

Technology & news for radio decision makers

NAB Show zooms in on tech



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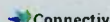
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Wireless power transfer and you

What do WPT systems for EVs portend for stations, particularly AM?



Paul
McLane
Editor in Chief

Imagine your electric vehicle being charged as you drive it down the road. Pretty convenient! But as the U.S. auto industry explores such technologies to charge electric vehicles wirelessly, should AM radio broadcasters be concerned about interference?

That's one of the topics to be explored in the Broadcast Engineering and IT Conference at the spring NAB Show. A session about EV power will be given on Monday April 7 by Bob Weller, vice president of spectrum policy at the NAB.

According to a session preview, the association's engineers have been studying the possible effects of wireless power transfer, or WPT, systems — not only for stationary use, as in a garage or parking lot, but more dramatically for use while a vehicle is in motion, through charging elements within the actual roadway.

NAB's work included a visit to a prototype WPT installation in Detroit, according to the conference agenda.

Although the description didn't specify, the facility in question is probably the short section of public roadway unveiled by the Michigan Department of Transportation and the City of Detroit in late 2023.

According to the state DOT, "Using technology from Electreon, a quarter-mile segment of 14th Street is now equipped with inductive charging coils that wirelessly charge electric vehicles (EVs) as they drive, marking a pivotal step toward electrified, emission-free roads." (You can learn more about that at www.michigan.gov, search "wireless charging roadway.")

The NAB presentation is expected to provide background information on how WPT systems operate, including possible mechanisms for creating RF interference in the AM band, as well as some of the test results obtained by NAB.

The images at bottom appeared on the city of Detroit website in November 2023 when the first section of roadway was opened. "Electreon's wireless charging technology is based on inductive coupling between copper coils installed below the road surface and receivers installed on electric vehicles," it stated.

This issue of Radio World previews other tech sessions at the NAB Show.



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Trump and the FCC

President Trump in February signed an executive order giving the White House oversight of the FCC and other independent agencies. Broadcast industry legal observers say it was principally issued to set up a court case challenging the Supreme Court's *Humphrey's Executor* doctrine, which restricts a president's ability to remove commissioners from independent agencies.

According to the Associated Press, the 1935 Supreme Court ruling established that presidents cannot fire appointed leaders of various federal agencies without cause. But conservative legal experts have argued that all such agencies in the executive branch answer to the president and that he should be able to fire their leaders at will, according to the AP.

"It's pretty clear that the executive order violates [the Humphrey's] doctrine," said Scott Flick, partner with Pillsbury Winthrop Shaw Pittman LLP. "But the administration is trying to get the Supreme Court to overrule that 90-year-old decision, and this executive order creates a test case to accomplish that.

"If the Supreme Court ultimately overrules [the doctrine] and commissioners at independent agencies are effectively made at-will employees, then the White House would be able to wield tremendous power over these agencies by simply threatening to remove any commissioner who doesn't vote in line with the administration's policies and priorities."

— Randy J. Stine



President Trump shown speaking to the Conservative Political Action Conference in February.

Samuel Corum/Sipa/Bloomberg via Getty Images



AM Bill

Despite assertions by some carmakers that the proposed AM Radio for Every Vehicle Act would lead to crippling costs, the Congressional Budget Office for the third year in a row found otherwise. It asserts the bill would only result in "a small increase in production costs to update the media system software and modify other radio components," and would not exceed the federal cost thresholds for private-sector mandates (\$206 million in 2025, adjusted annually for inflation).

The office estimated the total cost of the mandate on automakers would be several millions of dollars each year the requirement is in effect. But EV carmakers have said the bill would cost them \$3.8 billion by 2030, saying "even if the material costs are low, the intangible costs of EMI mitigation are substantial."

— Elle Kehres

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Writer



Nick Langan

The author wrote recently about the use of a flared-skirt antenna by KWRM(AM) in southern California.

HEBA finds its way to nighttime AM approval

David Maxson explores the physics behind this unconventional antenna

The high-efficiency broadband antenna, or HEBA, is an omnidirectional AM broadcast antenna that has been described as immune to seasonal variations in ground conductivity. Its footprint also is significantly smaller than a traditional antenna, because it does not require ground radials.

According to Worldwide Antenna Systems, the developer, these characteristics have sparked considerable interest within the AM broadcast industry.

In September, the FCC granted nighttime approval for HEBA operation on 940 WQVR(AM) in Webster, Mass. Engineer David Maxson was part of the process to gain that approval. He will present a session at the NAB Show titled "Proving the HEBA Antenna," Monday April 7, in the Broadcast Engineering and IT Conference.

Maxson will discuss the design, measurement techniques and insights from NEC-5 software modelling. Grady Moates of Loud and Clean Broadcast Science, part of WQVR's engineering team, and consulting engineer Peter Zollman assisted Maxson with preparing the paper associated with his talk.

Maxson has worked as a broadcast engineering consultant since 1982, when he co-founded Broadcast Signal Lab, the precursor to his present business, Isotrope, which launched in 2010. His contributions include NAB presentations on measurement and interference issues and helping to standardize HD Radio broadcasting, including authoring "The IBOC Handbook — Understanding HD Radio Technology."

Addressing efficiency

The HEBA's architecture has raised questions within the industry: What are its underlying physics? How efficient is it, exactly?



In the WQVR deployment, the HEBA stands 72 feet high and occupies a 40-foot-square footprint. It has two driven elements: a cylindrical horn-shaped vertical frame positioned above and a large capacitive plate parallel to the ground plane below it.

Maxson said the HEBA form factor is based on the Crossed-Field Antenna, a reference that may spark memories among engineers.

In the paper, submitted for the NAB Show BEITC Proceedings, he noted while the two antennas share similar physical components, they are optimized differently.

Right

The HEBA's E-cylinder, visible above its 20-foot-high ground plane structure, at 940 WQVR(AM)'s deployment of the antenna in Webster, Mass.

"The CFA was designed around the controversial premise that 'independent' magnetic and electric fields could be 'crossed' to produce a propagating electromagnetic wave," Maxson wrote. While the HEBA evolved from the CFA's architecture, he said it is based on more "pragmatic" broadcast engineering principles.

"The HEBA's shape and method of excitation were not analogous to regular towers," Maxson said, "and these features naturally fostered skepticism during the FCC approval process."

It was uncertain whether the standard FCC equation for predicting tower performance could model the HEBA's vertical pattern accurately.

This led to a decade-long process to gain both daytime and nighttime operation approval from the FCC.

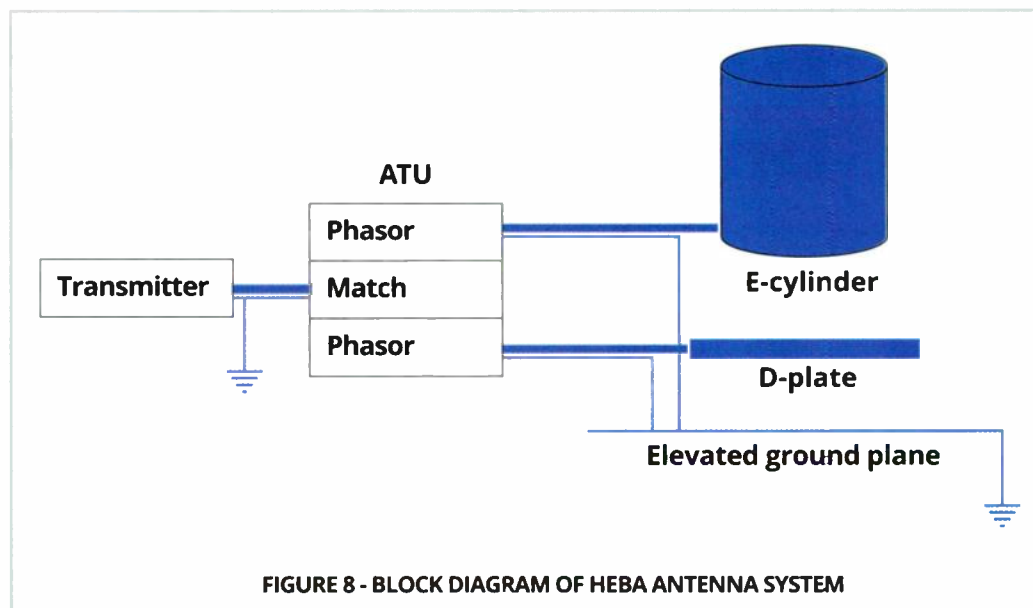
Background

Initial experimentation with the HEBA began in 2011 on a small wooden platform with an arrangement of elements built at the tower site of WQVR (formerly WGFP).

After preliminary testing and development, the FCC granted an application for experimental operation in 2015. When tests at a higher frequency proved successful, Maxson said the design was scaled to operate at the station's frequency, 940 kHz.

By mid-2016, a new, larger ANTENNA was constructed from the ground up at its current location near the transmitter building. Final testing was completed in 2017 and the station secured a license for daytime operation in 2018.

Efforts to evaluate the HEBA's vertical pattern encountered several procedural dead ends until NEC-5



Above
Block diagram of the HEBA antenna system from the paper as submitted for the NAB Show BEITC Proceedings.

Right
David Maxson



modelling software revived the project in 2022, leading to final FCC nighttime approval in 2024. The station's nighttime power remained limited to 4 watts to protect a co-channel 50 kW clear-channel station in nearby Montreal, Canada, from skywave interference at the Canadian border.

"Regardless of the final nighttime power authorization, proving the vertical pattern to the FCC required a rigorous process," Maxson said.

Modelling for the future

Maxson said he will discuss some of the findings from the NEC-5 modelling. He will also address the antenna's ability to set up a radiating signal without being overly coupled to and dependent on the earth ground near it.

He is optimistic regarding the antenna's performance.

"Its features offer benefits not seen with other short AM broadcast antennas. The dual-feed arrangement appears to enhance the electrical height as well as cooperate with the elevated ground plane to reduce near-field ground losses."

He said future HEBA deployments will need to be modelled separately for running on different frequencies. But as the designs evolve, he believes, "It will come to a point that the HEBA can be standardized and authorized by calculation without modelling each design."

With its reduced height and smaller footprint not dependent on a grounding system, Worldwide Antenna Systems says, the HEBA could be a way for AM stations to monetize their current tower real estate. 3

“Regardless of the final nighttime power authorization, proving the vertical pattern to the FCC required a rigorous process.”

A regulatory “refresh” for translators is overdue

Jim Turvaville reflects on changes in the FM landscape

This is an excerpt of a Radio World ebook that explores the interesting and sometimes arcane world of FM translators.

Writer

**Paul
McLane**

Editor in Chief

Jim “Turbo” Turvaville, widely known as Turbo, is owner of Turbo Technical Services and retired former corporate director of engineering for WAY-FM Media Group Inc.

He would like to see translator owners and operators speak up about the need for a regulatory refresh.

“The FCC went through a phase of doing away with obsolete technical rules for AM and FM stations, but it failed to address any of those for FM translators,” he said.

“Whether that would be a total elimination of the IF spacing requirements; elimination of third-adjacent-channel protection completely; changes in ownership restrictions to allow common ownership with commercial primary stations under limited circumstances; or relaxation of signal delivery methodology for commercial band facilities — these and many other issues warrant discussion and consideration by the FCC.”

