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MacGyver in the Age of Centralized IT

A special essay on how radio companies can manage the interdependence of local staffs and centralized IT

TECHNICAL MANAGEMENT

BY FRANK McCOY AND MIKE BALLERINI

The authors are chief engineer of Salem Communications' Chicago cluster and CIO of Salem Media Group, respectively.

It's been a bit over two decades since computers largely took over radio station content management. As these systems became more sophisticated, they also became increasingly data network dependent. A lot of this was driven by consolidation in the late 1990s.

Those who lived it would agree that consolidation

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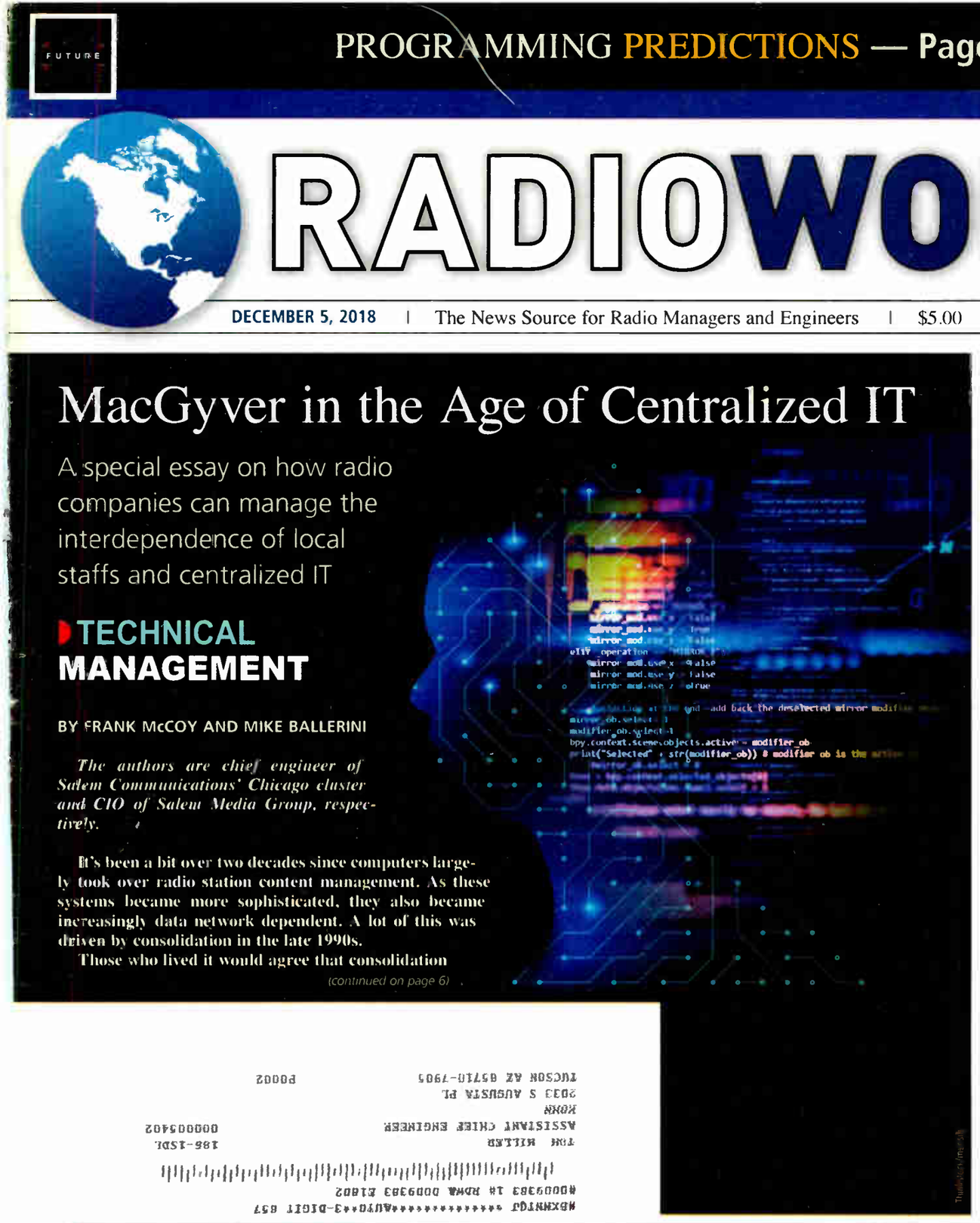

