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# Iowa gets SMARTS

## State broadcast association honors John and Jan Schad



Paul McLane  
Editor in Chief

# A

As an advocate for a vibrant broadcast technology marketplace, I'm always glad when I learn that a longtime supplier has received

kudos from their colleagues or clients.

So it's nice to share news that at its 2022 annual convention in Altoona, the Iowa Association of

Broadcasters inducted the founders

of SMARTS Broadcast Systems, John and Jan Schad, into its Hall of Fame.

SMARTS Broadcast Systems has its roots at KEMB, an FM station that the Schads ran for 13 years in Emmetsburg, Iowa. John worked as morning show announcer, news reporter and president; Jan ran traffic, billing and sales. Their three children were also involved.

The automation software they developed for their station formed the basis of their company, which formed in 1989 and has provided products to more than 1,000 stations.

John Schad remains president/CEO today; Jan Schad passed away six years ago. The firm has 17 employees, including son Johnny Schad and daughter Peggy Stolley, and is still based in Emmetsburg. Later the Schads also helped the local Chamber of Commerce secure a license for an LPFM station, which continues in operation today.

Congratulations to the Schads and their company family. Shown below, from left, are Jeanne Schad, Peggy Stolley, IBA board member Bernadette Merrill, Johnny Schad, John Schad, Dave Potratz, Debbie Kribell and Kathy Roethler.

To read my 2019 interview about trends in automation with Johnny Schad and Debbie Kribell, visit [radioworld.com](http://radioworld.com) and type either of their names into the search field. 📻



## THIS ISSUE

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## On the cover

Mentor Mark Persons and mentee John Loven. See page 24.

**PEP UPGRADE:** FEMA and Audacy unveiled the latest upgrwaded Primary Entry Point facility in New Orleans, shown at right, part of an ongoing effort to harden the Emergency Alert system infrastructure. The “all-hazards upgrade” was done at WWL(AM/FM). It is the 15th radio station to work with FEMA in this series of upgrades. There are 77 PEP stations. The upgrades include increased sheltering capabilities, expanded broadcast capacity and sustainable power generation for all types of hazardous events.

Courtesy/John Kennedy/Audacy



in March. Though puny compared to the TV deals, that \$18.8 million transaction is still the largest radio transaction since 2019.

**CLASS D EXEMPTION:** The FCC clarified a question about public inspection files for Class D FM stations. Nonexempt NCE stations are required in their online public files to include a list of programs showing their most significant treatment of community issues during

**STATION DEALS:** The first quarter of 2022 was a big one for broadcast station sales in the United States, which reached \$11.05 billion, their highest volume by dollar amount in almost three years, according

to data from Kagan, the media research unit of S&P Global Market Intelligence. But most of it was due to one TV transaction, the plan led by Standard General to take TEGNA private. The largest radio deal in Q1 was the acquisition of Cherry Creek Media LLC by Townsquare Media Inc., announced

the previous three months. But the rule did not define “nonexempt” or clarify which stations are exempt from that requirement. In a new order, the FCC now has clarified that Class D FMs do not have to comply. There are about 100 such stations in the United States. 📻

4

An advertisement for Burk Technology. On the left, the text "GET 3 FREE" is displayed in large, bold letters, with "GET" in white and "3 FREE" in red. On the right, there is a photograph of a black rectangular device, the ARC Plus Touch, with a digital display showing "0.0" and the Burk Technology logo. The background is dark blue with abstract white wave patterns.

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Writer



Randy J. Stine

Radio World's lead news contributor wrote about hybrid station operations in the July 6 issue.

# The NRSC has been busy

Current efforts include AM noise and metadata for streaming

**T**he National Radio Systems Committee has been busy with several initiatives, including the release this spring of an EAS guideline for FM stations and ongoing examination of the sources of noise on the AM band in the United States.

The NRSC, which held meetings during the NAB Show in April, is sponsored jointly by the National Association of Broadcasters and the Consumer Technology Association. The group aims to help broadcasters and receiver manufacturers come together to find solutions to common problems in radio broadcast systems.

The EAS guideline adopted in April sets forth recommendations regarding how broadcasters can best implement EAS functionality at their facilities. The action was taken at the first series of NRSC Subcommittee meetings to be conducted face-to-face at an NAB Show since 2019, according to David Layer, NAB VP of advanced engineering technology.

The EAS document does not represent a requirement for compliance to any standard.

However, the group hopes that broadcasters, automation software vendors, transmission equipment manufacturers and consumer electronics manufacturers will find the recommendations in the document useful.

The NRSC's Data Services and Metadata Subcommittee, chaired by Steve Shultis of New York Public Radio, adopted the guideline "Best Practices for Delivering Emergency Alerts and Information for FM Radio Broadcasters" (NRSC-G303).

The document includes technical information about radio broadcaster participation in EAS, as well as background information on the FCC rules pertaining to EAS and the infrastructure used to generate alert messages.

Methods of delivery of both EAS messages as well as lifeline emergency information provided by radio broadcasters are discussed in the document, Layer said.

The guideline includes a special focus on using metadata over FM radio signals, Layer said, including both analog and digital. NRSC noted the number of FM signals nationwide — about 13,000, plus another 9,000

## Quu and As

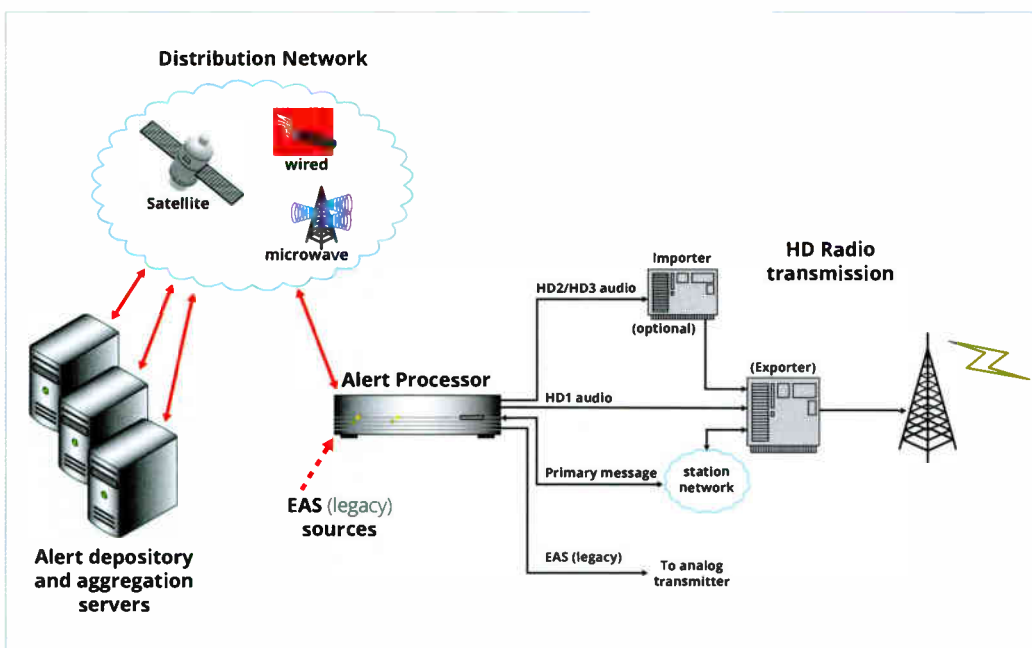
**Q:** What is Quu and why does my station need it?

