



# RADIO WORLD

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**Lokita Solutions**

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### POWER OF RADIO



• At the collegiate level, covering a presidential election is an unforgettable experience. — Page 29

## Possible C4 Upgrade Stirs Debate

Should the FCC move forward with a proposal to allow some Class A FMs to increase power?

### REGULATION

BY RANDY J. STINE

**WASHINGTON** — Opinions vary in radio circles on whether the Federal Communications Commission should move forward with a proposal to allow some Class A FMs to upgrade power levels from 6,000 to 12,000 Watts.

Some think the timing for the power boost is bad, following the rapid proliferation of FM translators and low-power FM stations in this country.

Others see it as a chance for hundreds of small-town FMs to double their effective radiated power, expand listening areas and tap into additional advertising revenue.

The idea of creating such an FM class has been bruited before. But Commissioner Ajit Pai sparked hopes at the 2016 Radio Show in Nashville when he said he's pushing for the commission to issue a notice of proposed rulemaking. His comments drew a lot of

industry attention.

Proposed Class C4 FM stations would be allowed a maximum effective radiated power level of 12 kW from a reference antenna height of 100 meters above average terrain.

"An NPRM would allow us to ask the

right questions, explore the advantages and disadvantages of the proposal and receive the review of all stakeholders. Then we would be in a better position to determine whether to implement this idea," Pai said at the Radio Show.

Observers say the commission could adopt either a notice of inquiry or a NPRM, the latter formally proposing a change in its rules. FCC officials

(continued on page 6)

## Dec. 21, 1906: A Very Significant Date in Radio

Laying broadcasting's foundation

BY JAMES E. O'NEAL

Although most of the history books completely ignore what transpired at Brant Rock, Mass., on Dec. 21, 1906, those of us with an interest in radio should mark it prominently on our calendars — one to celebrate, perhaps by hoisting a tankard of lager (Canadian) in memory of the individual who set the stage for radio broadcasting on that date 110 years ago.

I speak of one Reginald Aubrey Fessenden, a Quebec-born, largely self-educated scientist, who had endeavored to give radio a voice for many years and was finally ready to pull the wraps off of his invention and show it to the world that Friday afternoon.

Wait, you may say: Aren't you mistaken, wasn't that Dec. 24, 1906, Christmas Eve?

Well, yes and no. True, most of the

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Reginald Aubrey Fessenden

Courtesy State Archives of North Carolina

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Website: www.radioworld.com  
Email: radioworld@nbmedia.com | Telephone: (703) 852-4600  
Business Fax: (703) 852-4582 | Editorial Fax: (703) 852-4585

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**EDITORIAL CONTRIBUTORS**  
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CORPORATE DIRECTOR AUDIENCE DEVELOPMENT Meg Estevez  
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ASSOCIATE CIRCULATION MANAGER Michele Fonville

**SUBSCRIPTIONS**  
Radio World, P.O. Box 282, Lowell, MA 01853  
TELEPHONE: 888-266-5828 (USA only 8:30 a.m.-5 p.m. EST)  
378-667-0352 (Outside the US) FAX: 978-671-0460  
WEBSITE: www.myRWNews.com  
EMAIL: newbay@computerfulfillment.com

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

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# Lokita Solutions Explores "Content Companion" App

## Company says it uses FM radio, TV broadcast and on-demand clips to create business opportunity

### INNOVATION

BY TOM VERNON



Linking related content across multiple media platforms is a hot topic.

RTP Holdings is a two-year-old software startup based in Radnor, Pa. Its primary focus is location-based content engagement via mobile apps. The company's systems integrator name is Lokita Solutions. It also consults to large corporate entities, educational institutions, broadcasters and multichannel video program distributors.

Lokita Solutions came to the attention of radio when it was named as a finalist in NAB's recent Pilot Innovation Challenge. It says it uses FM radio, TV broadcast and on-demand clips to provide broadcasters with a "branded content companion application."

Founder and Managing Director Chet Dagit describes how Lokita Solutions' hyper-local content engagement can work for radio: "Someone listening

to radio in their car may hear about a celebrity attending a local event. They can pair the Lokita Solutions mobile app with the radio for on-demand listening, replaying the news as desired. When they arrive at home, they can pair the app with the TV to see what companion video content is available. They can also watch live video of the event's local news coverage. Finally, they can check out related video content that is available both on TV and online."

He said the emphasis for Lokita Solutions is to unify radio and TV broadcast, by using the mobile phone as a bridge between the two.

### CONTENT COMPANION

According to Dagit, the Lokita Content Companion, currently in concept demonstration phase, is designed to work with

both AM and FM stations and with support for analog and digital transmission.

There are two program sync methods used by the mobile app for the two primary functions. The first function is identifying the station, the program and its time. This can be done with audio watermarks and/or audio and speech recognition, or with RDS when the phone is already paired with the car radio. Then the mobile app optionally can activate the second function for extracting data from the radio signal for use by the mobile device. This second function is best done with RDS/RBDS car radios with Bluetooth on board or can also be executed with audio watermarks.

Once the Lokita app has executed either of these functions, it can operate independently from the station's broadcast signal using its mobile data connection and can receive further updates from the radio signal passed on through the radio receiver.

The most important thing, according to Dagit, is to have the Lokita app do all of this in the background for the user, so it is a one-click or one-gesture function with the phone by the user, so that there are no distracted driver implications.

### TV APPLICATIONS TOO

On the TV side, the Lokita Solutions mobile app takes advantage of the Advanced Television Systems Committee's ATSC 3.0 standard, which really comprises about 20 standards. Included

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Lokita Solutions allows users to engage with content on the car radio, pair it with a mobile app, and later pair the app with the TV to see related video, and then discover other content both on TV and online.

# Tell FCC What To Do About AM Boosters

Bureau appears to conclude there's nothing more to be learned; you can comment

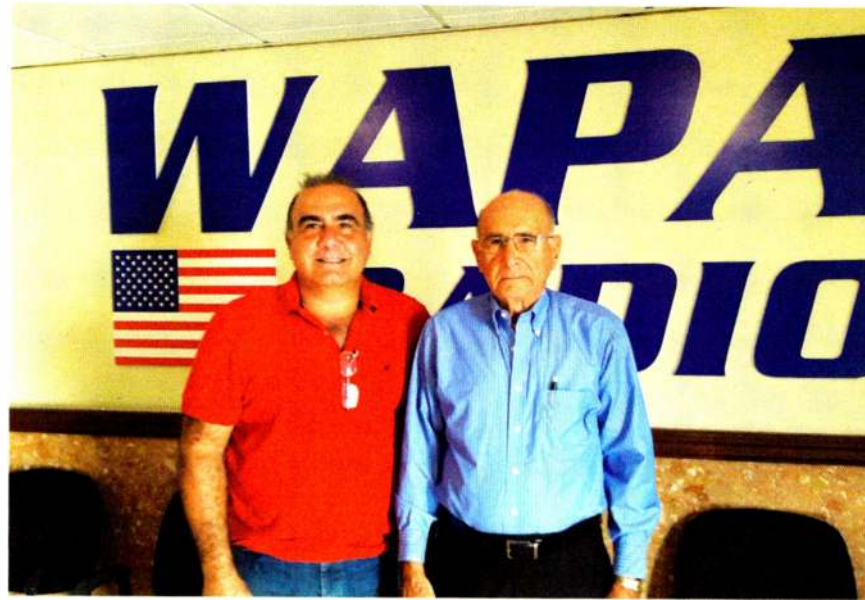
BY SUSAN ASHWORTH

Should the FCC allow AM synchronous booster stations to be licensed permanently?

AM operators and others have the opportunity to weigh in thanks in part to the urging of a broadcaster in Puerto Rico who has been using synchronous systems for years but is about to lose his experimental licenses.

The possible permanent licensing of such boosters has been an ongoing discussion within the industry. Some have lamented that formal licensing of boosters is not part of the FCC's AM Radio Revitalization efforts. But synchronous AM transmission is a complex technical issue; and some observers have said the motive behind some existing synchronous operations is not experimentation, as intended by the FCC, but rather increased coverage.

Wilfredo Blanco-Pi, along with his son Jorge, operates two AM stations in Puerto Rico — call signs WAPA and WISO — and has operated three boosters, W12XSO, W13XSO and WA2XPA, for years.



Jorge G. Blanco-Galdo, left, and his father Wilfredo G. Blanco-Pi are shown at the WAPA Radio Network studios.

In November, he received an FCC shutdown order for his synchronous stations, effective next May. In the letter, the Media Bureau told him that AM synchronous authorizations were

intended for temporary experimental operations but noted that his boosters have been in operation for 17, 14 and 13 years respectively. Apparently concluding there is nothing more to be learned

## FROM THE EDITOR



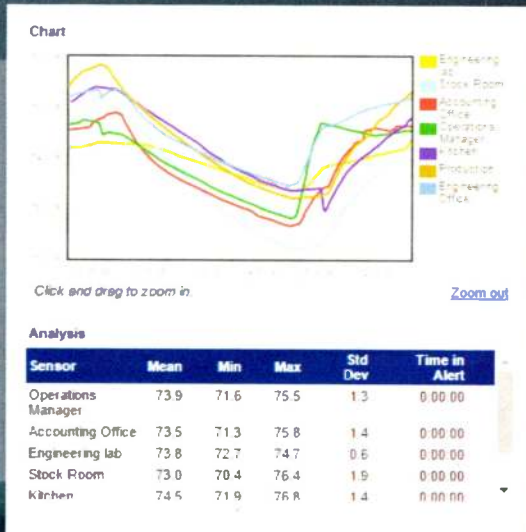
*It's fascinating to see how the commission has finally acted in this question of AM synchronous boosters. Given the talk about innovative AM revitalization approaches, I would have thought the FCC might instead encourage our industry to take a fresh look at the recommendations in the Kintronic paper mentioned, which is based on the Puerto Rico case. ... Let me know your thoughts about it to radioworld@nbmedia.com. Merry Christmas and happy holidays to all from your family here at Radio World!*

— Paul McLane

from those authorizations, it said it would renew the licenses for six months but that his authorizations then would be cancelled and the call signs deleted.

The FCC said that the temporary experimental licenses issued to AM booster stations were handed out to test that low-power co-channels can operate at the same time without objectionable interference. Having confirmed this assumption, the commission said,

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**OPINION**

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the licenses, which are limited under commission rules to five years, were cancelled.

Blanco-Pi had already asked for a rulemaking (read it at <http://tinyurl.com/rw-booster2>) and now has asked the commission to reconsider the cancellation.

"The action of cancelling abruptly the license of our synchronous boosters is a de-revitalization measure that would put in distress a small AM radio broadcaster," he wrote.

"I have invested over a million dollars throughout the years, and decades of work to improve the synchronous booster system," he told the commission. "And now, unexpectedly and hastily, the AM branch orders [us] to shut down all of our three AM boosters in

**The action of cancelling abruptly the license of our synchronous boosters is a de-revitalization measure that would put in distress a small AM radio broadcaster.**

— Wilfredo Blanco-Pi

six months." He said his system had been "applauded by engineers and specialists in AM transmission" including Tom King of Kintronic Labs (read their technical paper on that topic at <http://tinyurl.com/rw-booster>).

Blanco-Pi said that Commissioner Ajit Pai has encouraged others to experiment with synchronous boosters but that the FCC's action in his case would discourage such experimentation. He also balked at the fact that the FCC cited a five-year term to justify his cancellations yet the only requisites on the construction permits and licenses are an annual review and a note that the installations would be subject to the outcome of an eventual rulemaking.

The Federal Communication Commission now has issued a terse Public Notice of a window during which comments are being accepted until Dec. 29. Filers should use docket # RM-11779 (file at [fcc.gov/ecfs](http://fcc.gov/ecfs)).

Back in 1987, the FCC opened a notice of inquiry into synchronous technology in Docket No. 87-6. It urged

broadcasters to investigate the potential benefits of synchronous operation. In 1989 the commission declined to issue rules, citing technical uncertainties that could take years to work out, but said it generally would continue to authorize experimental authorizations in support of stations investigating the idea (read that at <http://tinyurl.com/rw-booster3>).

