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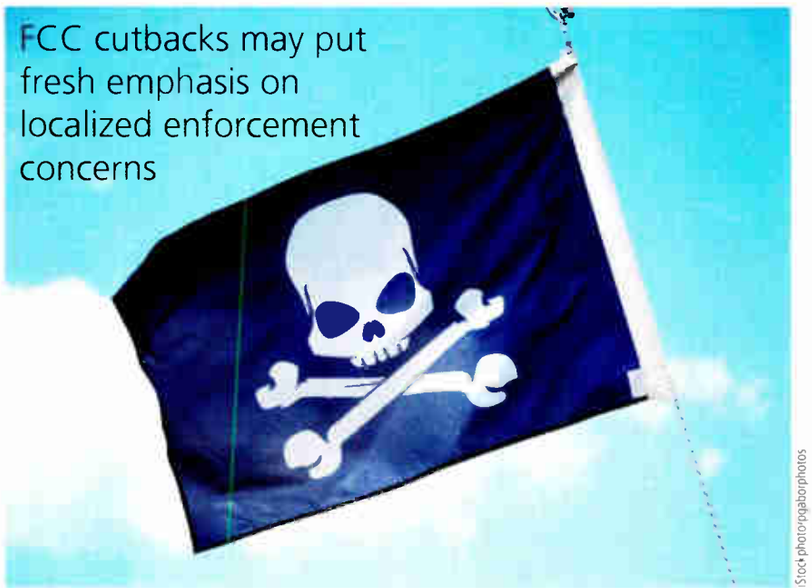

FCC cutbacks may put fresh emphasis on localized enforcement concerns

iStock photo/gaborphotos

BY RANDY J. STINE

WASHINGTON — Planned closings and staff cutbacks at FCC field offices that sparked debate about the impact on enforcement are likely to bring fresh attention to the role of state, rather than federal, laws against broadcast pirates.

The Federal Communications Commission Enforcement Bureau plan will shutter nearly half of its field offices — in Buffalo, Detroit, Houston, Kansas City, Norfolk, Philadelphia, San Diego, Seattle and Tampa — as part of its much-publicized plan to modernize field operations. The FCC in December declined to provide a date for the closings, which a spokesperson described as "an ongoing process."

According to some observers, the move can only hurt the agency's ability to mitigate interference. "The commission's enforcement against illegal radio operators, otherwise known as pirates, appears to be in flux," said one person familiar with the developments.

The commission has the authority to levy fines against unlicensed stations and seize equipment. Through the middle of December, it had issued $90,000 in proposed forfeitures against

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Our "Last Best Chance" to Revitalize AM

RW asked our resident AM expert for his thoughts on details of the FCC order

AM REVITALIZATION

BY W.C. "CRIS" ALEXANDER

The author is director of engineering for Crawford Broadcasting.

As I have followed the print and online news pieces and commentary about the FCC's AM Revitalization Report and Order and FNPRM, I have found the disparate viewpoints to be fascinating. Some say the proposed changes don't go far enough. Some say they go too far. Yet others seem to be satisfied with what has been proposed.

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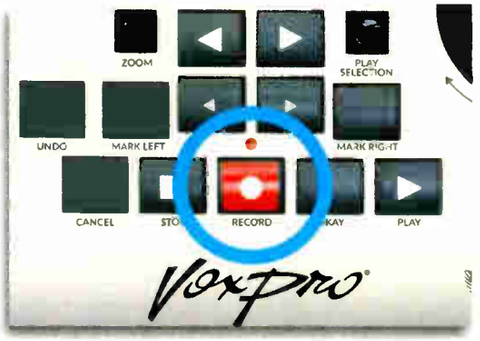

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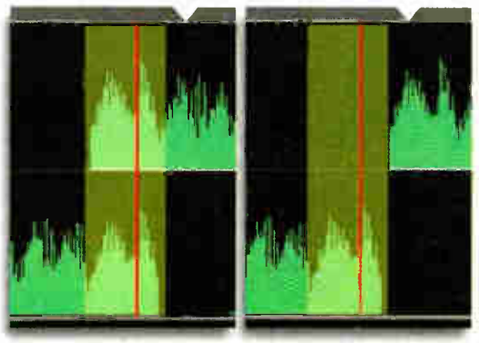

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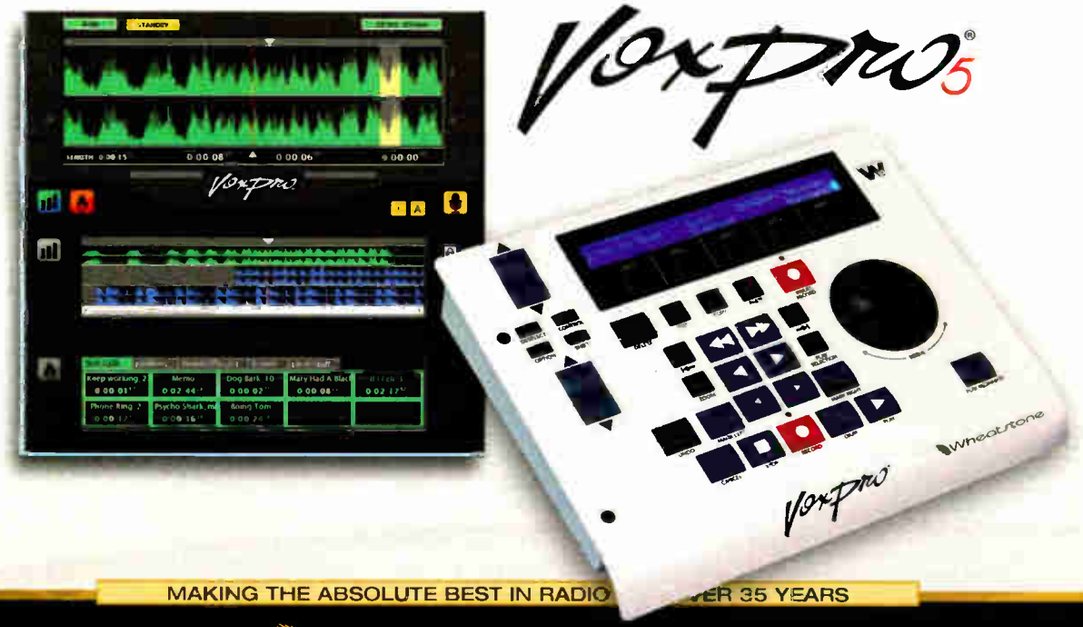

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A Chat With the NTA's Ched Keiler

Association says translators will benefit AMs but are not a cure-all for the band's issues

TRANSLATORS

BY SUSAN ASHWORTH

It's been a busy season for the National Translator Association: fielding calls, lobbying on Capitol Hill and calling again on the Federal Communications Commission to open a series of translator filing windows that would enhance direct broadcast service across the U.S.

Founded in the 1960s, NTA represents TV and FM translator licensees, and holds an annual meeting each year to discuss key issues affecting translators. Its event will be held this May in Spokane, Wash.

Radio World spoke recently with NTA Vice President of Audio and Radio Charles "Ched" Keiler, who is also lead principal with E Three, a broadcast engineering firm. A version of this interview appeared on *radioworld.com*.

Charles "Ched" Keiler

***Radio World**: Tell us about the NTA.*
Keiler: The National Translator Association is a national not-for-profit organization that supports the use of translators for the enhancement of free over-the-air broadcast signals originating from broadcast stations. This would include both the radio and television broadcast stations.

More specifically, with regards to radio broadcast stations, radio translators can be used to supplement the broadcast of AM, FM and FM HD stations throughout the FM broadcast band. Translators greatly benefit the broadcast industry and NTA wants to make sure that Congress, the Federal Communication Commission and the public are aware of these benefits. NTA regularly sends personnel to Washington to lobby on behalf of the translators and the broadcast industry for the public benefit.

***RW**: What was the organization's take on the recently released AM revitalization order, particularly as it relates to translators?*
Keiler: NTA, along with most of the rest of the broadcast community, was hoping to have an AM-only filing window in place before now, as well as a general open filing window for translators for all broadcasters. We support what the FCC stated in its recent Report and Order on the subject and are looking forward to the start of the 250-mile waiver process filing window followed by an AM-only translator filing window.

The 250-mile waiver process will give many stations more of a chance to employ the use of translators to enhance their coverage using their existing AM station. We certainly support this idea and the thought of the FCC hosting more frequent filing windows, as these actions benefits both the broadcaster and the public.

***RW**: Do you feel the 250-mile rule will meet the translator needs of AM radio stations?*
Keiler: The 250-mile relocation waiver was approved a short time ago, and wasn't even on the drawing board a couple of months ago. The waiver is a one-time, short-term fix. There are a lot of others within the broadcast community that feel that translators are not a cure-all for what ails the AM broadcasters. We tend to agree to a point, but if translators can be used to enhance the coverage of an AM station, then we are in support of it. I know from personal experience that translators have changed the outlook for many AM broadcasters with which I was personally involved. We do need to consider what happens to the AM broadcast band after this filing window.

***RW**: Do you have any concerns about the translator language as it's written in the AM order?*
Keiler: I do know that a number of

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More Radio, More Voices

Make Radio World part of your day every day. Visit our website for great Web-only Radio World content, including the following recent posts and stories:

"Ask and You Shall Receive" — Watermark enhancement is a hot topic. Following his earlier article in RW, Rick Sewell says a fellow engineer sent him a beta copy of software to help stations field test their encoding in various environments. Read it at *radioworld.com/sewell.*

Translators for AM: Owners, Don't Get Your Hopes Too High — Larry Langford, a regular RW contributor and owner of WGTO(AM) and W266BS in Cassopolis, Mich., writes, "I want to take a moment to make sure that no matter how you get a translator, be warned it's still going to be a crapshoot. It's not a full-service FM station by a long shot." Read it at *radioworld.com/langford2.*

KTRU.org

College Radio Zombies: A Tale of Two Stations — Despite being left for dead, two college radio stations in Texas are back on the airwaves and thriving. See *radioworld.com/zombies.*

Marti Knew How to Make Connections

His products helped local radio stations really get out into their communities

It takes business confidence — or chutzpah — to launch a company and give it your last name. One can imagine both the fear and the pride of seeing that first sign go up on a building.

A few such entrepreneurs may, through skill, hard work and luck, eventually experience a satisfaction few of us will: hearing an industry use their name as a verb.

George Marti, who died in December at age 95, knew that feeling. As I wrote in an online story about his passing, Marti's gear was so popular that for decades, engineers who wanted to set up a remote broadcast would talk of doing a "Marti" or "Marti-ing" the signal back to the studio.

Radio World wrote about this a number of times, including Buc Fitch's essay in 2005 titled "This Pot Reserved for Marti Remote," which you can Google. George Marti was big even by Texas standards, a member of the Texas Radio Hall of Fame, who also had been honored by the Texas Association of Broadcasters with both its Lifetime Achievement and Pioneer Broadcaster of the Year Awards.

His peers revered him; in 1991, the National Association of Broadcasters gave him its Radio Engineering Achievement Award. In researching his obituary, I learned that an early Marti RPU joined the collection of the Smithsonian's National Museum of American History two years ago.

His was a career with many layers. "Marti was known as one of the county's leading educational advocates," the Cleburne Times-Review wrote. "Through grants from the Marti Foundation, hundreds of students have earned college degrees. Marti was a renowned cattle fancier, having negotiated the first importation of Charolais livestock from Canada into the United States. ... He owned a bank and served as Cleburne mayor for six terms. He also served in the Marine Corps."

Courtesy Cleburne Times-Review

George Marti in an undated photo.

It quoted current Mayor Scott Cain saying that Marti led the city during some hard times. "He had to personally guarantee payroll to see that the employees were paid."

Wouldn't you want to have a mayor like that in your town?

DRIVEN EARLY

According to a Texas Association of Broadcasters bio, Marti graduated from Central High School in Fort Worth at age 16 and attended technical school for nine months. He received his radiotelephone First Class and Amateur Radio licenses just prior to his 17th birthday (call letters: W5GLJ).

He credited his grandmother with urging him to develop a business plan — when he was 12. He chose to try to start a radio station in Cleburne, and eventually that's just what he did. After serving in the Marine Corps, he and his wife Jo put KCLE(AM) on the air in the late 1940s; he built his own 250-watt transmitter and audio console in his mother's living room.

"KCLE was 28 miles south of Fort Worth," he told RW in 2010. "I got the AM station to air but then ran into a problem: We wanted to do remote broadcasts, but there were no telephone lines linking many of the areas we wanted to cover." To solve the matter, he built a remote program unit, or RPU.

"This was a small portable transmitter that you took to the remote broadcast location. You then broadcast the remote over VHF directly back to an antenna on the station tower. With the receive antenna I put on KCLE's 300-foot tower, we could do remotes anywhere within a 25- to 30-mile radius."

Eventually, so many people asked him to build RPUs that he sold the station and established Marti Electronics in 1960. High school football coverage would never be the same.

According to the TAB, "Before he designed and built the units and successfully lobbied the FCC to allow their use, radio stations had to use telephone lines that were expensive and not always reliable. His invention revolutionized the industry." STL equipment came later.

Marti owned and operated Marti Electronics until 1994, when Broadcast Electronics purchased it. BE later moved Marti manufacturing to Illinois. In the early 1990s, Marti and Jo purchased the Bank of Cleburne and owned it for five years, eventually merging it with another financial entity. (How many people own a bank?) The couple also created the Marti Foundation, which funded $10,000 scholarships to help local graduates attend college.

Jo died in 2003, according to a Radio World story at the time. George married his second wife, Margaret, in 2004, according to the TAB bio.

TAB President Oscar Rodriguez called the late George Marti a giant whose technical and business acumen changed the course of the broadcasting industry. An elementary school is named after him. Marti's colleague Lee Edwards called him one of the nicest men this industry ever saw. The sentiment is backed up by what the TAB wrote when it gave Marti its Lifetime Achievement Award: "Marti believes that the duty of a broadcaster is to help others. 'If you are not helping people, you are not doing your job.'"

Photo by Buc Fitch

A Marti receiver.

Photo by Jim Peck

George Marti, right, visited with Peter Burk at the NAB Show in 2009.

FROM THE EDITOR

Paul McLane

Congratulations to recipients of NewBay Media's Product Innovation Awards for 2015.

For Radio World, the winner is the **Inovonics INOmini 635 FM/RDS SiteStreamer**, shown; winners were also named by our sister publications Radio magazine, TV Technology, Digital Video, Video Edge and Government Video. All nominated products are featured in the PIA Program Guide available at *radioworld.com*.

Now in its third year, the PIA program recognizes excellence in manufacturing of products to serve the TV/pro video and radio/online audio industries. Companies pay a fee to nominate; winners are selected by a panel of professional users based on the description provided by the companies. Evaluation criteria include innovation of concept and design, creative use of technology, price value and suitability for use in a broadcast TV/pro video or broadcast/online radio environment.

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JANUARY 6, 2016

NTA

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broadcasters are looking at translators right now to see what is available in the markets that they serve. It's going to take time for them to negotiate and acquire a translator and then seek out an appropriate tower site to place the translator on to enhance their coverage.

