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## Geo-Fencing Court Battle Heats Up

VerStandig vs. SoundExchange decision could overhaul streaming royalties

### NEWSANALYSIS

BY RANDY J. STINE

**HARRISONBURG, VA.** — A streaming royalty lawsuit brought by a Virginia broadcaster is being watched as a potential precedent that could dramatically overhaul royalty payments that radio stations pay for webcasting their on-air signals.

That would be good news for broadcasters. Many large owners have said they aren't making money with streaming, while many smaller owners have given up or haven't tried due to high royalty fees.

VerStandig Broadcasting is headquartered in Bethesda, Md., and owns stations in Virginia, Pennsylvania and Maryland. It wants to use a streaming technology known as geo-fencing to allow it to cap the online retransmission of its broadcast programming to within 150 miles of a station's transmitter and not trigger the sound performance royalty fees (see sidebar, page 6).

The "declaratory judgment action," filed by VerStandig in federal court in Harrisonburg, Va., in April, argues that



istockphoto/Kardi Szabolcs

using geo-fencing would qualify it for an exemption under webcasting copyright law and protection from royalties gathered by SoundExchange, the entity responsible for collecting digital performance royalties and distributing them to copyright owners.

SoundExchange is a nonprofit orga-

nization funded by a portion of the royalties that it collects from broadcasters on behalf of copyright owners who register with the organization. The Librarian of Congress designated it as the sole collective for gathering and distributing royalties. In 2013, it collected \$656 million in royalties from approximately 2,500 entities in the United States, according to court documents.

SoundExchange moved to dismiss the suit in June, arguing that the court lacks jurisdiction; it claims in court documents that the Copyright Office has definitively ruled "the 150-mile exemption applies to digital retransmissions of radio broadcasts over cable and satellite systems, but does not apply to

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## IEEE Takes "Green" to Heart

Broadcast Symposium discusses protecting the environment and reaping savings

BY JAMES E. O'NEAL

**SAN ANTONIO** — Acknowledging that many broadcast owners want to be ecologically sensitive even as they seek to limit operating costs, the IEEE Broadcast Technology Society for the first time included a "green" component in its fall symposium.

Discussions at the October event covered a range of topics, from tower and RF safety to IP infrastructures and audio improvements. Organizers said the event drew 110 attendees, the same as in 2013.

### LIGHTING FOR THE FUTURE

A growing concern to broadcasters is reducing the environmental impact from radio and television operations. Much of one day's proceedings was devoted to this topic, with a round of sessions themed "Green Energy for Broadcast" and featuring presentations exploring economies to be gained by moving to new tower lighting technologies and examining ways for operating AM and FM transmitters more efficiently.

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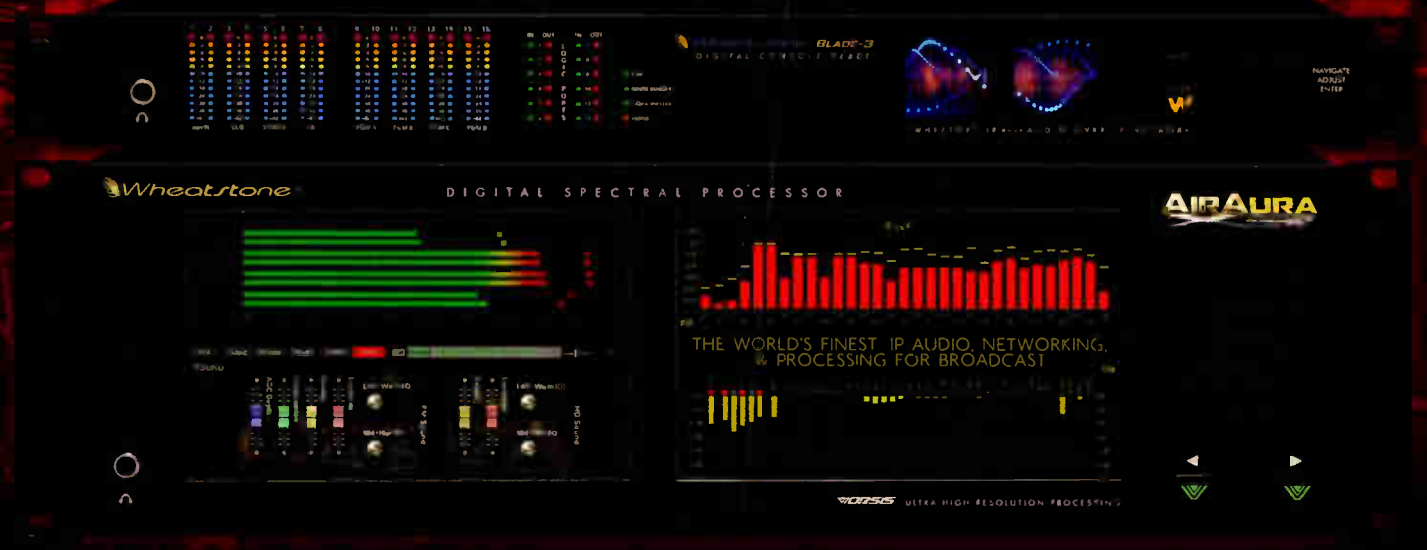
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### GREEN

(continued from page 1)

Leslie Kutasi is responsible for broadcast business development at Dialight, which makes visual indicator components. He examined the pros and cons of using incandescent bulbs, xenon strobes and light-emitting diodes to light towers. According to Kutasi, LEDs don't carry baggage associated with the other two lighting sources.

"There's no EMI or ozone generated," said Kutasi, comparing LEDs to xenon lamps. "They consume only about 5 percent of the electrical power required by incandescents and are completely recyclable, as they contain no hazardous materials."

He said LEDs offer other advantages in tower lighting. They reduce light pollution by directing their output to the horizon to reach airplanes flying at altitudes near or above towers instead of scattering it to the ground, eliminating the requirement for supplying high-voltage AC to towers. LEDs also are mechanically robust and have long service lives, he said.



**Dialight's Leslie Kutasi examines the pros and cons of using incandescent bulbs, xenon strobes and LEDs to light towers.**

Kutasi provided an example of the financial savings that could be achieved by replacing incandescent fixtures on a radio tower equipped with a beacon and three sidelights. In the course of a year, assuming a cost of electricity at 8 cents per kilowatt hour, nearly \$600 would be required for incandescent lighting, compared to about \$13 for LEDs. In addition, due to the long life of LEDs, expenses associated with bulb changing would be eliminated, saving an additional \$500 during the year.

Kutasi also pointed to an associated savings in the station's carbon footprint because of reduced electrical power consumption. "The CO<sub>2</sub> saving is 8,905 pounds," said Kutasi. "That's almost like taking one car off the road for a year."

#### TRANSMITTERS ON A DIET

Cutting transmission costs were next on the program, with GatesAir Manager of Radio Product Development Tim



**Tom Silliman, right, president of Electronics Research Inc., models the latest in tower climbing safety gear as ERI Director of Installations and Safety Kathy Stieler watches. They were part of a tutorial session at the 2014 IEEE Broadcast Technology Symposium in San Antonio.**



**GatesAir's Tim Anderson discusses cutting transmission costs for FM HD.**

Anderson discussing a way to achieve "significant" savings in connection with the transmission of FM HD Radio, flagging the high peak-to-average power ratio associated in broadcasting digital FM.

Anderson said that with today's hybrid FM+HD Radio transmission system, as many as 534 OFDM carriers may be generated in modulation of the digital component. In order to provide sufficient headroom for accommodating the peak loads presented in maximum carrier situations, it's necessary to use a larger RF amplifier than would otherwise be necessary.

"Because of this peak energy, we have to significantly back off the RF amplifier," said Anderson. "If you want to get a kilowatt out, you have to use a 2.5 kilowatt amplifier. You need to get this high 'crest factor' down to make amplification more efficient."

Anderson showed that with a new modulation algorithm, "PAR2," the large crest factor associated with earlier techniques could be substantially

reduced, thus lowering amplifier peak power requirements and yielding other benefits in the transmission of digital broadcasts.

Greater economies in AM transmitter operation received equal time, with Ben Dawson, managing partner of Hatfield & Dawson Consulting Engineers, delivering a paper on Modulation-Dependent Carrier Control, also called Modulation Dependent Carrier Level technologies, and about which Radio World has written extensively. Dawson used both acronyms in his presentation. Crawford Broadcasting Director of Engineering Cris Alexander, a Radio World contributor, wrote the paper.

Although engineers have worked since the 1930s to reduce AM carrier power requirements, Dawson said, only recently was this really practical in the evolution of broadcasting technology.

"The carrier of an AM signal doesn't really do anything," said Dawson. "It's only real purpose is to be there in order to provide very simple demodulators with a method of turning a complete signal into an easily demodulated signal. The carrier power doesn't carry any information at all, and therefore is mostly a waste of power."

He stated that techniques for carrier power reduction were not readily implemented with older AM modulation schemes such as Loy Barton's invention of high-level Class B modulation, but that present-day transmitters are able to take advantage of MDCL.

"Modern receivers are able to operate very efficiently and with low distortion by using systems that don't really depend

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Photos by James O'Neal

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# “No Local Radio History Is Too Small”

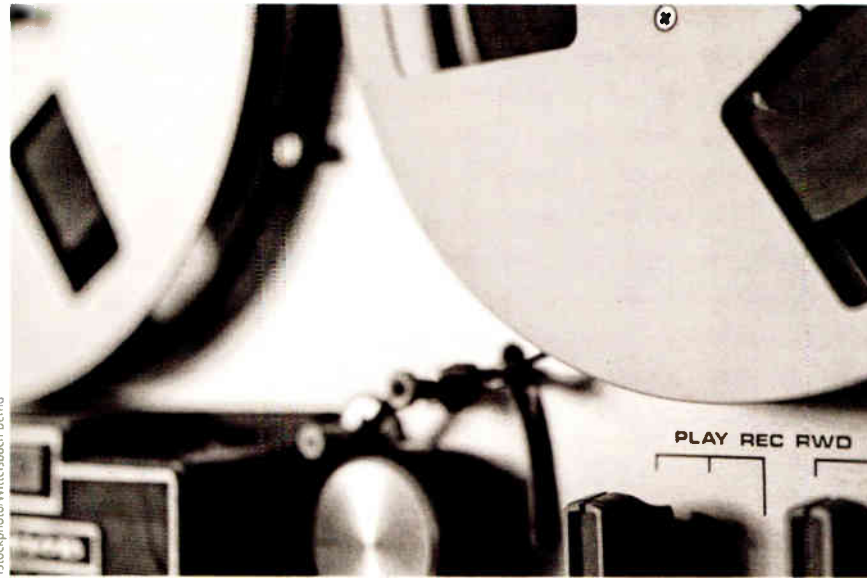
Radio Preservation Task Force seeks to save U.S. radio’s cultural history

How to save radio’s audio history? A big group of media history faculty, plus staff at the Library of American Broadcasting, is trying to help.

The Radio Preservation Task Force calls itself the first national radio history project of the Library of Congress; it grew out of the Library’s ambitious National Recording Preservation Plan. I wrote earlier about the radio-related aims of the overall plan; see <http://tinyurl.com/mulxa9u>.

The task force says radio is “perpetually declared to be a dying medium” but nevertheless attracts dedicated listeners and commercial and public support. The organizers believe radio’s history is a chronicle of our country’s culture and a potential trove for historical researchers, but that much of it is “untapped” because of radio’s live nature and problems of accessibility to content.

The task force is particularly interested in assessing the extent of recorded radio history beyond the relatively well-documented “golden age” of radio. This means “local, regional, noncommercial and under-represented movements in broadcasting history.”



**The task force wants to learn “how much is ‘out there’ on a local station basis – especially recordings of all or part of a ‘typical’ broadcast day.” It also wants to identify audio collections in danger of being lost.**

Surveying the landscape of radio materials will involve use of meta-data analytics and the development of research “caucuses” made up of faculty specialists and state university archivists.

For someone outside of academia, this all may sound somewhat dry. But what it means is that people who care about American radio in all its forms are trying to help both researchers

## FROM THE EDITOR

Paul McLane



and average Joes put our hands on the recorded material of everyday life in our medium, now and in the future.

