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Aldena – Unique Products and Capabilities



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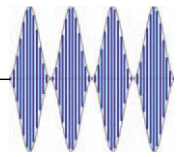
Radio Guide

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September-October 2013

Radio Waves

by Ray Topp – Publisher



When this issue hits your desk, you will have two new websites available to you. We've been working overtime to get these sites ready, to help you *find* what you need – and *sell* what you need.

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We've all asked ourselves why there has been no "clearinghouse" for new radio product information, product updates, and technical info. Although this material demands timely distribution, that's not what we've had so far. You've had to wait for someone to send you an email – or wait even longer to see it in print.

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– Ray Topp, Publisher

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Aldena – Unique Products and Capabilities

by Clarence Beverage – Communications Technology Inc.

My first acquaintance with Aldena came in the mid-1980s when our firm was looking for a software package to use in the design of multi-element FM and TV antenna systems. Harry Anderson of EDX Engineering software fame directed us to Giuseppe Napoli at Aldena knowing the quality of their design software. We purchased their SR software design package (now EMLAB) and came to know the company and its unique capabilities well through the years that have followed. Telecommunications Aldena SRL was officially established in 1979 as a manufacturer of broadcast antennas designed for transmission of radio signals. The company heritage goes back prior decades, to receive antenna products designed by Giuseppe's father Lionello Napoli. Like many in our industry, Lionello started in electronics as an amateur radio operator.

Earlier this year, the company moved to a larger facility in Milan. The new complex encompasses more than 200,000 square feet with 96,000 square feet of building space, and is the location of a modern outdoor test range as well as an indoor, near-field test range facility.



The best way to get to know Aldena and its product line is to look at their capabilities and how their products helped our firm meet client needs over the last 25 years. Our firm has always done a lot of FCC application work for new NCE-FM stations. As we all know, NCE-FM stations are allocated on a predominantly contour overlap basis in the northern hemisphere. In order to fit in a new station it is often necessary to design an antenna pattern that is entirely custom and often with fairly narrow major lobes. These patterns are often unachievable with the ring type antennas we commonly use in the United States.

One of Aldena's legacy products is the 8-element log periodic, which is a broadband antenna that covers the 88-108 MHz band. 8-element log periodic antennas have been available in this country for many years, but typically have been rated for maximum input powers of 250 or 500 Watts, where the Aldena antenna has an input power rating of up to 5 kilowatts – which is what has made them popular for full power FM use. This antenna, and EMLAB, has been used by our firm and other engineers in the U.S., to design many antenna systems licensed by the FCC for both full power, translator and booster operation.

Aldena EMLAB, formerly SR software, allows the user to design custom radiation patterns, taking into account the mounting structure dimensions, orientation and the relative power and phase of each antenna in the system. Those familiar with directional AM antennas can think of this as a piece of AM antenna pattern design software for FM and TV antennas. The software comes with detailed measured pattern data for all of Aldena's antennas, as well as many other known manufacturers,

including RFS, Coel, Kathrein, IRTE and Sira. This software tool is what has allowed us to design patterns for FCC filing and planning purposes.

The picture below is of a booster licensed to Fordham University for its first FM booster project in New York City – WFUV-FM2 – located on the roof of the Riverside Church at 120th Street in Manhattan. The facility was designed in 2002 and first licensed in 2004. Back at that time, one antenna for horizontal polarization and one antenna for vertical polarization was used. The final ERP was 2.5 kW and the required TPO was a full kilowatt. This antenna system was also licensed as an auxiliary antenna for emergency use.

Fordham ultimately built a second booster on a Durst building, the EPIC, at 31st Street in Manhattan. The antenna chosen for this application was light weight, offered ease of assembly and high power handling capability. This booster also had a maximum ERP of 2.5 kW and employed Aldena's 5-element, tuned to frequency, Yagi antenna type AST-05-02-337. The pattern for this booster system took full advantage of the software and current techniques to manipulate the pattern to fit the application.

First, two antennas were stacked horizontally at a spacing to narrow the beam width as much as possible. Second, radiation off the rear of the antenna was nulled to near nothing, by adding a third Yagi a quarter-wave ahead of the pair just described, and phased 90 degrees to provide a deep null. These pattern characteristics allowed the booster to fit FCC requirements and minimize radiation in directions that would cause mutual interference with the main.

Third, the antenna elements were turned 45 degrees to vertical to generate essentially equal horizontal and vertically polarized radiation. This booster, WFUV-FM3, was first licensed in the spring of 2010. This picture depicts the system near the end of construction with the Empire State building in the background.

The 5-element, tuned to frequency, yagi has become a favorite of ours in terms of modest cost and excellent performance. These antennas have been in use at KSIQ-FM1 in San Diego since early 2010 and translator applications as well. They come standard with a mounting bracket which allows the antenna elements to be rotated to any desired slant.



For full service FM stations, the rate of change of the DA pattern cannot exceed 2 dB per 10 degrees of azimuth change. Before the DTV transition NCE-FM antennas were often vertically polarized to provide the protection required by the FCC Rules to TV 6 stations. It is cases like that which have been implemented with various Aldena Antenna types in past decades. Here are just a few examples:

WXHL-FM, Christiana, DE – licensed 1994. The antenna system consists of two ASR.03.02.315, three element yagis stacked vertically, vertically polarized, with a 1.2 kW ERP.

WKDU-FM Philadelphia, PA – licensed 1996. The antenna system consists of two APX.02.02.520 c.pol. panel with an ERP of 800 Watts.

WOFN-FM Beach City, OH – licensed in 2000. The antenna system consists of two ASR.03.02.315 3-element yagis stacked vertically and oriented at 80 degrees, and a second pair oriented at 219 degrees with a single horizontally polarized element. This antenna system was a pole mount and the FCC proof of performance was undertaken at the Aldena factory. The ERP is 22.5 kW.

KOZO-FM, Branson, MO – licensed in 1998. The antenna system consists of four ASD.01.02.215 vertical dipoles with an ERP of 20 kW.

The staff at Aldena has remained stable through a long period of time and their technical expertise is first class. Based on our years of experience with the company, I think that it is accurate to say that they want their clients not only to be satisfied with the rugged design and quality of their products, but highly pleased as well. This link <http://www.aldena.it/> takes you to the company web site. Most of what I have described here are single station antenna systems which are fairly simple. Aldena's manufacturing and integration experience also includes multi-station master antenna systems and combiner systems, tuned to frequency, and broadband power dividers, Grid Type 950 band STL antennas, TV antennas for VHF and UHF operation, as well as commercial wireless products and propagation software including SFN network analysis.

Please note that Aldena also manufactures several circularly polarized FM antenna models. When looking at the data sheets on the web site you will see a significant difference in the way that the European community looks at Omni antenna patterns and the way we look at them here in the United States. In Europe the pattern is displayed as it actually exists on a mounting structure, while here in the U.S., they are characterized as a perfect circle. What you get for a radiation pattern with an Omni antenna is a subject unto itself – please take a look at our white paper at www.commtchr.com/fimomniantennas

Here in the U.S. RF Specialties has represented Aldena faithfully for many years. John Sims in the RF Specialties of Missouri office has been heavily involved in the sale of the Aldena Product and has participated in a number of project installations giving him added experience which helps to assure that the client is getting a configuration which best meets their needs. *John and the team at RF Specialties may be reached at <http://www.rfspecialties.com>*





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Interface-To-Face With Good Computer Audio

George Zahn

In past articles, I've covered a variety of different digital editors for laptops and desktops, but rarely discussed has been the interface that gets your audio into the computer to begin editing. This is a critical concept, since all the best editing and effects tools in any piece of software can do little good if the audio coming into your computer is of poor fidelity. It's the same old GI-GO (Garbage In-Garbage Out) story.

If your music is already saved as a .wav, .mp3, or other digital file, you can generally open those files quite simply in any audio editing software. A tip, especially if you're working with older or memory-stretched computers (and many software editing tools can hog RAM pretty well), is that once you open the file from an external device (CD-ROM, thumb drive, etc.), it is most stable for the editing software if you save it to the local computer hard drive (normally the C: Drive).

Doing this gives the editing software a solid reference as to where the audio is stored. There's nothing worse than opening a file from a CD-ROM disc in your software without saving the original file, then removing the CD for one reason or another – possibly to put in a blank, anticipating burning the newly edited piece. You then do a number of critical edits, only to find that, because you removed the reference disc and didn't save the file onto the internal hard drive, you end up with a mish mash of unusable audio.

Saving the audio file to the hard drive is the most reliable way to work with that audio in your software. It prevents disappointment later, especially if you stop and start projects and switch discs in the CD/DVD drive.

Getting Ripped Helps

One of the most accurate ways to get the audio you need into the computer is “ripping” in from an existing audio CD. If you have a CD that's “audio only” pre-recorded from the manufacturer, or something you recorded and finalized on a CD audio recorder, ripping allows you to literally extract the digital signal from the CD audio file (which may show up on a computer search as a .cda) and do it in faster than real time.

No matter the type of computer platform, you have ample tools on today's devices to rip audio from an audio CD. If you're new to these devices, common examples of “ripping” options can be found under the RIP drag down menu in Windows Media Player. A Mac can convert .cda files to mp3 files for you through iTunes. Software such as Audacity, Adobe Audition, et al, will have features that may be named “Extract Audio from CD” in its menu options. With your recorded CD in the drive, the ripper may allow the option to select individual tracks as separate files or converting an entire CD into one large file.

CD or Not CD – That is The Question!

For many who may be editing in less than ideal conditions, where there is no good quiet “announce space” or an adequate way to get audio from a small console or a microphone into the computer (this occurs for anyone who's office becomes their editing location), it generally

comes down to wasting a CD, or tying up a studio to record voice work, or dubbing from a work station onto a CD. Even if you have the ability in the studio to record to flash memory, it still ties up studio time. Those contents of the thumb drive or CD then get transferred from the drive or ripped from the CD into the office editor computer – all taking more time and effort

So wouldn't it just be better to record directly into our editing computer? As a manager and on-air person/producer, I hate wasting time, and on some fairly short or non-critical voice work for projects, I've actually recorded a few words or a few lines directly into my office computer. Granted, the minimal fan noise on the desktop is a minor issue, but for “quick hit” voice work, judicious placement of the microphone – I use a unidirectional Sennheiser MD 421 with decent side and rear rejection – has bailed me out when studios are jammed and I'm on deadline.

How do you get decent quality audio into the office computer? Most standard computers with basic sound cards have front jacks that allow for a headphone output and possibly one microphone input. The back of the sound card on the rear of the computer will likely have the same two options, and if you're lucky, you should also have a line level-in jack and possibly a line level-out jack. Note that on basic sound cards, largely due to space limitations, these are unbalanced mini-plugs, and there's no real guarantee of a decent signal-to-noise ratio.

Some skillful engineers, and a few of us who like to play with a drawer of adapters, may have come up with a way to effectively get good audio into a basic sound card. But a recent experiment trying to get line level audio from a DVD player into the line-in mini-jack on my four-year-old computer with a very basic, but otherwise good sound card, resulted in unacceptable noise.

Initial Reaction to XLR-USB

If you've ever tried using a communications microphone from a headset or even a basic hand held dynamic made for computer communications (Skype, etc.), you know that these devices will generally not be anywhere near the quality we expect from professional studio and recording microphones. Because the mini-jack is made for computer condenser mics, I've had very little luck trying to adapt a pro microphone into the mini-plug.

One way to get better audio into your editing computer is through a PCI (Peripheral Component Interconnect) card. Odds are that's what your basic card that shipped with your desktop or laptop is now, but there are better versions available. The reality is that the limitations of space preclude an XLR connection on the card. PCI cards



Shure Model X2U
XLR-to-USB Adapter

can range from well under \$100 to more than \$600, and offer a wide range of features. Mid-range models may have RCA type connectors for connection to consoles. The higher end models are made to interface with automation systems and other digital devices.

PCI cards are getting far more sophisticated, but there are other options for getting audio into the desktop or laptop computer. If announcing directly into your computer is your desire, there is a wide range of XLR-to-USB microphone adapters that can be had for under \$100. Some are available from manufacturers such as Shure, ACT, OSP – and I've even played with an older adapter from Radio Shack with some success. Some of the better USB adapters also allow for phantom power to pass through to a condenser microphone. It's best to research a bit before just buying one, especially if you intend to use a condenser mic.

In today's plug-and-play technology, you don't have to be a computer guru to use one of these USB mic-only interfaces. The only limitation here is how “studio-like” you can make the room in which you need to work. I wouldn't do extensive voice work in my office, but as stated earlier, if fan noise and general ambience can be circumvented, the microphone-to-USB capability is a nice quick fix. You can also get a number of “professional” microphones that have dedicated USB outputs, but I will say from my perspective, that I appreciate being able to hear the performance of a microphone I know well, to gauge the effectiveness of the USB adapter.

Should you find that there are more things you'd like to do from your office or other workspace, where your desktop or laptop may be ensconced, you can find other USB interfaces that allow for basic mixing or even connection to a larger outboard mixer. These interfaces can retail for as little as \$100-\$200 and many offer balanced XLR mic and line inputs. Many more expensive models have proprietary interfaces for use with specific software or MIDI interfaces. Some of these units also have digital S/PDIF digital input and output jacks to avoid converting existing digital audio back to analog.

