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# INSIDE

- Website markets towers
- Free copper and generators!
- Copper theft solution
- 4G backhaul options
- Security products showcase
- Pennsylvania State Wireless Association



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 EDITOR  
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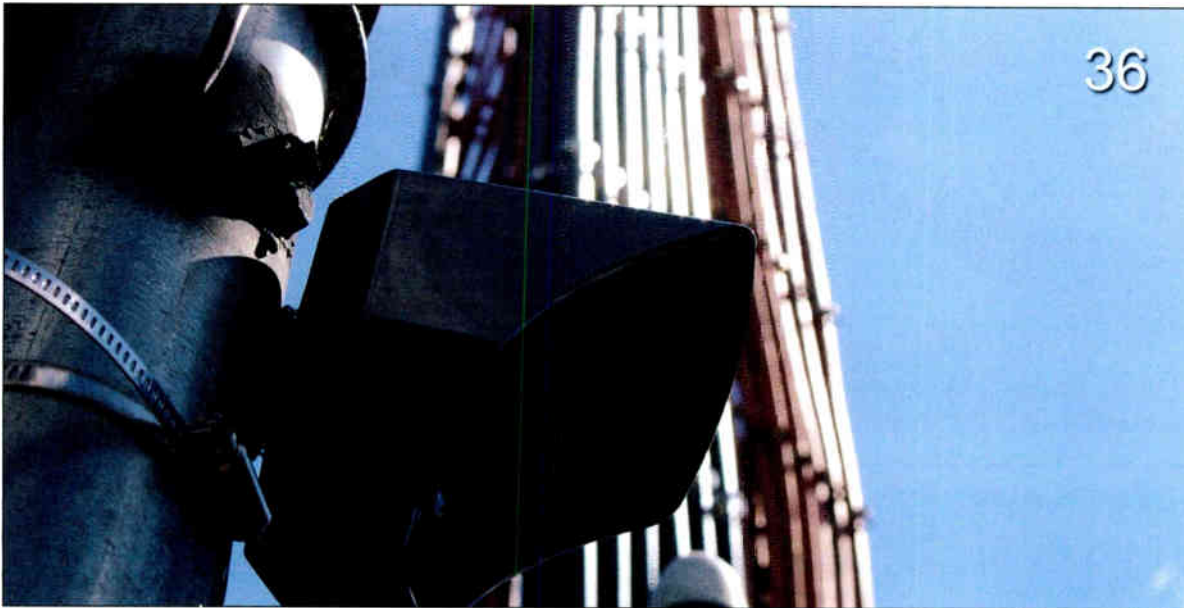
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This 230-foot AGL, freestanding, lattice-structure American Tower site near Watertown, SD, achieves a height of 2,074 feet AMSL on the Great Plains. It hosts four 20-foot relay horn antennas, two 10-foot microwave dishes, and a three-panel cellular array. The structure is topped out with a beacon, a six-foot omni and an 18-foot dipole.

*Photography by Deb Moldenhauer, NATE.*

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**AGL Editorial  
Advisory Board**

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Tower Innovations, Inc.

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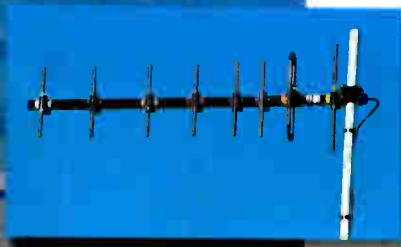
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# Questions? Ideas? Blog 'em!

Well it's the time of the month that I love. The hard work is done. All of the articles have been formatted, corrected, laid out, all the advertising is in, and now I get to think of a few things to say in this space. Hmmm ...



The APCO convention (Association of Public-Safety Communications Officials International) is in Kansas City this year, and I'm looking forward to it. I've been to a couple of regional

and state conventions during the past year and I like what I've seen. We're all still waiting for this interoperability thing to play out, in addition to the issues that really matter to us, including the use of the 700 MHz band. I've not had the chance to see how some of the new 3.5 spectrum and 4.9 (public safety) are going. A little bit of a shakeout is going to happen quickly — the WiMAX and LTE camps are going to have a small battle. Or at least those in the industry who make it a career to sit in towers and think of

**I'm still betting we'll see a large number of new alternative sites popping up, and as some of the newer carriers begin to deploy, we're going to be into more and more new sites**

what should happen want there to be a battle before deployment.

I'm still betting we'll see a large number of new alternative sites popping up, and as some of the newer carriers begin to deploy, we're going to

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

be into more and more new sites (green fields). On that note, I'm trying to get a handle on how some of the rural broadband Department of Agriculture-driven deployments are going. If you have any info, please drop me a note.

Mostly people tell me they worry about backhaul capacity and backup power generators. Some carriers are defecting from shared backhaul companies and building their own backhaul circuits. Generator replacement and upgrades appear to be moving along swiftly, although some of the time pressure appears to be off a little — we'll try to obtain an update for the next issue of AGL magazine or the AGL Bulletin email newsletter.

I'm not sure this is a good idea, but I'll share it with you (and about 12,000 others): I started a blog to touch on some issues and other matters I'm concerned about, but that are either a little too free form, not yet completely researched or not fleshed out. It also is for topics that are too far off the mark to be published in this magazine. If you are curious, point the browser over to <http://towersnstuff.blogspot.com/> and give me a little feedback. Use the blog as a question board or give me

an idea of anything you would like to see addressed. I love digging into things and seeing what I can figure out. This is totally unofficial, so expect it to be informal too.

We're gearing up for the PCIA Wireless Infrastructure Show in October. It is the show that I believe really reflects the industry the best. We'll be making a full showing in Florida, and hope you will too. That is about it from the corner office. Actually, as "the office" is for many in this crazy industry, my office tends to be the front seat of a vehicle. **agl**

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**PUBLISHER/CEO**  
Richard P. Biby, P.E.  
[rbiby@agl-mag.com](mailto:rbiby@agl-mag.com)

**EXEC. EDITOR/ASSOC. PUBLISHER**  
Don Bishop  
[dbishop@agl-mag.com](mailto:dbishop@agl-mag.com)

**CONTRIBUTING EDITOR**  
Sharpe Smith  
[ssmith@agl-mag.com](mailto:ssmith@agl-mag.com)

**ART DIRECTOR**  
Scott Dolash  
[sdolash@agl-mag.com](mailto:sdolash@agl-mag.com)

**ADVERTISING MANAGERS**  
**Mercy Contreras**  
[mcontreras@agl-mag.com](mailto:mcontreras@agl-mag.com)  
**Mary Carlile**  
[mcarlile@agl-mag.com](mailto:mcarlile@agl-mag.com)  
**Phil Cook**  
[pcook@agl-mag.com](mailto:pcook@agl-mag.com)

**CIRCULATION MANAGER**  
[circulation@agl-mag.com](mailto:circulation@agl-mag.com)

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Biby Publishing LLC  
18331 Turnberry Drive  
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Does \$250,000 for \$25 sound like some kind of Las Vegas gambling story? If only it were.

No, it describes the amount of damage done by metal thieves to a cell site near Tracy City, TN, and the scrap value of the copper they stole.

Sometime in the late hours of Friday, June 27 or the early morning hours of the next day, thieves went to work cutting away copper grounding wires from guy anchors at a 360-foot tower near Tracy City, TN.

Ricky Gibbs, cellular/marketing manager for DTC Wireless, the carrier that rented space on the tower, said that thieves apparently stripped off the copper grounding wire from one guy anchor and began cutting the grounding wire from a second when for some reason they cut through the guy wire itself, causing the tower to fall.

Sgt. Scott Hampton of the Grundy County Sheriff's Department said, "When the tower fell, it fell toward the inside of the compound. These characters were unable to get over the fenced-in area. They cut the lock off the area where the guy wires were anchored. I'm guessing when it collapsed, it made such a racket that it made whoever was in charge of the sawing operation get out of there. It scared the hell out of them and they left."

Gibbs said the third guy anchor's copper grounding wire had not been stolen.

"We were told the day the tower fell that police later caught two suspects breaking into a facility of the Sequachee Valley Electric Cooperative, perhaps also to steal copper

there. I think they were going to investigate whether it was the same individuals who stole the grounding wire," Gibbs said.

Sgt. Hampton said, "We have two suspects, but we haven't completed the investigation pending some work being done in the crime lab" that might link the suspects to the cell tower destruction.

## Temporary antenna

DTC Wireless installed a temporary omnidirectional antenna on a 200-foot utility tower owned by the electric cooperative that the carrier used previous to an upgrade to GSM technology and sector antennas on the 360-foot tower that Wireless Properties built for upgrade. Gibbs said that Wireless Properties is moving expeditiously to replace the tower, which Gibbs estimated to have been worth \$250,000.

"They probably did \$250,000 worth of damage and got \$25 worth

of copper," he said. DTC Wireless uses 47 cell sites, and Gibbs said copper has been stolen from some of the company's other sites with self-supporting towers. "They get into the compound and take the copper ground," he said, but he added that so far none of the thieves have broken into equipment shelters.

In Tennessee, it became more difficult for thieves to sell metal to scrap dealers when a law went into effect on July 1 that bars recyclers from buying anything marked as belonging to telephone or utility companies, manhole and water meter covers, streetlights, guard rails, traffic lights, street signs and beer kegs.

Efforts by state wireless associations and PCIA to help state legislatures pass laws to deter metal theft are growing more important as metal scrap value rises. Steps that site owners and carriers take to prevent theft in the first place are becoming more important, too. **agl**



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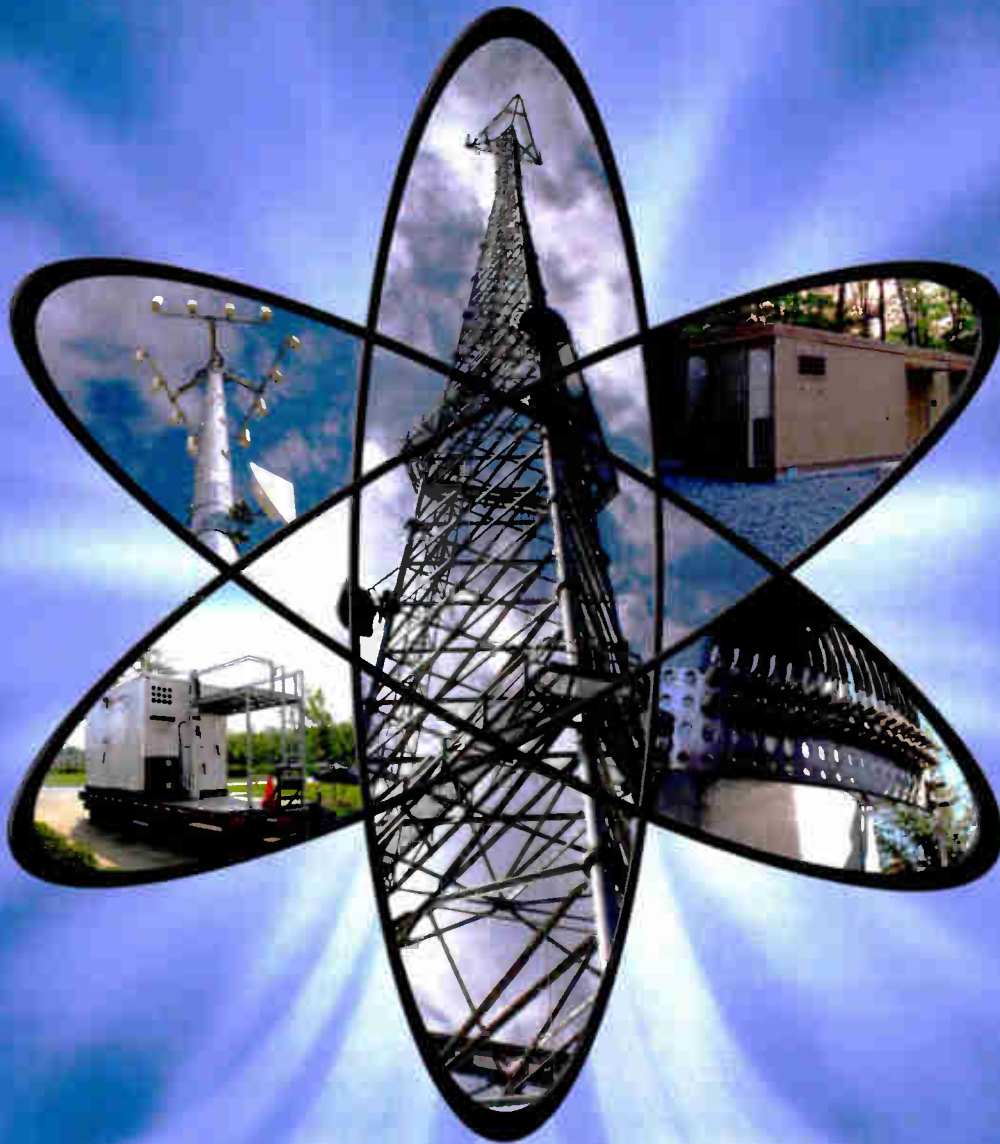
by Don Bishop, Exec. Editor  
dbishop@agl-mag.com



Maya Pawar, marketing manager at Valmont PennSummit, poses with students at the government school built for migrant workers' children in Dharamsala, India. She spent a month teaching at the school as part of a three-month visit to India.