Waze Wants to Partner With You

Google-owned business offers to be your resource for everything happening on the road

SUPPLYSIDE

BY PAUL McLANE

One in a series of occasional profiles of companies offering services to radio stations.

Waze wants to partner with you.

"Don't just report traffic, report solutions," the company states in its marketing to stations. "Partner with the world's most trusted driving app and give your audience the traffic news they'll use. It's 100-percent free."

Waze launched more than a decade ago as a crowdsourced traffic app. It was acquired in 2013 by Google for roughly $1 billion.

Mona Weng, global lead of Waze for Broadcasters, spoke at this fall's Radio

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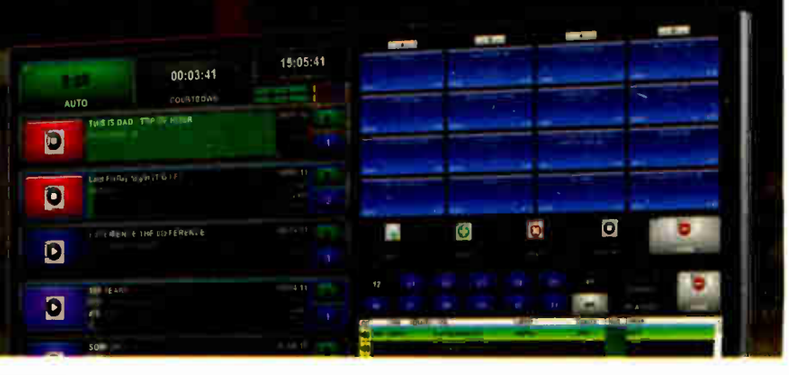

This screen provides full local or remote control over a live show, complete with specific console and automation functions. Courtesy SAVE Diffusion.

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Cloud Management to Streamline Workflows

Examining how Software as a Service is redefining contribution and control for broadcasters

This article is from Radio World's recent eBook "Radio Rises to the Cloud." Read it for free; click on eBooks within the Resource Center section of *radioworld.com*.

COMMENTARY

BY CHARLIE GAWLEY

The author is vice president of sales, APAC/EMEA, Tieline Technology.


Charlie Gawley

Cloud technology solutions have been drivers of change in the broadcasting industry for some time, and increasingly station infrastructure and the cloud are further intertwined.

From a content delivery perspective, much has been said and written about how broadcasters can now distribute rich content to consumers through over-the-top IP-based technologies using the internet, instead of traditional channels like terrestrial radio transmitters. So too have broadcasters streamlined broadcast workflows behind the scenes in order to create flexible IP-based studios with scalable routing, storage, management and transmission solutions.

Therefore it was natural for cloud technologies, and in particular software as a service, to become more influential as an interface between "the studio" and the multitude of "capture assets" at remote sites — assets employed to ingest news, sports and other content and then transmit IP streams flexibly to affiliates and transmitter sites as required.

SAAS FOR BROADCASTERS

SaaS has streamlined operations in many broadcast facilities. Typically, third-party applications are used over the internet to perform a myriad of broadcast tasks like equipment control, mixing as well as data ingest and storage. In today's cost-driven environment, SaaS cloud services have many advantages for broadcast networks. These include:

- Pay as you go: Services deliver predictable costs that can be managed easily.
- Scalable: Services can be scaled in size and feature-set to suit the broadcast application.
- Automatic updates: Incremental updates are automatic, reducing IT service requirements.
- Accessibility: Services delivered over the internet provide accessibility from anywhere with connectivity.
- Remote control: Engineers have the ability to control equipment remotely from the studio.