It's possible that the window might not be long enough, especially if someone has to go out and buy a translator and then perform a number of engineering steps that would be necessary to move the translator in order to make it operational for their needs. In many cases, I find that the first attempt to acquire a tower site is not successful for any number of reasons. This is one of many reasons that we still would like the commission to keep in place other tools like the Mattoon waivers that have been and can be useful in the future in the relocation of translators after the 250-mile waiver expires. Perhaps the commission should reconsider not allowing the 250-mile waiver to expire as it is currently set to do.

***RW:** You also support TV translator licensees. What are your priorities for that group?*
Keiler: With respect to television translators and the incentive auction, if events proceed the way the commission envisions, there's going to be a tremendous consolidation of the 600 MHz band and that means a tremendous consolidation of free over-the-air television as we have known it for the last 60 years. A lot of translators, LPTV and some Class A television stations are going to be seriously affected, as they are not protected from this process. As a result, they could and will likely go off the air along with a number of other broadcasters.

NTA has asked the commission to protect these stations, and we will seek compensation for the relocation of these and other displaced translators along with any modifications that might be needed to allow these translators to be relocated and remain operational, and allow continuous service in the public interest.

***RW:** How does the NTA feel about the recent expansion of LPFM, which some view as being at the expense of translators?*
Keiler: In 2010 Congress passed the Local Radio Community Act. The act explicitly states that translators and LPFM should be on an equal playing field. In order for this to happen, some of the technical rules need to be melded together so that the limited radio frequency spectrum can be allocated fairly. For example, filing windows should occur simultaneously. This is not as easy as it sounds to accomplish.

It would be to the publics', as well as broadcasters', benefit that when there is a filing window, it would be a window that would be equal to all. If you have a window for only LPFMs, then translators are left out of opportunities that may only exist at that time; and vice-versa for LPFMs. We have not had a translator filing window since 2003. The best process would be to have more frequent and predictable filing windows and treat all services as the same.

Perhaps the commission should reconsider not allowing the 250-mile waiver to expire as it is currently set to do.

***RW:** Can you talk about the role that translators have played in HD Radio?*
Keiler: FM HD Radio is composed of a conventional analog signal with digital sideband that is capable of carrying multiple streams of audio simultaneously. Back in 2010, the FCC allowed translators to rebroadcast those digital multiple streams of audio, which are called digital broadcast minor channels, via translators. A number of broadcasters have taken advantage of the use of these digital minor channels to extend unique broadcast to the public and expand their public service with their existing single station.

A broadcaster is allowed to rebroadcast these digital minor channels on an analog translator within their service contour. This essentially means that a single broadcaster can have multiple analog broadcasts throughout the FM band by the use of their digital minor channels and analog translators. Many broadcasters have taken advantage of this opportunity.

***RW:** What is one aspect that you'd like the radio industry to understand about translator technologies?*
Keiler: With respect to AM broadcast-

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PIRATES

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pirate operators in 2015, according to an FCC spokesperson.

Commissioner Ajit Pai has been especially critical about a perceived lack of action on pirates. The number of enforcement actions against unlicensed broadcasters does appear to be trending downward. According to a DIYMedia.net, an online blog that follows FCC enforcement issues, the number of enforcement actions against pirate broadcasters was down in 2015 compared to the previous year. Through the middle of December, there were 45 FCC enforcement actions against unlicensed broadcasters in 2015. There were 198 such actions in 2014, according to data made available by the FCC and compiled by DIYMedia.net, and 268 actions in 2013.

An FCC official declined to comment on the DIYMedia data for this story.

STATE OF MIND

Though the FCC enforces spectrum rules on a federal level, three states have criminalized unlicensed broadcasting.

In Florida, operating a pirate radio station has been a felony, carrying a possible five-year prison sentence, since 2004. New Jersey adopted an anti-pirate broadcasting law in 2006; in the Garden State it is a Class C felony that carries a $10,000 fine and possible five-year prison sentence. In New York, which adopted a law in 2012, it's a Class A misdemeanor punishable by fines and up to a year in jail.

Those states have been especially hard hit with illegitimate operators. Some observers believe broadcast associations in other states may soon start to push for similar models to criminalize unlicensed broadcasting.

Critics in and outside of the FCC have doubted its commitment to combating illegal broadcasting. Remarks in December by Commissioner Pai echoed the theme. In an address to the Annual Institute on Telecommunications Policy and Regulation, sponsored by the Practicing Law Institute and Federal Communications Bar Association, Pai described an FCC trend of ignoring pirate complaints.

We are looking for a big criminal prosecution to help send the signal that we are serious about pirates.

– Paul Rotella, New Jersey Broadcasters Association

He said an email that he'd obtained from an unidentified whistleblower within the FCC's Enforcement Bureau from October of 2014 included these instructions from a bureau regional director to field agents: "We are scaling back our response to pirate operations. Barring interference to a safety service, pirates should not be given a high priority. If there's interference to a safety service, it's not a pirate case but instead a safety case." The email went on to state, "We will not be issuing NALs [Notice of Apparent Liability] to the majority of pirate operators," according to Pai.

A 2015 letter from 30 legislators to Chairman Tom Wheeler appears to have jump-started discussion among commissioners about spectrum enforcement, observers said. The congressional letter estimated there were "34 pirate radio stations operating from rooftops in Brooklyn and the Bronx" causing interference in New York City and northern New Jersey.

The FCC has since created an inter-bureau task force to work with outside stakeholders, including the National Association of Broadcasters, to direct policy and enforcement options in the matter of pirates. That group held a pirate radio roundtable in June.

Recommendations from the meeting included ramping up short-term enforcement with notices of apparent liability, forfeitures and equipment seizures. Amendments to federal policy, including the Communications Act, could also be developed, according to those familiar with the process.

One observer, who requested anonymity as not authorized to speak publicly about the matter, said

FCC enforcement has "too often just been a letter to the pirate asking them to stop broadcasting," with little followup. "Now you see at Congressional oversight hearings that the FCC is starting to realize something really needs to be done about pirates."

In testimony last fall before the House Subcommittee on Communications and Technology, Wheeler compared chasing pirates to Whac-A-Mole: "They pop up and we jump on them. They pop up and we jump on them. We need new tools."

LOCAL COORDINATION

At the fall Radio Show in Atlanta, Commissioner Michael O'Rielly said the FCC should collaborate more with federal, state and local authorities. "For instance, I doubt most buildings are zoned for broadcasting purposes, certainly not in residential areas with children, so let's work with local building officials," O'Rielly said.

"At the same time, we need to explore targeted and narrow changes in federal law to expand the commission's authority in this area."

In an interview with Radio World, O'Rielly said lack of FCC staff can definitely "undermine our ability to strike" at pirate radio broadcasters going forward.

"A fundamental key, however, it is not necessarily the number of staff in a bureau but the overall level of leadership and commitment to solve the issue." He cited Wheeler's response to Congress as an indication that the problem "has not moved up the commission's priority list much."

O'Rielly said asking Congress t increase the penalties imposed by th FCC on broadcast violators is worth considering and called for more co laboration between the FCC and st and local law enforcement.

"Unfortunately, state and local exp tise and resources in this area often do allow for robust enforcement efforts."

DETERRENT?

Observers told RW it's not clea whether legislative measures taken by individual states are having much of an impact anyway. The FCC still has the clear lead on spectrum enforcement in the United States, they said, but does appear ready to let states take on more of the burden.

Pirate broadcasters have been arrested for violating state law in Florida and New York through the years. In Florida, arrests have often resulted in probation or placement in a diversion program plus a fine. It's unclear if any people convicted have served jail time.

In New York, a 2013 story in the New York Daily News contained information about the arrest of two people in Brooklyn for operating a pirate radio station with transmission equipment found on the roof of a building on E. 76th Street. The outcome of that case is unclear.

David Donovan, president of the New York State Broadcasters Association, said even though New York has its own law, the FCC still needs to be the leader on pirate radio. "Ultimately, it is still the FCC that decides whether someone is operating without a license," he said.

The association earlier this year released data from a private engineering report showing an "estimated 100 illegal operations" spread across five boroughs of the Big Apple. "There are illegal FM and AM transmissions operating from hundreds of rooftops throughout New York City," NYSBA stated.

Paul Rotella, president and CEO of the New Jersey Broadcasters Associa-

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NTA

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ers, translators can help eliminate issues that cause the public to seek other stations in the FM band, such as noise and interference issues along with emissions from low-frequency noise sources – issues in which the FCC has not thoroughly addressed as of this time. I know that for many broadcasters who have installed translators with their AM stations, they are very pleased with the results.

The AM band offers a unique public benefit, as Commissioner [Ajit] Pai has stated so eloquently. It offers unique programming that is not found elsewhere. While translators will benefit AM stations, they are not a cure-all for all the issues that remain within the AM band, and we should not stop trying to improve and revitalize the AM broadcast service.

***RW:** What would you like the industry to understand about the NTA and its goals?*

Keiler: The National Translator Association's entire focus is on both television and FM radio translators, and on translator benefits to the public. We would like to invite all translator owners along with other interested parties to become members and support the National Translator Association.

***RW:** NTA must be pleased to see translators being considered in a public, positive way.*

Keiler: It's nice to see how translators can benefit broadcasters and the public. The family living within a small rural community benefits from obtaining broadcast services that would not be available to that family or the community, which in turn, educates and enlightens that community for the good of [the whole]. Large metropolitan areas benefit from enhanced broadcast coverage. Ethnic communities within large metropolitan areas benefit from broadcast specifically geared towards their ethnic believes and customs. Translators are a great and not always appreciated benefit to the public interest for more reasons than I have been able to enumerate here.

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AM

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I have my own opinions on the various facets, colored no doubt by my own and my company's interests; but I do think I see the big picture. The question to ask for each proposed change must be: "Is this good for the overall health and well-being of the AM broadcast medium?"

In an effort to answer that rather subjective question, let's take a walk through the NPFRM and see what the FCC has proposed and asked in each section.

CLASS A

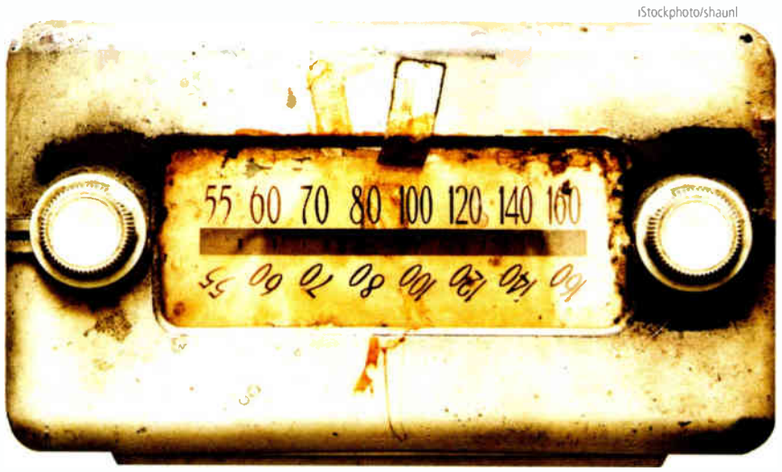
First, and rightly so in my view, is a proposal to modify AM protection standards, and first among those standards proposed to be changed is Class A nighttime and critical hours protections.

We all very likely know the history and the arguments with respect to Class A night/critical protections, so I won't belabor them. The question being asked, in essence, is whether in this day and age the protections afforded Class A stations are appropriate and in the public interest.

The FCC concludes that the co-channel 100 uV/m groundwave contour and first-adjacent channel 0.5 mV/m groundwave contour protections now afforded Class A stations are appropriate, day and night. It also concludes that critical hours protection of Class A stations should be eliminated. There are a couple of interesting points here.

What is not dealt with in a firm proposal is nighttime skywave service contour protection for Class A stations. This is, without a doubt, the proverbial "elephant in the room," the one Class A protection that has the greatest impact on co-channel stations. It is interesting that until very recently, only iHeartMedia has been vocal on the issue. I think that we are going to have to deal with this issue in this proceeding, one way or the other.

The other interesting point that I noticed is that the FCC contradicts itself in the proposal to maintain the 100 uV/m and 0.5 mV/m groundwave contour protections. Later in the notice the FCC proposes increasing the daytime primary service contour for all except Class A stations to 2 mV/m in order to "overcome



iStockphoto/shaunl

increased environmental noise."

While we all likely understand that Class A stations often play a unique role in emergency communications and situations, if signal levels below 2 mV/m are not useful because of environmental noise for all other station classes, is there something different for Class A stations?

RSS

Next on the list of proposed changes to AM protection standards is a change in the nighttime RSS calculation methodology. Without getting into the specific math involved, back in 1991 the FCC overhauled the AM protection rules, and one of the changes was to lower the threshold for stations considered as interfering to other stations to a 25 percent exclusion (it had been 50 percent) and to include first-adjacent channel stations in the interference calculations. This was in an effort to keep interference levels from climbing, but it did not work. Instead, it handcuffed stations and in many cases made it impossible to produce "interference-free" principal community coverage. In some other cases it actually resulted in more real interference to stations.

The FCC recognizes all of this in the NFPRM and proposed to roll back the 1991 rule changes having to do with RSS calculation methodology, restoring 50 percent as the exclusion level and eliminating first-adjacent channel stations from consideration in night interference calculations. This is a very good thing and I believe most all commenters will support it for obvious reasons.

DAYTIME PROTECTIONS

Moving on down the list we come to the aforementioned change in daytime protection to Class B, C and D stations.

There are several proposed changes in this section, including rolling back changes implemented in 1991. These include returning to a 0 dB (1:1) ratio for first-adjacent channel stations, changing the second-adjacent channel ratio to 0 dB (1:1), and eliminating third-adjacent channel protection altogether. These are all good and they will do away with a lot of grandfathered overlaps, particularly with respect to first-adjacent channel stations, that were created as a result of the 1991 rule change.

The other big proposal in this section is a change in the daytime primary service contour for all except Class A stations from 0.5 mV/m to 2 mV/m.

Again, the reason given for this proposal is to overcome increased levels of environmental noise. I generally see th as a good thing and I personally will support it (I actually proposed this change some 25 years ago in comments), but also see that it can have a detrimen effect on some stations that are unable take advantage of the change to increa power and/or modify their direction patterns. It can and will also have a de rimental effect on high-power Class B and Class D stations, since those already operating at 10 or more kW won't have the headroom to make the 12 dB power increase. I really expect a wide spectrum of comments on this proposal.

AM ON FM

The next section in the NFPRM has to do with siting FM cross-service fill-in translators (known in the biz as "AM on

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PIRATES

(continued from page 6)

tion, said no one has yet been prosecuted in that state for illegal broadcasting.

"I think [the state law] has been a deterrent. I have told the FCC they should use the state broadcast associations as a funnel of information. The state associations can follow up on the interference reports and then provide that information to the Enforcement Bureau," Rotella said. "It's really a two-prong attack at the state and federal levels."

Some pirate stations in New Jersey have become brazen enough to sell commercial time, Rotella said.

"We are looking for a big criminal prosecution to help send the signal that we are serious about pirates," he said. "There are ongoing state investigations, but so far the state's attorney general hasn't taken up a case."

Other state associations have been watching developments in Florida, New Jersey and New York and are considering anti-pirate advocacy of their own.

In Massachusetts, backers have tried and failed several times to implement an anti-pirate law. State House resolution H.1536 was reintroduced this year; it seeks to establish a penalty for the "unauthorized transmission to, or interference with, a public or commercial radio station." The measure is supported by the Massachusetts Association of Broadcasters.

