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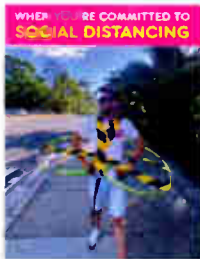
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Jason Ornellas Makes His Mark

Our Excellence in Engineering recipient "will go through walls to get things done"

BY PAUL McLANE

The recipient of the Radio World Excellence in Engineering Award for 2020–21 is Jason Ornellas, regional director of engineering for Bonneville International.

Recipients of the award represent the highest ideals of the radio broadcast engineering profession and reflect those ideals through contributions to the industry.

We selected Ornellas as the 17th recipient of this award because of his years of outstanding current and past work for four major broadcast companies; his project expertise, exemplified in recent large studio projects in California including one completed during early weeks of the pandemic; and for his role in streamlining and reimagining workflows at Bonneville.

We also salute the way Jason cele-



brates the successes of fellow engineers; for his work as part of the NAB Radio Technology Committee's Next Gen Radio Architecture group and its PPM

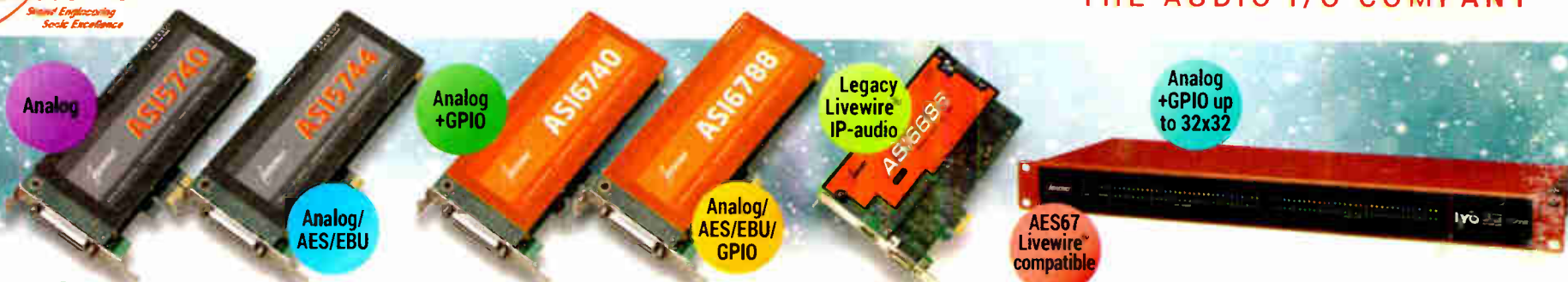
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With Bonneville colleagues on a helo pad on Farnsworth Peak in Salt Lake City. From left: Shawn Calloway, Aaron Farnham, Jason Ornellas and Brad Russell.



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Codecs Make More Robust Connections

Technology brings more locations via more methods at lower cost than ever

Tim Neese is president of MultiTech Consulting Inc., a multi-faceted broadcast technology consulting and contracting firm.

Radio World: What's the most important trend in the design and performance of codecs for remotes or STL?

Tim Neese: Most codec manufacturers are incorporating and continuously improving stream redundancy and error correction techniques that allow for significantly more robust connections. These techniques allow codec users to take advantage of readily available transport methods and the public internet to make reliable connections for both remote program contribution and studio to transmitter links.

RW: How are today's technologies solving problems in creative ways?

Neese: One of the most common issues is studio and transmitter sites that are unable to be linked via traditional (RF) point-to-point methods. This, combined

Today's codecs and encoding algorithms have proven to be more than up to the task of making those connections viable and reliable.

with the ongoing sunset of the telco ISDN and T1 infrastructure, has propelled connection of these sites via the public internet to commonplace.

Today's codecs and encoding algorithms have proven to be more than up to the task of making those connections viable and reliable.

RW: What role are codecs playing in this new world of at-home broadcasting?

Neese: In the new world of broadcasting where, for some, every live segment is what was once considered a "remote" broadcast, the codec has become as essential as a microphone or pair of headphones. For many broadcasters, codecs are the "magic" device that has allowed them to continue normal programming in a completely remote fashion.

RW: How many ways are there of making connections?

Neese: The number of connection transport methods has decreased in recent years.

Not long ago, it was possible to purchase codecs that could connect via POTS, cellular, ISDN, T1 and



Ethernet. In some cases, all of these connections were available via a single codec.

As telcos have begun to phase out ISDN, T1 and traditional POTS circuits in favor of newer transport technologies, codec manufacturers have focused on these technologies as well.

While the traditional connection choices have decreased, newer technology connections have become available in more locations, via more methods and at lower cost than ever before.

For instance, data connectivity via mobile phones and devices is now as common as patch panels in facilities once were. Numerous codecs are able to leverage that connectivity via either a physical or wireless connection with the device or as a software application that runs on the device itself.

RW: What would you like manufacturers of these technologies to add or offer in future?

Neese: I would like to see more manufacturers include advanced security tools and options like firewalls, integrated VPNs and secure web configuration services within their codecs. That, I believe, would allow for more secure codec deployment via direct connection to public networks and provide even greater deployment flexibility for broadcasters.

THIS INTERVIEW IS EXCERPTED FROM THE EBOOK

"TRENDS IN CODECS & STLs"

Read more at radioworld.com/ebooks.



ORNELLAS

(continued from page 1)

subgroup; and for his growing national profile including multiple terms on the board of the Society of Broadcast Engineers.

Jason Ornellas is 33, but he already has 15 years of solid engineering work and accomplishments to his credit. And we're not the only ones who have noticed. Just this fall he was promoted to oversee Bonneville's chief engineers and IT specialists in its West Coast markets of Seattle, San Francisco and Sacramento, a position in which he works more closely with senior leadership.

QUICK LEARNER

Born and raised in San Francisco, Ornellas was not looking for a radio technology career when he went to college. While attending the University of Indianapolis on a baseball scholarship, he took communication courses.

"One of the options was PR, radio, TV or journalism," he told me. "And who doesn't like music? So I ended up going for radio and got into it. [But] I realized really early on: I'm a terrible

Channel had an opening for a staff engineer there, Ornellas was ready.

In that role he managed 10 studios for the San Jose cluster and was responsible for the San Jose Sharks Radio Network. He learned more about automation systems, facility and studio wiring, and networking. He gained experience with satellite feeds, on-call support, remote vans, webcasting, EAS and other meat-and-potatoes aspects of radio technology.

After two years, he was offered a job across the country as chief engineer of Greater Media's New Jersey operations, including WDHA(FM) and WMTR(AM) and regional duties at several other stations.

"I've been very fortunate that the companies that I've worked for are all very well-respected and have always had great leadership from an engineering side," he said.

He and his wife Ashley wanted to be back in California though, to be closer to family; so in 2014 they headed west again, and he became director of engineering for CBS Radio in Sacramento, overseeing technical aspects of a cluster of four FMs and one AM. During that time he also led the integration and



On-site at KZZO(FM), installing a GatesAir FAX20 transmitter.

"I've got a great team of engineers in all the markets. I love what I do. I'm a big believer in pushing the limits, trying to be innovative, and really thinking outside the box," he said.

"I don't like the answer, 'It can't be done.' Well, let's figure that out. Everything can be done. Someone has done something before, so let's start peeling back the layers of what's stopping it, and let's move forward."

To that end he has led two notable studio projects in the past two years.

The first came about when Entercom sold those Sacramento stations to Bonneville. As a result, studios and some operations of former CBS outlets KHTK(AM) and KNCI(FM) needed to move quickly to a location that was already serving KZZO(FM) and KYMX(FM).

"We left the facility in immaculate shape and successfully made the transition to all under one roof with zero downtime and under budget," he recalls proudly.

Steve Cottingim, senior vice president and market manager for Bonneville Sacramento, told me, "When Bonneville began operating the Sacramento stations for the Entercom Trust, we had to move all of the stations to one building. Jason spearheaded the entire move and worked with Scott Jones to build out



Ornellas during a webcast for Clear Channel early in his career.

the studios and move all the equipment to get us back up and running with no interruption.

"Jason always rises to the occasion and delivers outstanding results. He is respected and loved by everyone in Sacramento. Jason is an individual who will go through walls to get things done. The engineering team that works with him all work together as a cohesive team because of his leadership."

The second project was construction of a new studio location for Bonneville's four FM stations in the Bay Area, KOIT, KMOV, KBLX and KUFX.

Scott Jones said, "Jason was our project manager for our move out of San Francisco to our new, state-of-the-art facility in Daly City. Integrating a

His boss Scott Jones calls Jason Ornellas "a born leader, with a keen technical mind and an innovative approach to broadcasting."

jock. I needed to not be on the air."

He worked as a broadcast technician at the university's FM station WICR, where he tinkered with IT, did remotes and maintenance, worked with audio consoles and automation, learned from the chief engineer and helped build his first AoIP studio.

"I really just got fascinated with signal flows and all of the under-the-hood stuff."

He also had an internship with Clear Channel Radio in San Francisco during that time; and though it was a promotions internship rather than a technical one, it allowed him a foot in the door. He stayed in touch with the staff in the Bay Area and told them of his interest; and at graduation time, when Clear

worked on the design for the Jim Rome Studio in Costa Mesa, Calif.

Later, when Entercom merged with CBS Radio, four of the stations were sold to Bonneville — and Ornellas went along with them. He now reports to Scott Jones, Bonneville's senior vice president for engineering and technology.

Along the way, people who have been particularly helpful in his career so far include Scott Uecker, general manager of WICR in Indianapolis and one of his college professors. "I owe him a lot for the opportunity, to have that kind of program at the University of Indianapolis that allowed this kind of hands-on experience."

Also influential are David Williams at Clear Channel San Francisco (now iHeart); Milford Smith and Keith Smeal at Greater Media; and "all the legendary engineers at CBS, including Erik Disen and Sam Cappas ... And here I am with Bonneville, and hopefully one day, I'm that mentor to someone else."

PERSISTENCE

He's had a super experience working for the company since he joined it.

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MDCL installation at KHTK(AM) with Ralph Wiegmann of GatesAir.

new AoIP plant built on the WheatNet architecture, our new studios are the crown jewel of Bonneville. His leadership kept us on schedule, even during the shelter-in-place orders in effect due to the global pandemic.”

That project came with another complication, a personal one. Jason and his wife Ashley have three kids under the age of 2; when their twin boys arrived in January this year, the babies needed to spend time in neonatal intensive care.

“The NICU, visiting them every day, as well as making sure San Francisco’s project stayed on task — it was definitely balancing life and work,” he recalled.

“But family’s first. My wife — bless her, because radio engineers’ wives don’t get enough credit. I’ve had to leave her at the table when I’m taking calls on a vacation. But she understands the role of the job. And I love being a dad.”

CONSISTENCY

So what’s ahead?

Part of his job is to implement standards that Bonneville wants to roll out for its air chains, systems and workflows. Seeking consistency across its markets, the company is standardizing on important components like Wheatstone AoIP networks, consoles and routing; RCS Zetta Automation; Telos VX studio phone systems; and Mitel Office phone systems.

“Our next big project is taking a step back, looking at our infrastructure. What is critical and high-risk that we need to get our eyes on? We’ve got some older transmitters that we need to get up to par with the solid-state, as well as finishing our rollout of our automation system to markets that we haven’t finished yet. ... We’ve got to make sure our transmitters, our tower sites are up to par with how nice our studios look. We also will be transitioning to standardizing our HD transport with GatesAir and the FMXi4g Importer/Exporter unit.”

He expresses excitement about Bonneville’s efforts at streamlining systems and workflows, and how the

technology team supports one another — driving to help a colleague in another market, raising a hand to help out or logging into a GUI remotely to help with a problem.

Managing a remote workforce for a radio organization, he points out, multiplies the usual number of technical problems that must be investigated.