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# Regulatory Implications of Site Upgrades/Modifications

—by Jacqueline McCarthy, Esq.—

As wireless services proliferate and demand for wireless infrastructure increases, site modifications and upgrades take on primary importance for wireless development stakeholders. New services such as EVDO (Evolution-Data Optimize), WiMAX (Worldwide Interoperability for Microwave Access) and LTE (Long Term Evolution) may require an antenna swap



or upgrade. New market entrants demand access to existing infrastructure to catch up to their more-established competitors, requiring infrastructure providers to make antenna space and structural capacity available quickly. Currently, many infrastructure providers are redeveloping older sites to meet current needs and regulations, and to maximize space and structural utilization. Increasingly, carriers demand site-hardening features such as space for generators, either out of a voluntary business decision or in preparation of a possible mandate from the FCC through its backup power order that, at press time, is still subject to appeal. Sometimes, tower

modifications include compound expansions, or height increases.

This vast array of site modifications and upgrades implicates a variety of regulatory and compliance triggers. PCIA advocates for common-sense regulatory approaches to site modifications, and communicates the critical importance of these efforts to policymakers.

NEPA (National Environmental Policy Act) and SHPO (state historic preservation office) compliance efforts are required for some site modifications. Specifically, the NPA (Nationwide Programmatic Agreement, which establishes infrastructure providers' regulatory responsibilities with respect to SHPOs and Indian tribes) includes compound expansions and height increases in its structure of Section 106 documentation responsibilities. Likewise, the NPA defines a tower enhancement that does not involve a new collocation as an "undertaking" subject to federal regulatory review. In PCIA's most recent comments to the NPA Advisory Committee, which meets annually to consider revisions to NPA policy, it urged the Committee to exclude compound expansions and height increases of less than 10 percent of original height or 20 feet, whichever is greater, from



Section 106 review. PCIA also urged the Committee to except such enhancements from the federal "undertaking" definition for purposes of NEPA. PCIA will continue to stress the importance of these exclusions to FCC decision-makers.

Carrier efforts to add backup power to existing sites and the FCC's backup power order requiring eight hours of auxiliary power at all sites places increased demand on compound space and can challenge site design principles. At press time, the U.S. Court of Appeals for the D.C. Circuit is deciding on the jurisdictional authority, administrative appropriateness and substantive validity of the order at the request of a broad coalition of industry stakeholders that challenged the order, including PCIA, which intervened in the legal

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challenge to the order. Regardless of the outcome of this challenge, the trend toward site hardening through the addition of auxiliary power will continue to drive compound expansions and increases in site footprints.

Local zoning regulation of site upgrades and modifications often proves to be highly ambiguous and thorny. Ei-

ther expressly or by municipal interpretation, zoning ordinances may require a *de novo* approval for any site modification, especially if the originally-approved site is subject to specific variance or special exception conditions or proffers. Such approval requires site owners to re-justify all design, engineering and location considerations,

some of which may have been prepared many years before when the site was first approved. In practice, a *de novo* approval provides a platform for local opposition to question the appropriateness of the site. Similarly, some municipal consultants capitalize on the opportunity for a site upgrade to take their "pound of flesh," triggering a time-consuming and expensive review process even when radio-frequency or design modifications are minor. In the absence of clear zoning ordinance standards for the treatment of site modifications, infrastructure providers are left with no guidance, and are often at the mercy of arbitrary decisions on how to regulate.

PCIA provides a variety of resources for wireless infrastructure providers to navigate the often-muddled path of local regulation of site modifications. Either on its own or through a local state wireless association, PCIA will intervene in specific upgrade controversies to explain the industry need for streamlined review processes for necessary improvements. PCIA's siting legislation expresses a clear preference for collocations and, by implication, site modifications, and prescribes limits on review time and expense at the municipal level. Finally, PCIA's model zoning ordinance defines antenna swaps and structural improvements at wireless sites as "ordinary maintenance" not requiring any permit. The model ordinance defines tower height increases of less than 10 percent of original height or 20 feet, whichever is greater, as "minor modifications" subject to administrative approval only and expressly exempted from public hearings. Through its outreach with local governments and their affiliations such as the National Association of Counties, National League of Cities and American Planning Association, PCIA educates policymakers on why site modifications are so important, and why it is good policy to allow site owners to ensure that their facilities are ready to meet the ever-increasing demands of the wireless user public. **agl**

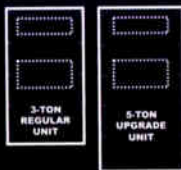
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# Backup Power: Federal Mandates and Industry Trends

—by Mike Saperstein—



The future of the FCC's much-maligned backup power order, which requires 24 hours of backup power at all central hub facilities and eight hours of backup power at all wireless facilities, including all DAS nodes, remains in limbo while the U.S. Court of Appeal for the D.C. Circuit ponders its fate. Regardless of the court's decision with respect to the order, site hardening and continuity of operations remains a concern for DAS providers, and for infrastructure providers generally. PCIA and the DAS Forum serve as an informational resource about

during emergencies. Additionally, the DAS Forum's intervention showed that the FCC failed to allow for proper notice and comment when creating a rule that imposes a nearly impossible hardship. On May 8, 2008, the court held oral arguments for the case. In its questioning at oral argument, the court focused almost exclusively on the preliminary question of whether Congress has given the FCC the authority to create such a mandate. The FCC had claimed that Congress appointed it with the duty of "promoting safety of life and property through the use of wire and radio communication." The judges aggressively questioned the FCC on this point, asking if, under the FCC's logic, the FCC could require all cell phone users to carry spare batteries around with them at all times.

In a surprising twist, the court also questioned the FCC on its failure to submit its order to the Office of Management and Budget (OMB) for its approval as required by the Paperwork Reduction Act. Some judges expressed the view that this failure removes the court's ability to even consider the case. In subsequent briefs on the OMB issue, both CTIA and the FCC responded that the court did, in fact, have the ability to rule on the case. The FCC, however, took the opportunity to tell the court that though it did have the legal authority to rule on the order, the court should exercise its discretion not to consider the challenge because OMB's opinion of the order could substantially change the way it is ap-

plied. In turn, CTIA asked the court to strike this portion of the FCC's brief as it went beyond the scope of the issue it was asked to address. At press time, the court was considering all briefs in making its decision. While the outcome of the case is unknown, the following represent possible outcomes in the case:

*The court vacates the order* — By vacating the order, the court dismisses the FCC's mandate. If the FCC sought to address backup power, it could only do so through a new rulemaking.

*The court vacates the order in part and upholds in part* — It is difficult to predict the effect of this outcome as it would depend entirely on which portions of the order the court accepts and which part it rejects. The FCC would then have to issue another order responding to issues struck down by the court.

*The court rules that it cannot or will not hear the case* — Should the court decline to hear the case, the FCC would need to submit its order to OMB and await a decision on the paperwork implications of the order. This would give the FCC an opportunity to revise the order before re-releasing. It is likely that the industry's challenge to the order would continue in this instance.

*The court upholds the order* — If the court were to uphold the FCC's order, most CMRS providers and the DAS and infrastructure vendors who serve these providers would need to either (a) implement plans to add backup power to all hubs and nodes, or to (b) apply for a waiver of the FCC's rules. Under the order, an applicant need not comply with the mandate if it can demonstrate that compliance is

## The DAS Forum's intervention showed that the FCC failed to allow for proper notice and comment

the engineering, architectural, equipment and regulatory elements of this increasingly commonplace feature of wireless facilities.

Wireless industry stakeholders challenged the FCC's October 2007 order in *CTIA—The Wireless Association v. FCC*. The DAS Forum and PCIA—The Wireless Infrastructure Association intervened in this challenge. The DAS Forum's brief focused on the specific hardships that DAS providers would experience by the order and pointed out that the order was both unworkable with respect to DAS and generally ineffective in advancing the policy goal of ubiquitous wireless communications





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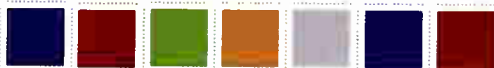
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## DAS forum

precluded by either: (1) federal, state, tribal or local law; (2) risk to safety of life or health; (3) private legal obligation or agreement. If the order is upheld, the DAS Forum and PCIA will assist the industry in addressing compliance and exemption plans.

Regardless of the court's decision with respect to the FCC's backup power

## Carriers and infrastructure providers alike will face complex issues

order, the addition of backup power at wireless facilities is a market reality. Some national carriers now require space for generators or other backup power facilities at each site as a matter of course. DAS providers, whose networks depend on visual inconspicuousness and low-profile designs, are especially challenged to implement power facilities in harmony with network architecture. As the addition of backup power takes center stage during site design and modification, carriers and infrastructure providers alike will face complex issues about power sources, energy efficiency, safety and structural/spatial constraints.

PCIA and the DAS Forum are addressing the need for information sharing and advocacy with respect to backup power. At the 2008 Wireless Infrastructure Show in Hollywood, FL, PCIA will host a "Power Lunch" to discuss the options available to wireless site operators for backup power, including the specific challenges and technologies involved with various power options, and to review the latest developments in the challenge to the FCC's order. For more information on the 2008 Wireless Infrastructure Show, visit [www.pcia.com](http://www.pcia.com).

Please join us in our advocacy efforts by contacting the PCIA Government Affairs team at 703-739-0300 with any questions, concerns or updates. **agl**

Saperstein is a public policy analyst with PCIA.



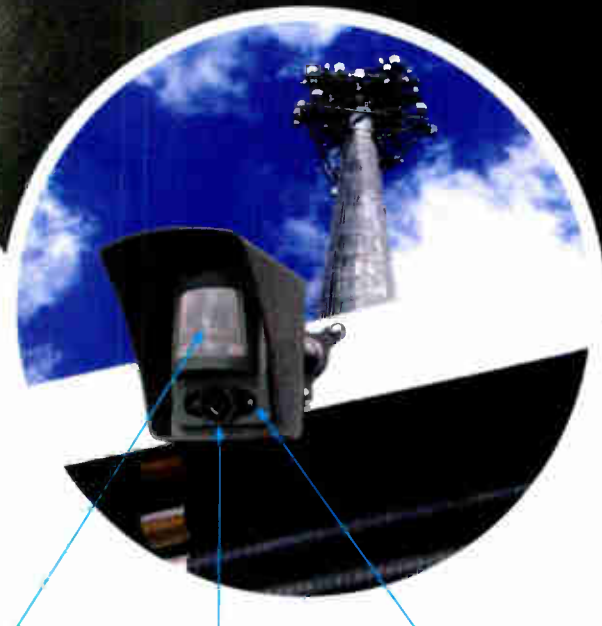
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# SWAP Comes of Age

by Nancy Chrisman

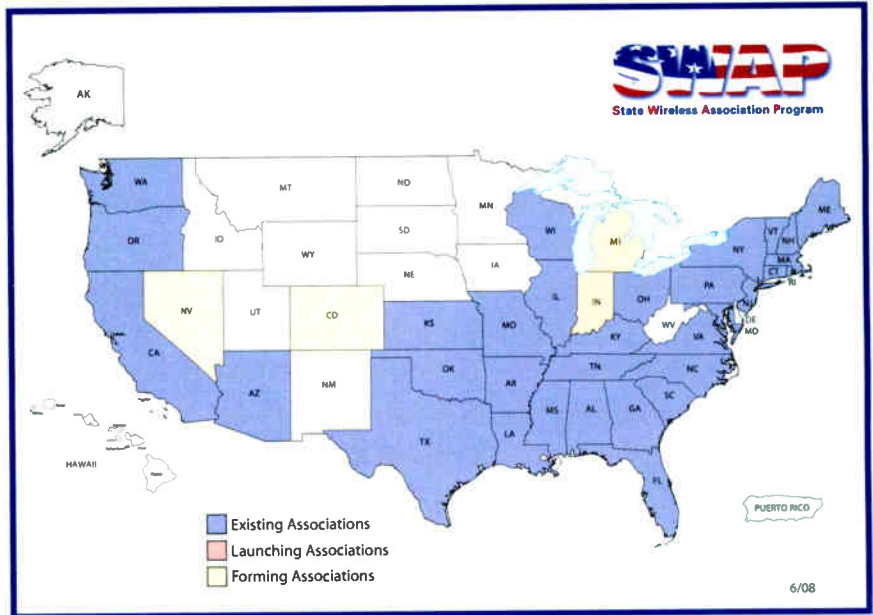
State wireless associations have quickly become a cornerstone in wireless. They educate, they advocate, and they strengthen the industry and our communities in many ways. Stories abound of relationships forged through state wireless association involvement that have ultimately led to key market successes. *Rev G, Katrina Order Backup Power Rule, Challenges in Site Acquisition, Working with*



*your Electric Utility Partners, Tower Climbing Safety Training* and various regulatory workshops are just some of the free or low cost educational programming offered by state wireless associations around the country in the first quarter of this year alone.