CLOUD MANAGEMENT AND REMOTES

From the broadcast engineer's perspective, one of the most significant ways in which SaaS has changed broadcast engineering is the ability to control equipment remotely in real time. In the old days, adjusting equipment at a remote location or transmitter site may have required hours or even days of travel time in some situations. Whereas today, complete remote control of a station's broadcast equipment is at our fingertips every minute of every day over IP.

These days, hardware manufacturers and countless other suppliers of broadcast technology provide solutions for managing fixed infrastructure at transmitter sites. This equipment can be configured using fixed IP addresses, providing a direct IP link into the equipment. It is more complicated to manage "mobile" broadcast contributions from IP devices with changing IP addresses over cellular or Wi-Fi networks. However, there are solutions that now deliver remote control of hardware like audio codecs used to stream news reports and live audio from major and minor league sporting events and other remote broadcast applications.

This connectivity can be provided by cloud-based servers, which detect the presence of devices when they

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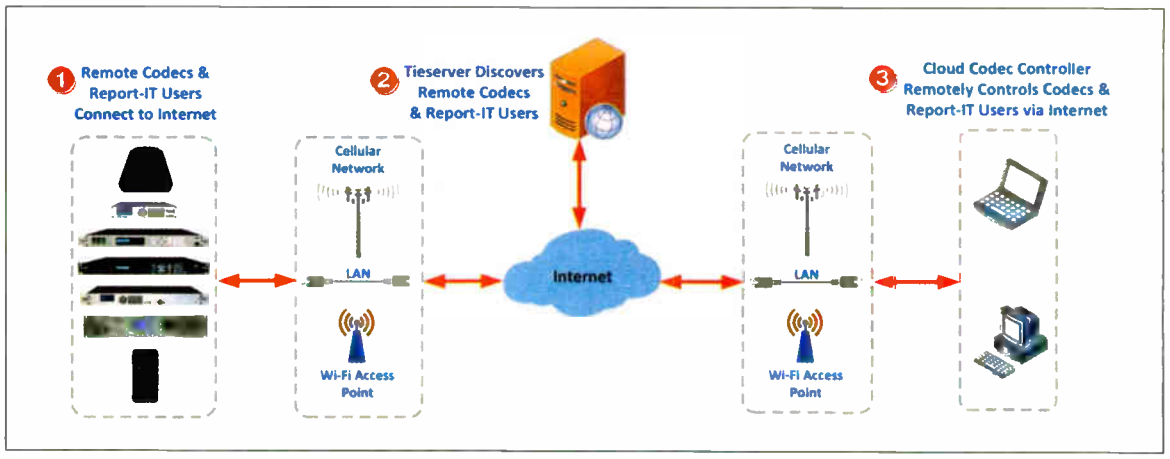


Tieserver in the cloud discovers codecs and Report-IT users, and provides a remote engineering control interface.

SAAS

(continued from page 3)

connect to the internet. Tieline's Cloud Codec Controller is one such service. No longer do engineers need static IP addresses to reach out and interrogate and configure codec equipment. This is done automatically by devices "reaching out" to a cloud-based server to identify themselves as soon as they are connected to the internet.

Devices don't need to be connected, just present and available to allow secure, real-time monitoring and remote control — even over cellular and Wi-Fi networks. Even apps like Report-IT can be accessed and controlled remotely using minimal bandwidth.