**A:** Quu makes it easy for radio stations to sync industry-standard artist info, programming, and ad messages for both RDS and HD displays in the car. It's a cloud-based engineering solution, a programming benefit, and a sales opportunity.



**“ The EAS guideline includes a special focus on using metadata over FM radio signals, including both analog and digital. ”**





**Above**  
A graphic in the NRSC document, recreated here, depicts how a digital radio station can implement HD Radio's enhanced emergency alerting functionality with the introduction of an Alert Processor that receives alert content from an authorized source, then generates the primary alert message and any accompanying audio or visual images. The alert message is sent from the Alert Processor to the HD Radio Exporter or, in the case of stations that have implemented other advanced services, the HD Radio Importer.

translators and boosters — and said the service's "ubiquitous and pervasive infrastructure" makes FM especially important following a natural disaster.

In the document, the NRSC acknowledges that reception and proper display of metadata is highly dependent on the receiver, but said that metadata "sent using RDS is more likely to be used by listeners as there are a large number of RDS-equipped receivers in the marketplace."

In addition, metadata provided over the HD Radio digital radio system will be useful for listeners who have HD Radio receivers, though these are fewer in number.

The guideline work was conducted within the Emergency Alerting and Information Working Group, chaired by Matt Straeb of Global Security Systems.

The document can be found at [www.nrscstandards.org](http://www.nrscstandards.org) under the Standards and Guidelines tab.

The EAS guideline includes discussion of RDS best practices; the implications of locating broadcast functionality in the cloud; HD Radio broadcasting; support of the HD Radio Emergency Alerts feature; and considerations for hybrid radio systems, including DTS AutoStage.

The Federal Communication Commission has been working on upgrading the Emergency Alert System in the U.S. It also recently updated its rules to increase the reliability, speed and accuracy of Wireless Emergency Alerts.

## Other activities

Layer said the principal activity in the DSM Subcommittee is in its Metadata and Streaming Working Group, chaired by David Bialik, president of David Bialik & Associates.

The group has begun work on another NRSC document, NRSC-G304, "Metadata for Streaming Audio Guideline." It will aim to assist radio broadcasters in supporting their audio streaming operations and better coordinating the use of metadata for over-the-air and streaming signals. This will be the first streaming-focused document developed by the NRSC, Layer said.

The guideline will focus on the HTTP livestreaming (HLS) method of audio streaming, which has become the de facto standard within the radio broadcasting industry, he said.

Meanwhile, the AM and FM Analog Broadcasting Subcommittee, chaired by Martin Stabbert, vice president of

engineering for Townsquare Media, is studying several topics of interest to AM broadcasters, including the benefit of having AM carriers from different stations synchronized to help reduce co-channel interference from skywave propagation.

Layer said work also continues on a compendium of studies characterizing RF noise in the AM band with the goal of educating broadcasters, the Federal Communications Commission and others as to where all the noise is coming from.

Much of the AM discussion is being coordinated by the AM Improvement Working Group, chaired by Brian Henry, president of Henry Communications.

Meanwhile, the NRSC's Digital Radio Broadcasting Subcommittee — co-chaired by Glynn Walden, consultant to Audacy, and Jackson Wang, president of e-Radio Inc. — is focused on continuing developments with in-band on-channel digital radio, Layer said.

The IBOC Standards Development Working Group, Layer said, is developing a guideline for all-digital radio operations on the AM band, and updating the NRSC-5 In-band On-channel Digital Radio Broadcasting Standard, as part of a mandatory five-year review process. That update, which describes the Xperi HD Radio system, is expected to be completed by the end of this year.

The update includes new FM-band modes of operation, both backward-compatible and non-backward compatible, which would increase the digital capacity of radio stations and could be used, for example, to support the types of services found in the "Internet of Things," Layer said.

Xperi is submitting updated reference documents for review by the IBOC standards group, which is chaired by Alan Jurison, senior operations engineer at iHeartMedia.

The next meeting of the NRSC is scheduled for Oct. 18 in conjunction with NAB Show New York. 🌐



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World Radio History

**Writer**  
James  
Careless



### Read the Guidelines

Access a PDF at  
<https://tinyurl.com/rw-distract>.

# WorldDAB tackles driver distractions

Issues recommendations for stations to make visuals safer

**D**river distraction is a threat to public safety, says WorldDAB, and improperly designed graphics on car entertainment screens are part of the problem.

To mitigate this threat and the possibility of government regulation, WorldDAB has created Driver Distraction recommendations for stations to make in-car visuals safer and less distracting. They were presented during a WorldDAB Automotive conference in London.

The presentation began with Harman Project Manager Tuner Development Rüdiger Hentze putting safety issues into context.

"In the ranking of traffic accidents, driver distraction is in the top 10," he told delegates. "In Germany, depending on the statistics, it is between number 5 and 8 ... Mobile phones, radio systems and navigation are listed at main reasons for distractions. Our recommendation is to limit the distractions based on visual services."

Hentze noted that, in a car travelling at about 30 miles per hour, a driver looking at a radio display for just a few seconds is driving blind for roughly 100 to 130 feet.

He added that overly bright display screens close to the windscreen or on top of the dashboard can impair vision at night. In the worst scenario, "you will not see the person or any other barrier on the street."

## Reducing distraction

RadioDNS Project Director Nick Piggott said WorldDAB's Driver Distraction Guidelines can help radio graphics designers create safer visuals for in-car displays.

"We've identified three contributive factors to driver distraction: Legibility, relevance and frequency of updates," he said. "When designing for digital radio, we need to consider all three of those."

Legibility refers to creating on-screen song/artists titles and radio station information that is easy to read and understand with a quick glance.

"Some designers at radio stations really don't understand how their content is going to be displayed (in cars), which is in stark contrast to the very clear understanding they have of how things look on mobile and how things look on desktop," said Piggott.

"So we have far more detail in these driver distraction guidelines about how to design for screens in vehicles and how to check that your design's legible, and that is followed up with a similar piece of information for manufacturers on how to present that design legibly."

Then there's relevance: "Every time you update content on the screen, it will cause a driver distraction. So only put content on the screen that's really helpful to the driver ... We've also pointed out that it's important for manufacturers to update content without driver intervention. We know that there are some digital radios, for instance, that require the driver to interact with the radio to do things like (load) slideshows or read text, and that's making that distraction issue more of a problem."

The term "frequency of updates" refers to how often broadcasters refresh their in-car visuals. To maximize safety, they need to strike a balance between keeping listeners informed while minimizing how often they change their screens.

"We've recommended a 20-second refresh interval," said Piggott. "That means that a broadcaster knows how often they can send content. It also means that a manufacturer knows that they can implement blocking on bad broadcasters (who change screens more often than that) ... to protect from unnecessary driver distractions."

Piggott urged delegates to get the guidelines into the hands of radio station graphics designers now.

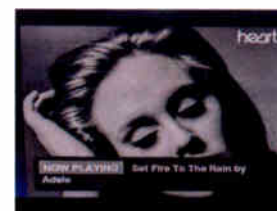
Rüdiger added, "We don't (want to) find ourselves being legislated, for when we could have regulated this ourselves much more easily."

## Example Visuals

34



- ✓ Text is legible
- ✓ Artist photo is clear / good quality
- ✓ Everything can be understood in 1 second



- ✓ Text is legible
- ✓ Artist photo is clear / good quality
- ✓ Everything can be understood in 1 second

world **dab**

**Right**  
An image from the guidelines shows best practices.



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John Bisset

CPBE

The author has spent over 50 years in the broadcasting industry and is in his 32nd year writing Workbench. He handles western U.S. radio sales for the Telos Alliance and is a past recipient of the SBE's Educator of the Year Award.