“What are their resources like at home, with their network? Is it their network having issues? Is it the VPN having issues? It’s very time-consuming

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HONOR ROLL

Recipients of the Radio World Excellence in Engineering Award represent the highest ideals of the U.S. radio broadcast engineering profession and reflect those ideals through contributions to the industry.

2020-21	Jason Ornellas
2019-20	Dave Kolesar
2018-19	Russ Mundschenk
2017-18	Larry Wilkins
2016-17	Michael Cooney
2015	David H. Layer
2014	Wayne Pecena
2013	Marty Garrison
2012	Paul Brenner
2011	Barry Thomas
2010	Milford Smith
2009	Gary Kline
2008	Jeff Littlejohn
2007	Clay Freinwald
2006	John Lyons
2005	Mike Starling
2004	Andy Andreson

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ORNELLAS

(continued from page 5)

ing. But with this regional engineering technical infrastructure, we now have engineering teams that [can say], 'Hey, I can take this one; I'll deal with this issue; I'll work on this ticket. Hey, I'm on a transmitter site today.'

EMBRACING CHANGE

Beyond his immediate projects, I asked him about important trends in our industry. Ornellas describes himself as "all in" on the connected car.

"The more information, the more data, the more content that we can put in that dashboard," he said, the better. He also has been a key part of Bonneville stations becoming active with the RadioDNS hybrid radio initiative.

Radio, he notes, remains the most popular source for people in their cars. "Now it's up to broadcasters and manufacturers to make sure we don't lose our place there. We have competition; there's no doubt about it. But we still have that connection that will be hard to beat, as long as we provide the content that our consumers and clients are looking for."

Meanwhile, within broadcast companies, he expects functions will increas-

ingly become "virtualized" and that more hardware will become obsolete.

He has first-hand experience with this. Ornellas is a member of the NAB Radio Technology Committee's Next-Generation Radio Architecture working group, and he chairs the PPM subgroup that has been working with manufacturers to get Nielsen Audio PPM encoding built into on-air processors.

As part of that work, he participated in a beta test of PPM encoding inside an Urban AM audio processor; and the working group plans a similar effort for FM and streaming, he said. Perhaps someday processing can even move to the cloud.

In general, he said, "We're eliminating hardware and we're integrating more software, to the point where we're going to have be taking care of a lot more software than hardware. And we can fix a lot more with software than fixing it with a hardware box. ... It's exciting to see."



On Level 4 of San Francisco's iconic Sutro Tower.

The pandemic seems to have accelerated a change in thinking around the industry.

"I think a lot of manufacturers hit that reset button, and it gave everyone that little jolt that we needed as an

industry, to really start thinking of the cloud architecture, about WANcasting, using your automation systems to its full capabilities and beyond, not just scratching the surface."

He's eager to see how workflows change over three to five years. "Everything will have an IP [connection] by then — if not already, we're very close to that — but just being able to do one click and let it do multiple steps in multiple markets for us."

I asked if this trend means big facility jobs like the one he recently completed will be the last of their kind.

"I don't think the San Francisco project is the last one. However, I do think that they will be designed a lot differently." The pandemic forced the idea of "broadcasting from home" into the mainstream, and its lessons won't be forgotten.

"Studios are still going to be studios. I do think the common areas, the performance studios, large break rooms — those are where you're going to start seeing square footage not needed. Does every AE and sales manager need an office? Maybe have four or five community desks, not a dedicated seat for everyone.

"There's going to be a lot of questions. Until we get to the next build, I don't know the answer. But the facilities

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aren't going to get bigger; they're continuing to get smaller."

SERVICE

One of the things that impresses about Jason is how active he is at the national level. He is already on his third term as a member of the board of the Society of Broadcast Engineers.

"SBE has done a great job with creating new programs within memberships to really educate and get people more resources to learn and grow, within a reasonable budget and membership cost," he said.

"We're trying to stay really relevant and get a younger core to embrace the SBE — and not forget the history of it as well."

To that point, I reminded him that people have been asking where the next generation of engineers will come from for decades. At 33 years old he is, unfortunately, atypical — a relatively fresh face with potentially decades of career in front of him, a young man who radiates ardent enthusiasm for radio engineering and technology.

Is he, in fact, a unicorn?

"I think I'm definitely one of the few. But they are out there," he replied. To encourage more, he hopes the industry will expand the way it defines radio engineering. "It's not just radio. It's audio. It's streaming. It's metadata. It's IP packets. It's algorithms of the processors and encoding," he said.

"There's so much more to it, and we probably do ourselves a disservice by just thinking of RF. The RF side has gotten a lot easier, with computer monitoring and remote controls and whatnot; the RF isn't as daunting anymore, especially with solid-state transmitters and not having to worry about tubes and retuning the grid or the cavity."

Ornellas is heavily involved in his company's streaming and podcast systems. "Everything I touch has an IP on it. It doesn't need to be physically touched anymore like in the old days."

He feels the industry has hurt itself by pushing many engineers out instead of helping them grow into these areas. And he expects the need for this expertise will only grow, given the trend toward virtualization and software.

"We might have an influx of a new type of broadcast engineers. They might be very IT-driven, yet understand the signal flow of radio — the microphone, the console to STL, to processor, to transmitter. Everything's going to be a lot more simple. The job is getting easier because it's become more streamlined and because of how companies are looking at doing things."

POSITIVE FORCE

I should add that anyone who has seen Jason's posts on social media knows that

"It's not just radio. It's audio. It's streaming. It's metadata. It's IP packets. It's algorithms of the processors and encoding."

he'll be the first to cheer on colleagues and to spread positive feelings.

His boss Scott Jones calls Jason Ornellas "a born leader, with a keen tech-

nical mind and an innovative approach to broadcasting. He's a positive force with his encouragement and passion. I am very proud of his leadership in driv-

ing excellence for Bonneville."

Radio World couldn't agree more.

Jason reminds us that radio is supposed to be fun. "It's something new every day. You might have a plan, but that plan might get derailed," he said.

"I like that. I like the unknown. I like fixing things and repairing things, playing with new equipment, installing it, testing, doing the R&D. There's just so much that falls into engineering that it's never a dull moment.

"And I love what I do."

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Radio Equipment Pandemic Cleaning 101

These tips will serve you well long after coronavirus is gone

BY DAN SLENTZ

Allowing employees to work from home is an excellent way to keep them safe and healthy in a pandemic, but it's not always possible. So keeping radio studios clean is more important than ever.

Best practice, of course, starts with training staff in proper hand washing and the use of hand sanitizers. And hopefully you have issued individual microphone windscreens to your air talent.

But what about cleaning your specialized radio equipment? Let's share some recommendations from manufacturers. The information should not be taken as a final say but as supplemental to national guidelines and what organizations like the Center for Disease Control and World Health Organization recommend.

KNOBES BECOME GLOBS

The components of popular cleaning products can cause unexpected problems when used on broadcast equipment.

Jim Gray of Optimized Media Group has a client whose staff started bringing in household cleaners when the pandemic struck. These included 409, Clorox, Windex, Lysol and a few other familiar brands.

But many such cleaners contain ammonia, which can be very harmful to rubbers and plastics. Whether from one particular cleaner or a combination of them, the gear at the station reacted badly. Equipment knobs became soft and deformed. Automation screens became cloudy. Mic shock mounts had to be replaced.

Jim estimated the cost of the damage at around \$2,000. Since making the necessary repairs, he has purchased disinfectants that are electronics-safe. He is using 70% isopropyl alcohol as his cleaner but encourages others to do their own research for their needs.

The CDC doesn't have radio-specific guidelines, but for electronics it suggests using covers that can be wiped down when

possible. Of course this is not practical for devices that are in constant use.

Follow manufacturer instructions for cleaning and disinfecting: if no guidance is available, use alcohol-based wipes or sprays containing at least 70% alcohol. Apply it to a clean cloth, not directly to the surface. Then dry the surfaces thoroughly.

The CDC has a detailed information page about disinfecting facilities, including sections on soft surfaces, electronics, laundry, outside areas and other problem spots. Go to cdc.gov and search "disinfect facility."

ASK THE MAKERS

As the CDC points out, manufacturers are a key source of information on how to clean and disinfect specialty equipment.

For instance, at Telos Alliance, Support Engineer Johnny Goldsmith and Marketing Coordinator Bryan Shay note that some parts on Axia products have rubber coatings, so home cleaners may cause problems.

They recommend 70% isopropyl alcohol applied with a dampened soft cloth; allow it to sit on the equipment for 30 second or more, then thoroughly dry with another soft cloth.

They say you should avoid using Clorox brand or similar wipes on consoles and similar equipment because it may cause fading of printing. They advise against spraying disinfectant or cleaner directly on a surface, because liquid can cause great problems if it penetrates the electronics.

On Telos VSet phones, the handset may be cleaned with Clorox wipes, but the company still suggests isopropyl alcohol, to be sure to not get liquid into the earpiece or mouthpiece holes.

Goldsmith says check out the page "Recommendations for Cleaning and Sanitizing Consoles and Equipment." Go to support.telosalliance.com and search "cleaning and sanitizing."

At Wheatstone, Support Technician Dick Webb says look for disinfectant wipes that are labeled specifically as suitable for use on electronic devices. Check the ingredients and avoid anything corrosive.

Dick recommends you test a cleaning product on an inconspicuous area to make sure it doesn't hurt the surface. Also, in addition to not spraying gear directly, he notes that a cloth can still cause damage if it is sopping wet, dripping liquid onto and into the electronics.



A cleaning product damaged this after-market shockmount.



Rubber-coated keycaps can turn to "jelly" after frequent cleaning with non-approved cleaners, such as products with ammonia.



For convenient cleaning, Jim Gray cut a roll of heavy paper towels in three and put them in a disposable Rubbermaid food container with 70% isopropyl alcohol.

MIC CARE

Microphones are an obvious area of concern. Where windscreens are in use, each user should be issued their own.

For cleaning, Audio-Technica's Audio Solutions department says you

can remove a windscreen and spray it lightly with a disinfectant. Foam windscreen and headphone coverings can be washed by hand with mild soap in a sink, but carefully wring them out and dry thoroughly before using them.

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For mics, arms, booms and headphones, dampen a wipe with 70% alcohol and wipe the surfaces. It should be wet enough to show moisture on the surface being cleaned, but never so much that it saturates the internal workings.

Most microphones have metal grilles as well as foam or other material to cut wind/pop noise. The grilles can allow bits of food as well as viruses and other germs to get in. Some manufacturers suggest spraying a mic very lightly with a "mist," but Audio-Technica specifically advises against that.

"If a microphone has a removable metal grille, as most handheld microphones do, unscrew the grille and clean it while it is separated from the diaphragm and electronics of the microphone," it states on a support page. "Internal windscreens should likewise be removed from the grille and cleaned separately."

Though cleaners with ammonia or chlorine may be effective for viruses, I'd be very concerned about their use on microphones as both can destroy soft materials quickly; and they can leave a pretty foul smell for someone putting their face a few inches from a mic.

CABINERY

Of course, regularly clean surfaces that people touch a lot such as light switches and doorknobs. Cleaners like Brillianize, used with microfiber cloths, can kill 99% of bacteria, according to a study from University of California, Davis, which the company notes on its website.

Studio furniture is one such surface. David Holland, chief design officer of Omnix, says the company builds its countertops using Wilsonart high-pressure laminate, a very durable material. On these you can use more robust cleaners than with electronics.

Wilsonart suggests cleaning first with dish soap, warm water and a soft cloth, then apply a SARS-CoV-2 approved disinfectant. In the absence of that, use a diluted bleach solution based on CDC guidelines (see box at lower right). Remember to test the cleaner first on an inconspicuous area.

Wilsonart has a helpful nine-page guide that includes discussion of specific brands; find it at <https://tinyurl.com/rw-wilsonart>.

