverse range of genres including natural history, automotive, reality, sports, documentary and science.

NGC's website describes program host Sean Riley as a master rigger, engineering enthusiast and set de-

signer with an expertise in suspension and load transfer involving large masses and difficult access. Gravity Design, a company he founded and for which he serves as principal rigging designer, provides rigging and force-management solutions for clients ranging from circus acts to industrial installations.

Theatrical rigging projects pictured on Gravity Design's website reflect Riley's study of theater arts at the University of California Santa Cruz and his work as an instructor in theatrical design.

"His passion for mechanics is matched only by his passion for extreme adventure," information published by NGC reads. "He loves to pull on a diving wetsuit, arc up a blowtorch or dangle from a height that would have most people going weak in the knees — just for fun. He drives heavy machinery, jumps off bridges, rock climbs and is a back-country solo survivalist."

assigned channel and power. Then, above the analog antenna, we put up a dummy pole, a piece of pipe to hold the aviation obstruction-marking beacon at the height approved by the FAA. Then,

we were prepared to wait several years for our digital channel assignment, knowing our tower was ready."

The chief engineer said Red River made similar installations at two of

its other TV broadcasting sites, at Plankinton, S.D., and Duluth, Minn. All were installed before the final DTV allotments.

Tower King II installed KDLT-TV's first digital antenna three years ago. As was anticipated, the antenna was designed to take the place of the pole above the analog antenna with the easiest possible swap-out. Sturzenbecher said that, unfortunately, the first digital antenna did not work as well as expected during cold weather. Low temperatures caused transmitter power reflected from the antenna to rise. A certain amount of reflected power is expected, but the observed amount was excessive. The cause was unknown, so a repair atop the tower was not possible, and KDLT-TV arranged to have the antenna replaced. The manufacturer later examined the defective antenna. Sturzenbecher said the manufacturer reported finding nothing seriously



The on-air signal from KDLT-TV was interrupted for much of one day while the station's digital TV broadcasting antenna was replaced with a new one.

wrong. The fault remains a matter of some conjecture, possibly involving a loose fitting at the top or a connection that was affected by metal that contracted during cold weather. Meanwhile, Sturzenbecher said that the replacement antenna has performed within specifications even during cold weather.

Analog shutdown

"The digital signal is getting out well," he said, and KDLT-TV shut down its analog signal on Feb. 1, 2009. Some TV stations shut down their analog signals early, with FCC permission.

Of Tower King II, Sturzenbecher said the crew did "a very good job. Tower King II has excellent people. Kevin Barber was the foreman for a different company when this tower was erected. When the original digital antenna was put up, he had his own crew and put it up. Now they put up this one. Those people are top of the line."

Sturzenbecher said he was aware that the National Geographic Channel's program host, Sean Riley, was a rigger who was used to high places, "although I don't know that he normally works at that height. The camera operator is not a rigger, and I was surprised to see a camera operator up there also. Whenever the tower guys were up there, they were up there, too."

The National Geographic Channel's audio engineer faced a challenge recording Riley's and the tower crew's voices, Sturzenbecher said, because the soundman had to track a lot of wireless microphones at a distance and use the microphones within a high-RF environment. "The crew was working below a couple of active broadcasting antennas," he said. "Obtaining audio without a buzzing sound from RF interference was tricky."

Sturzenbecher said he has seen several episodes of the *World's Toughest*

Fixes series, including the one involving KDLT-TV. "I thought they did a very good job," he said.

Tower King II

AGL also spoke with Kevin Barber, the owner of Tower King II, after the broadcast. He said that the NGC production company recorded about 120 to 150 hours of video. Asked what was left out of the broadcast that he might have liked to see included, Barber said it would have been good to see a view presented of how the workers travel on the road and a view of their home life and lifestyles, which for many involves living in hotels and trailers.

"We travel with our families on the road," Barber said, "especially those with children from infants to about age seven. You see some of the older tower families coming off the road and finding something locally and settling down."