# Three steps to a more efficient A/C system

Also, a solution to our mic model mystery



## Your Tips Go Here

Email

johnpbisset@gmail.com

**H**ow are your studio and transmitter site air conditioning systems running? For the majority of our readers, this is the season when reliable operations is crucial. But maybe your management has cut your service contracts to meet reduced operating budgets. If so, there's a YouTube video that can help. It describes three steps you can take to ensure good cooling.

The first is to use a vacuum to clean the return vents of dirt and dust. Restricted air flow can hamper cooling.

The second tip is one that I've heard debated by engineers and air conditioning techs. The video suggests NOT using pleated high-efficiency air filters, but instead selecting the standard fiberglass ones.

The argument is about whether pleated filters restrict air flow and make a system work harder. Fiberglass filters may be fine for sites you visit regularly — like the studio — where they can be changed regularly. However, visits to transmitter sites may be several months apart. We've all seen the filth that the pleated air filters trap, especially in transmitters. Ask your air

conditioning tech or the manufacturer of your system for a recommendation.

The third tip is simple enough: Clean the outside condenser unit. The fins get clogged with dirt, dust and insects as air is drawn from the front, sides and back and pulled through by the top-mounted fan.

Disconnect the AC at the condenser. Using diluted dish soap, squirt the liquid through the vents — no disassembly needed. Allow the soap mixture to sit for a few minutes, then use a garden hose to rinse the fins, cleaning the dirt-encrusted suds from the unit. Rinse several times with clean water from the garden hose, though not at high pressure lest you damage or distort the fins.

This routine provided a cooling improvement of 10 degrees in the video. Not bad for an hour's work.

At YouTube, search "#1 Problem & Quick Fix with Central Air Conditioning Not Cooling" to find the nine-minute video.

## Mic mystery

Evan M. Tidwell is the general manager of WSHF(FM) in Muscle Shoals, Ala. ("Real Country 94.5, The Voice of the Shoals").

**Above**  
Use a hose and dish soap to clean condenser coils.

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

nautel.com



Evan writes that the picture from Dan Slentz that we published in June shows an RCA 4-AA condenser mic, manufactured by General Electric.

This model was introduced in 1928 to compete with Western Electric's 47-A condenser. The RCA designation is 4-A for the mic and an extra A for the "Announce" stand. The 4-AP version shipped with the "Program" floor stand.

The mic's multiple pins are to allow both the audio circuit to pass through the cable, as well as 6-volt and 200-volt supply voltages for the vacuum tubes.

When introduced, Evan says, this model was an impressive replacement for the carbon mics in use at the time. Many photographs of NBC and other studios from 1928 to 1933 show this microphone.

Once RCA introduced the ribbon or velocity mics in 1932, they quickly replaced most condensers.

Evan moderates the Vintage Radio Station Broadcast Gear group on Facebook, to which Workbench readers are invited. Evan welcomes readers to share photos of your favorite pieces. Remember to send them to us, too, especially if the mic is still being used!

Arizona Public Media Senior Broadcast Engineer Stephen Claasen also recalled this microphone model from a collection owned by his father, and remembers his dad identifying it as a condenser mic.

Unlike the electret condenser mics of the 1960s and later, the capacitive element needed to have an external charge on it continuously, and the output was quite low, so audio amplification was necessary. As Stephen remembers, the condenser element looked a bit like the carbon button mics, but internally it was different.

## Sniffing out AES signals

Those of us who have transitioned from the world of analog signals to AES and digital probably still remember the "Fox and Hound" signal tester.

The Fox was an audio signal generator clipped on one end of a wire, and the Hound was an inductive signal "sniffer" that identified the cable carrying that test signal.

Alan Colwell, CPBE, wrote to see if there was a piece of test equipment that can be used the same way but to identify AES signals.

System integrator Edwin Bukont, founder of E2 Technical Services and Solutions (*E2techserv.com*), reminded me of the Ward-Beck Bit Spitter and Bit Buddy. Sadly, they are no longer manufactured.

Ed says the next closest solution isn't cheap. Most devices that will generate a tone or silence for AES are video products, so they are AES3id. To get AES3, you would need suitable impedance transformers; then you need something to demodulate and "hear" the signal. That solution starts at \$2,000. It's not cheap, and not always that functional either. The good stuff is in the \$3,000+ range.



### Above

An image from the YouTube video with tips for getting the most out of your air conditioning.

### Left


Evan Tidwell gave us the scoop on this early RCA model.



Ed's best inexpensive solution is to buy StudioHub AES converters from Angry Audio and put one on each end of the circuit, coupled with a tone generator and a powered speaker.

For a single-box solution containing both a generator and a receiver, there is the Whirlwind Qbox-AES at under \$700. This is an AES3/AES3id box with a built-in speaker. It does require a separate analog tone generator to be used with the AES generator, so there is some added expense.

Finally, depending upon your needs, another option may be to get a USB-AES sound card for a PC or laptop and use the free audio tone generator and edit software to generate a tone and monitor it.

Let me know if you have discovered any other solutions. 

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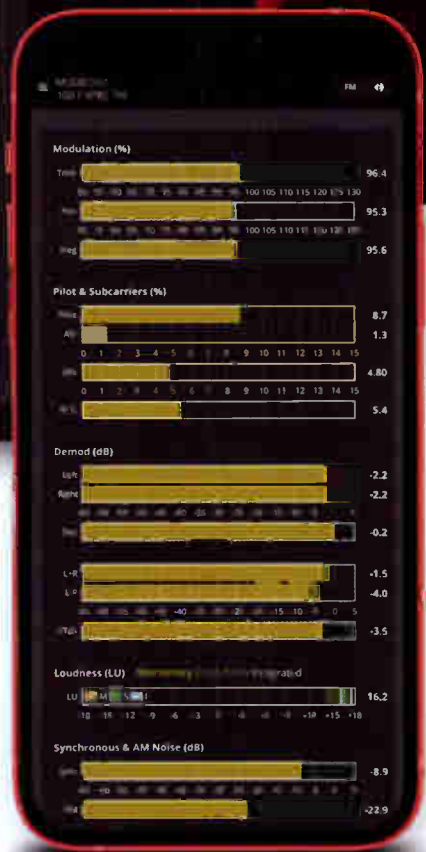
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# RadioPix deploys behavioral intelligence

System supports creation of dynamic visual content

**B**roadcast Pix, founded in 2002, offers toolsets that are used by broadcast government, live event and other specialty businesses. Graham Sharp is CEO.

"Supply Side" is a series of occasional interviews with providers of products or services about their businesses and offerings.

**RW** You describe RadioPix as "the complete system for visual radio."

**Graham Sharp:** RadioPix systems come complete with everything your station needs to start creating dynamic visual radio content, including two RoboPix cameras — simple to install and compatible with radio automation software, Axia and Wheatstone consoles. You can start streaming great images of your radio show in minutes.

**RW** Briefly what sets it apart?

**Sharp:** Behavioral intelligence automates the production process, using voice-detection to ensure all your shows look dynamic and interesting. When audio is detected from a microphone through either the analog or Dante interface, media-aware macros can be triggered to change camera positions, roll clips and animations, add or remove titles, and even execute sophisticated compositions.

It's loaded with relevant content, such as clips, stills and graphics templates. The system can store 60 hours of content, so there's plenty of space for your own content as well.

RadioPix can be used to start broadcasting and streaming straight out of the box, but two hours of consultation support is included to assist in importing the station ID, build the look and program the behavioral intelligence.

