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EDITORIAL STAFF

EDITOR IN CHIEF, U.S. Paul J. McLane
 GEAR & TECHNOLOGY EDITOR Brett Moss
 TECHNICAL ADVISER Thomas R. McGinley
 TECHNICAL EDITOR, RWEE Rich Rarey
 PRODUCTION EDITOR, RWEE Karen Lee
 CONTRIBUTING EDITOR Emily Reigart
 CONTRIBUTING EDITOR John Bisset
 ASSISTANT WEB EDITOR Michael Balderston
 INTERNATIONAL EDITOR IN CHIEF Marguerite Clark
 LATIN AMERICA EDITOR IN CHIEF Rogelio Ocampo

EDITORIAL CONTRIBUTORS

W.C. Alexander, Susan Ashworth, James Careless, Harry Cole, Ken Deutsch, Mark Durenberger, Charles Fitch, Christopher Friesen, Harold Hallikainen, Craig Johnston, Alan Jurison, Paul Kaminski, John Kean, Peter King, Mark Lapidus, Daniel Mansergh, John Merli, Laura Mir, Jim Peck, Mark Persons, Stephen M. Poole, Carl Lindemann, James O'Neal, Tom Osenkowsky, Rich Rarey, John Schneider, Randy Stine, Richard Strickland, James G. Withers, Tom Vernon

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PUBLISHER John Casey
 EDITORIAL DIRECTOR Paul J. McLane
 PRODUCTION MANAGER Karen Lee
 ADVERTISING COORDINATOR Caroline Freeland

CIRCULATION

GROUP DIRECTOR, AUDIENCE DEVELOPMENT Meg Estevez
 CIRCULATION MANAGER Kwentin Keenan
 ASSOCIATE CIRCULATION MANAGER Michele Fonville

SUBSCRIPTIONS

Radio World, P.O. Box 282, Lowell, MA 01853
 TELEPHONE: 888-266-5828 (USA only 8:30 a.m.-5 p.m. EST)
 978-667-0352 (Outside the US) FAX: 978-671-0460
 WEBSITE: www.myRWNews.com
 EMAIL: newbay@computerfulfillment.com

CORPORATE

NewBay Media LLC
 PRESIDENT AND CEO Steve Palm
 CHIEF FINANCIAL OFFICER Paul Mastronardi
 CONTROLLER Rick Ng
 VICE PRESIDENT OF AUDIENCE DEVELOPMENT Denise Robbins
 VICE PRESIDENT OF DIGITAL MEDIA Robert Ames

VIDEO/BROADCAST GROUP

EXECUTIVE VICE PRESIDENT Carmel King
 VICE PRESIDENT / SALES DIRECTOR Eric Trabb

ADVERTISING SALES REPRESENTATIVES

US REGIONAL & CANADA: John Casey, jcasey@nbmedia.com
 T: 212-378-0400, ext. 512 | F: 330-247-1288
 US REGIONAL: Michele Inderrieden, minderrieden@nbmedia.com
 T: 212-378-0400, ext. 523 | F: 301-234-6303
 EUROPE, AFRICA & MIDDLE EAST:
 Raffaella Calabrese, rcalabrese@nbmedia.com
 T: +39-320-891-1938 | F: +39-02-700-436-999
 LATIN AMERICA: Susana Saibene, susana.saibene@gmail.com
 T: +34-607-31-40-71
 JAPAN: Eiji Yoshikawa, callems@world.odn.ne.jp
 T: +81-3-3327-5759 | F: +81-3-3322-7933
 ASIA-PACIFIC: Wengong Wang, wng@imaschina.com
 T: +86-755-83862930/40/50 | F: +86-755-83862920
 CLASSIFIEDS: Michele Inderrieden, minderrieden@nbmedia.com
 T: 212-378-0400, ext. 523 | F: 301-234-6303
 LIST RENTAL: 914-925-2449, danny.grubert@lakegroupmedia.com

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CES 2016: A Glimpse at Radio's Potential

Show highlights technology, connected auto partnerships

BY SUSAN ASHWORTH

Despite the flash of excitement from 4K drone technologies and cloud-connected hoverboards, a century-old medium was at the heart of a surprising number of announcements at the 2016 CES convention in Las Vegas last month.

Acronym-heavy technologies drove many headlines, from VR to IoT, the latter of which is expected to help lead the consumer technology industry to \$287 billion in retail revenues this year, according to the Consumer Technology Association, which produces the show.

But radio broadcasting and audio technologies sat front and center as features of in-car apps and boosting interest in the newest interactive aftermarket dashboard screens.

LEAN BACK

Why does radio — a legacy technology when compared to many offerings at CES — remain a stalwart?

"The so-called 'lean-forward' and 'lean-back' behaviors of consumers haven't changed," said Mike Bergman, senior director of technology and standards for the Consumer Technology Association, which produces CES.

"Some consumers still want to be directly involved in the selection of each [music] program and each track. Other consumers want to lean back and have great content delivered to them, and many consumers exhibit both behaviors, depending on their mood.

"Radio is a great example of a lean-back service," he continued. "The hardware is available in all infotainment packages, from the most basic to the most advanced; and we are still seeing innovation in radio technologies and



Car manufacturers, including Ford, touted the promise of connected car technologies. Many centered around using mobile devices to sync streamed audio more seamlessly into the dashboard.

user interfaces."

Of the nine carmakers and 115 or so automotive tech companies at CES 2016, almost all showcased product that included radio.

Content also continues to drive radio's appeal. "Radio is like a companion show," said Bob Pittman, CEO of iHeartMedia, during a session at CES. He noted that radio reaches 93 percent of U.S. adult listeners. "Users who are driving or can't interact with their phone can still connect with a personality on the radio."

Of course, there are now many forms of "radio." But listener connection, along with radio's reach and business models, may explain why the technology found a seat within a number of the interconnected devices showcased at CES, from new DTS/HD Radio installations in cars like the Cadillac CT6 and Toyota Land Cruiser, to new aftermarket dashboard

technologies from Kenwood, Pioneer and Alpine; and in the introduction of new streaming options from the likes of Amazon Prime Music, Apple Car Play and Android Auto.

"There is now this demand for more content options," said Geoff Snyder, vice president of automotive business development for Pandora. He said the streaming media company has begun to introduce comedy and secure streaming rights for serial podcasts in an effort to widen content offerings.

Content is expected to evolve further, as radio considers what role it will next play in the newest trend in automobile design: the introduction of self-driving autonomous automobiles.

"We are on the road to autonomy. That's the next step forward," said

(continued on page 6)

More Radio, More Voices

Make Radio World part of your day every day. Visit our website for great Web-only Radio World content, including the following recent posts and stories:



"DAB: Delivering Audience Benefits — Graham Dixon, head of radio for the European Broadcasting Union, writes, "Inevitably, audiences have been trained by their Internet experience to challenge broadcasters with new demands, new expectations." See radioworld.com/dixon.

"Five Questions: Ronald Wittebols" — He is assistant manager and technical director of the award-winning WBFH(FM), "The Biff," a high school-based radio station operating at Bloomfield Hills High School in Michigan. "A high school radio station is the best 'lab' class any school district could offer," he told us. See radioworld.com/wittebols.



"Translator Prices Are 'All Over the Map'"

— An interview with Scott Fybus about his translator brokerage, including discussion of how much people are paying out there in the market. "The high end of the range seems to have settled just over \$100,000." See radioworld.com/ff-map.



Radio Is a Muscular Mass-Reach Medium

In-car audio is "huge," Westwood One notes, and AM/FM is the big boy on the block

AM/FM radio is America's top "mass reach" medium. And despite proliferating audio choices, 97 percent of in-car tuning comes from three established platforms: AM/FM, the leader, followed (well behind) by satellite radio and personally owned music.

Those are among the main points of a recent presentation by Westwood One for its clients and partners about the state of American in-car audio. It compiled industry data from several sources including the quarterly "Share of Ear" study from Edison Research that tracks consumer time spent with audio sources, as well as from Nielsen and RADAR.

Westwood One began by concluding that "in-car audio is huge," with nearly a third of all audio being consumed in vehicles. The average American adult listens to one hour 14 minutes of audio in the car each day, out of a total daily consumption of four hours 16 minutes.

Available audio sources in our lives have proliferated, overall. They now include personally owned music, Sirius

XM, Pandora, YouTube, TV music channels, streaming, podcasts, Spotify and more. Yet AM/FM still constitutes half of total listening in *all* locations, five out of every 10 minutes.

in the car, 10 minutes to Sirius XM and eight minutes to personal music. Streaming and podcasts get only three minutes.

Another salient piece of information is that AM/FM's in-car reach is relatively steady. Five years ago, 78 percent of persons 12+ were reached weekly in the car by AM/FM; and the number

We often allow ourselves and others to ignore an ongoing "big picture" every time someone mentions Pandora or Spotify or podcasting.

In the car, radio's position is yet more powerful, seven minutes out of 10.

Westwood One notes that in the car, the "big three" content platforms of AM/FM, satellite and personal music account for 97 percent of audio time — and of those, AM/FM's piece is almost three times bigger than the other two combined. An average person spends 53 minutes a day listening to AM/FM

stood at 76 percent last year.

Two-thirds of AM/FM listening takes place out of the home (almost the opposite of streaming audio, which tends to be a domestic pursuit).

Westwood One concluded its slides by noting trends that play further to radio's strengths.

It predicted that "geolocation" is going to become an increasingly

FROM THE EDITOR

Paul McLane



important theme, as new available data connects media exposure with store visitation behavior. Companies like NinthDecimal, a mobile programmatic and audience intelligence platform, are creating targeting solutions that will make these connections, it said.

Also, podcasts, currently a tiny slice of in-car listening, is growing "fast" as a compelling audio source. Meanwhile, efforts to convince wireless carriers to activate FM chips in smartphones will help boost OTA radio's presence via that in-car channel.

COUNTERWEIGHT

Now, to be sure, uneasy lies the head that wears the dashboard crown. Radio's historical dominance in the car is certainly not what it was in 1985 or 2005.

The information cited above must be considered in the vein of a pro-radio sales pitch: Westwood One is a radio network and it is owned by Cumulus Media, a radio-heavy company. Their numbers here don't compare

(continued on page 5)

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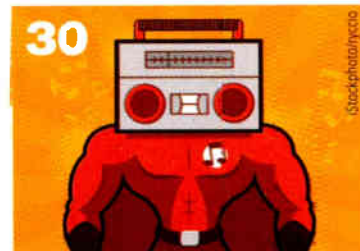
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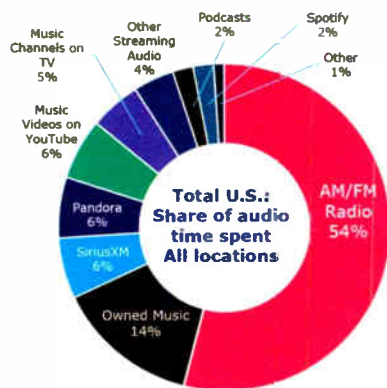
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Total listening in all locations: AM/FM represents 5 out of 10 minutes of daily listening

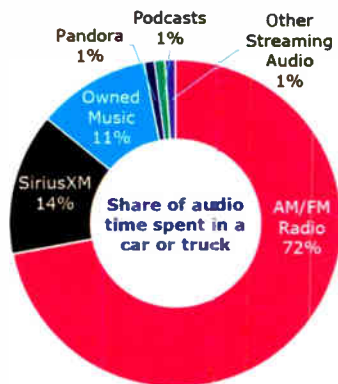
Share of total U.S. audio time spent – all locations persons 18+



Source: Edison Research, "Share of Ear," Q3 2015, 18+.

Total listening in the car: AM/FM represents 7 out of 10 minutes of daily listening

Share of in car audio time spent among persons 18+



Source: Edison Research, "Share of Ear," Q3 2015, 18+.

(continued from page 4)

"deltas" from 15 or 20 years ago, nor do they scrutinize listening habits for, say, young adult demographics specifically. There is plenty of reason to keep an eye on long-term competition and demographic erosion.

But the information provides a factual counterweight to an incessant narrative of radio as yesterday's audio news. We often allow ourselves and others to ignore an ongoing "big picture" every time someone mentions Pandora or Spotify or podcasting. Don't overlook radio's established and continuing strengths.

A clear-eyed ad buyer in 2016 who looks at the accompanying graphics and wants to pick the most influential in-car audio platform in American lives shouldn't have much trouble figuring it out.

So when anyone asks you how you feel about working in "old legacy radio," it bears repeating: Americans listen to AM/FM 53 minutes a day in the car. Radio, today, at the midpoint of the second decade of the 21st century, is a muscular mass-reach medium, a "king of the road" who doesn't have to apologize to anyone.

See the full slide deck at <http://tinyurl.com/westwood-deck>. Cumulus/Westwood One Chief Marketing Officer Pierre Bouvard blogs about topics like this; you can find more at westwoodone.com/blog. I share the discussion as context to our own new eBook, "HD Radio in the Connected Car," which you can read for free at radioworld.com/ebooks. And as always, let me know what you think, via letter to the editor to radioworld@nbmedia.com.

