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At NAB, a Focus on Hybrid and the Dash

We checked in with David Layer to ask about technology initiatives for 2021

BY RANDY J. STINE

Normally this is the time of year when technologists at the National Association of Broadcasters are finalizing their agenda for engineering and IT presentations at the spring NAB Show.

Those efforts have been pushed back, with the convention now scheduled for October. But Radio World checked in with NAB Vice President, Advanced Engineering David Layer for an update on the organization's technology initiatives at the beginning of 2021.

He has been vocal recently about the coming impact of hybrid radios — radios that combine over-the-air and internet connectivity — and the consequent need for FM and HD Radio stations to register with RadioDNS. He expanded on that theme during this interview.

Radio World: How will COVID-19 impact how NAB funds technology initiatives going forward?

David Layer: I expect that in the near term we will be focusing our funding on technology initiatives prioritized by our board as we adjust to the new financial realities created by the pandemic.

RW: What are the highlights of current NAB PILOT projects?

Layer: On the radio side, PILOT continues to work with Xperi and Hubbard to do a variety of all-digital AM radio tests, using of course Hubbard station WWFD, 820 kHz, Frederick, Md.

RW: What kind of tests, specifically?

Layer: Possible test areas highlighted by Xperi and Hubbard in their most recent experimental authority application, filed in June of 2020, include expanded testing of the use of an HD2 multicast audio service — creating a second audio service in addition to the main program services, including experimentation with different audio bitrate sizes used, and audio formats, including parametric stereo. Also, the addition of different data services alongside data services already deployed now; testing of emergency alerts services and new advanced alerting services; testing the performance of MA3 vs. analog in different all-electric vehicles; testing changes to the MA3 waveform by reducing the power level of the unmodulated pilot carrier level; and conducting building penetration tests of the MA3 all digital system vs. analog, and the MA1 hybrid system.

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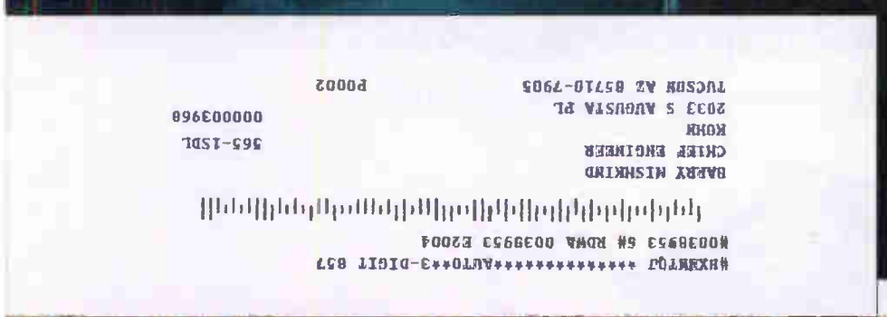

Geo-targeting Proposal in Spotlight

FCC takes a closer look

BY PAUL McLANE

The idea of allowing U.S. radio stations to "geo-target" content via FM boosters — which one FCC commissioner describes as a "potentially industry-altering technology" — took a step forward in late 2020.

The Federal Communications Commission issued a notice of proposed rulemaking to allow limited geo-targeting, and it asked for comments about it.

Current FCC rules authorize FM boosters to retransmit only the signal of their primary station, on the same frequency as the primary and within the primary's protected service contour. The low-power service was created in 1970 to allow stations to address gaps in coverage such as those caused by distance or terrain shielding.

At the time, the FCC noted that "indiscriminate use" of boosters could degrade the signal of primary stations and urged licensees to engineer boosters in a way that would limit such interference. Boosters are not permitted to cause adjacent-channel interference to other primary services or previously authorized

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Connectiv

A promotional image from Xperi highlighting the benefits of DTS Connected Radio.

DTS Connected Radio and You

It is "the only global connected hybrid radio ecosystem"

COMMENTARY

BY JOSEPH D'ANGELO

The author is SVP, Broadcast Radio at Xperi.

At the start of a new year, it seems like many people are wondering about what's next. After all, in 2020 — otherwise known as the Year of Utter Uncertainty — the idea that something else was going to happen took on an entirely new edge, with memories of lockdowns and Zoom calls. It should not surprise anyone that radio has been vital through it all.

Radio creates a feeling of personal connectedness, community and belonging. Expanding that value around the world, and across content channels, is what has driven our work innovating radio through DTS Connected Radio.

It converges technology and partnerships to make possible engaging, rich, multimedia content that is global, accessible, consistent and relevant.

If that sounds impossible, well, for the right company, with passion and commitment to broadcast radio, it is not. Here we are, with the only global connected hybrid radio ecosystem — just launched in the new Mercedes S-Class, with more to come.

DTS Connected Radio's ecosystem comprises tens of thousands of radio stations globally, our TiVo metadata catalog and so much more.

Synergies gained from our merger with TiVo have accelerated deployment, enhanced our offerings and helped ensure unsurpassed security and operational support. TiVo's massive music metadata platform and Xperi's hybrid radio platform make an entirely new radio experience possible with premium radio content enhanced with visually rich data and deep content descriptors.

Especially notable is TiVo's content aggregation, discovery and recommendation engines, which make content easier to discover for a richer listening experience — all harmonized through an ecosystem that delivers a unique, consistent and verified content experience from broadcast to in-vehicle.

Importantly, DTS Connected Radio's platform is the only one in the world that caters to the unique requirements of both broadcasters, who retain content control, and automakers, who get a turnkey, secure and global solution.

The ecosystem is built on rich multimedia metadata experiences sourced directly from broadcasters, enhanced with our content library and harmonized to deliver a unique end-user experience in the car.

ALWAYS DELIGHT THE CONSUMER

DTS Connected Radio is all about delighting the consumer.

Because the content is so engaging, and interactive, radio can outclass pure-play digital audio platforms that are crowding out space on vehicle infotainment systems.

It starts with the ecosystem: built on rich multimedia metadata experiences sourced directly from broadcasters, enhanced with our content library and harmonized to deliver a unique end-user experience in the car.

The listener enjoys an immersive experience where they can "favorite" a station, get detailed station information, give a thumbs up or down on programming, as well as access a global events database for concerts, performances, museums, festivals and more.

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DTS RADIO

(continued from page 3)

QUALITY, ACCURACY, AND COMPLETENESS

Back when we started developing DTS Connected Radio, we shared the concept with automotive clients who offered detailed requirements. Paramount was global support and consistency across nearly 50 countries.

Meeting this initial requirement wasn't easy, but we've exceeded it with over 75,000 stations, in nearly 80 countries. All this content resides in a global ecosystem that is fully integrated, secure and ready to meet the high expectations of automakers and radio listeners around the world.

Here's a bit of insight into how we've made that happen:

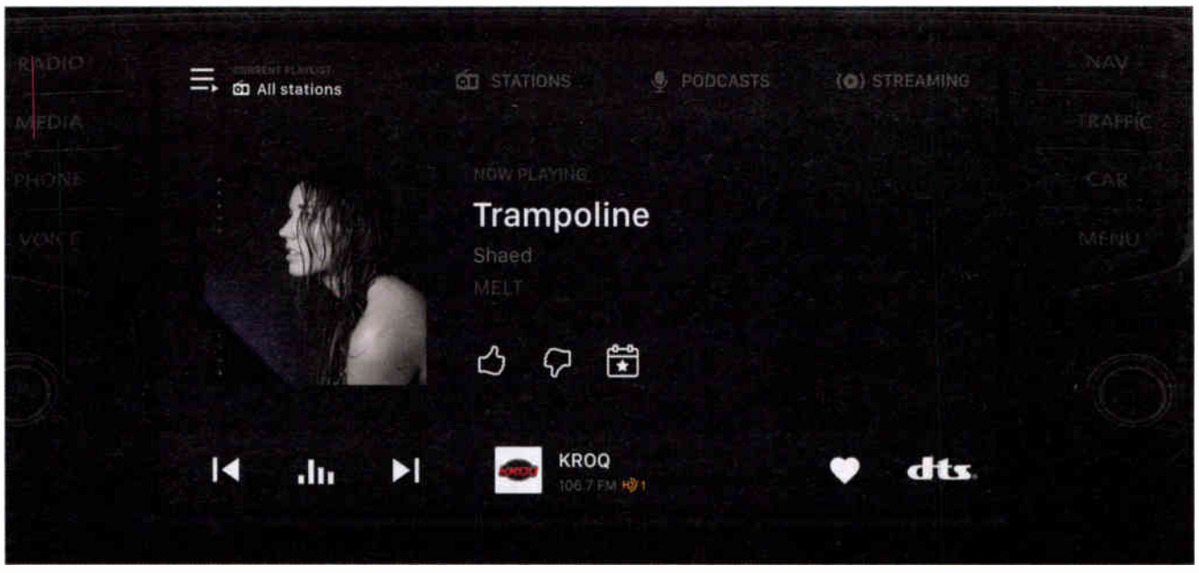
- **Content Aggregation:** To do this globally requires an entire infrastructure that includes content management, station integration, content distribution, service optimization, operational support and more. Radio station partners can join our platform through a variety of approaches. Most have chosen robust direct integrations, others have leveraged aggregation platforms. We also ensure that all publicly available information from regional sources is included. This first step of content aggregation is critical, but is only the beginning of delivering a global, commercial hybrid radio solution.

- **Content Validation:** This is where the real work begins, as the content takes shape within the DTS Connected Radio platform. The validation process starts with ingesting radio station feeds and ensuring accurate matching and integration into the platform. This process is supported by automated analytics and assets verification, as well as hand curation, localization and confirmation by a dedicated team of subject matter experts.

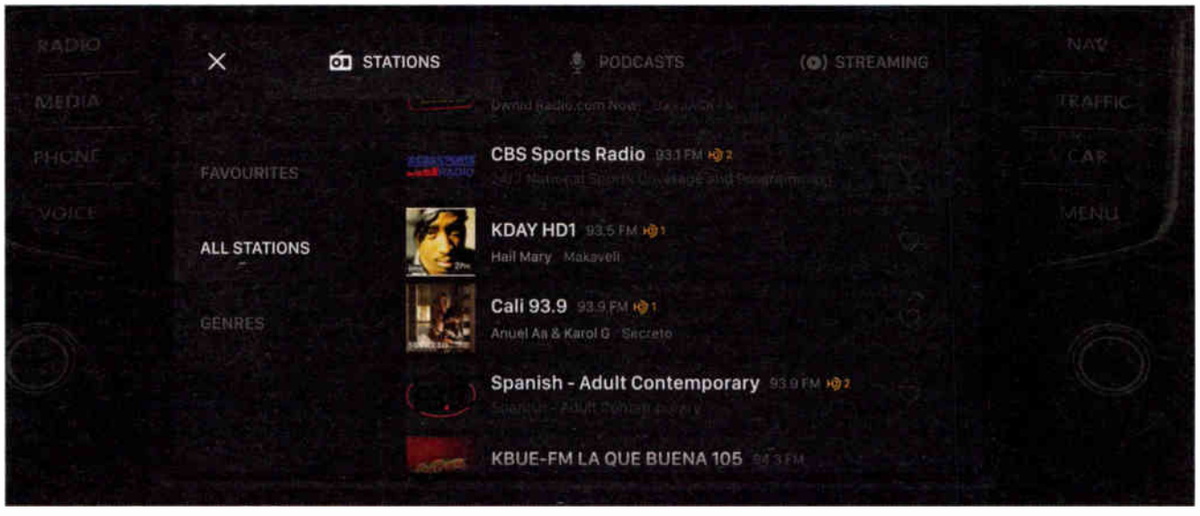
- **Content Enrichment:** We enhance the user experience through premium content integration, including leveraging our TiVo music metadata library of over 40 million tracks, artist biographies, song lyrics in 14 languages and global events that have been curated by location, station format and programming.

