

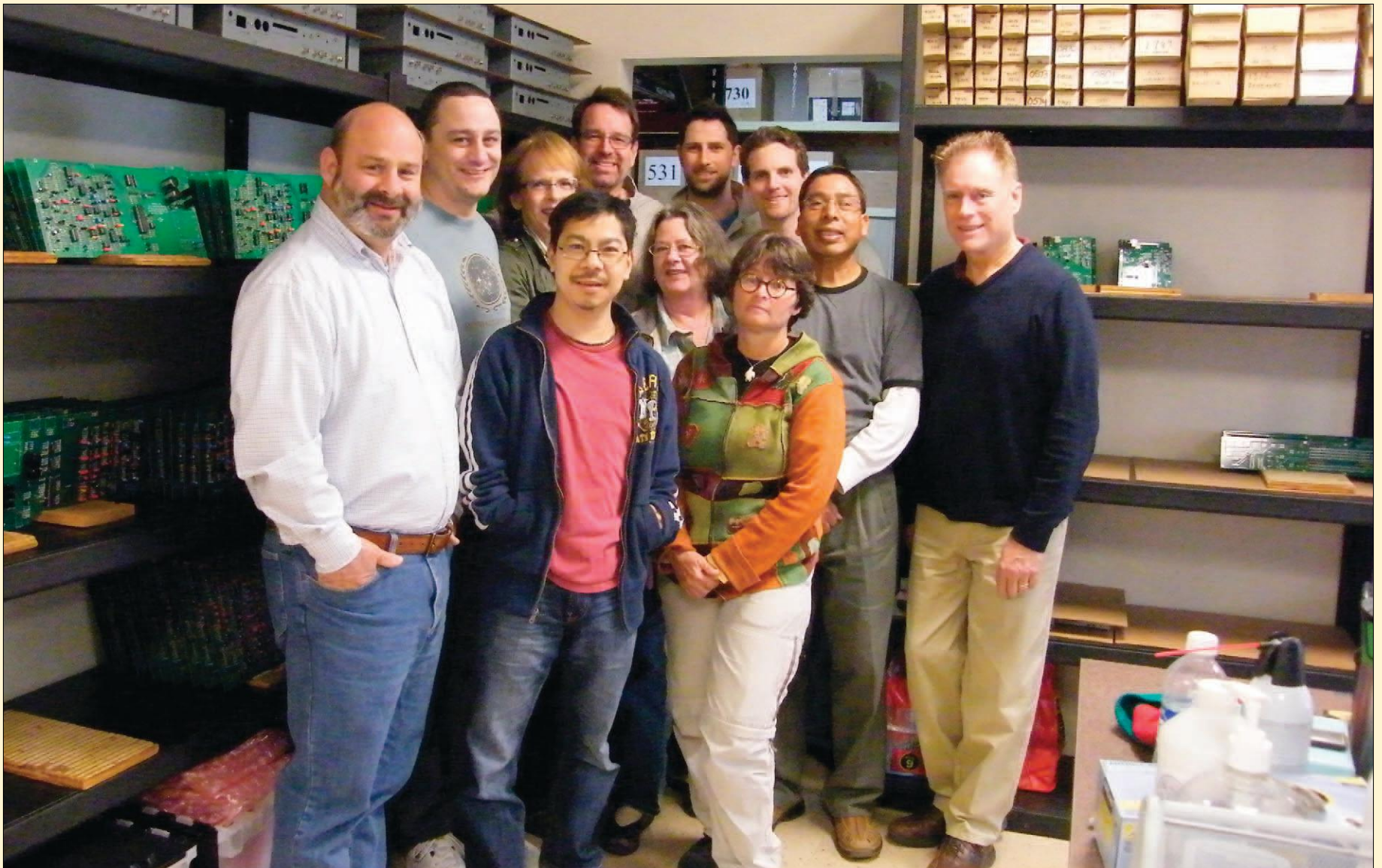
Radio Guide

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March-April 2011 – Vol. 19, No. 2

Inovonics – A Rich History, A Bright Future



Inside Radio Guide:

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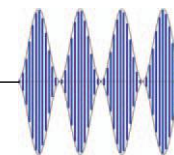
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by Ernie Belanger – Editor



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Put Your Head in the Clouds

In this, the NAB issue of *Radio Guide*, we’re encouraging you to stick your head in the clouds – well, sort of. Chris Tarr explores how Cloud Technology may be beneficial to you, and possibly save your station money and a lot of headaches – look at “The Cloud” in *Operations Guide*.

Jeff Johnson will help you test your skills at protecting your station assets – literally – in *Safety and Security*. And if you want to know what you can, and can’t say to the FCC, check out Peter Gutmann’s *FCC Focus* column to find out.

We also have tales of two transmitter sites. In this issue, from the West Coast, Mike Callaghan discusses transmitter plant planning in *Transmitter Site*, while on the East Coast, Steve Callahan trudges through a frigid New England morning, trying to solve an AM station’s mystery problem, in *Xtreme Engineering*.

In *Studio Site*, George Zahn encourages us to develop more production capacity, while Roger Paskvan is back with his second installment on non-traditional revenue, in *Small Market Guide*. And I’ll be talking to you about your stations’ readiness, in *Disaster Preparedness*.

Revised Radio Guide Web Site

If you haven’t had the opportunity to check out our web site recently, you may want to do so. We’ve revised the site so that the *Radio Guide* digital publication automatically opens for you. You won’t have to spend time clicking through a home page see it.

– Ernie Belanger, Editor

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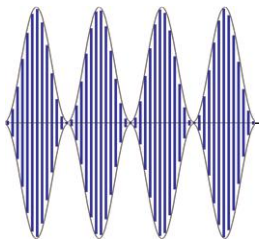
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Inovonics – A Rich History, A Bright Future

Inovonics is one of those companies that has been around, seemingly forever, yet many in our industry are still discovering the firm, its products and its people.

The company was founded nearly 40 years ago by Jim Wood and Mark Drake, two seat-of-the-pants engineers from the music business. Jim, never a whiz at math, elected to pursue a laid-back, liberal arts course of study in college, majoring in Theater Arts. But his longtime interest lay with the technical side of the entertainment industry, which is where he channeled his efforts – especially after his acting professor advised him to rethink a performance-oriented career path.

Mark, who was Jim's co-founding partner and an ex-Ampex employee, left Inovonics to pursue other interests after the first few years.

A Modest Start

Inovonics' first product was a drop-in, replacement tape recorder electronics assembly for the Ampex 350 Series reel-to-reel tape recorders and similar machines – the workhorses in recording and broadcast studios at the time. Magnetic recording remained the primary production and editing means for audio through the 1980's and Inovonics delivered several thousand channels of their recording electronics to radio stations and studios.

In addition to this "plug and play" replacement for old vacuum tube recorders, the Inovonics line expanded to include high-speed tape duplicating equipment, and retrofit amplifiers for the magnetic film recorders used in motion pictures prior to the "Pro Tools" revolution.

The Decision to Focus on Broadcasting

During their first few years of business, the two entrepreneurs quickly discovered that the broadcast industry was much better at paying their bills than the myriad of fly-by-night recording studios that cranked out the hits (or not!) during the early 1970's. Consequently, they increasingly directed their sales effort to broadcasters, where Inovonics has concentrated the majority of its product development and marketing ever since.

Even during the period that recording gear absorbed the company's energy and manufacturing resources, Inovonics was seeking other product avenues to diversify their catalog.

Jim Wood's own need for some form of audio limiter, to control peak excursions on his home-built disc recording lathe, prompted development of Inovonics' first dynamics processor: the Model 201 Average and Peak-Responding Limiter. The 201 found an enthusiastic following among recording studios, but it was of limited use in the broadcast environment.

All-news KFWB, in Los Angeles, CA had a slogan back in the 1970's: "You give us twenty-two minutes and we'll give you the world." It was a chance meeting with the engineers at KFWB that directed Inovonics down the path of audio processing for radio.

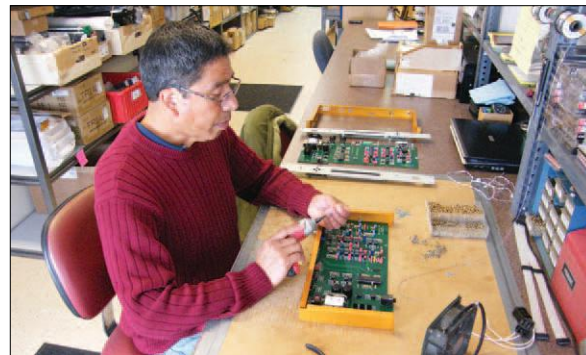
On that fateful day the KFWB slogan was more like: "You give us twenty-two minutes and we'll teach you a little bit about broadcast audio processing."

Inovonics First Broadcast Processor

The first air chain processor from Inovonics was the Model 220, and was dubbed the Audio Level Optimizer. It was a compressor/limiter with asymmetrical modulation capability for AM, and an independent high-frequency limiter for FM.

The HF limiter borrowed technology from a patented design that Jim had developed for his previous employer, GRT Corp., where it was used in preparing masters for major-label cassette tape releases.

The only readily available HF limiter in the late 1960's was the CBS Volumax and it didn't quite fit the needs of tape recording. The slow-speed Philips cassette, filled with inexpensive tape, exhibited a high-frequency overload characteristic similar to, but somewhat steeper than, the 75 micro-second pre-emphasis curve of FM broadcasting.



Each Inovonics unit is designed and built in house.

The Inovonics 220 was formally introduced at a broadcasters' conference in Canada. The late Emil Torick of CBS Labs was present at that event and gave personal kudos to the concept and design of the product. The 220 achieved moderate success, with a quantity purchase by RKO for use in their proprietary, house-built multiband processor – a six foot rack filled with off-the-shelf products from various manufacturers.

The Product Line Expands

These were the days when Mike Dorrough was having phenomenal success with his 3-band "DAP," or Discriminate Audio Processor. Mike sold these out of the trunk of his car on road trips throughout the U.S. The secret of Mike's triumph with the DAP hinged on his profound knowledge of broadcast practices and technology.

He'd roll into a mom and pop station and do a quick clean-up of the entire plant, demonstrating the DAP in the process, which shared the credit for the improvement in audio quality.

One of the broadcast equipment distributors representing Mike's DAP, called Inovonics in the late 1970's, asking if there was an Inovonics equivalent. He said that Mike just couldn't manufacture DAPs fast enough. "Well," thought Inovonics management, "We can make one of those."

That phone call spawned the Inovonics 230 "MAP," or Multiband Audio Processor. It was an 8-band device, again with peak processing that could be switched for either AM or FM service.

Oops!

The prototype was sent home with one of the production techs who professed to have a critical ear, the idea being that final component values could be "nursed-in" during this final product evaluation. In retrospect, it appeared doubtful that the fellow even listened to it, but the design went into production within a week anyway.

Bob Orban once used the term, "egregious distortion," though thankfully for Inovonics, not in connection with their products. Nonetheless, that term accurately describes the sonic performance of the 230. Not only was THD on the order of several percent, even at low levels, but the eight filter banks committed severe "crimes against nature" at their crossover frequencies.

The 230 became a semi-hit in the Central and South American markets, but did not garner significant sales in the U.S. It did prompt a far more thoughtful redesign, however, emerging as the 231 "MAP-II," which achieved respected status among AM broadcasters. Even 30 years after its introduction, the occasional 231 still returns to the factory for a loving overhaul. And because it utilizes generic, off the shelf parts, it can be kept running indefinitely. This is a concept inherent throughout the Inovonics product line.

Simplicity Rules

From the beginning, simplicity has been the hallmark of the Inovonics design creed. Of course any design has to be consistent with required features, proper operation and good performance. Simplicity is, nonetheless, a virtue, and one that apparently is appreciated by busy radio engineers – and especially by owners and managers with limited technical experience.