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CES

(continued from page 3)

Sherif Marakby, director of global electronic systems engineering at Ford Motor Company, who spoke at a panel about the role that entertainment plays in the car. At CES, Ford announced plans to triple its fleet of self-driving test vehicles by the end of this year; General Motors announced a partnership with Lyft to develop a fleet of self-driving vehicles.

CONNECTED GROWTH


What role does radio begin to play in this new environment?

The driving experience changes when the driver — without a constant eye on the road — becomes a full-time passenger who can consume new radio, curated music services and entertainment options. At CES, Volvo jumped on this idea and announced a partnership with Ericsson to develop new high-bandwidth streaming capabilities in

autonomous automobiles that will bring in new audio and video options, including pre-curated content tailored to the exact duration of a trip across town.

As radio looks ahead, it should consider how the melding of technologies in the car will impact the industry. Several car manufacturers — including BMW, Ford, Toyota, VW, Chrysler, Audi and GM — touted the promise of connected car technologies and made key announcements at CES, many of which centered around the promise of using mobile devices to sync streamed audio directly into a car's dashboard more seamlessly.

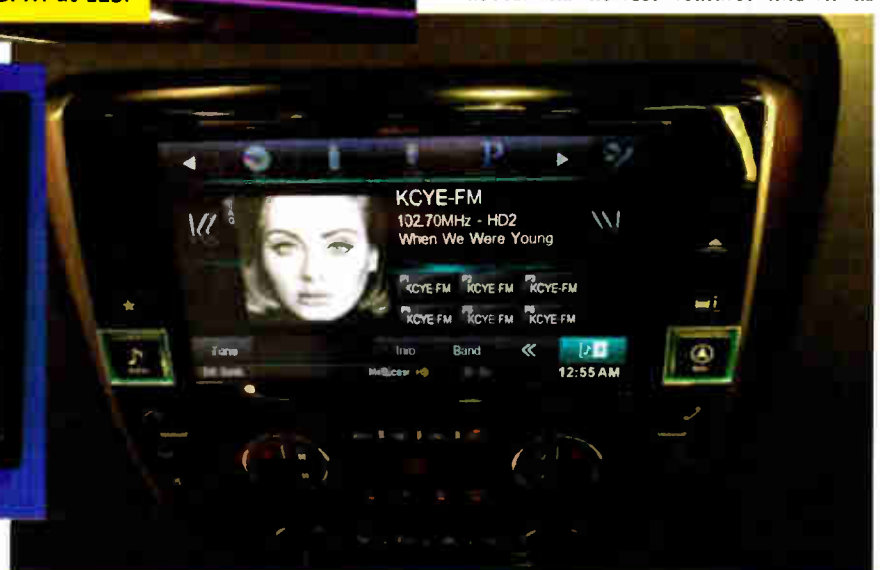
In her 2016 CES keynote address, GM Chairman/CEO Mary Barra said the company's goal is to have 12 million connected vehicles on the road this



Visual elements are an increasingly important part of infotainment systems. Here, HD Radio in a BMW at CES.



New cars such as the Cadillac CT6 and Toyota Land Cruiser included HD Radio in their factory models.



Other technology iterations on the CES show floor included new aftermarket dashboard technologies. Alpine (shown) inked connected partnerships with Apple Car Play and Airbiquity, which will support iHeartRadio and Spotify audio apps.

year. "The convergence of connectivity, vehicle electrification and evolving customer needs demand new solutions," she said.

To that end, a number of auto manufacturers announced integration with streaming audio programs, mirroring ongoing growth of the platform. In 2015, consumer use of streaming services was up 93 percent, according to a recent Nielsen Music report.

Apple CarPlay and Android Auto have received much attention in recent months. Car and Driver describes these as "phone-integration" systems or "phone-mirroring software" that beam Apple or Google operating systems from a phone to the vehicle's central display.

Apple said that to date, "every major automobile manufacturer" either sup-

ports or plans to integrate CarPlay into future models. Other streaming audio announcements revolved around Ford's new partnership with Google's Android Auto, as well as integration with Amazon Prime Music into BMW, Ford and Mini models.

At the show, mobile application developer Jacapps announced that the company's V4 app platform will support Google's Android Auto to enable Android smartphone users with an Android Auto-enabled car to stream radio station broadcasts and access podcasts.

"The car is becoming part of the digital lifestyle," said Thom Brenner, vice president of digital products and services for BMW. "As cars become connected, we OEMs need to think through how we add our devices make it seamless with their needs. Things that start outside of the car and need to continue in the car as needed."

Other technology iterations on the show floor included new aftermarket dashboard technologies from the likes of Kenwood, Pioneer and Alpine, the latter of which inked connected partnerships with Apple CarPlay and Airbiquity, which will support iHeartRadio and Spotify audio apps. iHeartMedia made its own announcements in the form of integration with Apple TV, which will allow Apple TV users to access the core

elements of the iHeartRadio app.

MORE PERSONALIZATION

One trend that the radio industry should absorb: Customers increasingly look for experiences that personalize content.

iHeartRadio, for one, announced that its users will be able to play live and custom radio stations, view recommendations, save favorite stations and access its newest feature, known as

My Favorites Radio, which combines a user's favorite stations and artists into one station.

Yet despite the wealth of interconnected technologies and options that were abundant across CES, customers also are looking for simplification.

"The more features you put in, the more you potentially fragment," said John McFarland, director of global insights and brand strategy for GM's Global Connected Customer Experience division.

"For all the advances we have, we have also seen that there is a lot of power having a simple button in the car to select an experience. Simplicity will continue to be a focus."

The show also featured an increase in the number of high-resolution audio devices like aftermarket auto receivers, including new options from Dual Electronics, whose in-car unit promises playback of lossless music files streamed from a smartphone over WiFi.

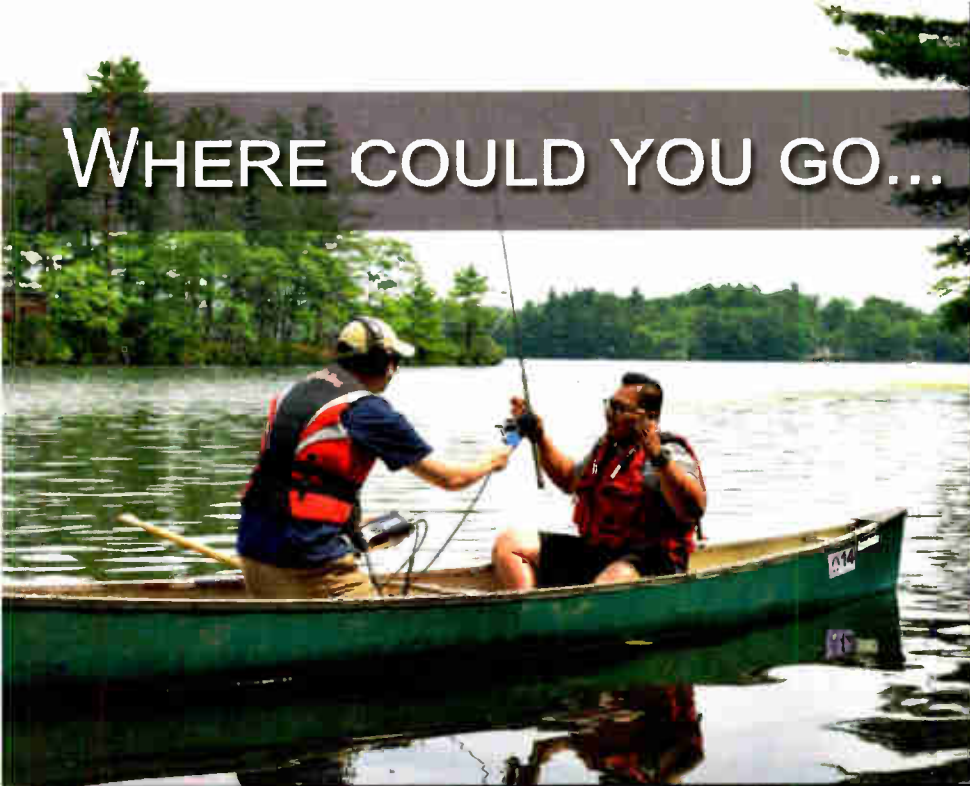
It remains to be seen what radio must do to hold its place as a key feature in tomorrow's integrated dashboards, though many believe that radio — in one form or another — will be a key part of that future.

"Music [remains] the core entertainment experience in the car," Pandora's Snyder said.



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JACOBS

(continued from page 1)

strongly in giving consumers whatever they want in the audio infotainment ecosphere. This means satellite radio, streaming apps, podcasts and whatever else they want. Most automakers will tell you they conduct considerable consumer research — quantitative and even ethnographic — where they're inquiring about popular audio options and observing drivers in action. The bottom line is that there's a hole in the fence, allowing new content to be easily accessible in the dash.



Fred Jacobs

content, my personalities and my local connection essential to listen to among all those options?

RW: What does car connectivity mean for broadcasters' long-term business model?

Jacobs: Broadcasters may find themselves in a position to have to reprove their appeal, both as advertising vehicles and as sources of entertainment and information. OEMs and their dealers are demanding accountability and data, rather than simply making a buy and hoping that car buying prospects here the spots.

Radio remains primarily an analog business, but all of the trends in automotive advertising and in media distribution are rapidly moving toward digital. Clearly, the competition for both advertising dollars and the consumers' attention and time are amping up — quickly — and broadcasters are going to have to adjust their business model quickly.

RW: How should HD Radio fit in this fast-developing environment?

Jacobs: It's an interesting dichotomy in that many broadcasters have questioned the efficacy of HD Radio, while many car makers insist that the digital interface is the only one that makes sense. Many on the automotive side will tell you the goal is to have a consistent look, feel and experience (album art, search, etc.) as consumers move from Pandora to Sirius to their favorite FM stations.

iBiquity did good work with the OEMs the past several years, creating direct relationships. I spoke with DTS CEO Jon Kirchner while in Las Vegas. He is all about the importance of automotive. It makes sense to look at them as an important entry point for the industry on which to form — and grow — relationships with the auto industry.

RW: Is there a revenue stream for broadcasters in HD Radio?

Jacobs: As HD Radio penetration improves in new cars that are sold and leased, it feels like that tipping point will be reached. At what point will a majority of broadcasters begin to focus on HD Radio, HD2 and HD3 stations to take advantage of that potential is a good question. That means commitments and goal-setting for HD2 stations — how they're programmed and sold. But ultimately, if there's an audience, there's revenue.

RW: How can the industry grow its digital listener-ship?

Jacobs: There are two key ways. First, improve the digital experience. Make sure the UX is solid and that streaming, podcasts, mobile apps and other digital assets are competitive with everything else consumers are listening to. Second is to promote these assets — something that broadcasters have been hesitant to do because of fears their audience will leave the AM or FM band to access them on the Web. Radio broadcasters are going to have to truly *commit* to digital in order

to realize its audience and revenue potentials.

RW: How does NextRadio fit into this discussion?

Jacobs: NextRadio has a lot of potential, especially among those who love their smartphones and have favorite radio stations where they live and work. The data issue is an important one to many consumers who will change their media usage behavior when they at or near their data limits. The interactive nature of NextRadio has a younger appeal, and broadcasters could most definitely use injections of both millennials and the "cool factor."

RW: What did you see at CES that we should know about, regarding HD Radio or connected cars in general?



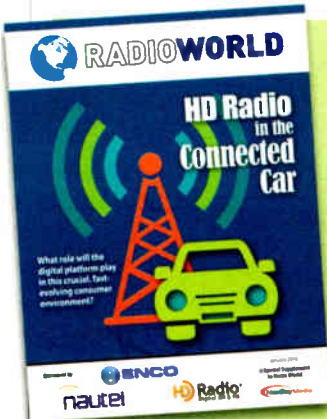
Virtual reality meets the autonomous car at the 2016 CES show.

Jacobs: Apple and Google are now being considered partners rather than predators by many automakers who may have been leery of these tech companies a year or so ago. This is going to turbocharge the proliferation of these platforms in cars, which will accelerate consumer adoption, thus creating a challenge for broadcasters.

Autonomous driving is coming — whether consumers are excited about it or not. What this will mean to radio is still debatable. But many in the automotive community feel that "drivers" of these cars will have their eyes free to be able to do other things in the car — like email, web surfing, videos and other activities. Whereas radio had a virtual monopoly on in-car entertainment, that could very likely change when autonomous hits critical mass.