The task force is led by broadcast historian Christopher Sterling, who is an associate dean at George Washington University and a member of the Library of Congress advisory group to which the new task force reports.

Seeking to learn more, I emailed with him and his colleague Josh Shepperd, assistant professor of media studies at Catholic University, who is research director for the task force and handles day-to-day operations.

*When I saw the recommendations in the National Recording Preservation Plan, I found myself thinking that it’d be almost impossible to try to aggregate archived material consistently, given the lack of any organized effort in the past. Where do you start a job this big? It sounds monumental.*

**Sterling:** Our intent is not to aggregate  
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**GREEN**

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on the carrier to be present to operate correctly," said Dawson. "MDCC gives you a compromise by reducing, rather than removing, the carrier so that antique demodulators will still operate and both older and newer receivers can receive an acceptable signal."

Dawson said that Alaska Public Broadcasting began experimenting with MDCC in 2010, as Radio World has reported. The goal was to provide more economical operation of its transmitters and to reduce requirements for delivering the fuel oil used to generate power at its more remote sites. He said that the FCC was asked for a waiver to allow MDCC, and in response, issued a Public Notice allowing any broadcaster to use this technique.

Dawson noted that Crawford Broadcasting soon implemented MDCC operation at one of its 50 kW installations in California and was able to cut AC power consumption by some 21 percent with no real impact on operations. "As a result of that initial installation, there were essentially no adverse effects reported either by the [listening] audience or by the employees of the station who did the 'drive testing,'" said Dawson. "And they solicited comment from the listeners as well."

Dawson said that Crawford had implemented the modulation technique at another of its 50 kW stations with no noticeable impact on reception in low signal areas and no observable effect on IBOC operations or the transmitter's ability to meet the AM emission mask.

Dawson observed that there are 225 AM stations in the United States licensed to operate with 50 kW daytime power; if MDCC were implemented by all of these stations, some 23.34 gigawatt-hours of electrical power could be saved annually, amounting to about \$8,600 per station at an average power cost of 9.8 cents-per-kilowatt-hour.

"That shows you quite thoroughly that the ROI for this sort of thing is very immediate and tangible," said Dawson.

**A "GREEN LUNCH"**

The "making broadcasting greener" theme was echoed in a keynote address given at the joint Broadcast Technology Society/Association of FCC Engineers luncheon keynote address by Huiet Joseph, senior manager of energy conservation at Cox Enterprises, parent of the Cox Media Group.

Joseph described Cox's commitment to reducing the organization's energy consumption and carbon commitment during the next several years by adopting more energy efficient lighting systems, replacing older HVAC control



**Cox Media Enterprises' Huiet Joseph says the company is committed to reducing its energy consumption and carbon commitment by adopting more energy efficient lighting systems, replacing older HVAC control systems and installing fuel cells and photovoltaic power sources at certain broadcast properties.**

systems and installing fuel cells and photovoltaic power sources at some of its broadcast properties.

"Cox has been into conservation for well over 20 years, with [the initial] efforts focused on lighting and things like that," said Joseph. "A program called 'Cox Conserves' was created in

2007 with a goal of reducing the company's carbon footprint by 20 percent over a 10-year period. The two main segments of that effort were to reduce our carbon footprint by 10 percent using energy conservation, and 10 percent by using alternative energy sources such as solar."

In 2007, Cox celebrated the fifth anniversary of the program; in those first years the company spent "over \$50 million" on sustainability, according to Joseph. "We successfully implemented 19 solar projects and installed six fuel cells at our properties. We also have water conservation projects. In all, we started about 175 individual energy conservation projects."

Joseph added: "We've also taken efforts to green up our [vehicle] fleet. With the cable systems we have a tremendous number of vehicles that are driven every day so greening up that fleet is very important."

Next year's BTS Broadcast Symposium will be held Oct. 14-16 in Orlando, Fla. Visit [www.bts.ieee.org](http://www.bts.ieee.org) for information.

*James O'Neal is technology editor of TV Technology and a contributor to Radio World. O'Neal is a member of the BTS Administrative Committee, the BTS historian and editor of the BTS quarterly publication.*

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## GEO-FENCING

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retransmissions made over the Internet.”

The attorney representing SoundExchange did not reply to a request for comment for this story.

Observers believe if VerStandig's complaint is upheld by the court, it would allow other radio stations to stream broadcast retransmissions online within a 150-mile radius and not pay royalty fees.

According to court documents filed by VerStandig, when Congress passed the Digital Performance Right in Sound Recordings Act in 1995, data sent over the Internet could not be restricted to recipients in specific physical locations. “As a result, radio stations that have sent their AM/FM broadcasts to listeners over the Internet were not able to satisfy the 150-mile exemption and have had to pay royalties to the owners of copyrights in the sound recordings that are part of the stations' broadcasts.”

VerStandig argues that the Copyright Act provides that a “copyrighted sound recording may be performed digitally, without infringing the copyright or payment of a royalty, when, among other things, it is part of a radio station's AM/FM broadcast that is being retransmitted no more than 150 miles from the station's transmitter.”

### COMPLICATION

A September opinion of a Virginia magistrate judge appears to be a setback for VerStandig. The preliminary decision, which is non-binding, recommended that the case should be tossed because of lack of a “controversy” between the parties.

SoundExchange argued to Magistrate Judge Joel Hoppe that VerStandig had not been at risk of being sued by the company for copyright royalties when it filed its suit, and said it did not threaten legal action against VerStandig. “No case or controversy yet exists between the parties,” SoundExchange pleaded in its argument to dismiss the lawsuit.

SoundExchange did say it sent VerStandig a letter outlining prevailing law that showed the 150-mile exemption at issue does not apply to radio retransmissions over the Internet, according to court records, but said it never threatened litigation. Court records indicate

SoundExchange's reply came only after the company received a request for clarification from the broadcaster.

The magistrate wrote that VerStandig's desire to know whether geo-fencing would protect it from copyright liability was understandable, but he questioned whether the suit raised a “justiciable controversy” and whether SoundExchange has the authority to bring an action to compel a broadcaster to obtain a statutory license.

In his decision, Judge Hoppe stated that any dispute that may arise in that scenario is between the copyright owner and the broadcaster. Thus, the copyright owners themselves, who are not a part of the litigation, “must act” so that this particular injury can be “cured.” However, Hoppe concluded SoundExchange can sue to collect royalties and other fees if a broadcaster does not comply with the terms of its statutory license.

VerStandig disagreed with the magistrate and, according to court records, believes his recommendation was based on a “fundamental misconception” about the suit. Seeking a declaration that it will not be liable for copyright infringement under the Copyright Act, it claims the magistrate's findings were incomplete and based on an understanding that the company planned to use geo-fencing only on WTGD(FM) in Harrisonburg, Va., which does not stream on-air programming.

But VerStandig also intends to use the technology on the current Internet audio streams of WQPO(FM) and WJDV(FM), also in Harrisonburg. This matters, according to the broadcaster, because WQPO and WJDV are already party to the statutory license with SoundExchange.

“That relationship drives both the ripeness and jurisdiction,” of its declaratory judgment action, VerStandig concluded.

VerStandig officials said they intend to use geo-fencing eventually on all of their radio stations' online retransmissions.

U.S. District Court for the Western District of Virginia Judge Michael Urbanski will make the final decision and can take the magistrate's decision into consideration.

### “A BIG DEAL”

Broadcast industry observers believe VerStandig's case could reshape the royalty landscape.

“If VerStandig wins, it would be a big deal to a lot of broadcasters,” said David Oxenford, a communications attorney with Wilkinson Barker and Knauer LLC.

Oxenford said all radio broadcasters that stream their on-air programming must pay performance royalties to SoundExchange. Geo-fencing their

## GEO-FENCING: WHAT IS IT?

Geo-fencing is a location-based technology that creates a virtual perimeter around an area or location ranging in size from a single building to an entire state. The technology allows an entity to determine if a user's mobile phone, device or computer is within this perimeter based upon the user's IP address, WiFi and GSM access points, and GPS coordinates.

VerStandig Broadcasting claims in court documents

that geo-fencing allows data made available over the Internet to be restricted to recipients based on their physical locations. “When data is geo-fenced, only recipients physically located within the authorized locations can access the data. Recipients located outside the designated zone receive a message explaining the data is unavailable,” according to VerStandig filings.

VerStandig claims geo-fencing “is a proven technology used by the gaming industry to restrict access to online gambling to recipients in jurisdictions where gaming is legal.”

President John VerStandig said he is working with GeoComply, a supplier of geolocation solutions for the gaming industry. Other companies offer the technology. For example, radio webcasting service provider Triton Digital offers Geoblocking as an optional feature on its streaming media platform to manage visitors' access to a station's online stream.

“Geoblocking can be used in order to comply with distribution contracts or limit unwanted uses,” according to Triton's website. “You can create rules to allow or restrict access based on criteria such as the geographic location [country, region, city], the DMA and the radius within a specific location.”

VerStandig said his company had considered using Triton's technology but “we couldn't get assurances [from Triton] it would work correctly 100 percent of the time.” Triton declined to comment for this story.

— Randy Stine

streams, if it works accurately, could give broadcasters an exemption.

“Geo-fencing to some degree has been around for some time, but it is becoming more reasonable at this point for broadcasters to rely on.”

Nothing is stopping VerStandig or any broadcaster from using geo-fencing on its stream right now, Oxenford said, but an owner would run the risk of being sued by SoundExchange.

“If the broadcaster is wrong on their beliefs as to what the law says, they would face huge damages,” Oxenford said.

Statutory liability for damages in copyright infringement cases can be as much as \$150,000 per infringement, he said. “If you are playing thousands of songs heard by thousands of listeners, you could be talking billions of dollars for large broadcasters.”

The presiding federal judge was expected to hear arguments in late October on SoundExchange's motion to dismiss and VerStandig's exceptions to the magistrate's ruling to dismiss. Several industry observers believe a decision on whether the case proceeds to trial could come later this fall.



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## TASK FORCE

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collections, but rather to ease access to them — by developing a consistent “directory” — its format not yet determined — to ideally provide “one-stop shopping” for radio researchers. Naturally, collection standards vary, and some archive finding aids are wonderfully detailed while others are less so. Our job is to ease the researcher’s job by giving her or him enough to know whether to pursue that source.

**Shepperd:** It seems like a pretty ambitious goal, for sure. We’re starting with state archives and library scientists, and working our way to historical societies, branch libraries and eventually personal collections. Our working principle is that no local radio history is too small. As Chris pointed out: We’re aggregating archive participation, but not their recordings. All materials located by the task force will remain in current hands without exception.



**Josh Shepperd**

*Other than certain recordings of “Dragnet” and “The Lone Ranger” and so on, my personal experience is that our industry in general has been pretty mindless about saving its heritage. Media storage over the years also could be costly in terms of dollars and shelf space. How will you go about identifying and securing material that is “off the radar,” even within our industry?*

**CS:** Excellent question and a daunting one, too. Best known and widely available are the network programs of the “old-time radio” era (chiefly 1930–50), which are not our focus. We are trying to determine how much is “out there” on a local station basis, especially recordings of all or part of a “typical” broadcast day. And we care about both commercial and educational/public stations. Plus syndicated programs and series. There is very little known about how much material may exist. We also want to identify collections that may be at risk — about to be pitched, those with poor or no finding aids, those on older media that may need rescuing, etc.

**JS:** The goal of the project is less to secure materials than map if and where local and noncommercial radio recordings might exist. The next goal is to devise strategies with the Library of Congress, research librarians and digital archivists, to increase accessibility, preservation activities and the study of radio.

*I’m envisioning a lot of reel-to-reel tapes*

*from the 1960s and 1970s sitting on shelves, with its audio content “printing through.” What’s the biggest challenge from a media preservation standpoint?*

**CS:** We have the same nightmares; and the cost of redubbing things or otherwise saving such material could be huge. As the project develops, we may be able to identify potential funding sources interested in local or regional recordings. But that’s a later step.

**JS:** I have a feeling that some of the biggest challenges are yet to come — usually these materials aren’t quite as fragile and in danger of disintegration as early film, a topic that has received important attention from preservationists this past year. But the sheer breadth and depth of the recordings that we’re just starting to unearth will require a lot of planning

once we move into the cataloging, digitization and research phase of the project.