All Work and No Play...

Some of the entry-level units under \$150 include the M-Audio M-Track, Lexicon ALPHA, and Presonus AudioBox USB to name a few. These small mixing/interface devices may have limited inputs, but if you use a console going into one stereo input, you can turn your office into another studio. Beware – for those of us managers who can't get the production out of blood, you still have paperwork, budgets, and reports to do!



Presonus AudioBox USB

Are you ahead of the digital interface curve for expanding your production options beyond the studio? Have these changes helped productivity or caused issues? Have any of the interface devices allowed you to maximize remote news recording or production? Feel free to share your stories with me at gzahn@mkcommunities.org

George Zahn is a Peabody Award winning radio producer and Station Manager for WMKV-FM at maple Knoll Communities in Springdale, Ohio. He is a regular contributor to Radio Guide and welcomes your feedback. Share your stories with others by sending ideas and comments to gzahn@mkcommunities.org

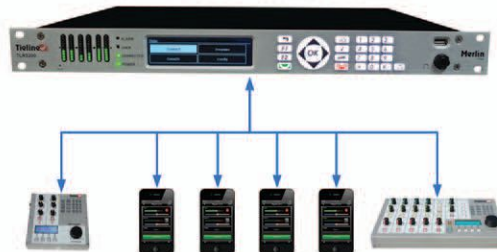
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Transmitter Site

Transmitter Care and Feeding

A Few Reminders

by Mike Callaghan

How long has it been since you cleaned the hysteresis dust out of your transmitters? Hysteresis dust is that fine, black particulate matter that seems to grow on the inside part of transmitters where it can be *really* hard to get at. There's no way to tell where it comes from. I always figured it was left over electrons that leaked out of the circuitry and just waited until it could become conductive again at an awkward moment.

Seriously, how long has it been? Did you really reach all the way in and get *all* the insulators? Remember what your mom said about cleanliness being next to something, and reach all the way around the insulators – wipe down the parts that carry high voltage and check for loose connections while you're at it.

Transmitters that still use tubes gather hysteresis dust a lot faster than solid-state rigs. I think it must be the high voltages that attracts anything drifting by in the air and pulls it onto the cables, insulators, and vulnerable parts of the tube cavity. This means high voltage leads can get really grimy if they don't get wiped down occasionally.

Cleaning the transmitter and getting the big chunks out of the air filters is just a part of transmitter maintenance. You also have to check for loose screws and connections. Away from the tube cavity, these rarely get loose. But one loose connection can ruin your whole day – if not some parts inside the transmitter at the same time.

Leave the Tube Alone

You don't have to pull out the tube each time you clean the transmitter. It can usually stay in the socket as long as you get the dust from around the bottom of the socket. A small handheld vacuum cleaner is great for this. Remember to check the screws inside the cavity while you're in there – vibration from the blower can loosen things up. The worst thing to find in a tube cavity is missing hardware, especially at the top. It may have fallen down into the tube fins, or worse, ended up down in the socket somewhere. If you can't find the missing washers and nuts, then you *do* get to pull the tube and start a serious search.

Falling parts can end up in very bad places, and you don't want them to cause shorts or arcing in tube sockets or across screen insulators. To avoid falling parts causing problems, remember this trick whenever you have to work in the top of a tube cavity. Take a big shop rag and drape it over and around the tube so that if you do drop some parts, they'll land in a place where you can find them easily. This can save you hours of searching, while you teach yourself new words in new languages.

Cleaning the Blower

If your transmitter has a tube, it also has a blower. Chances are this is shaped like (and called) a squirrel cage. Remember to clean the vanes on this once in a while. Dirt buildup on the vanes can seriously cut down

the air flow, and that affects cooling and tube life. The best way to keep it clean is to take it out of the transmitter and wash it in a sink. This will make it look and perform like new. Make sure it's completely dry before you put it back in the transmitter.

If you haven't the time or the inclination to do that, a stiff brush and vacuum cleaner will do an adequate job. Avoid using compressed air for this job, because the dirt you blow loose will gather in the bottom and get shot up into the tube socket when you start the transmitter again.

Making New Holes

Another part of maintenance involves drilling holes to mount replacement parts that are different than the originals.

If you have to do this someplace where the metal shavings will fall into a critical part of the transmitter, take a hunk of modeling clay and hold it inside where the hole will come through. Be very careful to just ease the bit through the metal so you don't put an extra hole in your fingers, and the clay will capture the shavings and hold them for safe disposal.

Small Hardware

One miracle some transmitter manufacturers haven't discovered yet are nuts with captive lockwashers. Rather than use them, they stick with the long-obsolete flat washer, then a lockwasher, and finally the nut. Removing these from a tight corner is an exercise in frustration, and it's almost as much fun as trying to put them back in. The secret in getting them out is to loosen the screw enough that you can reach in and grab the nut and washers with the tips of the fingers on the hand not holding the screwdriver.

When you have a hold of them, turn the screw a little farther and then grab the nut and the washer sandwich all as one piece. When it's time to put them back, reverse the procedure. Hold the screwdriver so the screw is going up at a slight angle through the hole to keep the washers from falling off and then slide the washer sandwich onto the screw as you slowly turn the screwdriver to get the tip started.

Phillips screws are much easier to work with than the slotted ones. If you don't have a good screw launcher in your toolbox, it's time to start shopping for one. My favorite flat screw starter is the 'Quik-Blade' type, with the two blades that slide over each other and so expand in the slot on the screw. These have a really firm grip and are easy to get loose after the screw is started. They come in assorted sizes.

Change the Batteries

Remember to change the alkalines inside the transmitter at least once a year, and to label the date next to the battery holder when you do. There is no general rule about whether the transmitter should be on or off when you do this, so make sure to follow the manual.

Antenna Plumbing

For doing antenna work with rigid line, a set of ratcheting wrenches is a must. These work like a socket wrench, but have a closed end like a box wrench. 9/16" is the size you use on 3" lines, and they're amazingly fast for working with line sections.

They'll fit between the nuts on the flanges and the line itself, so you needn't remove them between strokes like an open end wrench. Another indispensable tool for hanging rigid line is a laser level.

Secure the elbow to the top of the transmitter, and set the level on top of the horizontal piece sticking out the top. Level it up, switch on the laser, and the spot on the wall shows where the other end of the section will need to hang for it to be even. Then you can set the hangers with the laser beam and slide in the new line. Use the same technique with the connections to the dummy load, the phasor if you have one, and the second transmitter. This idea not only saves time, but the finished work will be a piece of art.



Cutting rigid line square on the end can be tricky. One way to make this easier is to take a radiator hose clamp, fasten it around the line, make sure it's even, and then to make the cut parallel with the edge of the clamp. Use a medium saw blade with about 24 teeth per inch for a clean cut.

Miscellaneous Tools

You'll also need a magnet on a stick. These come with telescoping handles if you want. I was once doing an FM transmitter installation. We were just about finished, the wiring was all complete inside, and someone dropped a 3/4" flat washer down into the windings of the plate transformer. You could barely see it with a flashlight. Our only option was to unhook all the leads to the 12-phase transformer, pull it out, then turn it upside down and, um, shake it. Then someone showed up with a really powerful magnetic grabber in their toolbox. Miracle of miracles, it snagged the washer and saved us hours of learning ... new words in new languages.

Speaking of plate transformers, when you have to move one around, remember to acquire some 3 or 4 foot lengths of 3/4" galvanized pipe. Rolling it on the pipes is a lot easier than any other way of moving it. This works for anything heavy with a fairly flat bottom – even bulky transmitters and high voltage supplies.

It's so easy to overlook basic chores like cleaning transmitters, with everything else we have to accomplish these days. Don't be one of those who figures that if the transmitter needs maintenance, it'll let you know. This is truly a case where an ounce of prevention means a lot more than a pound of cure.

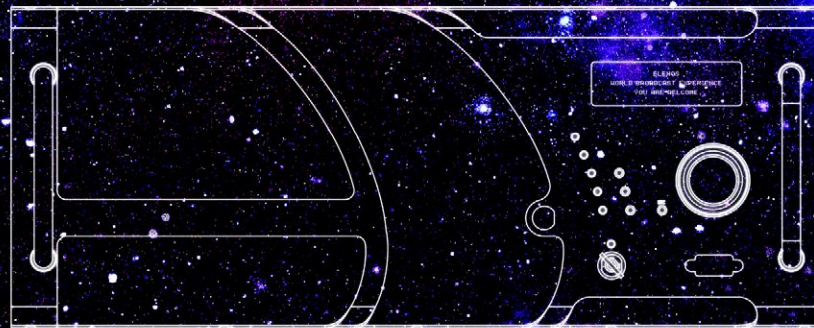
Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: rg@mike.fm

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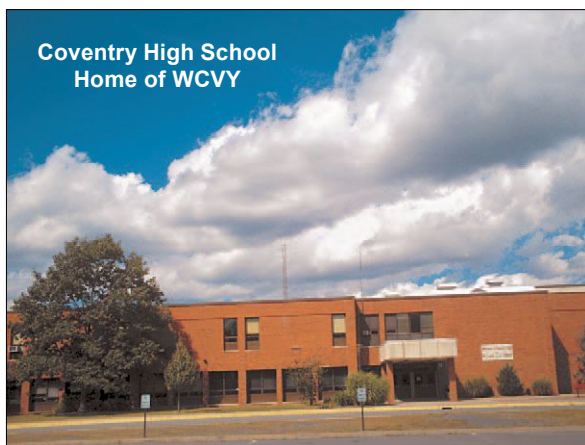
A Tale of Two Stations

by Steve Callahan

I was thinking the other day about a situation I found myself in a couple of years ago that hopefully, other broadcasters will never find themselves in. It's not strictly an engineering problem and solution, but it does directly impact what we as radio engineers confront everyday. Read on to learn how two stations were affected by their unfamiliarity with the FCC rules.

An old time radio engineer once told me that a Chief Engineer's number one goal is "to protect the license." Without a license from the FCC to broadcast, your radio station might as well be a gas station. Rather than putting the highest priority on changing the burned out light bulbs in the station's lobby, or fixing the sales manager's laptop, you should be concentrating on adhering to the FCC Rules and Regulations. You do have access to, and have read, a current copy of Title 47, Parts 70 to 79 of the Code of Federal Regulations, haven't you? You do participate in the Alternative Broadcast Inspection Program, don't you?

Back in the last century, at my first on-air job, the Chief Engineer warned me that if I didn't identify the station within two minutes of the top of the hour or write down accurate transmitter readings twice an hour, then the FCC would take away the station's license. While I was at that station, I lived in mortal fear that an FCC Inspector would storm in and tear the license off the transmitter room wall during my air shift.



Skip ahead to just a couple of years ago, and an educational FM station at Coventry, Rhode Island. WCVY was a station licensed to the Coventry Public Schools that had been a valuable experience for some students who had graduated to college broadcasting programs, and even got jobs in broadcasting after graduation. WCVY operated out of the Coventry High School and it was quite similar to other small noncommercial FM stations at other high schools around the country. Over the years, I've been through quite a few noncommercial stations licensed to schools and many seem to have been well equipped back in the late 1970's. That was when the FCC mandated that Class D 10 Watt stations increase to minimal Class A status with a minimum of 100 Watts – but equipment upgrades were few and far between. Unfortunately, WCVY was about to get on a legal roller coaster.

WCVY didn't know that 73.561 of the FCC Rules required a noncommercial educational FM station to maintain a minimum operating schedule. Whether it was for budgetary reasons or just something which was overlooked by a student staff that rolled over every four years, WCVY operated at a very minimal schedule.

Enter "Educational Radio for the Public of the New Millenium," who wanted a non-commercial frequency in the Providence, Rhode Island area, but found there were no frequencies available. WCVY was vulnerable, New Millenium let them know it, and convinced them to voluntarily enter into a time-sharing agreement. Now I've known several time-sharing agreements and none of them have been an amicable marriage. It seems like time-share agreements always bring together two entities with diametrically opposite objectives onto one frequency. Transmitters seem to get left on and there is always a lot of ongoing expensive legal jockeying between the time-share entities. Time-share agreements look good on paper but are not always good in practical use.

Basically, WCVY got the hours immediately after school to program the frequency and New Millenium got the rest of the day and night. I noticed when the time-sharing agreement was filed with the FCC and I felt badly about not approaching WCVY sooner to offer them assistance and programming. New Millenium then started building WRJI in the adjacent community of East Greenwich, Rhode Island. They proposed to locate their two-bay antenna on an American Tower cell tower and retained a local consultant to put all the pieces together.

Things did not go well for New Millenium from day one. Even though they were successful in getting the time share agreement with WCVY, they were licensed as the only radio station in East Greenwich and that community was too far from downtown Providence, which was their target market. There was just no way to get their signal into Providence, so after just a short time on-air, WRJI went off the air and left a large unpaid tower rent bill and an unpaid, and very unhappy, consultant. New Millenium didn't notify the FCC to ask for permission to remain silent, they just turned the transmitter off, and WRJI stayed off for almost a year. At this point, I approached WCVY and offered to help them right the wrong of being forced into a one-sided time sharing agreement.