As we see every year, the level of energy and inno-

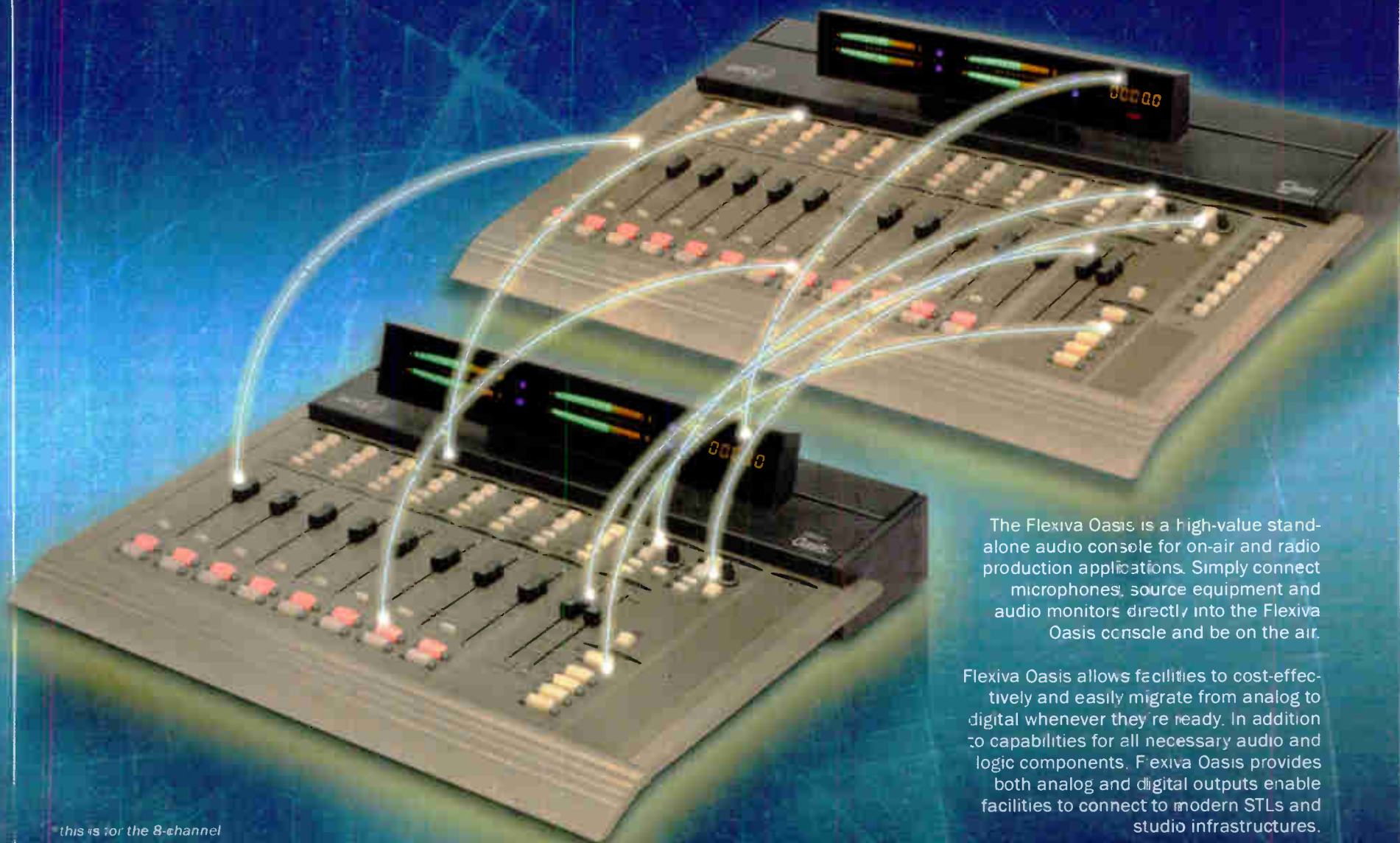
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Read what observers like Sam Matheny of NAB, Erica Farber of RAB, Scott Burnell of Ford, Mark Ramsey of Mark Ramsey Media, Roger Lanctot of Strategy Analytics and Geoff Snyder of Pandora have to say about HD Radio and the greater world of the connected car.

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Conduit, Hangers Suspend Wire Reels

Also, a website that can tip scrap dealers about stolen copper and help broadcasters track it, too



What's nice about Steve's solution is that the center rod can be removed easily, so wire spools can be changed or added. Choose a smaller diameter piece of conduit or pipe, so most wire spools will fit. Mount the brackets up on a wall, and the wire spools are out of the way, yet ready when you need them.

In our Feb. 3 column, Horace Wong of Entercom San Francisco showed how he tied studio silence sensors to ceiling-mounted strobe lights outside each

Fig. 1 (left): Wall-mount closet brackets hold reels of wire.

Fig. 2 (below): A close-up of the bracket used to suspend wire reels.



WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Salem Twin Cities Engineering Manager Steve Smit shared his video doorbell in our Jan. 20 Workbench column, and he now sends us another idea.

Seen in Fig. 1, Steve used readily available closet supports to keep his wire reels organized. A close-up in Fig. 2 shows a piece of conduit that lies in the closet support. This permits the wire reels to turn easily without the wire twisting as it's spooled out.



Fig. 3: Suspended on-air lights identify which studio mics are in use.

studio, providing an efficient warning when a station was off the air.

Educational Media Foundation's Manager of Studio Operations Jonathan Obien had a bit different take using "On Air" lights. With multiple production studios running down both sides of a hallway, Fig. 3 shows how Jonathan and his team suspended the lights on poles, outside each studio. This way it's easy to see if the mics are in use in any studio — and it's more efficient than flush-mounted wall mounting.

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Frank and Dave Hertel of Newman-Kees RF Measurements and Engineering in Evansville had some fun at the drafting table, designing the "nut" pictured in Fig. 4. Frank asks where he can buy a box of these Left-Hand/Right-Hand nuts in 6-32 size.

Townsquare Media's Ben Davis replied, "The same place you can buy a" *(continued on page 15)*

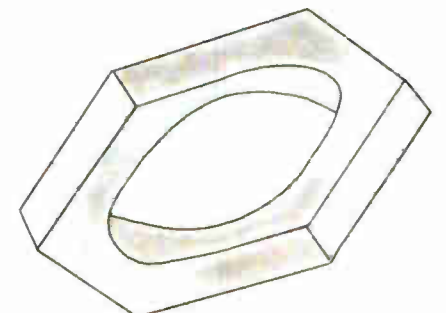
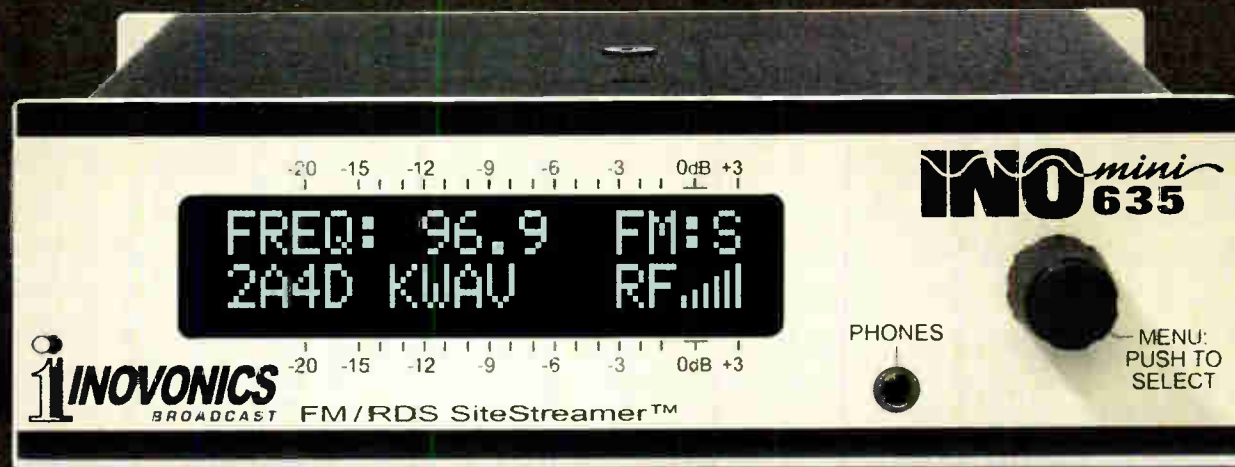


Fig. 4: Copy the drawing of this Left-Hand/Right-Hand nut for your air staff to ponder!



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The browser interface enables remote tuning, displays audio levels, RDS data, and logs signal parameters. Error messaging by Email/SMS; SNMP supported.

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Features:

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- ▶ Tunes the 76MHz to 108MHz FM band
- ▶ Analog AUX input monitors hardwired audio feeds
- ▶ Full dynamic browser support including audio streaming through the Web Interface
- ▶ Logs RSSI, Audio Loss, RDS Errors
- ▶ Email/SMS error messaging; SNMP support
- ▶ Measures audio levels for accurate diagnosis
- ▶ Easy to set up and use
- ▶ Headphone jack
- ▶ Small form factor: 1.6"H x 5.5"W x 5.5"D
- ▶ Optional rack mount accessory can mount 1-3 INOmini's in a 1U space (shown below)



FM Slide Rule Is a Treasure From the Past

ROOTS OF RADIO

BY CHARLES "BUC" FITCH

World War II stalled many emerging technologies and social changes. Broadcasting was hit hard; the conflict essentially put the kibosh on nascent television and frequency-modulated radio for the duration.

On the home front, the war was one of out-supplying the enemy and husbanding our resources. Broadcast

An RCA FM Coverage Calculator is forwarded herewith to assist you in planning an FM station.

— RCA instruction sheet, circa 1944

engineers were useful and busy in this effort, providing communications expertise and solutions at the highest level.

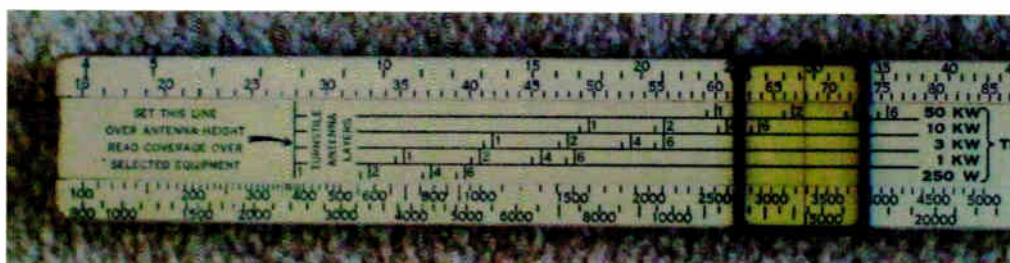
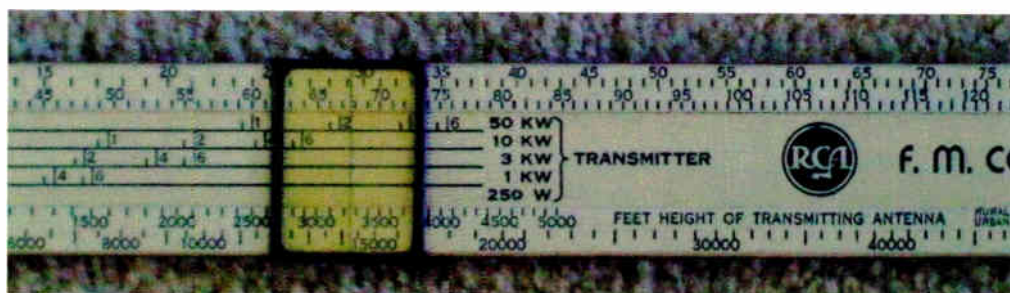
Out of that chaos, victories overseas brought a new optimism that we were going to win the war. A better day with a return to normal life was coming.

Broadcasters started to speculate and make plans for that future.

To bolster the enthusiasm and brio, RCA, a major supplier of equipment at that time, sent customers this interesting device circa 1944. It is an FM slide rule coverage calculator.

This relic came to me as a gift from longtime friend and audio connoisseur extraordinaire, Richard Robinson.

The intriguing device allows one to ascertain from antenna height (assume flat earth), transmitter power and bay count (think gain) to determine radius



coverage for urban (1 mV) and rural (0.05 mV) as well as the area served in square miles.

The FM band at the time was in the 40 MHz area and in horizontal polarity only in this case, predicated on using a turnstile antenna where each bay gives about a gain of 1.

If this slide rule concept looks familiar, review the 47CFR73.333 figure 1 in the Code of Federal Regulations from days of old, which for years was the

methodology for calculated coverage in the FCC's regulations ... essentially a paper nomograph version of this slide rule.

My romantic Latin American friends tell me that our dreams may cost nothing but are our most valuable personal possession. Perhaps an engineering for-bearer sat at his station desk during those daunting days of war, and manipulated this coverage calculator while dreaming of the new radio dial to come.

INSTRUCTIONS

The original letter that accompanied this device bears the RCA logo at the top and reads as follows:

An RCA FM Coverage Calculator is forwarded herewith to assist you in planning an FM station. This rule has been developed by the RCA Engineering Department and has been made with materials available under wartime restrictions. We hope you will find it helpful. Additional copies of this rule are available at one dollar each.

To use the RCA FM Coverage Calculator, set the left hand mark of the wood slide above the height of the transmitting antenna (second scale from bottom). Next, select the power transmitter to be used. For each power transmitter there is a line on the wood slider with a scale marked 1, 2, 4 and 6. These indicate the number of layers in a turnstile antenna. Set the small metal slider with its center mark on the number of layers in the antenna. Read on the next to the top scale the radius of rural coverage and on the top scale the radius of urban coverage. These indications will be shown by the center marking of the metal slider. The bottom scale on the rule indicates the number of square miles of rural coverage. Small markings to the left of those indicating number of layers in the antenna allow for 10 percent loss in the transmission line.

