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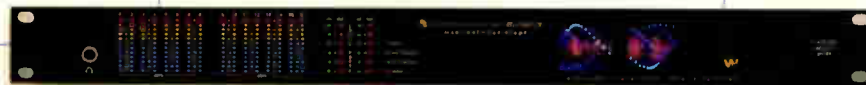
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NEWSROUNDUP

WEA: The federal government wants to make more changes to Wireless Emergency Alerts. If you wish to weigh in, comment deadlines are set. The FCC already made some improvements recently but has more in mind; it is taking input on a further notice of proposed rulemaking aimed at improving the system, upgrading its multi-media, multilingual and geo-targeting capabilities and implementing lessons learned since mobile alerts launched.

NAB and NPR both have encouraged the commission to recognize the consumer benefits of alert messages that direct the public to turn on radios for additional information during disaster recovery efforts; that was mentioned in the notice in a discussion of the potential role of WEA as a secondary messaging service, a tool for communicating emergency instructions to supplement the initial message.

Comments are due Dec. 8, with reply comments due Jan. 9, 2017. Submit comments in PS Dockets No. 15-91 and 15-94, FCC 16-127.

EAS: "While conducting an upgrade of US Cellular's Wireless Emergency Alerts platform, a test alert was inadvertently broadcast to our customers across our entire footprint." So said the carrier in a statement about an incident that delivered multiple test alerts to cellphones. FEMA is evaluating and working with the carrier to determine what actions should be taken to avoid a repetition.



The WEA platform has been the subject of attention in the alerting world as consumers become more familiar with it and as federal authorities have laid out improvements and expansion to the system. Broadcasters have watched with interest, wondering whether and how WEA alerts may affect the role their EAS broadcast alerts play.

In this case, according to FEMA, US Cellular inadvertently sent test messages using the WEA system to its cell subscribers and others who may be roaming on its network. The routine test messages were supposed to be visible only inside of the FEMA Integrated and Public Alert Warning System and the carrier's internal testing environments. US Cellular is one of 61 carriers participating in IPAWS WEA messaging; FEMA and the carriers maintain a test environment to try changes and updates before making them live. The carrier apparently connected the live cellular network to its test system.

SATELLITE: One of the main satellite-based program delivery conduits that radio stations use is changing. The AMC-8 satellite is being replaced by AMC-18, shown. Major U.S. radio networks coordinated efforts "to proactively determine the best replacement," according to a statement. The change affects delivery of programming including Cumulus Media and Westwood One, Orbital Media Networks, Premiere Radio Networks, Learfield, Skyview, et al, along with a large number of single programs that buy sat time. Current dishes will need to be reoriented from the 139-degree west longitude arc of AMC-8 to the 105-degree west longitude arc of AMC-18. Stations can re-point satellite downlinks as early as February.



John Joslin of satellite equipment dealer DAWNco said, "The radio sat move is a big deal that will affect almost every radio station. Some stations will simply re-aim their dish at an off-peak time." Others with older dishes will need a new 3.7-meter satellite antenna to receive signals from the new satellite. Joslin said contemporary 3.7-meter (or larger) dishes are designed to handle satellites such as AMC-18, which are spaced closer together in orbit. Older and smaller dishes can have trouble singling out satellites that are only 2 degrees apart rather than the older 3-degree spacing. Some stations may also find the new satellite location is blocked to them for a variety of reasons.

Upwards of 90 percent of radio stations may be affected by this change. The AMC-18 satellite launched in 2006 and itself is due to be replaced by SES-11 soon, but the location should stay the same. There will be an overlap period of several months during which radio networks will provide service on both AMC-8 and AMC-18 / SES-11. All stations currently receiving programming from AMC-8 will have until June 30, 2017 to re-point their downlink dishes. At that time, AMC-8 will no longer serve as the radio network "neighborhood," and there will not be a suitable replacement satellite at the 139 degree position.

OWNERSHIP: The NAB is taking the FCC to court again over its quadrennial media ownership regulatory review, the association confirmed not long before the presidential election.

"Broadcasters want to compete in the digital age and continue being a trusted source for local news and information, but FCC rules need to reflect 2016 and not the 1960s," said NAB spokesman Dennis Wharton. "It defies belief that the FCC allows AT&T/DirecTV and Charter/Time Warner mergers while barring two Topeka TV stations from combining, or a radio station from buying a newspaper." NAB signaled even before FCC chairman Tom Wheeler circulated his proposal that it was likely headed to court, saying that retaining the newspaper-crossownership ban, as the FCC did yet again, was an arbitrary and capricious violation of the Administrative Procedure Act.

NAB is filing its appeal in the U.S. Court of Appeals for the D.C. Circuit, the principal court of jurisdiction for FCC decisions. Prometheus Radio, which is also challenging the rules, filed in the Third Circuit.

MIKE CALLAGHAN: Colleagues are remembering radio engineer Mike Callaghan, 72, who died Nov. 5. The longtime chief of Clear Channel sta-



tion KIIS(FM) in Los Angeles retired in 2013. He had coped with diabetes-related illnesses for some 15 years. Survivors include his wife Dr. Gayle Callaghan and their three children, John, Kelly, and Caitlin. To read more about his life and career, see radioworld.com/callaghan.

EAS: The Multicultural Media, Telecom and Internet Council asked a court of appeals to reverse the FCC's decision on multilingual EAS notifications. The petition, filed in late October in the U.S. Court of Appeals for the District of Columbia, seeks a review of a commission order released in March. The MMTC wants the FCC to ensure that individuals not proficient in English have equal access to emergency information during local, state and national emergencies. Multilingual emergency alerts would be in key markets where sizeable populations are non-English speaking.

Under a Cocoon, ESB Plans for New FM Era

Soon crews will begin to assemble a three-bay auxiliary master FM antenna inside the enclosure

BY **SCOTT FYBUSH**

More than 1,250 feet above midtown Manhattan, a big part of New York City's future FM infrastructure is taking shape inside a protective cocoon of structural fabric that surrounds the base of the Empire State Building's historic broadcast tower.

"This is the largest construction enclosure ever mounted atop a functioning skyscraper," says Shane O'Donoghue, director of broadcasting at Empire State Building of the enclosure, which wraps around the lowest 35 feet of the antenna mast where it meets the original top of the 1931 landmark. "It has met all New York City Department of Buildings requirements and landmarks approval, and it's structurally supported on the tower itself." The new structure is visible even from street level 104 stories below.

NEW AUX

What's being born inside the cocoon? The first stage of construction this winter is reinforcing the mast, now

more than six decades old, to prepare it for potential future antenna moves at the Empire State Building. With the digital TV repack coming, the current lineup of TV antennas on the tower may change, though exact details are still up in the air awaiting the results of the

causing as little disruption as possible to other broadcast tenants and to the public observatories that sit just below.

That's a big reason for the cocoon's next stage: Sometime in early 2017, crews will begin to assemble a three-bay auxiliary master FM antenna inside the enclosure. Designed to serve all 19 of the FM stations that now call the building home, the new auxiliary antenna will closely replicate the cover-

O'Donoghue says the current ERI master antenna still has many years of life left in it. Less certain is the fate of the 1965-vintage Alford antenna.

FCC's spectrum auction and the business battle for tenants between Empire and the Durst Organization's new One World Trade Center site.

Whatever happens in the TV world, there's potentially a complex chess game ahead on the building's mast. Antennas may require reworking or have to be moved on and off the tower, all while

age from the two-bay master antenna and one-bay "mini-master" that sit more than 100 feet above it on the tower.

"The antenna has been designed and is in the procurement phase, along with the 19-station combiner," says O'Donoghue. The new combiner will provide a much-needed backup for the existing ERI combiner on Empire's 85th floor, which feeds

FROM THE EDITOR



Radio World loves hearing about your RF and audio facility projects. And they need not be atop an iconic skyscraper, as in Scott's story on this page. Write to me with your own at pmclane@nbmedia.com.

— Paul McLane

the 1990s-vintage ERI master antenna that serves 16 FM signals.

At present, those 16 stations, as well as the three that use the "mini-master" installed after 9/11, can't be used when climbers are on the tower. The present Alford auxiliary master antenna that rings the 102nd floor observatory and which celebrated its 50th anniversary last year is no longer adequate.

The cocoon itself is helping to reduce the need for antenna shutdowns on the tower above. The fabric that wraps the new structure, made by the Swedish manufacturer Haki, serves as a construction enclosure, allowing workers to operate inside the enclosure during the day without any RF shutdowns of the primary antennas.

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ment. O'Donoghue credits Skanska, the building's contractor JLL, the building's project managers and engineering teams from Plan B Engineering, and Thornton Tomasetti, the building's structural engineers. The cocoon, accessed through the hatch on the 104th floor at the very tip of the building, contains several levels of work platforms, all surrounded by an enclosure that protects not only against RF but weather as well. It's nearly waterproof, designed to survive 100-mph winds, and it's even adorned with LED lighting as part of Empire's trademark nighttime display.

Because the cocoon hangs off the tower, it also provides a new viewpoint that few people have ever had the privilege to see.

"You stand on the bottom platform," O'Donoghue says, "and you're looking down on the 1,250-foot top of the original building."

SEAMLESS SWITCHES

Once the new auxiliary master is in place and the cocoon comes off next year, O'Donoghue says the next stages of TV antenna construction on the tower will become easier.

"The uniqueness of this construction," he says, "is that we've designed a climbing aperture inside the tower that allows workers and material to be transported through the active 19-station auxiliary FM antenna to an ice shield above it that will act as an RF shield, allowing work to be performed on antennas above while the 19 FM stations remain on the air from this new auxiliary antenna."

That means that the FM tenants will
(continued on page 6)



Photo courtesy Skanska

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METAPUB

(continued from page 1)

Preliminary anecdotal evidence collected by PRSS on the heels of the earthquake test indicates success on most levels; the only official anomaly was at a station where a consumer desktop radio didn't display properly until being rebooted — a device malfunction, not an issue with the MetaPub system.

DIPPING INTO DATA

CPB's interest in emergency alerting, specifically digital alerting, was the origin for the idea, according to those familiar with the test plans. The stations participating were KPBS(FM) San Diego, KCRW(FM) Santa Monica, KPCC(FM) Pasadena, KQED(FM) San Francisco, KCBX(FM) San Luis Obispo and KXJZ(FM) Capital Public Radio in Sacramento. They will be allowed to keep the hardware and software they received and will be encouraged to incorporate metadata into their operations for emergency alerting and programming information, a PRSS official said.

CPB's strategic planning process identifies potential projects for funding with a specific eye towards endeavors that will help stations provide essential services to communities, according to Erika Pulley-Hayes, vice president of radio at CPB. This is the first metadata project it has funded.

"This test served as a pilot program for the potential of service enhancements during emergency situations. CPB has a keen interest in alerting and this is another example of sharing infrastructure for enhanced service during emergency situations," Pulley-Hayes said.

As broadcasting increasingly integrates with newer digital platforms, CPB feels metadata provides an important connective tissue between broadcast and digital media, which takes broadcast to multi-platform, she said.

"As a grant maker, we encourage innovation throughout the system. We have been encouraging digital innovation for the past few years and this project

ESB

(continued from page 5)

be able to make seamless switches from the upper master and mini-master antennas to the lower auxiliary master without causing disruptions to their signals.

So far, O'Donoghue says, Empire has signed a 16-year lease extension with one FM broadcaster, Emmis Communications, to use the auxiliary master; it's working on negotiating deals with other tenants, though Empire declined to identify them. Major broadcasters with operations in the city include CBS Radio, Cumulus, iHeartMedia and other familiar names.