Keep on track for RF safety



Policy on human exposure
Frequently asked questions

www.fcc.gov/oet/rfsafety

Go to www.agl-mag.com and register your subscription to keep AGL coming



Kevin Barber, the owner of Tower King II, said that as part of the safety precautions, the crew discussed the loads to be lifted, the procedures to be used for the day and for the entire job. He said he made sure everyone was aware of the hazards associated with the job overall, on each particular day, and for the particular portion of the job being performed at the time.

Barber said the program could have emphasized more of the engineering involved with the project and the safety precautions that were taken. Tower

King II had an engineer look at the scope of work and evaluate the loads on the tower. "The gin pole has been engineered for that type of antenna lift,"

Barber said. He explained that the jumping frame to extend the pole past its top by 50 percent also was engineered.

Barber said that as part of the safety precautions, the crew discussed the loads to be lifted, the procedures to be used for the day and for the entire job. He said he made sure everyone was aware of the hazards associated with the job overall, on each particular day, and for the particular portion of the job being performed at the time.

He said that the safety equipment used on tall towers is not so different from that used on smaller towers, it is "just on a grander scale. For our man raises, the cable is larger. Everything we deal with is based on a five-to-one safety factor, and for lifting personnel, a 10-to-one safety factor. On the smaller towers, it's relatively the same, just on a different scale," Barber said.

First come, first served

Tower King II is booked for work through September, thanks in part to the



Black-and-white coverage of the antenna siting business is a vanishing breed. Explore the background color and shadings of hot industry topics with AGL's in-depth feature articles.

conversion from analog TV broadcasting to digital broadcasting. Barber said that there is only a handful of companies such as his that can handle some of the larger antenna work and structural modifications to broadcast towers. For stations seeking qualified tower crews, "it was first come, first served," he said. "If you didn't sign up ahead and get a qualified contractor, you're waiting."

Among the variables that can affect a project are the weather and equipment breakdowns. "It can be a beautiful, sunny day, and all of a sudden the wind, rain and hail come in," Barber said. That's always a negative part of the industry. Or equipment breaks down while you're lifting something, or the elevator breaks down and you have to climb the last 1,000 feet. In Sioux Falls, that tower had an elevator, but there are a lot of towers out there from 500 to 1,000 feet tall that don't have elevators. You have to climb the whole thing."

Barber said that his company has 19 employees, and that the typical tower worker has earnings of the "upper middle class, in the \$60,000 to \$80,000 range per year, with hourly wages of \$16 to \$38, based on a 55-hour workweek, together with subsidies of as much as \$22,000 a year for living on the road." He said that Tower King II usually has at least two crews in the field at any time and sometimes as many as four, depending on the workload and the crew size needed for each project.

Despite the NGC program having to leave out some of the video that Barber said he might have liked to see included, he said he understood that "the show was intended to portray a tough fix, and I feel they portrayed it as best they could. They captured it well." **agl**

The program "2000-Foot Tower," produced by National Geographic Channel, has been broadcast several times since December. Rob Kerr is the producer for the *World's Toughest Fixes* series. Eric Cochran was a field producer for the episode and operated the camera on the tower.

Save Time and Money!


- Align at your own schedule
- Accurate alignment in 30 minutes
- No power or radios required on site for alignment
- Complete multiple alignments or jobs in one day

Have Confidence and Proof!

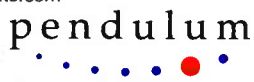
- Use our Path-Loss Calculator to calculate optimum path loss before you climb
- Document and save date, time, location and path loss information
- Download data and verify alignment
- Achieve alignment with optimum path loss on the tower

Path Align-R™

Microwave Antenna Alignment



Pendulum Instruments
- Experts in Time & Frequency Calibration, Measurement and Analysis
 Phone: 510-428-9488 (USA/Canada) +46 8 598 510 55 (Worldwide)
www.pendulum-instruments.com, sales@pendulum-instruments.com


Incorporating XL Microwave

Got Tenants?