- **Infrastructure: Network Operations and Security:** To meet automotive requirements, we've built a global network, geographically deployed and redundant with 24x7x365 support. The system has coverage wherever a vehicle may need to connect, and an unmatched level of security. That includes rigorous requirements such as recurring third-party security audits (we consistently achieve an A rating). Given the scope of the deployments, and number of concurrent connections, we've ensured the platform is dynamically scalable, able to handle 5 billion queries daily, and architected to meet the peak-loading requirements of local markets.

- **Services API:** Our unique services interface is designed to ensure exceptional response time, security and privacy, while offering flexibility to our automotive partners. It's the integration and connection point with consumers, and includes adherence to privacy regulations (GDPR, CCPA), copyright enforcement, content stream protection and content moderation at a localized level. It also enables us to infer consumer engagement to provide consistent metrics and analytics to our broadcaster partners.



The author writes that visually engaging artwork, interactivity and IP-delivered content are part of the DTS Connected Radio offerings.



Now Playing, at-a-glance information gives users real programming choices in a visually rich interface.

TiVo's massive music metadata platform and Xperi's hybrid radio platform make an entirely new radio experience possible with premium radio content enhanced with visually rich data and deep content descriptors.

A NEW CONNECTED REALITY

We believe that at the heart of DTS innovation is the ability to harmonize and do so securely — worldwide. It's what drives the user interface and the interactivity of the experience.

In a world gone mad by the noise of social media, this is the "what's next" that creates a consistent and rich experience, validated by our experts and bolstered by our content. For broadcasters it puts the real value of radio on a global scale and in a personalized way for each and every listener.

That's what's next. And now.

View Joe D'Angelo's Radio Show presentation "DTS Connected Radio: Looking Under the Hood" at https://tinyurl.com/rw-dtsx *or visit* dts.com *and search "under the hood."*

THIS ISSUE

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LAYER

(continued from page 1)

PILOT and Xperi also launched in October a collaboration focusing on radio implementation using Android Automotive, a new operating system that several auto OEMs have plans to deploy. We are working with Xperi and an international array of broadcasters to help build an engaging radio experience, continue to evolve the user interface and expand the hardware abstraction layer — the code that links the software and hardware in dashboard receivers.

RW: *Can you summarize current activities of work groups of the NAB Radio Technology Committee?*

Layer: Two projects initiated by the NABRTC's Next Gen Architecture working group are now in the testing phase and were discussed publicly for the first time during the 2020 Radio Show.

The first is the development of the Nielsen Audio Software Encoder, a software implementation of Nielsen's Portable People Meter encoder that can now reside within an audio processor. Early tests of this new encoder were conducted by Nielsen using AM radio stations. Additional tests are planned on FM stations in the coming months.

The second project in conjunction with Xperi is focused on improving and simplifying the inclusion of Emergency Alert System messages into HD Radio multicast channels. Broadcast equipment manufacturer 2wCom is producing a "capture client" device and shipping in small quantities to broadcasters involved in this project for on-air testing as a last step towards full production.

RW: *You mentioned NAB's work on developments involving hybrid radio. How significant are the recent iHeart/Audi announcement and Radio.com/DTS Connected Radio partnership?*

Layer: These recent announcements have been very exciting — 2020 will go down as the year when automotive hybrid radio arrived in the U.S. With consumers now purchasing vehicles with hybrid radios, it's vitally important that FM and HD Radio broadcasters register with RadioDNS, the not-for-profit organization that develops standards used by hybrid radio manufacturers for accessing broadcaster content over the internet.

All FM and HD Radio broadcasters should do two things to ensure that their stations are taking advantage of the hybrid radio receivers in Audi and BMW vehicles: first, create a Service Information (SI) file, which contains the basic metadata information needed by the hybrid radio receiver and second, register their stations with RadioDNS. RadioDNS does not charge any fees for this registration. Broadcasters can do these things themselves, or they can enlist the aid of service providers, some of which can assist broadcasters in these tasks free of charge. NAB and RadioDNS co-produced a tutorial back in July to help broadcasters do these things. It's available for free on-demand right now [*https://education.nab.org/courses/20491*].

RW: *What do you think about the uptake or lack of it for all-digital AM, now that FCC allows that option?Are broadcasters poised to take advantage of it?*

Layer: One of the best things to happen in 2020 for radio broadcasters was the adoption by the FCC of the all-digital AM Report and Order, establishing the all-digital AM service in the U.S., which broadcasters elect to use voluntarily.

I expect the uptake to be slow at first and to accelerate over time as the number of consumers with HD Radio receivers increases, thereby increasing the number of potential listeners.

RW: *The pandemic has pushed the adoption of "work from home" strategies by broadcasters. Do you expect that to continue?*

Layer: Anecdotally that would seem to be the case. I think it's widely acknowledged that the pandemic has accelerated acceptance of "work from home" by the broadcast — and other — industries. There is no reason to expect that broadcasters won't continue to make use of remote working.

RW: *Are there any other technology trends broadcast engineers at the station level should be tracking?*

Layer: I'll take this opportunity to once again urge FM and HD Radio broadcasters to register with RadioDNS and develop their service information (SI) file. Now is the time for radio broadcasters to support these modern radio receiver technologies — the automakers are watching. Radio broadcasters' level of support right now will no doubt be a factor in the future development of car radios by automakers.

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

FLEXIBILITY IS A "LIFESAVER"

For Radio World's ebook "Console Tech 2021" we wanted to find out what kind of physical and virtual console surfaces radio stations are using and how surface designs are evolving.

For example Rhode Island Public Radio, also known as "The Public's Radio 89.3FM," has a Logitek Mosaic with two JetStreamMini engines in its downtown Providence facility; it also has an offsite backup studio using an Axia system.

Shown is I.T. & Engineering Director Aaron Read. He said the station looks for flexibility. "We have very limited physical space so the ability [of the Mosaic] to do a lot of audio routing/mixing virtually is a lifesaver. The ability to log in remotely from any computer with an internet connection is a real help, too. It's made our transition to a mostly-WFH model in the pandemic far smoother than it would've been otherwise." Read added that the new backup studio with Axia gear was a blessing when rioters and looters caused havoc downtown in June.

Asked how console makers could improve future models, he replied: "Better headphone jacks and cue speakers."

You can read comments like these from several dozen engineers and station owners, plus commentary from manufacturers about features and designs that they're implementing in their new offerings. Find it at ***radioworld.com/ebooks***.

Emergency Audio at the Touch of a Button

How we added emergency audio players for our studio operators to have at hand

TECH SOLUTIONS

BY RICK SEWELL

Chicago is very much a competitive PPM market. While it is hard to be perfect, seconds of off-air time are costly, and minutes of off-air time are just not acceptable. If you're not on the air with PPM encoded audio, you are losing ratings.

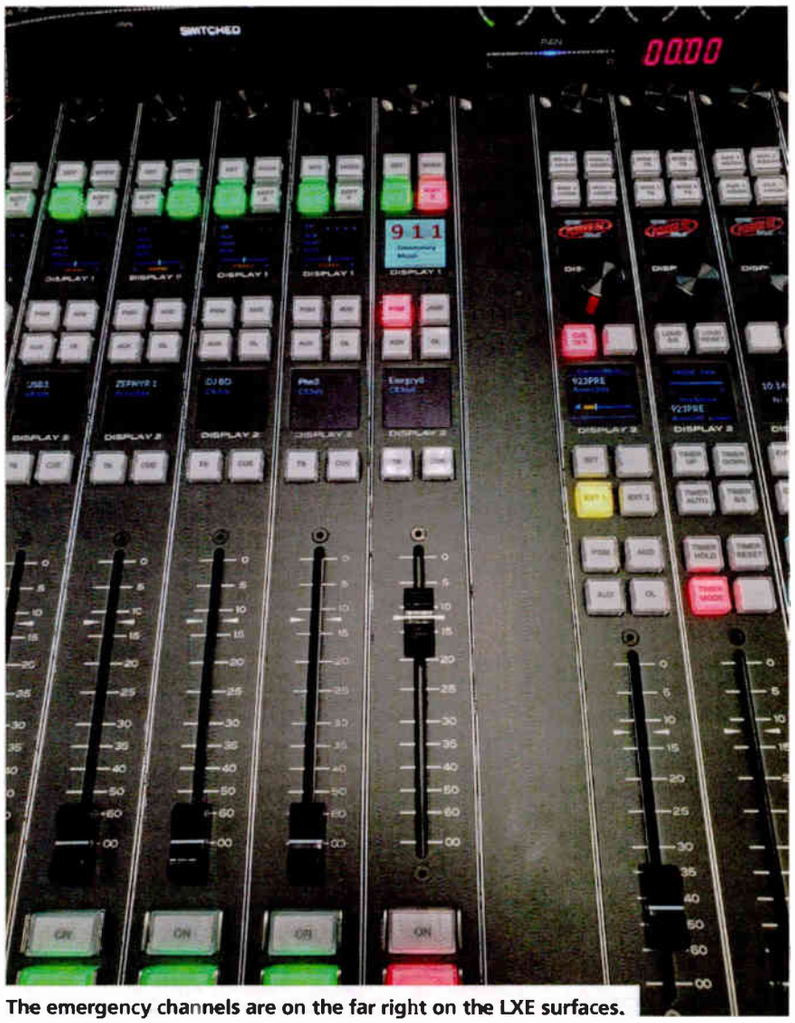
Handling emergency audio situations has evolved considerably since I first came to manage the engineering department here at Crawford Broadcasting's Chicago operation six years ago. I remember early on that there seemed to be no plan. When something out of the ordinary occurred, like the automation system stopped playout, the operators seemed to have no plan what to do.

Number Two, keeping the meters moving! It's a competitive PPM market, and the minutes waiting to find an engineer to fix the issue are just not acceptable. The duty of every operator is to make sure we have audio on the air, then call engineering to get things fixed and back to normal audio.

About the only plan that seemed to exist among the operators was perhaps to find a CD to put on the air. Often, they didn't know where the emergency CD was located, or they didn't even know such a thing even existed.

Basically, there was no plan, and very little training for such events. The plan seemed to be call engineering and throw up your hands to make sure everyone knows it wasn't your fault.

A few years back, we purchased USB thumb drive players to place at the transmitter sites for emergency audio. Using silence detection and macro pro-



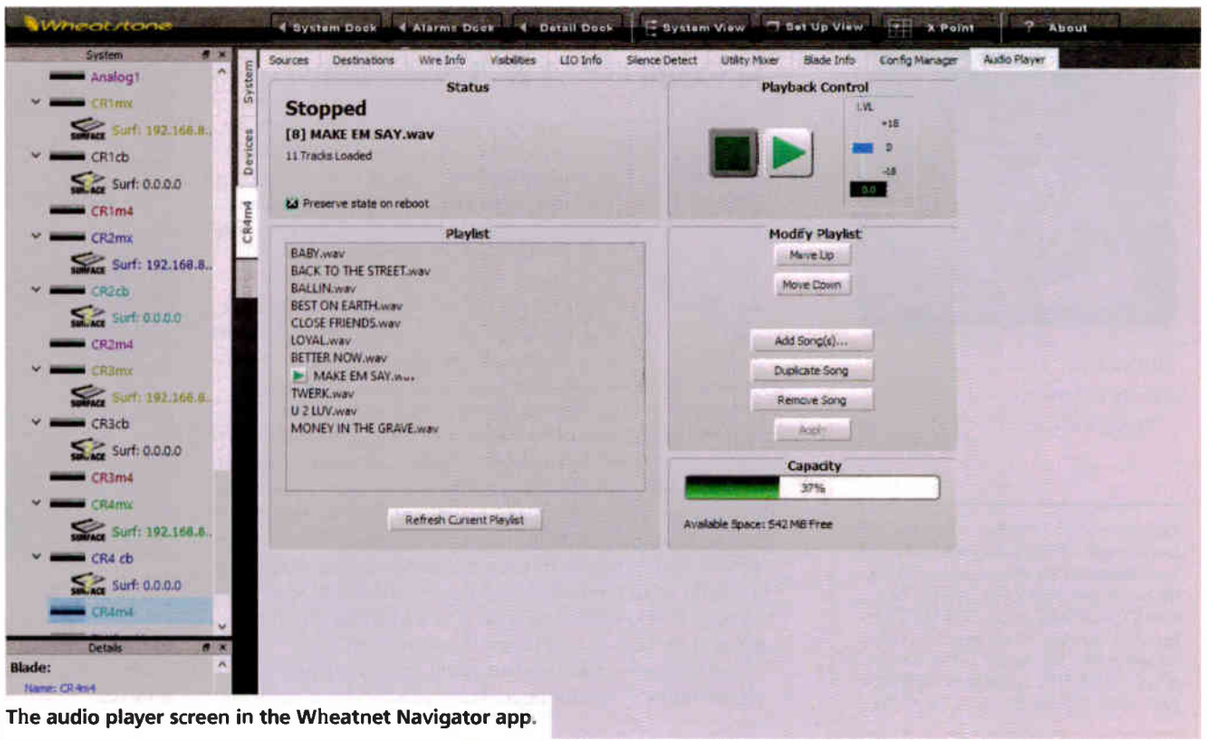
The emergency channels are on the far right on the LXE surfaces.

