



RADIO WORLD

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Gravley: “We Have a Very Good Story to Tell”

New Radio Board Chair Randy Gravley sees opportunities in the current environment

FALL RADIO SHOW

The Radio Board of the National Association of Broadcasters elected Randy Gravley as its chair in June. He is president and CEO of Tri-State Communications Inc., based in Jasper, Ga. His companies own and operate several radio stations in North Georgia.

He spoke to Radio World Editor in Chief Paul McLane about issues of concern as the U.S. radio broadcast industry heads into the fall Radio Show in September.



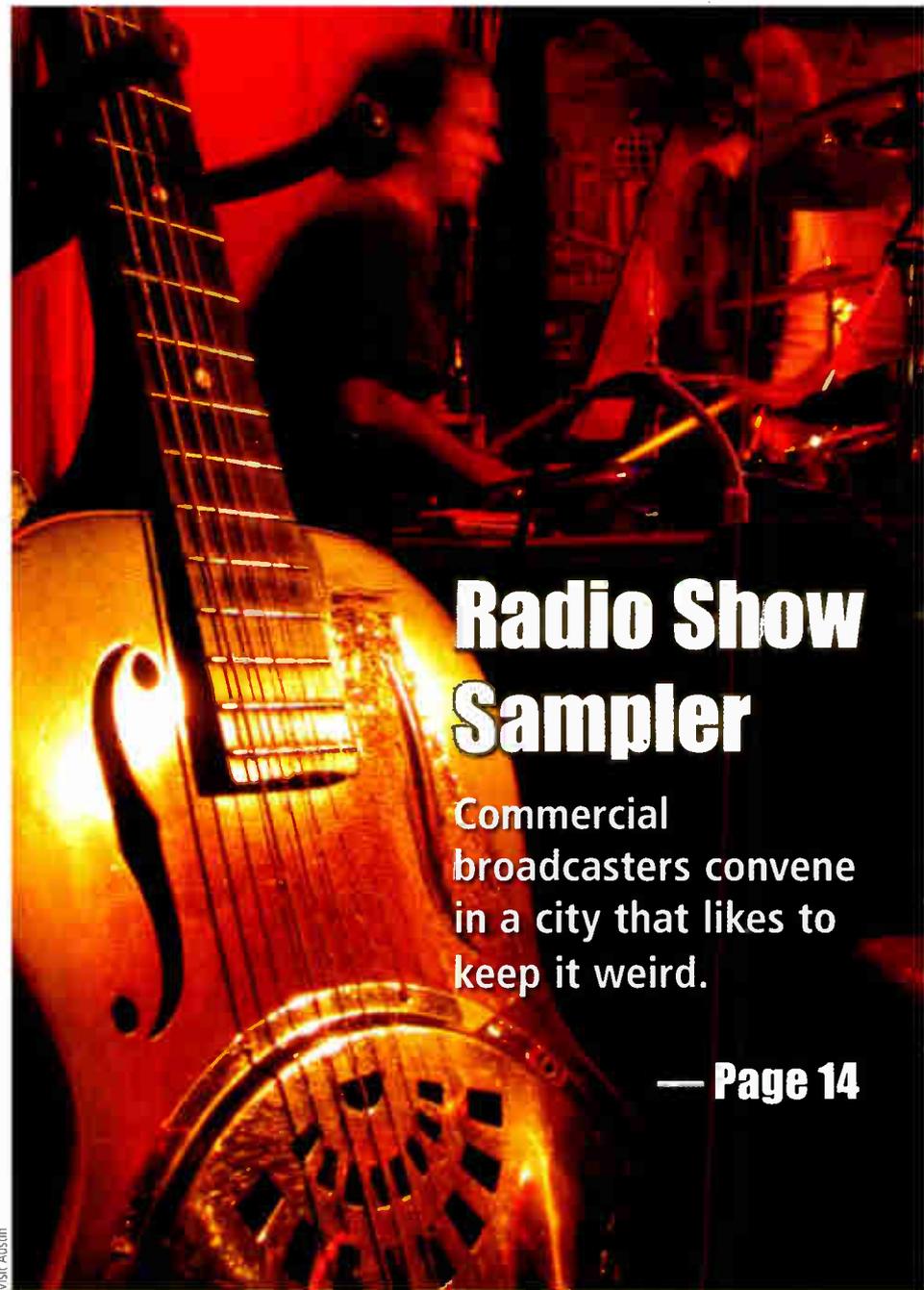
most pressing business challenge facing U.S. radio broadcasters right now?

Randy Gravley: We've got several areas where I think our industry's being challenged. One is the rise in the streaming services and other media platforms competing against us. To make sure that we stay technologically relevant is a very important area for not just large but small broadcasters, to make sure that we are addressing these issues.

We know that we need to be on as many platforms as possible, but we also need to make sure that we're giving listeners something that they can't get anywhere else, where they

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Radio World: What do you consider the

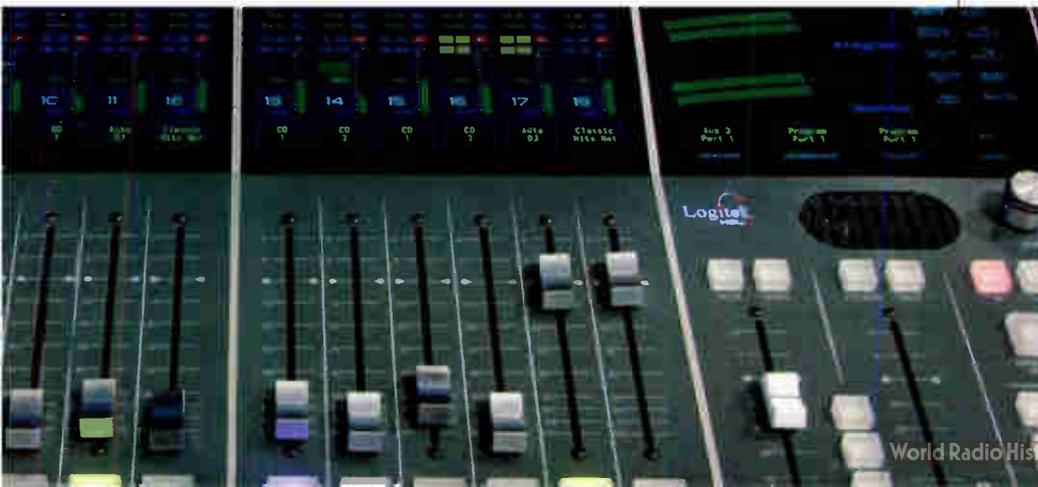


Radio Show Sampler

Commercial broadcasters convene in a city that likes to keep it weird.

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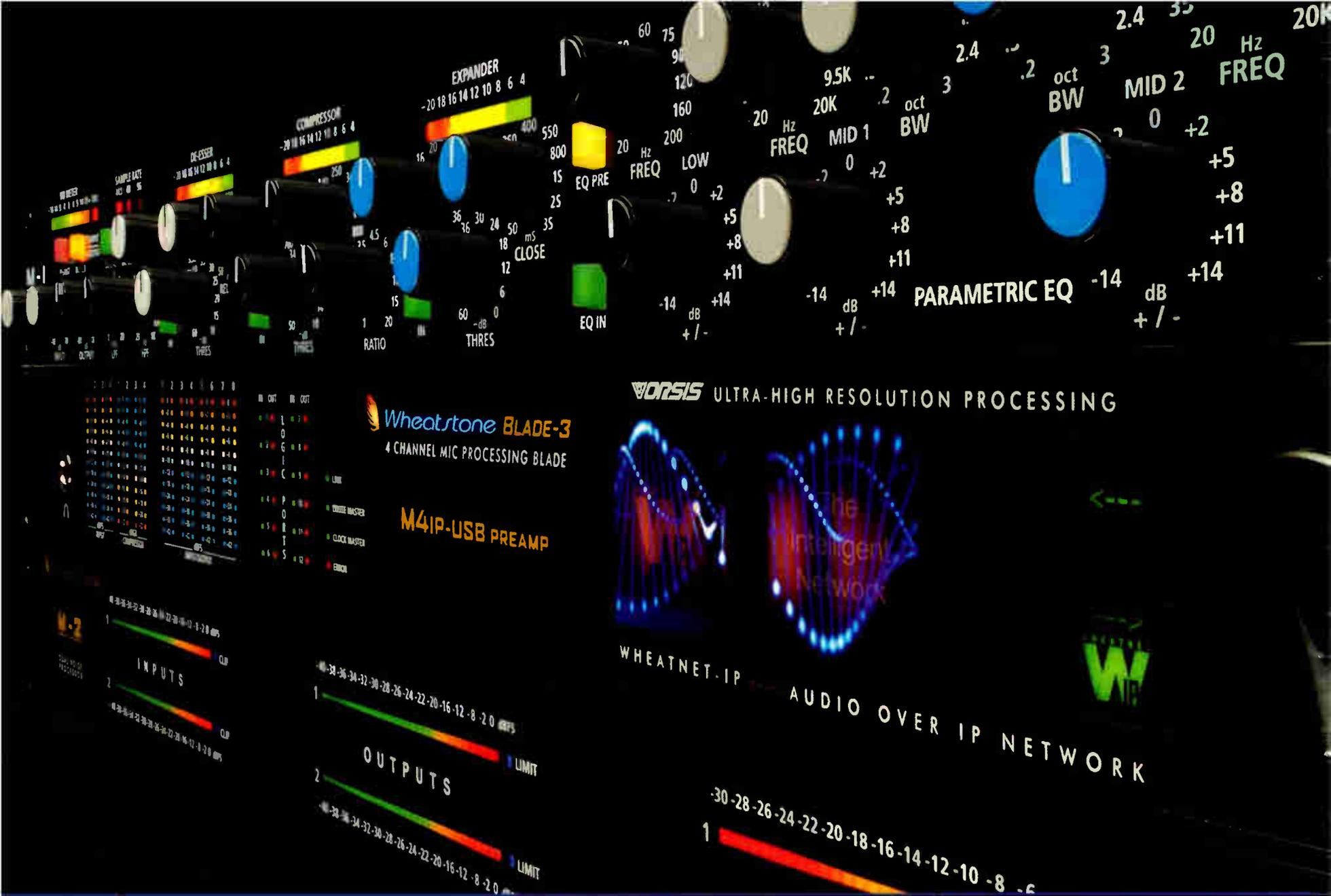
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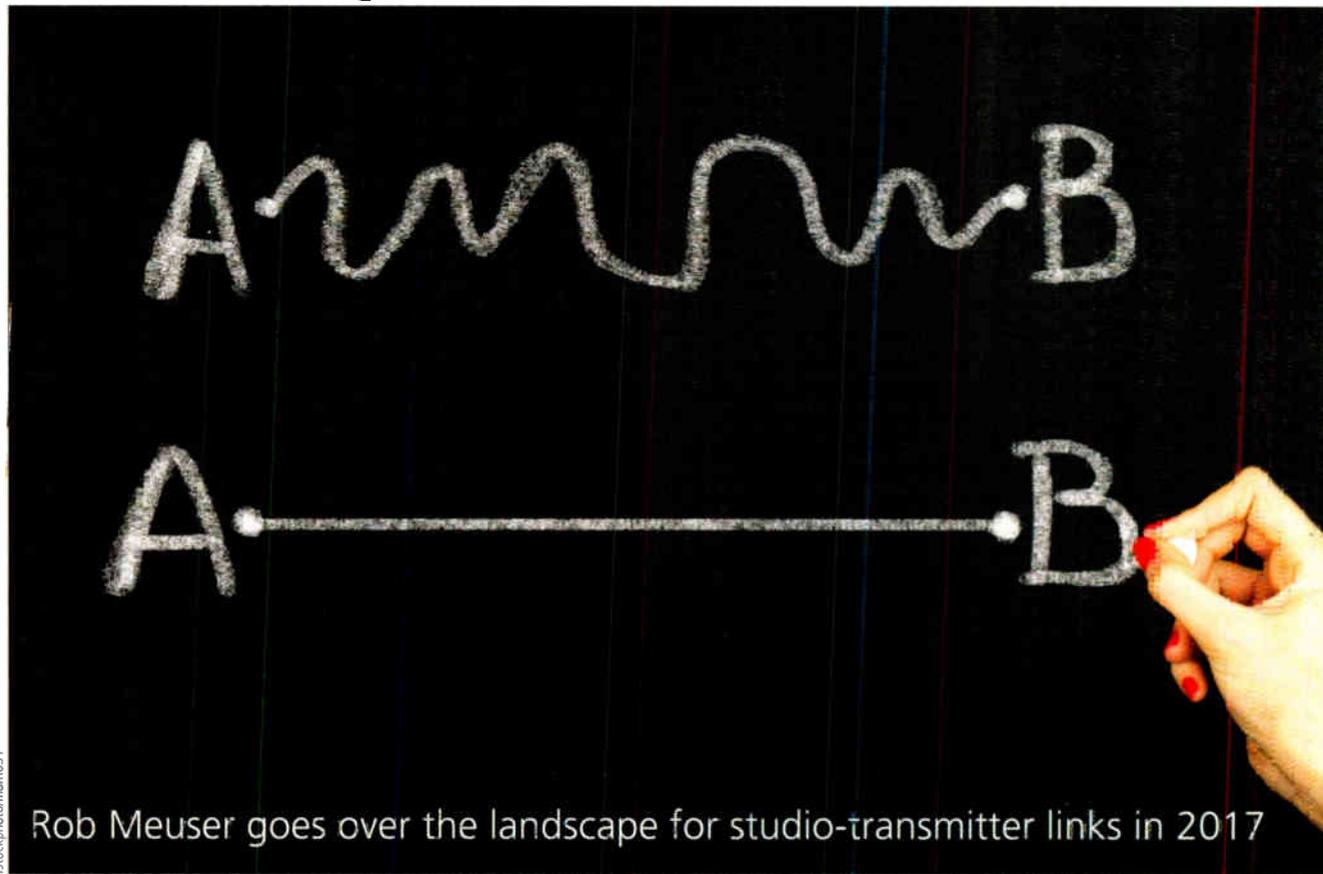
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Considering STL in an IT-centric World



Rob Meuser goes over the landscape for studio-transmitter links in 2017

RADIO IT MANAGEMENT

BY THOMAS R. MCGINLEY

The world has become IT-centric. While this is beneficial in many ways, the trend changes the options available to broadcasters to deliver content to their transmitters.

Veteran broadcast engineer and consultant Rob Meuser took a comprehensive look at options now available for studio-transmitter links and solutions to utilize them effectively in a presentation at the spring NAB Broadcast Engineering and IT Conference.

Meuser, CPBE, CBNT, is the CTO of Engineaux Inc. and a lifelong broadcast engineer who has designed and built radio and TV facilities over 40 years. He is former senior technical engineer for broadcast operations at CBS Television Network and former chief engineer of WHTZ(FM) "Z100" in New York.

He opened by taking a brief stroll down memory lane, describing the many STL systems broadcasters have used over the years. In the beginning, there were no STLs as stations were forced to co-locate at their transmitter sites. As stations built higher-power facilities some distance from downtown studios, the first STLs were wire lines leased from the regional Bell telephone

companies. Equalizers were used to compensate for high-frequency losses.