Turbo said the FCC’s AM revitalization initiative brought notable expansion in the landscape.

“With so much of radio listening being a mobile audience, and the miserable condition of AM receivers in automobiles, the only real lifeblood for most AM stations is having a companion FM translator,” he said.

“The FCC offered several opportunities for AM stations to acquire FM translators, from the first ‘250-mile window’ to the subsequent filings for new FM translators. Yet there are still some AM stations who failed to take advantage of either of those events. Now those AM operators either have to negotiate and acquire existing translators, or follow the path of so many others and just turn in the AM license.

“Meanwhile I personally work with several nationwide networks of satellite- or internet-fed NCE translators controlled from a single primary station control point, also known as ‘satellators.’ But that application longer seems to represent the bulk of translator use as it did in the 1990s and early 2000s.”

His experiences suggest that FM translators have become strategic signals for both AM broadcasters and FM broadcasters utilizing HD Radio.

“The more rural markets that I work in now are primarily using translators for AM cross-band programming, most of which did avail themselves of the FCC filing

opportunities. Some of my clients are now finding opportunity to acquire additional FM translators for their AM stations, a process that requires strategic negotiation with existing translator licensees and often involves moving the acquired signal to the desired areas,” Turvaville said.

“The FCC does not place a limit on how many FM translators can be used with an AM station, only restricts the coverage of the translators so they do not overlap by 50% or more. In my rural areas, the 2 mV/m AM daytime signal is large enough, or the 25-mile rule permits, a translator in the main community of license for the AM, and additional signals in nearby communities.

“My area of the U.S. does not have terrain issues like other locations that use translators as a fill-in signal in terrain-shielded areas, but that can be a strategic use of the service.”

He said the use of translators to rebroadcast HD Radio multicast channels created an entire new strategy for

FM owners, especially in crowded larger markets where translators might still fit but other signals cannot.

“In my direct work, I have a client in a top 200 market that operates a Class C3 FM and is the only station in the market running full HD Radio. They also own three FM translators that are collocated and repeat the HD2, HD3 and HD4 channels,” he said.

“It has become a revenue source for the station, by leasing the programming on the HD channel and companion FM translator. While the initial investment to install the HD gear was large, they have more than recouped the money by leasing the alternate channels.”

In the extended version, Turbo talks about the role of translators for small-market operators, interference complaint procedures and more. Find it at <http://radioworld.com/ebooks>.



Above

Jim “Turbo” Turvaville is owner of Turbo Technical Services in Mobeetie, Texas, and a former corporate DOE.



John
Bisset

CPBE

The author is in his 34th year of writing Workbench. He handles western U.S. radio sales for the Telos Alliance and is a past recipient of the SBE's Educator of the Year Award.



Tips Please

Workbench submissions are encouraged and qualify for SBE recertification credit. Email johnpbisset@gmail.com.



Mow, mow, mow your site

Discuss these tips with the person responsible for riding that tractor

John Lackness is sales coordinator at RadioGearheads, a company founded last year by Jim Offerdahl. But as a former chief engineer and the current owner of a couple of tractors, John also enjoys doing some mowing at Texas transmitter sites on the side.

(Mowing isn't a job for a station's full-time engineer, who has more important duties. You shouldn't be washing the GM's car, nor should you be mowing the lawn, unless you really want to. In John's case, it is a paid side hustle, and there's nothing wrong with earning a few extra bucks.)

Based on his experience, here are a few tips to share with your own mowing contractor as springtime approaches.

First make sure the contractor is insured. Then go out with your prospective mower and inspect the property. The key is to identify small problems before they escalate. Assume nothing.

Identify anything unusual — hidden hazards, including guy wires. John visited one site where the owner had installed

small aviation hazard balls on the lower guys just to make sure they were visible to anyone working on the property.

Also ask the contractor to let you know about other issues they find during the work. John takes notes or snaps pictures with his phone and texts anomalies to his clients as he finds them.

Watch for ruts or sunken areas that might indicate the presence of burrowing animals. I remember a site where a woodchuck had discovered sand-filled trenches that had been dug for the transmission lines and control cables of an AM directional. Sand was easier to burrow through than dirt, and this den extended 60 feet.

This problem was discovered when a mowing contractor saw a woodchuck "disappearing" into its den, frightened by the noise of the tractor. Fortunately the animal had not yet munched on the cabling. The park authority provided a Havahart trap to relocate the varmint.

Finally, ask your mowing contractor about the equipment to be used. John has an open-air tractor that maneuvers

Above
John Lackness uses two tractors to mow transmitter sites.

Audacy's Winning Formula with Detroit Lions and Tieline

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By Ryan Sczomak, Engineer, Audacy Detroit

In the nearly 21 years I have been with Audacy, I have seen a variety of technology. I can say now, working with all six of our Audacy Detroit stations, Tieline is instrumental for us. We use Tieline as the backbone of the Detroit Lions Radio Network on 97.1 The Ticket (WXYT-FM), helping us ensure Detroit Lions listeners all over the state of Michigan can hear the Lions go all the way (hopefully) to winning a Super Bowl!

In our Game Day Tieline roster, we use a Gateway 16 at Ford Field to broadcast all home games. We do this by using several stereo streams including main program audio, a producer communication channel, a feed to the stadium that is distributed to the concourse, and a feed to the Audacy suite. The Gateway at the studio has a 5th stream which sends to our uplink provider. Having the functionality of multiple stereo channels on a single codec is extremely helpful, as the NFL is the most complicated to run of all four of the major sports. We utilize the ViA codec for our pregame remotes on 97.1 The Ticket (Lions radio flagship) and on the road we travel with a ViA for play-by-play coverage.

Other Station Remotes

104.3 WOMC (WOMC-FM) is the official station of The Woodward Dream Cruise, a highly anticipated one-day event that attracts over a million spectators and tens of thousands of classic cars from all over the world. 104.3 WOMC utilizes multiple ViAs and the Report-IT app up and down the 6-mile stretch of Woodward Avenue for The Cruise, during which we broadcast from at least six different locations throughout the day from 6am to midnight. Needless to say, this is a high-intensity day for us, and we are happy that Tieline is up for the challenge.

We utilize LTE for the majority of our news and music station remotes. For our standard remotes with a ViA,



Tieline ViA in use at a Lions away game versus the 49ers in San Francisco

we incorporate 2 to 3 mics, and the matrix editor is a great way to make sure the talkback is not sent to an output that feeds external speakers. Our news station, WWJ Newsradio 950 (WWJ-AM) utilizes the ViA on a regular basis for remotes. On those remotes, they rely heavily on the stereo line input to play back cuts from a laptop. WWJ reporters also use the Report-IT app daily to send back reports and even do live updates.

We do not typically send an engineer for music station remotes, so being able to just send the ViA with the talent is great. The talent loves the simplicity of it in the field. Everything is set up for them and it's as simple as attaching the LTE antennas, pressing the power

(Continued on Page 2)

button and connecting. The other big advantage to the ViA is that the internal battery is terrific. We had power loss about halfway through a remote broadcast last summer and we didn't miss a beat, as the last 2 hours of the remote were running on LTE and the battery still had a lot more juice left when the remote ended.

Having revenue tied to remotes, especially play-by-play broadcasts, we strive for perfection and we are happy that Tieline helps make that possible.



Audacy Engineer Ryan Sczomak with the Gateway codec at Ford Field

Bridge-IT XTRA II Unveiled at NAB 2025

Tieline will show the new 1RU Bridge-IT XTRA II audio codec for the first time at NAB in April! The compact and affordable Bridge-IT II codec debuted at NAB in 2024 and this will be the first opportunity to see the new Bridge-IT XTRA II at NAB. Both codecs are designed to deliver affordable, reliable, and high-quality broadcast solutions for:

- Home studios and simple remotes
- Studio-to-Transmitter Links (STLs)
- Studio-to-Studio Links (SSLs)
- Multi-unicasting and Multicasting applications.

They include all the favorite first-generation Bridge-IT features: a front panel screen and keypad for simple menu navigation, XLR analog and digital AES inputs, a wide range of encoding options, and support for multi-unicast and multicast connections. New features supporting modern networking requirements include:

- Native support for AES67, ST2110-30, ST2022-7 (XTRA II), Livewire, RAVENNA and AMWA NMOS IS-04 and IS-05.

- Two full-duplex mono connections, or full duplex stereo, plus support for cellular modems.
- Multiple Ethernet and AoIP ports with failover to another connection, HTTP stream, or audio file playback.

Visit Tieline Booth N349 at NAB to check out Bridge-IT II and Bridge-IT XTRA II.



Jacob Danluck, Tieline VP Sales Americas (left) and Charlie Gawley, Tieline VP Sales APAC/EMEA at IBC with the award-winning Bridge-IT XTRA II



The Tieline Bridge-IT XTRA II codec

Sarkes Tarzian Radio Innovates with Tieline

By Jamie Till, Director of Engineering for Sarkes Tarzian Radio, IN.

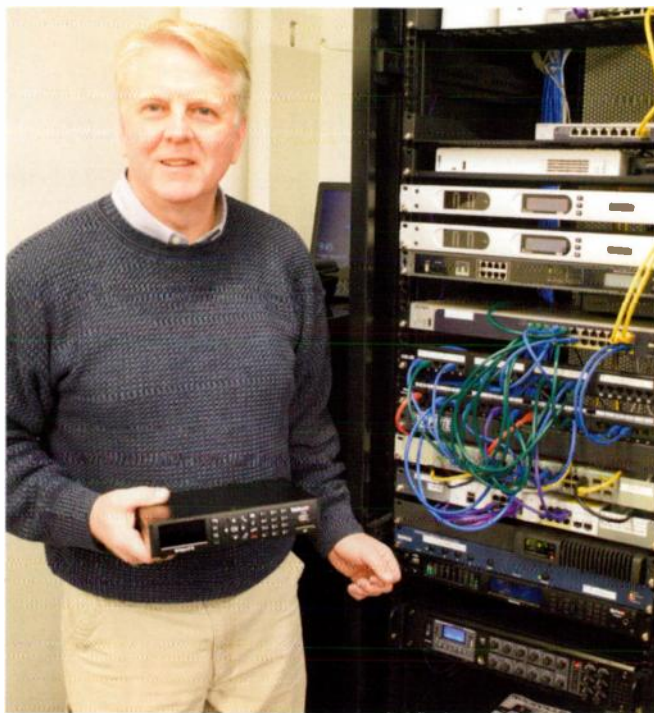
I have worked in Broadcast and Communication since the 1980s and have bumped into Tieline products my entire career. I think in general, Tieline products have always been a solid choice for any broadcast application. I have found that they have particularly distinguished themselves in my mind, by continuing to think forward while others have chosen to only move forward when they are dragged by circumstance.

This forward thinking was first shown to me about 7 years ago, when it was time to upgrade our STL network codecs. Tieline offered to loan me a set of Bridge-ITs to test. They were easy to deploy, sounded good and the price was competitive. I replaced all of our old STL codecs with Bridge-ITs.