If 73.561 could modify the WCVY license, perhaps 73.1750 could get it restored. 73.1750 basically requires a station that is silent to resume broadcasting within a year or risk relinquishing its license. Our very capable legal counsel got the FCC to inquire of the WRJI licensee exactly how long the station had been silent. It took over a month to get any answer from New Millenium, and when they did respond, they volunteered that WRJI had been off the air for thirteen months. Now WRJI became D (for dismissed) WRJI, but that didn't stop New Millenium from filing more applications with the FCC.

New Millennium now requested an extension to stay silent because they alleged that the local telephone company impeded their ability to operate. They also alleged that the station's silence was due to "a con-

spiracy" against them. The FCC didn't waste any time rejecting their allegations.

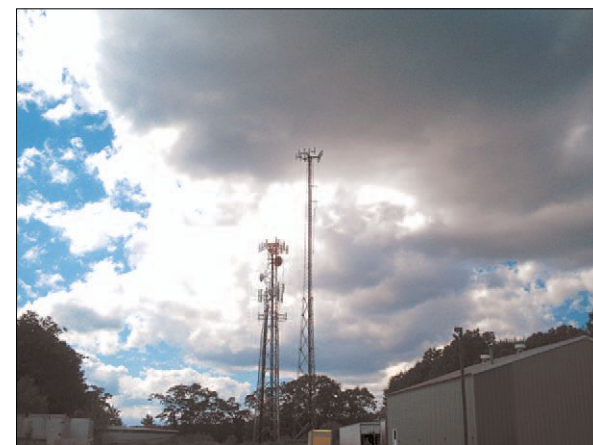
New Millenium then filed an application for a construction permit to move DWRJI into Providence, which is where they wanted to operate from all along. The FCC rejected that application by saying that an existing first-adjacent station in Providence and several co-channel pending applications in Northern Rhode Island, along with DWRJI being the only station licensed to East Greenwich, would make a move into Providence impossible.

While all this frantic applying was taking place, WCVY filed with the FCC to remove the time-share requirement from their license. I also arranged for an alternate program source that they could use when their students were not on-the-air. I also spent some time repairing equipment at WCVY which was in need of attention.

Rejection by the FCC didn't stop New Millennium. They simply packed up their transmitter and moved into Providence and became a pirate broadcaster. This move put them into the whole new category of enforcement with the FCC.

Back at WCVY, we filed an application, which the FCC granted, to increase the station's output from 100 watts to 6000 Watts utilizing a directional antenna. In my mind, I had done my part for WCVY – they had been "made whole" again and the station now had a chance to serve its community of license 24 hours a day. The moral of this story is that the FCC Rules can give, but they can also take away ... and then they can sometimes give back again.

If you know of a small, noncommercial station in your area, stop in and visit. Say hello and volunteer your time to help them out. Chances are they are under funded and can benefit from your assistance and guidance. You'll be passing along valuable knowledge and experience to some prospective broadcasters too. Make the station aware, if it isn't already, of some of the regulatory pitfalls it can fall into. Some of the systems we take for granted in our day jobs are unknown to small stations. With such a wide variety of automation choices available these days, there is no reason a station cannot program 24 hours a day, 365 days a year with some equipment that won't break their budget



Before I sat down to write this story, I thought I'd drive past the tower where the former DWRJI had been. I was quite surprised to see their two bay antenna still on the cell tower and they still hadn't reclaimed it. My bet is that they couldn't get back on site without paying some of that long overdue back rent.

Steve Callahan is the owner of WVBF, 1530 AM, Middleboro, Mass. and may be reached at wvbf1530@yahoo.com

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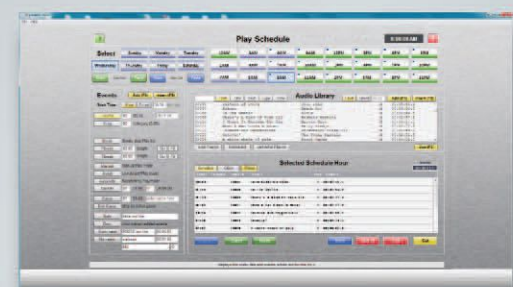


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Does the Punishment Fit the Crime?

by Peter Gutmann

As Gilbert and Sullivan proclaimed in *The Mikado*: “Let the punishment fit the crime.” There’s nothing novel about that – after all, at least in theory it’s the basis for our entire system of justice.

A recent Policy Statement suggests that the FCC at last may be moving in that direction, but it needs to go much further for its system of so-called “forfeitures” (translation: fines) to seem just. While the Gilbert and Sullivan song was full of comic examples, few licensees find much humor in the FCC version.

In May, the FCC announced a more lenient approach toward certain rule violations by student-run college stations. The specific situation involved a 250 Watt Iowa FM station, run by 19 student volunteers overseen by a single faculty advisor and with an annual budget of \$6,650. Its crime (voluntarily disclosed in its license renewal application) was to have filed several ownership reports and four quarterly issues-programs lists after their due dates and to have never created the remaining quarterly lists.

The routine penalty for such derelictions is \$20,000. In the past, the FCC has rarely reduced this amount, regardless of the size of the station or the circumstances involved, although licensees with otherwise clean records have qualified for a 20% discount. Here, the FCC entered into a Consent Decree under which the University agreed to implement a compliance plan requiring it to log all public affairs programs and compile them into quarterly lists, to ensure the timely filing of all biennial ownership reports, to instruct all station staff of FCC rules, and to engage a consulting engineer to conduct semi-annual audits of the station’s technical operation.

In addition, the University is to make a “voluntary contribution” to the US Treasury of \$2,500. (And what, you may ask, is a “voluntary contribution?” Well, a fine is a fine. Under the circumstances, that euphemism sounds like “voluntarily” handing over your wallet at gunpoint.)

The FCC coupled its ruling in this specific matter to a policy statement in which it recognized the value of student-run stations as incubators of industry talent that face challenges of financing and staff inexperience. It balanced these factors against the general need of all licensees for staff training and adherence to FCC requirements.

The new policy is rather limited. It only applies to first violations at student-run stations that involve submitting reports, placing materials in Public Files or giving public notices. The scope does not extend to substantive operational violations, which include, according to the FCC, “the broadcast of indecent, obscene or profane material, commercial announcements, illegal contests, underwriting, news distortion and other programming-related violations, violations of the Commission’s technical, public safety, tower/transmitter site construction and maintenance rules, etc., as well as recurring violations of any kind.” Moreover, relief will not be given to stations run by paid professional staff (other than a faculty advisor).

Under its new procedure, the FCC will give a qualified violator 30 days to elect a consent decree with obligations comparable to the ones imposed upon the

Iowa station. The violator must also demonstrate that it is programmed and managed entirely by student volunteer staff (and a faculty advisor). For this purpose, students are still considered volunteers even if they receive academic credit or work/study stipends. Finally, the station must submit a copy of its budget (presumably so the FCC can calculate the appropriate amount of the station’s “voluntary contribution”).

OK, let’s give the Commission credit where credit is due. Through the haze of distant memory, I recall my own college radio days, when we lived in abstract fear of the FCC but generally figured that if we didn’t overmodulate too much or curse over the air we’d probably be left alone. But I know for sure that a \$20,000 fine would have killed us. Sure, my university easily could have afforded paying it by wiping out a few scholarships. But the administration had far better things to do with \$20,000 than to bail out an errant student activity.

So this is a good start. But it doesn’t go nearly far enough. There are plenty of other stations out there that provide just as much valuable service as student-run EFMs and that need comparable relief from the FCC’s draconian fines in various circumstances.

The sad fact is that the FCC makes little effort to tailor penalties to the station involved – or to assess the impact of a substantial fine upon a station’s ability to keep operating. Rather, insistence upon full payment is likely to have a direct adverse impact upon the public service many stations are able to render.

The FCC’s general standard is to consider reducing a fine only if it exceeds 7% of a licensee’s gross annual income, as evidenced by the three most recent tax returns or equivalent documentation. Yet “forfeiting” even 5% of gross receipts could be devastating. (And note that the FCC tends to reject requests for reductions of fines by licensees with well-funded parents. Thus it will consider the resources of an entire university rather than the actual licensee.)

Also, on very rare occasion the FCC will increase a fine against an especially wealthy licensee. But while doubling a \$20,000 fine for a billion-dollar mega-corporation still has an infinitesimally negligible impact upon its bottom line, the same fine can shatter a mom-and-pop standalone that can barely make ends meet. Such inflexibility makes no sense at all.

Until some semblance of reason prevails, fines (or forfeitures, voluntary contributions or whatever you want to call them) are both a fact of life and a severe threat to the viability of small local broadcasters who can least afford them – and whose impairment will have a huge impact upon the communities they struggle to serve.

Speaking of fines, what are the danger points?

Public File – Inspectors seem to head right to the Public File, perhaps because noncompliance is so frequent. Common deficiencies include the quarterly issues/programs lists – and that means *all* of them since grant of the prior renewal – the current ownership report, EEO reports, coverage map, pending applications, political sponsorship materials and the “Public and Broadcasting” manual. Even if all are present, they must be sufficiently

well-organized so that an inspector (or member of the public) can find what he is looking for.

Other Records – In addition to the Public File, an FCC inspector is entitled to see other categories of records. These include required equipment performance measurements, certain information following transmitter modifications, time brokerage and subchannel leasing contacts and the station log. Although a far cry from the detailed record-keeping once needed to support license renewals, the station log still needs to reflect improper tower light functioning, certain AM parameters and any readings required by a station license or by the FCC. In addition, either a written designation of the chief operator must be posted with the station license, or agreements with chief operators serving on a contract basis (where permitted) must be kept in the station files and made available.

Staffing – If no one answers the door, or if whoever is present can’t answer simple questions about station operations (like: “Where is the Public File?” or “Where is your license posted?”) – look out! During normal business hours, every main studio must have either a manager present or, if she is temporarily out, another staffer who can contact her and in the meantime seems to be meaningfully in charge. Even if your station is time-brokered, you as licensee are still responsible for seeing that your main studio is properly staffed with your personnel.

Current Authorization – A copy of the current license must be posted at the transmitter control point. The “current” license may be decades old, but should authorize the present parameters of station operation. If issued to a prior owner, or before the present license term, you also must post the most recent assignment or renewal certificates.

EAS Equipment and Testing – The crucial role assigned to the Emergency Alert System leads the FCC to take compliance very seriously. Problems here include extended equipment outages, failure to monitor primary stations or receive monthly tests, and lapses in conducting the randomly-scheduled local weekly tests. As with Public Files, logging and record-keeping is essential – if you can’t document that a test was run, then as far as the FCC is concerned it never happened.

Towers – At least you know when an inspector is in your studios. Observations of towers can be made without your knowledge. Of particular concern here are damaged or missing fencing, lighting outages, and failure to post in conspicuous locations the required signage to alert the public of RF danger and whom to contact. While comparison to color intensity charts is somewhat subjective, faded painting is a further concern. Bear in mind that while a tower owner is primarily responsible for these matters, each tenant can be separately fined as well. And the FCC doesn’t care if your lease states that, as a mere tenant, you are absolved of responsibility.

Let me end with a caution about the aftermath of inspections. Far too often station personnel breathe a huge sigh of relief following an inspection because the inspector generally commended them or told them not to worry about a deficiency he uncovered. But do not mistake such remarks for a clean bill of health. You may still get a Notice of Apparent Violation, the first step toward a fine – and up to a year after the inspection. So document recollections and hold on to records relating to questions asked or information sought during an inspection, as you may need them to refresh faded memories (or substitute for departed staff) when preparing a response well into the future.

Peter Gutmann is a partner in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice, LLP. He specializes in broadcast regulation and transactions. His email is: pgutmann@wcsr.com

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Think Big – and In Stereo

by Chuck Miller, GM, WNKU

Audio – one of the many subjective sciences that makes life complete. Whatever I write, you will or will not agree with, but I'll start with this: your chief engineer is your best friend. He or she can fix things, is analytical, is patient, and is used to the seven-day workweek of an audio person.

36 years after a college recording experience went way out of phase, I've developed my own habits and opinions. Here's a few on live remotes or live in-studio sessions.

Radio Runs on Time

Concerts are scheduled for a specific time – be on time, in fact get there early. A good site survey will work wonders before the day of the show or event. Your advance phone call should be an ideal opportunity to meet the location's tech person. Have them help to look for power – and test it while you're testing your delivery method of choice back to the station. Bring a test CD/.wav file that features a series of tones – left, right, summed to center – and send them down the line to your studio. Have the board op run your channel in audition, set levels and report results to your program director. If you have an old test LP that features the stereo system phase check, be sure that's on your test disc or file. Alternatively, an old James Brown tune summed to mono in your cue buss with reveal if your line is in or out of phase.

Check the site for parking, load-in and out, noise sources, RF, food, and bathrooms. Share war stories with your new contact and give them some station swag. The day of show, you should be one of the first people at the event. Get set up and run another test back to the station – this time keeping the line fully engaged in audio delivery before the event, so the folks back at the station don't pull your plug. A thank you note to the venue works wonders for the next time.