You never want to forget your remote gear. Not only is it in contact with people, it's also out in the field.

Jacob Daniluck of Tieline echoes the advice to never spray directly onto



Telos Alliance reminds us to wipe with 70% alcohol solution, let sit, then dry.



Tieline and other manufacturers say don't spray your gear; instead use a cloth that is dampened but not sopping wet. A solution of 70% isopropyl alcohol can be used.



Omnix builds products with durable Wilsonart HPL. It suggests getting in the habit of trying any cleaner in an inconspicuous area first.

The CDC has a detailed information page about disinfecting environments around your station. Go to cdc.gov and search "disinfect facility."

For a useful and detailed discussion, do a Google search for "How Do I Clean My Audio-Technica Microphones?" For other brands, try a similar search or consult the manufacturer.

The folks at ElectroVoice add that if the mic has a removable threaded-on grille, it can be removed and soaked with the inner foam components in hot soapy water. The grille and foam components should air-dry before you put them back together and use the mic. For fixed grilles, a clean, soft-bristle toothbrush can be used to clean between the strands of grille wire. Visit <https://electrovoice.com/support/troubleshooting/>.

your gear and to use a clean soft rag dampened with 70% isopropyl alcohol.

A final note is that OSHA requires businesses to keep Material Safety Data Sheets (MSDS) for all chemicals and cleaners; keep this in mind when dealing with chemicals at your station. Should someone be "spritzed" in the eyes or inhale a cleaner, you'll need to know how to treat them. You should consult OSHA regulations and/or your safety managers.

To summarize, manufacturers want us to be smart and well informed about cleaning. The real experts are doctors and scientists, so the manufacturers I spoke with all said that you should refer to CDC guidelines when it comes to protecting the health of your employees.

While this pandemic will eventually be overcome, colds and flus will not. Maintaining our best cleaning practices will help minimize sick staff and downtime in the future and keep your equipment and studios safe.

Comment on this or any article. Email radioworld@futurenet.com with "Letter to the Editor" in the subject field.

A promotional graphic for Radio Ahead. It features the 'HD Radio Ahead' logo with 'Digital AM & FM' underneath. Below the logo, it says 'On the road to HD Radio broadcasting? Nautel has you COVERED.' and 'nautel.com/HDradio'. The Nautel logo is in the bottom right corner.

DILUTED BLEACH SOLUTION

As with any disinfectant, soiled surfaces need to be cleaned with water and detergent first. When properly used, bleach is a strong and effective disinfectant – its active ingredient, sodium hypochlorite, is effective in killing bacteria, fungi and viruses. A diluted bleach solution following CDC mixing guidelines is an acceptable chemical disinfectant if used appropriately.

- A bleach solution may be prepared by mixing:
 - 5 tablespoons (1/3 cup) bleach per gallon of water or,
 - 4 teaspoons bleach per quart of water.
- CDC recommends a contact time of at least one minute.
- Exposure of a bleach solution should not exceed two minutes.
- Always rinse thoroughly with warm water and soap and water after use.
- Follow manufacturers' guidelines and safety precautions.

For cleaning high-pressure laminate, Wilsonart suggests cleaning first with dish soap, warm water and a soft cloth, then apply a SARS-CoV-2 approved disinfectant. In the absence of that, use a diluted bleach solution like the one described above.

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Germicidals May Kill Your Electronics

Not all sanitizing wipes are safe to use on your equipment

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

I'd like to kick this column off with a heartfelt thank you to all of the Workbench readers and friends who sent congratulatory words on reaching the 30-year Workbench milestone. It's been great re-connecting with you, and I am truly blessed by each of you. Thanks for your support as we start year 31!

One of those messages came from Tim Portzline, and it's a nice complement to the cleaning article by Dan Slentz on the preceding pages.

Tim has been reading Workbench since it first appeared, and to prove it, he included his first submission in his latest email! He is now an engineer with the Pennsylvania House of Representatives while also doing contract work for several radio stations.

Tim notes that sanitizing wipes are a popular way to clean desks, countertops, doorknobs, etc., especially when trying to stop the spread of COVID-19. However, don't forget that not all sanitizing wipes are safe for electronics.

He recently got a call from a radio clients about a PR&E BMX console that had failed after being cleaned with wipes that were not intended for use around electronics.

In fairness to the staffer involved, the product labeling didn't mention anything about sensitive devices. But the liquid in the wipes apparently leaked between the modules and ran down the printed circuit boards below the console's surface. Channels began turning on and off on their own, and the problem made operating the board impos-



Fig. 1: Cleaning wipes may be conductive, posing a risk to electronic parts.

sible for a short time.

By the time Tim arrived at the studio, most of the solution had evaporated so the board was beginning to return to normal. But as a precaution, Tim removed the modules and cleaned them with isopropyl alcohol to eliminate any possible residue that remained.

After he finished working on the board, Tim got curious about whether the fluid in the wipes had any measurable resistance.

Ideally, the resistance should have been infinite. However, Tim measured as little as 28K-ohms across a small area with a digital multi-meter, as shown in Fig. 1. The resistance was certainly low enough to interfere with normal circuit operation of the board, akin to dropping hundreds of stray resistors across the traces of the printed circuit board.

Taking the experiment a step further, Tim tested a paper towel saturated with 91% isopropyl alcohol, shown in Fig.

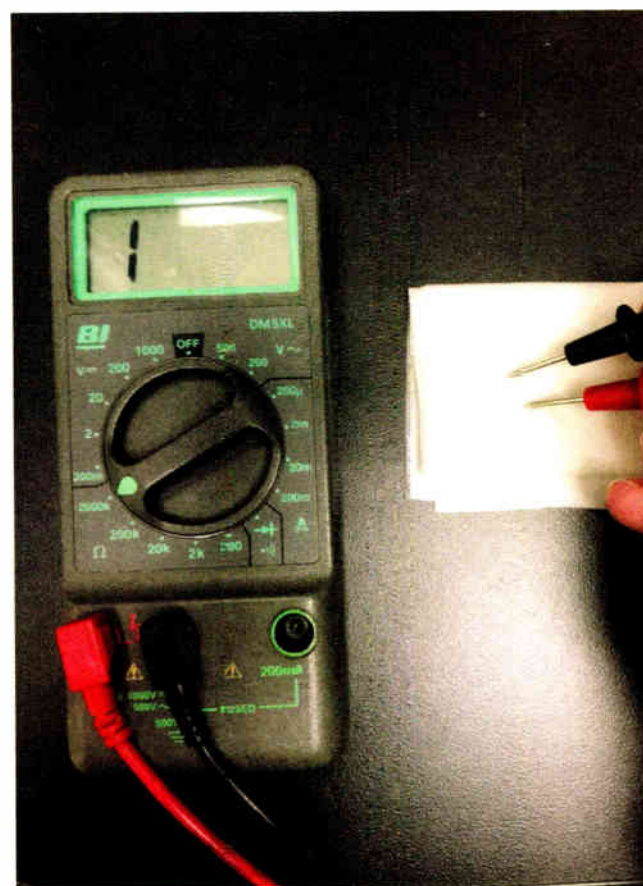


Fig. 2: Note the resistance of a towel soaked in isopropyl alcohol.

2. Here the resistance was infinite, or at least greater than the 2M-ohm maximum resistance of the DMM, making it high enough not to interfere with most low voltage circuits.

So, Tim's tip: Don't assume that cleaning wipes are non-conductive! Check them first.

ELWA Ministries Association is a U.S.-based nonprofit, nondenominational Christian ministry providing spiritual and physical aid to the West African country of Liberia.

In addition to a hospital and dental clinic, the organization runs ELWA Radio (Eternal Love Winning Africa), and we welcome their readership.

ELWA engineer Alan Shea writes about condensate drains, which we discussed in Workbench in October. Alan's tip originates with his dad, who was also a broadcast engineer and was Alan's first mentor.

To keep the drains clear, especially the trap where water can sit, take a piece of bare #12 solid copper wire and snake it through into the trap where it can sit. The copper leaches out into the trap water and helps kill algae by binding to it, which damages the algae cells, causing them to leak and die.

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Another point while we're on the subject of drains: If you have multiple air handlers, make sure that the condensate drain for each is plumbed individually outdoors, or to a larger drain.

Sometimes, to save time and installation cost, drains are tied together in a manifold-type arrangement. When the tech blows out one drain with compressed air, any algae plugs are simply blown into another A/C unit because of the manifold. Separate drains make more sense.

Alan also had an interesting experience with washing equipment. He encountered a piece of gear with a primary power supply toroid transformer that was a single piece of coiled-up steel. It was running hot, and constantly blowing the input fuse.

Alan realized that the steel laminations had too much eddy currents running through them.

He soaked it in a saltwater solution for an hour, then allowed it to air dry for a day. This created enough rust "insulation" between the laminations to cut down the eddy currents so that the toroid ran cool and no longer blew the input fuse.

Sometimes rust can be a good thing!

Any engineer with a little gray on the sides of their head will remember the ubiquity of RadioShack. I and hundreds of other engineers used their parts more than once, in emergencies, to keep a critical function working.

RadioShack is a shadow of its former self. As a recent AP Business story put it, the company "was unable to capitalize on the PC boom that began in the mid-eighties ... it also found itself largely on the outside of the portable device revolution of the aughts and drifting toward irrelevancy. It booked its last profit in 2011." The brand has been through two bankruptcies in recent years.

Longtime Workbench contributor Dan Slentz dropped us a neat note about an online revival of RadioShack. According to business news reports, the new majority owner Retail Commerce Ventures is a retail acquisition group whose strategy is to buy well-known brands that can benefit from its e-commerce expertise. They previously bought Modell's Sporting Goods and Pier 1 Imports out of bankruptcy.

The new RadioShack will be online, selling from its own website and via an Amazon storefront. Let us know of any experiences you have with it.

The existing 400 or so brick-and-mortar RadioShacks operate independently and remain open.

What's hard to believe is that the brand will celebrate its 100th birthday in 2021.

Speaking of the internet, Frank Hertel, a consultant with Newman-Kees and

If you have multiple air handlers, make sure that the condensate drain for each is plumbed individually outdoors, or to a larger drain.

another longtime Workbench contributor, was intrigued by the online store Ali Express, which is part of the Alibaba Group based in China that you may have read about. The site is www.aliexpress.com.

It offers a most varied selection of "things" — wall-mounted stands, brackets, cables and even gaming accessories.

Have you had experiences good or bad with that e-commerce site or any

other alternatives to Amazon, in shopping for things to help you in your engineering work? Drop us a note and let us hear about them.

John Bisset has spent over 50 years in the broadcasting industry. He handles western U.S. radio sales for the Telos Alliance. He holds CPBE certification with the Society of Broadcast Engineers and is a past recipient of the SBE's Educator of the Year Award. Workbench submissions are encouraged, qualify for SBE recertification and can be emailed to johnpbisset@gmail.com.

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DAB Advocates Celebrate Growth

WorldDAB meeting pushes for more adoption and wider awareness of the benefits

BY JAMES CARELESS

In a nod to COVID-19, the annual WorldDAB General Assembly took place in cyberspace in November. Approximately 300 people joined to hear 35 speakers describe the state of DAB+ digital audio broadcasting around the planet.

Videos of the sessions are available on the WorldDAB YouTube Channel. A sampling:

GAINING GROUND

In an opening address titled "Strong Progress in Troubled Times," WorldDAB President Patrick Hannon said 2020 was a good year for DAB+.

In the UK, DAB listening has overtaken FM for the first time; almost 60% of all listening is digital and 70% of that listening is done using DAB/DAB+ receivers. This trend has prompted the British government to launch a review to help assess consumer habits and support radio in the wider audio market.