*Do you expect local, commercial radio stations to be an important source of material? I suspect that archive preservation will be inconsistent locally, is that reasonable?*

**CS:** I think you are absolutely right — few stations, especially those with numerous ownership changes in recent years, will have saved much if anything. I can hope commercial outlets will have material, but I have my doubts ...

**JS:** Yes, station broadcasting collections, which are managed differently than broadcasting archives at universities, are a major object of interest for the task force. We’re trying to cut our search off at 1925–1975 for now, which means we’re dealing with stations with pretty long histories. Unfortunately in some cases these stations either trashed or incinerated their audio histories when they moved locations. In other cases stations saved everything. For example, one of our research associates just unearthed 15,000 lacquer discs at a prominent East Coast station. How we might eventually digitize and preserve these recordings will be a major topic of discussion in 2015.

*Your announcement mentions analyzing collections to create a “national finding aid.” What is that?*



**Christopher Sterling**

**CS:** It’s a combination of a user guide and a way of finding what is where. Years ago, this would have been a published book, which would “freeze” a “snapshot” of what was known when it appeared. Today, of course, such things are online and constantly updated.

But we have not yet nailed down all the details on this — we are still in the exploratory stage. For example, folks working with us (chiefly academics) have already found more than 100 archives with some radio holdings. And that’s after less than two months’ effort. We are betting there could be 200–300 or so.

*And you’ve mentioned a planned radio history conference at the Library of Congress next fall.*

**CS:** First, it’s not yet a done deal, as conferences have costs. Our hope and intent is that early in 2015 we can announce details of a day-long or two-day conference in Washington where discussion would center on what we’ve discovered in a year of looking and assessing, and how best to proceed in a way valuable to the most potential users. Most attendees would likely be academics interested in radio’s history and archive experts. The idea

would be to share what’s been learned, overcome problems that have arisen and get still more people interested.

*Radio World readers include many with a love for both technology and history. What else should they know?*

**CS:** We are very interested in hearing from stations that may have material (or perhaps have donated some to a nearby archive or historical society). At this very initial stage, we are interested in any comments, suggestions and critiques.

**JS:** Our relationship to radio is more than just one of an object studied. We really care about this history. A huge percentage of our faculty research associates are radiophiles, worked in the industry or started in college radio. Chris was trained as a radio broadcaster, for example.

Jack Mitchell, professor at University of Wisconsin-Madison, founder of “All Things Considered” and an Edward R. Murrow Award winner, recently said to me that Chris had one of the best radio voices of his generation at Wisconsin Public Radio.

*Comment to me at radioworld@nbmedia.com.*

*The Radio Preservation Task Force welcomes your help and suggestions. They’re on Twitter @radiotaskforce or email radiotaskforce@gmail.com.*

## NEWSROUNDUP

**VIRUS:** A ransomware virus was blamed for infecting computers at some stations in Louisiana, Arkansas, Virginia and Michigan in late October. In each case, hackers implanted a ransomware virus into computers at the stations that were connected to the Internet.

The virus tried to corrupt the database audio files on the stations’ automation systems and demanded \$500 in Bitcoins to stop the attack.

**DASH:** iHeartRadio is now live in Apple CarPlay and available in some vehicle models and headunits. The broadcaster says the integration is a big step in iHeartRadio’s auto offerings, placing the iPhone app in the dashboard. CarPlay locks out the phone’s screen when connected to the car and replicates the phone’s apps on the vehicle’s LCD display. To use, drivers need a CarPlay-enabled infotainment system in the dash, connected to a compatible iPhone that has the iHeartRadio app downloaded onto the device. Several automotive OEMs and aftermarket receiver manufacturers plan to add Apple CarPlay support over the next several months.



**The iHeartRadio icon figures prominently in Honda’s home-screen for Apple CarPlay.**

**FM CHIPS:** FEMA Administrator Craig Fugate says the organization recommends people have a radio as a source of information during emergencies. That radio can be in the form of smartphones that receive FM, Fugate says in a video posted on [freeradioonmyphone.org](http://freeradioonmyphone.org). “All disasters are local,” says Fugate. NAB President/CEO Gordon Smith says Fugate’s comments “send a strong message to wireless providers regarding the indispensable value of radio as a lifeline when disaster strikes.”



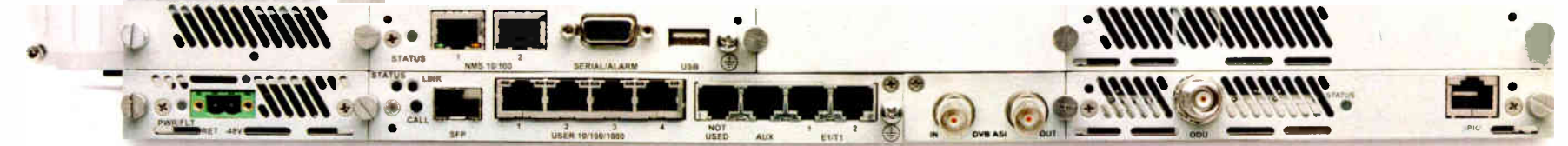
# HIGH CAPACITY EVENT STUDIO TRANSMITTER LINKS



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# A Caution About Transmitter Venting

Also, we find another source for useful lightning detectors

## WORKBENCH

by John Bisset

Read more Workbench articles online at [radioworld.com](http://radioworld.com)

Frank McLemore, project engineer and Alternative Broadcast Inspection Program inspector for Georgia, likes the tip we shared from Andy Butler about using rubber bands to hold the handle on a pair of pliers.

For a tighter grip, Frank suggests substituting a plastic cable tie for the rubber bands. He may not always have a rubber band handy but never leaves home without a bundle of cable ties. Great idea.

If you do like rubber bands, you could loop several over one end of the pliers handle so they will always be available.

Frank also relates an issue experienced by a fellow engineer. A site has two transmitters, each vented by a separate duct to the outside. One of the transmitters became the backup and was turned off; its vent, however, was not blocked.

Over a period of time, the operating transmitter used the non-operating transmitter to supply makeup air. Moist air was drawn backwards through the idle transmitter's vent and through the final cavity. The final tube socket and other PA components are not in good shape now. Components have been



For a snug fit, use a wire tie.

**Good judgment comes from experience, and experience comes from bad judgment.**

severely damaged by corrosion.

The lessons here are twofold.

First, don't directly couple the vent for the transmitter to the outside. Instead, use a vent hood arrangement above the exhaust port, 3 to 6 inches above the transmitter exhaust port.

Second, either leave the idle trans-

mitter's blower on to prevent backflow, block the vent or have an exhaust fan on in the duct. Any of these methods will prevent air from being drawn into the building through the idle transmitter.

Frank's motto: Good judgment comes from experience; experience comes from bad judgment. Learn from your mistakes!

Reach Frank McLemore at [fmclmore@bellsouth.net](mailto:fmclmore@bellsouth.net).

Doug Watson is chief engineer at MRN—Motor Racing Network. Our tip about a lightning sensor grabbed his interest for MRN's coverage of NASCAR races. In an outdoor sport, lightning detection is pretty important. Doug ordered one of the DigiKey evaluation kits we described.

Looking around, Doug noticed that Northern Tools also sold a detector for \$39.99. Doug ordered one. The AcuRite Lightning Detector is model 02020, and it's available only online. Doug says it appears to be the same as the Digikey kit, but packed into a pager-sized enclosure that uses two AAA batteries for power.

Doug put the two side by side on his desk with no storms in the area. When next to his laptop, they both detect the computer noise. Doug opened the AcuRite; it uses the same AS 3935 lightning detection chip that's in the Digi Key evaluation kit. The difference is the AcuRite is much less expensive. It doesn't have a USB port, but that's not a big deal for Doug. Head to [www.northernertools.com](http://www.northernertools.com) and in the search field, enter the item number 44215.

Workbench readers love to save money. Doug's find puts the lightning sensor within reach of any budget.

Doug Watson can be reached at [dwatson@mrn.com](mailto:dwatson@mrn.com).

Engineering consultant and technical author Lew Wallach needed a refresher on radio engineering, without a mathematical approach. At the same time, he's upgrading his ham station's lightning protection.

Lew found some books that he wanted to share with readers. They appear to be out of print but are frequently referenced. The good news is they are available as online downloads.

The first is "The Radio Engineers' Handbook" by Frederick Emmons Terman, published in 1943. Go to <http://ebookspdfs.org> and do a title search. Download the link that starts with [intermoionici.it](http://intermoionici.it). (The download is not in Italian.)

For grounding fundamentals, Lew recommends "The 'Grounds' for Lightning and EMP Protection" by Roger R. Block, published by PolyPhaser; and "Lightning Protection for Telecommunications Facilities" has much of the same information and is also a free download.

For more information, including some of Lew's writings on the subject, contact Lew Wallach at [Lew@n9wl.com](mailto:Lew@n9wl.com).

Contribute to Workbench. You'll help fellow engineers and qualify for SBE recertification credit. Send Workbench tips to [johnpbisset@gmail.com](mailto:johnpbisset@gmail.com). Fax to (603) 472-4944.

Author John Bisset has spent 45 years in the broadcasting industry and is still learning. He handles West Coast sales for the Telos Alliance. He is SBE Certified and is a past recipient of the SBE's Educator of the Year Award.



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# Environmental Agency Regulates Testing

Little-known rules could affect station operations

## REGULATION

BY THOMAS OSENKOWSKY

Broadcasters are well familiar with the Federal Communications Commission, which licenses and governs radio and television stations. The Federal Aviation Administration regulates location and maximum height of towers. Local zoning, building, electrical and fire codes govern new construction or modification of existing structures. The Occupational Safety and Health Administration has regulations that govern safety in the workplace, and the Americans With Disabilities Act protects the rights of the handicapped and disabled.

But broadcasters may be surprised to learn that in some states, particularly those with heavily populated areas where diesel standby and peaking gen-

erator sets are often deployed, environmental agencies may have regulations prohibiting use of diesel generators, including exercise or maintenance testing, on days where high ozone levels are forecasted.

Here in Connecticut, for example, the Bureau of Air Management, a branch of the Connecticut Department of Energy and Environmental Protection, uses an ozone forecast to determine whether certain operating restrictions apply for the forecasted day. Restrictions are aimed at lowering emissions of nitrogen oxides (NOx), which contribute to the development of ozone on high ozone days. Owners of what the bureau classifies as "emergency engines" (diesel-powered generators) use the ozone forecast to determine whether they can operate for routine, scheduled testing or maintenance. Such operations are restricted on days forecasted to have

ozone air quality index (AQI) levels classified as unhealthy for sensitive groups (USG) or worse levels anywhere in Connecticut.

The issue was brought to light in Connecticut when a state DEEP inspector made a surprise inspection at radio station transmitter site.

After the chief engineer contacted the Connecticut Broadcasters Association

to share his experience, a small working group within the CBA was assembled to look at the regulation. It found that the criteria determining which generators fell in the regulated group tended to include those in the size and age range of many radio and TV stations in the state.

