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NextRadio Outcome Leaves a Void

Effort to promote hybrid radio app and build FM chip awareness produces disappointing outcome

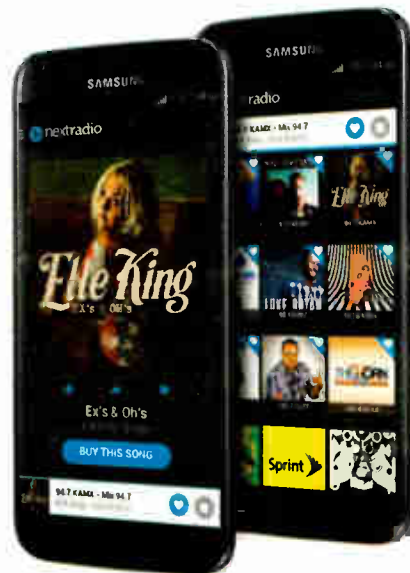
BY RANDY J. STINE

The founders of NextRadio thought they had the next big thing with FM radio on smartphones.

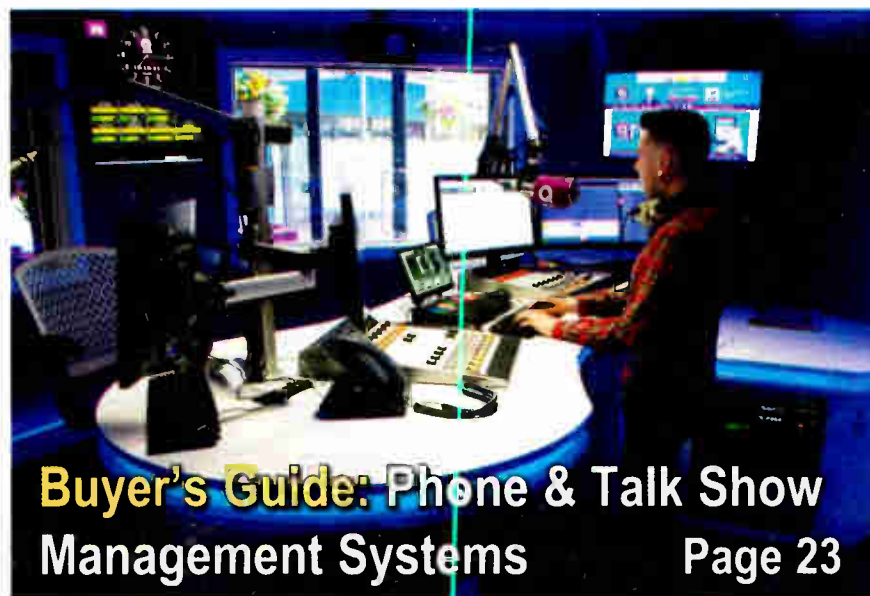
They secured financial backing for their launch effort from a consortium of radio broadcast groups. They paid millions of dollars to Sprint and other cellular carriers to activate FM chips in Android handsets they sold. With the NAB's help they launched massive public education campaigns. Even FCC Chairman Ajit Pai was in their corner, touting the importance of activating FM reception capability in the interest of public safety.

The point was to regain more FM portability by allowing listeners to tune to local radio stations on their smartphones via a built-in receiver chip,

(continued on page 10)



An earlier promotional image for NextRadio.



Buyer's Guide: Phone & Talk Show Management Systems Page 23

e-Radio Looks for Its Big Break

After years of laying the groundwork, the company thinks commercialization is not far off

DATACASTING

BY JAMES CARELESS

Up to \$55 billion annually. That's the estimate of value that could be created if U.S. FM stations were to add electrical appliance control messages to their data feeds. Revenue would come from utility companies remotely managing consumer power

consumption via radio and be divided among various stakeholders, including the radio owners involved.

Such connectivity would allow a utility to reduce power consumption during peak periods, or instruct heaters and air conditioners to boost their usage during off-peak periods to "bank" this energy against the next high demand period.

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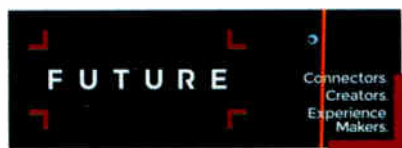
FUTURE US, INC.

11 West 42nd Street, 15th Floor, New York, NY 10036



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Benefit From RDS Guideline Update

Data maven Alan Jurison tells you what you need to know about NRSC-G300-C

RADIODATA

BY ALAN JURISON

The National Radio Systems Committee in 2018 adopted NRSC-G300-C, the fourth revision of the Radio Data System Usage Guideline. Find it at www.nrsstandards.org under Standards and Guidelines.

This latest release from the NRSC offers a variety of updates relevant to the radio broadcast industry. This article is a summary of the changes in the release. If you have an interest in any of the areas below, I recommend you download and review the NRSC-G300-C revision to read all of the details.

PI CODES FOR TRANSLATORS

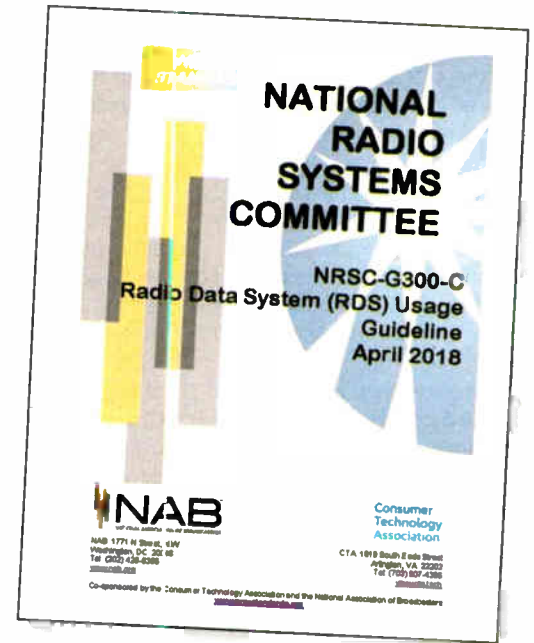
Section 5.1.1 offers new guidance on how to locate a unique PI code for translators re-broadcasting HD multicast or AM stations using the NRSC's <http://picodes.nrsstandards.org> website. The guideline discusses when this is appropriate and walks the reader through how to obtain the PI code from the site.

RDS ENCODER MANUFACTURER GUIDANCE

Section 5.1.2 recommends specific actions for encoder manufacturers to consider when they develop new products, software/firmware updates or documentation updates for their encoders.

These were crafted to avoid a common problem that has been encountered where multiple stations in the same geographic area implement RDS but do not enter a unique PI code, and therefore create inadvertent AF switching in some receivers to stations with dissimilar programming.

The NRSC strongly encourages manufacturers of RDS encoders worldwide to consider the new recommendations in the guideline to educate users of their product about the importance of entering a unique



PI code, creating alarm conditions and defeating the 57 kHz SCA output if the factory default PI code is active in configuration.

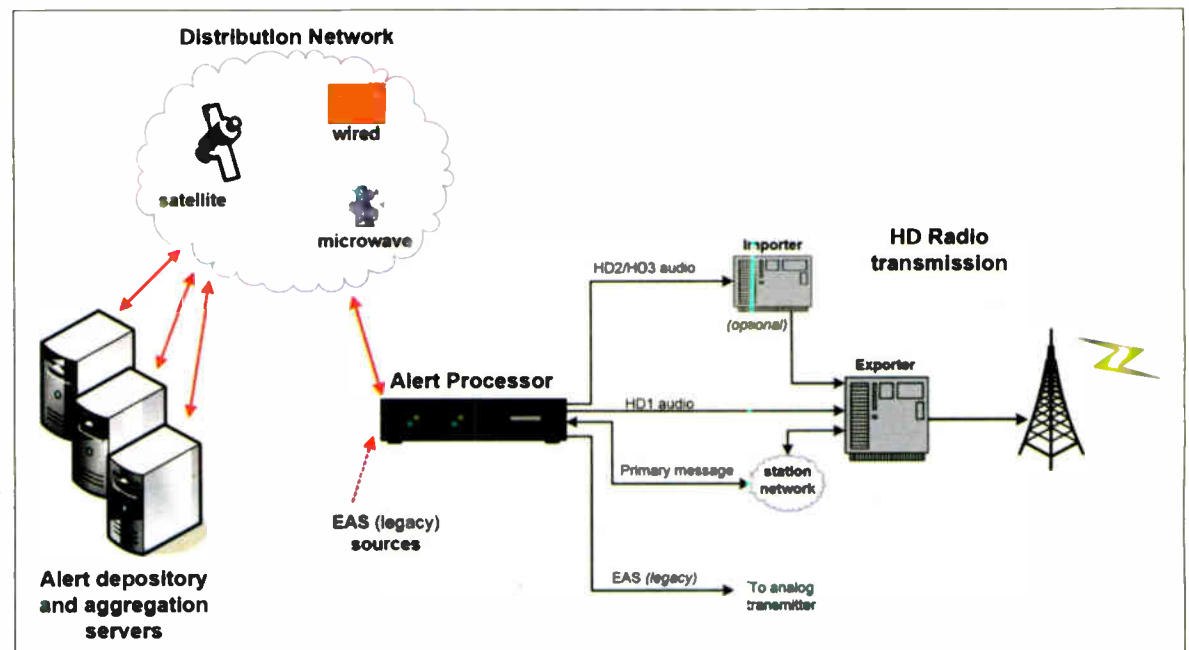
RECEIVER MANUFACTURER GUIDANCE

Section 6.9 offers specific guidance for receiver manufacturers from the NRSC on how to best use the metadata radio broadcasters publish. Using the NRSC's suggested guidelines will give the receiver the best possible user experience given the level of metadata offered by the radio station.

Suggested logic, from highest priority to lowest:

1. Internet enhanced metadata
2. HD Radio PSD metadata such as Current Program SIG Service Name/Station Name Universal/Station Name Short, Title, Artist, Album, Album Art/Artist Experience, Station Logo

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E-RADIO

(continued from page 1)

The projection is a breathtaking one, given that the current revenue of the U.S. commercial radio industry is generally estimated to be anywhere from \$13 billion to \$21 billion. But it is the contention of Jackson Wang, founder and CEO of e-Radio Inc., that stations could have a big piece of that pie.

Radio World has reported about this “smart grid” company several times in the past decade and recently checked back in.

The Toronto-based firm is owner of a patented communications solution and operates wireless communications networks. Its FM receiver modules can be integrated into a variety of smart grid devices for residential, commercial and small industrial applications — water heaters, HVAC equipment and so on — using FM broadcasting as its communications platform.

A growing number of such appliances are capable of being remotely addressed now, thanks to their built-in “internet of things” data reception architecture; however, the e-Radio platform does not rely on the internet, but on those

FM signals.

The company operates in the United States and Canada; it is also a member of the global RDS Forum and hopes to build a footprint in other markets. It has about a dozen full- and part-time employees and is privately held; Jackson Wang is majority owner.

The firm’s energy management approach — which Wang said has been proven feasible in field tests with radio stations and power utilities — is to send the appliance device instructions via one-way FM RDS signals as required. According to the company, its Utility Message Channel via RDS on FM can reach over 300 million people and their devices in about two seconds. This allows utilities to reduce or boost electricity usage on a near-immediate basis.

“FM RDS provides a reliable, economical and easy-to-provision one-way path to these IoT appliances,” said Wang.

“Appliances equipped with our small P2D 2045 FM receivers work immediately once activated, and generally do not require maintenance over time. In contrast, IoT-enabled appliances that rely on the internet have inherent privacy



An e-Radio module in action atop a water heater



issues, are more vulnerable and failure-prone and could be disconnected any time the homeowner replaces their router.”

The company is now conducting field testing with HD Radio as well.

DRIVING DATA REVENUE?

What Wang has been telling broadcasters for some time is that all this represents an unrealized revenue opportunity for FM broadcasters.

For many stations, the data infrastructure that transmits station

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Radio World (ISSN: 0274-8541) is published bi-weekly with additional issues in February, April, June, August, October and December by Future US, Inc., 11 West 42nd Street, 15th Floor, New York, NY 10036-8002. Phone: (703) 852-4600, Fax: (703) 852-4583. Periodicals postage rates are paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 282, Lowell, MA 01853.

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info such as identification and artist/song names has not produced revenue, whether we're talking about analog RDS or digital HD Radio.

Glynn Walden knows a lot about e-Radio. In his former role as CBS Radio senior VP of engineering and now as a consultant to its successor Entercom, Walden has worked with e-Radio to coordinate demo projects. He and Wang co-chair the National Radio Systems Committee's DRB Subcommittee, and Walden hopes to be an "active participant" in a rollout of the system on HD Radio.

He said that the problem dogging FM data is its one-way, one-to-many data transmission model.

We have proven that e-Radio works, and that it serves the public in a new way, saving utilities money while generating revenues for ourselves and radio broadcasters.

— Jackson Wang

"Every time we came up with a one-way data application that worked over HD Radio, someone came up with a solution that was deployable over a two-way channel like the internet," he said. "It made it pretty hard to monetize HD data and earn revenue from this data channel as a result. With IoT, there could be billions of devices only in need of one-way data."

Walden is convinced that Wang has found a way to make RDS earn money for radio broadcasters.