With full streaming capabilities and access to your own secure, cloud-based media management portal, you can reach a wider audience with online video and stream to Facebook Live, YouTube Live, IBM, Livestream or any CDN with a RTMP address.

**RW** What trends have you seen in how stations are using this kind of tool?

**Sharp:** More and more radio stations are streaming their shows, driving more interest and creating new



“More and more radio stations are streaming their shows, driving more interest and creating new sources of revenue through sponsorship and advertising opportunities.”

sources of revenue through sponsorship and advertising opportunities.

**RW** Are there misconceptions you'd like to dispel?

**Sharp:** Streaming video is not complicated with RadioPix, which is very easy to set up and use. And it can be controlled by the host using a configurable touchscreen user interface or any kind of MIDI controller, such as a foot switch. **R**





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NAB owns the 11-story, 118,000-square-foot building and occupies six floors, leasing the rest. There is a conference center on the top two floors and retail spaces on the first floor. The LEED Silver building was designed by architectural firm HOK (which also did the new BBC Studios headquarters). It is located in the new, very popular Capitol Riverfront neighborhood.



Photo by LG Business Solutions

Writer

Paul  
McLane  
Editor in Chief

# A new home for broadcasters on the Hill

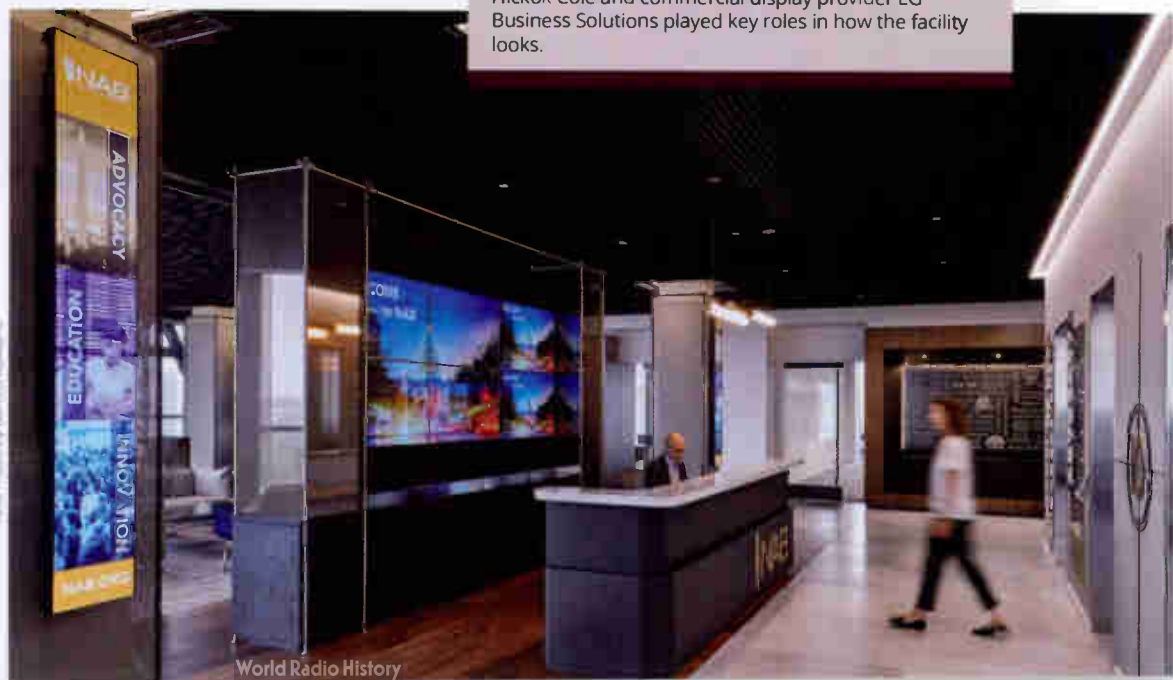
Inside NAB's shining headquarters in Washington

**R**ecently on Radio World's website, I shared photos of the new headquarters of the National Association of Broadcasters at 1 M Street Southeast in Washington. Here's a sampling; you can see more photos at [radioworld.com](http://radioworld.com), search "NAB HQ."

You want to make a bold first impression on a visitor. Here's the NAB lobby on the 10th floor. This large reception area and its striking video display have a lounge area with skyline views as a backdrop. Technology solutions provider Diversified, audiovisual consultant Miller, Beam and Paganelli, design firm Hickok Cole and commercial display provider LG Business Solutions played key roles in how the facility looks.



Signs on the bathroom doors reflect a bit of whimsy.



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Large touchscreens on one side of the lobby highlight the radio and television recipients of the NAB Broadcasting Hall of Fame. The old NAB lobby had nice but traditional bronze plaques. This multimedia experience is a dramatic upgrade.

This exhibit uses five 55-inch 4K UHD LED displays in a 5x1 configuration, with the touchscreen overlay so you can navigate the content. When you stand there you really want to play around with it.

Early inductees of the Hall of Fame like Ronald Reagan are remembered with photos and audio clips. The display also includes acceptance speech videos by more recent honorees like Delilah.

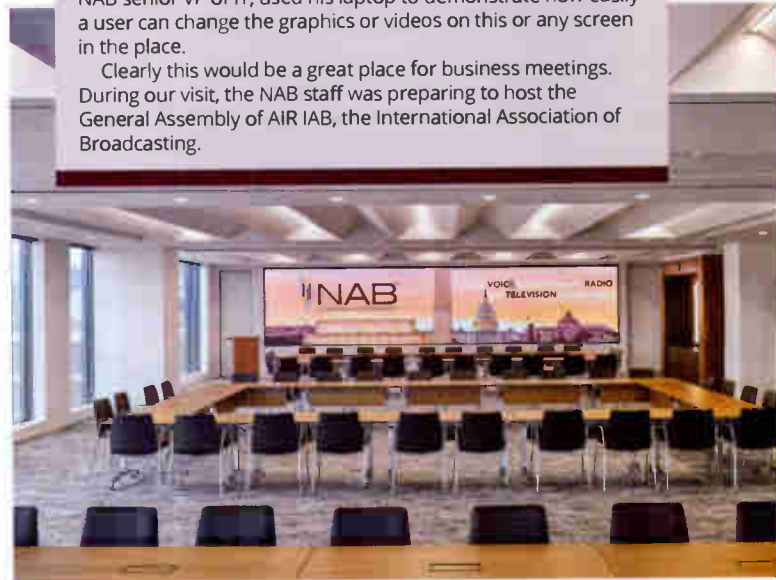


Signage and branding throughout are top-notch. The sophisticated system of monitors, screens and projectors allows a great deal of customization of meeting spaces and common areas.

On the 10th floor is a large multi-purpose Conference Center that can be divided into three rooms with drop-down walls, shown below.

One end is dominated by an LG LED Signage UHD video wall. It is 32 feet wide, gulp. While taking us around, Michael Tow, NAB senior VP of IT, used his laptop to demonstrate how easily a user can change the graphics or videos on this or any screen in the place.

Clearly this would be a great place for business meetings. During our visit, the NAB staff was preparing to host the General Assembly of AIR IAB, the International Association of Broadcasting.





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## Site Visit



The hallways and offices also offer numerous fun visual references to radio, TV and film. Little things like that can leave a lasting impression. Here, note the treatment of the meeting room windows at left, reminiscent of a Golden Age radio, and by the elevator doors the countdown graphic that doubles as a floor number.