Equally worthy of note is the considerable outreach that has been undertaken by state wireless associations to state and local lawmakers to promote a shared understanding of wireless issues and to create positive industry awareness. Finally, in the spirit of compassion and giving back that has characterized our industry since its inception, state wireless associations raised more than \$100,000 last year to support the work of local charities and to give back to the communities where we live, work, and play.

Never before in history has overcoming the wireless paradox of citizens clamoring for more and more complex wireless services while mounting more and more sophisticated campaigns against the deployment of enabling infrastructure in their communities been so difficult. However, recognizing that "all politics is local" and that there is "strength in numbers," the state wireless associations have been able to bring to bear the collective skills within a broad base of state wireless members in a way that is not only



highly effective, but also fiscally sound. This sharing of intellectual capital and other resources has proven time and time again to be a highly effective solution to some of our most pressing challenges.

An important factor in their success has been the continuous increase in carrier participation in state wireless associations. Serving on both steering and advocacy committees, carriers play an expanding role in guiding the work of the associations and defining the focus and approach on key issues. With the carrier community, state wireless associations and PCIA working in harmony, our industry has experienced unprecedented success at the state and local levels. Together we have thwarted damaging legislation, preserved good legislation, and promulgated new legislation that takes aim at key challenges facing our industry. We have intervened in local zoning cases, provided alternatives to biased ordinances, testified at hearings and participated in litigation. What has been particularly heartening is that despite impossibly full calendars, carriers and other key industry stalwarts understand the

value that state wireless associations deliver. They know that for the investment of about one hour every two or three months, they can significantly reduce their burden in the long run. With state wireless associations and PCIA in their tool box, they recognize that they simply cannot afford *not* to get involved. And those decisions are paying real dividends.

There is no question that the state wireless association program has come into its own. Within a few short years, state wireless associations have inextricably woven themselves into the very fabric of our industry and have delivered countless crucial outcomes. They effect legislation, promote positive industry awareness, educate the members and communities they serve and give back to those in need. **agl**

Chrisman is director of membership and SWAP at PCIA — The Wireless Infrastructure Association. If you would like the opportunity to advance the industry and work with the tirelessly dedicated volunteers in your state, county and town, contact her at [nancy.chrisman@pcia.com](mailto:nancy.chrisman@pcia.com).



DAS

WiMax

Backhaul

LTE

Power

# THE 2008 **WIRELESS** **INFRASTRUCTURE SHOW**

# PCIA

The Wireless Infrastructure Association

OCTOBER 12-15th, 2008 • WESTIN DIPLOMAT HOTEL AND SPA • HOLLYWOOD, FLORIDA

World Radio History

# SHOW SCHEDULE

KEY

- ▶▶ Track 1 • Finance and Business
- ▶▶ Track 2 • Advocacy and Regulatory Compliance
- ▶▶ Track 3 • Technology and Site Operations
- ▶▶ Special Interest Sessions
- Keynotes and Featured Speakers
- Special Events



## ▶▶ SHOW SCHEDULE\*

### ▶ SUNDAY, OCTOBER 12, 2008

- 8:00 A.M. – 8:00 P.M. Registration Open
- 11:00 A.M. – 8:00 P.M. Exhibitor Load-in
- 1:00 P.M. – 6:00 P.M. **Golf Outing, Sponsored by AT&T Towers**
- 7:00 P.M. – 9:00 P.M. **SWAP Presidents' Dinner, Sponsored by Excell Communications**

### ▶ MONDAY, OCTOBER 13, 2008

- 7:00 A.M. – 7:00 P.M. Registration Open
- 8:00 A.M. – 3:00 P.M. Exhibitor Load-in
- 8:00 A.M. – 9:00 A.M. **DAS Forum Breakfast and Annual Meeting (DAS Forum Members Only)**
- 9:00 A.M. – 11:20 A.M. ▶▶ PCIA's 6th Annual Wireless Investors' Conference, *Sponsored by RBC Daniels*
  - ▶▶ Mission Possible: PCIA's Public Policy Outlook
- 9:00 A.M. – 10:05 A.M. ▶▶ Collocation on Utility-Owned Infrastructure
  - ▶▶ Wireless 101 for Non-Technical Professionals
- 10:05 A.M. – 10:15 A.M. Sponsored Break
- 10:15 A.M. – 11:20 A.M. ▶▶ Competitors as Customers: Breakthrough Solutions for Collocation on Carrier-Owned Assets
  - ▶▶ Small Tower Forum Power Hour, *Sponsored by Media Capital Advisors*
- 11:30 A.M. – 12:45 P.M. **Power Lunch**
- 1:00 P.M. – 3:00 P.M. ▶▶ The Global Infrastructure Marketplace
  - ▶▶ SWAP: An Integral Part of a Successful Strategy, *Sponsored by Excell Communications*
  - ▶▶ WiMax and LTE Deployment: Flexible Infrastructure Strategies
  - ▶▶ Innovative Approaches to Site Acquisition and Development
- 3:00 P.M. – 7:30 P.M. **Show Floor Opening**
- 7:30 P.M. – 9:30 P.M. **Opening Reception, Sponsored by BCI**



# SHOW SCHEDULE

## ▶ TUESDAY, OCTOBER 14, 2008

- 7:00 A.M. – 7:00 P.M. Registration Open
- 8:00 A.M. – 9:00 A.M. **Policymakers' Breakfast, Sponsored by Patton Boggs LLC**
- 9:00 A.M. – 10:00 A.M. **Opening Keynote, Sponsored by Phillips Lytle**
- 10:00 A.M. – 1:30 P.M. **Show Floor Open**
- 12:00 P.M. – 1:30 P.M. Lunch on Show Floor
- 1:30 P.M. – 2:45 P.M. ▶▶ Lease Optimization: Managing Carrier Upgrades  
▶▶ State Siting Legislation  
▶▶ Innovations in Cost-Effective Broadband Deployment
- 2:45 P.M. – 3:00 P.M. Sponsored Break
- 3:00 P.M. – 4:15 P.M. ▶▶ Strategic Partnerships in the Wireless Infrastructure Industry  
▶▶ Emerging Trends in Zoning and Community Engagement  
▶▶ Extreme Makeover: Backhaul
- 4:15 P.M. – 4:30 P.M. Sponsored Break
- 4:30 P.M. – 5:45 P.M. ▶▶ OpEx Reduction Solutions  
▶▶ DAS Compliance with Federal Regulations  
▶▶ Optimizing Site Performance
- 6:00 P.M. – 7:30 P.M. **WWLF Reception**
- 6:00 P.M. – 7:30 P.M. **PCIA Presidents' Reception (invitation only), Sponsored by Lyle**

## ▶ WEDNESDAY, OCTOBER 15, 2008

- 7:00 A.M. – 1:00 P.M. Registration Open
- 8:00 A.M. – 9:00 A.M. **PCIA Members' Breakfast and Annual Meeting (PCIA Members Only)**  
*Sponsored by Atlantic Risk Management*
- 9:15 A.M. – 10:15 A.M. **Titans of Towers Keynote, Sponsored by SiteMaster**
- 10:15 A.M. – 10:30 A.M. Sponsored Break
- 10:30 A.M. – 11:45 A.M. **Customers of the Future: Carrier Plenary Session**
- 12:00 P.M. – 1:00 P.M. **Carrier Keynote Luncheon and Closing Ceremonies, Sponsored by Message Center Management**

\*Show schedule as of July 1, 2008. Sessions subject to change.

# PCIA THANKS THE SPONSORS OF THE 2008 WIRELESS INFRASTRUCTURE SHOW\*

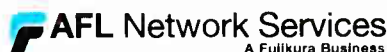
## Platinum



## Gold



## Bronze



## Other Sponsors



## ▶▶ PCIA'S 4TH ANNUAL GOLF OUTING SPONSORED BY AT&T Towers

Start your time in Hollywood on the links with a round of golf at the Diplomat Country Club Golf Course, the only 5 Star rated golf course in South Florida! It boasts four par-5 holes and a unique signature island hole. Register early, this event sells out fast! Registration opened on June 1, 2008. Email Nancy at [events@pcia.com](mailto:events@pcia.com) if you would like to be placed on a mailing list for golf updates. Please visit [www.pcia.com/show](http://www.pcia.com/show) to download the registration form.

The golf outing takes place on Sunday, October 12 at 1:00 p.m. Lunch will be served at 12:00 noon, prior to the shotgun start, and an awards reception will be held following the tournament. A complimentary shuttle service will be provided from the lower lobby to the country club (approximately 10 minutes away).

Prizes will be awarded in the following contests:

- Top 3 teams
- Longest drive (men & women)
- Closest to the pin (men & women)
- Multiple hole-in-one prizes!
- Visit the Diplomat Country Club website for more information about this award-winning course
- Don't feel like traveling with your clubs? No problem! There are Callaway rental clubs and FootJoy rental shoes available

\*Sponsors as of July 11, 2008



# Meet: Pennsylvania Wireless Association

by Chris Pleibel, president



## Pennsylvania Wireless Association

**Meeting Locations:** Philadelphia, Harrisburg and Pittsburgh

**Date Formed:** 2006

**Website:** [www.pa-wireless.org](http://www.pa-wireless.org)

**State Charity:** Child Life Program at Penn State Hershey Children's Hospital and USMC Toys for Tots

**President:** Chris Pleibel  
Primus Electronics  
Sellersville, PA 18960

[cpleibel@primuselectronics.com](mailto:cpleibel@primuselectronics.com)

Pennsylvania Wireless Association was founded in 2006 to support and promote the wireless industry throughout the Commonwealth of Pennsylvania. As the first wireless association in the Northeast, PWA has grown into a well-established and active group of like-minded industry professionals, due in large measure to the capable leadership of Todd Stiles who has been involved in the PWA since its beginning.

As an industry resource, the PWA is active on a variety of fronts ranging from regulatory and legislative involvement to educational and charitable endeavors. PWA's regulatory and legislative arm is actively involved in local and state-wide issues affecting the wireless industry in Pennsylvania. To this end, PWA has garnered a presentation session at the American Planning Association's 2008 Chapter Conference to be held later this year in Pittsburgh and will assemble a wireless panel to present industry-specific issues on a state-wide level to the many private and public sector planners who live and work in the Commonwealth.

### Calendar/Events

Summer: Pirates Ballgame — *Pittsburgh*

Fall: APA Chapter Conference — *Pittsburgh*  
Golf Tournament — *Pittsburgh*

Winter: Christmas Social — *Philadelphia*

PWA, in an effort to address pertinent developments affecting the entire wireless industry, hosted two educational seminars on recent national code changes. The first, on the pending adoption of Revision G of the TIA-222 code for antenna structures, addressed the significant effect of proposed changes to the design, construction, ownership and usability of antenna support structures. The second presented valuable information on the latest update of the ANSI Z359 Fall Arrest Code, the first major revision in 15 years. Both events underscore PWA's commitment to providing valuable and practical resources to its members



PWA is also committed to looking outward as an organization and continues to partner with other entities to positively affect the community. Since its inception, PWA has donated \$25,000 to the Child Life Program at the Penn State Hershey Children's Hospital. PWA has coordinated successful Christmas drives with the U.S. Marine Corp's Toys for Tots program. Its many sponsors and volunteers made these events a resounding success and poignant examples of what corporate and individual involvement can achieve when directed toward a common goal.

Future prospects for the wireless industry in Pennsylvania are bright and loaded with opportunity. PWA will have a major role to play in these future opportunities and will serve as a catalyst for other avenues of development in the Pennsylvania wireless industry. agl

### Board Members

Vice President at large	Todd Stiles <a href="mailto:todd.stiles@strat-comm.com">todd.stiles@strat-comm.com</a>
Vice President Social/Membership	Adam Cummins <a href="mailto:acummins@smartlinkllc.com">acummins@smartlinkllc.com</a>
Secretary	Mario Calabretta, P.E. <a href="mailto:fivesolas@verizon.net">fivesolas@verizon.net</a>
Treasurer	Michael Damiano <a href="mailto:MWDamiano@pplweb.com">MWDamiano@pplweb.com</a>

# Website Markets Towers on Avon Mountain

Marlin Tower takes advantage of resources from its affiliated broadcasting and Internet streaming audio enterprises to create tools for marketing its multipurpose telecommunications site in West Hartford, Connecticut.

