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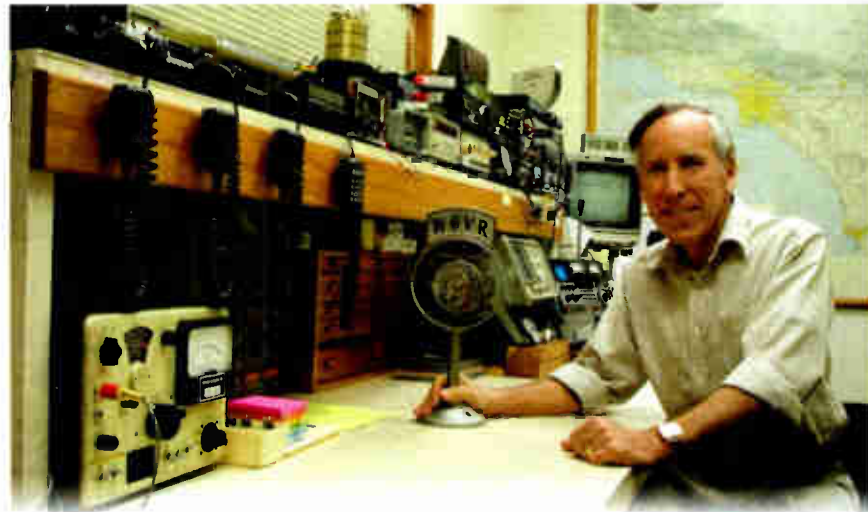


Photo by Gary Stigall

Gonsett, Born to RF Engineering

For This Consulting Radio Engineer, Life Is About Solving Technical Problems

BY GARY STIGALL

FALLBROOK, CALIF. — You see it in the neat rows of cherimoya fruit trees in the orchard of his summit home in Fallbrook, north of San Diego. You see it in his tidy laboratory. His clients can attest to his relentless discipline. Bob Gonsett

knows exactly how he likes things done. Bob Gonsett, consulting radio engineer, started life in Los Angeles, and there is no way you can understand him without knowing a thing or two about his father.

Faust Gonsett invented the two-way radio for police motorcycles and was chief engineer of the Beverly Hills, Calif., Police Department at an early age. He then founded the Gonset Company. (Although the family name is Gonsett, the company name is Gonset because six letters looked better than seven inside the company's diamond-shaped logo.) It manufactured a variety of amateur radio products including the VHF Communicators affectionately known as "Gooney Birds." The firm also manufactured TV antennas that were

(continued on page 8)

Mary Day Lee, Radio Pioneer

Could She Have Been America's First Woman at the Radio Microphone?



Brooklyn Children's Museum

BY JAMES E. O'NEAL

The unexpected sometimes happens during a research effort. This was true in my quest to determine the truth about

ROOTS OF RADIO

the fabled 1906 Fessenden Christmas Eve "first broadcast," which is well known to Radio World readers.

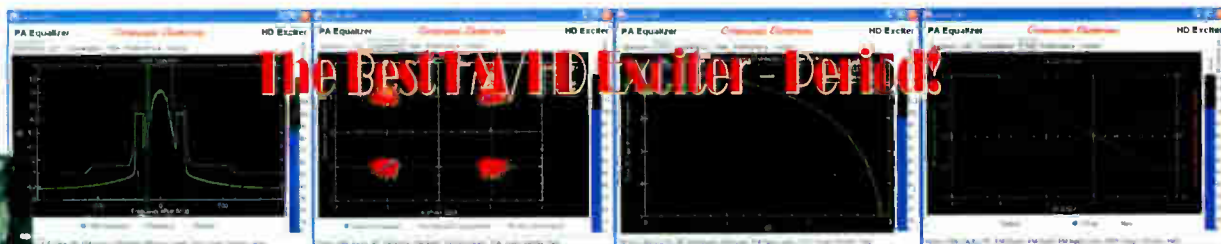
In doing that research I learned about a cluster of young people — teenagers — who lived in a Brooklyn, N.Y., neighborhood, shared a strong interest in radio and eventually made careers of it.

They were all born around 1890, and as such, were the first generation of young people exposed to radio — the first true geeks or techno nerds. As radio was a hot item, and poorly understood by the average person, radio experimenters frequently provided grist for newspaper reporters.

One New York paper referred to the Brooklyn radio kids as "smart boys" and reported on their activities. One of these was Francis (Frank) Hart who, in

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NPR's Shawn Fox uses one of the thousands of tablet and smartphone devices visible on and off the show floor and increasingly woven into IP-controlled broadcast products. The Apple iPad came out only days before the show.

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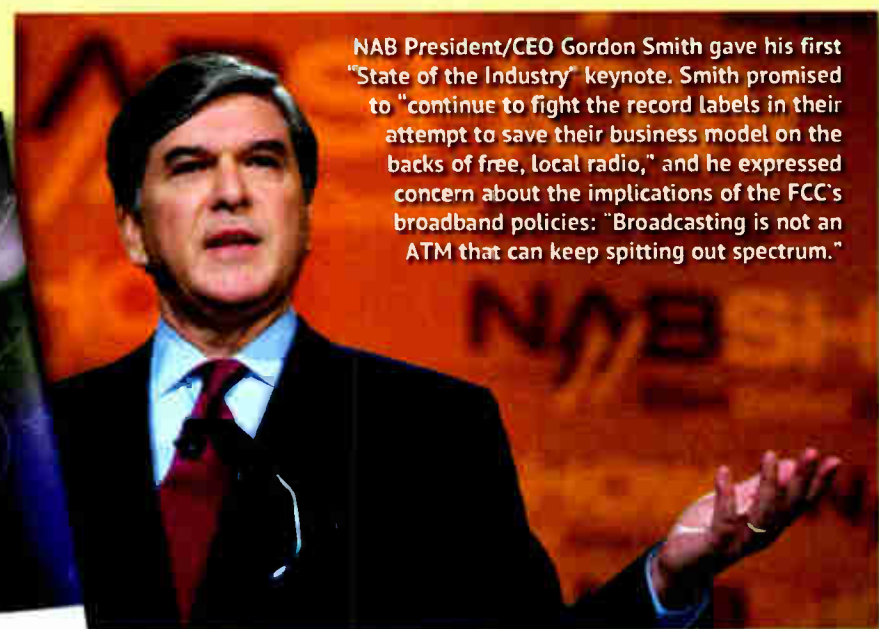


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Organizers estimated attendance at 88,044 (from 156 countries), an increase of 6.5 percent from last year.



NAB President/CEO Gordon Smith gave his first "State of the Industry" keynote. Smith promised to "continue to fight the record labels in their attempt to save their business model on the backs of free, local radio," and he expressed concern about the implications of the FCC's broadband policies: "Broadcasting is not an ATM that can keep spitting out spectrum."

© NAB

Radio, Back Where It Belongs

Move to Central Hall Accompanies a Welcome Upturn in Business

"Maybe it's because we're back where we belong."

That's the explanation a long-time radio exhibit insider offered for the undeniably upbeat feeling on the convention floor at the NAB Show in April.

"Where we belong" means the Central Hall of the Las Vegas Convention Center, where the majority of radio manufacturers clustered.

She's absolutely right. By moving the center of radio gravity back from the North Hall after many years, NAB organizers ran a jolt through the event for a lot of radio folks. Traffic was good, salespeople were busy and there was more of a sense of activity than in the recent past. It was heartening to feel such a positive vibe.

The economy, though, is the bigger reason for the change. Manufacturers were smiling about first-quarter performance and what they've been hearing from broadcast customers. "Upbeat." "Much improved." "Turned a corner." These were typical phrases.

As I wrote on the Radio World blog during the show, it appears radio engineers will have more money to spend this year on RF and studio plants. The cap-ex situation over the past year and a half has been severe ("like someone turning off a light switch," as one person put it, recalling late 2008); but 2010 is looking better.

'GET IT DONE'

This upbeat conclusion comes with caveats.

Attendees at any convention are not



Bill Gould discusses the Moseley family of products on the NAB Show floor.

likely to constitute a statistically representative sample. More important, broadcasters with big debts are likely to remain stingy with spending; it's not "pedal to the metal" time for them.

I heard from one trustworthy vendor that the cutback in cap-ex spending at Clear Channel in particular is breathtaking, even while CC has managed to cut dealer markup on many of the products it is buying to low single percentage points through innovative buying techniques including an online reverse auction among its vendors.

(Faced with very tight cap ex, one observer told me: "If I was an engineer preparing my budget, I'd put it all into duct tape.")

Another company, a transmitter manufacturer, said that although business has indeed been picking up, a typical order now might be for one transmitter where a buyer earlier had projected buying several.

"It's not that it's healthy," said a third

exec, who works for an antenna company. "It took a lot of time for manufacturers to swallow their pride and discount a lot. They're less profitable."

But these were minority comments.

I heard much that was upbeat, even from notable curmudgeons. I talked to one high-level engineer at a top-five radio group who said budgets were "back to normal" as of January, with a lot of RF projects coming along. The message from his corporate people is "get it done." Another company owner, who makes hardware, said the tone among clients right now is, "Maybe I *can* do that this year."

PRICE IS KING

If equipment buyers are coming back, though, they remain extremely price sensitive. As one fellow put it, "Price is king at this show."

That puts pressure on manufacturers to fill lower price points, and we've seen the result across product classes, nowhere more than in consoles and transmitters. It's remarkable how much engineering quality you can get for your money as a result.

I can imagine the strategy conversations at a successful, R&D-driven manufacturer: "Is it good for our prestigious business to go 'economy'? Does it help or hurt our brand? Are we turning ourselves into a commodity with no differentiation from the other guys? And does a low-cost rollout by our competitor open an oppor-

FROM THE EDITOR



Paul McLane

tunity for us on the upscale side?"

These market forces can be fascinating to watch play out. The move toward value is good news for buyers, though it's likely to make business tougher for manufacturers that have specialized in the lower-end niche.

This also was the year of the iPad. Though Apple's pretty tablet had only been on the market a few days, its fabulous form factor and display drew many compliments. Well-designed content that looks good on an iPhone looks spectacular on an iPad.

It was the year of iPhone apps applied to solving radio technology problems. And it was a year for high-end FM processors, as rival practitioners of that dark art emerged from their jealously guarded labs, blinked in the sunlight and pulled back their wizards' capes to reveal their latest DSP-fed creations.

Meanwhile, we continue to hear about interoperability, about digital power, about RDS (even after all these years!), about IP audio, about the morphed nature of an engineer's job ("There's a new generation of engineers. The only tool they own is an RJ45 crimper") and, unfortunately, about still more cutbacks in tech staffs.

But the show felt to me, by most measures, a success. One thing is certain: Radio was back where it belongs.

I sent our photographers out to capture a flavor of the event. This issue contains the results. In coming weeks, we'll have more post-show discussion, "Cool Stuff" winners and our summer product preview featuring gear from the floor.



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What's the Outlook for Tagging?

A Lot Depends on Apple and Microsoft, And They're Not Saying Much Right Now

BY RANDY J. STINE

CUPERTINO, CALIF. — If FM radio is going to insert itself more directly into the music-purchasing loop via song tagging, a lot will depend on its developing relationships with Apple and Microsoft.

NEWSANALYSIS

The technology giants, which media analysts say control the legal song download market in the United States, will have a major say in whether radio broadcasters ever see substantial revenue through their song tagging efforts, observers believe.

Tagging technology allows a terrestrial FM listener to “tag” a song heard on a specially equipped analog or HD Radio player — with a dock for an iPod or MP3 player — and later buy and download it to the player through Apple’s iTunes or Microsoft’s Zune Marketplace.

Nine major radio groups in 2008 committed to encoding songs to allow listeners to tag songs and are in various stages of deployment, with Clear Channel the largest adapter to date (see “Song Tagging Push Underway,” Radio World, March 10). Terrestrial broadcasters must encode songs with metadata that is transferred via the Radio Broadcast Data System subcarrier channel or HD Radio channels.

Microsoft and Apple apparently hope

song tagging will result in increased music download sales; but neither has been vocal in talking about it or taken a very high profile with tagging. It’s hard

date. The company is the marketplace leader and most important player, industry observers agree.

The company declined to comment for this story but has indicated that it sees song tagging as a great way for local broadcasters to jump into the digital music space.

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Tagging (right) is one of the features highlighted by iBiquity Digital in a brochure about the benefits of HD Radio in the wireless market.

to judge whether those firms are big believers or just dipping their toes into the market waters.

Industry analysts estimate that Apple is paying broadcast partners around 5 percent of the price for each download credit.

Apple, which posted a \$3 billion profit in Q2, announced in February that consumers had purchased and downloaded 10 billion songs on iTunes to

Microsoft declined to comment on its song tagging intentions for this story and said it expects to have “no comment available” for the foreseeable future.

The company was sued in March by an Illinois man who claims the company copied his patented technology for tagging and downloading music through an FM receiver (see sidebar, page 6).

Meanwhile, terrestrial broadcasters *(continued on page 6)*

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TAGGING

(continued from page 5)

who support tagging believe the technology may help gain them younger listeners and some revenue from song purchasing.

Dennis Wharton, executive vice president of media relations for NAB, said radio's prime motivation here seems to be a desire to attract and maintain listeners.

"Generating revenue is a part of the equation, but the revenue coming to stations right now through song tagging is quite modest. We think tagging provides listeners with a new gateway to purchase music, benefiting both recording artists and their record label. These technological developments underscore radio's staying power in a new media world."

'ARCANE'

Despite radio's intentions to capitalize on the new technology, it's difficult anecdotally to find consumers who are aware of tagging or participants who think a big payoff will come anytime soon.

Nor have financial analysts who follow radio written much about song tagging. Typically their reports have focused on debt capital management during a credit crunch rather than new innovations, industry watchers said.

Several radio financial analysts contacted for this article said they were prohibited by their employers from commenting publicly about iTunes song tag-

ging because they have not written about the topic.

"It really hasn't come up in quarterly earnings calls, so apparently (tagging) is not yet for material for CEOs to alert of brag about to Wall Street investors," said Jim Boyle, senior analyst at Gifford



The Alpine CDA-117 CD radio features iTunes Tagging. An Alpine executive said, 'Consumers are starting to make the link between radio and tagging.'

Securities.

Song tagging as a revenue generator is "really an unknown" right now, said Bishop Cheen, a financial analyst with Wells Fargo Securities.

"The core for radio has been so weak for so long that managements and investors would really prefer to see a fundamental recovery more than whatever the new thing may or may not be. Tagging is just one aspect of digital radio that may yet gain a foothold, but it really is way too new, and too arcane right now to be a driver of any investor sentiment."

John Sanders, media analyst with Bond & Pecaro, said he is skeptical whether song tagging will ever become more than a very small sliver of revenue for radio broadcasters. He said it "will not mark a revolutionizing of revenue for radio. It won't be radio's salvation."

MICROSOFT SUED OVER ZUNE FEATURE

A lawsuit filed by an Illinois ophthalmologist in U.S. District Court for the Western District of Wisconsin alleges that the "Buy from FM" feature Microsoft has built into its Zune MP3 devices violate patents he was issued in 2002, according to numerous media reports.

Dr. Edward Yavitz's lawsuit asks for a permanent injunction prohibiting Microsoft from selling new Zunes and Zune HDs, plus triple damages and court costs, according to these accounts.

Microsoft introduced the Buy from FM feature for its Zune players in 2008. Yavitz pitched the company his idea for a similar feature in 2006. At the time Yavitz was seeking to license his technology to Microsoft.

Yavitz LLC holds patents at the crux of the claim that cover broadcast technology, reports indicated. In the abstract of one, 6,473,792, the patent holders write of "a broadcast reception system or display system combined with a computer. The inspection system includes a receiver that is integrated with a computer. The receiver may be configured to receive analog FM signals and linked data transmitted according to at least one of the RDS and MBS standards."

The abstract continues, "The data serves as a trigger to provide the user with a prompt on the computer system. The prompt may be utilized to access information related to the primary radio broadcast and previously stored at a memory location. This permits a user to quickly access large amounts of information relevant to the current programming of a given radio station or to purchase music, goods and services featured in an FM broadcast."

If there is legitimacy to the plaintiff's claims, analysts said, the developments could hamper efforts to accelerate song tagging adoption by the public. Attempts by Radio World to reach Yavitz for comment were unsuccessful. Microsoft declined comment on the suit.

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World Radio History

However, some stakeholders remain optimistic. Several radio receiver manufacturers, like Sony, JVC and Kenwood, have added tagging capability to their automobile OEM and aftermarket head units in the past year, as we've reported (see March 10 CES coverage).