A new media production facility will be used to create national spots, branded educational content, PSAs, podcasts and material for NAB events and trade shows. The studio has a curved, 15-foot interactive video wall/backdrop, energy-saving LED lighting and robotic cameras.

Vice President of Media Production Michael Khatcheressian is an Emmy-winning producer so he knows how to use tools like this to maximum effect.

Logos on the large video display include companies that donated equipment and design services.

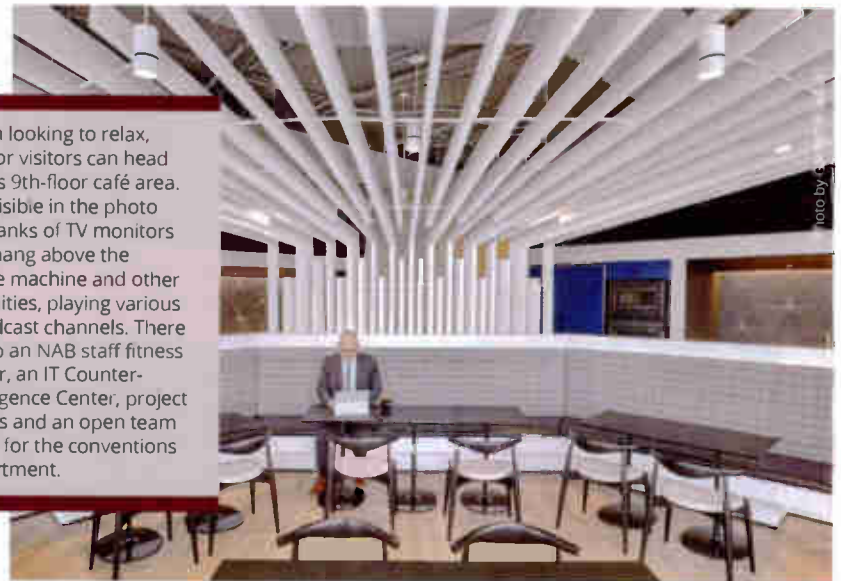
Photo by © iCLane



Near the studio is the new home of the NAB Technology Lab. Motto on another wall: "We improve lives through broadcast technology and broadcaster innovation."

The large room has equipment for testing and research work in video and radio. David Layer, well known to Radio World readers, is vice president, advanced engineering. He's shown demonstrating the lab's radio test bed, which essentially constitutes three AM and three FM air chains. This gear has been used in lab testing of all-digital AM HD Radio and in verification of MP11 mode for FM HD Radio. Until the new headquarters opened, this equipment had resided at the offices of consulting firm Cavell-Mertz & Associates in northern Virginia.

© iCLane



When looking to relax, staff or visitors can head to this 9th-floor café area. Not visible in the photo are banks of TV monitors that hang above the coffee machine and other amenities, playing various broadcast channels. There is also an NAB staff fitness center, an IT Counter-Intelligence Center, project rooms and an open team room for the conventions department.

Photo by © iCLane



We finished our tour on a nice patio venue on the 9th floor for events or meetings when weather allows. This outdoor area overlooks South Capitol Street to the left; here we are facing to the north and can see the U.S. Capitol.

The skyline in this part of town is changing so fast that you never know if a given view will still be there in a year or two, though there is an historic church right across M Street whose low profile should assure that at least part of this viewscape remains open.

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Writer



James Careless

The author wrote here recently about HD Radio uptake among Canadian stations.

# The evolution of the emergency radio

From AM-only portables to multi-function machines

**W**ith the advent of the 9V battery-powered transistor radio in the 1950s, the “Emergency Radio” was born.

Unlike vacuum tube receivers with heavy batteries or unpowered crystal radios, these handheld AM portables were small and simple enough to keep in a drawer. They could then be retrieved whenever man-made or natural disasters knocked out the power, providing listeners with lifeline connections to news, weather and relief information.

Since that time, emergency radios have evolved into multi-functional information/survival platforms. Models made by manufacturers such as C. Crane, Eton Corp., Kaito Electronics, RunningSnail and Sangean, among others, offer so many useful features — including AM/FM/Weather bands, hand-crank and solar rechargeable batteries, and built-in flashlights — that they have become the Swiss Army knives of radio receivers.

## What inspired the change

According to people who design and manufacture emergency radios, it was the Baygen Freeplay Wind Up Radio that transformed this industry’s technological thinking in the 1990s.

It was based on a clockwork-powered electrical generator developed by U.K. inventor Trevor Baylis. The

Alert, in 1992 after experiencing three large earthquakes in 17 hours.

“Communication and services, including electricity, were hopelessly overloaded,” said founder Bob Crane. “We vowed to make a good emergency radio so we would never be in this situation again.”

Joining them in this space was Eton Corp.

“We started making emergency radios 30 years ago and selling them to households across the country,” said Esmail Amid-Hozour, founder and CEO. “The first radio we made was the AM/FM/Shortwave (SW) FR200 with a built-in LED flashlight. We have now developed the ninth generation of this radio.”

As sophisticated emergency radios caught on, other manufacturers entered the market.

“We started to design and manufacture emergency radios in the early 2000s as a response to the tragic incidents and natural disasters that have occurred globally during that time, starting with the hand-cranked AM/FM MMR-77 with built-in illumination light,” said Andrew Wu, Sangean’s marketing manager.

“Our target markets were consumers in the United States and Europe.”

Sheldon Wu, sales representative with RunningSnail, said, “We believe everyone deserves to survive in a natural disaster. Therefore, we began to research and produce emergency radios in 2013. The first RunningSnail emergency radio was the MD-088, which comes with AM/FM/NOAA, 1000 mAh battery, LED flashlight, solar panels and hand-cranked generator.”

## Parade of innovations

The evolution of emergency radios has been a parade of never-ending innovations, many of them developed by Kaito’s Walter Zhao. “In 1999, we were the first company to

Below  
C. Crane’s CC  
Radio Solar

Below right  
RunningSnail’s  
MD 090





## Consumer Electronics



power generated wouldn't do much more than maintain a very low charge in the battery, but at least solar power could keep it from going dead."

But Kaito isn't the only innovator. "When we first carried the Baygen Freeplay, we modified it to add an LED light, which is now a standard feature for wind up radios," said C. Crane CEO Jessica Crotty.

"The other improvements that have occurred over the years include better reception and audio quality in addition to solar power generation capacity, longer-running rechargeable batteries, brighter LED flashlights, and now the ability to charge smartphones."

Said Eton's Amid-Hozour, "We started with a very basic weather radio. We then added more battery capacity, better dynamos, solar power, smartphone-charging capability, IPX4 standard weather resistance, Bluetooth capability, increased battery size to charge tablets, ambient lights in addition to the original flashlight, and NOAA Specific Area Message Encoding (SAME) technology."

At Sangean, said Andrew Wu, "Initially our priority was to provide handheld radios with a hand crank to power up the device and receive broadcast news in emergency situations. In the following generations, we added more ways to power up the device such as a solar panel and USB ports, and upgraded the rechargeable batteries. A flashlight with different modes, digital tuning and clock features were also included for more versatile everyday usage along with Weather Alert functions."

Sheldon Wu said RunningSnail is "constantly optimizing and upgrading our product functions to better respond to emergency situations. For example, we have added a Weather Alert Function, allowing monitoring weather alerts 24 hours a day to protect you and your family even if you are sleeping. We also added SOS Alarm Function, to set off a very loud alarm that easily catches others' attention to ask for help."