Now, despite the opening of a comment window, son Jorge Blanco-Galdo told Radio World in an email that he is not heartened. In his opinion, the FCC has shown no interest in continuing with AM boosters.

"The petition for rulemaking on making permanent AM boosters was made on January 2014 during the AM revitalization process. [and] the commission didn't include it in the NPRM [notice of proposed rulemaking] nor in the FNPRM [further notice of proposed rulemaking]."

He expressed frustration with the cancellation process and the way in which the FCC announced the comment period: "No statement by the Media Bureau, the AM branch or the commissioners is made encouraging

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## C4

(continued from page 1)

declined comment for this story about the proposal and whether further consideration is imminent.

## RM-11727

Matthew Wesolowski, licensee of WYAB(FM) in Flora, Miss., and David Honig from the Multicultural Media, Telecom and Internet Council, are co-competitors of the FM Class C4 proposal. In 2014 the commission took preliminary comments on their rulemaking request and assigned it a rulemaking number (RM-11727).

Wesolowski and Honig say there are many owners of small Class A FM "mom and pop" operations that are sometimes "just barely paying the bills." They estimated there are 800 Class A FM stations in mostly rural areas that could take advantage of the upgrade.

Wesolowski says hundreds of small-town stations across the country faced

nearly 7,000. Interest in them increased further when the FCC began allowing AM licensees to retransmit their signals on FM translators. FM translators also have become a popular option for retransmitting HD2 signals. This landscape complicates matters, some experts say.

## WAIT AND SEE

Broadcast engineering consultant Charles Anderson, president of Anderson Associates, said the C4 proposal represents another logical step in achieving efficient use of the FM spectrum.

"Its utility will be primarily for stations that are on the edge of achieving good coverage of their cities of license and significant populations centers within their existing coverage areas. Improved building penetration and overcoming unfavorable terrain will be the main benefits," he said.

However, Anderson believes any final rulemaking should be delayed until after the next filing windows for

said, "though that number might not be that significant."

Lipp said the concern about interference among FM translator users is legitimate.

Owners of those FM translators are left "not knowing whether there will be a Class C4 and whether they could be displaced by the Class C4 increase. The FCC cannot protect these translators," Lipp said. "Translator applicants should at least know what the spectrum constraints are when they apply. But these translators cannot be protected without offering the same protection to all other existing translators and to LPFM stations."

## LPFM IMPLICATIONS

It's also possible the C4 Class could adversely affect some of the more than 1,600 low-power FMs.

"There are LPFM facilities that are likely to experience some additional degraded services, especially on the fringe area of their service contours, if a Class A station is permitted to upgrade to Class C4," REC Networks' Michi Eyre wrote to the FCC in filed comments.

The consultancy says it has identified a number of LPFM licensees that could be affected by development of a Class C4. Low-power FM stations, which broadcast at a maximum of 100 Watts, typically reach a radius of seven to 10 miles from the antenna.

Another observer said creation of Class C4 would likely increase noise and congestion in the FM band.

"Resistance [to the proposal] arises when one looks at the impact the power increases might have," said Melodie Virtue, a communications attorney at Garvey Schubert Barer who specializes in FCC filings and applications. She said it could limit flexibility for site moves for stations that get hemmed in and reduce listenership outside predicted contours that stations not eligible for a power increase currently enjoy.

John Garziglia, a communications attorney with Womble Carlyle Sandridge & Rice, said the petition is a bad idea in today's world of broadcasting.

"While another new intermediate FM class might have been a good idea a decade ago, such a change now in the FM rules has the potential to displace many FM translators currently carrying AM signals and HD2 signals," he said.

Garziglia recalls the first time some Class A broadcasters were given the opportunity to double power levels from 3,000 to 6,000 Watts decades ago.

"Was the slight increase in coverage nice for FM stations? Yes. But did the



**Crank up the power? Supporters see the proposal as a chance to benefit small-town FMs in several ways.**

power increase make a substantial difference in either listenership or fortunes of Class A stations? Rarely," he said.

Jack Sellmeyer, president of Sellmeyer Engineering, anticipates the FCC will consider the proposal further, though the change in presidential administrations and the naming of a new FCC chairman could play a role in the timing.

"I don't think there are any significant obstacles to a notice of proposed rulemaking other than the staff time required to prepare it for a vote and issuance. I suspect there is a draft circulating among the commissioners. As to when and if they will act, that is anyone's guess. There is not enough time to complete it before the new administration takes office," Sellmeyer said.

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

## AM BOOSTERS

(continued from page 5)

people to participate with their comments, contrary to what they did in the AM revitalization process ... The Daily Digest announcement is made by the Consumer Division in a way nobody knows it's about synchronous boosters."

He said, "The best way to encourage broadcasters to get involved in installing AM synchronous boosters is to have installed and working a successful system just as ours," Blanco said. "If these boosters are shut down by the FCC — stating now and never before that a booster is meant to last only five years — no broadcaster will be interested in investing in AM boosters."

**An NPRM would allow us to ask the right questions, explore the advantages and disadvantages of the proposal and receive the review of all stakeholders.**

— Commissioner Ajit Pai

with uneven terrain and electronic interference issues would benefit from improved indoor reception.

The petition specifically calls for the Class C4 allocation to be assigned to facilities in Zone II of the United States, generally rural areas — and thus limiting potential negative impact on FM translators.

Wesolowski maintains that respondents to the FCC's preliminary request in 2014 "were almost universally positive."

Opponents of the creation of a Class C4 point to an already crowded FM band and suggest the upgrade could cause harm to existing translators.

The sheer numbers of FM translators has grown dramatically over the years; the commission currently lists

AM owners to apply for FM translators; those are expected in 2017 though not yet formally scheduled. This would help minimize the impact, he said.

"Furthermore, any C4 upgrade should be conditioned on any displaced fill-in translator being able to move to any other available channel in the band or being modified to retain at least 75 percent of its current coverage area," Anderson said.

It is also possible that some Class A stations upgraded to C4 might not be able to take advantage because of economic reasons.

One broadcast engineer said he "doubts there will be a significant number of stations which can obtain a significant power increase without relocating their transmitter sites," another cost consideration.

Mark Lipp, a partner at Wiley Rein, said he is not sure what the interest level will be among Class A broadcasters presented with an opportunity to upgrade power levels.

"The FCC staff and engineers will be able to determine how many can increase, but it isn't known whether those stations would actually take advantage of the opportunity," Lipp



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# iHeartRadio Is on Board With OnStar Go

The company is a charter brand in a developing GM ecosystem that uses IBM cognitive tech

## CONNECTED CAR

BY JAMES CARELESS

Soon, General Motors cars with the new OnStar Go platform may be able to determine their drivers' musical preferences and recommend that they tune into specific online stations or streamed audio services provided by iHeartRadio via the drivers' web-connected mobile devices.

OnStar Go's ability is not due to an in-car microphone system or software engine, capturing and deciphering whatever off-key songs drivers may be belting out during a commute. Instead, the GM platform uses IBM Watson's application program interfaces to develop its recommendations based on drivers' in-car selections over their mobile devices.

General Motors describes OnStar Go as the auto industry's first "cognitive mobility platform." GM and IBM col-

laborated to make the in-car service possible by combining capabilities of the OnStar AtYourService platform with Watson's APIs, derived from the IBM question-answer computer, which is designed to reply to human-offered questions using natural language.

iHeartRadio is among the charter brands to join this evolving dashboard ecosystem and was featured prominently in the GM announcement of the service.

"With the customer's consent, Watson will learn the driver's preferences, applying machine learning and sifting through data to recognize patterns in their decisions and habits," said Donna Satterfield, vice president of IBM Automotive. "This information will then allow brand and marketing professionals to deliver highly individualized, location-based interactions to directly impact their target audiences."

Music preference detection and recommendations — streamed via 4G into the car — are one of many services supported as promised by the OnStar Go platform.

Satterfield said companies in sectors like retail, fuel, hospitality, media and entertainment, restaurants and travel can use OnStar Go to deliver individu-

and parts/maintenance status."

iHeartRadio was announced as the streamed audio supplier for the GM/IBM platform when OnStar Go service was unveiled in Detroit and Las Vegas in October. Mindful of OnStar Go's sales possibilities, other vendors



alized mobile, in-vehicle "experiences" to a growing population of connected drivers that opt in. "It also will provide deeper engagement based on personalization, traffic, weather and such telematics as fuel levels, tire pressure

have signed onto the platform; these include ExxonMobil, Glympse (location detection and sharing), Mastercard and Parkopedia (parking spot locations, prices and availability).

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## LOKITA

(continued from page 3)

are specifications for mobile TV, 3D television, 4K UHD, high dynamic range color, high frame rate and wide color gamut. Rollout has begun in Korea, and in the U.S. is expected to start in 2017.

Since the Lokita technology depends on ATSC 3.0, it needs to wait for early deployment before field trials can begin, but plans are underway, Dagit explains. "We are already working on lab systems in the Baltimore and Washington, D.C., areas, and have support planned for field trials and deployments in several U.S. markets in 2017. For those systems, we are leveraging our South Korean strategic partnership with DigiCAP, whose ATSC 3.0 server architecture is already in pre-production deployment with South Korean broadcasters."

Dagit adds that there are upsides for all involved parties. "Pairing these mobile apps with TV and radio unlocks new revenue opportunities for content makers and distributors. It also opens new communications channels for improved public safety in emergency situations such as dangerous weather events." Recently, the FCC ruled to allow Wireless Emergency Alerts to include embedded links to rich media.

As the Lokita Solutions software was being developed, the RTP Holdings team utilized multiple Philadelphia-area resources, including the international startup collaboration service Impact Hub. Dagit also partnered with a local university's Broadband Wireless Lab for the development of their software. Initial funding was raised by friends and family. Now that their first patent has been awarded, Dagit said that they will begin to seek external capital.

The patented technology covers methods for interacting with video displays using a handheld mobile device, along with a system for creating position and orientation relationships between interactive devices. The company expects new and further continuation of patent applications will generate a larger patent portfolio within the next five years.

While its technology enables location-based content delivery via mobile apps, RTP's initial market was precision indoor positioning. Its core premise was to give

shoppers and/or tourists an optimized route to their favorite store or attraction to help them find their shopping wishlist items in the fastest possible way. Later, RTP added the emphasis for its technology to radio and TV broadcast.

Dagit said he was pleased to be one of the finalists in the Pilot Innovation program. "It has given us a lot of additional exposure to potential clients and the media, and is also a validation of location-based content delivery concept in the broadcast arena."

## THE PILOT INNOVATION CHALLENGE

Pilot is an innovation initiative of the National Association of Broadcasters. It received about 150 ideas in response to its first Innovation Challenge.

Companies were invited to respond to a challenge question, "How might local television and radio broadcasters engage their communities with next generation content on any device, whether big, small or moving?" Some 50 judges narrowed submissions to 10 finalists (Lokita Solutions among them). A panel of five from media technology and broadcast industries selected three, who presented ideas at the NAB Futures event this fall. Attendees determined placement of the winners. The first-place winner receives \$20,000, second place \$15,000 and third place \$10,000 to assist with prototyping their concepts and will have the chance to demonstrate prototypes at the NAB Show. Read more at <http://nabpilot.org/challenge>.



1st Place — *In Your Shoes: Robinne Burrell and Trina DasGupta, Redflight Mobile Innovation.* In Your Shoes is an immersive storytelling platform that utilizes virtual

reality to document the lives of multiple people involved in a single situation or issue.

2nd Place — *History Go: Jordan Sales, Elise Hackney, Alberta Lin, Eric Asencio, Mike Le, Claire Lohn, Texas A&M University.* History Go is an application that connects to user's current location and utilizes augmented reality to display relevant facts, pictures and videos about the area.

3rd Place — *The News Call: Chandra Clark, The University of Alabama.* The News Call is a DVR-type phone service that calls the user at a pre-determined time with pre-programmed customized news.