The Day of Show

You should have a mono radio to monitor your broadcast. This will ensure you're in-phase and on-air. I'm a huge fan of audio's ability to paint a mental image. Enhance your broadcast with a stereo pair of mics mixed in for ambience. You want to capture the sounds of the event, all the way down to a truck driving across your stereo field. Think ... a sense of place. Those noise-rejecting sports headset/mic packages are great, but won't give you the mixed in ambience you want for a remote.

Call me a control freak, but sending all your programming back from the remote site gives you a bit more control of the broadcast elements. If the star of the show is willing to talk, and willing to do so within the next few moments, you can easily control your stop-set from the field and get the interview. Audio is so portable these days, an interview on a good field recorder, dumped into a PC with an editor, then fed into your mixer, will also help you create a sense of

place and maybe impress your client. One should always have an on-air, qualified board operator back at the station and ready to take over, just in case.

Dynamic cardioid pattern mics are the only way to go while out in the field. Bring a couple of mic stands, tools, tape, sunscreen, chairs, extra XLR cables, a PA, extra power cords, a UPS that will support your gear, and an isolation transformer if you have one.

On Site Marketing

Eons ago we worked a blues festival in Peoria with four of us under a 10 x 10 tent, station banner, limited swag, station shirts, and a sign inviting people to stop by and sign up to win a free CD. Watching people stream buy us, as if we had the plague, and comparing the traffic at the classic rock station's tent, featuring a very dusty '67 Cadillac ambulance, an idea formed. Next year, at the same festival we parked a shiny matador red, '57 Chevy convertible next to our tent, behind ropes. Talk about drawing a crowd! Folks came over, wondering why the car was there and what station we were. Traffic was constant and very engaging all day long. Next year we parked the '57 on one side and a black '68 SS Impala convertible on the other side with better results. The point is – think big and in stereo.

Working inside presents unique issues, too. Again, a site survey will help you get the best out of a room. Besides the standard issues of load-in/out, where you set up, bathrooms and food, the site survey will allow you time to “hear” the room while meeting the techs. You'll want to know if you can take transformer isolated mic splits from the PA crew, and if they will let you set up supplemental mics for a variety of instruments and ambience.

Using the Right Mic

To get that big classical sound out of an orchestra, a pair of Neumann U-87 cardioid mics flown about 30-40 feet up and five rows behind the conductor, a pair of Neumann KM 84 cardioids flown about 10 feet and 15 rows back (both in an XY pattern at the orchestra), with a solo mic does a great job.

An added pair of Shure SM 81's in a “matched” XY pattern, flown near the rear of the hall, and aimed at the rear of the hall, really brings out the natural reverb of a good hall supporting a great orchestra. Chances are, you can get set up, get on the house intercom system and listen to the cue calls which are a great way to let your talent know – it's almost show time.

We could go on for days about rooms, so to be brief, get there early, get to know the crew, listen to the performance

space, use ambient mics aimed at the audience not just for applause but to mix in room sound, and always test the power supply. I've spent a lot of time in live performance situations and marvel at crews who just come in and set things up the easiest way – PA stacks downstage left and right, aimed right at the audience. The folks at Bose have the right idea and that is audio dispersion. If you have a plain PA stack, try placing it in different places, with an ear towards dispersion of audio, in concert with the space.

We're currently doing a live thing in a rounded academic auditorium. The PA was aimed straight at the bleacher seats. This beat the audio into the heads of the audience, and caused it to swirl around the curves of the room making it a muddled mess in the second floor box seats. A careful and broad placement of the mono PA against the walls in a X pattern fixed the issue. Point is ... know the rules, but always be willing to break them for a good reason. Don't be afraid to try new things, because you'll never know until you try. And never be afraid to ask bands to turn things down on stage. You want audio coming from your system, not the stage monitors.

Simple rules for all folks in audio include: understanding signal paths, basic care of fragile equipment, studio technique (stand by, breathing before opening a mic, breathing off-mic, pulling a mic down in the mix if it's not being used...), knowing microphone patterns and their characteristic (you do so by talking into all your mics, all around its pattern and listening on headphones), and knowing that by proper placement of a mic (45 degrees to the left or right at either 10 o'clock or 2 o'clock) you'll never pop a plosive again.

Be a Good Listener

Safely enjoy a thunderstorm and listen to the rolling sounds across the sky, listen to a B-17 in flight or a big block Chevy just cruising at 3,000 RPM. Crank up a good recording of Beethoven's 9th, and listen to the hall, find a stereo recording of a steam locomotive and study it at life-like volumes. Turn up Gun's and Roses' *Welcome to the Jungle* and check out the crisp wooden sound of snare drum. In fact, the entire production is a real audio treat worth your study. Most of all, protect your ears with a good set of contractor's ear plugs if you go to a loud concert, when flying, when mowing grass ...

Me? I'm a lucky guy who learned about sound from an audiophile father with his MacIntosh-powered JBL Voice of the Theaters, then Bose 901s. A career in public radio allowed a college kid to experiment. My first boss liked that sense of adventure, and sent me to NPR's first “Music Recording Workshop” for a week. Another week, years later, Western Public Radio's Digital Audio Workshop taught a room full of us the brave new world of digital audio.

I've had the pleasure and honor of producing live events/concerts/sessions for 10 stations in 10 markets, large and small. This spilled into a part-time avocation with concert production, and I've managed the production of hundreds of major shows, managed seven international tours, and did the production management for the Vienna and Saalfelden, Austria jazz festivals for 26 years. Now, I've lead a studio build for my current employer, engineered live acts when I can, and lead a good group of folks in the restoration of the Sorg Opera House in Middletown, OH. I love acoustics, my Koss Pro 4 AA headphones, Bose 901 IVs, the U-87, the SM 57, Scotch 226 mastering tape, Nipper the RCA dog, and the thrill of good audio – not too loud, but just right! – *Radio Guide* –



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- SUB-03 Subaudible tone decoder and SEN-6 Subaudible encoder.
- HC-3 telephone autocoupler and AC-12 rack of autocouplers
- DTMF-16 and DS-8 DTMF tone decoders.

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Moving a Broadcast Facility *Anything Can (and usually will) Happen*

by Chris Tarr

As many of you who regularly read this column know, I recently moved our broadcast facility from our previous two-location setup to a newly renovated, 12,000 square foot state-of-the-art facility just outside of downtown Milwaukee.

This move was the culmination of almost a year's worth of work and planning, and it happened over one weekend, coordinated by one person – me! It was a monumental undertaking.

I am happy to say that if you listened to the radio, you never would have known what was going on. It was completely seamless to the listener. There were (and still are) some bugs that need to be worked out, but in general the move was a success.

So, how does one go about making such a move? *Lots* of planning and assistance!

Sometimes you get real lucky and have the budget in place to build a brand new facility with all new equipment. You can then pick a day, flip a switch, and start broadcasting from the new site. More often than not however, you're re-using some of your infrastructure and are going to have to move some equipment.

Not Practical to Move TOC Racks

That's where the planning starts. Make one list of what can easily be moved, and another list with things that simply aren't very practical to take with. For example, I've found that in most cases, it's simply not practical to move TOC racks. The amount of downtime required to clear them out, move them, and wire them back up is massive. It's almost always cheaper and easier to install new racks at the new location. If you don't want to be off the air, you'll also need something to keep your programming on during the switchover.

In my case, I was moving everything except the equipment racks. So I purchased new racks along with UPS's and accessories. I also needed a way to feed audio back to the transmitter site. I decided to use a Telos Z/IP One over a point-to-point T1 circuit. I liked the Telos solution because they're simple to set up, have plenty of nice features, and are very affordable. I was able to install the racks and the Z/IP Ones in advance so that things were ready for me on moving day.



The Telos Z/IP ONE

Another plus to having racks in place is that the wiring can be installed and tested well before the move date. Since we're an Axia house, all of our audio is over IP. I had cabling contractors install CAT-6 to all of our studios, and had everything terminate in the racks. (as an aside, I had them run 12 cables to each room. I don't need that many now, but it's cheaper to run it all at the same time than do more later) I slept well knowing that getting audio up and running was going to be a case of plug-and-play!

Once you determine what stays and what goes, you need to come up with a continuity and contingency plan. How do you stay on the air during the move? What happens if things go terribly wrong? You don't want to scramble, trying to find solutions on moving day. I came up with a plan to provide audio during the move, and a second plan in case things went wrong and we were down for longer than the original plan.

I knew that if everything went to plan, the longest we'd be down was for six hours. Our music director loaded a six hour playlist (that could be repeated) onto an iPod. I connected that to the Z/IP One and fed that to a switcher. At 6:00 p.m. (the time we started the move) the song at the old studio faded out, the operator pressed the button on the switcher and told me to go. I hit play on the iPod and we were live from the new site. Nobody could tell the difference!



That programming gave me plenty of time to get the job done – but what if things really went south? As a contingency, I had the staff voicetrack several days of programming so that if things went terribly wrong, I could simply plug one of the automation workstations into the Z/IP One, while things got sorted out. It turned out that we didn't need it.

Now that you have a list of equipment, and continuity and contingency plans, what's next? Well, this is the "orchestra" that we have to conduct. I liken it to herding cats. Lots of people are wandering around in different directions, and your job is to keep them focused on the task at hand. You need to make sure that everyone has a role, and they know what that role is. You really can't wing it, or leave anything to chance.

In this case not only were we moving studios but also everything else related to the operation – so there wasn't just equipment to worry about. All of the office related things needed to be moved as well.

I strongly recommend hiring a good moving company. The one I hired held a training class in advance, to teach the staff how to pack their boxes and organize their things for the move. It went a long way to ratcheting down the anxiety level and making sure things were organized.

Next – and I can't stress this enough – find at least two people to be "moving captains" in your absence. In the last weeks before the move, I was very busy making sure things

at the new facility were getting ready for move-in. I didn't have time to be at the old location making sure things were getting packed and prepped correctly. I was very fortunate to have two people on staff who took the burden of that facility off of my shoulders.

So now you have a plan, and the building is packed up and ready to go. The big day is here!

First, make sure you're well rested and that you're taking care of yourself. Plan to have food and drinks around. It's easy to get caught up in things and you can't always step away to grab something to eat. You won't be making good decisions if you're tired and hungry.

Second, make sure you have plenty of help. Not just brawn, but brains as well. Things can quickly fall apart, so you need to be sure to have other people available to not only help solve problems, but to also take charge of other tasks if you have to change your focus.

Time to go! Hopefully all of that planning has paid off, and before you know it you're up and running in the new digs! Sometimes, though, the best laid plans still lead to an appearance by our friend Murphy!

In my situation, the move went fantastically well. We started on a Friday at 6:00 p.m. We hit the switch and started taking down the two studios. The moving trucks left the old facility at 9:00 p.m., and we were unloaded at the new place by 11:00 p.m. The main studio was assembled to the point that we had programming back at 3:00 a.m. At that point we went to bed and came back later in the morning to get working on the rest.



Things were going well when I got "the text." The PD sent me a message saying, "I'm sure you're aware that the song that's on the air is skipping." Uh-oh ... I put the studio workstation in "local mode" and went to work. It turns out that the file server lost a RAID controller card at the worst possible time. Remember when I said to make sure you had some brains? One of the people who was there to help is a systems administrator and was able to jump in and start working on the server problem so that I could focus on putting things back together. Had he not been there, I would have been distracted for several hours trying to resolve the problem. I also had a friend of mine with me who has helped me with many moves over the years. He not only understands what needs to be done, but is also very good at taking things off of my plate so that I can focus on the bigger picture. There is no way I would have been able to do this move without their assistance.

Long story short, by the end of the weekend the server was running, the studios were installed, and most of the equipment was working correctly. A successful move by any metric – and I only gained a few extra grey hairs!

Moving any business is difficult and disruptive, especially when you have one that has as many special technical needs as a radio station. However, with proper thought, planning, and help, it can be done quickly and with minimal impact.

Christopher Tarr CSRE, CBNE, DRB is the Director of Radio Operations/Engineering for 88Nine, Radio Milwaukee. He can be reached at chris@radiomilwaukee.org

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Disaster Preparedness

Disaster Recovery

by Tom Bosscher

Disaster Recovery is a huge buzz word, and people are making millions to pass along advice, good and bad. I would like to look at a few different areas.

Personnel. That's personnel, not personal. As in people. As the engineer of your facility, how many passwords do you have in your head that go with you when you go "toes up?" Seriously, what will happen to your organization? There are some computers that could take you hundreds of hours to crack its password. And some computers won't ever give them up. And what about the mid-day announcer who is a genius on the website? How many passwords does she have tucked away? To talk about this may seem trite, but if it were to happen, there is going to be a large amount of unnecessary work to get around your lost passwords.

Don't forget the transmitter remote controls. I inherited a station where the chief engineer/owner died, taking the VRC-2000 password with him. In this case, I dug around and found another engineer who had worked at the site, and he "let me in." Otherwise, that would have been a lot of pushbutton programming. In today's busy life, it just becomes too easy not to write these down. And the moment you commit the passwords to a file on a computer, it could be stolen. One old fashioned but very effective way is to simply write the

passwords on paper, and stuff those, with the current date on an envelope, into the company safe. Paper? Yes, paper! You read it here first.