The duty of every operator is to make sure we have audio on the air, then call engineering to get things fixed and back to normal audio.

When this type emergency occurred, if it was a time when engineers were on duty, they would leave the room to try to find an engineer without putting anything on the air first.

Many times, when I walked into a control room, the staff would be throwing their hands in the air, saying something like, "I didn't do anything!" to which my reply would be, "You're right, you didn't do anything!" In other words, why were you not getting any audio on the air before seeking or calling an engineer?

To me the priorities of every operator should be, Number One, making sure no objectionable material gets on the air — we don't want a $325,000 fine — but



The audio player screen in the Wheatnet Navigator app.

gramming in the Burk ARC Plus Touch remote control units, we designed a system that will play audio from the USB stick when both STL paths are silent for two minutes. Then, when normal audio is restored for a solid two minutes, it will revert back to it.

This is great for dire emergencies like the STL equipment being down or the studio generator not coming on during a power outage. However, for events like audio problems in the studio, when we have operators on hand, two minutes is an eternity!

So we wanted to give the operators a way to do the same thing we had at the transmitter site, but this time in the studio.

DEDICATED FADER

To achieve this, we added USB thumb drive players in the studio. We again put emergency audio on thumb drives and these were attached to the players by chains so they wouldn't be lost.

While this was a better plan than CDs that would get lost in the studio, we still found operators not remembering in an emergency where to locate the drives, how to get the fader on the board changed to the player, and how to get it on the air. By the time this all took place, the two minutes were up, and the transmitter site player was already on the air.

I knew that the Wheatnet-IP blades offered internal audio players, but we were still in a mixed infrastructure with the control rooms still having G5 Wheatstone control surfaces connected to the legacy TDM system. We also had some Wheatnet-IP blade infrastructure with interconnections to the TDM system.

Still, it was going to be an issue for the operators to use the internal players if they had to dial up a fader on the old G5 surfaces

We went through our studio rebuild this past year and now have an entirely Wheatnet-IP infrastructure. With that, we are now using the LXE control surfaces, which also took us from 16 faders to 20 faders. This allowed me to have a dedicated fader just for an emergency audio source.

We purchased four licenses, one for each station, and activated the Audio Player tab on each of the M4 microphone processing blades in the control rooms. We then assigned them to the very last fader on each of the LXE control surfaces.

Now here's the catch: We wanted to make things as easy as possible — to have an emergency audio source that the operators could get on the air with one button. This means we had to make it difficult for the operators to change the fader to any other audio source.

One cool thing about the LXE control surfaces is that they are very programmable. Just about every button on the surface can be customized to the need.

Well, the first thing I did after assigning the emergency audio player to Fader 20 was to defeat the source select knob to remove the ability to change to the source at all on that channel. I also programmed the soft key to only select the emergency audio player. I then took the program bus select button on the channel and made it into a tally-only button, showing that the fader is in program. Hitting the button does nothing to turn the fader program on or off. I instead used the second soft key button to be the program assign button on the fader.

The idea is that this fader is always in program and can't be easily taken out of program without special knowledge. We still have conscientious operators who turn the program bus assignment off on what they deem unnecessary faders at the beginning of their shift, a practice that you usually only find with our very experienced operators but is not desired in this instance.

I, of course, enabled all the necessary steps so the player is remote started. The result is that the operators have an emergency audio source that only takes two steps: Turn up the fader and push the "on" button.

In my mind, this should mean that anything more than 10 seconds of silence is unacceptable. If the main audio source stops playing, that first instinct should be to immediately press that "on" button and then call engineering.

This article originally appeared in the Local Oscillator newsletter of Crawford Broadcasting.

Rick Sewell, CSRE, CBNT, AMD is engineering manager for Crawford Broadcasting–Chicago. Radio World welcomes tech tips and story ideas at radioworld@futurenet.com.

NPRM

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secondary stations.

The geotargeting concept has been pushed for years by technology company GeoBroadcast Solutions LLC, which calls its proprietary system ZoneCasting; and its idea has gained support and interest from a number of influential industry players.

The geo-targeted content would only be available in the part of the primary station's protected contour served by the booster.

The booster programming would have to be "substantially similar" to the primary station's programming, a concept taken from television's ATSC 3.0 transition. Specifically, GBS said that to be substantially similar, a booster would be required to retransmit the same content as the primary except for advertisements, promotions for upcoming programs and "enhanced capabilities" including "hyper-localized content."

Notably, it proposed that this content would not exceed 5 percent of the broadcast hour.

GBS has said that its technology will work without causing any adjacent-channel interference, and that any self-interference would be manageable.

The proposal does not seek changes to rules regarding FM translators.

SERVICE ENHANCEMENT

The FCC wrote in its NPRM that the GBS proposal "presents novel technical and public interest issues that would benefit from additional consideration."

GeoBroadcast Solutions welcomed the proposed rulemaking: "The prospect of hyper-localizing over-the-air radio content has great potential for the industry in reaching underserved audiences, as well as providing news and alerts on a regional basis, and improving the advertising revenue for the stations," said spokesman Robert Udowitz.

"Industry groups, media and advertising companies, broadcasting companies, minority coalitions and individual stations have all supported and seen the prospects for this technology."

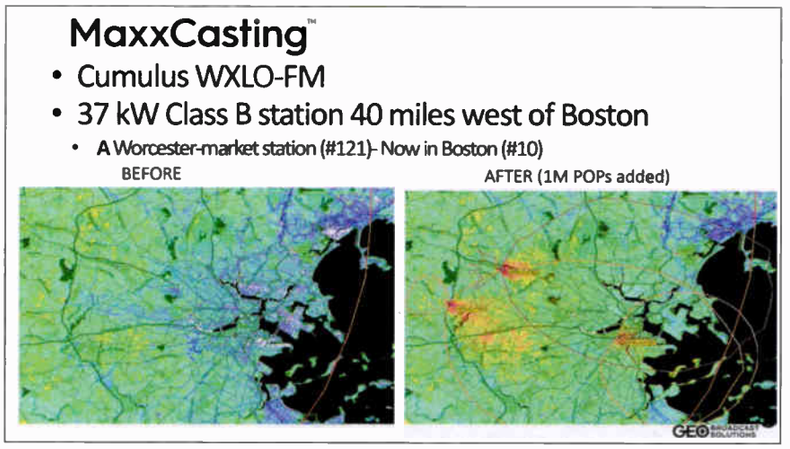
Commissioners Brendan Carr, a Republican, and Geoffrey Starks, a Democrat, worked together to bring the idea to this point.

Starks has been the more public supporter of the idea, emphasizing its potential benefit to small, women and minority broadcasters. But it was Carr who wrote after the NPRM was released, "We both saw the public interest benefits of this new technology, and I welcomed the chance to work with [Starks] and his team over the past few weeks and months to ensure that the commission launched this rulemaking."

Carr calls the idea "potentially industry-altering technology that will allow FM broadcasters to deliver targeted content over their existing spectrum."

He wrote, "This technology promises to enhance service in local markets and help these stations compete in an ever-expanding media marketplace. And it means that the freedom to transmit targeted or customized content, which mobile wireless carriers have long enjoyed and broadcast television stations are now realizing with ATSC 3.0, could soon extend to broadcast radio as well."

However Commissioner Michael O'Rielly, a Republican whose tenure on the commission was about to come to an end, took a more cautious view.



An image from a GeoBroadcast Solutions commentary in Radio World last year. GBS said a single-frequency network could be designed to the necessary specifications for geo-targeting, as illustrated in a deployment of the company's MaxxCasting system for WXLO(FM) in Boston. Its proposed geo-targeted version is called ZoneCasting.

Commissioner Brendan Carr described the idea as "potentially industry-altering technology that will allow FM broadcasters to deliver targeted content over their existing spectrum."

CAUTION FLAG

O'Rielly said he welcomed creative ideas intended to help "legacy providers to compete effectively with their unregulated counterparts." But he expressed reservations about the pace of the roll-out, "given its substantial implications for reshaping FM radio policy and the radio advertising marketplace."

He said the FCC should not rush.

"This rulemaking's embrace of new radio technologies seems to have occurred at almost light speed," O'Rielly wrote.

"In addition to these process-related concerns, there are also substantive reasons to proceed with caution. … Any rulemaking that considers taking steps that rely on a proprietary technology should be done under a watchful and extremely skeptical eye. It can take years, if not decades, to undue problematic regulations that contain embedded technologies."

He said comments that will be filed from the industry will be important.

"Geo-targeting will likely have different consequences for different stations, and it will be important for the record to flesh out the relevant benefits and drawbacks of more targeted ad sales," he wrote.

"Some argue that increased targeting could expand ad sales by making smaller stations, and even boosters, more attractive to ad buyers. However, it is also possible, at the same time, that geotargeted ads will lower station revenues overall because these ads will be cheaper as a result of reaching fewer ears, leaving stations with a more limited product to offer and putting them in the position of having to recoup lost revenue."

O'Rielly said that if advertisers can slice any given market into half a dozen mini markets, "it is possible they will only buy spots in certain neighborhoods and forego others, while potentially reallocating remaining funds to digital advertising or other media."

In the best-case scenario, he said, stations would be under heightened pressure to sell even more ads, at a time when potential ad sales are already being lost to other media.

"In the worst-case scenario, the door could be opened to allowing advertisers to entirely ignore certain neighborhoods or mini markets, placing an untenable strain on small stations or broadcast boosters that operate in these areas and harming consumers who live there. In the absence of more robust analysis, the assumption that these changes will promote diversity of voices, much less ownership, is incredibly premature."

ACCESS TO CAPITAL

But Commissioner Starks expressed no such reservations.

He pointed to the impact of the pandemic on small, minority broadcast owners, and said this proposal will help. He cited supported from civil rights organizations including Multicultural Media, Telecom and Internet Council (MMTC), the National Association of Black Owned Broadcasters (NABOB), National Urban League and numerous others. (MMTC filed "whole-hearted" support on behalf of 21 public interest, civil rights and business advocacy organizations.)

Starks said, "The ability to use of booster stations to provide hyper-localized content potentially opens up opportunities for station owners to increase advertising revenue, which for struggling stations could increase their chance of staying on the air to serve their local communities. It could also provide a cost-effective means for other small businesses to customize advertising to a targeted audience."

Another benefit, he said, is that it could help minorities gain more access to capital.

"GeoBroadcast Solutions has developed an advertising revenue sharing model that would help smaller stations install boosters and new technology necessary to use the system without having to come up with up front capital and operational expenses," he wrote.

"If this innovative proposal can provide a new revenue stream that keeps even a few struggling stations on air or opens up opportunities for new broadcasters to enter the market, it is well worth our serious consideration."