TELCO LINES RULED

In order to minimize the number of copper pairs in trunks serving multiple customers, the phone companies began multiplexing lines using SSB and other techniques. Up to 60 discrete channels could be transmitted on a single pair. Telco copper pairs were the dominant STL for the first 40 years of broadcasting.

In 1950, RCA developed the basic T1 transport using a 1.51316 MHz carrier that could deliver 24 B channels at 64 kbps. T1s are still used by many broadcasters on platforms like GatesAir Intraplex and several Worldcast offerings. Stereo broadcast audio channels, either uncompressed or bit rate reduced in various codec qualities, can be delivered, along with LAN extension, OPX phones and remote control data to a transmitter site on one or more T1 circuits.

WIRELESS STL

When FCC rules established the wireless BAS STL bands in Part 74, many broadcasters dispensed with recurring monthly telco charges to become independent using their own STL radio links. The 950 MHz band became popular for radio and is still in widespread use. However, 950 is bandwidth-limited compared to the higher STL frequency bands in use up to 23 GHz. Even with digital encoding, only

two stereo program channels plus low bit rate data for remote control and a few lower-quality SCA services is about all the 950 channels can handle.

IP AND STL

With the advent of private IP networks, LAN extension and the internet, internet protocol is rapidly becoming the dominant player in the STL space. IP has proven to be a much more efficient use of the telco infrastructure than even bit rate reduced digital audio. The number of IP-based choices available for STL services are many and move well beyond telco offerings. Meuser predicts that even "T1's may end up in the IP cloud."

GatesAir and Worldcast are each offering IP-based STL systems in both wired and wireless STL links. They include modern codecs built to demanding telco specs. A longstanding downside with the telco infrastructure however is vulnerability to "backhoe fades." These systems both add important redundancy to their STL IP links by using dual ethernet ports that connect to different and separate service paths. Proprietary bit splicing technology makes this possible.

PUBLIC INTERNET STL

With larger data pipes, both wired and wireless now commonly available including fiber, IP is well suited for

(continued on page 5)

“What Would Happen If I ...”

RF design remains a mysterious craft. How can you get the most out of your propagation?

BY MICHAEL LECLAIR

The following is taken from the introduction to the Radio World eBook “Propagation Analysis for Profit.”

At one time or another most people in radio management and engineering have wondered, “Just what could I do with this station if I were able to afford a power increase?” The phenomenon is particularly pronounced in the world of non-commercial radio but in fact is common throughout the industry.

Many professionals learned to ask the question while working in college FM radio, where stations operate at a bewildering array of various power levels. With pride perhaps exceeding the quality of the airwaves that could ever be achieved, those college kids couldn't help but imagine the massive increases in listenership that would be possible if only their signals could reach more people.

After I graduated from college I had the opportunity to dip my toes into the

world of the FCC allocation process with the assistance of a kind gentleman named Harold Dorschug.

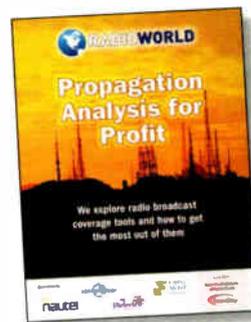
Harold had offered free assistance to one of my client stations in making an application to the FCC for a power

increase from 70 Watts to 100 Watts in order to achieve the protection of a minimum Class A facility. In those days the FCC was beginning to revoke the protections of the old Class D stations and most were being shepherded up to Class A status if it was possible to do so without causing interference.

Unfortunately, the FCC protection

contours were more conservative in those days, so there simply wasn't enough room at the time for all the Class Ds to increase in power. My client station had gone about as high as it could go.

Harold was a retired



Read the full ebook at radioworld.com/ebooks.

tract engineer for all the non-commercial stations I could find in the area. I learned an enormous amount from him about how to read FCC graphs and calculate coverage and interference contours. It was my introduction to what I saw as *real* engineering. I was hooked.

In those days an application was completed with rulers and lines drawn on a map, with French curves to smooth

out the intersections. Data on height above average terrain was gathered from contour maps along eight radials drawn in pencil on a geographic survey map. From the FCC rules and Harold, I learned the mathematics of protection ratios calculated in decibels and the logic of how to prevent interference.

Alas our efforts were doomed. The commission at that point in time wasn't about to accept any waivers to allow an increase in power where it might cause any interference; they already had enough complaints to deal with. And the idea of paying for a directional array to achieve higher power while protecting a nearby station was beyond the budget of my client.

We took our rejection and moved on.

(continued on page 6)

The latest programs can generate presentation-quality coverage maps that are as useful in the GM's or sales manager's office as in the FCC's inbox.

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CBS engineer who had worked in master control the night of Orson Welles' "War of the Worlds" and been a member of the first CBS television remote crew. He worked his final years at powerhouse WTIC(AM/FM) in Hartford, Conn. He was every bit the gentleman to me, a young and long-haired English major in jeans starting out as a con-

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carrying multiple channel STL payloads via a number of platform choices. The open internet is a cheap and readily available network for STLs, using devices like Barix boxes, but as most

Metro E or MPLS IP services provide high-bandwidth throughput, are very reliable and well suited for point to multipoint WAN distribution, but they require fiber connections at both ends.

everyone realizes, it is not secure. Even when such setups are tuned for optimal protection and performance, jitter and dropouts due to traffic congestion can occasionally impair and disrupt the service, especially if the path routes through different ISPs.

PRIVATE IP STL

Meuser advised that extending an office LAN or isolated VLAN from studio to transmitter site for STL is the most secure method to convey any IP-based STL system. Internal 10 dot subnets commonly are used. Exposing connections to public accessible IPs is much less secure, and if they must be used, appropriate firewall protection must be in place.

Metro E or MPLS (Multi-Protocol Label Switching) IP services provide high-bandwidth throughput, and are very reliable and well suited for point to multipoint WAN distribution, but they require fiber connections at both ends. They achieve significantly increased speed performance and reliability by labeling data packets to be routed via different network paths on a pre-determined basis to avoid slow-downs and congestion. MPLS services are offered by most of the traditional common carriers like Sprint and Century Link but also by smaller lesser-known companies as well.

LICENSED VS. UNLICENSED

Meuser discussed advantages and disadvantages of the various wireless STL bands in use by broadcasters. As radio stations find the need for larger bandwidth pipes, they are moving away from 950 MHz to the higher BAS licensed 18 GHz band. Other bands like the unlicensed ISM 2.4 and 5.8 GHz bands have become quite popular, especially with uBiquity's cost-efficient Rocket platforms.

Meuser cautioned about using the unlicensed bands in more-populated

NEWS

areas for primary broadcast STLs, since they are much more vulnerable to interference. Other users and services have proliferated dramatically in the ISM bands, making them virtually unusable for broadcast STL in many areas. The better option is obtaining coordinated and licensed service in the common

their reliability. But such events can be mitigated by using properly designed RF links with plenty of fade margin headroom.

All of the wireless transmission manufacturers providing equipment for the high-band microwave STL services offer selectable modulation schemes to balance out the quality, spectral efficiency, reliability and overall system performance requirements. By adjusting QAM rates and channel power, optimizing the data throughput and quality while reducing susceptibility to dropouts and interference can be achieved over a given path.

THE NINES RULE

When spec'ing out any STL system for reliability, the number of nines is the commonly used measuring stick. Meuser advised that 99.9 percent or "three nines" of reliability gives up a cumulative total of about eight hours of downtime per year, while 99.99 percent reliability or four nines gives up one minute 19 seconds; five nines yields 26 seconds of downtime and six nines (99.9999 percent) provides only three seconds of downtime per year.

Typically the more nines your service requires, the higher the cost.

Tom McGinley is Radio World technical adviser.

carrier FCC part 101 bands. The 6, 11 and 23 GHz bands became available to broadcasters in recent years.

INTERFERENCE CONCERNS

While the licensed microwave STL services rarely experience interference, they do have their negatives.

Line-of-sight paths are almost always required, which necessitates mounting dishes on towers and high-rise rooftops. Ducting and paths over water impacted by weather-related effects can disrupt

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WHAT IF...

(continued from page 4)

THE COMPUTING REVOLUTION

Today we still ask: How would my coverage be affected if I moved my FM antenna? Changed height? Increased transmitter power? Added a fill-in translator?

Now the work I learned to do by hand is done better and more accurately by software. The first-generation programs would calculate contour interferences based on the FCC curves and spit them out as charts. The latest programs can

generate presentation-quality coverage maps that are as useful in the GM's or sales manager's office as in the FCC's inbox.

Not only can we look at geographic coverage, we can with the click of a keyboard pull up highly accurate population surveys to evaluate the benefits of increasing coverage. And advanced models allow detailed views of where exactly we can expect to offer a usable signal and where it is likely to fail, based on our operating parameters and location.

A barrier to understanding the mysteries of RF engineering over the years

has been the cost of the software that provides the necessary calculations. This is why it is fun for example to highlight the coverage tool that Nautel, a sponsor of our eBook, recently developed that shows a Longley-Rice map of the coverage area for any radio station. This mapping tool is free to use and is a part of an RF Toolkit that Nautel makes available on its website; registered users can use this tool to view the coverage of any station they wish.

Since those early years when I peeked behind the veil of the FCC allocation process, I have been fortunate enough to get access to modern software tools and given the opportunity to learn how to use them. I have become fairly well acquainted with the FCC's allocation process and the engineering support required to get a successful result on more than one application. I have also had a chance to explore the subtleties of antenna designs and directional arrays, both AM and FM. While many have helped me to learn about the science of

engineering radio stations, I tip my hat in particular to Doug Vernier, whom I interviewed for this eBook and who has been a great mentor and teacher.

THE MYSTERIES OF PROPAGATION

The premise of this ebook is that new software tools and data sets have changed the game when it comes to answering questions about managing propagation for profit, whether it's for an FM, an AM or a shortwave facility. As a mature medium, broadcasting is now seeing a lot fewer new stations at high power, at least in the United States; but there are plenty of improvements to propose and, if substantial enough, to build to an operating condition. If you are one of those people who have wondered how it all works, read on. Enjoy!

Access the free eBook at radioworld.com/ebooks.

Michael LeClair, CPBE, is a long-time contributor to Radio World and is former technical editor of Radio World Engineering Extra.



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IN CASE YOU MISSED IT

Here's a sampling of recent headlines delivered to Radio World readers in their free daily NewsBytes e-newsletter. (Click the Subscribe tab at radioworld.com, then Newsletters.)

► Don't Merely Shift Burdens, NAB Tells FCC

The association said if the commission modernizes its media rules, it should disregard calls for relaxation of third- and second-adjacent FM channel separation protections and intermediate frequency spacing requirements; such changes would "harm the integrity of the FM or AM bands."

► FCC Releases New EAS Guide

To help small businesses, nonprofits and small governmental jurisdictions comply with its latest EAS rules, the commission released a "Small Entity Compliance Guide Review of the Emergency Alert System."

► Filed Your Form One Yet?

To participate in the nationwide test of EAS scheduled for Sept. 27, your station was supposed to register with the EAS Test Reporting System (ETRS) and file Form One by now.

► Brian Purdy Named TAB's Broadcaster of the Year

The Texas Association of Broadcasters honored five individuals during TAB's Annual Awards Gala, including the CBS Radio standout.

► EAS Box Makers Weigh in on Blue Alerts

Two prominent manufacturers filed separate comments about the FCC proposal to add a Blue Alert code to EAS.

► Cumulus Sees Positives in Q2 Report

CEO Mary Berner believes it is gaining a foothold on a turnaround, citing a 6.1 percent increase in revenue in the quarter for syndicator Westwood One, despite a dip for its radio station group and a weak overall radio ad market.



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GRAVLEY

(continued from page 1)

can't find it on streaming.

It goes back to a real dedication to localism. We can't just be a jukebox in the sky. We have to give both our listeners and our consumers the localism.

Yeah, radio is facing a tough business climate; but we also have a very good story to tell, with a report that just came out from Edison [Research] that shows AM and FM listeners more than 10 times more than Pandora, 20 times more than Spotify.

These are good stories to tell. I don't think that we always do a good job of telling that. We need to make sure that we work on that and tell that story not only to Wall Street, but to Main Street as well.

RW: Commercial radio has found it difficult to move its revenue needle overall, even as its digital revenue continues to grow. Can we ever expect to move that overall needle, back to being \$20 billion or more a year industry? How?

Gravley: It's not going to be easy, but I do think it's very attainable. We just need to make sure that we practice our rate discipline and get our fair price for our ads.

Study after study shows that radio offers the advertisers the highest return

on their investment out of any media platform. That's not, again, something that we discuss enough.

We also have an opportunity with the controversy surrounding online digital ads to make up some. We're finally hearing the full story. These ads are being reported, recording fraudulent air play; they're being placed on inappropriate websites that the advertisers don't know about.

"It goes back to a real dedication to localism. We can't just be a jukebox in the sky. We have to give both our listeners and our consumers the localism."

Most importantly, I think, is that they're showing that it's being ignored completely by consumers. Follow that up with a Procter & Gamble ad executive, the nation's and world's biggest advertiser, saying that the company's taking a stand against fraud in their digital advertising. That should be a buoy for our industry.

There's a huge opportunity for radio broadcasting to step in and fill that need. Radio advertisers know what they're going to get when they advertise on radio.

RW: We're hearing a lot about smart speakers in the home. What's your take on the Alexa movement and what should radio broadcasters be doing?

Gravley: I just got an Alexa for my birthday, last May. These voice-activated speakers are very neat.

I think they're going to provide radio with a great opportunity that we may regain our prominence in the home

again. Paul, you know that the number of radios in U.S. households have been declining year over year. With the growth of smart speakers, radio is finding another platform in which we can reach Americans in their homes. This is a neat and exciting time. We'll also benefit from these devices because they're convenient, the easiness of them. Also, it's not hard to tell your speaker while you're cooking dinner to play your favorite radio station while you're being preoccupied.

Radio broadcasters, we're the only locally based audio service. It gives us an advantage over the streaming services when it comes to devices such as Alexa and others.

To show the importance of Alexa and voice-activated speakers, at the last NAB Show they did an Alexa boot camp. That was to help radio broadcasters and the attendees build their skills not only on the technology side, but also for them to think about how to build compelling content to keep the audiences engaged in that. This is a great opportunity for broadcasters to work with these devices to help grow our listenership.

RW: That's in the home environment. In the car, what's your message to broadcasters about how to protect and grow radio's connected car role?

Gravley: This is a very important issue that the NAB and broadcasters don't take very lightly. This is something that we're paying a lot of attention to.

Our competitors would love to supplant radio as America's top choice in the automobile. NAB has taken the lead in meeting with automakers about the long-term relationship between the car and radio listenership. It's important that the car manufacturers understand that broadcast radio continues to have an enduring value to their consumers.



Gravley is shown with NAB Joint Board Chair Caroline Beasley.

It would be too easy to just lose sight of that for the new shiny streaming devices and the pretty pictures that they have on the screen.

Edison also just came out with research that said AM/FM radio counts for 70 percent of time spent listening in the car. With that, we need to make sure that we're delivering compelling, entertaining and local content. That will help us ensure AM/FM radio broadcasting's place in the dashboard.

I can't press [enough] upon how important this issue is. At the Radio Show coming up in Austin, an opening session will be focused on this very thing, the connected car and the future of the digital dash.