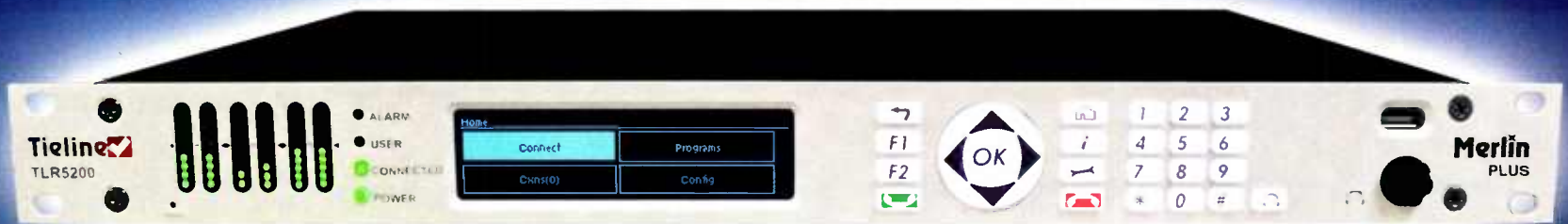


# The award winning combination



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## ONSTAR

(continued from page 8)

### WHERE IHEARTRADIO FITS IN

As a radio industry spear carrier in the battle to build and retain listenership in cyberspace, iHeartRadio's decision to join the OnStar Go platform makes sense. In doing so, iHeartMedia is ensuring that its online content is as readily available on GM's automotive dashboard as its AM and FM stations are today.

"We are excited to be partnering with IBM and GM as pioneers in this innovative initiative and having the opportunity to define streaming audio in the auto industry's first cognitive mobility platform," said iHeartMedia Business Development and Partnerships President Michele Laven.

"Only radio can deliver live and local programming in real time, and now with the intelligence of Watson, iHeartRadio will create more personalized and relevant content for listeners and advertisers and extend our reach even further."

Intelligence is the word for it: "iHeartRadio will use Watson Personality Insights from OnStar Go to curate personalized experiences that leverage on-air personalities and local content from radio stations across the U.S.," said IBM's Satterfield. "Drivers will be invited to share information from their calendars, social graph, location, music preferences and more to create dynamic and locally relevant entertainment experiences only available through the power of radio."

OnStar Go will know what its users

## DASHBOARD ECOSYSTEM

GM and IBM said that with the consent of an OnStar Go user, "Watson will learn the driver's preferences, apply machine learning and sift through data to recognize patterns in their decisions and habits. This information will allow brand and marketing professionals working with IBM and OnStar to deliver individualized location-based interactions that directly impact their target audiences."

It gave examples of possible uses: The system might remind a working father to pick up diapers and formula at a pharmacy a few miles before his exit. A driver could be notified that an order is ready for pickup at a nearby store and one of its employees will load their purchases into the car. A traveling foodie could hear dining recommendations from celebrity chefs when driving in an unfamiliar city.

Among specific brands that signed on at launch, GM said that ExxonMobil will use the platform to help drivers locate fuel stations, recommend fuel and lubricant products for their vehicles, and authorize fuel or car wash payments from inside the vehicle.

iHeartRadio will use Watson insights "to curate personalized experiences that leverage on-air personalities and local content from radio stations." Drivers will be invited to share information from their calendars, social graph, location and music preferences "to create dynamic and locally relevant entertainment experiences only available through the power of radio."

Mastercard will enable occupants to make secure payments for goods and services from the car using a Mastercard "tokenization" platform and Mastercard digital payment service. And Parkopedia will provide parking spot information including opening hours, prices, booking and payment capabilities.

like to listen to; iHeartRadio will be able to serve those preferences from their dashboards.

### AN IMPRESSIVE REACH

According to the GM/IBM partnership, millions of 4G LTE-connected vehicles will be on U.S. roads by the end of 2017, along with millions of mobile devices loaded with GM-branded apps. Add the fact that 12 million GM vehicles were predicted to be in use by 2016's end, and the potential reach of the OnStar Go platform is substantial.

"Consumers will be able to start using

the expanded OnStar AtYourService marketplace in early 2017," said Satterfield. "The feature will be available in more than 2 million vehicles in the U.S. by the end of that year, including Buick, GMC and Cadillac brands. Merchants and brands, however, can sign up for OnStar Go now to start developing potential offerings and uses for customers."

For iHeartRadio, having a place on the OnStar Go platform should provide an edge in the battle to keep internet-connected listeners tuned into broadcast radio content, rather than Pandora and

the thousands of non-radio streaming services on the web. But it is worth noting that this is not an exclusive relationship.

"We are looking for ecosystem partners across a variety of industries," said Satterfield. "Companies can connect with either GM or IBM to learn more."

## NEWS ROUNDUP

**OWNERSHIP:** Incoming House Energy & Commerce Committee chair Rep. Greg Walden, R-Ore. and Rep. John Yarmuth, D-Ky., introduced a bill to repeal the newspaper-broadcast cross-ownership ban, citing, for one thing, the need for real news to counter the "fake news" that has been getting so much attention. The FCC under Chairman Wheeler recently declined to scrap the rule. "Times have changed, and it's critical our media ownership rules keep pace with the innovation era," said Walden, a former broadcaster. NAB applauded the move.

**RADIO CARTEL?:** The Radio Music License Committee, which represents many commercial stations in music licensing matters, responded to a complaint against it by music rights agency Global Music Rights.



GMR alleged that RMLC represents an unlawful cartel intended to stifle competition among stations and drive down license fee payments for public performances of songs in radio broadcasts. RMLC Executive Director Bill Velez called it a "baseless, bullying lawsuit" and an "obvious ploy" in response to an antitrust suit it filed against GMR in federal court. He argues that GMR seeks to impose "monopoly pricing" on radio.

**DTS:** Product and technology licensing company Tessler Holding Corp. completed the acquisition of DTS Inc., parent company of HD Radio. The deal was announced in September. The newly combined company plans to introduce a new corporate name, stock ticker, brand and logo during the first quarter of 2017. Former DTS Chairman/CEO Jon Kirchner becomes president of Tessler Holding Corp.

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—Daniel Hyatt, SVP Engineer, Max Media, Denver, Colorado



As soon as I put Omnia.11 with G-Force on the air, **our Program Director was floored**. He commented on the **clarity and punch** of the audio, comparing it to listening to the station for the first time on high-end speakers. He said to me 'Even the silence sounds better!'. I'm sold on the power, flexibility, and tools... I was able to take the best-sounding station in the market, and make it sound even better!

—Chris Tarr, Director of Technical Operations, Entercom Wisconsin, Milwaukee



G-Force was **louder right out of the box**, yet more dynamic and open. Stereo Image Enhancer is a big improvement, noticeably wider, which is great. The low bass **bottom end is huge and subsonic**. Spoken word level stands out more without having to use a lot of AGC.

—Stephen Wilkinson, Technical Operations Manager, Hope Media, Sydney, Australia

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# Workbench Thrives on Ideas From the Field

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## WORKBENCH

by John Bisset

Read more Workbench articles online at [radioworld.com](http://radioworld.com)

Projects engineer Dan Slentz, a fellow RW contributor, points out that a lot of manufacturers have switched to RJ45 connectors for analog and AES audio in/out — and not just for AoIP applications.

Dan finds the pre-made stranded RJ45 cables from Monoprice to be very inexpensive — ranging from \$1 to \$3 — and you can get them in nearly every color and length possible at [www.monoprice.com](http://www.monoprice.com). The colors make it easy to identify the wiring.

Dan wanted to take advantage of the RJ45 for one application but had an issue when taking traditional balanced audio wiring (like the Belden 8451) into the RJ45. StudioHub makes a lot of great adaptors, though they are



**Fig. 1:** This inexpensive Calrad adaptor brings RJ45 connections to screw terminals.

not inexpensive. Shown in Fig. 1, Dan found the following compact RJ45 to screw terminal strip for less than \$10. The Calrad 72-171 can be ordered from Markertek ([www.markertek.com](http://www.markertek.com)) with free shipping. Just enter the Calrad part number in their search box.

Doug Olson is with Thermobond Buildings in Elk Point, S.D. His company recently worked with engineering consultant Clarence Beverage on a project for Radio Vision Cristiana



**Fig. 2:** One of four Thermobond pre-cast concrete building is being off-loaded.

in Ridgefield, N.J.

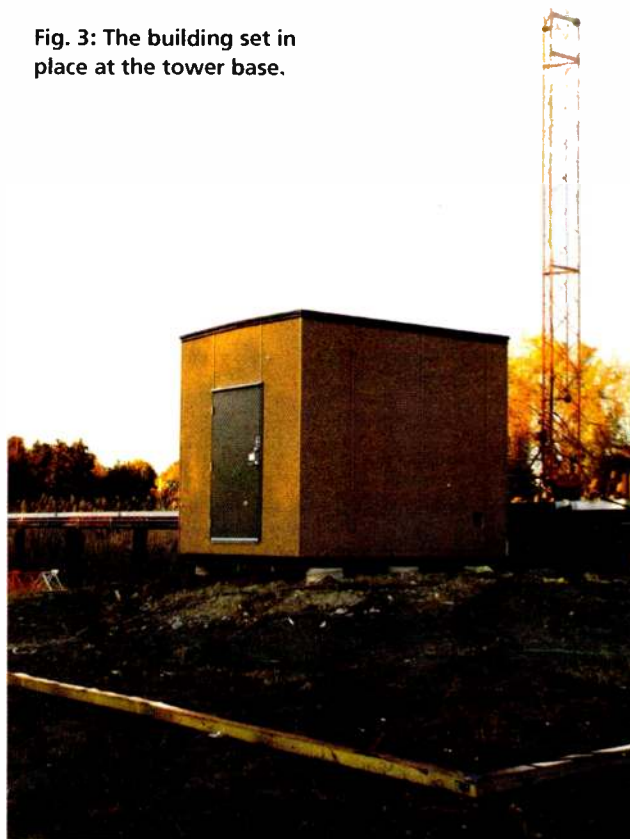
Thermobond constructed four 10x12 foot buildings; one is shown being off-loaded in Fig. 2. The shelters were shipped to Phasetek, where they were equipped and then transported to the New Jersey site. Fig. 3 shows one of the completed shelters.

Thermobond manufactured these pre-cast concrete shelters in their Elkhart, Ind., facility. More information on the entire Thermobond line of metal shelters, light-weight shelters, cabinets and pre-cast concreted shelters can be obtained from [www.thermobond.com](http://www.thermobond.com).

Monadnock Broadcasting Group Chief Engineer Ira Wilner writes about Buc Fitch's amplifier project using a good-size collection of odd parts from Radio Shack. Ira said it might be rewarding but he questions the low peak output power before clipping of the inexpensive power modules, and wonders if these modules might be a better fit for a headphone amplifier — but only if one uses DC blocking capacitors to prevent shorting out the amp with an accidental ground.

While it cost Ira a bit more money and wasn't nearly as elegant looking, a couple of years ago he needed a battery-powered portable stereo PA. Ira's amp will reproduce a piano with convincing fidelity and fill large spaces such as

**Fig. 3:** The building set in place at the tower base.



an opera house, movie theater or noisy restaurant for a flash mob performance preview of "Les Misérables."

Ira raided his pile of parts and found two of his ancient miniature acoustic suspension bookshelf speakers. He bought these in the late 1970s for a car sound system.

Back then, you could not find that sort of small speaker system for auto-

motive use. These were Grundig Hi-Fi Mini Boxes, and they had extraordinary extended bass for such tiny cabinets. In fact, nothing Ira has ever seen could match them. Passengers would always ask where the subwoofer was hidden, with disbelief that those tiny boxes were producing the sound.

As you may know, non-ported acoustic suspension baffles are very inefficient.

For Ira's portable PA, he mounted both speakers on a 29-inch-long two-by-four scrap with L-shaped end plates. He added two 12 VDC gel cell batteries, held in place by wooden spacers and mini bungee cords. The amplifier was a 4-inch circuit board from China with a 100 Watt-times-two dual channel class D amplifier onboard. Idle current was mostly for the heat sink fan.

(See MCM part #28-20868 at [www.mcmelectronics.com](http://www.mcmelectronics.com) or Parts Express part number 320-303 at [www.parts-express.com](http://www.parts-express.com). Either amplifier module is less than \$30.)

Ira found the little Sure Electronics amplifier card from Parts Express to be extremely efficient. His fully charged 7 AH (Amp/Hour) gel cells were only down 10 percent after an evening of flash mobs around town. Uncompressed audio playback of the piano was via his trusty Zoom H4n recorder's line out into the 2X4 wooden PA. It completely filled a 600+ seat theater with their piano accompaniment, and it sounded effortless. There was no peak distortion, reproduction was very clean. Ira estimates he was probably running peak power of around 50 Watts per channel.