Inovonics routinely couples design simplicity with a choice of component parts that are universally stocked by local and mail-order parts distributors. This has become increasingly difficult with contemporary digital designs, however, as these parts – many of which were developed for the computer industry – may go obsolete within just a few years.

Some Missteps Over the Years

It's not unusual for companies on the cutting edge of technology to commit a few faux pas, and Inovonics is no exception. While most try to forget them, Jim and the crew chuckle about the experiences.

The dubious reputation of being the "champion of lost causes" began with the firm's alliance with National Semiconductor in the development of products for the Magnavox AM-Stereo system. Oh well ...

Another ill-fated technology was "FMX," the coverage extension system developed jointly by CBS Labs and the NAB to extend the contour of FM stereo reception. The system worked, and at least one broadcast group was firmly behind it.

But just as in other chicken-and-egg scenarios, receiver manufacturers waited for wide scale adoption by broadcasters, which never happened.

(Continued on Page 8)



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Cover Story

Inovonics - A Rich History , A Bright Future

- Continued From Page 6 -

One Last Faux Pas

Then there was "Noise-Free Radio" (NFR), a scheme developed by veteran broadcast engineer George Yazell. NFR utilized narrowband FM modulation in parallel with conventional AM to effectively suppress many sources of noise when received on a special AM-band receivers.

George demonstrated his system in the Inovonics booth at a couple of NAB shows, but because the math didn't support the results - rather than the other way around - it was never taken seriously. But it did work - sort of.

Moving Forward

The current Inovonics catalog includes both analog and digital audio processing systems for production and air chain use. But with domestic and overseas manufacturers of these devices, having multiplied over the past 20 years, processing is now only one facet of Inovonics' business.

Expansion into RDS

Inovonics is a leader in RDS and RBDS technology. The European Radio Data System was introduced to the U.S. in the early 1990's. Broadcasting in Europe differs from the U.S. model, as Europe has broadcasting networks, to a large extent using low-power transmitters to cover an entire country. RDS didn't catch in the U.S. on immediately. The notable exception involved some rather esoteric uses: personal paging and GPS error correction.

In Europe one important feature of RDS is to keep a car radio tuned to the best signal that carries a networked program, as the listener drives from one area to another.

With the exception of FM translators, some NPR programming, and perhaps a couple of Christian broadcast networks, most radio in the US reflects an independent and "station-unique" program concept.

RDS works with this model as well - a listener selects a program type and the RDS radio will seek it automatically.

Over the past 10 to 15 years, RDS, which is known as RBDS (Radio Broadcast Data Service) here, has become almost ubiquitous with its scrolling display of artist and title information. RBDS is also used to scroll station IDs and promos, and even allows listeners to "tag" songs for subsequent download and purchase.



A very young Jim at his home radio studio - Circa 1953.

Inovonics was one of the first U.S. manufacturers with an RDS encoder in the mid-1990's, and remains one of the very few firms to offer encoders and decoders that are designed and built entirely in the U.S.

Another area that typifies Inovonics' product diversification is AM and FM modulation monitors and off-air receivers for FM translators. Again, simplicity prevails in these designs, and the products have emerged as no-nonsense and user-friendly, proven for day-in, day-out use.

A Bright Future

From its humble beginnings in the back of an electrical contractor's building, Inovonics has grown to occupy various California venues: first in Campbell and later in Santa Cruz.

The company is now located in the mountain community of Felton, CA, where day-to-day operation is overseen by Ben Barber, COO and Senior Engineer; Ben has been with Inovonics for 23 years. The company's sales and marketing is managed by Lukas Hurwitz, who recently came to Inovonics from Toshiba and Apple retail. Jim Wood does technical writing and continues to contribute to product design from his home lab in Southern California.

The future of radio broadcasting, as most of us know and love it, has become the subject for a good deal of discussion lately, given the broadband explosion and the myriad of possibilities that it suggests. But just as "digital radio" has been slow to displace traditional radio, until high speed Internet is available everywhere, and for free to listeners, radio will remain with us.

Inovonics intends to continue bringing broadcasters the performance and value that has become synonymous with the company's name.

For more information about Inovonics products visit their web site www.inovon.com or call them at: 800-733-0552.

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A Real Head Scratcher – Part 1

For an extreme transmitter site story this month, I didn't have to look any further than a problem that hit me this winter at Rhode Island Public Radio's WRNI-AM in North Providence. I'll lay out the symptoms of the problem for you. Now, in hindsight, it seems very logical.

However, at the time, the problem was very mysterious and very frustrating. Follow along and see if you come up with the cause that finally found.

RF Field Description

WRNI 1290 AM is a four tower, fulltime 10 kW station licensed to North Providence, Rhode Island. It operates with Towers 1, 2 and 3 during the day and Towers 1, 2, and 4 at night.

I totally rebuilt the transmission facility ten years ago. This included two new towers, four new antenna tuning units and new sample, control and transmission lines to all the towers. The array has always been very stable due to careful planning and construction, so you can imagine my surprise when I got a call one cold morning.

This Can't Be Good

When my phone alarm went off at 5:10 a.m., it was a call from the AM transmitter. The remote control said there was no common point current, so I tried to restart the main transmitter with no luck.

The alarm came in at a time when there was not a pattern change scheduled, but a quick check would be to switch to day pattern by remote control and see if something was amiss in the night array.



The coax junction box

I switched to day and the main transmitter would not start, so the problem must be the main transmitter, right? Well, I changed to the auxiliary transmitter and it would not start into either array. Things started looking pretty bleak at this point.

It was time to hit the road, and it took me a half hour to drive to the transmitter. When I got there, the first thing I did was count to see that the four towers were still upright in the field. Admit it, when you get to your site in the middle of the night, when it's gone off the air for no apparent reason, don't you first look for the comforting blink of the tower lights? (Yeah, it's instinct.)

The Mystery Starts to Unfold

I flew into the building and put the main transmitter back on the night antenna array. I hit the "ON" button and the transmitter output was fluctuating widely because of reflected power.

A quick switch to the day array again showed the same reflected power situation. Switching to the auxiliary transmitter showed the same reflected power problem into both the day and night arrays.

Now, there are two common towers, #1 and #2, in the night and day arrays, so I figured "Let's go to NDA on Tower 4 and see if I can get anything on the air."

Imagine my surprise when the same reflected power condition was noted on the NDA tower #4. Things were definitely not looking good at this point.

Fortunately, I have the ability to go NDA from either the #4 or the #1 tower, so I went out into the tower field on the coldest morning of the winter, so far, to change some "J" plugs to get #1 as the NDA tower.

When I got back to the now cold transmitter building, I took a look into the phasor and everything looked good inside of it so I hit the ON button of the main transmitter again. I had the same reflected power problem on the second NDA tower. At this point, several things were bouncing around in my head.



A look at the splices of the emergency cable.

Time to Check All Connections

Each of the towers has almost completely independent day and night components with the exception of contactors and static chokes. Back out into the cold field I went, and I opened each ATU box and checked all the connections on each component – and also checked all the contact fingers on all of the contactors.

The ground straps outside each ATU were untouched and looked good. All of the mica caps looked good with no cracks, and the inductors didn't have any sign of hot spots. I took a wild hunch and floated the static drain choke on Tower #1 with the hope that it, and its three cousins, hadn't all shorted at the same time.

I then tried some RF into NDA Tower #1 but no luck. There was still a lot of VSWR even with the choke floated. Things were turning from bad to worse at this point.

Delivering the Bad News

The sun was coming up and it was time to call the station's general manager and give him the bad news that we wouldn't be on during morning drive. Rhode Island Public Radio has an FM in Southern Rhode Island so we were on the air at least in the southern half of the state. Still, that was no comfort when presented with an AM station that had lots of backups and should be on the air.

Where is the Problem?

With different day and night components in each tower, the only common element from the transmitter to the towers was the four, 7/8-inch foam coax transmission lines. I couldn't imagine that I had any problem with the transmission lines because, in an effort to discourage any vandalism, we had run the four lines in a steel conduit out to the center of the array to a junction box, and then fanned out each line in its own conduit to each tower.

After all, what's the chance of having all four transmission lines fail at the same time when they are so heavily protected from the elements?

I had to eliminate the possibility of the transmission lines, so I pulled the J plugs in the phasor to open the transmission lines on that end, and then headed to each tower with my trusty VOM.

When I got to Tower #1, I opened the J plug on the input of the ATU and put the meter on the line from the center conductor to the shield of the coax, fully expecting to see an open circuit. That's exactly what I *didn't* see!

The meter showed that there was a hard short to ground somewhere in the Tower #1 transmission line.

Now What

Well, that explained why the day, night, and NDA on #1 wouldn't work. But why didn't the NDA on Tower #4 work? Trudging through the knee-deep snow out to Tower #4, I opened its J plug and found – you guessed it – another shorted transmission line. I saw a pattern forming! I went to Tower #2 and did the same test there and found a third shorted transmission line. I finally went out to Tower #3 and found my fourth shorted transmission line. It was not a good situation to be in, but things began to look a bit better.

An Emergency Fix

Tower #1, at about 400 feet, is the closest tower to the transmitter building. Since it is capable of operating in NDA mode, I had to get some RF out to it. Unfortunately, I had nothing longer than a 100 foot piece of 7/8-inch coax on hand, but a quick call to my trusty tower crew got them mobilized and they soon showed up at the site with a 200 foot section and another 100 foot piece. We did some field splices using weather proof boxes.

The emergency coax was connected to the input of Tower #1 and was then tied to the existing conduit in the field and the splice boxes were also attached to the conduit. Back in the building, at the output of the phasor, the new emergency coax was substituted for the Tower #1 shorted coax.

I stepped up to the main transmitter, said a little prayer, and hit the ON button. Up came the power to the NDA level of 2,500 watts and there was no VSWR! Within seconds my general manager called to confirm that we were back on the air.

What would you have done if you were in my spot? Can you guess what could have caused the problem based on what I've told you up to this point? In my next Xtreme Transmitter Site article, I'll reveal the cause of the problem that was so baffling that frigid New England morning.

Steve Callahan, CBRE,AMD is the Director of Engineering for Rhode Island Public Radio. His email is: scallahan@wrni.org

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Transmitter Site

Transmitter Plant Planning – Part 1

By Mike Callaghan

Transmitter plants outlast studios typically three to one, yet we spend a lot more time planning the studios for convenience and comfort. But, a broken transmitter plant can hold us captive just as long as a studio can – often with substantially more stress.

It's a rare luxury to have lots of space when you build a transmitter plant, but making everything fit properly and easy to work on is a major challenge. Every moment you spend in careful planning will come back to reward you many times over.

Plan Everything

Draw everything and CAD everything. Get a good CAD program and learn how to use it. While all CAD programs have a learning curve, if you find one that's easy to use, you'll spend more time designing and less time straining to make the program work.

List everything and review everything – and save everything. You need numbers, distances, quantities, voltages, amperage, heights, widths, and general costs before you order anything. Try “what-if's” for everything.

Fit things in different ways. Allow plenty of work space around every item that you can't move. Plan what goes on the walls, on the floor, and on the ceiling. Envision what door your gear enters through, and don't put anything in front of a door.

Plan the transmission line routing from the beginning. Remember to route a line to the dummy load. Double-check distances by measuring to both walls from a point, adding the measurements together, and checking the sum to make sure the room hasn't “grown!”

Look at the drawings to see what it will take to move anything out and something else in. What will you do if you need to change to a larger transmitter, add HD or a larger HD transmitter, or add more racks?

Create a Good Working Environment

Install plenty of light fixtures. You cannot have too much light in a transmitter plant. Now's the time to make sure you'll be able to tell a tan wire from a grey one, when standing deep inside an equipment rack.

Put in some sort of workbench with plenty of AC receptacles. Use a master switch to turn them all off at once so you don't forget to turn off that soldering iron.