5 years later with nary a single incident with the Bridge-ITs, I have a new project, a triangle of 3 locations that must interact. I had originally purchased leased fiber to interconnect the Livewire networks of the locations, but that proved expensive and overkill for my specific needs. I was contemplating a network of codecs to move around the audio and implementing an appliance-based SD WAN, using cheaper internet connections. I had talked with a couple of the other codec manufacturers and brought up SD WAN, they either glazed over, or told me stories of how I could "make it work". When I took my idea to Jacob at Tieline, he instantly said SD WANs were not a problem at all, and proceeded to introduce me to the then new Gateway product that would do exactly what I wanted to do with my codecs in a single platform.

Because of the network compatibility and the flexibility of the Gateway products, we can provide satellite audio and air monitoring from Bloomington, Indiana to downtown Indianapolis, and a bi-directional STL from Indianapolis to the Trafalgar, Indiana transmitter location for WTTS... all with a single appliance in each location. This is done over SD WAN, using 2 inexpensive fiber internet connections in each location for redundancy.

We are now in the process of changing out some more STL codecs in other locations and have started using



Jamie Till holding the Bridge-IT II and standing next to the rack-mounted Gateway codec

the new Bridge-IT IIs. So far, they are proving to be the better version of a reliable old standard. The built-in Livewire capability on the Bridge-IT IIs and Gateways removes the need for audio I/O from an X-Node, and the associated wiring. It is just one less thing to deal with and if I was starting with a new environment, it would save about \$2000 at each studio site. The Bridge-IT II's upgraded networking capabilities has not only eliminated steps in the audio chain, it also includes some of the networking features that are allowing us to make redundancy upgrades to our infrastructure, utilizing secondary and tertiary network routes.

My overall experience with Tieline is definitely a positive one. Their products are reliable and flexible. I have always gotten any advice I needed for deployment or configuration almost instantly. I must confess I have no experience with their repair support, because I have never needed them.

Codec Solutions at NAB 2025...

Whether you seek remote broadcast solutions, or STL and network distribution solutions, Tieline delivers multiple options at this year's NAB Show.

New Generation Bridge-IT Codecs

When we first showed Bridge-IT II at NAB 2024, the interest from broadcasters was through the roof! This year we reveal the Bridge-IT XTRA II, so don't forget to stop by booth N349 to see it for the first time at NAB.

Check out Gateway, Gateway 4 and ViA codecs!

Tieline will again show our award-winning products like the ViA, affectionately referred to as the 'Ferrari of remote codecs'. We'll also be chatting it up about our Gateway codecs that were awarded the Products of the Year. Discover why the ViA is the remote codec of choice and find out just how much power the Gateway models pack.

Discover Flexible MPX Solutions...

At NAB in 2023 Tieline revealed the new MPX I and MPX II codecs and the MPX II was awarded the 2023 NAB Show Product of the Year Award and a Radio World Best of Show Award. Tieline MPX codecs deliver composite FM multiplex (MPX) codec solutions for real-time network distribution of FM-MPX, or MicroMPX (μ MPX) signals to transmitter sites. Both the MPX I and MPX II support sending the full uncompressed FM signal, or purchase the optional μ MPX license to deliver high-quality multiplexed FM signals at lower bit-rates. The codecs support analog MPX (BNC) or MPX over AES192, to deliver a wide range of flexible composite encoder and decoder configurations for many different applications. An optional satellite tuner



card with MPEG-TS and MPE support lets you encode MPEG-TS over IP to transmit UDP streams over DVB satellite connections.

Have You Seen Our Latest eBook?

Our latest FREE eBook explores how Studio-to-Transmitter Link and Audio Distribution infrastructure continues to adapt in radio broadcasting. It details how the latest hardware and software solutions are being integrated into existing and future studio designs. Click [here](#) or scan the QR code to read it.



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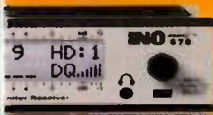
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well around anchor points and tower fences, as well as a second larger rig with an air-conditioned cab, ideal for Texas summers.

PS: The landscape contractor might value promotional airtime. Ask about a possible trade deal.

Timely reminder

While we're on the subject of walking around your site: Be aware that winter freezes and thaws can take their toll on transmitter buildings. The accompanying photo shows what one engineer found on a recent site visit. Damage to fascia can lead to roof leaks.

Walk around the entire building, scrutinizing everything.

An end to juice jacking?

USB "data blocker" devices are available in every imaginable configuration. William Harrison, technology manager of WETA(FM) in Washington, D.C., recommends you keep at least one of these "juice jacking preventers" in your kit, just in case you need power from an untrusted source.

Simply attach the data blocker between your USB cable and the power source to provide a physical block to data transfer/syncing. The



Above

Winter storms can damage building fascia, at the lower edge of the roof overhang, leading to roof leaks.

Below left

PortaPow's USB Data Blocker ensures safe charging in public settings.

Below

Using his Greenie, Dave Morgan pinpoints heat to melt potting adhesive.

device deters hacking and viruses by disabling the data pins.

PortaPow invented the first data blocker in the U.K. back in 2013. They manufacture blockers for USB-A to -A, as well as USB-C and other configurations. Search "PortaPow-3rd-Gen-Data-Blocker" on Amazon. Single units less than \$7, and multi-packs are available.

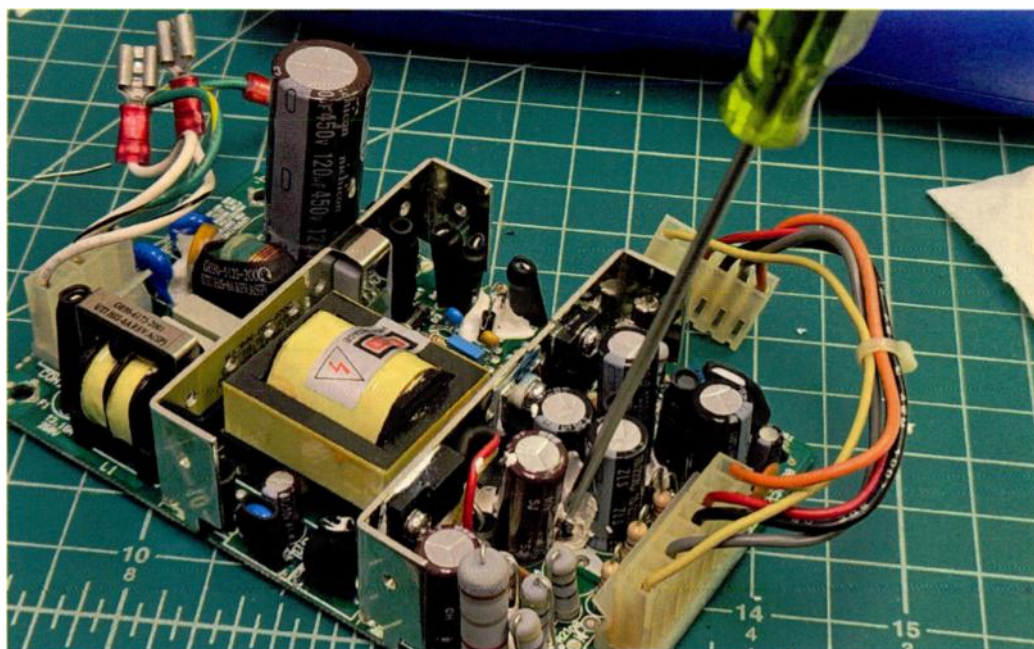
Melt the goo

Planning to replace capacitors in a switched-mode power supply? Sinclair Norfolk Director of Engineering Dave Morgan sent along a great tip.

You probably will encounter a hardened adhesive goo that discourages component removal. Dave's trick is to use a heat gun to heat the tip of a Greenie screwdriver, then immediately apply the tip of the hot screwdriver to the hardened goo. It will soften upon contact, making removal of the component possible. The Greenie pinpoints the heat so as not to damage other components, which might occur if you just directed the heat gun onto the assembly.

Attending NAB?

As you'll read in this issue of Radio World, the NAB Show will be a busy one. If you are fortunate enough to attend the convention, please be sure to visit the companies that support Radio World with their advertising; they make it possible for us to bring you this column. You will find me in the Telos booth. It's always good to meet longtime readers and exchange ideas! 🍷



ON AIR

MYTH OR TRUTH?

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Writer
Paul
McLane
Editor in Chief

What can digital-only boosters do for you?

They fill large coverage gaps and can help rimshots improve edge-of-coverage performance

A Saturday-morning session at the NAB Show will discuss "Digital-Only Boosters for HD Radio Single-Frequency Networks." It's based on a paper by Alan Jurison, who chairs the IBOC Standards Development Working Group of the National Radio Systems Committee; Jeff Baird, principal engineer at

Xperi; and Mike Raide, senior manager of broadcast technologies at Xperi.

"While analog FM and hybrid HD Radio boosters in SFNs have been widely studied, deployed and discussed, this paper will explore experimental observations of the first fielded high-power IBOC digital-only booster using off-the-shelf Gen4 HD Radio hardware," the session

summary states.

"What makes this different from existing installations is that the booster transmits a digital-only MP1 signal with no host analog FM component. Topics include potential applications, appropriate timing of implementations, and impact on analog and digital signal performance in the field."

We asked Alan Jurison for details. At the time of the Atlanta and San Francisco tests, he was employed by iHeartMedia; he now is an independent consultant.

Who was involved in this research and what was your role?

Alan Jurison: This work involves the efforts of more than 30 industry professionals from a variety of companies and consulting firms over a 16-year period.

Believe it or not, this began as a "napkin sketch" type project at a large group lunch of technologists with Xperi, the manufacturers and myself at NAB. Recall in 2016, we were just starting the foundational layers and discussions on how to include HD SFNs into the new Gen4 ecosystem, as Radio World reported at the time (see www.radioworld.com/blog-1/1245).