In Germany, he said, a second national DAB+ multiplex, launched recently, reaches 83% of the country's population. In the Czech Republic, existing DAB+ signals now reach 95% of all potential listeners, and Czech Radio revealed plans to start switching off analog services in 2021.

France will launch national DAB+ services in 2021, while Switzerland has confirmed its plans to start switching off analog broadcasts in 2022. In Italy, DAB+ consumer sales almost tripled in the first half of 2020, helped by a regulation requiring all receivers sold from January onwards to include digital capabilities.

Hannon said significant developments were occurring in other parts of Europe, Asia-Pacific, the Middle East and parts of Africa.

Tunisia and Algeria recently launched DAB+ services. A draft regulation for the licensing of digital radio is expected to be published in South Africa by March 2021.

AUTOMOTIVE PROGRESS

DAB's progress in penetrating automobiles was the subject of several sessions.

To date, the technology has been successful in staking out space in European automotive dashboards. For instance, in "Norway, Switzerland, the UK and Italy ... over 90% of new cars all have digital radios as standard," said Hannon.

The implementation of the European Union's European Electronics Communications Code this month, enforced by national laws in EU member countries, will improve matters further. All new car radios sold in the EU will be required to receive DAB+, whether an EU member country has digital radio terrestrial services on air or not.

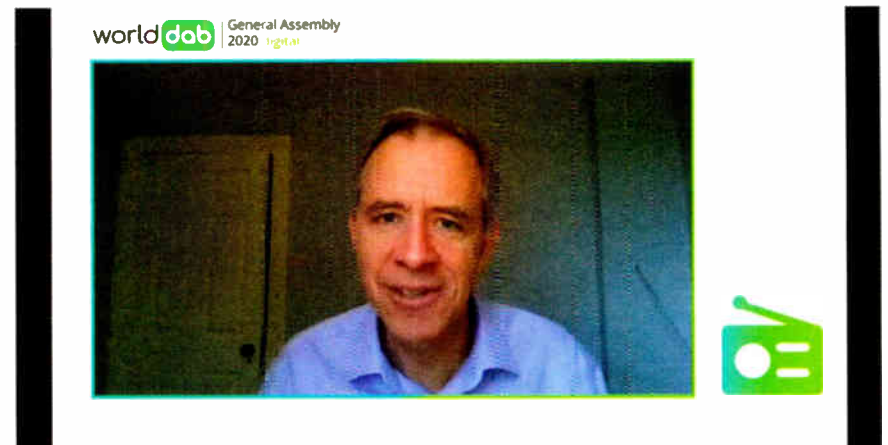
"COVID-related delays are possible," Hannon observed, "but critically there's no major issue ... By the end of 2021, the vast majority of new cars in Europe will have DAB+ as standard."

Radio's place in the car and the competition for in-car listenership were tackled by Roger Lanctot, director of Automotive Connected Mobility with Strategy Analytics.

He said connectivity is the way of the future for automotive infotainment.

"In 2020, for the first time, more than half of all (new) cars will come in with built-in modems," he said. This is enabling all kinds of in-car listening options including streaming media and hybrid radio, in which a receiver tunes to terrestrial broadcast but switches to the streamed version when the car is out of range.

Now being offered by Audi, with other automakers and equipment manufacturers looking to follow suit, in-car hybrid radio also allows users to search



WorldDAB President Patrick Hannon described progress for the technology and set out several priorities including more placement in automotive and consumer receivers and further adoption in new markets.

online for their favorite artists/songs and find them on terrestrial radio.

"The key that's enabling this is the backend metadata infrastructure that's being provided by multiple suppliers," said Lanctot. "It's stitching together that metadata from digital radio that makes radio searchable."

Looking ahead, Lanctot sees great advertising revenue potential in harvesting in-car listener data. "Companies like Drive Time Metrics are working with automakers to help them understand how to gain insights into the listening behavior of customers in their cars," he told attendees. "This is a very powerful value proposition that can potentially transform the broadcast industry if we can get at these insights."

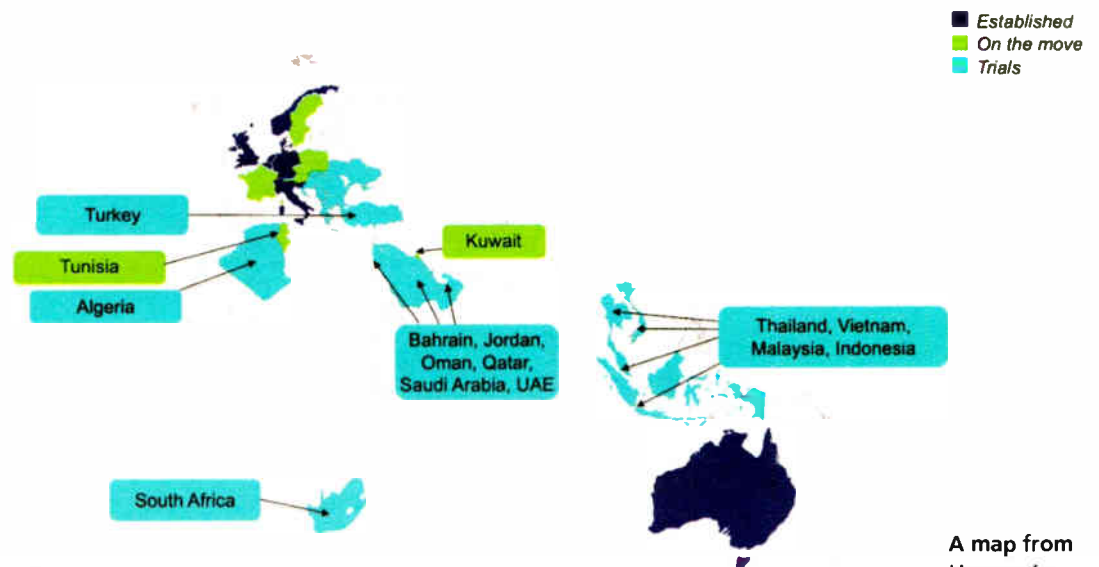
In another session, Guru Nagarajan, lead automotive manager for Google's Android Automotive, spoke with Xperi SVP of Broadcast Radio Joe D'Angelo about some of the challenges Google is facing in developing the company's Android Automotive operating system.

"We are learning," Nagarajan told attendees. "We've had 200 automotive OS platform releases now behind us ... With every release, we continue to innovate on the platform, expand the interfaces (and) make it more modular."

According to Nagarajan, radio still accounts for the majority of in-car listening in all circumstances, and will remain important.

"Whether it be a network-constrained scenario in a connected car or (where)

Around the world, interest in DAB+ is growing



A map from Hannon's presentation.

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you have full connectivity, radio's continuing to play a key role, and the data is reflecting that," he said.

VISUAL EXPERIENCE

But to retain its share of in-car listening via modern infotainment systems, radio broadcasting may need to move beyond audio.

"We all know that radio needs to be a really rich visual experience in cars of the future with bigger dashboard screens," said Laurence Harrison, chair of the WorldDAB Automotive Working Group. "Metadata is the thing that's going to power that. Metadata is the visual and textual information about your station that brings your bands alive."

It is up to broadcasters to provision this metadata to car dashboards. This is why WorldDAB has launched a campaign to encourage broadcasters to provide richer visual and textual data to in-car displays, to attract/retain drivers and passengers as they tune across DAB+ stations.

In doing so, radio can compete against streaming services and music

By the end of 2021, the vast majority of new cars in Europe will have DAB+ as standard.

— Patrick Hannon

apps that already use striking in-car visuals to lure listeners to their services. This will particularly matter when self-driving cars take over and drivers will be able to enjoy content on large in-car displays rather than watch the road.

Also discussed during WorldDAB's automotive sessions were "service following" strategies, as listeners move between FM and DAB+ to stay tuned to their preferred radio programs; a RadioDNS open source project that allows broadcasters to track and measure in-car listening across different platforms; and "quickfire" topics in which WorldDAB's Rosie Smith asked experts for predictions on the future of audio in the car. All can be accessed through the WorldDAB YouTube Channel.

BOOSTING DAB+ RECEIVER SALES

In a session about "Marketing DAB+" creative ways to build listenership and receiver sales were profiled.

In Germany, DAB+ radio manufacturer TechniSat teamed with Digitalradio Büro Deutschland to sponsor a "Design Your Own Radio" contest. People who logged in at meinradio.dabplus.de/

could use free online graphic tools to customize the case of a TechniSat DAB+ receiver. The best design was adopted for a limited edition radio, with the winner receiving one of these radios.

To maximize DAB+ marketing success in general, "collaboration is key," said Jacqueline Bierhorst, chair of the WorldDAB Marketing Group.

Bierhorst said promotions by European public and private broadcasters are vital to DAB+'s success in the region. As an example she cited the Netherlands' recent DAB+ video campaign, which was joined by more than

60 DAB+ channels, with "the most famous deejays and presenters embodying the switch from FM to DAB+" in their TV commercials. Since this campaign launched, DAB+ listening in Holland has gone up 27 percent.

SOLID YET STATIC SALES

In terms of actual radios sold, DAB+ sales are holding steady across 12 European countries, with 3.78 million DAB+ receivers sold annually in 2019 and 2020.

"Portable radios make up the lion's share of sales," said Max Templeman, insight director for consumer electron-

ics with research organization GFK. Portables accounted for about half of all DAB+ radio sales during these two years, with the rest coming from sales of car radios, clock radios, tuners and radio boomboxes; among others.

COVID-19 had an impact on DAB+ radio sales. Thanks to the lockdowns across Europe, online sales' share of total consumer purchases went from 26% in January 2020 to 60.9% in April 2020. As outlined by Hannon at the start of the General Assembly, ensuring all receivers are equipped with DAB+ as standard is a priority.



