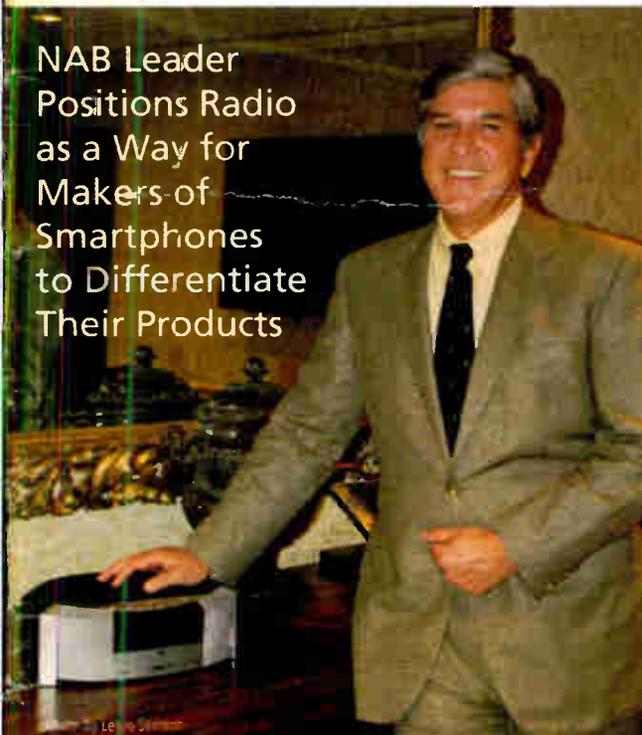


RADIO WORLD

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Gordon Smith, Back on the Hill, Puts Engagement to the Test

NAB Leader Positions Radio as a Way for Makers of Smartphones to Differentiate Their Products



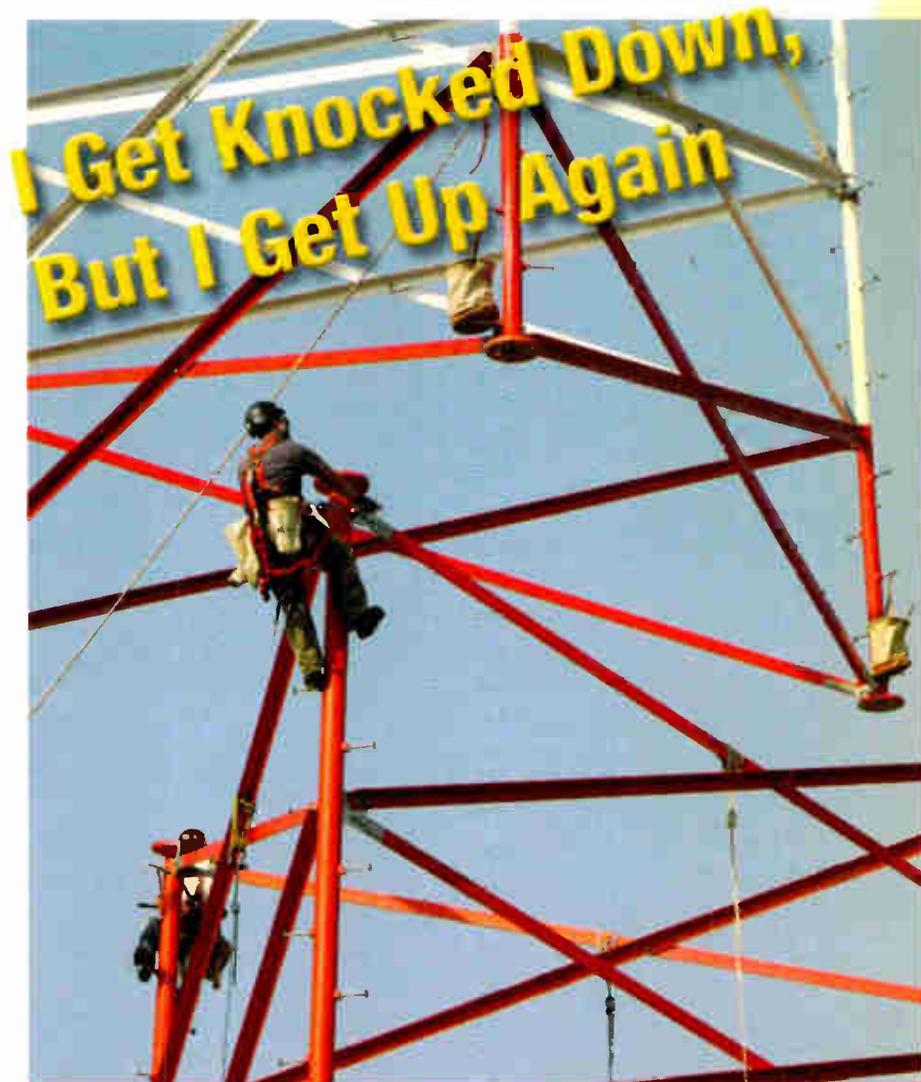
Gordon Smith with a Polk HD Radio tabletop receiver. 'We're trying to make sure that, as the debate takes shape, Congress sees a world of broadband and broadcast.'

WASHINGTON — The furniture chosen for the top office suite at the National Association of Broadcasters by its previous two occupants was standard Washington-type masculine: conservative dark wood and leather.

Gordon Smith's office has such pieces, but with a change-up; the former U.S. senator from Oregon also has some furniture from his former Capitol Hill office, including a wing-back chair covered in a tasteful paisley fabric and a leather couch with a plaid fabric seat, suggesting the slightly more casual nature of the current leader of the lobbying organization.

Three months into the new session of Congress, Smith, broadcasting's top lobbyist, is in the thick of the issues, pressing the industry's case on Capitol Hill

(continued on page 3)



At the NAB Show, Andrew Skotdal will tell the amazing story of KRKO — its 50 kW upgrade, the infamous destruction of its towers, its restoration and its major duplex project. Broadcast Engineering Conference themes also include cloud-based technologies, mission-critical IT, RDS implementation and infrastructure management for challenging times. — Page 16



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SMITH

(continued from page 1)

and at the FCC. A two-year restriction against direct lobbying of former colleagues is now over, and Smith is taking full advantage of the change as the trade group adjusts to post-election leadership changes on the Hill.

Radio World U.S. Editor in Chief Paul McLane and News Editor/Washington Bureau Chief Leslie Stimson spoke with Smith in his office at NAB's headquarters.

The conversation started with discussion of performance rights and how that issue evolved after the NAB Radio Board approved a "term sheet" and presented it to musicFirst last fall. The proposal outlined a possible settlement, suggesting among other things that music-playing terrestrial stations would agree to pay a limited performance fee — between 0.25 and 1 percent of their net revenue — in exchange for backing from performers and labels for NAB's legislative efforts regarding penetration of radio-activated mobile phones.

Thinking long-term, the thing that radio needs is to be on the platforms for telecommunications for the future. Those are digital platforms. For all the reasons we've articulated in the past, as an automobile-centric industry we need to be on more than just a dashboard. Because our position on the dashboard

outcome. But it is not the certainty that the other side wants.

RW: You were at CES. Did you talk to cellphone carriers about that issue there?
Smith: I did, a number of them.

I'll tell you what I infer from this. The smartphone is not yet a commodity.

'The telcos are making clear there will be a point at which you start getting billed for what you stream; and that's the plateau, that's the hydroelectric dam that those salmon are swimming up against.'

is no longer a couple of knobs and some buttons to push.

You've got to work to find your radio now. It's a digital console. If that's getting crowded, we need to be on other platforms, like cellphones, because that's where the people are. And no one does for the public what radio does, which is

But within a few years it will be a commodity, and the way manufacturers will distinguish their phone from another is by having more stuff on it. For very little money, and a great deal of benefit — in an age where telephone companies are going from all-you-can eat plans to pay-as-you go, billing by the bit — we think

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RW: Can you bring us up to speed on performance rights since the term sheet?

Smith: As I understand their communications to us, the other side feels that what we voted on nets out to insufficient dollars, and that their better play is to grow the digital platform and oppose us on all the other things radio wants, legislatively and regulatorily.

At the end of the day, though, it isn't their vote or our vote. It's the vote of Congress, and what Congress wants to do with where we ended up, that will likely drive our re-engagement on the issue.

RW: Are you still in discussions with musicFirst?

Smith: I talk with them regularly. Our position is unchanged at this point, but we remain at the table. We're not the ones that have walked away.

Our motive in the beginning was to beat a bad bill, and to make sure that if any bill passed, it left a bright future for radio. ...

to provide emergency information in the most efficient way that it can be received.

RW: Is it realistic to expect Congress to mandate radio on portable devices?

Smith: I said at the beginning, it's a tough sell. I understand that.

There is a very strong public policy reason for a mandate. In an age of terrorism [and] natural disasters, there is only one signal that keeps in operation when everything else is shutting down. And that's that radio signal, a lifeline, literally, for people in a blizzard, in a terrorist attack, in an earthquake, you name it. ...

So the difference between where we were last year and where musicFirst was, and is, we said, "If we can't get the mandate, then how about a phase-in of the market? And we would put advertising dollars into identifying those cellphone manufacturers who include an enabled radio chip, and that up to 1 percent, we would phase in, according to market adaptation." I still think that is a good

the outlet of free radio is something that will be very appealing to moms and dads when they give their kids a cellphone. ...

I noticed the other day the iPhone 3GS is now like \$45. You're getting into a commodity there. It's no longer north of \$500 for it. ... The first in that kind of a market is the one that makes the money; so that's Apple, a few of the BlackBerry designs. But now several are putting in radio-enabled chips. Zune is one of those ... iPod has the Nano and [there are] many others. ...

A smartphone has a usable life of about 18 months. That's the turnover rate. If we start creating awareness of the difference between paid radio and free radio, and for 25 cents extra or whatever it is — say it's a buck — you can have free radio on there and it does these things for you, that creates a market. All things being equal, people will say "Do I want a radio chip or don't I?" "I think I do." That will save on my monthly bill.

(continued on page 5)

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Shannon Nichols Sales Manager

Radio Has Its Head in the Cloud

The cherry blossoms along the lake near my home are threatening to emerge. That can only mean it's show time again — and in radioland, "show time" means NAB.

In this issue, Radio World starts our preview coverage of radio's biggest annual convention. Though radio is now but a small part of the spring show, few would argue about whether the Las Vegas event is the most important conference for radio broadcasters and equipment buyers.

Here's what you can expect from Radio World:

In this issue our writers take a look at the most promising sessions of the Broadcast Engineering Conference. Exhibitors give a hint of what they'll be showing, in our booth listings. And we hear from NAB President/CEO Gordon Smith about major radio issues in Washington.

Next time we'll preview management and regulatory sessions and hear from other newsmakers about business trends. We'll profile L. Robert du Treil, the NAB Engineering Achievement Award winner, and provide a Pocket Preview Guide with a radio floor map that you can take to the convention.

In subsequent issues look for our show photo special, news coverage, Radio World "Cool Stuff" Awards and new product wrapup. And of course our staff, contributors and photographers will be everywhere at the event itself.

Several further aspects of the show are worth your attention.

NAB engineers are doing their part to help with the association's cell phone push: they plan an exhibit called the NAB Radio-Ready Cell Phone

Showcase. According to Senior Director of Advanced Engineering David Layer, a similar exhibit at the fall Radio Show was well received.

He promises "detailed information on how radio can be included in cell phones easily and affordably." The exhibit will provide info about NAB's push to "educate" lawmakers on the benefits of including radio in cell phones and about the cell phone "embedded antenna" development work that NAB's FASTROAD Technology Advocacy program recently paid for.

Also new, the convention will feature something called PITS, or People Integrating Technologies and Solutions. NAB's John Marino, VP of science and technology, told me these PITS "are special areas on the show floor where attendees can gather and learn about some of the interesting technologies and applications that are now available."

The Radio PIT (at C456 on the Central Hall exhibit floor) will showcase HD Radio technologies, the Broadcast Traffic Consortium, several other technology initiatives and some live broadcasts. Marino told me these "pits" offer educational opportunities but primarily are intended to bring "additional excitement to the show floor." I heard from one radio manufacturer that this is the kind of activity exhibitors like to see to help pull more people into and through the aisles.

Relations between NAB and the Consumer Electronics Association have been testy at the CEO level; but the organizations, still interdependent in so many ways, continue to work together.

For instance, Brian Markwalter will

keynote the BEC; he's vice president of research and standards for CEA. Markwalter will talk about how radio receivers are evolving and the trend toward "connected" radios, devices that can offer streaming audio content from around the world.

Marino told me, "Shortwave was once the only way to listen to international broadcasts; but today's Internet-connected radios are providing an alternative, and it seems most broadcasters are embracing this new opportunity to expand their reach." Markwalter promises to talk about what the exponential growth in available channels mean for traditional AM, FM and TV receivers. (He calls it an Internet "tsunami" washing over broadcast receivers.)

FROM THE
EDITOR

Paul McLane



Other themes to watch for: Cloud computing is becoming a force in the world of IT, so there will be presentations in the engineering conference covering it from a broadcaster's perspective. NAB also is offering a mini-conference called "Content in the Cloud" that will address new cloud-based technologies for broadcasters along with case studies. For businesses looking to hold more meetings without traveling, NAB also has a Telepresence Conference.

I wonder if they have cherry blossoms in Nevada.

JUST LIKE SMITTY



Greater Media threw a luncheon at The Heldrich Hotel in New Brunswick, N.J., recently for Milford K. Smitty Jr., center, in celebration of his Radio World Excellence in Engineering Award. Our host was Greater Media Chairman/CEO Peter Smyth, far left. Several other executives and engineers, Smitty's wife Maralee, Radio World Publisher John Casey and I were in attendance.

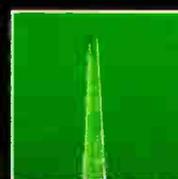
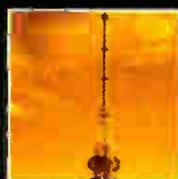
I shared some of the things Smitty's colleagues have told me. My favorite came from RW technical adviser Tom McGinley, who commended Smitty for "his high standards of engineering stewardship, his infectious good nature and sense of humor, and his exemplary passion promoting our craft in this wonderful business. All I can say at this point is: When I grow up, I wanna be just like Smitty."

standards of engineering stewardship, his infectious good nature and sense of humor, and his exemplary passion promoting our craft in this wonderful business. All I can say at this point is: When I grow up, I wanna be just like Smitty."



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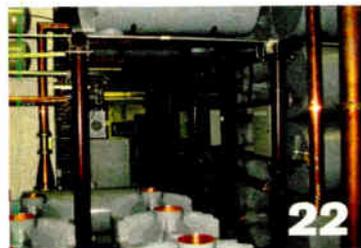
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NEWS

Gordon Smith, Back on The Hill,
Puts Engagement to the Test 1
Radio Has Its Head in the Cloud 4
News Roundup 8

FEATURES

Workbench: How Few Guy Wires
Can Support a Tower? 10
Build an All-Station Audio
Take-Over 12



22

NAB SHOW ENGINEER'S
PREVIEW

KRKO: The AM Station That Could... 16
Radio Gets a Telepresence 18
PSD Task Force Explains Its Work 20
The Day the Empire Master FM
Failed 22
NAB Flies Deeper Into the Cloud... 24
Keep It Going in Challenging Times... 26
A Broadcast Engineering Conference
Sampler 28
What to Do When the Inspector
Knocks 30
Quality Engineering on a Tight
Budget 32
Alaska Test Cuts AM Power Costs ... 34
NAB Show Booth Listings 38

GM JOURNAL

It's Always Independence Day
at 'The Surf' 56
A 'Super Window' Is the Way
to Go 58



STUDIO SESSIONS

Vorsis AirAura Is a Muscular
Performer 62
TASCAM DR-08 Is a Stealth-Mode
News Tool 65

OPINION

We Help Move Time Through
the Air 70

SMITH

(continued from page 3)

RW: *Is Pandora a real threat to radio in the dash, those kinds of personalized Internet services?*

Smith: They're trying to get into what has historically been the radio space. I don't think we know, at this juncture, at what economic level Pandora plateaus. It really depends on price.

Free is better. So that's a downward pressure on that business.

Many people in radio have an app now. I've got a bunch of them on mine [holds up a smartphone]. At what point do [users] start getting billed for that? I think the telcos are making clear there will be a point at which you start getting billed for what you stream; and that's the plateau, that's the hydroelectric dam that those salmon are swimming up against.

RW: *What would you say to a radio manager worried about Pandora-like services moving in on radio's dashboard turf?*

Smith: I'm trying to say, let's think creatively about how we get competitive in digital spaces; and that means inclusion in the devices of the 21st century. Exhibit A is the smartphone. Again, I think there's a tremendous public policy reason for having that — if not a mandate, then certainly encouraging the market to grow.

I think part of my job is to say, if radio eventually has to pay a terrestrial performance fee, we still believe that play and promotion are equal economic value. So if we have to pay, give us something to buy. Help radio, [which] is so essential to constituents of members of Congress, grow into the platforms of the 21st century. ...

Whenever we talk about Sirius XM or a Pandora model, when you look at the economies of scale, radio is a \$17 billion annual business. I doubt if any of those companies even hit one [billion]. I don't know their numbers; but it's wholly different. It's like little league vs. the major league in terms of just the economics.

RW: *Pandora's claiming some 80 million subscribers. Those are people who sign up for the free service; it's not clear how many are actually listening each day ...*

CORRECTION

An article about the NPR Labs accessible radio meeting at CES (March 1, page 6) stated that WireReady provides "automation and playout services to an installed base of some 2,000 stations that air radio reading services." The sentence should have read, "The company has an installed base of some 2,000 stations for its automation, playout and other services, and some 60 of those are radio reading services."

NEWS

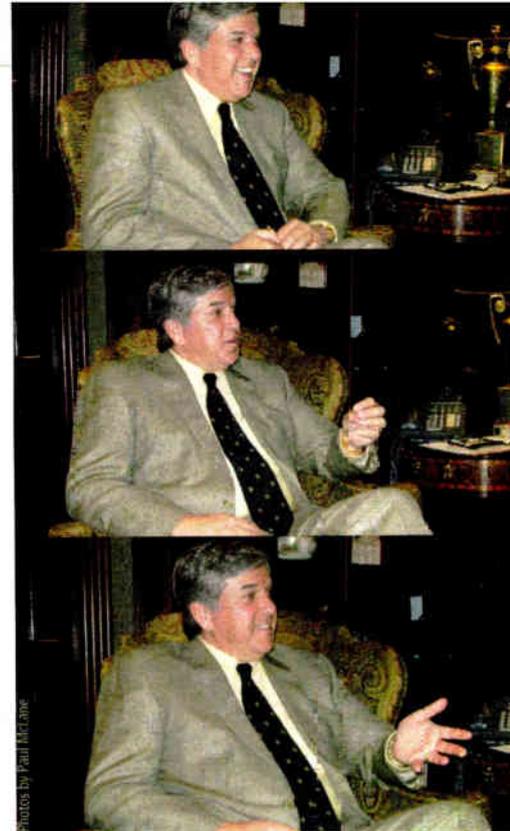
Smith: You buy a new car, they will either include XM Radio for six months, or they'll show you how you can subscribe depending on how much you're spending for the car. So they're trying to get in there. It will find its level; but I don't think, because of price, you'll ever see subscription radio rivaling, in economic dollars, terrestrial radio.

I can tell you in our conversations with musicFirst the biggest difference between the two sides is how they see the future. The other side sees digital as growing like a hockey stick exponentially forever. Terrestrial radio members that we represent see it as something that has a niche and will plateau and will not grow beyond a certain level. Nobody knows what that level is.

RW: *What are the priorities for NAB Radio Board members right now?*

Smith: One of them isn't even a legislative fix, and that's ... to actually monetize simulcast streaming. You can't really do that now. They've got to strip out all their commercials in order to do it. So let's come up with something that allows ...

(continued on page 6)



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SMITH*(continued from page 5)*

that category to grow. You can't grow it if you can't monetize it.

Certainly CRB [Copyright Royalty Board] rates retard the growth of the digital platform. Certainly inclusion on these new platforms is a huge priority.