You need a to hear the station from inside a rack so use speakers and an amplifier loud enough to hear, even above the fan noise – you need to know if you cut off the station when you cut off a piece of wire.

Put the AC disconnects near the back of the transmitters – then you won't be tempted to skip using them.

No Need for Walls

Don't spend the time and expense to build walls around the transmitters. New transmitters are a lot quieter than they used to be, and walling them in means going through a door to get from the front to the back. It slows you down, and it keeps you from being able to see the entire transmitter at once. This also means you can keep the transmission lines from going through walls. It's nice to be able to see a whole length of line at once.

In the layout, position the control rack so you can see the meters on the transmitters from the front of the control rack. It's important to know what a transmitter is doing while switching patterns or antennas.

Coax Runs

Avoid any solid coax lines longer than 20 feet. This is the length they come in, and if the runs are shorter than this, you won't need splices. No splices means the lines can support themselves using just the ends, and this avoids hanging them from the ceiling. It's neater, cleaner, and much easier to work with in a hurry.

When hanging the lines, a laser level is imperative. Install the end fitting on one end of the line, and place the level on top of it facing the destination. Use the level to get the line level, and then take the destination fitting and hold it above the destination port so the laser beam just touches it. Then measure the space between the fitting and the equipment – that is the length you'll want for the vertical line section.

Labels and Photos

Throughout the build, and long thereafter, a good label maker will be your best friend. Label everything. Label the license number and frequency on the STL receivers.



Label the circuit number on the telco equipment. Label power outlets with the breaker number that feeds them. Label the Main and Aux processors. Use the flexible labels and Brother P-Touch software that prints cable labels to mark the cables. The labels on both ends of a cable should be the same, showing the signal it carries and the cable number if there is one.

If you get one of the label makers that connects to a computer, you can make the labels any size you want. This helps when you label the buttons on a switcher, inputs on a panel, or anything that may have an odd length.

Get a good digital camera, and document where all the cables go on the rear of the equipment.

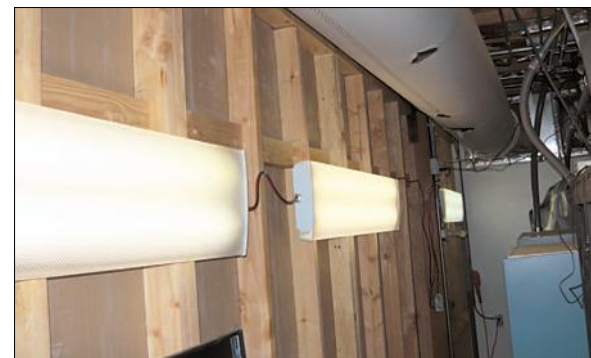
A picture really is worth a thousand words when you have to return equipment to a rack with a huge number of connections.

Light Locations

Don't mount lights directly above equipment. They should go behind or in front instead.

If the backs of the transmitters or racks will face a wall, surface-mount fluorescent fixtures against the wall,

about 7 feet up, with the long edge parallel to the floor. These give an incredible amount of work light, and are well worth the effort. Also, the high mounting angle will avoid shadows in the work area.



The better you can see, the safer you are.

Never mount equipment up against a wall, even if the manufacturer says you can. The manufacturer won't be there on a stormy night, when you need to get to a part you've blocked off.

Leave room to haul anything in and out of the door. Avoid putting heavy equipment where it blocks the doorway to other equipment. Determine the size of, and allow access to, heavy metal components.

Develop a Grounding Plan

Plan the grounds just as carefully as you plan the AC wiring. These days, all transmitters need absolute grounds, and the grounds must have integrity.

The three foot copper ground rod from the hardware store just won't make it. For stand-alone FM's on mountain tops, budget a chemical ground. The AM noise figure and rock-solid remote control make one worth it. Ground everything with copper straps.

The racks, the dummy load, and especially the transmitters and their power supplies. Many modern transmitters need a good ground reference for the control circuitry to work right. It looks neater to lay the ground straps under carpet or tile than on top of it.

Rack Layout Planning

When you lay out the racks, leave at least one rack space between equipment placements for ventilation. Allow extra space for future additions. You'll probably add twice as much new equipment as you'll ever take out.

Leave room for Rack Mounted UPS's. The future belongs to computers, and they have a boot time just as surely as old equipment needed time for the tubes to warm up. A UPS keeps a 2 second power dip from becoming a 45 second re-boot outage

If you have a computerized control system, plan on installing interlock bypass switches on the rack face. When these systems re-boot, they usually open the interlock relays, and that shuts the transmitters off until the computer is back up. The bypass switch keeps you on the air if you need a restart.

In the final part of “Transmitter Plant Planning” Mike will look at audio layout, RF Planning, Air Conditioning, electrical layout and more.

If you have comments, or if there is an area of transmitter plant planning that you want Mike to discuss in more depth in the final part of this series, let us know. Email us at: editorial@radio-guide.com.

Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: mc@amandfm.com

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Your Production “Soft Spot”

Move Editing for More Productivity

by George Zahn

In my more than 30 years traipsing around radio stations from 50,000 Watt AMs, to some of the smallest public stations in the Midwest, the one thing that I continue to marvel at is the ability for almost every station at which I've served to fill each of its studios at the most inopportune times.

We've All Been There

When the last minute, emergency production order from our top customer comes in, Murphy's Law dictates that just minutes before, each production room in our plant will become “ocupado.”

Today, more than any other time, those studio “No Vacancy” signs can be avoided. If this is something that still happens frequently at your station, you must be congratulated for having the incoming business to fill the production facilities. On the other hand, when is the last time that you examined the resources in each studio?

When I started in radio, the production studio was patrolled by the production director, who could almost always be found recording, blade editing, overdubbing and creating the sound that defined the station.

At some larger facilities, there might have been a separate editing area, but for many on staff, the best time to do any production (if you weren't the “Sheriff” of the production studio, or one of the “Deputies”) was after 5:00 or 6:00 at night.



Sorry, the production room tied up.

Becoming More PC

As technology grew at a logarithmic rate in the last decade and a half, many stations added Mac and PC-based editing software and computers. The problem was, that many stations didn't think outside of the box, or at least outside of the production studio.

Sometimes out of convenience, and sometimes citing the old saying “That's how we've always done it,” the computer and production software were placed right into the production studio.

While many stations have figured it out over time, there are still some who operate this way. At three stations for which I've produced, in the span of the last ten years, I've seen dramatically different systems used by different stations with various needs.

While some digital delivery systems have rudimentary editing (head and tail trimming, and some basic cut and paste), stations keeping all of their Mac or PC-based

heavy editing software in the production room are missing out, and likely creating logistical headaches.

I've worked at a station who kept its one licensed version of Adobe Audition on a computer in its only production room. When I arrived at the station, it didn't take long to convince management to buy a second license. Within a week, I was able to prove to them that we could be far more productive by placing that second copy of the licensed software on an office computer.

At that point, the station added a virtual production studio. I could take elements of what I'd created in the main production studio, load them into my office computer and finish the product at a desk, allowing the production studio to be open for the next producer.

Vocal Support

The production studio is becoming more of an announce booth, a good acoustic environment in which to record the vocal portions of a production. With the advent of the inexpensive, yet high performance software, producers can add the finishing touches – including multi-track production, sweetening, and even some equalization outside of the main production room and in an office.

There are some key considerations, especially for those producers doing frequency-specific production. That would include restoration projects in which heavy equalization is a key component. You cannot do that kind of work on a standard pair of off-the-rack computer speakers. In mixing and equalization it is imperative to have a trustworthy monitor system such as near-field monitor speakers or professional headphones.

The “Awful” Truth

Those cheaper computer speakers can still serve a purpose, though. In early mixing of music in recording studios, many rooms had Auratones, sometimes derogatively called “Awful Tones” by some. They weren't that bad, because even Quincy Jones plugged for the company, and some of those small Auratone speakers did have limited fidelity.

After creating a great mix on the big speakers, the stereo signal was often combined to mono and pumped mercilessly through the tiny Auratone. If it still sounded OK, the producer would know that the recording would survive the unforgiving terrain of the AM transistor radio speaker. To that effect, we can still use the basic computer speakers for a final check, to get an idea of what our listeners might be getting out of a clock radio speaker.

Moving the editing computer out of the studio also accomplishes one other major improvement. In many cases, our studios are being invaded by more and more fan noise. No, not the not the vocal support of our listeners, but the cooling fans that keep computer motherboards from overheating. Every computer added to a room adds noise, and too many devices in the studio can defeat any work done to give the room a profession “sound.”

It was on a recent tour I was giving at WMKV, that I was reminded of what I take for granted today. When I came to WMKV, the one studio we had (yes, one studio and one small announce booth – no extra production room

and no editing software) was just beginning the process of a planned move to a slightly larger space. In that move, which happened in my first year at the station, we were able to subdivide that air studio into two studios.

Savory Six Pack

Even before that major move, we invested in a multiple, six license package for editing software and had it installed in four offices and in our two main studios. WMKV went from perhaps 15-25 hours of new original programming every week, to more than 60 hours of new locally-created and edited programming each week.

Many of the computers for the software were already used in offices. We simply allowed the people on our small staff to be more productive and kept projects flowing smoothly through our production studio.

We have also trained many volunteers at the station, who produce some of our evening and weekend programs for our public radio station – and several bought their own software or used the principals we taught them on comparable products they had at home.

We now have two real production rooms and four virtual production studios, and there are times that all are in use!

A Closet Editor

If you're thinking about trying this, you can start small. Just as our video colleagues can have tiny video editing suites, you can even convert a good size closet or small storage area into a simple editing room, or maybe two. It even sounds better; would you rather show off a “supply closet” or an “editing suite” the next time you bring through a major client or a tour?

It is very important to stress that using pirated or single license software on multiple computers can result in liability and fines. In some cases, the software company (in our case, Adobe, although there are many viable alternatives on the market) has occasional specials on multi-user packages.

If you operate a public station or non-profit, you may qualify for a friendlier rate from some software developers. On the other end of the spectrum, if you are part of a larger corporation, it is also possible that you might be able to get a quantity discount. Some organizations can make acquisitions of the software as part of a larger purchase through an information technology department.

License to Thrill

Just as we wouldn't think about violating music rights, it's important to make sure that you're using properly licensed software.

The investment in software, and some decent monitors in critical mixing areas, can make your plant far more efficient and keep the stress levels down. And don't look now, but it's only a matter of time before some very basic audio editing will be coming to smart phones and tablets.

There are a few apps out there that allow for some basic multi-tracking already, although most smart phone microphones may not match up well with professional quality studio microphones yet. But as the technology evolves, we may see marked improvements in them.

If you have your tracks laid out, and just need to do some editing, you may eventually find some creative software engineer has developed an app for that.

Do you have a success story that smoothed studio flow and eased congestion? What are your thoughts on the new technologies that excite you going forward? Have you had some strange engineering situations for which you found creative solutions? Share them at: g Zahn@mkcommunities.org and your story could educate or entertain us all in a future issue.

George Zahn is the Station Director/General Manager for WMKV Radio in Cincinnati.

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Disaster Preparedness

Can Your Listeners Depend On You?

by Ernie Belanger

Recent events have shown that when a disaster of a huge magnitude strikes in a developed country, even with excellent emergency planning, it is a huge hardship. Think back to Hurricane Katrina, and recent events in Japan.

Once the main infrastructures start to fail, businesses, including media outlets in the area, are left to fend for themselves while emergency efforts are focused on the rescue of those injured – and later recovery of those who didn't make it.

Local radio stations can play a key role in passing information from authorities to those who are effected, but to be a key player it takes a commitment of money and other resources, and a lot of advanced planning.

Is Your Station In or Out

In order to keep your station ready to be a lifeline for your listeners, you need to “Be Prepared” – to borrow the Boy Scout Motto.