Comments should be filed via the FCC's online comments system and reference MB Docket No. 20-401. Comments are due Feb. 10, replies are due March 12.

INTERFERENCE CONCERNS

The FCC had asked for earlier comments about the GBS petition last spring and said it got "significant" public and industry participation. It specifically cited "a significant show of support from many small broadcasters that filed nearly identical comments," saying the volume of comments "demonstrates that there is meaningful interest on behalf of radio broadcasters."

(continued on page 10)

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NPRM

(continued from page 8)

The FCC said that most of those commenters support the petition, although some raised concerns that they felt should be addressed.

The National Association of Broadcasters gave qualified support to the idea in those previously filed comments.

"Enabling radio broadcasters to use boosters to location target announcements and other programming would benefit listeners with more relevant, tailored content, including emergency news and announcements. Geo-targeting could also open important new revenue streams for FM broadcasters in the markets for targeted advertising and smaller, local commercial advertisers," it wrote last spring.

NAB said zoned broadcasting may facilitate radio advertising by businesses that were previously priced out of advertising on radio or "found that buying spots that cover an entire radio market was not financially sensible."

But the association said then that the GBS proposal was "not entirely free of potential concerns." It expressed a worry about potential interference that, even if confined to a station's booster cluster, could cause listeners to change channels or reflect poorly on the FM service.

And it expressed concern that the system works only with analog FM service, which could undermine the expansion of digital audio broadcasting; but NAB noted then that GBS was working on implementing its system to be compatible with HD Radio.

But four of the most prominent radio groups in the United States said more research would be necessary before the FCC can seriously consider allowing zoned FM broadcasting.

iHeartMedia, Cumulus, Entercom and Beasley wrote, "Technologies that are not yet widely proven which could cause interference to the primary signal, as well as confusion among radio listeners as the primary signal is handed off to a localized signal, should not prematurely be adopted as a default standard without more real-world experience gathered with experimental authorizations."

Also last spring, Xperi Communications initially expressed concern over potential impact on HD Radio broadcasts but it later recommended that the FCC move to an NPRM.

Consultancy REC Networks supported the general idea but raised potential interference concerns regarding low-power FM and FM translator stations.

BITTERSWEET

The timing of the NPRM was bittersweet for GeoBroadcast Solutions. Its Chief Technology Officer Bill Hieatt, who had been deeply involved in the project, died in December, age 56.

"Bill worked with a talented team that have worked and developed our technology under his guidance," spokesman Robert Udowitz told Radio World in December.

"In the last two years he fortified that team with the best technical advisors in the industry. Under Bill and that team, we have successfully deployed MaxxCasting and prototypes of ZoneCasting, and expect a seamless transition and continued innovation. His presence will be missed but his guidance will continue."

Booster Questions: A Sampling of the NPRM

The NPRM described above asks whether the FCC should change its booster station rules and how. It laid out many questions, organized in three groups. Below is a sampling; read the NPRM at *http://tinyurl.com/rw-fcc-gbs*.

TECHNICAL OPERATION

Interference— Is it reasonable to expect stations to manage self-interference without additional guidance or mandates? Should the FCC impose second adjacent channel interference protections for boosters? Do the proposed operations pose a threat to other types of stations such as LPFM or HD Radio broadcasters?

Could self-interference degrade quality of service on the FM band? What would the listener experience be as they moved between zones?

Could there be circumstances in which a car moves from a booster zone to the primary and then to another booster zone in quick succession? How would sudden, repeated changes affect the experience?

Should the FCC limit the number of geo-targeting boosters per primary station?

Should it consider rule changes to better protect first-adjacent stations? Does an increase in boosters warrant a new rule that provides *predicted* protections for co-channel stations, as opposed to only protecting against actual interference?

Should a booster be required to shut down because of an interference complaint until it can prove it has eliminated interference? How many complaints required?

Will the impact of self-interference be the same for all receivers? The FCC wants to hear from receiver manufacturers, retailers and auto manufacturers "regarding the extent to which they are concerned about consumer confusion and whether such confusion is likely to result in warranty claims and/or equipment returns."

Have previous experimental operations provided enough information about interference?

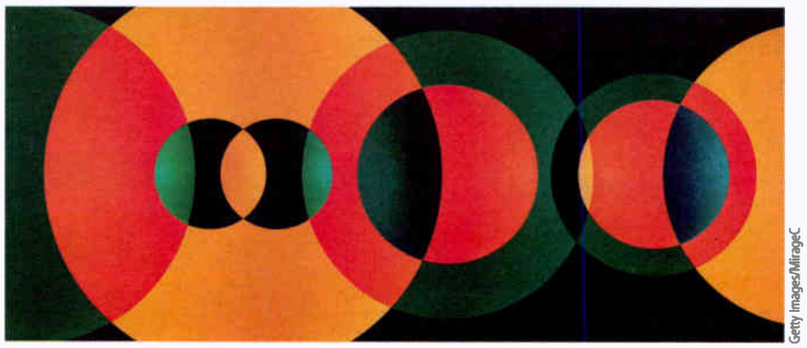
FM Booster Station Rules — What changes in rules covering boosters and translators would be needed? Should LPFM stations be included? How should the FCC deal with mutually exclusive booster applications?

Will an increase in boosters result in harmful increase to the noise floor?

Should the FCC consider special filing windows for certain types of stations? Should it adopt MMTC's proposal that Class A be given priority, followed by a second priority window for Class B and C stations?

Would the proposal limit other manufacturers from developing similar geo-targeting technology?

HD Radio — The FCC understands that the geo-targeting is only compatible with analog broadcasts. If the intent is to expand to HD Radio stations, what is the impact of the change in programming on the HD Radio signal? Would the booster only replace content on the HD1 channel or would it also simultaneously change programming on multicast channels? How does this affect scrolling displays?



Getty Images/MirageC

PROGRAMMING

The FCC asks whether it should require the booster to air content that is "substantially similar" to content on the primary. Do licensees need guidance as to the types of programming permitted within the categories of "advertisements, promotions for upcoming programs and enhanced capabilities"?

GeoBroadcast recommended a time limit for original programming of 5 percent per hour or three minutes. Is that appropriate? Should the FCC allow exceptions in emergencies, where additional local information may be valuable to listeners?

PUBLIC INTEREST BENEFITS

Would the rule change promote localism as promised?

If targeted ads include political content, how would that affect political file requirements?

GBS believes the change would benefit small businesses and other local advertisers who may not be able to afford ads to air in the entire market but who could be interested in more targeted ads. Should the FCC take that into account? Would national advertisers also benefit?

Would the change generate additional economic opportunity for broadcasters as promised? What would be the benefits to small, independent, minority- and women-owned FM station owners? Would the proposal have any impact on diversity?

How would the change affect competition among station owners, in particular those who currently operate FM boosters and those who would need to secure a new booster license?

MMTC told the FCC that GeoBroadcast Solutions had agreed to provide vendor financing to help small and diverse broadcasters obtain the equipment. Does that raise public interest concerns? Would smaller broadcasters be unable to deploy the technology without such financing?

And what about listeners — could interference issues reduce the effectiveness of emergency alerts? Could certain parts of a market be ignored in favor of population clusters deemed more valuable to advertisers? What impact would geo-targeted programming have on underserved populations?

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Tips for Avoiding Wet Encounters

Also, a postscript to our discussion about generator maintenance

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

San Diego engineer Marc Mann offers some great tips to augment our suggestions in the Oct. 14 issue for keeping your condensate A/C systems clear for drainage.

First, Marc noted that the photo depicted in that column (Fig. 1) showed the condensate drain hard-piped. Unfortunately, this is more the rule than the exception. It appears that the cleanout cap was not screwed on but secured using PVC cement. Changing the tubing and cap to a threaded type will permit direct access to the drain for cleaning with a bottlebrush and/or compressed air.

The photo also shows a water-detecting puck on the floor. This is great; but if water overflows the evaporator pan, it's too late. Consider installing an evaporator pan overflow pipe switch that fits into the condensate line; it will turn off the A/C if water rises in the drain tube due to a clog. An example is the Rectorseal Safe-T-Switch (Fig. 2) available on Amazon.

Marc also likes to add an easy visual method to check if the condensate is indeed flowing. As shown in Fig. 3, he adds a vinyl tube (with inside diameter of 1 inch) to the drain. PVC nipples placed on either end are held in place using hose clamps.

On even moderately humid days, you can verify that the condensate water is flowing and leaving the pan to wherever it is discharged. It takes but a few moments to confirm flow. The clear tubing also lets you see when dirt, algae or scum begins to form so you can use a bottlebrush to clean out the drain.

Fig. 2: A Rectorseal Safe-T-Switch.

Fig. 1: The condensate drain trap depicted in our prior column.

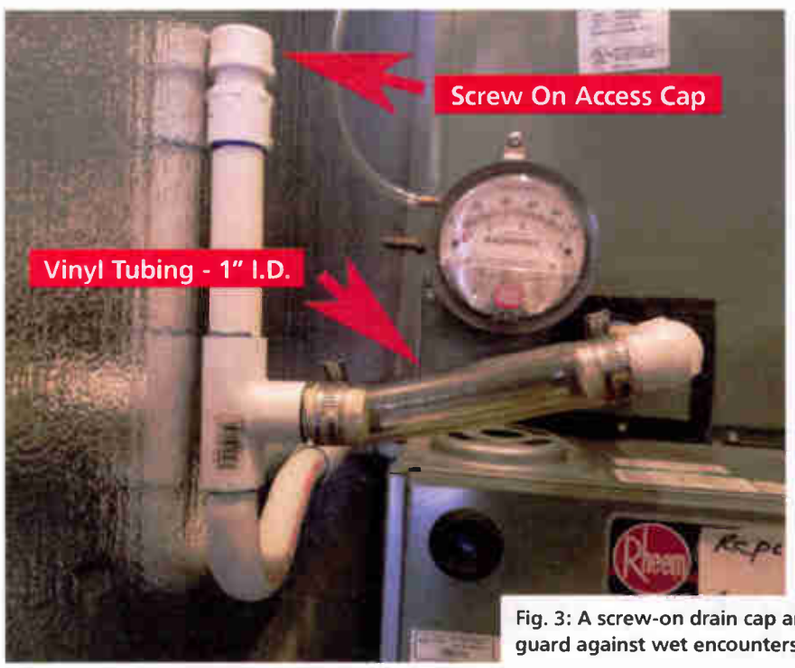

Fig. 3: A screw-on drain cap and a see-through section of tubing help guard against wet encounters caused by clogged condensate drains.

These low-cost methods can help you reduce the chances of a wet encounter of the worst kind.

Innovonics founder and industry innovator Jim Wood is active on a couple of Part 15 experimenter groups online.

"Being an admittedly elderly fellow, I got my start in radio when AM was just about the only game around," he told us. "In my home town of San Jose, the only FM station of license there was doing elevator music — Muzak or some similar service. Anyway, I've always had a soft spot for AM radio, 'the radio' I grew up with."

As a service to wannabe broadcasters, Jim developed a budget audio processor intended for Part 15 and LPAM applications. This was a "labor of love" project in his semi-retirement, and he has sold about 80 over the past few years. The Schlockwood 200 mono processor has XLR or TRS 1/4-inch phone plug ins and outs. It can be used as a ham radio voice processor! You can view it at his site *www.schlockwood.com*.

Jim said his second product in the

AM arena is under development with promising early results. It's an AM mod-monitor, again for the experimental broadcast crowd. Jim doubts this will have the appeal of the processor but it's a fun project.

Radio World honored Jim as an industry innovator in 2017. It's encouraging to see his innovative spirit continues!

Jim developed a budget audio processor intended for Part 15 and LPAM applications.

Speaking of building things, San Francisco's Bill Ruck read our column this summer describing a DIY cable tester by Buc Fitch (*radioworld.com*, search "XLR cable tester").

Bill recalls that in his youth he'd mooch mic cables from friends and associates for events he engineered. He quickly learned to test those cables before using them, because the event was not the time to troubleshoot faulty cables.