What we have to do is make sure that we're delivering good local content that's compelling and entertaining.

RW: Six to eight months into the chairmanship of Ajit Pai, can you give the commission a grade for its work during that time, and explain it?

Gravley: Absolutely. This is my easiest and favorite question that you're going to be asking.

I would absolutely, without question, give Chairman Pai an A+. At his core, he's just been a great supporter of local broadcasting, especially radio. He's made it very clear since he first came to the commission of his support, by championing the AM revitalization.

It's great to have a supporter of broadcasting with a chairman like Chairman Pai. He spoke about his parents coming to the U.S. with \$10 in their pocket and a transistor radio. He gets it. He understands it, and we love him for it.

He's done a great job too with crack-

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GRAVLEY

(continued from page 8)

ing down on pirate radio, not only the AM revitalization. Also actively seeking to eliminate unnecessary and outdated regulations on broadcasters is really helpful for broadcasters.

I just can't remember the last time an FCC chairman has been there who has shown such an appreciation for the role of radio broadcasters in the local communities. It's been heartening to watch. ... We're very, very fortunate to have Chairman Pai as the chairman of the FCC.

RW: Any hints about what he might say at this fall's show? It seems like a



Gravley meets with Pam Carnes, president of the Cherokee County Chamber of Commerce.

nice time to come up with another big announcement of some kind.

Gravley: You know what? I'm just looking forward to hearing him speak. I'll be there in Austin, which I know you will be as well. We'll learn together, how's that?

RW: The commission does seem serious about eliminating the main studio rule. Broadcasters, meanwhile, have always emphasized localism, as you have. How is this rule change serving localism and the public interest? It seems to be going in the other direction.

Gravley: I would disagree a little with that. I think that the rule is outdated. It's

antiquated. It doesn't serve the purpose today that it was intended for when it was put in place.

You don't have to have a studio in your city of license to be a great local broadcaster. With today's technology, there are so many advances that make it easier than ever to serve your local community. A broadcaster just having a staffer on hand 24/7 ... it may pay lip service to localism, but it doesn't equal localism. It's not necessarily the most effective and efficient way always to do localism.

Just the cost savings from eliminating this rule could allow broadcasters to reinvest those funds for upkeep of a studio, into newsgathering operations, hiring additional staff for news and

things of that nature, to organize charity drives, or upgrading facilities to expand coverage.

That's localism. That's serving the community. There's a great number of opportunities there for local broadcasters to take that money they're going to be saving on this outdated rule and really investing in local broadcasting. That helps the community. That's local broadcasting at its best. It's going to allow us to be able to give more local content.

RW: You touched briefly on illegal broadcasts. Even though Chairman Pai and Commissioner O'Rielly have talked a lot about it, the commission actually has fewer resources for enforcement these days. What should it be doing now?

Gravley: I think it's been clear that the FCC under Chairman Pai has been very aggressive in issuing fines to pirate operators. To be quite honest, I have no complaints about its actions so far. You can grapple about the enforcement office closing, but the FCC is showing that it's dead serious about this very issue. I think we're seeing that.

WHERE METRO MEETS THE MOUNTAINS

Born in Kennesaw, Ga., Randy D. Gravley, 44, lives north of Atlanta in the community of Woodstock, part of Cherokee County — "where metro meets the mountains."

He attended Reinhardt College and Kennesaw State University, and originally hoped to be a high school government teacher and track and soccer coach, but radio came along. He began his broadcast career at Cherokee Broadcasting in 1992, working on-air, in sales and as assistant manager. Today he co-owns Tri-State Communications with business partner Byron Dobbs, and serves as president/CEO. Tri-State owns WLJA(FM) and WPGY(AM), both in Ellijay, Ga., as well as an FM translator there that carries WLJA's HD2 signal. A subsidiary owns WXJO(AM) and its FM translator in Douglasville.

Among other accomplishments, Gravley was the youngest person to become chairman of the board of the Cherokee County Chamber of Commerce in 2004, and the youngest to chair the board of the Georgia Association of Broadcasters the following year.

His community and board work includes involvement with the Georgia Association of Broadcasters, Reinhardt College, Leadership Georgia Program, Chattahoochee Technical College Foundation, United Way of Cherokee County, Cherokee County Citizens Round Table for the County's Land Use Plan, Cherokee County Sheriff's Foundation, the county board of elections and its zoning board of appeals.

Randy Gravley was inducted into the Georgia Association of Broadcasters' Hall of Fame last year. He is an avid tennis player and loves to travel, with a particular attachment to Turks & Caicos.

"You don't have to have a studio in your city of license to be a great local broadcaster."

RW: Commissioner O'Rielly has asked Congress to allow the FCC to broaden its enforcement authority in certain ways: seizing equipment and pursuing people who help pirates indirectly, like landlords. Yet it seems unlikely that Congress would do that. Do you think it's possible that effort will have any traction?

Gravley: Clearly the pirate radio issue is a Whac-a-Mole problem that won't be solved until the FCC has every tool available at its disposal. I think Commissioner O'Rielly's proposal warrants serious consideration by Congress. Do I know if they'll do it or not? I don't know.

RW: We see more and more emphasis on mobile alerts, wireless emergency alerts via smartphones, which seems like a good thing. But it does seem to undermine the longtime role that broadcasters have built up as first informers. Should radio consider these alerts a kind of threat to that role?

Gravley: I don't believe wireless alerts undermine local broadcasting's role

during emergencies at all. If you receive one of those wireless alerts, one of the things that it tells you to do is to turn to your local media for more information. Of course, that means local TV and radio.

I don't think so. Nobody else has the relationships with law enforcement like broadcasters. We serve as the public's first informers. The law enforcement officers, they serve as the public's first responders. By working closely with law enforcement officers, we continue to keep our communities and Americans safe. That makes us the best source for the information during emergencies.

I'm sure you've heard Gordon Smith say that the future must be a partnership not only between broadcasting, but also broadband. I think emergency alerting is just one area where we see how such a partnership would benefit the public.

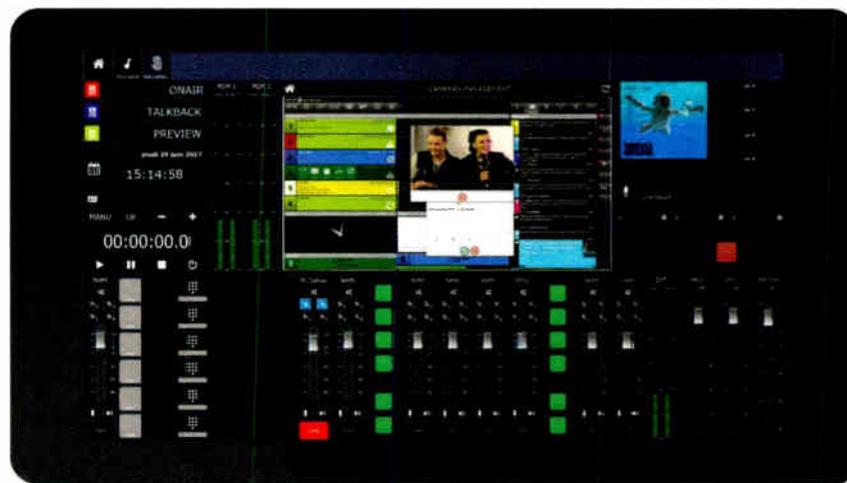
RW: There's been a lot of discussion about FM tuner chips in smartphones. Most broadcasters would like to see more of that, particularly in Apple devices. Chairman Pai supports the concept but firmly has said he doesn't believe in a mandate for that. Should broadcasters be pushing harder for a mandate of FM chips activated in phones?

Gravley: Look, we've made great headway from where we were. We do not support a mandate. There's been incredible progress made without that through the private business deals negotiated with Sprint and Verizon and T-Mobile and AT&T.

Unfortunately Apple is not one of
(continued on page 12)

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NEWS

GRAVLEY

(continued from page 10)

those. It's sad to see that Apple still refuses to turn on the radio chip in its devices. Does Tim Cook really want his legacy to be dismal for the potential of lifesaving benefits of radio-enabled mobile devices? It's unfortunate.

We've made great progress on that. Do we have more work to do there? Absolutely, but I'm very pleased with where we are and hope we'll get eventually every FM tuner chip activated soon.

RW: *We've seen a lot of evolution in the relationship between broadcasters, performers and record labels, but at times those relationships have been pretty chilly over the royalties issue. We've also seen some broadcasters negotiate content rights directly in certain circumstances. Can you characterize the state of relations with performers and record labels?*

Gravley: This is an issue that we've been talking about for some time. Yes, there is ongoing dialogue between broadcasters and the record industry. However, any deal that happens on the performance royalty would need to absolutely recognize the important role that local broadcasters and local radio plays in publicizing the artist's music, inspiring album sales and

also selling the concert tickets and their merchandise.

We talk a lot about this issue, but what's funny about it is that once you get outside of D.C., this fight is almost moot. In the real world, the mutually beneficial relationship between radio and musicians is on full display. Constantly, the record artists and their reps are visiting local radio stations and building those relationships with the radio on-air personalities, with the hopes that they're going to generate the air play for their music.

What I think is a concern for the small broadcaster: We're really not fooled by the claim that radio royalties would stay at \$500 a year. It may be for the first year; but once RIAA gets its nose underneath the proverbial tent, I think that you can expect that they'll be asking that those fees be raised to something like \$5,000 or more the next year.

RW: *What do you see as the role of the NAB Radio Board chairman?*

Gravley: I'm sure that you've heard Gordon say that unity is the key to any effective trade association. I truly believe that my role as Radio Board chair is making sure that we have unity in our industry so that we can win whatever policy fight that faces the NAB and our industry. To make sure that we're united as one.

NAB RADIO BOARD CHAIRS

(Some chairs served more than one term, and not always consecutively.)

1950s-'60s	Jerry Lyman
Merrill Linsday	Lowry Mays
J. Frank Jarman	William Sanders
F.C. Sowell	
1990s	Thomas Bostic
George C. Hatch	David Hicks
William Schroeder	Richard Novik
Ben Strouse	Wayne Vriesman
Rex G. Howell	Robert L. Fox
Jack W. Lee	Doug Williams
Grover Cobb	Dick Ferguson
Richard Dudley	Howard Anderson
Dick Chapin	Bill McElveen
2000s	
1970s	Andy Ockershausen
Harold Krelstein	David Kennedy
Don Thurston	John Dille
Len Hensell	Virginia Morris
Walter May	Carl Gardner
Arnie Lerner	Bruce Reese
	David Field
	Russ Withers
	Steve Newberry
	Charles Warfield
1980s	
Edward O. Fritts	2010s
Cullie Tarleton	Caroline Beasley
William Stakelin	Don Benson
Marty Beck	Jose Valle
Ted Snider	Randy Gravley
John Dille	
Bev Brown	

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Here's a Taste of What Austin Has in Store

A highlight sampler for this month's Radio Show in the Lone Star State

BY PAUL McLANE

September brings the fall Radio Show to Austin, Texas. Below are highlights and a sampler of sessions; for the full program and for session times, see www.radioshowweb.com.

TUESDAY SEPT. 5

Let's Put This in Gear — Three industry experts will discuss radio's outlook in the digital dash at a late afternoon

session called "The Connected Car Listener Experience."

Scott Deaver is executive vice president and chief marketing officer for Avis Budget Group. Joe D'Angelo is senior vice president of broadcast radio for Xperi Inc. And John Ellis is founder and managing director for Ellis & Associates; as global technologist of Ford's connected car business unit, he was involved in developing its connected car+cloud service and SmartDeviceLink, an API system for

integrating mobile into the car.

Welcome, Y'All — The conference kicks off with an opening reception in the Marriott's Lone Star Ballroom featuring music of funk-rock-blues band The Peterson Brothers.

WEDNESDAY SEPT. 6

Ready for a New Deal? — Radio executives and financial experts talk about business and regulatory changes in a

RADIO SHOW
Produced by NAB and RAB

IF YOU GO

Where: J.W. Marriott, Austin, Texas

When: Sept. 5-8

Who: Produced by the National Association of Broadcasters and Radio Advertising Bureau, the show "brings radio broadcasters and industry colleagues together to share knowledge, discover the latest innovations, network with industry leaders and explore creative business strategies for the digital age."

How: www.radioshowweb.com

How Much: Members \$499 for advance registration; non-members \$824. See website for group discount, young professional and on-site rates.

fast-moving business environment in the breakfast session "Pillsbury's Broadcast Finance 2017: Is Radio Ready for a New Deal?" Opening remarks by J. Davis Hebert, director of high yield media cable and telecom research at Wells Fargo Securities.

Hot Talk — Is the main studio rule dead? What will "media rule modernization" really look like? And what are we gonna do with all these FM translators? "Radio Regulation Under the

(continued on page 16)

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World Radio History

RADIO SHOW 2017

(continued from page 14)

FCC” is the subject when NAB’s Larry Walke hosts Mike Cooney of Beasley, Peter Doyle of the Media Bureau and J. Scott Enright of Emmis.

Warm Welcome for Chairman Pai — It’s likely to be a full and hearty room when FCC Chairman Ajit Pai keynotes the Radio Luncheon.

Already popular with commercial radio broadcasters for his attention to issues like AM revitalization and pirate radio, Pai has found even more favor since taking up the chairman’s gavel, thanks to his interest in easing or killing what he deems unnecessary burdensome regulations. Asked to grade Pai’s tenure so far, new NAB Radio Board Chair Randy Gravley responded with an A+ (see our interview, page 1).

Pai has a history of using the fall show to make notable radio announcements. Some have speculated he’ll lay out next steps for AM technical rule changes.

Oh, Not Much, Just a Little Pending Merger ... — Receiving the National Radio Award will be David Field, president and chief executive officer of Entercom Communications Corp. What might he talk about? In case you missed it, his company announced a little merger this year with CBS Radio that will make it the second-largest U.S. radio broadcaster.

“Since the industry’s partial deregulation in the mid-1990s, Entercom has grown from 15 stations with roughly \$35 million in revenues into one of the industry’s largest and consistently best-performing companies,” NAB stated. “Post-merger, Entercom will have over 240 stations and roughly \$1.6 billion in revenues.”

Before his Entercom career, Field was an investment banker at Goldman, Sachs & Co. in New York.

Alexa, I Like This Song ... — Doesn’t it seem just months ago that most radio people truly started paying attention to voice-control platforms like Amazon Echo, Google Home, Microsoft Cortana and Apple HomePod?

Oh wait, it was only months ago. Skip Pizzi of NAB moderates a panel



The radio rules panel is an annual feature of the fall show, and the FCC’s Peter Doyle, shown center in 2014, gamely shows up once again in 2017 to answer the inevitable hard questions from licensees.



David Field of Entercom will be honored on Wednesday.

on “Radio and Voice-Control, Living Together” that includes speakers from Beasley Broadcast Group, XAPPmedia and Futuri Media. In a separate session on the Innovation Stage, Steven Radley of iHeart Radio will discuss optimizing for voice platforms.

The Fred and Steve Show — Jacobs Media/Jacapps President Fred Jacobs and Amplifi Media Founder/CEO Steven Goldstein will participate in a two-part afternoon session about “Radio’s New Strategies and New Platforms.”