RW: *Much attention is paid to the pressure on TV by broadband, and whether broadcasters will give up spectrum. Why should radio managers pay attention?*

Smith: They are paying attention. In

fact, they are very much returning the favor that television did for them. A year ago, we ran radio and TV ads [in local congressional districts] to help defeat the Performance Rights Act. It was enormously effective. ...

RW: *Is there any immediate threat to radio spectrum?*

Smith: Not immediate; but if they can do it to your neighbor, they can do it to you eventually.

RW: *That's what you're saying about Genachowski's broadband focus.*

Smith: Yes, the whole thing is increasing the capacity of broadband. Which is not a bad thing; but if that translates into a world of just broadband and not broadcast, that's a very bad thing. We're trying to make sure that, as the debate takes shape, Congress sees a world of broadband *and* broadcast, where radio and television have good space; that they can continue to provide free and local service. ...

So radio is running ads on radio stations throughout America in support of television spectrum.

RW: *How do recent party changes in Washington affect NAB's outlook?*

Smith: ... Divided government makes it so that things don't happen in a rush. ... It gives us more places at which to take a shot if we're not happy. So in that sense, it means very little can be done to us in the dark of night or at the 11th hour that we would regret. ... It isn't politics; it's process. It gives us a stronger hand when you have divided government.

ers get you the answer." ...

But now with that gone, I'm able to go there [to Congress] as someone fully appreciative of the role that lawmakers play. I respect the role that they have to play. I think having been there with them, they can talk to me in a way that they may not be able to talk to others about the pros and cons of any issue.

RW: *How would you characterize your relationship with Chairman Genachowski?*

Smith: I would say businesslike. ... The challenge we had the outset is that we get mixed messages. We don't know the target, and therefore the consequences, of [the FCC's] proposals and how they translate onto the balance sheet of our members. We want clarity of message and consistency of that message as they continue to refine what they're going to do or what they're proposing. We're highly interested.

RW: *Especially when he's talking about*

'I don't want NAB to be seen as the House of No, but as the House of Engagement.'

RW: *There was a time when NAB was described as one of the most powerful lobbying organizations. Would you agree with that characterization today?*

Smith: Yes. I think we're proving it. It isn't so much NAB, it's what we do in a meaningful way in the lives of the American people; and their elected representatives know it. I'll give you the perfect example, the one that I know, very, very well. When I would run for election I would do Internet ads, and 30 people would click on [them]. I'd do some cable ads, and I'd have to run them for a long time to get any penetration.

But if I wanted to reach my constituency, I went to broadcast radio and television and I would see my numbers move. Because that's where the American people are. That's where they go still, for the information that is essential to having an informed life as an American citizen. That's why we're a survivor, and that's where we're effective.

RW: *You can lobby, now that the standard waiting period is over.*

Smith: Yes, it's been a wonderful experience to be able to now call. During the ban, I would have colleagues call me all the time and I would have to preface each call by saying, "Great to talk to you. If you're asking something that requires advocacy, I can't do that. If you ask me the question I will have one of my staff-

broadband and the possible television spectrum give-backs.

Smith: The chairman has been very clear that this will be an entirely voluntary process. Our objective is to "keep voluntary, voluntary." ... They want to entice broadcasters to turn in their licenses and share in the proceeds.

Let's say you're in a townhouse. And your neighbor, his economics aren't yours, and he decides to torch his apartment or condo for the insurance money. Are you held harmless?

RW: *No, my wall just melted.*

Smith: You've got smoke damage. You're damaged. As I think of spectrum, you get your neighbor channel saying, "Yeah, we want to sell out." That's fine if I'm held harmless; but if that means I have to be re-positioned to an inferior signal with a smaller reach, I'm not volunteering for that.

Voluntary can mutate into compulsory very easily in the whole re-packaging [scenario]. ...

RW: *What does the way NAB handled the LPFM situation indicate about the way you and NAB approach problem-solving and conflict?*

Smith: A perfect example ... In the last Congress, we used the process to get the two things that we needed from

(continued on page 8)

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SMITH

(continued from page 6)

LPFM. We wanted primacy. We got it. We wanted protection from interference. We got it. We were able to use the House rules and the Senate rules — the process to make sure that the final product had everything that we needed, and allowed them to proceed.

I said [at the outset] I don't want NAB to be seen as the House of No, but as the House of Engagement. If there's a public problem, we are part and parcel a public service. We'll try to help solve it, but we want within the solution to be allowed to continue making a living and meeting payroll and providing return on investment to shareholders.

The whole point of a trade association is to make sure that the rules of the road allow the prosperity for our members. They're all independent businessmen who will have different balance sheets and different debt concerns and shareholder concerns. But a trade association's central ... purpose is as an advocacy tool, and in that regard, NAB is a very, very effective player.

RW: Do you foresee a day when Congress stops funding public broadcasting?

Smith: I think that we're seeing that day. I think many in public broadcast-

ing understand that their resources need to be less oriented to the government's treasury and more towards the audience that they're serving. Yeah, there's some ideological edge in this debate, and that was exacerbated recently over Juan Williams. We're trying to be supportive; yet I can just tell you, as you construct budgetary priorities there's going to be a lot of pressure on things like public broadcasting and farm subsidies. The list is as long as my arm. ...

RW: What can you tell us about this fall's Radio Show, especially changes for the exhibit floor?

Smith: It's in Chicago. Merging the show with RAB was a net positive. It creates a larger place for radio to gather for all of its activities. Certainly there was some concern about how the exhibits were done here [in Washington] in a smaller venue. We'll have more space in Chicago, where some of those complaints can be addressed. ...

RW: Are you and RAB still working together to convince cellphone manufacturers to put FM chips in devices?

Smith: Yes, our positions are the same on that. ... If there's no mandate — I grant you, that's a tall order, legislatively — I believe a market will ultimately include, if not an FM chip, in the future

it will include an HD Radio chip, which takes care of AM and FM. I think that that's something new that manufacturers will want to include in their phones because they'll want to distinguish those from their competitors. They'll want that extra feature.

RW: How would you characterize the success of digital radio in the U.S. so far?

Smith: I think it's been mixed at this juncture; but I think it's a chicken-and-egg kind of problem. As you see more and more automobiles including HD in their offering, I think you'll see it take off. ... Just as automobiles are not, quote, commodities, you can get the lower-end automobiles that are very much like commodities. ... For very little money, you can add a feature that might mean they'll buy this model vs. the other. HD Radio is one of those.

RW: Gary Shapiro at CEA has said radio's acting like a buggy-whip industry, asking for a cell phone mandate. He touches on a sensitive point as many people are pigeonholing broadcasting as archaic.

Smith: Gary's great at the bravado and the sound bite. Here we are being called a buggy-whip industry and every week we reach an audience of 260 million Americans. That's better than the Betamax. ...

If this is a buggy whip, this is a pretty effective tool. Because it still reaches most of the American people every week. Its reach is enormous. Whatever pejorative label you want to attach to it, the funeral rites have been administered to radio for decades.

RW: CEA and NAB partner on the engineering side. Shouldn't the trade groups be partners in other areas?

Smith: There is a community of interest between NAB and CEA. It's just that right now, things are strained because the oxygen that they need is the spectrum we have.

So you really come down to a public policy issue of what do the American people need and want. Do they need more apps? Or do they need their local news, weather, sports and emergency information and how's the best way to get that to them?

There's not enough spectrum in the universe to handle video one-to-one by everyone. So do you need broadcasting in that mix? Yes, a really healthy broadcast signal. Otherwise you'll always be in a shortage.

That's why we keep saying the world of the future has to include us both. We are a survivor industry, an essential industry, because of our one-to-every-one signal.

Comment on this or any story. Email radioworld@nbmedia.com.

The advertisement shows a road sign with the text: "***** ALERT ***** EAS/CAP COMPLIANCE DEADLINE AHEAD CALL DIGITAL ALERT SYSTEMS TODAY". Below the sign is a red banner that reads: "New EAS/CAP Compliant Models Starting Under \$2000". At the bottom of the ad is a photograph of the DASDEC-II device, a black rectangular unit with a screen and buttons. The Digital Alert Systems logo is visible in the bottom left corner of the ad.

The notice is out — a new EAS/CAP compliance deadline looms ahead. And the best way to keep your station in compliance is the DASDEC-II, flexible emergency messaging platform. Cover all your EAS and CAP requirements in one easy to use, easy to maintain, and surprisingly affordable package. Call 585-765-1155 today or visit www.digitalalertsystems.com. Don't delay - the deadline is just around that corner.



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NEWSROUNDUP

HD RADIO IN MEXICO: IBOC technology in Mexico took a big step when the country's communications regulator endorsed its voluntary use nationwide for AMs and FM.

ASYMMETRICAL SIDEBANDS: NAB and iBiquity released preliminary data about the asymmetrical sideband approach to achieving better FM digital radio performance, describing driving tests involving WKLB(FM) in Waltham, Mass. See the report at www.nabfastroad.org. iBiquity is conducting additional lab tests; FASTROAD plans to release results soon. HD Radio proponents hope the data, combined with results gathered by NPR Labs and Nautel at WAMU(FM) in Washington, will provide a basis to ask the FCC to allow stations to use asymmetrical sidebands.

ALLOTMENT SHIFT: The FCC adjusted its allotment priorities to promote rural radio service. The commission made it more difficult to move an existing station from a rural market to an urban one, affect-

ing city-of-license requests. It also made it harder to add new stations to urban markets. Commissioner Michael Copps said the change was made to "avoid gaming our system that was designed to fairly distribute radio service." His colleague Robert McDowell said the change affects nearly 30 years of precedent that gave licensees "greater scope to make market-driven judgments."

MERGER REVIEWS: Commissioner Meredith Baker says the FCC merger review process is so long it chills investment. The agency has a 180-day shot clock, which the agency should either retire or actually enforce, she told the Institute for Policy Innovation in March. She also suggested other reforms to the merger review process.

MSTV & NAB: The board for the Association of Maximum Service Television, which lobbies to protect TV spectrum, voted to merge with NAB. NAB President/CEO Gordon Smith said the action complements the NAB board's strategic direction to elevate tech issues within the organization.

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PC Software for archiving and logging all of your stations audio.

How Few Guy Wires Can Support a Tower?

Disaster Can Be Spelled 'Unsupervised Contractor'

Cox San Antonio Market engineer Paul Reynolds took the picture of one of his towers in Fig. 1. This is a 370-foot Rohn, heavily loaded. Wind was light; maybe 5 to 7 mph is Paul's guess.

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

The station had leased space on the tower to a cellular carrier, which contracted with a "tower company" to do some structural things, mainly replace guy cables and install new anchors. Well, it turns out that the "tower company" in turn subbed the job to another "tower company."

So Paul showed up that afternoon to see what was going on. He noticed the second tier of guy cables hanging with no temporary cables installed. He called up, "Where are the temps?" The crew chief yelled back, "Who in the [expletive] are you?" Things kind of went downhill from there.

The man was relieved of duty the next day, and the tower company put up temps for the remaining levels of guy cable changes.

Paul writes that it's idiots like this who cause accidents. It was a miracle two men weren't killed and a tower felled in the process.

Paul, thanks for sharing this nightmare and reminding readers to supervise the work of site contractors no matter what they are doing.

I recall that a few years ago, a roof-

ing contractor was re-tarring the roof of a transmitter building. The chief just happened to be inside as the tar started pouring down the inside wall of the building. He caught it before any major damage was done.

dents will happen — but the chance of problems is minimized if you are on site supervising the work.

Paul Reynolds, CPBE, can be reached at paul.reynolds@coxmg.com.

Nassau Broadcasting's Bill Ryall, director of engineering for the



Fig. 1: You don't want to learn the answer to the question in our headline the hard way. Never leave a contractor unsupervised.

Another station was not so lucky. Its phasor was ruined when roofing tar leaked over the edge of the transmitter building roof and followed the coax lines into the equipment.

Both of these cases involved reputable companies — let's face it, acci-

group's Maine cluster of stations, read the comments in *Workbench* about rodent problems.

In areas with snowy winters and mountaintop sites, many engineers use ATVs, snowmobiles or other engine-powered methods to get to their trans-

mitters. Often these vehicles are kept outdoors or in structures that are not sealed or climate-controlled.

Remember that rodents *love* warm engine blocks. They also have a tendency to crawl into air intakes and build nests, especially if the engine isn't run regularly.

Rodents will crawl into truck engine compartments, and they'll nest in the computer control enclosure of gensets.

Bill has a snowmobile in the shop getting the top end of its engine rebuilt after damage caused by a hidden mouse nest that restricted airflow on the air-cooled engine. That's not a good situation should transmitter problems develop and you have no other way to get to the site. Worse, what if the machine dies, leaving you stranded miles from civilization? Remember that survival safety checklist?

Rodents will crawl into truck engine compartments, and they'll nest in the computer control enclosure of gensets. They also love to chew the plastic off wiring. That makes for a mess on both counts. All a mouse needs is an opening the size of a dime.

Use mothballs and clothes drier fabric softener sheets as repellents. Just

(continued on page 12)

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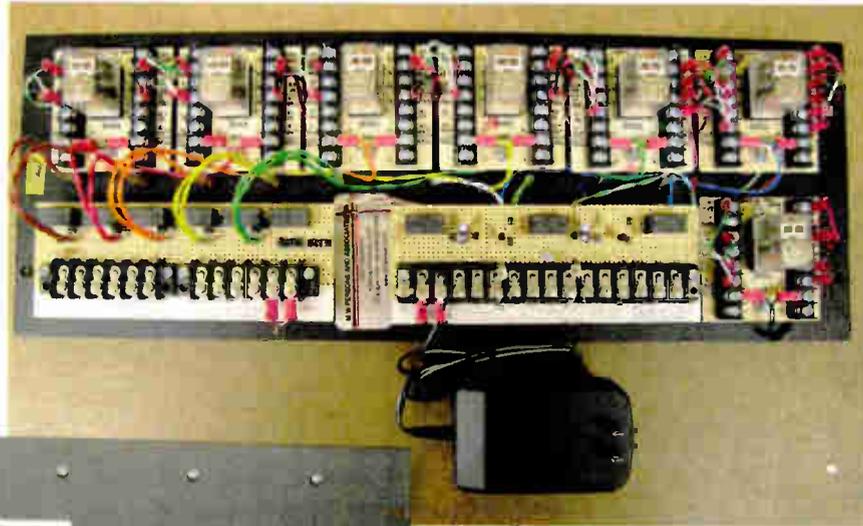
Build an All-Station Audio Take-Over

BY MARK PERSONS

It is rare nowadays to find a single-station operation. Even in small markets I encounter groups of radio stations all under the same studio roof.

TECHTIPS

Most such groups use a single EAS encoder/decoder unit with a relay system to interrupt audio for announcements on all of the stations at that location. I have built many audio relay



panels for EAS systems to do just that. It is not difficult.

A relay is used to interrupt normal audio for each radio station and replace it with EAS audio. The relay coils are controlled by an EAS generator. Just keep adding relays as you add radio stations to a single EAS unit. They can all fire simultaneously or one at a time

if there are some switches to limit the number of stations during a weekly or monthly test.

An interesting twist comes when there is a weather warning that is not covered by EAS and must get on the air on all of the stations ... probably simultaneously. If you have your thinking cap on, you will realize that those same audio relays can be used to do this job too. The difference is which audio source is used to feed audio to those transmitters.

LOADED

A simple design modification will add a relay that either lets the EAS system run its announcement or pulls in to take audio from one "master control" studio and feed all transmitters. Key here are the FCC rules that require EAS audio to take precedence over all other station audio. The system *must* failsafe to EAS regardless of what else is happening or what the program director might want to happen in the facility.

One of the technical hurdles is that one audio source might be required to feed six audio processors. If each of those processors is set to terminate the

(continued on page 14)

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WORKBENCH

(continued from page 10)

remember to change them regularly to keep them fresh. If you stuff them into the air vents of a snowmobile engine, remove them before you start it up.

Yet one more thing to check when visiting a transmitter site. ...

Bill Ryall can be reached at bryall@nassaubroadcasting.com.

Springtime is "home show" time. At a recent expo in New Hampshire I discovered an inexpensive yet sturdy device to hang things from wooden studs.

Stud Grabber instant storage clips will hold up to 25 pounds. The unique design securely grabs onto a 2x4. The Stud Grabber has sharpened spike-like prongs that dig into the wooden stud, effectively securing the bracket.

Made by Waylin Products. Stud Grabbers come in a variety of sizes. I liked the one shown in Fig. 2 because 3-inch coax would lie nicely in the cup formed by the heavy wire. Many transmitter "shacks" use wooden storage buildings, so you might find

these useful.

You can find out more at www.studgrabber.com. Google "studgrabber" to find a variety of online distributors.

If you're heading to the NAB Show next month, perhaps I'll see you there. It's readers like you who make this column, and this publication, so successful. Thank you for contributing and reading Radio World!

John Bisset marked his 40th year

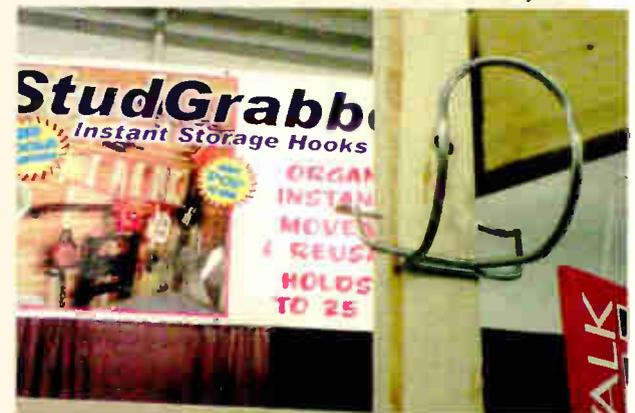


Fig. 2: The Stud Grabber is ideal for holding coax.

in radio in broadcasting recently. He works for Tieline Technology and is a past recipient of the SBE's Educator of the Year Award. Reach him at johnpbisset@gmail.com or (603) 472-5282. Faxed submissions can be sent to (603) 472-4944.

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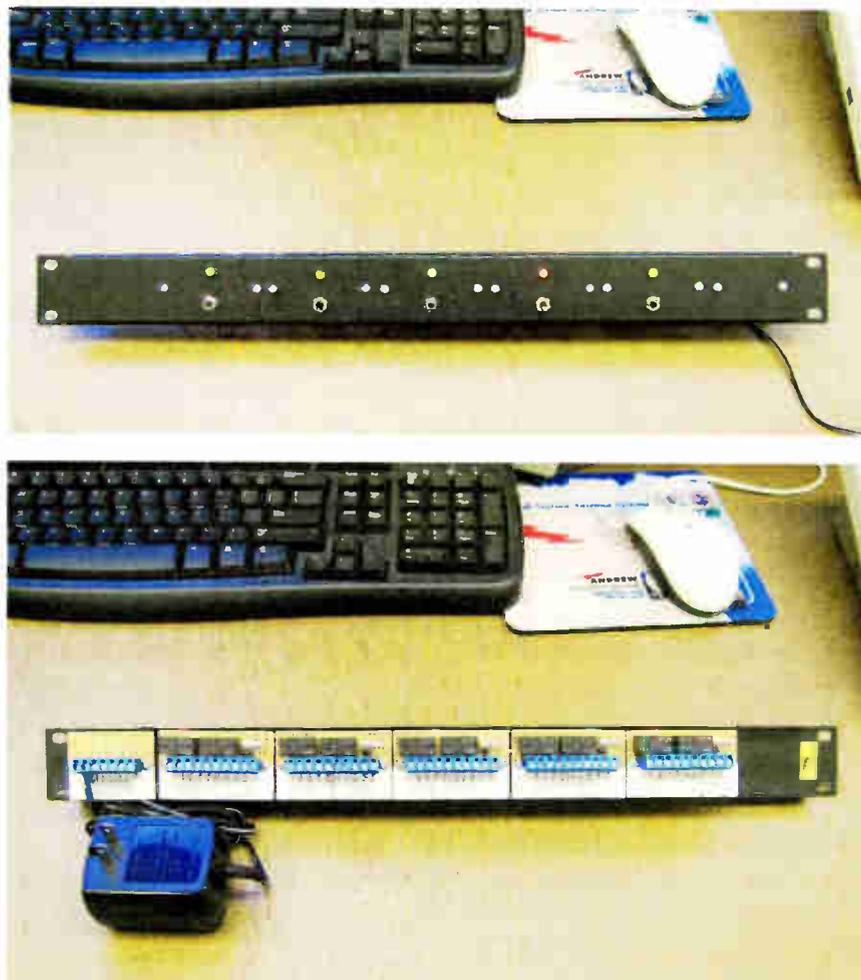
TAKE-OVER

(continued from page 12)

incoming audio with 600 ohms impedance, you could have a problem. A 600 ohm audio source will be loaded down to 100 ohms with a noticeable drop in audio level. Most audio processors have a jumper option to select a "bridging" input, which is usually 10,000 ohms. If you have six 10,000 ohm loads in parallel, the resulting load is only 1.667 ohms. It would take 17 such audio processor loads to bring the combined parallel impedance down to 600 ohms.