Kaito Electronics appears to offer the most features found on emergency radios. In addition to all of the features mentioned above, the AM/FM/SW/Weather Kaito Emergency Radio Voyager Max KA900 comes with dual speakers and stereo sound reproduction, a built-in MP3 player and audio recorder, and telephone-style direct-entry

**Left**  
Eton Scorpion II is shown charging a phone.

**Above**  
Sangean MMR-88

**Right**  
Kaito KA500

keypad for selecting stations. You can even load .txt files onto an SD card, put it into the KA900's SD card slot, and read them on the radio's monochrome LCD screen.

"If you want to read an ebook on your KA900, you can," Zhao said.

Of these many, many features, it is the ability to recharge smartphones that is driving emergency radio innovation. This is why manufacturers keep increasing the size and power capacity of these radios' rechargeable batteries, to provide users with longer smartphone use during emergencies.

"We deeply know that a dead phone can be life-threatening," said RunningSnail's Sheldon Wu. "This is why we are upgrading our original 1000 mAh batteries to 4000 mAh or 6000 mAh."

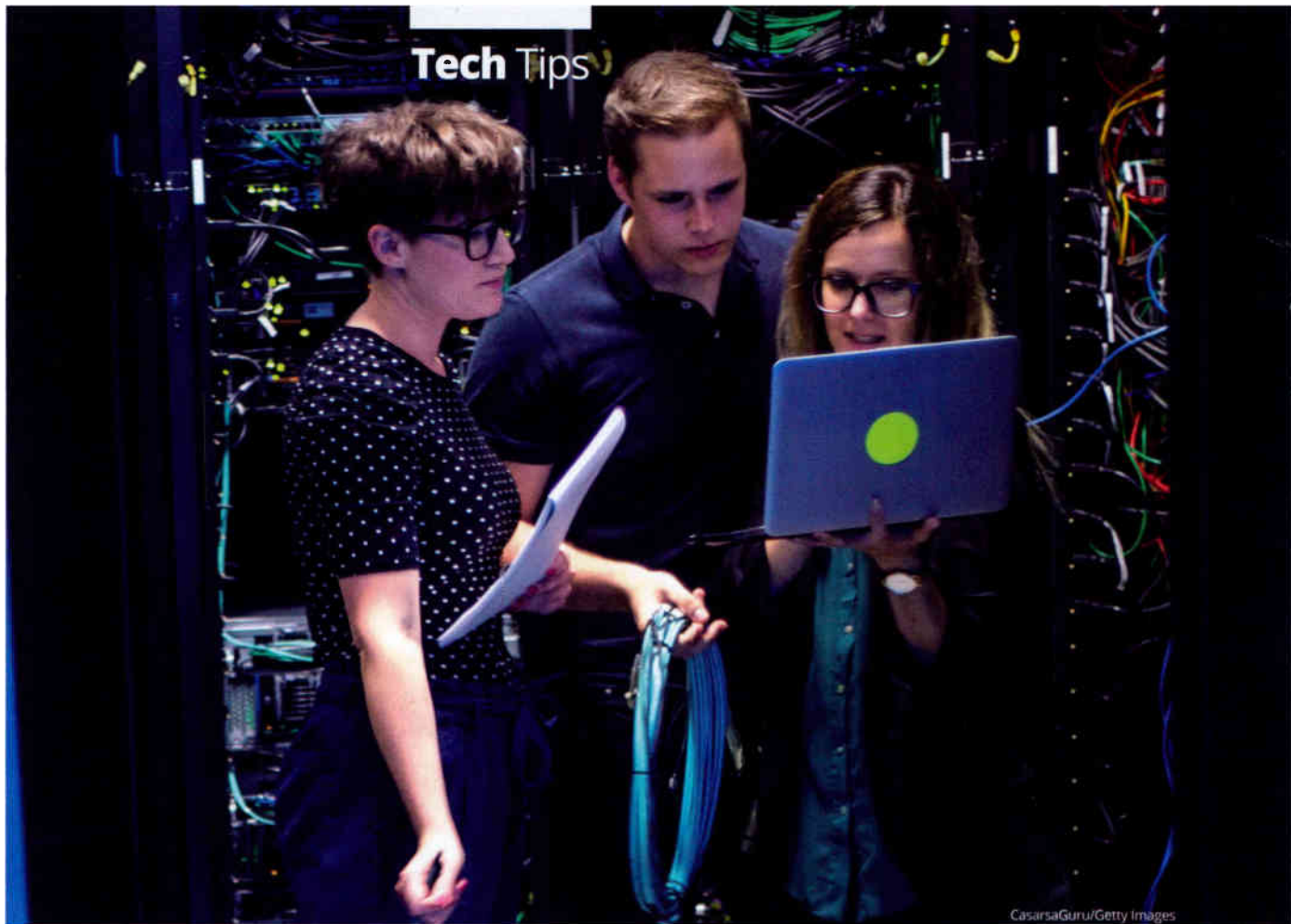
### What's next

According to manufacturers, sales of emergency radios tend to rise and fall in response to world events. For instance, "The demand for emergency radios increased due to the pandemic," said Andrew Wu.

Manufacturers intend to continue to innovate. Walter Zhao wants to add an Alert FM emergency messaging receipt display to Kaito's high-end emergency radios. "Our R&D department is already working on this application," he said. Other manufacturers told us they continue to look for new features and improvements.

The unpredictable chaos of modern life is the ultimate sales argument for buying an emergency radio. "It's always smart to be prepared, especially in areas that are more prone to natural disasters," Andrew Wu said. "A quick charge, enough for a phone call, can make all the difference in the world." 📞

“A quick charge, enough for a phone call, can make all the difference in the world.”



CasarsaGuru/Getty Images

**Writer**



**Mark Persons**

**CPBE**

Retired broadcast engineering consultant and recipient of the SBE John H. Battison Award for Lifetime Achievement.



**Comment**

On this or any article. Write to [radioworld@futurenet.com](mailto:radioworld@futurenet.com).

# Your mentorship matters

A time-honored tradition of helping those in broadcast engineering

**A** story in Radio World late last year described broadcast engineers as “Gods of the Machines.” How true that is when so few people know the microphone-to-antenna technology in a broadcast facility.

Back in the 1950s and through the 1970s, Brown Institute and other schools taught answers to FCC exam questions without teaching the science. The requirement was to have qualified operators overseeing directional AM radio stations.

The FCC caught onto this scheme and finally deregulated the requirement for First Class operators to take transmitter and antenna readings.

Engineers trained by electronic schools have always needed help understanding broadcast architecture. I was fortunate to learn from my radio broadcast engineer father and engineers at nearby stations. I would pester them with questions while absorbing answers like a sponge.

They were my mentors. That gave me the knowledge and confidence to go out into the world of radio broadcast engineering.

Mentor/mentee is a teacher/student relationship of, in this case, the practiced art of broadcast engineering. I say art because it is more than electrons flowing through wires. The engineer needs to fit all the pieces together to make a station play. An expensive mistake makes for a hard lesson learned, but one that can be avoided again by passing the story along.

Radio World contributor and friend Buc Fitch said it right: “Mentoring is the transfer of the love and practice of the craft while internship is academically focused on learning the mechanics.” As a mentor, I try to convey the spirit of broadcast engineering.

**Walk the talk**

As someone who likes to talk, I frequently shared knowledge with others during my 60+ years of engineering stations.

When retirement was looming, I found two engineers who could work into the role of radio broadcast





## Tech Tips

engineering contractor. They even paid me to do classes on how to measure AM antenna resistance and do RF spectrum analyzer measurements.

Now they come to town to do work on the stations I engineered at one time. That's when I get a free lunch for offering advice.