## AGL interview with John Ramsey

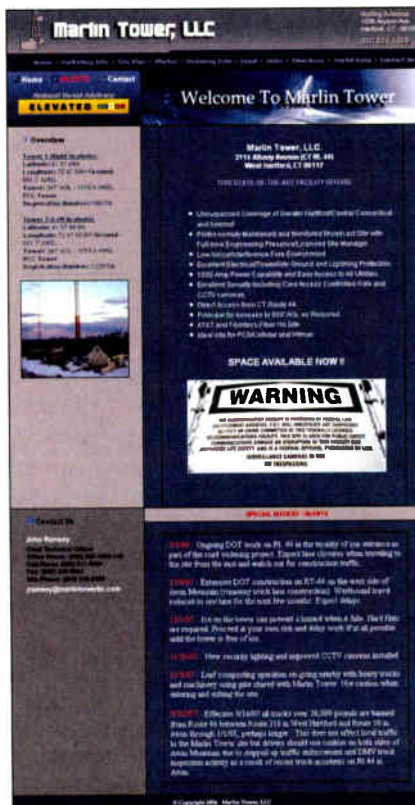
*In March 2008, AGL spoke with John Ramsey, chief technical officer for Marlin Tower, an affiliate of Marlin Broadcasting of Hartford. We were intrigued by a website that appeared to be dedicated to only one telecom site, and our conversation with Ramsey revealed not only the reason for that, but an interesting site marketing story. Here are the details in Ramsey's own words.*

**AGL:** How did you come to have a website for this one telecom site?

**Ramsey:** The company, Marlin Tower, is owned by Marlin Broadcasting, which owns the towers, two radio stations, and Beethoven.com, "the World's Classical Radio station," an Internet radio station and streaming audio content provider. Because of Beethoven.com, we have an excellent IT staff and we could make the Marlin Tower website in house at practically no cost.

We have a lot of FCC licensees on our towers and we get lots of questions from potential tenants who need specific information and from the technicians who maintain equipment at the site. For instance, a lot of people ask for directions to come to the tower to do work there for the tenants. Some want to know what the view looks like at various directions from the top of tower. It is a lot easier when they need file documents with a government agency or a contractor that they can check the height above

**24** above ground level



**At [www.marlintowerllc.com](http://www.marlintowerllc.com), the Marlin Tower website includes helpful information for tenants and installers alike.**

average terrain (HAAT), the geological coordinates, the electrical service and all the other details on our [marlintowerllc.com](http://marlintowerllc.com) website. The website has everything in one place. I provided all the content. Our IT manager, Chris Larsen, put it together into the website.

**AGL:** What are other things the tenants and workers on the tower site want to know?

**Ramsey:** First, looking back on the inception of the site, we wanted a first-class site. There are a lot of sites that are lacking, including some that are in farmers' fields and some on rooftops and undesirable locations. We built the tower for our FM station and not all broadcasters make good site managers so we wanted to go the extra mile and let people know we are serious about the tower business, and the website is one of the ways we do that.

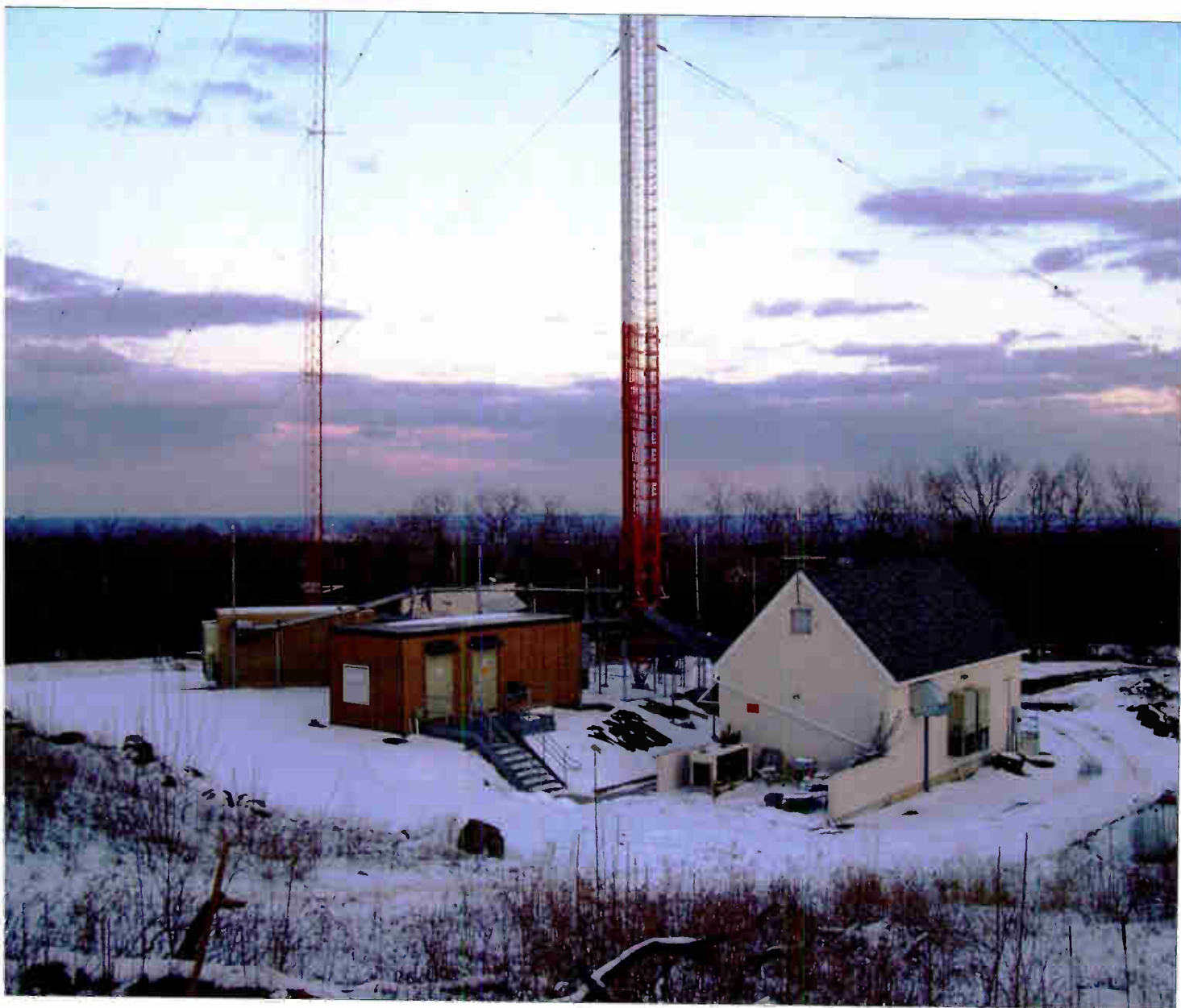
We are in a competitive environment. There are other towers in the area, and I don't believe they have websites. We wanted to market it as a classy site.

When we have technicians up here and installers, they always are asking, "Where is the nearest Radio Shack?" and "Who delivers pizza here?" The website has that information. It is a tool that installers use.

We put emergency information on the site. We are on the corner of Avon and West-Hartford and Bloomfield is nearby. For installers, there always is confusion as to which town you're in. What number should you call for emergency? From our site, 9-1-1 calls go to the correct public safety answering point to dispatch emergency services.

We want people to know where they are when they are on our tower site if and when they need to call for help or





It's quiet at the Marlin Tower antenna site, but on nearby U.S. Route 44, 40,000 commuters pass close to the site every day as drivers navigate the highway's winding curves along a 2-mile segment that had little or no cell coverage before the new tower at the right was constructed in 2000.

for the delivery of supplies. Many installers use GPS to get here. They just follow the GPS device's directions. They won't know what's nearby, where to go if there is an accident, where to call for a pizza or how to get to the nearest hardware store. The website has that information.

Pictures showing the view from the site are important, too. The pictures from the top of the tower are not the highest quality because I was hesitant

to give the climber my best camera, yet being able to see what the view is in each direction, that helps to sell the site. Someone asks, "Do you get into Avon well?" When they look at the pictures, they can see for themselves that we have a shot into the entire town.

There are pattern studies and topo maps, but there is nothing like putting

the eyeballs on the top of the tower for some people.

**We wanted to go the extra mile and let people know we are serious about the tower business. The website is one of the ways we do that.**

We also post right on the home page of the web site periodic alerts so  
*(Continued on page 28)*

# AUGUST-SEPTEMBER

## AGL TOWER OF THE MONTH







**MANUFACTURER**

Stainless

**OWNER**

Tri-Valley Broadcasting

**MODEL**

Custom Self-supporting

**YEAR BUILT**

1992

**HEIGHT**

285 Feet

**APPLICATION**

FM Broadcast, PCS  
ESMR, Public Safety  
Point-to-point Microwave  
Cellular, Paging

**LOCATION**

Pawling, New York

*(Continued from page 25)*

that our tenants know what is going on. This might include on-site work, nearby highway construction activity and warnings about falling ice. A number of users of the site tell me that they have found this very helpful.

**AGL:** *What about competition in the business?*

**Ramsey:** Hartford is the 50th radio market. It's been wired in the suburban area for cellular for 10-plus years. Our tower site is at the top of Avon Mountain, 700 feet high, which is not a

Notice the wires running parallel to the tower legs. Those are part of the AM detuning skirt that is important to eliminating interaction between this tower and the AM broadcasting tower 50 feet away, and other AM towers a few miles away. Also noticeable are the cellular antennas, which occupy some of the lower positions on the tower.



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- Automatic controlled descent (3' per sec.)
- Ideal for self-rescue or multiple escapes
- Approved for 2 person rescue (550 lbs/250kg)
- Easy installation and operation
- Bi-Directional design
- Compliance: OSHA 1926, Subpart M, Appendix C
- ANSI Z359.4-2007/CSA 2259.2.3-99 EN 341A/CE 0123
- CSA Classification: Type 1E

*\*Professional rescue training required.*



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World Radio History



mountain by many people's standards, but in southern New England, they call it a mountain.

U.S. Route 44, an east-west highway that runs for 238 miles through four states, is adjacent to the tower site. Route 44 has 40,000-plus commuters a day passing over Avon Mountain and right by our site. Because the highway goes over the hill with lots of twists and turns, there was no cellular coverage for the length of about two miles of road on the hill when we built the new tower. We knew that there was room for gap filling to serve this major commuter route between the suburbs and the capital city. We were putting up a new tower for our FM station, so we figured we would make it sturdy enough for multiple tenants to generate some additional revenue. And we started Marlin Tower to show prospective users that we were serious about the vertical real estate business.

**AGL:** *When was the tower built?*

**Ramsey:** In 2000. The original tower on the left side, looking at the photos, has been there since 1990. It also was built for our FM station and currently serves our classical AM station. In 1998, Marlin bought the AM and FM stations and wanted to upgrade them for a new antenna, for HD Radio, and also for tenants.

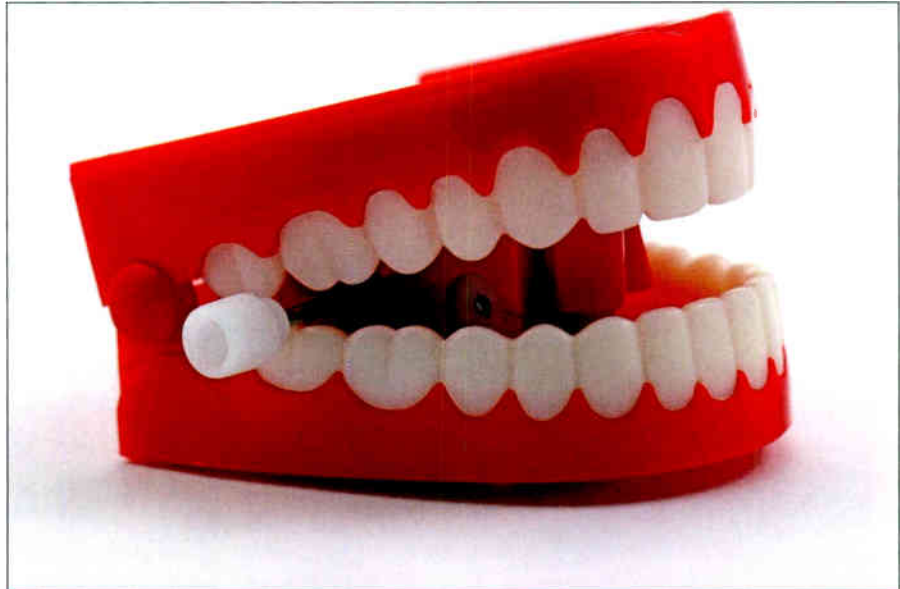
The existing tower was a decent Pirod tower but it didn't have much excess capacity. We didn't know if we would have to take it down, but we were able to convince the town to let us keep it. For the new tower, we built what is half of a planned 700-foot tower. We knew that even at 700 feet the elevation would not be optimum for digital TV broadcasting but we wanted to make sure we had the capacity if a TV station came knocking. But the timing was not right for a DTV station to move here. They would have had to move their analog transmitter here, too, operate it for less than a decade, and then abandon it due to the FCC mandate to cease analog TV broadcasting in early 2009. No one wanted to move their DTV and

analog transmitters here only to shut down the analog in a relatively short period of time.