RDS

(continued from page 3)

3. RDS RT+/RadioText parsed metadata
4. RDS RadioText metadata
5. RDS PS metadata
6. No metadata — just frequency/dial position stated in MHz; i.e., 88.1 MHz, 98.5 MHz, 107.9 MHz

EMERGENCY ALERTING

Emergency alerting via broadcast radio continues to be an important topic for the industry. A new section 8.3 discusses the HD Radio Emergency Alerting platform in detail. This is very helpful to broadcasters to

NEWS

"Many IoT devices do not need two-way data communications to be successfully remotely-controlled," he said. "In many instances, FM data is the most efficient, economical and reliable way to send information to these devices. The proof that the messages were received and acted upon will be evident to the utilities when their power consumption falls or rises a few seconds later."

PROFIT POTENTIAL

Making money from RDS/HD by adding appliance control messages to their feeds is obviously attractive to broadcasters. What problems might it cause for stations who add these messages to their RDS feeds?

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Do I have a role in this?

• You could... one day. The visionary scientist, engineers and companies like KINK

Broadcaster Alpha Media explained the concept on its website. "If you think FM radio and water heaters sounds like a funny pairing, you're not alone, but let us tell you more about this innovative technology and how you can help."

that for them."

Under the program, e-Radio provided both stations with UMC data feeds to insert into their RDS streams. Providing this service "was very low impact in terms of our operations," said Everhart. "We were able to provide them with secured access into our broadcast IT network to use certain data blocks on the RDS encoders, and it was just very, very easy to do. It took minimal involvement by our IT people to enable this."

As for the profit potential for radio broadcasters? "e-Radio paid us a reasonable sum for carrying their service within our RDS data," replied Everhart. "If that was extrapolated across the country, it could be a significant revenue boost for our industry."

Despite a decade of working to grow e-Radio and lobbying for awareness among broadcasters and utilities, Wang believes there is dramatic potential upside. "Utilities are an extremely conservative industry — read: glacial pace

(continued on page 6)

become familiar with this method of transmitting alerts to devices.

In addition, in Annex 1 RDS Use Cases, two new applications are discussed, including recent work from Global Security Systems' Earthquake Early Warning system, and Wisconsin Public Radio's implementation of Emergency Alert System text as an input to their Metadata Management System for displaying text-based EAS alerts via RDS and HD PSD.

Alan Jurison is a senior operations engineer for iHeartMedia's Engineering and Systems Integration Group. He chairs the NRSC Metadata Usage Working Group. His opinions are not necessarily those of iHeartMedia, the NRSC or Radio World.

Got a question about best practices for RDS? Email them to us at radioworld@futurenet.com and we'll ask Alan.

10 of the **TOP 10** U.S. radio stations are Nautel customers.

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E-RADIO

(continued from page 5)

of change,” he said. “However, just like glaciers, once momentum is finally gained, it can be unstoppable.”

He points to a recently published BPA report as a key development: he feels it provides detailed technical and financial proof that the concept is sound and will put e-Radio onto the path of commercialization.

According to the announcement, this study — which involved e-Radio and eight utilities, such as Bonneville Power

Authority and Portland General Electric — “demonstrates that smart water heaters can eliminate a major barrier to alternative energy growth while reducing the need for the majority of inefficient (mostly dormant) peaker plants at a cost a fraction of electrical storage devices ... The multi-year study further showed that e-Radio’s patented technology can help U.S. (West Coast) utilities satisfy their customers’ overwhelming support for renewable energy as a source they expect utilities to provide.”

How would the business work? In its current model, e-Radio would act

as a “one-stop shop” for the utilities. “However, for full-scale commercial deployments, we are looking at other possible structures that are commensurate with additional contributions and investments from partners,” Wang said.

Over two decades, the company has done test installations in approximately 30 markets. “All of them can be switched to be full-time Utility Message Channel stations on short notice as we commercialize.” He said e-Radio has agreements with major private and public networks, some listed under the News tab on its website.

“The networks we’ve done agreements with over the years can cover the majority of the population in the North American continent. As many of them are part of a network of stations, more can be added quickly via our relations with their corporate management teams.”

On the station end, the equipment needs would vary based on a broadcaster’s existing equipment. “We have over the years accumulated many more tools to adapt each to be a live UMC station,” Wang said. “It can range from no hardware at all, just network access security settings, to full encoder/servers etc.”

And how much might a given station earn? Wang didn’t give specific numbers to Radio World. “The lower part of the range is in line with existing market rates for the bandwidth required. However, some broadcasters are considering more of a partnership arrangement, which can be significantly more interesting than just being a bandwidth provider.”

WHAT NEXT?

The company believes it has proven the viability of its FM RDS model in numerous field tests. It won a 2015 CES Innovations Awards for its P2D 2045

(continued on page 8)

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A TECH CAREER

Jackson Wang, founder and CEO of e-Radio, was an aerospace engineering officer in the Canadian military; he then worked as a systems engineer with Litton Guidance and Control Systems on the U.S. Tomahawk Cruise Missile program and at the Ontario Ministry of Transport as a senior project manager specializing in public/private partnerships.



He co-chairs the U.S. National Radio Systems Committee’s Digital Radio Broadcasting subcommittee. According to his bio, he also leads the Broadcast subcommittee of the Home to Grid (H2G) Domain Expert Working Group of the U.S. Smart Grid Interoperability Panel. He was a founding committee chairman of Advanced Traveler Information Systems of the Society of Automotive Engineers and past chair of International Organization for Standardization (ISO) TC/204 WG10.1 subcommittee on advanced traveler services integration. He’s the principle author of numerous U.S. and international patents in the field of broadcast-based datacasting.

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How Smart Will AI Get?

Welcome to the era of contextual awareness

TECHNOLOGY

BY GREG SCOBLETE

While artificial intelligence has been kicked around academic computer science departments for decades, it's enjoying an unprecedented public moment as the fruits of machine learning and neural networks become an inescapable part of our daily lives.

At CES 2019, products that leverage some form of artificial intelligence were expected to be ubiquitous.

And, according to analysts tracking the development of artificial intelligence, we'd better get used to it.

IN THE RECIPE

To understand how AI will evolve, it helps to think of it less as a thing by itself and more as an "ingredient technology," said Sayon Deb, senior research analyst at the Consumer Technology Association. Like salt, it will be sprinkled liberally into a wide range of products, software and services but not in the same way or to the same degree. Asking how big the demand for AI will be in consumer and business markets is a bit like asking about the demand for USB ports, Deb noted. "It's so large because it's everywhere."

In the near-term, look for AI-powered improvements to arrive in any device that uses sensors to interact with the real world, in particular, via voice-based interfaces, predicted Bob O'Donnell, president and chief analyst at TECHanalysis Research. Advances in natural language processing will enable devices such as smart speakers to better understand and respond to verbal commands. It will also deliver voice interaction to new product categories. The spread of Amazon's Alexa is a good example of the trend, Deb said.

Any device with a camera will be the beneficiary of advances in machine vision and neural network-powered object classification, enabling cameras to differentiate objects in a scene, recognize human faces and more. Home security cameras, for instance, can learn to distinguish home owners from visitors and analyze exterior behavior for signs of trouble, O'Donnell said. While sophisticated facial-recognition technologies do raise privacy concerns, some of the early use-cases (like unlocking your phone) have proven very popular among consumers, Deb added.

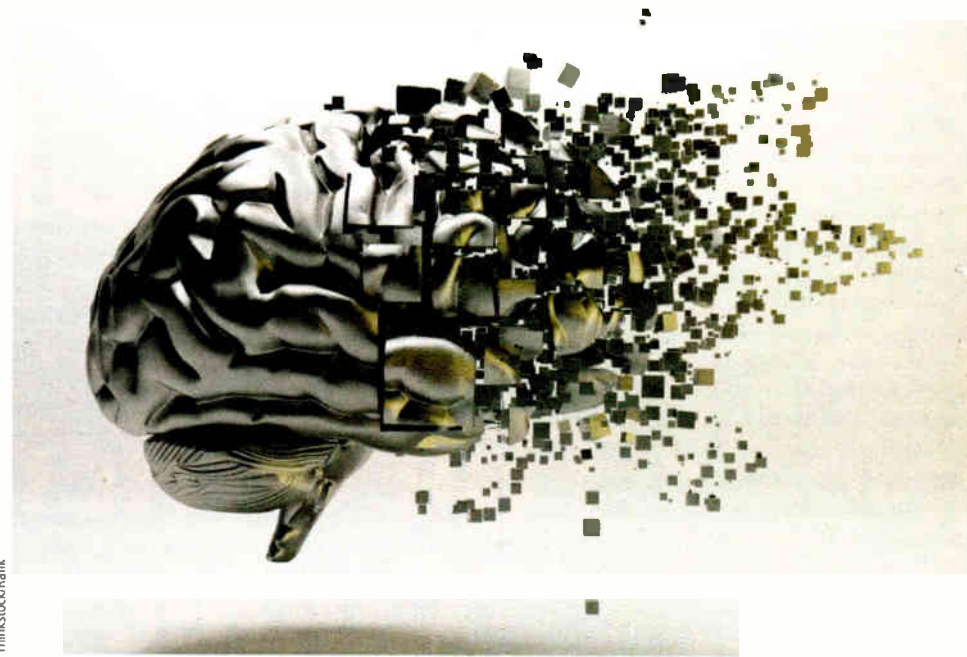
One of the big shifts that's underway concerns how AI devices acquire knowledge.

Improvement in edge-device intelligence will mean a more personalized experience — devices that are smart enough to learn your unique patterns and even attempt to anticipate them, O'Donnell said.

Today, much of the machine learning that powers AI capabilities is performed in the cloud, where developers can harness massive amounts of computing power and ingest huge data sets that no local desktop or tiny electronic device has the memory or processing power to cope with. The results of this learning get loaded onto so-called edge devices (your security camera, your smart speaker) which then interact with the world, but no longer acquire any new knowledge about it.

IT'S IN THE CONTEXT

But edge devices will increasingly be



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able to perform their own local learning, O'Donnell said. Chips from NVIDIA, AMD, Qualcomm and others are increasingly capable of running AI algorithms and conducting some sparse local learning without a server farm. This improvement in edge-device intelligence will mean a more personalized experience — devices that are smart enough to learn your unique patterns and even attempt to anticipate them, O'Donnell said. You could, for instance, have user interfaces on devices that refine themselves on the basis of real-time feedback from the user. This so-called "contextual awareness" will be extremely important for autonomous vehicles and personalized robotics as well, O'Donnell said. Both need an immense of data to navigate on their own, but the real world constantly throws new data at them. Vehicles and/or robots that can perform localized learning but then upload those results to the cloud will help in the collective effort to make robotic devices more intelligence.

This two-way communication does raise privacy concerns, particularly when it comes to the kind of granular, location-based data that contextually aware devices can generate, O'Donnell said. Ironically, the better devices get at edge learning, the less they'll need to send personalized data up to the cloud, he added.

While personalized devices grow more responsive, AI will also be leveraged by more businesses to automate and augment the work previously done by humans. According to a recent report from Forrester Research, natural language processing will combine with robot process automation to build more responsive chatbots, organize unstructured business data and automate a variety of business tasks.

This business automation naturally gives rise to concerns that as AI gets smarter, we'll collectively be automated out of a job. One widely cited study from Oxford University's Martin School noted that 47 percent of jobs, including many white-collar professions, are vulnerable to automation. CTA's Deb sees those fears as unfounded, at least for now. What studies like the one from Oxford can't measure is the new jobs that AI may create. Deb said.

"There's bound to be growing pains," Deb said, "but the potential of AI is boundless."

This article originally appeared in the CES 2019 Daily.

E-RADIO

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FM radio module in the Tech For A Better World product category.

Still, the radio industry cannot profit from e-Radio's technology until it is widely deployed by utility companies nationwide; without that deployment, e-Radio will not be leasing RDS capacity on a major scale. No major deployment means no \$55 billion a year to the radio industry. Wang hopes broadcasters can be partners in spreading the word.

"We need radio broadcasters to help us get the news out about our appliance-messaging technology, and to help us begin full commercial deployments with utilities across the

United States, Canada and the rest of the world," he said.

As an example, Wang points to an information web page posted by Alpha Media at www.kink.fm/energy-efficient/, which provides visitors with information about the pilot program and its possible future benefits. Alpha also ran public service announcements on air and on its website.

"We would love to work with broadcasters to do community outreach and to work with them to engage corresponding local utilities as potential customers for our services," Wang added. "Radio and utilities are both local [and] market-focused, and have special opportunities to connect."

"We have proven that e-Radio works, and that it serves the public in a new way, saving utilities money while generating revenues for ourselves and radio broadcasters," he concluded. "All we need now is a widespread commercial deployment, to deliver substantial benefits for everyone."

BIG LEAGUE

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NEXTRADIO

(continued from page 1)

while giving broadcasters the benefits of consumption information, as well as a return data path.