"Consumers are starting to make the link between radio and tagging. It's really an offshoot of the increasing popularity of HD Radio," said Steve Brown, products promotion director for Alpine Electronics. "Song tagging is available on every HD Radio module we sell."

Brown said Alpine, which carries radio that work with iTunes tagging, believes tagging will become more popular as manufacturers continue to integrate iPod and other MP3 players with and car audio systems.

He and others pointed to a statistic from Arbitron and Edison Research, part of the "Infinite Dial 2010: Digital Platforms and the Future of Radio" survey, that 24 percent of people 12 and older have listened to an iPod, iPhone or other MP3 player while the player is connected to a car stereo.

The study found that 44 percent of Americans 12 and older own an MP3 player and 54 percent of that group have hooked up the player to listen in the car.

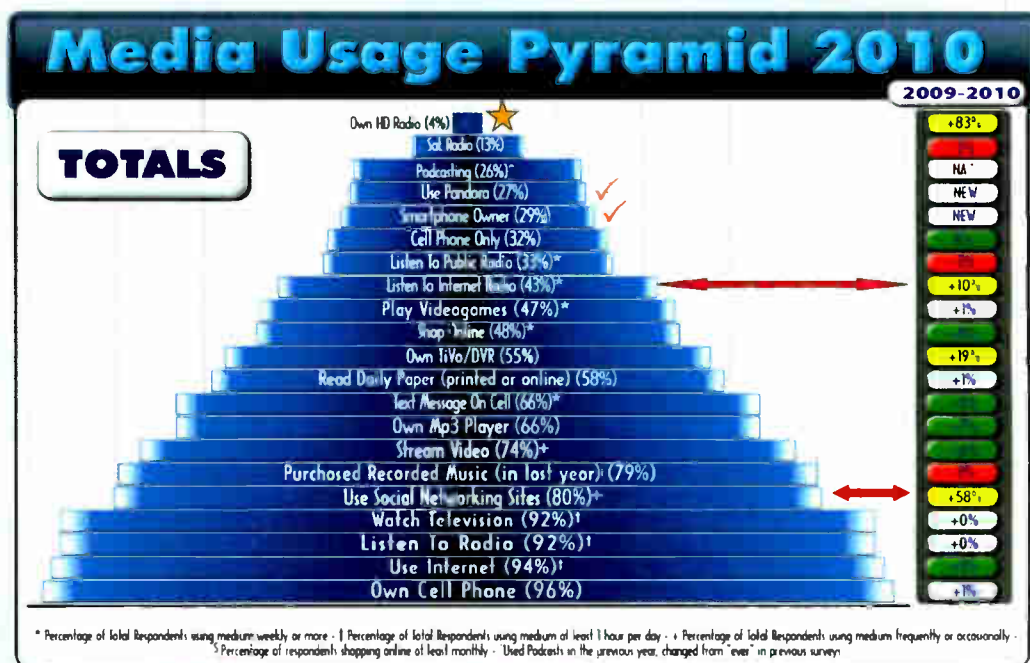
Outside of the car, iBiquity Digital's 2010 buyer's guide lists six tabletop radios that act as docking systems with iTunes tagging.

Will tagging take off? Comment to radioworld@nbmedia.com.

NEWS WATCH

PYRAMID: The Jacobs Media Technology Survey suggests that although a majority of listeners have yet to move to listening to radio on a smartphone or succumb to Pandora, the migration from over-the-air radio continues. The pyramid reflects answers from an online survey of listeners to rock stations; percentages at far right show changes from a year ago. Among findings: Pandora is enjoying "rampant growth."

PPM: Arbitron and the PPM Coalition reached a settlement, vowing "to move forward collaboratively." Rep. Edolphus Towns helped forge the agreement, along with the Media Rating Council. Arbitron is taking further steps to enhance its recruitment system, among other initiatives.



LEVIN: The man who led the development of the FCC broadband plan is leaving. Blair Levin will become a communications/society fellow at the Aspen Institute.

HOOKS: Civil rights leader and former FCC Commissioner Benjamin Hooks passed away. He was 85. He was the first African-American commissioner and was executive director of the NAACP from 1977 to 1992.

LIVE & LOCAL



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GONSETT

(continued from page 1)

sold nationwide by Sears Roebuck as well as some of the earliest FM broadcast converters for cars.

Fascinated with the electronics at his father's plant, Robert Gonsett took up amateur radio, passed his Novice exam at age 13 and soon advanced to General as WA6QQQ.

"Even the kings of old couldn't cast their voices around the world, but we could as amateur operators, and there were so many interesting people to meet," he recalls. When ham vanity call signs became available, he got his father's old call, W6VR.

After moving to San Diego County as a teenager, the young Gonsett found his way onto Mt. Soledad and became fascinated with the high-powered transmitters at KOGO(TV), which is now KGTV. He also became hooked on FM when the transmitter serving KJLH (now KIFM) needed serious repair.

His father died about the time the teenager graduated from high school. Bob met his future wife and office partner Judy at the University of Southern California; she later joined him near Boston when Bob was studying by day for his electrical engineering degree at the Massachusetts Institute of Technology while teaching scuba diving for the school at night. He was MIT's first underwater instructor.

Gonsett enjoyed listening to classical music on WBCN(FM) Boston, though the station (which is now WBMX) had some serious technical problems.

"One day I went over and asked if I could fix their transmitter since I liked the music but they had this little problem," Gonsett said, who was 20 years old at the time. "They had been off the air for days, and said, 'Have at it!' Next thing I knew, they made me chief engineer — all while carrying a full course load at MIT and teaching scuba in the evenings."

FCC EXPERIENCE

"WBCN was a lot of fun because there were so many problems to fix, from a poorly designed new transmitter to a near-prototype Shively antenna where portions of the bays exploded each winter due to an unstable RTV compound. The work was sort of like amateur radio carried to an extreme, but the work was easy because I had been doing that kind of stuff all my life."

Gonsett got his first taste of consulting when he engineered the WBCN transmitter move to the Prudential Tower, with all its attendant challenges.

Gonsett, now 63, fondly remembers his first serious encounter with the Federal Communications Commission. He had to work out a short-spacing deal with the local engineer-in-charge in order to make the WBCN move. The EIC agreed to the plan — and that's all there was to it. The process was "much simpler than getting a waiver today."

He graduated with a Bachelor of Science degree in electrical engineering from MIT in 1970 and took off to the Caribbean, where he quickly became chief engineer of the Caribbean division of Cable and Wireless/Western Union International. He used his pilot's license to visit outlying offices — and of course taught scuba on weekends. "The work was fun but not a career."

Soon Bob and Judy returned to southern California and he became chief engineer for KOWN(AM/FM), Escondido, and KFSD(FM), San Diego. He almost immediately branched out into consulting with his own firm, Communications General Corp.

CGC is known for frequency and spectral measure-



As a boy, Gonsett appeared on the cover of *Radio & Television News* in May, 1954, published by Ziff Davis, along with Sam Lewis, who worked at his father's radio manufacturing plant and Sam's wife.

ments as well as its California-centric e-mailed newsletter, but the vast majority of its business is in consultant radio engineering that often progresses out of sight.

He's shown great stamina in his career. Gonsett fought for years with incumbent land-mobile users and the custodian USDA Forest Service to install a heavily filtered 530 watt ERP FM transmitter for KWVE on prominent Santiago Peak in Orange County, Calif. The Forest Service insisted the station would cripple incumbent land-mobile communications. It took a court proceeding and exhaustive field measurements to prove no harm, and "K-WAVE" prevailed.

For a small Class A FM station in Carlsbad, he orchestrated a monumental move, shuffling adjacent and co-channel stations on both sides of the U.S.-Mexico border until KKOS could move to 95.7 MHz and obtain a Class B license at the desirable Mt. Soledad site in San Diego, in essence moving the station to the big city. He convinced the FCC to use his Longley-Rice calculations to prove sufficient coverage of the city of license — a showing Gonsett feels would have been rejected with the traditional F(50,50) propagation methodology.

HO TOO SOON?

Perhaps his biggest accomplishment to date involved designing and overseeing the construction of a major new radio and television transmission site in the Tucson Mountains in Tucson, Ariz. That location gave broadcasters a site close to the metropolitan population with far better winter access and maximum-facility RF plants.

Close attention was paid to site construction so that high-power broadcasting could live harmoniously with sensitive land-mobile and cable TV receivers.

According to Gonsett, the project took years to complete and involved numerous environmental issues, one of the first uses of Longley-Rice calculations in an FCC hearing and some envious TV broadcasters who opposed the project.

"That project was much more contentious than, say, the development of Mt. Harvard in Los Angeles."

Regarding trends at the commission, Gonsett said, "On AM we have a lot of drop-ins and a lot of man-made noise, now exacerbated by HD sideband interference.

"A classic example of AM HD Radio interference would be KNX at 1070 kHz and KDIS at 1110 kHz, each in Los Angeles, causing interference to 50 kW XEPRS at 1090 kHz that transmits from a point near Tijuana, Mexico. Specifically, XEPRS' analog signal had been regularly received in the Los Angeles basin and Orange County until HD transmissions were initiated in L.A."

Gonsett feels that HD Radio was introduced "way before its time — the bugs weren't worked out." His FM clients, he said, may self-inflict damage to their analog signals with the granted 6 to 10 dB IBOC power increase, and he already sees interference from "HD intermodulation regrowth," which he describes as a "widespread, nationwide problem."

"Over the years, radio has devolved from a high-quality service with fringe area coverage to a 'sorta sounds okay' media where fringe service is being destroyed by noise."

COMMUNICATOR

From the launching of his business, Gonsett has kept in touch with clients through a newsletter informing them about FCC statements and spectrum changes that could affect them, as well as other items of interest.

The CGC Communicator began more than 35 years ago as a hand-written sheet; later it was typed. In 1996 it evolved into an e-mail bulletin and now has more than 1,000 subscribers, according to Gonsett.

Last fall, when the Station Fire in Los Angeles threatened broadcast transmitters on Mt. Wilson and Mt. Harvard, Gonsett felt special urgency in his mission to inform regional engineers, and he became an ad hoc message center for those sites. Gonsett said broadcast engineering managers became deeply concerned when Mt. Wilson and their facilities appeared to be threatened by a burn-over and firefighters were being pulled off the mountain.

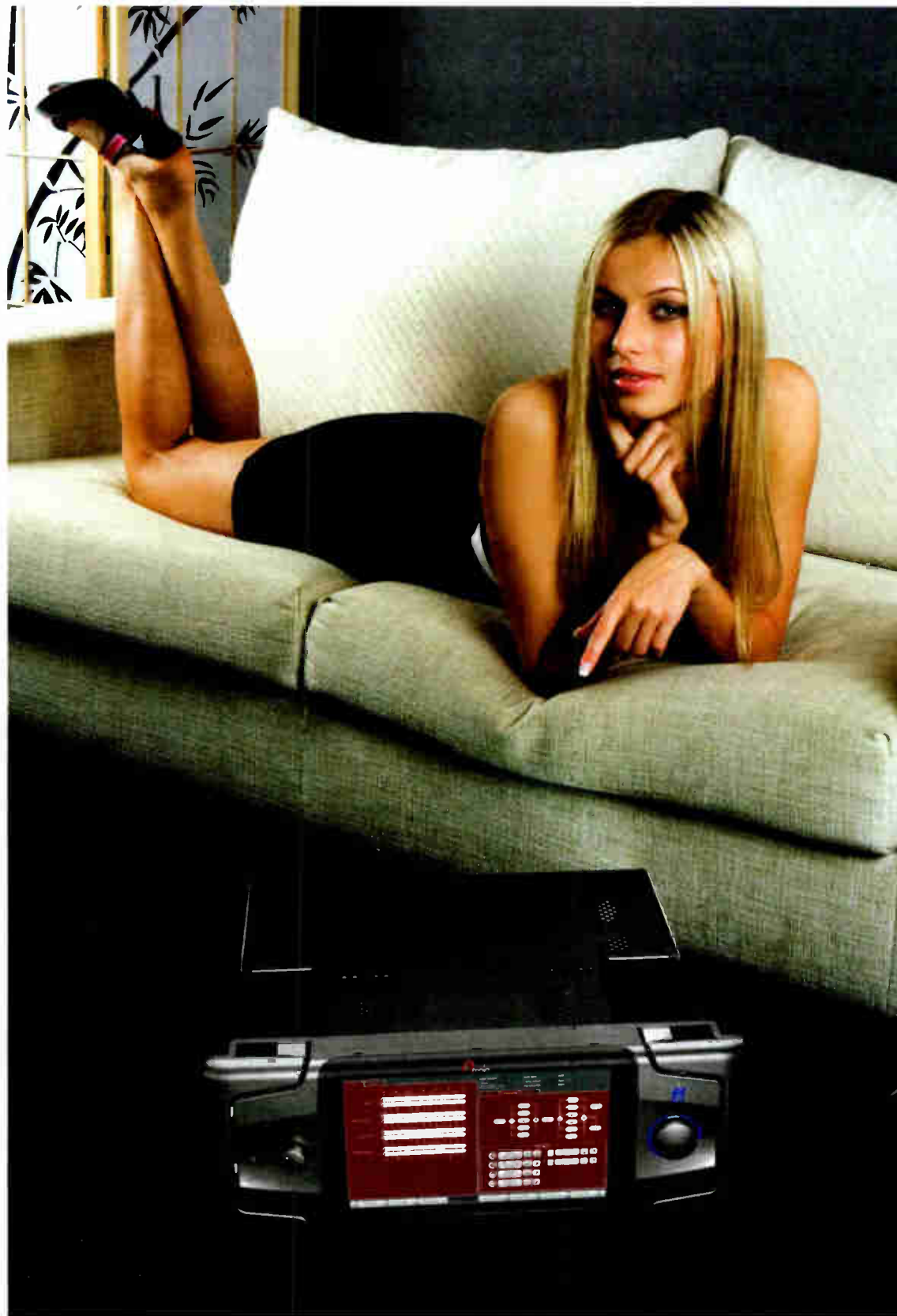
Gonsett donated his time to keep communications flowing between the Forest Service, site users and patrol officers. His sometimes multiple daily posts gave important insights for stakeholders. Newsletter subscribers in other parts of the country followed the Mt. Wilson broadcast-related communications with fascination. Ultimately, the burn-over didn't happen.

San Diego's SBE Chapter 36 in December honored Bob Gonsett with a Lifetime Achievement plaque as part of a holiday banquet. In giving the award, the chapter cited his work in the service of Southern California broadcasters over the past four decades, and in particular, during the fires this past fall.

Will he retire?

"I bill myself as being semi-retired, but I love the work — and the people in this business are terrific."

Gary Stigall, CPBE, is director of engineering for Televisa's Bay City Television in San Diego, a past client of Communications General Corp. Stigall has been a radio and TV broadcast engineer since 1977.



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Brazil Could Pick Digital Standard in 2010

'Radio Can No Longer Remain Analog in a Digital World'

BY CARLOS EDUARDO
BEHRENSDORF

BRASÍLIA, BRAZIL — Although tests and consultations are ongoing, Brazilian regulators are positioning to be decided upon a digital radio standard for the country within a year.

With a target date for full roll-out of an in-band, on-channel approach to digital radio by 2016, Brazil is expected to make a standards announcement by the end of this year or in early 2011. While iBiquity Digital's HD Radio system has been used on a trial basis by several commercial broadcasters since 2005, there also is interest in Digital Radio Mondiale's DRM30 and DRM+ technologies.

Experts say one or a combination of standards could be adopted.

The plan to name a digital radio standard was announced a year ago at the close of the 25th Congress of the Brazilian Association of Radio and Television Broadcasters, or ABERT, held in Brasília. The next congress will be held in 2011.

Anticipation continued after the minister of communications, Hélio Costa, opened a 180-day public consultation period in February to discuss which standard Brazil will adopt.

Brazil is an important receiver market in this hemisphere. It's the second-largest radio country in the world in terms of station count, behind the United States.



In April, iBiquity's John Schneider hosted a tour of CBS Radio facilities in Las Vegas for broadcasters from Brazil and the Dominican Republic to show a commercial implementation of HD Radio. CBS Market Chief Engineer Tracy Teagarden showed studios and the AM site, where this photo was taken. From left: Sergio Parisi; Fernando Luiz Parizotto; Tracy Teagarden; Sandra Pons de Brugal, president of ADORA, the Dominican Republic radio broadcasters' association; Gilberto Kussler; Ronald Barbosa; Rosa Olga Medrano; José Fidalgo; Frank Brugal; John Schneider; André Bouças; Marco Tulio Nascimento.

Brazil has more than 3,000 commercial stations and about an equal number of low-power community radio stations, according to iBiquity. Like in the United States, Brazilian commercial stations are licensed on a local basis, but they are allowed to federate and to share programming and advertising.