Now, something personal, but it applies to your radio stations. A few months ago, the township fire chief screamed by my house. I flipped on the scanner and a house just two blocks away was on fire. I arrived about 90 seconds after the first fire truck, and I was stunned. This nice suburban house was half gone. Now, I had myself convinced that I was pretty clever in protecting all my

personal data at home. Archived videos of the kids and grandkids, 45,000 pictures – all triple backed up. But what about that house fire? If that would have been my house, all three hard drives would be gone.

That night I ordered out two 2 TB hard drives – about \$190 for the pair. I have one labeled odd months, the other even months. Both are configured to be recognized as drive "T:". That "T" stands for transportable. I have the program *Second Copy* configured to copy my archive hard drive, my main hard drive and my wife's hard drive to this T drive. Once a month, I hand carry this hard drive to one of the transmitter sites I take care of, and bring the other one home. It then gets caught up. I may lose up to a month's worth of information, but I have the archives. House fire or not, flood or tornado, the pictures of the eight grandchildren are safe.

Now what does this have to do with your stations? Many of us who are not owned by a large national group do not have the facilities for a large amount of offsite storage. Sometime we can get a link to a transmitter site, and that is good. But even with that, you might want to look at the cost opportunity of backing up absolutely everything in your facility to one or two transportable drives.

If you did have a facility disaster, having all the files of your place, including production cuts, sched-

(Continued on Page 22)



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Smarter phones.

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Network everywhere.

No need for cheesy A/V mixers — RAQ lets you put a networked, professional console anywhere, at a price that'll make the even stingiest GM smile.

Double your pleasure.

Did you know that one QOR.16 console engine will power 2 RAQ or DESQ mixing consoles? Makes your money go further on news bullpens, production pods, ingest stations, etc.

Step to the side.

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Built to last... and last, and last.

Element modules are machined aluminum with wear-resistant Lexan inserts for long life. We've even designed custom-molded guides to prevent tears around the fader slot. No "ouchies" here.

Unlimited vision.

Some console makers give you "switched meters" to save costs. iQ does away with that annoyance: high-rez OLED displays meter all 4 buses at once.

A low price shouldn't mean "cheap".

Other companies cut corners on their low-cost consoles. Axia packs in as much as possible. Real conductive-plastic faders, machined-aluminum work surfaces, anodized rub-proof markings, aircraft-grade switches. At a price less than some analog "bargain" consoles.

Rack 'em up.

Turn your Radius 8-fader console into a rack-mount powerhouse. Great for OB vans, performance studios, concert remotes and more.

Good timing.

Unlike those other guys' small consoles, DESQ has an event timer and an NTP-capable clock — built-in, not extra-cost. Because time is money (pardon our pun!).

Small but mighty.

DESQ packs big console power into just 18" square. 6 faders, 2 buses, automatic mix-minus, Show Profiles and more. Perfect for standalone or networked studios.

Axia makes the switch.

No "plug-n-pray" unmanaged switches here; Axia builds our own custom zero-config, built-for-broadcast network switch right into our PowerStation and QOR console engines.

Show-off.

Element lets you store up to 99 Show Profiles — "snapshots" that recall channel sources, bus assignments, EQ settings, even fader positions. So every jock can have their own customized console.

Speak your mind.

Element consoles have comprehensive talkback features. You can talk directly to remote codecs, phone callers, adjacent studios... even individual talent's headphone feeds. Even our most cost-effective boards let you talkback to callers and codecs.

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Our meters aren't just good-looking; they're designed specifically to convey the most information possible at just a glance. And Axia consoles support VU and PPM metering styles — something you might not find on consoles that cost a lot more.

Big power, small price.

Radius loads you up with 8 faders, 4 mix buses, automatic mix-minus, onboard EQ and voice dynamics and more — for just \$5990 USD. Shh... don't tell the accountants.

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makes life much simpler. They also appreciate our 5-year warranty and 24/7 technical support (not that they need it).

In fact, we calculate that thanks to our huge selection of frame, module and mixing engines, there are at least 32,209,982 different ways to order an Axia console. With that many options, you'd better get started now! Mmm... don't you just love that new-console smell?

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Disaster Preparedness

– Continued from Page 20 –

uling programs and data, right across town, well, that would make you the engineer who saves the day, once again. I do not have the boxes of hard drives on-line just yet, but soon I will have two sets of multiple bay hard drives that will have everything backed up, with one set staying in my garage. At the worst case, the data will be one month old. But all your music, production cuts, financials and music scheduling information will be safely backed up.

A lot of ink has been used to talk about site disaster recovery. We in the broadcast business have seen what can happen to stations, due to sudden displacement of their studios by hurricanes and floods. But there are many events that can get you out of your studio. Here at Cornerstone University, about five years ago, we were kicked out of our studio building as the gas station next door emptied thousands of gallons of gasoline into the ground. Sitting on clay, it went everywhere, including our floor drains. The fire department showed me a combustible level in our fake floor that was enough to rip the building from the foundation. So we broadcast across campus for four days while the experts did their thing. That was an exercise in Mcgyverism. It also led to thinking about the next time – and there *will* be a next time.

Just a few weeks ago, in downtown Grand Rapids, the local Clear Channel cluster studio complex had such an event. A large fire riser water main in a building next door was punctured, and massive amounts of water filled the

lower parking garage, destroying dozens of cars, and sending gasoline into several downtown businesses. The fire chief ordered all buildings emptied of people, and all power shut down, including disabling the emergency generator. The objective was no sparks. One does not normally plan for this. In my forty years of broadcast employment, I have never heard of having to leave their studio building due to a flood from an adjacent parking lot structure – but it happened. Now being Clear Channel, they have a really elaborate Vsat system with receivers at each transmitter site. So while it was a disruptive time for the employees, especially engineering, they stayed on the air, serving those listeners.

So what can the rest of us do, without having access to that level of infrastructure? Today, DSL, cable modems or a wireless ISP installation at each of your transmitter sites is not cost prohibitive. Not only is it nice to have a computer with access to the Internet at your transmitter, using programs like LogMeIn® allow you to check into the transmitter from anywhere, including your smart phone. And if you lose your \$12,000 950 MHz digital STL, you can always bring up your Internet stream and switch it on the air. Right behind the installation of this, talk to your sixteen year old neighbor, and have them install a hardwired VPN tunnel between the studio and however many transmitter sites you can. Now, you can use that older on-air computer that you retired from daily studio use, and put that at the transmitter site. Install a remotely controlled on-air switcher, and you can start up that on-air computer at the transmitter site and switch it to air, from home.

Your next step is to have a small mixer, two hand held microphones, and a couple hundred feet of cable with connectors all set to go. With this located at the transmit-

ter site, if you lose the studio, you can bring up the transmitter site computer and put it on the air from your smart phone – then drive to the transmitter site and have the announcers live on the air. Brand new, the equipment should not cost more than \$700, or much less if your backroom is typical of most stations. For wiring, look at buying some CAT 5 50 foot and 100 foot cables and using the Studio Hub dongles.

And if your boss/owner tells you that there is no need for this type of planning, bring them out to your parking lot. Have them look across the street at another building. Then tell them to close their eyes, and slowly turn 180 degrees. Now, with their eyes still closed, tell them that when they open their eyes in five seconds, their studio is gone. Totally gone ... nothing. Have them open their eyes, and remind them, nothing is there. Then tell them that you are going to lunch and will be back in one hour. And when you get back, you are going to ask them what their plan is to get back on the air and produce revenue and maintain listenership. And you, as the engineer, take those sixty minutes for lunch.

Tom Bosscher is the Chief Engineer at Cornerstone University Radio. Email him at: tom@bosscher.org



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31-Band Audio Processing Explained

Recording engineers and pro audio folks know what to do with it. Here's an article that explains why you need it for radio.

We're asked periodically why we do the things we do. We don't have an answer for everything, but we have a few good ones for the features we've designed into our AirAura X3 and FM-531HD audio processors. Particularly about WHY 31-band processing is best.



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Your Digital Reality Check

What to expect from the all-digital chain and why what happens in the processor is more important than ever

Digital, like certain politicians, needs a reality check every now and then. As an industry, we tend to expect more out of digital than it can possibly deliver. It's easy to do because digital signal processing has been a good friend to us.

But let's be clear here. The all-digital air chain can't solve all our problems any more than our politicians can. It can't add frequencies where there aren't any and nor can it make up for crummy source material.

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M-4IP: Four Channels of Famous Wheatstone Mic Processing

Wheatstone's M-1 Mic Processor is a broadcast standard, making more voices sound the best they can, day in and day out. The new M-4IP gives you four channels of that famous processing, controllable on the WheatNet-IP Intelligent Network.

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Moving Along

Seven Clear Channel San Diego studios get LX-24 Consoles

It's hard to find a broadcast engineer these days who isn't on the move.

The closest candidate is John Rigg, director of engineering for Clear Channel in San Diego. And by move, we mean actual address move – as in, moving the studios to a new location. Otherwise, we're sure that Rigg is constantly on the move with seven stations and 40 studios under his care in one of the nation's top rated markets.

What we find unique about Rigg, besides his acute sense of humor, is that he's updating Clear Channel's broadcast facility on Granite Ridge Drive one studio at a time. More often, we find that broadcasters make sweeping routing and console changes only when they build out an entirely new facility in a new location. But not Rigg.

Get the whole story here: october13INN.wheatstone.com



Compact control surface descended from flagship LX-24...

Meet the all new L-8

There's always a small space that can benefit from having a top-of-the-line piece of gear. The L-8 is exactly that - not dumbed down in any way.

This cousin to the popular LX-24 is big in capability but scaled for news production, voiceover work and all those applications requiring a solid control surface that will deliver under deadline. The L-8 is based on all the same design principles as the LX-24 – a precision-built, low-profile, tabletop IP control surface that offers assignable sources to any fader and with hot-swappable individual fader modules.

Each fader provides access to four stereo busses, a stereo cue bus, and its own individual Bus-Minus. An LED source name display, an A/B source selector, and one programmable soft button are also available, and a SET button provides access to assignable controls in the master section. Snapshots of the L-8's configuration can be saved and recalled at the touch of a button, making setup for different working sessions a snap.

Get the whole story here: october13INN.wheatstone.com

Chief Engineer

Industry Standards Become Yesterday's Technology

by Scott Schmeling

This column will be a little different than in previous editions. No account of field fabricating transmitter parts, no troubleshooting, no repairing ice damage. None of that fun stuff! This time we're going to do something really difficult.

In the *Radio Guide* Nov/Dec-12 issue last year, I shared one of my New Year's resolutions with you. Since I tend to keep things longer than necessary (and I was running out of room), I planned to throw something away every day. I haven't quite succeeded in the "every day" part of that resolution, but if you were to check the things-to-day ratio, I think I'm fairly close to being on track.

It had been a while since I'd thrown anything, so a few weeks ago I spent a couple days playing "catch-up." I took boxes ... and boxes ... and boxes of stuff outside to sort through it. Admittedly, much (if not most) of what was there was no longer needed. There were a lot of old trade magazines that I was saving for a specific article or column. It's probably safe to say that information from 1995 was quite possibly outdated? I saved a few of the articles and columns, but the vast majority of the paper went to recycling.

I said last December, that I *hate* to throw something away if it still has *potential* use. As I sorted through things, that question of potential use came to mind a number of times. I called a couple friends – John Simms at RF Specialties and Mark Persons of Mark Persons and Associates, to see if a couple of the old industry "standards" might still be of some use to someone. The two items in question: Moseley MRC-1600 Remote Control Units, and SEDAT Satellite receivers. The answer in both cases – they are no longer of any use.

It didn't seem that long ago, if we were building a new station, we ordered an MRC-1600. When visiting a station, you would almost *always* find one in the rack. I must have seven or eight units – two or three of them had been modified to MRC-1620 for use with Moseley's Task Master software. I remember how revolutionary it seemed to be able to call a transmitter site with a computer and modem from almost anywhere, and be able to take readings and control the transmitter.



I say "almost anywhere" because the connection was on a hardwire telephone line to a modem connected to the MRC-1620 at the transmitter site. You didn't have to be at the studio, but you did have to be somewhere with access to a phone line – and have the software loaded on a computer with a modem. Now, of course, a number of manufacturers supply dial-up and/or IP-based remote control systems that we can access using a cell phone or smart phone from virtually anywhere!

I may be showing my age here, but when I started in radio (somewhere around 1964) our network feed came in on a dedicated phone pair. In about 1980 or '81, I installed my first satellite dish to receive our network. A couple years later the analog receiver was replaced with the new Scientific Atlanta SEDAT digital receiver. I don't know why I remember things like this ... but SEDAT stood for Spectrum Efficient Digital Audio Transmission. Network program distribution had a new standard! Now we could change crystals to switch to a different transponder, and the audio channel cards had thumbwheel switches to allow access to different program feeds. And ... the receiver chassis could hold more than one audio card, which meant we could have different simultaneous programs for multiple stations. It couldn't possibly get any better!



The SEDAT receiver remained the standard for several years, but eventually, the SEDAT receiver was replaced with the StarGuide receiver. The StarGuide was only two rack units high, considerably smaller than its predecessor (as I recall, about sixteen rack units for the original Scientific Atlanta), and included a front panel display and buttons to navigate menus and options for program channel changes.