Radio Corporation of America
RCA Victor Division
Camden, New Jersey

Charles S. Fitch is a registered professional consultant engineer, senior member of the SBE, lifetime CPBE with AMD, licensed electrical contractor, former station owner and former director of engineering.

WHO'S BUYING WHAT

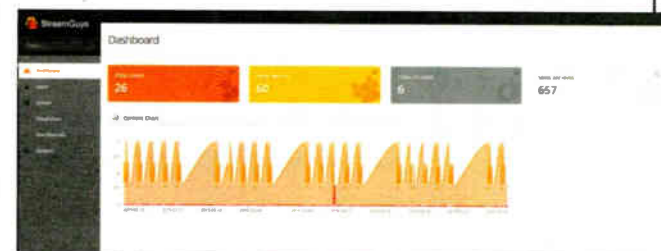
Cox Media Group has chosen a turnkey software-as-a-service streaming platform system from StreamGuys that is designed to support live and on-demand streaming, targeted ad delivery along with audience metrics. The new system is currently live across Cox Media Group's 60 radio stations.

The system is based around StreamGuys' cloud-based content management and delivery network.

It also integrates StreamGuys SG suite products and services into the network for streaming player data, accelerated podcast creation, enhanced royalty reporting and monetizing streaming initiatives.

Featuring StreamGuys' open architecture, the system delivers across Web and mobile platforms. It also features the SGPlayer multimedia player to deliver information like song/artist data, album art, recently played tracks and social media links; it is also a Nielsen SDK player to deliver client-side analytics.

Additional features of this new partnership include Cox using StreamGuys' SGrecast software (shown) to manage on-demand podcasts; help with local and national online ad campaigns; and a business software package that includes SGreports and SGalerts.



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WORKBENCH

(continued from page 12)

radiator cap for a '68 VW Beetle." That, and turn signal fluid, which you'll find most reputable auto parts stores keep in stock.

Malaysia's Paul Sagi sends us a link to a new type of compact fan. Designed for computers, but small enough to use in equipment rack applications, the Silencio FP Series by Cooler Master focuses on quiet performance and reliability. Life expectancy is 160,000 hours. Paul suggests taking advantage of these low-noise characteristics to provide additional cooling as needed in your studios.

The newly patented driver IC provides less vibration and low operating current, which saves on power consumption. The Silencio FP fans also come with protections against fan jams, and an auto-resume function after any blade obstructions are cleared to help protect the blades and motor. For information, search for Cooler Master Silencio fans. Models range from \$20 to \$100.

Art Reis, principal of RadioArt Enterprises, just experienced a doozy of a copper theft at one of his contract stations in the Joliet area. The station was hit with a burglary of copper wire, strap, a Delta OIB-3 and an oscilloscope. The theft occurred over the weekend of Jan. 9-10. The loss was discovered the following Monday morning. A police report has been filed.

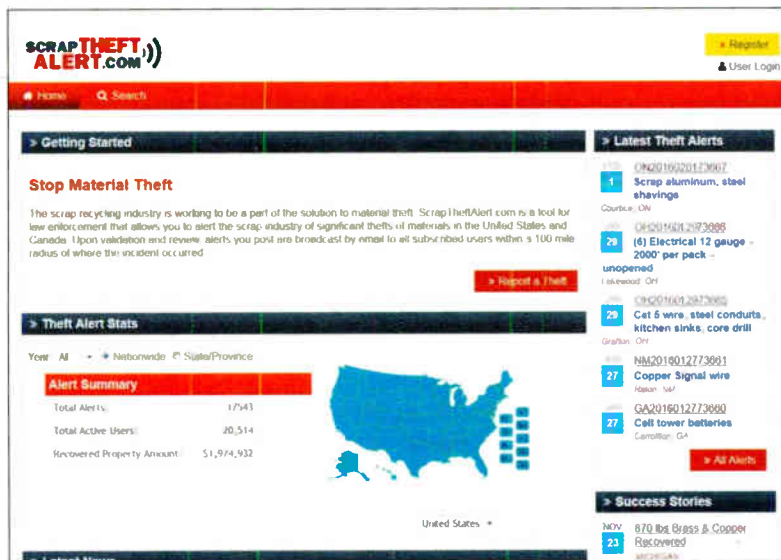
Specifically, the stolen copper included about 6,000 feet of #10 soft-drawn, uninsulated copper wire on six large reels, and approximately 100 feet of 6-inch .032-inch strap.

In the course of alerting many of the local scrap dealers about this, one tipped Art to *ScrapTheftAlert.com*, a website for scrap dealers, alerting them of the possibility of stolen property.

You must register on the site to use it, providing an email address and a password. After that, in the event of a theft from one of your facilities, you may file an incident report. Be sure to include any police report file numbers and a thorough description of the stolen property. Alerts are sent to virtually all scrap yards within a 100-mile radius of the theft site. This is a nationwide service.

This is an idea whose time is way overdue. Perusing the page, there have been more than 17,500 alerts posted. This includes not only copper strap and wire, but cell tower batteries, Cat-5 wire, steel conduit, even kitchen sinks. There are approximately 20,500 users registered. But the most gratifying statistic is the recovered property amount is closing in on \$2 million.

Art writes that he hopes you



never need the site, but by registering, you've taken your first step to thwarting this kind of activity.

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

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

Fig. 5: Home page of ScrapTheftAlert.com.

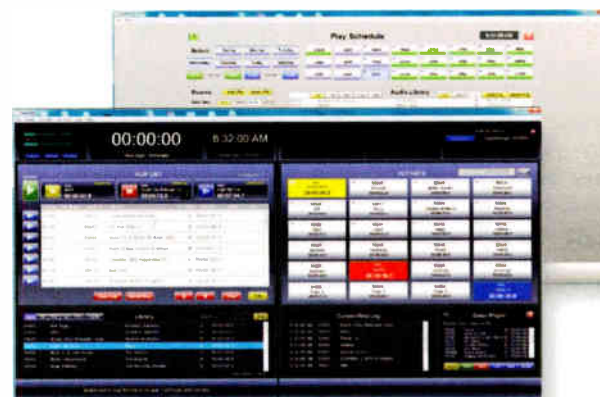


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Produces a consistent, spectrally-balanced sound regardless of density variations in incoming source material. Essential for different media formats.	Specialized automatic level and spectral management algorithms provide a wide but extremely stable 'on-air' stereo image.	Circumvents bass-related distortion. Increased depth, feel, and clarity of bass impact without affecting mid and high frequency content.	Mitigates market and terrain-specific multipath behavior, reducing the problem of multipath-triggered receiver-induced stereo blend.	A single AES/EBU cable between the processor and a current solid-state FM transmitter carries the digital baseband signal for exceptionally clean sound.	Control the FM-55 and stream its audio to and from anywhere in the WheatNet-IP audio network.

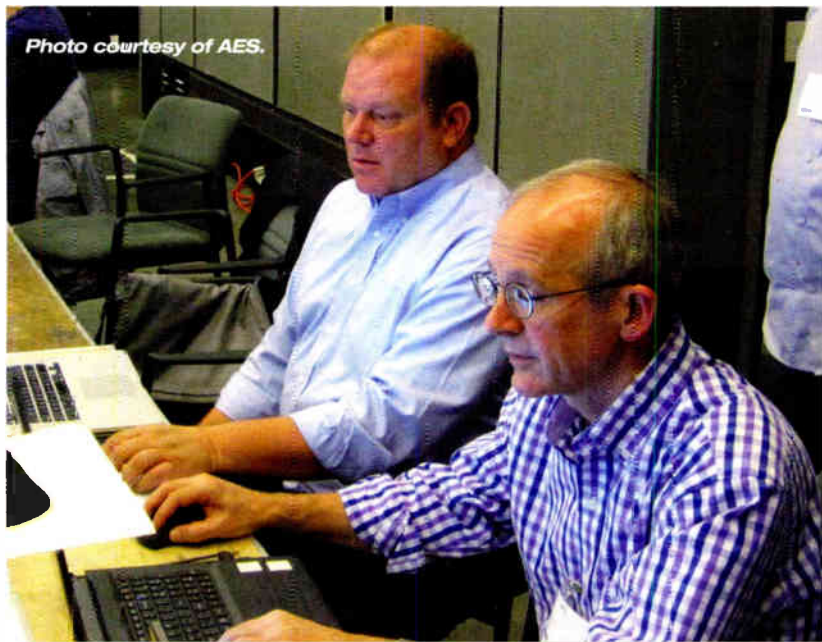


Photo courtesy of AES.

Wheat Goes To Washington For AES67 Plugfest

Wheatstone's engineers arrived at NPR's headquarters in Washington, DC in November with a WheatNet-IP audio network to participate in the second AES67 plugfest. This plugfest was a follow up to the AES67 system compatibility testing conducted in Munich last year, and provided for further testing on multicast as well as unicast streaming.

AES67 requires support for both multicast and unicast streaming the former of which needs the Session Initiation Protocol (SIP) for connection management. A number of products participating in the plugfest support unicast and SIP, including our WheatNet-IP audio network.

Thirteen products were tested, with AES67 implementations varying from software on a PC to hardware-based FPGA solutions.

According to a preliminary AES report summing up the plugfest, "Although these tests involved a growing number of devices compared to the previous plugfest, a majority of unicast streams interoperated successfully." However, because SIP interoperability was not achieved in some cases, the report suggests that an SIP technical overview and recommendation be published prior to subsequent AES67 plugfests in order to ensure the best possible conditions for SIP interoperability.

Multicast interoperability was also thoroughly tested during the plugfest, and according to the preliminary report, "most combinations (94%) were successful. Many of the receivers were able to interoperate despite some conformance issues."

The plugfest took place in November to confirm the interoperability of various products according to the AES67 standard that was first published in 2013 and revised in 2015. AES67 requires interoperability with linear PCM audio coding, a sampling frequency of 48 kHz, 16 or 24 bits-per-sample, 1 to 8 audio channels (2-channel stereo presumed to dominate), and a packet time of 1 ms.

The next plugfest is expected in 2016 in the U.K.

For more IP Audio News: INN31.wheatstone.com

IP Audio, Par For Australian Open Course

By George Biagioni

George Biagioni is IT Director for Crocmedia, an independent syndicator of sports content located in Victoria, Australia.

We recently returned from the 2015 Australian Open Golf Tournament, where my crew and I spent the better part of a week making the rounds and reporting live to spectators there as well as to listeners tuning in to sports radio station, SEN, in Melbourne and SportFM 9.13 in Perth. This marks the second year for Australian Open Radio, a temporary low-power station that Golf Australia contracted my company to set up in order to bring fans closer to the action. This special-event broadcast presented some unique challenges, and therefore required a most interesting mixture of technology to reach the ears at the tournament as well as those listening elsewhere.



To learn how we made it all work using 4G iPhone 6s with Report-IT, Teline Genie distribution, a 5W transmitter, and Wheatstone IP audio networking, audio processing and IP console...

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Your Question Answered

Q: What are the benefits of multiband voice processing?

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For more IP Audio News: INN31.wheatstone.com



ANALYZER

(continued from page 1)

tory doesn't mean it will perform correctly in the field, especially in high RF environments.

Among the first things I look for are "mixing products" between transmitters on site. Transmitters from as far as 10 miles away can cause mixing in a transmitter, resulting in unwanted signals that do not comply with FCC rules. An example is a combined AM/FM site. The AM signal, say at 1000 kHz, gets into the FM exciter, causing unwanted signals (spurs) 1 MHz (1000

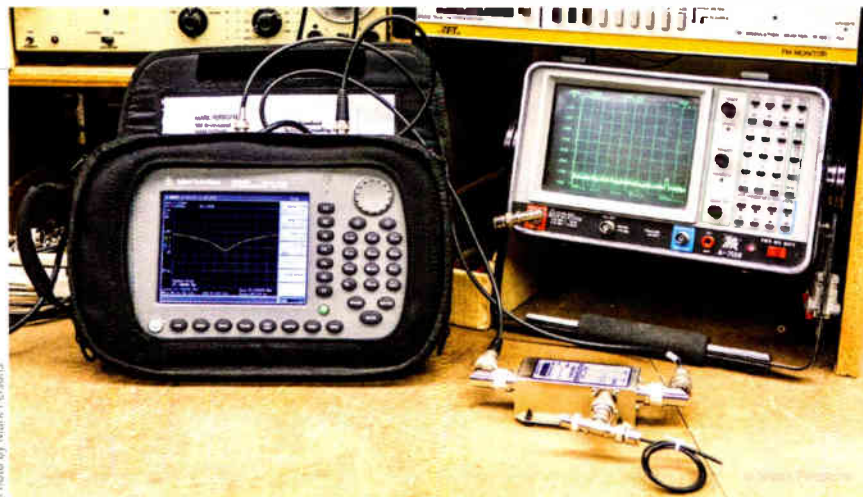


Photo by Mark Persons

Fig. 1: An Agilent N9340B and an IFR A-7550 Spectrum Analyzers with Eagle RLB150X3 Return Loss Bridge on a service bench ready for action.