The first decision that needs to be made is how involved your station wants to become in being a vital part of your listeners lives. Does the management team want to be a key player or not. This is a serious discussion that needs to take place with station management, ownership, engineering, and programming.

A Simple Question

Do you want to walk away when disaster strikes, letting your listeners depend upon your competition and other media to get the information they need, or are you going to step up to the plate?

If you opt not to do everything possible to provide your listeners with vital information in an emergency, your station runs the great risk of losing a large portion of its audience. Remember there is a basic trust between a station and its listeners.

They trust that you will provide them with the entertainment they want and the information they need daily, and in a disaster, they expect you will be there for them providing emergency information to help them make it through the perils they face. You trust your listeners to patronize your sponsors and to remember your station during the ratings periods.

Break that trust, mislead them into believing you will be there for them when a disaster strikes when you aren't prepared to be, and they will probably never come back to the station after the crisis has passed. That said, let's move on.

Never Enough Warning

Disaster usually strikes without a lot of warning to make preparations. So how do we prepare for disaster, as a key information provider to the public?

First and most importantly, make a disaster plan. Sit down with your local, county and state office of disaster preparedness. There are three reasons for your meetings. First, to lay out what part you want your station to play when a disaster strikes. Secondly, to solicit their help in developing your disaster plan, and lastly to seek funding to help harden your station against disaster, so you can remain a vital source of information.

In your meetings, you will want to determine how they will pass information to you for dissemination to listeners. Will they expect someone from the station at the command post? Will it come via phone, email or other method?

What Information Will You Receive?

The information should be the nuts-and-bolts, logistical information that your listeners must have. Items like: safe routes to leave the disaster area, the locations of emergency shelters, food and water distribution locations, and field hospital locations. I can be virtually any information that the public must have to survive in the aftermath of the disaster.

Of course each disaster will require different contingencies, so not all of this information will be needed for each disaster. Likewise, your station's involvement will vary according to the disaster at hand.



It is important for your station to develop a contingency plan, to deal with every type of disaster that could potentially strike your area. Ask for help from governmental authorities in developing your plan – they are the experts.

A Quick Review

In the Nov/Dec-2010 issue of *Radio Guide*. We discussed the need for a disaster plan, and what should be included. The plan starts with a contingency for your staff.

- Decide who is in charge once the plan is activated. You need a single person to call the shots.
- Assign specific tasks to specific staff members. This avoids confusion and wasting valuable man-hours and staff energy on duplicating efforts. Remember to be at least two deep for every task, in case your primary staffer is injured, dead, stranded or out of the area when the disaster strikes.
- Determine who is essential staff and who isn't. Which personnel are essential to keep the station on the air, and keep the information flowing to the listeners?
- Develop a staff evacuation plan. Based upon the level of the disaster, the recommendation to mitigate the staff's stress varies from simply dealing with minor disasters like blizzards, to the suggestion that you have an evacuation plan for non-essential staffers and all staff families.
- Design a Call Tree to alert staff that your disaster plan is being activated.
- Encourage your staffers, who have chronic medical conditions, to always be sure they refill prescriptions a week before they will run out. In a disaster they may not be able to get refills.

The last thing you need to deal with in a disaster is a medical emergency that could have been avoided if someone had taken his or her meds.

Don't Depend on Technology

Let's face the fact that we are extremely dependent on a technological infrastructure. You should plan that all, or a part of, that infrastructure is temporarily disabled – or worst case, unavailable for days or weeks. How would you keep your station operating and on the air?

Consider that phones, cell phones and the Internet may be compromised. How would you communicate with your staff and authorities to get information? How would you get your programming to the transmitter?

If there was no power at the studio what would you do? How about the transmitter site – do you have back-up power?

Basic Human Needs

Plan to have enough food on hand to last at least a week. That means you need meals for all staff who will be at the station – at least three meals, per day, per person. Plan for at least one gallon of water per staffer, per day, as well.

Remember, if the water system is working that doesn't mean that it is drinkable. If the water purification plant is compromised, water in the system may be untreated. Plan that the water system won't be working. You might want to have a supply of water to be used to manually “flush” toilets and for sponge baths.

Don't forget air mattresses or cots, and pillows and blankets for your staff, while they are at the station.

Equipment Contingencies

It is important to plan what you will do, to ensure that your signal remains on the air. Let's look at the studio. If the need comes to temporarily relocate your studio, have you planned for this?

Have you done your homework and determined a secondary or tertiary location that can be used as a temporary studio site? Do you have a list of everything you will need to operate from that location? Don't forget a way to get the signal to your transmitter.

What would you need? Is it packed in road cases and ready to be loaded up by you, or a staffer, and taken to the designated spot?

If your plan is to broadcast from your transmitter site, be sure you have back-up power and a quiet place to set up a portable studio that pretty much mirrors the functionality of the main studio.

A good laptop or netbook with the same program the staff uses in the main studio is the way to go. A portable hard drive that is updated daily with program logs, the latest commercials, liners, and a complete music library is essential.

Be sure that it is ready to be snatched up and hit the road on a moment's notice along with your portable studio set-up.

Be There for Your Listeners

At the end of the day, your station needs to do what it takes to be 100% prepared to operate in a disaster. There is no middle ground – it's either in or out. Ready to be there for its listeners – or not.

The clock is ticking, and it is only a matter of time until the next disaster will strike your area. It's not a matter of *if* but rather, it's a matter of *when*. I'm sure your listeners hope your station is prepared. They will be depending upon you as their lifeline.

Your comments are welcome. Do you have a disaster plan at your station? Do you want to share it. Email and let us know editorial@radio-guide.com

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Beware of the Ex Parte Rules

by Peter Gutmann

The FCC's ex parte ("from only one side") rules, which govern contact with decision-making personnel, sound like something only lawyers and lobbyists would care about.

Actually, anyone having business before the FCC needs to be aware that these rules exist, when they apply, and what they prohibit. Violations can carry severe consequences.

Test Your Knowledge

Here's a quiz: Let's assume that your upcoming renewal is opposed by a disgruntled ex-employee, upset that you owe him back pay, or by a listener claiming that your news is slanted.

Such complaints won't threaten the eventual grant of your renewal, but they will cause a delay of at least several months until FCC staff can pump out their standard letter stating that they don't concern themselves with such matters. In the meantime, your lender is getting nervous and wants assurance that your license is not in danger.

So ...

A. Can you call the Commission's processing staff to point out that the complaints are immaterial and to question why the renewal is being held up on that account?

B. Can your lender write the FCC a letter urging prompt grant?

C. How about if your local congressman comes by

for her weekly interview show, asks why you seem glum, and offers to have her office write the FCC Chairman on your behalf?

D. What if the mayor of your town were to send the Media Bureau an email emphasizing all the good things you do in the community?

E. Can you ask your lender, congressman or mayor to send such a message?

And here's one for extra credit:

F. Wanting to project a friendly image, FCC staff concludes a panel at a state broadcaster convention by inviting the audience to share their problems. So, after the presentation, can you sidle up and complain that your renewal is being delayed?

Well, the answers are: "No" to A, and "Maybe" to the others, so please read on.

A Little History

The ex parte rules arose three decades ago, in response to court concerns that undocumented oral contacts with FCC staff had led unfairly to two different records in policy matters – one for the public and a more extensive one for "those in the know." The Commission determined that it needed a means to obtain timely information concerning the issues it was called upon to consider and that useful information was often produced in one-party meetings.

Yet it balanced that need against the public's right to be aware of who was engaging in discussions with its staff, and the arguments and showings that were being made. Thus, the ex parte rules establish procedures for presentations to decision-making personnel and prohibit most communication in contested FCC proceedings unless: (1) full disclosure is made, and (2) all other interested parties are able to present their views as well.

What the Rules Restrict

The ex parte rules divide FCC proceedings into three categories. There are few contact or advocacy restrictions for "exempt proceedings," which include Notices of Inquiry and most rulemakings intended to address matters of general policy. Also generally exempt are unopposed applications or requests, meetings in which all sides participate, pure status inquiries, certain emergency submissions, and written communications served on all other interested parties.

At the other extreme, nearly all communication is barred for certain "restricted proceedings," which include matters designated for hearing, rulemakings to amend the FM and TV allotment tables, most waiver requests, and all broadcast applications, unless they are unopposed. In this context, oppositions include not only formal petitions to deny, but all "informal objections," a broad category that can take just about any tangible form.

In between are "permit-but-disclose" proceedings, which, for lack of a better definition, includes everything not classified as "exempt" or "restricted."

Practically speaking, that doesn't leave much, but the FCC has the discretion to designate a proceeding as "permit-but-disclose" in order to permit oral and written ex parte presentations.

(Continued on Page 20)

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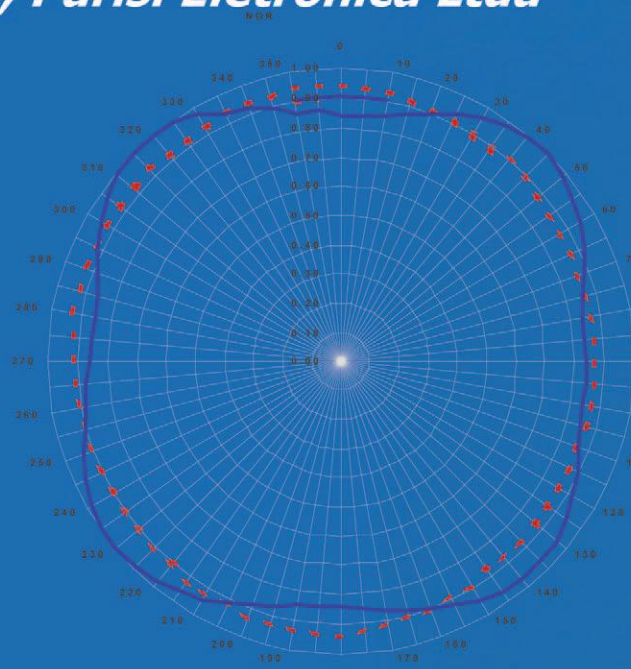


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by Peter Gutmann

– Continued from Page 18 –

However, all such communications are subject to the requirement that a timely report is quickly placed in the public record (through electronic filing) to reveal who was present at any meeting, so as to apprise others of what was said, and to afford an opportunity for opposing parties to express their views.

When Are They in Effect?

While there are many details and other provisions, the important point here is that once an application or request is opposed, or subject to mutually-exclusive filings, then the ex parte rules bar most contact with FCC staff by interested parties.

The rules apply not only to the parties' principals and their attorneys and other representatives, but also to anyone whom a party or interested person solicits to approach FCC decision makers on their behalf. In fact, soliciting a person to make an illegal ex parte contact is itself a violation of the rule.

Problems often arise when frustrated applicants rally viewers or listeners to express their support, or when they turn to their legislators, whose staff may not be aware of the danger in sending the Commission a letter urging action on behalf of a constituent.

There is a relevant exemption for a written presentation by a listener who is genuinely acting on his or her own initiative rather than in response to a request by someone subject to the ex parte rules.

An example of this would be a listener who writes to the FCC in response to a station's pre or post filing renewal announcements, which state that, "individuals who wish to advise the FCC of facts relating to our renewal application and to whether this station has operated in the public interest should file comments and petitions with the FCC."

Back to the Quiz

A. Should you call FCC staff to urge action on a contested matter? No!

You may call for the sole purpose of asking about the status—but only if you can restrain yourself from going any further. You cannot even add a subtle hint as to why action is needed or a discreet suggestion as to the form of relief that you want.

Your conversation should be limited to: "Hello, I am with station WXXX. Can you tell me when [identify application] will be acted upon? OK, thank you."