(Continued on Page 28)

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Chief Engineer

– Continued from Page 26 –

Only a few years later, the StarGuide was replaced with the XDS receiver which boasted four output channels, on line scheduling ... but I'm sure you all know about the XDS.

Something else that has been de-rated from "Industry Standard" to "No-Longer-in-Use" is the cart machine. The ITC Premium Series (single and 3-D) cart machines were standard equipment in stations everywhere. I know there are *still* stations using cart machines, but for the most part, cart machines have been replaced by computers using any of a number of audio playback programs.

And when was the last time you saw a turntable in use at a radio station? As far as that goes, how about an Otari 5050B reel to reel machine or a Marantz cassette machine? They were all once considered industry standards, but I think it's safe to say you see very few of them in use any longer.

Thinking back, I will be the first to admit that I don't miss cart machine maintenance one bit. I used to lug around a tool box specifically for taking care of all the cart machines. After thoroughly cleaning the heads, pinch rollers, and capstan shafts, I would check head alignment and frequency response. If aligning the heads didn't take care of the frequency response, it usually meant changing the electrolytic caps in the playback amplifiers. After checking all that on each deck in a studio, the levels would have to be adjusted so all decks were the same. It took a lot of time, but when the project was finished you *did* leave with a sense of accomplishment.

I even had some tools that I had specially modified for cart machine work. I had a paint stir-stick that I had trimmed so that it would slide in on the right side of the cart deck and close the cart sensing switch, which allowed me to push the start switch and engage the pinch roller, making it much easier to clean. Of course, I could sometimes do the same thing with my

finger – or a pencil, or letter opener – but the paint stir-stick stayed in place nicely and allowed me to use both hands for the cleaning process. Which was nice, because sometimes I would need to hold a small flashlight in one hand to watch the progress of the cleaning.

I also had (still have) a nut driver – quarter-inch as I recall – that I drilled down the handle and into the shaft. With this "little wonder" I could loosen the locking nut on the head alignment allen screw, and insert the correct size allen wrench through the handle and down the shaft of that nut driver to align the head. While holding the alignment screw steady I could tighten the locking nut without fear of any head movement. (I probably should have patented that idea!)

I did discover a new use for the old standard ITC cart machine. There's a company in Lexington, Kentucky that will take your old cart machine and make a lovely table lamp out of it. I'm *not* kidding – see the photo above. To turn the lamp on, you simply insert a cart (if you can still find one). You can enter <http://www.shannonlamp.com/ITCcartmachine.htm> into your browser to find out more.

I haven't disposed of the remote control units or the SEDAT receivers yet, and I have a number of cart machines on the shelves – so if any of you have a use for them let me know. Otherwise I'll be salvaging the power supplies and junking out the rest.



And I found something else. There were several "home-made" projects, ranging from simple power supplies to small amplifiers – and a fairly elaborate relay panel. It reminded me of how much I really enjoyed designing and building solutions. I loved being able to design a circuit for a specific purpose, then build it and watch it work! One project that I recall was simply using a 555 chip to delay a satellite relay closure for a specific period of time (seven seconds, as I recall).

Another time we were running *The Christmas Network* at four studio locations so no one would have to work on Christmas Eve or Christmas Day. Unfortunately, even though the network was satellite fed, there were no relay closures available for remote cueing. They were, however, sending 25 Hz tones to signal the local commercial breaks. Rather than purchase four 25 Hz sensors to use once a year, I decided to build my own. Off hand, I don't recall what chip I used, but I built and bench tested them, and they worked like a charm.

Rather than build a power supply, I simply wired a 9 volt battery clip to them. I figured a 9 volt battery would power a one-IC circuit for a good long time. I know – not very "scientific." During the week before Christmas, I made the rounds and installed the sensors at the four locations that needed them. Even though they worked on the bench, and I tested them after installation, they did *not* work when we started the Christmas music broadcast. The problem was traced to ... dead batteries! I hadn't checked the current draw and the batteries had been drained. A quick call to the other locations – a battery change – and all was good again. Oops!

Over time, industry "standards" become yesterday's technology and are replaced by the latest state-of-the-art technology which becomes the *new* standard. And at the current rate of technological advancement, who knows how long today's standards will last. It seems the only constant is change.

Until next time ... keep it between 90 and 105!

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. You may email him at: scottschmeling@radiomankato.com



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From the Ground Up

Is An FM Auction for You?

by Jim Turville

With the gavel having fallen on Auction 94, in May of 2013, there seems to now be a reasonably regular schedule of the FCC auctioning off available FM spectrum. However, a very small percentage of people actually participate in the process, making it seem either mysterious or exclusive. Neither of those views is necessarily correct, and some information can possibly help you decide if joining the ranks of FCC Auction participants is right for you.

Beginning in July 1994, the FCC instituted the Auction system for PCS and Cellular operating spectrum. In 1996 it was expanded to DBS spectrum, and with those successes, the sky became the limit on its use. The first auction involving broadcast permits was held in September of 1999. Known as Auction #25, it was a closed group of 242 bidders seeking 115 television, radio and translator applications, which had been mutually exclusive and clogging up the works in the FCC processing department – some for as much as a decade. After 35 rounds of closed bidding, the FCC had a gross bid income of nearly \$69 million, setting the pace for the future of spectrum auctions.

The first full, open auction of FM permits was scheduled in February of 2001 with Auction #37, which was delayed for administrative and procedural reasons until November of 2004. That open auction saw 456 bidders qualify to participate in the acquisition of 290 FM permits.

In the end, 110 bidders won 258 FM permits for a total gross bid of just over \$178 million. Auction #62 in January of 2006 saw 96 Bidders win 163 FM permits for a total gross bid of just over \$70 million; Auction #70 in March of 2007 saw 60 Bidders win 111 FM permits for a total gross bid of just over \$24 million; Auction #79 in September of 2009 saw 53 Bidders win 85 FM permits for a total gross bid of just over \$6 million; Auction #91 in April of 2011 saw 66 Bidders win 108 FM for a total gross bid of over \$10 million; Auction #93 in March of 2012 saw 56 Bidders win 93 permits for a total gross bid of \$4.4 million. The most recent action being Auction #94, which closed in May of 2013 and saw 55 Bidders win 93 permits for a total gross bid of \$5.3 million.

That history shows us some interesting things about the FM Auction process. First, it started really big; some of the permits in the early auctions were, in fact, some really large signals in top markets. The top permit in Auction #37 was a Class C in Mesquite NV on 96.7, which sold for just over \$7.1 million. It became KYLI(FM) which was modified in 2010 to Bunkerville, NV and became one of the Las Vegas FM signals. In fact, in order to get below \$1 million in cost, you have to get well past the top 25 permits sold in that Auction. Values were high, potential was good, and moving signals to richer urban areas was still viable.

Secondly, as you can see by the number of permits offered, the number of participants and the gross revenues earned by the FCC, the subsequent Auctions got progressively smaller. This is a natural progression since the permits offered got to be less strategically located and less valuable. Let's face it; if we examine the FM spectrum in and around the Top 100 markets, it's already pretty full. Most of the opportunities for "move-in" signals have long since been taken, and with the tighter restrictions in place now in the Rural Radio Act, moving a signal toward urban areas is increasingly difficult. As the pickings got slim and the regulations got harsher, the big players dropped off the scene for the most part.

To us optimists, what this really means is the increased ability of some of the smaller players, and even some entry-level station owners, to participate in the Auction process. If one is willing to start their broadcast ownership in a smaller more rural community, then there are some opportunities to be had in the Auction process. While a great number of the allotments which are on the current and upcoming Auction lists are those which were created as pawns in the great chess game of circle-moving, that does not mean they are not viable broadcast opportunities for the right technical person to build – and the right operator to run. In fact, many of the permits offered in the Auctions are never sold; after being re-offered in subsequent auctions a time or two, the FCC routinely removes them from the list permanently. In the re-auctioning process, the opening bid is often reduced in an attempt to entice newcomers to the process. In the just-completed Auction #94, there were 112 permits offered, 25 of which were recycled from the 3 previous auctions, with 30 of the permits offered for an opening bid of \$1,500 or less. Of that initial 112, there were still 19 permits which had no opening bid placed on them; a single bid at the minimum

(Continued on Page 32)

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From the Gound Up

– Continued from Page 30 –

opening value would have purchased *any one of them!* The FCC has subsequently removed several of those unsold permits from future Auctions, simply because of a total lack of bidding interest.

I'm not suggesting that every available CP has value and should be acquired. As noted already, some of these allocations were put there only to act as fillers for some other frequency move project involving an urban area shuffle. Many of them are in locations, and are sufficiently hemmed in by other facilities, to the point they cannot ever serve any population. But I read every Auction list, and take time to look at every facility, and can tell you with some certainty that there are some viable signals to be had in the Auction process which go unsold every time. Most are in rural areas where this Auction allocation is the only radio property for 30 miles in any direction. And while the population that the signal covers might be sparse, one would have a relatively captive audience to program to.

With some clever Engineering, a Class A or even a Class C3 facility can be built on an extremely affordable scale, meaning revenues from the smaller rural areas are able to support a local radio operation. Even if the allocation is a C1 or a C2, when the long form application is made, a lower class facility can be requested.

The FCC always cautiously advises potential participants to do their own due diligence on the viability of each of the permits to be offered. They do not ever guarantee that, should you be the winning bidder, your long-form application will be granted. There have been, on occasion, permits offered in the Auction process that end up being not

technically viable when the complete FCC Form 301-FM is prepared. Each potential participant should do sufficient research on the proposed allocation to determine what, if any, area-to-locate exists for the FM channel. As noted, any allocation can be one-step downgraded to a lower FM class, which often opens up a whole new world of potential sites. Any allocation can also be one-step upgraded on the same or alternate channels if the spectrum permits, often giving a much larger potential coverage than indicated in the original Auction listing. A due diligence study done by an experienced Consultant can be done quickly and affordably, and is well worth the cost in knowing what you may bid on is a viable FM channel and location.

The Auction process itself can be intimidating at the very least. The Public Notice which always precedes each Auction is usually 60+ pages of FCC-speak containing endless footnotes and references that appear to be total gibberish. But there are resources that help the layman to understand the process, not the least of which is the FCC itself with on-line tutorials and guides. With each of the recent Auctions, an on-line Tutorial was made available about 3 months prior to each Auction, which detailed the steps necessary to become a participant. While I heartily recommend that a potential participant seek competent FCC qualified legal counsel, I am personally aware that someone that takes the time to read and research the process can tackle it on their own successfully.

There are a few basic steps that have to take place to participate in an Auction process, which are always outlined in a series of Public Notices issued by the FCC – beginning typically 5 or 6 months in advance of the scheduled Auction dates. The first action step involves filing an FCC Form 175, stating your entity information and on which permits you intend to place a bid. This action restricts you to being able to place a bid on only those

permits selected, so some forethought is needed. It does not require you, however, to bid on all of those selected so you can be optimistic in your selections. Many applicants select every available permit, just to keep their options open. Following that filing, a subsequent payment equal to the amount of opening bidding credits you wish to have available is required, where each dollar represents one bidding credit. If one submits this upfront payment and any or all of it is not used, it will be refunded after the close of the Auction. These actions are carefully explained both on-line and in the Auction Public Notice, and are not nearly as complicated as may be initially viewed.

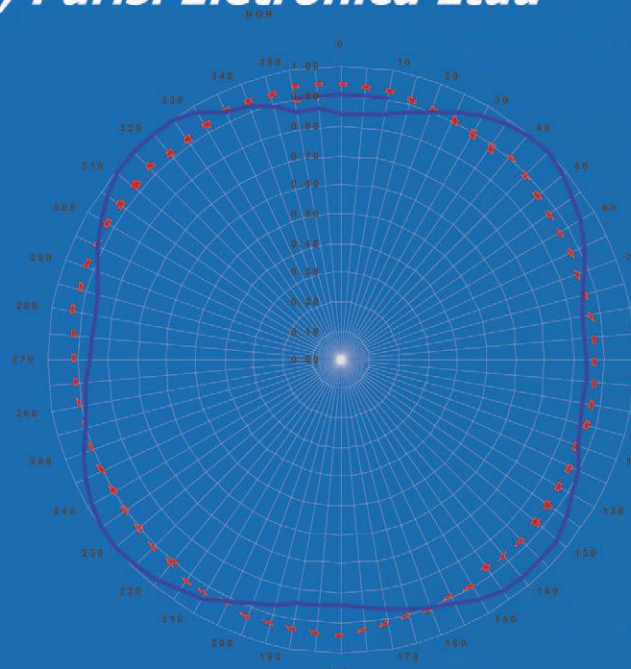
The Auction itself is an on-line process, conducted in a series of rounds; the conclusion of which is at the close of the round where there are no more bids on any permit. Your desired permit may see little or no further action after your opening bid, and you may be declared a winner shortly thereafter, while other permits continue to be bid upon. After the conclusion of the Auction, a formal filing window will be announced when the long-form application is to be filed. Traditionally, processing is quite quick with new CP's beginning to appear in mere weeks thereafter.