Ira had fun surprising shoppers and movie audiences as they first mingled with them. His little PA would sit unobtrusively in the rear of the theatre, or on Ira's lap, and when the piano sound file started to play, folks would look around for the piano or figured it was from the house PA up front.

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

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## FESSENDEN

(continued from page 1)

history books (and now websites) credit Fessenden with transmitting a short Christmas Eve program of recorded and live music, along with a scripture reading and a yuletide greeting.

However, validation of this event (the one solitary account was provided by Fessenden himself more than 25 years after the fact) has never been satisfactorily accomplished, despite attempts first begun more than 80 years ago and involving a number of individuals.

Despite numerous searches, there is absolutely no contemporary evidence that the celebrated Christmas Eve transmission ever took place. Yes, there is plenty of “hearsay” evidence — second- and third-hand accountings and remembrances — but such anecdotal tidbits don’t really count in the eyes of the historian. If he or she wishes to substantiate an historical occurrence, a “primary source” (a document, diary, logbook, manuscript, etc.) that was created at the time under study is essential. Sadly, no such primary sources have been unearthed to give credence to Fessenden’s solitary claim, which he penned in a letter dated Jan. 29, 1932 — a very considerable temporal distance from Dec. 24, 1906.

On the other hand, there is a comparative wealth of “primary source” information to substantiate Fessenden’s claim made in the same letter to having wirelessly transmitted speech and music sometime after 2 p.m. on Dec. 21, 1906.

I’d like to share some of this with you, as well as provide a bit of insight into what led up to that event, courtesy of Fessenden’s son, Reginald Kennelly Fessenden, who donated a large amount of his late father’s papers, pictures and other items to the State Archives of North Carolina shortly before his own death in 1944.

This up-close documentation allows us to zoom in on Fessenden, the company that he operated, the National Electrical Signaling Company, and the Pittsburgh businessmen who bankrolled this operation, Hay Walker, Jr. and Thomas H. Given.

### A RELATIONSHIP GOING SOUR

By 1906, and after years of sinking very large amounts of money into Fessenden’s research in developing a practical wireless communication system, relations between Fessenden and his backers had become somewhat contentious, with Walker frequently admonishing the scientist about wasting time and money.

There are several such communications, but this excerpt from an April 27, 1906, memo seems to set the stage for what follows:

*You speak of losing a couple of weeks*



Courtesy: State Archives of North Carolina

This photo of the NESCO Machrihanish, Scotland, station operating staff posed around the base of the 420-foot vertical antenna provides detail not visible in any of the surviving Brant Rock photos. The transmitter feed point is shown, as is the small building apparently used to shield the base insulator from the elements. (Fessenden noted in his description of the station that a “long gap” to ground was inserted above the base insulator when transmitting, and replaced with a “short gap” when receiving. At all other times the mast was kept grounded to provide lightning/static build up protection.)

*trying to receive messages and of it being of no importance anyhow. Now that is the way it may look to you with your knowledge of science and may be all right, but when you come to illustrate in what you call a business way you are very, very far from happy and you are as far away from the question as I can possibly be in wireless.*

*To really get over [the top] is our aim and to be the first on record that is witnessed by people who are in every way disinterested would, as you know, be worth everything to us...the man or Company first over publicly have [sic] a great start in a business way, and that part now is of importance to us.*

*“Art is long but time is fleeting.”*

*Hay Walker, Jr.*

As spring turned into summer, Walker (who spoke for both himself and his partner Given) became increasingly impatient with Fessenden’s dallying, pressing him to produce, wanting to see some sort of return on the NESCO investment, which after Fessenden’s firing in 1911 and the company’s being taken into receivership, would amount to more than \$40 million in today’s money.

Walker, too, was aware of Fessenden’s tendency to multitask and overextend himself. Fessenden had convinced his Pittsburgh backers to establish not only a research laboratory at Brant Rock, but

also a wireless equipment manufacturing operation in Washington, D.C., several U.S. experimental wireless stations equipped to handle telegraphic traffic, and two very large spark technology transmitting/receiving facilities — one located in conjunction with the Brant Rock lab and the other in Machrihanish, Scotland. (These coastal wireless stations were created to see if reliable transatlantic communication could be established — something that even Marconi had yet to do in the early 1900s — and if successful, generate revenue by undercutting message rates of the established submarine telegraph cable operation between North America and Europe.)

Fessenden didn’t believe in delegating authority, preferring to try to juggle the day-to-day operation of this sizable empire by himself — with some input, of course, from the men writing the checks in Pittsburgh.

Corporate records show that Fessenden, in the latter half of 1906, was following multiple tracks: trying to boost reliability of communications between Brant Rock and Machrihanish, producing satisfactory “compressed air condensers” (capacitors) needed for high-power wireless operations, experimenting with short-distance radiotelephone communications across water, organizing a public demonstration of radiotelephony, and

attempting to perfect the high-frequency alternator needed to power these latter two projects. Judging from surviving reports and correspondence, all seem to fairly equally occupy his time. (There were other smaller endeavors, too.)

Associated with all of these was the expenditure of a large amount of Fessenden’s time in writing reports and responding to queries from Walker, who was becoming increasingly concerned about Fessenden’s funding use. This Sept. 4 letter is indicative of how bad things had become and the growing state of dissatisfaction:

*Dear Sir:*

*We acknowledge receipt of your letter of the 31<sup>st</sup> ult. and say in considering the state of our Treasury, it is an extravagant and uncalled for expense account, and we decidedly disapprove of it.*

*In our own accounts, anything beyond the bare necessities of getting from one place to another, comes out of our own pockets.*

*It ought not to be necessary to say this, but it is.*

*Yours very truly,  
Hay Walker, Jr.*

By this time (September) Walker had also become critical of Fessenden’s tendency to stretch the truth about what he had been able to achieve, as evidenced by this Sept. 24 telegram:

*“Wire us what you have actually accomplished on [radio] telephone. No prediction.”*

*Hay Walker, Jr.*

Interestingly, by the end of September, the aforementioned over-water radiotelephone demonstration, which had been a very hot item for several months and involved a lot of Fessenden’s time in trying to secure a small boat at a cost acceptable to Walker, seems to have dropped off the landscape completely.

With the beginning of October, activities focused more or less exclusively on creating a receive site some nine miles from Brant Rock, in Plymouth, Mass., in connection with the planned public radiotelephony demonstration, and in trying to boost communications reliability with Machrihanish. Records show that the latter project had become especially contentious, as the worsening of fiscal matters had led to some severe cutbacks

at the Scottish station and a very bad morale situation among its operators.

"Office Instructions" from Fessenden to the Machrihanish manager drive this home, even revealing that Fessenden has considered trying to secure backing from other sources to continue his experimentation:

Oct. 9, 1906: "Give formal notice all [Machrihanish] employees of the termination of all contracts in conformity with instructions of Given & Walker on account of [Brant Rock/Machrihanish] messages cannot be exchanged."

Oct. 10, 1906: "Given & Walker directed me to give all employees a month's notice and I have mailed copies accordingly.

I do not think that this will amount to anything much but we may have to let go some of the men temporarily.

I want to avoid doing this if we possibly can because if we shut down even for a month it will make a great deal of trouble starting up again if the operators leave Machrihanish. Moreover it unsettles everything.

We can probably form a company soon and Mr. Westinghouse and some other men whom I have seen will come into it."

Ultimately, Fessenden was able to convince his original backers to continue funding the Machrihanish operation, at least until he had done everything he

could to boost the reliability of communications between Machrihanish and its Brant Rock counterpart.

However, in reports to Walker dated Nov. 12 and 20, Fessenden wrote that due to the effort being expended on the Plymouth site, along with a general shortage of manpower, he hadn't been able to accomplish much in connection with transatlantic work. He closes by noting:

"We are installing the apparatus [at the Plymouth receive site] but will have to drop either the Trans-Atlantic or the

[radio] telephone until we get another operator."

Hay advised Fessenden to hire someone and to continue planning for both projects.

Pressure continues to build until the first week of December when word is received of a catastrophic accident at Machrihanish. Faulty guy lines and high winds teamed to topple the 420-foot tower (née smokestack), essentially putting the station out of business.

Efforts became focused exclusively on setting a date for the Brant Rock/Plym-

outh demo. However, this proved difficult, due to the unavailability of various players. And to cloud the matter further, word of a similar radiotelephony demonstration in Europe had been received.

Dec. 14, 1906 telegram to R. A. Fessenden:

Impossible to arrange test for Saturday. Mr. Given is in New York. Will try to arrange for next week by having [legal] case postponed.

Hay Walker, Jr.

(continued on page 18)



Photo by James O'Neal

The Fessenden collection of papers and other materials is one of the largest at the State Archives of North Carolina. The printed descriptor of the collection is more than 30 single-spaced pages long itself.

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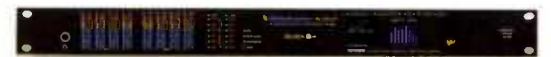
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# FESSENDEN

(continued from page 15)

Dec. 15, 1906 (9:30 p.m.) telegram to Hay Walker:

*No use making public demonstration now. Slaby-Arco [German radio researchers] gave public demonstration today using our 1904 method [presumably speech-modulated high-frequency spark or Poulsen arc transmitter]. Associated Press will probably not care for it now.*

R. A. Fessenden

Dec. 17, 1906 (1:30 p.m.) telegram to R. A. Fessenden

*We still want test [comma] case being postponed. What day will suit you after Wednesday.*

Hay Walker, Jr.

Dec. 17, 1906 (3:00 p.m.) telegram to Hay Walker Jr.

*Necessary have test Friday as notice too short to get any Guests for Thursday. Very important you advise me earliest possible moment otherwise no guests will be able to be present.*

R. A. Fessenden

Dec. 17, 1906 (4:20 p.m.) telegram to Hay Walker, Jr.

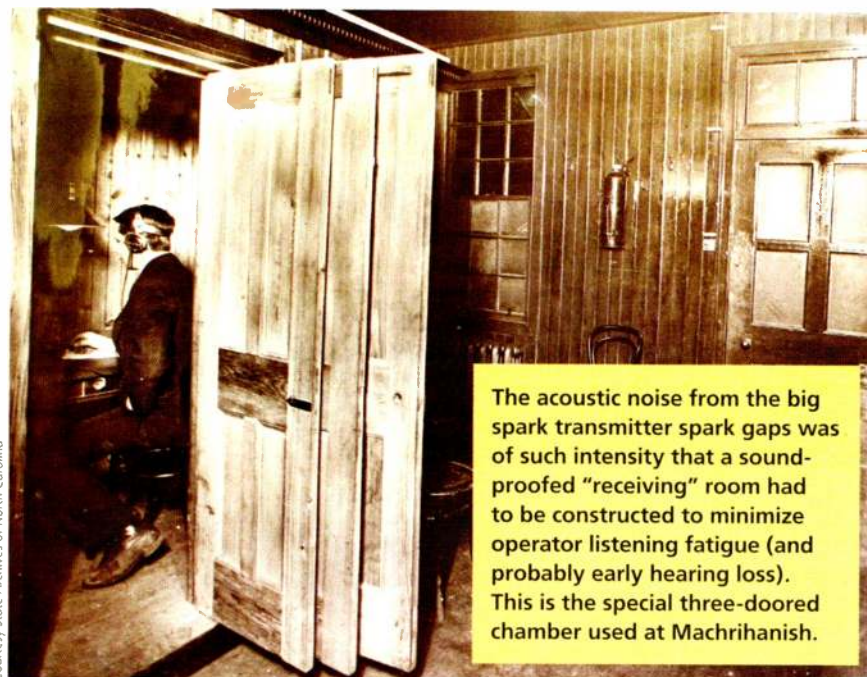
*Please telegraph date test earliest possible moment, on account short notice guests.*

R. A. Fessenden

Dec. 17, 1906 letter to Hay Walker, Jr. (excerpted):

*I had taken down the apparatus to make some other tests, but will easily have it in readiness by Wednesday, so would suggest Thursday or Friday for date of test. Everything is working very nicely.*

*We will not of course be able to get*



Courtesy: State Archives of North Carolina

The acoustic noise from the big spark transmitter spark gaps was of such intensity that a sound-proofed "receiving" room had to be constructed to minimize operator listening fatigue (and probably early hearing loss). This is the special three-doored chamber used at Machrihanish.