Connecticut also is experiencing illegal broadcast operations, but a Connecticut Broadcasters Association official said the group hasn't yet made plans to move forward on initiatives to combat pirates with state prohibitions.

"Illegal broadcasting is a problem here. That is especially true in the southern part of our state," said Mike Rice, vice president of the CBA. "It's a continual stream of pirates that are shut down and then just move to a new location. I think the FCC remains responsive to interference complaints within their ability to provide the manpower to get things done."

The FCC's longtime battle with pirate radio and perceived lack of progress on the issue have some observers skeptical that having states criminalize the infraction will impact the number of pirate operations.

"I do not believe state-level efforts to fight pirates are having much of an effect," said John Anderson of DIYMedia.net. "There's lots of reasons for this, including the fact that local and state law enforcement officials have much better things to do than hunt down pirate radio stations."

Anderson, an assistant professor and director of broadcast journalism at Brooklyn College, said the FCC's enforcement effort to catch pirates has been inadequate.

"Field enforcement efforts have been generally ineffective for decades, and the recent reconfiguration of field enforcement staff and resources will only serve to exacerbate the agency's efforts."

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AM

(continued from page 8)

FM"). Currently, such translators must have their 1 mV/m contours completely within the lesser of the parent AM station's 2 mV/m contour or a 25-mile radius centered on the AM site. This is a real problem especially for AM stations with their transmitter sites located some distance outside of town.

The FCC proposes to change the rule to the greater of those same two criteria instead of the lesser. This would be perfect, if the FCC hadn't also thrown in another restriction that the translator's 1 mV/m contour cannot extend beyond a 40-mile radius centered on the AM site.

That restriction is going to be a killer for stations with a large 2 mV/m contour radius. Why shouldn't an AM station that puts a 2 mV/m contour over a community 50 miles away be able to site a fill-in translator in that community? Hopefully we will see a lot of comments in support of the "greater of" change but in opposition to the 40-mile restriction.

PROVE IT!

The next two sections have to do with proofs.

First, the FCC proposes to further pare down the partial proof requirements to include only monitored radials (i.e. those radials that have a licensed monitor point on them). The current partial proof rule requires that adjacent radials also be included if there are fewer than four monitored radials.

This is a good proposal and will reduce the burden on and costs to many AM licensees, a good number of which may be avoiding running a needed partial proof because of the trouble and costs.

Then the FCC deals with a laundry list of items with respect to method-of-moments (MoM) proofs and recertifications. Since the MoM proof rules went into effect in early 2009, we as an industry (and consulting engineers in particular) have learned a great deal about what in the MoM rules works and what doesn't, what's necessary and what isn't. Many of these items were dealt with in a public notice a few years ago, and I won't deal with them here. The FCC seeks to codify these changes.

There is one change that commenters to the AM revitalization NOI requested that is specifically not proposed in the NFPRM: elimination of the requirement for reference field strength measurements.

Having done a lot of MoM proofs and recertifications over the last almost seven years, the one thing that takes the most time is making the reference field strength measurements. There is no requirement for maintaining any specific field strength or cap in the rules, so the measurements are really pointless. I can understand and perhaps even support making the measurements as part of the initial proof. That makes the fields part of the permanent record so that engineers can at least see if things are in the ballpark when there is a question. But the requirement to repeat the measurements in the biennial recertification should be dropped. It is a big waste of time, effort, money and fossil fuel.

The question to ask for each proposed change must be: "Is this good for the overall health and well-being of the AM broadcast medium?"

LAST BEST CHANCE

Finally, the FCC has at long last gotten around to proposing that those expanded band licensees who requested and received waivers of the requirement to submit either their parent regular band or expanded band station license make a choice and submit one or the other for cancellation.

My personal feeling is that this is a very good thing. Part of that stems from the fact that my company complied with the sundown rule in a timely manner and submitted its standard band parent station license. Another part is simply a desire to see the *migration* to the expanded band complete. Arguably those 25 expanded band licensees who have held onto their standard band parent station licenses have not *migrated*. I hope we can wrap this up and perhaps, as the notice of inquiry that follows the NFPRM suggests, open up the expanded band for further development.

These proposed AM rule changes without a doubt represent our "last best chance" to revitalize AM. With them we have the opportunity to reshape the allocation picture on the AM band improve both coverage and signal levels within coverage areas, open more opportunities for AM-on-FM cross service translators, streamline partial and MoM proof procedures and reduce the burdens thereof, and wrap up the expanded band migration.

I would encourage all AM licensees to jump in with comments. Believe it or not, the FCC really does listen.

The author is a longtime Radio World contributor. In 2007 he received the Robert W. Flanders Engineer of the Year award from the Society of Broadcast Engineers; this spring SBE elevated him to its membership rank of Fellow.

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NEWSROUNDUP

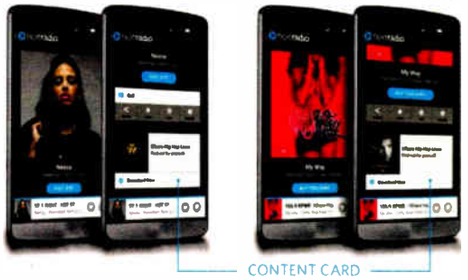
LICENSING: A group of 70 public radio and TV licensees took a stand on the way the FCC plans to keep tabs on licensees in an effort to strengthen diversity. The commission is proposing to require Restricted Use FCC Registration Numbers to identify individual interest holders on ownership reports filed by noncom educational stations. But the group told the commission that collecting information about governing board members will contribute "nothing useful to the FCC's picture of diversification of broadcast ownership" because persons listed on the reports are not "owners" of stations as the concept is understood by the FCC and the courts, and the process would "taint the value of such information, by mixing data on ownership (of commercial stations) with data that does not reflect ownership (of NCE stations)." They also raised privacy concerns. "The FCC's proposal as it would apply to NCE stations is bad policy and legally unsupportable."

FRANCE: Advocates welcomed announcement of a timetable for deployment of digital terrestrial radio. The Alliance for Digital Radio reacted to a plan from regulatory body CSA in December of some 40 allocations, and a hundred local allocations. "With this announcement, the French regulator confirms its support for the digitization of broadcast radio in France," the alliance said. "It also underlines the commitment of each of the CSA's individual members to the development of a new, high quality and diverse radio offering which is free-to-air and anonymous." The alliance includes WorldDAB, SIRTI and SNRL, proponents of the DAB+ system. However, the group thinks the planned eight-year period is overly cautious. "While FM already suffers from a significant geographic imbalance, the proposed schedule risks creating a two-speed radio landscape in France," it stated.

(Stockphoto/Yury Kirsanov

ROCKHILL: Charles F. (Chuck) Rockhill died in late November, age 70. He was at his home in Cary, Ill., according to his friend Steve Sampson, and is survived by his wife Sharon and son Bradley. He was born in Indiana and attended Ball State University in Muncie, Ind. Over the years, he worked for a number of broadcast equipment manufacturers, including Sparta Electronics, Beau Motors, Moseley, Allied Broadcast Equipment, Harris-Allied Broadcast and Andrew Corp. He later formed Asia Pacific Business Development and served as a consultant for several major companies.

NEXTRADIO: Emmis-owned NextRadio said the use of "cards" in its app can provide an additional way for broadcasters to present station and ad messaging. NextRadio Cards, it said, operate like a billboard, displaying under music and/or program schedule information, complementing enhanced ads on the Now Playing screen inside the app. "It starts to shape what stations can offer to their advertisers or can help with station promotions, app awareness and other messages they want to get to their listeners," said NextRadio President Paul Brenner.



FCC: The Commission reorganized its International Bureau, saying the changes make work more efficient and "enable new analyses of trends" in international telecommunications. It consolidated spectrum rulemakings in the Satellite Division and moved economic reporting and statistical analysis responsibilities that had been distributed throughout the bureau to its new Telecommunications and Analysis Division. Chief Mindel De La Torre was quoted in the announcement saying the change "elevates and expands the role of economic analysis and improves our international coordination role."

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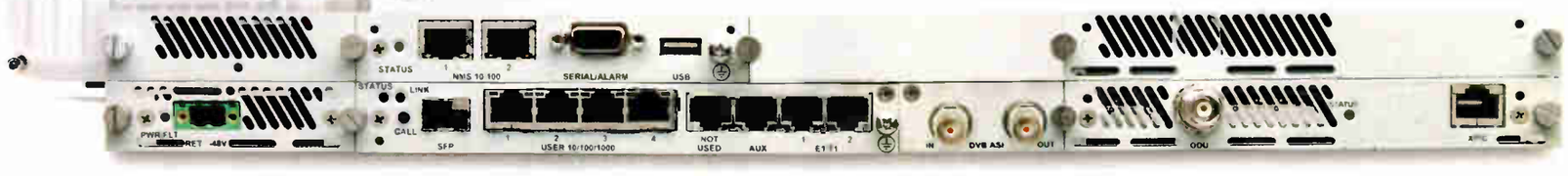

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The Mice Versus the Generator

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WORKBENCH
by John Bisset
Read more Workbench articles online at radioworld.com

Ron Wilken, CET, is the owner/operator of RGW Enterprises, a technical solutions company based in Ontario.

During a maintenance visit to one of the sites he handles, the general manager told him that the generator contractor had reported the droppings and smell of mice in the generator room. On inspection, Ron found that someone had laid four bait traps. None had been touched, so he decided more drastic steps were needed.

Ron purchased spring-type mouse traps, a different type of bait and an electronic zap-trap for the flies and other bugs present. Ron laid the traps with peanut butter and put down some of the new bait at the transmitter site.

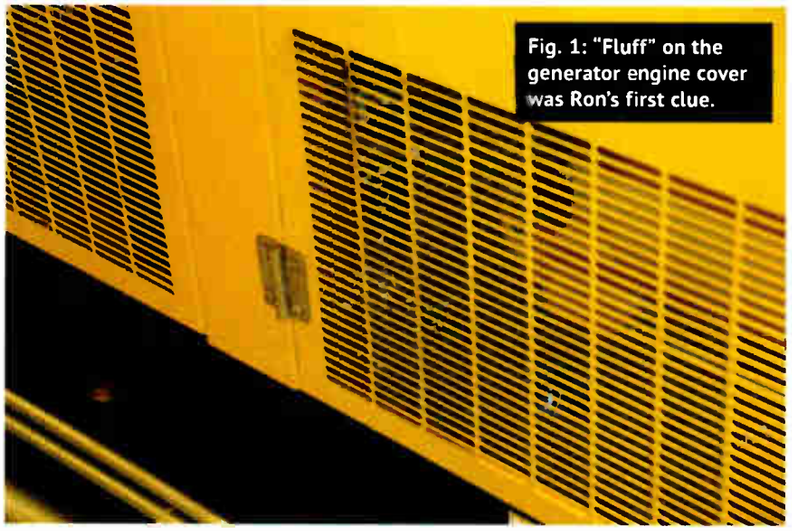
Fig. 1: "Fluff" on the generator engine cover was Ron's first clue.


Fig. 2: He found that the vent between the engine and alternator was clogged completely.


Fig. 3: Little air blew through the generator even after Ron had removed the nesting material.

In doing so, Ron noticed some "fluff" on one of the generator engine covers (Fig. 1). Opening it, he discovered that the vent between the engine and alternator was plugged completely with similar fluff (Fig. 2).

Ron advised the GM that the generator contractor should come and clean out the alternator because Ron had no way of knowing what might be inside. The GM contacted the company but in checking the service sheet from the previous visit, there was no check or initial against the fuel or air filter inspections. These nests were not built in a few days; the problem had been overlooked by the generator maintenance technician.

The service company could not come until the following week, so Ron decided to open up the vent and clean out what he could. At least the generator wouldn't overheat from lack of cooling in the alternator. Wearing a mask and protective gloves, Ron used the shop vacuum and removed what he could of the nesting material. When he started the generator, he noticed very little air blew out (Fig. 3).

He was just about to close things up when he noticed the air filter housing too was plugged with mouse nesting material (Fig. 4). Again, Ron attacked the nest with the shop vac and managed to suck out all the fluff; he evicted three mice as well. These escaped into the room and eventually made it to the field outside as fox bait.

The filter itself was damaged; th mice had eaten a softball-sized hol in the filtering element. Fortunately didn't appear as a hole on the inside so it was still serviceable; but it would have to be replaced. Ron located a replacement and ordered one. It is relativ simple to change this filter, involv just a screw and a clamp.


Fig. 4: Mice nesting material also had clogged the air filter housing.


Fig. 5: The fluff battle continues.

When the new filter arrived, Ron made a screen using 1/4-inch construction cloth and a large hose clamp from the local plumbing store. To protect the filter from the sharp ends of the con-

(continued on page 15)

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INOVONICS BROADCAST

Go Behind the Curtain of the Digital Revolution

Understand the principles of digital to get the most out of your audio

DIGITALBASICS

BY JAMES G. WITHERS

This is the conclusion of our two-part article about basics of digital technology. The first part appeared in the Dec. 16 issue.

Digital computers have been commercially available for almost 70 years, and yet the digital "revolution" is a relatively new phenomenon, beginning in the early 1980s with the introduction of the IBM PC.

Why the delay? Two words: speed and memory. And those two words lead to a third: cost.

Last time I explained the nature of the problem and mentioned the fact that in the process of writing the piece, I loaded 129,712 individual bits of information into my laptop's memory, 16,214 bytes in all. A fair amount of digital writing to be sure, but a pittance considering the requirements of recording and storing digital audio. Computing power simply was not up to the task until the microchip was invented, and even then, some tricks were required to pull it off.

COMPLEX ISSUES

The transmission of information requires some complexity. The more complex the information, the more complex the system needed to send and receive it. In the computer world, a single bit can only relay two different conditions: on or off. OK as far as it goes; but even Paul Revere needed two lamps to get the jump on the British, so clearly, we need more bits; a *lot* more.