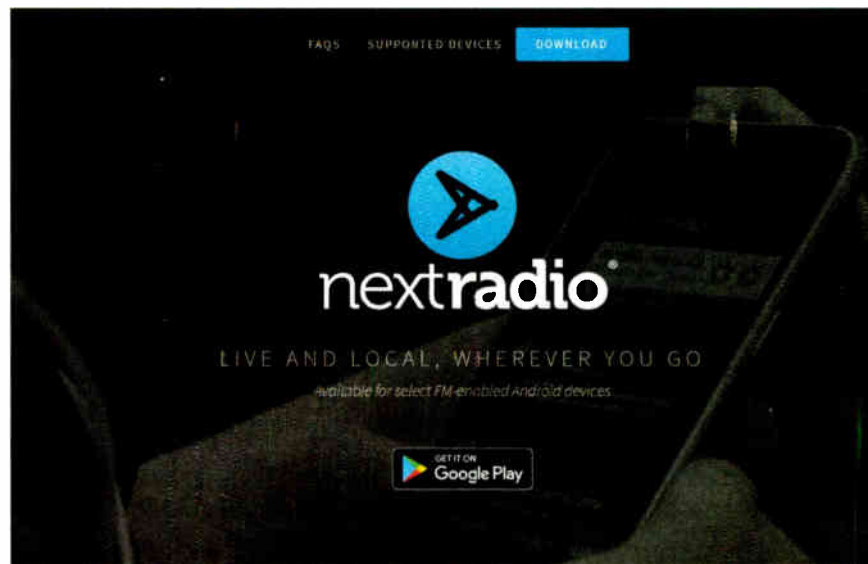
However, in the end it seems NextRadio lost its juice. As the New Year dawned, it had laid off most of its employees and was drawing down operations dramatically.

BIG AMBITIONS

The reasons for its demise are still being discussed around the industry.

Maybe it was the fact that NextRadio developers were unsuccessful at convincing Apple to activate the hybrid radio app on iPhones? Or perhaps it was a lack of interest by the general public who load up their smartphones with more appealing apps and entertainment options? Or the simple fact that money to fund the project simply ran out.

NextRadio, launched in 2013, was developed by TagStation LLC and owned by Emmis. TagStation is a cloud-based software platform that allows stations to manage album art, metadata and enhanced advertising on various devices.



The NextRadio site remained active in early January but informed visitors that the app had been removed from iTunes and that NextRadio would no longer provide support for live radio streams.

At the time, in an effort to kick start NextRadio's foothold in the marketplace, a consortium that included Emmis, iHeartMedia, Beasley, Urban One Inc. (formerly Radio One), Hubbard Radio, Townsquare Media, Bonneville, Entercom Communications and others agreed to pay Sprint \$15 million per year over a three-year period in return for the wireless provider activating the FM tuners in a minimum of 30 million FM-enabled wireless devices.

In all it appears Sprint was paid at least \$39.2 million total for the app activations, according to Emmis government filings. Emmis ended the practice of paying cell carriers to activate the chip in smartphones in 2016, and instead adopted a revenue sharing formula with wireless providers.

The long-term hope was that the radio industry could eventually monetize the NextRadio app, in part through data attribution. They hoped it would provide advertisers with robust analytics and more insights about radio ROI.

The introduction of the Dial Report by TagStation in early 2017 was a milestone in those efforts, but that was about the time funding from the radio industry began drying up, according to Emmis filings to the U.S. Securities and Exchange Commission.

Data attribution was what would make the platform successful, said Emmis CEO Jeff Smulyan, but it needed money and buy-in from the rest of the radio industry to make that happen.

By October 2018, Smulyan, who had toiled both hard and publicly to promote the initiative, made it clear that Emmis was "unwilling and unable" to continue funding the NextRadio and TagStation businesses on its own. Soon after, it terminated 35 employees of NextRadio and TagStation. The Indianapolis Star newspaper pegged the total number

of employees between the businesses' operations in Indianapolis and Chicago at 40 before the job cuts.

Emmis disclosed in its recent financial filings that operating losses from its related NextRadio businesses totaled \$7.6 million over the 12 months ending Aug. 31, 2018.

SCALEBACK

The cuts in personnel and services resulted in a dramatic reduction in scope and scale of business operations. For now TagStation will only support free logo services to NextRadio and certain other distribution points.

"Station-specific content such as album art, on-air related images and other metadata that were previously used for PAD [Program-Associated Data]-related broadcasting will no longer be available through TagStation cloud services," the company wrote in an email to station clients. "We will provide certain product support and maintenance for the foreseeable future."

A TagStation representative told Radio World that "just under 4,000 HD radio stations lost album art and other metadata — news, talk, jock and promotional images — for HD Radio Artist Experience, certain connected cars, websites, NextRadio, third-party apps and Now Playing."

In addition, approximately 15,000 radio stations, including FM/AM/HD and translators in the U.S., are online for simple logo and station metadata services being sent to NextRadio and certain connected cars, the company official said.

An Emmis spokesperson told Radio World that NextRadio President Paul Brenner remains with the company. Brenner, who has been with Emmis since 1998, declined to comment for

(continued on page 12)

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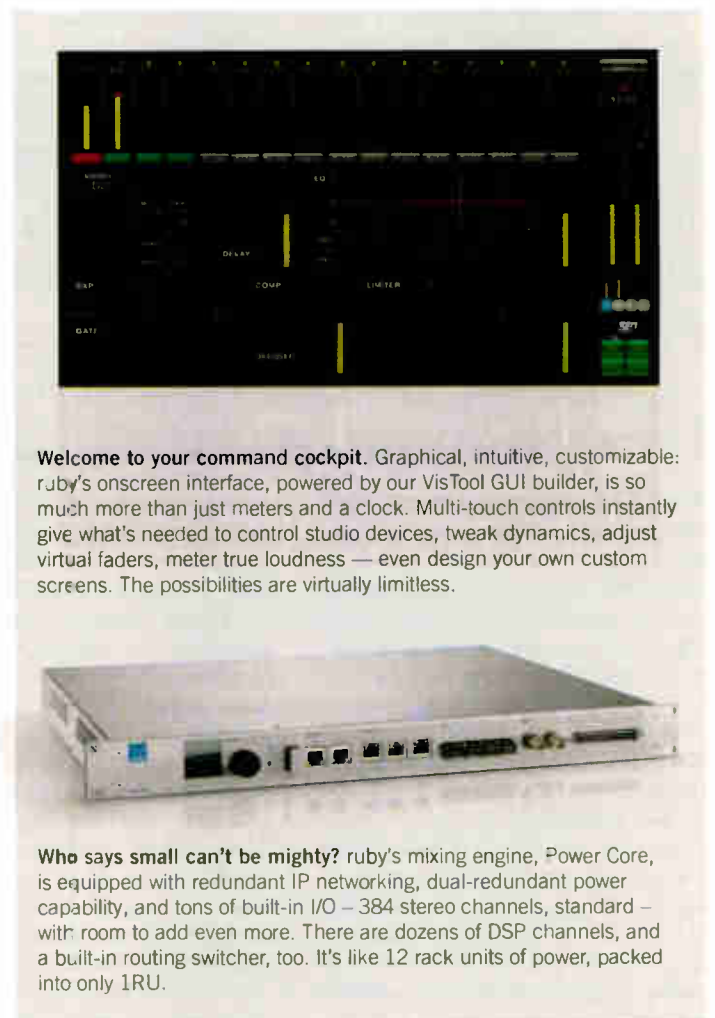
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World Radio History

NEXTRADIO

(continued from page 10)

this article.

Emmis tried to drum up additional investment in NextRadio the past two years by giving other eligible radio broadcasters several “call options” to acquire all or part of NextRadio, according to paperwork filed with the SEC. The next call option that could have been exercised by eligible radio broadcasters is in August 2019. Following recent developments it’s unlikely that will happen, observers said.

Smulyan’s failure to build the consortium large enough to support NextRadio for the long term was its ultimate failure, insiders say. It didn’t help that two of the largest U.S. radio broadcast groups, iHeartMedia and Cumulus, have been through bankruptcy proceedings.

CHIP DISAPPOINTMENT

The industry vibe about the fall of NextRadio appears to be mixed, according to observers. It can be read as a blow for hopes that the wireless industry will adopt local radio reception more directly into future device designs. Others are more hopeful.

“It’s unfortunate to see the momentum made on NextRadio and TagStation halted. We continue to believe in the technology, and are confident there will be other companies that step forward to take up the mantle,” said Dennis Wharton, executive VP for communications at NAB.

In the end, mobile carriers did not see a business case for activating FM chips in those phones so equipped.

— Rick Ducey

NAB had helped fund NextRadio’s initial development. The group’s biggest disappointment was Apple’s refusal to activate FM chips in iPhones, Wharton said, who confirmed NAB did supply a “significant amount of financial support for NextRadio” but declined to give a specific dollar amount.

Bob Pittman, iHeartMedia chairman and CEO, told Radio World in a prepared statement: “Although NextRadio may not have lived up to the high expectations we all had, it was a great success in getting the industry to begin thinking seriously about other devices besides just the traditional AM/FM radio. And for that we can thank Jeff Smulyan, who has always been a media innovator.”



Paul Brenner, shown at a convention in 2017, will remain with Emmis.

Rick Ducey, managing director for BIA Advisory Services, said NextRadio had some big hurdles to overcome, though he was glad to see the radio industry showing it has an appetite for innovation.

“In the end, mobile carriers did not see a business case for activating FM chips in those phones so equipped,” Ducey said. “There was some operational complexity and limited risk-adjusted returns to support a FM chip

margin compression and increasing marketplace competition for listener hours and advertiser dollars,” Ducey said. “When the goal is to get to listeners wherever they are and on whatever device, the ready-made environment supporting streaming audio offers is a lot easier to adopt than building a new infrastructure.”

Mark Ramsey, media strategist and researcher, said NextRadio was “conceived as an industry-centric solution to an industry problem, not a consumer-centric solution to a consumer problem. That is always a recipe for disaster.”

He continued, “All tech innovations are risky and failure is simply the cost of a lesson learned. This shows that quality content is the most important factor in radio’s success. The greatest concern for the radio industry should be that passion for radio is sinking among younger listeners especially. To the degree that radio exits the content business to focus on distribution, economy, scale, consolidation, etc., it will continue to lose its way.”

LOSS OF SERVICE

The technical implications facing radio stations that participated in TagStation is still sorting itself out. A customer notification from TagStation in an email to radio stations in late December signaled the beginning of its plan to reduce the scope and scale of its operations: “From now on TagStation will only support free logo services. Station specific content such as album art, on-air related images and other metadata that were previously used for PAD related broadcasting will no longer be available through TagStation cloud services.”

Broadcasters who used the TagStation service do have replacement options for their album-art and on-air image needs. Jump2Go and Quu Interactive supply similar metadata services, according to several broadcast technical experts contacted for this story.

“Beasley was aware of a possible loss of the service so we already had a solution using Jump2Go and Quu Interactive,” said Mike Cooney, chief technology officer and VP of engineering for Beasley Media Group. “We were only without images for a day or two. Most of the impact of losing [TagStation] was on HD stations and subchannels.”

The TagStation logo service, which will continue for now, will be a good “interim solution” for other smaller broadcasters, Cooney said.

Jeff Littlejohn, executive VP of engineering and systems at iHeartMedia, said the broadcaster only uses TagStation to feed the NextRadio application, so “very little impact is expected” on iHeart stations.

Cumulus Media announced in 2017 that all of its stations, including subsidiary Westwood One, had signed on for the TagStation service. An engineering official with Cumulus said the company was reviewing options to replace TagStation and testing different services in few markets.

“It’s nice to see the logo versus nothing, but we do want to offer ‘full service’ to our HD listeners. Cumulus Media is striving to put the best product out there, whether it’s analog, HD, streaming, apps, etc.,” said Randy Norris, regional director of engineering for Cumulus.

Norris said only the broadcaster’s HD/HD2/HD3 stations were affected by the loss of TagStation.

There doesn’t appear to be much left of NextRadio and TagStation at this point, according to observers. In early January, the NextRadio website remained active but told visitors that the app had been removed from iTunes and that NextRadio would no longer provide support for live radio streams. The businesses detailed cuts in personnel and services in a press release in mid-December: “After exploring several alternatives, we have made the difficult decision to dramatically reduce the scope and scale of our operations, which includes the termination of 35 employees of these businesses. NextRadio and TagStation employees that were separated were given generous severance packages.”

There was no mention of the status of Dial Report in any of TagStation’s press announcements and what would become of the audience measurement tool.

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



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World Radio History

More Thoughts on Split Type “N” Connectors

And here’s a simple site security tip to try

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

Frank Hertel’s “Repair and Protect Type ‘N’ Connectors” tip got a lot of attention. Frank is not the only engineer who has “been there, done that.”

San Francisco contract and projects engineer Bill Ruck was the first to offer further thoughts on the subject.

Bill is not sure if the silicone fuel line is completely benign. While silicone has a reasonable dielectric constant, it is not 1.000. Remember that a “compatible 75-ohm BNC” has the same pin diameter and the same shield diameter as a 50-ohm BNC but is only lacking the plastic around the female socket.

That is just enough difference to make it near 75 ohms. Adding the piece of silicone tubing may not make a major difference at 950 MHz, but at higher frequencies, the addition could be an issue by lowering the impedance of the junction. In other words, it might not be a great idea if the feed is for a C-band antenna.

Bill also cautions that true 75-ohm Type N connectors that can be found on translators. The pin and socket diameters are smaller than the common 50-ohm Type N connectors.