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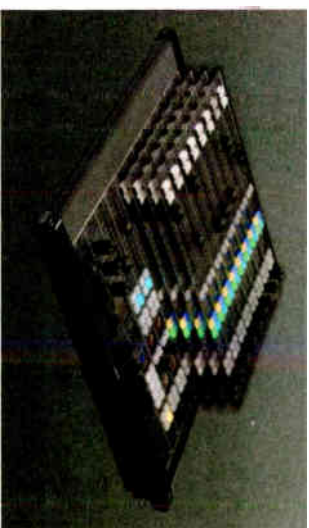
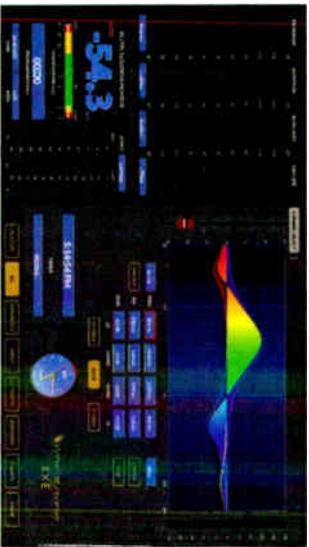
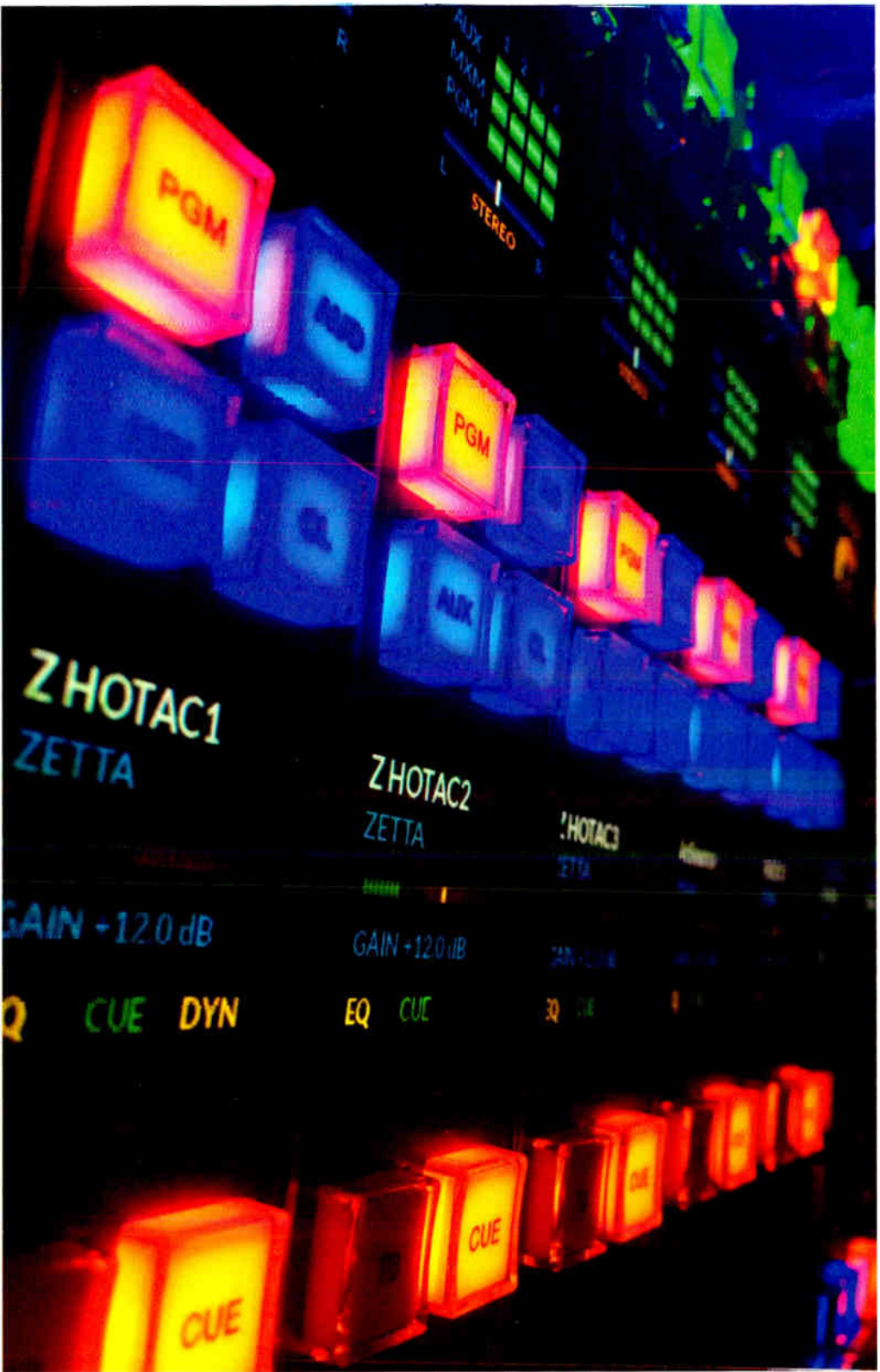


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MARKETPLACE

Tieline Gateway Codec

Tieline is now shipping its Gateway Multichannel IP audio codec, which surpasses the Merlin Plus and Genie Distribution models.

The company highlights the DSP power of this 1RU IP codec; it says Gateway enables transport of multiple channels of mono or stereo audio across the internet or any QoS-enabled IP network, including T1 and T3 connections and private WANs with MPLS.

It streams up to 16 IP audio channels with support for AES67, ST 2110-30, AES3 and analog I/O as standard. It comes in two versions; one supports eight channels in/out (eight mono or four stereo), the other supports 16 channels in/out (16 mono or eight stereo). An upgrade path allows a buyer to start with eight and expand.

Features include hitless packet switching using SmartStream Plus redundant streaming, plus bandwidth aggregation using Fuse-IP technologies over internet connections. It supports 16 bidirectional mono or eight bidirectional stereo streams of IP audio in 1RU.

It's interoperable with other Tieline IP codecs and compatible over SIP with EBU N/ACIP Tech 3326 and 3368 compliant codecs and devices. The Gateway interfaces with analog and AES/EBU sources, as well as newer broadcast plants with AES67 and ST 2110-30 IP audio infrastructure. An optional WheatNet-IP card will be available.

Gateway is configurable through an embedded HTML5 Toolbox Web-GUI interface and is controllable using Tieline's Cloud Codec Controller.

Info: tieline.com/gateway



A Black Version of the RE20

If Darth Vader ever needed a studio microphone, he'd want a black one. He might well choose the dark-charcoal Electro-Voice RE20 microphone, a new color option that is suitable for (among other things) use on camera.

The RE20 itself has been around for more than 50 years but the company says it has seen fresh interest.

"Beyond providing the industry-standard sound of FM radio voices, the RE20's popularity has surged in recent years with the rapid growth of podcasting and home recording/production," a press release states. "It also remains a trusted tool in professional recording studios, and a mainstay mic on live-performance stages everywhere."

Features of all RE20s include Variable-D design to minimize proximity effect; a mid-bass tone-shaping switch; integrated pop filter; and humbucking coil to guard against line hum.

Info: www.electrovoice.com



Axia iQs AES67 Mixing Console Software

Telos Alliance has launched Axia iQs AES67 Mixing Console Software. "iQs is the first soft console controlled by a full HTML-5 interface, allowing you to control a mix from anywhere, on any device: Mac, Windows, tablet, laptop or even a smartphone," it said.

The software can be deployed using either Telos Alliance's new AE-1000 server or on a Docker container.

The company says the software gives broadcasters the benefits of cloud deployment but accessible on familiar devices. "If their device has a web browser, the broadcaster can control a mix with iQs."

Telos said this is part of a larger virtual plan to "build inclusive virtual platforms and collaborate with valued partners like Dolby, Fraunhofer, Nautel, and others." Its goal is to build out a virtual ecosystem "serving up audio specialization in tight packages for deployment via OEM, on-prem, off-prem or the cloud."

Info: telosalliance.com

SoundTools WallCAT8

Hardware manufacturer SoundTools introduced WallCAT 8, a two-gang wall plate with four female and four male XLR connectors.

The plate utilizes eight connectors, allowing the choice of either input or output across four XLR channels. A pair of RJ45 connections in the back transmit analog audio, AES3, DMX and interCOM signals to multiple locations with a Cat-5e, Cat-6, or Cat-7 cable. Connectors on the WallCAT 8 come preinstalled, ready to go without need for soldering.

The company says its WallCAT 4 models have been popular and drove it to try to fit eight connectors on to a standard 4-inch x 4-inch wall box plate.

Info: www.soundtools.com



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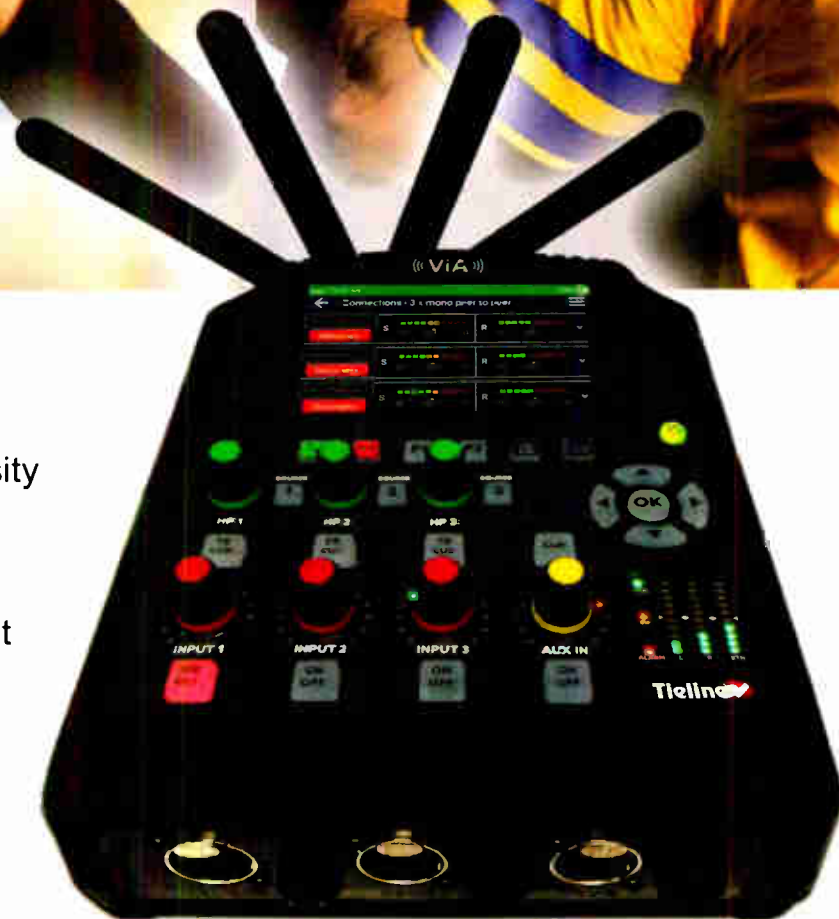
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What a year: COVID, fires raining ash, weeks of 100+ degrees, power blackouts, even beta testing Orban's XPN-AM with PPM encoding! Thanks and congratulations!



Congratulations, Jason, on this well-deserved accolade, from your friends at RCS.



The Society of Broadcast Engineers congratulates you, Jason, on receiving this honor. Your dedication to the ideals of the SBE and devotion to high technical standards are reflected in your work and your service to the SBE.



This honor is well-deserved, for your hard work, high standards and commitment to improving our industry's technologies and workflows.



Thank you Jason for your passion and enthusiasm for the broadcast industry. All of us salute your efforts to continuously look and move forward.



Best wishes and thanks from your friends at Wheatstone. It has been a pleasure and a privilege to work with you on numerous challenging projects. Congratulations on receiving this well-deserved award.



Omnirax has long valued Jason for both his patronage and his willingness to be both an evangelist and a trusted advisor in our mutual efforts to make radio sound and work better.



Jason, thank you for the passion, leadership and embrace of innovation that you bring to this remarkable profession.



Radio's Global Response to COVID-19

Facebook group swapped hundreds of ideas from around the world

BY KEN BENSON

The author is co-founder of consulting firm P1 Media Group.

The year 2020 has been like no other, a year we'd all rather forget. Coronavirus turned our world upside down.

But rather than dwelling on how COVID-19 decimated radio listening, revenue and personnel, we want to close out the year by sharing some of the amazing and extraordinary ways radio worldwide responded to the pandemic.

In mid-March when the lockdowns began, P1 Media Group felt compelled to do something, somehow, to help radio. We knew there was no programming playbook for COVID-19, yet listeners all around the world were depending on us to keep them informed and entertained during this unimaginable time.

With P1's global footprint we were beginning to see some very interesting ideas stations were executing in different parts of the world and had a feeling that if we could create a hub for stations to share and exchange these ideas, those ideas would spark more ideas and inspire more stations, and radio listeners everywhere would benefit.

It was our desire to use radio's collective brainpower to help us through the pandemic that led us to the formation of the Facebook group "Coronavirus Radio Ideas."

SMILES ONLINE

Thanks to the support of Benztown and Radio Days Europe, the Coronavirus Radio Ideas Facebook group took off like a rocket.



Coronavirus Radio Ideas

Public group · 2.9K members

The Coronavirus Radio Ideas Facebook group quickly attracted several thousand members representing radio in more than 80 countries.

It quickly attracted several thousand members representing radio in more than 80 countries spanning six continents. Over 300 ideas were shared in the first months, covering everything from programming to podcasting, promotion to marketing, sales to social media and much, much more.

A laugh and a smile can be just what a listener needs to cope during challenging times and radio delivered its share of smiles both on air and online.

"The Kyle and Jackie O Show" from KIIS in Sydney, Australia created several amusing social media videos. One featured show producer Pete demon-

strating social distancing on the sidewalks of Sydney with a homemade contraption that kept him six feet apart. Another video revealed how parents could teach kids simple fractions while drinking wine.