*all our guests now, as most of them have doubtless made other arrangements. I think, however, I can get one Bell man and possible Elihu Thompson and I think the Scientific American man.*

*With reference to Slaby-Arco, this is our old 1903 and 1904 device, and makes a very bad noise in the telephone [headphone] and in addition does not tune well.... It shows, however, what advertisers the Slaby-Arco Company are, as what they have is less than what we had in 1904.*

### SUCCESS AT LAST!

Finally, the demo was locked in for Dec. 21. No more communication is found in the files until the day after the event (Saturday) in the form of Fessenden's report to Walker:

Mr. Hay Walker, Jr.  
Pittsburgh, Pa.

Dear Sir:

*The telephone test Brant Rock to Plymouth took place Friday, December 21st.*

*Those present were: Mr. Pickard, from the Bell Telephone Company, Professor Elihu Thomson from the General Electric Company, Mr. Read from the American Telephone Journal and two Associated Press men.*

*Dr. Kennelly and the Scientific American man could not come on account of short notice and previous engagements.*

*I endeavored to obtain Professor Trowbridge and a Western Electrician man, but the latter had a previous engagement and the former's wife was seriously ill.*

*Owing to the fact that all trains were delayed the party did not arrive at Brant Rock until nearly twelve o'clock and after lunch it was two o'clock before the Associated Press man and Mr. Picard started for Plymouth.*

*The test passed off successfully. With our own transmitters [carbon microphones] an Associated Press man at Plymouth got every word except one which the Associated Press man at Brant Rock spoke. He was not so successful with one of the purchased transmitters [carbon microphones] which was used,*

*though he heard what Mr. Stein and I said on it. The Associated Press man spoke very low, lower than into an ordinary telephone. [The carbon microphone was connected in series with the RF source (the alternator) and, mindful of the RF currents flowing through it, Fessenden had constructed a special unit.]*

*The Bell Telephone man called us up in the evening and said that the Associated Press man seemed very much impressed with the test. He asked if he could come down again and see me about some further details before making his report to the Chief Engineer of the Bell Company. I told him "yes", and he was down this morning and spent from ten o'clock to three o'clock with me.*

*He asked for a lot of particulars, current strengths, resistances, etc., all of which I gave him as they are covered by our patents.*

*I spoke to him about the trouble with the transmitters, and he stated that in his report which he had already partly written he had stated that the system itself worked absolutely perfectly and uniformly, and that the only variation was the usual one due to transmitters [carbon microphones] packing, and that this was no worse than on their regular lines.*

Yours very truly,  
R. A. Fessenden

There is no additional correspondence of any kind in the file until Jan. 3, 1907 (a letter from Fessenden to Walker with additional comments about the Dec. 21 demo and the report of the Bell Telephone engineer, Greenleaf Whittier Pickard), so it is presumed that Fessenden took some time off to spend with his family during the Christmas week, also freeing his staff to do the same.

### YES, VIRGINIA, IT WAS A CHRISTMASTIME BROADCAST!

In summarizing the events of Dec. 21, 1906, it's interesting to compare what Fessenden said in his letter (dated Jan.

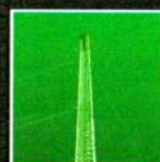
(continued on page 20)



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## FESSENDEN

(Continued from page 18)

29, 1932) to Westinghouse's Sam Kintner, who had written some three weeks earlier to ask if it were true that Fessenden had performed the world's first radio broadcast near the end of 1906.

Fessenden replied:

*"If you mean broadcasting the transmission of speech, music and singing to other stations of the same ownership as the transmitter, then the program given to Dr. Kennelly, Prof. Elihu Thompson and the engineers of the Western Electric and A.T.&T., and other companies, and the editors of several New York News papers [sic] at the exhibition (on 21 December 1906) which you will find described in the American Telephone Journal, Jan. 26th and Feb. 7th, 1907 would be a broadcast...."*

### SUGGESTIONS FOR FURTHER READING:

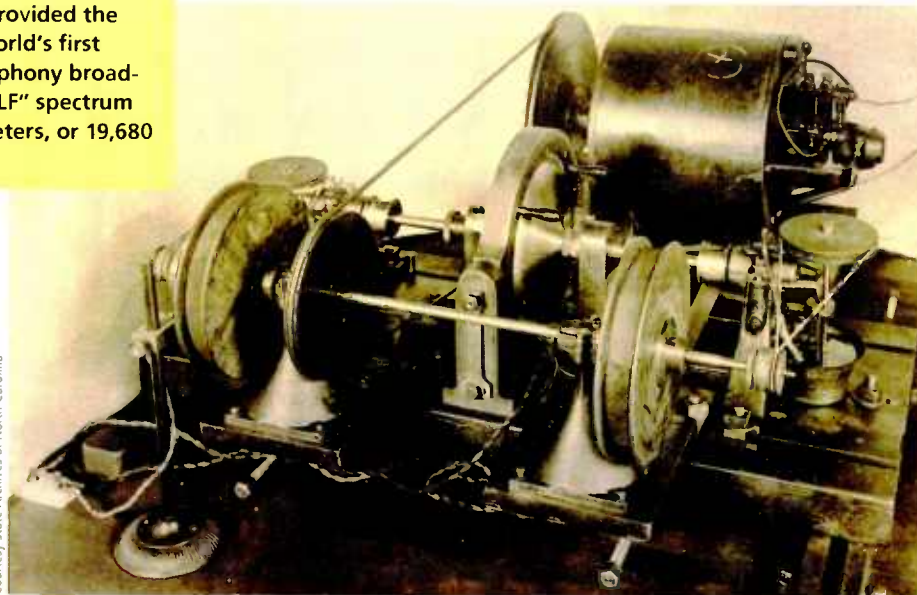
Halper, Donna A. and Sterling, Christopher H., "Fessenden's Christmas Eve Broadcast: Reconsidering An Historic Event," *The AWA Review*, Aug. 2006, p. 119.

O'Neal, James E., "Fessenden, World's First Broadcaster?" – *Radio World*, Oct. 25, 2006. (<http://tinyurl.com/o55os97>)

O'Neal, James E., "Fessenden: The Next Chapter," – *Radio World*, Dec. 23, 2008. (<http://tinyurl.com/lhdqche4>)

This modest high-frequency alternator provided the continuous wave RF necessary for the world's first public demonstration of "true" radiotelephony broadcasting on Dec. 21, 1906. It operated in "LF" spectrum at 50 kHz with a wavelength of 6,000 meters, or 19,680 feet (about 3.75 miles).

Readers will note that this recollection of events more than 25 years after the fact is somewhat at a variance with what happened according to "primary sources," but Fessenden does declare that he did in fact "broadcast" on that date. And as the transmission was in no way encrypted or sent in a highly directional beam, it does meet the criteria for a broadcast, even though there would likely have been few receivers capable of tuning in the very long wavelength used (6,000 meters) within range of the miniscule ERP (less than 0.2 of a Watt) signal that Fessenden's apparatus was able to generate then. However, we do know that there was at least an audience of two listening-in as radio was being born: Bell's Pickard and one of



Courtesy State Archives of North Carolina

the "Associated Press men" who were stationed at Plymouth.

In reflecting on what happened on that long-ago afternoon of Friday Dec. 21, 1906, there is no doubt that Fessenden planted the seeds which would a decade and a half later germinate into radio broadcasting. This is no doubt either of his intentions, as evidenced by the following typed "handout" presented to those present for the demonstration:

*"[Radio] Telephony is admirably adapted for transmitting news, stock quotations, music, race reports, etc. simultaneously over a city, on account of the fact that no wires are needed and a single*

*apparatus can distribute to ten thousand subscribers as easily as to a few. It is proposed to erect stations for this purpose in the large cities here and abroad."*

### ACKNOWLEDGEMENT

The author wishes to express his thanks to the staff of the State Archives of North Carolina for their assistance in connection with his research, as well as for the granting of permission to publish the Fessenden collection photographs that accompany this article.

*James O'Neal is a regular contributor who frequently writes about radio history.*



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Bradley Division  
800-732-7665

# PowerClamp TVSS Tames WEQF's Storm Problems

Henry Engineering surge suppressor levels out power fluctuations — no more resets

## USERREPORT

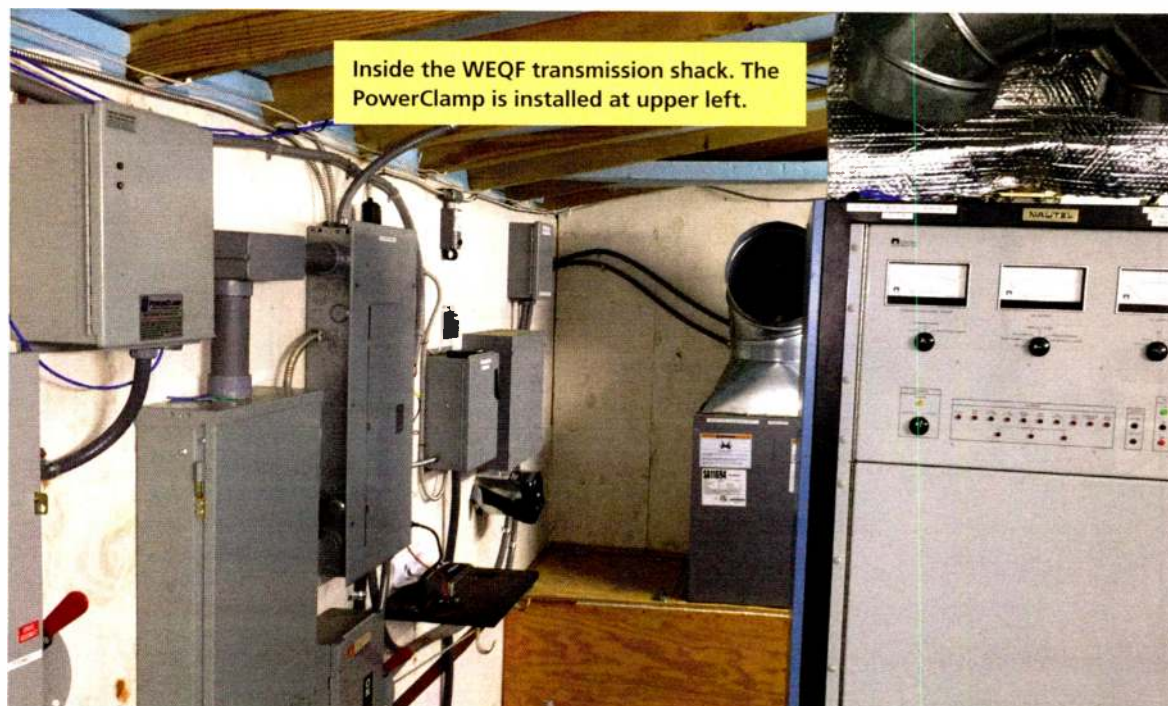
BY CURTIS YOUNG  
Broadcast Technician  
Calvary Technical Management

**DILLWYN, VA.** — It has become the normal routine for WEQF(FM). Like many stations at the “end of the power line” when a storm rolls through the area, the power is up and down, spiking and dipping into brownout leaving the old solid-state transmitter off the air in a “protected” alarm mode that requires someone to log-in and reset it in able to restore it on-air.

Sometimes things are even worse and the storm scrambles the remote control so that it will not respond; then it's a 45-minute trip to the site to reset everything manually.

Adding more surge protectors at different points in the system is to no avail, and even gets them toasted sometimes during heavy lightning events. The grounding at the site was done well, a “halo” around the building and connected to the tower. All of the guy anchors are grounded as well.

In asking around about what others use for surge protection a friend who takes care of some sites in Nevada and California mentioned using a device from Henry Engineering. I thought of the Matchbox boxes that have been around and in solid service for many years, as well as other devices that they have manufac-



tured for radio studios that I have installed. I wondered what could they do for surge protection that would make them stand out from the many other products available.