If you put a male 75-ohm plug into a female 50-ohm socket, it likely will not make good contact. And the opposite is worse — if you put a 50-ohm male pin

into a female 75-ohm socket, you will likely destroy the socket by breaking off the fingers. Bill says he learned both lessons the hard way!

Bill also learned a long time ago, from Norm Philips at Susquehanna Radio, to use 7/8-inch EIA connectors on 950 MHz antennas instead of Type N connectors. These are much stronger, much more waterproof, and it has been Bill’s experience that once installed, he never had to do anything with them — they just worked.

Bill discovered the hard way to avoid flexible jumpers on all antennas, but instead made a full loop at about 1 1/2 times the minimum bending radius at the connector. This gives just enough flexibility to make the connection, and at the same time avoids another connector junction. This technique works great with 1/2-inch coax and even with 7/8-inch coax.

A U.S. Navy veteran, Bill learned in the service to put protective caps on all connectors when not in use. Since he has written the checks for his personal test equipment, Bill is careful to keep the connectors in good shape. The plastic caps keep out dust and dirt as well as protect the connectors. Bill would collect those caps but started to run out of the Type N size.

It turns out that they are relatively inexpensive and readily available, but you have to purchase 100 of them, a lifetime supply — if you live long enough.



Fig. 2: Reset combination locks to zero.

(At www.mscdirect.com, search for part number 31992233, seen in Fig. 1).

WA4MZZ, Sheldon Daitch, found the repair of splayed Type N center pins interesting. Sheldon also pointed out that the center pin diameter changes between 50-ohm and 75-ohm connectors. In the example shown by Frank and Dave Hertel, it would appear the center female connector damage shown could be the result of the use of the wrong impedance male connector.

Tony Dinkel is with Entercom Las Vegas and also offered a comment about Type N female connector repair. Tony says the cause of damaged female Type N connectors is usually improperly assembled Type N male connectors. If proper attention to detail is paid to the alignment and protrusion of the center pin of the Type N male connector, repairs should not be needed.

Over the years, Tony has found and repaired some botched-up connector assemblies, including replacing chassis-mounted female Type N connectors on very expensive equipment. All it takes is a quick look at the center pin of the male Type N connector to see if it is centered and not protruding out too far.

So Tony’s recommendation is to take a moment and check the male connector before inserting, to prevent the splayed center conductor in the first place.

Site security is always on an engineer’s mind. Here’s a simple tip that can keep your site safer.

On combination locks, when arriving or leaving the site, always return the combination lock dials to 0-0-0-0 (Fig. 2).

This does two things. First, if you arrive at the site and the combination is set to something else, you know vandals may have visited your site. Also, leaving the combination exposed (by not returning the dials to 0-0-0-0) could allow a

passerby to copy the combination and enter later.

Simple, yet secure.

K.M. Richards is a unique programming consultant who, in addition to providing programming consulting, has a background in keeping several low-power FMs on the air and spent a lot of time in the studio in the ‘80s. Although he doesn’t consider himself an engineer, he reads Radio World cover to cover to stay abreast of topics that can help his clients.

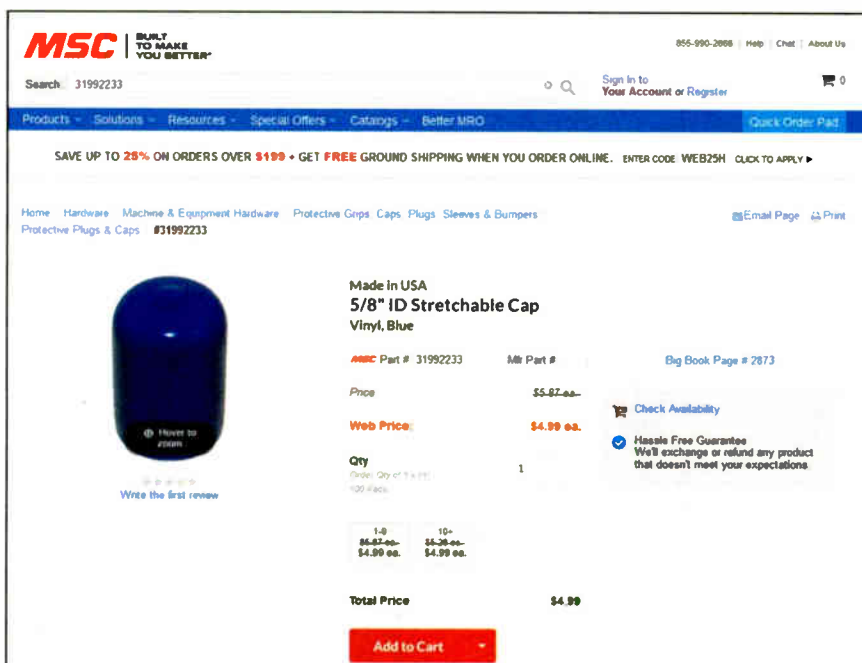
This also lets K.M. have intelligent conversations with the station engineers. K.M. writes that one of his personality traits, which endears him to most engineers, is that he’s good at organizing and planning.

In the May 23, 2017, Workbench column, K.M. wrote that when taking a set of “normal” readings of equipment, he brought along his battery-powered label maker. Those “normal” readings were then placed on or near the equipment. In an emergency, this gives you virtually instant access to “normal” readings, eliminating searching through a notebook or smartphone. If that’s not practical for some reason, add a page to that binder showing the signal paths listing every piece of equipment with its normal readings, perhaps on the page opposite your rack path diagram.

Being prepared is good advice. Making sure the preparations are somewhere that you don’t have to panic to find and use them is even better.

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

Author John Bisset has spent 49 years in the broadcasting industry and is still learning. He handles Western U.S. Radio Sales for the Telos Alliance. He is SBE certified and is a past recipient of the SBE’s Educator of the Year Award.



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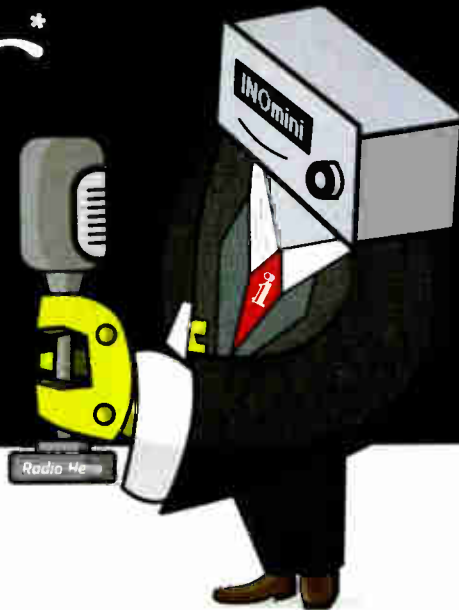
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Fig. 1: Bill Ruck learned in the Navy to put protective caps like these on all connectors when they’re not in use.

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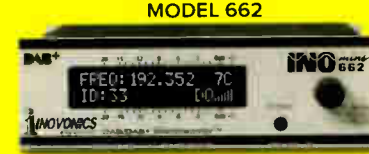
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MODEL 633
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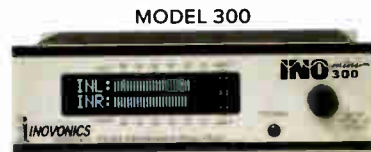
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Lights, Power, Ground, Back in Action!

North Pole's KJNP got a new tower and a new lease on life in 2018



Installing the ground screen

BY REDGY SWEDBERG

Last March, the author described a project to replace the AM tower at KJNP in Alaska ("Hands On: Replacing a Tower at North Pole"). In this installment he describes the culmination of the project.

After KJNP's replacement AM tower was constructed, we began the work on the lights and static eliminators.

We are using Medium Intensity Dual Obstruction Light Standard E2, which has red lights at night and white lights during the day. The LED lights from Slatercom were mounted on the tower by Nolan Brothers.

The power to these will run through a Austin-Ring transformer at the base of the tower. With the long power run from the building, we are operating the Austin-Ring transformers with a 240 vac primary. We operated the lights with a direct AC connection while installing the Austin-Ring transformer. These have a ball gap to install in addition to the ball gap over the tower base insulator. Nautel has a downloadable ball gap spacing utility that we used to set the initial gap to 3/4 inch.



The tractor used to put in the ground radials

The system originally was set up for incandescent lights operating at the beacon with 120 vac; with the lower current draw of LED lighting, we now have 156 vac on the tower base. The new tower lights have an operating tolerance of 100 to 277 vac, so we did not need to change anything from the original

configuration.

We also have power to the ATU for the current meter and heat. With temperature swings from 80 degrees F in the summer sunshine to -60 degrees in the dead of winter, the tuning of the ATU can change. We have the unit insulated with heat to maintain a stable tem-

perature. There is also a utility power outlet at the tower base.

The lights were installed with an ice shield above the side-mounted lights. Each light has a built-in level to make it easier to install correctly.

Originally, the tower light monitor antenna was on the bottom of the enclosure, but we found it was getting some moisture in it. We drilled a different mounting hole on the side, and put a drain/vent in the hole in the bottom of the enclosure. Drilling the stainless steel was not easy, but it resulted in a better location for the monitor antenna, even though it is not as protected from falling ice. Because this is an insulated tower, we are using a radio signal to get the tower light information back to the station building.

For the center feed, it was installed in 10-foot sections. The sections were made of 1-inch water pipe silver sol-



dered together. As a section was added on, the tower crew would raise it 10 feet inside the tower, then I would solder on another section. This goes up 150 feet, then attaches to the tower legs with copper strap from the pipe to the tower legs. It is distributed through six clamps. There are supports every 10 feet to keep the feed centered in the tower.

GROUND RADIALS

While the tower was down, we used a transit and tape measure to set stakes for the ground radials. There is a 30-by-30-foot screen around the tower base and the radials are hooked to that.

We put a sub-soiler on our tractor three-point to pre-rip all the radials, so that when we trench in the wire we would not run into problems. This was done by using a pipe with a sweep elbow bolted to the rear of the sub-soiler to feed the into the ground when actually trenching in the wires.

Some areas still needed to have hand-dug trenches. These were areas where we could not get our tractor through because of space, and where there were

(continued on page 18)



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 34: Alarm Notification · 35: NTP · 36: Front Panel Locking · 37: Crosspoint Save · 38: Debugging Functions · 39: No Cooling Fans · 40: Sound Card Replacement · 41: Self Healing (and more...)

KJNP

(continued from page 16)

underground wires to avoid.

With these steps done, we mounted a stand on a trailer pulled by the ripper to feed the wire into the ground.

After putting in the radials, we put a 3-inch copper strap square around the tower base at 30 feet to hook the radials to, the inside of the square is 1/2-inch copper mesh. All this was put together with silver solder. The number of connections to solder made this take a lot of time.

We put dirt over the copper ground mat. The radials were connected to the outer edge of the mat. After the dirt we put down fabric to stop the weeds from



Progress becomes evident



Copper ground screen with fabric

TUNING

Tuning the tower took some time. It has to be done when the standby antenna and tower are not operating, so we did it at night.

We used a signal generator and Delta OIB-1 bridge to measure and sweep the tower, then to set the coax input to 50 ohms. After setting everything with a signal generator we put the transmitter on at 5,000 watts and checked the measurements. These measurements were used to calculate our power level

with the base current meter in the ATU.

The original tower was 185 ohms, the replacement tower is 190 ohms, so we were able to make some small changes to the tuning in the ATU to make everything match. Over the next week, we brought the power up to 50,000 watts.

There is a panel just outside the screen with the electrical panels and junction boxes. The wiring was retained from the original tower, so we did not

(continued on page 22)

growing. On top of that is crushed rock.

The ATU was put back into place and connected to the ground mat. The coax hooked back up, and the tower feed point hooked back up. The feed point is a 1-inch copper pipe inside the tower, insulated to the 150-foot point where it connects to the tower. This was done on the original tower to prevent arcing over the base insulator.

We wanted to make the replacement as close to the original as possible, since that tower was working fine, except for mechanical issues due to age. However, we did update to a galvanized tower with updated obstruction lighting to minimize future maintenance.



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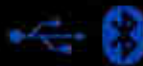
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Ohm's Law Answers Your Questions

Understanding these concepts will help you solve more than theoretical problems

TECHTIPS

BY MARK PERSONS

Understanding electronics and electronic troubleshooting starts with knowing Ohm's Law. This is not difficult and can make your work so much easier.

Ohm's Law was a constant companion over my long career as a radio broadcast engineer. The relationships among volts, amperes, ohms and power made it all so understandable.

German physicist Georg Ohm published the concept in 1827, almost 200 years ago. It was later recognized as Ohm's Law and has been described as the most important early quantitative description of the physics of electricity.

Fig. 1 is a list of simple formulas for using Ohm's Law. Nothing complicated, just good answers to your questions. You don't need to be a mathematician to run the calculations. The calculator on your smartphone will handle this easily.

P is for power in watts, I is current in amperes, R is resistance in ohms and E is voltage in volts. Solve for any of those knowing two of the other parameters.

OHM'S LAW ON CURRENT

When I look at a 100 watt light bulb, I think 120 volts at about 0.8 amperes (0.8333 amperes is more exact). That is 100 watts of power being consumed.

So how many lights can be put on a 15 ampere circuit breaker? Let's see — 15 ampere circuit capacity, divided by 0.8333 amperes for each bulb in parallel = 18 lamps. Conversely, it is 18 lamps X 0.8333 amperes per lamp = 14.9994 amperes ... right at the limit of the circuit breaker.