Let Fryer Marketing help you add **revenue** and **value** to your site by designing a low cost, effective marketing campaign to attract more tenants.

Services include:

- Research & development of a prospect list
- Competitors report (tenants on surrounding sites)
- Professional layout and design
- Printer-ready graphics
- Submission and supervision of all printed material
- Mail shop services (Labeling, Posting, Mailing)

Fryer Marketing & Media

www.fryermarketing.com

610 931-7076

For details click on

Got Tenants?

Crystal Peak site
Loma Prieta, CA
client: K-Comm



Fear and Loathing in Las Vegas

or

What I Learned at the Tower Technology Summit

By Jim Fryer

Hunter Thompson called Vegas “the savage heart of the American dream,” and judging from the lamentations of the service industry workers, the “dream” is starting to skip a few beats. For example, the day after I arrived, the casino hotel where I stayed declared bankruptcy. Ads for reclaimed house auctions permeated the local airways (\$900K value homes starting bids at \$300K; three-bedroom, two-bath ranch houses with starting bids at \$5,000!). And while it would be a tidy little story to lump the tower industry’s outlook into the same economic milieu of Sin City, the infrastructure’s pulse seems much stronger by comparison.

Permit me to bring you the following nonlinear threads and observations woven in and around the Tower Technology Summit.

A calm and prudent outlook seemed to prevail with the vertical real estate crowd whether the subject was new build-outs or carrier consolidations or the threat of a DAS-centered universe. The Tower Owner Roundtable session diplomatically preached cooperation with the carriers by being mindful of their pain threshold for rate increases. The carriers apparently have a problem with paying more for adding wind load and decreasing the potential capacity of

the landlord’s tower while boosting their own profits from new applications.

Billy Crystal achieved wuss status for canceling his headliner appearance at the collocated CTIA Wireless 2009 Gala due to a back injury (an excuse I once used successfully to avoid raking the leaves) and Jay Leno is a mensch for stepping in at the last minute. The fact that NBC is going to be using mobile phones as a medium for a variety of programming enhancements, including those of Mr. Leno’s, had *nothing* to do with it.

According to several tower session participants, mergers by the carriers are a *good* thing. They free up capital for further expansion is the thinking behind it. As you go down the ladder of inventory size, however, that logic gets fuzzier. I would not want to have to explain that to a small tower owner who just saw his revenue cut in half or lost altogether.

The number of show vendors was up significantly this year, according to CTIA, but attendance was down slightly. Compared with other shows using Sin City as their meeting point, this was a rousing success. Vegas has seen close to 50 percent drops in trade show attendance this year, according to locals. On the trade show floor, the urge to sell, understandably, is outstripping



From left: Moderator Benedikt Ibing, BAC Communications Infrastructure; Terry Armant, Global Tower Partners; Ed Farscht, Diamond Communications; and David Siegel, T-Mobile Towers, at the Tower Owners Roundtable session.

the urge to buy. Losing the little money you have left at a crap table is a further incentive to stay at home and plant a vegetable garden instead.

One major tower developer talked about how DAS is not the tower killer that analysts suggest and is more of a complement to tower coverage than an adversary. According to Marc Ganzi, CEO of Global Tower Partners, DAS has succeeded in areas verboten to towers and has adaptability through fiber optics. Upper-crust suburbs, it seems, like their coverage the way they like their domestic help: unobtrusive and upgradeable. A DAS system may take three to five nodes to accomplish what could be provided from one tower site while bringing the RF dangerously close to street level, but image trumps efficiency and safety most every time. One market analyst was still wary and said DAS is getting more traction with the major carriers and has become much more than a fill-in solution.

Third-tier carriers could be a bright spot for the coming year. Clearwire could pump up to 14,000 new site leases into the market, according to Ganzi. They are in a stronger position to do so, having announced that they have gone cash-flow positive by adding 18,000 new subscribers to the 245,000 total over 31 U.S. markets. A Clearwire spokesman hinted at a faster rollout of WiMAX in '09 than anticipated. It currently has more than 1,200 sites up or rolling out in four of its networks and another 10,000 in development or already deployed.