Also, it is the fifth-largest country in terms of both land mass and population, with nearly 193 million people, according to the Brazilian Institute of Geography and Statistics. More important than its population size is that Brazil is the largest national economy in Latin America, the second-largest in the Americas (behind the United States) and the ninth-largest in terms of gross domestic product based on purchasing power parity, according to the International Monetary Fund.

There is a sense of pressure in Brazil to move on a digital decision. At the close of the biennial ABERT meeting last year, Daniel Pimentel Slaviero, the association's president, declared, "Radio can no longer remain analog in a digital world." ABERT, like NAB in the United States, represents the interests of commercial broadcasters.

He said some new/upgraded transmission equipment would be needed if any digital standard is adopted, but there would be "no change to frequency allocations." Regulators have supported an in-band digital radio solution for Brazil, apparently ruling out a solution like Eureka-147 DAB or DAB+.

"The frequencies will be the same, and the digital signal can coexist with analog, so we aren't dealing with the same migration period as television," Slaviero said. Brazilian television is in the midst of transitioning to digital using the ISDB-Tb standard; that migration period is set to

end in 2016.

ABERT Technical Advisor Ronald Barbosa said the simplest HD or DRM receiving devices currently cost the equivalent of about \$56, which would decrease as more receivers are sold.

Whether HD or DRM, "The cost for radio businesses to adopt the digital standard is at least 12 times cheaper than for TV broadcasters. On average, it will be between roughly \$85,000 and \$170,000, vs. \$1.1 million to \$2.8 million for television broadcasters," Barbosa said. "The investment doesn't eliminate the capability to transmit an analog signal."



Daniel Pimentel Slaviero,
ABERT president



Ronald Barbosa, ABERT
technical advisor

The IBOC approach, familiar to U.S. readers, assumes an indefinite period of "hybrid" operation that allows broadcasters to continue to air analog signals while adding digital services on their existing frequencies. Presumably at some later time, the analog could be switched off and the entire licensed channel used for digital services.

The possibility exists that the country will adopt different standards for AM, FM and shortwave.

While AM and tropical-band shortwave remain important in large swaths of Brazil, DRM may be better positioned than iBiquity's HD Radio AM for these wavebands, according to anecdotal comments on Brazilian digital radio message boards, blogs and press accounts. Yet

(continued on page 12)



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BRAZIL HD

(continued from page 10)

HD Radio has more receivers on the market than does DRM. If regulators opt for DRM on AM and for HD Radio on FM, there is a concern that the rollout could be delayed by the manufacturing time necessary to produce dual-standard receivers, according to these accounts.

iBiquity publicly has supported the use of DRM30 for shortwave services in Brazil. It also supports the concept of multi-system tuners capable of receiving both HD Radio on AM/FM and DRM on shortwave.

Brazil has a strong electronics manufacturing sector, so whichever standard or mix of standards is decided upon, acceptable receivers are expected to be able to be produced domestically.

STANDARDS UNDER DISCUSSION

Selection of HD Radio would be a big win for U.S.-based iBiquity. It is the official digital radio technology in the United States, Panama and the Philippines; we've reported that Mexico is likely to adopt the technology, and iBiquity says the Dominican Republic also is close to adopting a standard. Brazil potentially could be the sixth country to adopt HD Radio as its official digital radio technology.

It would be a significant expansion of the company's presence in the Western Hemisphere. Argentina, Canada, Chile, Colombia and Jamaica broadcasters are trialing HD Radio, as are several countries in Europe and Asia, according to iBiquity.

"Brazil also tends to set the technology standard for the rest of South America," iBiquity Director of Business Development for Latin America John Schneider told Radio World recently.

"As an example, its chosen digital TV technology [ISDB-Tb] is being adopted by many of its neighboring countries, so we feel the process could repeat itself for digital radio."

HD Radio is used experimentally by about 30 Brazilian broadcasters, both AM and FM.

"The Brazilian government has stated that no new spectrum will be made available for digital radio, and that the country must adopt an IBOC standard," said Schneider.

"Brazilian radio uses exactly the same AM and FM technical standards as the United States, and so our technology is a good spectral fit for their country



The new ABERT broadcast association headquarters in Brasília, inaugurated in 2009.

for the same reasons as in the U.S. With an installed user base of about 30 broadcasters, the country has already invested several millions of dollars in our technology, so they have a good start on commercial implementation," said Schneider.

"Also, we offer them a mature receiver technology that would allow economical receivers to quickly get into the hands of Brazilian listeners."

HD Radio was developed by iBiquity, whose investors include broadcasters like CBS, Clear Channel, Entercom and Radio One, as well as financial institutions such as J.P. Morgan Partners, New Venture Partners and FirstMark Capital, and strategic partners Ford Motor Co., Harris, Texas Instruments and Visteon.

It isn't a secret that ABERT favors the HD Radio standard, but it doesn't align itself with any product or business. In 2007, the association judged iBiquity favorably because it was the only entity that offered an FM IBOC technology.

At that time, ABERT contracted with Mackenzie Presbyterian University to create a methodology for testing HD Radio in cooperation with those broadcasters authorized to try it. The resulting methodology and tests were based on guidelines issued by Anatel, the National Telecommunications Agency.

Trials and studies were carried out over nine months by five mostly commercial broadcasters: an AM and FM station in São Paulo, an AM station in Belo Horizonte, an FM station in Riberão Preto and a community radio station in Cordeirópolis. The conclusions of the HD Radio tests were delivered to the Ministry of Communications at the



end of 2008. They served as input from the radio broadcasting industry to help the government define the standard best suited for Brazil.

Other groups that participated in the study were the Brazilian Association of Radio Broadcasters (ABRA) and state-level associations of radio and television broadcasters.

NEW ROUND OF TESTS

Starting in February of this year, the Ministry of Communications coordinated another round of tests for digital radio in Belo Horizonte, initiating experimental transmissions using the Digital Radio Mondiale DRM30 and DRM+ standards. The Belo Horizonte DRM trial results will be compared with 2007 HD Radio trials in São Paulo.

According to specialists at the ministry, DRM offers technical robustness and could serve some of the country's needs, especially the use of DRM30 for AM and tropical-band stations.

DRM30 is used by shortwave broadcasters worldwide, including in this hemisphere. On the national level, Russia and India are committing to using DRM30 on AM and shortwave, and some broadcasters in Germany, China, Spain and France are also using DRM30 on shortwave,

longwave and AM under experimental authorizations.

More recently, with the DRM+ standard, the DRM Consortium is able to offer solutions for VHF broadcasting above 30 MHz, meaning that it can offer in-band solutions for Brazil's AM, FM and tropical-wave broadcasters.

With DRM30, regions like the expansive Amazon River basin, served by Rádio Nacional da Amazônia, will be able to receive nearly clean transmissions, without interference, with technical quality and pure signal, even when programs originate far from the reception area, according to authorities in the communications ministry.

Michel Penneroux, DRM Commercial Committee chair and head of international broadcasting for French transmission-services company TDF, declared at the ABERT Congress in 2009 that the European system is "more interesting for Brazil" considering the size of the country.

The consortium that developed the DRM standards is an international not-for-profit organization composed of broadcasters, network providers, transmitter and receiver manufacturers, universities and others, including the BBC, Deutsche Welle, NHK, Radio Vaticana, Dolby, Sony, Harris, Nautel and

Transradio SenderSysteme.

The current DRM trials are coordinated by technical experts from the Ministry of Communications in partnership with representatives from Anatel, the National Institute of Meteorology, Norms and Industrial Quality, the Federal Universities of Minas Gerais, Pará and Rio Grande do Norte, and two German engineers and researchers from the Center for Studies in Telecommunications from the Catholic University of Rio de Janeiro.

Although convinced that the HD Radio is best suited for Brazilian commercial radio, the broadcasters' association ABERT believes that at this time — when the Ministry of Communications is in the midst of a public consultation and trials of the DRM standards are under way — it is necessary to await the final results to decide which model to adopt in Brazil.

According to technical experts at the Ministry of Communications, the introduction of digital radio in Brazil, no matter which standard is chosen, will improve sound quality, radically improving the listener experience.

Carlos Eduardo Behrendorf writes about the radio industry in Brasília, Brazil. T. Carter Ross and Leslie Stimson contributed to this piece.

Selected data in Radio World is from BIAfn's MEDIA Access Pro™.



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And more compatible equipment is likely on the way. The IEEE is working on a consumer electronics standard called "AVB" (802.1), which is similar to Livewire. When the standards-making process is eventually complete, CD players and other devices that can interoperate with Livewire studio equipment will probably appear.

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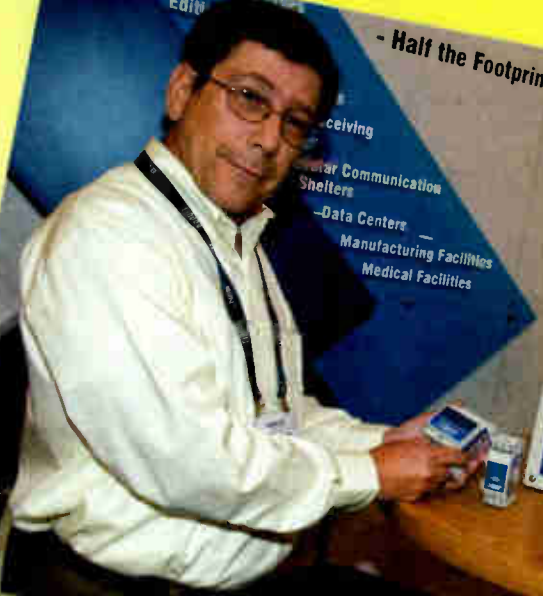
connecting radio & internet

James Cridland and Nick Piggott spread the word about RadioDNS, an open project that aims to link broadcast radio and IP. The technology, based upon the Domain Name System, allows IP-connected radios automatically to locate the servers of the station they are tuned to.

Connecting radio and the internet to deliver enhanced content and

Photo by Kovacs/Dawley

- Half the Footprint



Ted Gladis discusses Superior Electric's Stabiline surge protective devices. The company has a new voltage regulator family called the BVR line.

Photo by Kovacs/Dawley



It was the year of the app — here, a show app for the iPhone, with human support structure by John Lackness.

Photo by Jim Peck

Rebuilt tubes and a bad one, in the Econco booth.

Photo by Kovacs/Dawley



Inovonics' Lukas Hurwitz, new director of sales and marketing, compiled a graphic illustrating the significant number of mobile phones he identified that provide RDS capabilities. (He used the comparison site www.phoneegg.com.)



Photo by Jim Peck

Habitat for Humanity's Build 2010 House Project erected a house shell in the LVCC parking lot. Attendees could volunteer for a two-hour shift.

Photo by Jim Peck



Photo by Kovacs/Dawley

Photo by KovacsDawley



Implementation of the HD Radio power hike was a topic of many presentations. Geoff Mendenhall, VP of transmission research & technology for Harris Broadcast, speaks at the Broadcast Engineering Conference.

Photo by Jim Peck



Nautel's Philipp Schmid discusses the benefits of asymmetrical sidebands and peak reduction in digital radio with a group of engineers from Citadel.

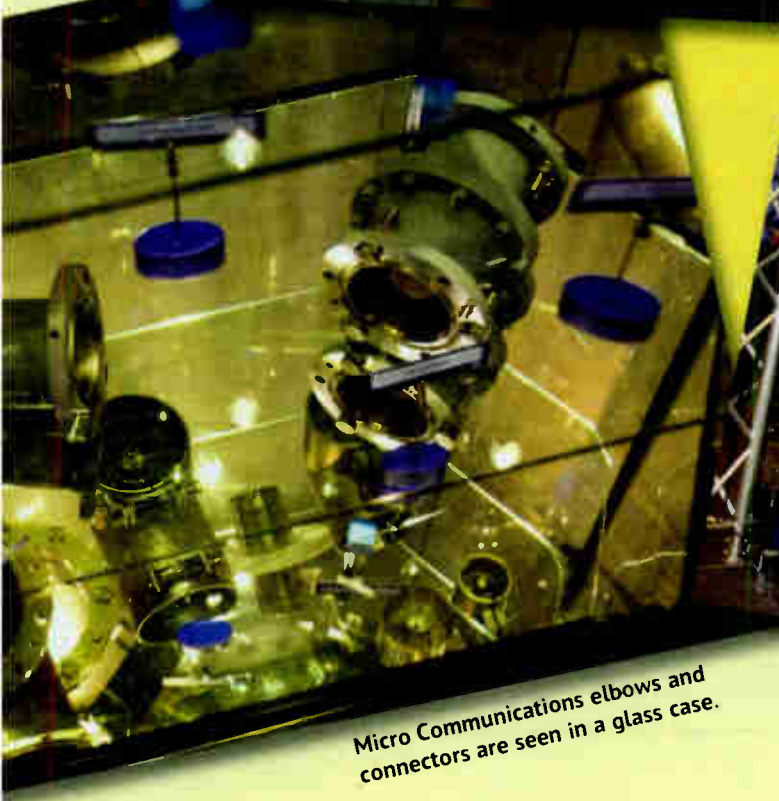
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Carl and Carissa Beckman from Beckman Tower discuss projects with Owen Ulmer of Sabre Tower.

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Micro Communications elbows and connectors are seen in a glass case.



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A Fly Brings Down a Transmitter

Also, a Tip for Those Who Have Sage Boxes With Thermal Printers

In Mark Tomlonson's nearly 30 years as a radio chief engineer, he has seen transmitters go down due to wind (it happened at AM station WAYT, which is now WJOT, in 1981), fire (at FM station WMUK, 1991) and flood (at FM station WIDR, 2005). This is the first time he has lost one to a fly.

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Insects, especially swarming ones, can give engineers fits. But this was no swarm. A lone housefly recently brought down the box that changes the HD1 and HD2 audio into HD Radio at WMUK. Without that box there is no HD.

The device is a Linux computer, so it has a hard drive. One side of the drive usually is left open for cooling; at WMUK the open cooling faced a side panel. The errant fly crawled between the hard drive and panel and came into contact with the power leads for the disk.

That was the end of life for both fly and hard drive. And without the HD signal, the exciter shut down; with no exciter signal, the HD transmitter shut down.

The chain of events seems simple in retrospect, but Mark could not have guessed that a fly had been the source of the failure until he investigated.

There's nothing special about the drive; Mark replaced it with one in stock. WMUK is back on the air full strength, with both HD streams.

Mark Tomlonson can be reached at tomlonson@yahoo.com.



Fig. 1: An old plastic phone card saves the Sage printer mechanism.

Mark Voris is the chief engineer for the Spirit Catholic Radio Network in Omaha, Neb. He has a tip for engineers who maintain older Sage Endecs that use thermal printers.

Grab an old phone card or game card and attach it with Velcro brand or similar hook and loop fastener to the front of the Sage Endec. As seen in Fig. 1, the hard edge of the card is ideal for tearing off the EAS printer receipts.

After advancing the paper, use the card edge to tear the paper receipt cleanly. Yanking on the paper, or pulling and tearing the paper strip can damage the printer mechanism. If you can't get your operators to follow the proper

procedure, roll the strip and secure it with a paper clip until someone removes the strips properly.

Mark Voris can be reached at mark@kvss.com.

Contract and project engineer Mike Patton enjoyed our March 10 tip from Ted Fuller, who figured out why the MW-1 meter kicks upwards at turn-off and told how to fix it.

Mike too has developed some tips for this transmitter. One is to replace the audio transistors on the PA modules with Moto (now On Semi) MJ15024s. The transistors originally were 2N6254 RCAs, more recently Motorola

MJ15011s or MJ15015s.

The MJ15024s have higher voltage standoff and current ratings than the 15015s or 15011s and should be much tougher in the field. To Mike's knowledge, none of his retrofitted PAs has suffered a failure.

Mike notes that current gain on the 15024s is a bit lower; so change them all at once, in all modules. That makes 39 transistors counting the driver, at about \$10 each — it's not cheap. But even with lower gain, there is enough current gain in the audio chain not to load down the driver, and positive peak performance is unaffected.

For folks in the Deep South, Mike's firm provides support and parts for transmitter models that are no longer supported by the makers or that were made by companies that are no longer in business. In addition to parts and repairs on the Harris MW and SX series, Mike's firm can retune rigs on-site or in his shop.

Mike Patton calls Baton Rouge home. He can be reached at mike@michaelpatton.com.

Workbench columns are archived online; go to www.radioworld.com, select "Columns" under the banner, then "Workbench."

Here's a tip prompted by an item that appeared in November 2008.

Broadcast engineer Paul Sagi, in Kuala Lumpur, responded to the column titled "What's Wrong With This Picture?" The article suggested that you check tower grounding after you clear debris and weeds from the tower base.