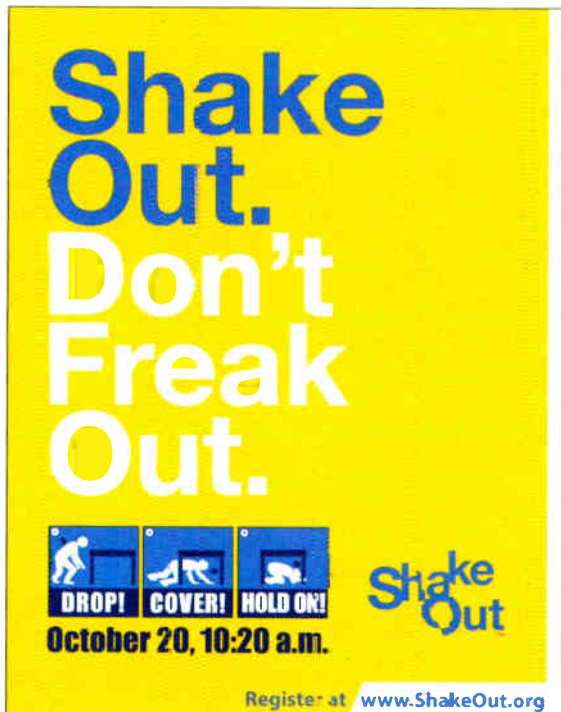
O'Donoghue says the current ERI master antenna still has many years of life left in it. Less certain is the fate of the 1965-vintage Alford antenna, which likely won't be needed once the new auxiliary master is in place. "No decision has been made yet," he says about that piece of broadcasting history.

In the meantime, he's excited to be helping to write the next chapter of FM there.

"The history of radio at Empire is an incredible history," O'Donoghue says, "and to have had some impact here has been really great."



This metadata message went out on KCBX.



Promotional poster for the annual event. Great ShakeOut Earthquake Drills are regionally organized campaigns linked as a worldwide preparedness movement.

fit. Digital is becoming very important. Video, photos and text are really taking over consumption habits, so it is important radio broadcasters can diversify services over multiple platforms," she said.

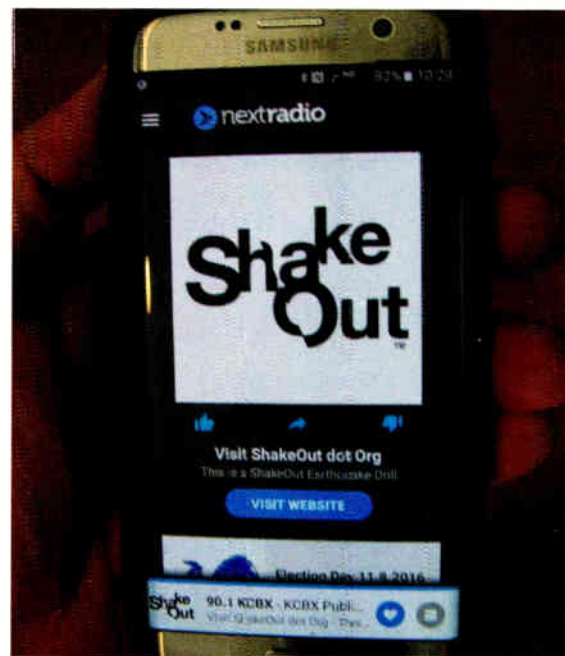
Pulley-Hayes said CPB received immediate anecdotal feedback on the test and expected an official report within a few months.

Michael Beach, vice president of NPR Distribution, which manages the PRSS, said the organization became interested in the project as a way to further test metadata delivery.

MetaPub, introduced earlier this year, passes through specific metadata to be used by radio stations that appears on the listener's portable display device, Beach said. The material can include text, graphic images and web links. Approximately 21 public radio stations in the country are participating in an ongoing MetaPub beta test.

SETUP

Station selection for the Great California ShakeOut began earlier this year; PRSS approached nine stations in the state to gauge interest level and determine whether it could work technically "based on their capabilities and our capacity," Beach said.



KCBX metadata that went out via NextRadio.



Transmission of the ShakeOut message.

Once the six were selected, PRSS assessed what each needed to deliver RDS, HD1 and HD2 metadata. PRSS provided the hardware and software for stations to access emergency metadata-enhanced messages and broadcast them to their listeners; it also provided extensive engineering support and performed quality-assurance tests.

Much of the pre-testing was completed by PRSS engineer Matt Walther, Beach said. Walther is a PRSS systems architect and took the lead configuring the radio stations that took part in the California test project.

"Surprisingly, the stations needed less equipment than we expected. Some of the stations were already passing HD content, so they already had a network established for pushing HD data to their transmitters. It was the same thing for some with RDS and streaming on the Internet," Beach said.

Some stations were missing what Beach describes as "middleware," such as Arctic Palm Technology CSPRM, NextRadio's TagStation, ENCO PADapult and Broadcast Electronics TRE Core Engine. Some had middleware but did not have integration with MetaPub, or required a software plug-in or another software solution, he said. A few were starting the process from scratch, Beach said, which called for a small PC loaded with Arctic Palm to allow integration of metadata.

In addition, PRSS provided year-long TagStation subscriptions for all of the pilot stations, which allows stations to add a mobile application component via the NextRadio app, Beach said.

(continued on page 3)

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Engineers Gather at SBE National

New Freedom Award aims to build connections between veterans and engineering

BY JAMES E. O'NEAL

COLUMBUS, OHIO — The Society of Broadcast Engineers scheduled its 2016 National Meeting to coincide with the Ohio Association of Broadcasters' yearly engineering conference and, according to organizers of the combined events, the results were gratifying.

"The events of the SBE National Meeting and the Ohio Broadcast Engineering Conference presented by the Ohio Association of Broadcasters combined to make an excellent educational and recognition event for SBE members," said SBE President Jerry Massey, who was elected to a second term.

"The attendance at the sessions and trade show was good, and the OAB event provided an excellent backdrop for the live webcast of the SBE Annual Membership Meeting and the awards dinner that followed."

Some 180 radio and television engineers — many of them SBE members — journeyed to this central Ohio city of 850,000 from as far as Florida, California and Canada for two days of technical presentations, FCC policy updates, equipment displays, SBE business meetings and door prizes at the Greater Columbus Convention Center and the nearby Crowne Plaza Hotel.

While first day's activities were limited to SBE Certification Committee and Board of Directors meetings, the following was filled with events beginning with a 7:45 a.m. SBE Fellows' breakfast and wrapping up with an 8 p.m. awards banquet.

Thursday engineering conference sessions got underway with welcoming remarks from Richard Dyer, chairman of the OAB board of directors and president and general manager of Cincinnati's WLWT(TV).

Dyer began his presentation with praise for the men and women in the broadcast engineering profession.

"We would be lost without our engineers," he said. "You bring the broadcast magic to life. You are there doing everything that needs to be done to get the show on the road. You are like the EMS first responders at our radio and television stations."



Jerry Massey

FCC NEWS

Next up was an hour-long update on FCC policies, directives and initiatives by Stephen Hartzell from the legal firm of Brooks, Pierce, McLendon, Humphrey & Leonard; Chris Imlay, who is a partner in the law firm of Booth, Freret & Imlay and the SBE's general counsel; and Blake Thompson, chief engineer at WQKT(FM)/WKVX(AM), moderator for the discussion.

Near the top of the lengthy list of commission-related items was the recent nationwide EAS test. Hartzell noted that the FCC takes EAS-related matters very seriously and has been quick to issue

notices of violation to broadcasters and cable system operators alike.

"It's very important to file Form Three in a timely fashion," said Hartzell. That form was due Nov. 14. "You have to file even if you had no problems in receiving and transmitting the national test. The FCC can issue a fine for not filing even if the test went fine."

The panel also discussed the impact of the reduction of staff at the FCC, AM revitalization, pirate broadcasters and the continuing incursion into spectrum previously set aside for broadcasters, with Imlay commenting that "just about every allocation is threatened."

THE SBE FREEDOM AWARD

The joint event saw the first presentation of an SBE award created as part of an initiative to encourage military personnel about to depart the service to look into working in the technical side of broadcasting.

Its 2016 recipient was Army Staff Sgt. Norman Portillo, recognized for his work in establishing an SBE chapter at

his Ft. Bragg, N.C. post and for assisting individuals there in connection with SBE broadcast training and certification programs.

"This is a new program that we've been wanting to get off the ground for some time," said Massey. "We will be working with people who have skills in electronics, IT and broadcasting and are leaving the military to enter civilian life. We want to entice them to consider entering broadcasting as a profession."

"We've been working on the preliminaries for this for about a year now. Our new Freedom Award was established to recognize those individuals who have been instrumental in assisting these military people to transition to civilian life."

Portillo previously won the organization's Educator of the Year Award. He was presented with the Freedom Award during the Oct. 27 wrap-up dinner event at which a number of SBE members and chapters were recognized for their contributions to the organization.

Michael Hendrickson was recognized with the SBE's Engineer of the

(continued on page 10)



Richard Dyer



Staff Sgt. Norman Portillo

METAPUB

(continued from page 6)

"There were challenges in a few cases with pushing out a message to the RDS encoder or HD importer/exporter. All in all we had to purchase and license less software than expected," Beach said.

There were challenges during pre-testing for the project, according to one of the stations involved.

"This was our first attempt to push metadata. There was total unfamiliarity with any of the software on our end. There was a learning curve," said Frank Lanzone, general manager of KCBX. "Configuring the software to integrate with our HD importer/exporter took time. There was some hit or miss in testing, but it all came together."

Lanzone gave credit to Ken Schreiner, director of engineering at KCBX, and to PRSS engineers for their efforts during pre-testing.

"We've wanted to utilize metadata for our music shows and have already started using it for titles and info for news and information shows. We are now experimenting as to the best ways to set up the information that make the most sense for listeners," Lanzone said.

The participants told Radio World that one of the take-aways from this project is that there is no single, blanket solution that can be used. Stations must make an internal review of their broadcast chain including their web services.

"Stations might have static data being displayed via RDS but not on HD. The station will need to review what it needs to be able to send dynamic data," Matt Walther of PRSS said. "This might involve reviewing networking to ensure that the middleware application can communicate with both

the RDS and HD devices."

Likewise, several of the stations had program information coded directly into a predetermined schedule that would be sent out via their web services. One of the stations had its web developer update the site's code to accept data being sent from the middleware application. This allowed for the live message to be displayed on all of their web streams and site.

ROADMAP

PRSS staff was present at four of the stations to monitor the Great California ShakeOut test, Beach said. Each radio station involved worked with local emergency managers to determine what text to use and graphics to plug in. The stations also aired a 60-second prerecorded announcement about the drill. Evaluation will continue for a few months before the final report is issued to CPB.

Beach said the roadmap for the PRSS MetaPub service is taking shape.

"The bigger MetaPub that we are growing beyond the ShakeOut will allow these six California stations to use the MetaPub and display programming metadata locally. We've created an API [Application programming interface] and are working with producers of national content to be able to format their data."

"This is really a perfect example of building something like MetaPub and thinking about what else we could do with it, as is the case with emergency communications. We were thinking just song title or story title, but then it leads to others asking if it can do this or do that," Beach said.

The bigger picture, he said, is PRSS and CPB learning how to take advantage of opportunities to better meld the digital world and broadcast world and ultimately connect better with radio listeners.