CFOX in Vancouver, Canada produced a clever video — based on BBC nature series including an impeccable impersonation of the one and only Sir David Attenborough — called "Humans Are Emerging." ACE Radio Network in Australia created wonderful theater of the mind with an extremely well-written and -produced call of a fictitious horse of race, naturally called "The COVID Cup."

Thanks to the support of Benztown and Radio Days Europe, the Coronavirus Radio Ideas Facebook group took off like a rocket.

Songs parodies also provided fun topical ways to cope with life during a pandemic. Retired morning man and Twisted Tunes genius, Bob Rivers, changed the Beatles classic "I Want to Hold Your Hand" to "You Gotta Wash Your Hands."

FFN radio in Germany changed Camila Cabello's hit from "Havana" to "Corona." And in Seattle, the Fitz morning on show on 98.7 The Bull, transformed 90s Hip Hop song "O.P.P." to "We've got no TP" to promote their toilet paper giveaway.

MUSIC AT HOME

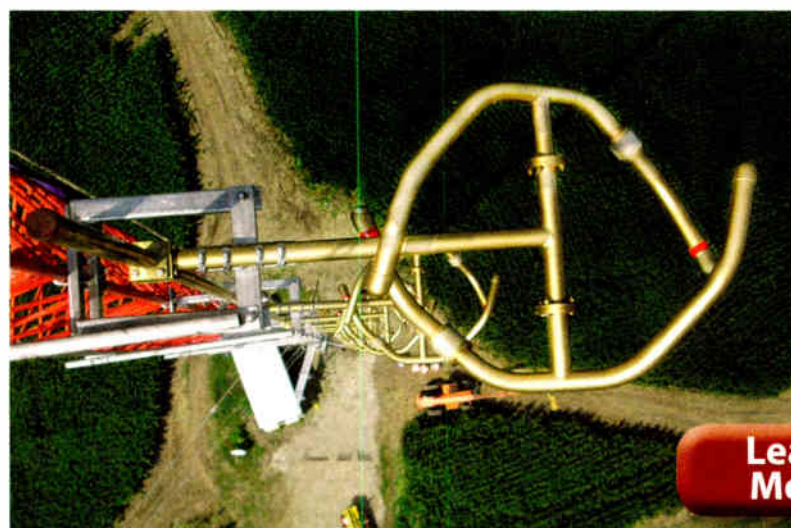
COVID 19 closed the curtain on live concerts, so radio created new ways to bring live performances to listeners safely.

NRJ Radio in France held the "NRJ Music Tour at Home" while in Spain Europe FM showcased live performance through its "Home Festival." And NRG Radio Kenya produced a massive one day fundraiser "We are One Africa Concert."

Radio 7 in Hannover and the Local Media San Diego cluster produced drive-in concerts, where listeners were treated to live performances from the safety of their cars.

Some stations went to extraordinary lengths to honor our heroes on the frontlines. Hospital workers in Cyprus were quarantined at hotels between long and grueling shifts at local hospitals. Mix radio threw those heroes a massive rave. Power 96.1 Atlanta took their nightly salutes for essential workers to the skies one evening, with skywriters creating a massive heart over downtown Atlanta. Z100 New York and Elvis Duran held nightly light shows set to music on the Empire State Building.

Yet stations didn't recognize only the frontline heroes; the BBC in the UK staged weekly on-air sing-a-longs across their stations to raise the spirits of an entire nation.



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Power 96.1 Atlanta arranged a salute to essential workers that included a massive heart over downtown.

WHEN YOU'RE COMMITTED TO SOCIAL DISTANCING



"Intern Pete," aka Peter Deppeler, shows off his homemade social distancing system for "The Kyle and Jackie O Show" on KIIS in Sydney.

AFFIRMING

Revenues were decimated due to COVID-19 and radio had to become more resourceful than ever to retain its advertisers.

There were stations offering one week of free ads or "run your schedule now and pay when you can" promotions, while others bundled hundreds of thousands of dollars in free airtime for clients and charities that needed it most.

In Dallas, Texas, iHeartradio called on the help of local billionaire Mark Cuban to provide insights and encouragement in a special five-station simulcast aimed at helping businesses.

Despite all the challenges we faced in 2020, radio found many ways to positively impact their local communities.

The NENT Radio Group in Sweden started "Listener Help," a program that connected listeners in need with listeners willing to help. Listeners brought food, medicine and a smiling face to those who needed it most.

The Rolling Stones came to the aide of Fabulous 103 in Pattaya, Thailand, where the once-thriving tourist town was devastated by COVID-19, donating the proceeds from the song "Living in a Ghost Town" to feed the impoverished unemployed tourism workers.

Our global response to COVID 19 reaffirms radio is an amazing and remarkable medium with talented and creative content producers all over the world. Radio delivered the laughs and smiles, the essential information and the hope and reassurance we needed when we needed it most.

Get inspired and join the group at www.facebook.com/groups/coronavirusradioideas. View winners from the recent *Global Coronavirus Radio Awards* at <https://plmediagroup.com> and click on *Coronavirus Radio Ideas Winners*.

To All the Radio Engineers Out There Helping Stations Stay On-Air:



Thank You for Keeping Us Together.

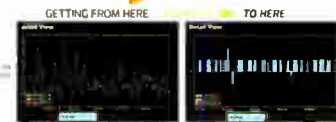
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Dielectric Innovates for EMF Colorado

Weather resistance and improved efficiency aid two-station antenna performance

BY JACK ROLAND
Colorado Field Engineer
Educational Media Foundation

PUEBLO, COLO. — Educational Media Foundation is most often identified with its growing K-LOVE and Airl brands, which today represent the largest contemporary Christian music radio networks in the United States. EMF has provided a presence for both networks in Colorado through the acquisitions of KLCX(FM) and KWRV(FM), serving the Pueblo market and surrounding regions.

The acquisitions happened at different times, but both stations have long been combined into a common antenna. That antenna originally was designed to accommodate 104.9 and 107.9 MHz. KLCX broadcasts K-LOVE on 106.9 MHz, and KWRV carries the Airl format on 104.9. Unfortunately, 106.9 MHz was not in the frequency range of the original design.

There were other concerns with the existing antenna, including its lack of protection against icing and other weather. The transmitter site is about 30 miles southwest of Pueblo in a mountainous area, so ice would often detune the antenna and raise VSWR levels, reducing coverage.

Following a severe system failure, we reached out to Dielectric for help, which led to the purchase and installation of a Dielectric DCR-M antenna and two-station combiner. In the months since installation of the antenna, combiner and two new transmitters, the new RF systems have eliminated all existing problems while strengthening our signal coverage.



Dielectric solved a problem by spacing the antenna bays at an approximate 0.92 wavelength, which allows the 100 kW ERP to be produced with a lighter eight-bay design.

BAY SPACING

The DCR-M model is a center-fed, eight-bay antenna with an omnidirectional pattern. The antenna design has unique attributes to meet the weight and wind load limitations of our tower. A typical two-station antenna uses half-wavelength bay spacing, which would

have required 16 bays to produce the appropriate antenna gain and 100 kW ERP with a 30 kW transmitter. The 16-bay antenna loading would not have been a solution for the current tower without significant tower modifications.

Dielectric solved this problem by spacing the antenna bays at an approxi-

mate 0.92 wavelength, which allows the 100 kW ERP to be produced with a lighter eight-bay design.

Dielectric's "funky elbow" design maintains the full-wavelength electrical spacing between the antenna bays while allowing the physical spacing to be reduced, resulting in near full-wavelength bay spacing antenna gain. It also simultaneously reduces the RF radiation on the ground, which was a concern given the tower's proximity to walking trails, campsites and wildlife.

The antenna also includes a "fine matcher," which allowed for easy adjustments of the antenna system's input impedance upon installation on the tower.

Galvanized Endeavors of Colorado Springs handled the DCR-M installation, as well as removal of the old antenna and damaged transmission line. The new antenna mount and transmission line were put into place, and the antenna was installed on the tower with its center of radiation positioned at 163 feet above ground level.

Given that the site elevation is at 8,350 feet above sea level, the antenna is prone to very heavy winds (often above 100 mph) and a consistent 20-to-30-inch snowpack in the colder months.

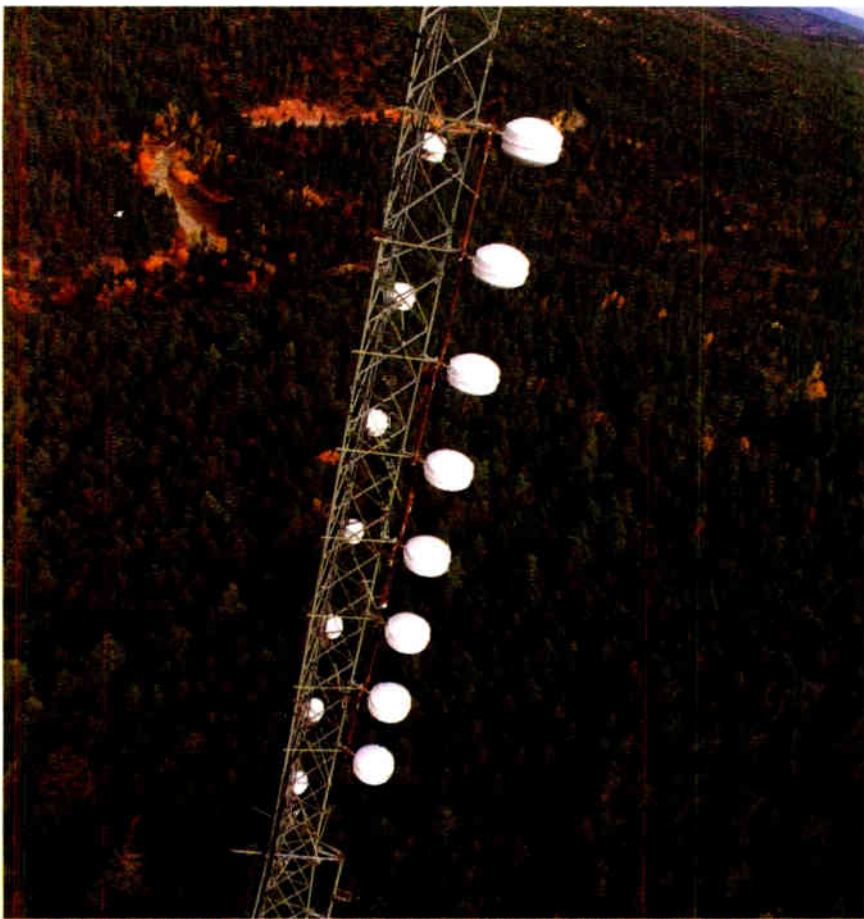
These weather conditions truly require antenna protection, and Dielectric's antenna radome design has already delivered. We experienced a hefty snowstorm in October, which left several inches of ice and snow on all surrounding structures. The antenna

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AMB22-4MOT	AMB16-4 MINI MOT	HMB14-4MOT	HMB8-4-MINI-MOT
AMB-22-4	AMB16-4 MINI	HMB14-4	HMB8-4-MINI-MOT
AMB-22-4E	AMB16-4E MINI	HMB14-4E	HMB8-4E

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Antennas, Power Products and Transmission Support



was white from top to bottom, yet the radomes offered full protection from the wintry conditions. The antenna remained in tune, and with no change to VWSR levels, which remained steady between 1:05 and 1:08 across both station frequencies.

Inside the transmitter building, the Dielectric two-station combiner is properly matched to both the transmission frequencies and the transmitter power output. This means the combined signals are sent to the antenna with the right amount of power with minimal loss and a proper safety margin — all while meeting the mask requirements. The combiner properly prevents intermodulation issues from the two signals mixing along the path.