A spectrum analyzer will tell the story. Without one, you may not know there is a problem or how bad it is.

kHz) on either side of the FM signal. This usually happens when audio is fed to an active balanced composite input on the FM transmitter's exciter. Double shielded cable or grounding the shield at the exciter input usually takes care of the problem.

A spectrum analyzer will tell the story. Without one, you may not know there is a problem or how bad it is.

Fig. 1 shows my two spectrum analyzers on a service bench. Weighing in at just 12 pounds on the left is the Agilent, now Keysight, N9340B. On the right is my first analyzer, an IFR A7550. It dates back to the 1980s and weighs about 40 pounds. In the middle is a return loss bridge.

A spectrum analyzer, connected to a return loss bridge, is a great way to look at antenna Voltage Standing Wave Ratio. My favorite is the Eagle RLB150X3 return loss bridge, available for as little as \$250. Yes, it is a poor man's 5 to 1000 MHz network analyzer, but it tells almost everything I need to know about a transmitter load. Return loss bridges are three-port devices with an input from a spectrum analyzer tracking generator, a port for the unknown load, and an output to the spectrum analyzer's input.

Using a return loss bridge, I can see a VSWR picture of what the load looks like at the frequency of interest and

nearby frequencies. I might discover that an antenna is not on frequency, but off a bit. The display shows how far off and I can, in real time, see how antenna adjustments change the operating characteristics. Fig. 2 shows VSWR on one of my amateur radio antennas.

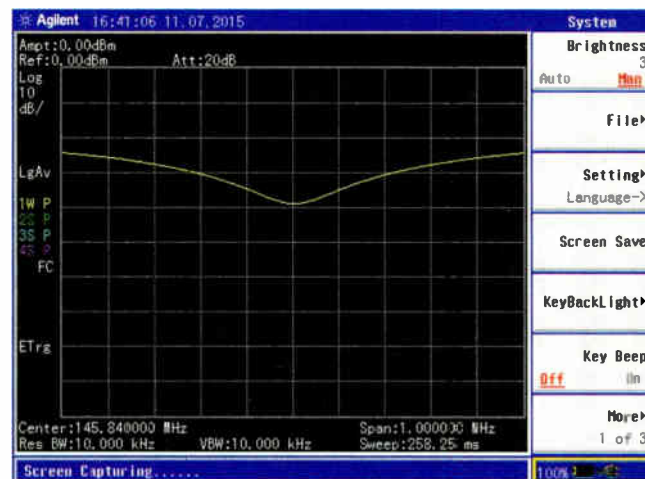


Fig. 2: The Agilent analyzer plot of a ham radio antenna in real time.

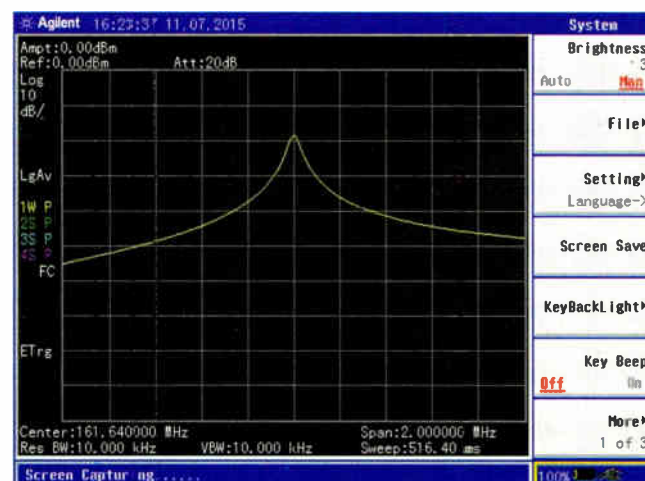


Fig. 4: Tuning a band pass cavity filter is easy when using a spectrum analyzer with tracking generator.

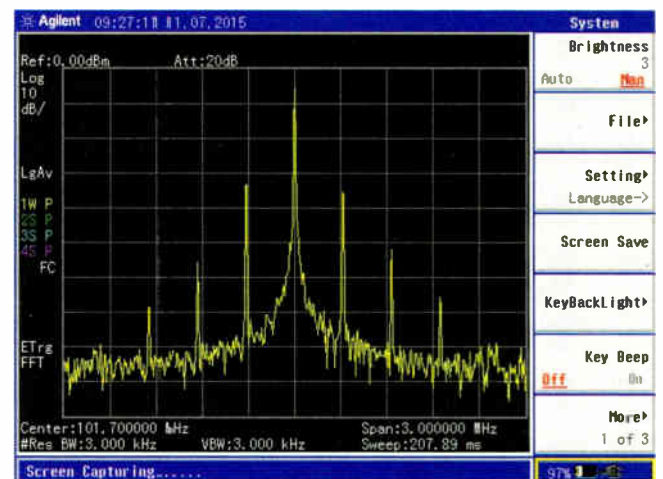


Fig. 3: Spurious radiation is plainly indicated from a faulty FM exciter under test.

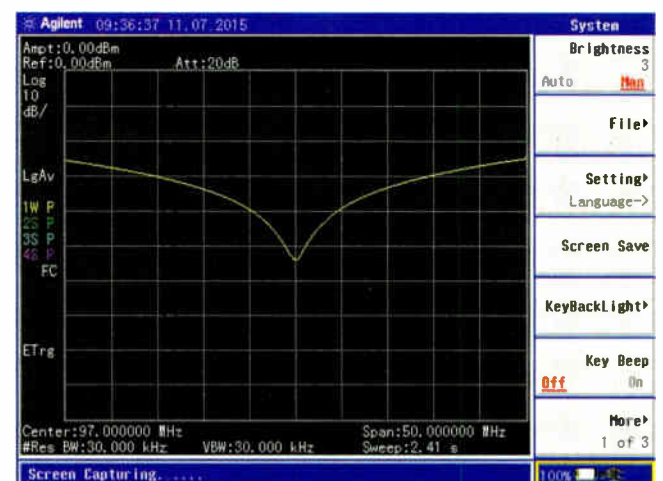


Fig. 5: Checking the VSWR plot of a shorted quarter wave stub filter to confirm performance.

quency of interest and nearby frequencies. If the analyzer shows the unknown load is 20 dB down from the reference (20 dB return loss), that tells you the VSWR is 1.22:1. 30 dB is 1.07:1. There are charts for that on the Internet.

TROUBLESHOOTING

I remember troubleshooting a Continental FM transmitter that intermittently dropped to near zero RF output. A spectrum analyzer told the story. The exciter was moving to a new frequency, due to intermittent DIP switches in its exciter frequency synthesizer. The mystery was quickly solved with a spectrum analyzer. Details in the June 15, 2011, RW (<http://www.radioworld.com/solvetransmittertroubles>).

I put an RF spectrum analyzer in the front seat of my car and set it to span from 88 to 108 MHz. A 30-inch piece of piano wire on a magnetic mount served as a roof antenna. Driving down a city street, I watched signals go up and down at a rapid rate. That explained why receivers were having such a difficult time in that mobile environment. The worst location was between tall buildings in a downtown business area.

An RF spectrum analyzer is a constant companion in my shop. I often

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Photo by Mark Persons



Fig. 6: A spectrum analyzer with return loss bridge measuring and tuning a remote pickup antenna for low reflected power.

see unwanted spurious radiation from FM exciter. Fig. 3 shows spurs spaced about every 300 kHz surrounding the exciter's frequency. The usual cause is electrolytic capacitors in the exciter's RF amplifier stage that have failed open. Capacitors at voltage regulators can cause the same symptom.

MAKE ADJUSTMENTS

You can use a spectrum analyzer with a tracking generator to adjust cavity filters. Fig. 4 shows a filter tuned to 161.64 MHz for use in protecting a remote pickup receiver from high local RF. Then there is Fig. 5 showing shorted quarter wave stub trap VSWR. See the May 22, 2013 issue of RW (<http://www.radioworld.com/preventtransistorfailures>) for details.

Fig. 6 shows an analyzer with a return loss bridge looking at a Cushcraft Ringo 160 MHz remote pickup antenna. Antenna VSWR is plainly evident on the analyzer.

Having a spectrum analyzer and knowing how to use it are two different things. Many manufacturers have tutorials. You can learn from fellow engineers or better yet, Society of Broadcast Engineer members in your area. Become proficient at interpreting what you see on an analyzer screen. You might be amazed at what you find.

AVAILABLE MODELS

RF spectrum analyzers are available from many sources today. They include:

- Keysight (formerly Agilent). www.keysight.com
- Anritsu. www.anritsu.com
- Signal Hound. www.signalhound.com
- Rigol. www.rigolna.com/products/spectrum-analyzers
- Tektronix. www.tek.com/spectrum-analyzer
- GW Instek. www.gwinstek.com
- Rohde & Schwartz. www.rohde-schwarz.com

More are being introduced every time I look.

Not all RF spectrum analyzers are the same. Those in the \$10,000+ range are usually self-contained. Less-expensive ones in the \$1,000 range are often a box that connects to a computer. They let the computer do the number crunching and display. Best to get one with a tracking generator.

If you are purchasing an analyzer, I highly recommend one that has a 300 Hz or narrower resolution bandwidth filter so you can measure occupied bandwidth on AM stations accurately. Reading to

3 GHz or more is good too. You might need it when adjusting a satellite dish. How about 950 MHz STLs? They can go wild causing interference. An RF spectrum analyzer will tell the story.

Yes, a spectrum analyzer can be your eye to what is happening in the RF domain. It lets you see what is going on. Having the right tools will help you get the job done right. Don't leave home without one. It makes perfect sense.

Mark W0MH is a Certified Professional Broadcast Engineer and has more than 40 years' experience. His website is www.mwpersons.com.

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Proclaim 16: Show Staples, With Religion

Annual NRB convention is billed as must-attend for Christian communicators

FAITH RADIO

BY EMILY M. REIGART

The National Religious Broadcasters Association will convene its annual conference in Nashville this month. The marquee event targeting Christian communicators has a schedule that reflects the shifting media landscape, with increasing emphases on digital and social media, as well as the politics of the 2016 presidential election.

According to the NRB, the event's new name — "Proclaim 16" — emerged from a "strengthened mission focused on advancing biblical truth, promoting media excellence and defending free speech." Additionally, the change helps to differentiate the association from its convention, as only one of many NRB activities.

The event will include show staples such as an exposition floor: programming, policy and technology sessions; and networking opportunities. It coincides with NRB board and business meetings and a Radio Advisory Council and Standing Committee Meeting.

Eight attendee tracks are offered for those who wish to focus on a particular industry at the Christian media convention. Attendees can choose among the Radio, TV, Church Media, International, Film & Entertainment Summit and Donor Development Summits. There is



All show floor photos courtesy of the National Religious Broadcasters

also a special Pastors Track.

RADIO SUMMIT

The Radio Summit will run Feb. 24–26 and will cover relevant topics targeting managers, programmers and talent.

Sample sessions focus on "The Science and Art of Compelling Content," "Getting Started With a Radio Program and/or Podcast," "Building Loyalty to Radio Brands through Social Media" and "The Future of Radio: Innovation and Staying Relevant."

Some 90 presenters have been announced for the four-day conference. Those of particular interest to radio broadcasters include Bott Radio Network Director of Operations Ben Fowler, Cumulus Media Vice President of

Social Media Lori Lewis, Emmis Communications Chairman/CEO/founder Jeff Smulyan, WRMB(FM) Station Manager Dolores King-St. George, Moody Radio Director of Research and Learning Jennifer Epperson and Hibbard Group President/CEO Jack Hibbard.

Representatives from NextRadio will be on hand to explain their platform and how broadcasters can more utilize it.

HIGHLIGHTS

The convention's opening session will be held Feb. 23, 7–9 p.m. in the Delta A Ballroom and will feature speakers including NRB President and CEO Dr. Jerry A. Johnson; Shiloh Metropolitan Baptist Church Pastor H.B. Charles; LightWorkers Media President and actress Roma Downey; and Blount Communications Group President and NRB Chairman of the Board Bill Blount.

The evening of Feb. 24 will feature a public worship service with Pastor Rick Warren and singer/songwriter Michael W. Smith in the Delta A Ballroom. Museum of the Bible founder and Chairman Steve Green will give an address.

Also of note are the public policy and FCC sessions, both of which will be held Feb. 25, in the Delta A Ballroom and Canal AB, respectively.

Attendees who plan ahead can have lunch with Warren Feb. 24, and the show closes out Feb. 26 with a black tie optional gala dinner and the Special Service Awards. Both events require tickets.

Prior to the convention, on Feb. 22, the organization will host an NRB Digital Media Summit, which will focus on best practices for social media and online communication platforms. Scheduled highlights in this track include speakers

proclaim16
NRB INTERNATIONAL
CHRISTIAN MEDIA CONVENTION

IF YOU GO

What: Proclaim 16

Who: The organization National Religious Broadcasters sponsors this international Christian media convention.