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DRONES: Verizon said it tried out drone-based 4G LTE in its first-ever emergency management and disaster recovery exercise, held in Cape May, N.J.; it also scoped out a venue and did a few tower inspections with unmanned aircraft. The carrier described a “successful test [proving] that 4G LTE coverage can be provided from an aircraft to first responders in the event no traditional service is available.” “Today’s test is the first time we’re flying airborne LTE on an unmanned aircraft system and provide high-bandwidth communications in a communications-denied environment,” said David Yoel, CEO of American Aerospace Technologies, which is helping the carrier to test its Airborne LTE Operations initiative. “As the aircraft’s flying along, it’s streaming imagery to the web ... We built up a map in near real-time, so that emergency responders know what the condition of roadways infrastructure are, and they know where to respond, and how they can get there.”

BIRDS: A bird conservation group estimated that approximately 750 tall towers in the United States have converted to flashing lights but that another 15,000 towers should make the switch. Per recently adopted FCC and FAA guidelines, tower owners are encouraged to switch or reprogram steady-burning red or white lights for flashing, to help birds and save energy costs while still protecting aviation. The American Bird Conservancy provided the 750-tower estimate in a blog post. (New towers standing more than 350 feet tall may only use flashing lights at night, under the new rules; but the FCC and FAA have been encouraging owners of older structures to extinguish non-flashing lights as well.) ABC is among those that say steady red or white lights can disorient migratory birds flying at night, and it cited research that a reported 7 million birds die a year in collisions with towers.

DASHBOARD: General Motors and IBM formed a partnership to combine GM’s OnStar system and IBM’s Watson cognitive system to create OnStar Go. Among companies involved early is iHeartRadio. The partnership will expand the OnStar AtYourService platform through capabilities supported by OnStar Go with IBM Watson. The companies called it “the auto industry’s first cognitive mobility platform.” ExxonMobil, Glympse, iHeartRadio, Mastercard and Parkopedia are the first brands to join.



According to the release, “iHeartRadio will use Watson Personality Insights from OnStar Go to curate personalized experiences that leverage on-air personalities and local content from radio stations across the U.S. Drivers will be invited to share information from their calendars, social graph, location, music preferences and more, to create dynamic and locally relevant entertainment experiences only available through the power of radio.”

FM CHIPS: NAB’s tech arm Pilot reports that “a record number” of smartphones with enabled FM chips were sold in the U.S. during Q2. The top 70 percent of the best-selling devices, offered by at least one carrier with the chip enabled, sold in that period, totaling 12.7 million smartphones.

That amounts to about “46 percent of the total” top models, according to a blog by NAB’s Skip Pizzi.

He noted the decline in popularity of the Apple iPhone, which represented about 38 percent of the best-sellers. Apple has declined to activate the FM chip since it was added to devices in 2009.

A potentially concerning trend is the removal of the 3.5 mm headphone connector from some iOS and Android devices. Because the majority of FM-enabled smartphones use wired headphones as the antenna for reception, this could be a hitch in the progression of FM activation, but Tagstation/NextRadio President Paul Brenner has said he does not consider this to be a problem.

TRANSLATORS: “It is not too early to call the relocation program a resounding success.” So said FCC Media Bureau Chief Bill Lake in a blog post in early November. He took note of the closing of the second filing window to allow AM stations to relocate FM translators up to 250 miles to rebroadcast their signals, which he said is helping some provide new nighttime service. “In the first window, which was open to smaller and daytime-only AM stations, 671 relocation applications were filed, and over 90 percent of those applications already have been granted. In the second window, open to all classes of AM stations, 420 relocation applications were received, with 265 granted thus far.” The total number of applications was almost 1,100 — from a total AM station census of 4,671 in the country.

“Though a few of the AM licensees already owned or could lease the necessary translators, a substantial majority of the licensees participating in the windows chose to acquire the relocating translators, thereby ensuring a permanent place for their programming on the FM dial,” Lake wrote. “Seven hundred sixty-six translator assignment applications were filed during the two windows, and 631 of those already have been granted.”

MEUSER MAKES THE LINK



WorldCast Systems presented its Innovation Award to Robert Meuser of Engineaux Inc. for his use of MPX over IP and Scripteasy on his STL. He’s third from left, shown with the company’s Kevin Campbell, Tony Peterle and Christophe Poulain at the fall Radio Show. He designed and specified equipment for one of the first digital MPX-over-IP studio/transmitter links in the United States, for Rice University’s KBLT(FM).

SBE

(continued from page 8)

Year Award, and Cheryl Lustenberger of the Performance & Production Center Television Studios at Emerson College received the SBE Educator of the Year honor. The dinner finale included a ceremony in which SBE members Jay Adrick, Wayne Pecena and Joseph Snelson were elevated to the grade of SBE Fellow.

A DAY ALL ABOUT BROADCAST TECHNOLOGY

Other activities at the joint SBE/OAB event included a day of simultaneous engineering presentations in the areas of radio, IT and video. The three tracks featured such industry experts as GatesAir’s Tim Anderson, Nautel’s Fred Baumgartner, the Telos Alliance’s Frank Foti, Broadcast Electronics’ Brian Lindemann and Dielectric’s Christine Zuba. Wayne Pecena, director of engineering of broadcast technical services at Texas A&M Uni-

versity, hosted the final technical session, “Troubleshooting the Broadcast IP Network,” which played to a nearly standing room-only audience.

The event also featured an equipment exposition, with more than 50 vendors including familiar names like Broadcast Electronics, Broadcasters General Store, Comrex, ENCO Systems, ERI, GatesAir, Jampro, Logitek, Nautel, NPR Satellite Services, RCS, SCMS, the Telos Alliance, Tieline and WideOrbit on site to display their products.

The 2016 meeting marked the SBE’s second time to partner with the Ohio Association of Broadcasters; the first was more than 10 years ago. SBE National Meetings have also been held with other state broadcasters’ associations during the past two decades. Next year’s will take place in Denver and will be held Oct. 25–26 concurrently with the Rocky Mountain Audio Video Expo at the Denver International Airport Crown Plaza Hotel.



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You can DIY a solution, but here is a company with a ready-made option

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Retired resident guru and frequent Workbench contributor Marc Mann weighed in on our discussion of “do it yourself” ways to keep A/C condenser coils clean (July 20 and Sept. 1 issues). Most manufacturers of air conditioners don’t provide filters for this. But we know the outcome when we fail to clean condensers on a regular basis.

DIY approaches work, but how well? Marc discovered a company whose core product prevents “airborne debris” from clogging the condensers of wall pack air conditioners, air handlers and rooftop units (see Fig. 1).

Air Solution Co. of Ohio manufactures custom coil filters to your specification and specializes in cottonwood air intake filter screens. They are designed to stop airborne debris at the point of entry.

What appears to set these apart from DIY solutions is the filter material used (three grades) and how they are attached to the condenser. The material is a vinyl-coated polyester medium that has “high volume and high velocity airflow with extraordinary low air resistance and static pressure impact.”

It also has other benefits, listed on their website (www.airsolutioncompany.com/products). Be sure to check out the demonstration videos.

The pliable mesh screen can be easily removed or changed for cleaning using a quick-release toggle fastener technology, shown in Fig. 2. These little fasteners fit through the grommeted holes of the filter mesh, and flip down to lock the filter in place. In areas where hail is common, a filter standoff “hail guard” keeps hailstones from damaging the air handler or condenser coils. For particularly dusty areas, the company has developed a dual-ply filter that traps small particulates.

The filters can be used for transmitter building air intakes where ambient air is used to cool.



Fig. 1: Filters from Air Solution Co. keep debris out of air conditioners.



Fig. 2: It’s easy to change or replace filters, with no tools; just flip the quick release toggle fastener.



Fig. 3: An example of the installed mesh filter from Air Solution Co.

The company also claims “rain can rinse them clean” and “It only takes a few quick swipes of a broom, brush or shop vacuum or rinse with a garden hose” for a thorough cleaning.

While you are on the website, take

a look at the energy savings calculator page to get an idea about cost savings and payback. Their “wall of shame” page is a good reason to invest in filtering — especially during cottonwood season.

Marc suggests Workbench readers

take a look at these offerings to see if they have an application that would reduce condenser/air handler maintenance. Fig. 3 shows a completed filter installation.

Here’s an interesting side note. In the spring and summer, usually from mid-May to mid-June, the 17-year periodic cicada broods are scheduled to emerge in a number of states. This was an especially bad year for some states. So, that means we wait another 17 years? No! In the United States, there are 23 identified broods, and one recently was discovered in Ohio and Kentucky — referred to as Brood OHKY.

In 2016, Brood V, a 17-year variety, emerged in New York, Ohio, Pennsylvania, Maryland, Virginia and West Virginia. But in 2017, Brood VI (also a 17-year variety) will emerge in Georgia, South Carolina and North Carolina. Then in 2018, Brood VII, another 17-year variety, will emerge in New York. So in certain states there’s no getting away from them.

Unfortunately, although cicadas are harmless to humans, they are attracted to the sound of mechanical equipment. Without filtering in place they can get sucked in, which affects the operating performance of your equipment.

The weather plays an important part as to when cicadas will emerge. A cool spring delays emergence until later in the season. They usually begin to emerge when the ground temperatures 8 inches below the surface reach 64 degrees Fahrenheit. When cicadas emerge, they will be a problem for several weeks, so readers in the affected states should take precautions to manage them.

I received some nice comments about Buc Fitch’s inexpensive audio amplifier using the German-made KEMO amplifier brick (RW Oct. 26 issue).

Buc received some comments too, including a couple readers who were perplexed why he bothered to build something when one could just buy it.

Good point, but Buc adds that the experience was not about the amp, rather about him. He loves to build things, to put his personal stamp on something.

It goes further than that. Buc has adopted an attitude that the more you know, the better your decisions. And how do you learn? By doing. And you learn something every time you “do” in this business. On top of that, the best lessons are the expensive ones, as you never repeat them.


Watch for another of Buc’s construction projects soon.

Contribute to Workbench. You’ll help your fellow engineers and qualify for SBE recertification credit. Send tips to johnpbisset@gmail.com.

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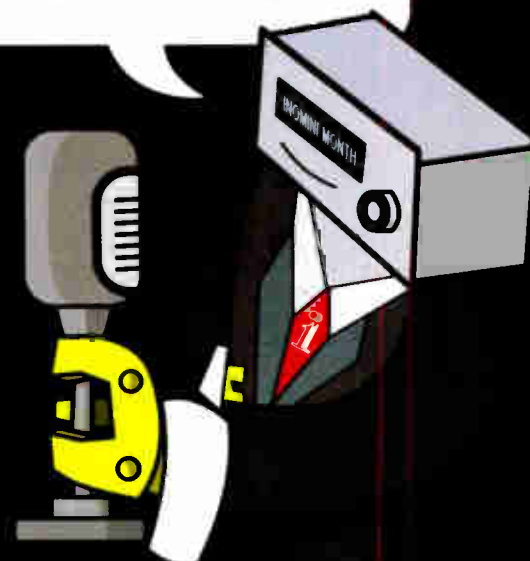
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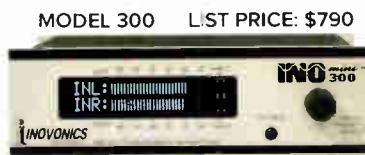
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Industry Roundtable: Trends in Transmitter Technology

We asked five cutting-edge transmitter manufacturers about trends in their biz

BY BRETT MOSS



Scott Incz
BW Broadcast



Rich Redmond
GatesAir



Chuck Kelly
Nautel



Thorsten Becher
Transradio



Eric Pere
WorldCast

The transmitter is the final leg of the radio broadcast chain. No matter how good the chain is up to that point, failure at the transmitter will render the whole effort for naught.