For perspective, the 600 ohm standard is from many years ago when audio consoles had output transformers that needed a 600 ohm load in order to achieve good frequency response. Active balanced circuits today do not need a load and are happy with 600 ohms or more of termination. For that matter, they perform just as well with no load.

I remember installing an all-station take-over panel at a station a while back. It was after 5 p.m. by the time the job was done. After a look around, it became apparent that I was the only one left in a building with six radio stations. There was a gleam in my eye. Should I flip the switch and be heard



by everyone in town? Hmmmm ... I'd always wanted to be an announcer on the radio!

Well, since radio waves travel at the speed of light, the answer is probably halfway to Alpha Centauri by now.

PENCIL AND PAPER

Back to the subject at hand. My recommendation on custom-building an interface panel is to draw a schematic diagram and keep it in the station engineering records. You can do it with pencil and paper as long as there is some kind of logical information trail. That will help future engineers understand what you have created. Do neat work and label everything. It just makes good engineering sense.

There are those who do not have the time, skill, patience or tools to construct such an interface. In that situation, I build such devices in my shop and ship them out for engineers to install. Yes, complete schematics are included.

The author wrote about "Solving the Case of Tower vs. Tower" in the March 1 issue. For more good ideas, visit radioworld.com and click on the Tech Tips tab under News & Technology.

Mark Persons, WOMH, is a Certified Professional Broadcast Engineer and has more than 30 years experience. His website is www.mwpersons.com.



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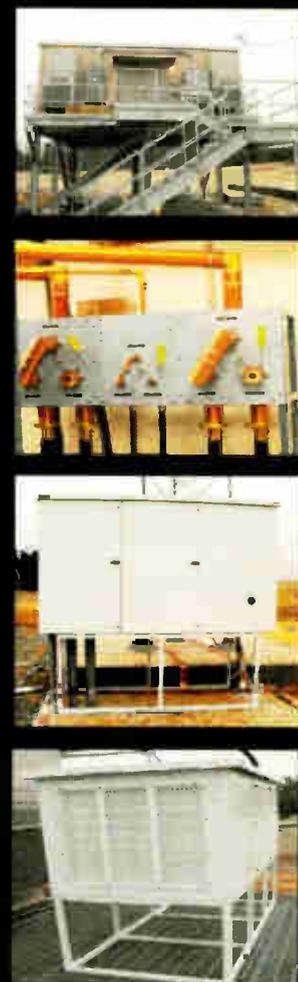
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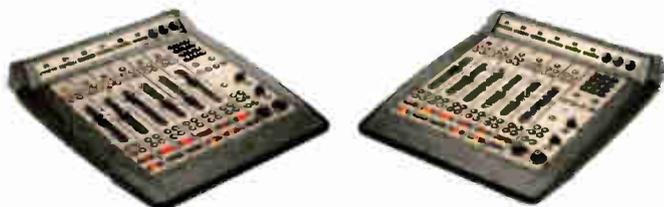
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Deal #2: Bigger studios earn you an even bigger deal! Buy four Element consoles — any size — and you'll get the hot new Telos VX broadcast VoIP system everyone's talking about. That's a VX Engine that can handle up to 50 phone lines, two VSet12 phone controllers, and VX Producer software. That's a complete package worth **\$10,480.00** in goodies, gratis.

How long will this deal last? Frankly, we don't know. But you should probably snap it up before someone comes to their senses. Oh, and even though it's our "NAB Special," you don't have to come to NAB to get it — *just call us!*



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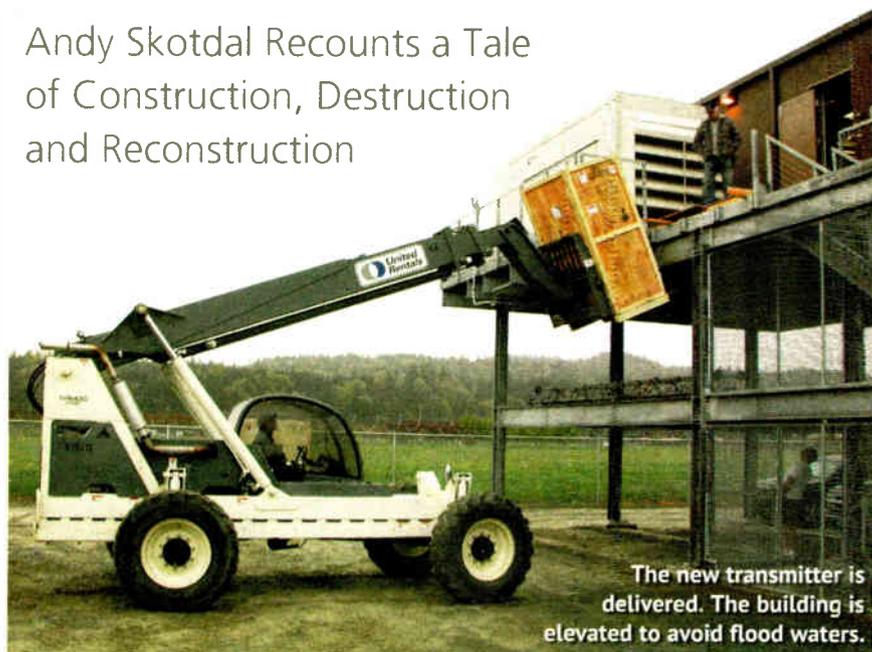
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World Radio History

KRKO: The AM Station That Could

Andy Skotdal Recounts a Tale of Construction, Destruction and Reconstruction



The new transmitter is delivered. The building is elevated to avoid flood waters.

BY THOMAS R. MCGINLEY

Andy Skotdal, president of S-R Broadcasting Co. Inc., owner of KRKO, Everett, Wash., has had perhaps the most challenging ordeal of any broadcaster trying to move and improve a legacy AM service for his community.

Skotdal's NAB Show presentation is titled, "KRKO(AM): 50,000 Watt Upgrade, Antenna Destruction, Reconstruction and 50 kW Diplex." It is part of the Radio Engineering Forum on Tuesday morning of the Broadcast Engineering Conference, which offers a variety of real-world experiences dealing with difficult circumstances.

For more than 11 years, Skotdal has had to surmount remarkable odds and resistance, battling neighbors, their attorneys, the local airport, the state and county governments, environmental preservation agencies and societies of various

kinds — and, finally, a domestic terrorist. He's done this in one of the most environmentally sensitive and politically progressive areas of the country.

MANAGE THE CLOCK

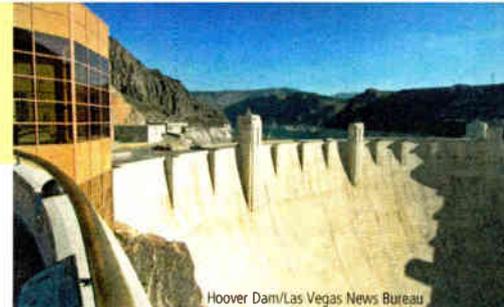
Skotdal will first offer an overview of the original effort expended to make the move.

After finding and acquiring an appropriate location and parcel of land, the company spent eight years securing the necessary permits and finally constructing the new KRKO on the Snohomish River flood plain east of Everett. KRKO's 50 kW four-tower facility was completed and commenced operations in early 2009.

Anyone familiar with this saga has to wonder how he succeeded. Perseverance and valuable lessons learned along the way eventually paid off. "It was 50 percent land-use law, 25 percent political



A view from the tower during ground system installation.



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campaign and 25 percent financial staying power," Skotdal says.

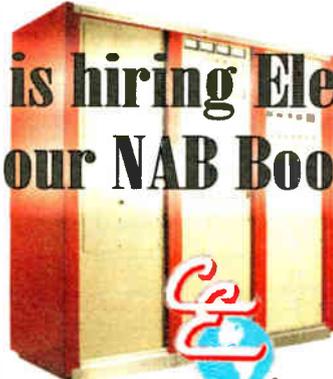
The project quickly confronted opposition on multiple fronts and began to drag on. Skotdal came to feel that the government agencies processing the permit applications, and which ultimately had to rule on the controversial aspects, were not helpful.

"We pre-coordinated with the jurisdiction prior to applying. They indicated we didn't need a lot of detail for our application; so we went with their advice, and it was a mistake. Because of opponent group pressure, the jurisdiction moved the goal posts after we applied."

The most important lesson Skotdal learned was clock control.

"We should have made our original application with every study we ultimately had to do, out of the gate. It would have allowed us to better control the clock and would have prevented the opponents from gaining extra time to

(continued on page 18)



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KRKO

(continued from page 16)

ramp up and raise money.”

Eventually, he said, opposing groups raised and spent more than \$600,000 to oppose KRKO in a losing legal effort.

He describes a six-point plan that resulted in his eventual success.

“First, we engaged the entire community to support us; second, we never misrepresented the project; third, we always sought out the best consultants we could find; fourth, we were able to financially sustain the litigation; fifth, we never stopped working on the project; and sixth, we maintained a meticulous database that was keyword-searchable including every newspaper article, editorial, opponent comment letter, exhibit and decision in the ongoing effort.

“Someone planning a project like this is going to face exactly the same arguments we heard, and their opponents will probably use much of the same information introduced in our hearings,” he advises. “Regardless of the location, get a report done for every argument

you can think of in advance of project submittal.”

TAKE 2

After eventually prevailing over the legal opposition and completing major construction, KRKO had to deal with an attack in 2009 by a self-proclaimed Earth Liberation Front terrorist.

In the dead of night, the criminal commandeered a track hoe at the site and managed to destroy two of the four new self-supporting towers and ATU buildings.

The FBI assumed jurisdiction for the investiga-



Jason Kardokus, owner of NorthStar Broadcast Contractors in Seattle, calls ‘Stop’ during the reconstruction.

systems to malfunction as well as improving system impedance and bandwidth performance. The rebuild also includes additional construction techniques and precautions to thwart potential vandalism, such as antiterrorism foundation nuts.

His presentation will focus on a pictorial review of the entire construction, destruction and reconstruction journey of KRKO. Skotdal

is planning on adding a second duplexed station to this site on 1520 kHz, building two additional towers. That FCC construction permit application is pending.

Some media observers regard AM radio as a dying service and think the Internet eventually will supplant terrestrial radio. Skotdal articulates a well-reasoned rebuttal in defending the time, effort and expense he has committed to his project.

“The broadcast transmission cost of one-to-many is infinitely scalable and yet the cost remains fixed. Broadband can’t do that. 4G can’t do that, either.

“AM’s problem today is content. As for the Internet, that’s radio’s new farm team. We can easily steal whatever finally makes money on the Internet because we are content producers too, but we have something Internet players don’t: a transmitter.”

Tom McGinley is Radio World technical advisor.



George ‘Buzz’ Anderson inspects the destroyed 199-foot antenna element and tuning units.

tion because ELF is considered a domestic terrorism organization. No arrests have yet been made. Skotdal remains resolute.

“FBI investigations take a long time, but I have no doubt they are going to arrest those responsible for the damage.” KRKO carried insurance to cover the rebuilding of the damaged array, which is now finished and back on the air.

Whenever a transmission facility, for whatever reason, is damaged after construction, an opportunity arises to redo aspects that could have been done better the first time.

Among those, Skotdal will describe resolving the problem of RFI causing the tower lighting control



The track hoe used to damage the antenna system is visible through the fallen steel. The vehicle had been stored behind a locked fence made of anti-climb wire and stranded with barbed and razor wire.

Radio Gets a Telepresence

The NAB session “Adding Visual Communications to Radio Broadcasts” will discuss a technology that provides a different way for a radio broadcaster to interview celebrities and personalities from venues.

Beth Tepper, a marketing and promotions exec at Premiere Networks, and John Antanaitis, a product marketer for the video division of Polycom, will show a system in which local talent appear on a video monitor at the venue, while a camera and microphone capture the guest responding to questions from the radio talent. The result is a two-pane video live interview streamed on the station’s website.

Setup of equipment is straightforward and requires minimal technical expertise of one person.

“Premiere’s agreement with Polycom provides stations with two innovative offerings,” Tepper said.

“First, stations are provided video-link access,

which allows them to participate in remote events from their home studio via Polycom’s telepresence technology. Second, both on-site and video-link stations are offered video content acquisition capabilities, whereby remote interview content is recorded and made available for them to use on websites, social media, etc.” It’s a turnkey system implemented on the station end, with support by Polycom.

“This technology provides stations with exclusive content featuring relevant artists talking to their local personalities, which has the opportunity to be monetized,” Tepper said.

The presentation is part of Sunday morning’s Broadcast Engineering Conference sessions on “The Future of Radio Broadcasting.”

— Tom Osenkowsky



The system was used in Premiere’s radio remote broadcast before the 44th Annual CMA Awards. Taylor Swift is being interviewed; she views station talent on a monitor with a picture-in-picture of her on-screen appearance. Joe Boxer of WMZQ(FM) is on the screen.

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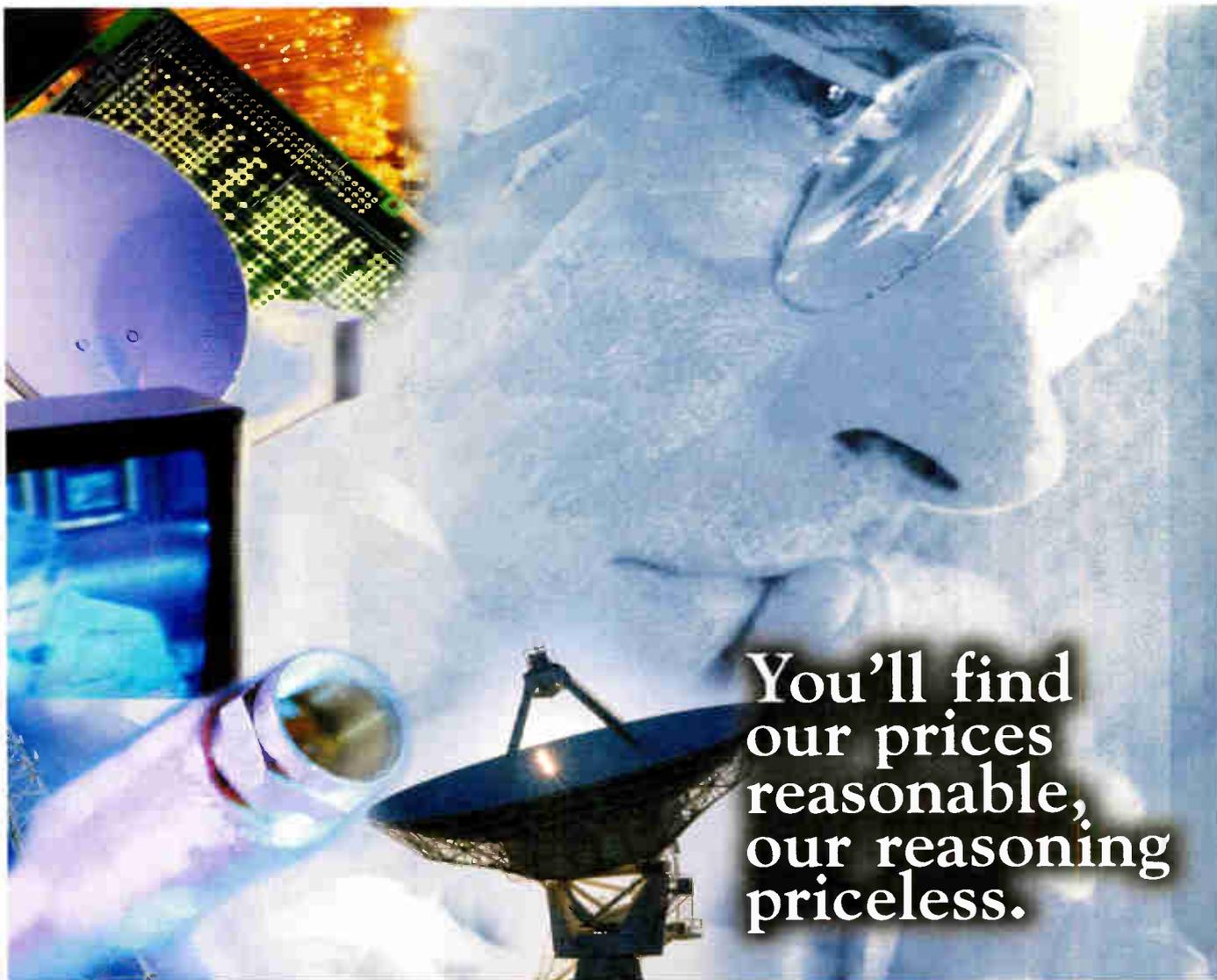


sion." Install these units to make a real difference in the reception of HD and other MPEG4 or DVB-S2 satellite channels. Internal circuitry has been completely redesigned for reduced power draw, so that indoor receivers and power supplies will never be overtaxed. In order to prevent signal outages, when outdoor temperatures fluctuate, DAWNco's best LNBs feature a highly stable +/- 5 KHz rating.

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PSD Task Force Explains Its Work

Session Explains a Standardized Method For Radio Program Service Data Distribution

BY THOMAS OSENKOWSKY

Radio is no longer just an audio service. Audiences employ new technologies such as portable media players, podcasts, web streaming and mobile devices. These devices support text and visual information that the audience now expects.

RBDS and HD Radio support Program Service Data, which allows synchronized metadata to accompany aural program material. PSD formerly was known as Program-Associated Data, or PAD.

The NAB presentation "A Standardized Method for Program Service Data Distribution" addresses a two-year effort

of the PSD Task Force of the iBiquity Public Radio Advisory Board to develop a flexible standard for metadata packaging.

Bruce Wahl, senior solutions architect of NPR Distribution, and Dan Mansergh,

data entry. This task can be automated, a benefit for stored programming.

The proposed PSD standard has the following system requirements: A multitude of program formats such as news, talk, local or long-form music must be supported. The data platform must be agnostic as to distribution platform (satel-



...but don't make problems. There are plenty of them to go around. And Henry is there to help you get them solved.

SixMix: USB Broadcast Console is a full-featured professional radio station audio mixer. It's designed for live broadcasting as well as recording, editing, remotes, and other production tasks.

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Multiphones II: Multi-user distributed headphones system with Zoned Talk-back. Multiple "Guest Pod" listening stations can be daisy-chained with cat5 cable.

Minipods: Compact stereo headphone amplifier for single or multi-listener systems. Use with or without MultiPhones II master unit.

The Matchbox HD: Rack-mountable Matchbox HD is the new high performance version of the industry's most popular analog level and impedance converter.