When: Feb. 23–26

Where: Gaylord Opryland Resort and Convention Center, Nashville

How: www.nrbconvention.org

How much: Members \$550, others \$650, first-timers \$350, day pass \$275; rates increase \$100 after Feb. 21



Facebook Global Politics and Government Outreach Director Katie Harbath and "Do Over" author Jon Acuff.

DEBATE

The selection of convention sessions also reflects NRB policy positions. Titles include "Why the Jihadists Want to Take Away Our Freedom of Speech — And How Our Government and the Left are Helping Them Do It," "Losing the Freedom to Believe: Redefining Marriage," "Christian Genocide" and "Israel: Hope in a Region of Crisis."

A session with communications attorneys helps broadcasters track activities at the FCC and federal government including AM revitalization, FM translators, political broadcasting rules and public files.

The convention is a week prior to the Tennessee primary elections and will feature two live candidate forums. Final details will be announced closer to the show.

Presidential hopefuls from both sides

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Candidates Ted Cruz (left) and Ben Carson have confirmed participation.

EXHIBITOR SAMPLING

This is a sampling of the exhibit floor; for the full list see www.eiseverywhere.com/home/nrbx16/exdir/.

American TeleCenters Inc.	201
Australia Presents / Christian Media Australia	K1
Barbizon Lighting Company	247
BGS	817
Blubrry Podcasting	231
Broadcast Electronics	813
Broadcast Software International	835
BSW	546b
Canadian Religious Broadcasters Association	241
Christian FM Radio Networks	912
Comrex Corp.	546
Cruz Creative Media	340
De Wolfe Music USA Inc.	655
Dielectric LLC	930
ENCO Systems Inc.	916
Faith Radio	508
Family Research Council Fellowship of European Broadcasters	244
FirstCom Music	659
FreeConferenceCall.com	750
HisAir.net	240
International Broadcasting Network	840
Ka You Communications Kingdom	847
LeSEA Broadcasting Corp.	802
Liberty Counsel	628
LibsynPro	251
MegaVoice	214
Myers	710
NPR Satellite Services	851
NPR Satellite Services	704
OMB America	328
Oracle.com	841
Orbital Media Networks Inc.	451
QNAP Inc.	334
RCS	843
RF Specialties Group	810
SCMS	716
Shively Labs	908
Spreaker Inc.	706
Stream Station Inc.	712
Syes America LLC	822
Technical Innovation	917
The ADS Group	K4
TWR	310
USA Radio Networks	230
Voice Broadcasting Corp.	913
Wowza Media Systems	934
ZenoRadio	910

of the aisle have been invited to participate in Q&A sessions, hosted Feb. 23 and 24 from 1–3 p.m. According to NRB, candidates Sen. Ted Cruz and Dr. Ben Carson have been confirmed as participants. Salem Media Group will broadcast the forums. A “Presidential Debate Watching Party” will view the GOP debate from Houston on the evening of Feb. 25.

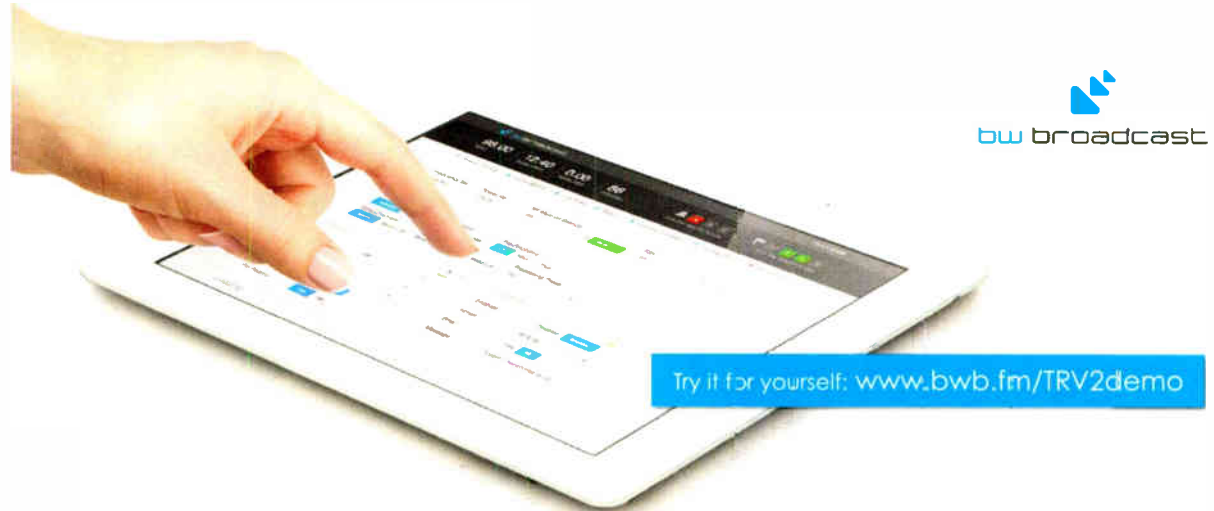
SHOW FLOOR

Admission to the exhibit hall is free for registered attendees. Doors will open Feb. 24 at 10 a.m. The Proclaim Exposition ends Feb. 26 at 2 p.m.

Some 200 companies will have a presence on the floor, which will also host an interactive exhibit presented by event sponsor Museum of the Bible.



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WSOU(FM) Weathers Winter Storm Jonas

Seton Hall's student radio staffers stayed on the air despite blizzard

COLLEGE RADIO

Despite January's winter storm Jonas, Seton Hall University's student-run station stayed live on the air for listeners in northern New Jersey and New York City even while campus closed.

WSOU(FM) student staffers as well as paid staff Program Director Steve Varsanyi, Technical Operations Director Brian Kane, Assistant News Director Katie Fatzler and Assistant Program Director Holly Fitzpatrick worked in shifts to provide weather and traffic reports, news updates and other updates. WSOU also broadcast its typical music and sports programming, including the long-running "Hall Line" call-in show. And like any promotionally minded radio station, WSOU highlighted its service to the community by distributing a press release after the storm.

Prompted by that, RW caught up with General Manager Mark Maben and Katie Fatzler to find out more.

Radio World: Was there a plan for the blizzard?

Katie Fatzler: There was a plan arranged amongst WSOU's student managers to have a set team in place



before a hurricane or a blizzard, WSOU students get a real-life lesson you can't get from a textbook or lecture. No matter their career plans, this kind of emergency planning is a beneficial experience for our students.

RW: Did everyone show up?

Fatzler: Everyone assigned to be present over the weekend was there. Some of us arrived at different times, but we all started to hunker down on Friday, Jan. 22.

RW: Any problems?

Fatzler: We ran out of milk!

Maben: There were no programming or technical problems. The students' preparation helped to ensure that the station operated smoothly.

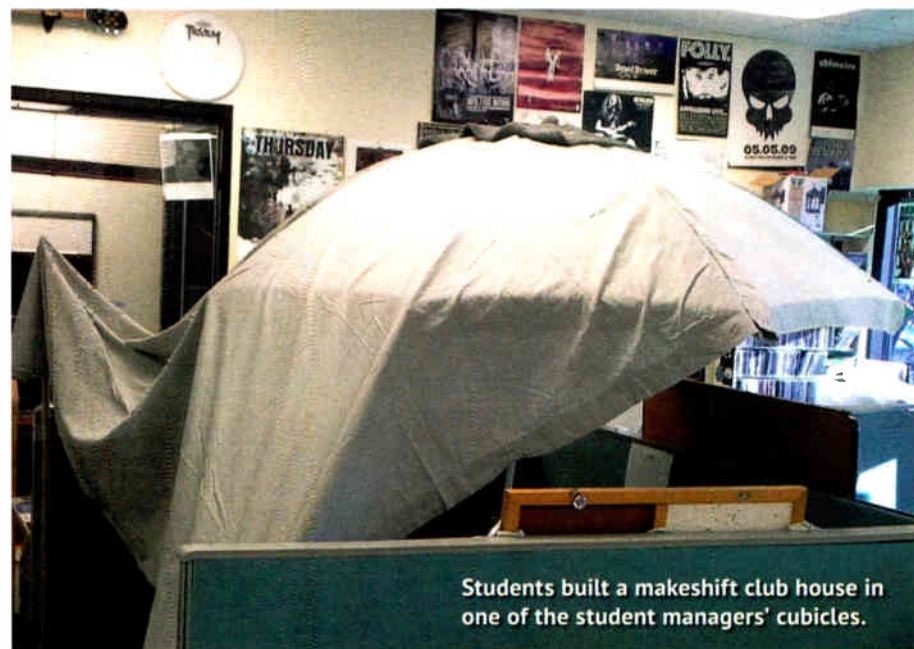
RW: Any fun stories?

Maben: For me, it was the "club house" that our news director Giancarlo built around his cubicle in the student managers' office. It reminded me of the forts kids make at home out of couch cushions or old sheets. When you are stuck inside for 48-plus hours, you get creative. (See below.)

Fatzler: A few of us were astounded that one of our



Katie Fatzler



Students built a makeshift club house in one of the student managers' cubicles.

before the storm began. We encourage staff on campus to make their shifts, but we realize it isn't always possible or safe for all our staff to be present. WSOU's staff consists of a majority of commuters, myself included. Anticipating the weather, there were 10 managers and assistants who stayed at the station over the weekend. We also had a stockpile of food, knowing we wouldn't be leaving the station for a few days. We even turned our Technical Operations Manager Brian Kane's office into a makeshift pantry.

RW: Do you have a permanent snow plan in place for events like these?

Mark Maben: There is a permanent snow plan in place from the perspective that the station will operate normally during a storm and will provide information to our listeners. Learning how to plan is part of our

educational mission, so that means giving the student managers of WSOU the responsibility to formulate and execute an individual snow plan.

Our student leadership discovers that each weather event requires a different approach depending on the forecast.

A snowfall of 2 to 4 inches may simply mean that the student managers make sure DJs and newscasters who commute have an on-campus backup in advance of the storm.

A heavy snowstorm or blizzard requires having a team of students inside the station before the storm begins so that no one has to walk across campus or drive, as student safety is a priority.

They also discuss if the number of newscasts or traffic reports needs to be increased or if special programming is required. Whether it is preparing the station

team members had never seen "Jumanji" or "Pulp Fiction," so when she wasn't DJing, we made sure she watched both.

RW: How long was everyone in the studio?

Fatzler: It really varied depending on the person. Some waited it out overnight Friday into Saturday before they trekked into the snow. Most of us were here from noon Friday to noon Sunday. Honestly, I was probably here the longest since I regularly DJ Friday mornings from 6-9 a.m. and just stayed through to Sunday.

WSOU began broadcasting in 1948 and was the first college FM radio station in New Jersey. The station also earned recognition for its broadcasts during Hurricane Irene, Superstorm Sandy and other major winter storms.

Tieline Hits Home Run for Entercom KC

World Series remotes get royal treatment with Merlin and Commander G3 codecs

USERREPORT

BY JOHN MORRIS
Assistant Chief Engineer
Entercom Communications,
Kansas City, Mo.

KANSAS CITY, Mo. — Our Entercom stations own Tieline Merlin and Commander G3 rack-mount and remote codecs, as well as some older Commander G1 POTS codecs and multiple Report-IT Enterprise user accounts.

Tieline codecs are an integral part of our setup, and we use them for a variety of broadcasts, including remote location news, sports events and talk shows. We also use Tieline gear for commercial client drop-in remotes, and we have used a pair of Tieline Commanders in IP mode as a backup STL.

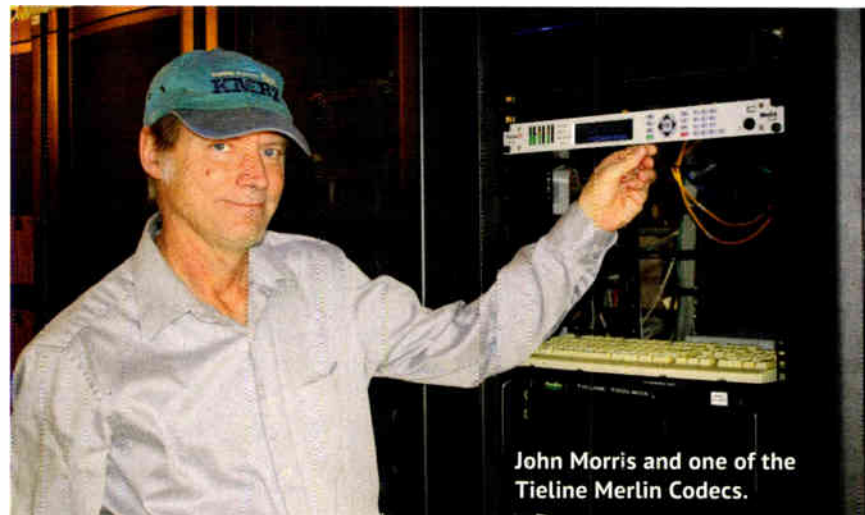
Our Tielines are used frequently for sports play-by-play, and we still connect over POTS; however, lately, we have been using IP more often.

RESCUE

In fact we had a situation recently where Tieline came to the rescue during the World Series between the Kansas City Royals and the New York Mets at Citi Field in New York. We were about to use some non-Tieline ISDN codecs to broadcast the game on KCSP(AM), our sports talk station and the flagship station of the Royals in Kansas City,

but were unable to establish anything better than a POTS-quality connection out of state.