DTV needs as much height as possible, so that's why we planned for 700 feet, which would add to the 700-foot height of the mountain itself. But there is a taller stick five miles away, and the DTV stations that didn't have their own towers went there, which makes sense.

**AGL:** *Who was your first wireless tenant?*

**Ramsey:** The first cellular company to rent antenna space as Verizon. They had been looking for a place to fill the gaps on the state highway. This tower is in a restricted area with high-priced homes. It also is near a watershed. Most of the mountain ridge is in an adjacent town that has a protection act, but the tower is in West Hartford.



## Talk. Talk. Talk.

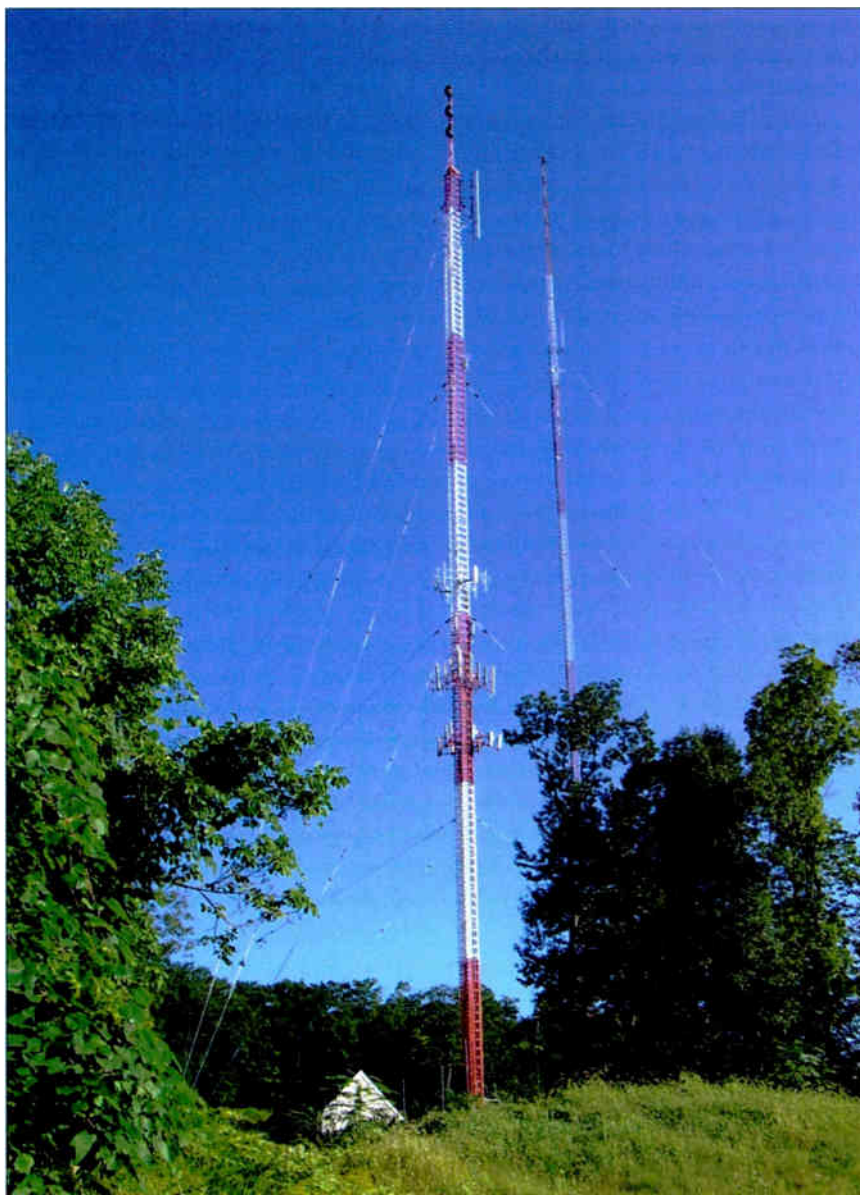
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**The newer, 367-foot tower, constructed in 2000, appears at the left of the tower built in 1990. The newer tower is designed to support its extension as high as 608 feet with a multi-ton load, so it has plenty of capacity for additional tenants including some that might want the highest possible antenna positions.**

So putting up a new tower is a real challenge. We had already done the work so Verizon was knocking on the door for space on the tower practically from day one.

I had trouble convincing some of the other carriers that they needed it. The first one, one of the big carriers that I won't name, is one that I have subscribed to since the 1980s. I contacted them and told them they needed an antenna on the tower because they had no

coverage for a mile or so on either side of the hill. They said they had good coverage already.

I said, "You may think you don't need it, but here's my number, and from my number you can tell I'm a long-time customer, and I believe you do need it. You can tell me you don't want it, and I believe you, but don't tell me you don't need it."

They wouldn't move. Now, this next step we took wasn't my idea;

credit goes to one of the company's vice presidents who is really good with advertising. He authorized the radio station to broadcast a spot to promote the tower.

The spot said, "If you're one of the 40,000 commuters who travels Route 44, and if you are a Verizon customer help is on the way. Verizon is building an antenna site that will fix the problem of your dropped calls. If you're not a Verizon customer, call your carrier and tell them about Marlin Tower. This is not a singular problem, so you should sprint to your phone and call now." That was a play on words, "singular" problem and "sprint" to your phone, for the other carriers to put them on the air at the site.

We knew no customers would call their carriers, but we knew the carriers would hear about the spot since the spots ran on one of the most popular stations in the state, which we happened to own. We put the spot on the air, and the first call we got was from Verizon. They said, "It's great; you're promoting us." Within a week we got calls from the other providers.

They actually complained at first, but they loved the spot. Who could not like a spot like that? Sprint said they didn't need our site because they have an antenna on another tower down the ridge. Friends tell me they have coverage problems and they say they don't. Cingular moved up here in 2001, so the spot worked.

The spot encouraged cell phone users to ask their carriers to call Marlin Tower. Although we didn't think that would ever happen, radio is a pretty effective advertising medium and I wanted to be prepared if it did. Up until that point we didn't even have a telephone number listed in Marlin Tower's name. So to make sure people could find us we put in a phone number with voice mail and set up the website. So the spot was one of the reasons for building the website. The other was to put all of the information in one place so that we could promote the site in a high-tech way.

All of the carriers wanted a copy of the commercial. Even though some

weren't thrilled about it at first, they all wanted a copy to send to their offices around the country, which we gave them. The carriers are still talking about it seven years later in a positive way. They had never heard of an FM station marketing a cell site that way.

Marlin Tower is unique outfit and we have been very successful. I do all the marketing for it and I serve as site manager. The tower has a combination of AM and FM broadcast, three low-power TV stations, three cellular and PCS carriers, antennas for UHF and VHF government and commercial two-way radio services and paging.

We also have a WiMAX antenna. The WiMAX user is a local company from Massachusetts that is experimenting in Hartford. They have a small setup here. We gave them a good rate going in to see if it works.

WiMAX and mobile wireless are clearly the wave of the future and with a tower site ideally situated to provide extensive coverage of the metro area and the suburbs we are hoping to attract more users in the future. We have plenty of room to expand because we only built half of the 700-foot tower that originally was planned. When we built the site we planned for the future and included such things as 1200-amp electrical service and state-of-the-art security systems. And not only can we add height to the tower if needed, we have a large amount of land around the tower for equipment and shelters.

**AGL:** *How long would the opportunity last to extend the tower?*

**Ramsey:** We filed for and received FAA approval for 608 feet a few years ago — the tower is currently 347 feet tall. The interest in the full height evaporated, and we cancelled the FAA approval for 608 feet. We think we could re-file and obtain it again if necessary. There have been no changes to the nearby airports since then.

The way I sold it to management to construct the tower so that it could be extended to 608 feet someday is

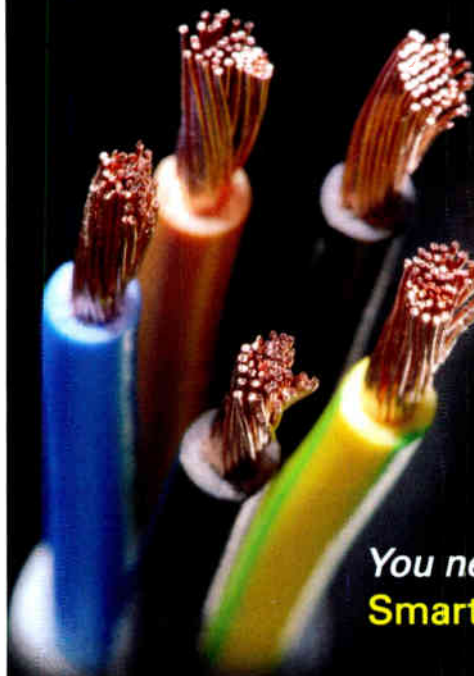
that if someone needs 50 feet more on top, we could give it to them and not overload the tower. It was designed for 700 feet with a multi-ton DTV antenna on top.

We have lots of capacity. Someone would have to pay to use it, of course. The town doesn't have a problem with the higher tower, and the FAA would approve it.

**AGL:** *There are several nearby AM broadcast stations, how do you handle detuning?*

**Ramsey:** Yes, there are two AM stations within 3 km including our own AM tower which is 50 feet away from the main tower, which made detuning a real challenge. We take detuning very seriously. I've  
*(Continued on page 42)*

# Copper Theft?



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# Free Copper and Generators!

‘Free Copper and Generators’ is the imaginary sign that criminals see when they drive by one of your tower sites, whether in a remote location or a crowded neighborhood.

by **Greg Weger**

With the amount of work that constantly goes on at tower sites around the country, thieves can drive up to your site, even in broad daylight, and to casual observers they may resemble the crews that regularly work at your site. Unnoticed because they are unremarkable, they help themselves to your copper, generators and anything else they want and simply drive off. Neighbors and passersby most likely won't notice whether the “crew” is adding cable, repairing cable, or stealing cable. Worse, in some cases the neighbors don't care since they aren't too happy to have your tower in their view anyway.

Vandalism and theft at communication sites, particularly those in remote areas, is on the rise, driven by the ever-rising price of copper and the easy target most tower sites represent. Tower sites are full of copper. They have copper ground wires, copper buss bars and a lot of transmission lines and other cables that are full of copper that can be, in most cases, easily stolen and sold quickly for cash to willing buyers. And the 100 percent profit margin on stolen goods makes even the best-run companies today envious.

**32** above ground level

On top of the loss of valuable resources, the site owner must spend a large sum to not only replace what was stolen, but also to install the replacements and repair damage caused during the theft. The typical “cut and run” thief isn't particularly careful about how they leave your site. Sometimes they leave your site inoperable, which may be the first indication that thieves visited your site. God help the tower site owner if a thief is hurt while vandalizing a site, because surely some less-than-scrupulous lawyer will be happy to file suit on behalf of the poor “victim” of the site owner's inadequate security at the site.