Later, when Bill had more money, he started buying Belden 8412 and making his own. Bill continued to check them but got tired of fumbling with a VOM. So in desperation he cobbled an XLR tester, similar to the one described by Buc Fitch.

Bill included what he found to be an important feature: He tested the connector shells for connection to any of the pins. He learned from experience never to connect the XLR shell to Pin 1, to avoid ground loops. In practice, you can't do this with a Cannon XLR connector, but the Switchcraft A3M and A3F have a convenient place to do this.

Over the years, Bill writes that he has found all sorts of miswired configurations as well as unbelievably bad workmanship hidden inside that XLR shell.

We'll wrap up this column with a postscript from David Morgan, director of engineering for Sinclair TeleCable–Norfolk whose tips for generator maintenance we shared recently.

From a webinar I did for the SBE on generator maintenance, David adds that the little rubber boot on the positive battery terminal not only guards against corrosion but also prevents accidental shorting of the battery terminals.

How can this happen? Very easily, when you are working with metal tools like wrenches in close proximity to the terminal.

Is your rubber boot missing? You can find replacements at most auto supply stores.

As we enjoy the winter weather in the Northern Hemisphere, it's also important to check that your block heater is working. As a part of his preventive maintenance, David checks the temperature. Block heaters can and do go bad, and he has replaced one himself.

Battery age is another point to consider. After getting burned a few years ago by trying to squeeze a little more useful life out of an older battery, David now makes it a rule to replace his generator batteries after three years.

The specific gravity of the individual battery cells can be a good guide to replacement. Hydrometers for measuring this can be found on Amazon for less than $15.

David also plans to add hardware cloth to keep mice out after several set up house inside his big 180 kW Kohler. He has also seen mouse pieces in the metal fan guard grating as well as other places inside the genset. That block heater is an excellent welcome sign!

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

John Bisset has spent more than 50 years in the broadcasting industry and is in his 31st year writing Workbench. 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.

Nurture Your Personal Network

To build knowledge, build relationships. Great sources of information are all around you

TECHCAREERS

BY DAVID BIALIK

When you're an engineer, the employer judges you by your skills and knowledge. Let's talk about knowledge.

A good engineer does not need to know everything, just how to find the answer. In the old days we had tons of books to refer to (I still have editions of the "Audio Cyclopedia" and "Radio Handbook" on the shelves). Manuals from companies like Ampex and Scully explained the principles of how the products worked. Today we have the search engines — but who can really rely on the unedited and curated database?

The best answers will come from your teammates in arms: other engineers. This is why organizations like the Society of Broadcast Engineers, Audio Engineering Society, IEEE Broadcast Technology Society and Society of Motion Picture and Television Engineers are important.

At local meetings, engineers gather and learn from headline speakers on new and innovative topics. Then the magic happens. Groups form and the engineers start to trade war stories. During these discussions you will hear about the idiosyncrasies of various equipment, how non-ordinary scenarios were solved and where the job openings are.

Unfortunately, online Zoom meetings are not the best for this, but it is still happening.

Trade publications are fabulous when you can determine the difference between a good user report and sales hype. Learn which authors are good; you will eventually meet them throughout your career. Trade publications also let you know about current technologies and products, where to obtain the items and sometimes who is using them.

School is a great start for the engineer, but you should also take advantage of industry conferences and conventions.

Someday soon we'll be able to attend major events in person again, where you'll be greeted by huge exhibition halls. Yes, you get to see all the new and exciting equipment available for the right price. But you also get to meet salespeople and (if lucky) the designers of the gear you will depend on.

One thing to ask, because it is never obvious, is whether you can join their online user group. Sometimes the company hosts it, or it may be found on a common social media platform like Facebook. That's a great place to read, ask questions, trade experiences.

Beyond the exhibit hall there are gath-

Ask your manufacturer if it has an online user group and how to join; that's a great place to read, ask questions, trade experiences.

Photos by Jim Peck

Trade show conversations, like this one between Mark Goins and Stephen Denny in the GatesAir booth at the 2019 NAB Show, are an important part of building your personal knowledge network. Manufacturer salespeople and designers can be valuable sources of technical and career info.

Associations and societies bring you together with people who have common career interests. Here, colleagues teased Nautel's Jeff Welton, right, as he was honored at the 2019 Public Radio Engineering Conference.

MARKETPLACE

WorldCast Updates Transmitter Features

WorldCast Systems rolled out a new version of its Ecreso FM transmitters, which range from 100 to 2000 Watts.

It said the 1.9.0 release now enablews you to automate a configuration change or send GPIO commands in case of specific alarms. Complementary to the scheduler features, the automation is part of the Communication Pack license.

It also uses an updated SmartFM algorithm that the company says enables broadcasters to reduce energy consumption by up to 40%, lowering expenses and CO2 emissions.

"After many tests and deployments worldwide, we have updated the five saving strategies to adapt to your on-field conditions," it said. "In particular, SmartFM V2 brings you a new 'Extreme Savings' strategy for when broadcasters need it most."

The release adds RDS settings to the UDP and TCP RDS console, enabling their configuration with an RDS automation software. Added are TA, TP, PTY, DSN and MS.

And the company now offers a new Support Level Agreement as well as its optional 10-year warranty.

The transmitters for analog FM are offered in a compact, modular 2U or 3U chassis design. They support remote control by Web server, SNMP, RS232 or GPIOs.

Information: *www.worldcastsystems.com*

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erings, technical sessions and standards meetings. The gatherings will be very broad and you can usually hear some notable speakers. The technical sessions will teach you about new technologies and techniques. Standards meetings will allow you to be part of the evolution of the technology.

Being a member of the organized technical community is essential. Going to conferences and conventions is great. Don't be arrogant and think, "I don't need to do this because I know everything." (Yes, I have met such people.) You are never too old to learn, and technology is always changing. Don't be ashamed to ask others questions; this is the only way to learn (Socrates agreed with this).

Remember: An engineer does not have to know everything, just how to find the answer.

David Bialik is a consultant who has held technical broadcast and streaming positions for companies like Entercom, CBS Radio, Bloomberg and Bonneville. He is co-chair of the AES Technical Committee for Broadcast and Online Delivery and a Senior Member of the SBE. Reach him at dkbialik@erols.com *or 845-634-6595.*

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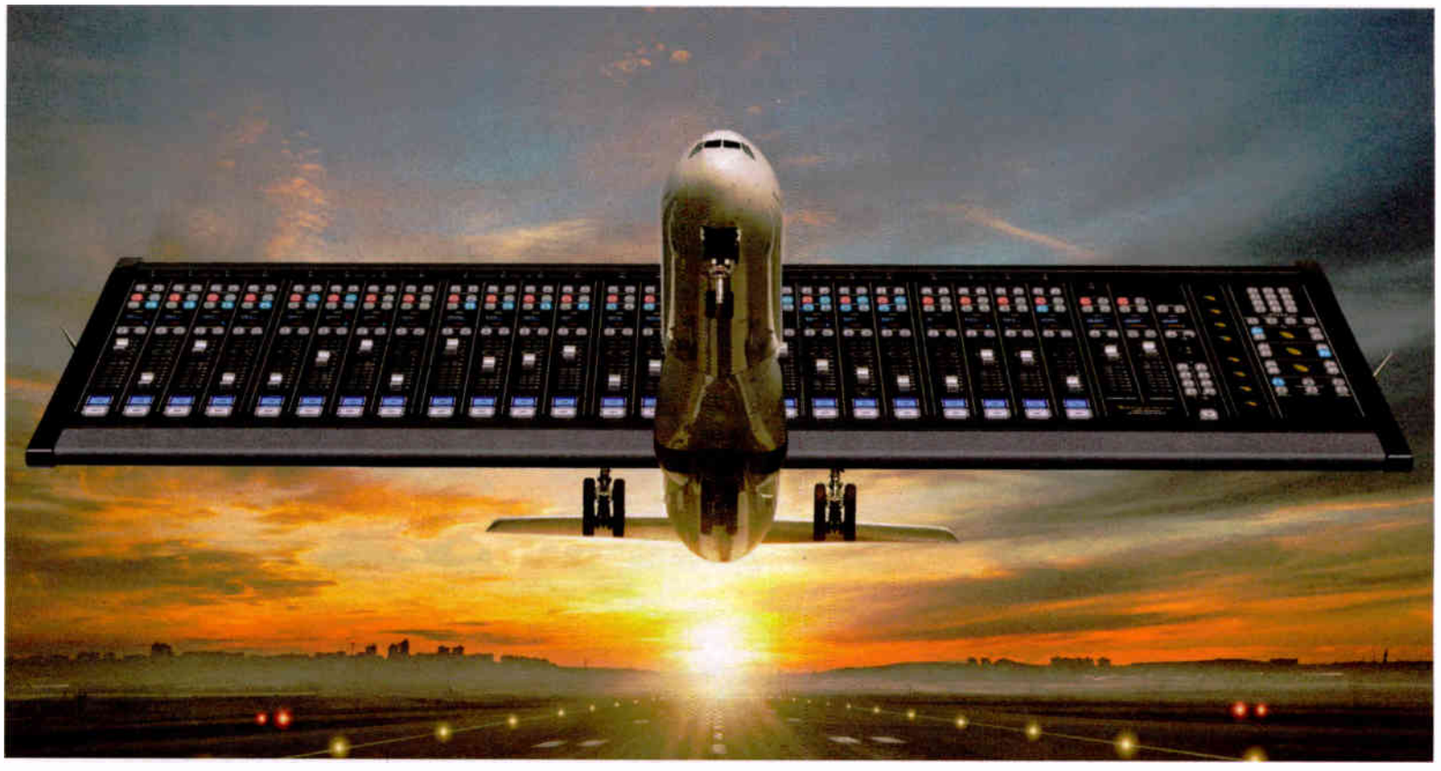

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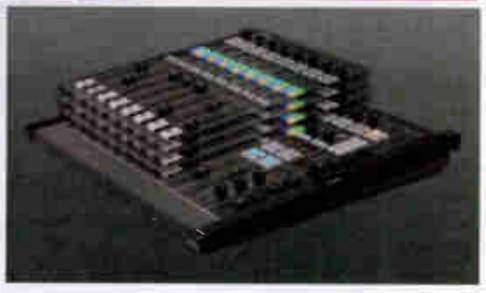

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Quick, We Need a Temporary AM Antenna

Here's what happened after a crew declined to climb WJMC's old stick

TECHTIPS

BY MARK PERSONS

Mike Murrey hired on as engineer at WJMC(AM/FM) and WAQE(AM/FM) in Rice Lake, Wis., back in 1998. He took one look at the 459-foot tower serving WJMC on 1240 kHz and knew it would need to be replaced someday.

Well, that someday came in late 2019 when a crew refused to climb the 63-year-old structure. That started a chain of events to replace the tower.

PLANS

Heavy and consistent rains made site preparation exceedingly difficult. Temporary roads were built with rock and gravel so concrete could be poured at the new tower base and guy anchor points. The original concrete could not be used because towers are now "engineered" so they can be insured by insurance companies.

It was beginning to look like the project would extend into 2020 when the tower crew announced they were starting "right NOW" to take the old tower down. Rather than disassemble the old tower a section at a time, they elected to cut a guy anchor and let 'er fall. (See the video at *http://mwpersons.com/video.*) People were evacuated from the studio/transmitter building and nearby business for the tower to come down. Besides, who would want to be inside working while a spectacle was going on outside?

HURRY

It had been assumed that there would be more than enough time to put up a temporary AM transmit antenna, but now there was a scramble to make it happen.

Mike's original plan was to have two utility poles put up to support a long-wire antenna. My experience with horizontal wire antennas is that they make good "cloud burners," as we say in the amateur radio hobby — RF radiation tends to go up rather than out to the horizon. I found that to be the case when helping another station. The coverage with a quarter-wavelength wire, from the tower base to a tree, went only a few miles. Ouch!