But changes are coming, disrupting big iron. Radio World talked to some of the leading transmitter manufacturers about what is on their radar these days.

Joining us in separate Q&As that are integrated below were Scott Incz, managing director, BW Broadcast; Rich Redmond, chief product officer, GatesAir; Chuck Kelly, director of sales, Nautel; Thorsten Becher, vice director sales, Transradio; and Eric Pere, broadcast project manager, WorldCast.

RW: What is the hottest thing in transmitters these days?

Chuck Kelly: I'd propose that there are two themes driving innovation in our industry today, intelligence and integration; and they are interrelated. By intelligence I mean harnessing IP, local remote data gathering, processing power and connectivity. Mixing these elements has created new options for automatic audio backup and local playout, unprecedented control and opportunities for a true digital path right through to the exciter for optimum loudness and sound. Integration, as a byproduct of harnessing the intelligence in sensible ways, helps engineers reduce the component count in their facilities and do more with less in a positive way. When fewer boxes or components are needed, fewer things can fail and there can be less cost by integrating features in the transmitter. Examples of these two themes working together include integrated audio processing, remote control, codecs, fail-safe systems, etc.

Scott Incz: The advancement in transis-

tor technology, which enables transmitters to be more compact, run cooler and have longer lifespans, especially with the introduction of LDMOS devices. Additionally, one of the hottest things is IP connectivity — not only for remote control monitoring but also for the delivery of audio to the transmitter via network protocol, such as AES67 and others.

Rich Redmond: Transmitters are going in two directions. They either seem to be built for higher and higher power capabilities, often liquid-cooled in design, to deliver HD Radio and other digital formats; or they are getting simpler and simpler for lower power. If you think of translators, certain Class A stations at very high elevations, educational FMs and single-frequency boosters, there is a lot of activity in relatively low-power levels under 1 kW. Over time, those transmitters have had more capabilities added, but they get much simpler to operate. And both low- and high-power transmitters have also grown far more compact.

Thorsten Becher: We like to talk about long- and medium-wave broadcast transmitters, which we feel are transmitters offering a DRM power equal to typically 80 percent (or even more) of the AM carrier power with MER >30 dB.

Eric Pere: It makes me smile to hear of "hot topics" in the FM transmitter market given that it has been around (at least in stereo form) since the 1960s. It is truly amazing to think that it is still so prevalent and has not undergone any major technological changes in that time — just adapting modern technologies to work with old and existing FM systems is in itself a major task.

Not that there have not been any changes but, when it comes to transmitters, engineers are notoriously conserva-

tive. Most people would never contemplate buying a CRT TV over a flat screen just because it's "proven technology" but the critical role of the transmitter coupled with the expense involved means that change will come much slower than in other areas. Personally, I think that the time has come to make the definitive

It does require a certain skillset to operate that not all engineers possess. These systems are a little more complex, and will require some training to learn if the customer does not have prior experience. GatesAir provides that training for customers both new to, and experienced with, liquid-cooled transmitters.

In warmer climates, where irrespective of the temperature you want to run a closed-loop system with air conditioning, there are distinct operating advantages with liquid cooling.

— Rich Redmond

switch to digital audio and perhaps even digital MPX. Digitizing an analog MPX signal may not be ideal but we can multiplex various signals in a digital stream in a much more efficient way.

RW: Liquid cooling would appear to be a winner for closed-loop cooling systems and climates with sites that need almost constant AC like desert or tropical regions. Energy savings should pay for the transmitter in a few years. Few offer this option so far. Is the market just not big enough or what are the reasons it has not gained more traction?

Rich Redmond: GatesAir has been in the liquid-cooled transmitter business for nearly 50 years, including high-power AM and TV transmitters. While liquid-cooling is relatively new to FM, the technology and its benefits are not new to GatesAir.

In some places, the climate doesn't necessarily call for liquid-cooling. In warmer climates, where irrespective of the temperature you want to run a closed-loop system with air conditioning, there are distinct operating advantages with liquid cooling. But they require more attention than an air-cooled transmitter, where you are simply dumping air into a room for cooling. Each station needs to decide what is most appropriate for their situation, and where they feel comfortable. But we are fans of liquid-cooling, and it offers a very attractive ROI for sites that have significant cooling needs and costs. It is a technology that we are comfortable with, and we have led the industry on the liquid-cooling innovation front for many years.

Thorsten Becher: Both techniques, air-cooling and liquid-cooling, have their particular pros and cons. From our point of view, the major drawback of liquid-cooling is potential leakage, either during normal operation or, par-

ticularly, in the course of maintenance work. There is no means for hermetically sealing a liquid-cooling system, thus there remains some risk of water drops affecting sensitive transmitter electronics, or even worse, provoking injury to people due to water contacting mains wires.

Eric Pere: Generally, FM transmitters operate far more efficiently than DTV or DAB transmitters so, the advantages of water cooling aren't as significant in the FM sphere.

If a manufacturer does wish to produce a water-cooled FM system, they can opt for one of two approaches.

Today the performance of MOSFET amplifiers is close to the theoretical limit. Those final few percentage points will be the most difficult to obtain, but development continues.

— Eric Pere

The first option requires a significant initial investment by the customer but delivers a highly-efficient and effective performance. This is the route which we at WorldCast Systems chose when, in 2004, we developed a liquid-cooled FM transmitter under our Ereso brand. For us at that time, it was less about operating at high ambient temperatures and more about improving the reliability of the system. We utilized technologies initially created for the railway industry to reduce the temperature of the power-related components such as the power supplies, RF, coupler etc. We also deployed DC/DC conversion techniques used in distributed computer architectures for greater overall efficiency. The result was a reduction to the total cost of ownership and to the carbon footprint of the system but customers have to be prepared to make a significant capex spend to acquire it.

The other approach that manufacturers can adopt is much more affordable for the customer but, in general, offers little or no advantage compared to an air-cooled system. In order to get any appreciable benefit, you need to have a large number of FM transmitters using a single water-cooling system.

Many also tout the maintenance advantages of a water-cooled system as no air cleaning is required. However, when maintenance is required on the water-cooling system, it requires a complete shutdown of all transmitters — a point often forgotten. Given these reasons, we can see why the market is limited for these systems.

Chuck Kelly: Let me start by taking a look at TV broadcasting, where liquid-cooling has been more commonplace. Liquid-cooling as an alternate to a pure air system has historically been very

attractive to larger TV sites where high amounts of waste heat are generated by powerful, 20–40 percent low-efficiency TV transmitters. It is hard to beat the thermal properties of a fluid to move large amounts of thermal energy. If there is a negative related to liquid-cooling in these large installations, it is typically related to the additional effort need for plumbing, approvals and exterior air exchange units. Typically the advantages aren't compelling enough at low- to mid-power and so in the TV industry, liquid-cooling is largely reserved for higher power transmitters.

When we look at the radio broadcast industry we find dramatically more efficient transmitters, typically in the 60–75 percent range, so radio engineers normally find heat extraction much easier to manage. While there may be some broadcasters with very high power needs and liquid-cooling-friendly sites, the majority can manage waste heat extraction quite effectively using an all-air cooling system. So, this becomes a “your mileage may vary” situation depending on many factors including TPO power, transmitter efficiency,

(continued on page 18)

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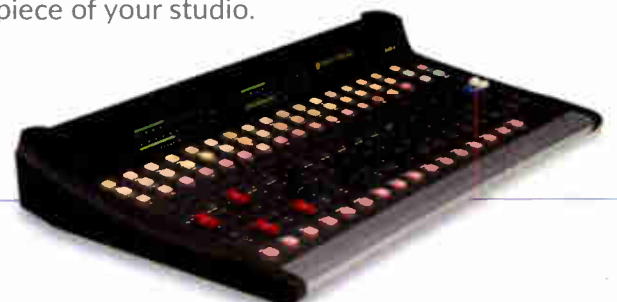
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TRANSMITTERS

(continued from page 15)

existing air investment versus green-field site, floor space costs, site readiness for liquid-cooling and local power rates. For new installations, where the cooling infrastructure is not already in place, and where high-power and warm climates incentivize its consideration, a case can be made for the total cost of ownership of a liquid-cooled system. However, the station must be aware that initial cost and installation costs will be higher and the time required for installation will be days instead of hours. Further, only about two-thirds (but not all) heat is transferred to the heat exchangers, so nominal conventional cooling is still required for power supply dissipation. Factory training on the technology is essential, and it may not lend itself to being maintained by nonregular contract engineers making only occasional visits.

Similar to the TV broadcast situation, for transmitters with lower waste heat generation, air-cooling will continue to be the de facto standard. The vast majority of broadcasters have air-cooling-compatible sites today, so it will be interesting to watch the ongoing trend in preference for air-cooling versus liquid for radio broadcasters as radio transmitters become more efficient and waste heat requirements decrease.

Scott Incz: With efficiencies of modern devices sometimes exceeding 90 percent, the requirement for liquid-cooling is less necessary in FM transmitters, than say, TV transmitters. TV transmitters' digital waveforms mean lower efficiencies are obtained from power amplifiers, creating heat issues. Liquid-cooling should really be unnecessary and would only increase the complexity of design and build for the manufacturer, and maintenance cost for the customer. We would rather spend time increasing our transmitters efficiency and thus alleviating the need for complex cooling systems. Less maintenance, increased reliability and reduced operating costs. It's a win-win for manufacturers and customers alike.

RW: LDMOSFET has been the winning SS RF device technology choice for a number of years. Has that technology been maxxed out for efficiency and performance? If not, what other improvements are in the pipeline and if so, are there any new technologies being developed to replace LDMOSFET?

Eric Pere: Today the performance of MOSFET amplifiers is close to the theoretical limit. Those final few per-

centage points will be the most difficult to obtain, but development continues. As a comparison, 90 percent efficiency was a good performance for switching power supplies a few years ago. Now, with some fine tuning on the DSP, we can obtain upwards of 95 percent.

LDMOSFET's most likely successor waiting in the wings is GaN or gallium nitride. GaN offers low intrinsic losses to achieve high efficiency as well as very large bandwidth with a flat gain over frequency. It is currently more expensive compared to LDMOS and will likely only become an affordable option for FM transmitters following larger scale deployment in the TV market.

Scott Incz: The latest technology of LDMOSFET devices has certainly not "maxxed" out. Our own design engineers are starting to see efficiency close to 90 percent and we believe we can obtain even higher with some of the design concepts we are working on at the moment. This is still work in progress but we hope to reveal more soon.

Rich Redmond: LDMOS is the standard today, and the most beneficial innovations in recent years was the development of 50 V LDMOS. This really ushered in the convergence of robust, cost-effective power supplies from the IT and telecom industry; along with very robust and high-power RF devices. The transmitters can now take advantage of some of the innovations in very-high-efficiency power supplies that come from these other industries.

What we continue to see is increased power density in the device. A few years ago, a 500 W device was a fairly large device to have. Today, there are 1500–1600 W LDMOS devices. The technology to cool and handle that amount of wattage in a small footprint continues to evolve. The advances continue, and we'll continue to see the evolution of LDMOS both in power handling capability, the ability to cool it and energy efficiency. Some of these innovations come from mobile base station market developments, so in broadcast the convergence of 50 V LDMOS really introduces a lot of technologies that broadcasters can take advantage of for very reliable, highly efficient and cost-effective transmitter solutions.

Thorsten Becher: The latest versions of LDMOSFETs seem to have reached some maximum of efficiency and performance limits. Nevertheless, innovation in the semiconductor market never comes to a stop. Remember the microprocessors used in PCs of the 1980s, and compare to today's high-speed multicore chips used in any cheap smartphone. We are confident that

ongoing development in new material compounds, further minimization of the active element size and application of new structural designs will without doubt lead to further improvement until reaching the limits given by physics.