When it came to the Atlanta Digital-Only project that is the center focus of the paper, the lead organizations were iHeartMedia,

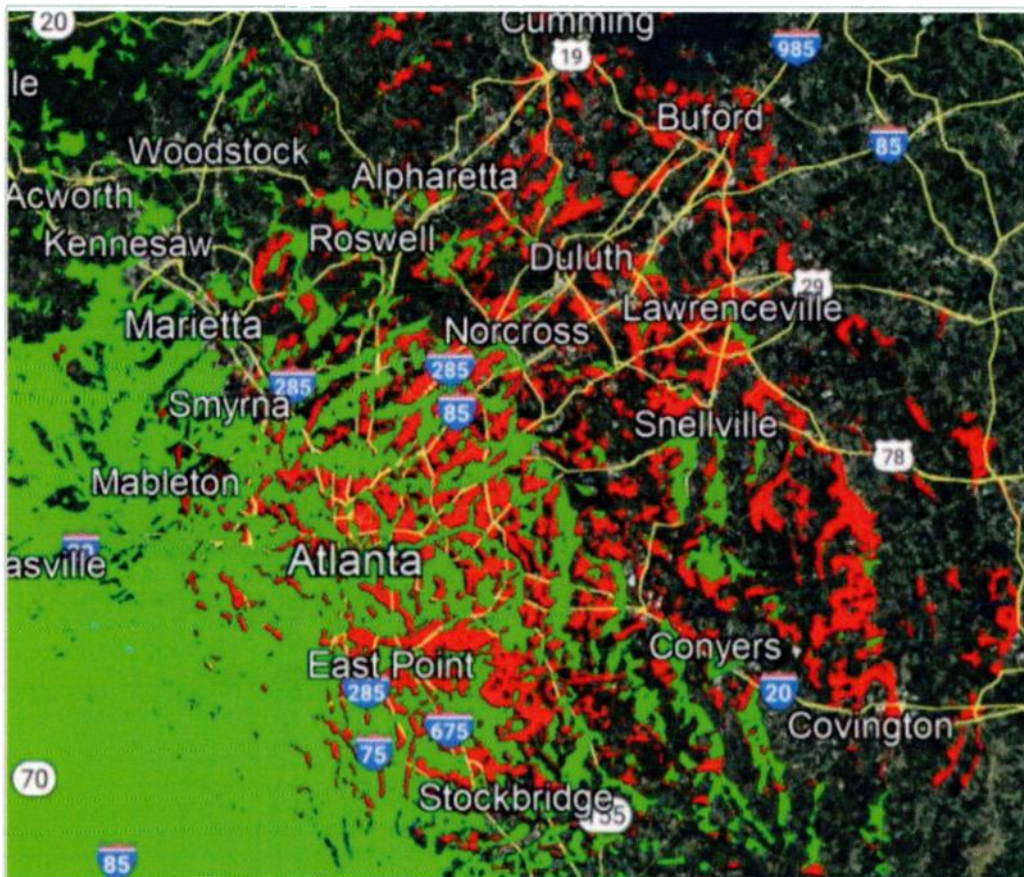


FIGURE 11: HD COVERAGE PROPAGATION STUDIES WWPW HD (GREEN) / WWPW-FM1 HD (RED) URBANIZED ATLANTA ZOOM-IN

HD Service Population	Configuration
3,231,161	Main HD -20 dBc + -10 dBc Digital Only Booster
2,208,936	Main Only -20 dBc
+1,022,225	Net Gain of Digital Coverage from Digital Only Booster

TABLE 3: HD COVERAGE PREDICTIVE POPULATION STUDIES ESTIMATED NET GAIN OF DIGITAL COVERAGE

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GatesAir and Xperi. However, the foundational contributions from individuals and organizations that established the success of this project are far-ranging and include other partners like Octave Communications, V-Soft Communications, Nautel, Kean Consultants as well as other broadcasters such as Greater Media (now Beasley Media Group), Cumulus Media and KUSC, to name a few.

In the engineering paper, which will be available for sale from NAB during and after the convention, we attempt to acknowledge everyone involved. I certainly hope we didn't miss anybody. This has been a huge collaborative effort over many years.

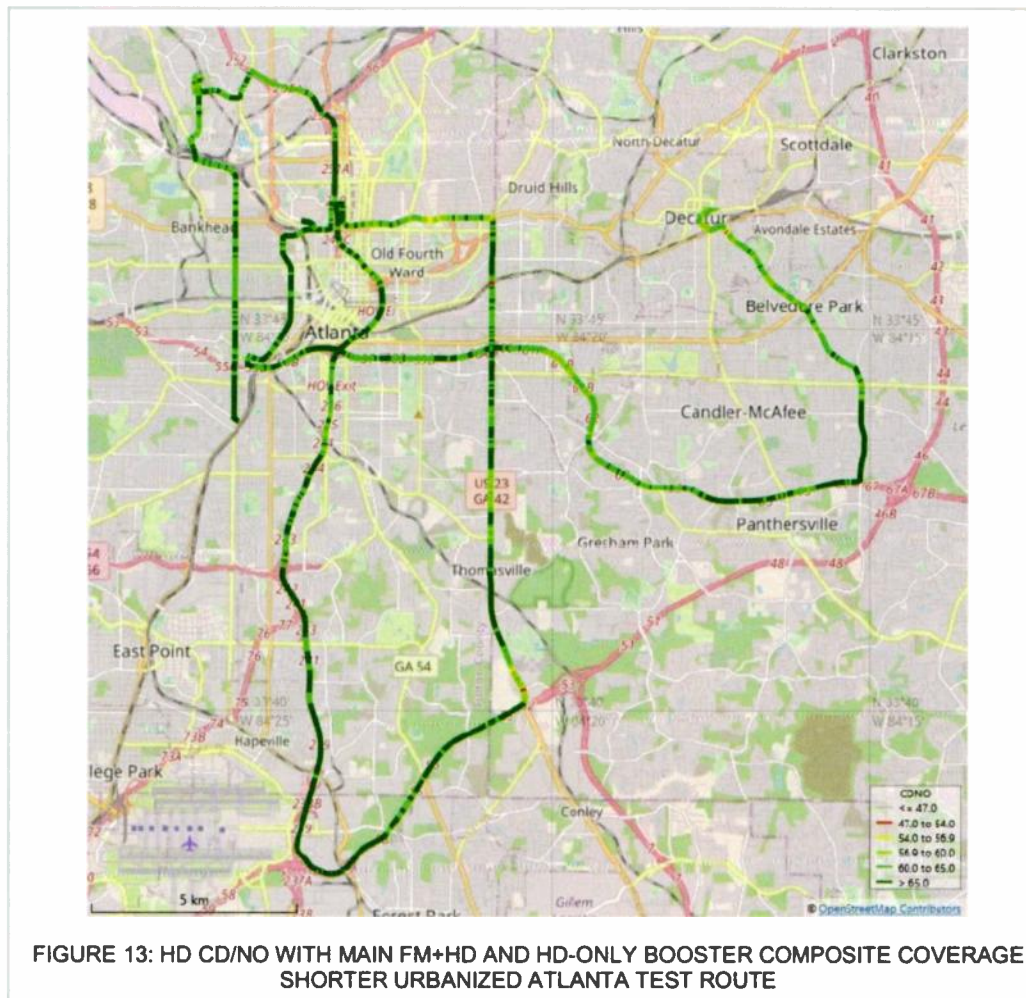
For the Atlanta Digital-Only project, my role was to research past work done by other parties, confirm older and modern methodologies in predictive and lab environments, and coordinate the technology resources, regulatory requests, test teams and planning.

At the time I was employed by iHeartMedia as a senior operations engineer working on special projects. I had significant involvement with FM+HD boosters in San Francisco and other markets, as well as product development advisory roles with the manufacturers and Xperi.

As the continued chair of the IBOC Standards Development Working Group (ISDWG) and now an independent consultant, I wanted to see this through and share the knowledge that was gained from this effort with the industry. I'm grateful that iHeartMedia, Xperi, NAB and others have been supportive seeing this through and helping us share this story.

RW How many such installations are there?

Jurison: To date, there have only been three digital-only boosters that have



received experimental authorizations from the FCC. They are WD2XAB-FM1 Baltimore, WKLB-FM1 Boston and WWPW-FM1 Atlanta.

Since these stations were operating under experimental authority to support testing, and the testing has concluded, the present-day answer to this question is zero.

“ It is our hope that the research contained in the paper advises the industry on what an all-digital booster can accomplish with off-the-shelf Gen4 HD Radio hardware and other solutions commercially available today. ”



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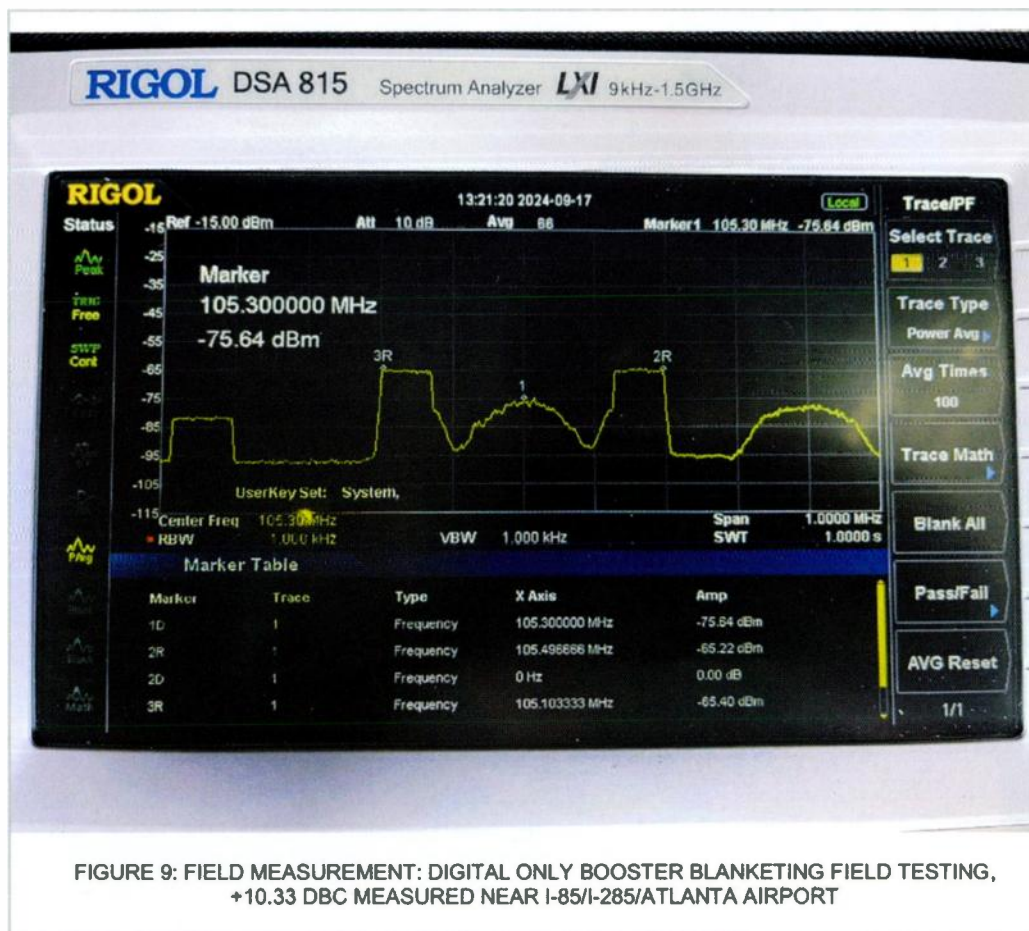


FIGURE 9: FIELD MEASUREMENT: DIGITAL ONLY BOOSTER BLANKETING FIELD TESTING, +10.33 DBC MEASURED NEAR I-85/I-285/ATLANTA AIRPORT

It is our hope that the research contained in the paper advises the industry on what an all-digital booster can accomplish with off-the-shelf Gen4 HD Radio hardware and other solutions commercially available today. Whether the industry will want to move forward with more experimentation, or a request for rulemaking to permit full-time operation of digital-only boosters for HD Radio single-frequency networks, remains to be seen.

What conclusions should we know about?

Jurison: The authors of the paper are confident that digital-only boosters are viable to fill in large coverage gaps, particularly for rimshot signals or stations that are trying to cover right up to their protected contour.

We proved that digital boosters are far more successful compared to analog boosters. The need for them will grow in importance as OEM factory-installed HD Radio penetration rates in automobiles continue to accelerate, improving the listening and visual experience in the dash.

With more than 1.6 million or 35-40% of registered automobiles in the Atlanta DMA with HD Radio, the test team wanted to evaluate the use of the booster in an IBOC-only mode.