Even though the transmitter site's mountain elevation required the RF components to be derated for altitude, Dielectric's modern combiner design is compact, and the new system opens up a great deal of interior building space. As this is a shared space, floor space is at a premium. The new combiner fits comfortably in the building, which allows us to make the most efficient rigid transmission line run possible — a perfect convergence point with the antenna feedline coming into the build-

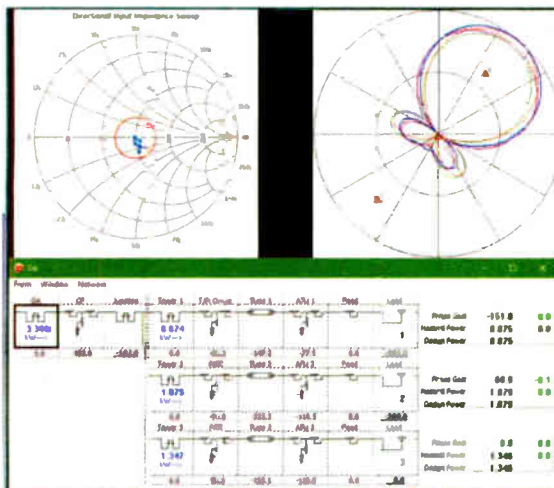
ing. The location of the combiner means I can access the rear of my transmitters and audio racks comfortably to perform maintenance.

Two months in, the new Dielectric system has exceeded our expectations performance-wise, while providing a robust and reliable solution which has simplified our lives in engineering.

For information, contact Jay Martin (United States) at +1-207-655-8138 or John Macdonald (international) at Dielectric at 1-239-272-5962 or visit www.dielectric.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 brett.moss@futurenet.com.



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DESIGN

FABRICATION

INSTALLATION

The ATU y'all built for Wheeler's 1390 WPLI (AM) in Lynchburg has been absolutely stable since we installed it in October. The efficiency gain in this new ATU is appreciably noticeable when listening in the field. I'm now able to clearly detect the station in places where before it was just noise. Many thanks to you and your crew for helping us quickly and effectively fix that station.

-Josh Arritt, Contract Engineer



Antennas, Power Products and Transmission Support

TECHUPDATES**NEW COAXIAL FM HYBRID FROM ERI**

Electronics Research Inc. released a new design for its high-power Model HY0244 coaxial FM Hybrid.

This unit can be used as either a power combiner or a power divider. It is often part of constant impedance FM filters used in the combiner system for multichannel master FM antenna systems, according to the company.

The new design has a higher peak voltage handling capability than the previous version, to accommodate a system that includes elevated HD Radio injection levels. It also has improved bandwidth and is easier to tune for applications that require covering the entire FM broadcast band.

In addition to its use in FM channel combiner systems, it has application as a cabinet power combiner for high-power FM transmitter systems. It can also be used as a power divider to feed dual input master FM antennas.

The HY0244 is available with a variety of port configurations including 3-1/8-inch, 4-1/16-inch, 6-1/8-inch and 9-3/16-inch. It is available in both crossover and non-crossover designs.

The standard HY0244 offers an equal split, 3 dB, coupling ratio but other values can be provided. The HY0244 is constructed in a rugged and lightweight aluminum housing. It is offered as a system component in channel combiner, high-power constant impedance bandpass filters, FM cabinet combiners that include motorized switching, and other applications.

The HY0244 joins a family of hybrid couplers from ERI. This range of designs includes coaxial FM couplers with combined power handling capability from 15 kilowatts to 280 kilowatts.

For information, contact ERI in Indiana at 1-812-925-6000 or visit www.eriinc.com.

BEXT HAS CROSS-COUPLING FOR COMBINERS, FILTERS

Bext Corp. recently introduced a series of RF combiners and filters with Cross-Coupling.

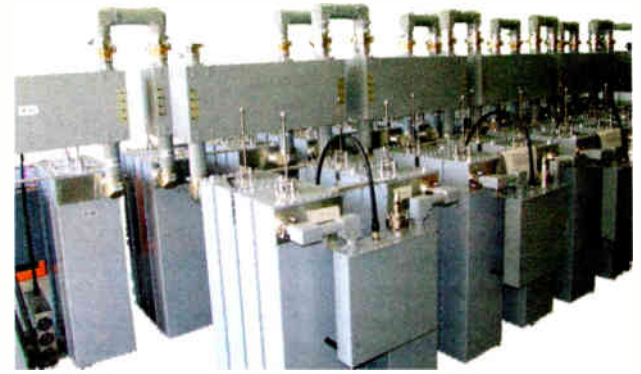
It says that by means of manipulating a portion of the RF signal and reinjecting it out of phase, it can combine FM channels that are extremely close in frequency, as close as second adjacent, or 400 kHz.

Bext's broadband FM antennas allow multiple transmitters to broadcast from a single antenna, saving tower space that normally would be necessary for multiple antennas, and providing optimal coverage for

all transmitters involved.

The same technology is available on the Bext line of RF filters, which allows aggressive filtering for situations where steep filtering is necessary due to separate stations whose antennas are physically very close, again where those transmitters operate on frequencies that are very close to each other, as close as second adjacent, or 400 kHz.

Bext combiners and filters can be ordered for standard analog FM sta-



tions, translators or boosters applications, or for IBOC/HD Radio FM stations, translators or boosters applications, and can handle up to 60 kW of total TPO power.

For information, contact Bext at 1-888-239-8462 or visit www.bext.com.

KINTRONIC PROVIDES IMPROVED DIRECTIONAL DATA

Kintronics Labs says its model KTL-DA-MON-T/P enables customers with AM medium-wave directional arrays to monitor each tower's current ratio and phase displayed on digital meters electrically interfaced with a Potomac Instruments Model 1901 digital antenna monitor.

The directional pattern monitoring system simplifies tuning of a directional antenna array and can enable remote monitoring of antenna parameters so station engineers can remotely check their antenna pattern.

The KTL Model KTL-DA-MON-T/P monitoring system can be configured for any number of towers and directional patterns.

Kintronics says that alarms can be programmed so that if the current ratio or phase changes by a set amount the screen will change color to an alarm state. The unit is designed to be mounted in a standard 19-inch rack and is suitable for U.S. or international applications with the required input power being 120-240 VAC, 50/60 Hz.

For information, contact Kintronics Labs in Tennessee at 1-423-878-3141 or visit www.kintronics.com.

**SINE CONTROL TECHNOLOGY ANNOUNCES NEW SURGE SUPPRESSOR**

Sine Control says its Series 200 ultrahigh capacity surge protective device (SPD/TVSS) is suitable for use at broadcast transmitter sites, especially in areas with high exposure to lightning, as well as in network centers, studio complexes and other mission-critical installations.

The Series 200 is rated at 200,000 surge-amps per phase, and will attenuate powerline spikes and surges to within a few volts of the AC sine wave.

The Series 200, the company says, is particularly suited for solid-state transmitters that use switching power supplies that are especially vulnerable to power line disturbances. PowerClamp SPDs use a hybrid of multiple technologies to reduce the amplitude of AC spikes and surges that often damage these switching power supplies.

The Series 200 has 33% more surge-amp capacity than previous PowerClamp units, but costs less thanks to newer production technology, the company says.

The PowerClamp Series 200 is available for single- and three-phase WYE electrical service from 120 to 480 volts. LEDs monitor the unit's fuses, with a Remote Status Output optionally available. Load-matching is not required, and there is no insertion loss or risk of power cutoff.

For information, contact Henry Engineering/Sine Control at 1-562-493-3589 or visit <https://henryeng.com/powerclamp>.



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Antennas, Power Products and Transmission Support

RF HAWKEYE SWOOPS IN ON LINE FAULTS

DAC System SA announced a new product to monitor transmission lines and antennas called RF Hawkeye.

It said RF Hawkeye is based on ultrawide-band (UWB) radar technology and a smart coupling system that allows operators to inject a low-power radar signal into the transmission line. RF Hawkeye listens to the echoes and, by means of real-time digital processing, performs an analysis of the T/L response to detect any change at the earliest possible stage, before a fault degenerates to a severe level. It says the injected low-power signal does not affect the transmission and is compliant with regulations.

According to DAC System, the result is a TDR-like system that can remain in place and be monitored 24/7. The company says any changes affecting the signal will be detected, localized and pinpointed at the precise position in a line/antenna system up to 750 meters (2,460 feet) long.

The system can detect reflections by small discontinuities in the line down to return losses equaling 55 dB and detect changes with high sensitivity (<1 dB). Besides degradation analysis it can detect and localize the presence of arcs in the line, even of short durations (down to 100 μ sec or less).

The company says the system can handle a range of faults typologies that affect performance of the transmission system and in some cases the safety of the station.

For information, contact DAC System at +41-78-8821723 in Switzerland or +1-917-854-7839 in the United States or visit www.dacsystem.ch.

RFHAWKEYE 

SHIVELY LABS SLV/VERSA2UNE ANTENNA IS RETUNABLE



Shively Labs says its SLV/Versa2une antenna model can achieve a precise directional pattern to meet customer needs through retuning.

It highlights its lower cost, lighter weight with low windload, branch-fed design with robust 7-16 DIN connections and radome option for ice protection.

In best-case scenarios the antenna would be mounted on a tower structure with width of 36 inches or less, or outriggered pole.

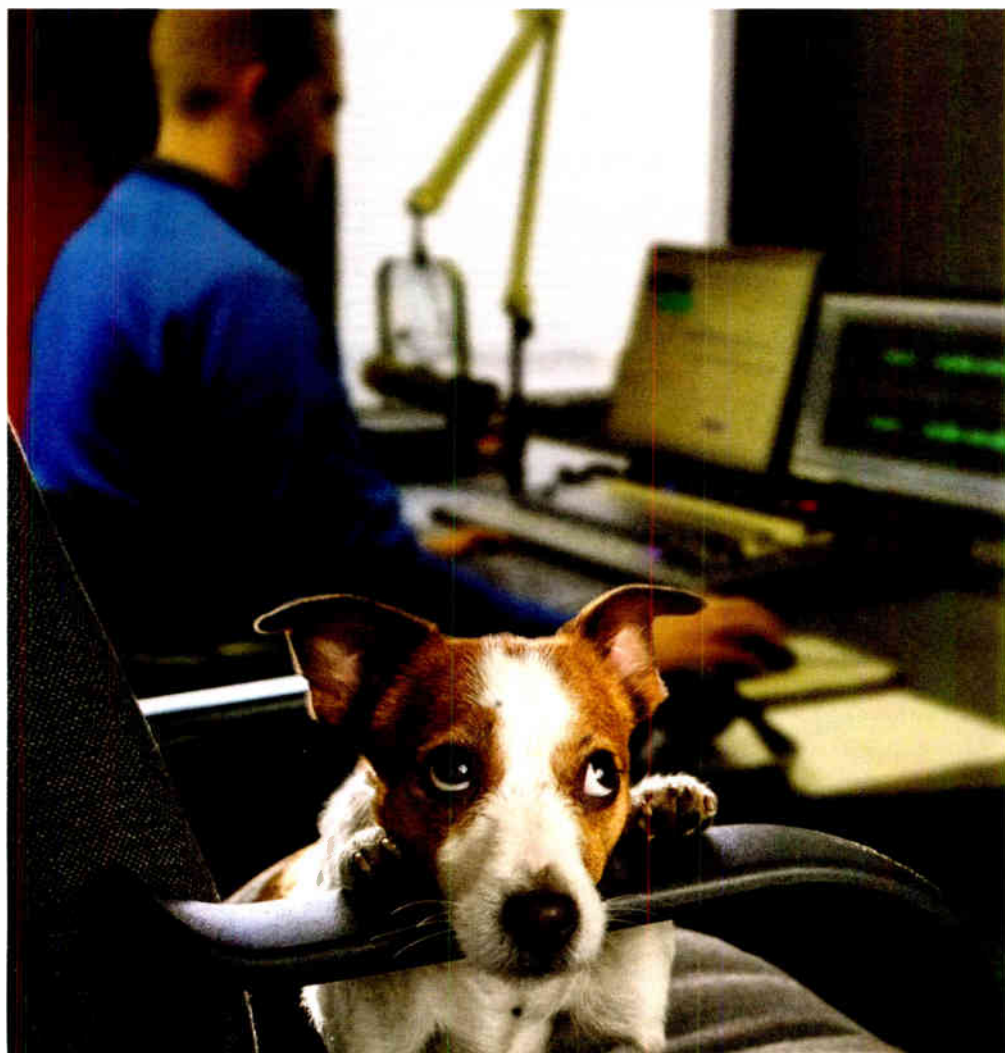
Pattern work is specific for each case by frequency and tower design. Directional pattern work is used to determine the location on the tower for mounting the antenna system while conforming to the FCC envelope.