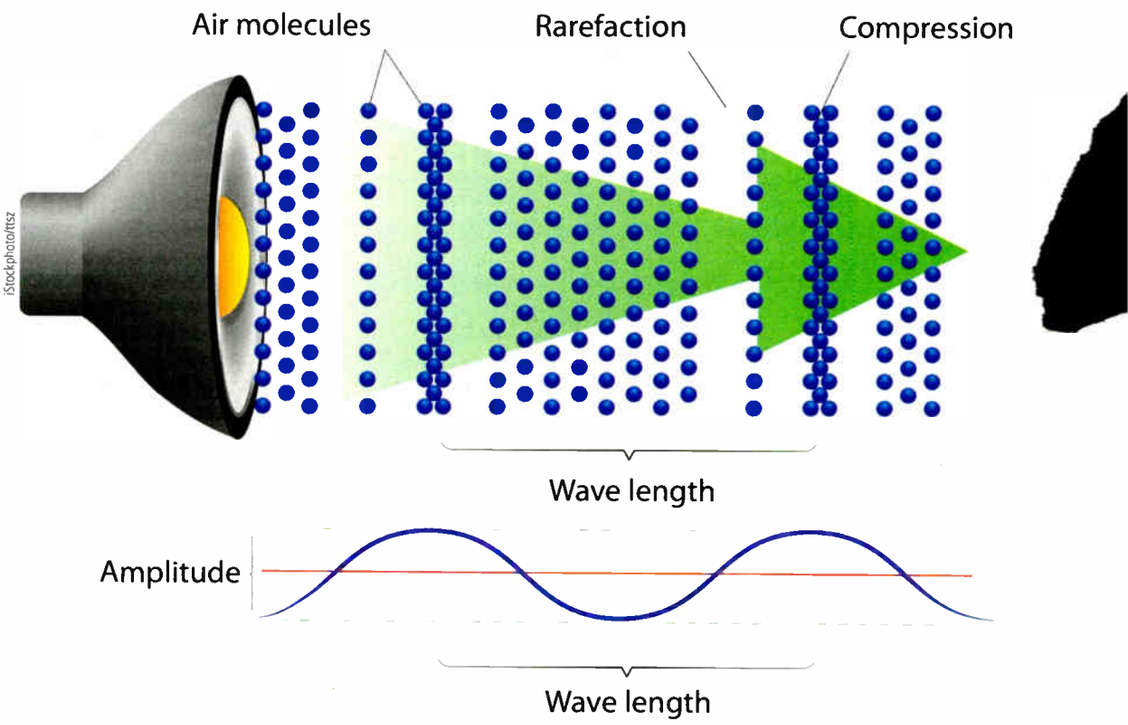
The written word is complex, photographs even more so, music greater yet, and video information blows the doors off all of it. As each new level of information transfer is considered, the "write speed" (or in the analog world, the "bandwidth") of a system has to increase right along with it. Early attempts at transmitting "content rich" data illustrated the problem.

In the 1950s, Bell Labs had a prototype videophone demonstration at Chicago's Museum of Science and Industry that fascinated me. The phone worked pretty well, with my little sister's grainy black and white image filling the screen from the other side of the museum, sticking her tongue out at me. The exhibit pointed out, however, that the videophone required 600 times as much bandwidth as a simple audio phone call. That issue, unavoidable at the time, doomed the analog videophone.

Digital compression, which we'll discuss, resurrected the videophone idea but still, the speed required to copy and playback large amounts of information, like videophone images or full-fidelity audio, is tremendous, even in compressed digital form. To understand why, we need to revisit the chessboard example from the first article.

2 BITS, 4 BITS, 6 BITS, A DOLLAR

Recall that we could identify each square on the board by connecting six binary switches (binary meaning having two states) in a "Power of Twos" configuration, each switch having twice the numerical value of the one preceding it. If we assign a unique bit count to each square, we could store it and recall it with exact precision, time after time. But what if our information was more complex than what six bits could define? What if we wanted to overlay a complex musical tone on our chessboard?



We could, of course, try that, but it is immediately apparent that the 64 squares on the chessboard would capture a woefully inadequate snapshot of the sound wave, made up of not only the fundamental frequency, but several harmonics as well. Using the term from part one of this article, the resolution of a 6-bit system stinks. We need more squares, which means more switches.

Since eight bits is the standard number of bits for a computer byte, we'll start there.

Eight bits allows for 256 unique switch arrangements (2×2×2×2×2×2×2×2=256). Now we're talking. By adding just two more bits, we have increased the sample size, as it is called, fourfold. A much more defined chessboard!

A 256-bit sample size gets us started, but we still have to consider how often we need to make that sample, since one snapshot of a piece of audio doesn't help at all if we are trying to capture an entire song. We have to take multiple snapshots and we have to take a lot of them. That is known as the sample rate.

The sample rate directly correlates to the frequency response of the digital system used to record and playback audio. This is because of the way sound waves are constructed. A low-frequency tone is made up of waves that are long, like rolling waves on a pond. High-frequency waves, though, are spaced very close together. The higher the frequency, the more tightly packed the waves and the more often we have to sample in order to capture instantaneous changes in the waves.

An AT&T/ Bell Labs engineer named Harry Nyquist derived the equations which now bear his name to predict how fast telegraph pulses could be sent over a radio channel in the 1930s and '40s. The Nyquist Sampling Theorem states that a sampling frequency must be roughly twice as high as the highest recovered frequency.

If we are looking to capture and reproduce 20 kHz CD quality audio, then, we need to sample at a rate a bit more than twice that frequency. For that and some other technical reasons, a 44.1 kHz sample rate does the trick.

Since we're gobbling up computer speed and memory anyway, let's just go ahead and grab for the brass ring; we'll increase the sample *size* from eight bits to a more generous 16 bits. Two to the 16th power slices our chessboard into 65,536 squares, a lot of resolution in anyone's book. If we capture our complex waveform on that chessboard, and further, sandwich it side by side with 44,000 other chessboards having the same resolution every second, we have created the current standard for broadcast digital audio. And with a simple calculator, we can multiply those two numbers together to determine the impact on our computer's speed and memory.

The result is a whopping 705,600 bits (or 88,200

(continued on page 19)

WORKBENCH

(continued from page 12)

struction cloth mesh, he wrapped the band with multiple layers of black electrical tape.

On his return a few weeks later, Ron opened the door to the generator and found two dead mice in traps he set during his visit. He removed the dead mice and reset all four traps. Ron changed the air filter with the new one, and noted that the old one had signs of a new nest being built (see Fig. 5 and 6.) There also was more fluff in the vent again.

Fig. 6: More nesting material turned up in just a few short weeks.

Ron decided to investigate further and removed the end cover of the alternator. There, he found a huge nest with yet more mice in it. This was all vacuumed out, including one mouse (Fig. 7). Fig. 8 shows the vacuumed compartment. The generator was tested and returned to service.

He was curious as to where the mice had obtained the nesting material. He discovered the mice had destroyed half of each of two boxes of transmitter air filters. He consolidated the remaining good filters and moved them into the transmitter room, making sure there were no hitch hikers! The rest were removed to the garbage.

Ron's next step is to find out how the mice were getting into the generator room in the first place.

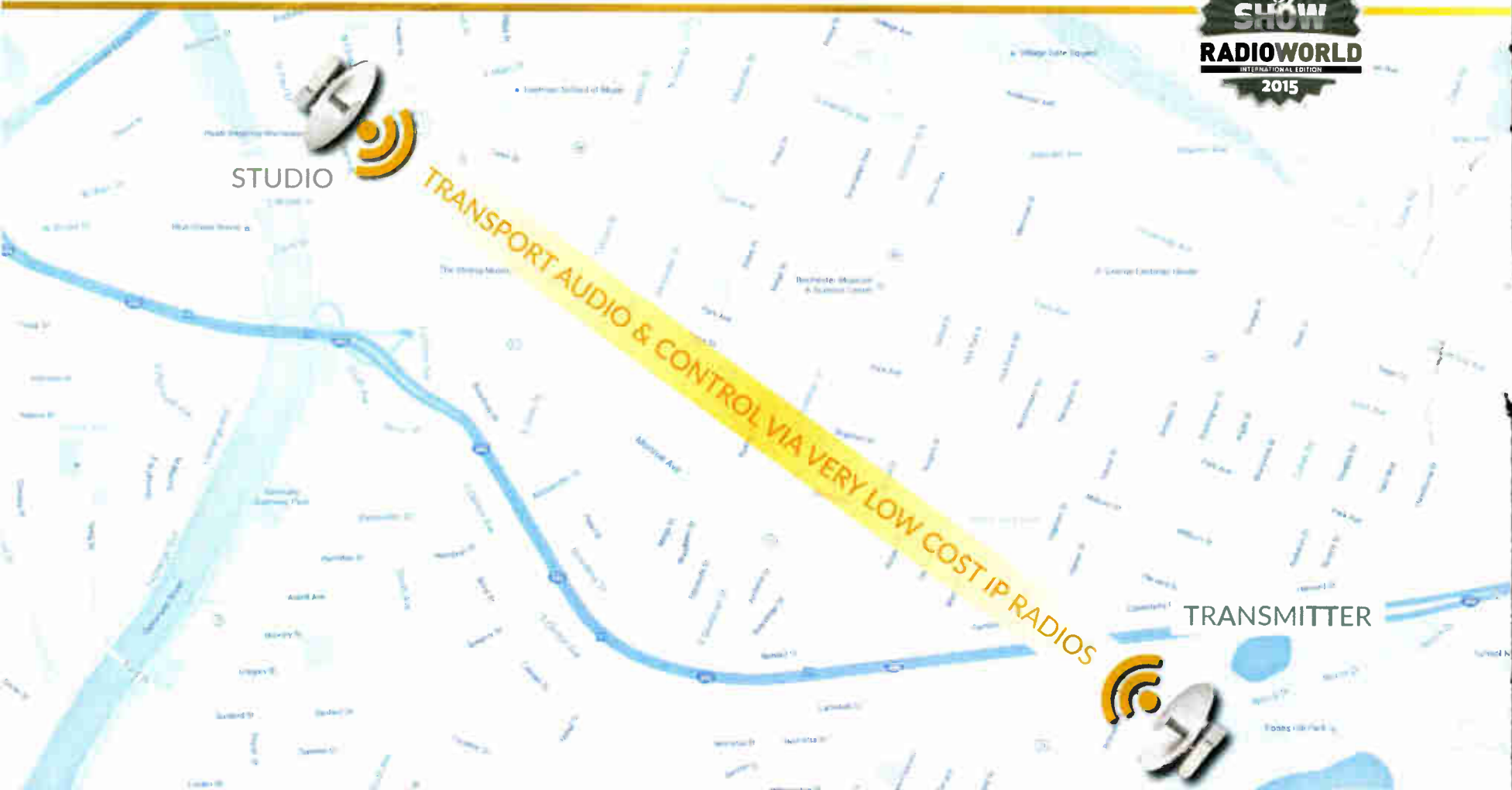
His experience is a good reminder to inspect *all* systems at your transmitter sites and to investigate anything that doesn't look quite right. Backup equipment, such as transmitters or generators, can be ideal spaces for infestation because they are not regularly used.

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

Author John Bisset has spent 46 years in the broadcasting industry and is still learning.

Fig. 7: More mice after removing the end cover.

Fig. 8: The nesting material removed.



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Ben Blevins, the engineer in charge, tells us they've literally moved an entire sports broadcast into a different studio while it was live, on the air. And, not one fan noticed.

That's an impressive display of studio athleticism, and brave too, considering that sports fans can get rather vocal about even minor disruptions in the game.

For the entire story... INN30.wheatstone.com

Screen Builder At IMG World

This is the screen that Ben Blevins built using Screen Builder, a new app for WheatNet-IP. He designed this customized interface to help his producers navigate over a dozen sports games, often in real-time and on the fly, for a new "Red Zone" channel called IMG College Football Blitz that features highlights from college football coast to coast. "There's a production assistant that moves around the building and coordinates with the producer to acquire post-game, post-coach comments or other highlights from any of the games being produced (anywhere in IMG's 48-studio complex)," explains Blevins. "We built this little all-in-one access panel so they can have access to everybody at once as a sort of intercom, complete with their own headphone mix to monitor all that is going on and to drive the show where it's going next."

Ben gives a guided video tour of his Screen Builder project... INN30.wheatstone.com

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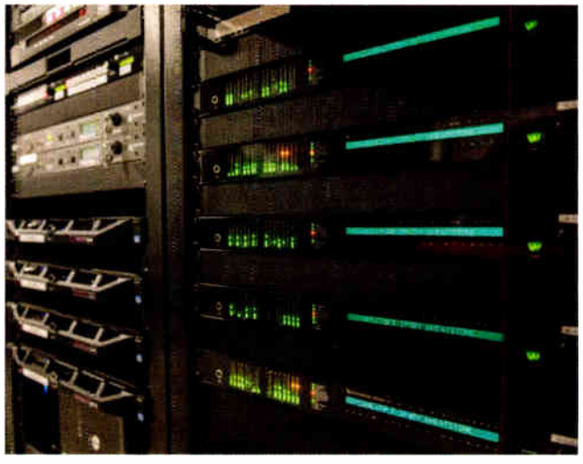
How IP audio networking can make sharing audio between two studios five miles apart so much easier.



Sharing seems to work as long as what's mine is mine and what's yours is mine. So that's how we set it up for WGN-AM and WGN-TV, which are able to share audio and resources for traffic, sports and televised events across five miles through WheatNet-IP audio networking.

WGN-TV shares live weather, sports, and traffic reports with WGN-AM, even though their studios are more than five miles apart. The WGN-TV studio on Bradley Place in Chicago and the WGN-AM studio facility five at the Tribune Tower are interconnected through a metro Ethernet LAN circuit and WheatNet-IP audio networking.

A single audio interface BLADE connects a WheatNet-IP audio network at each location, providing the live audio go-between for the AM's morning simulcasts with WGN-TV anchors.

For the entire story... INN30.wheatstone.com

RDF Radios: Nautical Gems of the Past

These receivers are still a favorite of hams and other enthusiasts

RADIO RECEIVERS

BY MARIO FILLIPPI

In the days prior to GPS, mariners used Radio Direction Finding receivers as navigational aids.

RDF radios basically are specialty radio receivers for longwave frequency reception, ranging from 150 kHz to 520 kHz and outfitted with rudimentary direction finders. The 150–520 kHz portion of the spectrum at one time was populated with many marine beacons, all transmitting their call signs continuously in slow CW for identification and location. Some even transmitted weather reports using AM voice. A very large rotatable ferrite antenna atop the RDF receiver, a compass reference and signal strength meter were used to hone in on a particular marine radio beacon.

RDFs were produced for many decades by manufacturers such as Gladding, Ray Jefferson, Raytheon, Pearce-Simpson, and even Heathkit and Hammarlund, names familiar to SWLS and hams. Most were portable, powered by batteries, and had built-in telescopic antennas for other bands that were included such as the old Marine band (2–4 MHz coverage), or perhaps the "new" VHF marine band (156.05–162.025 MHz), FM BCB (88–108 MHz), and even the CB band. Most models included the AM broadcast band, which probably served as the ship's main source of entertainment in former days.

Top view showing 360 degree azimuth dial and rotatable ferrite antenna.

Author's vintage Ray-Jefferson Model 630 Radio Direction Finding receiver.

Side view of Ray-Jefferson RDF with large rotatable ferrite antenna for aiming at beacons.

This model included AM, FM, CB, longwave and VHF bands.

RDFs can be used by longwave enthusiasts or even AM DXers as auxiliary receivers because of their ability to null out unwanted AM signals on the broadcast band via the large rotatable ferrite antenna.

My shack is graced with the presence of a beautiful example of an RDF manufactured around the 1970s: the Ray Jefferson Model 630, produced by Jetronic Industries of Philadelphia. It runs off eight D cells or a ship's 12V battery. It's an excellent performer on AM, not only because of its ability to bring in weak stations, but also because it can null out man-made noise which constantly plagues the AM band.

This four-band radio includes AM/FM/CB/LW/VHF and is a reflection of the era in which it was produced due to the fact that the CB and VHF bands are included. CB, very popular in the 1970s, was embraced by those on board ships because it was a cheap and additional way of communicating with other operators both on land and sea. In addition, a license was not needed for CB, and the Coast Guard and local police would monitor emergency CB Channel 9, an additional safety net for the mariner. The VHF band, on the other hand, came in handy for listening to NOAA weather stations from 162.400–162.550 MHz or for other public service activities.

Controls layout from the Ray-Jefferson instruction handbook, circa 1970.