## AUTOMATIC

While some generators are tested with engineering or maintenance personnel present, other stations conduct

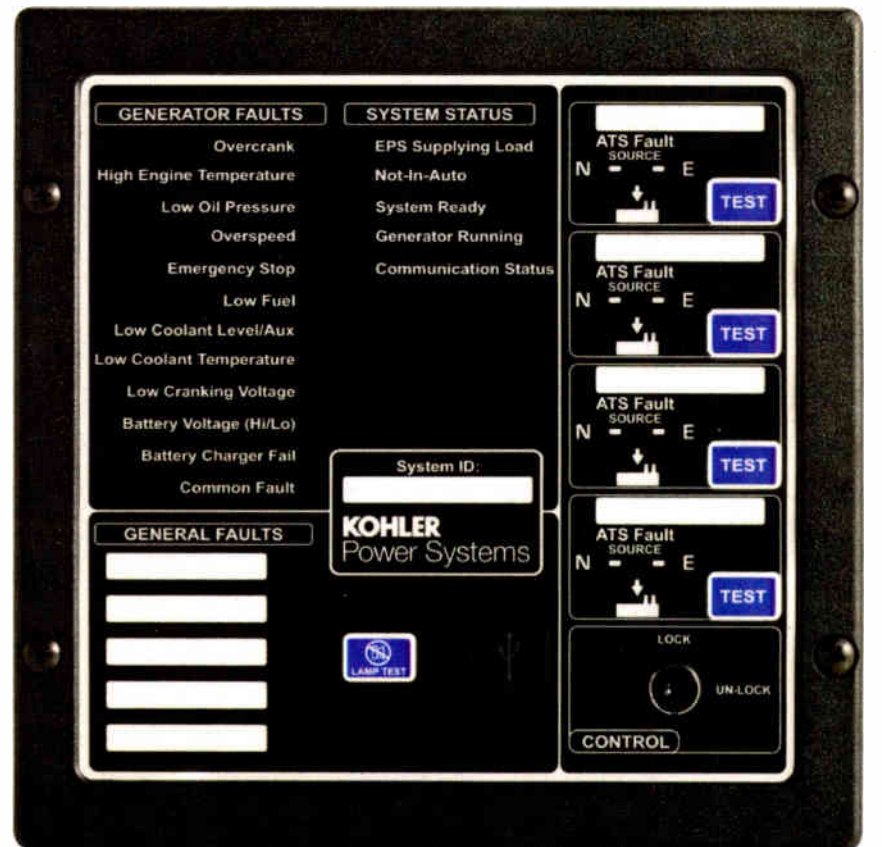
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Kohler Generator Automatic Transfer Switch Controller



Kohler Generator Remote Annunciator Panel

automated testing. Typical station transfer panels include options allowing programming day of the week and time to exercise the generator, either load or no load. These automated testing routines could easily result in situations where testing lands on an Ozone Alert day, violating the regulations.

Further, some broadcast facilities, depending on the severity of approaching storms and operational demands will start and transfer to stable generator power to "ride out" severe electrical storms, thereby reducing possibility of equipment damage and program disruptions.

air quality alert days because they are likely to precede a storm front containing severe weather.

The working group said this is the worst time to restrict the ability of a broadcast facility to mitigate damage to its transmission equipment by prohibiting anticipatory generator operation to get off the power grid in advance of electrical storms, or for testing/repair.

A key element of the process was quantifying the contribution of NOx from all the broadcasters' generators throughout the state. After surveys and calculations, engineers at DEEP were

able to see that the total contribution by broadcasters as a specific group was actually very small.

The CBA's position is that government officials rely on broadcasters to disseminate critical information in times of emergency and to operate the Emergency Alert System. If there is a power outage, broadcasters count on their generators to be fully operational on demand. Routine exercise is an essential component of ongoing maintenance and monitoring.

Since precedent now exists for waiver of the regulation specific to broadcast-

ers, the experience in Connecticut may be helpful in other states where similar regulations may be on the books.

Broadcasters may wish to engage their state associations or counsel for assistance in determining if their facilities fall into a regulated group.

*Tom Osenkowsky is a radio engineering consultant in Brookfield, Conn., and a longtime RW contributor. He has been in the radio broadcast industry since 1975.*

*Comment on this or any story. Email radioworld@nbmedia.com with "Letter to the Editor" in the subject field.*

**Since precedent now exists for waiver of the regulation specific to broadcasters, the experience in Connecticut may be helpful in other states.**

Connecticut Broadcasters Association President and former Chairman of the Board Michael C. Rice understands the importance of readiness in time of emergency.


Power outages may be caused by natural and/or manmade events, and a broadcast facility must have reliable power at all times. Ensuring that a generator is capable of delivering full power involves routine testing and the broadcaster has no control over which days are designated for high ozone alert.

"Once this matter was brought to our attention, I contacted General Counsel Eric Kemmler to devise a plan of action," said Rice. "The CBA worked with legislators, lobbyists and officials from DEEP representing the needs of its member stations over a one year period to draft a waiver of the regulation. Essentially, it places broadcasters in the same exclusion category as hospitals and nuclear power plants."

#### **GREATER GOOD**

In the end, broadcasters made a compelling argument: that the greater good would be served by allowing an exemption for broadcasters, due to their public service role.

They said the time when broadcast radio and TV can be of the most benefit to the public can often coincide with



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### **Mosaic Digital Console**



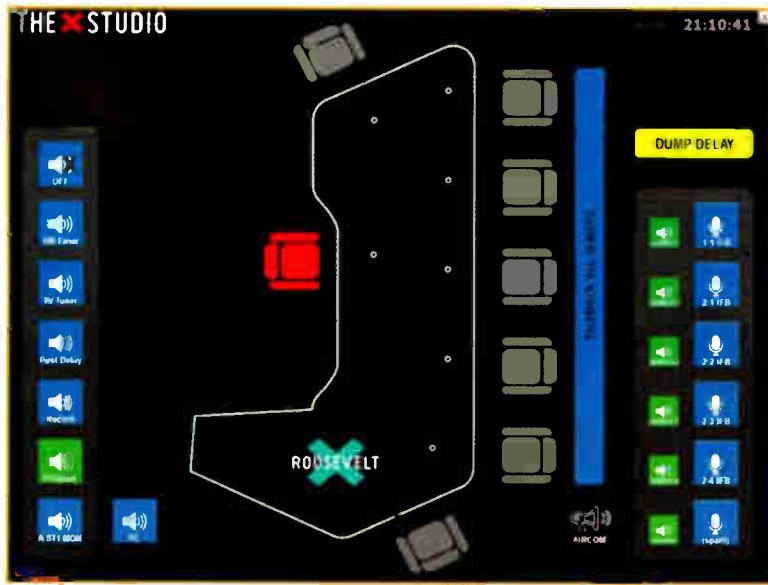
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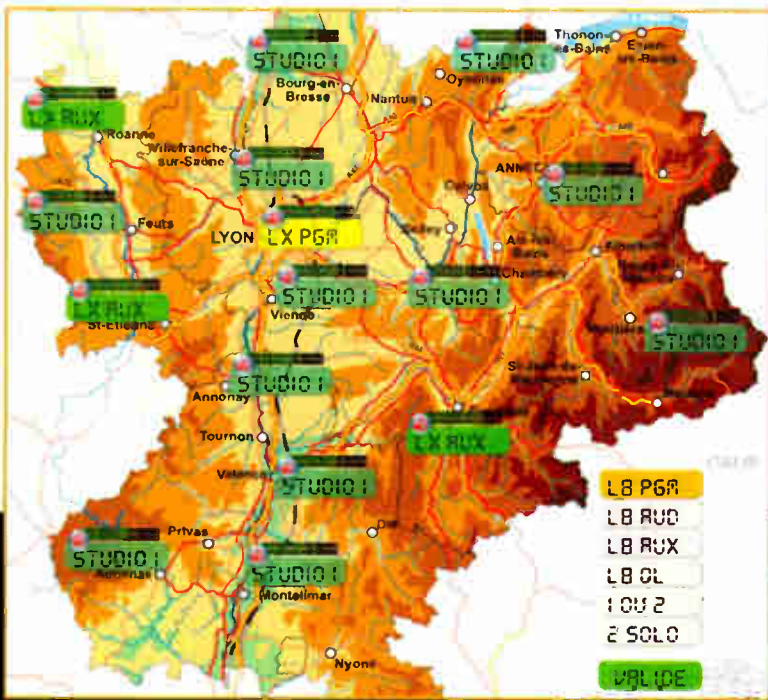
Powered by Logitek JetStream Audio Networking, the Mosaic offers the flexibility of AoIP within a streamlined, desktop-friendly design. Consoles are available in sizes ranging from 4 to 24 faders, with 2 different sizes of meter bridges. Bright, easily read OLED screens are used throughout for source identification and confidence metering; illuminated rotary controls and programmable backlighting for on/off and selector buttons allow custom color-coding for operators and easy operation in any type of studio lighting.

An updated Softkey module incorporates dedicated profanity controls and eight Quick-Select buttons for mix changes, transmission switching, studio switching and more; an optional Source Selector module adds five more Quick-Select router controls.

Call today to schedule your demo of the Mosaic, or another of Logitek's digital consoles based on our exclusive Dense Node IP Architecture.



The above producer control screen was built by our friends Agile Broadcast in Australia to control the room pictured on the right. Using Screen Builder's drag, drop and script interface, this screen is incredibly powerful and was completed in record time.



The screens at the left and above were created by our friends Save Diffusion in France. The map of France indicates radio stations around the country and their current status. The screen above delivers specific data about various transmitter sites. These screens were created with Screen Builder.

got an idea?

drag it, drop it, draw it, script it,  
and make it come alive with

WHEATSTONE  
Screen Builder

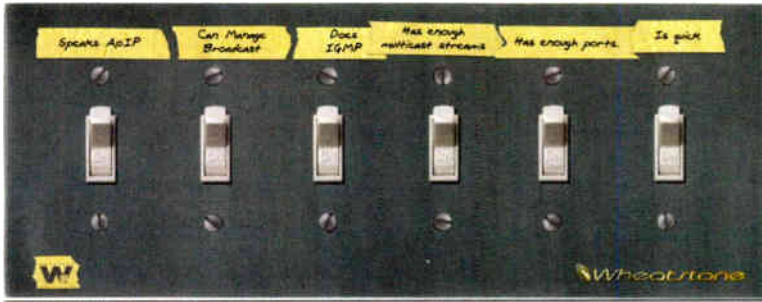


Screen Builder's environment comes with a slew of predefined widgets like faders, knobs, buttons, switches, clocks, timers, alarms, events, salvos. Import your own graphics. Create custom control panels that work with touchscreens to do anything you can script: a system to do. Make crosspoints, fire salvos, turn routes on and off, change connections, do wholesale studio switching - whatever you can think of.





THE INTELLIGENT NETWORK



### 3 Things You Need to Know About Network Switches

**You're about to embark on a social experiment.**

You've selected the perfect control surfaces and the audio network is almost laid out for your new studios. Everyone and everything speaks broadcast and, so far, you haven't had to take up IT as a second language. But now you're about to drop a couple of network switches into the middle of it all and you're worried that things could erupt into a civil war between this newer IT world and the radio cavalry.

**Discover the three most important characteristics Wheatstone engineers look for in a network switch...**

**Go to: [INN16.wheatstone.com](http://INN16.wheatstone.com)**

### What the #@& is Cable Certification?

**We often use the term "certification testing" when referring to cable used in audio networks.**

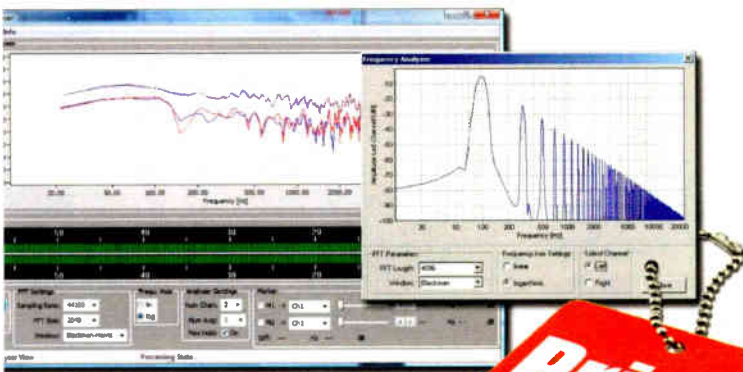


But if a person didn't know better, they'd think we were talking about guys in white lab coats running around with clipboards.

Hardly. This is just another way of saying that you should test your cables to make sure they're within manufacturer spec. Unlike the BNC and XLR world, Ethernet cable actually comes specified by The Telecommunications Industry Association (TIA) and the Electronic Industries Association (EIA) according to a "category," as measured every 100 meters (328 feet). The current standard is the TIA/EIA-568.

**Here's what to test for and how...**

**Go to: [INN16.wheatstone.com](http://INN16.wheatstone.com)**



### Audio Performance Testing on the Cheap

**by Wheatstone's Jeff Keith**

There's nothing like a little audio performance testing to cap off a hectic week at the station, especially if you don't have to haul out the heavy (read "expensive") equipment to do it.

There are two main things I like to test: the flatness of the frequency response and the distortion added by equipment in the air chain. For this, you'll need clean test signals, and a way to measure those signals after they've passed through the air chain.