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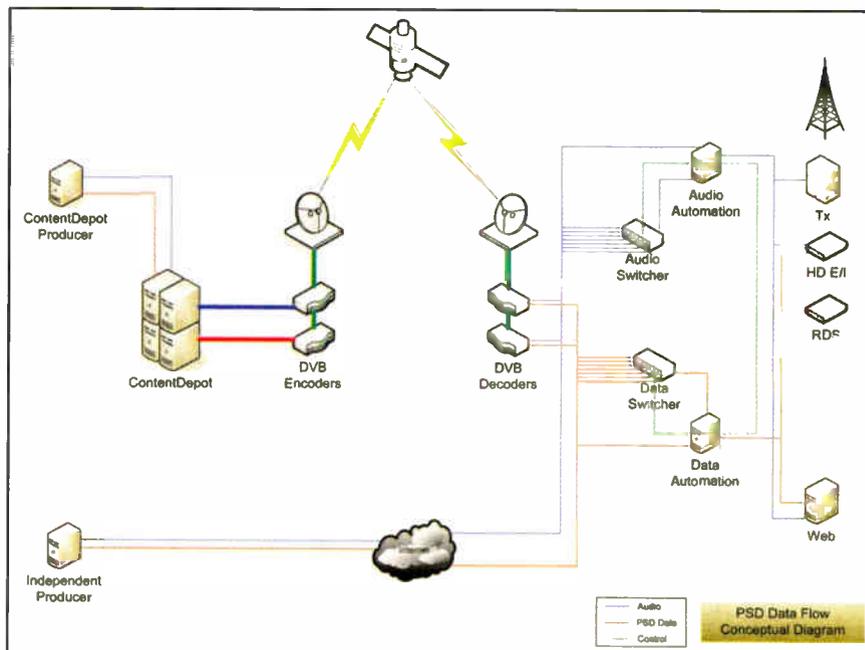
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This PSD Data Flow Conceptual Diagram shows paths for audio, control and data from and to various sources and destinations.

director of engineering for KQED Public Radio, will discuss how a PSD packaging standard will allow stations to embrace the ability to provide semi-automated accompanying text with aural program material. Their talk is part of Sunday afternoon's NAB sessions on "Improving HD Radio."

PROPOSED REVISION

PSD is particularly important to broadcasters who air long-form news and talk programming. One of the challenges facing these programs is the need to aggregate and enter metadata for each program manually. By establishing a standard, program suppliers, automation system vendors and broadcasters are relieved of the necessity for manual

lite, Internet, live), and flexible to support future fields and data types. A single data package must support data requirements of HD, RBDS and web/app streaming and provide a consistent ingest interface to producers while preserving as much compatibility with existing program distribution architecture as possible.

The proposed standard is XML-based. Two shortcomings in the present system are resolved in the proposed revision: The currently defined set of fields does not provide for more than one PSD data set per segment file, and the number of fields needed has increased since the specification was drafted. Shown is a PSD Data Flow Conceptual Diagram showing paths for audio, control and data from/to various sources and destinations.

OLD BETSY WOULD BE PROUD

Amateur radio operators and assorted other door-prize hounds will line up once again to get into the Amateur Radio Operators Reception.

The event starts at 6 p.m. on Wednesday evening of the NAB Show, in Ballroom B of the Las Vegas Hilton. It's sponsored by Heil Sound, Broadcast Supply Worldwide and Turner Engineering.

No doubt the ghost of Hiram Percy Maxim, 1AW, co-founder of the American Radio Relay League, will be there, hoping someone pulls his name out of the door prize bowl (though he won't have Old Betsy with him; the rotary spark-gap transmitter remains safely on display at ARRL headquarters).



istockphoto/royal register

59%

of teenagers consider the wretched audio quality of their favorite tunes coming through most streaming websites, tinny laptop speakers or poorly encoded MP3s as "good enough".

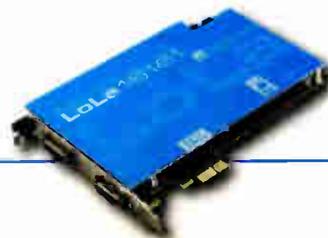
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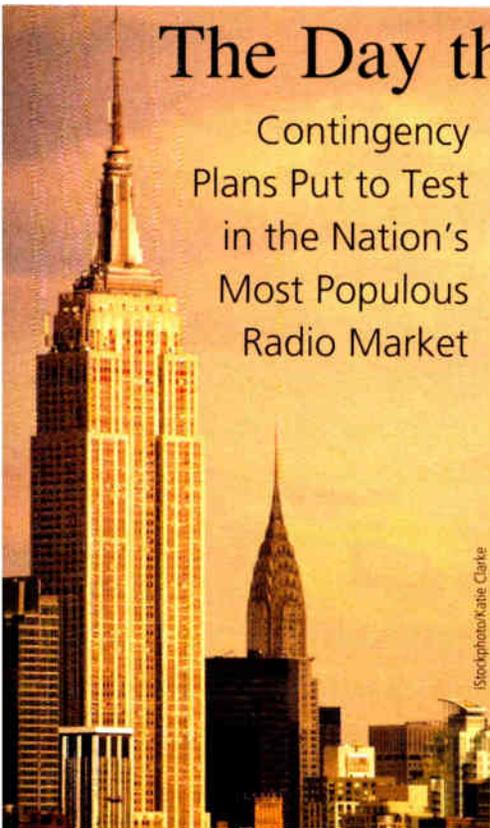


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The Day the Empire Master FM Failed

Contingency Plans Put to Test in the Nation's Most Populous Radio Market



power dividers at the top of the iconic building. The damage included a burned transmission line and a burned power divider with holes in the sidewall and output port.

"Now, in 20/20 hindsight, anyone could say, 'Why didn't you have a spare power divider?' Well, you know we never thought of that, because antenna power dividers usually don't fail," Giardina said — which is exactly one of the lessons he hopes to impart.

The current master FM antenna was

were able to do that once we were able to inspect the antenna, and make sure the damage was on to the lower bay.

"Because of restrictions and the uniqueness of the Empire State Building and its observation decks, we couldn't just go up on the tower at 5:45 p.m. and start doing inspections. I had to coordinate 19 FMs, plus all the TV stations in New York, all had to agree to go off

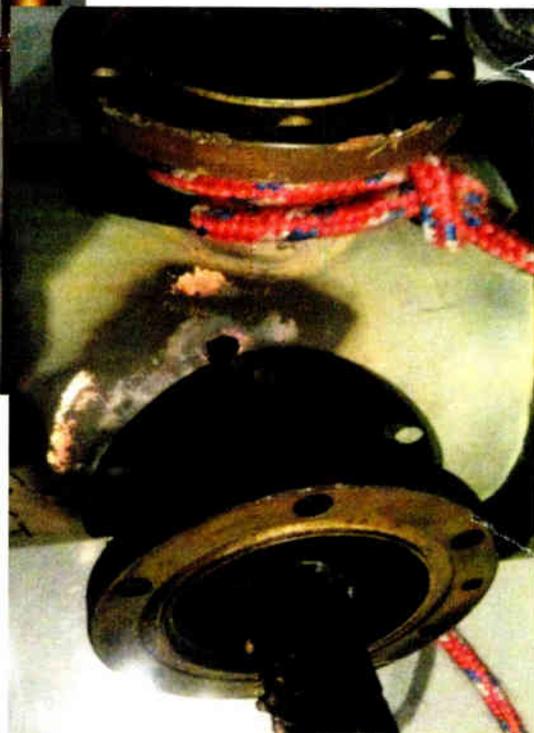
focus on how to prepare and develop contingency plans for a variety of situations. In the case of the power divider failure, Giardina was able to mitigate many of the problems with the repair, by



Photos above and below reveal the damage to the power divider.



The center aisle in Empire's Master FM room.



BY LAURA MIR

When the master FM antenna failed at the Empire State Building in midtown Manhattan on Monday, Oct. 18, 2010, it put 19 FM stations off the air.

Joe Giardina, CEO/CTO of DSI RF Systems, was in charge of restoring service to the antenna. His company of engineers, designers and certified tower climbers, based in nearby Somerset, N.J., manages the combiner room and antenna at Empire.

"I was in Rome when this failed. My guys were on the tower and were able to take photos and e-mail them to me in Rome. I was able to look at the damage and advise them what to do, in advance of my arriving back in the country the next day, to figure out what we were going to do to repair this."

He'll talk about the logistics of this case study at the NAB Show, discussing circumstances surrounding the failure and the importance of station backups and contingency/disaster recovery plans.

What Giardina is trying to get across to people, he says, is that this type of failure "just happens, and there is nothing you can really do to prevent this. But once it did happen, we had a logistical plan in place that allowed us to get back on the air very quickly."

NIGHT SHIFT

Giardina says that in the bustle of keeping stations serving the nation's largest market on the air, he often forgets that what he does and the challenges he faces may be of interest to other engineers around the country.

The October failure affected the

What could have been a catastrophe from a logistics point of view operated quite smoothly.

— Joe Giardina

made custom by Electronic Research Inc. and installed in 1994. There were no off-the-shelf parts available. Once DSI engineers determined that the problem could not be solved on site, two people rushed the damaged units to ERI in Chandler, Ind., for repair. In the meantime, Giardina and his crew were prepared to handle getting transmissions back on the air.

"There was a plan in place to switch to the upper bay of the antenna and run at reduced power to stay on the air, and we

the air at 12 a.m. so that we could do work. That (off-air) plan was in place. So what could have been a catastrophe from a logistics point of view operated quite smoothly."

At midnight, as Monday night turned into Tuesday morning, all broadcasting ceased from Empire. The stations had the choice to shut down operations for overnight hours or transfer broadcasts to a backup. For most of the broadcasters affected this meant transferring operations to 4 Times Square. DSI workers had from 12:01 a.m. to 4:42 a.m. to complete inspections and remove the damaged power divider.

When the repaired parts had completed their round trip from ERI two days later, the antenna was again shut down overnight so the crew could reinstall and test the power divider.

"We had 4-3/4 hours to do what takes most crews a day to do. We had six people in the tower doing two jobs simultaneously, getting done at literally 4:45 a.m. each day."

A portion of his presentation will

following well-laid plans.

"As part of your logistical plan, on a station level — and in this case on a master antenna level — make sure you have adequate backup. (In this case) we only manage the combiner room, we don't manage each individual station. Whether you had an onsite backup was meaningless, since you had an antenna failure."

Giardina's moral is to work on many levels to ensure you are covered in the case of a failure. This includes not only creating disaster plans, but training talented staff who can follow those plans.

Joe Giardina will present at the NAB Show on Wednesday, April 13 at 4 p.m.

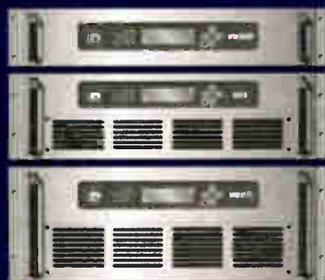
Laura Mir, CBNT, is a board member of SBE Chapter 37.

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NAB Flies Deeper Into the Cloud

Cloud Computing Gets an Expanded Look
At the Broadcast Engineering Conference

BY TOM VERNON

One of the emerging technical trends to be discussed at the 2011 Broadcast Engineering Conference is cloud computing. It is a term new to many broadcasters, though the technology has been

accomplish with your own computer. All of your information lives on a server farm.

Cloud users need not be concerned with the location of applications or data; they only need a computer with Internet access. This gives users the advantage of "anywhere/anytime" access to informa-

Advantages

- Economies of scale through volume operations
 - No facility
 - No maintenance
 - Upgrades (apps/servers stay current!)
- Pay-per-use via utility charging
- Focus on core activities while outsourcing those that are not core

As A.J. Janitschek of Radio Free Asia explained in a presentation at last year's NAB Show, cloud computing offers several advantages. But it is not without risk and other downsides.

developing for some time and has been discussed at recent past conventions. The cloud gets an expanded look this year.

Basically cloud computing involves using the Internet for tasks you usually

tion with a device as simple as a netbook. Anyone using Google Gmail is involved with cloud computing.

For businesses, the advantage is that the computing infrastructure can be

outsourced, leaving them free to focus on core competencies. The bottom line is higher efficiency with lower cost. Broadcasters gain the advantage of having access to applications and services they otherwise could not afford.

DELIVERY

Cloud computing usually is delivered in one of three ways: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

With SaaS, vendors license applications to customers for use on-demand. GoogleApps is one such service.

With PaaS, the provider delivers a computing platform where users can develop, test, deploy, host and maintain applications in the same integrated environment. Two examples are BungeeLabs and Microsoft Azure.

Infrastructure as a Service involves the buyer using the service provider's equipment. The vendor provides the client with virtual machines and storage. With IaaS, users may realize an economy of scale through volume operations. There is no IT facility or maintenance; applications and servers stay current. Operating costs are reduced through pay-per-use, and stations can focus on the core activities of broadcasting while outsourcing IT operations.

RETHINK

Adopting cloud computing demands a complete rethink of the design, operation and planning of a station's data center.

A traditional project would involve

'CLOUD-BASED TECHNOLOGIES FOR BROADCAST'

A Monday morning group of sessions, chaired by Greg DePriest, vice president of technology policy for NBC Universal, explores the topic of the cloud at the NAB Show.

Al Kovalick of Avid will address "Planning for the Cloud: Essential Concepts and Applications for the Media Facility." John Hoehn of IBM Media and Entertainment will ask, "Does Cloud Computing Matter? Or, Is There a Cloud in Your Future?" And Todd Martin and William Hender of Chyron will offer a video-oriented presentation on how "Cloud-Based Graphics Creation Offers Broadcasters Lofty Rewards."

Cloud-related presentations also are part of the sessions "Mission-Critical IT for Broadcast" Monday afternoon, the "Radio Engineering Forum" Tuesday afternoon and "Internet-Enabled Radio and Television" Wednesday afternoon.

planning space utilization with a 3D CAD program and using predictive analysis software to understand energy and cooling requirements. Add to this recent research that suggests power consumption increases of over 600 percent in seven years, and switching to cloud computing may be a lot cheaper than building your own data center.

While working in the cloud is new to many broadcasters, industries such as insurance, government, healthcare and financial services are on board. The city of Orlando reduced its IT costs by 60 percent using Google Apps. It was also one of the first cities to switch its employees to Gmail.

Among early adopters of this technology in radio broadcasting were NPR and Sirius Satellite Radio. Both are using Isilon's NAS (Network Attached Storage) for media storage. Both employ large numbers of media production workstations. NAS allows centralized storage of large amounts of media that can be accessed via the Internet at broadcast centers around the globe. In the case of NPR, Isilon also provides replication software for disaster recovery preparedness.

But getting aboard the cloud need not be a high-stakes game. Radio Free Asia is developing a private cloud to link their global operations using Ubuntu Enterprise Cloud. This is a Linux-based, open-source solution that is compatible

(continued on page 26)

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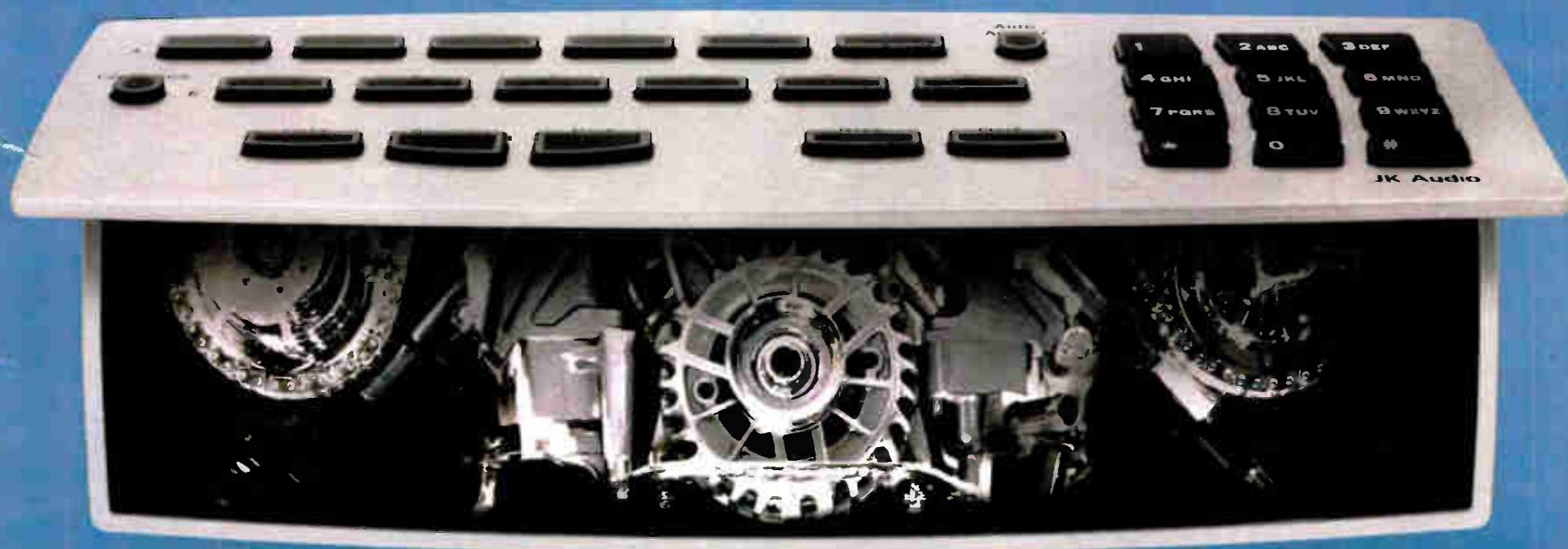
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Keep It Going in Challenging Times

SBE Ennes Program Reflects the Economic Realities Facing Engineers

BY FRED BAUMGARTNER

The author writes in his capacity with the Society of Broadcast Engineers.

The SBE Ennes Educational Series presents two types of live, full-day programs each year.

One is a traveling "road show." We've had them recently in Sacramento and Miami, and more are planned soon in Pittsburgh and New York.

For the 16th year, SBE also will present a full-day Ennes program at the National Association of Broadcasters spring show in Las Vegas.

The program, Saturday, April 9, is in conjunction with the Public Broadcasting Service. PBS/NPR programs start Wednesday prior to NAB; on Saturday those events join up with the SBE Ennes program, which is in turn part of the NAB Broadcast Engineering Conference.

The annual Ennes program at NAB is unique in that it is driven by the simple question, "What is it broadcast engineers most need to know this year?"

Review the program topics over the years and you'll receive a lesson in the history of technology driving our industry. In other years the program leaned toward deep-dives into basics. Years six and seven were focused on IT and the new Certified Broadcast Networking Technologist certification from SBE. Other years we looked at "everything" RF or audio.

UP TIME

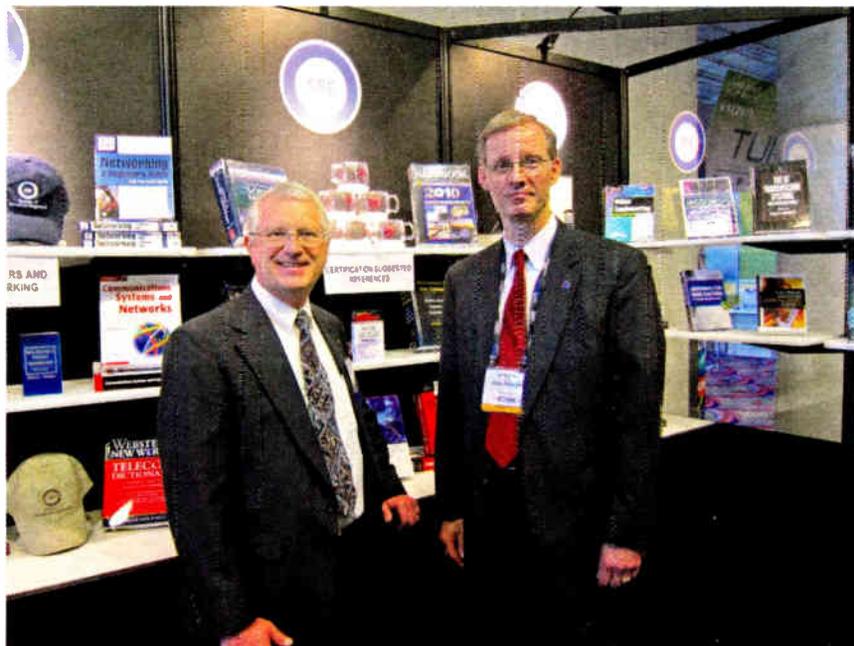
This is the first year that the dominant driving force has been not technology but economic reality.

Whether dealing with receivership, tight budgets or changing programming and ever-tighter workflows, most of us are focused more than ever on infrastructure.

One of the things that make broadcast engineering such a broad-ranging field is that we have incredible infrastructure to maintain and manage. From buildings, to generators, to studios, to NOCs and data centers, to towers in the clouds, few occupations demand such a wide skill set ... and that's before we mention broadcast skills.