B, C, D and E. Letters, email or other messages may be sent by you or anyone else – and they can say just about anything you want – so long as they are sent at the same time to all other parties (or, if they are represented by counsel, to their attorney). That way, other parties can submit their own views if they disagree.

Advice About Letters

It is always wise to have potential letters submitted through your attorney – for two reasons. First, he or she will know how to serve the letter properly on all who are entitled to copies. Indeed, the letter should indicate all the others to whom it is being sent.

Second, someone knowledgeable and independent needs to review a letter carefully and objectively before submitting it.

You would be amazed at some of the damaging things people say unintentionally, while trying to be helpful.

For example, it's great for a local business leader to praise a station for providing 24/7 information for a solid week following a recent storm, but not if it was a daytime AM that had no authority to stay on at night. Ostensibly helpful information like that could wind up fueling a fine for illegal operation.

F. And what if the FCC staff seeks input from you? Even though they are generally sensitive to situations that may cross the ex parte line, you shouldn't put them in an embarrassing position. It's fine to comment or even complain generally about the length of time it takes to grant contested renewals, or to ask why they take so long.

But it's not OK to advocate the merits of your specific situation, or even to cite your circumstances as an example of your overall concern.

Fairness

The ex parte rules boil down to fundamental fairness in dealing with the FCC. It is essential that all parties having business with the FCC be aware that a wide variety of communications with the staff are subject to the ex parte rules.

While there is far more detail than we have covered here, any planned business-related contact with FCC staff should be discussed beforehand with knowledgeable counsel to avoid inadvertent ex parte violations and potentially harsh penalties.

Peter Gutmann is a member in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice PLLC, he specializes in broadcast regulations and transactions. His email is: pgutmann@wcsr.com

If you have a comment about Peter's column or if there is a legal question you would like Peter to explore in a future column, please let us know. Email us at: editorial@radio-guide.com

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Safety and Security

A regular column on protecting property and persons – with a technical slant.

How Would You Protect This? A “Final” Exam

by Jeff Johnson

We have explored in these articles many aspects of safety and security from fire extinguishers safe for electronic equipment, to building perimeter alarms, safety gear and signage. Let’s put our knowledge to use.

Safety and security can be compromised by everything from vandals to “hot” RF energy. Here is a list of topics discussed in *Radio Guide*:

- **Physical site security** – peripheral and intrusion alarms incorporating infrared beams, motion detectors, heat (fire) detectors, and RFID cards.

- **Fire safety** – the use of “clean agent” suppressants, CO₂ and powder extinguishers – both area and portable.

- **Radio Frequency** – understanding and safety – the nature of RF energy, how to detect it and protect personnel, warning signage.

- **RF and thermal burns** – avoidance and treatment.

As broadcast engineers we are responsible for so many differing, challenging environments and locales, here’s a chance to see how much you’ve learned from this column.

Your Test

Design safety and security systems for two totally different broadcast sites – urban and rural.

In doing so, ask yourself these questions: How may each site be secured? What are the differences between them?

The Differences

One requires protection against cattle, the other requires protection of and also against people. Also ask yourself what are the potential disasters that can cause loss. Those answers: Fire, Weather, Theft, Injury, and Vandalism.

Remote Tower

The first is a rural transmitter building and tower accessed by a country lane nearly impassible in poor weather. The site is populated by cattle.

There is no studio.

The transmitter is in a new custom-built shelter. The tower is 1,230 feet tall, and lit by strobes.

Oh – there is no Internet connection at this site so the use of any Internet connection is not possible.



1230 foot tower
in the middle of nowhere.

Possible Solutions

- High fence constructed of difficult-to-cut steel, topped with razor wire.
- RF warning signs.
- Intrusion alarm system – call out via dial-up.
- Lights – a help, rather than a hindrance to vandals?
- A “Beware of the Bull” sign.

Urban Studio Location

The second is an urban site, surrounded by single-family homes. How would you protect it?



An inner-city broadcast homestead.

Possible Solutions

- Perimeter surveillance by motion detectors, infra-red light beams, video cameras.
- Intrusion alarm system and interior surveillance by motion detection and real-time Internet streamed cameras.
- “Junk yard” dog or resident engineer.
- Police surveillance regularly scheduled.

(Continued on Page 24)



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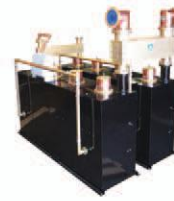
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Safety and Security

by Jeff Johnson

– Continued from Page 22 –

Co-located Transmitters

These transmitters are in a transmitter room located at the station's Studio/Office building.



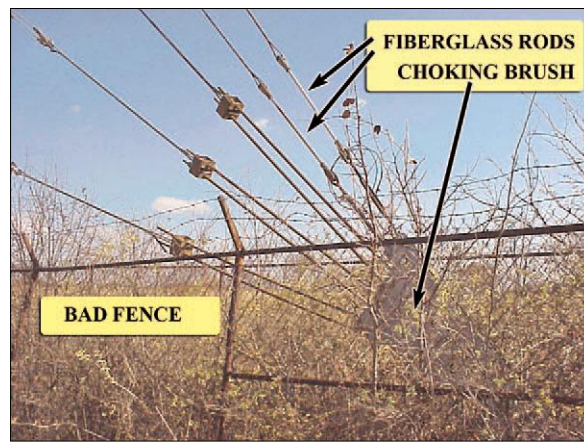
Your challenge here is to design a fire protection system for them which is safe to use in a multi-use facility.

Remember, you can't use a gas flooding system because personnel are there during business hours.

There is at least one option available to you – use an alarm system connected directly to the fire department.

Tower Anchor

Look at the photo below. How vulnerable is this anchorage to disaster?



This is a tower anchorage in trouble that should immediately raise several red flags.

Possible Solutions

- Replace the rusted, defective fence so it will deter vandalism.
- Remove weeds and brush – they are a fire hazard and disguise anchorage and guy defects.
- Fiberglass guy elements are vulnerable to fire or a hacksaw. If those fiberglass elements get hot enough to weaken, that tower may come down. Upset a listener, and they might cut through them with a hack saw. Then too, vandals would do it just for the fun. Replace them.

Urban Tower Site

This last scenario is one of the most interesting for you. It is an AM tower located in the middle of an urban area.

Towers, especially urban located towers, are the most recognizable part of a broadcast station.

They are also the most visible and in many ways the most vulnerable.

So how do we protect this, the station's most valuable asset?

AM towers require surveillance of the grounds.

- Lights on the tower triggered by motion.
- Lights "on" should trigger an alert sent via remote control to advise of an intruder.
- Cameras monitored by video "skimmer" and real time on Internet stream to verify if the intruder is a danger.
- Periodic surveillance by police if possible
- Clear away brush and unused wooden shelters for fire safety and to eliminate hiding spots for vandals.

So What Have We Learned?

As I said at the beginning of the column, the knowledge that you have gained in reading this column during the past year can be put to use when you encounter the scenarios that I've described here.

These are all real situations that exist today. I found each of these, and took the photos myself when called upon to do a couple of station inspections.

If you have some of these situations at your stations, now is an excellent time to begin correcting them.

Jeff Johnson can be reached at: jeff@rfproof.com



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Operations Guide

Putting Your Head Into “The Cloud”

by Chris Tarr

It's a big buzzword these days. Cloud storage, Cloud computing, apps “in the Cloud.” What is the “Cloud,” and what does it mean to us?



The Cloud

Simply put, the Cloud is way to describe a server or cluster of servers hosted somewhere on the Internet.

It's an easy paradigm to understand – your data is out there somewhere, just not on your machine. That space is referred to as the Cloud. Many of us have been using the Cloud for services and we never even knew it.

Why Care About the Cloud?

Because whatever is in the Cloud is stored remotely, and you can access the data from anywhere, from just about any device. You're no longer tethered to your computer, or needing to carry mobile storage with you. Just sit down at any computer, or grab any smartphone or tablet, log in, and you're set. All of your data is at your fingertips.

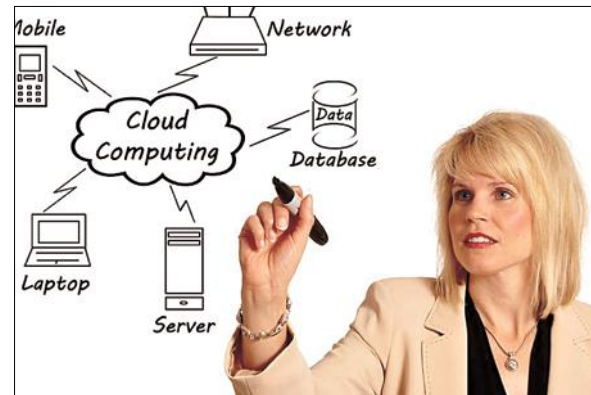
Here's an example of some of the things you can do with the Cloud. One of my favorite apps is Dropbox (www.dropbox.com), an on-line file storage service. Dropbox is very simple to use and is available across several platforms. A basic account, with 2GB of storage is free, then you can add on extra storage for a fee if you'd like.

One of the great features is the ability to share folders with other Dropbox users. What I've done is taken all of the equipment manual PDF's that I have, and placed them in a folder that I have shared with my other Engineers. That gives us a fairly robust library of shared equipment manuals that can be accessed by many different types of devices in the field. Talk about handy!

Our entire library of manuals is accessible to everyone, without the necessity to lug around heavy boxes of books or even worry about loading it on a laptop or netbook computer to have access. Just go to “The Cloud.”

Document Sharing

While Dropbox is good for file sharing, there are some great ways to share and collaborate on documents. Google Docs is a web-based word processor with many advanced sharing and collaboration features. It integrates well with Gmail and can import and export from many different types of word-processing software.



Microsoft has now followed suit with Office Live, part of the SkyDrive service. Microsoft's offering is an on-line version of Office, which is completely compatible with the “off line” version of the Office suite.

Photo Sharing

If you're into photography, Picasa (www.picasa.com) and Flickr (www.flickr.com) are good choices. They both offer free storage for your photo albums and have plenty of tools available for uploading, altering, and managing your photos. If you're like me, you probably take lots of pictures in the field of components, building issues, and things like that. It's very easy to take a quick picture, upload it, and share.

(Continued on Page 28)

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Operations Guide

by Chris Tarr

– Continued from Page 26–

Cloud Mail

Of course, one of the most popular uses of the Cloud is for email. Running a full-fledged email server for your company is an expensive and time-consuming task. It requires some dedicated specialists to keep it running, and if you want to have a lot of reliability you need to spend a lot of time and money on hardware and network connections.

The other significant problem is scalability. Imagine if your group acquired the stations across town. Could you scale up your current email system to handle all the new additions? Think about how long it would take to add servers and what your additional equipment investment might be.

Many companies now are using services such as Google Apps or Hotmail for email solutions. You pay a fixed cost per user, per year, and you're done! The host provides an uptime QOS guarantee, and takes care of the bandwidth and hardware – and it scales immediately. In the case of Google Apps, you're given a lot of Enterprise-grade tools as well, such as mobile device management and Microsoft Outlook integration.

On-Line Collaboration

Another benefit to these services is that they also offer the on-line collaboration tools as part of the package, such as intranet sites, chat, and document sharing. This works great if you have employees that are out in the field or working in remote locations.

You can have your sales packages or business office forms on-line and your staff can be assured that whatever is there is always the latest version. No worries about servers crashing or leaving that USB drive on your desk. All of the updated information is available anywhere, on any device.

Even if you aren't a big business, services such as Gmail and Hotmail are great for personal email accounts. In the case of Gmail, many of the services that I've talked about (such as Picasa and Google Docs) are already available to you by using your Gmail login.

Warning: Danger Lurks in the Cloud

There is a danger to moving your life to the Cloud. The most obvious is the danger of data loss.

You're trusting your valuable data to a third party that may or may not care as much about your data as you. Also, in today's economy, you could run the risk of having the company hosting your data disappear, along with your files. Then there's privacy and security. How protected is your data on-line?