Las Vegas has an Erotic Heritage Museum, which I saw *only* in passing on my way from the airport — really! In Philadelphia, we have a Please Touch Museum, but — aw, you better make your own joke here.

Multiples in the site acquisition game have dropped considerably from last year. Going from the high teens down to the low double digits, the small and mid-tier site-acq firms that kept their powder dry may reap the benefits of a downturned economy. The mom-and-pop sites that held onto their cash cow for decades, turning away the 20X-multiple-buying city slickers, may finally be bringing ol' Bessie to market. Also, broadcasters are adding to the pool of available sites

as shrinking ad revenues put a squeeze on their bottom lines. The National Association of Broadcasters will be announcing its entry into the leasing/site acquisition arena shortly.

The list of new innovative products at the show was not exactly eye-popping:

- You can get an etching on your Blackberry, iPod or MP3 player for around \$20 from a company called Coveroo. Given that cell phones were permanent fixtures to people's faces throughout the show, a little adornment is not such a bad idea.
- A snazzy wireless Bluetooth headset, if you are going for the total geek look rather than the hard-of-hearing earplug look, or the Madonna/KFC assistant manager wrap-around style, or the I-am-Borg metallic combo.
- An application that will let you voice-access your Google calendar and contacts simply by saying "toktok." The person next to you will think you are speaking Urdu and, no doubt, be impressed.
- The Sony Ericsson T707 handset that lights up when someone calls and can be assigned different lighting schemes depending on the caller. Creditors in red? Other than that, it's simply "a phone that makes calls," according to Ericsson. Imagine that.

The new monorail system in Vegas doesn't affect the cabbies, according to my poll of five cab drivers, most of whom spoke English. And good ol' Americans are the best tippers, by God, and the French are the worst — comforting news to the "Fox and Friends" crowd.

In the exhibition hall, CTIA segregates the tower-related services from the wireless apps and equipment crowd in the Tower Technology Summit pavilion, ostensibly to make it easier on footsore attendees negotiating the mile-long exposition, but the contrast between the wizardry going on in wireless pavilions versus the nuts-and-bolts attitude of the tower sector is palpable — not unlike having a barbershop quartet singing in the middle of a Cirque du Soleil performance. A tower lighting exhibitor, for example, gave me a pen that lights up (cool!). A wireless apps exhibitor gave me — well, I'm not sure what the hell that thing was and neither was the Transportation Security Administration guard at the airport who decided not to let it on the airplane. agl

Jim Fryer is president of Fryer Marketing & Media, a consulting firm focusing on the tower industry. His email address is jim@fryermarketing.com.



Reliable.
Responsive Innovative Convenient

Your business objectives are our top priority. We deliver work on time so you avoid delays, surprises and costly mistakes. For projects large and small, single- or multi-site, you can rely on consistent results nationwide.

Employee-Owned [800] 593 7777
Offices Nationwide terracon.com

Terracon

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

3G: 'Bread and Butter'

4G: 'Nice Glide Path'

Equity research head Ric Prentiss expects consistent spending on 3G infrastructure while gradual investments are made in a transition to 4G, with data-only services leading the way.

AGL Report

On April 1, the first day of the Tower Technology Summit (collocated with CTIA Wireless 2009) in Las Vegas, Ric Prentiss, head of telecommunications services and equity research at Raymond James & Associates, hosted his annual Executive Breakfast Roundtable. Attended by 200 investors with an interest in the wireless infrastructure industry, the breakfast featured presentations by Jake MacLeod, principal vice president of Bechtel and chief technology officer of the company's communications unit, and David M. Cutrer, Ph.D., chief technology officer of NextG Networks.

Prentiss told the audience, "3G is the bread and butter of the industry. It's growing well. We expect consistent spending on infrastructure. Meanwhile, 4G represents a major change in the network for antennas, backhaul and base

station equipment. But the transition to 4G will take place over time, in a gradual way, with data-only services in urban areas coming first. It will take a nice glide path. We will start to see some 4G from Clearwire in 2009 and 2010, with incumbent carriers activating 4G more so in 2011 and 2012. The 4G installs will represent additions to the network, not taking older parts of the network down."