Leg mounts, face mounts, two-leg pickup mounts and offset poles are available options. The distance away from the tower structure is a variable. Testing is based on interaction between the structure and antenna properties. Shively says patterns derived from the testing will be offered to the customer for comment and approval.

Many times, power levels have to be adjusted to maintain the FCC protects of more difficult pattern envelopes. Upon the acceptance of a pattern, Shively will document the proof and provide the necessary details of the antenna needs to the customer.

Shively says it uses scale modeling to offer the most options in re-creating the relationship between antenna and tower. By modeling on the test range, it is possible to identify unwanted interactions and mount the antenna in a way to avoid such problems. The company has an outdoor pattern range to test performance of antennas.

For information, contact Shively Labs in Maine at +1-207-647-3327 or visit www.shively.com.



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

Urban OPTIMOD-FM 8100A/XT2 6-Band Limiter, also a pair of Texar Audio Prisms with the Phase Rotator option (ideally post 500 s/n). WhatsApp/Viber +35797869349 or e-mail; DavidShapiro56@outlook.com

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

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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

Wanted: ITC interconnect cables between ITC cart machine and record amp. Manual and idlers for Harris CB-1201 turntables. Don, k8drs1@gmail.com

Old recording of AM 930 KRTH 'Smokin Oldies' format recordings from the mid 80's. WhatsApp/Viber +35797869349 or e-mail; DavidShapiro56@outlook.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.

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Collaboration Aims at Analytics Standard

RadioDNS Technical Group leads effort to measure consumption across platforms

COMMENTARY

BY BEN POOR

The author is project manager, radio, on the Technology and Innovation team of the European Broadcasting Union, an alliance of public service media with 115 member organizations in 56 countries.

For almost as long as radio and television services have existed, a large amount of effort has been expended on measuring the audiences that listen to them.

Largely driven by the boom in U.S. commercial broadcasting in the 1930s, measurements were necessary to define the advertising models that were to sustain these new services.

Although audience measurement on television would come to dominate what is understood to be “listening figures,” audience measurement is still a vital part of radio both for commercial and public service broadcasters.

In Europe, methods of audience measurement for radio vary between countries, but three methods have been generally adopted across industry: diaries, interviews and electronic measurement.

These give periodic snapshots of listening (e.g. ranging from daily to twice yearly), which does not give a clear picture of individual usage, either being driven purely from device usage, or being more based off brand recall, as such providing a broader picture of performance.

More detailed information about real engagement with specific programs, special events, segments and topics is lost in the aggregation. An experienced manager will know that a good radio station is the sum of all these parts yet relies on “craft” that can sometimes be hard to justify to those who control budgets.

ONLINE REVOLUTION

An alternative arrived in the 1990s with the rise of online measurement. This introduced a number of new metrics but also provided analytic data that could be available instantly.

Thus, those publishing on the web could have a live view of how audiences were reacting to their content. For newspaper publishers, this has fundamentally changed their business; and although this has led to a rise in “clickbait,” it is notable that audiences still place value in “trusted sources.”

long can, in theory, give us the analogy to traditional measurement, with the benefit of being near-instantaneous.

Broadcasters have been trying this for the best part of two decades, although currently largely only for internal use. The reason is that much of this data relies on inference from server logs, by using proprietary methods from the broadcaster’s own applications or through third-party applications. A lack of shared technical standards and methodologies has limited development.

By contrast, traditional methods may not be sophisticated or granular but they have the advantage that they have been accepted as valid and largely transparent. Additionally, the different actors that sit between a broadcaster and their



Ben Poor

and caching, numbers are harder to rely on. For newer connected platforms like smart speakers, acquiring comparable figures can be challenging both for live and on-demand listening and again reliant on the platform (e.g. Amazon, Google) granting access. Importantly, the only party with access to the whole picture is the platform pro-

vider itself.

While internet streaming for radio has previously been a minority proportion of overall listening, dwarfed by use of broadcast, this will perhaps change as audiences consume more on-demand and personalized content, as well as with the further rollout of connected cars.

FREE AND OPEN STANDARD

A clearer view of consumption across all platforms will become more and more important. Having a standardized method that can directly carry analytics for both broadcast and broadband, live and on-demand — the full spectrum of hybrid radio — is needed.

Such an effort has started as a collaboration among several organizations, led by the RadioDNS Technical Group, which I chair. The body is responsible for developing and maintaining open standards for hybrid radio, involving representatives from broadcasters and associations across three continents (including the National Association of Broadcasters and the European Broadcasting Union) as well

(continued on page 30)

Having a standardized method that can directly carry analytics for both broadcast and broadband, live and on-demand — the full spectrum of hybrid radio — is needed.

Audience measurement for radio services has been changing in similar ways with the rise of internet streaming and connected devices. Being able to measure how many people are listening to a stream, during what times and for how

listeners can obfuscate the situation, resulting in the broadcaster not getting the full picture.

With a distribution chain that now includes increasing number of layers, each with opportunities for aggregation



The author writes that, with the spread of hybrid radio systems to cars like this Audi A4, the development of a free and open standard for the gathering of analytic data from connected devices becomes more important.

Write to RW
Email radioworld@futurenet.com with “Letter to the Editor” in the subject field. Please include issue date and story headline.

READER'S FORUM

THIS IS RETIREMENT?

The idea of a broadcast engineer totally retiring does not seem to be working out for me.

I tell everyone I am semi-retired. The theory is to be able to find a few small side jobs to just make a little "mad money" using the skills acquired through a decades-long career.

But the last few months have demonstrated how this theory never seems to quite work out.

I live in rural Colorado, about 15 minutes from a four-station FM transmitter site. For them, the nearest unretired engineer is over an hour away.

I've just finished installing two transmitters there for K-LOVE/Air1. In the process I learned that fluid-cooled transmitters are not just for huge markets and installed on skyscrapers. This was one of the most complex installs that I have worked on, and the finished project seems like a new level of quality — 35 kW and 10 kW, so clean and quiet they seem unreal.

Just as I was completing the transmitter project and thinking of relaxing again, I got a text from the manager of a college radio station where I have a support contract. Turns out they got funding and had taken delivery of two Wheatstone control surfaces, blades and Cisco switches. My experience is with small stations that owned good control boards, but nothing IP-based. So it looks like have some learning to do, as this next project gets underway.

If I really wanted to enjoy being semi-retired I guess I should have just gone back and taken a part-time job where I worked in college. Too bad there aren't many RadioShacks left; that would have been the retirement job for me.

Michael Baldauf
Rye, Colo.



Michael Baldauf

TALK OF AM DIGITAL IS FUTILE

Re "AM Advocates Watch and Worry," Sept. 30:

The topic of all-digital on the AM band has been rehashed and disposed of over so many years now, I'm surprised Radio World gives it space anymore. So once again:

Akin to the flurry of interest in AM stereo and quadraphonic now long gone, there is no consumer demand for digital AM, and virtually no digital AM radio receivers commonly available to receive it, save for new car dashboards.

New car penetration alone will not substantiate the argument for wholesale conversion from analog to digital AM transmission and transmitter plant conversions. The discussion is futile and moot.

James B. Potter
Cutting Edge Engineering
Kimberling City, Mo.



HOW ABOUT AN FM TRANSLATOR WINDOW?

Re "FM NCE Filing Window Coming in 2021," Oct. 14 issue:

It's been more than a decade since the last NCE FM filing window, but I can't even recall when was the last time the FCC allowed applications for translators in the reserved band.

Once this round of NCE FM and LPFM apps are filed, shouldn't the FCC consider a translator window as well? Isn't the notion of decades between filing windows for any service absurd?

Harry Kozlowski



ABOUT STATIC DISSIPATERS

Mr. Persons, I'm writing regarding your article of regarding the lightning strike to KJRM's broadcast facility ("What Happens When Lightning Hits," Oct. 14 issue):

While I'm always fascinated by the effects of lightning strikes and enjoyed the article. I was concerned by your comments on static dissipaters. While these devices are sold in the North American market by several firms, they have no code support in either the U.S. or Canada, and have not been shown in the field to reduce the incidence of lightning strike.

There is no known method of consistently preventing lightning from striking, and static dissipaters of the kind you mention act no differently than a conventional lightning rod. As such, these devices are not approved for use on government or military facilities, and do not enjoy wider industry support in North America.

I'd be happy to pass along links to scientific studies, or put you in touch with expert scientists in the lightning protection field. Thanks for your consideration.

Simon Larter
Dobbyn Lightning Protection
Calgary, Alberta

Mark Persons replies:

Dobbyn lightning terminals/lightning rods are Benjamin Franklin technology from 250 years ago. Don't get me wrong, they are a good way to conduct lightning strikes to the ground. I prefer static dissipaters, which are multiple sharp points to "bleed off" static charges so the voltage between the sky and ground is less. That results in no lightning strike or a strike with less intensity. Static dissipaters are the same as having one hundred or more air terminals, not just the one that a tower traditionally has next to a top beacon.

A station I did contract engineering work for years ago would be hit by lightning every summer with frequent damage to transmitters and other equipment at the base of their 380-foot tower. I was able to convince a new owner to spend a few thousand dollars to install static dissipaters the next time tower lights were changed. Fifteen years later, there hasn't been one instance of lightning damage. Likely they've had a few strikes of lower intensity.

ANALYTICS

(continued from page 29)

as device manufacturers and service providers.

The goal of the project is to develop a free and open standard for the gathering of analytic data from the connected devices themselves, as well as the definition of a basic set of data to be gathered. By optionally using RadioDNS Hybrid Lookup, the broadcaster can define and control where the data is sent regardless of whether the listening is happening over broadcast or broadband.

Having the ability to determine how a listener moves between plat-

forms (e.g. FM and IP), the broadcaster's own radio services and live/on-demand during a session, in an anonymized way, is key to revealing the real value of hybrid radio services.

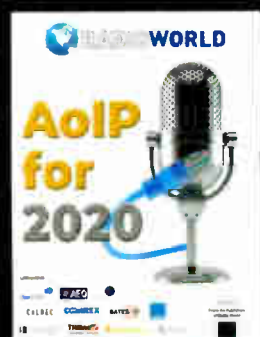
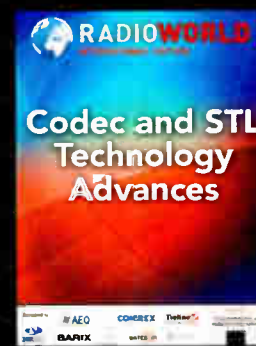
This can act as proof to broadcasters of their value, in a way that supports future investment. This benefits device manufacturers, increasing the coverage and quality of hybrid radio services that can be offered free-to-access for their own customers.

Ultimately, the winner will be the listener. Regardless of the means and mode of listening, enabling measurability for the connected era can improve radio, keeping it vibrant and exciting in an increasingly competitive space.

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