Fig. 1: WJMC's studio with the temporary antenna.

Mike Murrey asked for and received special temporary authority from the FCC to cover the situation. He chose to run 250 watts, instead of the licensed 1000 watts, to keep RF at bay.

DETAILS

A better choice was to erect the tallest possible temporary vertical antenna.

The local power company installed a used 40-foot utility pole with 35 feet sticking out of the ground (Fig. 1). Topping that was 40 feet of pipe bolted to the pole. A wooden dowel was inserted inside the bottom pipe section to keep it from crushing when mounting bolts were tightened down. There was a fair amount of pole to pipe overlap. The top turned out to be only 68.5 feet above the ground.

The pole consisted of four 10-foot sections of iron plumbing pipe, reducing from the bottom 1-1/4 inch to 1/2 inch at the top. To help with antenna efficiency, Mike constructed a "top hat" of three 10-foot wires, at the top, attached to nylon guy lines. These wires were bare #10 soft-drawn copper. It was the same wire that is normally used in AM ground systems. They helped make the electrical height of the antenna a bit taller. A #6 stranded copper wire ran down the wooden pole from the metal pipe at the top. The wire was connected to a used/temporary antenna coupling network at the bottom. Four 200-foot copper radials were run out from the base on top of the ground. Some half-length radials were also run bercause there was extra wire available on the supply reel. Might as well use it.

Things didn't go exactly as hoped (Fig. 2). Mike attached the pipe to the top hat while the utility pole was being put into the ground. Then the pipe bent

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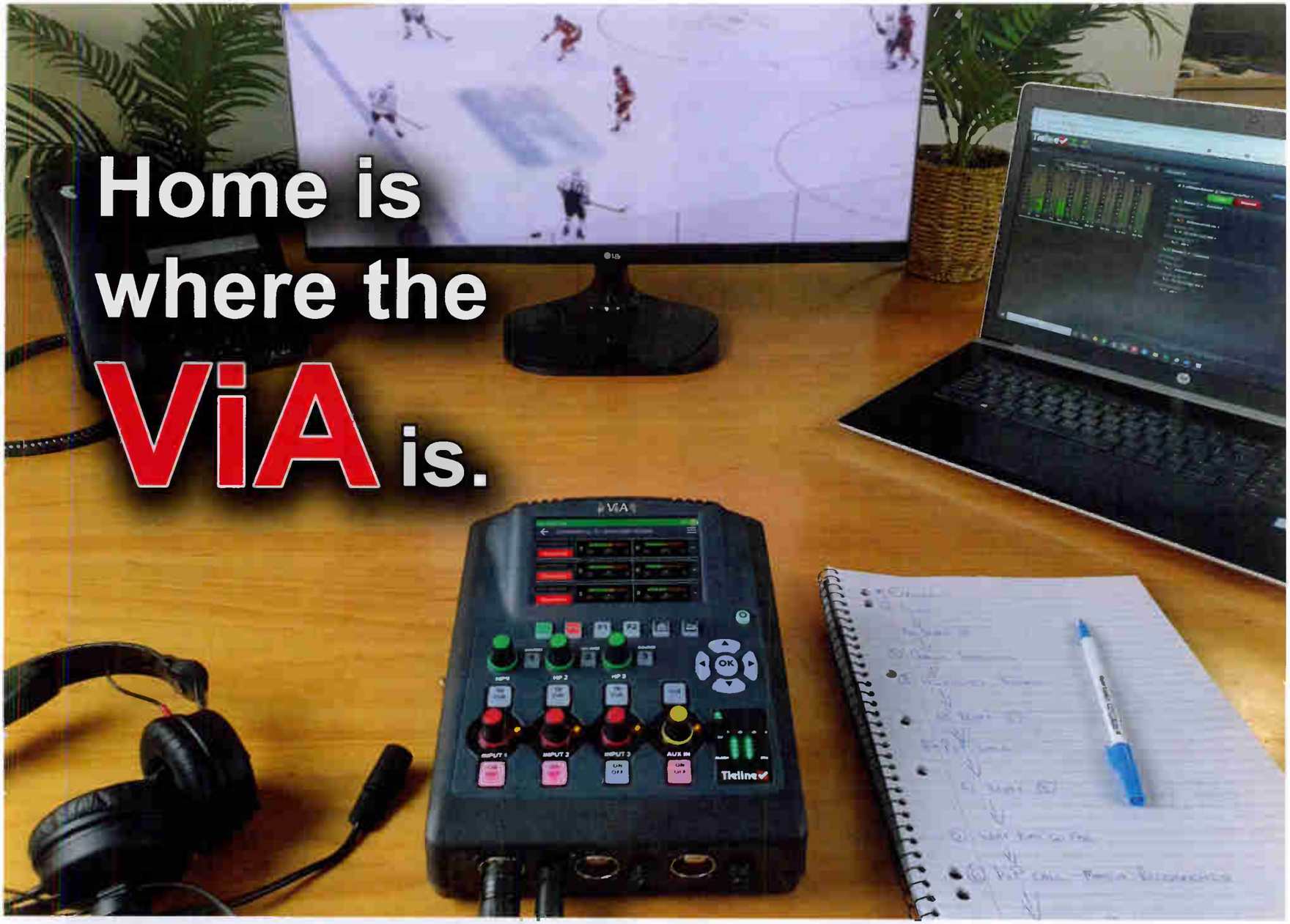

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Fig. 2: Raising the antenna.

ANTENNA

(continued from page 18)

over at almost 90 degrees while being raised into position. That required two boom trucks to help straighten the pole so it could be guyed. You will see it was still a bit bent in the photo.

AFTER DARK

Contract engineer Del Dayton out of Eau Claire, Wis., was called in to measure the antenna impedance at night (Fig. 3). He came up with 38 –J180, then calculated a design. Components were then installed and adjusted in a temporary antenna coupling network. It was convenient that the original 50-ohm transmission line could be pulled over and connected to the coupling network.

The downside is that the temporary antenna could not be constructed 100 feet away from the studio and original tower as originally planned. Instead it was located just off the parking lot some 10 feet or so from the studio. This is because trucks could not drive over the water-saturated ground.

The location presented its own challenges. Even though employees were kept RF-safe from the tower, RF got into unshielded cables leading to the fax and credit card processing machines. Mike relocated those to another part of the building.

Mike is a U.S. Air Force veteran and was laughed at by his U.S. Navy veteran brother. It seems Air Force guys don't know how to tie knots in rope on guy lines. It takes a sailor to do it right!

He asked for and received special temporary authority from the FCC to cover the situation. He chose to run 250 watts, instead of the licensed 1000 watts, to keep RF at bay.

A DELAY

Construction of the new 459-foot tower began, but soon the tower crew pulled off the job for three days to work at a TV station that was off the air. The foreman felt justified in doing that because WJMC was indeed "on the air." The station manager and employees were happy because they still had listeners instead of being off for weeks.

(continued on page 22)

Fig. 3: Del Dayton tunes the temporary antenna coupling network.

Fig. 4: The author takes field intensity measurements.

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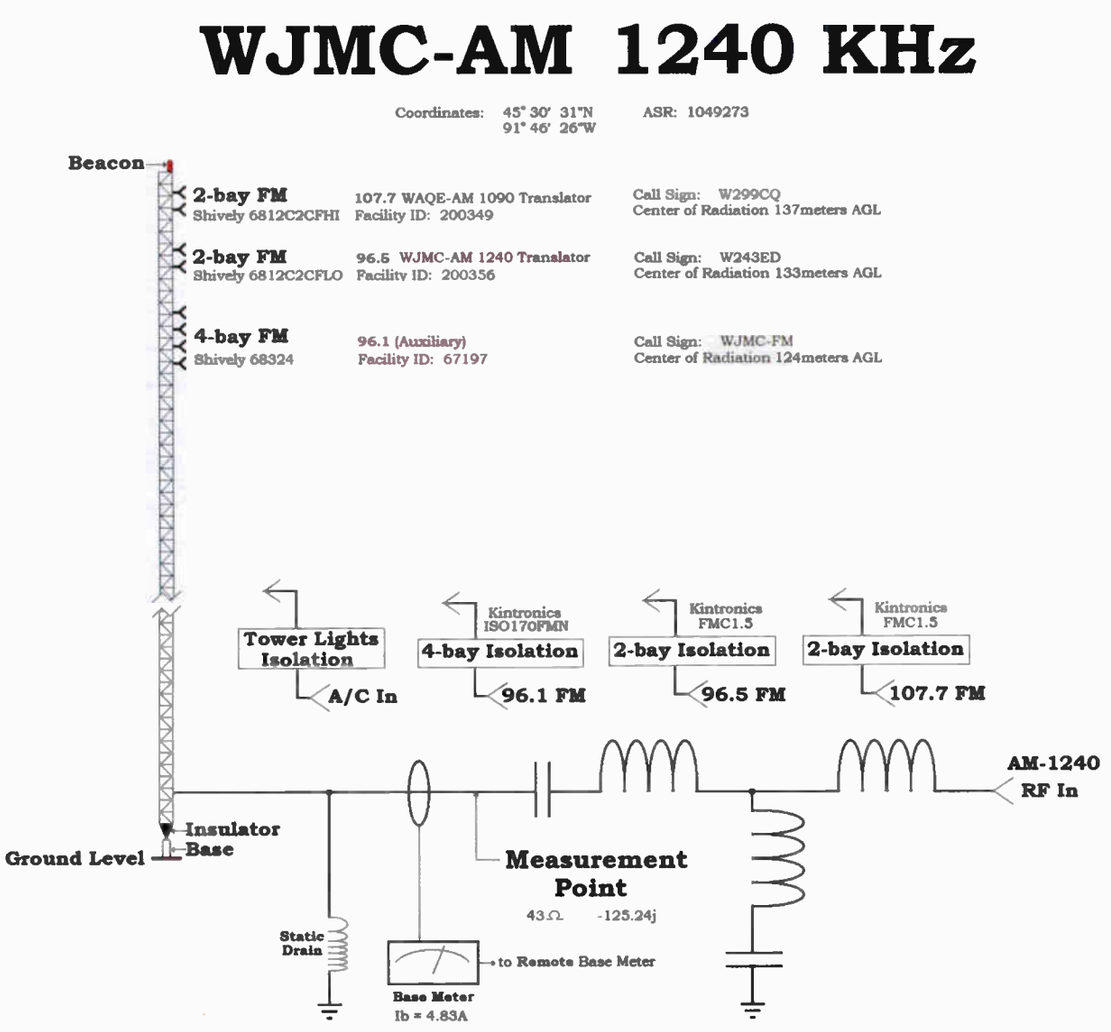


Fig. 5: Schematic diagram of the WJMC antenna system.

ANTENNA

(continued from page 20)

HOW WELL DID IT WORK?

The station had usable coverage. This intrepid reporter measured field intensity at 14 random points in the listening area using a GPS to document each location (Fig. 4). That allowed me to figure distance to measurement locations and plot them on a curve. This was a "Mark's Two-Hour AM Micro-Proof," as described in an article I wrote for Radio World in 2003 (read it at *www.mwpersons.com/articles/6-4-03-RW-article.html*).

The data revealed that the field intensity was 33 mV/m at a kilometer with only 250 watts of transmitter power. It was certainly better than nothing! There was about 10 mV/m in downtown Rice Lake and about 12 mV/m in residential areas. The population of this small Wisconsin town is 8,338 people. The half mV/m contour went out about 10 miles in their low ground conductivity of only 4.

Field intensity was 33 mV/m at a kilometer, with only 250 watts of transmitter power. It was certainly better than nothing!

The meter I used was a Potomac Instruments FIM-41. The FIM-21 and the PI 4100 are similar instruments that are commonly used for measuring monitor points on AM directional antenna systems. They are good tools for determining antenna efficiency, as you see in this article.