First, Jacobs will reveal findings from an NAB study about connected cars and discuss strategies. Goldstein will then lay out seven strategies for success in podcasting. Also featuring podcaster Kirk Minihane of Entercom’s WEEI(FM). Robert Earl Keen will entertain.

Those Guys With Six Rotors — Matthew

Clark of Hogan Lovells, John Kean of Cavell Mertz and Sam Wallington of K Love Air 1 will talk about “Drones: Applications and Implications for Radio” in a half-hour chat on the Innovation Stage in the Marketplace exhibit area.

THURSDAY SEPT. 7

Repack, Reschmack! — Nah, seriously, the TV repack will have consequences for many radio stations, so a morning session on the Innovation Stage in the

(continued on page 15)

EXHIBITOR LIST

As of mid-August.

** Mobile	326	NextRadio	11
ABC Radio	317	OMT Technologies	123
Adder Technology	303	Powergold Music Scheduling	213
Aptivada	304	PromoSuite	120
BizTalkRadio	215	Radio Advertising Bureau	420
Bonneville Distribution	330	Radio World	414
Broadcast Electronics	124	RCS	113
Broadcast Software		Regional Reps	408
International	224	RF Specialties Group	5
Broadcasters General Store	229	Rohde & Schwarz	305
Burli Software, Inc.	321	SCMS	222
COLONYLive	227	Second Street	2
Comrex	125	Shively Labs	3
Dielectric	4	Sierra Automated Systems	218
DJB Software/Digital JukeBox	424	SoCast	314
ENCO Systems Inc.	7	Social News Desk	10
ERI-Electronics Research/ERI	112	SoundExchange	409
European Broadcasting		Specialty Data Systems (SDS)	325
Union - dotRadio	423	Suitelife Systems	313
FirstCom Music	312	Sun & Fun Media	12
Gabriel Media	217	Test All Media	114
GatesAir	119	The Media Audit	220
Local Radio Networks	425	TrafficCast	306
Logitek Electronic Systems	315	vCreative	13
Marketron Broadcast Solutions	221	Veritone	329
Matrix Solutions	309	Vipology/Benztown	8
Media Monitors	113	Wavstar, LLC	421
Miller Kaplan Arase	412	Wedel Software	323
Moseley Associates	1	Wheatstone Corp.	126
MusicMaster	427	WideOrbit	129
NAB Member Services	416	WorldCast Systems	118
NAB Public Service	416	YomConnect	302
Nautel	6	Zipwhip	9
NewBay Media	414	Zocle Media & Tracon Digital	311



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Recipients of the Marconi Award pose in 2016.

RADIO SHOW 2017

(continued from page 16)

exhibit area explores this. Look for "The Repack's Impact on Radio" on the agenda. Opening remarks are by Holly Saurer, associate bureau chief of the FCC Media Bureau. Speakers are from NAB, Cox Media Group and American Tower.



Attendees talk about career path advancement stories at the 2016 conference.

Tech Talk — The National Radio Systems Committee holds three sub-committee meetings in the afternoon: AFAB, RBDS and DRB.

Get a Job — The NAB Education Foundation, in partnership with the Broadcast Education Association, will host a three-hour Career Fair Thursday afternoon. Suitable for industry veterans as well as entry-level job seekers hoping to network with radio companies. Job seekers can register at www.nabef.org/careerCenter/registration.asp using code CF17 to obtain free entry to the Career Fair and show exhibits. Recruiters receive EEO credit for participation.

Rickey Doesn't Stick to the Script — The NAB Marconi Radio Awards Dinner and Show will be hosted by host Rickey Smiley, heard in 60 markets and syndicated by Reach Media Inc., part of Urban One. Announcing this, NAB Executive Vice President of Radio John David said, "Rickey Smiley doesn't stick to the script, so we're not sure what he'll do as host, but be assured that it will be very, very funny."

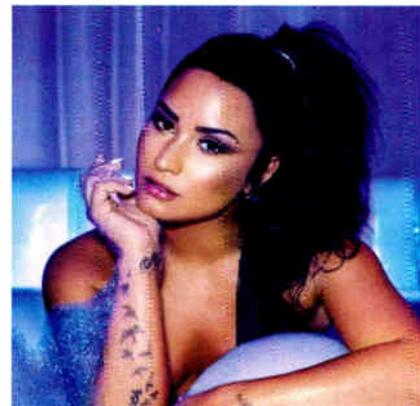
The Marconis are given to stations and air personalities to recognize excellence in radio. For exam-

ple, finalists for Network/Syndicated Personality of the Year are Kim Komando; Elvis Duran; Raul Molina, Sylvia del Valle and Andres Maldonado; Sean Hannity; and Smiley himself.

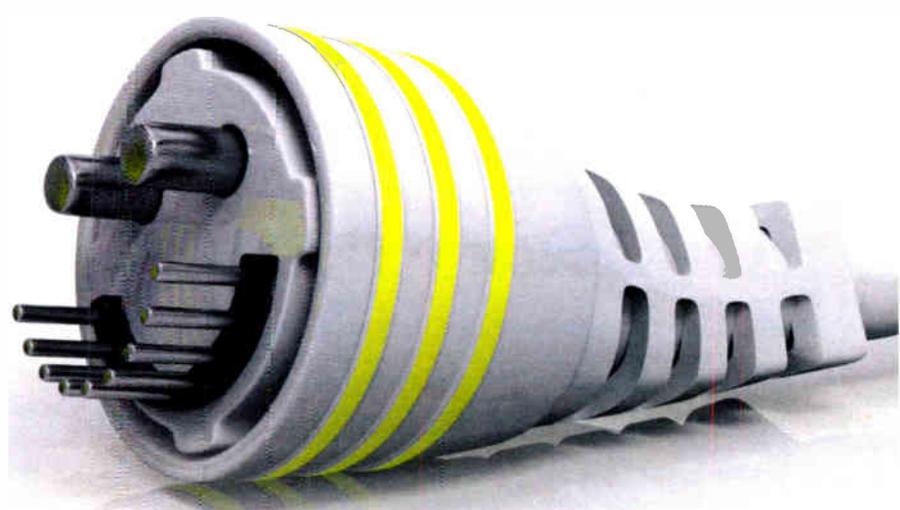
Take Us Back to Tulsa — Country band Asleep at the Wheel will perform at the Marconis. Ray Benson founded the group in Paw Paw, W.Va., in 1970; it is now based in Austin, and recently put out its third full-length Bob Wills tribute album.

FRIDAY SEPT. 8

Beyond Camp Rock — Singer/songwriter/actress Demi Lovato headlines this year's Music & Mimosas event, traditionally held on the show's last morning. The Grammy nominated and multi-platinum singer is an advocate for mental health and a Time 100 honoree. Entertainment will include My Jerusalem, Temecula Road and Drake White.



Demi Lovato headlines the Friday morning getaway session.



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Chris Malone
Program Director
The New 97.7 R&B



Chris Collins
PD/IT Manager
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A Notch Filter Waiting to Happen

Give this simple DIY project a whirl

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

Almost every engineer has had the opportunity to top off his or her vehicle's air conditioner with a can or two of R131A refrigerant. But don't throw the empty can away — with a little work, you can turn it into a notch filter.

Newman-Kees consulting engineer Frank Hertel recently encountered a

few sites that have experienced RF interference to their 900 MHz digital mode STL receivers. To correct the problem, Frank and his team have been using notch filters to attenuate some of the interfering signals from the cell equipment. Most of the problems were due to the strong cell site transmission overloading the front end of the receiver.

While Frank was topping off the refrigerant in his truck, it struck him that the refrigerant can would lend itself to becoming a notch filter, thanks to its dimensions. Filters at these frequencies are interesting — they are basically hollow canisters with a tuned probe or stub protruding into the canister.

The pictures here illustrate the process that Frank used to build his notch filter. It turned out that (by pure luck) the "as built" notch fell at 815 MHz.

By lengthening the stub, which was a small piece of brass hobby tubing, Frank could move the notch down to about 650 MHz. Shortening the stub permitted Frank to move the notch well above the 900 MHz band.



This Will Get You Started

Fig. 2: Tools you'll need to construct the notch filter.

Frank notes that if the cavity was made of 1 5/8 inch or 3 1/8-inch hard line, with appropriate connectors and properly optimized, it could remedy the needs for higher-power transmitters that have harmonics in the cellular bands.

Keep in mind that this do-it-yourself filter has not been optimized. This results in the notch being fairly broad. But this is a good thing, in the case of notching out the cellular bands. The notch will reach a depth of approximately -30 dB. Its insertion loss at 940 MHz is approximately 3 dB.

In this particular case of using an R134A can as the cavity, the length of the stub is the key factor in the cavity's notch frequency. The diameter of the stub will be instrumental in the bandwidth and depth of the notch, while also influencing frequency. Remember that everything interacts.

Readers will need access to a spec-

(continued on page 22)

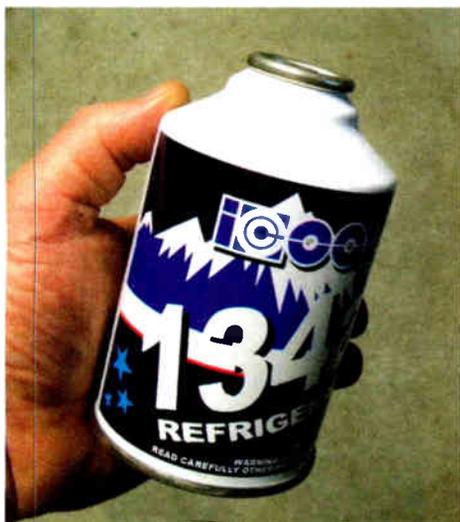


Fig. 1: Don't throw this can away — it's a notch filter waiting to be constructed!



Drill out the filler snout with stepper bit to the last step of the bit which is ~1/2"

Fig. 3

Nut from BNC connector is centered and soldered over 1/2" hole that you drilled in the top of the can

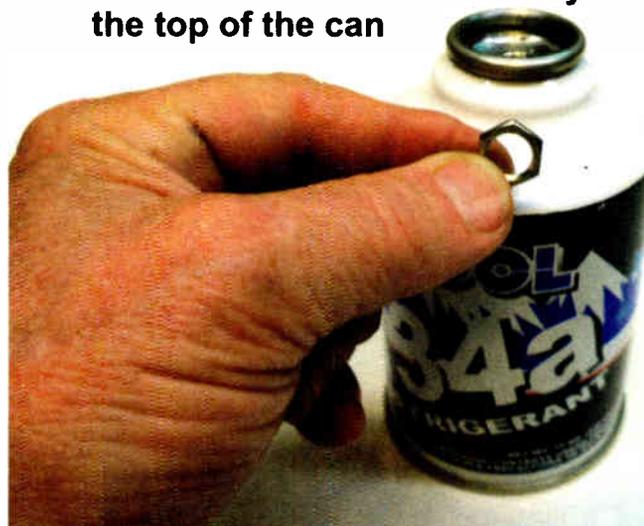


Fig. 4

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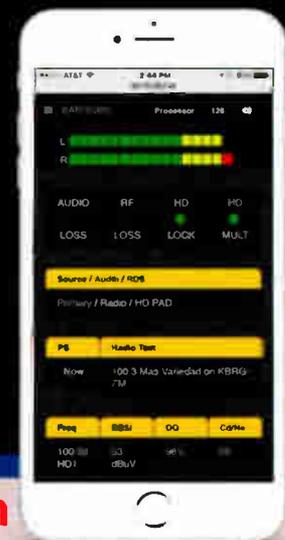
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- ▶ No Dead Air: Assignable failover audio backup
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- ▶ Alarms & Notifications via email, SMS messages, SNMP support



Coming Events: IBC-Amsterdam / NAB Radio Show-Austin



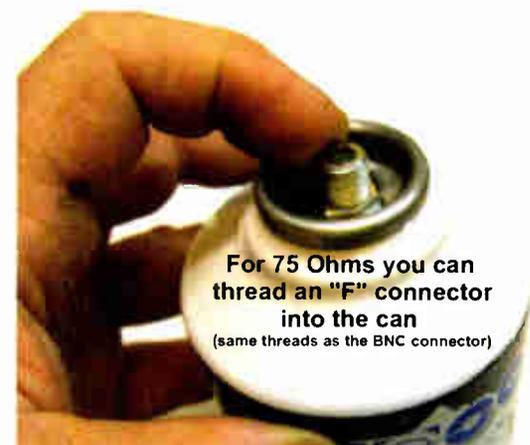
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BNC mounting nut centered and soldered in place (a bit tricky to do)



BNC Connector threaded into the nut soldered to the top of the can



For 75 Ohms you can thread an "F" connector into the can (same threads as the BNC connector)

Fig. 5

Fig. 7: Thread the BNC connector and stub assembly onto the nut.

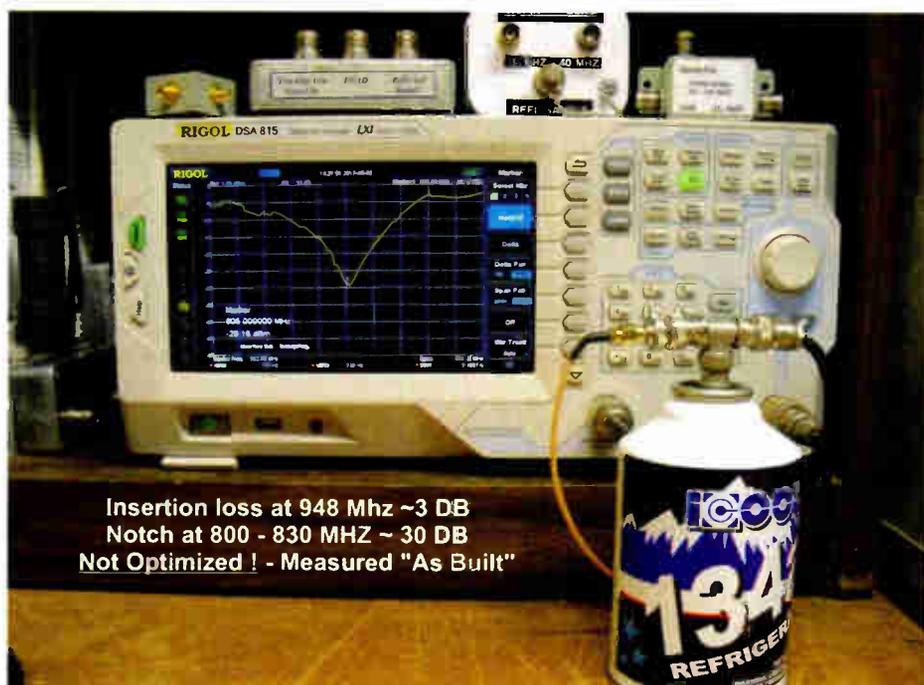
Fig. 8



Longer "Tuning Stub" equals lower notch frequency

Tuning stub soldered onto BNC connector for tuning of "Notch" Frequency - Stub is made from brass "Hobby Tubing"

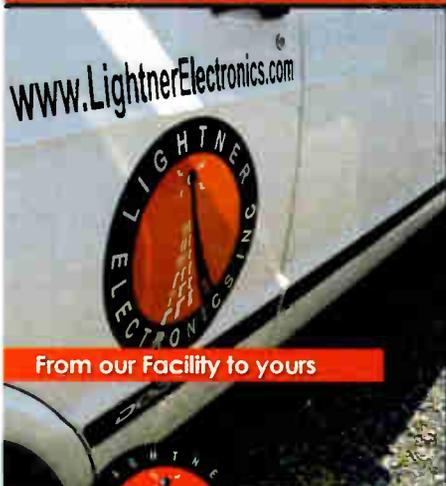
Fig. 6



Insertion loss at 948 Mhz ~3 DB
Notch at 800 - 830 MHz ~ 30 DB
Not Optimized ! - Measured "As Built"

Fig. 9: The notch filter specifications.