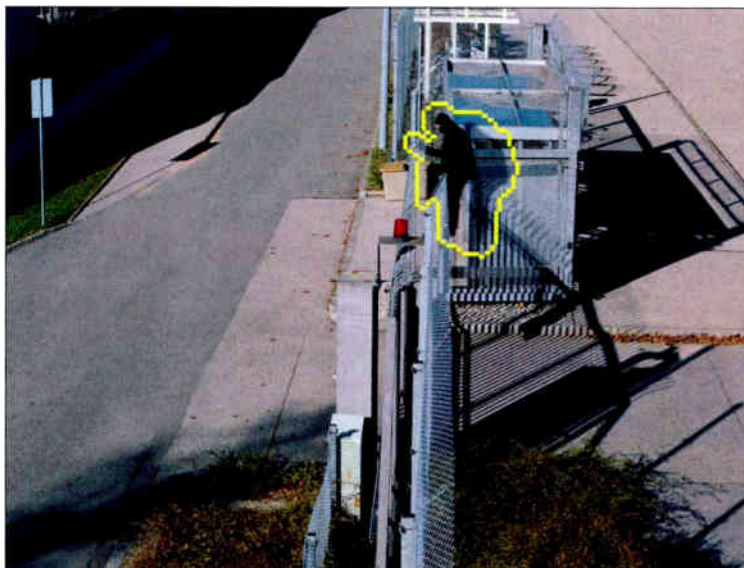
## Tower owner's problem

All site owners, operators and managers want to protect their investment and their tenant's property. The site owner faces the problem of how to protect a large number of sites in a cost-effective and reliable way.

While many tower sites are equipped with intrusion detection devices, these are generally installed only to protect the equipment shelters and their contents. Fences are normally not “alarmed” and therefore there is no indication that the fence has been torn down for access before it is too late to stop the theft of the copper or the generators or both. More-

over, even if a perimeter fence alarm system is installed these systems have often proven to send false alarms and, with no visual confirmation of an intrusion, alarms are often ignored or responded to in a leisurely manner by law enforcement or control room personnel, providing little or no hope of nabbing or even scaring off the snatch-and-go thieves.

The addition of always-connected, full-motion video from each site back to the tower owner or operator's network operations center or NOC presents a whole host of problems,



**Photo 1.** Software analytics can recognize an individual entering a predefined ‘detector field’ within the camera's visible range. To minimize false alarms, object recognition filters determine whether or not the intruding object is in fact a human being. This helps prevent objects like animals or scraps of paper in the field from generating alarms.





**Photo 2.** A single, fixed, day/night camera mounted high on a tower normally cannot reveal details of intruders and their vehicle.



**Photo 3.** Floodlights can be installed to illuminate the area of interest when intruders come.



**Photo 4.** A pan-tilt-zoom camera mounted on a tower leg or on the roof of the shelter with non-penetrating room mounts allows closer observation of intruders.

not to mention significant cost and bandwidth requirements.

### Security guards

The sheer number of communications sites renders the use of security guards financially unsustainable.

Using traditional methods of protection, it is *sometimes* less expensive to repair the site after the event than to install systems to stop the event from occurring. And on any individual site basis it may be true that it is cheaper to repair than to prevent. But there are, however, several factors that can and will affect the site owner's decision:

1. Currently, estimates for replacing pirated copper at tower sites range from \$2,000 to \$5,000 per site, depending on obvious factors such as site size and quantity of grounding materials.

If the price of copper continues to increase even 50 percent over the next 12 months, replacement costs will increase proportionately.

2. As the demand for copper continues to increase, the *number and frequency* of sites robberies will, in all likelihood, also increase. Therefore, the material costs will not increase arithmetically, they will increase geometrically.

3. The hiring of additional maintenance crews may be required to keep up with the increased numbers of raids on sites, thus significantly increasing labor costs for the site owner.

### New protection technologies

The field of video security is advancing daily, providing new tools to companies looking to monitor the security of their facilities. While the cost of

copper is rising, the cost of technology available to help prevent theft at remote sites is decreasing. More importantly with the ability to deploy electronic video analysis tools known as video analytics at the camera, it is now quite economical to deploy systems that can detect intrusions, report them instantaneously to the appropriate authorities, record the event, and most importantly, to immediately set off alarms that may cause the thieves to "shop" somewhere else, rather than your site. Understanding the capabilities of these new technologies is critical in obtaining the most effective security solution for your needs.

Traditionally, laser and fiber-based fence detection systems, motion detectors, acoustic sensors and video cameras monitored by security personnel

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**Photo 5.** A recording of an observation of intruders could provide important prosecutorial evidence.



**Photo 6.** The ability to zoom in on an intruder's vehicle license plate could speed identification and apprehension of suspects.



**Photo 7.** The pan-tilt-zoom camera can be used to verify site access alarms during normal hours. In this view a technician is accessing the site.

in a central control room have been the primary solutions used to protect facility perimeter and critical infrastructure facilities. The challenges with all of these solutions are that they must be monitored by human operators, as is the case of traditional video surveillance, and human operators inevitably miss critical events. Traditional intrusion detection systems are also highly susceptible to false alarms.

Additionally, since these traditional systems require broadband connectivity (fiber or coaxial cable), it is expensive to implement and monitor conventional camera-based security systems.

State-of-the-art video surveillance systems use video analytic software to eliminate the need for operators, dispatchers or security personnel to continuously and simultaneously monitor multiple video feeds by having computer software perform the monitoring function and then alert the operator by bringing up the camera feed on his screen and providing an audio alarm at his station when a relevant event occurs. Server-based video analytic solutions can perform this function but require continuous real-time video feeds from each camera.

New technology moves the analytic function from the server to the camera. These systems are referred to as "analytics at the edge" systems. These systems are more flexible and more cost effective than traditional approaches because they eliminate the need for continuous real-time video feeds from each camera to be transmitted to the

central location. This technique significantly reduces the bandwidth needed from each site since the system captures images on a local storage device and needs only to transmit information when a perimeter is breached or an event occurs. The reduced bandwidth requirements of "analytics on the edge" solutions allows the surveillance network to operate effectively over existing narrowband facilities, including the phone line or IP connection used to monitor the building alarm system or over the cellular network using cellular data modem connectivity.

### Analytics at the edge

The field of software-based video content analysis is becoming more and more advanced each year, providing the ability to detect wrong-way travel at facility exits, loitering behavior, excessive speed of vehicles or individuals, and intrusions into preset perimeters. To protect facility perimeters, software analytics can be used to recognize an individual entering a predefined "detector field" within the camera's visible range. When an object enters the field, the system generates an alarm. To minimize false alarms, the software has object recognition filters that use algorithms based on factors like object size and behavior to determine whether or not the intruding object is in fact a human being. This helps prevent objects like animals or scraps of paper in the field from generating alarms. (See Photo 1.)

Video analytic software can be run as a server-based application, but using

analytics at the "edge" provides several unique benefits. Server-based analytics require uninterrupted, jitter-free video feeds from the cameras back to the central server. If these feeds experience interruptions from loss of connectivity to the central server, the analytic software is rendered non-functional. When the backhaul network carrying the feeds has a great deal of traffic, the congestion significantly degrades the analytic software functionality and video feed quality. Solutions that run the analytic software directly on each camera feed at the camera's encoder significantly improve the reliability of the detection system while reducing the bandwidth needed for the network. Running the software at the "edge" in this manner means that the camera only needs to transmit its feed over the backhaul to a central monitoring center when the camera's software analytics generate an alarm. This eliminates the possibility of "missing" events due to connectivity problems and uses backhaul bandwidth much more efficiently.

### Video camera selection

Today's market offers a wide range of security cameras, and choosing the correct camera for your application can be a challenge. Every security application and camera placement has unique requirements, and no one type of camera fits every need. A fixed position camera is a good choice for detecting a perimeter breach along a fence line using video analytics but, because of its fixed visual range, it is not a good



choice for providing surveillance coverage over a wide area unless several cameras are used to cover multiple angles. A camera with pan, tilt, and zoom (PTZ) capabilities gives security personnel a larger visual range with the ability to change the direction the camera is looking, but caution needs to be exercised when using a PTZ camera with video analytics. Video analysis software typically does not work when the camera's field of view changes regularly because complex analytics work best when optimized for one specific field of view.

It's also important to consider whether or not the camera will need to operate in low-light or no-light situations. Near infrared (IR) cameras with onboard IR illuminators work well for many night vision applications, but most IR illuminators have a maximum range at which they effectively provide the infrared lighting the camera needs to see in the dark. Highly sensitive thermal cameras effectively provide a view of humans or vehicles in the dark by heat radiated from these objects and do not rely on an illuminator. Thermal cameras have additional applications such as detecting hot spots on equipment.

### Multiple camera types

In a large system, several types of cameras will be required because no one camera type will meet the needs at every location for every purpose.

Among the large number of cameras on the market are PTZ cameras with integrated analytics that track a targeted individual as he or she moves. Understanding the application and the on-site situation are key to correctly determining which camera to use.

The best security equipment in the world is worthless unless the information it provides is effectively monitored. Large security systems typically have more security camera feeds than the facility's security personnel can effectively monitor. Studies show that operators miss up to 95 percent of the activity in a scene during only 22 minutes of continuous monitoring. This is what makes effective use of technologies like analytics so important.

### Content analytics

The use of video content analytics allows a computer to continuously monitor relevant video feeds and alert the central monitoring station when something actually happens. In the event of an alert, security personnel automatically begin to receive the video feed or, if useful backhaul bandwidth is limited, still frames from the camera generating the alert, along with the ability to replay what happened before the alert.

Much like the technology used in DVRs that allow home users to pause, rewind and fast forward a live televi-

sion feed, security personnel have the ability to review the stored video feed from the alerting camera, even going back to the activity that took place well before the alert was sent. With this information in hand, the monitoring agency can then notify appropriate law enforcement agencies for intervention.

With the vast increase in video surveillance, numerous third-party providers of video monitoring have been

## Human operators inevitably miss critical events. Traditional intrusion detection systems are also highly susceptible to false alarms.

established. You may choose to have your own control room personnel monitoring your sites or to farm this service out to established security firms or the new monitoring facilities.

### Backhaul connectivity

In deciding the bandwidth requirements for communications site security, first decide what level of video resolution is required. Although the highest resolution video requires a correspondingly high level of bandwidth availability, the resolution required to accomplish acceptable site security may in fact be much lower.

If, for instance, the site has backhaul access that will allow access to  
*(Continued on page 47)*

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# Copper Theft: Problem, Testing, Solution

AT&T partnered with security company SNC in an effort to halt the theft of copper from the wireless carrier's cell sites in its North Texas operating area.

by Keith Jentoft

In 2006, AT&T's network engineer for the company's North Texas market reported fewer than 50 incidents involving the theft of copper bus bars, grounding wires or cable from cell sites. Within a year, copper theft incidents rose to more than 150, a nearly 200 percent increase.

Although the cost of the copper stolen in a typical incident was valued only in terms of hundreds of dollars, the repair cost was increasing dramatically along with the threat involving loss of service. Replacing or repairing damage from copper theft at AT&T's North Texas area cell sites grew from less than \$70,000 in 2006 to more than \$210,000 in 2007, an increase of more than 200 percent.

Because many of the affected sites are remote, no suspects were identified

in any of the thefts, so no related arrests were made by law enforcement agencies. Because remote sites receive relatively infrequent visits by technicians, key grounding connections could be missing for some time, exposing the sites to possible extensive damage should lightning strike in the interim. That would raise the stakes for base transmitter station repair and replacement to the level of catastrophe.

Taking the initiative to find ways to detect intruders and notify authorities as quickly as possible, AT&T Central Region corporate security looked for partners to help the company stop the growing epidemic of thefts. As a systems integrator, security specialist and monitoring service operator, SNC Security offered AT&T a wireless video security system, Videofied, made by

RSI Video Technologies and originally intended for residential indoor use.

In meetings with AT&T's North Texas market network leadership team, SNC demonstrated the wireless video security system's wireless, battery-operated capability to deliver to the security company's monitoring station a 10-second video of a site intrusion immediately when a break-in occurs. The specially developed equipment uses a battery-powered sensor and camera that operate for four years on three AA batteries.

Thanks to the battery power and wireless interconnection, the wireless system may be easily installed anywhere at the site to provide detection and immediate response to criminal activity, increasing the probability that theft suspects might be apprehended. Operationally, the system provided

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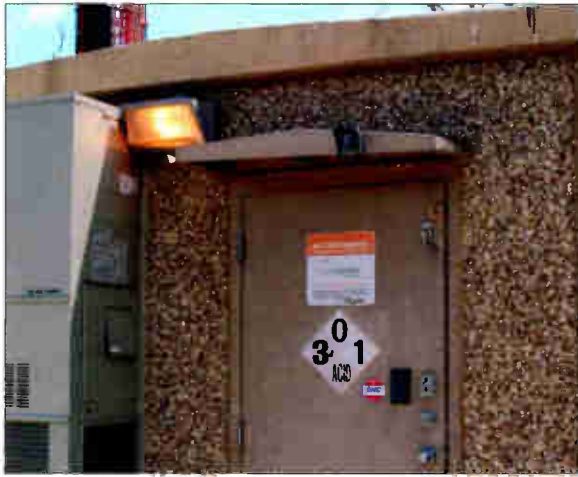
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This view of a shelter shows the camera above the door and a proximity card reader on the door above the doorknob. The camera also views any approach to the air conditioner. Some thieves have removed air conditioners to gain entry to the building and have stolen all or part of the air conditioners for the metal they contain.