Cutrer said, "Deploying data-only service first makes sense. It doesn't disrupt the current revenue stream. You find out how customers respond to it."

MacLeod pointed out that with 4G, a carrier's entire antenna system has to be changed to use MIMO antennas (multiple input, multiple output antennas, also known as smart antennas). He said the carriers are likely to require new transmission lines and base stations.

"After that," he said, "then the backhaul is choke point. You will get north of 100 MB of capacity required for backhaul. Backhaul systems are a major concern for all carriers. When we migrate to 4G, that will be the first truly broadband wireless system that we will have."

Cutrer said that there "is no magic bullet" to solving the backhaul problem. "In the right situation, the radio backhaul can be a fast, cost-effective way. In the urban cores, it can be challenging to design that kind of a network. Even if you did, ultimately, you need a fiber drain point to take all of that backhaul. We see fiber playing a larger and larger role in the backhaul network in the core and the radio access network."

MacLeod added, "We call ourselves the wireless industry, but the only part that's wireless is the access. The rest is wired."



Windloading

It's not just about surface area, anymore. It's velocity pressure, gust response factor and pressure coefficients. Learn about the latest analytical procedures in Guide to the Use of the Wind Load Provisions of ASCE 7-02.

www.asce.org

The most effective wireless access is the one with the shortest link. The focus of all carriers is getting that signal into the ground as soon as possible. A long air link is an unstable link."

Risky part of the business

The biggest deployment issue has been and always will be the siting, zoning and permitting, MacLeod said. He noted that companies such as fellow panelist Cutrer's NextG Networks that have "cracked the code on that" to some extent are useful when developers look for sites, whether on rooftops or towers. "Even when they are collocation placements, you still have to go through zoning and permitting," he said. "That's the most risky part of the business."

Prentiss asked how femtocells fit into the deployment mix, and MacLeod said that Bechtel sees femtoceils as complementary. "An effective femtocell that can leverage backhaul with DSL or cable modems is complementary to traditional siting, zoning and building," MacLeod said. "Long term, femtocells may evolve to something that could be deployed outside the home, and the line may blur between what is a femtocell and what is a picocell."

MacLeod explained that a femtocell is a Wi-Fi access point in a home or business that is used to offload some cellular system macrocells to put traffic



Photography by Don Bishop

From left: Ric Prentiss, head of telecommunications equity research at Raymond James & Associates; Jake MacLeod, principal vice president of Bechtel and chief technology officer of Bechtel's communications unit; and David M. Cutrer, Ph.D., chief technology officer of NextG Networks.

over the Internet instead. "It's a good technique, and the carriers are still experimenting in a large way to figure out how to manage the femtocells," he said.

Prentiss said that, in the financial world, "we like people who earn a return on investment before spending more," referring to expensive projects to increase cellular system capacity and coverage, including more backhaul. "What about placing servers at the cell sites and moving the content closer to the users?" he asked.

MacLeod said that while femtocells accomplish some of that, even with servers at the cell sites, traffic must be transported from the server to the network core. "Fiber is the ultimate solution, but

sometimes it is not economical," he said. "You can go with microwave or Ethernet."

MacLeod related a conversation he had with the chief technology officer at a wireless carrier. The CTO told him the carrier had finished an optical transport upgrade to the core, and it already was saturated. The carrier is planning another core transport increase immediately that is expected to be adequate for only another 18 months. "He told me that 30 percent of the core traffic is YouTube, which didn't exist five years ago," MacLeod said. "The CTO asked, 'How do you plan for that, and how do you charge for it?' Video only will increase, and it's a serious situation." **agl**

My Design Criteria:

- Standardized Tower Reinforcement ✓
- Advanced Engineering Capabilities ✓
- Precision Manufacturing ✓
- Total Project Management ✓

Structural Components
Bringing It All Together.