The rule here says you don't put more than an 80-percent load on any circuit breaker for fuse, which is 14 lamps in this case. Always keep some headroom in a circuit. As you know, breakers and fuses are used to protect against fires or other dramatic failures during circuit problems. They get unreliable at their current limit. You don't need nuisance break trips or fuse burnouts from running too close to the line.

OHM'S LAW ON RESISTANCE

There are not many high-level plate modulated AM transmitters around anymore. The Gates BC-1 series is an example of this 1950 to 1970s technology. The design typically has 2600 volts running the RF Power Amplifier tubes.

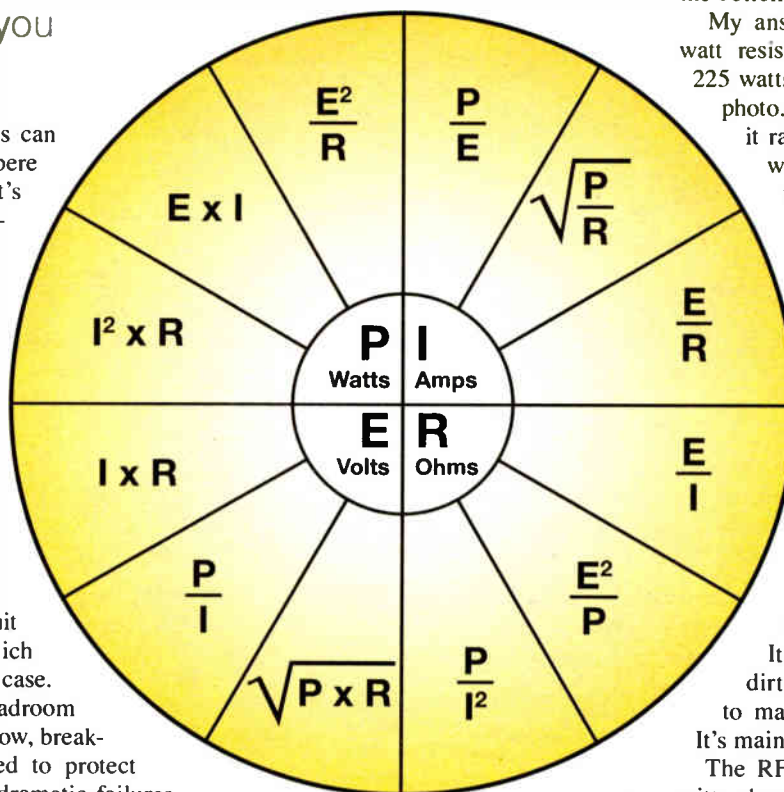


Fig. 1: Ohm's Law chart

Ohm's Law has been described as the most important early quantitative description of the physics of electricity.

Power supplies like that need a "bleeder" resistor between the high voltage and ground to bring down/bleed the high voltage to zero when the transmitter is turned off. This should happen in only a second or so of time. The power supply could stay hot with high voltage for minutes or hours if the bleeder resistor fails open. That is a serious safety issue for the engineer working on it, if he or she fails to short the high voltage filter capacitor before touching any part of the transmitter.

The bleeder in a Gates BC-1G transmitter is R41, a 100,000 ohm/100 watt wire-wound resistor. You see one handheld on the left side of the photo in Fig. 2.

Ohm's Law tells us that 2600 volts across the resistor squared (times itself) then divided by 100,000 ohms resistance equals 67.6 watts of power dissipation required on a continuous basis on a 100 watt resistor. You would think that the 32.4-percent safety margin would be enough. This resistor typically failed after 10 years of use. The answer is in the ventilation the resistor gets for cooling. The 67.6 watts in heat has to

go somewhere. This transmitter model has some, but not a lot, of air flow on the bottom where the resistor is located.

My answer was to replace the 100 watt resistor with a resistor rated at 225 watts, as seen in the center of the photo. It gave more surface area so it ran cooler, thus longer. A 100 watt resistor is \$15.14 vs \$18.64 for a 225 watt unit. It is only a \$3.50 difference for a huge increase in reliability and safety. The screw that holds it in place will need to be longer if you do this modification. No big deal.

Yes, there is a meter multiplier resistor string next to the resistor and high-voltage capacitor. It samples the high voltage for the PA voltmeter. Dirt has accumulated on the high-voltage end of the string. It is high voltage that attracts dirt, requiring frequent cleaning to maintain transmitter reliability. It's maintenance.

The RF dummy load in this transmitter has six 312 ohm/200 watt non-inductive resistors. The transmitter sees

the 52 ohms because the resistors are in parallel. Simple math, 312 ohms divided by 6 resistors = 52 ohms. Yes, 52 ohms, 51.5 ohms, 70 ohms and other impedances were common in the past before solid-state transmitters more or less forced the standard to be 50 ohms. Tube-based transmitters will tune into almost any load while solid-state transmitters are designed to perform into 50 ohm loads....and don't give me no VSWR!

OHM'S LAW ON VOLTAGE

Let's say we know that 2 amperes of current is going into a 100 ohm resistor. What is the voltage across the resistor?

The formula is 2 amperes x 100 ohms resistance = 200 volts. From that, we can solve for power in the resistor. It is 200 volts x 2 amperes current = 400 watts.

OHM'S LAW ON POWER

A Continental 816R-2 FM 20 KW FM transmitter might have 7000 volts on the plate of the PA tube with 3.3 amperes of

(continued on page 22)

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World Radio History

OHM

(continued from page 20)

current drawn. Ohm's Law tell us that 7000 volts x 3.3 amperes = 23,100 watts of power. That is transmitter power input, not output. The power output is subject to the power amplifier efficiency, which is typically 75%. Then, the transmitter power output is 17,325 watts. That also means that 25% of the input power is lost in heat. That is 23,100 watts of input power x .25 = 5775 watts of heat.

Be sure to check the manufacturer's data sheets for exact numbers for each transmitter model.

HALF POWER?

Half power doesn't mean the transmitter's PA voltage is half. If it was half, then the PA current would be half and RF output would be one-quarter. You'll remember when local Class 4 (now Class C) AM stations ran 1000 watts day and 250 watts at night.

A Gates BC-1 transmitter might have 2600 PA volts and 0.51 amperes of PA current during the day. We can determine the resistance of the power amplifier by taking the PA voltage of 2600 and dividing it by PA current of 0.51 amperes. The answer is 5098 ohms.

That same PA resistance applies regardless of the power level of this transmitter. At quarter power, the PA voltage is 1300 volts. Ohm's law, using the same 5098 ohms, tells us that the PA current should be 0.255 amperes. Yes, it worked out that way in practice. The simple trick was to connect 120 VAC to the primary of the transmitter's high voltage transformer for night operation in place of 240 VAC in the day.

With quarter power, the antenna ammeter read half and the signal field

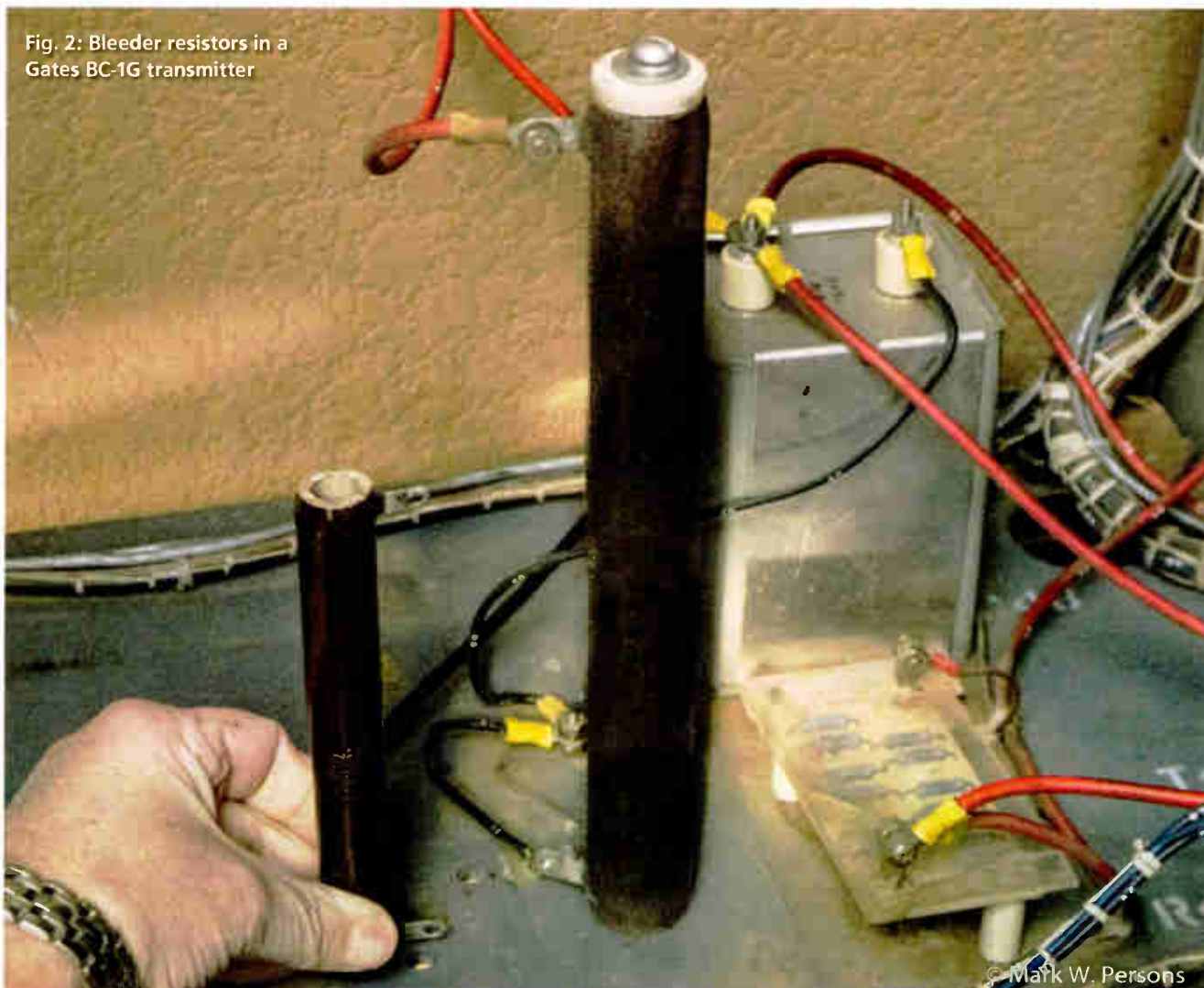


Fig. 2: Bleeder resistors in a Gates BC-1G transmitter

© Mark W. Persons

intensity was half, not one-quarter. Let's examine this. If you have a 50 ohm antenna and 1000 watts of power, what is the antenna current? Using Ohm's Law, take 1000 watts divided by 50 ohms = 20. The square root of that is 4.47 amperes. Divide 250 watts by the

same 50 ohm antenna resistance and you get 5. The square root of that is 2.236 amperes, half of the day antenna current. It's Ohm's Law.

Think Ohm's Law when you are on the job. It answers your questions and makes perfect sense.

Mark Persons, W0MH, is an SBE Certified Professional Broadcast Engineer; he was named the Robert W. Flanders SBE Engineer of the Year for 2018. Mark is now retired after more than 40 years in business. His website is www.mwpersons.com.

KJNP

(continued from page 20)

have to replace the wires and coax in the ground.

We put the station back on the air at 12,000 watts for a couple of days, then moved up to our low-power nighttime operation of 21,000 watts. A few days later we moved to 35,000 watts daytime, then to our license power of 50,000 watts daytime. While slowly increasing the power, we also monitored for hot spots, arcs or anything that looked like a potential a problem.

After getting back to normal operations, we took down the standby antenna and put it away. We also rebuilt the fence around the tower base, so everything is back to normal.

We have received listener reports from Bethel and Anchorage and confirmed coverage at Dot Lake, which shows a coverage area of more than 300 miles; KJNP(AM)'s signal is as good or better than when we started.

Radio World wants your first-person project stories. Email radioworld@futurenet.com to learn more.

The station building alongside the replacement tower



Comrex VH2 Doubles as Disaster Recovery Tool for Entercom

Repurposed hybrids replace ISDN backup, saving money



USERREPORT

BY ROBBIE GREEN
Director of Technical Operations
Entercom Houston

HOUSTON — Entercom Houston is a group of six stations serving the greater Space City area. I work as director of technical operations, meaning that I oversee purchasing and configuration for those Entercom stations.

Several years ago, we replaced our business phone system with a SIP-based system. That meant we needed to replace our old hybrids with new VoIP hybrids. I purchased two Comrex VH2 two-line VoIP hybrids to use in production rooms that previously had no phone capabilities.

While we were using them in that capacity, they were always reliable — I never had to think about them, and they did what they were meant to, which is what you want from a hybrid system.

Shortly thereafter, we did a complete overhaul of our broadcast systems and replaced every production room phone. However, we still had our VH2 units, and I felt that

there was another purpose they could be used for.

We had been using ISDN codecs as a disaster recovery audio tool at two of our AM transmitter sites. The provider had been raising ISDN BRI pricing in our area for a long time, and ultimately increased our monthly recurring ISDN payment from \$100 per month to \$1,000 per month per line. We needed a more cost effective solution.