RDF radios are now mainly relegated to history, as are most of the maritime beacons, but those who are interested in a receiver for distant AM BCB reception, aeronautical longwave beacon reception, or perhaps limited shortwave reception, then you might want to pursue this fun avenue of listening.

These radios can be found at ham fests, flea markets or my favorite, eBay. If you search under "RDF" you'll always find at least a few up for auction, and if you check "completed auctions" in the eBay menu, you'll be amazed at the many different makes, models, and features of these radios in their half-century history. As mentioned earlier, older models included 2–4 MHz AM reception, which includes the 120 and 90m tropical bands, so those shortwave listeners interested can "hone in" (pun intended) on those particular models.

Mario Filippi is a freelance writer, long time radio amateur (N2HUN) and an avid short wave, longwave, VHF/UHF and satellite enthusiast.

DIGITAL

(continued from page 14)

bytes) of data to be stored every second! Now in the world of the terabyte (1 trillion bytes), 88,200 bytes per second might sound trifling, but it definitely is not. Consider that the average song is maybe 3.5 minutes long. If we sample and store over 88 kBps (kilobytes per second), that is 34 megabytes of information per song!

I was an early advocate of digital audio and even designed a hard-drive storage system in 1993. The largest drive I was able to buy for the system was 345 MB and it cost $1,600! Recording music with a sample size of 16 bits and a rate of 44.1 kHz was simply beyond the limits of technology in that long ago time (I would have gotten all of 10 songs on the drive before it filled up). I used 8-bit samples at a rate of 32 kHz and was able to store a few hundred songs.

RESCUED BY COMPRESSION

Fortunately, there are a few tricks that we can play with the digital signal to save space and still record and playback at our desired 16bit/44.1 kHz sample rate. Which gets us to compression.

MPEG and ADPCM are two widely used compression algorithms.

MPEG is an acronym for the Motion Picture Experts Group, which is a standing committee of experts from that industry. Beginning in the late 1980s, this group took on the task of determining the best method for compressing the incredible amount of data involved in digitally recording movies and sound tracks into something more manageable. In the process, they created MPEG1, then MPEG1, Layer 3 (which is what we call MP3), and on to MPEG2, MPEG3 and MPEG4; each scheme bringing slightly different attributes to the compression algorithm.

ADPCM stands for Adaptive Differential Pulse Code Modulation. That compression scheme was invented by Bell Labs for compressing voice data over digital subscriber lines. (As an aside, the ADPCM standard was originally based on an 8-bit sample size and a sample rate of 8,000 samples per second, resulting in a 64 kbps data rate. That, in turn, became the DSL — Digital Subscriber Line — bitrate standard.)

Without delving into the specific equations of each method (which is above my pay grade anyway), all of the compression schemes are referred to as "lossy," which means they lose data (and therefore, fidelity) as they do their work. The lossy compression model was chosen because it was simple and because "lossy" is a relative term. It turns out there is a large amount of audio information in the average musical recording that the average person simply cannot hear very well.

ADPCM and MPEG compression both use pyschoacoustic modeling to determine which specific sounds and frequencies can be "downsampled," or ignored altogether in the A/D conversion, without noticeable degradation during playback. There is, of course, some disagreement on all of this (who, exactly, is the "average" person; how much is too much when limiting certain high frequency waveforms.), but for the most part, compression works extremely well if used with a tender touch and in any event, like it or not, it is a very necessary fact of life in the digital realm.

WHAT'S IT WORTH?

So given all of that trouble, is the technology that makes digital broadcasting possible worth the effort? The answer is unequivocally "yes," and for several reasons.

The first is noise. Noise, like all naturally occurring sound, is analog in nature. Furthermore, it is what is called a "spread spectrum" signal, which means its energy is spread thinly over many different frequencies. The good news about that is that noise is never very problematic, if the main signal is loud enough. The bad news is that it is always there, and is very hard, in fact impossible, to completely remove.

To make matters worse, since noise cannot be eliminated, when copies are made of analog audio, the noise is copied, as well. The main audio level remains fixed from copy to copy, but new noise is added to existing noise with each copy, so after a very few copies (well under ten), the noise is so prevalent, that the copy is worthless. Record companies and copyright holders thought this was pretty cool, but the rest of us hated it.

With digital copying, though, once the series of digital bytes is recorded, they can be "cloned" over and over and over again, with each copy being an exact duplicate of the original. The "exactness" of digital copies is due to the fact that digital signals are not amplitude dependent "waves," but rather are based on the sequence of ones and zeros in each byte. So long as the sequence remains accurate, the decoding will be accurate, even though some analog noise from the original microphone and wires and amplifiers will always be lurking around in the background.

The second reason digital equipment is preferable to analog is cost. Gordon Moore, one of the founders of Intel, informally suggested what has become known as Moore's Law over 40 years ago. He predicted (and the prediction has proven to be uncannily accurate) that computer speed and memory would roughly double every 18 months. Another way to state the law would be to say that for a given amount of computer power, the cost would halve every 18 months.

Either way, the cost of digital equipment, which can be "bent" to perform almost any function requiring calculations or processing through the simple expedient of software, has become extremely inexpensive compared to analog equipment, which must be built, one component at a time, for hardware specific applications.

So that is the story of what goes on behind the curtain of the digital revolution as it applies to radio broadcasting. Worth it? Absolutely. Complicated? You bet. In fact, I've worked up a sweat explaining it. I think I'll take a break ... maybe fire up the TEAC reel-to-reel and go have a cup of digitally prepared coffee.

Jim Withers is owner of KYRK(FM) in Corpus Christi, Texas, and a longtime RW contributor. He has four decades of broadcast engineering experience at radio and television stations around the country.

Pandora, Google Play Music & SoundCloud

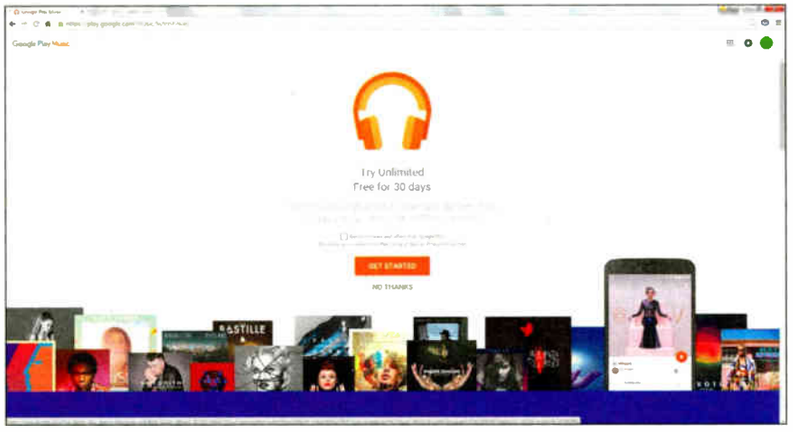
How streamers program music compared to traditional radio

PROGRAMMING

BY JAMES CARELESS

Pandora, Google Play Music and SoundCloud are among the biggest names in online music streaming. For radio broadcasters, such services are serious competitors for listeners. Yet these three streaming audio companies appear to follow very different operational models than conventional radio stations.

Is this really the case? Yes and no: Although these companies do not use radio's staffing structure and control room/transmitter model, much of what they do is actually quite familiar to broadcasters once you get a handle on their approaches.



Google Play Music's strategy is to leverage the cloud as the storage location for users' music libraries.

THE NITTY-GRITTY

Pandora was founded as Savage Beast Technologies in 2000 by Tim Westergren, Jon Kraft and Will Glaser. The trio initially had no plans to launch an online music service; they were focused on selling their Music Genome Project software to retailers music stores and other recorded audio retailers, to expose customers to new artists in-store and to boost sales.

The November 2000 news release that introduced Savage Beast to the world stated, "Tower Records (MTS Inc.) and Riffage, an Internet pioneer in digital music, represent two of Savage Beast's charter partners. By integrating Savage Beast's modular music discovery technology into their websites and Tower's in-store kiosks, Savage Beast's partners can develop a customized experience for music lovers."

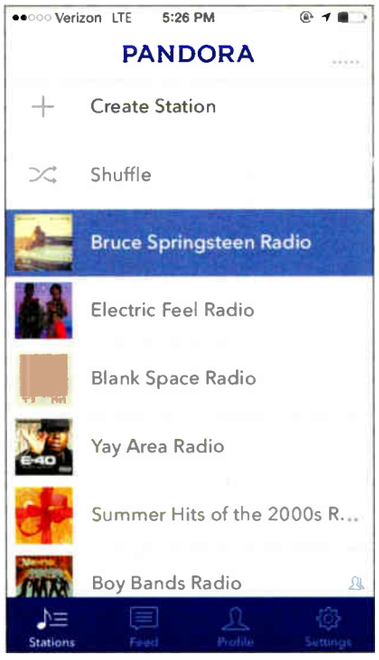
Unfortunately, the retail music business tanked in the years that followed — Tower Records filed for bankruptcy in 2004 — undercutting Savage Beat's core market. The company morphed into Pandora in 2005 and launched its own music streaming business.

It was a wise decision.

"As of Q2 2015, Pandora had over 1,700 employees and nearly 80 million active monthly listeners listening more than 22 hours a month," said Ron Nenni, its director of music programming. Pandora offers both free (ad-supported) and paid subscription (ad-free) music services, plus online music sales.

But Pandora has plenty of competition itself these days.

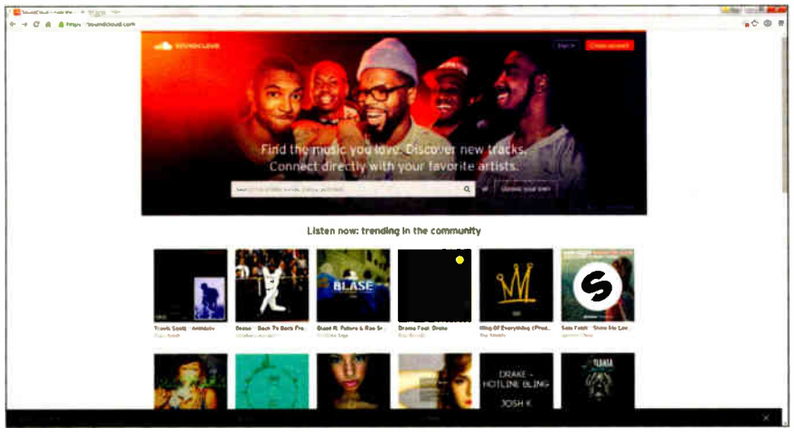
Google Play Music was launched by Google in late 2011. "It is the only service of its kind that lets you store your entire music collection online for free, with a subscription service that gives you access to 35 million songs, a store to purchase music you want to own forever and a free radio service to try us out," said Matt McLernon, Google Play+/YouTube Communications Manager.



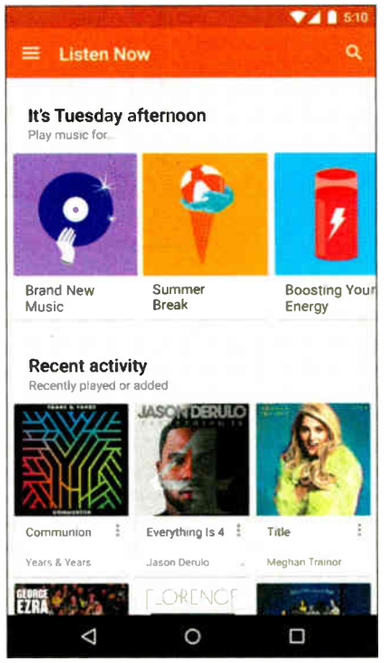
Each song in Pandora is analyzed using up to 450 distinct musical characteristics, to aid to making "new song" recommendations to users.

Google launched its music service to capitalize on cloud-based media, media stored on other people's computers and sourced by users via the Web.

"Early on we saw that music listening (and media generally) was moving to the cloud," said McLernon. "After launching at Google I/O a few years ago, launching a free locker service that now can store up to 50k of your own songs and launching our subscription service two years ago, we've been aggressively investing and growing this service to reach fans in 60 countries around the world."



SoundCloud's sale hook is to connect its users to the actual music creators on its service.



Google Play Music combines online music storage for users with a music download store and a streaming audio service.

Meanwhile, SoundCloud, launched in Berlin in 2008 by Alex Ljung and Eric Wahlforss, is designed to gives its users access to the world's largest community of music and audio creators.

"SoundCloud allows everyone to discover original music and audio, connect with each other and share their sounds with the world," said Megan West, SoundCloud's director of content relations. "In addition, creators can use the platform to instantly upload and share sounds across the Web, as well as receive detailed stats and feedback from the SoundCloud community."

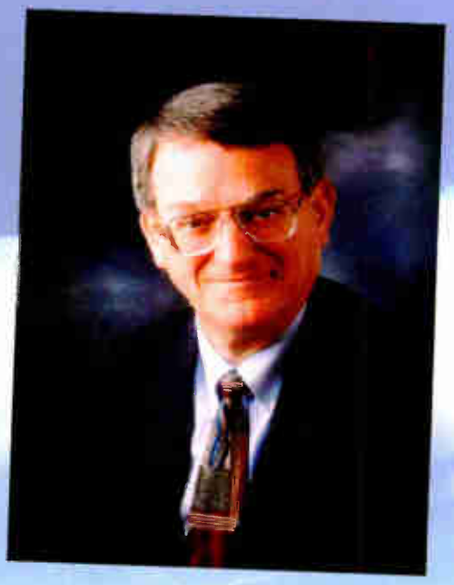
As of August 2014 when the On SoundCloud partner program was launched, creators also have the opportunity to earn money from sharing their work. More than 100 million tracks are available on SoundCloud, and it reaches more than 175 million unique users monthly.

MUSIC PROGRAMMING

Even in today's centralized radio industry, music selections are made by music directors who seek the best, most popular content within their stations' genres. Since radio broadcasting itself is a one-way medium, listener input is an after-the-fact phenomenon. Feedback is mostly limited to phone or online com-

(continued on page 23)

Congratulations and Happy Retirement to Jim Bealor!



Thanks for sharing your 40 year journey with us! We've been honored to have you as part of our team and blessed with your many contributions to BE and the industry.

May the road ahead be filled with the thrill of adventure, the joy of music, and the laughter of grandchildren!

Best wishes from your Broadcast Electronics family!