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WORKBENCH

(continued from page 20)

trum analyzer that has a tracking generator in order to "tune" and "know" the specs of your notch filter, otherwise you are flying blind.

This is an easy build, go ahead and build it because you can. Figs. 2 through 8 will take you through the construction steps.

Frank hopes this project will be useful; you might even come up with another use for an empty R134A can in the process. If you do, share your results with Workbench!

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

Author John Bisset has spent 46 years in the broadcasting industry and is still learning. He handles West Coast sales for the Telos Alliance. He is SBE certified and is a past recipient of the SBE's Educator of the Year Award.

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World Radio History

Information Station Specialists Acquires Intellectual Property From Radio Systems

Two transmitters will now be made and sold by the company

SUPPLYSIDE

When Radio Systems recently decided to sell its low-power AM line, its longtime dealer Information Station Specialists acquired those models. We asked owner Bill Baker about the transaction.

Supply Side is a series of occasional interviews with industry manufacturers and service providers.

Radio World: Which product or products have you acquired?

Bill Baker: Information Station Specialists will now be manufacturing and marketing two very specialized transmitters: the TR6000, a 10 Watt AM transmitter, which has Part 73, Part 90 and Part 15 applications; and the Talking House/I A.M. Radio 100 mW AM transmitter, which is certified as a Part 15/unlicensed device.

RW: Where are these being used in the world of radio?

Baker: There are two versions of the TR6000 transmitter (www.theradiosource.com/products/tr6000.htm): The model HQ5.0 is the workhorse transmitter for the Travelers Information Stations, which are licensed by government agencies and medical response entities. A related version, the TR6000 Model 15.73 (www.theradiosource.com/products/tr6000-1573.htm) can operate on educational campuses and camps and even as a drop-in unit for broadcasters who need to run at reduced power while their main transmitter is off-line.

The Talking House/I A.M. Radio Transmitter (www.talkinghouse.com) is the classic product known for its applications in real estate and other unlicensed applications by businesses, visitors bureaus, parks and historical sites.

RW: You mentioned that beyond TIS uses, these might be of interest to AM stations. Why?

Baker: The TR6000 Model 15.73 transmitter, specifically, is a tool that has



Bill Baker

been utilized by AM broadcasters and engineers over the years as a quick means of putting up a signal should a failure occur. Because it can operate on DC with less than 40 Watts of power, the unit can be set up to kick on automatically in an emergency via solar/batteries at a remote site when AC power to the main transmitter is severed. And because it is frequency-agile, it can be a cost-effective resource for an engineer who manages multiple AMs.

And with regard to TIS, broadcasters,

engineers and consultants are actually in the perfect position to develop a revenue stream and increase their engagement with a community by installing and managing a TIS radio station for a local government or medical response agency that wants to provide emergency, event or visitor and travel information. There is an example of one broadcast consultant who designed and implemented a whole staff of TIS stations for their state Department of Transportation on the East Coast.

Everyone knows that broadcasting's content has become more centrally produced over the years and this has increased the public's appetite for more locally-driven content — something that localized radio stations can provide if professionally managed.

RW: Are new carrier current radio stations still being built, or has that market pretty much gone away with the onset of LPFM and online streaming?

Baker: I have not heard of a carrier current station being installed at a school in many years. However, it is noteworthy that both of these transmitters are used under Part 15 with conventional whip antennas on high school and university campuses across the country for sports play-by-play or as part of broadcast training and media production curricula.

(continued on page 28)

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BAKER

(continued from page 26)

RW: What were the terms of the business acquisition?

Baker: The purchase was primarily the intellectual property with parts and inventory. Information Station Specialists has been a reseller of Radio Systems products for 30+ years, so it was easy to set up the terms with a trusted partner.

RW: Where will the product be manufactured and how will it be supported?

Baker: We have production at our

Michigan headquarters as of June 2017. Warranty, repair and support will be available through the providing company, as always.

RW: What else should we know about the product or the transaction?

Baker: The designs of these products have time-tested over decades, so their reliability is well established. Moreover, their designs are quite unique: the TR6000-HQ5.0 is the only TIS transmitter on the market approved to broadcast the full audio bandwidth without the requirement for a 3000 Hz audio filter

which was previously required.

Both models can tune up on any frequency — even 9 kHz spaced — and are approved for military use. The TR6000 will drop into a 19-inch rack with convenient indicators and controls which require only 1 RU of space.

We provide both TR6000 models in various packages that include all electronics, antenna systems and the required hardware, licensing (as required) and installation/training services. But we are also happy to partner with broadcasters who want to present these solutions to their marketplace.



Talking House AM Transmitter



TR6000 Model 15.73

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We are pleased to make both of these communication solutions available to the markets in which they have served — and to new ones, which present themselves every day.

For information on these products, see www.theradiosource.com and www.talkinghouse.com.

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MARKETPLACE



IP Codecs: Access NX is the latest audio IP codec from Comrex, introduced this spring.

The codec features a hardware platform optimized for running CrossLock, Comrex's custom reliability layer.

"CrossLock enables both powerful error correction and network bonding, and intelligently monitors and dynamically adjusts network connections in real time," the company says.

Its updated interface improves the user experience with faster processors and a 5-inch capacitive touchscreen that doesn't require a stylus. Other notable new features include a second mic input and an added second 1/4-inch headphone jack.

The codec also provides two USB ports, Ethernet port, built-in battery for up to 6.5 hours of talk time (5 hours with mixer) and AAC family and Opus encoders.

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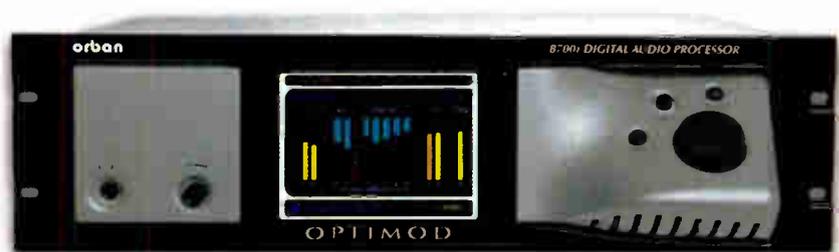
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TECHTIPS

BY MARK PERSONS

When you find a circuit breaker that has failed open, it is improper to bypass it with a jumper wire.

Instead, use a fuse in place of a breaker on a temporary basis. After all, the breaker was there for a reason: to protect wiring and circuits from catastrophic failure! Inline fuse holders are great for fuses up to 20 amperes. I've soldered wires to larger fuses when a fuse holder was not available. Attach a paper note on or near the breaker handle, indicating to leave the handle down and that a fuse is being used instead on the back side.

Remember, this is a *temporary* fix until a replacement breaker is installed.

Also, when you make a change or have information that might be helpful

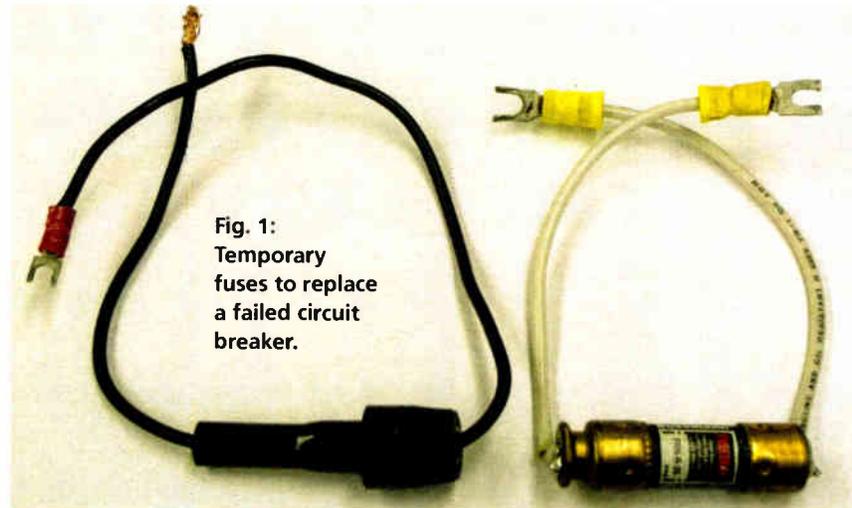


Fig. 1:
Temporary fuses to replace a failed circuit breaker.

in the future, make a notation in the equipment manual. Do *not* use an ink pen, use a pencil so you can erase the note, if the change you make doesn't work out as planned.

AIR PRESSURE SWITCHES

One of the most common problems in a transmitter is an air pressure switch that won't let the transmitter run, even when the cooling fan is working. Those switches were put there for a reason. They protect the transmitter from lack of cooling. We know that all blower motors eventually will fail from bearing or electrical problems. That is why transmitters are protected from catastrophic failure by air flow or air pressure switches.

Bypassing a switch leaves the transmitter open to serious problems when the blower does quit entirely. The cost can be very high, not to mention the bad reputation you might get for doing the wrong thing.

Don't assume that the air pressure or air flow switch is bad when it might be trying to tell you there is a real problem.

Check the air path before making any

(continued on page 32)

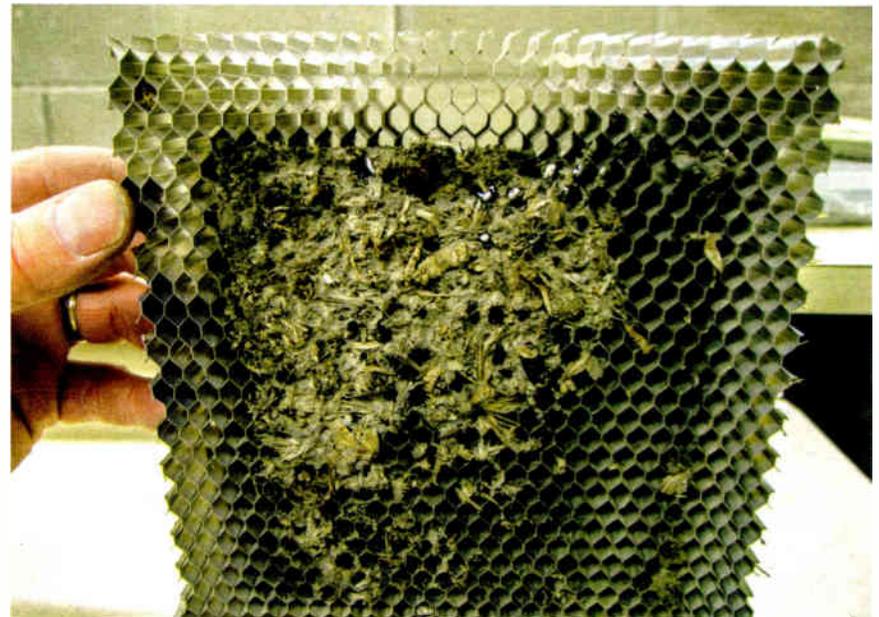


Fig. 2: A clogged honeycomb air filter from a Continental FM transmitter.

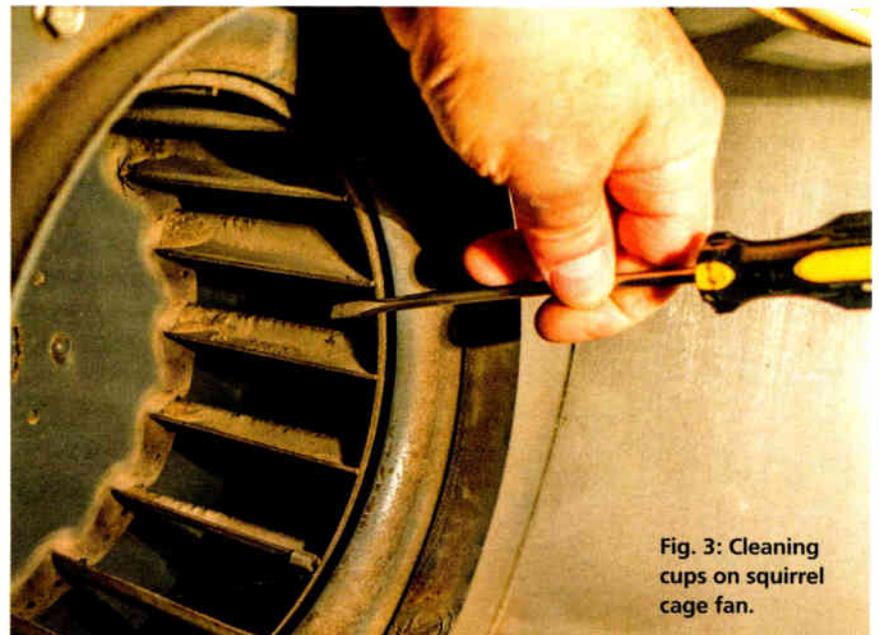


Fig. 3: Cleaning cups on squirrel cage fan.

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TIPS*(continued from page 30)*

attempt to recalibrate an air switch. The metal honeycomb air filter in Fig. 2 is a common example of how airflow can be restricted due to lack of maintenance. Use a mirror to examine the air holes to verify all is well. Airflow is also often reduced by dirty blades in squirrel cage fans.

The cupped blades fill with dirt, thus reducing fan efficiency and allowing transmitter component temperatures to rise. I typically use a flat screwdriver to scrape dirt away.

Check the transmitter's instruction manual for a procedure to set air flow or pressure switches. Lacking good directions, my approach is to adjust an air sensor so the transmitter air light shows normal when the blower is running and the high voltage is off. Then open a PA cabinet door about 1 inch. The air light should go out. Adjust as necessary to get it right. Test it several times.

I recommend doing this whenever you replace a tube in a transmitter. It just takes a couple of minutes to save a major headache and expense later.

CHECK THE TEMPERATURE

Fig. 4 shows a thermometer on the air output port of a transmitter. It is just one more performance indicator like a voltmeter, ammeter or power output meter.

I typically use an inexpensive Taylor brand zero to 220 degree F thermometer. They are available in the cooking utensil department of many local stores for under \$10.

My recommendation is to purchase two thermometers for each transmitter. Use one at the transmitter's air inlet and one at the air outlet. The temperature difference should stay constant. Incoming will likely be cooler in the winter and warmer in the summer. Just add the normal difference to find what the output stack temperature should be. Look in the transmitter's instruction manual or check with the manufacturer for normal heat rise across the transmitter at the power level it is running.

Don't be surprised if the temperature differential on a 20 kW FM tube transmitter is 100 degrees F. Make notes on what temperature is normal and use the thermometer as one of the many readings you take at the transmitter site on a regular basis.