Because of its closer proximity and higher digital ERP, the HD Radio signal in the urbanized Atlanta downtown core was mostly provided by the booster. It was noted that in most vehicles, the IBOC signal contributed by the booster survived the effects of blanketing interference and Receiver Induced Third Order Intermodulation Effects (RITOIE) caused by the in-town full Class C combined FM sites in and near the urbanized Atlanta core and the heavily congested Interstate 75, Interstate 85 and Interstate 20 corridors.

Essentially any audio impairments in the analog domain were completely erased with HD Radio receivers, and the receivers stayed locked in HD in a very hostile RF environment.

When we were doing our testing with Xperi in town and collecting data with the booster off, we received complaints when the booster was OFF! The followup question was: "How soon can you expect to complete the testing? Because we'd like it back on."

In a vehicle with HD Radio it made a tremendous difference. The digital-only booster remained on for over five months, and the only complaints that I am aware of that we ever received were when it was off. I think that's a remarkable achievement.

Keep in mind, everything we learned also applies to hybrid FM+HD boosters. While analog FM boosters can be tricky to implement successfully, HD SFNs are much more robust and really provide a compelling reason for stations that have analog-only FM boosters to convert to FM+HD hybrid boosters.

Given what we've learned, I personally would never recommend implementing a booster without HD Radio. The paper will explain that in more detail.

What impact do these have on analog signal?

Jurison: This was our biggest concern. Our most recent research shows that there is very little to no impact to analog FM reception on the host station, even in the booster's blanketing contour, in modern automobiles. We tested in 19 different test vehicles and the area served by the booster has a population in the millions. As I mentioned, the only time we had complaints is when the HD only booster was turned off during testing.



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James E. O'Neal

The author is a longtime contributor to Radio World and former technology editor of TV Tech.

BELT session offers insight on AM viability

John Kean finds that “enjoyable” mobile reception is possible

Noise problems in the AM broadcast band are nothing new; several initiatives to alleviate the situation were underway 100 years ago, not long after the “birth” of broadcasting.

However, here in the 21st century, the situation has only gotten worse, with the RF din from light dimmers, cellphone battery chargers and other consumer devices — compliant with FCC Part 15 in name only — making AM reception in the average home impossible.

A saving grace of sorts for AM service, though, is that nowadays, most radio listening is done in the car, not in the living or bedroom, as was the norm decades ago.

Mindful of this, John Kean, senior engineer at Cavell, Mertz & Associates (part of Capitol Airspace Group), undertook a field study of AM reception, with detailed signal-to-noise records involving mobile reception of three 50 kW AM stations in the Baltimore and Washington markets.

The study, undertaken with the support of the NRSC's AM Improvement Working Group, was released in January under the title of “NRSC-R102 Measurement of AM Band RF Noise Levels and Station Signal Attenuation.”

Kean will be providing information on the study and assessment of AM reception in a Monday afternoon session of the Broadcast Engineering and IT Conference titled “Real AM Radio Coverage Across Urban to Rural Areas: A Novel RF Measurement Approach.”

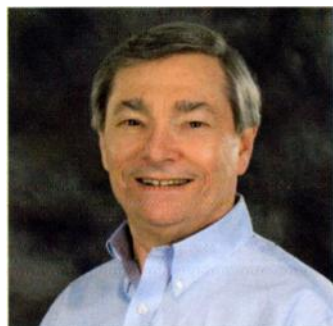
Unexpected finding

In a pre-convention interview, Kean explained what was behind his investigatory work.



Right
An aerial view of WBAL field strength on the route through downtown Baltimore. The city's Camden Yards sports stadium is visible at bottom left. Field strength along the route is depicted in varying colors, with red showing less than 1 mV/m.

Below
John Kean



“To clarify the impact of radio frequency noise on AM radio reception, I conducted a study, with the approval of the NRSC's AM Improvement Working Group, or AIWG. The working group had previously discussed RF noise, a known factor in degraded AM reception, particularly along roadways — a key location for AM listening. The study aimed to quantify that environmental noise.”

Kean observed that in addition to man-made noise sources outside the automobile, a car's electrical system and associated “unintentional radiators” can also degrade mobile AM reception, but this was not part of the study.

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Above
The cover of the report published in January.

"This study focused on environmental RF noise from sources largely outside our control, such as nearby power lines, traffic signals, roadside electrical equipment, and electronic/electrical equipment in buildings.

"My work on this project began with discussions with the AIWG in early 2023," said Kean. "During the course of several meetings, I presented the technical details of my proposed approach and shared results from preliminary drive tests conducted in Arlington, Va. These initial findings were

densely populated downtown Baltimore: Despite all of the high-rise buildings and congestion, acceptably low AM noise levels were observed in most areas of the city.

"The noise remained very low — less than a tenth of a millivolt per meter, RMS," said Kean. "There was one peak while driving under one of the routes of the Baltimore electric streetcar system."

He also observed huge variations in the field strength of one of the AM signals being monitored, Baltimore's WBAL, which operates on 1090 kHz with 50 kW.

"The WBAL signal reached 100 microvolts per meter on an elevated area of roadway in west Baltimore, but fell to less than 1 millivolt per meter in downtown. However, the RF noise remained surprisingly low, with the peak being near an electric streetcar terminal at the city's Camden Yards stadium."

Kean said his testing also disclosed groundwave field strength variations that were not in accord with predictions based on published (M3) ground conductivity data.

"While some of this variation may be due to local changes in ground conductivity not reflected in the M3 data, it's largely due to substantial signal attenuation by buildings," he said.

“AM radio is still capable of delivering very satisfying sound, and most noise can be almost eliminated with built-in software in modern car radios.”

promising, and I presented them at the meeting of the NRSC's AM & FM Analog Broadcasting Subcommittee in the fall of 2023." The field work itself began in October of that year.

Kean then developed a comprehensive methodology for the study, identifying representative AM radio stations, travel routes and equipment. As part of this pre-travel preparation he made an interesting discovery.

"Our measurements utilized an E-field (electric field) antenna, the type used in all vehicles, whereas groundwave studies typically employ H-field (magnetic field) antennas. This difference in antenna type may influence signal attenuation, particularly over longer distances," he said.

"Although our antenna and receiver systems were calibrated in an open area, the study data suggests that the two field types may not correlate as closely as previously assumed."

His investigative efforts also produced another unexpected finding while driving the test vehicle through

Kean offered this conclusion, after fully evaluating his data: "AM radio is still capable of delivering very satisfying sound, and most noise can be almost eliminated with built-in software in modern car radios. Our study found that along roadways — where most AM listening occurs — RF noise remains moderately low, allowing for good reception. However, in urban areas, AM signals do suffer significant loss related to building density, a problem never reflected in station coverage maps. This can disproportionately impact listeners in densely populated areas."

Kean's session is on Monday afternoon of the Broadcast Engineering and IT Conference and is titled "Real AM Radio Coverage Across Urban to Rural Areas: A Novel RF Measurement Approach." He will describe the methodology and his findings, along with possible solutions for AM broadcasters in addressing problematic reception in urban areas.

The complete report "NRSC-R102 Measurement of AM Band RF Noise Levels and Station Signal Attenuation" is available at www.nrscstandards.org/reports/nrsc-r102.pdf.

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Super Hi-Fi seeks to redefine radio workflows

"In our paradigm the radio station itself exists completely in the cloud"

Right
Brendon
Cassidy

Brendon Cassidy is founder and chief technology officer of Super Hi-Fi. He will give a Saturday talk in the Broadcast Engineering and IT Conference titled "Redefining the Live Radio Technology Infrastructure and Workflows for Talent and Technical Teams."

nursed to keep things running. Operators can connect from anywhere to administer and control the station. Any studio location, or bedroom even, can now go live.

This fundamentally changes what a radio station is, how you can operate it, and the constraints for the underlying economics.



RW What is the session about, specifically?

Brendon Cassidy: It describes how we virtualize radio stations by connecting them to the cloud through a series of innovative user interfaces and back-end services. The engine that runs the station itself is assembled and exists entirely in the cloud. Essentially, studios and transmitters simply become nodes on a network. This is a fundamentally different approach to operating and controlling radio stations. It has significant implications on the overall cost structure, complexity of operations and the flexibility of production.

RW How is Super Hi-Fi involved in this redefinition?

Cassidy: With the recent enhancements to our platform and the imminent introduction of our next few products, Super Hi-Fi is in the position to offer a complete, vertically integrated, end-to-end solution for operating every aspect of a music-based radio station, including a new approach for operating live radio.

RW What is the role of AI in this redefinition?

Cassidy: At Super Hi-Fi, AI plays a primary role in automating the manual tasks that are required for operating all forms of radio. Embedding it at the core of our solution lets humans do what they do best: bringing brands to life, telling stories and creating meaningful connections with the listener. AI is used for rote, repetitive work — building music logs, selecting imaging elements, producing segues, and managing levels — so that talent can focus on the meaningful (and more fun) parts.

RW Your tech is described as cloud-native. What are the benefits of doing it this way?

Cassidy: This might be a little difficult to communicate, but in our paradigm the radio station itself exists completely in the cloud. It delivers directly to transmitter sites and/or to listeners over IP. There isn't a rack of equipment sitting in a closet somewhere that has to be managed, maintained, secured and

RW You've said that the workflow of radio's technical teams will benefit. How?

Cassidy: In the simplest of terms, with the right cloud-native approach, the technical work becomes ensuring that studios and transmitters maintain robust internet connectivity. Almost all of the other technical tasks are handled by the managed cloud infrastructure. This is exactly like the difference between investing in building and maintaining your own server infrastructure versus using a managed service infrastructure like Amazon Web Services. There is so much less to maintain and worry about when the cloud service manages the vast majority of the infrastructure, connectivity, security, and other underlying services.

RW Some people hear about such developments and say, "That's the end of the radio studio facility as we know it, and it's taking localism with it."

Cassidy: We strongly disagree. What is killing localism is time. As broadcasters continue to downsize and reduce staff, the remaining talent have more and more work to do. This defeats localism because they just don't have the time to devote to it.

We unlock time by rethinking what a radio station is with tools that provide optimized workflows leveraging the power of AI. We also unlock margin by reducing the total cost of operations.

With more time to focus on local and more revenue to potentially support the efforts, we think that radio companies can reverse the current trend and reengage with listeners at a deeper, more local level. Plus, broadcasters can better afford to leverage in-market talent if they are liberated from having to maintain costly real estate and facilities to support that talent.

RW Can you tell us about one or two real-world radio industry clients who have deployed this approach?

Cassidy: Both Audacy and Beasley have deployed stations with our cloud-native approach with transmitter-based playout. We have new products coming to market very soon that will complete the picture I've suggested here. 

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Writer



Paul Kaminski

CBT, CBNT

The author wrote recently about Shotgun Tom Kelly's book "All I Wanna Do Is Play the Hits."

Here's what SBE is up to at the NAB Show

Education, fellowship and networking highlight SBE activities

Members of the Society of Broadcast Engineers and those interested in what it offers will find a busy agenda at the 2025 NAB Show. They'll also have a chance to meet the society's new executive director.

Activities start with an Ennes Workshop on April 4 and 5, consisting of two educational tracks.

"RF 101 Bootcamp" is designed to give people whose specialty is information technology some knowledge of basic electronic theory and transmission concepts so they can apply them to real-world broadcast situations.