Your Tower Reinforcement Company!

1617 Pearl Street, Unit A
Boulder, Colorado 80302
Toll Free: 1 (866) 386-7622

www.StructuralComponents.net



LED/Strobe Medium-intensity Lighting System

TWR Lighting has introduced its second-generation, E-series, medium intensity dual red (LED)/white (strobe) beacon lighting system, which features low power consumption, a five-year full-system warranty and lightweight single-beacon design. The lighting system, Model L-864/865, also offers an acrylic lens, lockable NEMA 4 enclosure, and an NEC-, UL-, UV-rated strobe cable. www.twrlighting.com

Solar Obstruction Lighting System

The A810 obstruction lighting system from Carmannah Technologies incorporates a high-flux 32.5 candela LED obstruction light. A complete, ready-to-install solar power system allows the A810 to provide illumination that operates free of electrical connections to a generator or grid. The FAA- and ICAO-compliant system is easy to install with no need for a specialized electrical crew. The lighting system withstands extreme conditions and provides reliable illumination to protect towers. www.carmannah.com

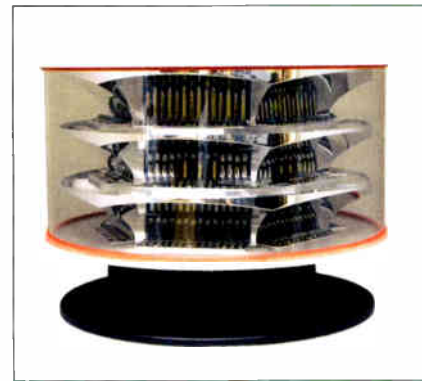
Medium-intensity Dual Lighting System

The FlashGuard 3000B medium intensity dual lighting system from Honeywell combines a daytime white strobe light and a nighttime red flashing strobe into a single flashhead, eliminating the need for two separate lighting systems. The flashhead is powered and controlled by a power supply that can be mounted remotely at the base of the structure. The power supply constantly monitors the operation of the system and provides alarm contact closure upon any failure. The system automatically switches between day, twilight, and night intensities by the use of a calibrated photocell. www.honeywell.com



LED Medium-intensity Red Beacon

Flash Technology has introduced the FH 3610, which is the latest in its series of LED aviation obstruction lighting. The FAA-compliant L-864 LED medium-intensity red beacon features high-flux LED technology and an efficient optical design. It interfaces into existing installations, and its robust, low-power design (48 Watts, 1/2 amp at 120 volts) is warranted for five years of maintenance-free operation. Replacing a 300-millimeter incandescent beacon with an LED L-864 beacon may require adjustments to the red light controller to establish proper alarming. www.flashtechology.com

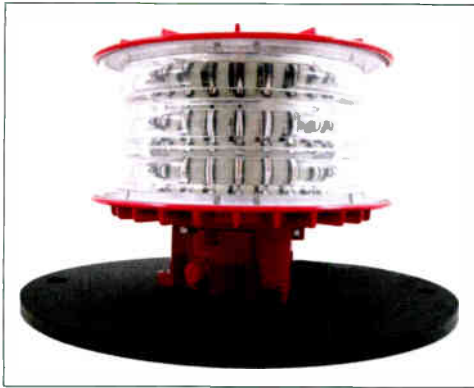


Flashing Dual (White/Red) Strobe

Dialight offers the all LED L-864/L-865 flashing dual (white/red) strobe that is ETL certified to FAA requirements and compliant with the ICAO and DGAC standards. The dual flashing strobe saves on power consumption by using a low-voltage flexible cable, thus eliminating the need to send high voltage up a tower. The dual strobe weighs 45 pounds and is less than 12 inches tall, which reduces wind loading. High-flux LED technology makes the strobe resistant to shock and vibration. The power supply/control box can be located at the base of the tower or up to 550 feet from the light engine. www.dialight.com