After taking a look at their website and seeing published specs, descriptions and testimonies, I was curious to see if the “Power Clamp TVSS” surge suppressor would actually work in our facility. A PowerClamp Series 10 was purchased in June of this year and installed at the main disconnect of the building. This unit is for 120/240 V “split phase” service, and is rated

by Henry Engineering for 200,000 surge-amps (per phase) of surge protection. Ours is an “R” model, which means that it includes a Status Output Circuit that will send a signal to our remote control system if any of the PowerClamp fuses require replacement

The installation almost seemed to be a bit too simple — parallel the power lines into the PowerClamp TVSS, run a ground to the building ground system and it was in service. Just that fast.

I also connected the relay option that we chose to a status on the Broadcast Tools WVRC8- Plus remote control unit in order to set up and receive alerts for when we take a hit that causes an alarm. Since this unit has been in place we have not once had to reset a “protect” alarm on the transmitter, and not once have I had to cycle power on any of the equipment on-site in order to get it back online.

All of our gear (except for the Nautel FM3.5 transmitter) has been connected to an APC battery backup all along and still would get zapped and put into useless modes that required interaction to restore the station to air. None of this has occurred in the months since putting the PowerClamp into service. On occasion we have lost power at the site, and when it was restored by the utility we were notified by our remote that the transmitter was back on and running at 100 percent.

I cannot say enough about how smooth our site is running after installing putting in the PowerClamp TVSS. It has made life so much easier in dealing with this site; now I have to remember to visit the site to fill out logs. It sometimes seems like an easy drive in the country, no rushing about to get back on-air.

If you have a site that has expensive electronic gear that needs to be protected from nasty surges, you really should look into installing the right model PowerClamp TVSS, a device made specifically for your utility connection.

For information, contact Hank Landsberg at Henry Engineering in California at (562) 493-3589 or visit [www.henryeng.com/pchome.htm](http://www.henryeng.com/pchome.htm).

## TECHUPDATE

### TRANSRADIO OFFERS RANGE OF ANTENNAS, SERVICES

Transradio provides solid-state AM and FM transmitters, program input and power supply equipment, site control facilities and broadcast antennas as well as complete digital transmission systems.

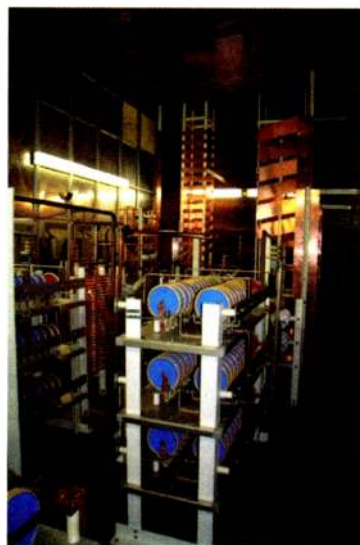
In addition to the design of AM antennas and related systems, the company says, it consults on the adaptation and improvement of existing AM antennas for the particular requirements of DRM30 transmissions.

Because the quality of a DRM signal depends significantly on a broad impedance bandwidth and symmetric impedance characteristic related to the carrier frequency, most existing AM antennas do not match the bandwidth criteria for digital transmissions.

In order to adapt existing AM antennas for DRM30 operation, narrow-band AM antennas with considerable mismatch even within the transmission bandwidth may be modified by customized extension networks to fulfill the requirements of digital transmissions in accordance with latest ETSI and ITU standards.

Transradio's antenna product range and services includes the design of directional and omnidirectional antennas; antenna tuning devices such as diplexers, triplexers and filters; extension networks; antenna switching equipment; antenna feeders; and optimization of existing antenna designs.

For information, contact Transradio in Germany at 011-49-30-339-78-0 or visit [www.transradio.de](http://www.transradio.de).



# Kintronic Triplexes KABC(AM)

Fitting more AMs onto an antenna array can be done

## SPECIALREPORT

BY **BOBBY COX**  
Senior Staff Engineer  
Kintronic Laboratories

**BRISTOL, TENN.** — At Kintronic Laboratories we are continuing to expand our engineering design and analysis capabilities to permit us to take on the most challenging of AM multiplexing projects. Directional and non-directional AM projects once thought impractical are often completed now with great success due to the improvements in modeling and design. Stations as closely spaced as 50 kHz have been diplexed successfully on multiple occasions. Final tune-up time in the field is greatly reduced due to the accuracy of the modeling and factory pretuning that is done.

Kintronic Laboratories is currently supporting the relocation of KABC's directional transmission operation in Los Angeles with the design and fabri-



cation of the custom phasing, matching and filtering equipment. KABC (790 kHz) will be triplexed with KWKW (1330 kHz) and KFOX (1650 kHz) on their existing two-tower array. The new equipment design incorporates Method

of Moments modeling to match on-site tower measurements and a full nodal analysis incorporating the networks from all three stations to provide the best estimates of performance for each station.

The incorporation of the full system for each station in the modeling is vital

to understanding the ramifications of design choices on the bandwidth of each station involved. This full system analysis is rarely offered by AM antenna system designers due to the complexity and time required. At Kintronic Labs, this approach has been streamlined by our proprietary software to allow it to be implemented as our standard for multiplexed designs.

The tuning and filtering networks for the KAB's triplexing project are provided in weatherproof enclosures tailored to the physical requirements at each tower. Dual-stage filtering provides sufficient isolation between towers while minimizing the impact on station bandwidth. Shielded duct interconnections for the 790 kHz ATUs and filters along with vertical mounting of the 790 kHz reject filters eliminates the loss of isolation performance due to unintended signal capture. A reliable, RF-tested pattern and transmitter switching controller, transmission lines and phase-matched sampling lines and control cables complete the equipment package being supplied. Kintronic Labs specializes in the design, manufacturing and support of custom broadcast equipment.

For information, contact Kintronic Laboratories in Tennessee at (423) 878-3141 or visit [www.kintronic.com](http://www.kintronic.com).

## TECHUPDATE

### NEW LP SERIES AXIOM MASTER FM ANTENNA FROM ERI

Electronics Research has extended the Axiom master FM antenna product line with an LP Series variant that provides a broadband medium-power FM antenna capable of handling up to 15 kilowatts of combined input power. The LP Series Axiom is available in half wave-spaced 4-, 8-, 12- and 16-bay configurations. This is suitable for use as an auxiliary master FM antenna for systems that are limited to a bandwidth requirement of up to 18 MHz of the FM Band (88 to 108 MHz).



The antenna is a side-mounted configuration with a proprietary feed system and has a significantly lower purchase price than the high-power Axiom FM antenna. The system is configured with a single 3-1/8-inch EIA flanged RF input. As with other ERI FM antennas, the LP Series Axiom includes brackets for mounting to a tower leg or pole up to 15 inches (381 millimeters) in diameter or for face-mounting on uniform cross section towers with face sizes up to 42 inches (1067 millimeters). Other mounting configurations are available optionally.

This new antenna model builds on the success of the high-power Axiom master FM antenna first put into operational use in 2004. Since then a number of Axioms have been installed as both main and auxiliary master FM antenna systems. The antenna is optionally available with electrical de-icers or radomes for environments with heavy snow and ice.

For information, contact ERI in Indiana (812) 925-6000 or visit [www.eriinc.com](http://www.eriinc.com).

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# Golden West Radio Radiates With Dielectric

Radomes help tame rough prairie environment

## USERREPORT

BY LAVERNE SIEMENS  
Director of Engineering  
Golden West Radio

### KINDERSLEY, SASKATCHEWAN —

The small Canadian community of Kindersley first took in the signal of CKVX nearly 11 years ago when the 50 W station lit up the airwaves. The low-power FM signal covered a radius of about seven kilometers (just over four and one-quarter miles), blanketing the immediate community but unable to reach a much larger audience share on the periphery.

We were recently afforded the opportunity to apply for a power increase to better service the larger community. We struck a deal with a local wireless company to collocate on an existing tower vacated by the CBC, and were approved for a full-power license that raised our TPO to 18.9 kW; and our ERP to 100 kW.

With 41 AM and FM stations spanning from northwest Ontario to Alberta, Golden West Radio's stations differ in antenna design and manufacturer based on varying site needs. However, Dielectric was our immediate choice for CKVX based on site characteristics, coverage needs and many years of positive experience with their products.

The tower extends just over 300 meters high (approximately 1,000 feet) on a site with appealing topology. Unlike much of the flatter Saskatchewan terrain, the tower site is situated on a rising hill with clear sightlines in all directions. With CBC's vacated, top-mounted TV antenna still in place, we opted for a side-mounted position immediately below the TV antenna. With unidirectional radiation a key requirement, we opted for Dielectric DCR-C ring style antenna — a proven design that we have had great success with across our station group.

The topology eliminated the need to include null fill in the design, but we did request a negative 0.75-degree tilt due to the antenna height. We ordered

an elliptically polarized design with a 70/30 horizontal-to-vertical pattern. Elliptical polarization provides the reception advantage of a vertical component without doubling the transmitter power output, as is required by circular polarization. This keeps our transmitter power below 20 kW, comfortably meeting our licensed ERP without increasing monthly power bills.

The higher gain of an elliptical design also reduced the antenna size and windload, simplifying the antenna installation and tuning. On the advice of our consulting engineer, we opted for a 10-bay design that was simple to install, lowering installation cost while meeting our transmitter size; and accelerating our ROI while delivering low total cost of ownership. Our collocation leases costs are based on the number of antenna bays so keeping that count down helps keep that monthly rate lower. The upfront cost of a larger antenna with more bays would have quickly canceled out the cost of a larger transmitter.

Installation was seamless. While the Dielectric ring design is lightweight, some minimal tower strengthening was required since the CBC TV antenna remained. After adding crossbars, the tower crew installed mounts, connected one line section to each bay, and hoisted each into position one by one. A 3-1/8-inch coax connection down the tower and into the plant finalized the installation.

Dielectric antennas are well regarded for their engineering design and qual-

ity, which contributes to a simple and straightforward antenna tuning process. Unlike many smaller broadcasters, we have our spectrum analyzers to take readings and measurements. With the provided fine match, we quickly achieved a return loss of better than 30 dB at  $\pm 100$  kHz, resulting in a very comfortable VSWR.

One important design characteristic of our antenna order was the addition of radomes for ice and wind protection. Our wide-open, remote prairie location leaves us susceptible to inclement weather conditions. While some other antenna vendors offer radomes that protect only the antenna drive point, we felt that the remote location of this site warranted the 100 percent protection of the Dielectric radomes.

Having full protection ensures we do not have to send out a tower crew to de-ice the antenna after an ice storm. In the Canadian prairies, we have no guarantee when we might next get melting temperatures after an ice storm. Experience has taught us we could be in for prolonged power rollback time if the antenna isn't protected properly during an ice storm. The Dielectric radomes do just that.

Our DCR-C antenna has performed exceptionally well since it began radiating our signal at higher power. We are achieving the predicted 0.5 mV contour and are meeting all coverage expectations. In fact, CKVX now has one of the largest coverage patterns in the province, and anecdotal listener response has been overwhelmingly positive. Dielectric's outstanding sales and

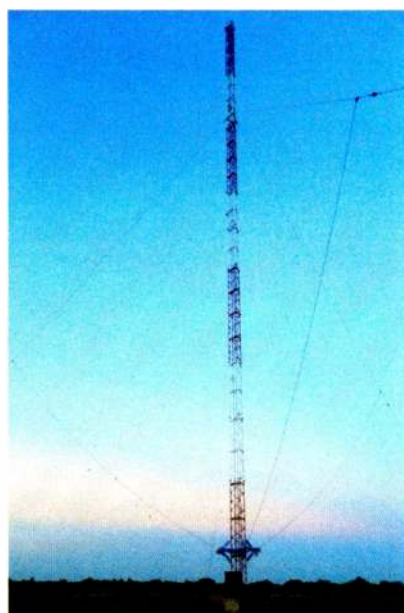


service support across antenna design, ordering, manufacturing and delivery kept everything moving on schedule and on budget.

For information, contact Kim Savage at Dielectric in Maine at (207) 655-8528; or visit [www.dielectric.com](http://www.dielectric.com).