Chuck Kelly: While LDMOS and alternative chip technologies still hold potential for performance gains, unfortunately most chip manufacturers are directing their investment towards the high-frequency or pulse-power devices needed in lucrative, high-growth sectors such as LED lighting,

control through our Audemat-branded products and we apply this expertise and technology throughout our Ecreso transmitter range. This has resulted in features such as Expert Maintenance Reporting (EMR), which sends the user regular reports on the status of key parameters as well as information on the performance and lifespan of components. We also have a new SNMP management software suite called WorldCast Manager which provides performance and alarm information on not just the transmitter but all devices across a network.

A good work rule in the early design phase is to select and use well-proven components known for their long-lasting availability in the market.

– Thorsten Becher

high-power ISM, "big science," cellular, satellite, military and space. The result is that broadcast transmitter designers today are faced with the prospect of squeezing out incremental performance gains. That being said, our industry is populated with many creative engineers who have proven their ability to leverage chips optimized for other technology sectors and create performance advancements in our own industry.

RW: Transmitters used to last 20 and even 30 years before short life-cycles for chip versions and computer control entered this space. The same is true for consoles and studio gear. Manufacturers are now telling us 10 years is about the most we can expect. Replacing large capital items like transmitters at that cycle is not something most station owners can easily budget for and accommodate. What are transmitter manufacturers doing to alleviate that pain?

Eric Pere: Granted, new transmitters nowadays may not last 20 or 30 years but, in general, they are more affordable than they have ever been. This is especially true when you consider the fact that they have (or at least should have!) a built-in digital exciter and a much-improved total cost of ownership as well as being more compact than previously.

And of course, computer control also brings some great advantages such as the ability to monitor every single part of your transmitter in great detail. We are very fortunate at WorldCast to have great experience in monitoring and

Chuck Kelly: At Nautel we talk a lot about the long view. We know our customers buy equipment for the long haul and we do our best to design our whole offering: transmitters, reliability, serviceability and support in a way that supports that long vendor relationship. In fact, even the ownership structure of our company is supportive of the long view approach. Our experience is that we are still seeing many customers maintaining our systems for multiple decades, but we also do see the impact of an increasing pace of technological innovation that causes some customers to replace systems earlier to gain new capabilities or efficiencies.

For instance our higher efficiency transmitters sometimes justify an earlier technology upgrade to attain lower operating costs. Another example would be a customer who can change the way they monitor their facilities thanks to modern sophisticated control capabilities afforded by Nautel's Advanced User Interface. Digital radio components also tend to have a shorter replacement cycle given the pace of change in the digital broadcasting space. So while we still see and believe in the long term view, there are situations where customers are choosing to change out equipment at a faster pace than may actually be required through the lifecycle of the product.

Thorsten Becher: A good work rule in the early design phase is to select and use well-proven components known for their long-lasting availability in the market. More complex devices such as embedded computers or touch-

(continued on page 20)



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TRANSMITTERS

(continued from page 18)

screens should be, both electronically and mechanically, of an easily replaced design. What really counts is energy costs, reliability, ease of maintenance and availability of spares for a long period of time. Following this rule, Transradio manufactures transmitters with minimum maintenance requirements, and can provide spare parts for typically 15 years or more.

Scott Incz: The advances made in transmitter technologies have actually led to an increase in reliability, cost and lifespan of transmitters. The reason many stations may look to upgrade transmitters after 10 years is to take advantage of features that the newer transmitters will offer them. Each generation of transmitters is more efficient, more reliable and offer stations flexibility, sometimes integrating other products to create a "one box" solution. Stations may actually find it more cost-effective to upgrade to a greener, more reliable, less maintenance heavy transmitter, than continue with their existing one. The cost of transmitters is actually far less than it was 20 years ago, so even smaller stations can take advantage of upgrading to keep up with the larger networks.

Rich Redmond: There was a period of time when computers lasted for a very long cycle. Transmitter designs, like computers, have changed over time. Part of it is the sophistication: Transmitters that lasted 20-to-30 years had relay-type control and/or very large transistor logic. They had a single tube and a blower inside to cool them. They also weren't incredibly efficient like today's transmitters, which have the benefits of soft failure, solid-state and high-efficiency advances. Often, the replacement cycle is not because the product wears out; it's that certain devices within that transmitter cease to be available.

If you look at the price of transmitters now compared to then, they are much more cost-effective than they were a number of years ago. In the early 1990s, a 1 kW FM transmitter might cost you \$16K. Today, a 1 kW is

the ones that result due to customers not keeping up with software updates. It's important to remember that we frequently use software updates to perform hardware changes (adjusting amplifier bias levels, power supply output volt-

for some in-field failures, but we see many more power supply failures due to AC main surges or dirty power, this is especially a problem in emerging markets.

Thorsten Becher: From our experience, the predominant cause for failure is an inadequate cleaning of air filters by maintenance staff. In few cases, also high spikes on the mains supply lines have been encountered.

The vast majority of failures can be traced to lack of maintenance, improper grounding or poor lightning protection.

— Chuck Kelly

generally under \$8K. The prices have dropped, and they are easier to repair and maintain over time. Engineering resources are also more efficiently put to use; weekly trips to the site, and consistent tube cleanings, are eliminated. Lighter weights from today's more compact transmitter footprints often allow single-engineer maintenance. So overall, the capital investment of buying, installing and maintaining a transmitter is substantially less expensive, even when considering the quicker replacement cycle.

ages, etc.). Therefore, what we used to do by sending out a bag of parts and an instruction sheet we now do with a software update and not implementing these updates can have a direct effect on equipment reliability.

Eric Pere: Generally, poor or unstable mains supply is one of the most common causes of failure observed. In many awkward transmitter locations, mains electricity is subject to large variations, short dips and interruptions which means that voltage regulators, inverters or generators are often necessary. However, these can also generate some unexpected variations when switching or adjusting the voltage. Most modern transmitters use switching power supplies which can easily manage voltage changes but several, quick variations generate large current peaks which, in turn, generates a lot of stress for their active parts. This was not an issue for the old linear-style power supplies but their poor efficiency and noisy AC behavior rendered these obsolete.

Scott Incz: Lightning protection is incredibly important and is responsible

RW: How much longer will high-power tube transmitters be relevant in our business? Many engineers worry that if companies that make and rebuild tubes like Econco/Eimac and Richardson decide to stop producing or close their doors, that will mark the end of this era.

Rich Redmond: High-power tubes will remain relevant for the foreseeable future for a certain customer base. This will continue to dwindle as the engineering base shifts to a younger, more IT-savvy generation. Fewer engineers entering the market today do so as RF specialists. More often, RF is a trade they learn, or outsource to firms with experience. However, today's solid-state transmitters are often sensible for younger engineers that have IT experience, and there is a quicker learning curve when it comes to maintaining the transmitters thanks to design benefits such as hot-swappable PA module and power supply replacement. But the change will continue over time, and there is still a need for vendors that make tube transmitters, and make and/or rebuild the actual tube components.

Chuck Kelly: Tube technology is still the most efficient, cost-effective approach to high-power shortwave transmission where quick frequency changes are made over a wide frequency range.

RW: In general, what are the most common failure modes of modern designed transmitters manufacturers are seeing in the field? Lack of cleaning and maintenance plus improper grounding and lightning protection are certainly the major ones, but what are the others?

Chuck Kelly: The vast majority of failures can be traced to lack of maintenance, improper grounding or poor lightning protection (ties to grounding). It's hard to say there's another common failure mode beyond those — short of



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However, in AM and FM systems over all power ranges, solid-state has become the preferred technology as it has evolved to be more cost-effective, more fault-tolerant and offers higher performance than tubes. And yes, the writing seems to be on the wall for tube suppliers/rebuilders. In AM and FM broadcast at least, it's hard to imagine a scenario where it would be wise to specify a tube in a new design or purchase.

Thorsten Becher: Today, all broadcast bands ranging from longwave up to band IV/V for DVB-T(2) and, literally, each RF power in the respective band can be served with all solid-state transmitters. Thus, we consider tubes no longer relevant for new transmitter investments. But agreed — as soon as the few remaining companies in this business such as Eimac or Richardson close down production or refurbishment of power tubes, the tube transmitter era will come to its final end.

Scott Incz: Not so relevant because long-life solid-state amplifier parts, including the latest LDMOS technology, are producing longer lifetime, more compact levels of high-power RF. It is probably accurate to say that the tubes won't be around for much longer, at least for broadcast applications.

RW: Put on your science fiction cap. What fantasy yet possibly-doable-someday transmitter technology do you wish you could invent, perfect, bring to the market at an affordable price?

Thorsten Becher: Just my personal fantasy — making a transmitter offering the same RF power in a cabinet of half the size and weight than today, saving production costs and simplifying shipment in the entire world.

Rich Redmond: Imagine a high-power transmitter that is 100 percent efficient and the size of a college dorm fridge. Once we have reached that point — and the day will eventually come — there's a high chance that there won't be much more room for innovation. In the meantime, we will continue to work toward that goal.

Scott Incz: A supercool, super-efficient, super-reliable transmitter, in an unbelievably small box!

It would need to have superconductivity in the power supplies and RF amplifier stages, an RF amplifier output requiring no cooling and minimal real estate. It would need increased high-power FET devices that need little

matching to the antenna stage, as well as a single-chip IP audio to on-channel modulation capabilities. It's not here yet, but we are getting there.

Eric Pere: I can imagine some kind of high power RF DAC to achieve direct to RF output modulation. On the other hand, it is more likely that, after being around for a century, FM broadcasting will be replaced by a new way of listen-

and yet live comfortably within the existing analog and hybrid digital spectrum allocation. We still see generous amounts of room for dreamers and innovators in radio broadcasting. We've been fortunate to be able to hire a lot of fresh designers over the past few years and we look forward to the contributions they will make in the coming years.

Looking even farther out, we envision that all broadcast content will be

A supercool, super-efficient, super-reliable transmitter, in an unbelievably small box!

— Scott Incz

ing to radio. I still dream that it could be possible to achieve highly-effective digital radio with affordable receivers and good coverage but if we continue to pretend that it already exists, it will probably never actually happen.

Chuck Kelly: Well, with ATSC 3.0 we may see a lot of broadcasters implementing SFNs ... we should watch that space. As a company we've explored some work on making portions of the radio broadcasting spectrum all-digital

data, reconstituted at the receiver to be separated out and readied for consumption. Broadcast AM/FM/TV will continue to be relevant as long as the cost to distribute that data is less than other methods.

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BRIC-Link II Streams for IMG College

Comrex's multitalented codec is capable of direct streaming to listeners

USERREPORT

BY BEN BLEVINS
Head of Technical Operations
IMG College

WINSTON-SALEM, N.C. — IMG College is the nation's leading collegiate sports marketing company, with national, regional and local offerings across various platforms. Our network includes more than 70 colleges and universities in addition to other collegiate sports properties. Targeting 190 million college sports fans, we produce 35,000 hours of radio programming annually. Delivering audio to large and diverse audiences is what we do, and we do it across several different media formats. While terrestrial radio is our primary platform, streaming has increasingly factored into how we deliver our product.

TOOLS

Comrex's BRIC-Link II codec is one of the essential tools in our arsenal to meet the various demands and delivery requirements of our customers.