The Society of Broadcast Engineers started the SBE Mentor program several years ago to bring along those new to engineering. I signed up and am now assigned to four mentees.

The most recent mentee is John Loven. He was hired away from the cellular industry to be the engineer for 16 Hubbard Radio facilities in central Minnesota. I built many and serviced all those facilities over the years. What a great fit for a mentor and mentee!

John came with a background in microwave RF, but AM antennas with coupling networks and phasors were somewhat of a mystery to him. This was a great opportunity for me to be a teacher and enjoy a great friendship along the way.

In the process, I've had to keep up with the latest broadcast engineering technology. As the mentees face problems, I help them and often learn from them while working out the answers. It is not always easy for an analog RF guy like me.

### In the beginning

It all starts when I find a mentee, or I am assigned one by the SBE. The first act is to schedule a one-hour phone call or an in-person meeting to talk about our strengths and weaknesses. We get to know each other before any advice is given.

In one case, I found the mentee was not a good match and asked SBE for a change. It is best to get off to a good start rather than suffering with a problem. The mentee also signs my form saying he or she won't sue if something goes wrong with my free advice.

I set down rules at the first meeting. That includes 8 a.m. to 5 p.m. Monday through Friday calls. Don't call

**“As the mentees face problems, I help them and often learn from them while working out the answers.”**



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from a transmitter in the middle of the night asking, "What do I do now?" Don't expect me to be always available. After all, even retired people have schedules. That is even more important for mentors who are still working for a living.

## On the job

When I have been able to be with a mentee at a jobsite, I resist the temptation to do the work. After all, the new person needs to learn the job, even if he or she is slow to catch on.

The first photo shows me explaining the engineering room at a studio to John Loven. He needed to understand the basic plan before proceeding with a change.

My biggest problem is keeping hands off the equipment. After all, the best approach is to explain how it is done and let the student learn by mistakes, just as I did years ago.

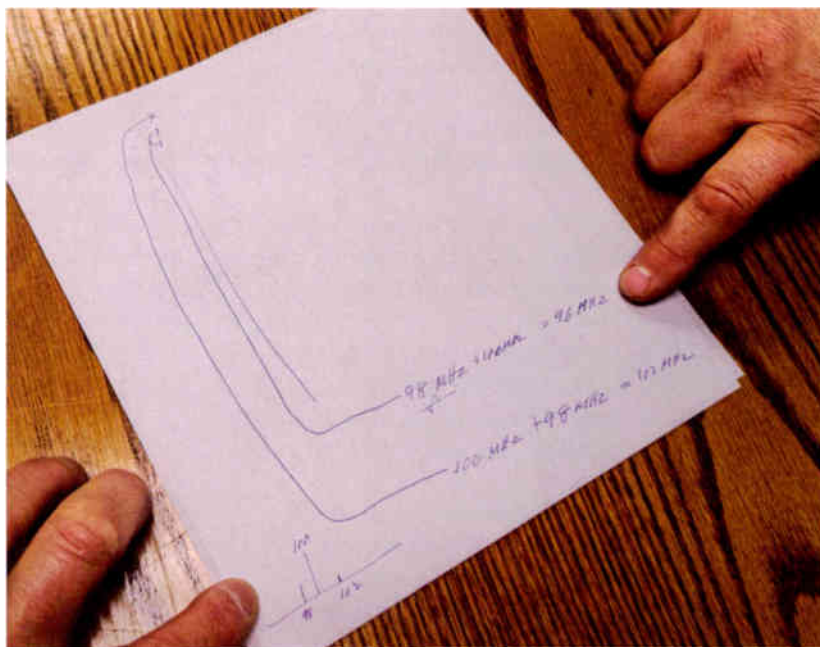
The second image shows a hand drawing and conversation during coffee, explaining intermodulation between two transmitters. It is the theory part before a spectrum analyzer is pulled out for actual measurements.

There is still a service bench at my place. I invited a mentee over with a tower light controller that needed repair. I talked him through troubleshooting and replacement of a failed resistor. Again, he did the work. I just guided him along.

In the process, he learned troubleshooting techniques while I instructed him on the best ways to do soldering. This made me feel good that it took just one inexpensive component to restore the equipment, rather than replacing the entire controller for big money.

There are times when a mentee will ask a question that is out of my area of expertise. That's when I go to my friends or a list of the other SBE mentors to find one with the right qualifications. I don't act as the middle person, just pass the name and contact information along. Then later I can hear how it came out.

I am not saying that all those who help others should be members of the Society of Broadcast Engineers. I am saying that the SBE has a good program that works.



Above  
Instruction over  
coffee

In the third photo, I was teaching others before the official SBE program began. Mentoring is an excellent idea that is the right thing to do. Amateur radio has had people like that since the beginning. They are referred to as Elmers.

## What did you say?

Be conscious of using buzz words, phrases and abbreviations that outsiders would not know, such as STL, ICR, AoIP, RF circular polarization, ground system, TPO, ERP, HAAT, composite audio and SCA. The list goes on. Explaining these is all a part of the teaching and learning process.

## Schools

The Society of Broadcast Engineers was a group of mostly men who got together to share ideas. Now it appears to be a group of men and women working, among other goals, to ensure the survival of the profession.

At last check, there are four SBE certified schools. Bates Technical College is one of them in Tacoma, Wash. SBE member Roland Robinson is one of two instructors teaching the subject there.

He says they start out with basic electronics, soldering and test equipment. They go on to audio and video, leading to system design and maintenance. Most students learn television broadcasting, video production and content delivery. Many quickly find themselves working at television stations in the northwest after graduation. Some have gone on to be radio broadcast engineers.

SBE certification exams are offered at the college as well. Roland said there is even an

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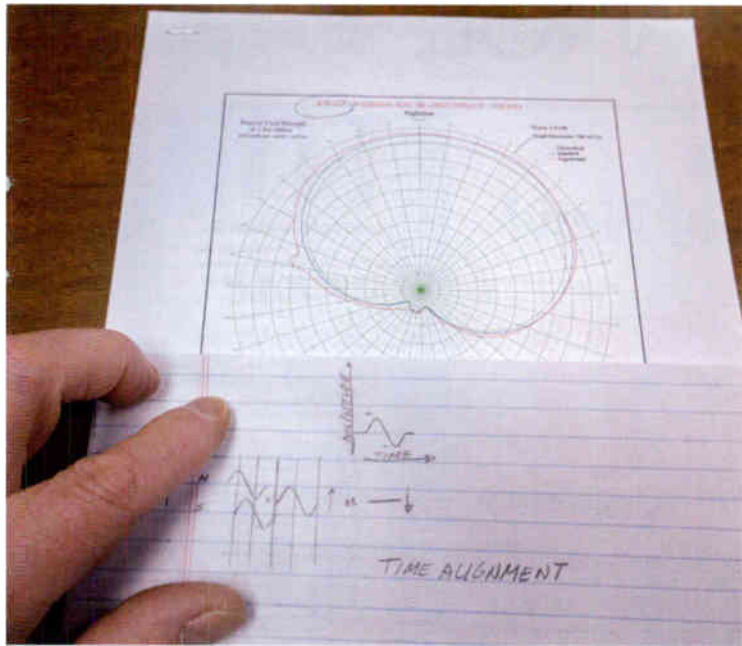
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amateur radio station at Bates for students to use. It is a great tool for learning RF propagation across all frequencies. See my article from 2021 titled, "Alike, but not alike: Broadcast vs. ham radio." Find it at [radioworld.com](http://radioworld.com), search "ham radio."