The VH2s were the perfect answer. We set them to auto-answer, meaning that if our primary audio goes off the air, we can call into the VH2 and use our remote control system to switch the call onto the air. We use a SIP provider that can handle G.722, which is good enough for AM radio. And in an absolute worst case scenario, our sister sports station in Dallas can call in and put one of their studio lines on so that we can keep something on the air.

Because VH2 is such a reliable piece of equipment, I know we can trust it to work in case of an emergency. While it's designed to be used in a more traditional hybrid capacity, VH2 is versatile enough that I can use it for a totally different function.

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

TECHUPDATE

AVT ADDS ANSWERING MACHINE, AES67 TO MAGIC THIPPRO

German company AVT has enhanced its Magic THipPro telephone hybrids by offering AES67 as a software upgrade for up to eight channels for units delivered as far back as 2010.



In addition, users can now benefit from an answering machine with automatic recording, which comes standard with the latest software release 3.0. The answering machine allows station staff to meet new GDPR data protection guideline criteria, by allowing calls to be automatically accepted and playing an optional announcement that permits the caller to either accept or decline personal data usage via DTMF tones.

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



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TECHUPDATES

JK AUDIO BLUEDRIVER-F3 NOW PROVIDES HEADPHONE OUTPUT



JK Audio's BlueDriver-F3 plugs into the XLR jack of a dynamic mic like any other wireless mic transmitter; but the company highlights an important difference: BlueDriver-F3 uses two-way Bluetooth wireless audio to send and receive audio from any Bluetooth device (e.g. smartphone, tablet, computer, etc.). The return signal from the Bluetooth device is supplied on a 3.5 mm output jack on the side of the transceiver.

When JK Audio introduced BlueDriver-F3, only the phone function and a few smartphone apps supported Bluetooth as an audio input. According to JK Audio, early adopters were using their phone to either call into the station for a live broadcast or record a phone interview. The logical use of the BlueDriver-F3 side-mounted 3.5 mm output jack was a mic-level output to an external digital recorder. Monitoring was through the headphone output jack of the recorder.

Today, several smartphone video and audio apps take advantage of 7 kHz bandwidth Bluetooth audio I/O, allowing live broadcasts or recordings through the paired device, reducing the need to capture a recording on an external audio recorder.

Effective November 2018, the 3.5 mm output jack on BlueDriver-F3 is a TRS earpiece/headphone-level output jack, allowing a reporter to carry a conversation with the studio or to monitor playback of recorded material. The headphone output level is adjusted on the paired device.

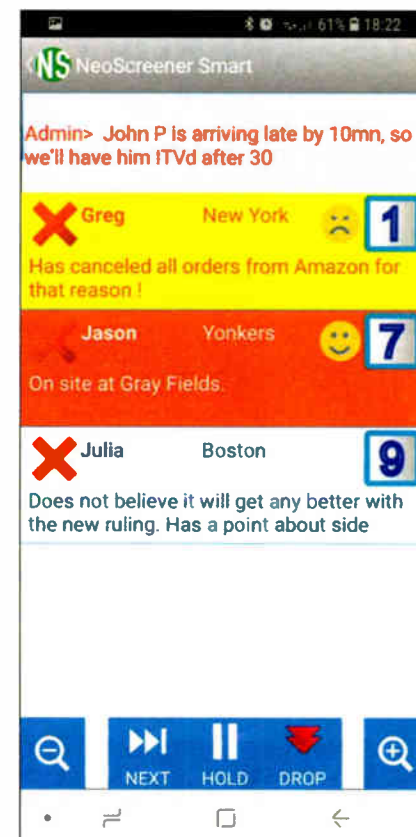
For information, contact JK Audio in Illinois at 1-815-786-2929 or visit www.jkaudio.com.

NEOGROUPE UPDATES NEOSCREENER SMART APP

NeoGroupe says recently upgraded its NeoScreenerSmart application.

The enhanced version lets remote hosts see, air and drop screened phone calls at the studio via their mobile phone. This, the company says, makes it easier for the host to manage phone operations when working from the field.

Also, users can now install the NeoScreenerSmart application on Android-based touch desktop phones, thus NeoScreener functions are available on IP phones, allowing users to carry out tasks such as air, answer, hold or drop lines.



Other features include a pop-up message, which provides (before staff picks up the phone) the name of the caller if it exists in the NeoScreener database, as well as the status of the incoming phone number (banned, known, unknown, star caller, etc.).

The NeoScreener suite is now fully compliant with data laws, including the European GDPR, Asian PDPA and California Consumer Privacy Act.

NeoScreenerSmart operates with the AEQ Systel IP and Telos VX VoIP talk show systems.

For information, contact NeoGroupe in France at +33-972-23-62-00 or visit www.neogroupe.com.

WHO'S BUYING WHAT

RADIO FRANCE CHOOSES AEQ SYSTEL SYSTEM FOR MARTINIQUE

The technical management of French national broadcaster Radio France selected the AEQ Systel IP talk show system to manage incoming and outgoing calls for on-air programs in its radio studios on the Caribbean island of La Martinique.

Systel-IP is a talk show system with multi-conference capability and is able to put several incoming calls on air simultaneously.



According to the company, the system is cost-effective, reducing operating costs and improving quality by being able to operate with VoIP providers. It also allows integration with an existing telephone system by connecting to IP-based corporate switchboards, avoiding the maintenance of analog lines exclusively for broadcasting.

In addition, the new touchscreen phone interface SystelSet+ was supplied for this project. Features include a user-friendly keyboard and a wide touchscreen.

The touchscreen makes management of every task during a radio show easier.

The project was implemented and executed by Eurocom Broadcast with support from AEQ's representative in France, led by Jesus Vazquez, sales manager.

For information, contact Peter Howarth at AEQ Broadcast International in Florida at 1-800-728-0536 or visit www.aeqbroadcast.com.



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BROADCAST BIONIC'S BIONIC STUDIO IS A MULTIPLATFORM TOOL

Bionic Studio from Broadcast Bionics is a studio communication multitool. The company calls it a feature-rich software interface that includes everything needed for a talk show system and allows for additional possible workflows. It enables a station's content to become discoverable quickly and shareable easily, suitable for the demands of multiplatform broadcasting. The Bionic Studio comprises Bionic Talkshow, Bionic Social and Bionic Director. Bionic Talkshow is a feature-rich SIP phone system that the company says is simple to use but can scale to take care of complex workflows. It's compatible with all line types, incorporates Skype TX for Radio and operates as a standalone system but is also compatible with TelosVX hardware systems. Bionic Social filters and monitors social media, showing the "mood and mind" of an audience as well as directing users to the best social media content. Bionic Director switches cameras automatically to visualize and stream every link. To edit and share video clips to social media after a fader is closed takes moments, according to the manufacturer. A voice transcription plug-in delivers full text search and makes video searchable on all search engines. The Bionic Studio is your station's multitool for all communication, and the user interface fits on one screen in the studio, saving valuable real estate.

For information, contact Broadcast Bionics at 1-888-363-4844 or visit www.phonebox.com.

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TECHUPDATE

TELOS VX ENTERPRISE AND PRIME+ VOIP TALKSHOW SYSTEMS

Telos says that its VX system was the first voice over IP talk show system. The company has introduced the next evolution of its system.

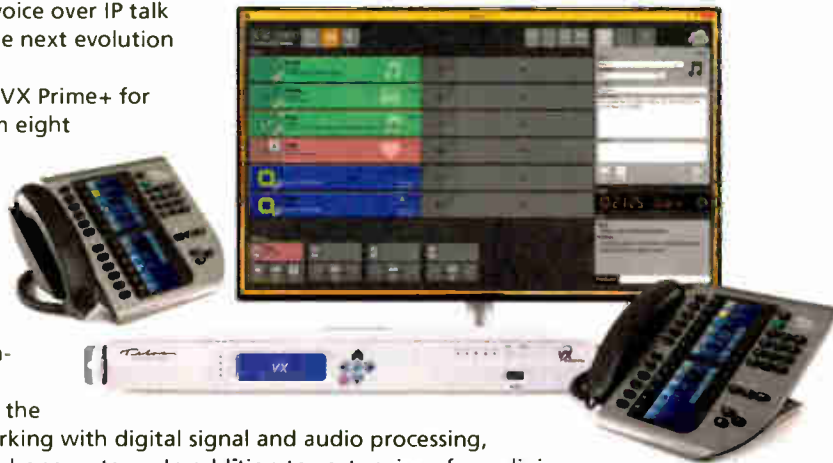
The VX Enterprise is for large systems and VX Prime+ for smaller, so Telos says it has users covered from eight to 120 hybrids. The latest offers built-in support for AES67 in a 1RU chassis. Additionally, support for the G.722 voice codec ensures quality calls from supported mobile devices.

The scalable VX Enterprise and Prime+ systems offer the flexibility of office phone systems and PBXs while lowering maintenance and equipment costs.

The company says these products combine the flexibility and economy of modern SIP networking with digital signal and audio processing, making it easier for talent to take control of phone systems. In addition to cost savings from digital phone service provisioning, VX eases the cost of installation, maintenance and cabling by using standard Ethernet as its data backbone, it says.

Support for AES67 gives broadcasters the flexibility of integrating VX into any AES67 environment, in addition to an Axia Livewire network. With plug-and-play connectivity, users can network multiple channels of audio with any AES67-compliant hardware. Beyond AES67, Livewire users have the added convenience and power of networking control (GPIO), advertising/discovery and program associated data throughout the network.

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



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

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

WYBG 1050, Messina, NY, now off the air is selling: 250' tower w/building on 4 acres; 12' satellite dish on concrete base; prices drastically slashed or make offer. 315-287-1753 or 315-528-6040

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I'm looking for the Ed Brady radio show in which he did a tribute to Duke Ellington, the station was KNBR, I'd be willing to pay for a digital copy. Ron, 925-284-5428.

I'm looking for KTIM, AM,FM radio shows from 1971-1988. The stations were located in San Rafael, Ca. Ron,

925-284-5428.

I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example news-cast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, KTAB, KDIA, KWBR, KSF, KOBY, 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 home-run 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.

Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time is 13:44. Ron, 925-284-5428 or email ronwtamm@yahoo.com.

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

Looking for KTIM FM radio shows from 1981-1984 if possible unscoped. R Tamm, 925-284-5428 or ronwtamm@yahoo.com.

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What NAB Told the FCC About the Digital Marketplace

Here are the association's recent comments about competition in the audio marketplace

REGULATION

In the fall, the National Association of Broadcasters filed comments with the FCC regarding the audio programming marketplace, part of the commission's preparation of a congressionally-required communications marketplace report. The comments give insight into how the association views radio's current competitive environment.

The text below is excerpted from that filing and has been lightly edited for style and length. The filing was signed by Rick Kaplan, Jerianne Timmerman, Dan McDonald, Theresa Ottina and Alexandra Falcon of NAB Research; they were responding to MB Docket No. 18-227, "In the Matter of Status of Competition in the Marketplace for Delivery of Audio Programming."

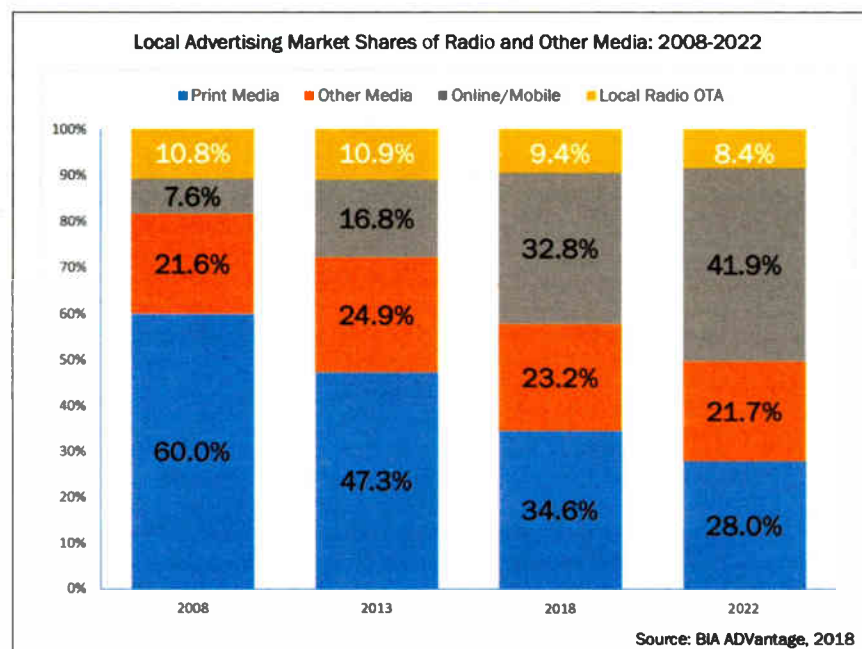
In the analog audio marketplace of the past, consumers had two choices for obtaining music and other audio content: buy it or listen to broadcast radio. In the 21st century digital marketplace, audio content is delivered and consumed very differently.