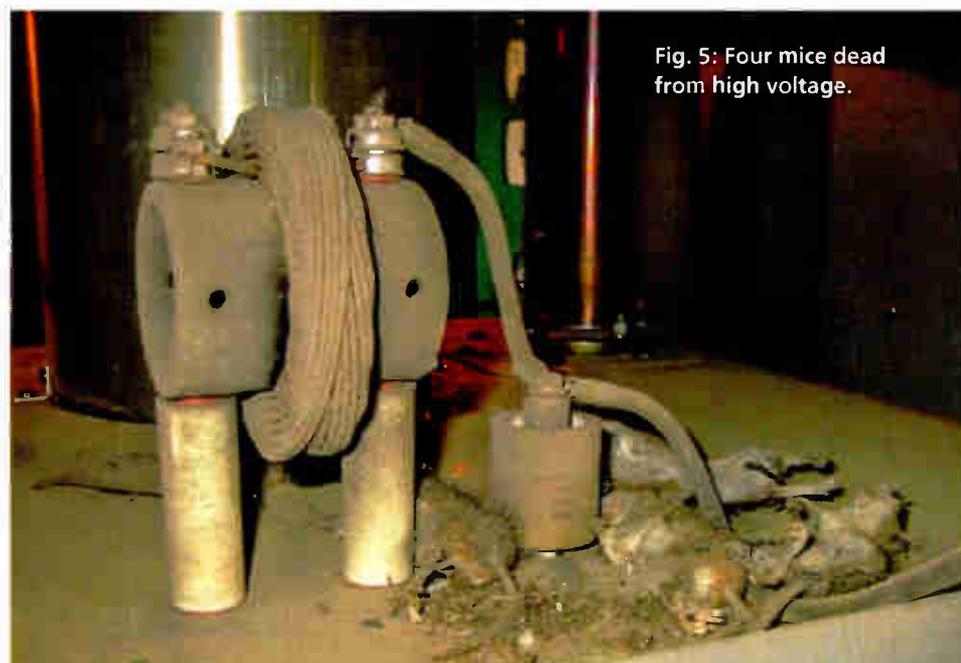


Fig. 5: Four mice dead from high voltage.

MICE IN THE BUILDING

You've seen it before. Dead mice in the high voltage section of a transmitter. Remember, you could be just as dead if you touch high voltage!

Use a high voltage shorting stick, as I described in an RW article in April 2016 ([radioworld.com](#), key term "arc gaps"). You will be surprised — and still alive — when a loud flash and bang happen on a circuit you just shorted to ground and thought was dead. Safety first!

Do your best to keep mice out of a transmitter building by plugging any openings as little as 1/4 inch wide. Mouse traps, in my opinion, are a Band-Aid for the problem. Keep the mice out, so you don't have to clean up their messes afterward. Scout out and cover any openings that can invite mice and other critters.

SOLID-STATE STUFF

When checking a diode, don't assume that failed diodes always short. Yes, that

is the most common failure mode, but they can fail open.

Case in point: a Collins 5 kW AM transmitter that would not turn on. The

(continued on page 34)

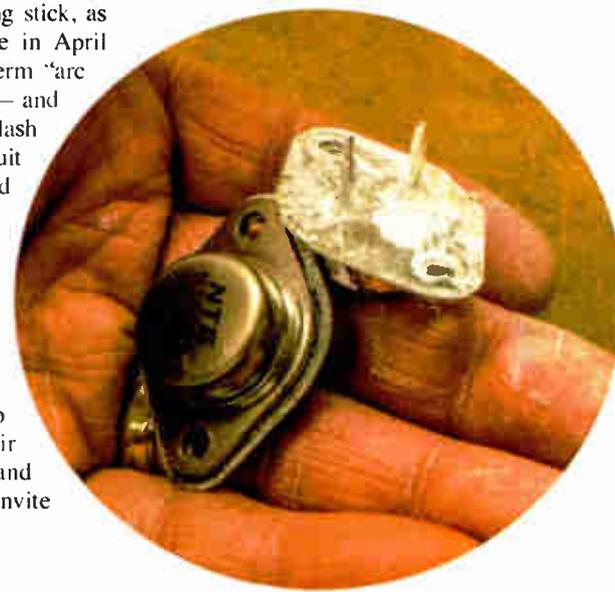


Fig. 6: A transistor with excessive heat transfer compound.

Fig. 4: A thermometer atop a transmitter air outlet.

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TIPS*(continued from page 32)*

problem was an open steering diode in the logic circuit. A glass-cased diode opened after 40 years of age and temperature cycling. It happens!

A similar situation occurs with transistors. I often find open or "no gain" transistors in the exciter of Continental 315F/ 316F 5/10 kW AM transmitter. Checking for shorts with an ohmmeter does not find the bad ones. Harris MW-1 AM transmitters have a similar problem. I use a Sencore TF-46 Super Cricket Transistor & FET Tester. With it, I check for leakage and even match transistors for gain in the RF section of a module for best performance.

Heat sink compound is used to help transfer heat from a transistor to the heat sink it is mounted to. More is *not* better. Best to put a bit on and rub it around so there is a thin layer on the transistor before it is bolted down. The photo shows the white compound on transistor leads. Bad choice! Keep the leads clean so they can make good contact with the socket they mate with.

Fig. 7 shows just the opposite. Too little heat sink compound. In either case, the transistor will likely run hotter than it should and will fail early. Heat the bane of semiconductors.

Many radio broadcast engineers have worked with the Harris MW-1 AM transmitter. There are 12 output modules, each of which plugs into a circuit



Fig. 7: Too little heat transfer compound.

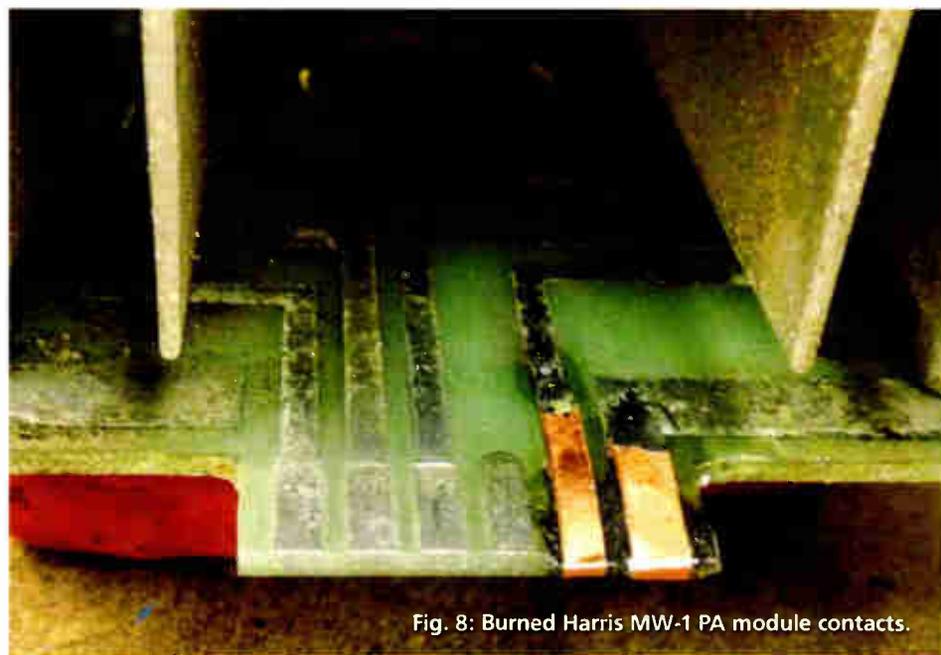


Fig. 8: Burned Harris MW-1 PA module contacts.

card edge connector. You need to not over-tighten the mounting screws that hold the module in place but make sure they're snug. They also provide an RF ground to the module. If you forget, RF current will attempt to flow through the socket, then burn the edge connector and socket it plugs into. If the damage isn't too great, the circuit card can be repaired using copper tape over the burned connector, as shown in the photo.

By the way, you are caught in the middle on this one. Over-tightening the module screws will strip them out of the threaded aluminum sheet they go in. Just use common sense and don't overdo it.

On a related matter, I learned from a

factory representative years ago that the transmitter will have about one module failure per year. That is normal. Losing more is likely a symptom of other problems.

It makes perfect sense to think these things through before jumping into mistakes.

By the way, there is a free audio version of my father's book, "Where Have All the Broadcasters Gone?" available on my website at: <http://mwpersons.com/books>.

Comment on this or any article. Write to radioworld@nbmedia.com.

Mark Persons, W0MH, is a Certified Professional Broadcast Engineer and has more than 30 years' experience. His website is www.mwpersons.com.

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USERREPORT

BY JAVIER CAMACHO
Technical Manager
Radio Martos

MARTOS, SPAIN — Radio Martos is a local radio station based in the south of Spain. We have two control rooms and a shared studio.

consoles. For our particular situation we assigned the microphone channels to a group in the console, so it is possible to control all of their input levels using a single fader.

The advantage for us is that microphone outputs are sent to the network and they can be used at any location at the radio station using a mixing console, computer or any other Dante device.



Until recently, we used a hardwired dedicated microphone and headphone set for each control room. We have used AEQ Forum and Capitol IP mixing consoles for a long time and recently connected them via AoIP. To take advantage of this change, we were offered a new mic/headphone AoIP interface for studios that features four microphone inputs and four headphone outputs.

The AEQ NetBox 4MH connects to a Dante protocol-based IP network. Using the NetBox level of each microphone input and headphone output can now be remotely software adjusted from the

Headphones can be fed from either control room. There are two headphone circuits — primary and secondary — defined in the Dante controller. Using the control application, we are able to assign a headphone to the primary or secondary circuit, so we can provide instructions to the presenter only or to any of the guests using the primary channel or leave them with only the secondary (e.g. program) feed.

Our NetBox sits on top of the table by the moment, just as it came from factory, but it can be affixed to the furniture in any position.



One particular feature that saved us some issues with the cabling is that it can be fed by Power over Ethernet directly from the switch, although not all PoE-ready switches are compatible, as it requires PoE+, which is able to provide more power than basic PoE.

It has some other features that we don't use at the moment, such as switchable phantom power supply for microphones, line-level inputs which are switchable with the microphone ones,

and line-level outputs, which are always provided in parallel with the headphones, as well as four general-purpose inputs plus four general purpose outputs that may be routed to remote devices throughout the network.

Perhaps the most eye-catching thing about this system is the StudioBox. Using the NetBox as a network interface and power source, the StudioBox can be used to operate the NetBox remotely — for example offering a mute button from the studio, for coughs, profanity or a talkback control.

The remaining five keys are used to establish talkback circuits to five remote locations, so we can talk to them through the microphone (they are also removed from air), while headphone listening remains open.

The StudioBox's polycarbonate perimeter can be lit to provide signals from the console operator. The operator can illuminate the StudioBox in green to request the presenter's attention, or in red to act as an on-air light.

The system is ingenious and flexible, so it was quickly adopted by us.

For information, contact Peter Howarth in Florida at (954) 581-7999 or visit www.aeqbroadcast.com.



NM-250 MKII - Newsroom Mixer

Features:

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- 2 Balanced Mono Mic Inputs
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- LED Meter Display
- Phantom Power Built In (48v)
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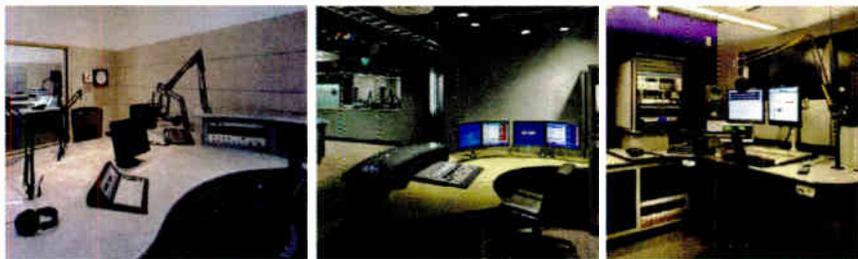
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TECHUPDATES

WHEATSTONE NOW HAS STUDIO FURNITURE

Wheatstone, known for its consoles, processors and IP audio network equipment, also offers studio furniture. The company says its QuickLine furniture is a cost-effective, modular option. SmoothLine furniture, shown, features sleekly-styled rounded edges and other "custom" qualities without the custom price tag.



There are five QuickLine modules to choose from for 32 functional configurations that can be changed for sit-down or stand-up operation in studios as small as 10 by 8 feet. QuickLine furniture features durable, high-pressure laminate tops and countertop edges with racks below the counters. Delivered knocked down to reduce shipping costs, QuickLine furniture arrives with hardware and assembly instructions for quick setup.

According to Wheatstone, SmoothLine furniture has the custom look but is moderately priced for studios of any size. It features freeform countertops, modular casework based on standard equipment racks, and concealed hinges and rounded edges. SmoothLine furniture has high-pressure laminate exteriors and extensive laminate and Marmoleum options for casework and countertops.

For information, contact Wheatstone in North Carolina at (252) 638-7000 or visit www.wheatstone.com.

ARRAKIS ACCENTS WITH LIGHT

The Accent furniture collection is highlighted by its maker, Arrakis Systems, for its beauty and function. The company says its aluminum frame, attractive panels and gorgeous tabletops make it suitable for any broadcast studio. Custom configurations allow users to decide what fits their needs.

A new option is custom lighted panels. These are made using semi-translucent, durable acrylic plastic. Arrakis says that the colored backlighting makes a studio pop out, giving a station a distinct and professional look.

The lighted panels are placed on the outside of the pedestal racks. These are available for balanced U, unbalanced U, short U, long L and short L configurations. Custom colors available.

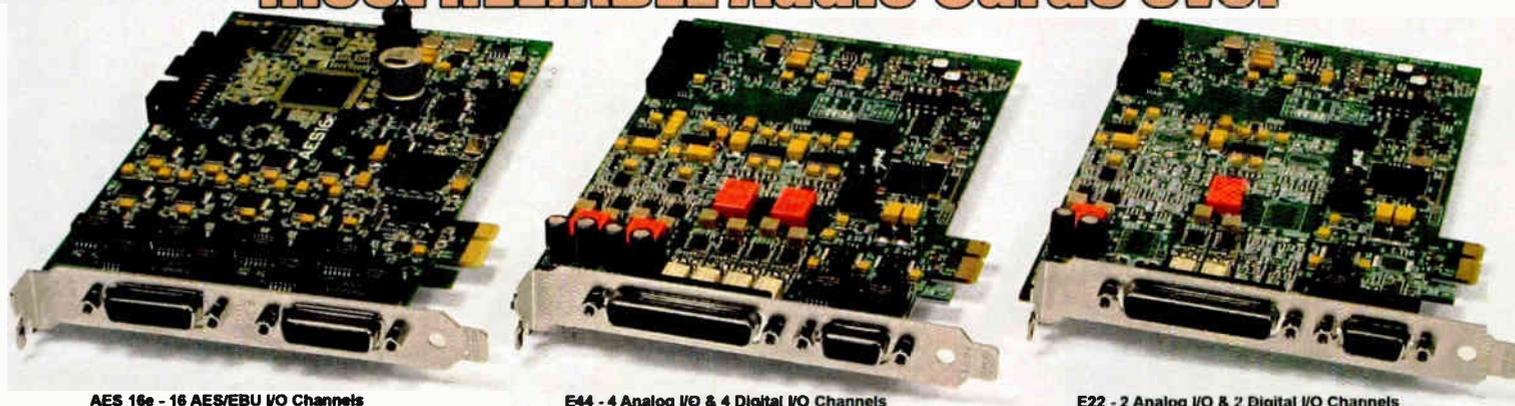
For information, contact Arrakis Systems in Colorado at (970) 461-0730 or visit www.arrakis-systems.com.