BEFORE AND AFTER

I had done the previous antenna resistance measurements back in 1993. It was 108 ohms with –247 ohms reactance for an antenna current of 3.04 amperes with 1000 watts input. Del Dayton measured the new tower as 43 ohms, –125 ohms reactance, for 4.83 amperes at 1000 watts. The details are in Fig. 5. Yes, the two towers were the same height.

A lot of factors can change the characteristic impedance including tower width, antennas on the tower, isocouplers, lighting chokes, capacitance to the tower from the guy lines and lead-in to the antenna coupling network.

I now believe the old tower had a bad electrical connection between tower sections near the top. Yes, this

Fig. 6: Mike Murrey and the completed project.

can happen as towers rust. Sections can become electrically disconnected, even with tons of downward pressure. Hard to believe, but it is true. That is why at least one leg needs to be welded at joints. Learn more on an article I wrote in Radio World in 2012, "Better Living Through Tower Welding" (*www.radioworld.com/news-and-business/better-living-through-tower-welding*). Mike had the crew weld two tower legs because it was convenient for the welder when doing the work.

In Fig. 6, Mike Murrey shows off the completed project with new isocouplers and a rebuilt AM antenna coupling unit. The new tower has FM translators for their two AM stations and a backup antenna for their three full-power FMs.

Comment on this or any article. Write to radioworld@futurenet.com. *Mark Persons, WØMH, is a Certified Professional Broadcast Engineer and recent recipient of the SBE John H. Battison Award for Lifetime Achievement. His website is* www.mwpersons.com.

Telos VX Builds Community in Milwaukee

Adaptation and flexibility handle shifting phone system demands

USERREPORT

BY MIKE DORRIS
Partner
Inrush Broadcast Services

MILWAUKEE — 88Nine Radio Milwaukee (WYMS/88.9 MHz) is a catalyst for creating a better, more inclusive and engaged Milwaukee through music and stories created for a culturally open-minded community. Their studio facility, built in 2013, is located in the Third Ward neighborhood. All of their programming, including their subchannel 414 Music exclusively devoted to local music, originates from those studios today.

When 88Nine moved into their new space, the studios were filled out with a combination of Telos Hx1 hybrids and an Nx12 talk show from the old building. In a call back to the 1970s, POTS service was dropped directly into the new building and distributed to studios via Cat-6 patch panels.

However, being forward-thinking in both programming and technical areas, Radio Milwaukee adopted the VX in early 2015.

To allow staff a chance to establish a comfort level with the new system, the VX first replaced the Nx12 in the main air studio while the scattered Hx1 hybrids remained. The staff found the transition to be seamless as the phone module of the Axia Element console displayed the lines identically. A VSet12 12-line phone was also deployed in the air studio for talent that was more comfortable with a more traditional phone instrument.

The improved audio quality and increased reliability of VoIP was immediately noticeable, all while operational telecom expenses were reduced dramatically.

When the VX was implemented in 2015, it connected to our VoIP provider Flowroute directly over the public internet, and has performed flawlessly ever since. In 2020, as we planned our migration to Flowroute's more robust peering infrastructure, we chose to forgo this direct connection.

We instead made the VX an endpoint on the facility's newly commissioned Asterisk-based VoIP PBX and trunked the PBX to Flowroute. This will allow the staff to make extension-to-extension calls (when they're finally back in the building) and enables unified telecom administration.

The VX still performs flawlessly behind the VoIP PBX. Creating additional extensions has been a breeze and we've been able to quickly add phone numbers in Flowroute, map those numbers to extensions in the PBX, and add them to the VX.

Since 88Nine is a fully Axia-based facility, this can all be done remotely in a matter of minutes — one of many conveniences afforded by VoIP and AoIP during the pandemic.

In the main studio, the VX has been an integral part of "Let's Hear It," a weekly request show hosted by Marcus Doucette for many years. It also allows 88Nine to continue interacting with their local community on a more individual level through frequent contesting and listener contributions.

After the VX deployment in the main air studio, we began looking at expansion to the other studios. A backup control room also featured an Axia Element console with a phone module, so a VSet telephone was purchased and it was configured as a mirror of the main studio.

However, the staff found that they preferred to only use the Element phone module for control in that environment. With the versatility of the VX ecosystem we were able to use the VSet in a production studio that already featured an Axia iQ console. Creating the additional studio and show in the VX was just as simple as the main studio. It was far more time-consuming to remove the Hx1 and its wiring than configuring the new hybrid in the VX!

During the pandemic, the VX has been indispensable. Pledge drives at the station normally featured a full phone bank of volunteers and multiple hosts on a stage, pitching for the station. This year, during two different pledge drives, access to the studio space was severely

Marcus Doucette takes requests for "Let's Hear It," a weekly request show.

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.

restricted. The VX served as a simple method for getting multiple hosts on the air, with one staff member in the studio and others into a dedicated VIP line. Other calls are handled on the additional hybrid channel and regular call-in group.

The Omnia audio processing built into VX makes these phone calls sound clean and full.

In the future, the remaining production rooms will have VSets installed so the VX can handle telephony for the entire studio facility. Retiring the remaining POTS hybrids won't have the same cost savings as with the main studio since these last few lines are already running on ATAs [analog telephone adapters], but it will continue to simplify management and provide a consistent studio experience for the staff. We're pleased with the VX's ability to grow and change with the facility over the years and we rest easy given its flawless track record since it was installed.

For information, contact Cam Eicher at The Telos Alliance in Ohio at 1-216-241-7225 or visit www.telosalliance.com.

For integration information, contact Brian Sapp at Inrush Broadcast Services in Chicago at 1-312-872-8911 or visit https://inrush.net.

TECHUPDATE

D&R SHIPS AURON MIXER WITH HYBRID

D&R says its new Auron is made for talk show and phone-oriented radio shows with a built-in phone hybrid.

The company says Auron offers an analog signal path with flexible digital control. The console uses a split unit topology with a master unit capable of connecting to one or multiple 10-fader units.

The Auron features a 7-inch HD touchscreen display for metering and system control with K-ALPS or ALPS motorized faders and optional modules for Dante AoIP or USB audio.

The control room/studio section has user assignable switches.

The Auron Fader Unit can be customized to fit a studio's needs. According to D&R, available channel configurations include mic/line, VoIP or balanced/line. Each channel features a 1-inch OLED display and four user-assignable switches. The company says that all channels are designed for high-quality audio, with components like THAT VCAs and microphone preamps and a three-band EQ.

The master unit has four volume controlled, balanced outputs (master, sub, aux and PFL). One digital master AES3 output and two monitor sections; control room and studio. Each with a balanced speaker output and a phones outputs.

The 10-Fader unit features two slots that enable 16 x 16-channel Dante AoIP or USB audio cards. Modules available for the dual-stereo slot are Bluetooth 4.0, AES3, SPDIF and RIAA.

The whole system is configurable on the 7-inch touch display or via the Auron web app.

For information, contact D&R in Netherlands at +31-294-418-014 or visit www.d-r.nl or www.dnrbroadcast.com For U.S. sales contact Progressive Concepts in Illinois at 1-630-736-9822.

AVT Brings Magic to Radio 1

Dutch broadcaster pleased with Magic PhonerSet and THipPro hybrid

USERREPORT

BY JESSY GOLDFINGER
Radio Broadcast Engineer
Red Bee Media

HILVERSUM, NETHERLANDS — Red Bee Media was chosen to be the service provider for the integration of the new talk show system for Radio 1, the news and sports radio station of the Dutch public broadcaster.

As a requirement, the system was to be usable for three broadcast studios, two production studios as well as eight audio workstations with a total of 40 telephone lines at a total of 22 user workplaces. In addition to classic telephony, it should also be possible to make high-quality voice contributions via the Luci Live smartphone app usually used by Radio 1.

Together with Red Bee Media, Radio 1 decided to use a talk show system from AVT Audio Video Technologies. The company convinced us of its flexibility and modern hardware platform. All requirements were met with three Magic THipPro telephone hybrid systems and four Magic ACIP3 dual-audio codecs. In addition, various PC licenses were required to operate the system. AVT offers three different variants for optimal use at various workplaces. Put simply, these are the workplaces of the presenters, the technicians and the editors, who all have different ways of working.

For many users, it was particularly important to be able to operate the system via a standard telephone, which AVT makes possible with the new Magic PhonerSet.

The phone is a VoIP phone with an Android operating system that conveniently displays the caller lines via a large touchscreen display.

However, the Magic PhonerSet is not, as usual, registered to the private branch exchange, but exclusively to the Magic THipPro systems. The audio signal is also streamed directly between the THipPro and the PhonerSet.

On the one hand, this saves licenses in the PBX, and on the other hand, it is a handy operation, as the current line status is always visible on the display.

With this method of operation, each Magic PhonerSet can also connect to any studio at the touch of a button. This means that an editor can work with any studio from his desk, e.g., set up connections, handle calls, preassign lines and so on.

The integration into the studio environment was almost exclusively IP-based. The audio connection to Radio 1's Lawo Core was realized via AES67 and the signaling via EMBER+. The entire cabling therefore essentially consists of two network cables per system used for management, VoIP, AES67 and EMBER+.

The integration of the audio codecs into the system is easy for the users. The codec lines are displayed on the various client devices like normal telephone lines, so that users do not have to rethink their operation.

What I particularly liked about the whole integration phase with AVT was the flexibility with which they reacted to our requirements.

AVT implemented many requested functions during the integration that were important to the users such as a meter indicator for Luci Live transmission quality. Going beyond the request, AVT implemented the metering for all lines, including normal telephone lines.

Radio 1 also wanted the database to be password-protected, which AVT initiated in a very short time.

In practice, Radio 1's engineers have found making changes in the configuration to be user-friendly, giving confidence and eliminating dependence upon third parties.

The system has now been in operation for almost half a year and, apart from minor problems, has run smoothly. The competent support from AVT has also responded quickly to my questions — this is particularly helpful with new systems.

For information, contact AVT in Germany at +49-911-5271-0 or visit www.avt-nbg.de.

TECHUPDATE

BROADCAST BIONICS CALLER ONE HANDLES CALLS

Broadcast Bionics says that its Caller One answers, screens and controls calls from a browser on any device.

Caller One is a software talk show system, using PC, webRTC and the latest SIP (voice over IP) technology to deliver a new way of routing calls to air without any dedicated hardware.

The company says that Caller One has been specifically designed with the smaller studio in mind. It is quick and easy to install and maintain; yet feature rich. Caller One handles multiple SIP lines, users can add more workstations by accessing the software via a browser to collaborate, produce or call screen. All can be done on a mobile device, such as an iPad or tablet.

With no hardware or cabling, all that is needed to get started is a PC and some SIP telephone lines, either from a SIP provider or directly from an existing office switch if it can supply SIP extensions.

Caller One features and functionality include:

- Screen and control calls from any browser;
- Manage up to 12 lines;
- Connect using IP audio drivers or soundcard;
- Unlimited workstations/screeners;
- Dispositions and caller demographics;
- Call directory;
- Call history/call log;
- Chat (visual talkback);
- Call recording;
- Call conferencing.

For information, contact Broadcast Bionics in England at +44-1444-473999 or visit www.bionic.radio.

TECHUPDATE

CALL IN STUDIO KEEPS IT SIMPLE

Call in Studio is a virtual cloud-based phone platform that allows broadcasters and/or podcasters to accept calls in a call-in talk show format.