Paul shares a tip about the type of conductor used for grounding when copper strap is not available.

(continued on page 21)

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LEE

(continued from page 1)

1906, began keeping a sort of radio log/diary. Hart and the remarkable perspective that his journal provided about early radio were mentioned in my articles writings about the "world's first broadcast."

Nowadays, it's difficult to imagine not having instant 24/7 communications, or electric lights that work every time the switch is touched. Yet, 100 years ago, even in the largest cities, telephone service was a rather mysterious thing, subscribed to only by the rich; many electric

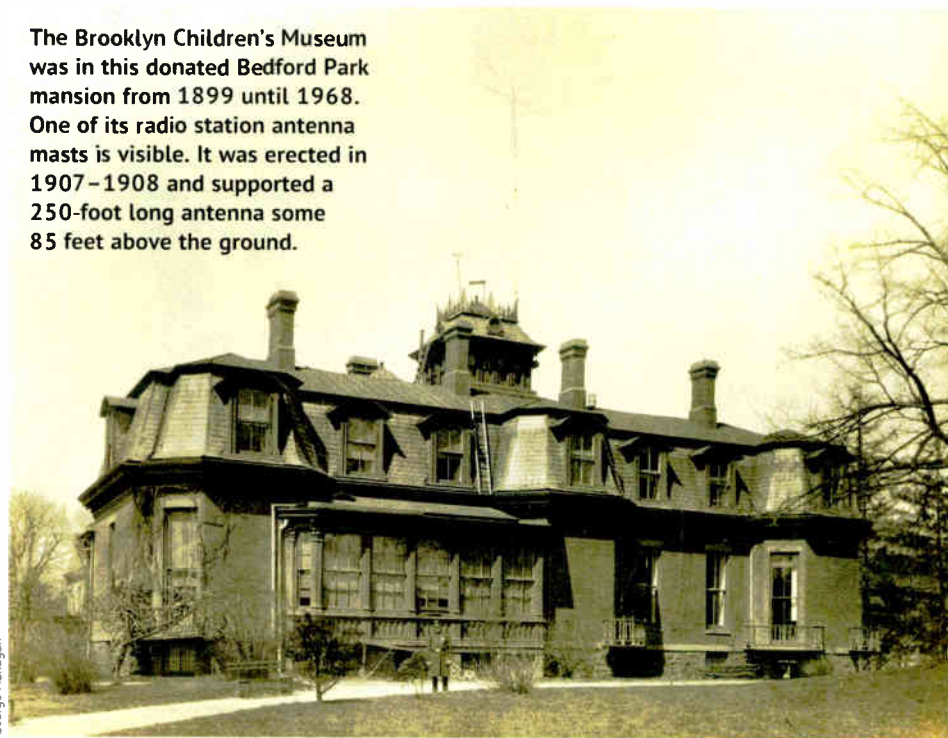
power companies provided power only during the evening hours and shut down during thunderstorms.

High school science classes shied away from the teaching of subjects such as electricity, wireless, x-rays, flying machines and similar wonders. These inventions were too new, and most educators had little or no grasp of such technologies.

So where did the young people of that era turn to satisfy their hunger for knowledge in such areas?

Certainly, there were public libraries, but in the early 20th century, these weren't universal, and — just as today

The Brooklyn Children's Museum was in this donated Bedford Park mansion from 1899 until 1968. One of its radio station antenna masts is visible. It was erected in 1907-1908 and supported a 250-foot long antenna some 85 feet above the ground.



George Flanagan



Pennsylvania State Archives

Mary Day Lee is seen with three of her protégés in this 1907 photograph. From left: Austen M. Curtis, Lee, Lloyd Espenschied, Frank Hart.

— had to balance the reading interests of their clientele with resources available, meaning that the overwhelming majority of books were popular fiction rather than scientific treatises.

Magazines in the area of electricity and wireless were scarce — the first title printed in this country that catered to radio experimenters didn't appear until 1908.

FILLING AN EDUCATIONAL VOID

Children in Brooklyn were fortunate in having access to the first museum created exclusively for young people. The Brooklyn Children's Museum, established in 1899.

Its mission was "to actively engage children in educational and entertaining experiences through innovation and excellence in exhibitions, programs and use of its collection."

Hart and his peers were in their early

teens when the museum opened. It's not known if they became "regulars" immediately after opening day, but it's likely this happened with the arrival of a recent college graduate trained in the sciences, someone who would have a great influence on the lives of Hart and his friends, many who went on to successful careers in radio engineering.

Unusual for the times, their mentor was a woman.

It was not uncommon for women to work in the field of telegraphy or telephony. In fact, they were chosen over men for staffing telephone switchboards, based on perceptions about demeanor and temperament.

However, radio in the early 1900s was very much "a man's world." It involved working with lethal voltages, physically large and heavy apparatus and the climbing of high masts — something women

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“just didn’t do” then. (Lee de Forest’s 1907 marriage to Nora Blatch wound up in the divorce courts because she persisted in her career as an engineer after their nuptials.)

Such stigmas notwithstanding, Mary Day Lee arrived at the Brooklyn Children’s Museum on Oct. 3, 1905, and began a nearly two decade-long career in instructing boys and girls about the wonders of electricity, radio and the physical world around them.

Her arrival was heralded with a small note in the organization’s Museum News:

***ANNOUNCEMENT:** It gives us pleasure to announce the appointment of Miss Mary Day Lee, of New Rochelle, New York, to the position of First Assistant in the Children’s Museum. Miss Lee is a graduate of Barnard College and of the Teacher’s College, New York, where she gave special attention to physics and chemistry. Her work at the Museum will include popular lectures on these subjects and she will be glad to meet any boys and girls who are interested in physical and electrical apparatus and experiments.*

Census reports indicate that Mary Day Lee was born in Richmond, Va., but the surviving records are ambiguous as to her exact date of birth. College records give it as April 21, 1879. The circumstances of her family’s move to New York City are vague. College records indicate that she graduated from Barnard in 1905, making her about 26 years old at the time of her museum appointment.

Lee was soon to become a pivotal figure in the museum’s operations and in early radio itself. During her tenure, she also would serve as the mentor to young people interested in the physical sciences.

POPULARIZING RADIO IN BROOKLYN

Lee wasted little time in bringing one marvel of electricity to neighborhood children: a wired telegraph system, which gradually spread out to interconnect the museum with the homes of the young people that she worked with. Within a few months, this wired telegraph system morphed into a full-blown “wireless” station.

The beginnings of that radio station are recorded in the Museum News in spring of 1906, in an article titled “Our Wireless Telegraph”:

“The wireless telegraph receiver is now in good working order and hardly a day passes in which we do not hear messages from some of the stations in the vicinity, or some of the vessels outside the harbor.”

Although the article carries no author’s name, clearly it was penned by Lee. Further in the account is a detailed description of how to make detectors for radio waves and of the construction of a

(continued on page 22)

WORKBENCH

(continued from page 18)

Rectangular conductors make better grounds for RF and lightning-caused impulses than do round conductors, because the rectangular cross-section configuration results in lower self-inductance (other factors being equal). So if copper strap is not available, go with rectangular conductors.

I mentioned this to Nautel’s lightning and grounding maven John Pinks. “Compared to any other geometric

shape,” he told me, “a circle has the smallest circumference that encloses a given area. Conversely, the cross-section of a wide, thin strap has a comparatively long perimeter compared to a circular conductor.

“As RF currents tend to flow on the surface of conductors due to skin effect, the useful area of a strap is much larger than that of a round conductor. This effect is, however, frequency dependent and more significant at the higher end of the lightning’s frequency components, i.e., 5 MHz.”

Thank you, gentlemen, for the

tutorial. Paul Sagi can be reached at pksagi92@gmail.com. John Pinks is jpinks@nautel.com.

John Bisset marked his 40th year in radio in broadcasting recently. He is international sales manager for Europe and Southern Africa for Nautel and a past recipient of the SBE’s Educator of the Year Award. Reach him at johnbisset@myfairpoint.net. Faxed submissions can be sent to (603) 472-4944.

Submissions for this column are encouraged and qualify for SBE recertification credit.

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LEE

(continued from page 21)

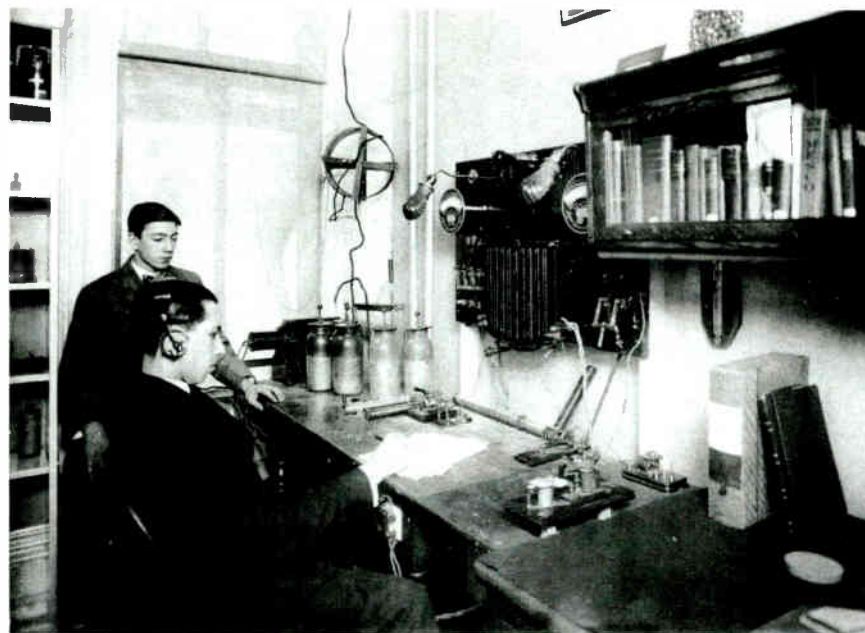
spark type of radio transmitter.

The museum's radio room — collocated with Lee's office — soon became one of the most popular attractions at that institution:

"The number of devotees of 'wireless' grows steadily, and each week brings one or two more High School boys who wish to investigate the subject seriously and to persevere until they make a transmitter and receiver that will work.

"More than fifty boys from high schools and colleges have come expressly to see the instrument and about ten boys come regularly two or three times a week to experiment on some part of the apparatus."

Other evidence of her accomplishments is found in an undated newspaper clipping, probably from the Brooklyn Eagle during her first year at the museum. Its gist is that by acquiring radio skills, a person could eavesdrop on commercial and naval communication traffic; but the article also establishes that Lee had sufficient mastery of both the Morse code and radio apparatus to teach these skills:



One of Lee's charges, Frank Hart, operates the museum's first radio station as an unidentified youth observes. The station was located in Lee's office and was under her control. It operated with the self-assigned call letters of 'CM' for Children's Museum.

soon constructing stations of their own.

The wireless station constructed and operated under the auspices of Lee was state of the art, employing a large induction coil for the generation of the thousands of volts of electricity needed for spark transmissions, and also a mechanical interrupter to drive the coil. The power supplied to the museum at the time came from an "Edison" power plant and was delivered as DC.

If Lee had accomplished nothing else during her lifetime, the construction and operation of one of the few pre-World War radio stations should be enough to put her in the record books.

Lee obviously took pride in the pioneer radio station she helped create, reporting in May of 1906 that it was undergoing "many improvements" and that "we soon expect to have the most powerful amateur station in this part of the country.



A capacity crowd awaits the setup of electrical apparatus in the museum's lecture hall. Lee demonstrated and operated such equipment on a regular basis.

Of course there is considerable intelligence required before the wireless wire-tapping is a success. Worst of all the wireless people talk in Morse code, like any other telegraphers, and before you can understand the dots and dashes ... it is necessary to learn that code. Right here is where the Children's Museum in Bedford Park, Brooklyn, comes into the story.

That unique institution, which is one of Brooklyn's greatest claims to fame, as everybody knows, runs a set of miscellaneous lectures and courses for the instruction of children, in addition to exhibiting the armadillo, flamingo, cassowary and other stuffed animals for their edification. The curator is Miss Gallop and her assistant is Miss Lee. It is Miss Lee who has taught the boys physics and incidentally wireless [author's emphasis].

The wireless work was a result of the elementary course in physics which Miss Lee gives. The boys became very much interested in electricity, and especially in wireless telegraphy, and were

"We can receive without difficulty all the messages sent from stations within a radius of fifty miles, and sometimes we can hear Philadelphia," she wrote in the Museum News. "Some of the boys have heard messages from Rockland, Maine, and Cape Hatteras, distances respectively of three hundred and four hundred miles. Unfortunately we cannot transmit as far as we can receive, but when we increase the height of the pole we hope to signal twenty-five or thirty miles."

FIRST WOMAN BEHIND THE MIC?

One of the "regulars" at the museum station was Frank Hart, who, concurrent with the establishment of the station, constructed a wireless station of his own in his bedroom. Hart is credited with assisting in the installation of the museum's station — in particular, the erection of its large long-wire antenna, one end of which was anchored 85 feet above the building.

(continued on page 24)

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LEE

(continued from page 22)

In addition to his logbook/diary, Hart kept a scrapbook documenting some of his accomplishments. One item is a newspaper clipping that describes his radio activities and apparatus. Although the date and newspaper name are missing, the story appears to have been printed in mid-1907, just a few months after Lee de Forest started his broadcasting activities in New York City.

What's significant is that the clipping indicates young Hart was experimenting with something few others had tried: the transmission of speech via radio waves. And although this is speculative at best, the article lends some support in making a case for Lee to have been one of the first women — possibly even the first woman — to have her voice transmitted by radio.

Boy Holds Key to Wireless

There is a school boy, Frank Hart Irving [sic], at 942 St. Mark's avenue, who though only sixteen years old, sat in his bedroom and by means of the perfect wireless telegraph instrument that he had made himself, followed the movement of every vessel in the fleet until it had reached Virgin Pass, and received



Brooklyn Children's Museum

Mary Day Lee is pictured with other Brooklyn Children's Museum staff members. Rear row, from left: Miriam S. Draper, librarian; Agnes E. Brown, special assistant; Marguerite Carmichael, assistant to the curator. Front: George P. Engelhardt, assistant curator; Anna Billings Gallup, curator; and Mary Day Lee, assistant curator. The photograph was taken in 1913 and was made on glass negative that was damaged in handling, resulting in the visible cracks.

every message sent out, even ... official dispatches ... which were intended only for official ears.

Frank has within the last two months

constructed an electric arc and connected it with his wireless instruments, so that he may converse eight blocks away with a friend. It is an odd sight to see

this boy stand in his bedroom, one wall of which is covered with telegraphic and electrical apparatus, and by playing the blaze from a Bensen [sic] burner on an arc light that he has rigged up, talk with a friend a quarter of a mile away without the use of wires ...

What the reporter is describing is one variant of an early AM radio transmitter — known in some circles as an "arc phone." (The Bunsen burner mentioned supplied hydrocarbons needed to stabilize the arc.)

Such a device was fully capable of transmitting speech and music, and it was this technology that de Forest used in his early broadcasting experiments.

Hart was born on Aug. 12, 1891, making him 16 — the age indicated in the article — in 1907. He logged the first reception of de Forest's speech transmissions on March 20 of that year. Therefore, we may assume he constructed his AM transmitter sometime in the spring or summer of 1907.

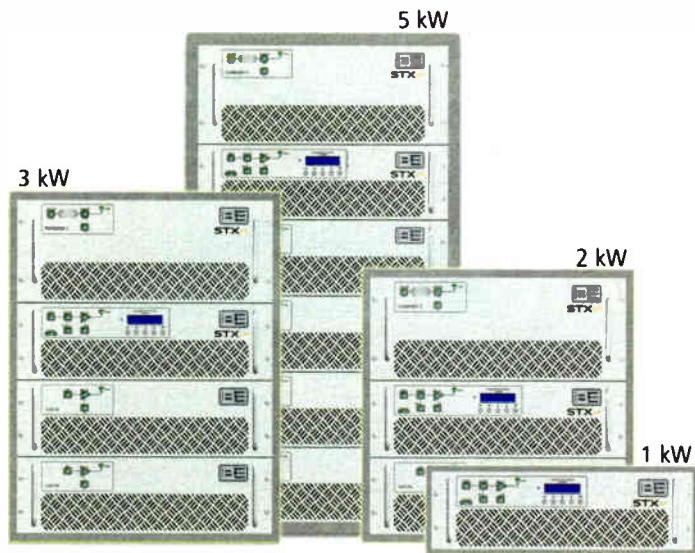
Hart made no entries in his journal about how this primitive radiotelephone transmitter came into being, but two scenarios are likely, and directly or indirectly involve Hart's mentor and advisor, Mary Day Lee.