## TECHUPDATE

### AMPEGON OFFERS MONOPOLE MW ANTENNA



Ampegon says its sturdy folded monopole 50 kW antenna system features a "straightforward design concept for highest reliability and efficiency even under heavy environmental conditions."

Fully grounded and not requiring a base insulator for antenna placement, the system streamlines antenna setup, explains Ampegon, simplifying maintenance of components and auxiliary systems.

For example, the company says, no isolated energy transformer is required to power the air obstruction light since a light is supplied directly with the antenna structure.

Constructed as a single unit, the radiating structure comprises the mast and also part of the guy ropes. These guy ropes supporting the mast are each divided by a single insulator. The upper section forms the "antenna cage," which is connected to the mast on one side, and by ropes to the insulated feed point at the base of the antenna.

As a result, says Ampegon, all parts of the steel structure and ropes are fully grounded, which eliminates the risk of "floating" and means there is no

electrostatic discharge or flashover.

Versions for wind speeds up to 150+ mph are available. Versions for high-power broadcasting (50+ kW) are also obtainable upon request.

For information, contact Ampegon in Switzerland at 011-41-58-710-44-00 or visit [www.ampegon.com](http://www.ampegon.com).

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## TECHUPDATES

### ALDENA ADDS TO ANTENNA LINE

Aldena Telecomunicazioni's range of FM antennas now includes three specific solutions for high-power applications (up to 13 kW per each antenna).

The ACF218 is a broadband FM double-crossed aluminum dipole antenna featuring omnidirectional patterns with preferred direction. The ASE 01022x0 is a broadband FM dipole antenna in welded aluminum



The high-power FM antenna Aldena recently installed for network operator Raiway in Milan.

or stainless steel, also with omnidirectional patterns with preferred direction, while the ASR0318 is a broadband-FM three-element Yagi.

For Band III DAB antennas, the new ADC Series of omnidirectional coaxial antennas features vertical polarization pattern, low weight and wind load along with various gain levels up to 6.5 dB.

In addition, the company recently announced it has installed a new high-power FM antenna for Italian network operator Raiway on the Isozaki Tower in Milan. The dual-feed installation consists of eight high-power FM dipoles, each with 13 kW each of power, designed for use on five FM frequencies. Aldena has also installed a DAB and DVB-T gap filler antenna for Raiway.

For information, contact Aldena Telecomunicazioni in Italy at 011-39-9039-0461 or visit [www.aldena.it](http://www.aldena.it).



### NEW BANDPASS SERIES FROM SHIVELY

Shively Labs says that sometimes less is more.

It is introducing an addition to its bandpass filter line. The 2712 series filter is a high-efficiency, medium-power filter design. The company says the design uses 3D EM simulation software and state-of-the-art machining and manufacturing techniques.

The 2712 is 35 percent smaller and 40 percent lighter than its predecessor, the 2516, but has the same efficiency, saving floor space without increasing overall heat load. It is available in three- or four-cavity configurations, with the option of cross-coupling to enhance isolation above and below carrier. The 2712 can be in branched or balanced combiners and comfortably handles 10 kW and up to 15 kW with optional blowers.

For information, contact Shively Labs in Maine at (207) 647-3327 or visit [www.shively.com](http://www.shively.com).

### P-CUBE OFFERS COMPLETE FM RF TRANSMISSION COMPONENT LINE

FM RF components manufacturer P-Cube Inc. says it is now able to supply a complete line of components for the output side of the FM transmitter. This includes filters, hybrids, power dividers, patch panels and directional couplers.

Bandpass filters in three- and four-section units are available. Adjustable, nonadjacent coupling in the four-section units permits the optimization of the rejection band, both above and below the pass band. The single filters range in power levels, from 500 W to 25 kW of average power. Any of these filters can be paired, as in a constant-impedance filter, to double the power handling of a single filter. Low-pass filters up to 25 kW are available in standard format or in wide-rejection bands covering up to the 8th or 10th harmonic.

Four-port hybrid units come in sizes ranging from Type N up to 4-1/16 inches, with the option of mixing the actual port sizes on a single unit. They are available as standard cross-over design or a non-crossover design. These hybrids are ideally suited as a building block in power-combing or power-splitting systems. Coupling values other than the common 3 dB coupling value are also available.

Power dividers are available up to four-way output. However, other numbers of outputs can be built on special order. The common input port size is available in 1-5/8-inch up to 6-1/8-inch. The outer material can be either brass or aluminum, depending on the environment.

Also available are fixed-tuned, short-loop directional couplers in line sizes from DIN 7/16-inch up to 6-1/8-inch, with one to four couplers on a short-line section. The coupling range at FM frequencies is 45 to 70 dB.

For information, contact P-Cube in Maine at (207) 318-3349 or visit [www.pcube207.com](http://www.pcube207.com).



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# A Phoenix Rises From the Ashes

Elevated counterpoise antenna system breathes new life into a silent AM

## **SPECIALREPORT**

**BY MIKE VANHOOSER**  
President  
Nova Electronics

**DALLAS** — Nova Electronics has extensive experience in the design and construction of "elevated counterpoise" systems for AM radio stations. These systems have been shown to be operationally equal to a buried ground system, with drastic savings in labor and materials, and far less susceptible to damage and wear.

Elevated radials are an inexpensive and practical solution where there is sufficient property to install a minimum of six equally spaced radials a full quarter wave in length. They may be used to replace damaged buried systems or for new installations.

In new installations, these systems allow continued farm use of the land, installation in rocky areas where a buried system would not normally be employed and implementation of a station in environmentally-sensitive areas where the land disturbance associated with buried systems would be prohibited. Based on the experience base, concerns about stability in varying weather conditions or efficiency problems are unfounded when systems are designed and installed properly.

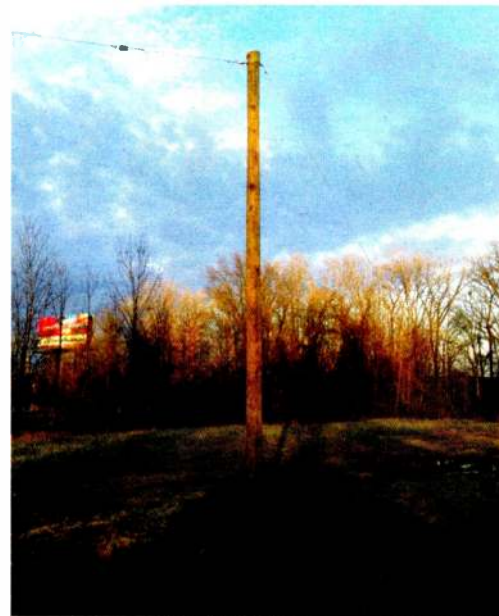
This design has been proven at many AM stations, including most recently at WDTW, and also WPCI, KKKW, WNJO, WGNY, WWJZ, WVNJ and KNGR. The only disadvantage is in directional antenna systems, as it is not currently accepted for MoM analysis, but that is expected to come. However, the large cost-saving over a traditional buried system will more than offset the additional cost of a traditional proof.

### **DETROIT**

In probably one of the few reconstruction projects occurring in the Detroit area, WDTW recently was rebuilt from the ground up. WDTW started off just after World War II in 1946 as WKMJ, and in 1963 became WKNR, "Keener 1310," one of Detroit's legendary rockers. At the end of 2012, then-owner Clear Channel announced they would be closing the station and donating it to the Minority Media and Telecommunications Council.

The station was dismantled and all towers demolished, with nothing but the transmitter building and tower bases remaining. In 2014 it was acquired by Pedro Zamora, and in March 2015 Nova Electronics was contracted to rebuild it.

The station was rebuilt under the existing license in order to save considerable time and money. Although the original array was an old Earl Cullum-designed distributed array, it was updated as much as possible to modern stan-



**In an elevated counterpoise system the radials are not buried but are above ground. Here, for WDTW, the radials are attached at the base of the tower, then slope up 15 feet at about 20 feet out and continue until terminated by design or space limitations.**

dards, while leaving the less-than-ideal original design parameters, due to the limited time remaining to return it to operation. So it was decided to make the best of what we had to work with, and find a way to make it perform to maximum potential.

Several changes were made, to improve performance and save considerable expense. The original towers were 105 degrees/210 feet tall, and the new Tylon towers were lowered to 195 feet through top-loading. Also, as the site was constantly wet, an elevated counterpoise was installed instead of a standard buried ground system.

At the lower height, no paint and lights were required, and the elevated counterpoise required only 7,000 feet of wire, as opposed to over 20 miles with the conventional system. It took only days instead of weeks to construct. Between the two, this resulted in a savings of almost \$100,000. This eliminated the ability to perform a Method of Moments proof, but the extra expense of a standard proof was offset by the huge savings.

In running the Proof of Performance, we compared the new array with a proof from the last modification about 20 years ago. Measured performance was equal to slightly better, compared to the conventional buried ground system in use during the old proof. This stood as confirmation of the performance of an elevated counterpoise system. While saving a significant amount in materials and labor, no sacrifice in radiation efficiency was noted.

**For information, contact Mike Vanhooser at Nova Electronics in Texas at (214) 725-5621 or visit [www.novaelectronics.net](http://www.novaelectronics.net).**

## **TECHUPDATES**

### **LBA EXPANDS BROADBAND AM ISOCOUPLER PLATFORM**

LBA Technology's CAMI AM tower broadband isocoupler is now available in five models to accommodate a range of applications. The expanded CAMI line means there is an economical isocoupler for nearly any single coaxial line installation on an AM tower, LBA says. It is suitable for applications such as two-way, microwave and STL links, FM translators, low-power FM, LPTV and television translators, even for high-power FM and TV collocations.

LBA says that the CAMI 500, CAMI 1800, CAMI 5000, CAMI 10000, and CAMI 40000 offer a simple, economical solution to take advantage of existing vertical real estate on "hot" AM towers. The LBA CAMI isocoupler family now supports any combination of RF carriers from DC to 2700 MHz or more, and conservative RF power levels to 40,000 watts at FM. High-impedance AM isolation is achieved on any specified frequency between 530–1710 kHz.

Unlike commonly used tuned isocouplers, the same broadband CAMI model will fit these application frequencies without retuning. This means an FM or TV operator need not change isocouplers, even if they are reallocated. This can solve major TV repack site issues. The CAMI passes AC or DC current to tower top amplifiers, is resistant to weather and lightning, and is easy to install from ground level with supplied hardware.

**For information, contact LBA Technology in North Carolina at (252) 757-0279 or visit [www.lbagroup.com](http://www.lbagroup.com).**



### **JAMPRO OFFERS JAVA**

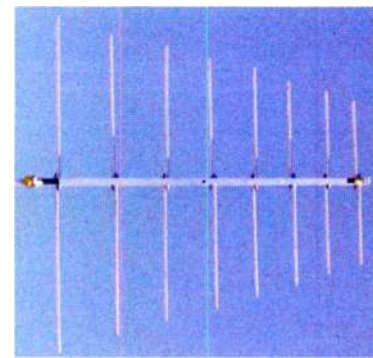
The Jampro JAVA is an FM broadband log periodic antenna system that the company says is suitable for high-gain directional applications. It is broadband with low VSWR across the entire FM band.

Polarization can be vertical, horizontal or slant. Components are aluminum with hot-dip Galvanization optional.

The antenna system consists of log periodic antenna assemblies, power divider, feed cables and mounting brackets/hardware to provide secure mounting to the tower.

Custom directional azimuth pattern and FCC certification are available on the Jampro full-scale test range to confirm FCC DA and customer's requirements.

**For information, contact Jampro in California at (916) 383-1177 or visit [www.jampro.com](http://www.jampro.com).**



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Wanted: real plate reverb. abgrun@gmail.com.

## AUTOMATION EQUIPMENT

### WANT TO SELL

DIY-DJ Version 2.0 is now available. Over 500 copies of DIY-DJ, a Linux based radio automation system, have been distributed and now version 2.0 is available. Voice tracking, join satellite feeds, do unattended sports and remote events, temperature announce, scheduler, automatic cut editing on import, and much more. It's FREE. If you are using version 1.0 or would like to try DIY-DJ, go to krwsfm.com, register and download your free full version. The only thing we ask is that you let us know if and how you are using the software. Call (406) 679-0527 or email krws@digitaldevelopment.net for a copy today.