Known for its ability to deliver reliable point-to-point audio over IP, the BRIC-Link II also has some lesser-familiar attributes that have expanded our capabilities. Specifically, the HTTP streaming feature has been a surprise and a delight when unexpected projects pop up. BRIC-Link II is capable of acting as a source feed for icecast2, Shoutcast and other servers, which can require a bit finessing and the use of a customized profile. But the standalone streaming server function — very easy to set up — has really come through for us on a number of occasions for customers like Notre Dame, University of



Texas and Central Michigan University among others.

To use a BRIC-Link unit in streaming server mode, just set the HTTP Settings in the System Settings tab to "accept incoming connections." In our case, we needed to change the default IP port from 8000 to something that worked within our IT department's firewall requirements. By providing the IP address and port in the correct format (one specific to the listener's choice of player) in an HTTP link on a web page, commonly available media players such as VLC, WinAmp and Windows Media Player can pull the

Conservatively,
up to 70 simultaneous
streams can be
supported using a lower-
bitrate algorithm like
HE-AAC v2 at 24 kbps
stereo.

stream and play back audio directly from the BRIC-Link. Mono and stereo versions of AAC, HE-AAC v2 and Ogg FLAC are available at varying bitrates to accommodate your headend bandwidth availability and the quality demanded by listeners. Keep in mind that you will need enough available bandwidth to support the incoming requests at the bandwidth of the algorithm selected.

This application is a perfect solution for some of our schools that need to get a program feed using VLC or another media player. But it can also serve program content directly to web stream listeners on a modest scale.

Conservatively, up to 70 simultaneous streams can be supported using a lower-bitrate algorithm like HE-AAC v2 at 24 kbps stereo. However, we've had instances of up to 120 streams using HE-AAC v2 at 18 kbps mono. Again, making sure you have enough upload bandwidth is key to ensuring the stream will be heard on the other end. In our experience, the performance has been flawless.

BRIC-Link II has a well-deserved place in our equipment racks. While point-to-point audio transmission may be its most common use, BRIC-Link II was able to expand our offerings to our customers through its less-appreciated streaming capabilities.

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

TECHUPDATE

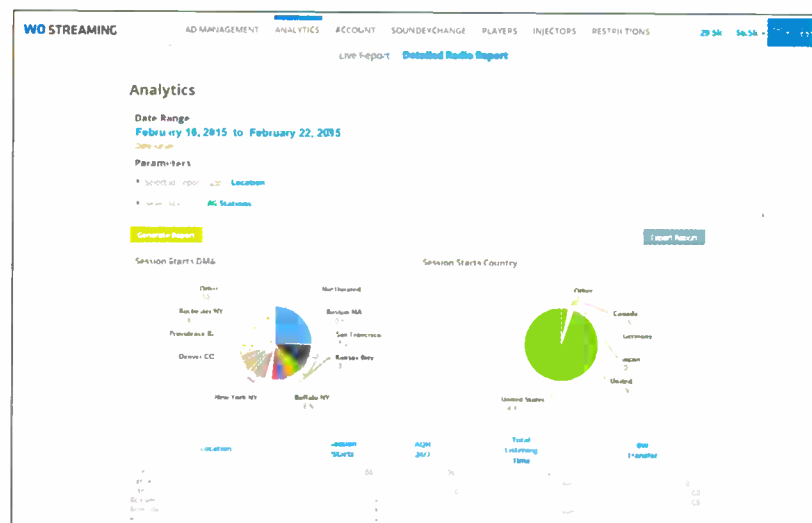
WO STREAMING MONETIZES AUDIENCES

Broadcast software developer WideOrbit describes its WO Streaming digital audio platform as a reliable, high-quality solution for streaming station content and ads.

It says stations can monetize audiences with WO Streaming with a variety of advertising options, whether in-market or out-of-market, over the air or on a mobile device.

The company highlights WO Streaming for helping to drive revenue, expand listenership and extend content from linear broadcasting to digital listening platforms. Stations can target audiences by geographical location, device or portal. Users can offer various types of ad executions like preroll audio and video, in-stream, companion banners and display advertising.

It is a cloud-based service and allows stations to reach listeners on popular mobile devices, including iOS and Android smartphones and tablets. To assure listener satisfaction, WideOrbit says, it profiles audience behavior including total listening hours, sessions, multiple AQH metrics, one- and five-minute CUME, average session length and more. WO Streaming can be deployed without other major changes to station operations or back-end technology. For information, contact WideOrbit in California at (415) 675-6700 or visit www.wideorbit.com.



ABOUT BUYER'S GUIDE

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

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StreamS HiFi Encoder Boosts Max Radio

Pairs with Orban Optimod PCn 1600

USERREPORT

BY PHILIP KUSHNIR
President
Max Radio Society

VANCOUVER, BRITISH COLUMBIA

— I have been involved with radio since high school, when I helped run a closed-circuit system at Eric Hamber Secondary School in Vancouver, British Columbia. I had my first regular weekly FM radio show in 1978 on CFRO(FM), Vancouver Coop Radio. I went into commercial radio full-time in 1983, switching to part-time in mid-1986 to pursue other ventures.

I've been running my own internet radio operation since February 2000, when I joined the now-defunct service Live365. Back then I used a vintage analog processor I had in my gear collection, an Orban Studio Optimod 424A compressor/limiter/de-esser. This unit did not have a real peak limiter despite its description. Stream encoding was initially in 128 kbps MP3 format with MacAmplite until Live365 set a limit of 56 kbps. Setting modulation levels with this setup was difficult, as clipping was tough to avoid. MP3 was a constant frustration with unwanted programming contributions from "Artie Facts."

In other words, it mostly sounded like junk.

Over the years I used various com-

binations of hardware and software, moved on from Live365 and gradually transitioned from MP3 to AAC and HE-AAC streaming. I spent a lot of time and effort tuning up processing and encoding but was never able to achieve the quality of sound I wanted.

CHANGES

All that changed in December 2015 when I made a massive upgrade to the Modulation Index StreamS HiFi Encoders/Orban Optimod PCn1600 combination.

It was easy to get incredible audio right away with one of the Gregg MX presets. I tried all the presets, found the one closest to what I wanted, then started tweaking it until I achieved the on-air signature sound I had dreamed of having.

On the encoding side, the StreamS HiFi encoders have helped me create the Holy Grail of internet radio: beautiful web players that work on all modern browsers without plug-ins, Flash trash or any other add-on crap. For listeners it's a dream come true: excellent audio quality, crystal-clear album art and song information, all delivered with rock-solid reliability thanks to HTML5 live streaming. All that listeners need is a modern web browser. They don't have to compromise security on their systems with Flash, Java or other rubbish. Listeners also save on data usage, as my sta-



tions' streams are much more data-efficient with HE-AAC than they ever were with MP3.

HLS means no streaming server is required. The StreamS HiFi Encoder works with any modern web server like Apache, NGINX or IIS, and also works flawlessly with Amazon AWS S3 (which is what I'm using). I've found it to be the most reliable way to stream and the easiest and best for listeners.

For listeners with surround sound systems, I'm able to offer them convincing 5.1 surround sound versions of my two stations using the Optimod PCn1600's upmix feature and the StreamS HiFi Encoder's 5.1 surround sound encoding. This is especially nice on the new fourth-generation Apple TV with the StreamS HiFi Radio app hooked up to a surround sound system.

The HLS streams are excellent for in-car listening. They can keep playing for up to one minute without any audio interruptions even if the cellular reception cuts in and out.

Listeners enjoy perfectly timed album art and song tags. The StreamS HiFi Encoder's built-in UDP servers accept

XML metadata from my playout system.

For my websites, I've built beautiful web players using Viblast and VideoJS with high-resolution album art and ID tags. They are compatible with all leading contemporary web browsers with no plug-ins and no compromises.

HLS is the best web streaming option. It's way more reliable than Icecast or Shoutcast, the easiest for listeners to tune to, and the most resistant to stream interruptions from variable mobile connections. With the StreamS HiFi Encoders I've setup synchronous multiple bitrates (currently 32 kbps and 64 kbps) for players that support adaptive bitrates (including the LG73 and Max Radio web players). The players automatically in-perfect sync drop down to a lower bitrate in areas with challenged bandwidth then seamlessly switch back up to the higher bitrate when proper bandwidth is restored.

Together, StreamS HiFi Encoder and Orban Optimod PCn1600 combination result in the perfect radio experience for my listeners and the best streaming experience for me. I recommend this system for any broadcasters who want to give their listeners the best radio sound (and album art visuals) ever.

For information, contact John Schaab at Modulation Index at (940) 206-7702 or visit www.streamindex.com.

TECHUPDATE

FRAUNHOFER IIS HIGHLIGHTS CONTENTSERVER FEATURES

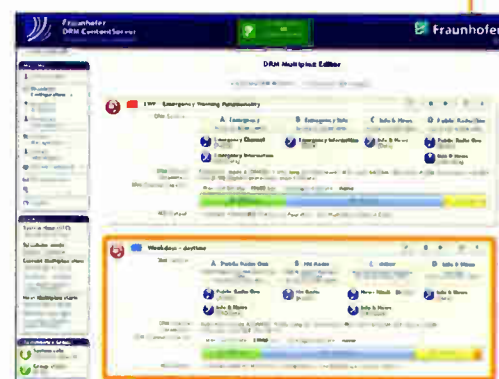
Fraunhofer IIS says its ContentServer R6 technology is intended to allow broadcasters to bring audio content and data services to air with ease, and that its flexible configuration provides the ability to match diverse needs of broadcasters and network operators.

The users range from community stations to local or regional broadcasters, up to large-scale national networks. Device manufacturers can benefit from a special edition of the ContentServer that provides for the generation of test streams, e.g. for standard compliance testing.

Features of R6 include Emergency Warning Functionality to alert the public when disaster strikes; for DRM environments xHE-AAC as the standard audio codec and support for multiple PAD multimedia applications per audio service; internal audio encoders with AES67 AoIP live audio input (Livewire, Ravenna) as well as advanced support for remote audio encoders; a monitoring system that controls system functions including content provision; and added support for data provision via XML/JSON RPC API.

Fraunhofer ContentServer R6 technology is available for DAB and DRM as a package, including hardware and specific customer support services, from Fraunhofer's OEM partners.

For information, contact Fraunhofer in Germany at 011-49-9131-776-6089 or visit www.iis.fraunhofer.de/audio.



PRODUCT SPOTLIGHT

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Tweaking the Stream With Telos 9X/2

Galaxy House World gets twice the mileage out of one processor

USERREPORT

BY FRÉDÉRIC VÉLU
 Founder
 Galaxy House World

FLASSANS-SUR-ISSOLE, FRANCE

— In 1993, I founded Galaxie Radio, a terrestrial FM station in France, which I sold 20 years later in 2013 to a Parisian group called HPI. Why? I was bored playing the same 40 songs over and over again via a format with sometimes 22 minutes of ads per hour. I will tell you that the one pleasure I had was tweaking preprocessing and my three Omnia 6EXis, which I had on each of the three frequencies we had at that time!

But you know, when you've got the music bug, it's hard to shake.

So in January 2015, I decided to build Galaxy House World (I had to change the spelling a bit for the new operation) as a web-only service from my own studio. We have regular listeners in 67 countries and are growing every day.

I have two passions with Galaxy House World: first, the music itself, an

eclectic mix of electronic and urban; second, the audio quality, which must be the best available.

I am particular about the audio quality of Galaxy House World and so are my listeners, which is why I chose Telos

as setting up a Microsoft Office pack. Although there are many well-developed presets you can use with the Z/IPStream 9X/2, I'm a "tweaker" and particular about my audio. I was able to go deep with the 9X/2 and sculpt the

having to buy a second license. It was just magic. It was as if I had not just one Omnia 9X/2 but two, both using the same audio source from my automation, and it was able to process the two streams differently. On my iPhone and Apple Car Play via a Bose sound system in my car, even at low bitrate, Galaxy House World sounds far better than a typical FM radio station. And, on top of that, it never loses the signal.