We called Don Free, who is the engineer for the Kansas City Royals Radio Network and he had a Tieline Com-



John Morris and one of the Tieline Merlin Codecs.

mander G3 unit that we asked him to try instead over IP. He connected it to the stadium LAN and dialed into our Kansas City Merlin codec and it hooked up immediately, so it was used as the primary link for the game. We routed studio communications and a mix-minus feed back to the stadium by assigning a channel in our studio's Wheatstone console to the Merlin codec's input. The broadcast sounded great and was

definitely comparable to ISDN-quality.

It's not the first time this has happened to us and is occurring with increasing frequency. It appears ISDN problems are more numerous when calling out of state. Recently, I set up a remote broadcast for a guest on a network show on the West Coast. The remote engineer could not connect over ISDN if he called from there, but I could

call him successfully. He told me that this had been a problem at his end for a while. Like us, he could get a local connection at full bandwidth but could not get the carriers to talk above POTS-quality out of state.

Due to the phasing out of ISDN, it's becoming a pain to get ISDN lines installed, and it's getting prohibitively expensive. Our in-house carrier changed hands recently and subsequently our

bandwidth issues started increasing. After several weeks we still don't have ISDN long distance-capability through this company. I've had assurances their techs would get back to us and so far, nada. Nice "on hold" music, I'll give 'em that!

When I started with Entercom, we were doing Marti shoots with vans and UHF antennas on deployable masts. POTS codecs were a revelation and definitely safer. These days with POTS there are numerous issues, such as difficulty obtaining a dedicated line at the venue, the cost of line installation and bandwidth issues. Plus it's often tough to get a phone jack handy at a remote venue, which often necessitates a 200-foot run down a hall to the "D mark" using all your JK line and in the process creating a trip hazard!

As for IP:

- IP is pretty ubiquitous and it's now at most locations with a jack handy.
- IP bandwidth is usually no problem and it's more stable.
- IP is cheaper and the boss certainly likes that!

The Tieline codecs saved the day for our World Series broadcast and in my opinion IP is now starting to lead the way. The connection was rock-solid and sounded great. All of our engineers find Tieline codecs easy to operate and configure and overall there's less of a learning curve with the Tieline product — which is a big win!

For information, contact John Lackness at Tieline USA in Indiana at (317) 845-8000 or visit www.tieline.com.



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Comrex BRIC-Links Are a Slam Dunk

Engineer for Orlando Magic finds ease of use and reliability to be a layup

USERREPORT

BY MIKE SPRYSENSKI
Market Engineering Manager
iHeartMedia Orlando

ORLANDO, FLA. — As the market engineering manager for iHeartMedia, I oversee the technical operations for all of the company's radio stations here. We use both Access and BRIC-Link units for various applications like remotes and STL links. I have been extremely pleased with the reliability and flexibility of both lines of Comrex IP codecs.

A couple of years ago, the NBA decided to transition to IP codecs instead of using the traditional ISDN technology because the latter was getting more difficult to obtain in some locations and to cost more than IP networks, especially when dealing with a lot of units and sites as the NBA does. After reviewing what was available, they decided to go with the Comrex BRIC-Links as their new standard.

ASSIST

I was pleased with their choice, and as home radio engineer for the Orlando Magic, I was happy to assist them in getting the new codecs installed.

The transition was done over the course of the end of the 2013–14 season, when we broadcast about a half a dozen home games on the BRIC-Links. In the following season, we used BRIC-Links exclusively for both home and away games. The BRIC-Links are installed at the Magic's network studios as well as at the Amway Center in downtown Orlando. The Magic have 11 BRIC-Links they use for their day-to-day and game operations. They also use a BRIC-Link to send their network audio to their distributor, SkyView. All NBA arenas are equipped with BRIC-Links that the teams use when playing there.

The BRIC-Links are easy to set up and install. In most cases, we used static IP addresses. We also have all of the Magic BRIC-Links on the Comrex TS Server. The TS server enables us to see all of the other NBA Bric-Links



so the producer of the radio broadcast can connect to the other arenas around the country when the team is on the road using the built in BRIC-Link web browser. Using the TS server eliminates the need to poke holes through routers and deal with port forwarding to make a connection.

When using ISDN, you connect to the other end by dialing up the phone number of the remote unit. The BRIC-Links are just as easy, but instead of a phone number, you connect via an IP address or use the TS server to connect. You do need to make sure you have a good Internet connection if you want a high-quality broadcast. The BRIC-Link does offer a number of algorithms depending on your connection speed, but make sure you have the best con-

nection available. Hard-wired is always my preference and we usually will do a walk-through and test prior to the event.

For my iHeartMedia stations, we still use ISDN codecs because there are locations that have established ISDN service, but for new locations we now always go with an IP solution. Everybody has Internet, right? So we have found that pretty much anywhere we want to go, as long as we have Internet, we can get on

the air. We've saved tons of money with not having to install ISDN lines. These days, for an ISDN line, just for a one-shot deal it can cost you up to a thousand dollars — plus, they need to be ordered up to 90 days out. With BRIC-Links, if we've got an Internet connection, we can get on the air.

For example, one of my stations did a promotion with an airline a few years ago that started direct flights from Orlando to Amsterdam. We flew to Amsterdam, not really knowing what connectivity options were going to be available to us. As soon as we arrived, we walked around the streets looking for a location and stopped when our morning show host said "I want to do the show from here." I looked for Wi-Fi hook-ups, and found a local hotspot. We did a test, and had a pretty good connection, so we did

Using the TS server eliminates the need to poke holes through routers and deal with port forwarding to make a connection.

one of our two days from the streets in Amsterdam. A nearby restaurant allowed us to set up outside and use their tables. We did about six hours of broadcasting from there. I've used Comrex IP codecs also from Mexico, Rio and most recently London with great success.

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

TECHUPDATE

AETA RINGS UP SCOOPHONE 4G

AETA Audio Systems is expanding its ScoopFone family with a 4G version of the range of professional mobile phones for broadcasters. In addition to HD Voice calls at 7 kHz audio bandwidth, the ScoopFone 4G allows VoIP calls. The user can transmit through HD Voice, 3G, 4G/LTE as well as wired IP connections within a single box. Coding algorithms available for IP are Opus, G.722 and G.711.

With HD Voice, the ScoopFone 4G uses a dial-up connection over the 3G mobile network providing Quality of Service. HD Voice delivers higher-quality voice transmissions by extending the frequency of range of traditional or narrowband voice calls (300 Hz to 3.4 kHz) to wideband audio ranges (50 Hz to 7 kHz) to allow a fuller signature character of the speaker's voice. Unlike mobile data links, HD Voice delivers a priority connection with secure quality once the call is established, with lower cost and lower latency, the company says.

In IP the encoding mode is automatically selected depending upon the device being called, with a priority for Opus. A network quality meter guides the user for adjusting the bitrate if needed. The interface is intuitive, making ScoopFone 4G simple to use with optimal transmission performance. To simplify IP connections, a SIP account is available and active.

Like the ScoopFone HD, the ScoopFone 4G works with any microphone and offers mixing between one microphone/line and a second line input, together with a clear interface which journalists can operate with confidence under pressure. The unit is powered by rechargeable NiMH battery with an integrated charger or standard AA batteries.

For information please contact AETA Audio Systems in New York at (646) 458-1423 France or visit www.aeta-audio.com.



Still Zephyr After All These Years

Telos' latest Z/IP ONE is a chip off the old block for Westwood One

USERREPORT

BY LARRY COSTIGAN
Westwood One Sports

NEW YORK — As coordinating producer for Westwood One Sports, I handle the logistics of getting equipment to our various broadcast crews around the country. During a typical NFL football season, from September through the Super Bowl, we do five NFL games plus a Saturday college broadcast every week. So on any given



Larry Costigan

ing that a lot of locations are moving away from ISDN, as are we, particularly on some of the college football and college basketball broadcasts we do. It's only natural, then, that Westwood One Sports has increasingly been transitioning to IP technology. Thankfully, Telos has come out with their latest Zephyr product, the Z/IP One IP codec for remote broadcasting.

The "Z" in Z/IP One actually stands for "Zephyr," and uses improved versions of the same codecs in the original Zephyr, but offers more potential bandwidth. We know these new Z/IP One units will offer even



week during the fall, we have broadcast crews moving around to six stadiums and cities across the United States. I decide which equipment is best for the application; hire the various broadcasters, engineers, statisticians and announcers; and assign them to each city.

In my 16 years with the company, we have used various Telos Zephyr products for play-by-play origination and other pickups of live events. Right now, our main path of transmission is an ISDN line. For these broadcasts, we rely quite heavily on Telos Zephyr Xstream ISDN codec units. They are durable and can stand up to a bit of a beating as they get shipped around the country. I believe we have been using our original three Zephyr Xstream units for more than 10 years.

Eventually, however, broadcasters are going to have to face the sun setting on ISDN. We are discover-

better audio performance. In fact, while Westwood One Sports relied on Zephyr Xstreams in both directions for the last Olympics in Sochi, Russia, we used Z/IP One units as backup. For the upcoming Summer Olympic Games in Rio de Janeiro, we plan to take the plunge with the Z/IP Ones for the primary feed. We also like the idea of saving on costs with the new Z/IP One units. Because ISDN lines can easily run \$100 to \$200 a month, and accrue per minute usage fees, IP is less expensive.

Ultimately my job, and that of Howard Deneroff, executive producer for Westwood One Sports, is to make sure that our broadcasts sound as good as possible. Howard is particular about this, and believes that we sound much better when we're doing a broadcast on a Zephyr. "It doesn't matter who my announcers are —

whether they have voices like Mickey Mouse or Darth Vader — they always sound better," he says.

We have done all of our network broadcasts this way for all these years simply for that reason. As we say our goodbyes to ISDN, we look forward to embracing broadcast over IP. If the performance of the Telos

Because ISDN lines can easily run \$100 to \$200 a month, and accrue per minute usage fees, IP is less expensive.

Zephyr Xstream is any indication, we have as much to get excited about — and more — with the Telos Z/IP One.

We can't wait to see what the future sounds like.

For information, contact Cam Eicher at the Telos Alliance in Ohio at (216) 241-7225 or visit www.telosalliance.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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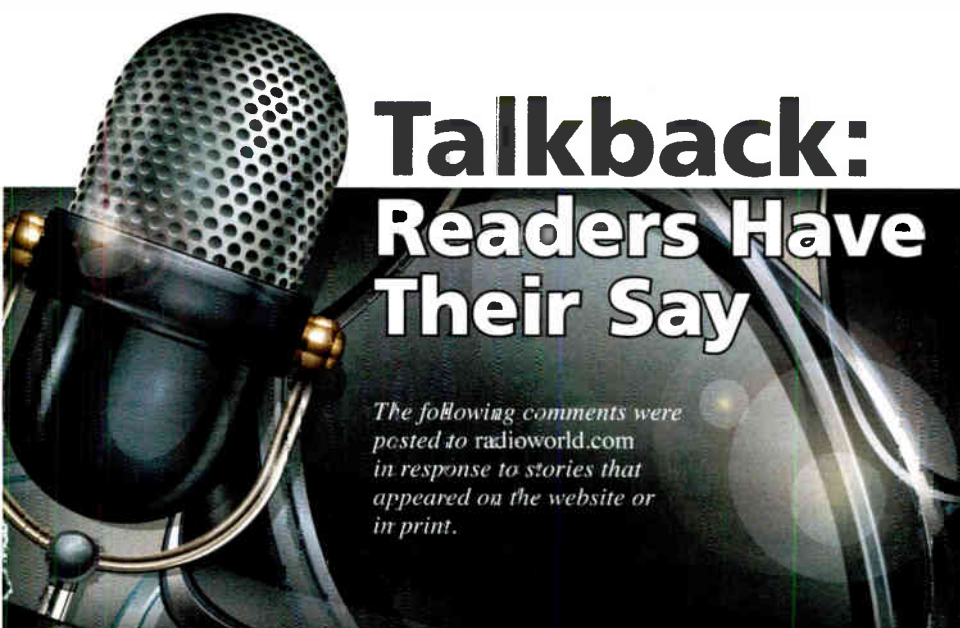
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Talkback: Readers Have Their Say

The following comments were posted to radioworld.com in response to stories that appeared on the website or in print.

istockphoto/creator76

AM REVITALIZATION

"Class C Owner Worries About AM's 'Local Channels'" (Radio World online, Feb. 1)

I've been wondering why there haven't been more discussions of AM power increases; I would think that would be the first and most obvious route for AM improvement.