Get the Word Out to Create Action

Make 2016 your station's year of doing good for the community

PROMO POWER

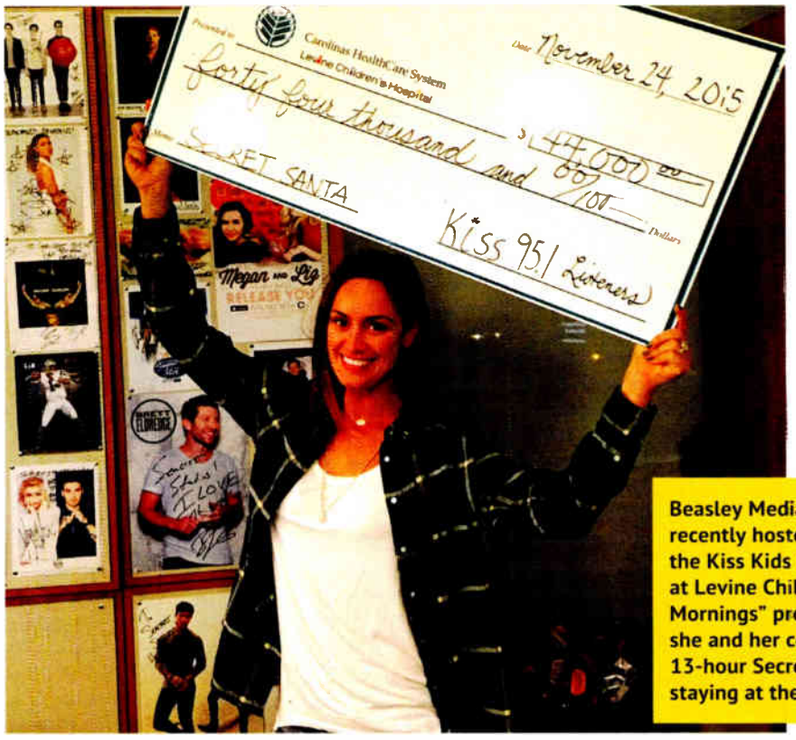
Mark Lapidus

Poverty comes into sharp focus during the holidays. Fortunately, giving during December has become an integral part of the season. While basking in the warmth and good cheer of holiday feasts, we become better people when we "pay it forward" and offer our money and time to those less fortunate.

For almost a century, radio and public philanthropy have played a critical role in helping the needy in the local community during this special time of year.

During 2016, could you find it in your heart to expand beyond the holidays and do more good throughout the year?

January is an excellent time to consider this possibility because you have plenty of time to plan. This is one of those cut-and-dried decisions that's up to your management team; it will happen only with discussion and commitment. Now, I've never seen a mandate come from corporate requiring its local stations to raise 15 percent for charity annually... but if you make it your own to be more involved with helping the needy, it's something you'll remember for the rest of your career.



Beasley Media Group's WNKS(FM) in Charlotte, N.C., recently hosted the fourth annual Secret Santa for the Kiss Kids Radiothon from the Seacrest Studios at Levine Children's Hospital. LauRen from "Kiss Mornings" proudly holds the check from the $44,000 she and her cohosts, Roy and Maney, raised from the 13-hour Secret Santa Radiothon for the Kiss Kids staying at the Levine Children's Hospital

A common misconception is that a large staff is required to help out in a community. Not true! What *is* vital is that someone on your staff has personal connections to people and non-profit groups who are already organized and know what's realistic in your community. Then our role as broadcasters is to paint the picture with sound and get the word out with enough reach and frequency to create action.

DO YOUR RESEARCH, MAKE A PLAN

If you're willing to grow your community outreach this year, I suggest planning one large activity per quarter. In station clusters, it's a perfectly good idea to duplicate this activity on more than one station, especially if the stations have distinctive audiences. I'm also a huge believer in involving other media outlets — TV stations, newspapers, or local media websites — to act as partners in maximizing the market reach and showing solidarity in improving local conditions.

Your quarterly "activity" could be promoting an actual event — such as a concert to benefit a local charity — or perhaps you're pushing for donations on the supply side, where you are collecting canned goods for the food bank, or coats and gloves for those who can't afford to buy them.

Once it becomes known that you are expanding your charity efforts, it's possible you'll be approached by a non-profit that wants to use crowd funding via one of the many online platforms now in that business. You should be aware that these professional fundraising technology companies often make their money by taking a cut of what is raised. While there's nothing wrong with that model, you must determine that the percentage is okay with all parties involved in the fundraiser so it doesn't come as an unwelcome surprise at the conclusion.

This Polar Plunge is missing one thing: a radio station to promote it!

As I've stated on many occasions, I am a proponent of annual radiothons when done well. Look no further than St. Jude's Children's Hospital to serve as the model for this endeavor. They have fine-tuned their approach with short, magnificently pre-produced sound bites that paint the picture. Plus, the way they encourage listeners to become monthly contributors sets a new standard in on-air fundraising.

If you truly don't know where to start, ask your audience. You'll no doubt receive great ideas, encouragement and volunteers to help you succeed. When stations do good, everyone wins!

How has your station "done good"? Tell us at radioworld@nbmedia.com.

The author is president of Lapidus Media. Contact him at marklapidus@verizon.net.

STREAMING

(continued from page 20)

ments, and ratings that assess how well stations are attracting their target audiences (though efforts at "hybrid" radio seek to change that feedback structure).

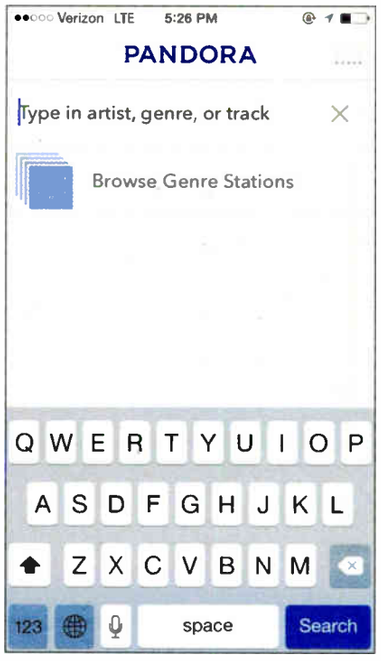
The models used by Pandora and Google Play Music are strikingly different from conventional radio's approach — and from each other's as well.

Pandora uses its proprietary Music Genome Project software to program its family of online audio streams. "Each song in the Music Genome Project is analyzed using up to 450 distinct musical characteristics by Pandora's team of about 100 music curators, data analysts, scientists and playlist engineers," Nenni said. "These attributes capture not only the musical identity of a song, but also the many significant qualities that are relevant to understanding the musical preferences of listeners."

This said, Pandora doesn't turn its music selection process entirely over to software. "We also hire the most talented genre specific curator programmers — aka program directors — to fine tune the product and complement the algorithm to find that next best song," said Nenni.

Once this is done, "the Music Genome Project then leverages 15 years of listener feedback — more than 55 billion thumbs and 8 billion station adds — and machines for scale to provide billions of hours of personalized listening from a growing library of millions of carefully selected tracks. Listeners can also choose from 800 expertly curated genre stations to complement their mood, activity or event."

Google Play Music's programming approach seems closer to that of conventional radio. "Similar to how radio DJs



Now a streaming audio powerhouse in its own right, Pandora's Music Genome software was originally designed to help record stores sell more music.

pick what tunes to air, we have a dedicated team that curates and edits the playlists or radio stations featured in Google Play Music," said Matt McLernon.

Another difference to radio and Pandora: Google Play Music's playlists "offer listeners music based on the moment — mood, activity, time of day," he said. "There's an element of human curation mixed with data driven analysis to determine which artists and songs go into each playlist, for just the right music to make whatever you're doing better; from 'Waking Up Gently' to 'High Heel Power Walk' to 'Working Out' to 'Working It on the Dance Floor,' just to name a few from the thousands we have."

Another interesting aspect of Google Play Music: "Individual aspiring unsigned artists who can upload and sell their music directly on Google Play," said McLernon.

SoundCloud is different again. At this streaming site, all content is controlled and uploaded by the artists and creators themselves.

"Our job at SoundCloud is to make sure that the platform is up and running and to constantly improve the users' experience," said West. "We don't have people that would fill a similar role to a DJ, as each listener's experience is curated based on their listening habits and tastes."

One last big difference between streaming media and radio: All three of these companies see themselves as free from the format straitjackets that bind broadcast radio stations.

"Terrestrial radio focuses on a segment of the audience by choosing a specific format that will garner enough market share to monetize. This is a top-down programming model where the PD may weigh in audience feedback by conducting music research," said Ron Nenni. "At Pandora, we are able to super-serve each genre by offering stations across each demo, decade stations, activity stations, local targeted stations and of course artist and song stations that can be personalized."

IN THE DRIVER'S SEAT

Even in the 21st century, radio is still programming its music slots much the same way it did 50 years ago. As critics see the matter, listener input feels like an afterthought to programmers, and the idea that radio stations must be defined by their specific genres remains sacrosanct.

Streaming audio breaks both of these molds.

The models used by Pandora and Google Play Music are strikingly different from conventional radio's approach – and from each other's as well.

"Google Play Music puts the listener in the driver seat, giving them control over what tunes they want to hear and when," said McLernon.

This approach appears to be generating results: "According to the Recording Industry Association of America, streaming music is now bringing in more revenue than physical musical sales," he said.

This doesn't mean that the concepts of broadcast radio are doomed. "Just as there's not one type of music fan, there's not just one type of way of listening," said McLernon. "That's why we also offer a free radio service, locker service and store."

James Careless reports on the industry for Radio World from Ottawa, Ontario.

LPFM Fundraising Case Study

Donors and underwriters helped WDPE get on the air

LOW-POWER FM

BY DAN SLENTZ

The author is consultant to WDPE(LP) in Dover-New Philadelphia, Ohio.

"DNP 102.3" has confronted financial and other struggles before and after our launch, a common occurrence for many low-power FM stations. But DNP 102.3 faces them with continued enthusiasm and excitement.

After fine-tuning the working relationship within the board of Dover-New Philadelphia Educational Broadcasting, we knew we had to take on the aspect of fundraising. Most locals seemed to embrace the station concept, but how could we encourage them to donate?

The Dover Canal Days festival provided an excellent opportunity for the station to raise awareness — and funds.

Dover Canal Days, a local festival, provided an opportunity. Starting with that event we adopted the NPR-like example of spiffs or gifts. A small donation (or even no money in some cases) earns prospective listeners a station bumper sticker; donors in a higher bracket get a T-shirt or poster of photos of the city or an early map. Posters of various sizes are according to the size of the donations.

We haven't yet fully explored the potential for grants, which are harder to obtain before a station goes on the air. The board perceived this issue as a problem that will be improve now that the station is broadcasting; we hope the local organizations responsible for such grants will then recognize the benefit to the community and the help the station itself gives to non-profit organizations through on-air support.

MISSION STATEMENT

WDPE has been founded with a two-fold mission.

First, the station will provide an opportunity for anyone to get into broadcasting, communications, engineering, IT, on-air presentation, public speaking, public relations and promotions. The station itself offers an excellent opportunity for volunteers. Numerous local persons joined as volunteers even prior to last summer's launch.

The second, equally important part of the mission is to support all non-profit organizations as "their voice." This includes helping them with their missions of anything from child mentoring to health awareness and local history. Many local non-profits greatly improve the quality of life in the area; the station (and board) are dedicated to helping them.

UNDERWRITING

The station expects to find its primary support through underwriting; our board has developed an interesting and unique model, with three tiers of underwriters. All underwriting is to be paid in advance.

The first level is "Underwriting Friend." In exchange for a commitment of $1,000 per year, they receive one underwriting announcement daily between 6 a.m. and 1 a.m. Underwriting announcements rotate equally and include the overnight hours, though any run overnight are not counted as their one per day. This means the Underwriting Friend receives 365 announcements annually. There are limited availabilities for this level of support — only 10 underwriters are planned at this level.

Special programming, like live sports coverage, special programming, etc., are not part of the regular schedule and thus not a part of the regular underwriting rotation.

The second level the "Launch Underwriter." In return for a $2,000 level of support, this underwriter receives three underwriting announcements per day, again rotated equally. They receive a total of 1,095 announcements throughout the course of the year. There can be up to five of this level.

The final tier is the "Founding Underwriter" at $4,000 per year. This level of underwriter receives eight underwriting announcements per day or 2,920 per year (rotated equally between 6 a.m. and 1 a.m.). To further entice up to five underwriters at this level, there are additional benefits. These underwriters receive additional underwriting announcements in all special programming (including live sports and special programming), plus a discount of $500 off their second year of underwriting, if chosen and paid for at the same time as the first year.

Unique to this level is product/service exclusivity. For example, let's say the underwriter is a car dealer and supports the station at the Founding Underwriter level. If no other car dealer has supported the station at the Launch Underwriter level or Underwriting Friend level, no other car dealer can be accepted as an underwriter.

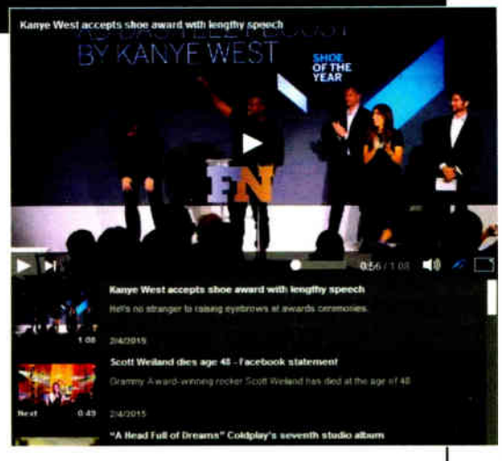
The board feels that this market exclusivity has great value and that underwriters will recognize this. It also helps with bringing in the necessary funds up-front to alleviate the concerns of operational funding. But this exclusivity, as mentioned, is *only* available *if* no other car dealer (service/product) has already supported the station with underwriting at a lower financial level.

The station also uses the multi-level approach for traditional donors. These include the "DNP Radio Friend" for $10, "DNP Supporter" at $60, "DNP Founding Member" at $100 and the "DNP Major Donor" at $250. Though there are currently no gifts in exchange for these donations, the hope is that someday the station can afford to offer tiered level of gifts to match these donations. This could be a special donor support sticker at each level, with a coffee mug for the $60 donor; a coffee mug and T-shirt at the $100 level; and two mugs, two shirts and special on-air recognition, if desired, at the $250 level.

DNP 102.3 launched last summer.

Dan Slentz is an engineer and LPFM veteran. Tell your fellow readers about your own LPFM strategies and successes. Email radioworld@nbmedia.com.

VIDEO FOR RADIO



The Tribune Content Agency says its new TCA Video Network is a resource for radio stations and other media that want to expand the digital assets that they publish.

Part of Tribune Publishing, the agency offers access to a library of short-form, professionally-produced videos to enhance a station's website experience for visitors. Content is from a range of sources, including Tribune publications such as the Chicago Tribune and L.A. Times, Morningstar, Reuters, AFP, Bloomberg, The Savory, Splash Media and more.

"We're offering timely content within national, international and local news; music news, entertainment, sports, health, finance, along with viral stories," said Art Bushnell, GM TCA Video Network.