Z/IPStream 9X/2 Streaming Software. Based on technology in the popular Omnia.9 audio processor, 9X/2 is not simply a streaming processor/encoder, but a complete audio management system that will actually improve the flaws found in recorded source material, both music and voice, while addressing the specific technical challenges of Internet distribution.

Setting up the 9X/2 was just as sim-

ple as setting up a Microsoft Office pack. Honestly, I have never found a processing/encoding software program where you have the option to go into as much detail in creating your signature sound.

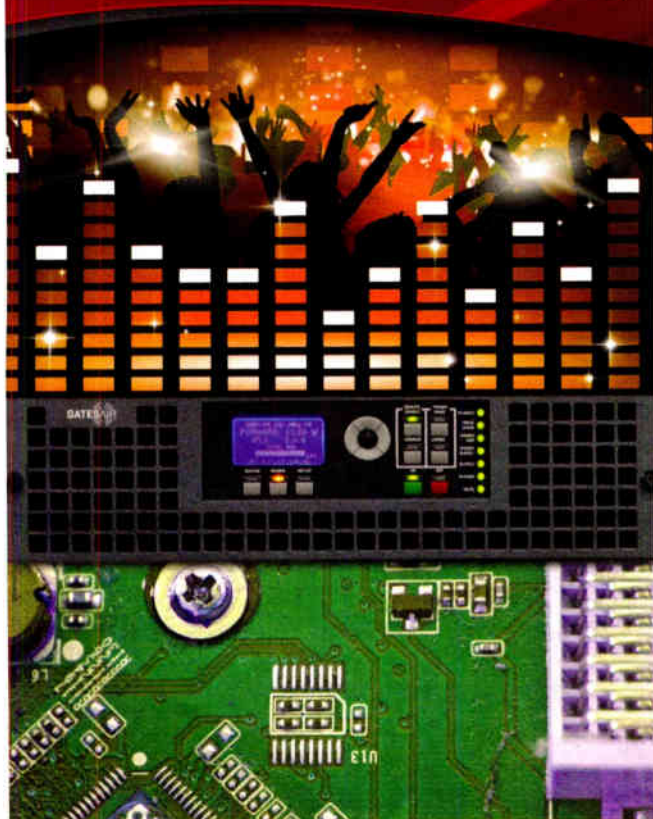
I serve two streams — one for the net and one for the apps I created for iPhone, Android and Windows 3G/4G mobile phones. I was able to carefully tweak and process the two streams differently in the same session without

sound the way I wanted. The main Galaxy House World signal, www.galaxyhouseworld.com, is encoded with 192 kbps AAC LC. The second signal, falcon.shoutcast.com:8373/ stream, is 48 kbps HE-AAC V2.

There is no doubt in my mind that the Z/IPStream 9X/2 is the best processing and encoding software on the market.

For information, contact Cam Eicher at Telos Systems in Ohio at (216) 241-7225 or visit www.telosalliance.com.

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StreamGuys Boosts RFC Media

Reliability and flexibility are factors for audio streaming content provider

USERREPORT

BY JOHN WHITESIDE
Technical Director
RFC Media

HOUSTON — RFC Media creates content-driven internet radio stations that help brands and events engage deeply with their target audiences. Building and bolstering listener relationships in a way not possible with branded playlists, our stations are handcrafted and hosted live by award-winning, on-air personalities.

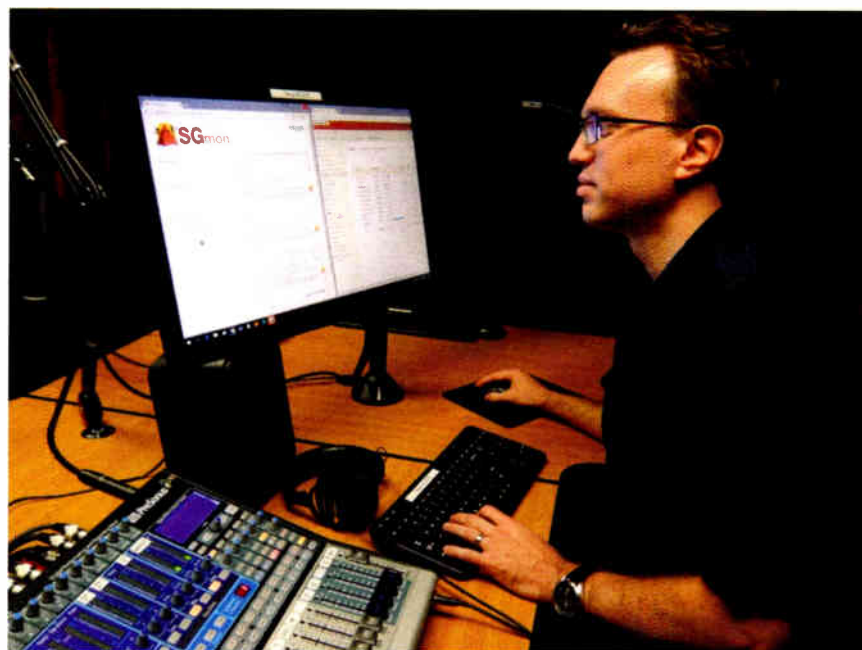
In addition to creating branded online radio for organizations such as NASA and retail chains including Specs Liquor and Timewise Food Stores, we also power dozens of original stations and live, on-location event broadcasts for leading internet radio portal TuneIn, complementing its massive array of aggregated stations with custom-format, themed programming.

TAMING TECH ISSUES

Plagued by frequent technical issues with our previous streaming service, we set out two years ago to find a more reliable platform. Our old provider's service would go down quite often, and they were unable to figure out what was causing the outages. As a services company ourselves, we can't afford to have such issues affecting our clients, as our reputation is on the line — particularly with top-tier, high-profile clients like TuneIn who require flawless performance for their listeners.

We also required a platform and vendor flexible and customizable enough to meet the individual needs of each of our clients. We run 96 stations and counting, and some of our customers have very specific requirements — for reasons as crucial as legal compliance — that may only apply to one station. Finding a streaming provider willing and able to accommodate these varying needs was essential for us.

We started researching StreamGuys' software-as-a-service (SaaS) streaming platform based on a recommendation from TuneIn, and we've never looked



back. We found the StreamGuys platform to be the easiest to work with and very customizable, with lots of tools we can use to meet the needs of our clients and ensure that we have the best-quality product going out.

We now deliver all of our live streams through StreamGuys' cloud-based infrastructure, giving us the rock-solid reliability we were seeking. From myself on the technical side to our president and our COO, we all sleep better at night, with the outages we used to experience a thing of the past.

My confidence in the StreamGuys platform is reinforced by their SGalerts service monitoring software, which is part of their SGsuite of SaaS tools. SGalerts automatically notifies me of any issues affecting any of our stations — anything from our computers themselves to our connectivity — so I can resolve them quickly. That helps us meet our 99 percent guaranteed uptime commitment for our clients.

We use other StreamGuys tools to enhance our client offerings and our workflows. Most of our clients' stations don't have any outside advertising, as their brand-specific nature typically precludes it. However, for those customers who do want to monetize their streams with additional revenue sources, we take advantage of StreamGuys' third-party, dynamic ad insertion capabilities, which make it easy for us to incorporate external commercials.

We use StreamGuys' SGplayer multimedia player to deliver rich streaming experiences on select client sites. The fact that it's HTML5-based is great, as it plays and looks great on any device. Our

clients' audiences love features like its listing of the last five songs played. We turned that feature off once on NASA's Third Rock station during a design update, and there was a listener outcry.

We use the SGreports log processing service to get detailed listener metrics,

enabling us to provide in-depth reporting to our current clients, as well as serving as a valuable resource for our sales team when talking to prospective new customers. And our most recent addition, the SGmetadata software, leverages StreamGuys' efficient, push-based approach to dramatically reduce the bandwidth consumption — and thus cost — of delivering metadata such as song, album and artist information to our listeners.

While reliability was our primary goal in switching streaming providers, the StreamGuys platform has also given us much higher audio quality. Our old platform required a proprietary encoder, which degraded the audio. The second we turned on a StreamGuys stream at the same bitrate, we could hear a huge difference.

Beyond the platform and technology, the people at StreamGuys have been fantastic to work with. We can bring them specialized requirements, and even if they don't have something already available to meet that need, they always make it work. Their customer service is number one, and it's been a great relationship. Out of all of the streaming platforms and providers that we've dealt with, in our opinion, StreamGuys is the best.

For information, contact Timothy LaBelle at StreamGuys in California at (707) 667-9479 or visit www.streamguys.com.

TECHUPDATE

FUTURI STREAMING USED AT HUNDREDS OF STATIONS



Futuri Streaming is now used by hundreds of stations, according to Futuri Media. It launched the platform in 2016 after its acquisition of StreamOn. The latter's platform was designed for radio broadcasters and emphasized broadcast-grade reliability, listener ease of use and social strategies for bringing in listeners.

The hardware platform is a streaming encoder that's designed like a broadcast transmitter, Futuri says. It describes it as the "world's only intelligent streaming transmitter." It says the platform uses broadcast-ready hardware with industrial-grade components and dual power supplies. It has remotely accessible configuration and can be upgraded without downtime.

Futuri Streaming uses HLS technology and Omnia Audio processing. It is firewall-friendly to reach more listeners. Streams are delivered through Limelight, one of the world's largest CDNs.

Futuri Streaming checks metadata against iTunes and automatically displays album art on the user player. Real-time analytics are provided through integration with Media Matrix. Ad integration is smooth; done through a platform with partner Adswizz, Futuri Streaming partners can make sure ads cut in and out at the right time with the Smooth Spots algorithm.

Futuri Streaming offers 24/7 tech support. It offers proactive monitoring of and support for its station streams, an additional resource for taxed teams.

For information, contact Futuri Media at (877) 221-7979 or visit www.futurimedia.com.



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

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

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Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time is 13:44. Ron, 925-284-5428 or email ronwtamm@yahoo.com.

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At KRAB We Weren't Afraid of Dead Air

People can now hear and see for themselves what it was that made the station unique

COMMENTARY

BY CHUCK REINSCH

Recently Radio World had an article by Ernesto Aguilar that discussed changing views of what "community radio stations" are [see radioworld.com/aguil-ar]. Following up on that, I thought your readers might be interested in learning about an online archive where examples of programs and other artifacts of Lorenzo Milam's station KRAB can be heard and viewed.

It has been 32 years since KRAB(FM), 107.7 Seattle, went off the air. Even after going silent, every so often an article or story would appear in the press describing KRAB and the exploits of founder Lorenzo Milam almost mythically. Friends would share these with me, knowing I would take exception to some part of it. It wasn't that there was anything all that objectionable in the articles, it was simply that my memories of the station were still as vivid as ever, and the stories conveyed by the authors seemed, to me, to lack authenticity. The articles were being written by individuals that had never listened to KRAB.



The photo is from a late 1960s fundraising brochure. From left: Gary Margason, a KRAB founder; Nancy Keith, program director; Steve Menasian, engineer; and Mary Siegel, volunteer. That's a Neumann U 87 hanging below the fake Tiffany.

Finally, at the end of 2012, I decided that rather than reacting to what I read, I would "set the record straight" and try to document in some public and authoritative way what I remembered of KRAB. Some of it is a reflection of my memories, but there is also a collection of artifacts, ephemera and whatever else I have found that contributes to conveying what was special about KRAB.