**Development and testing**

The wireless video security system had not initially been designed for outdoor applications, so additional development work was required to create an outdoor sensor and camera combination and an outdoor arming and disarming station and to finish a GRPS cell-based reporting capability to send alerts to the monitoring station. SNC also had to refine its internal monitoring processes to optimize interaction with AT&T's corporate security and with law enforcement agencies for a seamless solution.

The team decided to field five systems immediately to obtain real-life data on the solution's basic operation and viability. SNC installed the five systems at Dallas-area sites selected by the customer. These five sites had a

history of multiple copper theft incidents. The initial deployment lasted five months, and the results helped to define the final solution.

To begin, SNC mounted the standard indoor Videofied camera and sensor combination in an irrigation valve box and put the entire assembly on a movable arm to create a "bucket cam" — the first outdoor Videofied camera. These early camera and sensor combinations became the forerunners of a new line of ruggedized outdoor devices.

To save time, SNC used a wired third-party proximity card reader to arm and disarm the initial five systems. By the second phase of testing, Videofied developed its own wireless proximity card arming station to simplify installation and operation.

Communication connectivity from the towers to the central station initially was provided by standard landlines installed by SNC while the wireless video security system was being tested

network engineers real-time knowledge of grounding conditions for faster repairs to protect against outages.

viability. SNC installed the five systems at Dallas-area sites selected by the customer. These five sites had a



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for compatibility with AT&T's static IP SIM cards. Once the equipment was approved for use on the AT&T network, the landlines were disconnected, and the five original beta test sites were converted to 100 percent wireless applications during the second quarter of 2007.

During the initial testing phase, SNC worked closely with the network team to optimize monitoring processes. As part of this system, they implemented dynamic alerting that incorporated the weekly personnel schedules of the network field technicians. They also implemented daily updates of the systems in the field as to whom was authorized to arm and disarm the system, both employees and contractors. Even today,

the service template SNC created is continually reviewed for possible improvements and faster law enforcement response. For instance, SNC has implemented pushing the videos of the intrusions to multiple people within the company as well as directly to law enforcement agencies for certain sites. The objective is to apprehend as many suspected thieves as possible.

The second phase of testing began in the third quarter of 2007. In October 2007, SNC equipped 18 additional sites with



This camera gives a straight view from the cable tray looking outward, revealing any possible intruders to viewers at the security monitoring center. Metal thieves might be attracted by the copper in the wires shown here covered with green insulation.



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the latest generation of the new wireless video security systems and upgraded the initial five sites. The goal was to broaden the test sample and saturate an area to see what would actually happen with the copper theft. The tests continued throughout the Dallas area through the first quarter of 2008.

**Results?**

The short answer is, "It works." The systems have been in place for over a year and have proven they deliver real protection against copper theft at AT&T cell towers. The production version of the new wireless video security outdoor system is performing beyond expectations. The new generation of camera and sensor combination operates at temperatures from -20 degrees F to +140 degrees F and is entirely waterproof. It also has enhanced night vision with twice the illumination of the initial unit.

In addition, SNC's monitoring and installation processes deliver results that can be measured and thus help to support a purchase decision based on the return on investment. Affordable hardware, simple and consistent installations and proven processes are all part of the solution. SNC is being noticed beyond AT&T as other carriers and tower owners begin to follow AT&T's lead and deal with copper theft in a serious way. The following data compiled in the test speaks for itself.

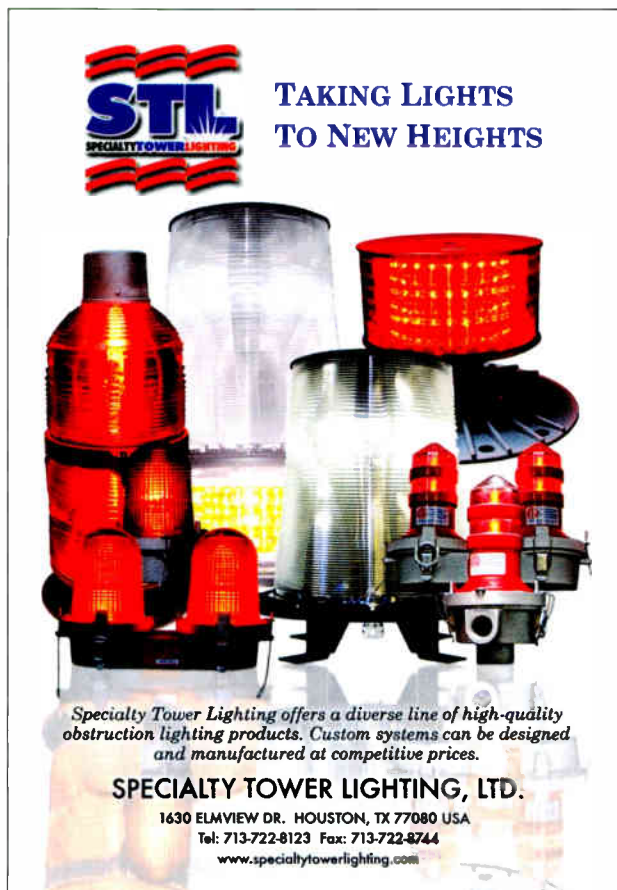
**Compelling statistics**

The financial effect of the 25 wireless video security system test sites has been compelling:

- The cell tower sites installed represented reported losses of more than \$100,000 during for 2006 and 2007.
- No thefts have been reported at 18 of the cell site locations since installation of the alarm system. Criminal activity at those sites stopped.

- Criminal activity was detected at five cell sites following installation of the video alarm system
- The activity was quickly noted and police were dispatched in all five incidents.
- Five individuals were arrested in connection with four of the incidents.
- One suspect was sentenced to 3 years in prison.
- Less than \$5,000 was spent for replacement or repair at all the sites combined where the wireless video security system was installed.

This is only half of the story. Even more dramatic is the continued copper theft plaguing other tenants at sites used jointly by AT&T and other carriers. While AT&T solved their problems the other carriers continued to be hit by copper thieves, *even at the same sites*. After installation of SNC's wireless video security system, AT&T sustained no losses as copper thieves avoided the

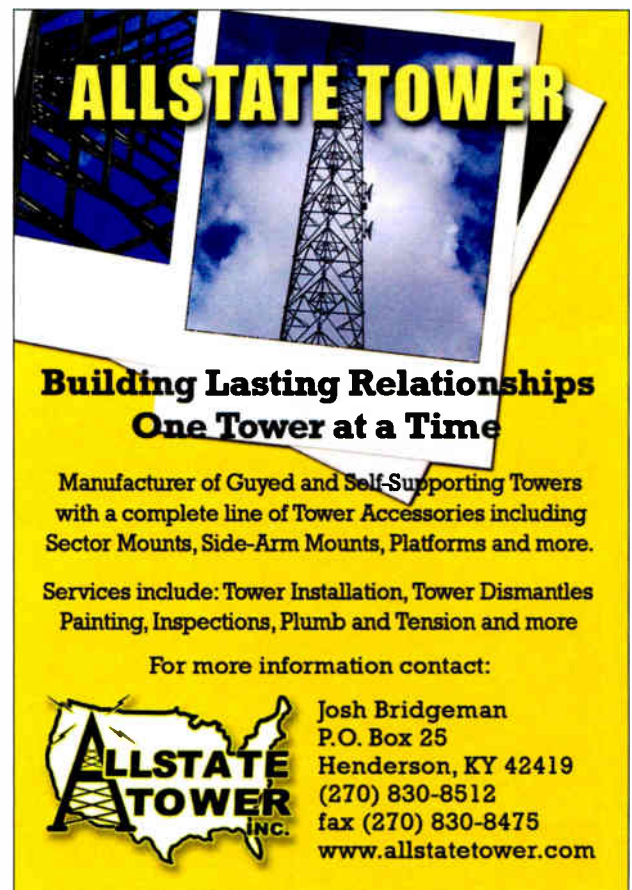


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AT&T area of the sites and targeted the other carriers. According to police reports filed for five collocated sites in the test group, other carriers sharing the sites with AT&T were hit multiple times by copper thieves. Although the cost to repair for the other carriers is unavailable, police reports confirm the following incidents in which the other carriers' copper was stolen and no arrests were made:

- Site 1: three incidents on 2/15/08, 3/11/08 and 4/4/08
- Site 2: two incidents on 7/18/07 and 2/19/08
- Site 3: one incident on 4/24/08
- Site 4: four incidents on 12/27/07, 1/19/08, 2/27/08 and 4/11/08

SNC is now promoting this concept to tower owners and carriers across the country. The company has an established national installation and service organization capable of implementing national

rollouts as they have done with many retail chains. Mike Korbuly, vice president of SNC, said, "We believe that this affordable solution is a viable answer to copper theft for tower owners. Our efforts over the past 14 months to prove the system works have delivered what we promised. This is the message that I

spoke about at a recent state wireless association meeting in New Orleans."

Jentoft is president of RSI Video Technologies in White Bear Lake, MN. His email address is [kjentoft@videofied.com](mailto:kjentoft@videofied.com). Videos of actual apprehensions can be viewed at [www.coppertheft.info](http://www.coppertheft.info).

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(Continued from page 31)

heard horror stories of communication towers that were built close to existing AM towers without proper detuning. This is a disaster waiting to happen. The onus is on the owner of the tower to protect the pattern of a nearby AM broadcaster and this is very hard to do properly unless detuning was considered in the design of the tower.

At Marlin we wanted to do it right. This included breaking up the guy wired on the new tower with insulators, a very expensive proposition but absolutely necessary since it is nearly impossible to detune a guyed tower without such insulators. We also have a two-section detuning skirt that we had designed by Nott to handle both nearby stations. We require our users to bond their transmission lines to the tower at 20-foot intervals. This bonding is very important, as are pre- and post-construction measurements

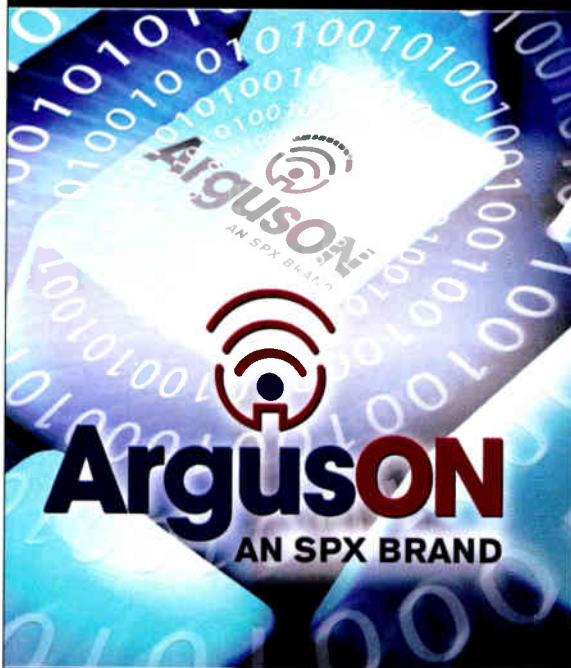
		
<p><b>Boyd E. Arnold</b>, vice president and general manager, authorized the radio spots advertising the antenna site's availability.</p>	<p><b>John Ramsey</b>, chief technical officer, wrote the content for the Marlin Tower website and markets the antenna site.</p>	<p><b>Chris Larsen</b>, IT manager, prepared the website. The IT department carries multiple responsibilities, including Beethoven.com.</p>

on both stations when appropriate, and we monitor the detuning process through the use of a shielded loop antenna mounted halfway up the tower between the upper and lower skirt. This works very well.

*AGL: Does Marlin own other towers?*

**Ramsey:** No, these are the only two. We are looking for others. Marlin is interested acquiring additional sites if the proper opportunity appears. **agl**

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# 4G Backhaul Options: Fiber and Microwave

Microwave enables speed to market and early revenue generation. Fiber-optic infrastructure guarantees the best in performance, scalability, reliability, and network longevity.

by Barton Filipiak

We have an insatiable appetite for data, whether provided by a radio or television broadcaster, an Internet service provider, or more recently, our cellular telephone carrier. It is difficult to even call it a telephone anymore. Mobile handsets have become so much more than their simplistic wireline relative allowing us to do infinitely more than just talk. We can send and receive email, trade stocks, check the weather and even download music and videos from the internet. Well, at least those of us fortunate enough to live and work near 3G cellular systems can do those things. Only about 50 percent of the deployed cellular network is 3G. And while yes, we *can* do those things, throughput is often slow and the quality of service at times may be far from ideal.