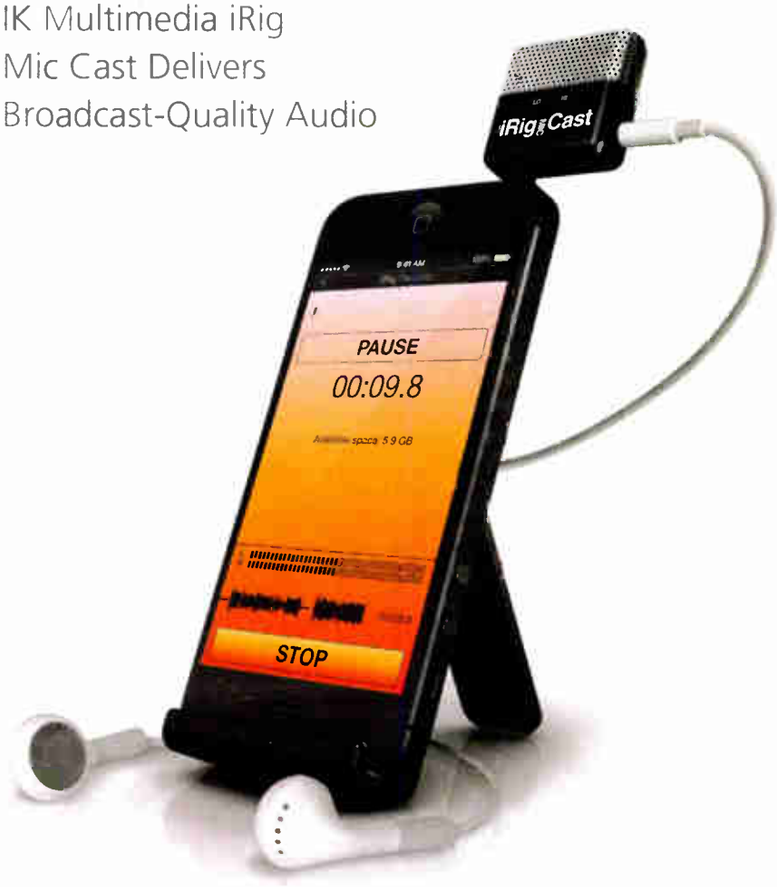
"We work with our clients to help them earn incremental revenue, engage their visitors for longer periods of time and bring new audiences to their site." He said there are no fees for the content or technology. "We've made the experience to embed content a simple process that can be easily integrated into our clients' workflows."

The company says the platform allows content providers to monitor the access, views, engagement and revenue earned by a given video. TCA says the content loads fast and is optimized to run on any desktop or mobile device. Features include rights management and an administrative dashboard that tracks usage and viewership of individual videos and websites in real time.

The company says the video content can offer stations a new revenue source and reach various demographics including millennials.

Professional Audio in Your Smartphone

IK Multimedia iRig Mic Cast Delivers Broadcast-Quality Audio



PRODUCT EVALUATION

BY CARLOS MARTIN SCHWAB

In recent years, some companies have aimed at using a smartphone as a portable sound recorder, in their efforts to improve audio quality (telephone quality originally) through microphones and recording apps.

IK Multimedia, a company founded in Italy, offers one of the smallest broadcast-quality sound microphones on the market and at a very affordable price of $39.99, allowing for smartphone recordings everywhere.

FORM FACTOR

The iRig Mic Cast, weighing in at about half an ounce, is an ultra-compact microphone (1.18-inch x 1.85-inch x 0.39-inch) that connects to a iOS or Android smartphone or tablet TRRS jack.

iRig Mic Cast is a condenser electret microphone featuring a cardioid polar pattern, two different sensitivity settings (low and high) and an internal built-in windscreen. It also features a mini-jack headphone output enabling real-time monitoring of what is being recorded.

Regarding apps, it includes two free ones for iOS: iRig Recorder, an easy-to-use voice recording/editing app also available for Android; and VocaLive, a multieffects processing app for singers. It also works with all regular phone calls and any voice-over-IP app such as Skype.

iRig Mic Cast is compatible with iPhone, iPod touch, iPad, Mac computers, besides Android smartphones and tablets. Finally, to offer ease of use at a desk, it features an adjustable tabletop stand for convenient smartphone positioning during recording.

The three main challenges faced by a microphone in the field are ambient noise rejection in up-close recordings, acceptable quality of sound sources that are not close in silent environments and

(continued on page 26)

PRODUCT CAPSULE

IK MULTIMEDIA
iRig Mic Cast Microphone

Thumbs Up
+ Small footprint
+ Quality sound for its size
+ Sensitivity settings
+ Comes with useful app

Thumbs Down
– Not high fidelity

Price: $39.99

For information, contact IK Multimedia in Florida at (954) 846-9101 or visit *www.ikmultimedia.com*.

IRIG MIC CAST

(continued from page 25)

the need to provide broadcast-quality sound.

While in some cases built-in smartphone microphones provide a sound quality journalists can use on some of their tasks, they typically feature an omnidirectional polar pattern that makes them unable to respond to the first two challenges mentioned above.

Due to its feature set, IK Multimedia iRig Mic Cast can rise to these challenges. To reach the first challenge it takes a microphone with a directional pattern that is high enough to reject off-axis sound effectively. iRig Mic Cast sports a cardioid polar pattern that allows for the much-needed ambient noise rejection.

The second challenge can be reached by a directional pattern and a sensitivity that are high enough: iRig Mic Cast has a sensitivity mini switch that, in its low setting (LO) is good for close-up sound sources, and in its high setting (HI) can pick up distant sound sources with a

logic reverberation level in relation to the characteristics of the environment (more or less reverberant) and the distance from the source.

As regards the third challenge, the microphone can reach it with its own feature set: a condenser electret microphone with a frequency response of 100 Hz to 15 kHz that is enough to pick up certain details in high frequencies and to reject low frequency "rumble." Besides, its built-in windscreen is an outstanding feature when compared to smartphone built-in microphones. Try to record with a smartphone in a windy outdoor setting and you will see what I mean.

Due to its feature set, IK Multimedia iRig Mic Cast can rise to these challenges.

The iRig Recorder app that comes with the microphone is appropriate for the minimal needs: export files as compressed M4A (MP3 would have been better if you ask me), transfer files via iTunes, Wi-Fi and share files with easy upload to an FTP server or SoundCloud (I would add the extremely popular Dropbox).

This microphone, aimed at students and journalists, with features designed with outdoor tasks in mind (mainly practicality, broadcast-quality sound and portability) and at a reasonable price, deserves to be taken into account by all kinds of journalists on the field. You can go to YouTube and check the features and sound quality of the microphone demonstrated in quite a few video clips available.

Carlos Martin Schwab is a sound engineer, column writer, and public accountant that owns his own recording studio Tribal Tech, in Rosario, Argentina. Reach him at tribaltch@gmail.com.

Fostex T50RPmk3 — Just Right

SHORT TAKE

BY CURT YENGST, CSRE

If you want a review of a pair of headphones, I'm the last person you'd want to hear from. I hate wearing headphones. Back when I was an announcer, I even refused to wear them when on the air. I'd leave them on the counter next to the console and turn up the level just loud enough that I could still hear them when the hot mic muted the monitors. I never liked the confined feeling they gave me.

Well, enough about me. Let's talk about a new offering from Fostex, the T50RPmk3 stereo headphones. This particular headset is one of a line of three: the T20RPmk3, with open earpieces optimized for deep bass; the T40RPmk3, the closed-ear version, optimized for focused bass; and the T50RPmk3. These semi-open headphones claim a "flat and clear sound."

The T50RPmk3 boasts a 15 Hz–35 kHz frequency range and a 50 ohm impedance. The drivers utilize Fostex's Regular Phase technology, which Fostex began using about 40 years ago. It is essentially a flat driver, rather than a traditional, speaker-like, conical driver. This eliminates phase coherence anomalies between the edge and center of the driver. They've been slightly retuned from the earlier T50RP models for even flatter response. Other improvements include a tighter, yet more comfortable headband and ear pads, and a few aesthetic upgrades. Another feature is the inclusion of two detachable cables; a 1/4-inch TRS cable, and a 1/8-inch stereo mini cable for portable devices. Each cable features a locking connector at the headphone end.

WAWZ's David A. Dein wears the Fostex T50RPmk3 headphones.

I compared them to two other headphones I've used (under duress) — the AKG K141, and the Sony MDR-7506. I've always preferred the AKGs for comfort and accuracy. While the Sonys are louder and brighter, great for monitoring vocals over a loud mix, they can be fatiguing. The T50RPmk3s presented a happy medium. Though bulkier than the AKGs, they were very comfortable, even after wearing them for a long time. They were bright without wearing out my ears. Listening to everything from classical to hard rock, I thought they sounded cleaner than the AKGs.

Next, I handed them off to our WAWZ(FM) on-air staff. Each has their own preferred set of headphones, usually Sony MDR-7506s or AKG K240s; and each thought the T50RPmk3s sounded better.

Like the AKGs, they required more level from the headphone amp than the Sonys. One concern was the length of the cable. Some preferred the coiled design of the Sonys' cable to keep it out of harm's way, although the T50RPmk3s' cable looks beefier than most I've seen.

Speaking of durability, they look and feel solid; but the DJs were wondering how they'd hold up to months of almost daily abuse. Unfortunately, I couldn't keep them long enough to break them!

But beyond that, even as a guy who doesn't like headphones, I liked the T50RPmk3s. They were easy on the ears and surprisingly comfortable. A street price of $159.99 puts them in range of comparable professional headphones and definitely worth consideration.

For information, contact Fostex at info@americanmusicandsound.com *or visit* www.fostexinternational.com.

Curt Yengst, CSRE, is a frequent contributor to Radio World.

ACOUSTICS

ANTENNAS/ TOWERS/CABLES

WANT TO SELL

CCA FM8000G 107.9, 50129.9 hrs, like new; 4-Bay Jampro antenna deicers, gd cond; 4-bay Shively circul polar FM antenna, manual. sherry@prtcnet.org, or 859-533-5635.

AUDIO PROCESSING (INCLUDES ON-AIR)

WANT TO BUY

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST - 214 738-7873 or sixtiesradio@yahoo.com.

AUTOMATION EQUIPMENT

WANT TO SELL

DIY-DJ Version 2.0 is now available. Over 500 copies of DIY-DJ, a Linux based radio automation system, have been distributed and now version 2.0 is available. Voice tracking, join satellite feeds, do unattended sports and remote events, temperature announce, scheduler, automatic cut editing on import, and much more. It's FREE. If you are using version 1.0 or would like to try DIY-DJ, go to krwsfm.com, register and down load your free full version. The only thing we ask is that you let us know if and how you are using the software. Call (406) 679-0527 or email krws@digitaldevelopment.net for a copy today.

CONSOLES/ MIXERS/ROUTERS

Autogram 8-chnl & 6-chnl boards; Logitek Perfectionish 8-chnl board, for parts or refurb, any offer takes, FOB Springfield, TN 37172. Neil, 615-384-9744.

MICROPHONES/ HEADPHONES/ SPEAKERS/AMPS

WANT TO SELL

1934 RCA 77A double ribbon microphone, originally used by Arthur Godfrey at WFBR Baltimore. 100% perfect condition. Contact Bill Cook, 719-684-6010.

WANT TO BUY

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 214 738-7873 or sixtiesradio@yahoo.com.

MISCELLANEOUS

WANT TO SELL

I'm selling between 150 and 200 cassette tapes that consist of old-time radio shows, sports shows, some local New York radio talk shows, etc... Must take entire collection and the price is negotiable. Please call me for details and, my phone number is 925-284-5428.

CONSULTANTS

DISTRIBUTOR DIRECTORY

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

Radio broadcasts of Major League Baseball, NFL, and some college football games that are on cassette tapes, approx 100 to 125 games, time period of entire collection os from the 1950's – 1970's, BO. Must purchase entire collection. Contact Ron, 925-284-5428 or ronwtamm@yahoo.com

8-chnl & (2) 4-chnl cntrl boards w/mics & access, (2) CD players, (5) turntables w/ cabinets & stylst, gauge tuner for 1000W xmtr, studio patch panel, transmitter reader meter and EBS receiver, make offer. 315-287-1753 or 315-528-6040.

WANT TO BUY

Collector wants to buy: old vintage pro gears, compressor/limiter, microphone, mixing consoles, amplifiers, mic preamps, speakers, turntables, EQ working or not, working transformers (UTC Western Electric), Fairchild, Western Electric, Langevin, RCA, Gates, Urei, Altec, Pultec, Collins. Cash - pick up 773-339-9035 or ilg821@aol.com.

2" plastic "spot" reels 6.5 or 8" diameter, as used for quad video. Wayne, Audio Village, 760-320-0728 or audiovlg@gte.net.

Equipment Wanted: obsolete, or out of service broadcast and recording gear, amplifiers, processing, radio or mixing consoles, microphones, etc. Large lots preferred. Pickup or shipping can be discussed. 443-854-0725 or ajkivi@gmail.com.

I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example newscast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, KTAB, KDIA, KWBR, KSFX, KOBY, KCBS, KQW, KRE, KTIM, KYA, etc, I will pay for copies.. Feel free to call me at 925-284-5428 or you can email me at ronwtamm@yahoo.com.

Looking for a broadcast excerpt of a SanFrancisco Giant's taped off of KSFO radio from 1959, interviews with Willie Mays, Dusty Rhodes & some play by play excerpts, also features a homerun by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time is 13:44. Ron, 925-284-5428 or email ronwtamm@yahoo.com.

Looking for KTIM FM radio shows from 1981-1984 if possible unscoped. R Tamm, 925-284-5428 or ronwtamm@yahoo.com.

RECEIVERS/ TRANSCEIVERS

WANT TO SELL

Free sample SCA decoder. 417-881-1846.

RECORDING & PLAYBACK HARDWARE

WANT TO BUY

Large or small collections of 16" transcriptions or 12" transcriptions, not commercial LPs. Bill Cook, 719-684-6010.

Schnader telescriptions 16 mm musical films produced in the early 50 s. Bill Cook, 719-684-6010.

Standard Short-tune series. Bill Cook, 719-684-6010.

TAX DEDUCTIBLE EQUIPMENT

Donations Needed: All Volunteer, Non-profit Low Power community radios stations need Equipment. Will offer tax deduction letter, You determine donation value, We will pay shipping. Equipment shared between three Wisconsin stations. Looking for Mics, Mixers, field equipment, etc. You name it. Email: Dan@WIECradio.org.

BROADCAST EQUIPMENT EXCHANGE

Submit your listings to: minderrieden@nbmedia.com

TRANSMITTERS/EXCITERS/TRANSLATORS

WANT TO SELL

2005 Harris 3-DX transmitter, like new, programmed on 1080, housed in Orlando & out of service for nearly a year, $60000 or BO, pics avail. Max Anduze, 813-281-1040 for more details.

TEST-METERING-MONITORING

WANT TO SELL

Sylvania Type 219 Tube Tester & TFT EAS unit that was factory upgraded at TFT in April '08, not used since. bobzellmer@cox.net or 970-302-0161.

TUBES

EMPLOYMENT

RADIOWORLD *Equipment Exchange*

POSITIONS WANTED

Are you a small market station needing a good nuts & bolts engineer in the Los Angeles area? I will make your station shine! CET, fully FCC Licensed. Available for Full/Part-time/ Contract work. Available immediately. Mitchell Rakoff, 909-446-6820, mitchellrakoff@yahoo.com.

Experienced radio station manager seeks new management opportunity. More than 39 years experience in radio. Willing to relocate. Family-friendly format(s) preferred. Send details about your management opening to: radiogm@hotmail.com.

Extremely knowledgeable and articulate racing writer/talk show host Adam Amick is available for shows, correspondent, features, etc. Check out www.bleacherreport.com for samples. Call 214-384-5812 or email: adam@rubbinsracingshow.com.

Influential talent, strong music knowledge, with great energy/addicting smile in voice, fantastic writer/prep, supports local music and is known for it. Daniel, 425-761-2025 or dbelles@live.com.

What *Is* NextRadio Powered by TagStation?