The first suggests that Hart approached

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Tomorrow's Radio Today

her for information on construction of an arc transmitter. She certainly would have had the knowledge and skills to guide him in building such a device. Before he took it to his home, a period of testing and experimentation at the museum would have followed, providing her with access to this radiotelephone transmitter.

In a second scenario, Hart could have constructed the transmitter on his own. However, as a precocious teen, he would likely have been proud of his accomplishment and not hesitated in demonstrating this new "wonder" to Lee. Given her scientific curiosity, it's almost certain

that she would have tried it out herself.

In either case, Lee would have had the opportunity to experiment with the radiotelephone transmitter, and in doing so, could easily been the first female to have uttered words wirelessly across space — technically "broadcasting" to anyone within range.

The audience might have included other radio amateurs, as well as land-based or seagoing commercial station operators tuned to the proper wavelength, and possibly even the operators at the Brooklyn Navy Yard, who at that time were just getting used to de-

Forest's frequent experimentation with speech and music transmissions.

I have has no proof that Lee actually transmitted her voice via Hart's machine. But I consider the likelihood high, given the availability of the transmitter and the timing. (See sidebar.)

Ms. Lee did not leap frog into broadcasting as we know it; that business didn't begin until the early 1920s. She remained in Brooklyn as a lecturer, teacher and mentor to museum neighborhood young people, continuing to operate and improve the wireless station there.

Both the world and radio were chang-

ing in the decade of the 1910s. The first U.S. radio laws were enacted in 1910, and two years later even stronger laws were passed governing radio station operations and apparatus. (See my June 3, 2009 article "When the Federal Government Stepped In"). The sinking of the Titanic also did much to create public awareness of the power of radio.

Mary Day Lee continued her work in educating young people about this increasingly valuable tool, and also continued to shatter "glass ceilings," as she became — in 1917 — the first woman

(continued on page 26)

FIRST WOMAN AT THE MIC?

Was Mary Day Lee the first woman to have her voice transmitted by radio?

In order to establish even a speculative case for such priority, we note that while de Forest was broadcasting on a somewhat regular basis in early 1907, it was not until 1910 that he experimented with live musical broadcasts involving Manhattan Opera Company and female artists. According to historian Mark Schubin, de Forest transmitted live opera performances beginning on Jan. 12, 1910, with Olive Fremstad and Florence Wickham appearing in a production of "Tosca." De Forest may have played recordings of female vocalists prior to 1910, but this appears to be the first occurrence of his having transmitted a "live" female voice or voices.

Another early radio experimenter and pioneer, Charles Herrold, started up a "radiotelephone" station, with his wife, Sybil, assisting with its operation and appearing on the air. However, this did not occur until 1909.

Another radio pioneer, Reginald Fessenden, in a 1932 letter recounting his early experiments in broadcasting, mentioned that "others" not specified— possibly his wife Helen, or his secretary "Miss Bent" — were supposed to have sung in his first radiotelephone "broadcast," but developed an early case of "mic fright," forcing Fessenden to go it alone. While Fessenden stated that this was at the end of 1906, it appears much more likely that his celebrated Christmas Eve broadcasting activities actually took place in December 1909.

In either case, this would clear the way for May Day Lee to have been first, if she indeed had worked with Hart in constructing or testing his arc transmitter.

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LEE

(continued from page 25)

in New York City to be licensed to operate motion picture projection equipment. This was another “man’s world,” as it involved high-current electrical arc light sources, and the handling of extremely flammable and potentially explosive nitrate-based film.

THE GREAT WAR

The entry in 1917 of the United States into the World War affected not only the museum’s radio activities, but also those of most other radio operations, amateur or commercial. On April 7, and by order of the president, all private stations were shut down or taken over by the government for its own use. This spelled an end to the wireless activities at the museum.

Lee noted the demise of the station in a house publication, the *Children’s Museum News*:

“[T]he Museum Wireless Telegraph Station was dismantled on April 9th. The wireless pole and all of the apparatus used in sending and receiving messages were removed.

“While boys cannot hope to send or receive messages until after the war is over, the privilege of learning the wireless code and of practicing it on Museum instruments will be extended to beginners as heretofore.”

That publication also provided a partial listing of the young men — all trained in wireless by Ms. Lee — who by then had entered military service and were working in some aspect of wireless communications in the defense of their country.

Some of her former students kept Lee informed of their activities “overseas” as much as possible:

“Austen Curtis; the first boy who studied Wireless Telegraphy in the Children’s Museum announced in his last letter, dated at Paris, that he had been promoted to the rank of Captain in the Radio Corps of the United States Army.”

LEAVING THE MUSEUM

Although no formal mention of a wedding has been located, apparently Lee was married to Henry B. Weisse in, or sometime prior to, 1917. A New York museum association conference roster that year recorded “Mrs. Mary Day Lee Weisse” as an attendee.

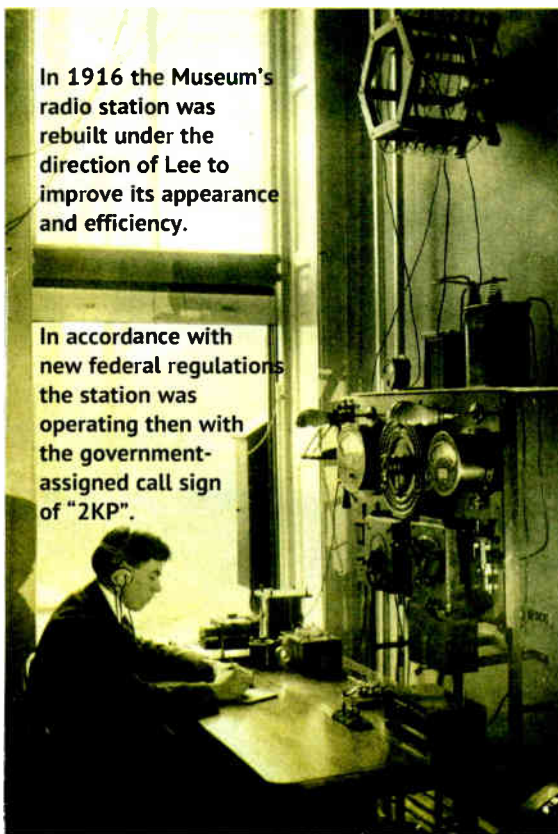
Little is known about her husband; however census records indicate that he was a stockbroker and the couple lived in Queens along with her sister Florence and their father, Richard Lee.

A 1923 article chronicles the end of her tenure at the museum:

The sudden resignation and departure of Miss Mary Day Lee early in February brought disappointment and regret to her many friends. For seventeen years, thousands of young people delighted in her lectures, and with her personal assistance many a troubled high school student solved his knotty problems in elementary physics and electricity. Under her direction for more than a decade there flourished an amateur wireless telegraph station where every eager inquirer into the mysteries of “Wireless” found satisfaction. Full-fledged wireless operators, made during their recreation hours, emerged from this station at different times. Several of these gave noble service to their country during the World War; some in the quiet research of technical laboratories, others in wireless stations of ships at sea, and others amid the dangers of the trenches and dugouts of the battlefields of France maintaining what was of supreme importance, unbroken

In 1916 the Museum’s radio station was rebuilt under the direction of Lee to improve its appearance and efficiency.

In accordance with new federal regulations the station was operating then with the government-assigned call sign of “2KP”.



Brooklyn Children’s Museum

wireless communications.

We wish her all happiness in her new home at White Plains, New York which is too far from Brooklyn to permit of her remaining longer in the Museum.

As far as can be determined, Lee Weisse was never directly associated with radio or broadcasting again, though the 1930 census showed that her sister, who still shared the couple’s dwelling, was employed in radio advertising.

In 1949, Lee Weisse received a small bit of recognition in connection with the post-war launch of television. That year, the *Brooklyn Eagle* published a story recognizing the accomplishments of one of her protégés, Lloyd Espenschied. He had enjoyed a long career at Bell Laboratories, and was being recognized as the co-inventor of coaxial cable, an essential commodity in television. Espenschied stated in the article that he and other Brooklyn youth had received early encouragement in their radio careers from both Lee and her supervisor, Anna B. Gallup.

Also mentioned were Austin Curtis and Frank Hart. Curtis had become a Bell Labs engineer too and along with Espenschied, participated in the world’s first long-distance test of radiotelephony in 1915. Hart was recognized as having served as the manager of a large trans-Atlantic shortwave communications station on Long Island.

Lee also was remembered by Alfred P. Morgan (1889–1972), who was in the same age group as Espenschied, Curtis and Hart. Morgan went on to author more than 50 books, which popularized the sciences for young people. Morgan recalled his association with Lee in the 1963 book “More Junior Authors”:

“I visited the Children’s Museum in Brooklyn, where an unusual young woman, Miss Mary Day Lee, a member of the Museum staff, not only encouraged boys to experiment with electricity and wireless telegraphy, but was able to aid and assist them. My hat is still off to the young woman who could discuss with you the fine points of winding a spark coil.”

POSTSCRIPT

After Lee Weisse left the Brooklyn Children’s Museum, little was written or otherwise recorded about her; I found it difficult even to determine when she’d died.

Census records are available only to 1930, at which time she would have been 70. Telephone books and city directories were of limited use, but did indicate that she was alive when 1970 editions were published.



James O’Neal

The White Plains Rural Cemetery tombstone indicates that Mary Day Lee maintained her identity even after her marriage to Henry Weisse.

My wife, Pamela, who grew up near White Plains, N.Y., suggested a visit to area cemeteries. Ultimately, we located Ms. Lee Weisse’s resting place and established her death date.

She and her husband, Henry, are interred at the White Plains Rural Cemetery, which was established in 1795 and is only a short distance from their last home. However, even finding the couple’s gravesite proved a challenge. The cemetery’s keeper provided a map and general coordinates, but no visible grave marker was evident. It was only after pulling aside a large bush that we found the marker; even in death, Mary Day Lee Weisse remained elusive.

Judging by the size of the bush, we may have been the first to visit her grave since she was laid to rest 40 years ago. I note this only as a way of indicating how this person, a true pioneer and very much ahead of her time, has been all but forgotten. It is my hope that through this published account of her life and career, her memory will be kept alive and her deeds remembered. She was a remarkable person.

— James O’Neal

LATER YEARS

Lee Weisse and her husband spent the remainder of their lives in White Plains. After her relocation to this New York City bedroom community, she began a second career as a public school teacher, educating young people in science and biology. None of the records examined indicates that any children were born to the couple.

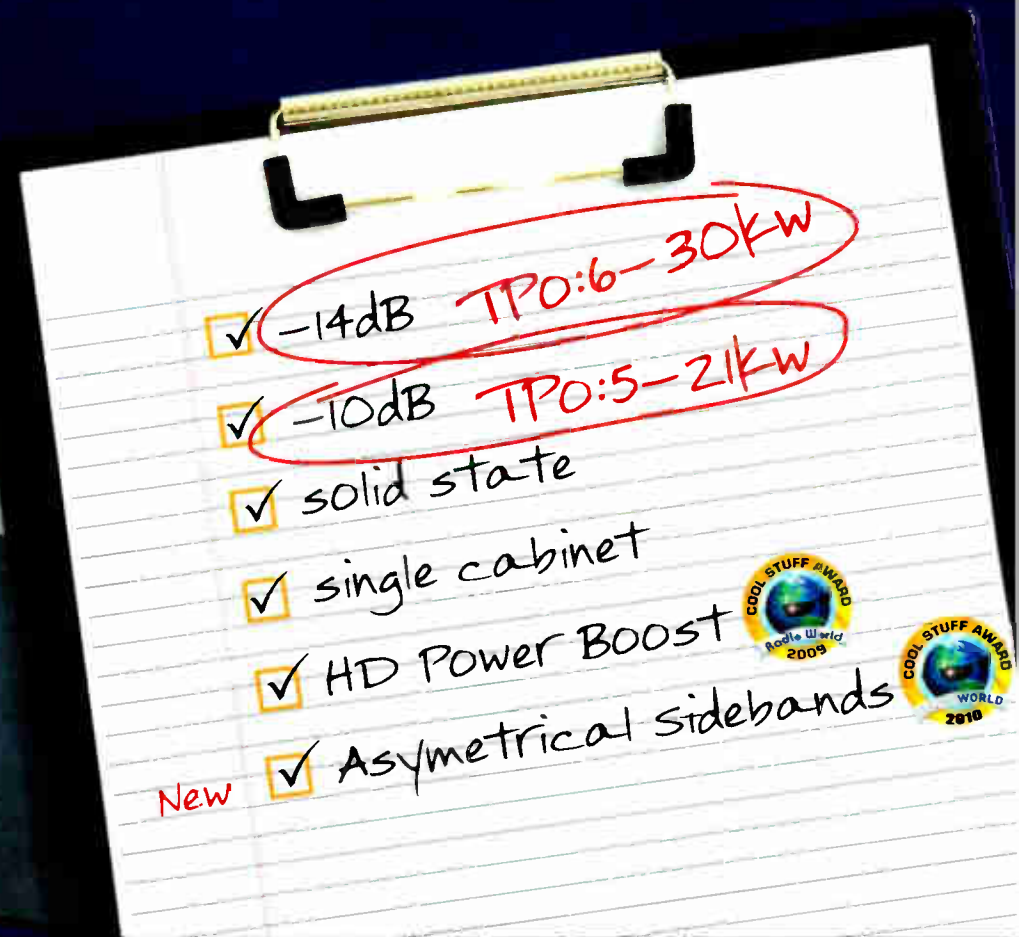
Mary Day Lee Weisse’s husband, Henry, died in late 1964 at the age of 87. She passed away on April 17, 1970 at the age of 90.

The author thanks the following for help in preparation of this article: Pamela A. O’Neal; Jane Johnson, Mecklenburg County (N.C.) Public Library; George Flanagan; Beth Alberty, Brooklyn Children’s Museum; Anne-Rhea Smith, Brooklyn Children’s Museum; Miriam Berg Varian, White Plains, N.Y. Public Library; and Harold Mercer, Jr., White Plains (N.Y.) Rural Cemetery.

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Terrence M. Baun, below right, receives the Society of Broadcast Engineers Lifetime Achievement Award from SBE President Vinny Lopez. "Terry's dedication to SBE and its mission, as well as his passion for broadcast engineering, are exceptional," Lopez told a standing-room audience.



Photo by Kovacs/Dawley

The next iteration of emergency alerting was on the minds of engineers. Jerry LeBow of Sage Alerting Systems, left, donned his "Dr. EAS" persona to describe the Sage Digital Endec.

Photo by Kovacs/Dawley



Photo by Holly Essex/SBE



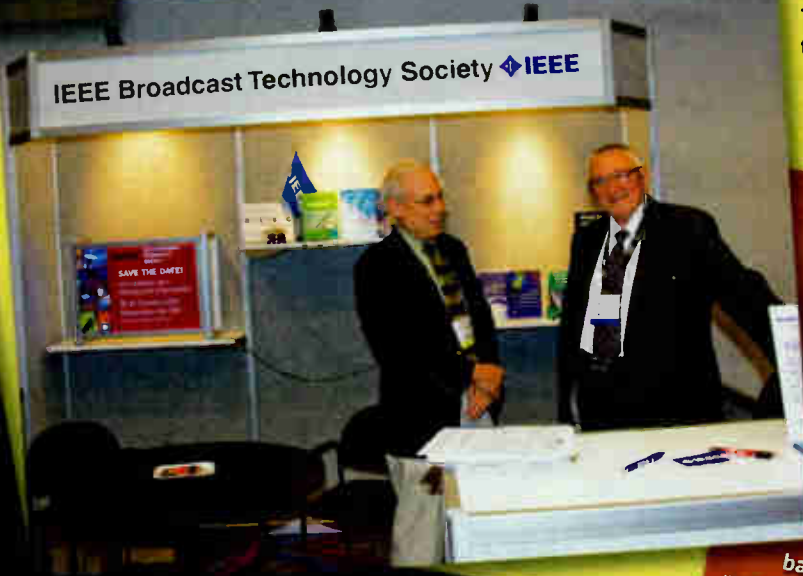
Equipment crates wait for the trip home.

Photo by Kovacs/Dawley

Logitek's Frank Grundstein discusses the Mosaic audio mixing control surface with Lynn Deppen of Keymarket Forever and Backyard Broadcasting's Tom Atkins.



Photo by Jim Peck



Lanny Nass, left, of CBS visits the IEEE Broadcast Technology Society to talk to Tino Trainotti of the University of Buenos Aires. Trainotti recently was elected an IEEE Fellow for contributions to the broadcast industry through development of antenna and propagation technologies.