While the Auction process may not be for everyone, it just may be for more than realize it. If you are interested in becoming a station owner, or expanding your own portfolio of properties, I heartily recommend that you look carefully at the next Public Notice for an upcoming FM auction and consider the potential that may lie in that list of permits.

Jim "Turbo" Turvaville has been Director of Engineering and I.T for WAY Media (www.wayfm.com) since 1999 and currently works in their Corporate Office in Colorado Springs, CO. He also maintains a small clientele of stations under his Turbo Technical Services (www.jimturbo.net) operation providing FCC application preparation and field work. He also filed to participate in the last FCC auction, just to get a feel for the process.

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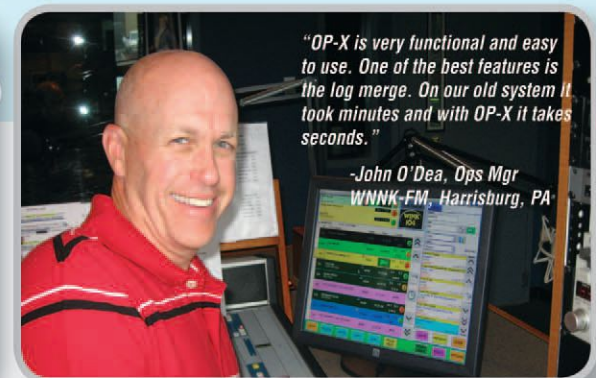
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A Tower Primer

by John Bredesen

Towers: Love 'em or hate 'em; they are a fact of life in the broadcast industry. Both the Federal Communications Commission and the Federal Aviation Administration take them very seriously. That should be an indication that knowledge of the Rules and Regulations relating to these structures is imperative. Fines upwards of \$25,000 in recent years give an idea of how serious it can be not to follow these R & Rs. As an FCC inspector told me years ago: "Some consider it downright tacky when an aircraft hits a tower because the lights weren't working."

Details on this subject are far more extensive than can be covered in this article. I'm going to highlight some areas and give references to documents where those details can be found.

Please note that when I use the word "tower" in this article, I'm really referring to any registered structure which supports an antenna subject to the jurisdiction of the FCC. And it must be understood that since towers are required by broadcasters, but intrude into airspace, both the FCC and the FAA cooperate and work together to assure safety for aircraft. For this reason both agencies are referenced in the article.

Antenna Structure Registration (ASR)

ASR is an on-line database maintained by the FCC, which stores information on all registered antenna structures such as location, height, lighting and other information such as ownership. As noted above, this database includes more than simply towers. It also includes antenna support structures

such as buildings, smokestacks, etc. Generally, any antenna support structure taller than 200 feet above ground, or is within the flight path of a nearby airport, must be registered.

Prior to the ASR system, each broadcaster supplied tower information as determined by them, even if there were multiple users on a given tower. Needless to say, conflicting coordinate and tower information was inevitable, and often nobody knew precisely where the tower was, how tall it was and, in some cases, who actually owned the tower. These problems were largely resolved with the implementation of the ASR system because there was now only one knowledge base per structure.

When application for registration is approved, a number is assigned to that structure and it must be prominently displayed. When broadcasters file with the FCC to use that tower, they refer to the registration number which assures consistent information.

Access to the ASR system is at: <http://fcc.us/9nHGt>

Tower Marking

Marking refers to whatever visible devices are necessary to assure aeronautical safety. This usually means painting and lighting. The document that covers this subject is the Federal Aviation Administration's Advisory Circular AC70/7460. It can be found at: <http://1.usa.gov/19flj24> This publication includes marking information not only on antenna structures, but also smokestacks, water towers and other structures of a non-electronic nature that protrude into airspace.

No matter what this circular says, when an application is made for the construction of a tower, the FAA will perform a study of the specific situation. If it is determined that the specifications detailed in the Circular are adequate, the applicant will be so notified. Two fictional examples below illustrate how a marking deviation from this standard could occur.

1. A 200 foot tower is erected in the midst of taller towers as might occur at an antenna farm. The "umbrella" effect of the taller marked towers could provide the protection needed for the shorter one, so marking might not be required.

2. There are also situations where a structure "of greater height or size" may present such an extraordinary hazard that higher standards of marking and lighting would be required to assure aeronautical safety.

The bottom line is that the FAA must make a determination of "no hazard" before they will approve a structure. If for some reason the determination of no hazard can't be met, the application will be denied.

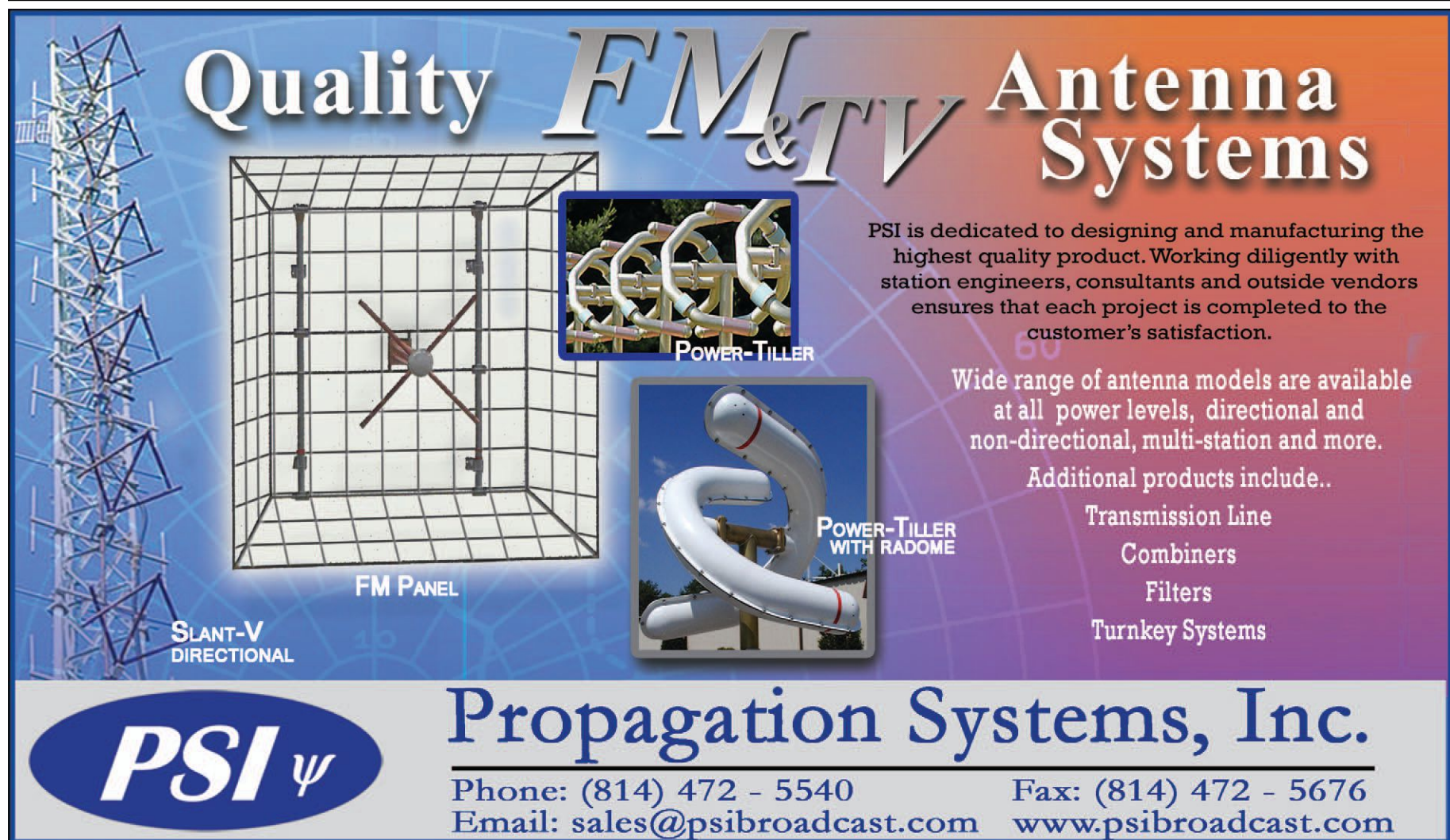
Tower Painting

The purpose, of course, of painting and lighting a structure is to make it as visible to pilots as possible. Painting is one way of doing that. For towers, the FAA specifies alternate aviation orange and white stripes, applied in number and widths determined by the height of the structure. An interesting fact is that the number of stripes is an uneven number, and the top and bottom stripes are aviation orange interspersed with white.

The tower owner not only must adhere to painting specifications as set forth in the construction authorization, but also must maintain the structure in good condition in future years. Many owners have been heavily fined for allowing paint to fade, chip and peel. Section 17.50 of the FCC R & R says very succinctly: *Antenna structures requiring painting under this part shall be cleaned or repainted as often as necessary to maintain good visibility.* And before you say, "well, it's the owner's responsibility for tower marking," note

(Continued on Page 36)

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Tower Topics

– Continued from Page 34 –

that Part 73.1213 says in part that: *In the event of default by the owner, each licensee or permittee shall be responsible for ensuring that the structure complies with applicable painting and lighting requirements.*

Tower Lighting

The FAA's Advisory Circular 70/7460 is the document with specific information about lighting. As is the case with painting, the general rule is that towers 200 feet or taller, or that lie within the glide slope of a nearby airport, require lighting. Lighting comes in many flavors. While the type of lighting required for a particular structure is determined before it's built, once in operation it literally requires daily monitoring.

The traditional lighting method is a series of red obstructions lights (small and burn continuously) and flashing beacons, the number and type of each depend on structure height.

A relatively new lighting technique consisting of white flashing lights can sometimes be approved. In some cases this lighting method can eliminate the need for painting the tower.

The effectiveness of even the best lighting system is diminished if it's not working properly, or not working at all. This is why monitoring of tower lights is required. Here are the basic requirements:

1. Tower lights must be observed once every 24 hours, either visually, manually through telemetry, or with an appropriate automatic system.

2. Daily observation results must be logged at the responsible control point.

3. If a failure of any flashing beacon or top mounted obstruction light is observed, and can not be repaired within 30 minutes, this information must be reported immediately.

The procedure for reporting tower light outages is as follows: dial 1-877-487-6867. When prompted by the phone

tree, say the state where the light outage is occurring. Give the briefer the outage information and they will issue a NOTAM (Notice to All Airmen) advising pilots of the tower light failure.

It is not required to report the failure of a steady-burning side mounted obstruction light, but it must be repaired as soon as possible.

When a reportable failure occurs, the information reported should include the following:

1. Name, title, address and telephone number of the person reporting the failure.
2. Type of structure (tower, antenna on a building, etc.).
3. Location of structure including latitude and longitude, if known, and the closest airport.
4. Height of structure above ground level (AGL) or above mean sea level (AMSL), if known.
5. The probable date for return to service.
6. The FCC ASR number.

A NOTAM automatically expires after 15 days so if an extension beyond that time is needed, it's the responsibility of the station to notify the FSS of that fact.

It is also very important to notify the same FSS when the repair to the lighting system is completed. The FAA routinely notifies the FCC when tower owners fail to contact the FSS by the end of the NOTAM expiration window, even if the lighting system has been repaired. They also notify the FCC if an extension has been requested. The expectation is that it shouldn't take that long to change a light bulb, repair the photocell, or whatever caused the failure.

There is also a requirement for a lighting inspection separate and apart from the daily observations. Again quoting the FCC, Part 17.47b: *The owner of an antenna structure which is registered with the Commission and has been assigned lighting specifications ..., shall inspect at intervals not to exceed 3 months all automatic or mechanical control devices, indicators and alarm systems associated with the antenna structure lighting to insure that such apparatus is functioning properly.*

Keep a contemporary log of this inspection.

As I mentioned at the beginning of this article, significant fines are routinely levied against those tower owners that fail to take tower lighting seriously, and that includes neglecting to report lighting failures and perform the quarterly inspections.

Fencing

There are many reasons for keeping the public away from towers. Vandalism, theft of transmission lines, suicides (yes, it's happened), shock and radiation dangers are but a few. FCC Part 73.49 says in part: *Antenna towers having radio frequency potential at the base (series fed, folded unipole, and insulated base antennas) must be enclosed within effective locked fences or other enclosures.* Not specifically stated, but certainly implied, is that a fence must continue to be "effective". For RF reasons, many fences around AM towers are constructed of wood which usually has a shorter life than a metallic fence. Inspection and, if necessary, repair by the owner is required to maintain that effectiveness. Again, fines are routinely levied against those stations or tower owners that fail to meet this requirement.

This is a synopsis of some of the important points regarding antenna structure safety. For more detail, visit the websites I've listed.

One final personal observation: The FCC Inspectors I've dealt with over the years are just ordinary normal people. They have a job to do, and by and large, I've not observed any that really had an "axe to grind". Like anybody you're apt to run into, if they feel they've been treated honestly and openly by people they meet in their rounds, they're apt to give that respect back. If you are faced with an infraction, acknowledge that you've goofed and work to fix it. Don't try to talk your way out of it because it generally won't work. And if you do try, and you're caught lying or making false statements, the hammer can fall hard. If the FCC tells you something is wrong, fix it, or be prepared to face the consequences. The FCC does not like to be ignored, nor does it like to be lied to.