Sessions will take the participant from the basics such as Ohm's Law to concepts like propagation, modulation, test and measurement, remote control, directional AMs and how to assess return on investment.

Industry veterans such as Jeff Welton, Fred Baumgartner, Kevin Trueblood, Tony Peterle and Cindy and Gary Cavell are among the presenters.

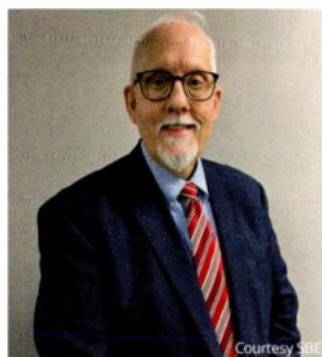
The "Media over IP" track introduces the essentials of IP-delivered media, covering video and audio implementations. Sessions will introduce the participant to internet protocol fundamentals, how to configure a digital facility for production and delivery, use of industrial off-the-shelf items for a digital facility infrastructure, and advanced concepts such as a discussion of artificial intelligence in media and how to assess ROI for media over IP.

Presenters include Joe and Jeff Geerling, John Passmore, Michael Liebman, Kirk Harnack, Al Salci, John Davis, David Bialik and others.

SBE President Ted Hand will give opening remarks to the participants. "The SBE Ennes workshops show



Photo by Jim Peck



Courtesy SBE

that education and training is still the hallmark and heart of the SBE's mission goal, with this training leading to certification of our members, our second mission goal."

The two tracks come together for a Sunday afternoon session about establishing a contract engineering practice, with speakers Rob Bertrand, Davit Robakidze, Jim Stenberg and Gary Cavell.

The Ennes Workshop will be held in the West Hall of the Las Vegas Convention Center. For information about the registration fee and NAB Show discounts, go to <https://sbe.org/sbe-ennes-workshop-2025-nab/>.

SBE booth NL2 will be accessible during exhibit floor hours.

The SBE national board will meet on Saturday evening. Ted Hand, serving his second term as president, will preside over the general membership meeting on April 7. He said the society continues to develop its library of station self-inspection guides and work with engineers in other countries to develop training opportunities and grow membership.

A reception follows the general membership meeting Monday evening, with an opportunity to meet the leadership including new Executive Director Mike Downs, who began work in January. He has 27 years of experience in non-profit management at an international level, including at Kiwanis International and Key Club International.

For those who've registered, SBE Certification exams will be administered Tuesday morning, April 8.



Photo by Jim Peck

Top right

Members gathered at the 2024 membership meeting.

Middle

Mike Downs is the new executive director of the Society of Broadcast Engineers.

Right

Representatives of AMITRA, the Mexican Association of Broadcast Engineers and Technicians, mingled with their peers at the the SBE booth at last year's convention.

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Writer



Elle Kehres

The author is assistant editor of Radio World.



How to protect your tower technicians

BEITC session dives into compliance, emergency prep and site maintenance

A session titled "Tower Site Safety" will explore how broadcast companies can create a safe and productive environment for tower technicians. Held during the NAB Show's Broadcast Engineering and IT Conference, its attendees can expect to learn how to prevent accidents and protect workers.

James Leifer, director of broadcast operations and engineering at American Tower Corp., will lead the session alongside Clark Lindstrom, the company's director of safety programs.



The session will cover a range of topics including general safety requirements, such as wearing personal protective equipment and displaying proper safety signage, to emergency procedure guidance in instances of tower collapse and personnel injury on-site.

A 2023 safety survey from Tower Climbers United, part of Communications Workers of America, reported that more than 65% of wireless tower technicians have been on a job site where someone has been injured and 4% where someone has been killed.

Organizers said tower safety sessions are meant to encourage

feedback between employers and tower technicians and create a safer environment for all, whether the tower serves broadcast, telecom or other applications.

Broadcast tower climbers and technicians, however, tend to be at increased risk due to taller tower heights and higher power levels. Broadcast towers can reach up to 2,000 feet. An average "cellular or PCS cell site," on

Above
A photo from NATE's Climber Connection series, which emphasizes safe work practices.

Right
James Leifer



According to its website, founded in 1995, American Tower is one of the largest global real estate investment trusts and an independent owner, operator and developer of communications real estate. Its U.S. portfolio includes nearly 42,000 towers.

the other hand, is typically 50–200 feet high, according to the FCC.

Findings from the CWA study include:

- Nearly 1 in 5 workers know someone who has been killed on the job
- 1 in 4 workers have been on five or more job sites where someone has been injured
- More than 77% of respondents said they have experienced unrealistic project deadlines imposed by wireless carriers such as Verizon, T-Mobile, AT&T and DISH Network

Keeping up to date with safety standards is an important facet of American Tower's work — and they are not alone in that effort.

Organizations like NATE, the Communications Infrastructure Contractors Association, publish guidance to help companies stay compliant with federal, state and local requirements.

Recently, NATE published a new document outlining environmental and regulatory compliance to telecom contractors. The guide is divided into two sections, the first of which covers environmental risks at job sites, including hazardous materials, endangered species and historic site regulations, topics that will be covered in the NAB session.

“Tower Climbers United reported that more than 65% of wireless tower technicians have been on a job site where someone has been injured and 4% where someone has been killed.”

Hazardous materials in particular will be a focus. Attendees will learn how to notify the ATC construction manager if hazardous materials are discovered and what procedures to follow when handling and reporting asbestos.

The presentation is part of “Resilience, Safety and Protection for Broadcast Service” on Monday of the NAB Show. 



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More sessions of interest in the BEITC

The conference will feature almost 75 presentations this year

The Broadcast Engineering and IT Conference at the NAB Show features almost 75 presentations this year. Several are described on the preceding pages and below are five more of interest. Be sure to browse the agenda at <http://nabshow.com> for more sessions, including many that pertain to video, television, streaming and multimedia.

"How to Create a Visual Radio Product on a Limited Budget and Without Extra Human Resources" — Fabio Gattari, the lead software architect at Etere, discusses visual radio management software that "allows radio stations to



Above
A view of the exhibits in the West Hall at the 2023 convention.

produce captivating live broadcasts without the necessity of a specialized video operator."

"Is WMAS (Wireless Multichannel Audio System) the Future for Wireless Mics?" — Speakers from Shure, Sennheiser, IABM and CBS/Paramount explore the question. A recent FCC ruling allows WMAS technology to operate in various bands, including VHF and UHF TV bands. This panel, presented by the North American Broadcasters Association, will explore the pros and cons of WMAS and lay out issues to consider when choosing an audio upgrade.

"Broadcasting Without Boundaries: Seamlessly Integrating EAS Into Virtualized Air-Chains" — Bill Robertson, vice president of Digital Alert Systems, discusses virtualized EAS with Cindy Cavell of Cavell Mertz, part of Capitol Airspace Group. DAS is one of the companies promoting "EAS at the Edge," described as a hybrid combination of the EAS device at the operator site, virtualized systems for radio station operations and virtualized services for system monitoring, management, reporting and software updating.

"Enhancing Resilience: A Backup Communication System With Cyber Communications Integration for Broadcasters" — Matthew Straeb of Global Security Systems/Alert FM proposes a system that integrates traditional emergency broadcasting with a new cyber communications module. "The system is engineered to detect, mitigate, and recover from both natural and cyber events, effectively adapting to a dual-risk environment," according to the show summary.

"Ultra-low Latency Audio Over Bluetooth — a New Benchmark" — Jonny McClintock and Dr. Dean Armstrong of Virscient Ltd present a paper on audio transmission over Bluetooth, and discuss how ultra-low latency can be achieved using standards-based transceivers and low-power links. 

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Attendees at the reception last year inspect the door prizes.

No Ham Reception at NAB Show This Year

The Amateur Radio Operators Reception — a traditional part of the NAB Show experience for many broadcast engineers — will not take place this year.

"With our longstanding partner no longer operational, we're taking this opportunity to reinvent the event for next year by exploring fresh partnerships and innovative ideas," an NAB Show spokesperson told us in an email. The partner was not identified.

Radio World isn't certain when the reception tradition began, but it has been

part of the show for at least 35 years. We've seen engineers lined up outside eager to get in, and the reception is noted for its full table worth of door prizes.

"In the meantime," the spokesperson wrote, "attendees can look forward to exceptional broadcast programming and networking in the TV and Radio HQ, a firsthand look at cutting-edge technology in Futures Park and valuable industry insights at the Broadcast Engineering and IT (BEIT) Conference." 

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CPR embraces a home of light and glass

Cincinnati Public Radio makes a visual statement about its mission

Below
Exterior view.
These images are
computer renders.
The grand opening
is expected this
spring.

Cincinnati Public Radio comprises FM stations WVXU, WGUC and WMUB, serving southwest Ohio, Oxford/Dayton, southeast Indiana and northern Kentucky with news, classical music, jazz and independent music via its main and HD digital channels, podcasts, apps and streaming.

CPR has been located in the Over-the-Rhine neighborhood on Cincinnati's west side but it will move this spring into a new facility in Evanston in northern Cincinnati. An earlier plan would have moved CPR to a location near City Hall, according to WVXU's news coverage, but costs became prohibitive. So in 2022 CPR purchased a property on Dana Avenue that was being used as a parking lot.

"The design team was tasked with creating a new home for our office and broadcast facilities," said Vice President of Engineering Don Danko. He led the technical project working with CEO/General Manager Richard Eiswerth, COO Dan Smith and Chief Engineer Will Staffan.

"There are two on-air studios, two interview studios with corresponding control rooms, four edit pods, an audio audition pod, a podcast studio and a performance studio with an isolation booth, video control room and an audio control room."



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Radio Facilities

The images on these pages are renders. The project broke ground in the summer of 2023 and was slated for completion as this article was being finalized in early 2025. AV integration is scheduled for February and March, with move-in and a grand opening in April.

WSDG provided studio design, acoustics and AV. ProCraft Media executed the studio integration. The architects are Emersion Design, with construction by Skanska USA, structural engineering by Schaefer and mechanical, electrical and plumbing engineering by CMTA.

Audio infrastructure

"CPR adopted the Dante AoIP system a few years ago with the purchase of two SAS consoles," Danko said.

"Since then, we replaced all the remaining consoles at our current facility." The studios include new SAS consoles for on-air studios and two production studios to allow them to "flip a switch" and broadcast from the new building.

The consoles were ordered with a candy apple red frame that "pops" visually when a person enters the room. "After we sign on, we will be repurposing the existing consoles to edit studios and the podcast studio."

Furniture is provided by Cabinet Works Unlimited. Its owner Ken Bagwell provided a lot of attention "to get the design correct and ensure things like wire management



and cutouts for headphone controls and cough buttons were placed just right."