Briefly, KRAB was the fourth listener-supported station in the country, going on the air in December 1962, licensed to Lorenzo W. Milam, and transferred to the nonprofit Jack Straw Memorial Foundation in 1964. While KRAB broadcast on a commercial channel, it was a noncommercial nonprofit enterprise.

The operators did not seek a particularly wide audience, or even a livable wage. Programming policy was

summarized in the frequently repeated mantra "KRAB will broadcast programming that other stations will not, or are unable to air." They hoped a sufficient number of listeners would value a radio station making that promise, and would then be willing to support it with a \$12 per year "subscription."

KRAB sounded different. The volunteer announcers were told to speak normally, as if they were in the same room as the listener. They sometimes stumbled over unfamiliar languages and names. At KRAB we weren't afraid of dead air: Silence was considered a tool that if used

KRAB sounded different.

The volunteer announcers were told to speak normally, as if they were in the same room as the listener.

judiciously would enable listeners to transition from one genre of programming to another. Silence was preferable to filling the air with meaningless babble.

The listeners were university professors, artists, poets, housewives (this was the '60s) eager for something besides queen for a day, and teenagers older than their years. More than one person has characterized KRAB as their "graduate school." Listeners were cautioned that no one was expected to listen, and "like," everything on KRAB, except perhaps the station manager and program director. KRAB published a program guide so listeners could pick and choose what and when they would find something to their liking. There were a few, like myself, who enjoyed the juxtaposition of programs that provided an element of surprise, and appreciated the after-the-fact awareness of realizing they were learning something by accident and whimsy.

The archive started with a few of my own tapes and program guide copies. It has grown with the addition of digital copies made by the Jack Straw Foundation, the former licensee, programs from institutional collections, copies saved by former KRAB producers, recordings made off-the-air by listeners, and dubs circulated amongst "KRAB Nebula" stations.

People can now hear and see for themselves what it was that made KRAB unique. The programs in the archive range from the silly to the profound. There are

KRAB-FM 107.7 Seattle, Washington 1962-1984



K-R-A-B were once the call letters of a non-commercial, educational FM radio station (107.7) in Seattle, Washington that went silent in 1984. This site has absolutely nothing to do with the station in Bakersfield that now uses these call letters. If you are looking for the "booty girls", you best move on.

When KRAB went on the air in late 1962 it was the fourth station in the country to attempt an audacious experiment: The founders of KRAB, and of the three stations that preceded it (KPFA, KPFA, and WBAI), naively believed that there were, are, enough people like themselves, intellectually curious, artistically adventuresome, open and willing to be challenged by political views contrary to their own, and believers in the power of communication to improve society, so that a radio station not serving commercial interests could be financially viable. That thesis continues to be tested.

Like KRAB and the Jack Straw Memorial Foundation, this web site does not seek to profit monetarily from what is presented here. These archived materials are shared for educational, cultural and scholarly purposes to assist the curious in understanding what an imaginative group of people can do with a radio frequency, a transmitter, and

The KRAB Archive can be found at www.krab.fm.

examples of voice, music and ideas that were heard on only a very few radio stations across the country. There are even examples of "programmed silence." Some worked, and some didn't.

It is my hope the archive will help the curious, and young, understand that just because most media have chosen formulaic and monolithic programming formats, there can still be room for radio stations to be less constrained. The archive is a testament to the efforts of the former staff, volunteers and supporters of KRAB who demonstrated what can be done with a radio frequency and imagination.

The KRAB Archive can be found at www.krab.fm.

Comment on this or any story to radioworld@nbmedia.com.

The author started listening to KRAB in late 1963 and volunteered the next year. He served as program director, station manager, board trustee and president at various times.

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OPINION

READER'S FORUM

DON'T ABDICATE

Has radio abdicated its part of the radio-music industry partnership?

I spend a lot of time in the car with my 4-1/2 year old niece. I listen to NPR, Bloomberg Radio, an iHeartMedia classic rocker and a lite rock station also iHeart. The CD player nearly always has my niece's Katy Perry CD in it. I used to sometimes play an MP3 player, but it was stolen from the car. On long trips I do listen to other CDs.

Mackenzie frequently asks me the name of various singers/bands. My memory isn't what it used to be, so even older bands I cannot always identify for her. And many of the newer songs, even ones I like and hear frequently, I do not know the names for.

I have recently observed that the stations I listen to hardly ever identify the names of the songs and bands. Not very long ago they did about 50 percent of the time, but this seems to be becoming less and less frequent. I have a 2010 Toyota matrix with a good-sounding audio system, but it does not have HD Radio nor RDS so I am stuck.

I know the over-the-air radio industry strongly feels they should continue to get preferential treatment by the recording industry. When I can't even learn the name of a song without Googling the lyrics (something I have done quite a few times over the past few years), it seems to me radio is not keeping up its side of this partnership. After all, even the oldest music is generally available for purchase via download, but without this information radio is not helping to sell it.

I would love to hear the opinions of others on this topic.

*Rolf Taylor
Rocket Engineering
and Consulting
Annandale, Va.*



REVAMP NIGHTTIME RULES

I would like to add some comments to the editorial by Dave Dybas in the recent issue of Radio World concerning AM revitalization.

I have to agree with Dave on some facets of the 1A 50 kW clear channel stations. With the interference plaguing the AM band these days, protecting the nighttime contours of the 50 kW stations is a waste of spectrum.

My day starts at about 2 a.m. when I hit the road. I am not a talk radio fan, and at that hour, it's all over the dial, so frequently I'll try for WSM in Nashville on 650. Here in Iowa, it used to be a pretty dominant signal overnight.

When I am out in the prairies where there are no wires or wind turbines, I can dial in 650. Well, between a Canadian station and an Anchorage, Alaska, station (yes, Alaska), WSM is only there about 20 percent of the time.

Now, get into town or near high tension lines carrying data and forget it, everyone is gone; all that I can hear on AM are the few locals that don't have to reduce power to 11 W or so to protect a station 1,000 miles away that I can't hear anyway even if I wanted to.

I would much rather have a local station, with local news, local weather, local PSAs and mostly local EAS. Since all of the 50 kW clears are streaming, if someone wants to listen to a sports team 1,000 miles away, dial up the stream on your computer or smart phone and listen to a nice clean feed.

I am not against the 50 kW power levels and the daytime coverage; those guys need to make lots of money to pay the big power bill even with MDCL; but I think the nighttime protection needs revamping. Yes, much of the daytime groundwave of most of those stations

is poor at night due to the groundwave/ sky-wave cancellation, but the daytime protection should also be the nighttime protection. That would allow a whole pile of Class D stations to get enough power at night to serve their community with local news, weather, high school sports and emergency information, something that 50 kW stations 1,000 miles away, satellite radio, Pandora and all the rest of the sub broadcast sources can't do.

Now that I have all of the 50 kW guys angry, another suggestion for AM radio: Back many years ago, the government required that all automobile radios have FM instead of AM only. Well, it's time for them to step in again. This time require that *all* AM receivers to comply with the NRSC curve. This is especially important for the foreign cars with the 3 kHz sharp-as-a-knife ceramic IF filters.

I have an older Dodge pickup with a stock radio, and the AM actually sounds pretty sweet, way better than the one in the Honda that my wife drives, which sounds like it has a towel stuffed in the speaker. With all of the technology in car radios, why not a wider IF or at least, like some ham gear, a variable-width IF that changes with signal strength?

On a decent radio, most AM sounds pretty good, if the station puts some work into it, but the radios are trash. I would pay for a decent AM radio long before I would want internet access or the rest of that junk that the auto manufacturers are stuffing down everybody's throat. (That's why I ride a motorcycle 98 percent of the time.)

Now that I have the 50 kW guys *and* the automobile manufactures mad, I'd better quit.

*Ron Schacht
Engineering Consultant
Iowa*

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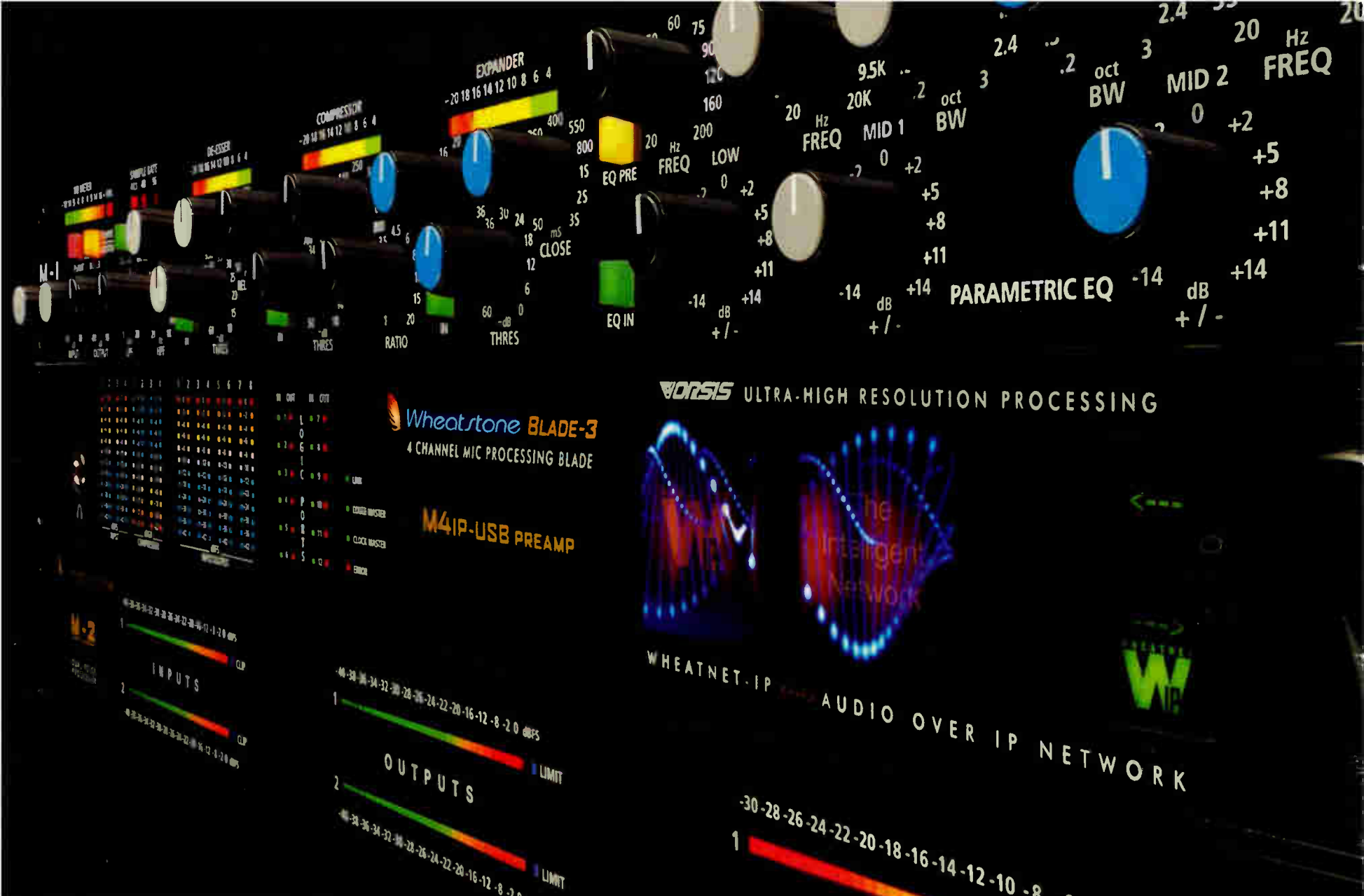
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