Medium-intensity Red Beacon

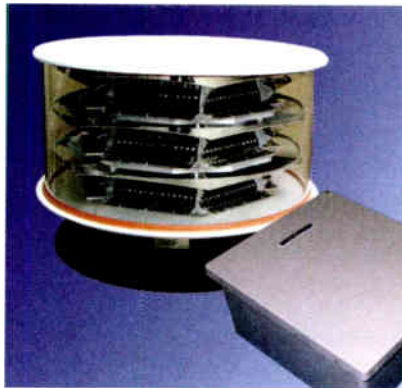
The D264 Series LED-based medium-intensity red beacon from Dialight is an FAA-compliant, efficient L-864 device with a sharp cut-off beam that meets the ICAO light pollution requirements. While achieving almost zero light pollution at ground level, the high flux LED-based beacon projects 2,000 candelas to be visible to aircraft, using 90 percent less energy than 300 millimeter incandescent obstruction lighting fixtures. The compact D264 Series beacon, which can be flashed or steady burned, weighs less than 32 pounds and mounts onto existing bolt-pattern installations. www.dialight.com



LED Flashing Red Obstruction Light

The FarLight L-864LED3 is an omnidirectional luminaire designed to replace incandescent beacons used for obstruction lighting of TV, radio, communication, and microwave towers. The L-864LED3 is available in 120 volts and 240 volts AC or 24 volts and 48 volts DC configurations. It features a light source of 72 Luxeon Star LEDs, power consumption of 48 watts and peak intensity of 2,000 candela (average). The unit's dimensions are 10.3 inches in diameter by 9.7 in height, and it weighs 18 pounds including power supply.

www.farlight.com



Medium-intensity Dual Lighting System

The Unimar LED-based medium-intensity dual-lighting system is now paired with the Dialight dual LED beacon to provide aviation obstruction lighting for structures up to 500 feet in height. The ETL-certified DLS(X)-007 provides 24 hours a day of aviation obstruction lighting protection, thus eliminating the need to paint the structure. It serves as an alternative to xenon strobe and incandescent products, which reduces operating and maintenance costs.

www.unimar.com

Medium-intensity Dual-LED System

The FTS362X Series medium-intensity dual-LED system from Flash Technology uses state-of-the-art optics, minimizes energy cost and maximizes life expectancy. The passive temperature management system ensures the LEDs stay within their temperature tolerance in all operating conditions, eliminating the need for fans and other moving parts. The system is equipped with a microprocessor-controlled driver, which enables the beacon to continue to flash by using the default safe mode if communication with the controller is lost.

www.flashtechnology.com



Medium-Intensity White Lighting System

The ILS-2400 medium-intensity white lighting system uses xenon flash tube technology and Fresnel optics to provide a reliable tower lighting solution. The L-865 white day/white night strobe obstruction lighting system uses the same power supply as the IPS-3400 to reduce personnel training time and spare parts inventory requirements. The ETL-certified lighting system features an accessible design layout, flash head interlock switch for enhanced personnel safety, alarm contacts (Form-C) for power failure, white strobe and photocell alarms.

www.itl-llc.com



White Day/ Red Night Strobe Obstruction Lighting

The ILS-3400 medium-intensity dual lighting system features a white strobe for day and a red strobe for night. The L-865/L-864 obstruction lighting system also supports LED and incandescent side lights. Features include flash head interlock switches for enhanced personnel safety, alarm contacts (Form-C) for power failure, side light and photocell alarms, xenon flash tube technology and Fresnel optics.

www.itl-llc.com

L-810 Obstruction Lights

The RTO Series of L-810 obstruction lighting from Dialight is available as a single, dual or retro-fit unit for direct replacement of incandescent lamp/lens technology. The DC version runs at only 3.5 Watts, for solar applications or battery backup, while the AC version operates at 6.5 Watts running off of 120 to 277 volts AC, 50-60 Hz. The RTO Series can be operated steady or flashed. High-flux LED technology allows it to use 95 percent less energy than incandescent fixtures.