There are ways to mitigate the risks. To start with, *always* have an "off-line" backup of your data. All of these services have the ability to download and save the data that is on-line. It's a good idea to periodically download your data and burn it to a CD for safekeeping. This protects you in case your provider has a failure or simply goes away.

Privacy

The second concern is privacy. There's a great maxim that applies here: If you aren't paying for the product, you aren't the customer – you're the product. So, like anything in life, the best way to insure privacy and security is to find a provider that charges a fee. Typically, that means that the provider isn't making their money by making you or your data the product they're selling to someone else!

Be sure to read the company's privacy policy and make sure that your data isn't being used for mining purposes. Also, be sure that the service allows you to encrypt your files and connect using a secure method such as HTTPS. Of course, the first line of defense is you. Make sure you use a strong password, and that you don't send your data in the clear when using a wireless Hotspot.



Cloud computing is the future. After all, why maintain the infrastructure if you can outsource it and make it more convenient in the process?

There really isn't a department in the organization that wouldn't benefit in one way or another by what the Cloud has to offer. Whether it's file sharing, collaboration tools, or email, more and more business large and small are moving to the Cloud and are realizing significant cost savings and increased productivity.

After all, isn't smart Engineering and Management all about enabling your staff to operate efficiently and cost effectively?

*Let us know what uses you or your station's personnel have found in "The Cloud." Email us at: editorial@radio-guide.com
Chris Tarr CBRE, CBNT, DRB is the Director of Engineering and IT for Entercom's radio stations in Milwaukee and Madison, WI*

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Chief Engineer

Checking Out The Rear View

by Scott Schmeling

As Paul Harvey used to say, “Over my shoulder, a backward glance.” In this article, I’m going to look back at the articles from the past year and take care of a little “unfinished business.”

Point-to-Point IP STL

By far, the article that brought the most response from you was from the March/April, 2010 issue of *Radio Guide*, the one about using a Motorola PTP300 IP Radio with a Tieline codec as an STL.

If you recall, we had been using a “wireless Internet” from a local provider. But during heavy-use times, the bandwidth would shrink and was unacceptable. We installed our own Point-to-Point IP radio (an extension of our studio computer network) in November of 2009.

The system has gone only down three times. Once because strong winds blew one of the two antennas at each end out of alignment (they were re-peaked and tightened down, and have been solid ever since) and twice because something blew out my small network switch at the transmitter site. However, the transmitter site’s IDU (In Door Unit) and the network switch were on a UPS with power line surge protection.

I can only theorize what may have caused the failure, but since installing an Emerson CAT6-5POE-FF in-line surge protector last September, I haven’t had a single problem.

By the way, I got several emails about this article. I heard from other engineers in Las Vegas, New York, Montana, and other locations around the country.

I also heard from a couple previous co-workers! I did respond to all of them, but it appeared some of my replies didn’t get through. If yours was one of those, please accept my apology and please feel free to email me directly at scottschmeling@radiomankato.com

Dear Santa

In the November/December, 2010 edition of *Radio-Guide*, we went through my tool box (and I tried to convince Santa that I had been a good engineer last year).

First, let me say: a guy can’t have *too many* tools! I ran out of space and had to leave a few goodies out.

Radio Design Labs makes quite a few very handy items. One in particular has been incredibly helpful. In their “Test Equipment” category you’ll find the PT-AMG2 along with its companion PT-ASG1. The PT-AMG2 Portable Audio Signal Generator and Monitor is an audio generator/LED level meter and monitor speaker all-in-one.

It’s calibrated for standard balanced +4 dBu, as well as unbalanced (consumer) -10 dBv, and microphone level -46 dBu. It’s very handy for checking output levels as well as “ringing-out” cable pairs.

The optional companion PT-ASG1 is the same audio generator, minus the meter and speaker. You can inject the signal at one end of the cable with the PT-ASG1 and check the other end of the cable with the PT-AMG2’s meter and speaker.

The meter/monitor also includes a phase checker. Using the PT-AMG2, you can feed the meter from a console’s output while inputting tones from the signal generator to set all inputs, mic or line, to standard levels.

With this arrangement, you can calibrate the input and output levels as well as verify your wiring’s polarity. If all is good, the green “in phase” led lights up. If there’s no light, start looking for a “flipped pair.”

I also use the RU-SM16 stereo meter from RLD. It allows me to simultaneously check left and right channels.

Even though my left and right channels were calibrated to standard levels, sometimes things needed a little tweaking!

(Continued on Page 32)



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Chief Engineer

by Scott Schmeling

– Continued from Page 30 –

Another “goodie” I wasn’t able to include in the article is my Ethernet cable tester – I use an Ideal LinkMaster (model # 62-200). It analyzes all four pairs for polarity, short/open, and general wiring errors. I test every cable I build. No matter how careful I am, it is possible, though rare, for wires to shift around as they are inserted into the RJ-45. I’d much rather find an error before I install the cable, rather than during “troubleshooting.”

I won’t list a specific model here, but a microphone cable tester should also go on your wish list if you don’t have one already. Mine checks for continuity, shorts, and polarity. As with the Ethernet cable tester above, I check every microphone cable before repair to isolate possible problem areas on the cable, and after repair or building of a new cable. Again, it’s better to test before the cable goes into service.

Studio Rebuild

And finally, in the September/October 2010 issue, I finished a three-part series on our studio construction projects. In the design phase of the project, we determined we wanted to lower the overall profile of the room. Mic “arms” have become standard equipment in studios, and for the board operator and co-host positions they would still be used.

But we designed the room with space for four guests. Adding four more mic arms would raise the profile (and clutter) of the room, and potentially block sight lines between the guests and host.

We opted, instead, for low profile Audio Technica U859QL gooseneck condenser microphones. The mic’s are mounted in the Audio Technica accessory desk stands. A Shure mixer supplies phantom power for the condenser element as well as mixes the four microphones into one console input.



The U859QL mics in position.

Audio response is excellent. These microphones are more sensitive than the “old” mic’s, so a little experimentation with mic placement and gain setting was necessary. They sound great and look good, too.

Lighting

Another issue we addressed was lighting. Before the project, there were four, four-lamp fluorescent light fixtures. Most of the time, only two of the lamps in each fixture were lighting up. To say the least, the lighting was bad. We installed seven, four-lamp fluorescent fixtures with diffuser grids, giving us much more even light than before.

For whatever reason, when the studio was originally built (60 years ago), there was no switch for the lights. Of course at that time, if the station was on the air, a live body was at the controls, so I can only imagine there was no switch because someone would always be there.

The studio walls are constructed with cement blocks covered with a layer of acoustic ceiling tile. Given the wall construction, we determined it would be too costly to try to add a light switch. Besides, with a switch, the last one to leave would have to remember to turn the lights out. Instead, we installed a combination motion/heat sensor with an adjustable time delay.

If the sensor doesn’t detect anyone in the room for 30 minutes, the lights turn off. We decided on the 30 minute delay because fluorescent lights are most efficient if they are left on for longer periods of time. The lights are almost never off during the day because of the activity in the room. A half-hour after the last manned shift, the lights turn themselves off.

When someone walks through the door they turn back on. It took a little getting used to at first, especially seeing the light off at all, but now, it’s just part of the personality of the room. If this might be something you’d be interested in, check with your electrician.

If you have any questions from any previous articles, or any ideas you’d like to see in future articles, please feel free to email me. Right now, I’m headed out to take care of an FM transmitter. The calendar says spring is just around the corner. But the thermometer says it’s three below (19 below wind chill)! I’m not complaining about the weather – I choose to live here and it goes with the territory. I’m just ready for spring to arrive.

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting, a 16 station group in Southern Minnesota. He can be reached via email at scottschmeling@radiomankato.com



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Field Guide Studio Wiring

Radio Systems StudioHub+

by Ricky Adams

Kids-ON-Line—my former, yet still extremely popular steamed-by-Internet daily program on AOL—is on an extended hiatus. But not because of Radio System's StudioHub+. Seriously (which is a rare mode for me), back at AOL I was a one-man show, and that included my engineering and wiring! And this never could have happened without StudioHub+.

Genius System

This system is both genius and simple. That's it—it's simple genius—just because no one ever took the time to invent and promote a wiring standard for broadcast. And now, that more and more manufacturers are cooperating to make their gear available with StudioHub+ compatible RJ-45 audio connectors, we real-world users can really benefit.

By the way, you heard me right. Most all the major manufacturers in the broadcast industry are actually cooperating, and widely adopting the StudioHub+ wiring standard—making it the default I/O on their gear!

Why StudioHub+

I was introduced to the product by Dan Braverman of Radio Systems all the way back in 2003, when they built a studio for us at our Virginia campus—then another, then another, and then a studio at the Brooklyn Zoo—it's true!

All were done in record time due to StudioHub+ and its simple plug-and-play system.

But then reality hit. Their engineers went home and we were left to fend for ourselves—and StudioHub+ allowed us to do just that.

This ultra-clever system, using standard CAT-5 cables and adapters, let us mere “programming types” maintain, add-to, and even troubleshoot our wiring.

Easy as 1-2-3

The system works like this:

1. Wire everything with CAT-5/RJ-45 patch cables—because they're cheap, available everywhere and work great for analog and digital.

2. Plug one end of an RJ-45 patch cord into the increasing number of consoles made to work with the StudioHub+ standard. For those that still don't, Radio Systems makes adapter harnesses for every model console.

3. Select one of hundreds of available adapters—like RJ-45 to XLR, or RJ-45 to 1/4" TRS—to plug the other end of the patch cable into the source gear.

That's it! You have, and more importantly for me, I have just wired a studio.

It's easy to do, and even easier to re-do or add-to, since it always happens that gear is added or changed out. Now it can be a simple fix.



Ricky Adams in his former AOL studio.

But That's Not All

And the clever folks at Radio Systems haven't left it at that. By adding +/- 15 VDC to the unused 4th pair on the CAT-5 cable, they've enabled a world of useful, powered accessories.

Now you can use balancing amplifiers (called MatchJacks), headphone, mic and monitor amplifiers—and even A to D converters.

And the system completes with plug-and-play inter-studio tie lines and a lovely RJ-45 patch panel.

So, when I get my show back on at AOL, it certainly won't take too long to plug it all back together!

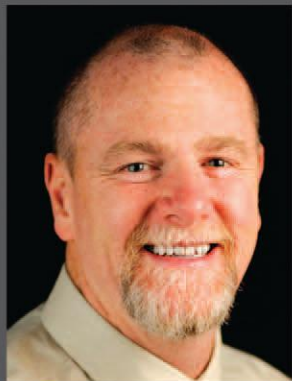
As of press time, Ricky Adams is still waiting to return to AOL, and we wish him luck. For information about StudioHub+, and Radio Systems other products you may call 856-467-8000 or visit www.radiosystems.com

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Field Guide FM Antennas

Jampro JHPC Penetrator

Jampro's 50+ years of experience helps clients to the realization of another successful project. Jampro was pleased to be involved with K-Love Radio's recent addition of KLHV in Cotton Valley, LA.

Jampro has been involved with the project from the earliest conceptual stages to the final acceptance. The project had a number of challenges, however the team worked with K-Love to meet an ideal balance of right-sizing the current project and still future-proofing their investment.



KLHV's transmitter site.
All were products supplied by Jampro.

Jampro provided a complete solution to K-Love Radio, that included notable items like the Jampro JHPC Penetrator Series Antenna, a 450' all-weld tower, LED lighting system and all ancillary items needed to commission the site.

Project Management

Every stage of this project was a balancing act, and all members of the Jampro team worked to help finalize the design. The team worked with K-Love's construction group, landlord and surveyors, to find the best possible location for the tower on the undeveloped property.