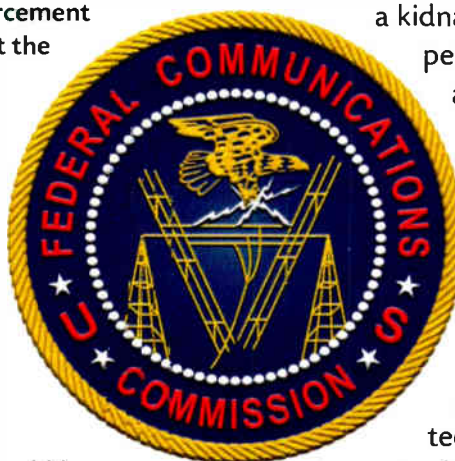
We all know that power line noise from inadequately filtered devices has severely reduced the signal-to-noise ratio of AM signals (which, of course, raises the question of why FCC regulations or enforcement haven't been tight enough or aggressive enough to prevent the manufacture and sale of such devices).

And I would think daytime power increases would make sense for most AMs and that even most co-channel AMs would benefit with increased local coverage if they would accept each other's interference at the fringes.

Yes, we are waiting for our consulting engineers to free up and rest up from all of the translator activity so that we can look at improving our AMs. If the AM rules get rolled back to what we refer to as the "old rules" then maybe we'll have an opportunity to improve on our current situation. We're all about doing a better job with our existing AM. Better signals will equal less audience erosion.

I cannot understand the upside down thinking in DC. First they say they want to "revitalize" AM radio. Great ... So their solution is FM. That doesn't define "revitalization" ... To my way of thinking, revitalizing AM radio is revitalizing the AM band, not just adding an FM translator. If they were serious about it, whomever's back pocket is being greased by HD and that gang, they'd knock off AM HD first! Just by doing that, it would dramatically clean up the band, and inexpensive IF components in AM receivers would restore full bandwidth to the AM band.

The very essence of what the FCC, NAB and other actors played in the initial destruction of the AM band, by denigrating its quality to force the market to FM, they know what the solutions are. They simply refuse to truly revitalize the AM band.



HD RADIO

"How to Save HD Radio, If Someone Wants to Try" (Nov. 21, 2014)

Another issue that I have experienced personally is the poor quality of the receivers themselves. I have had three units that went bad, two Sonys stopped receiving and another had issues with volume adjustment not working properly. All of these required large transformers on the power supply plug. I also have a small armband portable that occasionally will power itself back on, and when you go to use it, the battery is dead.



EMERGENCY ALERTS

"FCC Turns Attention to EAS" (Radio World online, Jan. 28)

It's a nice thought for LPFMs to run EASs. But we cannot get funding for the expensive equipment. We cannot advertise to raise funds. So, FCC, how about sponsoring a program with flexible funding and payback rates?

EAS is a mess. My LPFM has a choice, either run unintelligible computer messages about thunderstorms 120 miles away, or turn it off. The CHP last fall activated an Amber Alert for a kidnapping 300 miles distant an hour after it happened; by the time the EAS had concluded I had already found on the Internet that the poor child had been found after a half hour earlier anyway.

In California, the EAS boundaries follow county lines. Stupid. LA County has five weather zones between our transmitter and the distant desert, and our weather alerts are never uniform across the county. The big radio companies that control the local EAS committee could care less about splitting the county into quadrants.

In the '70s, KPPC DJs sang the EBS test. That would be more relevant to my audience than we we air now.

STREAMING

"RIP, Live365" (Radio World online, Feb. 1)

Sadly the small broadcaster just lost his/her freedom of speech. It was a great ride Live365. Thank you for giving so many a chance to be heard.



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OPINION

Rethink Our Proven Senior Band

Revitalizing the existing AM spectrum should be the primary issue

COMMENTARY

BY MICHAEL AFFLERBACH AND LEE AFFLERBACH

We strongly support Cris Alexander's comments in Radio World ("Our 'Last Best Chance' to Revitalize AM," Jan. 8 issue), especially his clear message that this is the last real opportunity to enhance the current AM radio service.

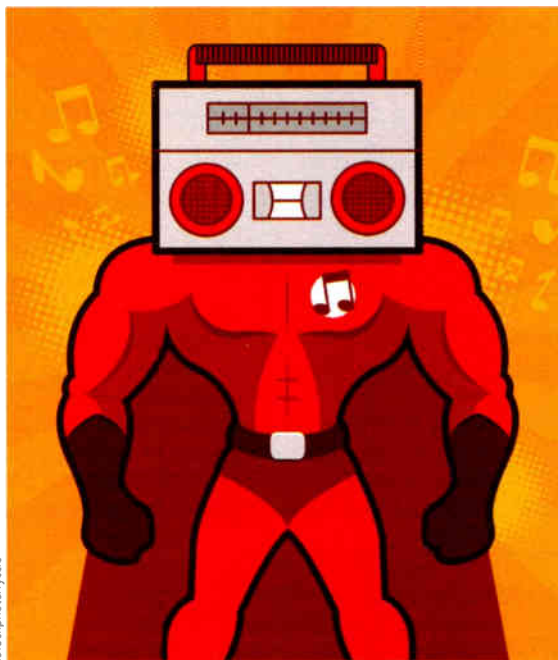
Unfortunately, we note that most commentary from the industry (and most of the comments that have been filed with the commission) to date are largely focused on FM translators and not on the primary issue of revitalizing the existing AM band.

FM translators are at best a stopgap measure for AM operators. This is not a time for moving the deck chairs on the Titanic, but instead it is necessary to rethink and revitalize our proven senior radio band. We are not dealing with the short term (decade or less technical fads, such as video rental stores or 8-track tapes). Instead, we represent an industry that has a tradition of 100 years of service to the country, and more specifically, the local communities that we serve.

We strongly support the proposal to raise the overall level of signal intensity for AM service to a minimum of 2 mV/m. However, like so many things in radio engineering, the devil is in the details.

With regard to the proposal, note that of approximately 5,000 AM radio stations in this country, approximately one-fifth or 988 stations, operate on the six Class C channels (1230, 1240, 1340, 1400, 1450 and 1490 kHz).

Further, under current regulations, the Class C stations are limited to a maximum daytime power of 1 kW — as outlined in the newly proposed R&O, the power limit would remain 1 kW day and night. Were a proposed 2 mV/m contour signal level to be adopted,



Class C stations would fall even farther into the abyss of the interference and make them less relevant in their market.

In order for Class C stations to stay on parity with Class B and D facilities during daytime power levels, these Class C stations will need to have the option to increase power to 4 kW — since they are now normally only protected to the 1 mV/m at current daytime power levels.

This proposal (to upgrade Class C licenses to a minimum service level of 2 mV/m) would not necessarily enlarge coverage area, but level the playing field with other regional AM stations, and more importantly, attempt to address all the undeniable interference from

power lines, Part 15 devices, fluorescent lights and every other imaginable radiator!

Furthermore, all licensed stations should be provided with the option in a near-term special filing window to relocate within the AM band to any optimum channel based on channel availability under the proposed Section 73.37 separation criteria. The adoption of these new standards is the perfect opportunity for any station owner to reallocate within the AM band. This will provide local market stations with an opportunity to better utilize existing spectrum made available by either the reduced protection requirements and/or through relocation to channels previously vacated by deleted facilities.

It ought to be noted that there currently exists a similar provision for low-powered FM facilities which allows LPFM stations to change to any available FM channel as a minor change if their operation incurs interference. We see no reason that licensed commercial broadcasters should be treated with less consideration than noncommercial broadcasters.

In closing, we believe that there *are* clearly some opportunities to breathe new life into the AM band. In order to take advantage of these proposed rules, broadcasters will need to have the flexibility and technical tools to capitalize on these opportunities. This is our reaction after having read and carefully considered the full ramifications of the commission's current R&O. Admittedly, we speak as owners of multiple Class C stations owners — yet since Class C stations represent almost 20 percent of all AM licenses, it is hard to imagine a comprehensive AM revitalization without any real consideration of Class C stations (beyond simulcasting via FM translators).

Michael Afflerbach is a partner in CTC Media Group and is located in New Bern, N.C. He is responsible for the day-to-day management and operations of AM stations WNOS 1450 AM (with translator W298BX), WWNB 1490 AM (with translator W280ED) in New Bern, N.C. and WECU 1570 AM in Winterville, N.C. Along with his father, Lee Afflerbach, Michael also works with clients on broadcast and wireless consulting projects.

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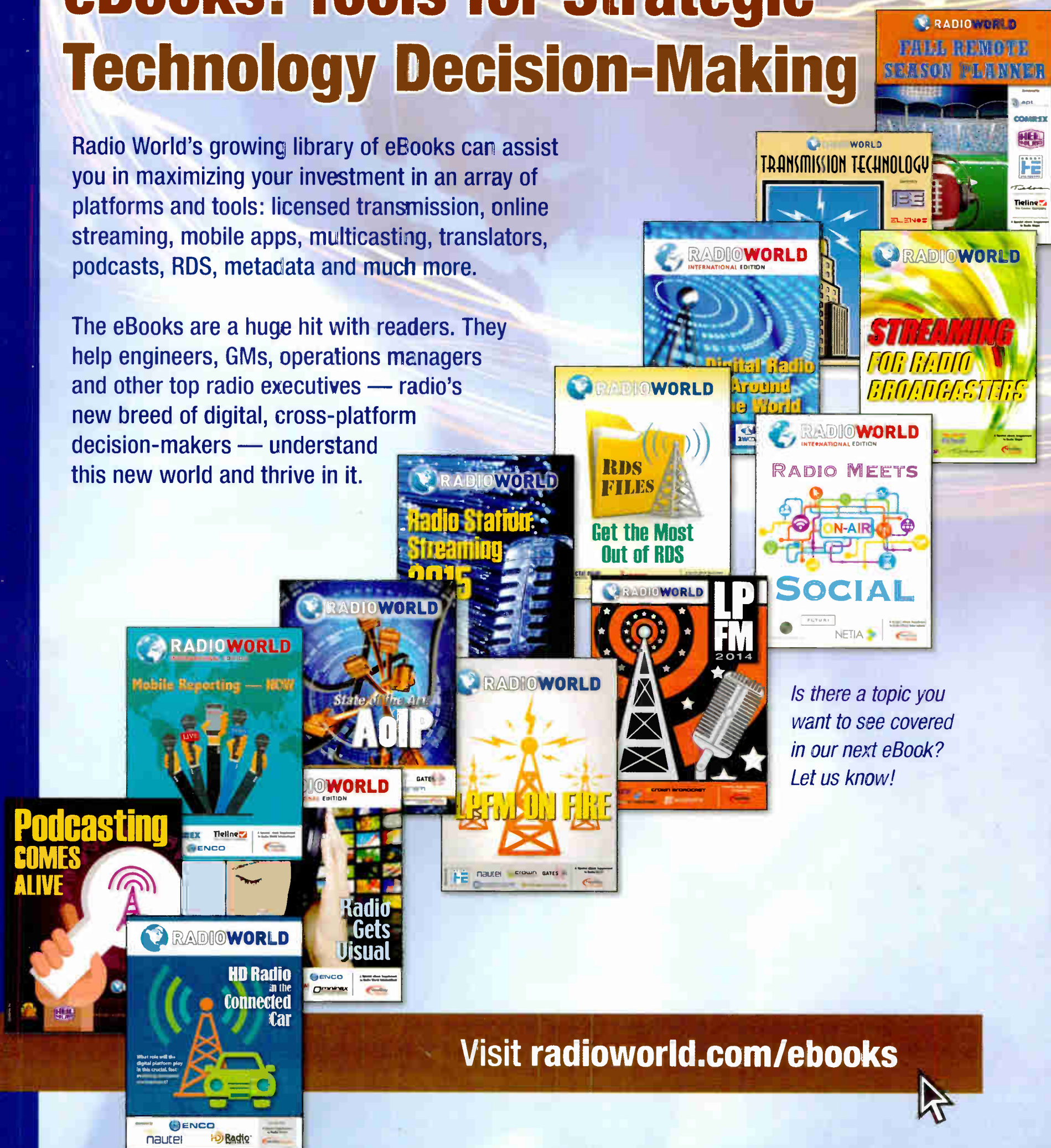
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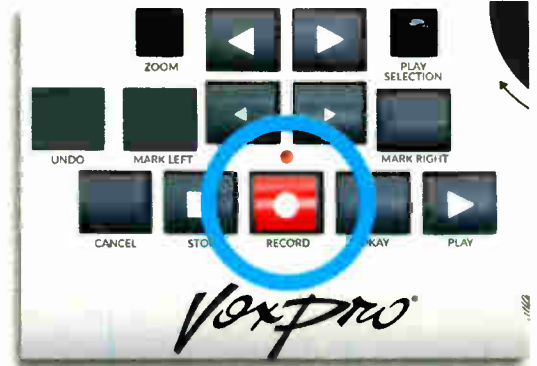
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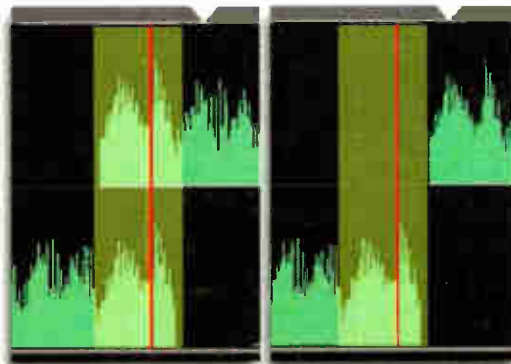
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