To help things more, the Society of Broadcast Engineers also now has the Technical Professional Training Program (TPTP) that I recommend to mentees. This training package

**Left**  
About that AM directional ...

**Right**  
Mentee Joe Offerdahl assembles an N connector.

offers a number of components to get new talent started in the field. At \$475 for a year, it is worth every penny.

The broadcast engineering community needs to do its part by passing along necessary knowledge to newbies so they can do the job. Broadcast engineers should give back to the profession that earned them a living.

Learn more at [sbe.org/mentor](http://sbe.org/mentor). The society also has useful information at [sbe.org/certification](http://sbe.org/certification), [/schools](http://sbe.org/schools) and [/tpt](http://sbe.org/tpt).

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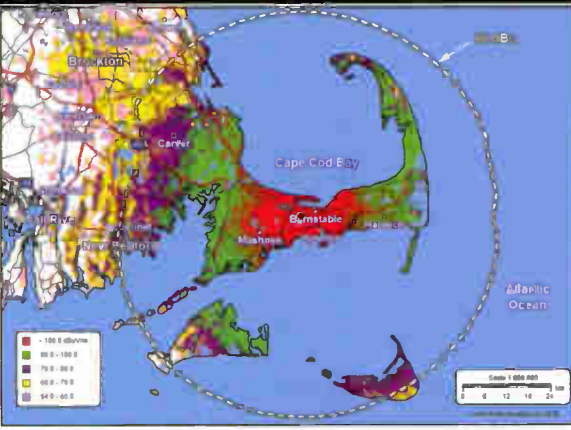
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Writer



David Houze

Product Manager, WorldCast Systems

# Let's improve radio's carbon footprint

Rethinking FM broadcast can also help drive cost savings

**G**lobal CO2 emissions from energy combustion and industrial processes rebounded in 2021 to reach their highest ever annual level, according to a March 2022 report from the International Energy Agency. In total, more than 36 gigatons of emissions were pushed over the air in 2021, a 6% increase compared to 2020.

Combined with worldwide increases in electricity costs, sustainable energy has become one of the greatest challenges facing radio broadcasters.

In the broadcasting chain, the transmitter represents the most impactful equipment as it continuously delivers a fixed output power to the antenna. In the FM chain, transmitters go from a few watts to dozens of kilowatts depending on the coverage area, landscape and radio listeners' profile.

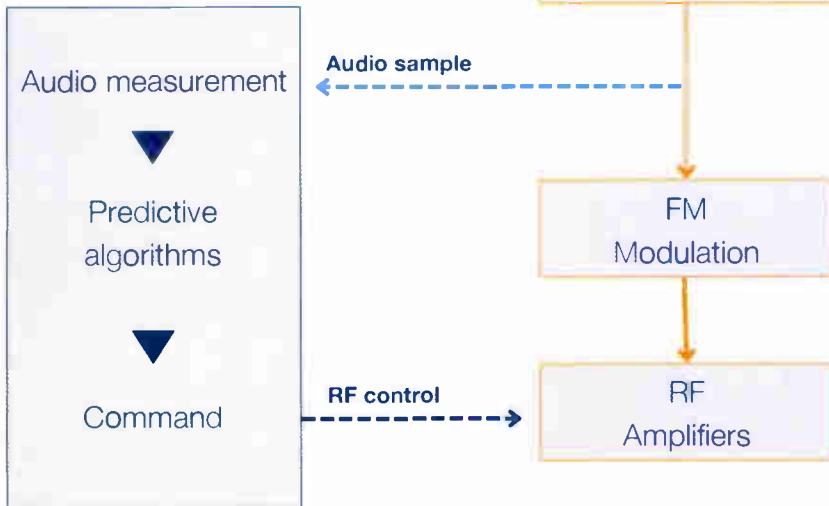
After years of innovation, the new generation of FM transmitters integrates state-of-the-art technologies, such as the most recent LDMOS generation with up to 85% efficiency or the new high-efficiency PSUs. Combined with embedded features (RDS encoder, sound processor, stereo encoder, audio over IP decoder), efficiency has increased up to 76% for the most efficient transmitters. But the physical component optimization is almost reached; efficiency is not going to increase anymore.

## A smarter way

To reduce FM transmitters' energy consumption, it is necessary to rethink the concept of FM broadcasting based on the incredible performances of transmitters and receivers.

A common misconception is that the technical objective of an FM broadcast chain is to transmit at a specific output

SmartFM



Above Elements Of SmartFM

power in order to cover a service area. The real objective is to deliver a high-quality and constant listening comfort for listeners over the entire service area.

Listening comfort can be summarized as the signal-to-noise ratio. Is the listener disturbed by the noise? Listeners' audio perception of the same noise ratio varies depending on the type of audio content. For example, with speech programs, the slightest disturbance will have a direct, negative impact on listening comfort. However, with highly processed music (covering the full audio spectrum), the noise will be easily covered by the signal itself. It is then possible to slightly reduce the signal-to-noise ratio without impacting audio perception.

WorldCast developed its SmartFM algorithm based on this concept. A psychoanalysis algorithm qualifies the robustness of audio content to perturbations. Then, when the signal is robust enough, the artificial intelligence adjusts the transmitter power accordingly.

This results in up to 40% electricity savings while maintaining listeners' comfort and service area.

Another major impact of SmartFM is to reduce the average heat dissipation of the transmitter itself. Consequently, the cooling system's electricity consumption is reduced proportionally to the heat reduction.

For example, the efficiency of a 10 kW FM transmitter on the market is about 74%, which means that the direct electrical consumption is approximately 13 kWh, 24/7. Total electricity consumption to feed one 10 kW FM transmitter during one year is then estimated at 120 MWh. With SmartFM, total consumption for the exact same system drops by 10% to 40%, a maximum reduction of 50 MWh per year for a 10 kW FM transmitter.



Readers' Forum

## A policy of non-help

In his letter "We'll Get Back to You" (<http://tinyurl.com/rw-service>), Michael Baldauf wrote, "I recently had to contact a major supplier of transmitters about an issue at a site where I am a contract engineer. I called but was told that no one would talk to me; I would have to send an e-mail, to which they would reply in the next three days."

If we have an issue at a site, this is an unacceptable response. We need to know the name of that major supplier. There is no need to keep it a secret if that is their policy. Inquiring minds want to know.

I realize that this "major supplier" could be one of your advertisers, but maybe the pressure would help convince them to change this policy of non-help.

Bill Traue, CSRE  
Bill Traue Technical Service  
Idaho Falls, Idaho

## You're only the customer

I laughed when I read Michael Baldauf's letter. I'm still waiting for someone at a certain major radio audio manufacturer to call me back with an answer to my question. I think it is going on three years.

When I originally called to ask if some parts were available for a particular model, the young woman said: "Oh, yes; I'll have someone call you back."

After several days without a word, I wound up repairing the bad switches and finding small bulbs somewhere via the internet.

I think that some of these companies are only interested in selling new, fancy, expensive equipment rather than helping one save some money by providing service after the sale. The college radio station where I volunteer does not have tons of money to buy new, fancy equipment all the time.

Michael is correct: Before recommending or purchasing critical equipment, check out the customer support, somehow, if you can.

Terry Babic

To help radio broadcasters reduce the electricity consumption of their FM transmission network and improve their carbon footprint, the industry must rethink the whole concept of radio broadcasting and continue to find new ways to innovate.



How to submit

Send letters to the editor to [radioworld@futurenet.com](mailto:radioworld@futurenet.com).





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