FCC Chairman Julius Genachowski defended his spectrum management and broadband policies. He advocates incentive auctions in which television broadcasters could voluntarily surrender some spectrum for mobile broadband use and receive money in return. He praised broadcasters for their public service.

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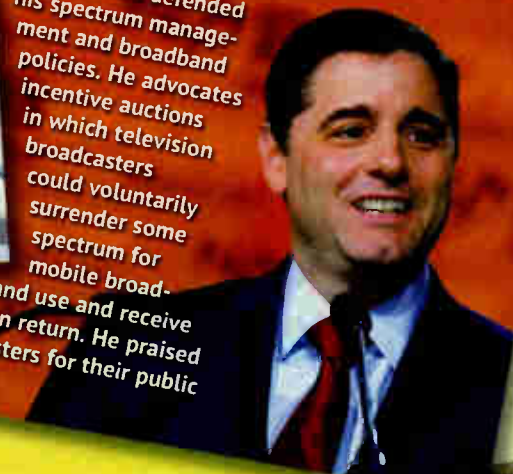


Photo by Jim Peck

Digital audio pioneer Barry Blesser of 25-Seven Systems, whose column appears in Radio World Engineering Extra, brought his systems-based approach to human interaction to the Broadcast Engineering Conference.

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World Radio History

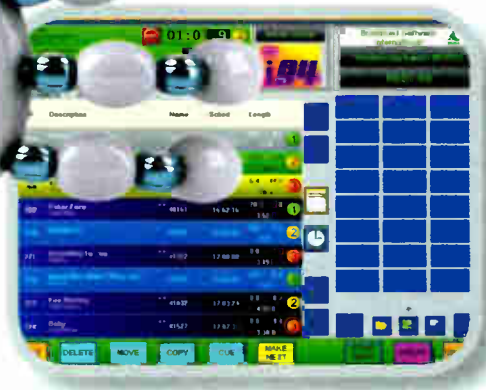
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BY BRAD HART
 Director of Engineering
 Lincoln Financial Media

DENVER — When Lincoln Financial Media began investigating Nautel transmitters more than 15 years ago, we kept getting the same response from the users

USERREPORT

we questioned. I would ask a station's chief engineer about his experience with the Nautel transmitter and the engineer would say something like, "I don't know much about our Nautel because I hardly ever do anything to it. It just works and keeps on working."

The results of my earlier investigations and my own experience over the years since have made me an avid Nautel user. When it came time to upgrade Denver-area FM stations KKFN (104.3) and KQKS (107.5) for HD Radio operation, our brand choice was obvious.

HD RADIO CONSIDERATIONS

What wasn't immediately apparent was how to implement HD at the Green Mountain transmitter site of both stations.

The transmitter building housed two Nautel FM-10 transmitters for each station. These four transmitters were already a tight fit in the small building. There was no room for separate digital-



only transmitters, combiners or reject loads to implement HD Radio broadcasting. The only practical choice was hybrid FM+IBOC1 operation.

Our challenge was to find a small footprint hybrid operation transmitter with enough capacity to provide more than 20 kilowatts of transmitter power at both -20 dB and room to grow to -10 dB digital injection levels.

Nautel made this easy with the introduction of the single-cabinet NV40 transmitter at the 2008 NAB Show. The

NV40 footprint actually was smaller than each set of two FM-10 transmitters, and the NV40 with 23 kilowatts of -10 dB FM+HD Radio power could handle our power output requirements for the present and future.

The transmitters were shipped to Majestic Rigging and Transportation Co. in Henderson, Col. They provided a four-wheel drive flatbed to bring the NV40s to the site. We could only install one NV at a time so there were two trips to the site. Trip one was to remove the

two existing Nautel FM-10s on 104.3 and deliver the 104.3 NV40. We had the electrician standing by to get the three-phase power to the transmitter. RF plumbing, control/metering cabling and HVAC were completed within 24 hours. The next day repeated the same process for the 107.5 KQKS transmitters. It was a pain doing one at a time but that's life with a small building.

Nautel Field Service personnel were on hand to make sure the transition went well. With the NV40s being essentially "plug and play," the whole process went smoothly. The Nautel engineer did a quick check of each transmitter but much of his time was spent training station staff on the new transmitters, which went on the air in early September 2009.

The factory training was especially important to get our staff up to speed on the Nautel Advanced User Interface. The AUI provides an array of diagnostic and operation information on the transmitter along with local and remote control through a 17-inch LCD touchscreen.

The in-depth diagnostics on the AUI are impressive. Users can see extreme details of the transmitter, down to things like the speed of cooling fans. Plus the factory can hook up and remotely see the same detailed information. Now you don't have to describe a problem; they can see it for themselves. That's very cool.

The NV40 has features like an integrated exciter that is frequency agile with advanced adaptive precorrection and combiner equalization, direct to channel modulation, and SCA and RBDS encoders.

Our stations purchased the full HD Radio suite of Nautel products including the Exgine option for the exciter, the Exporter Plus for HD Radio encoding and the IPR Importer for multicasting. Multicasting is integral to the future for these stations. KKFN now airs two extra sports formats in addition to the main channel sports programming. KQKS has implemented HD Radio broadcasting on the main channel with multicast formats in the planning stages.

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audio processing, stereo encoding, RDS encoding, audio backup, I/O remote control and TCP/IP connectivity, in a slim 3 RU enclosure.

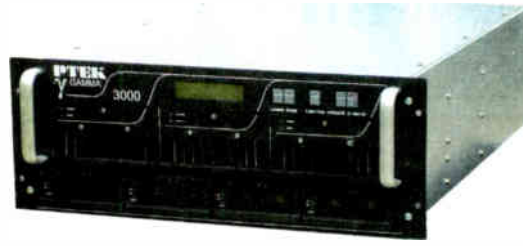
Ecreso says its approach of combining a quality transmitter with other functionality delivers savings in cost, real estate, time and energy. The Next FM occupies less space at the transmitter site, draws less power and is a competitive, cost-effective alternative to purchasing separate devices. With a single, integrated user interface to control all functions, the Next FM provides greater user efficiency. The Scripteasy V2 programming application is included; broadcasters can control and monitor a range of external equipment and create automatic actions via an intuitive graphical interface.

These savings do not come at the cost of quality, according to Ecreso. The transmitter offers a strong FM signal-to-noise ratio of >80 dB and a low distortion level of <0.05 percent. The 20 or 100 W exciter can be used with an external power amplifier to reach output power of up to 3 kW. Similarly, the onboard audio processing uses multiband DSP technology and offers versatility, consistency and audio quality. Dual power supplies ensure redundancy.

For information, contact Ecreso/WorldCast Systems in Florida at (305) 249-3110 or visit www.ecreso.com.

PTEK AIMS AT COST

PTEK's Gamma series of FM transmitters feature a compact footprint without sacrificing reliability and maintainability at a low price point. The Gamma series uses modular solid-state power amplifiers that are internally combinable to 3.5 kW. Efficient power is ensured by multiple load-sharing 1.5 kW hot-pluggable power supplies. Utilizing these common components across a scalable transmitter line



for 1 kW to 20kW reduces cost of ownership while increasing operational dependability, the manufacturer says.



The Gamma series is designed to answer customer demand for a small, dependable transmitter that is economical to purchase, quick to get on air and easy to maintain. A 2.5 kW system occu-

pies 4 RU and weighs 60 pounds.

For information, contact PTEK in California at (888) 889-2958 or visit www.ptekpower.com.




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FMeXtra Is Radio's Best-Kept Secret

Broadcaster Tries Out FMeXtra Digital Radio System and Likes What He Hears

BY **STANLEY SWANSON**
Engineer
KYRM(FM)

LAREDO, TEXAS — It might be the best-kept secret in radio.

An FM station can add several additional digital audio channels with no FCC permission or notification, no change

USERREPORT

to the current transmitter or antenna, no license fees and no digital hash on adjacent channels. It is called FMeXtra and it's from a company called VuCast, formerly Digital Radio Express.

The number of audio channels that you can have depends on the encoding that you use and the bit rate for voice or music quality. With a mono FM station, a large number of channels is possible. The available spectrum will be limited if you are using an analog SCA or metering return for your transmitter remote control. In that case, the unused part of the subcarrier spectrum can be used for FMeXtra, which can also be programmed to protect RDS.

Since FMeXtra operates within the station's channel, it can be used in most countries without government approval. Standard radios will not play the FMeXtra signal, requiring a special radio. (But HD Radio also requires a special radio as well.)

I recently acquired and tested an FMeXtra system, then sent it to our World



Radio Network station KBNL(FM) in Laredo, Texas, where it was installed by WRN engineer Jimmy Stinson.

KBNL is a 100 kW Spanish Christian station owned by World Radio Network, with headquarters in McAllen, Texas. Arturo Lozano, the station manager, uses the four FMeXtra channels for English and Spanish music and teaching programming. RDS is also occupying its own carrier thus consuming more bandwidth.

The FMeXtra XI encoder was programmed for us by Energy-Onix, which is a dealer for VuCast. The encoder is computer-based so it can be reprogrammed with a monitor, keyboard and mouse. Lyle Henry, a consultant known as the Radio Doctor, has done many



FMeXtra installations and can give you more programming information.

The encoder requires a digital signal for input, and is normally set for 32 kHz sampling frequency. We used two inexpensive Behringer Ultramatch Pro SRC2496s as A/D converters. Although these are labeled as L and R inputs, the encoder is programmed to use them

as separate mono inputs. However, the Behringer and the XI encoder can be programmed for stereo, if desired. The Behringer front panel has LEDs that show the audio level. The supplied Marian cable includes four XLR connectors that connect between the Behringer and a DB9 connector on the XI encoder. The output of the encoder connects to an SCA input on the STL transmitter and the only connection at the transmitter is the composite output of the STL receiver to the composite input of the Harris FM-25K transmitter.

Since FMeXtra operates above the audio spectrum, up to 99 kHz, the only requirement is that the STL and transmitter have flat response to 99 kHz. Many STLs, particularly older ones, have filters in the transmitter or receiver. We replaced an old STL with an Energy-Onix STL-1.

The encoder can provide either aac-

Plus (HE-AAC) or AMR-WB+ encoding. The latter is superior to aacPlus at low bit rates. We are using AMR-WB+ on all four channels. A filter can be programmed in order to use RDS.

We have not done listening range tests, but others have indicated that reception extends at least to the limits of the stereo signal, often to the 50 dBu and even 45 dBu contours when driving out from an FMeXtra station. This depends on terrain and co-channel interference, of course. It handles light to moderate multipath well.

The Aruba FM receiver, made by VuCast, is an excellent receiver and sounds great. There is no crosstalk between channels. It has a display that shows the number of FMeXtra channels that the station has. By tuning up in frequency, the display shows the number of the FMeXtra channel that has been selected. Also, a green LED indicates that the receiver has been tuned to a station that has FMeXtra. The receiver has an F connector for an external antenna, a stereo headphone connector, as well as optical, USB, line in and line out connectors. An SD card slot permits easy firmware updates. I understand that a less-expensive radio will be available in the future.

The bottom line: FMeXtra does more than HD Radio at a fraction of the cost.

For information, contact VuCast in California at (650) 521-0179 or visit vucast.com.

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www.orban.com

TECHUPDATES**R&S NA8200 IS SCALABLE**

The NA8200 DAB/DAB+/T-DMB medium- to high-power modular transmitter family from Rohde & Schwarz has been designed for efficient operation, according to the manufacturer. With a total efficiency of up to 25 percent at 37 dB shoulder distance the DAB transmitter is competitive.

The output power for each amplifier is 400 W, which allows a total transmit power up to 2400 W in a single rack, equipped with a cooling system and an optional standby exciter. This allows users to save on operating and infrastructural costs.

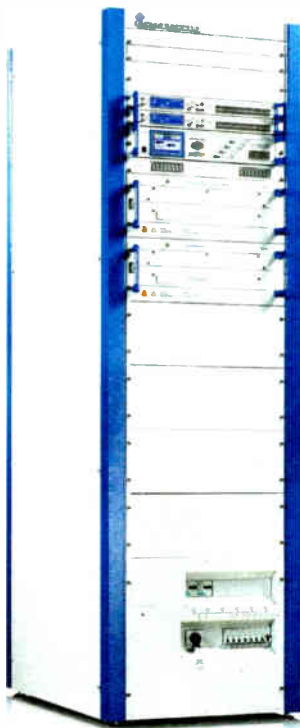
The new R&S SX801 multistandard exciter is a key component, with excellent signal quality and processing speed. Together with the low-loss and low-distortion RF design of the amplifiers and combiner system it ensures a typical signal-noise-ratio of 36 dB.

The R&S NA8200 accommodates up to six amplifiers in one rack for a high level of redundancy. Program output will be maintained even if an amplifier fails. This compact design also shortens signal paths, which means that no auxiliary modules, e.g. preamplifiers, are required. Direct connections instead of cables make reliable and cost-effective wiring possible.

The transmitters are designed for air-cooling using surrounding air as well as for cooling from ducted air and from the station cooling systems. For station cooling, intake and exhaust channels in any combination can be connected at the transmitter's roof and floor.

If multiple DAB/T-DMB frequencies are being processed at a site, Rohde & Schwarz can supply the transmitters with an n+1 standby system. The transmitter is ready to handle future DAB standards. Simple upgrades using software will be available to accommodate changes in standards.

For information, contact Rohde & Schwarz in Maryland at (410) 910-7800 or visit www.rohde-schwarz.com/usa.

**ECONCO REBUILDS TUBES**

Econco, a division of CPI, has been rebuilding power tubes since 1969.

The company says it is committed to providing repair service for all AM and FM transmitter tubes. Many AM

sockets have been converted to solid-state amplifiers, but Econco still maintains rebuild capability for the tube-based transmitters. On the FM side, it rebuilds all the tetrodes and high mu triodes used in single-tube transmitters and also the newer tube types used in HD transmitters.

Rebuilt tubes are popular with shortwave broadcasters. Econco has capability for modern Eimac and Thales tube types as well as for maintenance types in legacy systems.

It also has rebuilt tubes available from stock for immediate delivery. It can also rebuild and bank your duds. Banked tubes are not invoiced until called for shipment.

Econco is happy to provide telephone support to any tube user who is experiencing problems with a device. This service is available to all tube users regardless of their source of tubes.

For info, contact Econco in California at (800) 532-6626 or visit www.econco.com.



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Radio personality Ron Chapman accepts his induction into the NAB Broadcasting Hall of Fame from association head Gordon Smith. Chapman has been on the Dallas/Fort Worth airwaves since the 1950s and is known for his work at, among others, AC pioneer KVIL(FM), oldies KLUV(FM) and "Paul Harvey News."

Photo by Kovacs/Dawley



Jennifer Lynn of Zacuto takes a closer look at Electro-Voice mics including the classic RE20.

David Antoine and David Tallacksen, respectively the chief engineer and VP of operations for WBGO(FM) in Newark, visit DaySequerra, where David Day thanks them for their recent purchase of an HD Radio mod monitor and tuner. The HD monitor was the 2,000th sold by DaySequerra.



Photo courtesy DaySequerra

Yong-Tae Lee of the Electronics & Telecomm Research Institute in Korea speaks at the BEC, discussing lab test results of digital radio technologies including DAB, DAB+, T-DMB Audio and HD Radio.

Photo by Kovacs/Dawley



Comic book icon Stan Lee, right, talks with Chris Hardwick of "Web Soup."



© NAB

NAB Crystal Radio Awards honor commitment to community service. Rear, from left: Jim Coloff, KCVM(FM), Cedar Falls, Iowa; Julie Koehn, WLEN(FM), Adrian, Mich.; Mary Campbell, KBHP(FM), Bemidji, Minn.; Dan Seeman, WFMP(FM), Minneapolis. Front: Red Pitcher, WJBC(AM), Bloomington, Ill.; Joel Oxley, WTOP(FM), Washington; Peter Burton, KSWD(FM), Los Angeles; John Kijowski, WIL(FM), St. Louis; Jerry Schnake, WTMX(FM), Chicago. Not shown: Craig Jacobus, WIKY(FM), Evansville, Ind.

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Photo by Jim Peck

The Federal Emergency Management Agency's Mark Lucero listens to consultant R. Dale Gehman, who has been prominent in his comments and filings concerning implementation of the IPAWS/CAP protocols.