### WANT TO BUY

(2) Gates Dualux II consoles, working, just replaced w/a new board, Gates snow plow console, lots of extra modules, McMartin B-802 console, (2) BE 85150 consoles, working when removed this Summer, Marti STL, mono, QEI 675 FM exciter, Gates tube type program amp, Gates 25hz gen, BE F530 stereo gen, Inovonics 230 audio processor, BE triple deck cart machine, BO on all or part, 406-679-0527.

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### WANT TO BUY

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## MISCELLANEOUS

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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

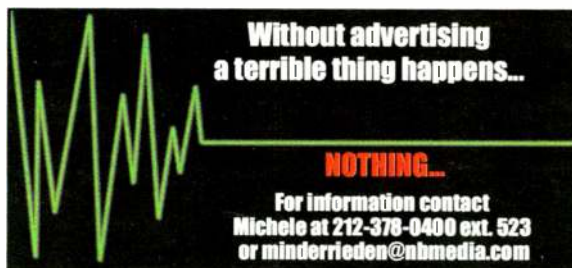
WYBG 1050, Messina, NY, now off the air is selling: 8-channel Harris/Gates console; 250' tower w/building on 4 acres; collection of very old 78s dating back to 1904; 12' satellite dish on concrete base; prices drastically slashed. 315-287-1753 or 315-528-6040

### WANT TO BUY

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I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example newscast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, KTAB, KDIA, KWBR, KSFX, 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 homerun by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

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

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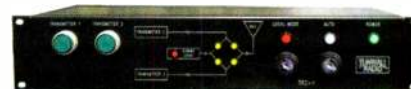
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# The Coolest Thing I've Ever Done

Covering a presidential election is an unforgettable experience at the collegiate level

## COMMENTARY

BY JAMES COPELAND

*The author is the programming director for KSDB(FM), licensed to Kansas State University.*

Reading a recent Radio World article about WSOU's election coverage ("Campus View: How to Plan a News Takeover for a Music Station," RadioWorld.com, Nov. 23) prompted me to share a few of my experiences as a college radio programming director during election night.

KSDB served as the carrier for all the outlets, including The Collegian (newspaper) and Channel 8 News (student TV class).

KSDB is blessed with a large studio complex occupying the third floor of the music addition to McCain Auditorium, built in the mid-1970s. Not much has changed in that time, except the equipment. (Yes, the shag carpet is original.)

We designated our largest performance studio, Studio E, as our election headquarters. We had around 15 people stationed in there, starting at 5 p.m. until after midnight. The reporters in Studio E were made up of Collegian

participants from the union's watch party in for comments.

Between all of that, we had one Marti set up at the Democratic headquarters

chunk of northeast Kansas at my fingertips that night. We started election coverage at 6 p.m., went to continuous coverage at 7:15 p.m., and continued until 12:15 a.m. Finally, sometime after 2 a.m. local time, we announced the final presidential results.



The "Big Board" in KSDB's election headquarters is used to keep track of mainly local races as the night goes on.



Reporter Brennan Flanagan reads an election update from the main on-air studio during election night. Staff in this studio also coordinated remote broadcasts.



Fifteen or more reporters crowd in Studio E in the KSDB Studios in McCain Auditorium on the Kansas State Campus. The room normally is used for live band performances and classroom instruction.

Covering an election at a college radio station is really a once-in-a-lifetime experience for most people. For 91.9 KSDB(FM), a station that's been around for nearly 68 years at Kansas State University in Manhattan, Kan., we've had our share of elections. But as is the nature of constant turnover in college radio, the next generation usually has to do some reinventing of the wheel, as student employees often don't write much down over the years. (And in the cast of KSDB, entire stations burn down every once in a while!)

This year, KSDB created a unique partnership between various campus media organizations. At K-State, our media outlets are very "unconverged" and are about as separate organizationally and geographically as possible. Our experiment was successful though, and

staff as well as KSDB staff, and they were designated local, state and national races to follow all night and were updated regularly on the "big board," so we could keep track of everything. Reporters in Studio E would report to the main on-air studio, where I was acting as announcer and board operator, and came on the air as soon as there was an update. Someone else in the on-air studio would talk to Studio E through an intercom, as well as coordinate all of the remotes and live call-in reports.

In addition to our election headquarters, we had two students and a professor in Studio A in McCain providing commentary to make sense of the numbers coming out of Studio E. Between those two reports, we would go to our satellite studio in the Student Union, where someone else was pulling par-

for Riley County, as well as another at the Republican headquarters. These teams checked in through the night and provided instant interviews with some of the local candidates.

Finally, reporters from Channel 8 news were at various watch parties throughout the state, and they called in with their own updates from their individual locations. Also, we had one reporter from a local TV news department call in with information.

All in all, I felt like I had a good

In addition to all our other news sources, we had reporters monitoring other local news outlets. One of which did provide local election coverage, but only from 8–10 p.m.

In total, we had over 30 people involved in this coverage. The night was simply electric, with people constantly commenting on how the coverage was "the coolest thing I've ever done!" I felt the same.

*We want to hear from you. Send letters to radioworld@nbmedia.com.*

## READER'S FORUM

### AM RADIO

Regarding the Warren Shulz commentary "Is It Time to Rethink Part 11?" in the Oct. 12 issue:

Some research shows the licensee of WBTC also has an FM nearby (WNPQ), and the AM has a full 250 W translator.

No one has more sympathy for poor little AMers but these are material services which should have been mentioned, too.

Steve Moravec  
Phoenix Media Group LLC  
Saint Paul, Minn.

### HD RADIO

The Readers Forum letter "HD Radio Dropping Out" in your Sept. 14 issue is inaccurate. The writer, Richard Brickhouse, writes that in the 1960s the FCC mandated all radios sold to have the capability to receive FM. Boy do I wish that had been the case.

Steve Trivers and I, working at Susquehanna Broadcasting Co. in York, Pa., sold a lot of Lafayette Electronics mobile FM tuners one at a time at WSBA(FM).

In reality it was on the TV side that UHF was mandated to be added to VHF television sets. Even that mandate was a mostly poor one initially. VHF tuners had a click, click from Channels 2-13. UHF tuners were similar to AM radios of the day; fine tuning a UHF signal was difficult at best.

Bill Wertz  
Wertz Media  
Seattle



I found this article very interesting. We currently have 11 radio stations throughout the state of Michigan. One question I have always had is why doesn't FEMA utilize the shortwave WWV facilities as a backup for IPAWS? Internet connections in rural areas are difficult; sometimes the only option is DSL or a satellite connection, and we are in snow country.

I'm sure there are good reasons why they don't use WWV but I've never heard why.

David Bolduc  
Station Manager  
Strong Tower Radio  
Cadillac, Mich.

### OSCILLOSCOPE

Regarding "How to Calibrate Your Analog Console," RW Nov. 9:

Using an oscilloscope to set up an analog console is a good start.

I have found that using a Tektronix 760A stereo audio scope gives better presentation of audio levels and phasing. I use a dual trace oscilloscope, as well as the Tek 760a, to set up control rooms and production rooms. I had a video production client who had reports that their commercials, when played back mono, had reduced levels.


Using the Tek 760a, I quickly found a XLR con-

ductor mis-wired, causing a phase reversal in the edit bay output.

Since most dual trace oscilloscopes have poor trigger circuits for audio, the Tek 760a gives a better indication of phasing between channels. The Tek 760a can be setup for different impedances and levels.

The Tektronix 760a can be found used for under \$500 dollars. I recently saw one listed at the Broadcast Store for \$399. I have one of my Tek 760a's mounted in a carry case to take on site.

James Kiffmeyer, BSEE CPRE  
Broadcast consultant  
Kiffmeyer Engineering  
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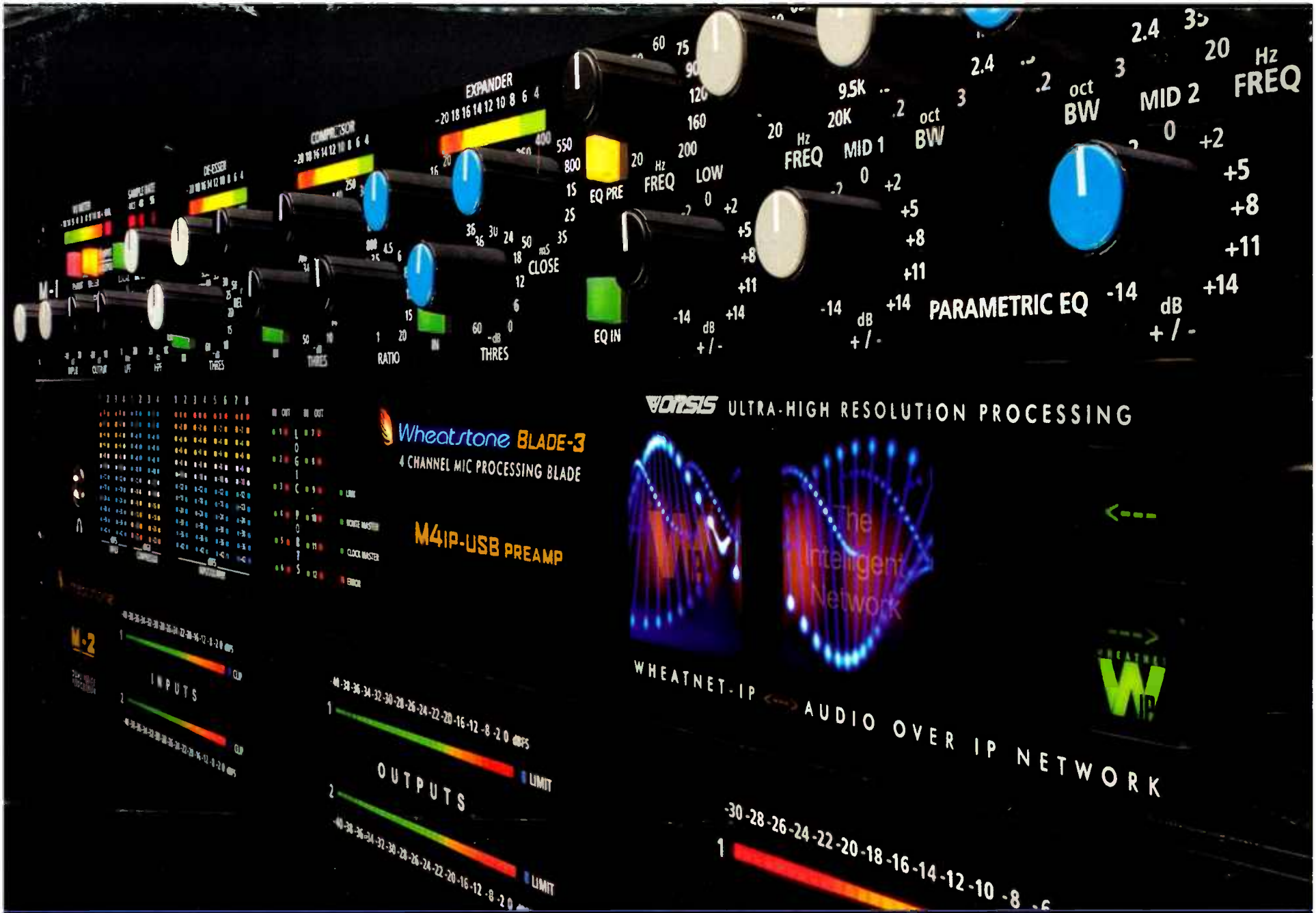
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For our SQ (Super Quiet) mic pres, we emulated and hot-rodged legendary studio preamps to sound incredible for modern radio.

Our compressors, limiters, & EQs are maximized for vocal smoothness, allowing your talent to stand out on-the-air.

Wheatstone's Graphical User Interfaces give you deep, intuitive control to tweak our world-class presets and save those you create.

The result? Voices that can sound superhuman.

### Wheatstone M-Series Voice/Mic Processors

**M-1:** single channel with knobs and buttons • **M-2:** dual channel with multiband compression • **M4-IP USB:** four-channel networkable BLADE-3

Learn more at [wheatstone.com/superhuman-voices](http://wheatstone.com/superhuman-voices)

**Wheatstone**  
BROADCAST AUDIO PERFECTIONISTS®

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