## Speed perspective

To put network speed into perspective, most broadband Internet connections for your home are in the 1 Mb/s to 5 Mb/s range while most 3G smartphones can only connect to data services at a speed of about 384 kbps. This is signifi-

## What will tomorrow's devices and applications require? More bandwidth than today, guaranteed

cantly better than dial-up service, but it still leaves much to be desired when streaming video. Wireless carriers recognize the disparity between our hunger for data and what their networks can

provide. In fact, they are having a hard time keeping up. Fourth-generation cellular infrastructure is scheduled for arrival as early as 2010, and some carriers are installing that infrastructure right now. Wait a minute, are some carriers already starting to deploy 4G infrastructure while some customers are still waiting for 3G service? Absolutely.

Knowing that 384 kb/s is slow, but still better than nothing, what is the ultimate limit when wireless bandwidth supply begins to meet consumer demand? 1 Mb/s? 5 Mb/s? 10 Mb/s? Well, no one can answer that question. I remember when I was told my 80 Mb hard drive would be more than I could ever use in my life. That prediction was proven wrong in less than a year.

## BlackBerry? — CrackBerry

Much like the Internet in its infancy, we are just scratching the surface of mobile data demand. And it appears this addiction rivals narcotics; there is a reason BlackBerry wireless devices are called "CrackBerries." A report published last year cited that in 2006, YouTube's Internet traffic consumed more bandwidth than the entire Internet did in 2000. And now, we can access it on mobile devices over the cellular

infrastructure. The only other guarantee is that wireless carriers cannot continue to bond T-1s to infinity in an economical way. In fact T-1 bonding has pretty much reached its fiscally responsible

limit. It is time for an overhaul, not just another upgrade.

Popular proposed 4G technologies such as LTE and WiMAX tout client-side connections with a downlink as fast as 100 Mb/s while the mobile device is in motion, and as fast as 1 Gb/s while stationary. The amount of backhaul required to support simultaneous users at those connection speeds is overwhelming. Sure, not every user will require 100 Mb/s while zooming down the road and certainly not 1Gb/s while sitting on a park bench, using a computer during the system's "busy hour." But then again, we thought 3G would be fine when deployment began in 2001. Presently, as few as seven users simultaneously streaming video to their mobile devices can shut down a cell. The real challenge for carriers is to build their networks as economically as possible while also guaranteeing the ability of that network to scale with their customer's needs.

## Expenditures to double by 2012

Cellular backhaul is one of the largest expenses a wireless carrier faces. An ABI Research report indicates backhaul capital expenditures will nearly double, from \$14 billion today to more than \$23 billion by 2012. That is nothing to blink at. So how will that money be spent? Several technologies exist to improve carrier backhaul, but only two physical transport mediums have demonstrated enough resilience to provide 99.999





percent reliability and sufficient capacity to support 4G networks: *fiber-optic cable* and *microwave antenna links*.

Microwave cellular backhaul has been popular outside of America for quite some time, and it has been gaining popularity here primarily for its deployment ease. It is also the most resilient wireless medium and supports data rates as high as 300 Mb/s within the bands used for cellular backhaul. The real beauty of microwave transmission is the speed with which it can be deployed. Other than the electronics, an operator with appropriate licensed spectrum only needs to purchase, mount and point the antennas, then turn the link on. Maybe that is oversimplified, but you

get the point. The link is then a physical path capable of transferring data by myriad protocols, all translated by microwave equipment collocated with base station equipment. Microwave is not without its drawbacks, though.

As mentioned previously, licensed spectrum is required, and in some areas it may be difficult to obtain. Indeed, as cell sizes continue to shrink and users require more bandwidth, spectral congestion will become an issue in populated areas: it already is an issue in our nation's capital. Additional capacity can be obtained by increasing the number of microwave links between points, but this means additional transmission equipment must be

purchased. Using microwave for backhaul also means additional tower space is required for dish placement, which customarily includes additional lease payments to tower operators. Furthermore, tower operators also must now be concerned with such factors as wind loading and available space.

### **Backhaul 'gold standard'**

Fiber-optic cable is widely recognized as the gold standard in cellular backhaul, but it is often not the carrier's first option. The transmission capability of single-mode optical fiber is only limited by the equipment connected to the ends: in fact today's communications

networks have yet to reach a bandwidth limit attributable to the fiber itself, making it the most future-proof transmission medium on the planet. No one can say what the future brings, but for now, optical fiber is at the top of the food chain. Fiber is also impervious to electromagnetic interference, so lightning strikes and other induced electromagnetic fields are a non issue. Market forces have made fiber prices extremely attractive, and operators often take advantage of this by oversupplying their network with many more fibers than necessary for a given design, providing cheap insurance for future growth. Coupled with advances in wave-division multiplexing, allowing each fiber to carry multiple data streams, fiber is one of the most easily scaled transport mediums on the planet.

So if fiber is so great, why isn't it the first option for wireless backhaul? Backhaul has traditionally been a leased service provided by the incumbent local

exchange carrier. Without competition, the incumbent carrier is unlikely to spend money replacing its existing copper network. Even when the replacement decision is executed, fiber is not quite as easily installed as a microwave shot. No spectrum acquisition is required, but a cable route must be engineered, equipment purchased and teams deployed to install it. In green-field installations, obtaining permits and approvals can be time consuming and expensive. In most brownfield operations, an operator likely already controls at least some portion of the right of way. Permitting is mitigated to some extent, but make-ready work must still be performed before cable can be installed.

#### Reduced installation time

Fortunately, help is on the way for fiber connectivity to cell sites. Non-traditional backhaul providers with existing robust fiber-based networks are

installing fiber to towers and snatching backhaul business from incumbents. Additionally, recent advances in fiber-optic cable and connectivity designs have reduced installation time by as much as 80 percent, resulting in lower overall cable installation expense.

Choosing one or the other is a decision only wireless carriers and backhaul providers can determine for themselves based on time to market and how they wish to spread their capital budgets. Certainly, there is room for both choices in the coming years as 4G networks are deployed. Microwave enables speed to market and early revenue generation, but fiber-optic infrastructure guarantees the best in performance, scalability, reliability, and network longevity. Regardless of the outcome, backhaul overhaul is about to kick into high gear, and things are becoming interesting. **agl**

Filipiak is market development manager for Wireless at Corning Cable Systems.



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(Continued from page 35)

4 Mbs of throughput, full streaming video at 30 frames per second may be achieved. Although this is obviously desirable, requirements for viable video security may run as low as 1 frame per second. This frame rate is achievable using cellular telephone system modems, and these devices can be placed at any site with cellular coverage. Leveraging cell modems or other communication facilities already in place at most tower sites allows the use of both analytics on the edge and remote operation of cameras and associated alarms.

**Sample solutions**

Video analytic solutions can be tiered to site owner's particular requirements. Here are some examples.

1. A single, fixed, day/night camera equipped with an infrared emitter mounted on the tower at a height sufficient to view approach roads and

operating in conjunction with a back-haul device such as cable or a cell modem allows personnel monitoring the site to verify intrusions and respond appropriately. However, due to the height above ground at which such a camera would normally be mounted, details of the perpetrators and their vehicle are not likely to be clear. (See Photo 2.)

2. Floodlights can be installed to illuminate the area of interest when intruders come. (See photo 3.)

3. Adding a speaker system allows security personnel to warn intruders that they have been observed and that law enforcement agencies are on the way to the site.

4. Using a PTZ camera, mounted either on a tower leg or on the roof of the shelter with non-penetrating roof mounts allows closer observation of the intruders and their vehicle. A recording of the observation could provide important prosecutorial evidence. (See Photos 4, 5, 6 and 7.)

**Conclusion**

Due to the innovations in video security such as analytics on the edge and increased competition among video surveillance vendors, it is possible to provide efficient, reliable, and cost-effective security to even the most remote locations. By limiting the bandwidth needs through the use of video analytics techniques and by using lights and audio to let the intruders know they have been detected it is not only possible, but cost effective, to protect every site. Chosen and installed properly, a remote site security package can cause "snatch-and-go" thieves to leave before they loot the site or make it possible for the site owner to provide authorities with evidence necessary to capture and convict the bad guys. **agl**

Weger is executive vice president for the Integrated Solutions Group at Lockard & White in Houston. His email address is [gweger@lockardandwhite.com](mailto:gweger@lockardandwhite.com).

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**Alarm System Equipment**

The RMS 703 from **Remote Monitoring Services** is a cellular-based monitoring system with power fail reporting. Used for “on/off” condition reporting, the RMS 703 monitors site security, lighting, generator fuel, grid power fail and HVAC failure. It also provides remote control of ventilators, water pumps and generators. The RMS 703 will work either as a stand-alone system or in concert with a third-party monitoring service.

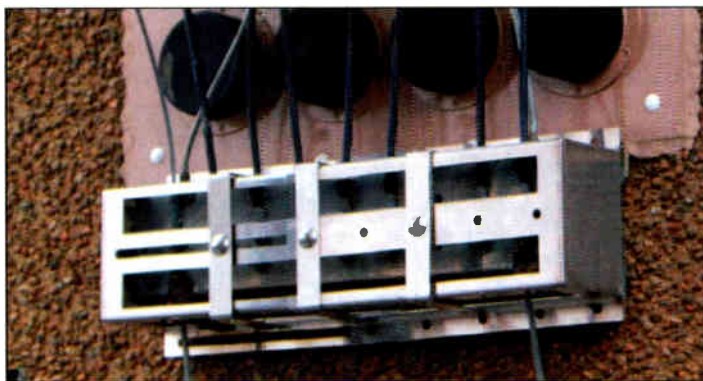
[www.towermon.net](http://www.towermon.net)



**Cell Site Perimeter Security**

The SmarterFence processor is a fiber-optic perimeter system from **Smarter Security Systems** that monitors security fences and sensor cables. A digital signal processor detects a disturbance of the fiber-optic sensor cable, using a micro-controller to analyze when a disturbance exceeds pre-set conditions and generates an alarm. Automatic environmental compensation algorithms ensure the highest probability of detection while ensuring a minimum of nuisance alarms.

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



**Busbar Security**

The Universal Bus Guard by **Mi-Jack Systems & Technology** deters busbar theft. By placing the Universal Bus Guard encasement on top of the busbar, unwanted intruders are turned away while cell tower personnel are still able to access the busbar to provide necessary maintenance. The bus guard adjusts to fit different size busbars and it features easy installation.

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



**Video Security**

The Videofied security system from **RSI Video Technologies** alerts police when a cell site has an intruder. Through video-verified alarms, the system provides faster police response, as well as a video record of what caused the alarm. Up to 24 cameras can be integrated into a single system. The alarm system features an integrated camera/motion sensor, universal door/window contacts, keypad, keyfob, interior sirens, exterior siren/strobe and control panels.

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

**Cell Tower Surveillance Kit**

The Speco remote management surveillance kit from **Tessco Services** is equipped to deter theft and vandalism at cell tower sites. Remote management software allows for dynamically programmable recording priorities, motion detection, event alarms and scheduling. The kit also features internal infrared LEDs with anti-reflective technology, computer server for use with dynamic IP addresses, 20-mile infrared range, pre-alarm and post-alarm recording, and 420-line high resolution video. Additionally, the Sony Super-HAD CCD automatic camera is IP67 rated for extreme weather conditions and IR remote control.

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





### Monitoring System

The DM-32 from **Hark Systems** is a monitoring system for sensing various events and alarms at tower sites. The DM-32 can operate in standalone mode or in concert with a Network Operations Center (NOC). With 32 inputs and eight contact closure outputs, the DM-32 will monitor and activate equipment at the site either automatically or remotely through a menu interface.

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

### Fixed Video Surveillance Service

**TowerTech** provides live security surveillance of cell tower sites in all areas in the country. The company monitors sites 24 hours daily and notifies local authorities when an unauthorized entry happens, while capturing video of the intruder for prosecution evidence from the pan, tilt and zoom camera system, which works remotely over the cellular network.

[www.towertech.us](http://www.towertech.us)

### Site Monitoring Service

**ArgusOn** uses machine-to-machine technology to provide automated monitoring services to remote sites through its network operating center. ArgusOn allows users to remotely access, monitor and manage security, equipment, tower lighting, power and generator backup in communication sites from any location. All calls are recorded and all sites are audited daily. In addition to automated systems, a staffed call center handles customer issues or escalation procedures 24 hours a day.

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

### Site Locks

CyberLock from **Videx** is an electronic cylinder that converts existing mechanical locks into an access control system. With electronic lock cylinders, programmable CyberKeys and CyberAudit software, tower owners can track and control access to every lock in a site.

CyberLock cylinders are electronic versions of standard mechanical lock cores. Each cylinder has a unique ID and is programmed with access codes that identify it as belonging to a system.

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

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