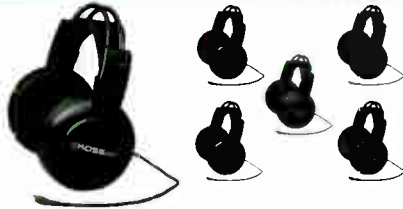
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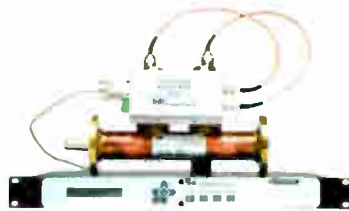


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Harris Supports HD Radio Multicast

Central Texas Broadcaster Also Has Upped Digital Power and Is Planning for -10 dB

BY CHRIS DUSTERHOFF
Chief Engineer
KNDE(FM)
Bryan Broadcasting

COLLEGE STATION, TEXAS — When the owners of Bryan Broadcasting approached me about upgrading KNDE(FM) to include HD Radio, the thought was exciting and scary.

USERREPORT

Bryan Broadcasting owns five radio stations in the Bryan-College Station, Texas market, which includes approximately 48,000 students at Texas A&M University and almost 11,000 more at Blinn College.

We knew we had a population of young people willing to adopt new technology. We also figured that if we offered radio content that was not currently available, this could be a very successful venture for us.

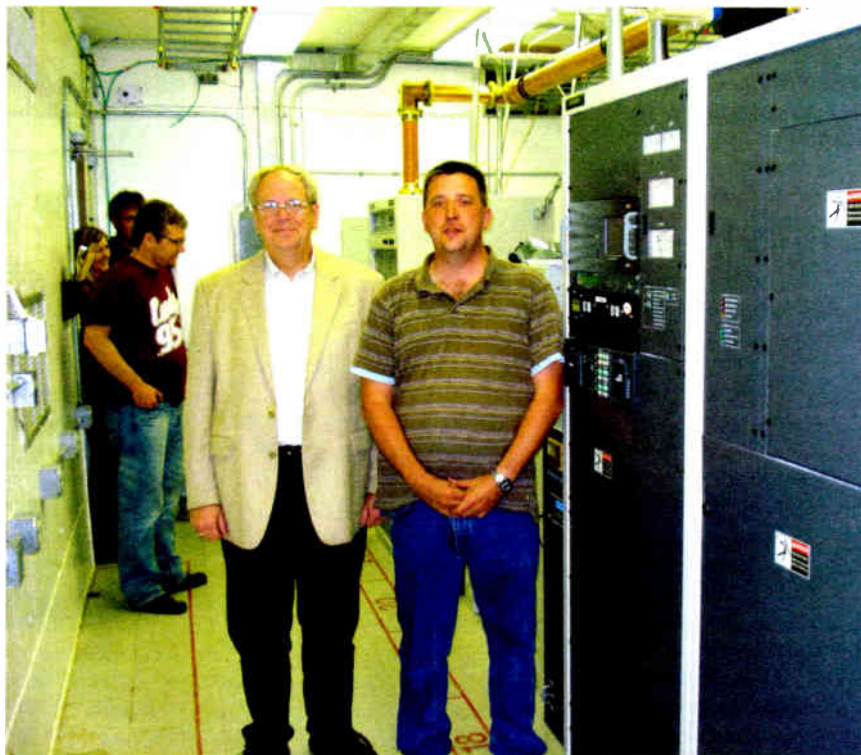
CONSIDERATIONS

Choosing the programming for the HD channels was a pretty easy decision. The FM runs a CHR format called Candy 95. For the HD2 we chose an active rock format branded "Rock Candy." Despite being a college town, the market had no such offering. The HD3 is branded as "Play by Replay." It has live and rebroadcast sporting events from four area high schools, as well as some Texas A&M sports such as volleyball, soccer and softball, that previously had little or no radio coverage.

The programming was the exciting part. The scary part was I needed to find

the equipment to meet our needs.

We had to consider the initial cost of the equipment, the ongoing cost of



KNDE GM Ben Downs and author Chris Dusterhoff

running and cooling the transmitter and available and knowledgeable customer service. We also needed to make sure we were prepared in the event the FCC approved increased power levels for the HD sidebands.

Our analog TPO was 15.6 kW and we wanted a transmitter that could handle common amplification of not only the

-20 dB, which was allowed at the time, but also the -10 dB level that was being proposed to the FCC.

After evaluating our options, we decided on the HPX40 transmitter from Harris. The transmitter was purchased along with the complete Harris FlexStar

The design of the HPX40 made the installation simple. The layout of cabinets helped with that. The external connections to the transmitter, including the three-phase wiring and remote control, were easily accessible and well labeled. The WAGO connectors used for the remote control and monitoring allowed me complete the installation wiring in half a day. The remote connections required no soldering in tight spots and were located to minimize the need to route wires through the cabinet.

Harris shipped the FlexStar importer and exporter in advance of the transmitter. These are located at the studio with all the processing. That configuration made for easy connection of the audio and data for all three signals. It also allows the engineering staff to keep an eye on them. We had the opportunity to have those configured and connected to our Moseley Starlink STL prior to the transmitter install.

Harris assisted in the installation, sending field service engineer Walter Freeman and product manager Terry Cockerill to the site to prepare for the launch. With the connections made, we turned on the transmitter into the dummy load. This was my first experience watching the real-time adaptive correction work. With a little tuning, I watched on the built-in spectrum analyzer in the exciter as the RTAC brought the signal under the NRSC-5B RF emission mask.

KNDE has since received special temporary authorization to operate at -14 dB and plans to move to -10 dB as soon as is allowed by the FCC. Increasing the sideband level was as easy as changing one setting through the front panel of the exciter. The HPX and FlexStar system has worked well at -14 dB, and we look forward to the opportunity to run it at the full -10 dB soon.

For information, contact Harris Broadcast in Ohio at (503) 459-3400 or visit www.harris.com.

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TECHUPDATE

GALCOM HAS NEW LPFM TRANSMITTER

The Cornerstone Transmitter from Galcom is a new low-power FM radio transmitter designed for churches, conferences, speech translation, missionary work or commercial stations.

As is, the Cornerstone has an output power of 2 mW. Power can increase with optional 1 W or 50 W amplifiers. A 300 W amplifier is planned.

It also has a built-in stereo encoder and audio processor, as well as a "mixer mode," which allows two microphones and two auxiliary inputs to be mixed using slide controls.

Control and monitoring is via a touchscreen LCD display. It has two balanced line inputs and four component inputs.

For information, contact Galcom in Ontario at (905) 574-4626 or visit www.galcom.org.



TECHUPDATES

CONTINENTAL ELECTRONICS HAS NEW DIGITAL EXCITER

Continental Electronics says its new 802Ex digital FM and FM+HD Radio exciter offers advanced forward-looking, adaptive precorrection, dual RF outputs, Ethernet IP connectivity and the ability to measure and display the latest NRSC HD test data in text and graphical form.

An "Insight" Performance Monitoring (IPM) system provides displays of relevant IBOC parameters including screens showing real-time frequency specific spectrum analysis, three variations of a quadrature constellation screen showing the demodulated OFDM carriers on I/Q axes, a Cumulative Distribution Function (CDF) screen displaying peak to average ration information and an Equalizer display screen to show much amplitude and phase correction is being applied to the drive signal to linearize the RF power amplifier. Additional displays are planned as the complete NRSC test requirement is finalized.

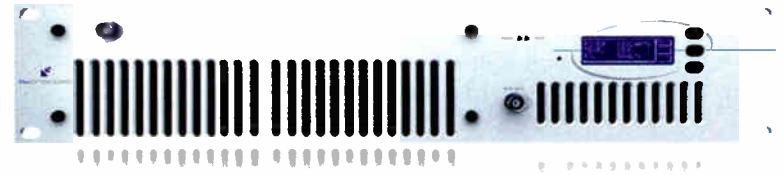
Continental also has an E2X packet alignment protocol designed to eliminate the misalignment of delayed data packets as they are transferred from the 800Exp Embedded Exporter to the Engine card within the 802Ex exciter. This packet alignment protocol eliminates gaps and holes Continental says are created by other systems and eliminates the need for external hardware to correct for alignment errors.

For information, contact Continental Electronics in Texas at (800) 733-5011 or visit www.contelec.com.



BW TX1000 DESIGNED FOR RELIABILITY IN TOUGH ENVIRONMENTS

According to BW Broadcast, the TX1000, the latest in the company's range of FM transmitters "with a difference," has comprehensive features and a creative design that make it an exceptional value.



The company says thousands of BW Broadcast transmitters operate trouble-free in some of the world's most remote installations. The new TX1000 offers reliable performance due to high efficiency, an innovative cooling scheme and fault detection/protection circuitry for temperature and VSWR.

If trouble were to occur, the architecture of the TX1000 includes BW Broadcast's gold-clamp transistor technology, along with a slide-in power supply, so the most vulnerable components can be replaced in the field quickly with no special tools.

Though small at 2RU, the TX1000 includes features like configurable compressor/limiter and front-panel LCD control interface.

The TX1000 includes BW's dual-loop Virtual VFO exciter with a low-distortion modulator and high-performance stereo encoder integrated into the FM transmission system.

Designed for global use, the TX1000 complies with applicable FCC and EU regulations and has a 220 VAC input.

For information, contact BW Broadcast in the United Kingdom at 011-44-20-8683-6780 or visit www.bwbroadcast.com.

Site Control



WVRC-8 Web-enabled and Voice Dial-up Eight Channel Remote Control



Site Sentinel™ 16 Web-enabled Sixteen Channel Site Remote Control System



WVRC-4 Web-enabled and Voice Dial-up Four Channel Remote Control



Site Sentinel™ 4 Web-enabled Four Channel Site Remote Control System



VAD-2 Plus Dual channel Voice alarm Dialer



AUDIO Sentinel™ Web-enabled dual channel stereo silence monitor



I/O Sentinel™ 4 Web-enabled four logic/status input, four relay output module

Relay Sentinel™ Web-enabled three relay module

Relay Sentinel™ 16 Web-enabled sixteen open collector/SS relay module

Schedule Sentinel™ Web-enabled Event Scheduler

Status Sentinel™ Web-enabled three input status/logic module

Status Sentinel™ 16 Web-enabled Sixteen-input status/logic module

WebSwitch™ (not shown) Web Remote Power Switch



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Bext Cruises on Route 66

FM Transmitter's Low Maintenance Profile
Is Appreciated at Remote Arizona Site

BY TOM ERICKSON
Station Manager
KJZK(FM)

KINGMAN, ARIZ. — I am the director of engineering for the K-Jazz Radio Network and station manager of KJZK(FM), a new noncommercial educational and public radio

USERREPORT

station in Kingman, Ariz., located on Route 66 about an hour from Las Vegas.

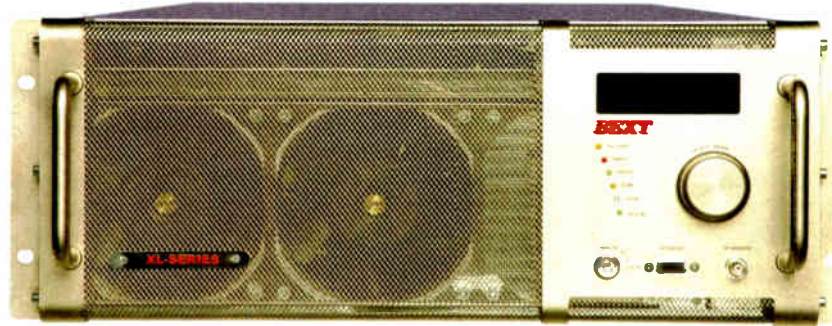
KJZK(FM) covers three counties, three states, two time zones (in season) and numerous prairie dog colonies in western Arizona.

The K-Jazz Radio Network serves central and western Arizona with stations in Kingman, Williams, Flagstaff and Prescott broadcasting in partnership with PRI member station KAWC at Arizona Western College in Yuma, Ariz.

TRANSMITTER SELECTION

The mission of the station group is to serve the needs of the residents of rural Arizona with a focus on community college education and programming. The stations broadcast public radio programming, local and regional news and information, along with an extensive lineup of locally-produced, community-based programs.

In 2009 we found ourselves in the market for a new transmitter for KJZK(FM). We selected a Bext XL-3500 FM transmitter (3500 W), which we installed at a transmitter site that is collocated with a Frontier Communications/Mohave Wireless Cellular site 18



miles east of Kingman in a remote area atop Blake Ranch Mountain.

When we received the transmitter we were surprised by how easy it was to install. From uncrating to on-air it took less than 10 minutes. The compact four-rack-space size integrated nicely into the small area available inside the cell-site building.

KJZK's antennas are at the top of the Mohave Cellular 200-foot tower. We use a two-bay PSI directional array at a licensed power of 4.5 kW. Like most remote sites it's a long, dusty trail to the top. Sometimes we can get there, often we cannot. Weather may make it impossible to even attempt the trip, so we are pleased with the performance of the Bext XL-3500 transmitter inasmuch as it needs no recurring maintenance whatsoever.

The XL-3500 has solid engineering. The best way to describe the unit is to compare it to my wife's favorite pasta sauce. "It's all in there!" ... the exciter, the stereo generator, the audio processor, the power amp ... all in an enclosure small enough to take up only four RU. And, importantly, in this installation it works nicely on

220 V single-phase drawing less than 20 amps per leg. No messy external power requirements.

We evaluated dozens of potential transmitters for this location and know of no other unit capable of doing what the Bext XL-3500 transmitter does for us. It's practical, user-friendly and value-priced. We have also noticed that it has excellent electrical efficiency.

KJZK's contract maintenance engineer is Mark Parthe of Arizona Broadcast Service in Prescott. He raves about the design, cost and tech support. But he also quipped, "I'm not making many trips to the transmitter sites these days and that's cutting into my billable hours big time."

All in all, we are overwhelmingly pleased with the BEXT XL-3500 and recommend the line for broadcast budgets of any size and requirement. For our upcoming projects we are preparing purchase orders for more

Bext equipment, including new transmitters at several other power levels.

For information, contact Bext in California at (619) 239-8462 or visit www.bext.com.

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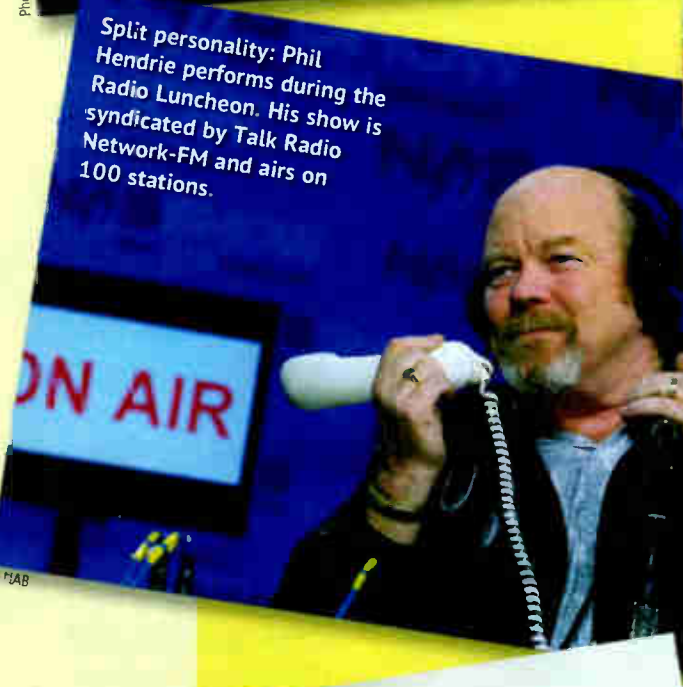


Lauren Darr signs a copy of "The Official LOI International Media Outlook Book," which provides perspectives from industry executives on trends.



Dan Braverman demos the company's new Platform console system in the Radio Systems suite.

Photo by Jim Peck



Split personality: Phil Hendrie performs during the Radio Luncheon. His show is syndicated by Talk Radio Network-FM and airs on 100 stations.

ON AIR

Photo by Jim Peck



Anthony Magliocco operates Hi-Tech Systems Comptometer, which interfaces to multimedia edit systems but recalls the first key-driven mechanical calculator.

Photo by Jim Peck



Photo by Kovacs/Dawley

Jane Clements of FireBurnDoctor.com in the U.K. takes a break on the floor of the North Hall after more than three days of walking the NAB.



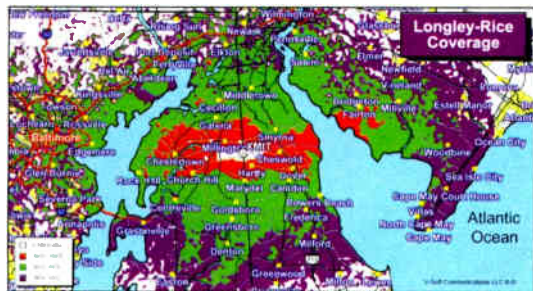
Photographer Jim Peck tells us: "This is either the skylight dome at the entrance to the Wynn Hotel/Resort/Casino, or what happens when a Smith Chart comes to Vegas. Blue skies courtesy of a higher authority than the FCC."