ABOUT BUYER'S GUIDE

Radio World publishes User Reports on products in various equipment classes throughout the year to help potential buyers understand why colleagues chose the equipment they did. A User Report is an unpaid testimonial by a user who has already purchased the gear. A Radio World Product Evaluation, by contrast, is a freelance article by a paid reviewer who typically receives a demo loaner. Do you have a story to tell? Write to bmoss@nbmedia.com.

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Since 1998 Radio Pros have counted on Lynx PCI cards to deliver reliable, stable audio performance. With the new Lynx E44, E22 and AES16e PCI Express cards, Lynx delivers the same reliability, along with the best specs in the industry. In addition, Lynx PCI Express Audio Cards are designed to operate seamlessly with any radio, production or recording application for both Windows and OSX computers.

Don't take our word for it, find out for yourself. Contact Lynx or your broadcast equipment retailer for a no-obligations trial of the E22, E44 or AES16e cards.

www.lynxstudio.com/radio

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STUDIO
TECHNOLOGY

TECHUPDATES

PRIMACOUSTIC ELEMENT PANELS TACKLE AESTHETICS

Primacoustic Element panels are a range of acoustic absorbers designed to give users more aesthetic options in their rooms.

Rather than being limited to the typical square and rectangular panels found in most studios, the hexagonal shape and beveled edges allow the panels to be installed in

unique patterns and clusters. Primary reflections and flutter echo can be controlled with an acoustic treatment layout that is personalized to a space.

The 16-inch (406 mm)

Element panels are 1.5 inches (3.8 cm) thick, and are constructed from 6-pound high-density glass wool for optimal broadband absorption. Primacoustic Element panels have been tested to achieve Class A fire ratings, making them safe for use in installations. The Element absorbers are available in black, grey or beige Broadway acoustic fabric, or in Primacoustic's proprietary Paintables white finish.

For information, contact Primacoustic in British Columbia at (604) 942-1001 or visit www.primacoustic.com.

BUYER'S GUIDE

Studio Furnishings, Accessories & Widgets

HENRY MIKE ALERT IS FOR TALLY LIGHT ARMS

Henry Engineering recently introduced the Mike Alert. It is a tally control interface for use with mic arms that utilize a two-color integrated tally light system, including "m!ka" mic arms made by Yellowtec.

These popular mic arms have two tally lights that are visible to the user. One light is white, the other is red. In many installations, the white light is used to indicate a "ready" condition, e.g., the mic has been assigned to a console channel. The red light is used conventionally, to indicate on air or that the mic is live.

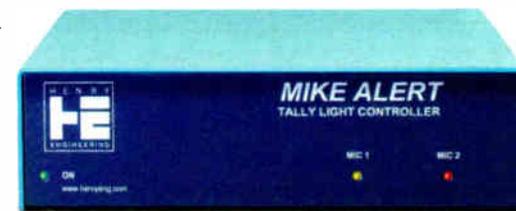
Mike Alert solves the problems encountered when interfacing the dual-color lights to a broadcast console mic tally output. Because the mic arm cable uses a five-pin XLR connector, it's limited to five conductors. Three are used for mic audio, and the two remaining wires are used for both the white and red tally lights. The two lights are wired with opposite-polarity, so that reversing the polarity of the control voltage determines which light, white or red, will be on.

Mike Alert provides the power and control circuitry necessary to interface the mic arm to the tally outputs of a console, router or other equipment.

Each Mike Alert unit can control two mic arms. Both the microphone audio and tally circuits are interfaced, with automatic polarity control to correctly operate the white and red tally indicators.

Mike Alert is compatible with any console or equipment that provides a GPI contact closure, open collector, logic, or DC voltage for tally light control. It is now in stock at Henry Engineering dealers with a list price of \$250.

For information, contact Henry Engineering in California at (562) 493-3589 or visit www.henryeng.com.

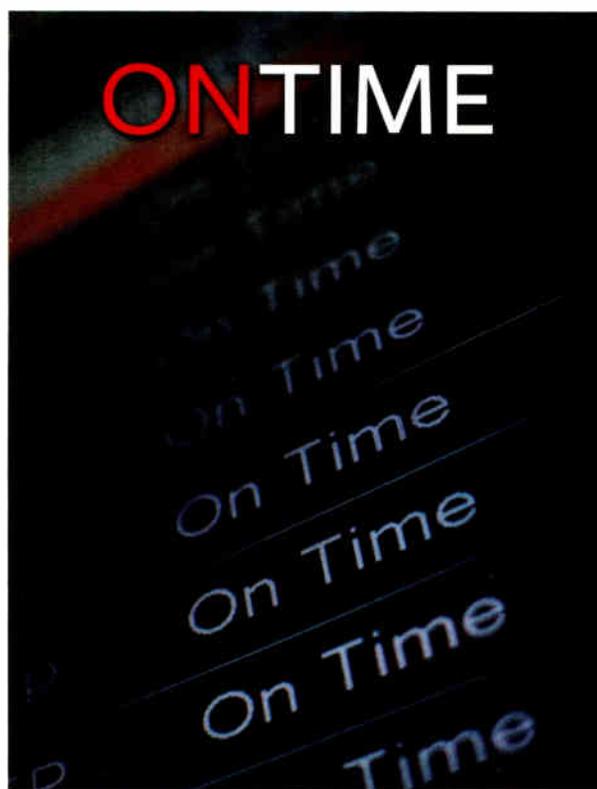


TITUS PROVIDES CUSTOM AND STANDARD LIGHT FIXTURES

Titus Technological Laboratories is known for stereo and AES audio monitoring and routing but it also manufactures popular on-air light fixtures. TTL has expanded into manufacturing custom light fixtures. They're suitable for radio and TV broadcast stations, teleconference centers, government installations and recording studios.

With the addition of laser engraving and cutting to CNC routers, exotic light fixtures can be fabricated to add to a studio or teleconference center. Multicolor Plexiglas, LED colors and illumination, as well as custom framing/mounting let the engineer or architect define the image they wish to project for their facility.

For information, contact Titus Technological Laboratories in Connecticut at (860) 633-5472 or visit www.tituslabs.com.



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O.C. WHITE OFFERS ULTIMA LP BOOM

The O.C. White Ultima LP mic boom is a modular product offering up to four boom arms on one installation.

The Ultima LP is a low profile, "table top hugging" design that aims to stay out of the way and provide clean line of sight. Each arm can hold up to six pounds. The counterbalance design aims to provide ease of movement yet keep the stationing from drifting.

Cable channels provide for clean operation.

For information, contact O.C. White in Massachusetts at (413) 289-1751 or visit www.ocwhite.com.

STUDIO TECHNOLOGY COVERS THE BASES

Studio Technology designs, constructs, delivers and installs studio furniture for the U.S. broadcast industry. The company cites its broad-based design and construction expertise to provide a range of standard and custom furniture to its customers.

Studio Technology says it can provide a simple custom configuration that is priced competitively with modular furniture, as well as higher-end furniture using solid surface or other alternative materials. The company has provided furniture for one-room studio renovations as well as participated in major projects on both coasts and in Hawaii.

It will work with any systems integrator or your local staff. It can also provide delivery and assembly of the furniture it manufactures.

For information, contact Studio Technology in Pennsylvania at (610) 925-2785 or visit www.studiotechology.com.



ACOUSTICS FIRST AEOLIAN MIXES TECHNOLOGIES

Acoustics First says its Aeolian Sound Diffuser creates a unique aesthetic while improving acoustics.

Similar to the company's Art Diffuser Model D mathematically, the Aeolian is a bicubic interpolation of a prime quadratic diffuser, "bridging the mathematical with the artistic." This combination creates

a smoother frequency transition, wider operating range and more forgiving diffusion pattern, the company says. Created for use in a drop ceiling grid or direct wall mount, the Aeolian can be placed where needed to optimize the acoustic space.

The Aeolian's design incorporates implied symmetry to defeat lobing problems. The diffuser is asymmetric, including the edges. Each edge is designed to vary in height by less than the width of the flange gap, creating an implied symmetry, without actually being symmetric. This feature eliminates all symmetry from the diffuser, complementing the undulating topology of the geometry and creating a unique aesthetic, while enhancing the acoustic effectiveness.

Aeolian products are made of Class A thermoplastic and have a Class 1 A fire rating.

For information, contact Acoustics First in Virginia at (888) 765-2900 or visit www.acousticsfirst.com.



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TECHUPDATES**AUDIOSCIENCE BUILDS AUDIO CARDS**

AudioScience designs and manufactures DSP-based digital audio peripherals for the OEM, broadcast, installed sound and entertainment markets. The company supports standards such as PCI Express, MPEG audio compression, CobraNetT, LivewireT and AVnu AVB audio networking along with the Windows and Linux operating systems.



AudioScience has 20 years of experience in building sound cards.

It says that whether you need a "built for broadcast" MPEG card that includes functionality such as multiple sample rate playback and recording or a pure linear PCM card with a low-latency ASIO interface, it has a product for you.

The latest card, the ASI5812, is a 192 kHz half-height audio card. Coupled with Omnia SST PC-based audio processing software, the ASI5812 has the ability to generate both an FM multiplex signal (MPX) and an HD Radio baseband signal. In the past this would have required two audio cards, one to generate the MPX signal at a 192 kHz sample rate and a separate card to generate the HD-Radio signal in the digital domain at a 44.1 kHz sample rate.

For information, contact AudioScience in Delaware (302) 324-5333 or visit www.audioscience.com.

**YELLOWTEC EXPANDS AND UPGRADES M!KA**

Yellowtec highlights the flexibility and elegance of its m!ka Mic and Monitor Mounting System. It calls it an intelligent solution to arrange microphones and monitors individually. Putting together various m!ka elements provides the flexibility to tailor a setup to a studio's needs and equipment.

Recently, the m!ka system was expanded to match more requirements. The entire product range is now available in black and aluminum color; and new elements and product upgrades have been added:

m!ka Monitor Arms have been upgraded; all are now equipped with a new head joint to improve and simplify friction adjustments. The arms independently set the friction of a monitor's horizontal or vertical tilt.

Also, the reach of its monitor arms has grown. Equipped with a pneumatic spring, the new m!ka EasyLift Monitor Arm simplifies monitor height adjustments.

All m!ka On Air arms now come with the CleanVision technology of Yellowtec's Litt Signaling Device. Slightly bigger, m!ka's new LED indicator provides better recognition but will not glare at short distance. In addition to a bright red for on-air indication, there is white for secondary signaling. Reversing the polarity of the supply voltage toggles between red and white.

And also new is Yellowtec's m!ka Mic Arm TV. The arm is suitable for anyone involved in video recordings or visual radio. Coming from below the camera's field of view instead of taking center stage, it discretely stays in the background. Faces will be fully visible for the audience.

For information, contact Yellowtec USA in California at (805) 931-6081 or visit www.yellowtec.com.

**ESE MAKES TIME VISIBLE**

ESE manufactures a variety of remote clock displays to go with the company's master clock and master timer products. Remote displays come in 0.4-inch, 0.55-inch, 1-inch, 2.3-inch, 4-inch and 7-inch digits in desktop, rack-mount, wall-mount or console enclosures, viewable from 10 to 250+ feet away.

All units come standard in red or amber LEDs, while four colors (red, amber, blue and green LEDs) are available as options on ESE remote displays over 0.55 inches high.

The remote displays read ESE Time Code, SMPTE-LTC, EBU and ASCII RS-232C timecodes output by any master clock. When working with ESE Time Code up to 100 slave displays may be connected, using up to 4,000 feet of cable (coax or twisted pair). Most displays switch between 12- or 24-hour format and time or date display with the flip of a switch.

For information, contact ESE in California at (310) 322-2136 or visit www.e-se-web.com.

**WHO'S BUYING WHAT**

Email announcements to radioworld@nbmedia.com

**VPR CHOOSES OMNIRAX**

Vermont Public Radio recently revamped its live performance space control room with **Omnirax** furniture.

VPR Engineer Mike Seguin, CBT, cited the manufacturer's experience. "We were under a fairly tight deadline and Omnirax came through. Studio 1 Control at VPR is living up to its expectations."

For information, contact Omnirax in California at (800) 332-3393 or visit www.omnirax.com.



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CCA FM8000G Trans 107.9, great cond; 4-Bay Jampro antenna w/deicers; 3-bay Shively antenna FM. D Brockman, 606-965-3436.

100' of Andrew HJ750 air Dielectric 1-5/8" transmission cable; (5) 6' Philistran insulator cable substitute; 5000' roll of galvanized 1/2" cable for guying tower; 3-bay almost new medium power Cablewave circular antenna on 92.1 MHz; ERI 3-bay antenna on 93.5 MHz circular, polarized; 375' Andrew LDF750 1-5/8" Andrew cable, let's make a deal, 318-224-4442.

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

Wanted: real plate reverb. abgrun@gmail.com.

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.

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

WYBG 1050, Messina, NY, now off the air is selling: 250' tower w/building on 4 acres; collection of very old 78s dating back to 1904; 12' satellite dish

on concrete base; prices drastically slashed. 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 audiolvlg@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 KTIM, AM, FM radio shows from 1971-1988. The stations were located in San Rafael, Ca. Ron, 925-284-5428.

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, KSF, KOB, KCBS, KQW, KRE, KTIM, KYA, etc. I will pay for copies... Feel free to call me at 925-284-5428 or you

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Looking for a broadcast excerpt of a San Francisco 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 KSF radio shows, Disco 104 FM, 1975-1978. R Tamm, 925-284-5428.

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

zines, spare parts and manuals, complete or "parts" machines considered, James, 870-777-4653.

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

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(2) LPFM radio stations for sale, located in the NW part of central Florida on the gulf coast, covers the county, get out of the cold weather, come to Florida, call or write for particulars, 352-613-2289 or email boceey@hotmail.com or Bob, PO Box 1121, Crystal River, FL 34423.

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.

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Delta IOB-3 w/18" leads & BNC adapter, \$2000; Potomac FIM-71 complete w/all access, manual, like new, \$5000; Potomac FM-41 w/manual, \$2000; Potomac SD-31/RX-31 w/cables & manual, \$1000; Belar AMM-3 AM modulation monitor, used, xlnr cond, \$300; Belar FMM-2 FM modulation monitor, used, xlnr cond, Xtals for 94.5, 98.3, 106.5, Belar FMS-2 FM modulation monitor, used, xlnr cond, \$1000 for both units; Belar SCM-2 SCA modulation monitor, used, xlnr cond, \$500 or \$1250 for all 3 units; Delta Electronics TCA-5/10EXR RF ammeter system, new unused, in factory box, \$500; Delta Electronics TCA-10/20EXR RF ammeter system, new unused, in factory box, \$500; Bird 4600-037 wattmeter/4600-000 3-1/8" line section 15 kW & 30 kW Elements, RF cable, bullet, new, unused, \$600; Bir 4716 wattmeter, 4712-000 1-5/8" line section 500W & 5000W Elements, RF cable, bullet, new, unused, \$500. Call 410-707-3654 or mundschenk55@msn.com

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Radio Broadcasting Is Being Redefined

IEEE-BTS Symposium helps technology managers keep an eye over the horizon

COMMENTARY

BY ROSWELL CLARK

The author is an IEEE BTS Adcom member.