As has been tradition, we start the day at 8 a.m. with a two-hour, back-to-basics tutorial.

Ronald Eligator of Acoustic Dimensions, Arthur Metzler of AMA Consulting Engineers, Neil Tucker of Design Republic and Stuart Reynolds of Diversified Systems provide a comprehensive seminar on designing, building



In the SBE booth, President John Poray, right, visits with Mark Persons, CPBE, a Radio World contributor.

and maintaining broadcast infrastructures, with an emphasis on dealing with the specialists and specialties involved, and most important the management of the projects and meeting timelines and budgets.

SBE General Counsel Chris Imlay, CBT, of Freret, Imlay & Tepper then addresses legal aspects of engineering that arise when a company is in bankruptcy and operating under business rules that are considerably different than "normal." Imlay knows broadcast engineers and what we deal with better than almost anyone in the legal field.

Well known in these pages is Tielinc Technology's John Bisset, who writes

CLOUD

(continued from page 24)

with Amazon's EC2 public cloud applications.

Some broadcast equipment manufacturers are putting the cloud to use. Broadcast Electronics' The Radio Experience was an early adopter of the technology, beginning six years ago with its Message Manager program.

"At first, stations didn't like the idea of having their data in the cloud," Jim Roberts, product manager for datacast systems at BE, said during NAB last year, "but eventually they warmed up to the concept."

At RCS, President/CEO Philippe Generali noted at last year's convention that two of the company's products, Mediabase and Media Monitors, use the cloud in order to make data about radio stations, music and advertising available to its customers in near-real time.

But every silver cloud has a dark lining. Issues that need to be considered include abuse and ill-intended use; insecure

piece, a little off-topic, on the practical realities of being a broadcast engineer in an information systems-based business. How does that redefine not just what we need to know and be proficient with, but how we work with others and structure our departments? This is something we think about a lot, but seldom discuss.

Dave Davies of Consolidated Engineering Inc. has been on the Ennes road show program for the last year, as

What is it broadcast engineers most need to know this year?

has Skip Erickson of Harris. This isn't the first time we've asked someone doing the road show to put together a special program for NAB.

In the case of Davies, it's about towers and what it takes to manage and maintain them intelligently. He'll talk about the "three Cs" of structural failure: causes, cost and cures. (On Friday, the PBS program has him covering more of the physical aspects of towers.)

In the case of Erickson, it's about disaster and the realities of recovering from the loss of your infrastructure, in a presentation titled "KREX: The Real World of Disaster Recovery."

We're talking minions, credit cards and the politics of coffee, crime scenes, regulations and real estate. In other words, these two presentations are anything but academic.

(continued on page 28)

application programming; malicious insiders; shared technology vulnerabilities; data loss and leakage; account service and data hijacking and unknown risk profiles. Bandwidth limitations may prevent moving large media files in and out of the cloud quickly. More intangible concerns with the cloud include loss of control as well as trust issues around security and privacy.

Some of these intangibles can be addressed by using a hybrid model with a private cloud built within the company's firewall to provide greater data security. Less-sensitive materials may be outsourced to the public cloud.

Cloud computing offers broadcasters freedom from the traditional constraints of operating from a single geographic location. Content is available anywhere there is Internet access. It remains to be seen how quickly the required high bandwidth can become universally available.

While cloud computing is in its infancy in the broadcast arena, the potential benefits, especially financial, may have managers asking not whether they can afford cloud computing, but whether they can afford not to have it.

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SBE

(continued from page 26)

Power is always a critical need. William Havrilla of Bay City Electric Works will take us through the process of giving our power systems their maximum life and reliability. As power systems become more intelligent, we have more opportunity to know the health of our systems and exercise and maintenance routines.

Texas A&M's Wayne M. Pecena, CPBE, 8-VSB, AMD, DRB, CBNT, has agreed to close out the day with a presentation about something broadcast engineers definitely need to be aware of: the transition to IPv6.

Maintaining our IT infrastructure means facing IPv6. As much fun as NATs are, the limitations of IPv4 addressing, from QOS, to multicast, to maintaining IPsec from end to end, are pushing our infrastructure to the limits. Twelve years into the standards track and by NAB time, the last top-level block of IPv4 addresses will have been released. IPv6 is widely adopted on commercial networks and moving closer.

Attendance requires full NAB registration or PBS/NPR program access. SBE members receive the rate of \$595 by registering using the special NAB Partner rate. Registrations can be made at www.nabshow.com.

COME TO THE BOOTH

In addition to the Ennes Workshop, SBE will have a booth and hold several meetings and events at NAB.

On Saturday are the Frequency Coordination Committee Meeting

(closed) and Certification Committee Meeting (partially closed). On Sunday the society's board of directors meets, as does the Education Committee. Tuesday brings certification exams and a frequency coordinators' meeting; Wednesday is SBE's EAS meeting.

A highlight will be the spring Membership Meeting on Tuesday, April 12 at 5 p.m. We will recognize a number of local chapter certification chairs for service and three Sustaining Member companies for having been members of the SBE for 25 years. Prizes will be given away to several winners.

The society's booth will be on the second floor concourse of the Las Vegas Convention Center South Hall, Lobby Booth 29. The location is up the escalator from the South Hall main entrance and just outside the entry to the exhibits on the second floor, as in recent years. BEC technical sessions will be nearby in the South Hall second-floor meeting rooms.

The booth will offer SBE-published handbooks, technical books from major publishers and the SBE CertPreview. There also will be several society logo items for sale. Membership renewals and new memberships may be transacted at the booth. Staff and national board members will be there to answer questions about membership, certification, educational programs and regulatory issues. Booth hours are Sunday from 2 to 4 p.m. and then generally tracking exhibit floor hours the rest of the week.

Fred Baumgartner, CPBE, CBNT, is with the Ennes Educational Foundation Trust and Harris Broadcast.

A BROADCAST ENGINEERING CONFERENCE SAMPLER

Stories in surrounding pages explore selected radio sessions; here's a further sampling. The BEC agenda also includes the impact of various consumer devices; Internet-enabled radio and TV; the outlook for mobile DTV; and other topics.

The Future of Radio Broadcasting (Sunday AM)

"Next Generation of Radio Content Collection & Delivery Tools"
Pierre Robidoux, CBC/Radio-Canada

"Media on the Move: From Applets to Craplets"
Andrew Janitschek, Radio Free Asia

"Migrating Radio Call-in Talk Shows to Wideband Audio"
Tom Hartnett, Comrex

"The Impact of Consumer Devices on Radio Content Development & Engineering"
Chip Jellison, RCS

Improving HD Radio (Sunday PM)

"PAPR and Asymmetrical Sidebands Field Results: HD Radio Coverage Technologies"
Nautel, WAMU(FM) and National Public Radio

"New Developments in Master FM Antenna Systems"
Keith Pelletier, Dielectric Communications

"Decision Points and Implementation Considerations for Elevated HD Radio Power"
Brian Lindemann, Broadcast Electronics

"Using the IBOC Quality Metric to Optimize the Transmission System for HD Radio Reception"
Brian Walker, Nautel

Mission-Critical IT for Broadcast (Monday PM)

"XML, WSDL, SOAP, SOA and REST: A Decoder Ring for the Broadcast Engineer"
Paul Turner, Omneon/Harmonic Inc.

"10 Gigabit Networking for Audio and Video"
Stephen Lampen, Belden

"When Simple Isn't That Simple: Using SNMP in Broadcast Facility Control"
Tony Peterle, WorldCast Systems Inc.

"Techniques for Integrating Audio Over IP with Program Automation"
Bryan Jones, Broadcast Electronics

Radio Engineering Forum I & II (Tuesday all day)

"AM Directional Antenna Pattern Performance Improvement Using Power Dissipation Within the Phasing and Coupling System"
Ronald Rackley, du Treil, Lundin & Rackley, Inc.

"Test and Evaluation of an AM Directional Antenna Tower Base Voltage Sampling System and MOM Proof Methodology for the WAOK Radio Array Utilizing a Mix of Guyed

and Self-Supported Towers"
Tom King, Kintronic Labs

"Building an AM Array on a Landfill"
Gary Smith, Bonneville Phoenix

"Field Trials of Digital Radio Technologies: DAB, DAB+, T-DMB Audio, HD Radio and DRM+"
Yong-Tae Lee, ETRI

"Performance Analysis and Field Measurements With the Digital Radio Broadcasting Standard DRM+"
Jens Schroeder, Rfmondial

"Get the Most Out of Your Tower: Effectively Using Design Codes to Your Advantage"
Dave Davies, ERI - Electronics Research, Inc

"Full Duplex for Your RPU Adds IFB"
Bill Ruck, Broadcast Engineer

"A New Approach to Solid-State High-Power FM Amplifiers"
George Cabrera and Tim Anderson, Harris

Emergency Operations — Planning & Implementation (Wednesday PM)

"Case Histories in Lightning Protection and Grounding"
David Brender, Copper Development Association Inc.

"Keeping the Lights On - Business Continuity Planning for the 21st Century"
Keith Graham, AZCAR Inc.

"Implementation of N+1 Technology for Improved Cost Efficiency While Maintaining Service Integrity"
Wendell Lonergan, Nautel

RDS Implementation (Wednesday PM)

"Maximizing the Potential of the RDS Bandwidth"
Tony Peterle, WorldCast Systems Inc.

"Understanding and Optimizing RDS for a New Generation of Receivers"
Alan Jurison, Citadel Broadcasting/Radio World

"The Latest RDS/HD Datacasting Trends & Developments"
Jim Roberts, The Radio Experience

Green Technology (Thursday AM)

"Going Green and Seeing Black: Mainstreaming Green Technology Into Broadcast Engineering and Programming"
Tom Vernon, Radio World, Ashleigh Elson, Radio Netherlands Worldwide, Brad Hockmeyer, KTAO, Gary Cafe, Broadcast Australia Energy Systems, Jamie Field, Entercom

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What to Do When the Inspector Knocks

Jim Dalke Helps Radio Stations
Figure Out Whether They're Ready

BY LAURA MIR

From the beginnings of AM spectrum management to the complex and legalistic FCC rules of today, Jim Dalke takes engineers through the history of broadcast regulation and how they can navigate the complex system so that their facilities are compliant should an inspector come knocking.

Dalke, CPBE, AMD, 8-VSB, is a contract engineer with Dalke Broadcast Services and editor of Waveguide, a publication of SBE Seattle Chapter 16. He will present "When the Inspector Comes Knocking" at the NAB Show on Wednesday, April 13.

"I want to go back and talk a bit about the history as it developed from the '20s through the beginning of the inspection process, how that began with the Communications Act of 1934, and bring as much organization to it as is possible."

He has seen firsthand the difficulties and errors that many stations face in complying with FCC regulations,

through his work as both a contract engineer and an inspector for the Alternative Broadcast Inspection Program of the Washington State Association of Broadcasters.

Simply stated, compliance "takes a lot of discipline."

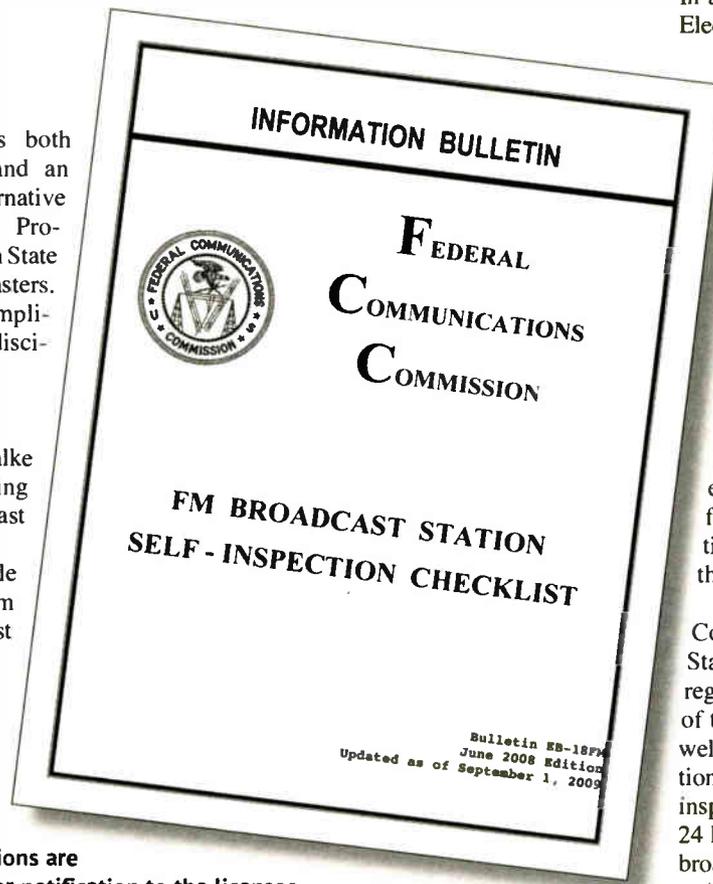
EARLY CONCERN

In his research Dalke came across an interesting comment about broadcast regulations.

"One of the people to popularize the term 'radio' was Lee de Forest

The Enforcement Bureau of the FCC publishes a checklist to help licensees comply with broadcast regulations.

Most on-scene inspections are conducted without prior notification to the licensee.



when he incorporated the De Forest Radio Telephone Company," Dalke said. In a letter in the June 22, 1907, issue of Electrical World magazine, de Forest warned that radio chaos would result unless stringent government oversight regulation was enforced.

"It kind of surprised me that the concern about it (regulations) went back that far. The point was that this led to the eventual establishment of the FCC in 1934. When they established that and gave the FCC the license process, they also gave the FCC some very extensive inspection capabilities to make sure that everybody that was licensed — AM radio, primarily, and eventually FM and TV — was carefully regulated. And with the regulation came their authority to perform these inspections."

The Federal Communications Commission, an agency of the United States government, is charged with regulating non-federal government use of the radio spectrum, including TV, as well as other interstate telecommunications. The FCC has broad authority to inspect stations; it can go to any licensee 24 hours a day and inspect any part of a broadcast facility.

"When I've gone in to do my inspec-

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Jim Dalke

itions, it occurred to me that people just don't fully comprehend the inspection process itself," Dalke says.

The single biggest issue in compliance involves the public file.

"Many stations are putting copies of their public files online; there are pros and cons to this. There is a lot of stuff in the public file that the FCC says the public has the right to know, but on the other hand the stations may choose not to make it *too* available."

Broadcasters should supply nothing more than required while definitely providing nothing less.

Though proposals to require stations to post public files online have been debated, this remains a station decision at present, many choose not to do so for a number of reasons. Some stations furnish an electronic copy only on their intranet, with a simple computer terminal at the studio for public access, or choose to release only parts of the complete file on the public Internet.

Dalke tells clients problems also can arise when a station puts *too much* information into the public file. Broadcasters should supply nothing more than required while definitely providing nothing less.

These are the types of compliance areas where stations may need more

guidance. Failure to follow the rules correctly can cost a station thousands of dollars in fines.

IN THE LOOP

"The public file is interesting in that technically engineers are not responsible for it, yet many engineers end up in this inspection loop," Dalke said. However, it is the chief operator's job to make sure the file is complete; and since many engineers also serve as chief operator, they should educate themselves on the process of maintaining the public file correctly.

Alternatively, Dalke says, they should enlist a certified inspector to ease the learning curve. Further, if a station has used an inspector from the Alternative Broadcast Inspection Program to complete the FCC's Broadcast Station Checklist, the commission is less likely to make unannounced visits, he said.

At NAB he'll also discuss the next generation of the Emergency Alert System and the Common Alerting Protocol. CAP is an open, interoperable, data interchange format for collecting and distributing emergency warnings. "The CAP systems add a whole other

layer of responsibility for the station," Dalke notes.

The ECIG Implementation Guide from the EAS-CAP Industry Group is one of the tools available to guide stations in this area. The guide is intended to facilitate the effective use and translation of CAP for broadcast EAS. The FCC is responsible for ensuring that communications providers have the capability to transmit and receive emergency alerts. As Radio World readers are aware, many broadcasters may need to replace EAS encoders/decoders or upgrade to meet the FCC mandate.

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Quality Engineering on a Tight Budget

Randy Woods Explores How IT-centric Best Practices Can Be Employed in Radio

BY THOMAS R. MCGINLEY

In an era when lots of engineers have left our industry and migrated into full-time careers in IT, Randy Woods is a reverse exception.

Woods spent more than 10 years working as an IT specialist in banking and other businesses before discovering radio engineering a decade ago. He is director of engineering for Central Florida Educational Foundation's Z88.3 and its noncommercial Christian radio stations WPOZ(FM), WMYZ(FM) and WHYZ(FM), as well as translator stations, serving Orlando and Central Florida.

Having worked in an industry that embraced computer network-based technologies long before broadcasting did, Woods brings a wealth of new perspective and creative problem-solving ideas to his NAB 2011 Broadcast Engineering Conference session. But he does so with a keen focus on efficiency and cost savings at the same time.

"Many of the IT practices that I was

involved in a decade ago are just starting to come into common use in broadcasting," he said.

"That is great news for us, as we can learn from the past, benefit financially from the commodity status of the IT world and implement cost-effective systems and techniques in the current budget-restrained radio industry."

ECONOMICAL POWER

Setting up reliable redundancy for standby and off-site emergency backup computer systems is one of the areas where Woods has made big improvements at his and other stations.

"We can put in the technology that will make our stations better and we don't have to pay for the first and second generation of R&D for these systems. We can get them for almost nothing in many cases. The same equipment that I installed in large bank data centers, that was state of the art at the time and cost \$50K, I am now installing into my radio station for \$1,000 or less."

Woods will discuss details of some of the systems he's installed and where he bought them.

"Yes, our station would not be what it is today if it were not for eBay," said Woods, revealing an increasingly

into the core without a router isolating them. That has a number of disadvantages which we need to review to make the case for using only routed systems."

Quality of Service is an IT process that is managed carefully and extensively by IT pros in many enterprises where consolidated data services

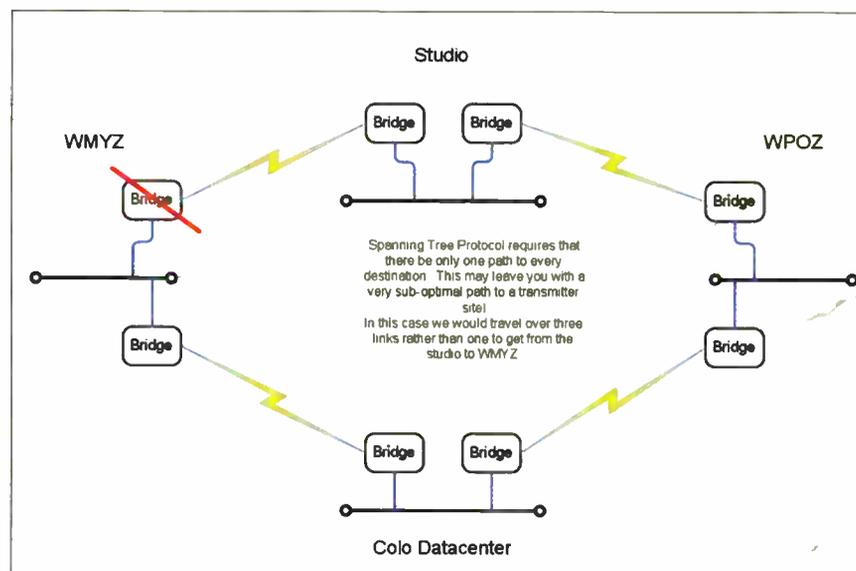


Fig. 1: An example of how bridge-based network redundancy falls short.