**Here are some suggested tools and tricks:**

**Go to: [INN16.wheatstone.com](http://INN16.wheatstone.com)**

### When Radio Is Your Hobby

**After talking with radio hobbyist Bill DeFelice, we're convinced that deep down inside all of us is a radio station wanting to get out.**

Maybe that's why we jack up our stereo systems, have tuning forks for ears, and, for some of us anyway, make broadcast equipment.

Most of us fell in love with radio at a young age. For Bill, it started with his school's 330 watt FM (WMNR-FM, 88.1 MHz), where he ended up being the CE most of his high school years. He then went on to engineer a variety of stations, from a 1000 watt AM daytimer to a 50 kW FM blowtorch, before his current gig as IT support technologist for the Norwalk Connecticut Public Schools, where he was recruited to build a Part 15 AM and FM station as part of a high school renovation project.

**Read more: [INN16.wheatstone.com](http://INN16.wheatstone.com)**



# BBG Remakes Staff Offices

Open layout aims to simultaneously improve morale, cut costs



Bright windows line the perimeter of BBG's renovated office space.

Photos by Bob Kovacs



André Mendes sits in his new cubicle.

BY BOB KOVACS

The Broadcasting Board of Governors, the federally funded organization that manages Voice of America, Radio Free Europe and Radio Free Asia among other services, is responsible for creating some 4,100 hours of original programming each week, delivered in 61 languages. The BBG's stated mission is to inform, engage and connect people around the world in support of freedom and democracy.

That takes more than a little office space, and the BBG recently found itself with an urgent need to bring more of its employees into its building on Independence Avenue near the U.S. Capitol.

To make room for staff shifting from the Health and Human Services building next door, management is trying a new office scheme: wings full of low-rise cubicles instead of increasingly crowded offices originally designed for a single person.

Starting Sept. 29, BBG began to move into the first of the completed spaces, which eventually will house the organization's Technology, Services and Innovation group. TSI provides IT and technology services for the BBG's broadcast operations.

The first person to make the move into the open-office cube farm was André Mendes, BBG's director of global operations.

"This space went from 80 staff desks to 153 desks," Mendes said, indicating the first wing of the project.

The full project will encompass 34,000 square feet and will house hundreds of BBG, VOA, RFE, RFA employees and others in the organization's international broadcast operations.

Other cost savings will come from seemingly minor changes.

Until recently, Mendes said employees were in a warren of offices, each with one or more printers. These printers, of various makes and models, require

a total of \$500,000 per year in cartridges. The new office space will have a handful of central printers, which will dramatically cut down on the complexity and cost of printing services.

The previous office organization resulted in fewer staff interactions because the physical offices did not encourage contact. That had serious consequences for BBG.

"Historically, this organization has one of the lowest morale ratings in the federal government," Mendes noted. Bringing a large number of people into a shared, collaborative space is expected to improve teamwork and facilitate better sharing of ideas and the overall workload.

Other employee-friendly features in the new space, such as treadmill workstations, standup desks and personal care rooms, are intended to make staff feel more appreciated.

Much of the staff involved with the initial move is from the organization's IT group, so they have paid considerable attention to networking and workstation capabilities. For a start, there will be no desktop PCs — only laptops and tablets. Also, phone service will be provided by voice over IP, which means that an employee's phone will essentially be where ever the employee's laptop is located. And there will be plenty of networking capability.

"We are going to have a lot of wireless bandwidth in this space," Mendes said.

The BBG expects the project to save \$2.6 million in fiscal 2015, primarily through rent savings in other buildings. Mendes noted that this amount is equivalent to the cost of four or five language services.

Mendes said that staff response to the move has been mostly positive, perhaps in part because employee teams were responsible for choosing features such as chairs.

Bob Kovacs is editor-in-chief of *Government Video*.

## PEOPLE NEWS



**Eric Garcia**

*Spanish Broadcasting System Inc.*

has been appointed revenue chief for the radio division

**Lynne Weil**

*U.S. Global Leadership Coalition*

was chosen to be its public affairs director

**John Geary**  
*iHeartMedia*

was named Sacramento market president

**Jane Mago**

*NAB*

will retire as general counsel and EVP of legal affairs



**Mike Powell**

*RCS*

was promoted to senior VP of international operations and chief compliance officer



**Jonathan Blakely**

*Minnesota Public Radio News*

has been named program director

**Claudine Cazian**

*Premiere Networks*

has been promoted to vice president of programming and branded entertainment



# Where's Your Passion for the Music?

It's time to have your annual chat with on-air talent about this subject

I met a hardcore Bruce Springsteen fan yesterday. She expressed to me that the best gift her husband of two decades has ever given her was a pair of tickets to see Bruce and the boys in concert when they came to town.

Without prompting, she then gave me an update on the latest Springsteen news and wanted to hear pretty much anything I had to say about his career and music going back to 1973.

After offering what meager stories I could, we started discussing other bands. She lit up the room with her enthusiasm, and I immensely enjoyed hearing her passion for music and watched as others entered the conversation with excitement.

This encounter prompted me to remind you that it's time to have your annual conversation with on-air talent about this subject. Springsteen aside, this concerns passion for music.

If you're managing a music station,



KROQ's Kevin & Bean participate in April Foolishness 2014, an example of their passion for their job and for the music.

Photo by Alex Rauch

**Do not assume** they will pull out their own wallets as often as you need them to in order to stay musically connected.

I hope you're blessed with air talent who live and love the music you're broadcasting. If they truly love the product, it makes your job as a manager easier to help them connect with your audience.

The reality is that experienced DJs are often past the stage of initial musical fascination, and we must remind them regularly that the foundation of a music station is — contrary to what they may feel — not themselves as performers, but the music and artists they are playing.

Sounds simple enough, I know; but communicating passion takes effort, planning and, most importantly, awareness.

## RE-ENGAGE

Awareness about musical passion wears off with time. To awaken the Sleeping Beauty of musical passion, you must re-engage with live performance at shows, talk about the subject with those most involved and stay on the cutting edge of cultural news regarding your particular form of music.

Voice tracking a few shows daily on various stations with no other kind of

engagement will not cut it over time.

Need to reminisce about what passion for the product sounds like? Try the BBC's 6 Music or any of their other channels, which you can stream on your phone or laptop. It's so palatable that it will make you want to send the host a text or email just let him know that you're listening, and maybe even "have your say" (as the British intone in their media) that you agree or disagree with the assessment they're making about the bands they're playing.

In part, managers can also set up on-air talent for success by scheduling features. Example: Have talent review releases, whether they are whole albums or individual songs, then deliver a 20-second review on-air and direct listeners to your website to read a written piece or watch a video (which could simply be shot on a camera phone). Ask your audience to participate and then communicate their reviews back on-air and online, creating a total passion feedback loop.

Another great feature is having an audience relive their favorite shows. They

text you a time-limited audio review they record on their own phone and you can edit the piece and play it back along with the songs they're talking about on it. These bits can comprise anything from releases or shows from this past week to those from 20 years ago.

What matters is the relevancy to your format and the passion they can help you express on-air.

Another handy tool you must provide your talent is daily information about

**PROMO POWER**



Mark Lapidus

your core artists. If talent is too busy or too lazy to look it up, a great PD should have news about that format's top 50 artists easily accessible. This can be accomplished through an old-fashioned printout and by setting up RSS feeds to be accessed by talent.

## MAKE CONVERSATION

Find out what bands your talent enjoy in your format. Get comps or buy the talent tickets on a regular basis. Do not assume they will pull out their own wallets as often as you need them to in order to stay musically connected. Reality check: Concerts are expensive, and radio doesn't always pay so well!

When you have staff meetings with talent, always allow time to discuss your station's music and artists. This conversation should be informal and steered by the PD to get everyone pumped about your mission to entertain, engage and ignite the passion in every single audience member.

The unfortunate alternative to expressing love for music is the creation of a boring broadcast music jukebox that will have difficulty competing with iTunes, Pandora and Spotify in the long run.

Passionate broadcast radio equals excitement — and success.

*The author is president of Lapidus Media and a longtime contributor. Email him via marklapidus@verizon.net.*

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# Try These Rapid-Fire Revenue Generators

Get back in the black with these strategies

## SALES MANAGEMENT

BY SCOTT FYBUSH

Every radio manager has been there: that moment when all of the little tricks you've tried to make your sales target just aren't cutting it anymore.

But there's always another new idea out there, and several of the top small- and medium-market managers from around the country just may have the idea that pushes your bottom line into the black.

### PSA



Perhaps it's those public service announcements your station prides itself on airing. Don't give away what you can sell. Instead of a PSA, first offer an ad deal.

You're serving the community, of course, but Carol Floyd, the market manager/sales manager for the Cromwell Radio Group in Mattoon, Ill., says there's no reason you can't also be making a few dollars on them.

"When I came to radio, I was amazed at all the things we air for free on a daily basis," Floyd said. "Any time someone asks us to air something for free, we have a preferred nonprofit package, buy one get one free. It's small enough that they can afford it."

A typical package costs nonprofits \$125 or \$150, which covers the cost of 10 ads, plus 10 more thrown in for free. "If you don't ask, you don't get," Floyd said.

### MILITARY PRIDE



Or maybe your market is a big military location, like Hampton Roads, Va., where Carol Commander is the director of sales for Saga's Tidewater Communications cluster. That station

group, which like others quoted in this story participated in a session about this topic at the spring NAB Show, has been bringing in extra money for several years with a "Military Hero of the Week" promotion.

"It's 100 percent NTR," Commander said, and it's revenue that's coming out of a different budget line at many of



Vince Benedetto

the companies that sponsor the promotion. "There are many companies that have an entire budget that's dedicated to military, companies like Geico and big banks. They have a military budget

Steak House. Commander says the promotion is good for an extra \$40,000 a year from its title sponsor alone, plus additional sponsors.

### SIGNAGE



Another source of non-traditional revenue that's become increasingly popular for radio owners is to branch out



Carol Commander

into digital signage, giving advertisers the chance to put their message not only on your own airwaves but also on signs at the local arena, convention center or airport.

the face of the "Arlo's Shed" promotion, in which a lucky winner goes home with anywhere from \$10,000 to \$25,000 worth of "stuff you'd find in your garage."

The key for sponsors, Commander says, isn't in the giveaway itself but in the leads generated by all the entries for the giveaway. The sponsors get contact information at the end of the promotion, "and obviously, we teach them how to use those leads post-event, so they can get more revenue that way," Commander says.



Carol Floyd

Keeping advertisers (and potential advertisers) happy is an important piece of Commander's sales strategy, which includes a "Brandsformation" workshop the stations hold periodically at an off-site location.

"There's no ask involved," Commander says. "It's just how to take a good local business and turn it into a good local brand."

There's nothing a radio station does that can't be named and sold.

Floyd says her stations "went through and created a grid, to make sure we know what's expiring and what isn't." If sponsorships are falling off, "we have quarterly blitzes" to fill the grid up again, she said.

The session at the NAB Show also included ideas from the audience.

At Blackgold Radio's "93.1 The One," CJLD(FM) in Leduc, Alberta, owner Mark Tamagi says the station put up a performance stage in the lobby, "Stage One" and sells naming rights.

And don't overlook the potential to unlock some extra revenue from something as simple as a station concert. At Benedetto's Bold Gold stations, the annual "Thunder Bash" is free to listeners — but tickets are only available for limited periods at sponsors' locations.

"Nothing tells an advertiser your station is relevant like when they call up to say 'We ran out of tickets!'" Benedetto says.

Scott Fybus is a longtime contributor. Learn more about Scott via his website [www.fybus.com](http://www.fybus.com).

**"You take streaming, your website, digital ads, and you can put together a very customized package that nobody else in the market is going to be able to do."**

— Vince Benedetto

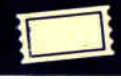
that has nothing to do with their regular broadcast or print budgets."

At Tidewater, listeners submit names for the contest, and the winner each week comes to the station for an award (sponsored by a local trophy company) and a gift certificate to Ruth's Chris

At the Bold Gold Media stations in northeastern Pennsylvania, owner Vince Benedetto took that idea one step farther, selling not only ad space on all the signage and monitors in the nearby Mohegan Sun Casino but also putting a radio studio right in the casino.