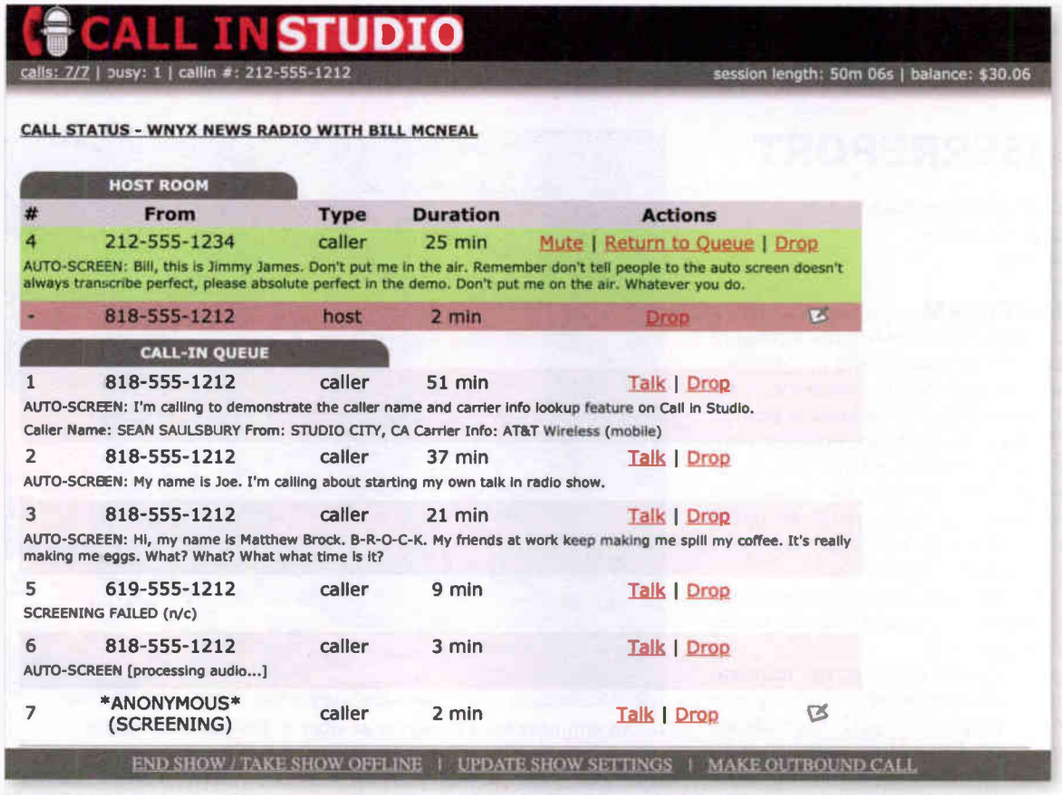
The company says its system can be connected with almost any broadcasting, live-streaming or recording setup. It is designed to be simple to use by a single producer or screener, and it includes security features to keep unauthorized users out.

Over the past year Call in Studio has rolled out several features including Zoom connection compatibility, Microsoft Teams interface and other services.

The user interface offers host rooms, host queues, screening rooms, call-in queues and other call management features.

Callers can call in via a web interface (WebRTC), which helps facilitate worldwide audiences. Professional billing options are available for medium- to high-volume customers.

For information, contact Call in Studio at mail@callinstudio.com or visit www.callinstudio.com.



Earforce Keeps Interviews Rolling With Opal

Comrex phone/IP audio interface handles multiple jobs

USERREPORT

BY RENS KOREVAAR
Audio Engineer
Earforce

Audio engineer Rens Korevaar at work in the Earforce studio.

AMSTERDAM — Earforce is a recording studio that handles a range of tasks. We do mixing and post-production, and periodically record music for use in documentaries and other media.

In the past few years, however, podcasting has become a large part of our business. We produce the sound and make sure everything sounds beautiful, but we also help businesses and other podcasters develop content.

Our goal is to help our clients reach their audience, and also share the stories they want to tell.

As an audio engineer, my responsibilities have extended as we've gotten more into podcasting. I have always done a lot of recording and audio production, but these days I also produce podcasts and help write scripts, in addition to whatever else needs to be done.

Many of our podcasts involve interviews and other conversations that we need to record. When COVID hit in March, we had a whole string of podcasts that were cancelled because the country went into lockdown. Many of our podcasters were afraid to come to the studio, or their companies wouldn't allow them to visit.

We obtained the Comrex Opal phone/IP audio interface because of the pandemic, and it has allowed us to continue producing content.

We use it to allow guests to call into a podcast from their laptops, and sometimes we'll also record conversations over a connection between two Opal units. Additionally, we'll use it to monitor voiceover recording for commercial and ad reads — it allows us and our customers to listen in high quality and give notes while our voiceover talent is recording.

Opal is about as easy as a solution like this could be to use. Basically, you just click on a link, then click "connect" and it works.

We still sometimes have difficulty getting interview guests to understand it, but we also have difficulty getting people to plug in their headphones. Nothing is truly foolproof. I have a routine where I remind people to check their connections and remind them to click the button, and even though some handholding is required, we can always eventually get it to work.

Opal helped us keep some of our podcasts recording, that would have otherwise been cancelled. We do a podcast with the pharmaceutical company Springer Healthcare called "The GP in Corona Times" (title translated from Dutch). We called general practitioners throughout the Netherlands using the Opal, and recorded their stories about COVID and their patients. The audio quality was significantly better than it would have been were we to use a phone or Zoom (or a similar streaming service). Our host was also connected to the studio from home with Opal. We couldn't have produced it without that equipment.

I think Opal is definitely worth buying. The price point is low enough that it pays for itself. Good audio is so important — if you hear something in high quality, even if you don't know anything about audio, it just feels better to listen to. Especially these days with everything going remotely, the Opal definitely comes in handy.

For information, contact Chris Crump at Comrex in Massachusetts at 1-978-784-1776 or visit www.comrex.com.

CONSULTANTS

ANTENNAS/ TOWERS/CABLES

WANT TO SELL

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

AUDIO PROCESSING (INCLUDES ON-AIR)

WANT TO BUY

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

Orban 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@out

EQUIPMENT

WANT TO SELL

Qty 8: DM Engineering MSRA-RM Multi Station Relay Adapter. New, in original boxes. Call/Text Bill 702-419-7903.

SPEAKERS/AMPS

WANT TO SELL

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

RECEIVERS/ TRANSCEIVERS

WANT TO SELL

Professional grade SCA demod module, $25.00. Contact David davidwj3089@ gmail.com

WANT TO BUY

AM Stereo radio. Call 417-619-2467.

RECORDING & PLAYBACK HARDWARE

WANT TO BUY

1960s-vintage MacKenzie Repeater machines, magazines, spare parts and manuals, complete or "parts" machines considered, James, 870-777-4653.

RF CONNECTORS

WANT TO SELL

RF CONNECTORS & GADGETS – Parts, Products & More! www.W5SWL.com

TAX DEDUCTIBLE EQUIPMENT

Donate your broadcast facility; IRS approved 501(c)(3) non-profit charitable organization. Fair market value. License (AM/FM/FV), land, building, tower, equipment, etc. The Augustus Foundation, Inc., 2902 Main Street, La Marque, Texas 77568. (409) 359-3435. Contact Dr. M. Augustus

TRANSMITTERS/ EXCITERS/ TRANSLATORS

WANT TO SELL

BE-25T 25KW FM transmitter 2007 frequency agile tube transmitter in good working condition on 90.7 (all its life) when pulled from service. Approx. 6 mos. on rebuilt tube and a newly rebuilt fan motor, also spare optical modules, manuals and maintenance logbook. $17,500/OBO. As-is, where-is: Hayward, CA, Jeff Cotton, 530-279-6262 or info@kdup.org.

MISCELLANEOUS

WANT TO SELL

UPGRADE consoles to international specs with world standard Weston 30B illuminated 4" vu meters. 4 in like-new condition. GramOphone@earthlink.net

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

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

OMAS MARCONI PEN FOR SALE

Omas Marconi 100 Anni di Radio 1895-1995 Charcoal Grey Limited Edition Pen (No.3334 of 4000) New in original Presentation Box; This pen commemorates 100 years of Marconi's invention of radio Call or Email for Photos 919 556-5506 or Email: radiogla@gmail.com Price: $2600 + $50-Shipping

WANT TO BUY

Looking for KSFX radio shows, Disco 104 FM, 1975-1978. R Tamm, 925-284-5428.

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.

TUBES

Diversity Was the Story of the Year

For community media and public radio, DEI was at the center of the conversation

COMMENTARY

BY ERNESTO AGUILAR

The author is membership program director of the National Federation of Community Broadcasters. NFCB commentaries are featured regularly at www.radioworld.com.

When 2020 ended, many people in noncommercial radio looked at the defining moments of the year. And though the big stories of the nation had a lot of resonance, one topic in particular towered over the community and public media industries.

COVID-19 had a stunning impact, including upon stations forced to change core operations and to lay off staff amid financial problems; and the presidential election spawned an array of community discussions, such as escalating polarization and the complex issues opened up by misinformation. This year is likely to see both of these subjects dominating headlines and our popular consciousness.

However, if you are a watcher of community media or public radio, nothing quite shaped the industry like diversity, equity and inclusion.

Ernesto Aguilar

CALLS FOR ACCOUNTABILITY

DEI was front and center in no small part due to the proverbial dam breaking in community and public media.

Scandals had been brewing at prominent organizations since at least 2017. But where leaders once beset by controversy angled out of positions largely on their own terms, 2020 was the year jobs were withdrawn, people were fired, organizations committed to do better, and everyone ignoring problematic cultures was officially put on notice.

This past year, noncommercial media outlets of many sizes saw their names tied to claims of racism, exclusion and abusive workplaces.

St. Louis Public Radio and WAMU drew national headlines for serious internal issues. Social media and the internet became for ums for workers at Georgia Public Broadcasting, GBH, PRX and elsewhere to speak out.

Where staff may have once been quiet, 2020 was the year they instead called for accountability at places like WNET in New York and NPR. Past issues sunk the jobs of Sonya Forte Duhé and Andi McDaniel; they had new positions at Arizona State University's well-regarded journalism program and Chicago Public Media, respectively.

Elsewhere, 2020 saw a wave of retirements and resignations by those caught up in staff conflicts, the most visible of which was American Public Media Group CEO Jon McTaggart. Even community radio saw the spotlight, with sexual misconduct and other issues being raised.

How diversity initiatives will be executed in 2021 remains to be seen, though signs are good that such topics will continue to be a high priority.

DAY OF ACTION

It was not all bad news.

The killing of George Floyd and nationwide racial justice demonstrations pushed many communities to have dialogs about bias and equality. Seattle's KEXP announced it was changing its DJ lineup in a bid to more accurately represent its diverse city.

In July, Colorado Public Media offered a sober look at its own failings, pledging to do better. And in the fall, Public Media for All organized a day of action that mobilized dozens of major public media organizations and hundreds of employees to commit to improvements related to diversity, equity and inclusion.

How diversity initiatives will be executed in 2021 remains to be seen, though signs are good that such topics will continue to be a high priority.

In December, the Corporation for Public Broadcasting hosted a discussion on diversity with managers across the industry. Organizations like Greater Public, NFCB and the Station Resource Group are leading conversations with their cohorts. And outlets such as Capital Public Radio, KALW and Blue Ridge Public Radio have agreed to accomplish at least one Public Media for All goal in their first 30 days of signing up.

2020 was a most difficult year for radio. Yet, new calls for inclusion may make 2021 a year we step up to be more relevant, diverse and engaged.

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

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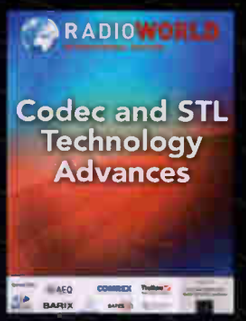
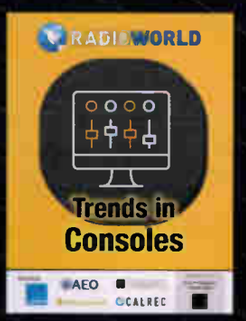
Email **radioworld@futurenet.com** with "Letter to the Editor" in the subject field. Please include issue date and story headline.

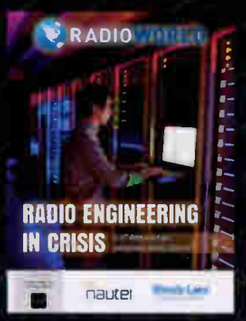
EBOOKS: Tools for Strategic Technology Decision-Making

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



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





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