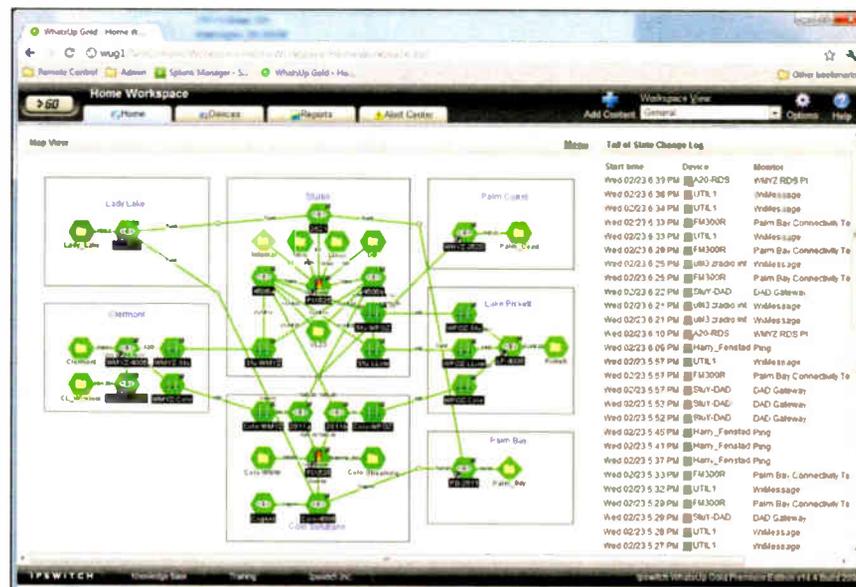


Fig. 2: This view of Z88.3's Network Management System shows the status of every monitored device at a glance. 'Green is good,' Randy Woods says. 'Anything else, dig deeper to find the root cause. Historical event logs are on the right.'

valuable resource more engineers are discovering and using.

Data and LAN/WAN connectivity to transmitter sites increasingly is becoming necessary and even critical for most stations. Often, the only options are wireless links, which Woods says have a higher potential for failure.

"IT best practices of the past will tell us that we should use routers, rather than bridges, to connect telco-based and wireless WAN links. In radio, the wireless links are natively bridges, so commonly they are installed directly

are mission-critical. Yet QoS rarely is managed in radio applications.

"QoS is a relatively complex system of classifying, prioritizing and queuing data. It is implemented differently by every equipment vendor, and it is also commonly different from model to model within the same vendor," he said.

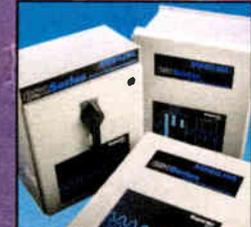
"For the average radio engineer, it is outside of their skill set, and will probably stay there. For a skilled IT person, it is great fun! To master every packet and tell it where to go and when to go is thrilling for an IT pro."

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TECH LUNCHEON WILL SALUTE DU TREIL

L. Robert du Treil will receive the NAB Radio Engineering Achievement Award for lifelong dedication to the industry. His work of 50 years in the business has involved all aspects of AM, FM and television allocations.

The NAB Technology Luncheon also will feature an address by technologist/author Steven Berlin Johnson as well as the presentation of the Technology Innovation Award for advanced technology exhibits and demonstrations at the show. Thomas B. Keller



will be awarded the Television Engineering Achievement Award. The NAB Best Paper Award also will be presented; that award was launched in 2010.

For du Treil, broadcast engineering is a family matter. His father L.J.N. du Treil was a broadcast engineer with the Marconi Wireless Telegraph Co. and the Federal Radio Commission who later started his own consulting business. We'll have more on his career next issue.

Keller will be recognized for achievements in five decades of service as well. Keller served as president of NAB's Science and Technology

department in the 1980s, playing a role in establishing the ATSC, and supervised the Advanced Television Terrestrial Broadcast Project, which gave demonstrations for the FCC and Congress on the capabilities of early HDTV technologies.

He is president of the technology consulting firm T. Keller Corp., which NAB said has led development efforts in broadcast equipment and practices. He engineered an early electronic field production program for network release and produced a computerized captioning system for the hearing-impaired. Keller is a senior member of the Broadcast Technology Society of the IEEE and is a Lifetime Fellow of the SMPTE.

Woods will describe a few areas and applications in our business where more active management of QoS can provide important benefits.

Remote control and monitoring is a critical component in broadcast operations to ensure that critical systems stay up and on the air.

"About 12 years ago, I managed a group of people that monitored the IT systems in about 500 bank branches and data centers. The only way that it was possible was through the use of a standard called Simple Network Management Protocol, or SNMP. When I came into radio 10 years ago, there was no SNMP-based monitoring system for radio."

Nowadays more broadcast companies are using SNMP.

"I'll show you examples of how I have implemented SNMP into radio and how we did it relatively inexpensively. We installed an SNMP-based programmable logic controller into our emergency generators, replacing the multi-thousand-dollar controllers with a few-hundred-dollar controllers and again put spares on the shelf."

Beyond the tips and suggestions Woods will offer for improving IP-based operations in radio stations, he will delve into several other arenas ripe for improvement. Emergency generators and uninterruptible power supplies are two systems that must work when called upon but too often fail for various reasons.

"I will make several recommendations to increase the reliability of your generator systems, and we'll cover ways of making UPS's even more uninterruptible."

Commercial radio, Woods also notes, lives and dies by ratings.

"If your PPM encoding is not working, you are not being rated, no matter how much your listeners love your station. You *must* monitor your PPM encoding effectively." He will show how Z88.3 did this and took up less rack space and electricity doing it.

His presentation is part of the Tuesday afternoon "Radio Engineering Forum II."

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Alaska Test Cuts AM Power Costs

Thursday Sessions Also Include Discussion of 'Mainstreaming' Green Tech Into Broadcasting

BY TOM VERNON

When Chuck Lakaytis, director of engineering for Alaska Public Broadcasting Inc., saw energy bills for his half-dozen 10 kW AM rural transmitter sites jump to around 50 cents per kWh, he knew something had to be done. "We questioned whether we could afford to continue the AM service."

Lakaytis had an idea. He called his FCC attorneys as well as transmitter manufacturers Nautel and Harris. Soon, the commission had granted experimental authorization for APB's KOTZ and KDLG to use energy-saving modulation schemes not legally available to U.S. broadcasters.

His presentation "Dynamic Carrier Control," on Thursday morning at the NAB Broadcast Engineering Conference, describes his experiences with this green technology.

At KDLG in Billingham, Alaska Public Broadcasting installed a Nautel XR-12 with amplitude modulation companding, or AMC. In Kotzebue, a Harris DX-10 was installed at KOTZ. It uses dynamic amplitude modulation, or DAM.

Both of these systems were developed

in the early 1980s in response to rising energy costs in Europe. Amplitude Modulation Companding was developed by the BBC. Dynamic Amplitude

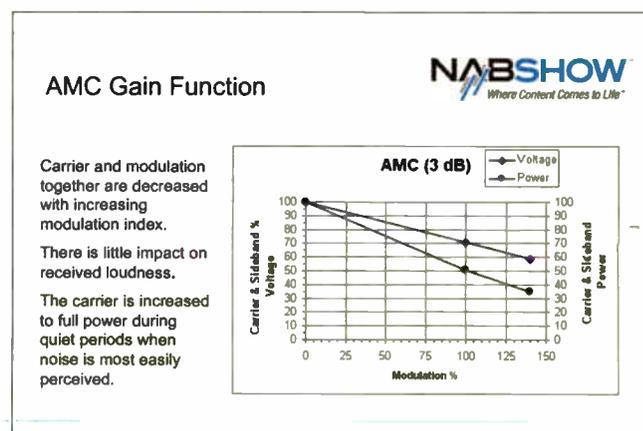
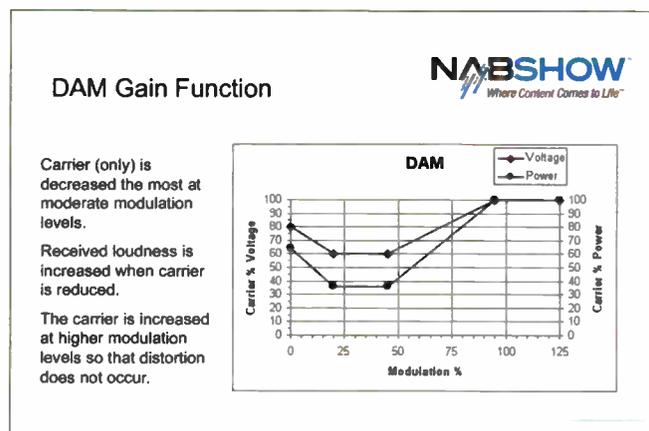
With DAM, the carrier is suppressed in relation to the modulation level. Both carrier and amplitude voltage are reduced in a linear fashion during low modulation, and increased at higher modulation levels.

AMC takes the opposite approach. The carrier is suppressed as modulation

Lakaytis said a two-month trial of AMC at KDLG showed a 27 percent reduction in electricity costs. "We may be able to get it up to 30 percent by tweaking the audio processor."

Several glitches and the severe Alaska winter delayed the installation of the DX-10 at KOTZ, so no data on energy savings were available at press time.

What surprised Lakaytis most was



These images are from a past presentation by Tim Hardy of Nautel about energy conservation in AM broadcast transmitters using carrier control algorithms.

Modulation was developed by AEG Telefunken.

Although both systems are accepted and deployed widely elsewhere, their operation is not allowed in the United States because they violate FCC rules on carrier shift and maintenance of licensed power levels.

increases, and then rises to 100 percent of signal level during lower modulation periods. Even though signal-to-noise is compromised with lower carrier levels during modulation, the theory is that the increased modulation will mask the increased noise level, so there will be no perceived difference.

the high audio quality. "It was no different than the old system." He adds that public radio listeners are a fussy group, yet there have been no complaints about audio quality or signal level. According to Lakaytis, it is also a bit disconcerting to see the transmitter's power output meter jumping from 60 to 100 percent.

The experiment has not gone unnoticed by other Alaska broadcasters. Lakaytis has fielded inquiries from engineers at some of the local 50 kW commercial stations about the success of the new systems and how they can get in on the action.

"It all depends on how quickly the FCC can take action and make a change in the rules," Lakaytis said.

OFFSETS AND CERTIFICATES

Also participating at the Broadcast Engineering Conference on NAB Thursday will be Val Fishman, senior business development representative for Bonneville Environmental Foundation, who will participate in the session "Going Green and Seeing Black: Mainstreaming Green Technology Into Broadcasting."

More businesses, including broadcasters, are seeking ways to reduce their carbon footprint. Fishman describes three ways by which stations can reduce their environmental impact: renewable energy certificates, or RECs; carbon offsets; and water restoration certificates, or WRCs.

RECs are used to offset the carbon emissions from the electricity a business uses. RECs represent renewable energy from sources such as wind, solar or

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biogas projects where clean energy has been directly delivered into the power grid to reduce carbon emissions from existing fossil-fueled power plants.

One REC represents the environmental benefits of 1-megawatt hour (MWh) of renewable electricity generated and delivered to the power grid. RECs are purchased from suppliers such as wind farms, solar plants and landfill gas facilities.

Questions are often asked about the effectiveness of renewable energy certificates. Do they really make a difference in reducing greenhouse gasses, or is it just good PR for the purchasers?

Fishman said Green-e, one of the leading certifiers, has a strict code of conduct and a thorough set of audit protocols.

"Any seller of Green-e certified products who violates Green-e protocols is notified by Green-e and their Green-e accreditation is revoked." She adds that Green-e consumer protections are enforced by consumer fraud law.

Fishman says that companies use carbon offsets to offset the carbon emissions from activities such as air travel, employee commuting and product shipping.

"Carbon offsets represent the capture and reduction of harmful greenhouse gases emitted from sources such as animal waste, landfills or refrigerants."

Types of carbon offsets include renewable energy projects and biogas projects that capture and flare methane gas from animal waste or landfills. A carbon offset represents the reduction of greenhouse gases equivalent to 1 metric ton of carbon dioxide (sold in units less than 1 metric ton and in units of pounds of CO₂e, or carbon dioxide equivalent).

WATER INCENTIVES

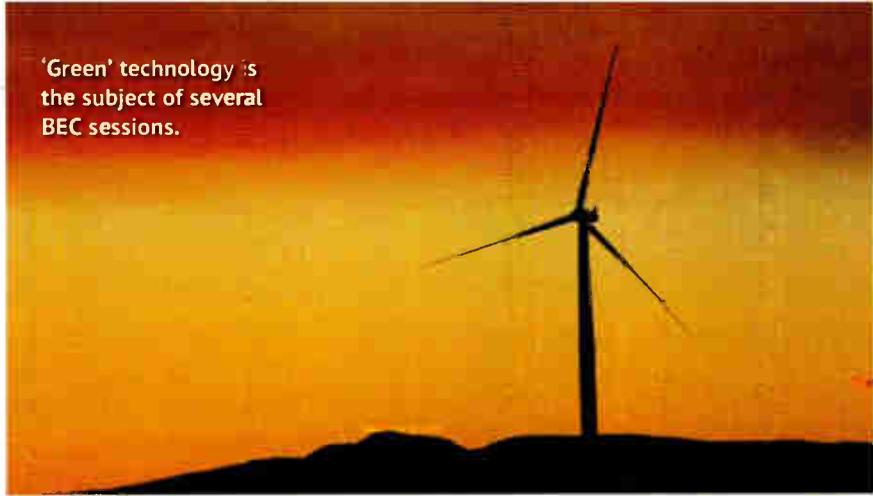
Fishman said a responsible water stewardship plan is a two-step process.

"First, conserve water in every way possible, including use of rainwater collection systems for non-drinking water uses, use of low-water plants and xeriscaping, and replacing single-pass cooling systems with closed-loop systems. Second, purchase WRCs as a way to take responsibility for the residual water footprint."

Water restoration certificates are an outgrowth of water laws in the western United States. In many areas, they mandate that water rights holders use their allotted water or risk forfeiting their water rights forever. These laws result in many streams running dry, particularly in late summer.

"WRCs are a voluntary, market-based program that create economic incentives from water rights holders to leave water in critically dewatered systems," Fishman said. Where there are new, progressive laws, water rights holders can restore water to rivers with-

'Green' technology is the subject of several BEC sessions.



Courtesy Bonneville Environmental Foundation

out forfeiting their valuable water rights. Each WRC represents 1,000 gallons of

water that BEF will return to critically dewatered rivers and streams through

supply contracts with local water trusts. Fishman emphasizes that not all RECs and carbon offsets are created equal. Consumers shopping for green solutions should check to see that they are certified by a leading independent certification organization such as Green-e Energy, Green-e Climate and The Climate Action Reserve. More stringent suppliers may also require that all RECs and carbon offsets meet environmental impact and siting criteria set up by independent environmental organizations such as the Natural Resources Defense Council.

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A 'Super Window' Is the Way to Go

A Simultaneous LPFM/Translator Competition Would Best Reflect the Intent of Congress

COMMENTARY

BY DON SCHELLHARDT

The author is a legislative and regulatory attorney. He also is president of the Amherst Alliance, a media reform advocacy group; in this article he writes only for himself.

Recently Congress and President Obama enacted the Local Community Radio Act, or LCRA. The new law wisely repealed previous statutory limits on adjacent-channel spacing of low-power FM stations, opening up new frequencies for such stations. It also set the stage for the FCC's latest exercise in managing spectrum scarcity.

In theory, the LCRA should make room for thousands of new LPFM stations. In practice, however, the FCC must first decide how to deal with the many thousands of translator applications filed in Auction No. 83 (aka "The Great Translator Invasion," or GTI).

NOT ENOUGH FREQUENCIES

The number of translator applications in Auction 83 was far beyond any precedent, although a handful of "evangelical" broadcasting chains accounted for many of them, filing literally thousands of applications apiece. Having various concerns, the commission has kept GTI applications "pending" for more than seven years.

One post-LCRA debate concerns whether the Great Translator Invasion applications should be processed before new LPFM applications are even considered.

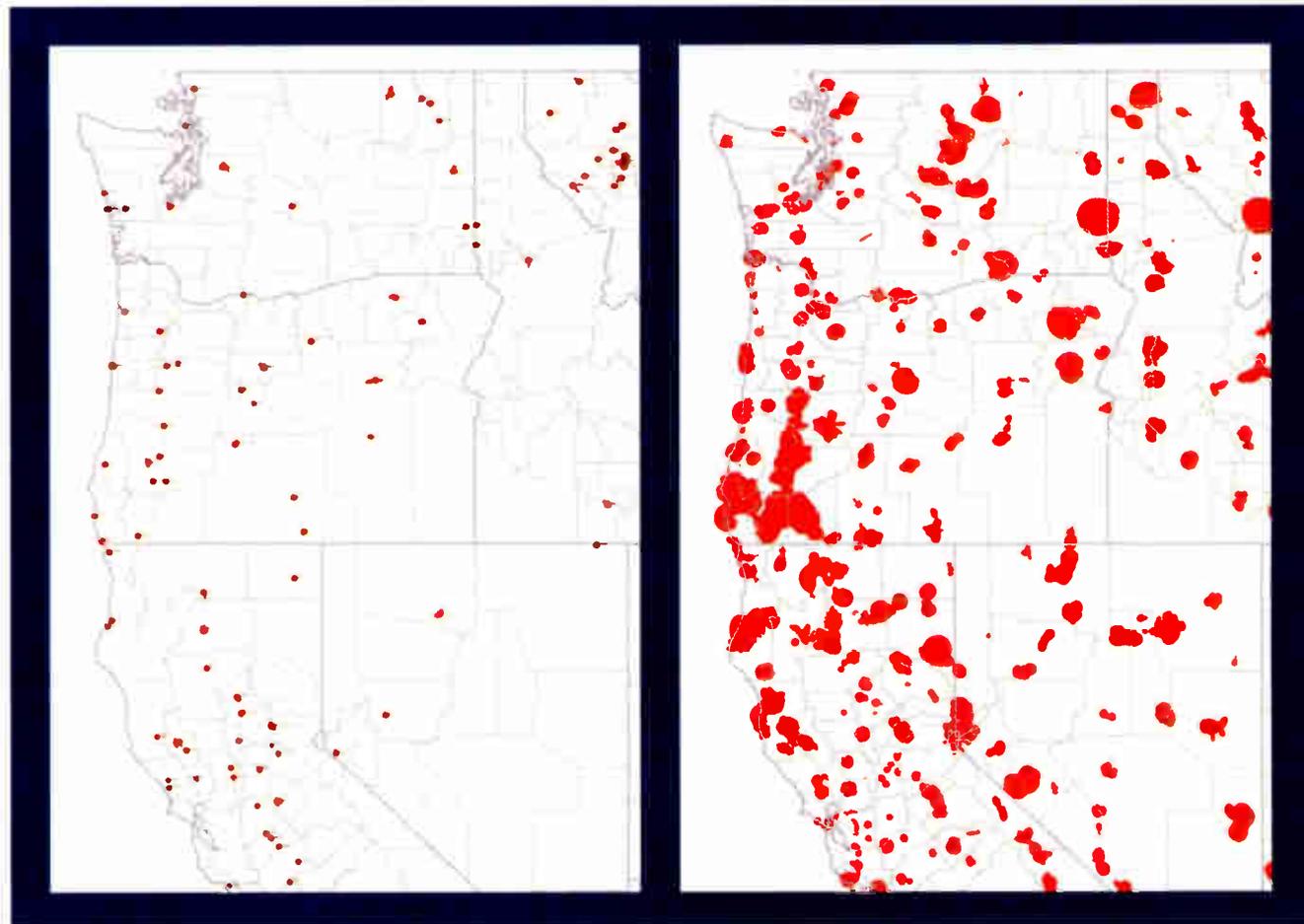
If they are, the translators will preempt all or virtually all of the remaining spectrum in many of the nation's metropolitan areas, leaving few if any frequencies to host LPFMs. Various

filings in FCC Docket 99-25 by the organization Common Frequency document that "capping" translator applications at 10 per entity would not prevent devastation of LPFM opportunities in many metropolitan areas. A Feb. 1 filing reports that even applying a cap of three applications per entity plus a cap of one application per entity per service area

LPFM advocacy group, has called for processing LPFMs first. Major translator chains, joined by 21 commercial radio broadcasters, have called for processing GTI applicants first, with minor concessions to LPFMs.

Basically, each interest group would assign the crumbs to the other side.

In January, Nick Leggett and I, speaking as co-authors of the 1997 petition for rulemaking that triggered FCC action on LPFM in 1998, filed written com-



Shown are portions of maps published by the Audio Division of the FCC Media Bureau in 2006. They show licensed LPFM station coverage, left, and licensed FM translator station coverage for the same geographical area of the Northwest.

would still leave more than 85 percent of metropolitan frequencies preempted.