Collaborating with all parties, the best location was determined, but the next stage presented a unique issue. Due to land restrictions, this new tower was going to be a tight radius tower.

Jampro provided a number of options to K-Love which illustrated the cost and differences of varying heights and the specific winds loads of the selected antennas. All parties worked together to analyze the results to narrow in on the correct combination, considering capital and ongoing operating expenses.

Now that the project was right-sized for the requirements, Jampro took on the challenge of making this project future proofed for K-Love. Jampro reviewed every component of the project. The goal was simple: what could be improved or maximized with negligible cost impact on the project. The review included the antenna selection, tower design, and foundation design. With minor impact to the cost of the project, additional capacities were available in the proposed design. However, the Jampro design team went a bit farther rather than just the use additional data to illustrate the additional capacity – they provided the client with some real life descriptions regarding an additional FM antenna and a cellular carrier.

Now that a final design was in place, Jampro worked with K-Love to add items from their wish list, and still keep the project on budget. In doing so, K-Love was supplied with a state of the art LED tower lighting system as well as a number of lower profile items.

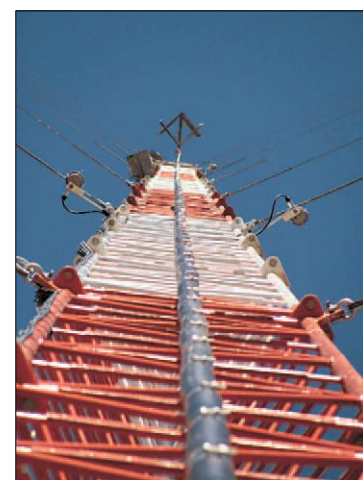
In addition to the obvious benefits illustrated above, Jampro eliminated many of the logistical stresses for K-Love, as they were the single-source supplier for all of the products required on the project. The Jampro team handled all the ordering, delivering, and coordination with local groups to ensure the project went smoothly.

Jampro monitored the project from start to finish and Jampro Services had a team in place to commission the site and do a final acceptance with K-Love.

Jampro was pleased to have partnered with K-Love on this project and was able to share its 50+ years of experience to build a project for today's requirements and still be ready for the future.

Jampro welcomes any enquiries on this project or others which we have supplied products or provided full turn-key solutions. If you choose, Jampro can be a single source solution for all your future broadcasting projects.

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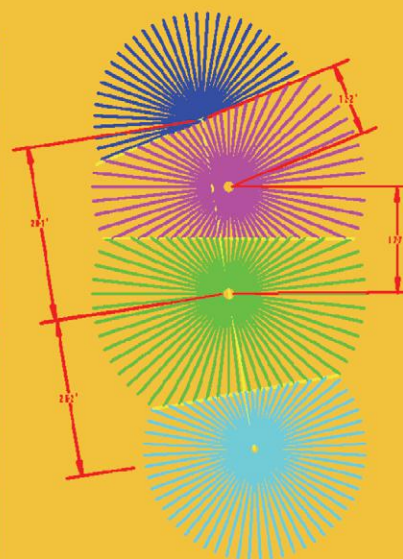
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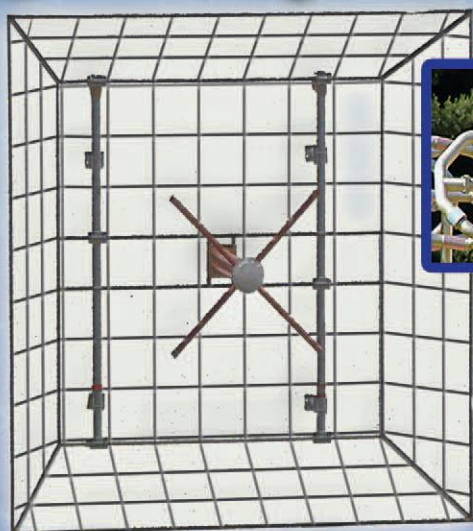
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Keeping the Power On

by Scott Cason

Any radio station owner who takes their service to the public and service to their advertisers seriously has a back-up generator.

While there may be a couple of stations out there that could run off solar cells, the reality is that without power, things get very quiet. And that's not good for broadcasting.

Most gensets are found at the tower sites, since studios are normally located in an area where the power is somewhat reliable. If it's not, it will not take very long for an owner to consider getting a generator for the studio site as well.

Most industries cannot tolerate lost power for any length of time; broadcasting is among them. For most stations, especially in the large markets, being off the air due to a power outage simply is not an option.

Quick Lesson

For those who need a lesson, all it usually takes is a ruined remote or two, costing a few thousand dollars a throw, before most owners are screaming for quotes on a generator. Another prompt is when construction starts in the area of either studio or transmitter and "backhoe fade" suddenly becomes a factor.

It is worthwhile to recall the blackout of large portions of the Northeast in the summer of 2003. Hundreds upon hundreds of radio stations—many who had slogans proclaiming how they were there "to serve the community"—were off the air and silent because they either did not have a generator or their generator failed due to lack of maintenance.

Fortunately for many stations, there has been a real push in recent years (especially among the major corporations) to

install generators at the transmitter sites. The aftermath of Hurricane Katrina in New Orleans, and along the Gulf Coast convinced many GMs that it finally was time to bite the budget bullet and get a generator in place.

More Than a Lump of Metal

Up until years ago, I never had the joy of ordering a generator. The stations under my care either had a generator or they did not care about it. When I did get the opportunity to buy one—let me tell you, it was a learning experience.

The transmitter site for the station was at the end of a circuit which passed through an industrial park. Anytime there was a problem, from a squirrel getting across a transformer to a vehicle taking out a pole, this station was off the air. And the summertime sags were something to behold.

What finally convinced the owner to purchase a generator was going off the air one Friday night during a high school football game. High school football is big in the south, and the game was sold out. Running make goods and refunding money caused him to "see the light," which led to him phoning me and asking about installing back-up power at his transmitter.

Not Too Small – Not Too Big

Making sure you get the right genset that can be counted on to pull the transmitter when the power goes out is no easy task, nor should it be taken lightly. Get a generator that is too small, and you will waste your money on equipment that will never work, nor will it ever be made to work unless you are willing to accept reduced TPO while you are on generator power.

On the other hand, if you get a generator that is too large, you will be throwing money away on excess capacity and possibly see reduced generator life since they do not like to be run with a lot of headroom—they have a load rating for a reason.

Another reason to pick the right size generator: since you cannot simply go to the local Home Depot and pick up one of these puppies off the shelf, a generator is a long term investment that, when done properly, will give you years of worry free service.



A modest-sized generator for broadcast use.

Doing the Homework

There are so many types of gensets to choose from that it is a good idea to do some research to know which is the best for your situation.

Is it going to be inside a building or do you need a weather proof enclosure? Gas? Propane? LP? Diesel? There are the three big makers of gensets: Cummins, Generac and Kohler. Some are better suited for the loads found at transmitter sites, others are better suited for loads found at studios.

(Continued on Page 40)

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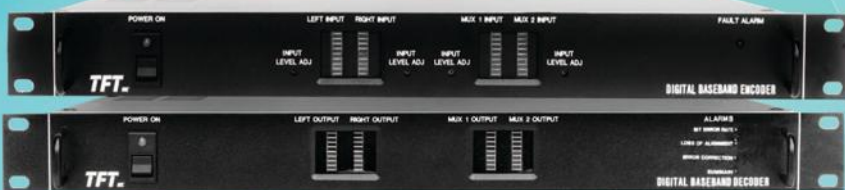
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by Scott Cason

Keeping the Power On

– Continued from Page 38 –

If you ask four engineers what is their favorite generator, you will get five different answers. But it still helps to ask around. A good way to find out about the reliability, ease of maintenance, and local support for different models is by asking around at the next SBE meeting.

After you have done the initial risk assessment (what it takes to ensure no power outages, period), then figured the degree of standby power protection required (minimal backup, substantial power for short outages or total standby for extended periods), you then have to figure out what kind of load you will be expecting the generator to pull.

Analyzing the Load

At an FM transmitter site, it is relatively easy to figure loads because the load is quite constant. Your TPO is 17 kW and it stays 17 kW day or night or no matter how loud the PD likes the sound.

At AM sites, the load can change dramatically if the AM has nighttime power changes, for example. With TV, the load changes slightly for tube transmitters based on average picture luminance and the effect it has on visual plate current.

The main transmitter is often (though not always) the biggest load. Then you add any and all terminal equipment: things like processors, STL receivers/transmitters, RPU receivers, remote controls, burglar alarms and both tower lighting and work lighting.

Do not forget those tower lights! You certainly do not want to be a sitting duck during a power failure with a dark tower. A small tower with one flashing beacon is not much. A taller

tower with multiple flashing beacons – especially when they are all flashing at once – is a major load factor to consider. Sometimes the beacons even can end up consuming more than the transmitter power.

The next time you get a chance, place a clamp-on ammeter on your beacon lead. You might be surprised how big the swing is while the beacons are flashing. If you have multiple beacon levels on your tower, multiply that by the number of beacons. Seeing a load rise and fall like that will send some generators into fits trying to keep up.



A larger 800 kW Generator.

Note the cinderblock needed to reach the door.

Keeping Your Cool

You might also want to take into account any ventilation needs. Although you might be able to get by during a short power outage during the summertime without your air conditioning (as long as you have some type of fresh air back up system), I have seen “springtime” thunderstorms leave the power out for several days.

Also, do you want to be working during the wintertime with no heating? If your transmitter is big enough, and you have the exhaust ductwork fitted to blow hot air in the shack, you might be able to get by without adding the heating unit to the load. But if yours is a solid-state class A FM with low heat output, or if your bigger transmitter has the exhaust ducted outside, you might want to add heating units to the overall load for the generator.

The next thing to consider is your back-up transmitter. Under normal conditions, you would not be running your main and backup at the same time. That is, unless your main took a hit during the storm and you are working on it into the dummy load. I always like to err on the side of caution.

If you are considering IBOC for your station, you will want to factor in the load for a digital transmitter when working up an order for a new genset. It will not be of much help if you find out the genset you ordered six years ago cannot pull the new 5 kW IBOC transmitter.

Additional Potential Loads

Other things to consider at the transmitter site include tenants, both present and future. Back-up power makes your tower very attractive to others who are looking for tower space to rent.

It also means you can charge a few bucks more per month to locate their antennas on your tower and their equipment in your building. If you get a chance, look at the base of a tower that has cell antennas on it. Nearly all the major cell phone operators have back-up power for their cell sites.

For current tenants, you can give them an option. Get on a back-up power circuit for a few more bucks per month or stay off back-up power with the rent staying as it is. If they agree, make sure it is added to the lease agreement you have with them *before* the changeover. If you have it in writing, with their signature on it, they cannot deny it.

As you add up the total load requirements, double-check to make sure you have not left anything out. In our next installment, we will look at the different load requirements for a studio site, and determine what to order. – Radio Guide –



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	27.5 kW	1988	Continental 816R-4B - Solid State IPA
	30 kW	1990	Continental 816R-6C - New Solid State IPA
35 kW	1998	Continental 816R-5C - Solid State IPA	

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Small Market Guide

Not So Traditional Revenue – Part 2

By Roger Paskvan

In the last issue we discussed the need for every station to have a web presence, not only to generate non-traditional income, but also to stream your signal.

Listeners now listen on-line at work, new radios are available in cars that pick up Internet radio streams for listener enjoyment, even smart phones pick up the Internet and radio stations streamed by stations. As technology evolves, it is more and more evident that if you do not have a web presence you may very well find yourself lost in the dust.

Using A Pro

By far the easiest way to generate a web page is to have a professional company build one to your specifications. There are many companies out there that specialize in creating a custom website for customers, some even have specific templates they have developed for radio stations.

These companies charge anywhere from \$150 per hour and up depending on the complexity of the offering. You may find that price lower if they have an existing template that will fit your need. You could jump on the Internet look at number of radio stations sites, find one you like and then contact the company that built the site.