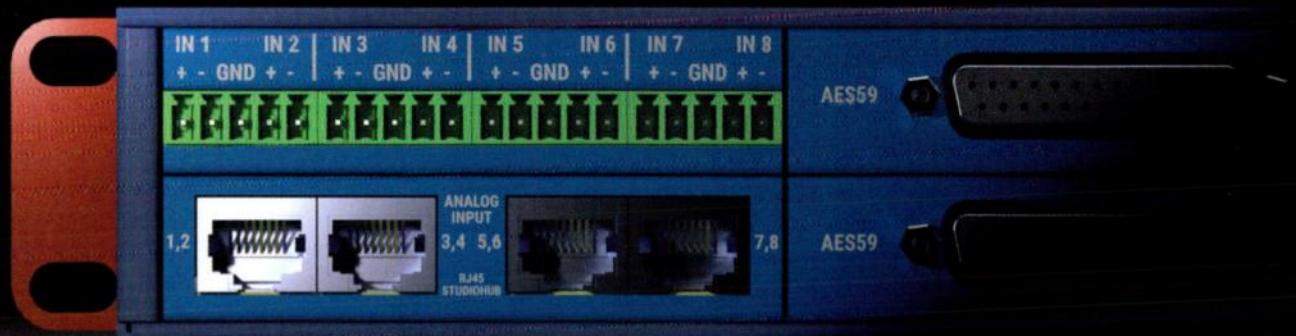
For audio processing, Danko said, "CPR has been using Omnia.9 processors for years and wanted to maintain that while also giving us the ability to activate more features within them. This required us to build out a Livewire system for transporting audio to the transmitter site and to the Omnia.9s, allowing us to utilize multiple processing cores."

This project is described in more detail in the Radio World ebook "Amazing Radio Studios 2025," which you can access at <http://radioworld.com/ebooks>. 📖

Above
On-air studio.



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BUYER'S GUIDE

Transmitters

About Buyer's Guide

The Buyer's Guide section appears in every other issue, focusing on a particular category of equipment and services. It is intended to help buyers know what's on the market and gain insight into how their peers are using such products.

GatesAir, SCMS give a boost to Woof Boom

Flexivas helped WERK recover after a power surge destroyed its plant

Businesses big and small, through every industry, talk about disaster scenarios. For a broadcaster, a transmitter failure that displaces most of its audience tops the list of worries.

Woof Boom Radio, a locally owned radio group located in Muncie, Ind., faced this reality head on when a power surge swept through the transmitter building of Class A 104.9 WERK(FM). In seconds, WERK's signal went silent as the event destroyed its surge protectors and backup generator. The station's long-serving Armstrong transmitter was no more.

The problem was exacerbated upon the station's attempts to move its auxiliary transmitter into service. The backup's power peaked at approximately 15 percent of WERK's 7.1 kW transmitter power output. Sean Mattingly, the group's director of technical operations, called on his representative at equipment dealer SCMS for assistance. SCMS was able promptly to ship a GatesAir Flexiva GX5K transmitter to Muncie.

"The GX5K strengthened our signal



to about 70 percent of our TPO," said J Chapman, Woof Boom Radio's CEO. It marked a needed improvement after two weeks of a limited market presence.

The completion of WERK's recovery came two months later with the arrival of a Flexiva GX10K transmitter, restoring its signal to full power. The station gained benefits of a solid-state transmitter, including around a

70 percent reduction in rack space. GatesAir said the transmitter's infrastructure is designed to reduce maintenance costs.

"We have a strong history with GatesAir and still have several legacy Harris transmitters in service that date as far back as 1980," said Mattingly, who noted their longevity and performance over time. He lauded GatesAir's service team for their attentiveness and said he has found the simple user interface easy to grasp. "They clearly put thought into the GUI, which the IT side of me appreciates."

That IT approach and straightforward connections to Woof Boom's transmitters helped turn a helter-skelter situation into a "pleasant installation experience," Mattingly said.

“They clearly put thought into the GUI, which the IT side of me appreciates.”

Above

Woof Boom Radio's 104.9 WERK(FM) has restored its Muncie, Ind., signal to full strength with its Flexiva GX10K.



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Tech Update

OMB Broadcast Unveils EM4000

OMB Broadcast says its 4 kW EM4000 compact transmitter offers durability, efficiency and quality in a manageable footprint to medium-power broadcasters.

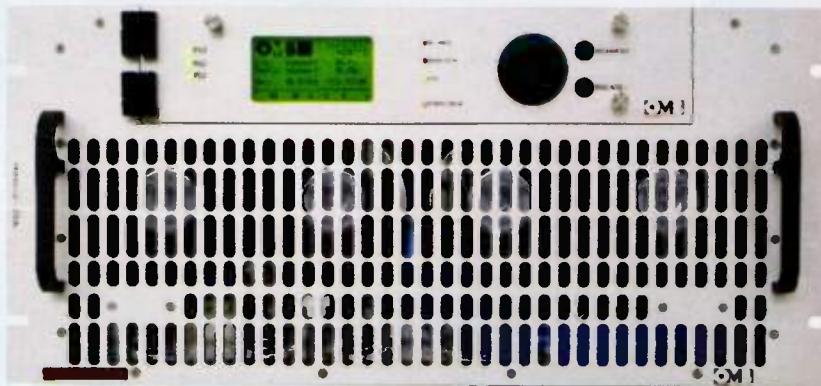
The model includes RDS, web-based telemetry through SNMP and support for AES/EBU digital audio input.

According to the manufacturer, the EM4000 has a typical AC efficiency of more than 73 percent and a typical RF efficiency of approximately 84 percent. The transmitter has four amplifying modules of 1,200 watts each, with redundancy.

The transmitter features an automatic night power reduction mode, a popular request among OMB customers.

Its telemetry package includes digital remote control and an RS-232 monitoring module, which supports full memory recording of events.

OMB specializes in manufacturing communication and broadcast systems, focusing on high-power transmitters across HF, FM, VHF,



UHF and microwave frequencies from 3 MHz to 100 GHz. Since 2023 it has been a member of the Abrans Group, with headquarters in Zaragoza, Spain. In addition, it maintains commercial offices in Miami, Los Angeles and Dubai.

Info: <https://omb.com>

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Tech Update

WorldCast Updates Ecreso FM AiO

WorldCast Systems has released a new version of its Ecreso FM AiO series transmitter, intended for single-frequency networks.

The France-based manufacturer said version 3.32 has new synchronization features and a built-in GPS receiver. Its SynchroStream technology is now integrated into its APT IP decoder, offering real-time dynamic delay compensation to ensure synchronization between multiple transmitters. The company said these integrations within the transmitter eliminate the need for additional hardware and cabling, improving long-term reliability.

WorldCast says broadcasters can adjust overlap areas with 50-meter accuracy, reducing interference in SFN deployments.

The transmitter uses technologies such as E-aptX, APTmpX and SureStream to ensure MPX over

IP transmission. It also supports measurement tools such as the Audemat MC6 for more detailed SFN signal analysis. There are 100 watt, 1 kW and 2 kW models in the FM AiO line.

WorldCast will showcase the updated Ecreso FM AiO at the NAB Show in Booth W3115.

Info: www.worldcastsystems.com



37

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Nautel powers coverage for 100 kW NPR station

KRPS gains stability and clarity to serve the Four-State Area



More Info
www.nautel.com

P

ittsburg State University's 89.9 KRPS(FM) is the 100 kW NPR affiliate serving southeastern Kansas, southwestern Missouri, northeastern Oklahoma and northwestern Arkansas, commonly known as the Four-State Area.

A financial grant enabled what General Manager Fred Fletcher-Fierro described as a major upgrade to the station's studios and transmitter site.

For 35 years, KRPS primarily aired a classical music format. In January 2024, it transitioned to all-news. "Our plan was to use HD subchannels for classical music and the BBC World Service, but we needed a new transmitter," he said.

The station's old transmitter had long suffered from myriad issues, keeping engineers busy diagnosing problems as they arose. After evaluating the capabilities of the HD-capable transmitters on the market, Fletcher-Fierro said KRPS opted for the Nautel GV40.

He described the unit as capable out of the box. "Its built-in HD capability was a key factor for me," he said. KRPS also benefits from the transmitter's on-screen diagnostics and its remote control and management features.

"After all the issues we faced with the old transmitter, knowing that Nautel can remotely access our GV40 and troubleshoot potential problems immediately is a relief," Fletcher-Fierro said. He praised the manufacturer's customer support and responsiveness, calling it superior to that of other companies with which he has worked.

KRPS' biggest challenge during the GV40 installation was unloading it from the truck at the transmitter facility. Once the staff managed the transfer, Fletcher-Fierro reported



a smooth process, aided by KRPS Engineer Jerry Tibbetts' experience with Nautel installations.

The GM said KRPS had already removed its old transmitter and the station was operating at reduced power. "Restoring full power as quickly as possible was our top priority," he said.

Right
The Nautel GV40 is unloaded at the KRPS(FM) transmitter site.

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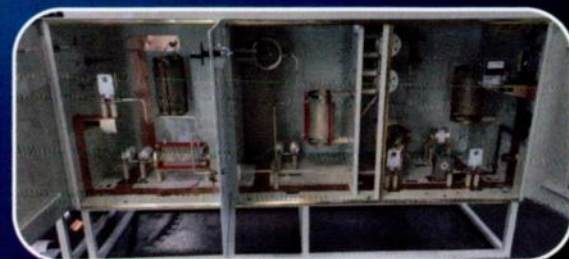


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The GV40 is unboxed inside the KRPS building.

The results from the GV40 have drawn some positive listener feedback, according to Fletcher-Fierro. "The audio quality has improved, even on our non-HD content," he said. He noted that KRPS previously experienced reception dropouts in parts of the Four-State Area, but those reports have ceased.

At a station where everyone wears multiple hats and juggles various roles, he said, investing in a robust transmitter was a smart decision. 📻

“Our plan was to use HD subchannels for classical music and the BBC World Service, but we needed a new transmitter.”

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Kool FM powers up with Aqua

A South Carolina LPFM enjoys an improved signal

The combination of WRTH(LP) in Greenville, S.C., and translator W299BO(FM) in Berea goes by the moniker "Kool FM 101.5 and

107.7." Together they serve an audience of listeners age 50+ in upstate South Carolina.

Owned by Quality Radio Partners, the stations fill a gap left by commercial broadcasters who often overlook this demographic in pursuit of more advertiser-friendly — read: younger — audiences.

Created, maintained and operated by Dave Solomon, "Kool FM" is a passion project, one he sees as a gift to his community. "Nothing brings back memories more than music," Solomon said of the "Carolina Super Hits" format.

"No audience relies on FM radio as their primary entertainment source more than this one."

WRTH has been in service since 2014 and reaches a potential audience of approximately 200,000 listeners.

After years of reliable service, WRTH's original transmitter was beginning to show its age. Solomon saw the opportunity to upgrade to a more modern unit featuring digital MPX and a DDS exciter to take full advantage of the station's modest 25-watt ERP.

In 2024, Solomon contacted Brendan Lofty of Aqua Broadcast to discuss acquiring an Cobalt C-300 transmitter. Aqua Broadcast says it has seen a growing business in the LPFM market.

The transmitter was ordered. When the unit arrived, Solomon wasted



Above
Dave Solomon
with the new
transmitter.

no time installing it, capturing the process on video before heading out for a drive to test the signal.

Solomon said overall signal strength was noticeably stronger. He said he immediately heard an improvement, especially in fringe coverage — "something every LPFM licensee is acutely aware of." Also, the C-300 includes a dynamic RDS generator, and Kool FM's RDS coverage has improved.

Eager to take full advantage of the digital MPX capability, Solomon invested in AES/EBU dongles and transitioned the entire station — from studio to transmitter — to a fully digital signal path. He

said improved sound fidelity has resulted. The station's translator, which rebroadcasts WRTH's over-the-air signal, also became noticeably quieter.