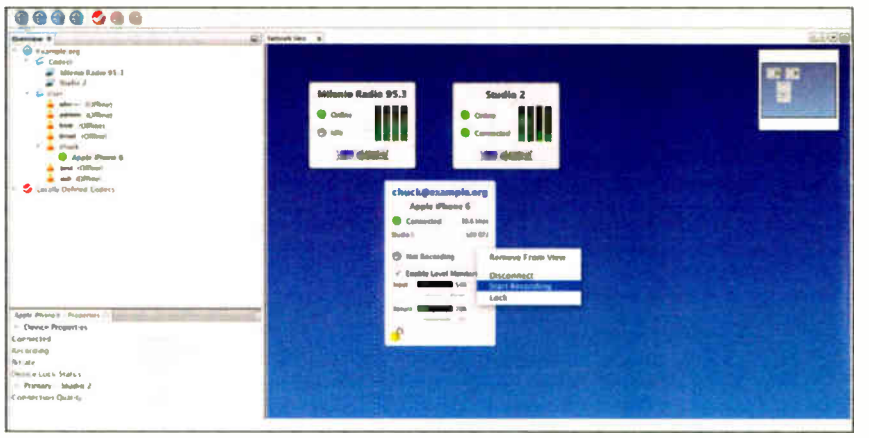
The advantages of this level of control are obvious. Technical support staff can be in a main office looking after multiple sites and monitor the connection status of many devices simultaneously.

SECURITY AND RELIABILITY CONSIDERATIONS

Carefully consider "privileged user access" to maintain security when using outsourced cloud-based services. These services bring an inherent level of risk, so having adequate controls over access to sensitive data and information is critical. Ask providers to supply information about who has oversight and access to this information.

In addition, adequate Tier 1 ISP bandwidth is required to stream audio and video services reliably and integrate SaaS applications and control reliably. It is also important to consider:

From the broadcast engineer's perspective, one of the most significant ways in which SaaS has changed broadcast engineering is the ability to control equipment remotely in real time.



The Tieline Cloud Codec Controller User Interface

- The fine print in ISP and provider Service Level Agreements to avoid pitfalls like bandwidth limiting.
- Whether adequate ISP and provider backups are in place.
- SaaS provider server locations; latency can be affected by server locations.
- SaaS provider redundancy; ask about support and what happens if the closest server crashes.

Whatever the service, the importance of off-cloud backup cannot be underestimated. Always think about how you would recover data in a worst-case scenario when designing risk management mitigation strategies.

THE FUTURE

Remote management of all broadcast assets using the cloud is the future. For many networks it is already happening today, albeit in varying degrees. Engineers should embrace the significant advantages provided by cloud-based assets after mitigating risk and planning carefully for all eventualities.

5G cellular networks will deliver even better connectivity and bandwidth, and SaaS opportunities for broadcasters will only grow as a result.

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THIS ISSUE

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GM JOURNAL

TRENDS IN TECHNOLOGY

OPINION

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PEP Station WLW Tests New Studio Shelter

BY RANDY STINE

The Federal Emergency Management Agency revealed new studio capabilities at WLW(AM) in Cincinnati this fall in a first-of-its-kind broadcast from a shelter at the transmitter site of the National Public Warning System Primary Entry Point radio station.

The iHeartMedia outlet is one of 77 PEP radio stations in the country and the second to have added modernized emergency studio facilities. Enhanced studio capabilities were completed at WJR(AM) in Detroit earlier this year, according to Manny Centeno, FEMA's NPWS program manager. The upgrades include increased sheltering capabilities, expanded broadcast capacity and sustainable power generation for all types of hazardous events.

PEP stations are designed and hardened to withstand various natural disasters and manmade events to ensure continuity of operations. FEMA began an effort to upgrade PEP facilities in 2015 after Congress passed the Integrated Public Alert and Warning System Modernization Act.

"This is really a critical development," said Centeno. "For many years FEMA and the FCC have supported radio broadcast and been adding resiliency to the system — things like generators, fuel to last for 60 days and other protections. Now we are expanding the survivability of these stations to include an all-hazards platform, which means chemical, biological, radiological air protection and protection from electromagnetic pulse."

FEMA is including studios within standalone modules to ensure that PEP radio stations are capable of broadcasting during and after emergencies when other communication sources may be down, Centeno said.

"We always say that radio is the backbone of emergency information to the public. It's a tested and proven method to reach the masses during disasters. Our intent is to protect radio so it can continue to serve the public as well as it has in the past," Centeno adds.