This would occur at a time when existing translators already outnumber existing LPFMs by an order of magnitude. A huge imbalance in favor of translators would become even more massive.

Conversely, if LPFM applications are processed before GTI applications, thousands of aspiring LPFM broadcasters would be likely to apply. The frequencies left for GTI applicants could be minimal, at least in metropolitan areas.

In short, there aren't enough metropolitan frequencies left to go around. If either group is processed before the other one, the latecomer will be left with the metaphorical crumbs.

SIMULTANEOUS CONSIDERATION

In recent filings in 99-25, Prometheus Radio Project, the nation's largest

ments proposing a "super window" for simultaneous consideration of LPFM and GTI applications. We apparently startled everyone.

We had concluded that simultaneous consideration, with "pre-screening" of translators by applying numerical caps, is the best way to interpret Section 5 of the LCRA.

Section 5 is somewhat murky but includes a Section 5 (1) directive that the FCC "shall ensure that ... licenses are available" for new (presumably, post-enactment) LPFMs, translators and boosters.

Surely, this availability will not be "ensured" if GTI applicants are allowed to preempt virtually all urban spectrum before newcomers are even considered.

Section 5 (2) adds that "licensing decisions" for new stations shall be

(continued on page 60)

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GARRETT

(continued from page 56)

spots fun to do. His zest for radio makes everyone smile.”

There are six to eight stations in the market; Adventure Radio Group, owned by Triad Broadcasting, owns several, and many more signals can be heard out of Savannah.

“Our station covers Savannah as well, but there are enough people beating the streets over there,” Garrett says. He feels that even Hilton Head stations had left a gap for a “real local radio station for the South Carolina Low Country.”

Garrett laments that many radio companies have cut staff and are squeezing savings out of anything that doesn't holler.

“It's down to the bones now,” he said. “They have taken the heartbeat and the soul and the personality out of radio in every market that's not in the top 10. They have gutted these stations and made part-time weekend guys program directors, and I don't understand that. The owners have taken the community presence out of it because they don't have the people to do it anymore.”

Surely Garrett has something good to say about large radio groups?

“Well, they have a few good people left; so good for them and I wish those



Karen Cully says Joel Garrett's 'zest for radio makes everyone smile.'

people the best.” he said. “But we are proving here in Hilton Head that you don't have to get rid of all the people. You can have a full staff and still make money.” He acknowledges, however, that large companies “gave me the shot to get where I am today. That, I will always appreciate.”

While many stations large and small are making social networks and mobile devices an increasingly large part of their business model, Garrett takes the

opposite approach.

“We use the Internet primarily to stream our signal, but with our format I don't see a ton of listeners getting involved in the Internet side,” he said.

“You're talking to someone here who came from top 40; and when I was running that, we mostly had a Web page with a radio station attached to it.

to take some time off to enjoy life,” he said. “One of my partners stresses that to me, and I get the feeling that he didn't always live this way.”

Garrett's parents live in the area, and he and his girlfriend moved to Hilton Head before the station took to the air.

General Manager Joe Mule (“myoo-LAY”) said, “Joel has provided the

You don't have to get rid of all the people. You can have a full staff and still make money.

— Joel Garrett

“Our station now has a good website, but our number one focus is still broadcast, just like old-school radio. We'll get on the bandwagon and ride with anything that progresses because you have to. But I feel it's more fun to just turn the radio on and listen to it.”

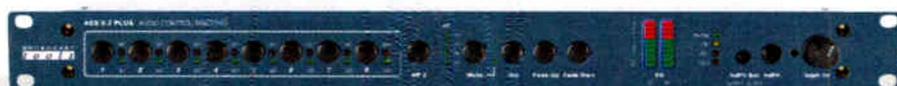
One might think that between handling an air shift, being program director and running around to most local events, Garrett's career would be in danger of taking over his personal life.

“Even though we're out and about on weekends for the station, I still have

enthusiasm and spark that made radio vibrant prior to consolidation. I was once told by a wise promotions director that you win your audience one listener at a time. Joel is doing that every day.”

You win clients that way, too. When Radio World first contacted Garrett on the phone, he interrupted the interview to take an incoming call from a car dealer client who wanted to talk about his commercials. The customer comes first.

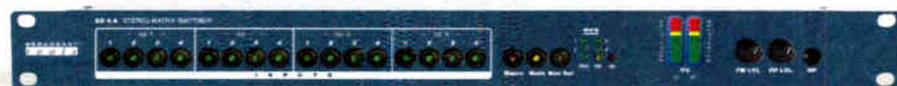
Ken Deutsch, a longtime contributor, says he listens to AM radio, Pandora and the voices in his head.



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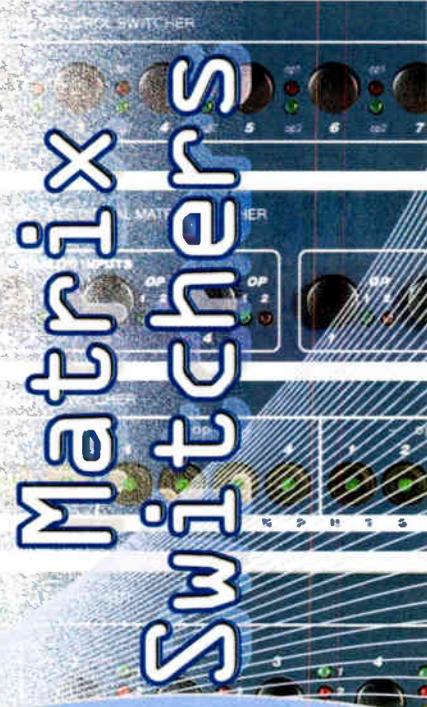
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LPFM

(continued from page 58)

"made based on the needs of the local community." We interpret this directive to mean that local communities must be "ensured" a range of choices — which will not happen if either GTI applications or new LPFMs have preempted so much spectrum that the other alternative is effectively barred from competing.

Thus, we proposed direct, simultaneous competition. (In February we modified the proposal to remove commercial translators from the "super window," acknowledging that statutory law requires commercial translators to be auctioned in a separate proceeding.)

Some "GTI Firsters" have criticized our proposal, arguing that (a) many GTI applicants "played by the rules" and should not be penalized retroactively and/or that (b) "first-come, first-served is the essence of fair play." Some "LPFM Firsters" have countered that (a) it can hardly be "fair play" to increase the huge numerical advantage that translators have over LPFMs and/or that (b) nationwide networks of satellators are a distortion, long overdue for correction, of the original concept of what translators should be.

Under our proposal, neither side suffers total defeat nor gains total vic-

tory. While we believe our proposal comes closer than others to reflecting the intent of Congress, we also hope it will encourage, in the future, more statesmanlike proposals for allocating scarce spectrum.

TARGETED DISPLACEMENT PROTECTION

Another petition is worth noting in this discussion.

The FCC, using its own authority rather than responding to a statute, has been allowing full-power stations, which it accords primary service status, to displace secondary service stations, such as LPFMs and translators.

LCRA Section 5 (3) transfers some of this system — but only some — from discretionary regulations to statutory law that the commission cannot change. Now, "when licensing new FM translators, FM boosters and low-power FM stations," the FCC "shall ensure" that these stations will "remain secondary to existing or modified full-power stations."

Those adjectives are crucial. *New* (post-enactment) LPFMs, translators and boosters must "remain secondary to" — subject to possible displacement by — "*existing or modified*" (pre-enactment) full-power stations.

Must existing LPFMs, translators and boosters also remain subject to displacement? Section 5 doesn't say. Do new

WHAT THE NEW LAW SAYS

Here is the text of Section 5 of the recently enacted Local Community Radio Act (Public Law 111-371). Bracketed text is added for emphasis.

SEC. 5. Ensuring Availability of Spectrum for Low-Power FM Stations

The Federal Communications Commission, when licensing new FM translator stations, FM booster stations and low-power FM stations, shall ensure that:

- (1) licenses are available to [new] FM translator stations, [new] FM booster stations, and [new] low-power FM stations;
- (2) such decisions are made based on the needs of the local community; and
- (3) [new] FM translator stations, [new] FM booster stations, and [new] low-power FM stations remain equal in status and secondary to existing and modified full-service FM stations.

full-power stations have the power to displace new translators, boosters and LPFMs? Section 5 doesn't say.

By codifying only *part* of the current system, Congress implicitly invites the FCC to take a second look at the rest of it.

In February, the Amherst Alliance filed a petition for rulemaking, asking the FCC to establish an opportunity for targeted displacement protection in cases where the LCRA does not preclude it.

Other issues remain. Will the FCC

decide that new "satellators" cannot be translators? Will the FCC alter the eligibility requirements for new LPFMs? Will the FCC act on low-power AM, and/or higher power ceilings for Part 15 AM stations, in pending Docket RM-11287? Can new technologies create more radio spectrum to share? These are questions to be discussed further.

The author co-wrote the petition for rulemaking that triggered the FCC's deliberations on creating a low-power FM radio service. Comment on this or any article to radioworld@nbmedia.com.

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Vorsis AirAura Is a Muscular Performer

Crawford Birmingham's Chief Engineer Tries Out Wheatstone's New Processor

PRODUCT EVALUATION

BY STEPHEN M. POOLE

A few years ago Wheatstone elected to move into digital audio processing, creating the Vorsis line. At the time, our station evaluated its budget-priced HD-P3 and ended up ordering two for our online streams.

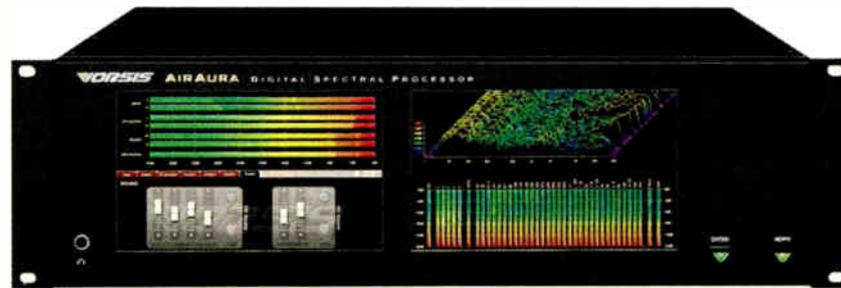
Recently I was given the chance to review the newest, top-of-the-line Vorsis, called the AirAura Digital Spectral Processor. Jay Tyler and Mike Erickson of Wheatstone/Vorsis brought one by our studios in Birmingham and familiarized us with it. We have since put it on air for further evaluation. My detailed thoughts follow.

If you're in a hurry and want the capsule summary, though, this processor is nothing short of amazing. If you're looking for a top-shelf FM broadcast audio processor, give it serious consideration.

INSTALLATION

When engineers discuss quality studio equipment, the Wheatstone name is likely to come up. The New Bern, N.C., company has built a reputation for making bulletproof, exceptional-sounding audio equipment for the studio.

When the processor comes out of the shipping carton, the pedigree is obvious: The finish is flawless and the unit feels solid and well-made.



You will need three rack spaces for it; but you don't need to reserve an empty space above and below it, as you do with some equipment. Ventilation is through the sides and the rear of the unit. Do use common sense: Don't mount it over anything with a big trans-

former, or atop something that produces a lot of heat. Make sure your rack is well-ventilated and you'll be fine.

The Wheatstone heritage also is obvious with the AC input, which is shielded, filtered and surge-protected. But given that this thing is loaded with DSPs and is, in essence, a purpose-built

computer, you should take the usual precautions. Connect the case to the station's common ground. If you are in an area plagued by lightning (as we are), loop the input and output cables

PRODUCT CAPSULE

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Thumbs Up

- + Phenomenal sound
- + 'Unbelievable' peak control
- + Range of factory-provided presets to get you started
- + Wired and wireless networking for remote control

Thumbs Down

- Documentation doesn't cover 'Pro' level

Price: \$13,995

For information, contact Jay Tyler at Vorsis in North Carolina at (252) 638-7000 or visit www.vorsis.com.

goes a step further with both wired and wireless networking.

The front panel essentially is an internal GUI terminal that communicates with the DSP section via networking; a touch pad is provided for navigation. A headphone jack (with adjustable volume) allows you to listen as you tweak, even in a noisy transmitter building. GPIO inputs and outputs are provided to allow interfacing to a remote control or automation system.

QUICK START

A book could be written about how the AirAura processes your audio; I'll provide a brief summary.

PRODUCT SPOTLIGHT

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Many users will find the Lite GUI sufficient; but you also can download the Pro GUI remote interface from the Vorsis website.

through some toroids for additional protection.

The AirAura only takes a few seconds (we measured about 10) from boot-up to audio output, but you should still put the unit on a good UPS to maintain a reliable AC supply.

The processor has plenty of gazintas and gazoutas. There are connections for both AES and analog, with separate outputs for FM and HD. There are four BNC connectors: two separately-adjustable composite outputs and two inputs for SCA. Like many of the newest processors, the AirAura is network-capable; you can adjust it remotely with provided software. But the AirAura

Primary dynamic range compression is done in a five-band AGC block, with smart level control and smart gating. If you like, you can go in and adjust the parameters of the primary AGC section. Parametric equalization can be applied either before or after AGC. The limiter is a 31-band, distortion-cancelled block that provides, among other things, hard, soft or look-ahead limiting. Separate limiter sections are provided for the analog FM and HD digital outputs. Diversity delay also is built in, allowing you to adjust the analog delay precisely so that it time-aligns with the HD signal.

(continued on page 64)

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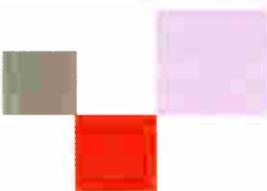
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- Opto-isolated outputs to protect external site monitoring equipment
- Easy setup — one button calibration
- Easy to install — installs inside the transmitter building, even if the lighting control equipment is located at the tower
- Insures total lighting compliance — alarms for single bulb failure (marker and beacon), beacon flash rate or on/off ratio outside of FAA specifications and photocell failure
- Failsafe alarms — alarm outputs are normally closed with no alarm condition. Power failure causes alarm open-circuit condition
- Compensates for antenna tuning unit bulb on the same circuit
- Simple design using off-the-shelf components; all ICs are socketed



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AIRAURA

(continued from page 62)

Some curmudgeons and old-timers might consider 31 bands of limiting to be overkill (or worse). But in fact, most top-of-the-line digital processors use additional bands for limiting. Vorsis takes the idea to the next level of the art.

When done properly, any distortion that results from aggressive clipping in a given band will either fall outside of that band or will be psychoacoustically “masked” by the main program signal. The result, borne out in our listening tests, is that, if you wanted to, you could adjust the AirAura’s limiting such that your modulation meter virtually “hangs” at 100 percent while still sounding clear, clean and “open.” The processor needs to be heard to be appreciated fully.

Vorsis adds other refinements that deserve mention. The overall goal obviously is to give you a processor that you can immediately put on air and then start adjusting. With that goal in mind, the default preset is called “A Quick Start.”

A nice feature is that, when switching presets, the AirAura smoothly “slews” (Wheatstone’s term) or “crossfades” (my term) to the new settings over several seconds. This is far less dis-



Adjusting L-R control in a single band to help with multipath.

concerting to the listener. For example, there’s not an abrupt, annoying change in perceived level when switching from a “soft AC” preset to an aggressive “urban” preset. The sound slowly and smoothly takes on the “personality” of the new preset.

Numerous presets are available to serve as starting points, ranging from minimal to very aggressive processing. But I recommend that you set it up on the bench with a good set of speakers or headphones before putting it on air. You’re buying it for what the processor can do; it’s worth investing time to

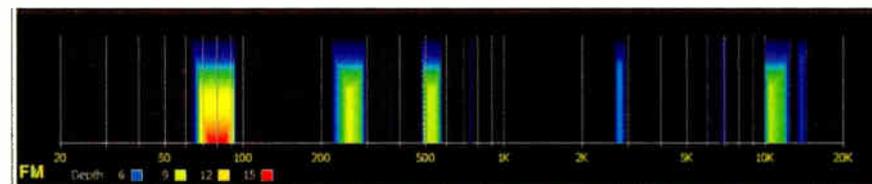
is shown in the image below; it allows you to make fundamental adjustments to a preset. You can adjust the density and apparent loudness, as well as low and high equalization.

Many users will find the Lite GUI sufficient. But if you’re one of those who simply must tweak every parameter of your processing, you can download the Pro GUI remote interface from the Vorsis website and gain access to most of what’s inside the unit. However, as the old saying goes, with great power comes great responsibility; that’s manifestly true of the AirAura.

The good news is that the Pro GUI will allow you to tweak virtually anything that your heart desires, even setting



The Lite GUI interface for routine adjustments. The ‘Sound’ screen is shown.



Peak limiting analyzer

become familiar with it. Run the thing through its paces, find a preset that sounds good for your format and try tweaking to get different sounds.

Each preset can be adjusted from minimal to aggressive processing while retaining that preset’s essential “sound.” If you find one that you really like but you feel it’s a little too “squashed” with your music, for example, you can back off the density a bit, opening it up without changing the essential character of the audio.

OPERATION

There are three ways to tweak the AirAura.

The first is with the front panel; you can select presets and perform essential adjustments using the provided touchpad. The front, in fact, is a built-in terminal that duplicates what the Lite GUI program does remotely.

The Lite GUI can access the AirAura via wired Ethernet or 802.11 wireless. My recommendation is to start with the Lite interface. It reminds me of another manufacturer’s “less/more” adjustments, and it’s much easier to use when you’re familiarizing yourself with the AirAura. The “Sound” screen

the separation levels at different places in the audio spectrum. If you think that your multipath problems are worse at high frequencies, for example, you can blend the separation a bit just at those frequencies, while leaving the L-R at full nominal separation across the rest of the band.

The bad news, of course, is that this level of control means that you easily make this processor sound phenomenally bad if you’re not careful. The usual rules for adjusting a top-flight processor are essential with the AirAura: (1) make a couple of small adjustments, no more than 1–2 dB at a time, and then (2) sleep on it. Give it time, listen with a range of programming, then tweak a couple more parameters. If you’re willing to invest the time, the AirAura will do pretty much whatever you wish with your audio.

Vorsis offers what it calls its Vorsis Bass Management System and Sweet Spot Technology in the AirAura, both of which can be fine-tuned with the Pro GUI. Refer to the manual for more; basically these offer more consistent low end and processed sound, respectively.

The AirAura provides considerably



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more than the usual level meters. A complete spectrum analysis display allows you to see what is happening to each portion of the audio spectrum. My personal favorite is the 3D spectral plot, visible in the front-panel image at the beginning of this article. But there are other analysis tools available, including a very useful clipping plot. You can see how aggressive your clipping is and fine-tune for the best-sounding compromise.

FINAL IMPRESSIONS

It isn't possible for me to cover the features of the AirAura here; there are too many. But as I said earlier, it is an amazing processor.

It's not cheap; it's right up there with other top-of-the-line processors. But any station looking for the most competitive sound possible must consider the AirAura. It sounds phenomenal, with shockingly tight bass and crystal-clear highs, along with a warm, sweet midrange. Peak control is exceptional. Because of its flexibility, it seems equally at home with the most laid-back classical music or the hottest urban or CHR.

The Lite GUI and the front panel are ideal for people who want to get the AirAura up and running in a hurry. The Pro GUI allows access to parameters for those who want to tweak for that last ounce of competitive advantage.

The wireless networking is a neat trick: You can sit in your car with a laptop and adjust the AirAura while listening to your own radio.

I ran across only two negatives. As mentioned, when using the Pro GUI, it's possible to make this unit sound bad if you're not careful. While you're learning how to use it, you'll find yourself starting over with a factory preset more than once. The second is that the AirAura is so new, the documentation wasn't complete, at least when I demo'ed it. The manual essentially covers installation and the Lite GUI adjustments. But Wheatstone's tech support is a phone call or e-mail away if you have questions.

I do hope Wheatstone will get the "Pro" level manual completed as soon as possible, but let me close by noting that we liked the AirAura enough that we bought the demo unit. I can think of no higher recommendation.

Thanks to Jeff Keith of Wheatstone/Vorsis, who shared some valuable insights about the design of the AirAura.