www.dialight.com

AGL	39, 40, 47, 49, 50, 58	NATE	inside back cover
AM Coordination	14	Nello	38
ASCE	54	Pendulum Instruments.....	51
Atlantic Risk Management.....	inside front cover	Phillips Lytle.....	11
BirdBusters	58	Roxtec	44
ComTrain	40	Sabre Communications	29
Dynamic Environmental Associates	35	Specialty Tower Lighting.....	34
Elk River	45	Structural Components.....	55
Farlight	24	Subcarrier Communications	back cover
Flash Technology	9	Telewave.....	5
Fryer Marketing	51	Terracon.....	53
Generic Antennas	46	TowerSource.....	15
Global RF Solutions.....	14	TWR	41
Granger Telecom.....	38	US Title Solutions	34
Higgs Law Group.....	58	Valmont	25
Hutton Communications	7	Waterford Consultants.....	13
ITL	46	WSI Lighting	58
John Fertic Photography	58		

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



Firefly™ Bird Diverter

Reduces collisions **Day and Night** using motion, reflectivity and light emissions

866.915.8225

www.birdbusters.com jackwagner@birdbusters.com



Find out what's happening in the tower industry between issues of AGL

- AGL Bulletin provides important developments in the tower industry
- AGL Bulletin is compiled and reported by the AGL staff
- AGL Bulletin is sent to your email in box twice a month.
- AGL Bulletin is FREE!

www.agl-mag.com/signup



A WSI LIGHTING ENGINEERED PRODUCT

WEATHEREX™ CODE BEACONS
 THE STANDARD TO FLY BY

WSI LIGHTING PROUDLY OFFERS YOU:

- Knowledgeable Staff
- FAA Approved Products
- Full Replacement Warranty on ALL lamps
- Full line distributor of code beacons, side markers, and strobe lamps
- Full line distributor of TWR and Honeywell lighting products including replacement parts and complete tower kits
- WEATHEREX is the ONLY FAA Krypton gas approved code beacon available

www.wsilighting.com

John Fertic Photography

Portfolio available at:
 Eyefetch
<http://www.eyefetch.com/profile-images.aspx?user=jfertic&view=date>

312.590.3106
 801 South Plymouth Court , #717
 Chicago, IL 60605

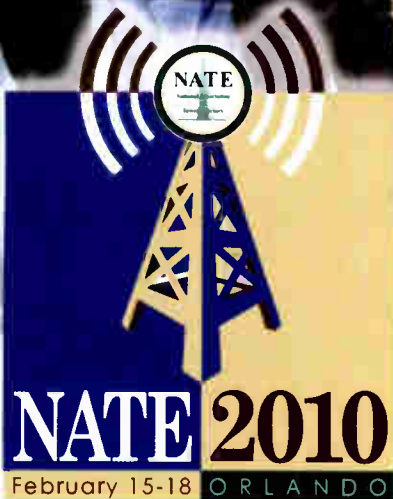
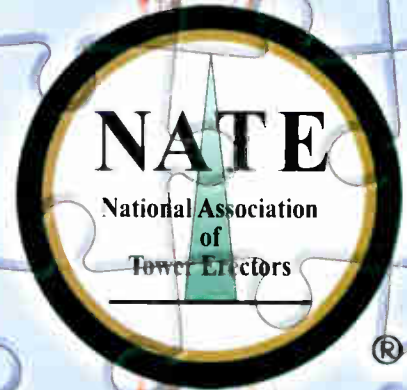


Put the power of AGL to work for you with a professional card ad.

Call Mercy Contreras at 303-988-3515
mcontreras@agl-mag.com

Tower Safety... Is every piece in place? It's Up To You!

*NATE encourages **EVERYONE** involved
in the tower industry to play their part in safety.*



www.natehome.com • 605-882-5865 • 888-882-5865 (U.S.)

Towers That Mean Business

Building today's high capacity co-location towers



**SUBcarrier
COMMUNICATIONS**

**139 White Oak Lane
Old Bridge, NJ 08857
732-607-2828
www.subcarrier.com**