"About 12,000 people a day go by the studio," he says. "You take streaming, your website, digital ads, and you can put together a very customized package that nobody else in the market is going to be able to do."

### GIVE AWAY THE LEADS



If you're in a market with no casino and no military base, how about home improvement? At Commander's stations in Virginia, veteran DJ Mike Arlo is

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# Get the Skinny on UConnect

Chrysler's connected car system blends sounds, safety and choice

## ROADTEST

by Paul Kaminski

Here, Radio World begins a series about the media infotainment systems in today's new vehicles.

"Connected car" is not just a buzz phrase. Nor is "connected trunk."

They're here; and they give drivers and passengers more choices for entertainment, information and safety.

I get to see these systems in action each week because I drive various cars and light trucks for my weekly "Radio-Road-Test" broadcast for *msrpk.com*.

A while back, I drove a Jeep Grand Cherokee Overland 4x4 edition, with the optional diesel V6 engine and eight-speed transmission. It's a 30-mile-per-gallon content delivery vehicle, whether driven on the highway or on off-road trails.

The content delivery is handled by the UConnect connected car system. I focus here on the top-of-the-line UConnect 8.4 system.

There are also other UConnect systems available with fewer capabilities.

UConnect touches both navigation and communication. For those in the radio business, Chrysler Group vehicles with the top-of-the-line UConnect option deliver audio content from AM, FM, FM HD, Sirius/XM Satellite and four other



The Jeep Grand Cherokee Overland (shown at top) features the UConnect 8.4 system. Also shown here are photos of the user interface, which has separate screens for the apps, SiriusXM and HD FM radio.

apps that piggyback with a connection from a smartphone (Aha, iHeartRadio, Pandora and Slacker). When the radio button appears on the UConnect screen, and it's activated, options to listen to terrestrial over the air AM and FM (with options for HD) stations and satellite radio (SiriusXM) are available, as they would be with a standalone radio receiver.

It also has USB connectivity for user-curated music, and the system has the capability to tag songs.

One thing I noticed about this iteration of UConnect is its flexibility. Menu

access is as simple as tapping the touchscreen to select the app you want. That's a good thing when you are learning a system on the fly. UConnect has a mix of steering wheel, touch screen or voice-activated controls.

However, the best and recommended way to optimize all the system's capabilities is to spend quality time with — wait for it — the owner's manual *before* one rolls out of a parking spot. That will help when going past the first few screens (menu-diving). Once it is set up, a driver or passenger can use voice commands to

make choices of inputs and operations.

With Message Access Profile, UConnect reads text messages and interfaces to Bluetooth-equipped cell and smartphones. The audio content dims when a hazard enters the driver's decision zone. The dimming of audio is activated by various sensors, which monitor the blind spot, front, rear and side proximity, and when the rearview camera is activated.

UConnect can provide 3G Internet access through a subscription to a proprietary network. That network also

provides the user unlocking services, navigation and emergency connection to a 911 center in case of an accident.

The top-of-the-line UConnect system will add \$1,200 to the base price for a Chrysler Group product. More pricing and model information and FAQs are available from *DriveUConnect.com*.

### THE BOTTOM LINE

The UConnect system in general wraps information, entertainment and safety warnings in a neat 8.4-inch package (diagonal screen) that occupies a prime piece of dashboard real estate.

It's easy to use, once programmed and gives driver and passenger many options.

Radio stations (whether AM/FM or satellite) are available as a primary choice for a UConnect system audio input. Once selected, secondary menus activate scan functions, RDS and HD Radio reception options to help the user find particular stations and then become a listener. Those menu options present opportunities for stations to present their "brand" in the best possible light. Managers, engineers and programming/operations people can optimize that opportunity by ensuring their station or stations present up to date RDS data and other metadata that systems like the UConnect can receive, along with signals of the best technical quality, and the content to match.

Paul Kaminski is the host of *msrpk.com*'s "Radio-Road-Test" program, a contributor for CBS News, Radio for many years, and since 1997, a Radio World contributor and columnist. A SBE Certified Broadcast Technologist (Chapter 1), Paul tweets @msrpk\_com.

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## Virtual Roundtable: Trends in Processing

*Imbued with seemingly magical healing powers, no piece of equipment in audio has more mystery than the processor. Radio World's latest Virtual Roundtable gathers together several Merlins of audio processing to tell us their tales of processing.*

*An unabridged version of this Virtual Roundtable is available at [www.radioworld.com/virtualroundtable](http://www.radioworld.com/virtualroundtable).*

**When you listen to today's radio stations, is there an issue with on-air signals that you see that isn't being properly addressed?**

**Frank Foti, Omnia Audio:** Tough question, as it is so market-dependent. What works well in one market may roll over dead in another, yet both markets feel they're establishing some sort of processing "benchmark." It's so subjective.

To my ear, processing induced intermodulation distortion (IMD) is so annoying. I can just about always tell another processor because the transients get sucked out of all the content, especially drums and cymbals, and it sounds as if my head is in a vise.

I also feel there's room to grow in the area of metadata and transmission processing. We now have the means to package info about the dynamics, along with the audio, such that the end-user experience can be enhanced. It could even be done seamlessly like enabling the receiver to adapt itself to the listening environment, and then replicate the recovered signal accordingly, so the audio sounds amazing, all the time.

**Jeff Keith, Wheatstone:** It's something that I see over and over again in the field: poor source quality. Many sta-

tions, in an effort to be the first in their market to break a new song, play songs that have been downloaded from some Internet site somewhere. Most of that material, in an effort to save download bandwidth and perhaps even hard drive storage space, have already been conditioned by a low-bitrate codec. Unfortunately these songs don't sound very good before they go through the on-air processing, and they sound even worse afterwards. Of course, many stations intend to replace those songs later on with better sounding, linear material, but it almost never happens. Once the song is happily nestled in the station's play-out system, it stays there — to sound bad on the air — forever.

Modern processors can deliver amazing on-air sound even under some of the worst conditions, but one must understand that no on-air processor is a magic bullet that will fix broken and underperforming air chains or bad source audio. Even "all digital" air chains can have very common issues such as insufficient headroom. To get the very best on-air sound, good engineering practice dictates that the engineer be intimately familiar with every single thing that's in his air chain, why it's there, and how it works. In every case I've seen, the best-sounding stations understand this to the nth degree and have it nailed to perfection.

**Bob Orban, Orban:** I am not qualified to second-guess the judgment of programming professionals, who are paid to get ratings and whose jobs are on the line if they don't. My job is to give these professionals the tools they need to achieve their programming goals.

**Do users and GMs expect too much from processors? Are their abilities overpromised? Can they turn the sow's ear into a silk purse?**

**Keith:** I can't harp on this enough: The radio station's on-air sound can "never" be better than that of the original source quality. From my point of view, some customers expect their newly pur-

chased on-air processor to deliver some kind of magical fix to their bad audio. Even worse, there have been so-called "fixes" offered by some that, on the surface, do appear to work like magic. The problem is, these algorithms can't remove distortion caused by clipping in the mastering stage, regardless of how pretty-looking a waveform they can make out of that clipped audio. Only the device that originally clipped that audio "knows" what was beyond the clip level, and that information is gone, not available to the declipper, and that makes any declipping process a guessing game that can only add new distortions that weren't even in the original clipped waveform (this can actually be proven mathematically).

**Mike Erickson, Wheatstone:** I think there's an expectation that a new processor will magically heal all the warts, and that's rarely the case if you have compromised audio sources or a compromised transmission system. In fact, if your audio sources are compressed, you run a very good chance that the newer, cleaner algorithms in a new audio processor will reveal even more bad details in that audio than your previous one did. I think we've gotten to the point where marketing may be trumping science and that's a problem. I'm waiting for someone to declare that mounting a processor upside down in the rack reduces distortion and improves stereo separation ... and I guarantee, if that was said, you'd see processors mounted upside down in racks in some stations.

**Orban:** Processors are very good at correcting source-to-source loudness differences and inconsistencies in spectral balance. However, they cannot fix quality problems caused by lossy compression (such as MP3) that has been applied to the source. It is risky to expect online processors to undo clipping and hyper-compression applied to the source material, particularly since some of this may be part of a given musical style, reflecting artistic choices made by the original artists and producers.

In the case of Orban's processors I try

not to promise more than I can deliver; the engineer in me dislikes hyperbole, and if I make a claim about performance, I prefer being able to back it up with research and measurements.

**Foti:** Audio processors, especially today's generation, are very, very powerful tools. But, as with any tool the artisan needs to understand it, and then do what they can to achieve maximum results from it. If you have the latest/greatest sports car and the driver keeps crashing it, is it the problem of the car?

I think users and GMs all still want the same result: good clean audio that's competitively loud. That's not going to change.

**How much processing is needed when many stations' material is little more than crushed MP3 files streamed off a hard disk? Or does that provide a challenge for the processor operator — to revive those songs?**

**Orban:** With the low cost of modern disk storage, there is no excuse for using degraded sources. Information lost to lossy compression cannot be recovered. The best one can do is make educated guesses about what might have been there before compression. This is risky business (the guesses can be unmusical and/or damage the material further), and is best left to the production studio. Even there, it is usually impossible to undo the quality degradation caused by severe lossy compression.

**Keith:** Crushed MP3 files are one thing, but the challenges of FM pre-emphasis and competitive loudness demand the use of very competent on-air processors in order to turn these files into something that's even passably listenable. Most on-air processors have tools that can help make those songs sound better than they otherwise should, but again, the best on-air sound is achieved by playing material that is linear, that is, has not been through a codec (or two). Expecting a different outcome is foolish.



**Foti:** It's been said for a few decades now, to process on-air for quality and competitive loudness, you must use the least amount of data compression, or hopefully none at all. Today, storage is cheap. There's no reason a library of music needs to be low-bitrate MP3 files. It's not a myth, if you are using low-bitrate MP3 files, and moderately heavy processing, that not-so-nice things will occur to your audio.

**On the other hand, does the promise of pristine HD Radio give new life to processors?**

**Orban:** The main advantages of HD Radio are (1) it is not subject to multipath distortion, (2) it uses no pre-emphasis, so it has adequate high-frequency headroom for modern music, and (3) the gain of the HD Radio signal path at the receiver is 5 dB greater than that of the FM analog signal path, meaning that the HD Radio signal requires much less peak limiting than does the FM analog signal to achieve loudness parity between them.

However, the HD Radio codec is now decades-old. It is not state-of-the-art and introduces audible codec artifacts at lower bit rates, particularly 32 kbps. These artifacts can be mitigated, but not eliminated, by artful preprocessing.

**Erickson:** I'm not a huge HD Radio fan ... I can hear the codec in the audio and it's much more annoying to me than the blemishes of FM radio, especially if the FM station is processed tastefully. There are some very cool tricks we can play in the back end of an HD processor to try and minimize the artifacts that would come up later once the audio has passed through the codec ... This leads

to another point: stations that have compressed audio files and transmit in HD. When that audio reaches the listener on the HD path, it will now have been pushed through at least two audio codecs before it gets to your audiences' ears. So while compressed audio doesn't help FM, it has the potential of making the HD broadcast even worse.

**Keith:** In my opinion, HD Radio "can" sound better than conventional analog FM, however it's still audio that's been through a bit-reducing codec. HD Radio sounds better than conventional FM only because in HD, the processor doesn't have to deal with the huge amount of high-frequency pre-emphasis that's used on the analog side. With this limitation out of the way, HD FM can sound remarkably good, even if it's not "linear" audio.

**Do all-digital signals create their own problems? What are those?**

**Keith:** Actually, good engineering practice at the station level usually keeps all the weird things that can happen with digital audio out of the way. However, the most common digital audio issue that I see in the field has to do with audio headroom and a misunderstanding of the difference between dBFS and dBu/dBm. During the analog years we got pretty used to the fact that there was "more" above 0 VU, so banging above zero on the old VU meter wasn't all that dangerous. But that's not how it works in the land of dBFS — there is no more left above zero, that's it — you're simply out of bits.

**Foti:** Well, sad to say, but I still hear certain radio stations that employ digi-

tal processors that are known to generate system aliasing distortion. That is an issue to be put on the shoulders of the processor designer. Likewise, it is best to know that the entire digital path is setup so that 0 dBFS at the output of the mixing console is also set to be 0 dBFS in every piece of gear along the path. If not, then added distortion, both harmonic and aliasing, will result. Additionally, too many sample rate conversions and/or time/sync issues can cause havoc.