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READER'S FORUM

NO ROYALTY, IN GOOD CONSCIENCE

As a Radio World reader in the unique position of being a broadcaster, a music publisher, a songwriter and even a recording artist, I'm here to interject my 2 cents' worth into the matter of payments to artists by broadcasters who air their recordings, realizing that what I say may be worth just that.

Let me pose a few questions, some of which may not have been considered but may be material:

1. If a recording artist performs live on radio, whether paid or gratis, is he entitled to a performance royalty?
2. If his backup musicians are merely that, are they entitled to a royalty?
3. If his backup singers are merely that, are they entitled to a royalty, and if so, what should it be compared to any backup musician's royalty rate?
4. Do we want to assume that any procedures also apply to television broadcasts?

Here we must note that the record label doesn't figure in the equation in the case of a live performance. Yet we must acknowledge that artists appearing on radio or TV no doubt have recording deals and are plugging songs they've recorded. This is commonplace.

Consequently, I'd conclude that whether a song is performed live or "canned," on radio or television, the artist and his diskery are compensated adequately by the effect of the airplay on the sale of his records, to say nothing of the promotion provided for the artist's personal appearances, including tours.

5. What about those musicians and singers backing up the artist on-air, live or canned, who don't share in royalties, even if they are permanent performers on his recording sessions, personal appearances and tours? Are they entitled to broadcast performance royalties?

6. If they are entitled to royalties, who will keep the business records and who will receive the payments to distribute to these people (provided they can be located years after the performances aired)?

It's my conclusion that those performers who have no arrangement with the recording artist or his diskery to participate in royalties from the sale of the artist's recordings are not entitled to royalties.

Those who are getting royalties from the record labels are adequately compensated as it is.

- Oliver Berliner

I further feel that while a name recording artist's work is indeed "unique and extraordinary" (typical and necessary showbiz contractual term), such designation does not apply to those who function with him yet have not been contractually entitled to a share of proceeds from the sale of records or of the "box office" in the case of non-broadcast live performances.

7. Does anyone remember the so-called Music Performance Trust Fund instituted by a once-powerful

A. F. of M., wherein the diskery was obliged to pay a percentage of the musicians' recording-session wages to a trustee who supposedly would hire them and pay them to perform admission-free concerts?

The purpose for extracting this "tribute" was to compensate "sidemen" for the loss of live-performance opportunities occasioned by the sale of records. We all now know that records actually provided more session income for the sidemen than it took away from live performances, and records even encouraged audiences to patronize the venues where their favorites were performing live.

Which brings us back to what has been the traditional "tacit arrangement" between record labels and their artists, to which we must add the well-entrenched, broadcaster-music publisher arrangement.

In the latter instance we know that the copyright law provides that a songwriter and his publisher are to be compensated for every commercial use of a musical work (yet not for spoken-word recordings, which are non-musical, although spoken-word recordings may qualify for grand-rights compensation). Since records are now copyrighted, does the law for songs apply to recordings of those songs?

Apparently, the thinking is that it does not but should. I was recently asked by the National Academy of Recording Arts and Sciences, of which I am a life member, to visit our solons in Washington to lobby for payment by radio broadcasters to recording artists. In all good conscience I could not do it.

You see, the vast bulk of the NARAS membership consists of musicians and industry persons who are not receiving royalties for their work under any contractual arrangement. As I've opined above, those who are getting royalties from the record labels are adequately compensated as it is; while those who aren't ... needn't be.

Oliver Berliner
Bozman, Md.

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OPINION

READER'S FORUM

THE 'PRSS FORWARD' TIMETABLE

Thank you very much for the coverage in Radio World on the PRSS Forward project (March 1, page 4). As you detailed in Paul McLane's excellent piece "Public Radio System Looks Forward," this is an enormous effort that will help sustain and secure the future of public radio.

As such, we want to make one point clear, which may have been confused by the March 24 piece on "PRSS Next-Generation Content Delivery" (page 33).

The new receivers, which PRSS engineers are still designing and testing, will not begin shipping to stations until mid-2011 at the earliest. Many questions remain to be decided, from "what exactly will the receivers do" to "how should they be installed," and we don't want to get ahead of ourselves.

Ultimately, our goal is to convert to the new system in 2012, and we look forward to sharing with the public radio community the details as they are confirmed.

For anyone interested in following the PRSS Forward project as it unfolds, please drop an e-mail to prssforward@npr.org and you will be subscribed to our monthly newsletter for this project.

Thanks for your interest, and we look forward to sharing details as they solidify.

*Pete Loewenstein
Vice President
PRSS/NPR Distribution
Washington*

RESPONSE TO 'TOUGH TIMES'

Concerning the use of XM for public entertainment in the letter from Harv Rees (Feb. 1, *Reader's Forum*), readers need to be aware of Sirius XM's longstanding business music subscription package, which ensures that all public exhibition royalties are paid as part of the subscription.

The confusion may come from recent changes to the service: Until the Sirius XM merger, the XM business music product had no station imaging, but the merged product now does.

*Kriston Rehberg
Fairfax, Va.*

STEAMROLLED IN GOOD FAITH

You have to laugh or you'll cry ("Digital Radio Cranks Up the Juice," Feb. 10).

"Worked in good faith" on IBOC? Is this Massachusetts and you're the Democrat running for Teddy's old seat? Steamrolled, you betcha.

I watched the IBOC fee schedule and heavy-handed tactics to pressure us into signing up for IBOC. I've heard the IBOC hash on AM and the denials. This is "I've been lied to so many times why should I believe you now?"

And really what does IBOC have to offer? More expense (power bill, tech support, fees, equipment and on and on), yes it offers that. What do you get? Better sound? No. Two listeners that you had anyway.

Look at the spectrum use. It spreads up and down the dial. Common sense says you can't put that much

noise on the band and not have trouble. I don't need an NPR engineer to con me on that one. So it goes back to the old adage: Follow the money trail.

If IBOC was valid, it would stand on its own merits. Complicated and expensive. Not commercially viable. The theater is like watching a White House press secretary.

The only problem is, us independent broadcasters get hurt. There isn't a small broadcaster I've talked to that doesn't think that IBOC needs to die, and die fast.

Recognize your mistake, take your lumps (a bad investment, you're out some cash) and look for something better, or maybe realize, just like wheels on your car, that FM works just fine, thank you.

WAGS is live radio, real people in real time, playing country, indie country, bluegrass, Americana, from CD, LP, 45s and yes some 78s, reporting to New Music Weekly for the country format and Roots Music Association for Americana.

*Jim Jenkins
Owner/General Manager
WAGS Radio
Bishopville, S.C.*

DUBIOUS ON DIGITAL

Paul, kudos for a well-written and thought-out piece ("Digital Radio Cranks Up the Juice," Feb. 10).

I have mixed feelings regarding the increase in power for FM.

FEDERALIZATION

(continued from page 46)

and religious, could well be swept aside in the waves.

Lastly we would oppose federal suggestions of journalism standards, new regulations for the press, or super-funding of any particular segment of the media, on the grounds that it is constitutionally indefensible.

As the Supreme Court has recently noted, the "institutional press" is entitled to no greater protection under the First Amendment than newer or more informal media outlets. [Here and below, the NRB quotes from the case of *Citizens United v. F.E.C.*, involving federal restrictions on broadcasting of political messages.]

Further, as a practical matter, if a federal agency draws lines of preference regarding one type of media but not another, that too may be suspect: "[w]ith the advent of the Internet and the decline of print and broadcast media, moreover, the line between the media and others who wish to comment on political and social issues becomes far more blurred."

"The First Amendment was certainly not understood to condone the suppression of political speech ... It was understood as a response to the repression of speech and the press that had existed in England and the heavy taxes on the press that were imposed in the colonies."

NRB would suggest that it is a very small step from the clearly oppressive taxes imposed on the media at



istockphoto/Sergei Popov

There is no doubt it will increase penetration of the signal. Like you, I am dubious (and that's being really polite) regarding the FCC's ability (or even desire) to respond quickly to any interference complaint, no matter how well documented it may be. We all have seen the wink and a nod the FCC has given to the many AM IBOC complaints, despite similar verbiage in their edict that allowed nighttime use of IBOC.

I did find one FCC statement laughable: "Out of an abundance of caution." The commission has never done anything out of an abundance of caution, and FM IBOC is no exception.

Your reference to being "steamrolled" was interesting, but I as the DOE of three FMs do not feel "steamrolled" ... yet. This more than likely will change in the future, as the digi folks will push for higher and higher levels, and eventually will begin to complain about those of us who have chosen not to broadcast IBOC, to the point that some will begin to call for the *outlawing* of all analog broadcasting.

Last, you wrote that the FCC "is an organization that sometimes takes years to issue decisions in public file cases — though I appreciate the good intentions and its recent attempts at being more responsive."

Refresh my memory, what is that old adage about the road to Hell being paved ...?

*Jerry Arnold
Director of Engineering
Midwest Communications/WPRS(AM)
Terre Haute, Ind.*

our Founding that led to the free press provision in the First Amendment, to our modern era of suggested federal entitlements and preferences for some aspects of the media but not others. The former was a direct suppression of the press — the latter could be just as devastating, given the economic difficulties all segments of the private media now face and the anticompetitive effect that results if media entitlements and preferences are doled out by our government.

NRB summarized its recommendations in the "future of media" proceeding as follows:

"It is NRB's judgment that the best option is to empower private media entities, including Christian broadcasters, by (1) lifting outdated or illogical regulations regarding restrictions on fundraising for third-party non-profit groups by non-commercial stations, and clarifying and making more flexible, existing rules for non-commercial stations concerning sponsorship and underwriting spots, (2) avoiding the temptation to burden broadcasters with new 'public interest' standards or 'localism' mandates, or government-induced standards of 'journalism,' all of which are constitutionally suspect, and (3) by refusing to super-fund public broadcasting, as such increased funding would create government-funded competition against all other broadcasters, including Christian non-profit, non-commercial stations; an ironic result, considering the fact that this inquiry notes the need to 'nourish and sustain' journalism and the media."

Avoid Federalization of Journalism or Media

NRB Says Whenever Government Announces A Preference, Media Autonomy Is Swept Aside

The National Religious Broadcasters recently filed comments in response to an FCC public notice about the future

NEWSMAKERS

of media. The first topic in NRB's comments was "federal intrusion into the business of journalism." The comments were authored by NRB President/CEO Frank Wright and Senior Vice President and General Counsel Craig Parshall.

Given the fact that media freedom is a constitutionally protected right, we believe that federal intrusion into the business of journalism is fraught with problems.

A cursory glance at the text of the First Amendment makes one thing very clear: each of those rights — religion, speech, assembly and the freedom of the press — were meant to be the rights of private citizens, to keep them vibrant and free from excessive government control. Our Founders believed that the very essence of press freedom required that it be free from any government regulation that would interfere with the primary mission of the press.

In 1774, when it was beginning to be clear to our beleaguered Continental Congress that the colonies might have to eventually break with England, the delegates to that body were already thinking ahead to those basic liberties that should ideally animate the colonies; liberties that are implicit in a free government and a healthy society. On October 26, 1774, the Congress penned a letter to Quebec, hoping to gain its support for the establishment of self-governing colonies, and its partnership in a

mounted resistance against England.

In that letter, the members of the Continental Congress described, among other fundamental freedoms, what they saw as the essentials of a free press:

The last right we shall mention regards the freedom of the press. The importance of this consists of, besides the advancement of the truth... its ready communication of thoughts between subjects, and its consequential promotion of union among them, whereby oppressive officers are shamed or intimidated into more honourable and just modes of conducting affairs.

Three concepts from that quote stand out. First, that free press must remain free to investigate and then communicate the "truth." Second, that the relationship of the press to the public is basically a horizontal one, where the press communicates to the citizens ("communication of thoughts between subjects"). Thirdly, and most important to the commission's subject proceeding, is the *subject matter* of the business of a free press: to monitor, and when appropriate, to forcefully criticize government policies and officials, even to "shame and intimidate" the ruling government into "more honourable" paths. It is axiomatic that the more entangled the federal government becomes in the running of the press the more likely press outlets will be to self-censor themselves on issues of federal policy.

CLIMATE CHANGE?

However, NRB notes a climate of opinion developing both in Washington and among academics, suggesting an increased role of the federal government into the business of journalism, and broadcast media.

In September 2009, a \$1 million grant was announced, forging a partnership between the Knight Foundation and National Public Radio. We note that in December, the FCC met with representatives of this partnership to help the effort along, and to assist NPR, a tax-payer funded entity, in enlarging its already considerable media presence through web and mobile platforms such as cell phones.

It should also be noted that the

Corporation for Public Broadcasting has requested the following sums from Congress: \$542 million as an advance appropriation for fiscal year (FY) 2012; and for FY 2010 \$307 million for "emergency grants to public radio and television stations" as a result of "this time of economic crisis"; \$40 million for digital conversion; \$27 million for satellite upgrades; and \$32 million for children's programming.

In July 2009, FCC Commissioner Michael Copps went on record to indicate that, in his opinion, what he perceived as the declining quality of American journalism was due in part to FCC deregulation of the media. The corollary to that, we assume, is that Commissioner Copps believes that increased regulation may be the solution.

In an October 19, 2009 article in the Columbia Journalism Review by the Washington Post's Leonard Downie Jr., and communications professor Michael Schudson, it was suggested that our federal government must correct the decline of journalism both in its quality and its financial status by an even higher increase of public taxpayer funding for the Corporation for Public Broadcasting.

As we consider the commission's inquiry, we note the statements made by Russian journalist Irina Samokhina at a press freedom roundtable in November of 2009. She described what happens when press freedom translates into a monolithic state-run media: the biggest competitor of the private, free press becomes the government subsidized, monopolistic press. In Russia there are 63 state-run newspapers in one region alone.

FERTILIZE, NOT SUBSIDIZE

We applaud any efforts of the FCC to stimulate the flagging profession of journalism, including print, electronic and broadcast, by policies that would *fertilize* the conditions under which the media does its work.

However, we would recommend that the federal government not *subsidize* journalism, either directly or indirectly, as that would lead necessarily to government supported entities becoming monolithic, and the privately funded press struggling, unsuccessfully, to compete.

For the same reason we would oppose any suggestion, by the federal government, of journalism standards regarding professionalism or quality of information, news coverage or editorial opinion. When the government announces a preference, even if it does not come in the form of a regulatory mandate, that preference creates a massive tidal effect. NRB believes that the constitutional autonomy of media outlets, both secular

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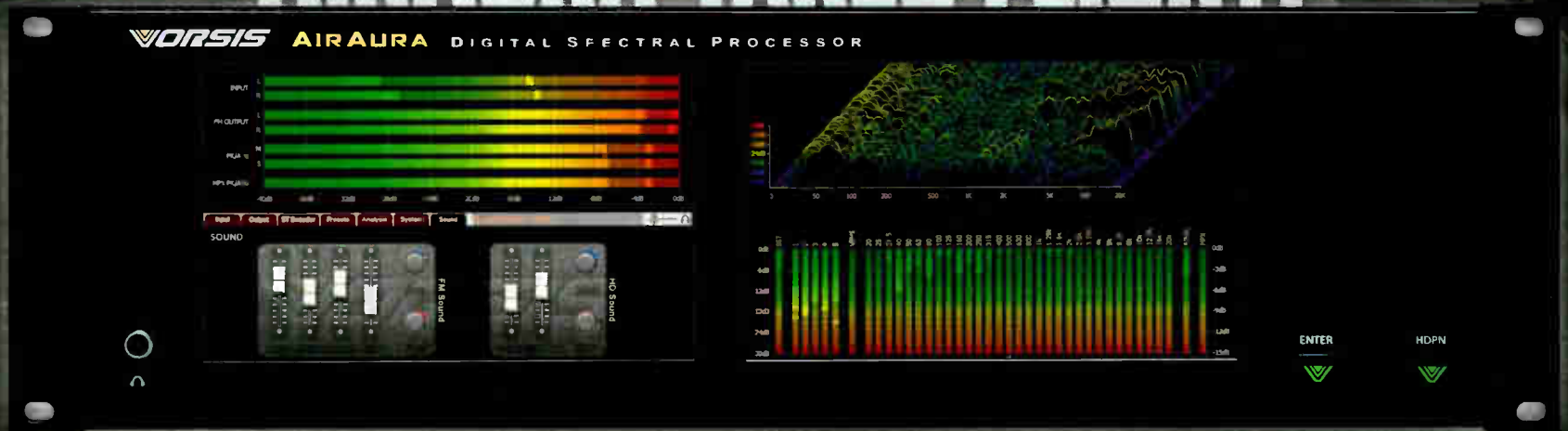
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