You may email John at: jarthurbredesen@gmail.com



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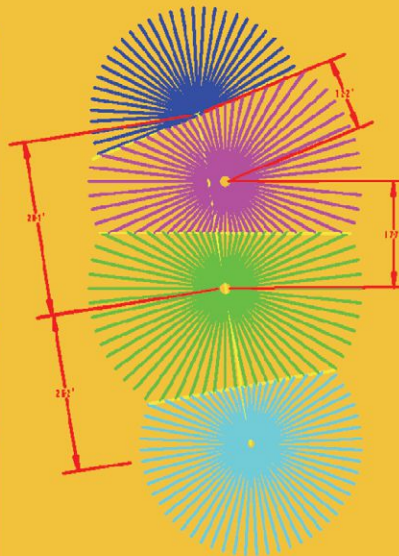
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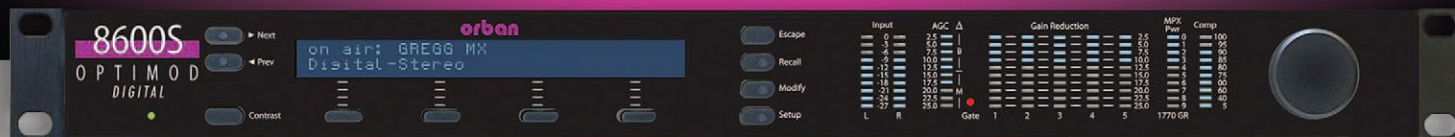
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Starting a Christian Radio Station

by Leo Ashcraft

Starting a radio station for your Christian Ministry may be the best decision you will make for your organization, and certainly fulfills your obligation to preach the gospel to all creation. What better way to reach the masses than through radio?



Radio is a powerful medium for communication. In the United States there are more than 550 million radios in use, including more than 170 million in vehicles. This amounts to nearly six radios per home! Americans utilize radio more than any other form of entertainment, averaging over 2 hours each day – listening in their cars alone! Granted, the average commute varies greatly from metro area to metro area, but those listening averages are amazing. An incredible 96% of adults 25-54 listen to radio on a regular basis, with the 12+ demographic not far behind.

Why is radio so compelling that most every American family has six radios and spends hours every day listening? It's kind of like broadcast Television – a free and over-the-air medium. But, unlike Television, it is a more “psychological medium.” It draws out the listener's imagination and emotion. It sets a creative stage in the “theater of the mind,” much more than Television. This is because we feel the need to picture what we are hearing – haven't you wondered what the DJ looks like? We respond to the spirit of the music, and react to advertising messages that beg us to intersect our lives with that advertiser's product.

The obvious question is: How best for you to utilize this powerful medium for your Ministry?

The statistics lay out a compelling case for radio. It illustrates the importance of how it can be utilized as a medium to share the word of God. If radio is truly the best medium at engaging the theater of the mind, then what better way to address the masses, with the matters of the heart and the Gospel, than through radio?

What better way to supplement the work of evangelists, pastors, and teachers around the world? With radio they can subtly (but very directly) inject the Gospel into people's lives, in a way that is inarguably the most accessible and potent medium available.

Though radio is indeed a powerful medium, which can be used effectively to further your goals of spreading the word of God, careful consideration must be undertaken to ensure this is the proper method for your ministry.

Formulating a Plan – Ask Questions

While considering whether a radio station is right for your congregation or ministry, it is important that you create an organized and practical plan. As you proceed through this process, many questions will arise. You must consider each step – through prayer, thought and discussion.

Consider the following points as you proceed through the organizational stages:

1. Do you have an existing organization? Example: Church, Ministry, Prayer group, Christian bookstore, fraternal organization, Christian school, etc.

2. Discuss with your friends and/or congregation – choose a core group of individuals who want to help with the project. You should limit the size of the group in order to maintain consensus and vision.

3. Is the area that you are considering rural or urban? Is there a sufficient population base to support the type of station you wish to establish?

4. Do you have a plan for raising the required funds? An effective plan in this area is crucial to the success of your endeavor.

5. Identify those in your flock with the means to make a significant contribution, as well as those who may be willing to assist in your fundraising efforts. There will be donors who are especially attracted to your initiative who would not otherwise make a donation. Note well that other Christian organizations may feel threatened by your proposed campaign.

(Continued on Page 40)

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– Continued from Page 38 –

Don't be discouraged by this attitude. Make a strong attempt to reach to these established Christian organizations – ask for their help – and let them know that there is much to be gained your common purpose.

Nexus Broadcast offers its assistance and guidance in formulating, and carrying out, an effective and practical plan. We can assist you in establishing your organization by sharing with you tested methods that work, and pitfalls to avoid.

Programming

Programming can make or break your low power FM radio station. Consider whether you want to develop your own programming, or use programming already available. Producing compelling programming can be very time consuming. The time and cost involved in producing your own programming usually precludes this option until well established. However, with today's computer capabilities, computer automation can fill in these gaps. It is important not to use this as a crutch and get "lazy." Originally produced programming can be very important to the success of any radio station.

There are also multiple sources available that offer Christian Radio programming. Many offer these programs through satellite delivery, Internet and Compact Disc.



Selecting the Station

There are many options available when deciding on a radio station. Consider the following points in determining which manner best suit your ministry's goals and requirements:

Purchasing a Station – This is generally cheaper than leasing a station. The upfront costs can be quite high, depending on your local market. However, you usually receive the necessary equipment to begin broadcasting and do not have the continuing lease payments.

Leasing a Station – You can consider leasing a radio station. In leasing, you have the necessary equipment to begin broadcasting and pay a monthly fee for use of the broadcast station. This is generally an one of the most expensive options. Stations owners must remain in control of the radio station; therefore there is no guarantee that your lease will be effective month to month. If the station owner changes his mind or gets a better offer, you may find your program without a home.

Buying Time On An Existing Station – This is the quickest method to get your program on the radio. This is similar to leasing a station, as you lease an hour or more each day for broadcast of your program. Prices will generally range from \$75 to \$500 dollars per hour, depending upon the market and the time of day. Radio stations are not required to sell you time, and it is up to station management whether they will allow or continue broadcast of your program.

Applying for a License – This is the least expensive way to start a station! This option, however, is not available all the time. In fact the opportunity for LPFM Radio Stations has been closed now for nearly thirteen years! Fortunately, the FCC will be an application filing window for Low Power FM stations in October 2013.

What is LPFM Radio?

Low Power FM is a service that was created in 2000 by the Federal Communications Commission to fill a need to provide truly local programming to an area. The FCC responded to pressure from thousands of people that believed that there was insufficient variety in the voices heard on the airwaves – as a result LPFM was created by an act of Congress in 2000.



The process to obtain an LPFM license follows a course of action similar to a full-power license. In order to make the LPFM radio stations accessible to non-broadcasters, the FCC significantly relaxed its rules. Stations are available on the FM band from 92.1 to 107.9 MHz, and cover 15 miles or more; enough to adequately cover most small to medium-sized cities, or a significant portion of a metropolitan area. LPFM radio stations can be used to provide educational, entertainment, religious and community broadcasts.

A projected Low Power FM application window by the FCC in October 2013 will provide new opportunities for Christian ministries throughout the United States. This will be only the second filing window in nearly thirteen years. The window will be open for only five days and will likely be the last of its kind as spectrum is limited.

The Low Power FM radio service is one of the few remaining low cost opportunities available to obtain a new radio station license and build and bring a new radio station to your community.

Leo Ashcraft is CEO of Nexus Broadcast "Broadcast Outside The Box!" He is a broadcast consultant with over 28 years engineering experience and an avid LPFM advocate for over 15 years. More information at NexusBroadcast.com or 888-732-3599

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Small Market Guide

A Man and His Play Scared Them All With Small Market Radio

by Roger Paskvan

Yes as this issue of *Radio Guide* comes out, it's close to that very venerable day. The man was Orson Wells, and his tool was a network of small market radio stations across the eastern USA.

At exactly 8:00 o'clock, on the evening of October 30th, 1938, a WABC radio announcer opened with, "The Columbia Broadcasting System and its affiliated stations present the Mercury Theatre in *The War of the Worlds*, by H.G. Wells ..." And so began the famous radio drama that would induce hysteria and panic nationwide. Millions of Americans tuned into a popular radio program that featured plays directed by, and often starring, Orson Wells. The performance that evening was an adaptation of a science fiction novel *The War of the Worlds*, about a Martian invasion of the earth.

In order to add reality to the radio drama, which foretold the invasion of Martian creatures, Mr. Wells chose to land the aliens in Grover's Mill, New Jersey, a real life, small farming community near Princeton.

It is estimated that nearly 6 million Americans listened to the radio broadcast. Approximately 1.2 million people took the fantasy as fact and prepared for the end of the world. Families rushed from their homes, highways were entangled with a mass exodus of cars. Electric and telephone companies, newspapers and radio stations were

swamped with hundreds of callers. Frightened citizens were crying, praying and running for their lives in panic.

In adapting the play for radio, Mr. Welles made the play so it would sound like a news broadcast about an invasion from Mars – a technique intended to heighten the dramatic effect. As the play unfolded, music was interrupted a number of times by news bulletins reporting that a "huge flaming object" had crashed on a farm near Grover's Mill, New Jersey. As members of the audience sat on the edge of their seats, actors playing news announcers and government officials described the landing of an invasion force from Mars and destruction of the United States. The broadcast contained a number of disclaimers but few listeners understood.

As this simulation of a news broadcast unfolded, created with voice-acting and sound effects, a portion of the audience concluded that it was hearing an actual news account of an invasion from Mars. People packed the roads, hid in cellars, loaded guns, even wrapped their heads in wet towels as protection from Martian poison gas, in an attempt to defend themselves against aliens – oblivious to the fact that they were acting out the role of the panic-stricken public that actually belonged in a radio play. News of the panic (which was conveyed via *genuine* news reports) quickly generated a national scandal. There

were calls (which never went anywhere) for government regulations of broadcasting to ensure that a similar incident wouldn't happen again.

There is a serious lesson to be learned. In 1938, the United States was just pulling herself out of the harsh, deep Great Depression. People had not forgotten their misery and they were insecure. Hitler, at this time, occupied Sudetenland and was preparing to invade Czechoslovakia. World War II was impending. People listened to the radio every day and heard the rumblings of war. For these reasons, the behavior resulting from "The War of the Worlds" broadcast was not so unusual. It is true that CBS announced at the beginning – and two times during the play, and at the end – that this play was fictional.

In spite of the fact that no other radio stations were carrying such urgent "messages" about an alien invasion, millions of people believed it was happening. This attests not to the "stupidity" of humans, but to their vulnerability. It attests to the exceptional dramatic performance of Orson Welles and his actors. Finally, it is living proof of the power of small market radio – both as entertainer and propagandist. *The War of the Worlds* exposed radio as only one potential medium of propaganda, as a proponent of fear, hatred and discrimination.

Could this happen again today? It would not be so easy to convince so many, since Television has become live on-the-scene broadcast. People listening to radio news would immediately turn to TV to verify the pictures – is it real? This whole thing happened because radio at that time was the only immediate news source people could trust. For many, small market radio was the sole source for information in 1938. Happy Halloween, the Martians are not coming ... yet!

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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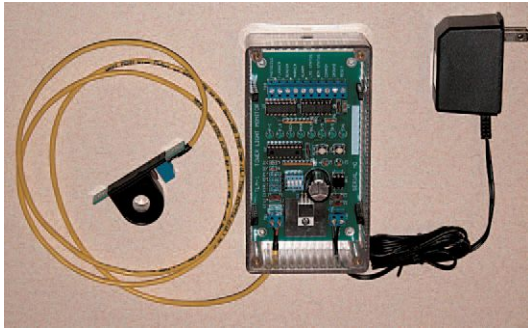
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Middleton, Wisconsin
www.wi-broadcasters.org

135th AES Convention

October 17-20, 2013
Javits Center, New York
<http://www.aes.org/events/135/>

Ohio Broadcast Engineering Conference

November 7, 2013
Greater Columbus Convention Center, Ohio
www.oab.org/events/

2014 CES Conference

January 7-10, 2014
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www.cesweb.org

NRB Convention

February 22-25, 2014
Nashville, Tennessee
www.nrbconvention.org

NAB 2014 Spring Convention - Las Vegas, Nevada

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www.nabshow.com

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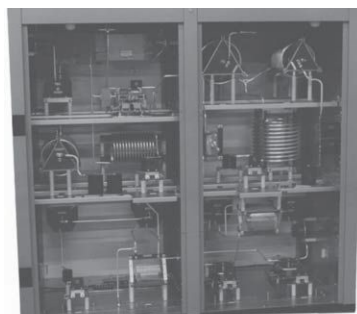
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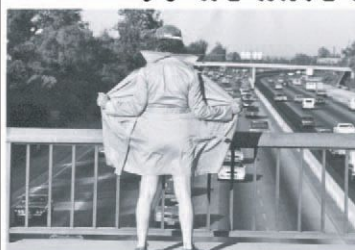
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