**What about streaming audio? What are the problems inherent there?**

**Foti:** Streaming should not be taken lightly. It has grown immensely over the past decade, and keeps growing. It offers many options that can aid the listener experience, data-reduced audio aside. While some wish to point to what they might think are the pitfalls of it, we must all remember what the listener is attracted to: content, content and content! Unless it sounds totally unlistenable, they will find it, and connect with it. Not much different than my childhood days of straining through lightning-induced static on AM radio while listening to my beloved Cleveland Indians baseball games.

Bitrate-reduced audio is the challenge. It's the economy of scale issue. Folks want to use the least amount of data (bitrate) yet achieve the maximum amount of audio quality. It's a bit of oil and water really.

While some view this question/topic as a dynamics audio processing issue, it's a bit more related to bitrate. We've been able to improve intelligibility of lower bitrates through processing algorithms, but the keyword here is "improve."

Depending upon the transmission bitrate, this will determine what amount of spectra and fidelity we can offer.

The dynamics processor for streaming has the tools to help mitigate coding artifacts from developing, or suppress them from being heard. Also, it's important to know that streaming is a different transmission animal, and on account of that, you must employ an audio processor designed for a streaming application.

**Orban:** The advantage of streaming audio is that it can use the latest codec technology, as most of the player devices are software-based, so they can be easily upgraded as the state-of-the-art improves. HE-AAC v2 provides excellent results today, and the new MPEG USAC codec promises a modest improvement even beyond HE-AAC v2 in the future, particularly at bit rates of 32 kbps and below.

The main problem with streaming today is that multicast is not yet widely implemented, so transmission bandwidth is used more and more inefficiently as the number of listeners to a given stream increases. A further practical challenge is commercial replacement and insertion, because the inserted program material may not be properly loudness-controlled with respect to the main program material. Another practical challenge is that rich metadata, providing title, artists, graphics, etc. is well-defined in standards documents but is not correctly implemented (or even implemented at all) by all streaming encoders, streaming servers and player devices. It is only a matter of time before this is sorted out, but right now, certain companies handle this much better than others.

*(continued on page 24)*

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## PROCESSING

(continued from page 23)

**Erickson:** It's as simple as this: if you want your stream to sound the best it can be, you should use a processor that is designed for the task. The worst thing you can do is put an FM processor or feed an off-air signal to a stream and expect it to sound acceptable. A codec, by definition, needs to find audio to throw away. Audio that has been processed for FM with very tight peak control doesn't give the codec much choice. A processor that's designed to be placed ahead of the codec will help that codec make those choices more efficiently and the final product will be pleasing.

**Keith:** Streaming audio isn't that much of a challenge as long as one remembers that when processing ahead of a bit-reduction process (codec), care must be taken to leave the codec something to work with. The reason is this: Codecs do their magic by finding opportunities within the audio to remove things that its built-in psychoacoustic model says we humans probably wouldn't hear anyway. The more compressed, EQed, limited and/or clipped the codec's input audio is, the poorer the job it can do to remove things it thinks we wouldn't hear and still leave us with decent sounding audio. To say this another way, once we take those opportunities away from the codec, it'll make mistakes in what audio information should be removed, and some of those mistakes can be quite audible if not annoying to listen to.

### What's the biggest issue for today's processor designer?

**Orban:** A big practical challenge is the pace of hardware technological change. Electronic components are available for sale for shorter and shorter periods of time before being obsoleted by their manufacturers. Traditionally, broadcast equipment has been supported by its manufacturers for decades, but this is becoming harder and harder to do because of progressively shorter parts obsolescence cycles. Hence, choosing a hardware architecture that can be manufactured and supported long enough to pay back the cost of the processor manufacturer's R&D becomes more and more challenging.

**Foti:** Imagination! Twenty years ago, Steve Church and I were dreaming of doing a lot of cool adaptive stuff for audio processing. The challenge was the cost of firmware at the time, which made it prohibitive. Today, that issue is gone. We have low-cost computational power and the tools to do just about anything. It's on us really!

### What was the best processor ever? Please, one you didn't build?

**Foti:** The work of the late Bob Kanner at KRTH(FM) (K-Earth), Los Angeles and KFRC(AM), San Francisco. These were custom air chains, and always sounded amazing. Bob's attention to detail was always an inspiration to me. My mentor the late Jim Somich had also done

some incredible work at WMMS(FM), in Cleveland. I also feel that Mike Dorough, Glen Clark, Greg Ogonowski and Bob Orban have done some great stuff, too.

**Keith:** Definitely Bob Orban's 8100A. In my opinion, Bob did an incredible design job on that product to skillfully balance the natural and immutable tradeoffs of the FM medium. Even today, some 33 years after, as an Orban customer I bought one of the very first units, that product can be found in all kinds of markets, still doing a very credible job of managing FM's tradeoffs. Sure, digital processors can do all of it better now, but that's mainly because some of the things we have to do to create competitively loud and clean audio on FM are either impossible, or highly impractical to do in the analog domain. But the 8100's still a great box, and always will be a benchmark in FM processing as far as I am concerned.

**Erickson:** I agree on the Optimod 8100 and would give an honorable mention to the Hnat Hides Tri-Maze. It was a very listenable three-band processor that could be used for FM or set up for AM. WQEW in New York had a pair of Tri-Mazes for AM stereo during their days as a standards station. Still one of the best AM airchains I've ever heard and by far the best AM stereo chain I ever heard.

**Orban:** Answering this question requires false modesty, but I think that most processor manufacturers would reply that the best processor ever is the one that is currently in their R&D lab! I have no

nostalgic feelings for my old designs. I have found digital signal processing to be immensely liberating, and the cheaper it has become to implement, the better I have been able to make my designs.

### Technology (and cost) aside, what would the perfect processor do and how would it do it?

**Foti:** Perfect audio quality and maximum loudness. That's the nirvana of every radio station. The how part of this, it is still in development, after all it's just a few lines of code!

**Orban:** Processing is a mix of art and science, so it is no more possible to answer this question than to say what the perfect painting, sculpture or piece of music would be. Moreover, there are certain things that processors can never do, such as reconstructing information that has been 100 percent lost due to lossy compression, peak clipping, etc.—mathematical singularities will always remain so, and entropy will remain part of the laws of physics.

Because processing should implement the preferences of programming professionals (which usually rests on a combination of audience research and instinct), the perfect processor would read the program director's mind and adjust itself accordingly. Perhaps in a Star Trek universe such a thing could exist, but that bit of science fiction is still a long way in the future!

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# Aaron 650 Cuts Through the Chatter

Rebroadcast receiver offers strong reception, useful analysis tools and failover features

## PRODUCT EVALUATION

BY TOM VERNON

In the world of broadcast gear, most of the publicity goes to amazing audio processors, dazzling digital consoles and smaller solid-state transmitters. The lowly FM rebroadcast receiver is one of those staple items that receive little attention from manufacturers — until now. Hot off the show floor from the spring NAB Show is the Inovonics Aaron 650 FM Rebroadcast Receiver. Inovonics has managed to bring this rather pedestrian product class squarely into the 21st century by using cutting edge technology. The device received a Radio World Best of Show award at the spring show.

connectors. A USB B-type connector delivers the RDS data stream for analysis. Network connections come via a RJ-45 port, useful for remote access via Aaron's web server, as well as accessing a web stream in failover mode.

Finally, there is a Euroblock connector for alarm tallies, including audio loss, RF carrier loss, loss or "hijacking" of the RDS/RDBS subcarrier and loss of stereo pilot.

Peeking under the top cover, Aaron is a marvel of surface-mount technology, with everything being done by a couple dozen integrated circuits and little else. SMT architecture means there are no tuned circuits. The quality of construction is up to Inovonics' usual high standards, and you're covered by a three-year warranty.

Interfacing with Aaron can be accomplished via the front-panel OLED display and jog wheel. The menu for

nal while switching between the two modes. Aaron can also regenerate a noisy RDS signal, or replace it with one more pertinent in the rebroadcast signal.

Aaron boasts some pretty amazing receiver specs. Unweighted monaural SNR for AES digital and L/R analog line outputs, referenced to  $\pm 75$  kHz carrier deviation with an RF input level of 60 dBuV is greater than or equal to 82 dB digital, 80 dB analog. With 0 dBuV, SNR is greater than or equal to 43 dB digital/analog.

This receiver owes much of its stellar performance to its software-defined radio architecture. As with most of today's modulation monitors, as soon as RF enters the box, the signal is digitized. After that, it's all about coding and DSP.

Aaron's SDR architecture enables a series of reception tools and visual aids that would not be possible with conventional receivers. Many of these will only work when Aaron is operated in the stereo-regen mode.

First up is IF Bandwidth. In the

### PRODUCT CAPSULE

#### INOVONICS AARON 650 Rebroadcast Receiver

##### Thumbs Up

- + All-digital SDR (software-defined radio) design
- + Software reception tools enhance marginal signals
- + Multiple alarms local and remote, email and text notification
- + Webstream and SD card failover options

##### Thumbs Down

- Only one failover option at a time

MSRP: \$2,390

CONTACT: For information, contact Lukas Hurwitz at Inovonics in California at (831) 458-0552 or visit [www.inovonicsbroadcast.com](http://www.inovonicsbroadcast.com).

advanced reception tools, "multipath suppression" and "channel equalizer," that function in both the pass-through and stereo-regen modes. There are no adjustments, they are either on or off.



It should be noted that there is an Aaron 640, a pared-down, value-oriented model, notably lacking some I/O options; here we review the "premium" 650 model.

### UP FRONT

The front panel of Aaron has a bright OLED display and jog wheel to access the rather extensive menu. There are two large solid-state VU meters as well as LED indicators for: audio loss, RF loss, RDS loss and stereo pilot. There's also a 1/4-inch headphone jack. Inserting a plug automatically brings up the headphone volume menu and sets the jog wheel to adjust volume. Finally, there is a slot for SD cards.

Around back there are two N connectors for receiving antennas, XLR connectors for analog left and right out, as well as AES digital out. Two composite outputs are available on BNC

this device is rather extensive however, and you'll probably want to do the bulk of the setup via the Web browser and laptop or mobile device once the initial IP parameters have been entered.

Most conventional rebroadcast receivers have a composite along with left/right audio outputs. Normally, you connect the composite output to the baseband input of the exciter or translator. With a solid, noise-free signal, this pass-through method works fine, but if the signal is iffy, not so much. Aaron gives you the option of using a stereo-regen mode, in addition to pass-through. With regen, the signal is demodulated down to left and right audio, then re-encoded by dropping the audio into a local stereo generator, resulting in a substantial reduction in noise.

You may make the decision as to which mode to use while setting up Aaron. Simply monitor the off-air sig-

factory default auto mode, bandwidth is controlled by the composite signal parameters, and maximum bandwidth is maintained consistent with signal quality. In manual mode, it can be adjusted in increments between 56 and 311 kHz.

A suite of three tools are included to compensate for deteriorating signal quality. A traditional stereo blend incrementally changes the reception mode from stereo to mono. Blending may be based upon RSSI (received signal strength), ultrasonic noise or multipath. It's your choice.

"High Blend" is very similar to stereo blend, but only the higher audio frequencies are blended toward mono. High-cut gradually rolls off high frequencies rather than sacrificing stereo separation. All of these have a series of manual adjustments made through the OLED display or Web access.

Additionally, Aaron offers two more

In the graphs and metering submenu, there are several powerful visual aids to assist with receiver setup. First is MPX-FFT, which will provide a spectral display of the signal leaving the 650. You can determine the injection level of the stereo pilot and all subcarriers, view FM baseband noise and irregularities, and see the effect of different IF bandwidths in the pass-through mode. Viewing this display while switching between pass-through and stereo-regen modes will give you a good idea of how much cleaner one mode is than the other.

BandScanner presents an RF spectrum display of the incoming signal at carrier frequencies, and here you can set the Center Freq of the display, Step Size or resolution bandwidth. In a wide-range analysis, you can see the entire FM band with the individual carriers of stations in your local market.