Technological innovations have dramatically improved providers' ability to deliver audio content. Consumers now access audio content delivered via a range of devices and from a wide variety of sources, including linear over-the-air terrestrial radio, subscription satellite radio, podcasts and numerous streaming services, both subscription and advertiser-supported. As a result, consumers purchase far less audio content than in the past, as their consumption has "shift[ed] from ownership to access."

In response to the Media Bureau's Public Notice seeking comment on audio competition, the National Association of Broadcasters herein discusses the transformation of the market for delivery of audio programming since the 1990s, when free terrestrial radio and purchased recordings were the only options for obtaining audio content and the only listening devices were AM/FM radios, turntables and tape/CD players.

Today, even though 92 percent of U.S. adults still listen to linear broadcast radio during an average week, millions of consumers utilize the range of digital options available in an increasingly fragmented listening market. An estimated 160 million persons ages 12 and older listen to online audio weekly.

Streaming music platforms have grown dramatically during this decade, and podcasting's "share of ear" has doubled in just the past four years. Younger listeners in particular have embraced digital audio sources and devices. The FCC's upcoming Communications Marketplace Report must reflect how digital technologies have significantly expanded the number of audio content providers and the marketplace choices available to listeners.



Given that consumers have a limited amount of listening (or viewing) time with a now almost unlimited number of digital options, broadcast radio, as well as other legacy media, operate today in a vastly different environment than in the analog past. The proliferating digital competitors for consumers' time and attention also compete for advertisers' limited dollars. The overall U.S. advertising market — upon which non-subscription outlets like radio depend has not yet equaled, let alone surpassed, its pre-Great Recession level. But despite this overall market drop, the digital sector of the ad market has experienced explosive growth over the past decade.

Indeed, the local advertising revenues of a single digital company that just celebrated its 20th anniversary — Alphabet/Google — now exceeds the total local advertising generated by all commercial radio stations in the U.S. (and rivals the amount generated by all full-power commercial TV stations in the country). The FCC's Report must recognize how these

broad marketplace changes have affected the competitive position of FM and AM stations specifically.

As NAB describes below, local radio stations are facing real and growing challenges in attracting audiences in a fragmented listening market, especially among younger demographic groups. The increasing share of local advertising revenues earned by online and mobile outlets, including the digital giants, has squeezed radio stations' share of local ad revenues. Radio stations in smaller markets that have much more limited advertising bases particularly struggle to earn

Any contention that radio broadcasters today compete for audiences and advertisers only with other broadcasters — and not with any other audio outlets and content providers — is untenable. Indeed, the very legislation requiring a biennial Communications Marketplace Report assumes a broad market and directs the Commission, in assessing audio (and video) competition, to "consider all forms of competition," including "intermodal" and "competition from new and emergent communications services, including the provision of content and communications using the Internet."

The FCC's identification of participants in the market for delivery of audio programming as including, but not limited to, terrestrial radio broadcasters, satellite radio providers and entities providing audio programming over the internet and to mobile devices appropriately reflects the breadth of the modern audio marketplace, consistent with congressional intent.

Even a relatively brief survey of today's market shows that millions of consumers routinely use a range of devices to access audio content from myriad sources, including AM and FM stations, and that advertisers increasingly use digital platforms to reach consumers.

A. Despite Dramatic Changes in a Fragmenting Audio Market, Listeners Today Continue to Access Local Radio Stations' Diverse Content in their Homes and On the Go.

Despite the expanding number of Audio Market Participants, consumers across the country still rely on AM/FM stations to provide entertainment and information wherever they may be — at home, at work or on the go. Radio retains the largest reach across media platforms, reaching in an average week 92 percent of all adults 18+ (227.24 million people), 96 percent of Hispanic adults (37.44 million people) and 92 percent of African American adults (28.52 million people).

By a large margin, AM/FM radio remains the leading audio source in vehicles; 82 percent of adults 18+ report that they use broadcast radio in cars, and 56 percent say that AM/FM radio is the audio source they use the most in vehicles. Notably, radio stations also lead in music discovery, with Nielsen reporting that 49 percent of its survey respondents cite OTA AM/FM radio as a source used to discover music, followed by friends/relatives at 40 percent.

The robust reach of AM/FM radio is unsurprising, given the wide range of program services local stations provide

adequate revenue, and as the commission is already well aware, AM stations face special challenges in attracting listeners and advertisers in markets of all sizes.

And soon, local stations will be competing for listeners against the "world's largest audio entertainment company," assuming completion of the proposed merger between SiriusXM and Pandora. The recognition in this proceeding of the broad scope and competitive realities of the modern audio marketplace should inform commission policies and future rulemakings regarding terrestrial radio broadcasting.

Technological Changes Have Fragmented the Audio Marketplace by Vastly Expanding the Number of Content Providers and the Options for Consumers and Advertisers

The development of digital technologies and the exponential growth of the internet and online services have transformed the audio (as well as the video) marketplaces.

to diverse audiences. According to BIA, the number of Spanish-programmed full-power AM/FM stations in the U.S. has grown from 547 in 2000 to 949 today. The number of Asian-programmed stations also has increased, from only 21 in 2006 to 94 today. In addition, 366 full-power stations provide a range of programming targeted to different demographic groups within the African American community.

These numbers, moreover, do not include the additional diverse programming aired via multicast channels on stations using HD Radio technology. According to Xperi, as of September 2018, there are 2,212 HD Radio stations on air in the U.S., broadcasting an additional 2,020 channels, for a total of 4,232 separate digital channels. The programming on these digital multicast channels runs the gamut from A to V (Alternative to Variety), with many channels offering niche music formats (jazz, classical, folk, bluegrass, etc.) and programming targeted to minority groups (various Asian, Urban and Spanish formats). In Washington, D.C., for example, local stations' multicast channels air, inter alia, news, sports, bluegrass/roots, vocal classical, soul/rhythm and blues, Urban gospel, Vietnamese music and talk, Hindi and the LGBT channel, Pride.

Local stations also serve their communities by providing a range of free OTA news, sports, weather and emergency information. Rural audiences in particular rely on the 6,818 full-power AM/FM stations located in small communities and rural areas outside of Arbitron Metro radio markets, where the smaller populations are less able to support full-power TV stations and other local media outlets.

And, of course, radio stations provide vital emergency information in markets of all sizes, including AMBER alerts. In fact, radio broadcasters, teaming with local police in the Dallas/Ft. Worth area, created the AMBER Plan, which has been credited with successfully recovering 924 abducted children since its inception in 1996.

In many ways, radio is the optimal method of reaching mass audiences during emergencies. Unlike wireless networks, radio's "one-to-many" architecture cannot be overwhelmed by a surge in traffic or experience network congestion.

When the power goes out, and internet and video services are unavailable, battery-powered radios are often the only point of connection and information for the public. Unsurprisingly, officials such as former FEMA administrator Craig Fugate recently urged residents in the path of Hurricane Florence to include an AM/FM radio in their disaster kits. Earlier this year, federal legislation designated radio broadcasters as a first

responder "essential service provider" entitled to access federally-designated disaster areas to maintain or restore operations during an emergency. No other audio market participant identified in the FCC's notice can make remotely similar claims or boast a comparable record of local public service.

Beyond continuing to provide their traditional OTA service, radio broadcasters also have embraced digital technologies to improve and expand their services to listeners via multiple devices. Millions of listeners enjoy the better sound quality and additional programming offered by HD Radio, and broadcasters are working to expand the availability of HD Radio in cars.

Radio broadcasters also have worked tirelessly to promote access to radio receivers in smartphones so consumers can receive free FM signals and, thus, access to a reliable source of emergency information via their phones. Although almost all smartphones are manufactured with hardware capable of receiving FM signals, not all phones have this feature activated. The major U.S. wireless carriers have unlocked FM capability in their Android phones, but Apple has not yet provided its customers with this feature.

On devices that include activated FM receivers and internet connections, hybrid radio allows broadcasters to use both paths to provide content simultaneously to listeners, offering audiences interactivity and visual enhancements to complement radio programming. The DTS Connected Radio Platform became available for automotive integration earlier this year and is planned for commercial launch in 2019. Combining analog and digital AM/FM radio with IP-delivered content, this technology creates an enhanced in-vehicle radio experience.

Radio broadcasters continue to expand their online services available to consumers via multiple devices. Thousands of commercial and noncommercial radio stations stream, and stations' streaming audiences are growing. From January 2014 to April 2018, local broadcasters' monthly average active streaming sessions increased nearly 33 percent and total time spent listening to broadcasters' streaming services increased over 17 percent.

Several popular radio apps, including iHeartRadio, NPR One, Radio Online and TuneIn Radio, allow smartphone owners to access thousands of radio stations and libraries of programs and podcasts for free (or for monthly fees in their premium versions). Commercial radio broadcasters also are moving quickly to increase their presence in the podcasting space, where public radio has already established a very sizable niche.

Recognizing clear potential to attract listeners and generate advertising revenue, a number of radio station groups

have committed to launching major podcasting initiatives.

In short, radio broadcasters are working every day to enhance the variety and attractiveness of their online offerings and reach audiences wherever they and their devices may be located. Stations must do so to remain responsive to consumers and competitive in a rapidly changing market.

B. Consumers, Especially Younger Ones, Now Access Audio Content From a Wide and Growing Range of Sources Via Multiple Devices

Despite the continuing reach of broadcast radio in the modern audio marketplace, that market is becoming increasingly fragmented. In contrast to the analog era when radio broadcasting and recordings were the only ways to deliver audio content, today many digital sources provide, and multiple devices deliver, both music and informational programming.

Millions of consumers now enjoy audio content accessed via satellite or internet, and their numbers are growing.

1. Listeners by the Millions Have Embraced Audio Content Delivered Online and Via Satellite

Last year, Nielsen Music declared that streaming is "becoming a new norm." The numbers bear that claim out. An Edison Research survey conducted in early 2018 found that 57 percent of those ages 12+ (or 160 million people) listen weekly to online audio, up from only two percent in 2000. Weekly online listeners spend an average of 13 hours and 40 minutes per week listening to online audio, up from six hours and 13 minutes in 2008.

And online audio listeners tend to be younger, with 88 percent of those ages 12-24, and 73 percent of those ages 25-54, listening to online audio monthly. Teens and Millennials in particular have embraced music streaming.

While many more consumers still stream for free, the number of those willing to pay for music and other audio content from on-demand streaming or satellite services has grown quickly. In 2003, fewer than 600,000 people subscribed to satellite radio; by mid-2018, SiriusXM had about 33.5 million subscribers.

Beyond offering 150+ satellite-delivered channels of audio programming in local markets across the U.S., SiriusXM continues to expand its marketplace presence through its availability in vehicles and via its streaming service. SiriusXM is set to become a much more formidable competitor among streaming services with its proposed merger with Pandora.

The total number of paid streaming music subscribers in the U.S. rose from 36.7 million in 2016 to 49.1 million last year, and has been projected to reach

90.1 million by 2025.40 Due to these increases in both ad-supported and subscription-based streaming, there were an average of 1.06 billion on-demand music streams every day in the U.S. in 2017, a 50.3 percent increase from 2016. And the first half of 2018 saw a six-month record of 403.4 billion on-demand song streams, or over 2.2 billion streams per day.

With the advent and expansion of streaming and satellite services, the audio marketplace has become more competitive and more fragmented. Consumers may choose from among dozens of different online audio and video music streaming options. These services have different price points and features, with many offering a free, ad-supported tier and one or more subscription tiers. Currently, YouTube, Pandora and Spotify are the most frequently used services, with Nielsen calling YouTube the "go-to source for music." An estimated 129 million people (46 percent of those ages 12+) report using YouTube weekly to listen to music or watch music videos.

While radio broadcasters are among the myriad competitors for streaming audiences, the dominance of the pure-play streaming services has increased over time, due to their much faster growth rates. Pure-play streaming providers accounted for 79.8 percent of total streaming usage in January 2014, and their share rose to 89.1 percent by April 2018.

Although not attracting as many listeners as music streaming, the audience for podcasting continues to grow substantially. According to Edison Research, podcasting's "share of ear" doubled from the first quarter of 2014 to the first quarter of 2018. An estimated 48 million people ages 12+ listen to podcasts weekly and 73 million listen monthly. Among monthly listeners, 26 percent report that they listen to podcasts "most often" in a car/truck, the second most cited location. Podcast listeners, moreover, spend less time with other audio sources than consumers overall, and spend much more time than the average consumer using mobile devices for audio listening. And the choices for listeners have grown exponentially, with more than 550,000 podcast shows now available, with millions of total episodes.