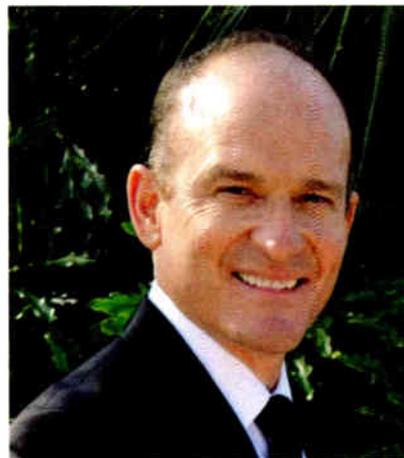
Radio needs to stay attuned to advancements in technology and meet expectations from its consumers. The IEEE-BTS Symposium, held in October, can help.

A lot has changed in radio over the past decade. Technologies that were first perceived to be a threat to traditional

growth in app development, which resulted in extensive growth pains for the radio business. Broadcasters struggled with the challenge of staying current with the technology and finding ways to utilize these new tools in ways that would be beneficial, rather than detrimental, to their core business.

SOCIAL MEDIA, SIMULCAST AND BIG DATA

Clearly, the radio stations that have been successful in maintaining their relevance with consumers have been those that have effectively implemented social media as a means of listener engagement. It's been shown that listen-



of broadcast directly tied to the traditional broadcast audio. For example, a video producer can create supplemental video content live as the traditional program is being broadcast. In this scenario, social media integration, online chat rooms and supplemental pictures or video snippets are added to the online multimedia channel to enhance what is being broadcast over the traditional means thus creating a rich media experience.

Although the base content or audio broadcast is the same, the online multimedia experience is much more rich and accessible via fixed or mobile devices which creates a whole new level of engagement for listeners. The modern consumer has grown to expect such additional content particularly in an age where information and supplemental content is readily accessible via keypad and more recently, voice command.

While radio has stood the test of time, like all entertainment mediums, it needs to stay attuned to advancements in technology and meet expectations from its consumers.

The IEEE Broadcast Technology Society plays a key role — through symposiums, conferences, white papers, etc. — to share information and build consensus on impactful technologies emerging today, as well as those that are “just over the horizon” in the world of broadcast technology.

In doing so, the society best serves the industry to ensure engineers and technology leaders have the latest and most detailed technological understanding. Understanding the present challenges and future technology developments informs decisionmakers to plan for wise and viable broadcast infrastructure investments resulting in customer loyalty and contributing to ongoing business success.

The 2017 IEEE-BTS Symposium will be held Oct. 10–12 at the Key Bridge Marriott in Arlington, Va. For information visit <http://bts.ieee.org/broadcastsymposium>.

Roswell “Roz” Clark is senior director of radio engineering for Cox Media Group and IEEE BTS Adcom member. He chaired several committees for Cox including Broadcast - IT Security, Automation Standardization, RF Safety Policy, and Broadcast Data Transmission. He is its technical representative in the Broadcasters' Traffic Consortium, the National Association of Broadcasters Radio Technical Committee, the Nielsen Technical Advisory Committee and the National Radio Systems Committee.

Social media interaction has been key in building a new listener experience and has been well received in the marketplace.

terrestrial radio broadcasting, such as social media, streaming audio, multimedia, mobile handheld devices, etc., are now being embraced by broadcasters to expand their broadcasting footprints and *pull* listeners more closely into their brand and content, rather than *push* them into alternative delivery paths.

The following is a quick glance at what has transpired in the recent past and what's on the horizon for radio broadcasters in this era of rapid technology growth. Some examples of how innovative broadcasters are turning these technology challenges into opportunities are also mentioned.

AN EVOLUTIONARY TALE

Looking back from the listener's point of view, it's fair to say that 10-plus years ago, “advanced” mobile devices were basically cell phones with the ability to receive email and perhaps listen to downloaded audio. Such devices weren't nearly as prevalent as they are today.

In that timeframe, radio broadcasters were just beginning to conduct some exploratory efforts with internet services. Websites were rolled out, and streaming audio was just beginning to take hold.

The expansion of cellular 4G and rapid advancements in mobile device capabilities eventually led to a rapid

ership increases when stations interact with their audiences on social media, share interesting content online, and even “live tweet” while on air. Social media interaction has been key in building a new listener experience and has been well received in the marketplace.

Beyond that, we are also seeing advancements in multimedia methods

READER'S FORUM

HEAR CHARLIE PERSONS' BOOK



title into the search field.

Paul, you told Radio World readers last year about the book “Where Have All the Broadcasters Gone,” written by my father Charles B. Persons (<http://tinyurl.com/rw-persons-2>).

I'm writing to share links to the free audio version of the book, narrated by Kirk Harnack. Anyone interested may hear it at mwpersons.com/books or go to SoundCloud or YouTube and type the book

Mark Persons
Brainerd, Minn.

REMEMBER NICK LEGGETT

It was good to see your recognition of Nickolaus Leggett (“Nick Leggett Dies; Was Advocate for Microcasting and LPFM,” radioworld.com, May 17).

As a reporter covering the FCC, I had been following his filings for some years.

Nick and Judith were guests of honor at the opening night of WERA(LP) here in Arlington last year. Though it was physically difficult for him to attend, Nick was so upbeat and personable. He sat for an interview, which aired on WERA several times, and left the station a donation.

A Renaissance man of sorts, he was an independent and dogged advocate.

So thanks for your article. We also were delighted to see the kitten in the air studio as RW's Photo of the Week.

Benn Kobb
WERA volunteer
Arlington, Va.

OPINION

READER'S FORUM

AM REVITALIZATION

Responding to Mark Fowler's commentary "Revitalization and Interference: Fact vs. Science Fiction" in the April 26 issue:

Please do not forget that if Class B and D stations are permitted to raise their power, Class C stations must also be permitted to raise power above the current 1 kW maximum to be able to counteract any increased first-adjacent-channel interference that would be caused by Class B and D stations.

Craig Fox
WOLF Radio Inc.
Syracuse, N.Y.

The work that the NAB, the NRSC and the broadcast engineering community did in the late 1980s and early 1990s that resulted in the current AM allocation scheme was conceived over several years of discussion and was generally well thought out.

In contrast, much of the FCC's current proposal seems to be haphazardly put together and ill-conceived in many respects.

For instance, the proposal reduces first-adjacent-channel groundwave protection by approximately 30 dB at the 2 mV/m contour. This represents a potentially destructive increase in 10 kHz interference between stations. If fully implemented, the audio signal-to-noise ratio above 5 kHz will be degraded significantly.

I suggest reading the comment that was filed by Univision, written by Karl Lahm. He provides an

in-depth analysis of how the FCC's proposed changes could degrade adjacent-channel protection and significantly increase interference between all stations.

Degrading interference protections will only further AM's demise. There are better ideas out there such as frequency synchronization and on-channel synchronous boosters that could potentially help "revitalize" AM without increasing existing interference levels.

Brian Henry
Henry Communications
Napa, Calif.

Mark Fowler makes excellent points but the big issue is still the amount of electrical interference, not the contour protected from other stations. While the recent reduction in forces at the FCC will make it difficult to police, there are ways to permit reporting of serious problems from volunteers whose qualifications can be ascertained. The FCC can then follow up without wasting time.

Bill Croghan, CPBE, WBØKSW
Lotus Broadcasting
Las Vegas

All nighttime AMs get 100 Watts. No more of the 21 or 6 watts crap. Maybe many years ago it was a problem but today AM is hanging on by its fingernails and every little bit counts.

A lot of the new transmitters have a problem run-

Revitalization and Interference: Fact vs. Science Fiction

Mark Fowler says the protection enjoyed by Class As under antiquated rules is illusory

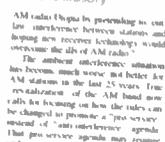
COMMENTARY

BY MARK FOWLER

The pending Revitalization of the AM Radio Service (reducing AM power by a long-overdue revision of the FCC rules to align AM technical standards with reality).

The proposed changes in AM technical standards have not been considered since an AM improvement rulemaking proceeding over 25 years ago.

The Association of Federal Communications Consulting Engineers said in its reply comments that the AM Radio Preservation Alliance employs an overly-deflationary interference model.



Mark Fowler

As no interference standard would be the case of decreased standard power levels.

The real world standard would replace the 100-watt standard with a more realistic standard.

Importantly, this reply comments provided information on the actual

OPINION

interference levels at licensed distances. Class A stations (Hartford's reply comment) were particularly shocked at the actual levels of interference received by Class A stations.

The rule change reflected by these consulting firms would actually promote improved local nighttime service by other classes of stations.

Class As by antiquated rules as altered if they provide no real protection as they do not eliminate the so-called interference experienced by the Class As since the beginning of post-World War II.

The reply was a historical of the FCC from 1947-1962. It is a historical of the FCC's 150th anniversary.

READER'S FORUM

RADIO LUMIÈRE

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Why I Support the Right to Repair

OPINION

COMMENTARY

BY STEVE JOHNSTON

that if they didn't provide that info with their products, I would not be buying it. The company chose to ignore my orders rather than release the information I needed to fix my own equipment. I am not a technician, but I am a consumer who provided a good amount of information to the manufacturer.

LET ME REPAIR

Access to basic service information is important to our industry.

HOW TO

SEND A LETTER TO THE EDITOR: Email radioworld@nbmedia.com with "Letter to the Editor" in the subject field. Please include issue date and article headline, if relevant.

RIGHT TO REPAIR

Responding to "Why I Support the Right to Repair," April 26 issue:

This subject caught my attention. As a volunteer "engineer" for eight years at non-profit KCAM(AM/FM) in rural Alaska, and even after 35 years as an electronics engineer in an aerospace company, the attempt to repair and/or work around a critical air chain component was a nightmare.

There was absolutely no overnight shipping. And talk about shipping cost! I spent much of my time attempting to incorporate backup and alternate signal routing; backup antenna, STL, even a backup antenna. And, yes, I considered it a blessing to find schematics, troubleshooting and repair documentation.

For me, my time at

KCAM(AM/FM) was incredible, with great people to work with, in the middle of the most scenic area in the country, in a community where everyone is looking out for the welfare of all, and challenges to keep both mind and body moving even at -40 degrees F.

Roger Bovee
Glennallen, Alaska

READER'S FORUM

TRANSLATOR TRICKS

Responding to "Are Broadcasters 'Gaming' the Translator Rules?" in the RW May 10 issue:

Good article exploring FM translator issues, thank you.

What you hinted at needs to be stated more bluntly: FM translators were gaming the system from Day One. In reality, they are a broadcasting service in their own right, not just a supplementary adjunct to the main station. They elbow their way into an already overcrowded FM radio dial.

FM translators have become the must-have prestige bauble to keep up with the Joneses to aggrandize radio property value. Full-service FM stations that complain about fringe contour interference from a translator are baring the fiction held out to their advertisers of exaggerated coverage claims. Average listeners don't attempt to listen to a station that can't keep receiver capture.

On the AM side, the notion that FM translators support AM revitalization is the oxymoron of the century. Clear FM reception seduces listeners away from the noisy AM band, thus directly subverting rather than enhancing the AM radio service. Let's quit the winking and nodding about FM translators.

As the boy in the crowd observed: "Hey! The emperor isn't wearing any clothes!"

A genuine improvement to the AM radio service would be to pull in the contour protections of Class A and B stations to allow lower-class AM stations to up their power, same day as night, and sunset their FM translators. That would be AM revitalization!

*James B. Potter, K3NSW
Cutting Edge Engineering
The Little Spot Shop
Kimberling City Mo.*

MAIN STUDIO RULE

Regarding "NAB: Main Studio Rule Actually Impedes Service," radioworld.com:

It is obvious that the *only* concern you have for the broadcast operation is bottom line cost. You have *no* concern for content, access, or most obviously, service to the community of license.

Holding on to the "main studio rule" is the last, however minimal, point of contact that a community has with its "local" broadcaster. Notwithstanding that an excuse to remove any business from

"Main Street" does not help the health of "Main Street" to begin with.

This also ignores the fact that this is the perfect foundation for creating the kind of media situation that Hitler used — *all* resources of information coming from one source and one source only with no ability to input from any other area.

No sir. The main studio rule needs to remain in place if *only* to serve as a reminder that stations are "licensed as a public trustee to serve in the public interest."

*Bill Shrode
Vice President and Director of Engineering
Mason Prairie Enterprises Inc.
Parkersburg, Ill.*

The FCC has shown a willingness to consider updating the main studio rules. Good idea, but I'd go further, and consider changing the city of license rules.

In almost every city (including many small ones), there are stations with a city of license in some tiny burg nearby. How many stations ID themselves as "KXXX City of License/City where the studio is located"?

It's an unexpected result of the 80-90 rules that created lots of new FM stations. Twenty-five years ago, we were proposing drop-in channels as "first service" to every little town outside a populated area. FCC rules at the time favored adding "first service" to a community (large or small) that didn't already have a radio station.

This resulted in hundreds, perhaps thousands, of stations licensed to small towns while the stations were really operated from nearby cities. Many of these little towns that got "first service" were so small, they didn't have any retail businesses. No matter. There were incorporated towns or villages, and thus, under FCC rules, qualified for first service.

Today this seems almost silly. We have clusters of stations operated from studios located in the nearby city, who may have several stations with cities of license in nearby little towns. The only time the city of license is ever mentioned is in the hourly ID.

I propose to make the city of license where the studio is located. Simple as that. All other rules still apply.

A case could be made that whole concept of "city of license" is outdated. Perhaps. But I'm suggesting that at least the current rules should reflect the reality of radio today.

*Art Morris
Contract Engineer and ABIP Inspector
Aurora, Mo.*



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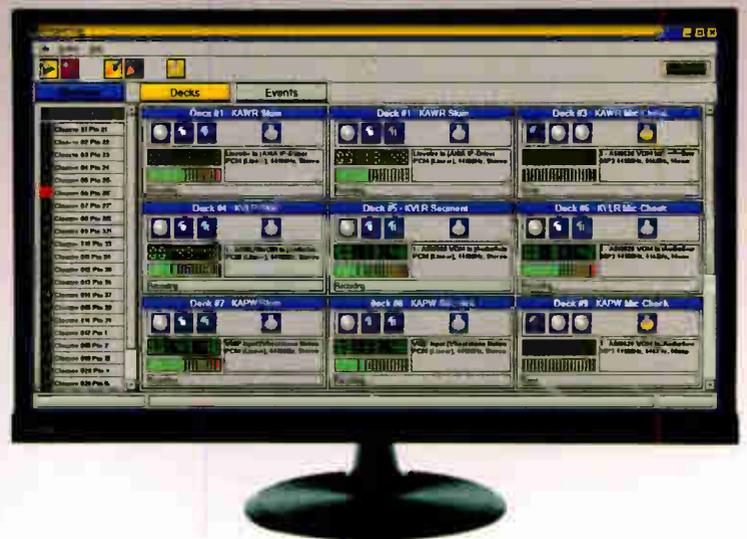
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