(continued on page 26)

**AARON***(continued from page 25)*

Processing, the next menu item, displays the real-time action of the three stereo reception tools discussed earlier. These are actually redundant to displays with the reception tools, only these displays have higher resolution, include a peak hold feature, and enable viewing all three displays simultaneously.

XY Plot provides the stereo sum and difference levels on peak-reading bargraphs, as well as the familiar XY scope display. This is useful for visualizing how wide the stereo image is, as well as out-of-phase signals and mono broadcasts.

LR Plot gives an indication of loudness by displaying peak levels for the left and right channels averaged over a 10-second window. The amount of time the program peaks spend at or near 0 dB is a direct indicator of program density.

**RDS TREATMENT**

Since this product is from Inovonics, you would expect RDS to get the full treatment, and you won't be disappointed.

There is a comprehensive display of RDS parameters. Additionally, in the RDS Regen mode, you are given four choices regarding the RDS subcarrier:

- Recode RDS simply regenerates and retransmits the incoming RDS signal in its original form
- Re-encoded RDS with new PI code retransmits the incoming signal, but allows users to insert a new PI code, enabling strict adherence to the RDS standards

- Built-in RDS removes the incoming data stream and replaces it with static RDS data that is entered manually
- Built-in RDS with Internet Time additionally inserts the current time derived from the Internet

The USB B connector on the back of Aaron delivers the RDS data stream to a PC for closer inspection. Used in conjunction with the RDS analysis software that can be downloaded for free

file will play for 24.25 days without repeating.

Unfortunately, your backup audio choices are an either/or situation. It would be better, for example, if the user could designate the Web stream as a first option, with the SD card as a secondary choice if the stream is unavailable, a likely scenario at deep remote locations. An Inovonics representative indicates that this type of failover option should be available in an upcoming firmware release.

## With its stereo-regen mode, reception tools and displays, it can make definite improvements on signals that have always been marginal.

from Inovonics, a detailed analysis of the RDS signal and content is possible. A company representative adds that Inovonics will make the source code for this software available to anyone who wants to do deep customization.

Even in the best-run stations, stuff happens, and your receiver may lose the signal from time to time. Aaron has got you covered with two menu-selectable options: failover to your Web stream via the rear IP connection, or switch to backup audio from the SD card inserted in the front panel. Either WAV or MP3 formats may be used. The 650 will play the audio files in the order they were recorded. After that, it will repeat until the receive signal is restored. A 32 GB card, SDHC type with 128 kbps MP3

When stuff happens, you also need to be notified, and the 650 has ample alarm options. Tallies for audio loss, RF loss, loss, "hijacking" of the RDS subcarrier and pilot loss, are available as either active-high or active-low outputs on the rear panel, as well as through the Web browser, which can deliver email and test alerts. The parameters of each of the four alarms may be fine-tuned when the receiver is set up.

The 53-page manual that comes with Aaron is complete and well written. It is worth reading; this is a sophisticated piece of equipment. While it's possible to get simpler gear running by blundering around with it, you will not reap all the benefits of Aaron if you take this set-it-and-forget-it approach.

Most important is taking time to study the menu tree, as this will give you the quickest overview of the setup and options. It can also serve as a handy checklist to make sure you didn't miss anything while installing Aaron.

All very interesting, but the real question is: How well does it work in the field?

From our hilltop location in central Pennsylvania, distant stations from Pittsburgh, 180 miles away, and Philadelphia, 120 miles away, were tuned in, as well as a few around 50 miles distant. A directional FM antenna was rotated for maximum signal strength. The tests lasted about three weeks.

Having listened previously with an older analog tuner, the difference in the number of stations received was impressive. The signal quality was not that great on many of the test stations, but that's where the stereo-regen mode works its magic. Signals that you would never consider rebroadcasting in pass-through mode can be cleaned up enough to air using Aaron's toolbox, and the MPX-FFT display confirms what your ears are already telling you.

On the more distant stations, there was occasional fade and flutter, but this was probably caused by summertime atmospheric inversions and aircraft taking off from the nearby airport. Stations within a 50-mile radius maintained a quality signal in the stereo-regen mode. One might expect slightly better performance from this location with a tower and high-gain antenna cut for the receiving frequency.

Tuning up Aaron for the best receive signal is a bit like tuning up an audio processor. There is no one right way to do it. There are a number of tools at your disposal, and engineers may take different strategies and settings, yet end up with comparable results.

To sum it up, stations with translator networks have had little incentive to upgrade their gear in the past. Incremental improvements in analog receivers probably weren't worth the time, money or trouble. Aaron, on the other hand, is a game changer. With its stereo-regen mode, reception tools and displays, it can make definite improvements on signals that have always been marginal. Sites that have not been considered for translators before because they are too remote might now be on the table.

Having spent several weeks evaluating the Aaron 650 rebroadcast receiver, one question remains. Where did the name Aaron come from? Company President/CEO Ben Barber explains: "Aaron comes from a play on words, 'on air,' to 'AirOn,' or Aaron."

*Tom Vernon is a long time contributor to RW. He keeps busy writing tech manuals and doing market research for several broadcast manufacturers.*

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## COMMENTARY

BY RICK GREENHUT

The author is director of broadcast business development for iBiquity Digital Corp.

It used to be that radio stations just had to sound good, fill a listener need in the marketplace and promote themselves to be a success.

We had the car dashboard to ourselves, streaming "radio" was a far-off Star Trek technology and everyone woke up to an alarm clock that was also a radio. We told ourselves that TV didn't

choices and options.

And it is changing faster than ever. HD Radio technology was developed to give stations the ability to reach multiple audiences simultaneously, as well as to create additional "invisible" revenue streams via the ability to provide traffic, weather and other value-added products to enhance the listener experience.

With more than 185 auto models from all major auto manufacturers equipped with factory-installed HD Radio receivers, your listeners are driving new cars off the lot with this 21st century technology already in their dashboards. About 20 million HD Radio-equipped cars are on the road this year; millions

tions platform is a radio, computer, cell phone, billboard or the stage at a street fair. All of these channels add up to your station's brand.

Why just sell spots, when you could be selling a complete digital solution for an advertiser? Packaging is what radio excels at; and combining all your digital assets into one buy — on-air, banner ads on your website, on HD Radio receivers and in your app — can help send an important message about your brand:

We're everywhere your prospective customer is, Mr. or Ms. Advertiser. Our brand can deliver for your brand like no one else, because we can put your message in front of the consumer *wherever* they may be.

Thinking like a Brand Manager, you start to see that for a radio station to stay successful in the 21st century means going from playing checkers to playing

advertiser's logo on HD Radio receivers to the mix, and you have a multimedia radio buy that allows an advertiser to utilize your "trusted brand" to sell their brand. To use that package goods analogy again, it's all about shelf space, whether that shelf is literal or in the listener's mind.

Or, put your all-news AM on your HD2 or HD3 channel, and instead of suffering tune-out, benefit from tune-over. When listeners leave your music channel, they go to your news station. Why share audience with the competition when you can share among your own stations? Don't let your PIs become a part of another station's audience.

Again, taking an example from another industry, if M&M Mars had worried about decreasing its sales, it never would have added peanut, almond or dark chocolate varieties. Instead, they would have lost customers to Hershey's Kisses. Consumers trust the brand, and



Rick Greenhut



Pittsburgh-based Steel City Media is a great example of how stations can give equal weight to all their channels and have imaging and distinctive logos for each.

kill radio, 8-tracks didn't kill radio, cassettes and the Walkman didn't kill radio, so the Next Big Thing (whatever that might be) also wouldn't kill radio.

While the steel industry was thrilled if they had a 10-percent profit year, radio stations were often keeping 30 cents to 40 cents out of every dollar they took in.

If radio and its one-to-many capabilities didn't already exist, it would seem too good to be true. Reach one person or a million for the same cost? Amazing!

Fast forward to 2014, and radio remains the last consumer entertainment source that hasn't gone fully digital. Taken for granted across all other audio content platforms are dynamic artist and title information and album art, as is digital quality sound. The marketplace has changed, becoming more vibrant, with an explosion of digital

more will be there next year.

So how do you cash in and monetize this digital opportunity?

### A MATTER OF TRUST

In every local radio station you have a classic example of a highly cost-effective, localized, instantly recognizable brand that can deliver the goods for advertisers.

What's more, as any program director knows, a well-designed format has a personality all its own, and listeners develop a personal relationship not just with the jocks but also with the station itself. We're "trusted agents." The audience grows to trust "its" radio station to find and aggregate music, news, weather and information on concerts and local events.

And that trust is extremely valuable to advertisers whether the communica-

tion. Like it or not, you're not just managing a station, you're managing a Brand.

### LOGICAL EXTENSION

Carrying the package goods analogy further, adding the HD Radio experience to the mix allows you to present a logical brand extension that will create a cohesive advertising solution for prospective clients.

For example, a rock station that adds a legacy format on its HD2 can allow advertisers to recycle the existing audience for that format, adding that older target demographic to the younger audience already being delivered by their main channel, all *without* cannibalizing their main channel's audience.

Package and sell them together, and you have a rationale for a bigger piece of a buy. Add banner ads on your website and scrolling text calls to action and the

aggregate sales for all the varieties is far larger than for just plain M&Ms alone would have been. Adding additional line extensions did not cannibalize sales for their core brand. This same concept holds true for radio as well.

There are innumerable opportunities here.

### MULTICASTING

Country stations can add an "Outlaw Country" format to their HD2 to attract younger listeners and a motorsports channel to their HD3 to deliver more men, creating a package that delivers the country music listener across a broad spectrum.

And religious stations no longer have to choose between spoken-word formats and traditional Christian music programming. Via HD Radio multicasting, they

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**BRAND**

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can deliver both, as well as segmenting their music so one channel delivers adults 25–54, while the other delivers adults 18–34. It's an exciting opportunity to expand the market for your brand.

There are as many new revenue opportunities here as there are creative salespeople.

Whether you're leasing channels to foreign-language broadcasters looking for a radio voice, selling an individual multicast channel to one client or creating a market-specific new music channel, the possibilities are limited only by your imagination.

So you see, it's not just about your on-air presence, or your website or even your additional HD Radio channels. And it's not about just selling spots, Web banner ads or scrolling text messages. It's about packaging them all together to create a new, improved version of your trusted brand that commands a bigger share of both the total audience and the media buy.

Digital doesn't just mean what you do on your website.

It means bringing what is still the most efficient, listened-to medium in the world into the 21st century by recognizing that, as general manager, you also have to think like a Brand Manager. And HD Radio Technology allows you to, in effect, add additional line extensions to your brand for far less than the cost of buying additional radio stations (even if they were available).

If we want to help radio retain relevance in the digital age, digital radio is the next logical step in creating additional venues to reach consumers.

As any Brand Manager knows, you have to change with the times.

*Rick Greenhut is a 40-year broadcast veteran who has held senior-level jobs, including vice president of new media at Premiere Radio Networks, vice president of business development for Westwood One, regional director of affiliate relations at NBC Radio Networks and division manager at Arbitron.*

**READER'S FORUM**

**FACE THE MUSIC**

Hi Mark — I was just reading your article ("Our Free FB Ride Is Nearly Over," Sept. 10 issue) in regards to Facebook charging companies for advertising. I've been doing research the past few hours and haven't come across anything else that says a charge will be assessed.

Can you direct to me to more information on this? We want to prepare for 2015 and in radio, we use our Facebook to promote everything we do. So this is very important for us and we'd love to learn as much as we can about it.

*Kacey Ober  
Director of Events  
Hall Communications Inc.  
WROZ(FM), WKZF(AM), WLPA(AM)  
Manheim, Pa.*

*Author Mark Lapidus replies:*

*Hi Kacey. Just enter the search terms "Facebook organic reach" and you'll see many articles about the subject. Here are a few to get you started. Thanks for reading Radio World!*

- "Facebook Zero: Considering Life After the Demise of Organic Reach" from Social.Ogilvy.com
- "Facebook Zero: Considering Life After the Demise of Organic Reach" from SlideShare.net
- "Facebook Puts Everyone On Notice About The Death Of Organic Reach" from Forbes.com
- "Facebook Reportedly Slashing Organic Reach for Pages" from AdWeek.com



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