Without doubt, the market for the delivery of audio content, both music and information, has been transformed by

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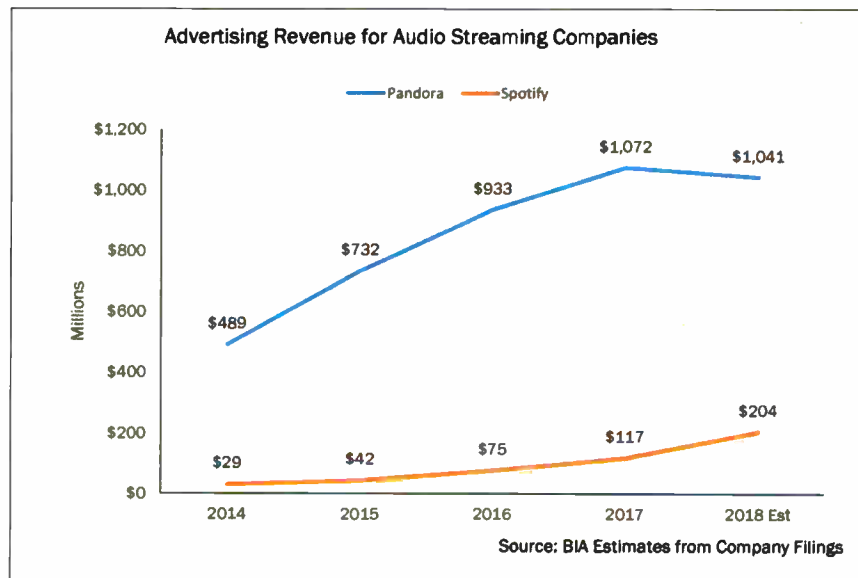
the rapid growth of digital services. The expansion of the number of online audio services has clearly benefited consumers, who now enjoy unprecedented choices of platforms and programming. It also has resulted in a vastly more competitive audio marketplace.

2. Listeners Now Use Multiple Devices to Access Audio Programming and Their Choice of Device Affects Their Choice of Content

To put it simply, devices matter. Consumers' choice of device influences the source of content they listen to, and consumers' use of multiple devices today reflects their desires to access a range of audio (and video) programming.

Rather than listening to audio content via only AM/FM radio and CDs/turntables/tape players as in decades past, the average consumer now uses "3.4 devices weekly to engage with music"; those subscribing to streaming music services "use an average of 4.7, while weekly AM/FM streamers use 5.5 on average." According to Nielsen, "devices and music go hand-in-hand." Consumers also routinely access news and information via multiple devices. In the first quarter of 2018, Nielsen estimated that adults 18+ spent an average of three hours and 48 minutes per day with digital media via smartphones, tablets and computers and an average of one hour and 46 minutes with radio. Adults under age 50 spent even greater amounts of time per day on smartphones, tablets and computers, and those under 35 spent substantially less time using traditional platforms (both TV and radio).

These device usage numbers reflect changing technology ownership. By early 2018, 83 percent of those ages 12+, or 233



million people, owned smartphones, and 50 percent, or 141 million people, owned tablets. Device ownership is higher still among younger demographic groups, with 92 percent of Millennials (those born 1981–96) owning smartphones, and 64 percent of Gen Xers (those born 1965–80) owning tablets. Fully 95 percent of teens (those ages 13–17) now report having a smartphone or access to one, and 89 percent of teens report using the internet at least several times a day, with 45 percent saying they are online "almost constantly."

Unsurprisingly, these changes in "technology [are] changing listening habits."

As ownership of smartphones has grown, for example, podcast listening has grown. Indeed, Nielsen recently declared that "smartphones drive podcast usage." More generally, Edison Research reports that, among consumers ages 13+ who listen to audio on a smartphone, most of their time is spent listening to either streaming audio (39 percent of their time) or owned music (33 percent), with podcasting in third place (11 percent).

The steady improvement in wireless headphones is also cited as another technological development

increasing the popularity of streaming services. And the 18 percent of Americans reporting smart speaker ownership in early 2018 (up from only seven percent in 2017) said that they listen to audio most often through their smart speakers and smartphones/tablets; in turn, that affects their audio consumption, including through some replacement of time spent with other devices and content sources.

One should expect that technology will continue to change the sources of audio content consumers access, and the commission's upcoming report should address the dynamic nature of the audio marketplace.

C. Advertisers Today Increasingly Utilize Online and Mobile Outlets to Reach Consumers

As providers' and consumers' choices for delivering and accessing audio (and video) content have proliferated, so too have advertisers' options for reaching consumers. BIA's analysis of the local advertising marketplace, for example, includes estimates of the shares of total ad market revenues for 16 different local advertising platforms. The digital revolution has disrupted both the local and national advertising markets, as advertisers increasingly spend their dollars with online and mobile outlets rather than with traditional media outlets. These shifts in the advertising marketplace are well documented.

BIA estimates that the share of local advertising revenues earned by online and mobile media rose from 7.6 percent in 2008 to 32.8 percent this year and will reach 41.9 percent in 2022. Mobile specifically is the fastest growing sector in local advertising due to its "ability to capture audiences of all ages based precisely on where they are and what they are doing, at any given moment." Looking at the local and national ad markets as a whole, Kagan estimates that the digi-

tal (online plus mobile) sector received 31.8 percent of total advertising dollars in 2017 and projects that digital's share will rise to 44.9 percent of the total by 2027.

A recent comprehensive survey of small and medium-sized businesses demonstrates the breadth of today's advertising marketplace and advertisers' general shift toward online platforms. While these businesses reported using a wide range of advertising platforms — from digital to direct mail to broadcast and print — the four most frequently utilized platforms were Facebook pages, websites, email and internet yellow pages, with notably fewer businesses using traditional media outlets, including newspapers, radio and TV (both broadcast and cable).

Further technological developments, such as the consumer adoption of smart speakers, will continue to expand the array of options available to advertisers.

Several familiar companies have capitalized on the digital disruption of the advertising market. Google alone earns close to 40 percent of all local digital ad revenues across all markets in the U.S., and Facebook and Google combined account for nearly 48 percent of all local digital advertising. As mobile ad revenue grows, social media outlets are expected to benefit, with Facebook expected to receive the "lion's share" of these ad dollars, followed by Twitter, Snap, LinkedIn and other popular apps. Audio streaming companies are also increasingly competitive in selling advertising, including targeted advertising. The advertising revenues of Pandora and Spotify have grown rapidly, with Pandora's ad revenues surpassing a billion dollars for the first time in 2017, while they also earn revenues from their subscription services.

[T]he market capitalizations of Facebook and Google — as well as Spotify and SiriusXM (even before its proposed merger with Pandora) — dwarf the market caps of many traditional media companies, including the highest-valued broadcast radio company and large TV station groups.

The second major section of the NAB comments argued that "radio stations today operate in a fundamentally altered competitive landscape," that local stations face real and growing challenges in attracting audiences in this landscape and face growing pressures on ad revenues, and that small-market and AM stations in particular struggle with these trends.

The authors concluded that the FCC's report — and its overall policies toward broadcast radio — "must fully reflect this proliferation of audio content providers and their real-world impact on AM and FM radio stations."

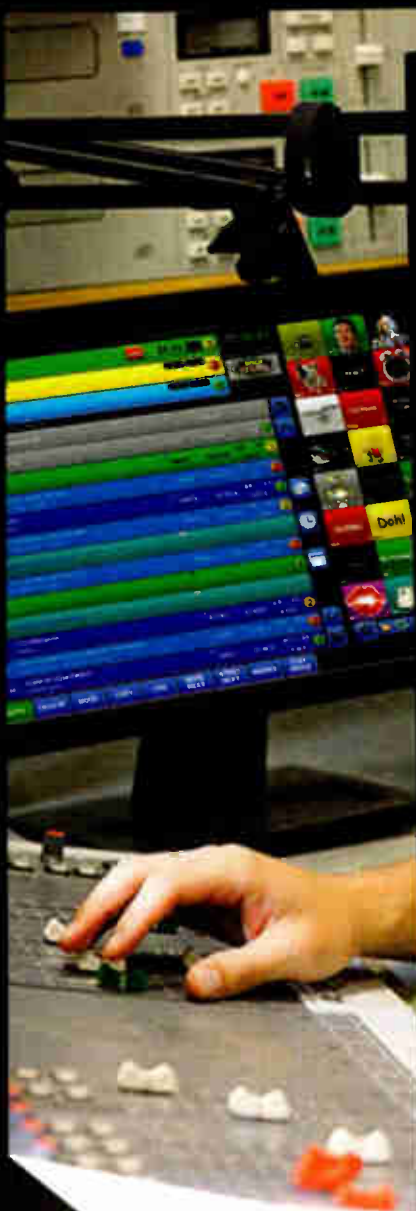
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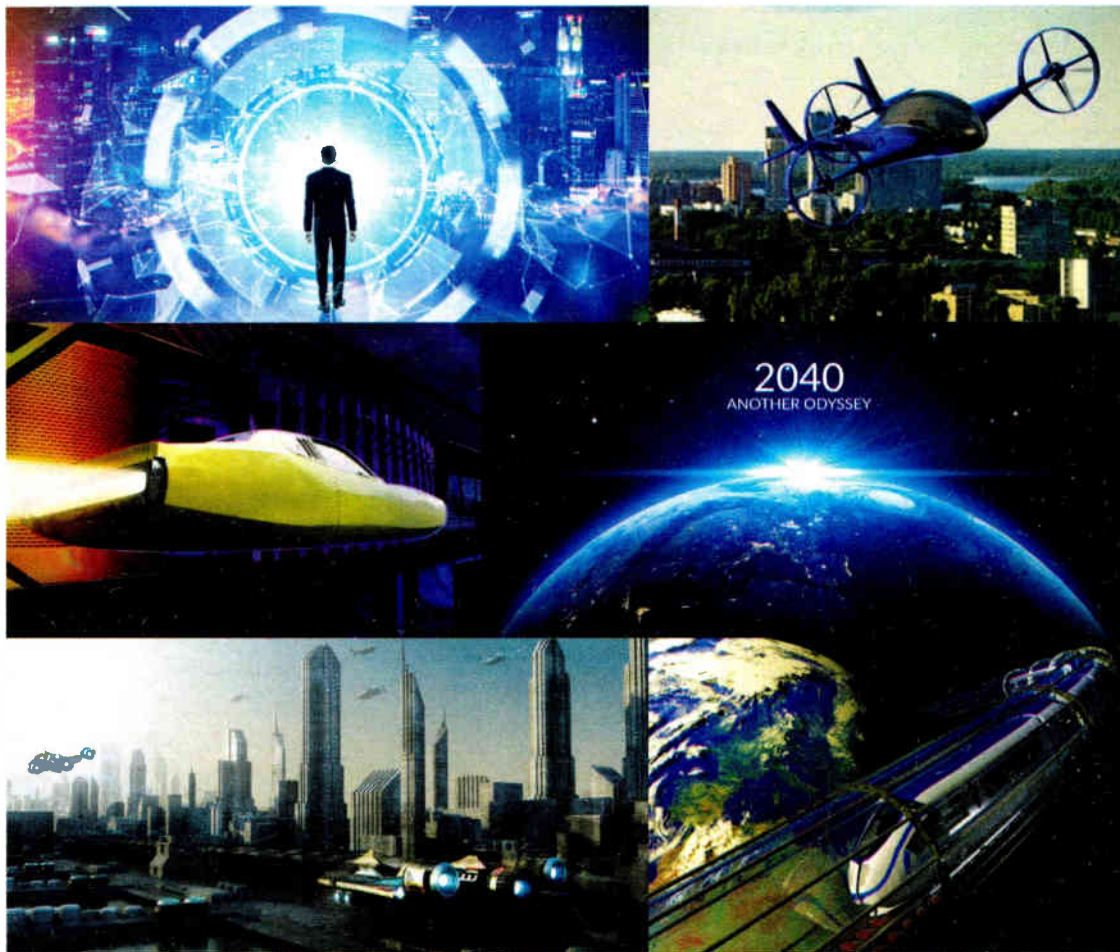
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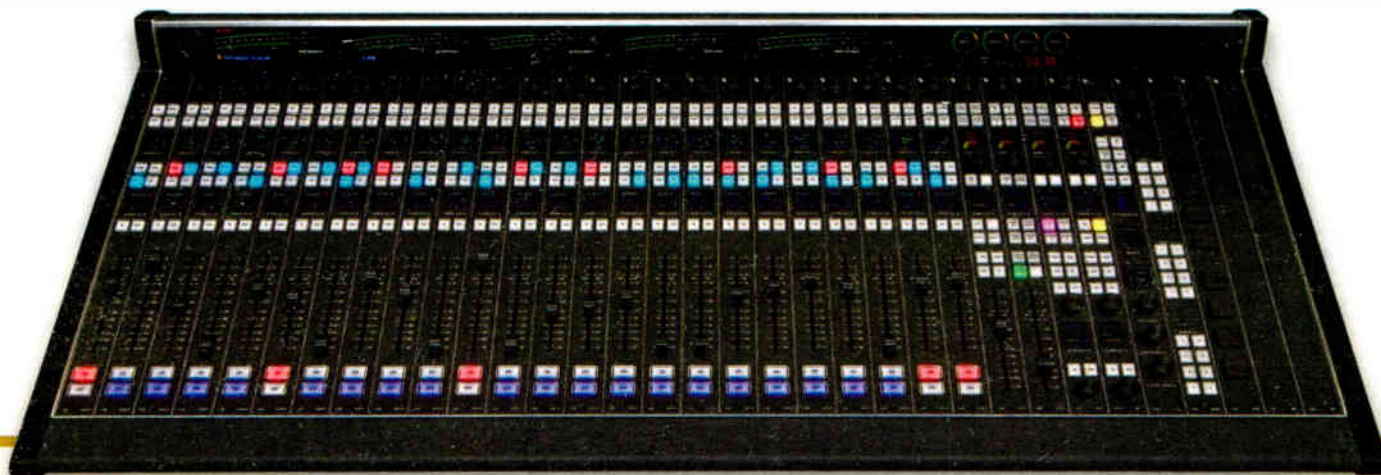
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