Stephen M. Poole, CBRE-AMD, CBNT, is chief engineer of Crawford Broadcasting in Birmingham, Ala., and a frequent contributor to Radio World.

TASCAM DR-08 Is a Stealth-Mode News Tool

BY TOM VERNON

TASCAM has a knack for introducing innovative technology with a great value, and the DR-08 linear PCM recorder is no exception. In a package

SHORTTAKE

slightly smaller than a TV remote control, you'll find tools useful to someone doing field recording, be it radio ENG or live music, though there are some caveats.

Retail price is \$299 though you'll find it at various dealers for significantly less, maybe even below half of list price.

Through a friendly menu interface, the user can select audio quality ranging from 24-bit/96 kHz linear through MP3 recording at 32 kbps mono. The DR-08 uses microSD and microSDHC cards for a maximum memory capacity of 32 GB. A list of brand-name cards that have been tested in the unit is available on the TASCAM website.

Its built-in electret condenser microphones have three positions. The closed position is optimized for a narrow field such as when doing interviews. When the mics are open they are optimized for stereo recording. When open and turned up, they are directional, useful when you want to record meetings.

A 1/8-inch external input jack is available for your own mic/line inputs. Analog output is via a 1/8-inch jack, and an internal speaker is provided.

The real versatility of the DR-08 comes when you connect to a PC via the microUSB-to-standard USB cable. Alternately, you can transfer files by removing the microSD card and inserting it into your PC's card reader. The unit is compatible with both Mac and Windows.

A backlit display allows you to set levels and record in the dark. One annoyance is that it can only be accessed through the menu. This is one instance where a simple momentary pushbutton switch might trump menu-driven firmware. A cool illumination option is the "stealth" mode, which defeats the record LED and backlight. Presumably this would be useful for times when you want to record in the dark without being detected.

A field recording of choral music using the built-in mics revealed a slight hiss during the quiet passages, which I did not find surprising on such an inexpensive device. Otherwise, the sound was transparent and rich in detail.

The DR-08 features auto level control

and a low-cut filter for clear recordings, as well as loop and variable speed on playback, allowing you to slow the playback speed without changing the pitch to learn new music. There's also noise canceling and EQ functions for improved playback timbre.

This device has great potential as a radio ENG device, although care needs to be taken. As with other miniaturized devices, condensation can form on the circuit board when going from cold to warm environments, rendering it temporarily unusable. Keep it in an inside pocket during winter weather.

While it has an aluminum front panel, and construction is more robust than that of a TV remote control, the DR-08 probably is not "broadcast quality." Dropping, dunking or hard use of the 1/8-inch input/output jacks may shorten or end its useful life. A padded carrying case would be a useful accessory, although none is available from TASCAM.

With moderate care, the DR-08 should survive in the broadcast environment. Given its price, a loss or demise would be sad, but not the end of the world.

For information, contact TASCAM in California at (323) 726-0303 or visit www.tascam.com.

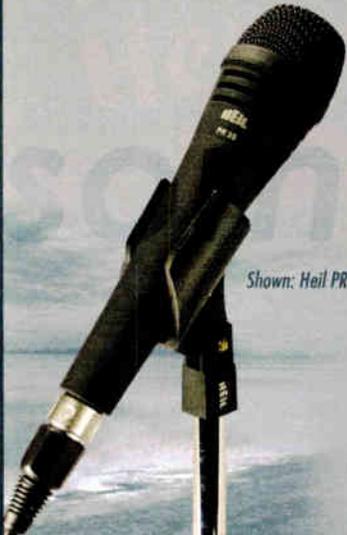




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20	KW	2005	BE FM2GS, solid state
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WWVB

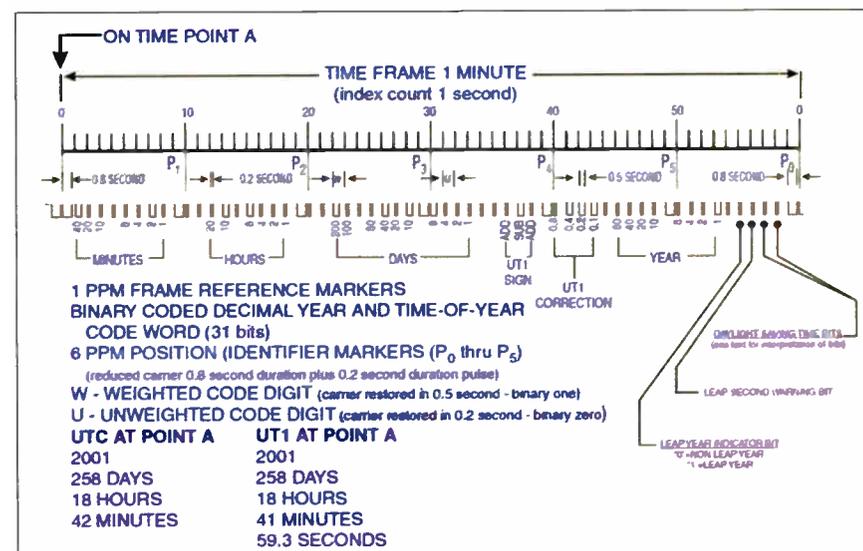
(continued from page 70)

help improve this situation, the transmitted power was increased about five years ago to 70 kW and the modulation depth was increased from 10 dB to 17 dB. This helped, but has not solved the inherent problem of a poor signal-to-noise ratio at the receiver in the far field. New approaches were needed.

The most obvious solution was to build another time signal station on the East Coast that operated at a different frequency.

frequencies from the same location improves the chances of receiving at least one of the signals because the transmission nulls are related to frequency and therefore should occur in different locations. Also, interference may be affecting only one frequency at a given location. A receiver would need to determine which signal is strongest or more readable. This is already the case for radio-controlled devices in Japan receiving signals from radio station JJY on either 40 kHz or 60 kHz.

Another idea being actively investigated is to add phase modulation to the



WWVB Time Code Format

Several sites have been investigated including Greenbury Point in Annapolis; the Voice of America site in Greenville, N.C.; and some of the retired Loran-C sites. Funding for this opportunity was made possible with the American Recovery and Reinvestment Act. The stimulus money was allocated for a station to be built at the Redstone Arsenal in Huntsville, Ala.

After much negotiation and investigation, NASA determined that they did not want a large low-frequency station so close to the Marshall Space Flight Center, also located on the arsenal. NASA was concerned that such a large amount of radiated power would interfere with their operations.

Unfortunately, after all of these negotiations, time had run out for spending the ARRA money, so the funds had to be returned; now we are back to looking for other ways to improve our service.

UPGRADE IDEAS

A possibility now being investigated is to upgrade the existing WWVB site further, by either building an antenna for a new broadcast frequency or splitting the antennas into two separate entities, as was done in the days of WWVL.

The effect of broadcasting on two

existing WWVB signal while leaving the AM BCD code intact. This would allow all existing devices to continue to work, but allow a new generation of radio-controlled clocks to be developed. These new devices would have greater processing gain and therefore be capable of reading the time code with a lower signal-to-noise ratio.

These kinds of systematic, continuous improvement initiatives support the NIST goal of providing a reliable time source that can be received everywhere in the continental United States (and hopefully including Alaska and Hawaii).

We envision that this will continue to go beyond clocks and watches and will become ubiquitous in consumer appliances. DVD players or microwave ovens will no longer blink 12:00 after a power outage. It will no longer be necessary to adjust any clocks when a Daylight Saving Time change occurs. Soon, accurate time will be displayed everywhere and we will have lost one more excuse for being late.

I invite and encourage readers to participate in a survey to help improve our services and to suggest new ones, at <http://tf.nist.gov/survey>. You can learn more about the Time and Frequency Division of NIST at www.nist.gov/pml/div688/.

We Help Move Time Through the Air

Managers of WWVB Explore Options to Improve the Service Further

COMMENTARY

BY JOHN LOWE

The author is manager of National Institute of Standards and Technology radio stations WWV/WWVH/WWVB.

While radio station WWVB may be familiar to readers of this publication, most people would not recognize those call letters. However, if you say you have an "atomic clock" hanging on the wall of your house, most everyone would know what you meant.

Of course it is not a real atomic clock, but a radio-controlled device that receives the WWVB signal and corrects itself nightly when the 60 kHz signal propagates the best.

In July 1956 the National Bureau of Standards started radio station KK2XEL in Boulder, Colo. It was a 2 kW transmitter sending a 60 kHz signal into the summer sky. Even though the effective radiated power was less than 2 watts, the signal was received and monitored at Harvard University in Massachusetts.



The antenna towers of WWVB in Fort Collins, Colo.

alkalinity of the soil.

On July 5, 1963, WWVB began broadcasting a 7 kW signal at 60 kHz. In August of that year, its sister station, WWVL, began broadcasting a 500 W signal at 20 kHz. On July 1, 1965, WWVB added a time code to the broadcast.

the top hat is much less than a quarter wavelength. Therefore, the top hat is inherently capacitive and a large inductor is added in the helix house to cancel the capacitance of the short antenna. A variometer, or variable inductor, is also included in the helix house to tune the antenna, which is especially useful during wind and ice loading.

In 1997, work began to improve the WWVB broadcast. More powerful transmitters (FRT-72) were acquired from U.S. Navy surplus in Virginia, Scotland and Iceland. Extended tuning variometers were acquired from the decommissioned Navy low-frequency station NSS in Annapolis, Md.

The WWVB broadcast was kept on the air during these upgrades by use of the old WWVL antenna. When the upgrades were complete on the WWVB side, the WWVL side was upgraded and they were combined with WWVB into a dual broadcast system. Broadcasting from both antennas, the WWVB signal was boosted to 50 kW of effective radiated power beginning in 1999.

This increase in power created an explosion of new commercial radio-controlled products, more than a million of which are sold each year.

ANOTHER STATION?

Despite the overall quality and reliability of these products, there are times and locations at which the WWVB signal is not well received or decoded properly.

This is due to distance from the transmitter and also interference (added noise) to the signal caused by nearby radiating sources such as computer monitors or power transformers. To

(continued on page 69)

An idea being actively investigated is to add phase modulation to the existing WWVB signal while leaving the AM BCD code intact.

This experiment showed that the frequency error due to the Doppler shift induced by the ionosphere was small. This was the forerunner of the WWVB broadcast.

In April 1960 another experiment was conducted in the foothills of the mountains west of Boulder. A valley-span antenna 3,400 feet long was strung near the old mining town of Sunset. The signal was broadcast with less than 15 watts of power, yet it was consistently observed in New Zealand.

Results from the Sunset experiment provided a much better understanding of the ionosphere and the study of whistlers, hiss, the dawn chorus and "sferics."

This set the stage for the WWVB radio station.

TIME'S TOP HAT

Construction began in 1962 on a site north of Fort Collins, Colo., near the small town of Wellington. The 390-acre site was chosen in part for its high ground conductivity, a result of the high

The binary-coded decimal (BCD) time code transmitted 1 bit per second by shifting the power of the carrier by 10 dB. The format is explained in the accompanying graphic on page 69.

Over the next few years, improvements were made to increase the power up to approximately 13 kW, and it remained there until the late 1990s. In 1972, the WWVL broadcast was terminated and its antenna became the rarely used WWVB backup antenna.

Each antenna is a top-loaded dipole consisting of four 122-meter (400-foot) towers arranged in a diamond shape. Suspended between the four towers is a system of aluminum cables called a capacitance hat or "top hat." The top hat is electrically isolated from the towers, but connected to a down-lead at the center of the diamond. The down-lead is the radiating element emanating from a helix house at ground level and also at the center of the diamond.

The wavelength of a 60 kHz signal is nearly 5,000 m (more than 3 miles), so the length of the radiating element plus

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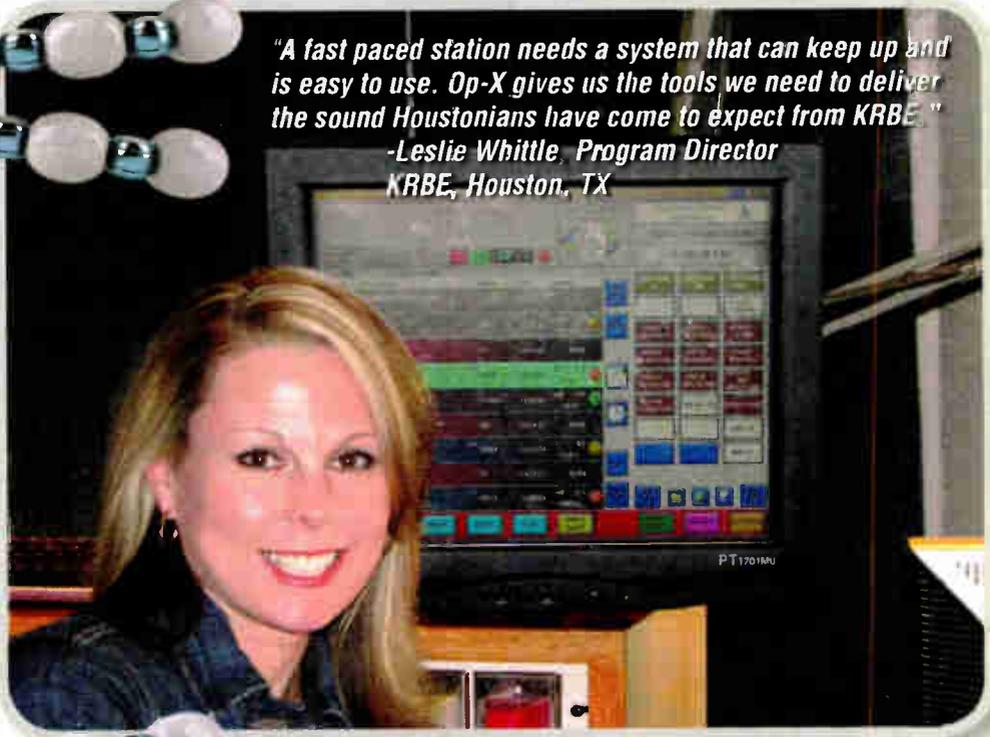
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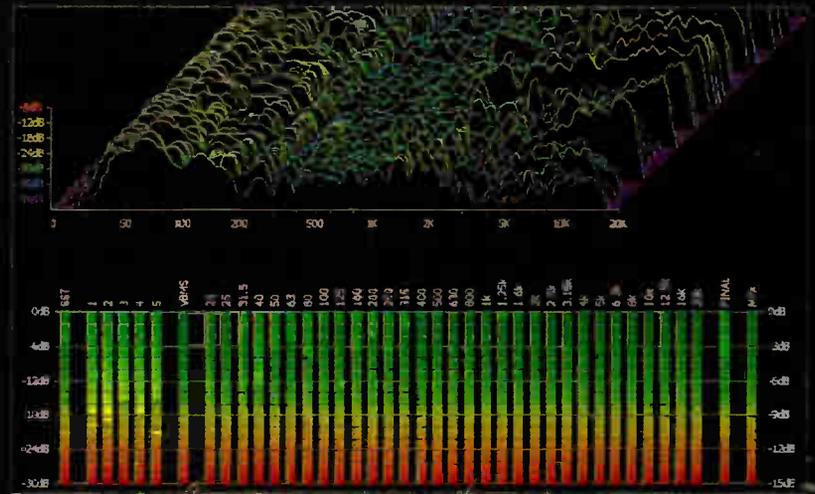
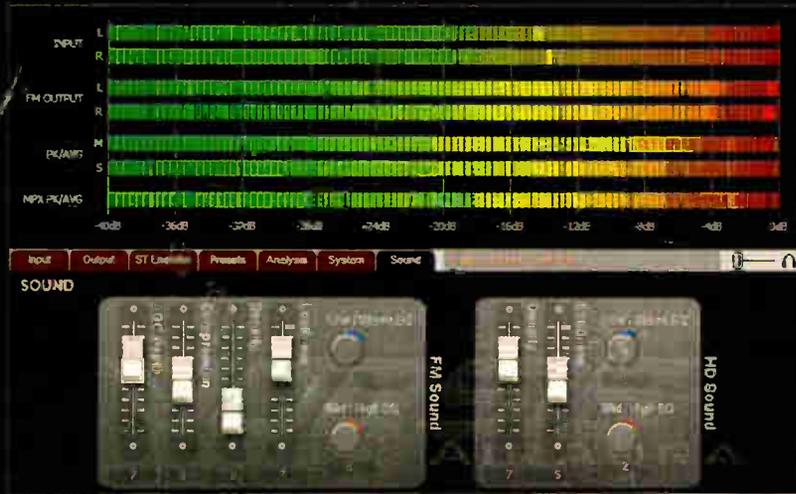
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"What an amazing difference in sound quality!!! This is a brand new FM station and comparing it to the other new station in town using the Other brand of processor our client is louder, cleaner, and even legal. Wheatstone definitely has a winner here with VORSIS."

"This is a great sound and we are so, so pleased with our new VORSIS on-air processor. You just threw down the gauntlet to the processing industry with this new unit! Nobody can match a sound this loud, this clean, and this unique! Now everybody gets to chase after us for a while. Thanks VORSIS!!"

"Our signal used to virtually disappear in downtown New York when we went on night pattern because of the extremely high level of man-made noise. Now when we're on night pattern our coverage in downtown is actually better than when we are on day pattern, the other brand of audio processor and a 10X higher powered transmitter! We're buying a second one to put on our daytime transmitter!"

"You have to be kidding! I have NEVER heard FM audio sound this good, this detailed, this smooth, this clean, and this loud (how did you do it??). Very nice work!"

"Love the box!!! Overall the sound of the station is vastly improved. It's loud, wide and clear."

"I guess the only word for VORSIS is 'WOW!' It's got some great bottom end, and it's more transparent than any processor I've heard."

"The AGC/Compressor/SST combination is simply amazing. We play classical CDs. Older classical CDs were mastered at a much lower level than current ones. Announcers don't compensate and never will. Your processor is able deal with what amounts to probably 40-45dB (or more) "average" level variations and hold them perfectly in the sweet spot with virtually no squashing, pumping, sucking, or other usually audible artifacts of such wide range level control. In short it does its job perfectly every time."

"This box sounds much better than any other processor I have ever tried. Ever!"

"I love classic rock and it's the program format on the station that I own. No other processor that I've tried (and I think I've tried them all!) sounds as good on this format. We're nice and loud and still cleaner than the other stations in the market. We were surprised to hear the intentional dynamics of songs actually get on the air - other processors just flatten them out or turn them into a sea of mush. For the first time ever we're also hearing subtle nuances in songs that we used to think we knew every single note of. What an amazing air sound! No.... What an amazing processor!!"

"The SST algorithm is the least audible of ANY processor I have ever had experience with. I'm not sure how you did it or exactly how it works but its automatic "leveling" is excellent - no pre-processing whatsoever is necessary with SST."

"The high end of this processor is very open sounding - there is no fake "sparkle" with the HF EQ either. Perfectly clean and natural sound. And did I mention LOUD?"

"Your equalizers are actually useful and unlike other processors do not grunge-up the sound merely by enabling them."

"Finally! A processor that deals effectively and transparently with overly-sibilant announcers and audio levels that usually go all over the place! (I especially love the tweak-able multi-band thresholds!!)"

"Why haven't the other audio processor companies been able to make an AM box that sounds this good? I can't think of a positive superlative that is big enough to describe how pleased I am with our AM sound now. Our coverage seems to have increased by quite a bit too!!"

"Our multipath is Gone! GONE! As an engineer I have difficulty believing a processor can make this much difference in apparent coverage area but the listening is the proof. We've had several listeners call and comment that their reception has greatly improved and even I've noticed vast improvements when driving through what were previously horribly multi-path prone areas. I'm not sure why, but it sure does work!!"

"This box has great metering and excellent analytical tools - you get good visual indication of everything that is happening inside."

"The unit's stability has been flawless, not even a tiny glitch. We have it set up to time-sync and it works great. The scheduler-based (and SILENT!) preset switching is perfect! Unit sounds very accurate sonically and is very easy to set-up."

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NOTE: We aren't naming names because everyone who is reaping the rewards of sounding better appreciates their anonymity (with respect to the competition). We won't blow your cover, either.