Solomon notes that Cobalt transmitters include a four-band processor as a standard feature, although WRTH uses Stereo Tool processing wrapped into its audio server at the station.

After more than a year of continuous operation, Solomon is comfortable giving a verdict on Kool FM's C-300 transmitter. "Best purchase we ever made," Solomon said with a grin. "This is the Cadillac of LPFM transmitters, no doubt." 



More Info
www.aquabroadcast.co.uk

“No audience relies on FM radio as their primary entertainment source more than this one.”

Tech Update

Radio Gearheads Expands Lineup

Radio Gearheads is a technology service and equipment sales business founded last year by longtime contract engineer Jim Offerdahl. With offices in Fosston, Minn., Quincy, Ill., and San Antonio, it now distributes transmitters from familiar brands including Nautel, Aqua, Ecreso and Broadcast Electronics.

Director of Sales John Lackness has spent more than four decades in broadcasting. He began as a jock in San Antonio and has worked for manufacturers including Marti, Tieline and BE; he also has experience at equipment and services companies Crouse-Kimzey, SCMS and RF Specialties.

"We're highlighting the Nautel GV-30DN, the narrow-sized version of the popular GV-30D," said Lackness, adding that the GV-30DN brings Nautel's full-sized feature set in a compact form, with the capability for digital

operation using an optional Nautel HD MultiCast+ importer/exporter.

The GV-30DN offers an optional software-based airchain that includes Omnia for Nautel FM and HD audio processing, blend-lock FM/HD sync, a Gen4 Engine modulator, a Gen4 importer/exporter and an airchain selector.

The company is also featuring the Aqua Cobalt C-1000 FM transmitter. The 2RU model features direct-to-digital synthesis modulation. Lackness highlighted it for its clean and stable signal. Features include four-band audio processor, backup power supply, SNMP capability, digital MPX output, ethernet control, a UECP RDS encoder, GPS-based sync and Linux operating system.



Info: www.radiogearheads.com

41

Stay Alert

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MSRP-3 AES

Three-Station AES/EBU Digital Relay Panel

The MSRP-3 AES is a three station AES/EBU digital EAS relay/switcher that provides additional alert audio distribution and transparent audio interrupt switching for EAS encoders. Together with an ENDEC or DASDEC, a MSRP-3 AES will provide interrupt switching for four digital audio paths. Each alert can occur simultaneously on one or more station outputs, but alerts can not be overlapped. It features an internal ADC (with wordclock input) that accepts balanced mono analog audio, or it can be bypassed and switched to a digital input with loop-thru. RJ45 station audio I/O jacks make installation easy with Cat5/6 patch cables. Control via RS-232 serial port, TCP/UDP Ethernet port, or contact closure inputs. Includes test and station relay outputs.

Coming Q1 2025



ALERT Sentinel® 2

Two-Station Alert Switcher

The Alert Sentinel 2 is a two station analog relay/switcher that provides alert audio distribution and transparent alert audio interrupt switching into two independent broadcast program signal paths. Perfect for weather alerts, remote broadcasts, or live sports. It features a POTS telephone hybrid interface and a balanced analog input compatible with 2-way/HAM radio as well as an internal 32GB SD-based MP3/WAV audio player for playing pre-recorded messages. Control with DTMF commands on its telephone input or radio/console audio input, or control via string commands on its USB-serial and TCP/UDP Ethernet interfaces.

Coming Q1 2025



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Tech Update

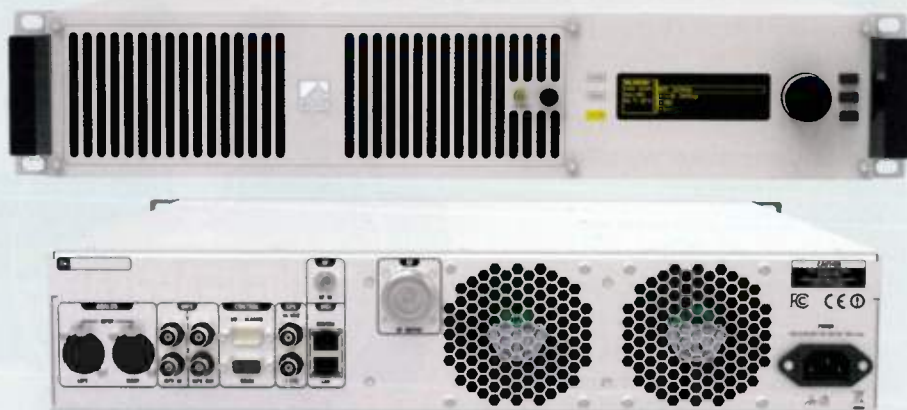
BW Broadcast Offers V3 Lineup

BW Broadcast highlights the feature set of its V3 line of FM transmitters, available in several power levels from 30 watts to 1 kW and occupying one or two rack spaces. (The 1 RU models can provide power as low as 5 watts, while the 2 RU models go down to 10 watts.)

The line provides built-in four-band DSP audio processing, Ethernet control, RDS encoder and FSK IDer, GPS inputs for SFN applications and hot-swap PSU.

"All V3 products have inputs and outputs you would come to expect of with a premium transmitter," the company states. That includes AES3 audio or composite/MPX over AES192, analog left and right, and two configurable composite (MPX) program inputs and outputs. Composite inputs and outputs can be configured as MPX, SCA, RDS or Pilot Sync.

External reference source for both 1 PPS and 10 MHz GPS sync inputs are at the rear of the unit, letting you integrate with



other products for a single-frequency network environment. The transmitters are designed and manufactured in the United Kingdom and come with a four-year warranty.

Info: www.bwbroadcast.com

42

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Elgato Stream Deck Studio Adds Rackmount Panel

Radio World's Dan Slentz wrote about Elgato's Stream Deck in these pages a few years ago. He suggested then that the company offer a rackmount version of the device with both network and USB connections.

Now Elgato has put Stream Deck into a standard 19-inch rackmount panel and called it the Stream Deck Studio.

It lists for \$899 with discounts for buying multiple units with a traditional desktop Stream Deck unit.

It is a 1RU panel with two rows of 16 customizable LCD buttons each. The Studio has two 360-degree dial encoders with push function and LED indicator and LED ring indicator. The unit can be powered by POE+ over the RJ45 Ethernet connection, which is 100 Mbps, or far more than enough bandwidth for controlling purposes. There's also a USB-C port for a direct connection to a PC, and it has a jack for an external power supply.

Dan wrote about it recently on the Radio World website:

"I've seen knockoffs of Stream Deck through Temu and other sources, but some of their button displays are monochrome or limited display, and there seemed to be user reviews indicating software issues," he said.



The Elgato Stream Deck Studio with multiple racked units.

"With the initial user reviews on Stream Deck Studio, most are good, but a few cite issues with networking. As we know, networking depends on a lot more than 'plug n' play,' and there's no indication if the problems were happening on a DHCP address (automatic IP connection) or static IP (fixed)."

But he said that so many computer systems in use in radio, this new version could be a valuable tool for quick manual intervention in controlling such systems.

Info: www.elgato.com/us/en/p/stream-deck-studio

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VINYLTHON?

Vinylthon is an annual event for radio stations across the USA and the World to celebrate the format of vinyl music by playing at least one hour of vinyl-only music on the two days (April 12 & 13). Many stations do more than one hour (some do up to 24 or 48!). It's a fun day for listeners and broadcasters because people are passionate about vinyl, and broadcasting shows that are only vinyl is an amazing experience for radio broadcasters of all ages!

The event is also a fundraiser for our Next Step Radio Scholarships, awarded by the College Radio Foundation, the non-profit organization that started the event and awards scholarships to college students who want to work in radio - think of it as a training day for the next generation of broadcasters!

HOW DO I JOIN?

Any radio station in the world can join us - AM, FM, LPFM or online only, non-commercial or commercial, any station is welcome to participate. When you register, your station will be listed on the official website (vinylthon.com).

IS IT FREE?

If your station is a non-commercial radio station, participation is completely free. However, there is a small fee for commercial radio stations (\$99), that goes to the College Radio Foundation for Next Step Radio Scholarships to support the next generation of professional broadcasters. This is a charity fundraising event, so donate \$99 even if you're *not* participating!

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playing
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Adam



How to submit

Radio World welcomes comment on all relevant topics. Email radioworld@futurenet.com with "Letter to the Editor" in the subject field.

of radio broadcasting. As Langan ends the article with the afternoon bell that ends the school day, we are left to reflect that here's a radio station that is nurturing the radio talent of the future, and they are having fun doing it!

Dr. Rob Quicke
Founder
College Radio Day

CTE and certifications

I am the AV production teacher and station manager of WKCS(FM) at Fulton High School in Knoxville, Tenn. We have been on the air since 1952 and are one of the oldest FM stations in the state. I am an alumnus of the program in addition to spending the last 21 years as the teacher/manager.

I'm always appreciative when high school radio gets the spotlight. It was great to read the story about WKHS in Maryland. We did a simulcast with them a few years ago as a part of High School Radio Day, which takes place every spring. Chris Singleton has done an incredible job with his station and broadcasting class.

I was especially interested to read that WKHS students are earning industry certifications through the Society of Broadcast Engineers Certified Radio Operator program.

Many radio broadcasting classes like ours fall under federal Career and Technical Education guidelines. Changes in federal law now make the ability for students to earn state-recognized industry certifications an essential aspect of CTE classes. Classes that can't offer industry certifications run the risk of being shut down by the local school districts in favor of classes that offer these certifications.

In the area of Radio/TV Broadcasting — called A/V Production in Tennessee — the SBE's Certified Radio Operator certification is not recognized by the state of Tennessee; it only recognizes Adobe software certifications. It would help ensure the health of high school radio programs if the broadcast industry would support the SBE and advocate for its certifications to be recognized in Tennessee and other states.

This would require an organized push from leaders in the broadcasting industry including radio stations, equipment manufacturers and state broadcast associations. Being able to offer the Certified Radio Operator certification as a part of my class will help us to continue to be a valuable CTE program for our schools and give us more opportunity to train future broadcasters.

Thanks so much again for your support of high school radio.

Russell Mayes
WKCS(FM)
Fulton High School
Knoxville, Tenn.

High-five for this high school

I am writing to thank you for Nick Langan's article "This High School Takes Radio Seriously."

Langan not only took us inside radio station WKHS where the students work, but more importantly he took inside the minds of the students too. He brought the station alive with his active writing and his descriptions of the station and the energy and enthusiasm from the students who are involved. Their experiences of producing radio are no doubt transformational.

Credit must also go to the tireless work of Station Manager Chris Singleton. From my experience in college radio, I know that it's often due to the work of unsung heroes like him that make the whole operation work.

Thanks for reminding us that radio is alive and well, and that there are young people who are discovering the sheer marvel

“Changes in federal law now make the ability for students to earn state-recognized industry certifications an essential aspect of CTE classes.”

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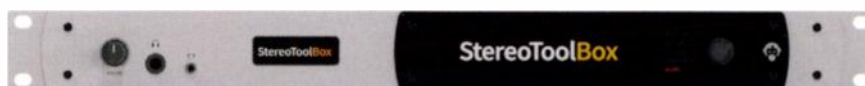


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