App platform helps stations take full advantage of the FM chip

COMMENTARY

BY PAUL BRENNER

NextRadio is the smartphone app that allows listeners to tune to live, local FM radio on a mobile phone. Every FM signal can be tuned to in NextRadio. More than 12,500 FM stations have been tuned to through NextRadio, and on average 5,040 stations are tuned to each day. NextRadio creates a new, unified radio listening experience on mobile phones providing consumers with a new way to listen to local radio using the FM chip.

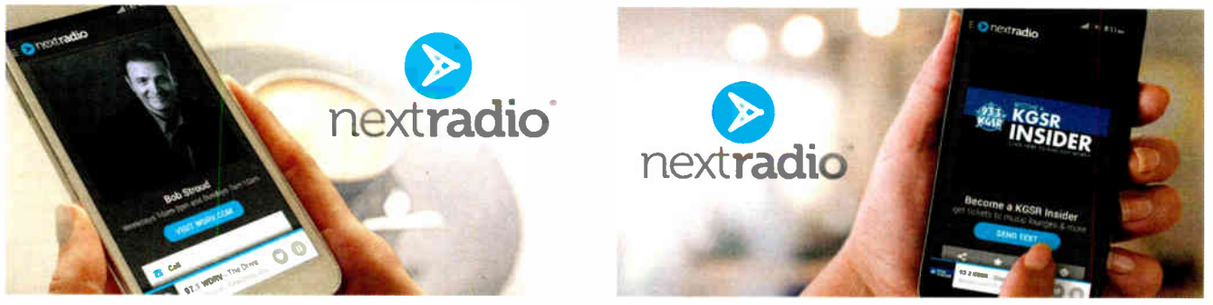
The difference is whether those signals are *seen and heard* in NextRadio, which comes from TagStation.

TagStation is the cloud-based service that is the programming and sales content engine behind NextRadio, powering the visual and interactive experience. It allows radio stations to synchronize their radio broadcasts with album artwork, images, text and interactive touch points for visual display in NextRadio. The average time spent listening to NextRadio is 20 minutes, and in a recent analysis of over 8 million NextRadio listening hours, TagStation clients garnered 60 percent more listening than stations only providing a free logo.

WORKING WITH AND HELPING BROADCASTERS

How we are working with and helping broadcasters?

We are listening to the industry, especially small to medium-size broadcasters, and adjusting to help overcome any challenges they face with respect to licensing TagStation to offer their listeners the full interactive experience of NextRadio.



The main obstacles we have encountered from the radio industry, specifically the small to medium-size broadcasters, with respect to TagStation include general product understanding, staffing resources to devote to TagStation, middleware connectivity concerns, and the cost of TagStation licensing. We have listened to these industry concerns and have provided solutions to overcome these barriers.

We have done several things in order to educate the industry about NextRadio and TagStation. We have attended several state broadcaster conventions. We provide online tutorial videos, host biweekly training sessions and supply a plethora of forum posts explaining how TagStation makes radio stations come alive in NextRadio.

TagStation is simple and easy to learn and use, but many broadcasters have thus far struggled to use the system to its potential. In an effort to help provide NextRadio listeners the best visual experience, we formed a Content Acceleration Team. We can help stations leverage existing online resources and bring your local programs and personalities to life in the NextRadio app.

TagStation is now being offered for only $10/month per FM analog station, with no setup fees.

Many small to medium-size broadcasters have shared with us concerns on the technical side of connecting to TagStation because TagStation requires datacasting software. This software allows TagStation to receive the now playing information about the audio airing on local radio. We've worked with several vendors to ensure their products support as many TagStation features as possible, and have even developed our own simple solution as well.

The final and most common concern for broadcasters is the cost to license TagStation. Recently, TagStation fees were drastically reduced in an effort to make TagStation more affordable for all broadcasters. This is important because the wireless industry expects our entire industry to operate as one unit to deliver a consistent user experience in NextRadio on every station in America.

TagStation is now being offered for only $10/month per FM analog station, with no setup fees. If you have a broadcast channel that wishes to utilize TagStation to serve content for FM/HD1, HD2, HD3 and HD4, pricing will remain at $35/month, billed annually at $420 due to the higher cost of supporting HD Radio systems.

All U.S. radio stations working together with TagStation will create a world-class visual and interactive radio listening experience in NextRadio. By using TagStation to improve the customer experience, grow listening and increase advertiser interest; the radio industry can show our current wireless partners that we can unify as an industry but also create a more compelling reason for getting Verizon and Apple on board with NextRadio.

WHAT'S NEXT FOR THE APP?

NextRadio has been working with the National Association of Broadcasters and a long list of industry leaders doing everything possible to get more FM-enabled smartphones into the market. This is no small undertaking, but together we are making tremendous progress. We are continuing to grow with Sprint, Boost and Virgin Mobile, and are getting ready to launch AT&T and handset maker BLU Products, all while working to add the remaining carriers and handset manufacturers.

In 2016, NextRadio will be available on approximately 60 million smartphones. Now is the time for our industry to ban together with TagStation to create visually interactive FM radio on a smartphone with NextRadio.

We are here to help!

Not on TagStation? To learn about middleware and the specifics, as well as new pricing, contact *sales@tagstation.com*. TagStation users: For any support questions or if you would like to add your station to our task list, contact our Content Acceleration Team at *support@tagstation.com*.

READER'SFORUM

TRAINING

The industry is now reaping the fine crop of elimination and disrespect THAT it so gleefully sowed after 1996 ("In Search of Engineers," Sept. 9). It eliminated the training ground for engineers, mostly smaller-market stations, where many of us shaped our careers, to save a few dollars.

Eldon Schlenker
Aztec Engineering
Grimes, Iowa

STANDALONE AM SOLUTION

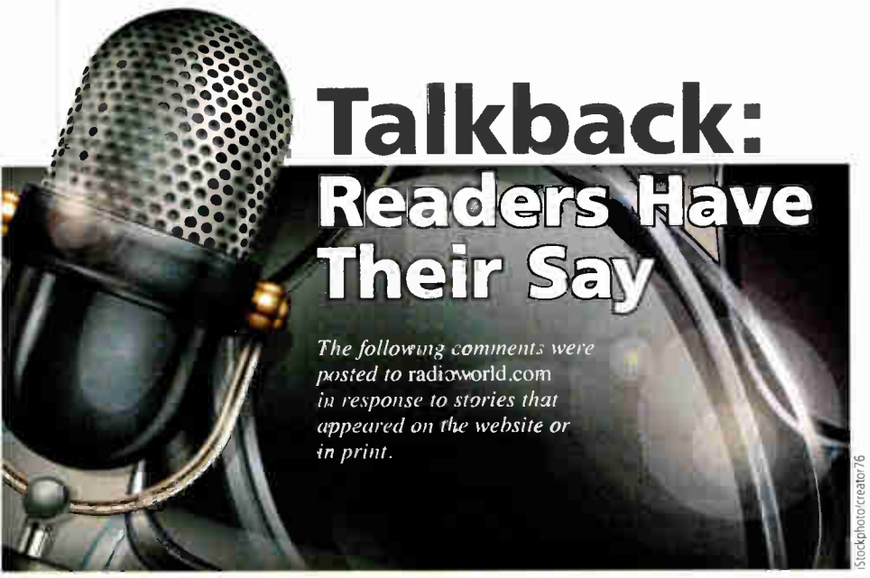
It has been suggested before, but here is my common sense solution for standalone AMs.

Open the non-com portion of the FM band (87.5 to 91.9) to commercial use, giving the AM standalones first choice. Non-coms are on 92.1-107.9, so fair is fair.

Maybe limit the power to 6kW, but many operators would jump at the chance. I like simple solutions, which is probably why this has not been seriously considerd.

This will probably make some mad, but that's okay, at least I know it was read. Kind of like when you make a comment on the air and someone complains — at least you know someone is listening.

Stu Wright
Orangeburg, S.C.



Talkback: Readers Have Their Say

The following comments were posted to radioworld.com *in response to stories that appeared on the website or in print.*

iStockphoto/creator76

TRANSLATORS

"NPR's Riksen: Incremental AM Approach Provides Flexibility But Falls Short" by Susan Ashworth, Radio World online

Doesn't NPR already have enough transmitters on FM? When is enough, enough?

I do not know about the availability of software for generation or reception of the DRM system with the Opus codec. I wish I had more information. I heard on This Week In Radio Tech (TWiRT) that a broadcaster could have two talk program streams on medium wave using DRM with the Opus codec. One channel with music with the Opus codec on DRM(30) would make it obvious that iBiquity's "HD Radio" is not good enough and is an unrecognized failure.

ONLINE

"Social Media for Engineers: Tool or Toy?" by Paul Kaminski, Nov. 18, 2015

There are also manufacturers who monitor these sites and are extremely helpful if someone is asking about issues concerning their equipment. This unsolicited help has made an impression on me and is duly remembered when purchasing new equipment.

I use the original Internet social media, mailing lists. With a half dozen lists, I reach expertise in several different subject areas. The email lists are hosted by a variety of servers so the Internet remains a distributed network.

FM TRANSLATORS

"New Translator CP Gets the Go Ahead, Despite Objections" by Susan Ashworth, Radio World online

The FCC bought this on themselves, by ruining the entire FM band, granting unnecessary translators. Translators that were strung together to form "networks," by mostly religious broadcasters. Not in the spirit of the original intention of the rules.

RIP

"Pickering Passes Away," by Brett Moss, Radio World online

Yes, if you had a Dual or BSR turntable in the '70s, one of them likely had a Pickering cartridge on them at one time or another. Thanks, Mr. Pickering, for your contribution to the vinyl audio world and bringing music to many of us. Ninety-nine great years – proves that music is good for the body and soul.

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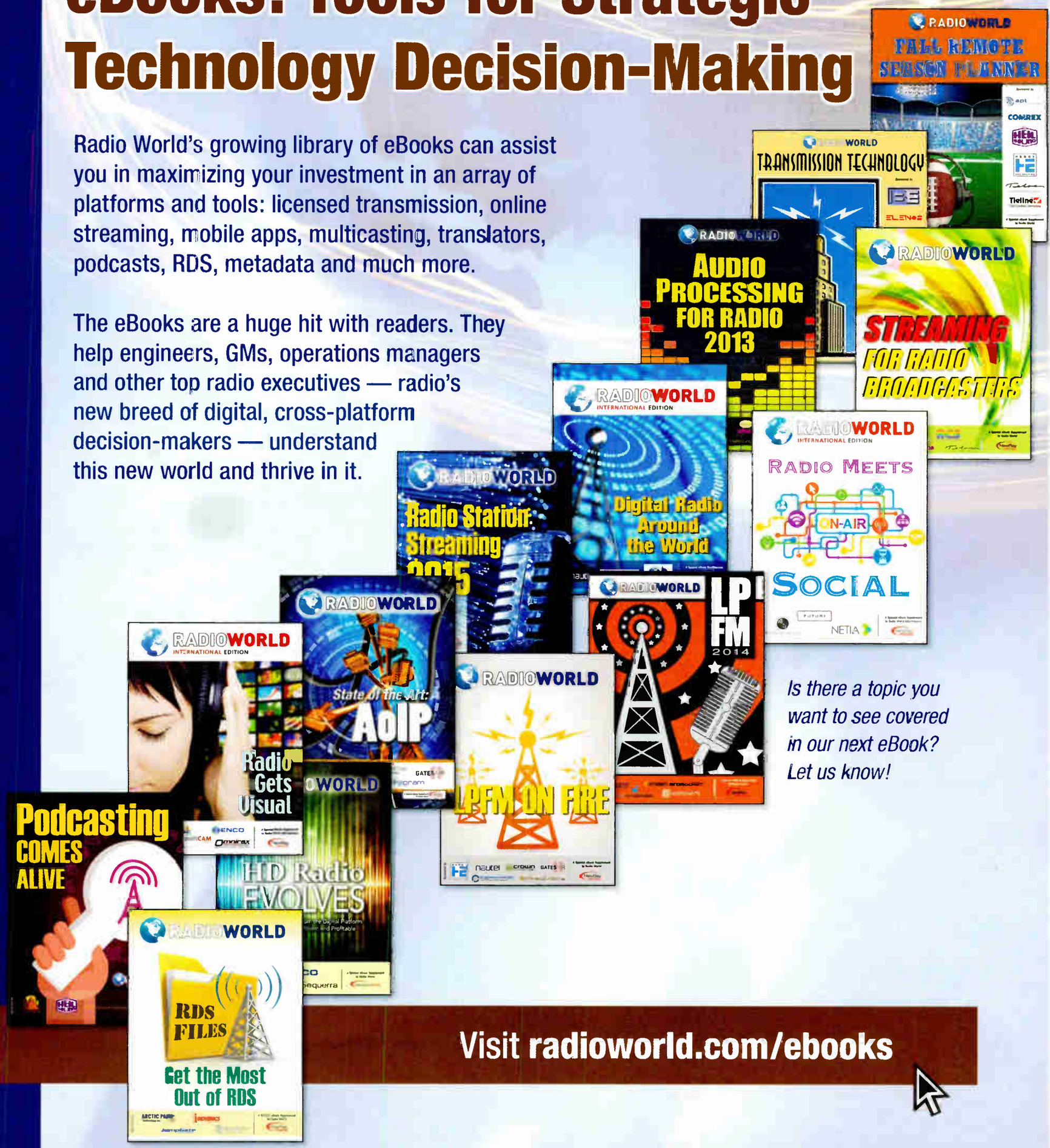
eBooks: Tools for Strategic Technology Decision-Making

Radio World's growing library of eBooks can assist you in maximizing your investment in an array of platforms and tools: licensed transmission, online streaming, mobile apps, multicasting, translators, podcasts, RDS, metadata and much more.

The eBooks are a huge hit with readers. They help engineers, GMs, operations managers and other top radio executives — radio's new breed of digital, cross-platform decision-makers — understand this new world and thrive in it.



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Finding YOUR Sweet Spot with FM-55 is Easier Than Unwrapping a Candy Bar

We've engineered FM-55 to make it easy for you to craft your on-air sound to be clean, loud, and sweet - no matter what your format. FM-55 comes with presets created by our broadcast audio perfectionists to cover virtually every type of programming. Just dial it up and instantly your sound gets a sonic facelift – one your listeners will love. Like giving candy to a, well, you get the picture...

Wanna tweak? We give you a toolbox that lets you get at every parameter in FM-55 to take control and sculpt the finest sound you can - YOUR signature sound. Best part is, FM-55 is exceptionally cost effective/cost competitive – the fastest growing choice in under-$3K FM processors! Give your listeners pure ear candy – contact us today and get FM-55 for your airchain now.

Nutrition Facts

Intelligent iAGC	Smart Stereo Enhancement	Bass Management System 3.0	Multipath Control	Wheatstone® baseband192	WheatNet-IP Compatible
Produces a consistent, spectrally-balanced sound regardless of density variations in incoming source material. Essential for different media formats.	Specialized automatic level and spectral management algorithms provide a wide but extremely stable 'on-air' stereo image.	Circumvents bass-related distortion. Increased depth, feel, and clarity of bass impact without affecting mid and high frequency content.	Mitigates market and terrain-specific multipath behavior, reducing the problem of multipath-triggered receiver-induced stereo blend.	A single AES/EBU cable between the processor and a current solid-state FM transmitter carries the digital baseband signal for exceptionally clean sound.	Control the FM-55 and stream its audio to and from anywhere in the WheatNet-IP audio network.

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