Most web developers have a link at the bottom of the site home page that will bring you to their page or give you their contact information.

Doing it Yourself

On the other side of the coin, if you are the do-it-yourselfer, buy a copy of a web page layout program and learn how to make web pages. There are many programs available. It takes a lot of effort to make a good web page, so plan on spending many hours of design time to get the site you want ready for the net.

Domain Name

The next hurdle is a “domain name.” Your domain name is the name of your station on the net.

Should you use your call letters, your current slogan or just your frequency? That is a loaded question.

Call letters change, as do station slogans. Unless you want to register a new domain name every time this happens, perhaps a better domain name would be the use of your frequency. Something like “Albanys100.9FM.com”

It is a generic, but it identifies the station and it won't need to be changed regardless of slogan changes or call letter changes. For a fee, you buy your domain name and own it. The registered domain will be directed at the unique IP address of your hosting site during the length of the contract.

Finding A Server

Once you have a workable web page and domain name, it's time to find a host so the world can see your offerings.

The Internet is full of web hosting companies that will provide access to their computer server farms for a monthly hosting price. As of this writing, the average monthly hosting price is between \$15-25 per month, depending on the number of links and pages. These server farms host thousands of web pages and have competent staffs to maintain the sites – a consideration that it is well worth the small hosting fee.

Self Servicing – Not Recommended

If you're the type of engineer or manager that wants the in-house server, things get significantly more complicated. You must purchase a high-end computer specifically designed for server applications. This type of computer is designed for continuous duty service, and will become burdened as more and more people log onto your website.

You'll also need to load operating and server software. Server software will do the mechanics of hosting your web page and allowing all logons to access the site, depending on your bandwidth. You will have to purchase a specific amount of bandwidth to maintain your website, from your local Internet provider.

You must also have a static IP address. This is a unique number for your website that your Internet provider can provide for a small fee each month. Then there is the need for a second server as a back-up, so your site is always available.

As you can see, it really is just so much easier to have the site hosted at a server farm – it's a lot less work and will have far fewer problems in the long run.

Our next issue will be how to make money with your web site and your program stream.

Roger Paskvan is an Associate Professor of Mass Communications at Bemidji State University, Bemidji, MN. You may contact him at: rpaskvan@bemidjistate.edu

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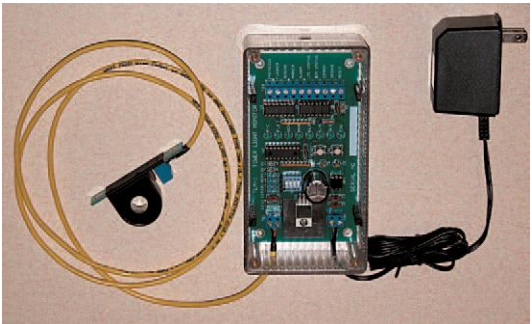
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During the heyday of AM in the 50's and 60's, practically every consulting engineer and tower contractor had a "wire plow" that they piloted themselves, or loaned out to clients, to build AM ground systems. After the "demise" of AM in the 70's, most of these plows were junked, cut up for parts, or allowed to slowly rust away.

Along Came the Early 90's

Most existing ground systems were now over 30 years old and many had been damaged or deteriorated to the point that coverage was being affected. The majority of the early broadcast design and consulting engineers were retired or had become silent keys. Sadly, the knowledge and equipment to properly build and maintain ground systems had been essentially lost with the dwindling demand for AM build-outs.

Enter AM Ground Systems Company. Kevin Kidd began his broadcast engineering career in 1983 with a single local AM client. That single station swelled to over 30 engineering clients over the next two plus decades, as local engineers left the industry or retired.

In the early 90's, one of his AM engineering clients suffered vandalism and needed a new ground system. Kevin, and the station's corporate engineer, searched unsuccessfully for several months for a reliable contractor to install the new ground system.

After numerous, frustrating failures by plumbers, tower crews and the corporate engineer, Kevin realized he did not know a lot about building AM ground systems – but had certainly learned how *not* to build them.

The corporate engineer soon departed the company and, by default, Kevin assumed his duties. Tired of wasting time and money, he decided to have a go at rebuilding the ground system by himself. Fortunately, he had been born into a farming and construction family and certainly possessed the necessary fabrication and equipment operation skills.

Kevin spent weeks talking to AM "old timers" and consulting engineers about how best to build a ground system. It turned out that the best way to build a good, stable ground system was neither the cheapest nor the

easiest. He then purchased a subsoil plow from a local tractor dealer and made several specific modifications.

Armed with the new plow, a Massey Ferguson 275 and his recently retired father as hookup man, they started plowing. Things went smoothly and the entire plowing process was completed in four days. Kevin spent another day bonding the new radials and ground infrastructure into the main site grounding. Upon restarting the transmitter, it became obvious that the operating characteristics of the station had changed dramatically.

After completely re-tuning the ATU and transmitter to match the now properly grounded antenna, the station enjoyed better coverage than it had in years. Kevin was satisfied to be able to do something that other "experts" had failed to accomplish.

It was only a couple of years later that they built their second ground system; the third followed about a year later. Another followed in just a few months, and as word of their ground system work circulated, they were soon doing several ground system projects (construction, evaluation or repair) per year. A good friend and fellow Ham became Kevin's assistant when Kevin's father announced that he was going back into retirement on the farm.

Then Came the 21st Century

Most stations were originally located on the outskirts of town, and the towns had grown to surround the formerly rural tower sites. In this time period, some transmitter site properties became worth more than the entire operating radio station. Leased property owners either raised rates or simply broke contracts to force stations off of the property. Station-owned property was often sold for enough money to build a new site, and still leave a nice "nest egg."

Hence, a new surge of AM transmitter site building was underway.

In almost 20 years of ground system work, AM Ground Systems has installed over 2.75 million feet of wire, at more than 150 AM towers. They have also performed evaluations and repair on over 60 towers.



As project size increased, their available crew expanded from a single assistant to five, with varying and essential skill sets.

All crew members are competent in advanced construction and electrical bonding techniques. All are self-starters and extremely conscientious. They currently have an SBE certified CSRE/AMD engineer, engineering assistant, certified welder, licensed general contractor, carpenter, and masonry and equipment operators with advanced skills on varying types of construction equipment.



At the same time that they were adding vocations and skill sets, their equipment inventory was expanding as well – two fully self-contained plowing machines, grading and excavation equipment and mobilization equipment, as well as a host of specialized test equipment. Much of their mechanical and test equipment was built or modified by Kevin to fulfill specific needs.



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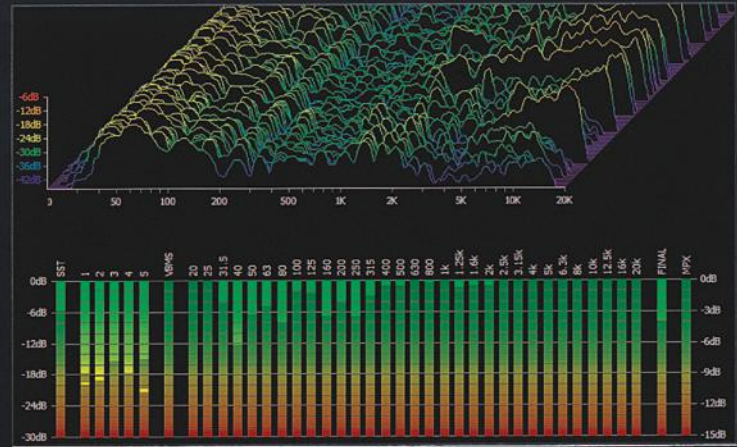
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"The music sounds great, and this box can be tweaked to anyone's preference. There is a lot to discover in this machine....but our single biggest achievement has been achieving the clearest, cleanest 'voice' I have ever heard come from an FM processor."

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Just wait until they get their hands on AirAura™



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www.vorsis.com | sales@wheatstone.com

"I am extremely impressed with the unit's capabilities and how well it performs with our NPR talk/Classical format."

"What an amazing difference in sound quality!!! This is a brand new FM station and comparing it to the other new station in town using the Other brand of processor our client is louder, cleaner, and even legal. Wheatstone definitely has a winner here with Vorsis."

"This is a great sound and we are so, so pleased with our new Vorsis on-air processor. You just threw down the gauntlet to the processing industry with this new unit! Nobody can match a sound this loud, this clean, and this unique! Now everybody gets to chase after us for a while. Thanks Vorsis!!"

"Our signal used to virtually disappear in downtown New York when we went on night pattern because of the extremely high level of man-made noise. Now when we're on night pattern our coverage in downtown is actually better than when we are on day pattern, the other brand of audio processor and a 10X higher powered transmitter! We're buying a second one to put on our daytime transmitter!"

"You have to be kidding! I have NEVER heard FM audio sound this good, this detailed, this smooth, this clean, and this loud (how did you do it??). Very nice work!"

"Love the box!!! Overall the sound of the station is vastly improved. It's loud, wide and clear."

"I guess the only word for Vorsis is 'WOW.' It's got some great bottom end, and it's more transparent than any processor I've heard."

"The AGC/Compressor/SST combination is simply amazing. We play classical CDs. Older classical CDs were mastered at a much lower level than current ones. Announcers don't compensate and never will. Your processor is able deal with what amounts to probably 40-45dB (or more) *average* level variations and hold them perfectly in the sweet spot with virtually no squashing, pumping, sucking, or other usually audible artifacts of such wide range level control. In short it does its job perfectly every time."

"I love classic rock and it's the program format on the station that I own. No other processor that I've tried (and I think I've tried them all!) sounds as good on this format. We're nice and loud and still cleaner than the other stations in the market. We were surprised to hear the intentional dynamics of songs actually get on the air - other processors just flatten them out or turn them into a sea of mush. For the first time ever we're also hearing subtle nuances in songs that we used to think we knew every single note of. What an amazing air sound! No.... What an amazing processor!!"

"Your equalizers are actually useful and unlike other processors do not grunge-up the sound merely by enabling them."

"The SST algorithm is the least audible of ANY processor I have ever had experience with. I'm not sure how you did it or exactly how it works but its automatic "leveling" is excellent - no pre-processing whatsoever is necessary with SST."

"The high end of this processor is very open sounding - there is no fake "sparkle" with the HF EQ either. Perfectly clean and natural sound. And did I mention LOUD?!"

"Finally! A processor that deals effectively and transparently with overly-sibilant announcers and audio levels that usually go all over the place! (I especially love the tweakable multiband thresholds!)"

"Why haven't the other audio processor companies been able to make an AM box that sounds this good? I can't think of a positive superlative that is big enough to describe how pleased I am with our AM sound now. Our coverage seems to have increased by quite a bit too!"

"Our multipath is Gone! GONE! As an engineer I have difficulty believing a processor can make this much difference in apparent coverage area but the listening is the proof. We've had several listeners call and comment that their reception has greatly improved and even I've noticed vast improvements when driving through what were previously horribly multi-path prone areas. I'm not sure why, but it sure does work!!"

"This box has great metering and excellent analytical tools - you get good visual indication of everything that is happening inside."

"The unit's stability has been flawless, not even a tiny glitch. We have it set up to time-sync and it works great. The scheduler-based (and SILENT!!) preset switching is perfect! Unit sounds very accurate sonically and is very easy to set-up."

"We are now VERY unique in our audio. Compared to other stations in the market, we are as loud yet maintain legal modulation (at least 4 stations in our market run with 130%+ modulation). We're not "squashed" sounding at all and if you compare us with the other stations (all formats) we're clearly a dynamic and clean stand-out signal on the dial now."

NOTE: We aren't naming names because everyone who is reaping the rewards of sounding better appreciates their anonymity (with respect to the competition). We won't blow your cover, either.