In all, FEMA is modernizing 33 of the NWPS PEP stations to include better studio capabilities with human survivability capabilities, he says. The studio shelters are all the same size and design. The all metal studio shelters — think of it as a Coke can that seals completely, Centeno says — have filtered air systems to ensure safety during a possible airborne chemical disaster.

Shown are Jeff Littlejohn of iHeartMedia, Manny Centeno of FEMA, Bill Cunningham and DJ Hodge of iHeartMedia, U.S. Rep. Steve Chabot and Antwane Johnson of FEMA. For photos of the facility, go to *https://tinyurl.com/y8qbyevx*.

"The modules are uniform size (8 feet x 20 feet) and transportable. We can easily move them around the country by train, plane, flatbed and boat," he said. "The studio modules contain a studio with audio mixing capabilities and processing, transmitter and associated equipment for monitoring."

The studio shelter even includes a rest area for station operators and an "incinerator toilet" along with food and water for several weeks, according to Centeno. Satellite and fiber optic communications systems are employed as well.

A ribbon cutting, tour and on-air demonstration of the new WLW studio shelter took place at the station's transmitter site in Mason, Ohio. WLW is a Class A clear-channel station operating with 50,000 watts. Centeno said the exercise was the first time the shelter system had operated live. He commended iHeartMedia and Cumulus, owner of WJR in Detroit, for their efforts in completing the modernization projects and ensuring that their stations are in a position to respond promptly during emergencies.

MACGYVER & IT

(continued from page 1)

came with a few bumps. In those days, picking the low-hanging fruit of expense reduction was lucrative; it was an environment where stations and groups were valued as a double-digit multiple of cash flow. Every expense dollar shaved was worth 13 to shareholders. Computers running the music and spots was an obvious idea.

But consolidation meant a new radio organizational chart. Publicly traded radio companies needed standardized reporting information which, in turn, meant that revenue and expense data needed to be rolled up into a consolidated balance sheet. Sarbanes-Oxley, enacted into law following the Enron collapse, brought a requirement that data be valid and independently audited.

Transmitting that data from a radio market cluster to corporate headquarters required an environment that prevented outsiders from learning stock-market-moving information in advance of public release. Public company boards and auditors had seen what happened with Enron and Arthur Anderson. They wanted to make sure their systems were adequate.

Radio also faced another major headache. Support for computers and other digital devices at radio market units was increasingly untenable. Every employee had a desktop machine, then a laptop, then a smartphone. Another computer? Just plug it into an available switch port. Not enough ports? Just add another switch. Most switches at stations were unmanaged. Routers were the ones station engineers used at home. Crossed wires often caused problems. Finding station engineers who understood networking was a challenge.

HERE COMES THE BUT

This is how the radio world looked in about 2005 — stable some places, chaotic in others but generally no-two-alike installations even within the largest of groups.

Network standardization held the promise of stability, predictability and, once the initial expense was absorbed, a continuing reduction of recurring expense. And unlike other cost-cutting efforts, centralized IT came with a help desk. Salespeople had someone to call, trained in computing and in bedside manner. Phone configuration was largely eliminated as a local headache.

You must know there is a "but" coming somewhere and here it is: Radio operations at the market level are not uniform. They cannot be. To survive, every outlet reaches a different audience. Every station has a different population within its coverage footprint. Tower sites are scattered in and around cities with differing configurations of powers, towers and utility availabilities. Each was independently designed and subject to a long history of changes reflecting good times and bad.

Remotely managing these facilities required an intimate knowledge of their architecture and limitations. Almost no examples of the standardized protocols and interoperability — the kind centralized IT offered on the business side — were present where radio's tires met the open road of local station programming and operations.

As an example, operations and engineering staffs have, for years, been installing and using home-brew connectivity schemes. Going back to early dial-tone, touch-tone control systems, remote access allowed stations to run "unattended" and to automatically alert when things went wrong. Market engineers were accustomed to creating electronic solutions to business operation and product delivery problems. They'd MacGyvered their way to opportunity, and past trouble, for years.

Generally, these operations and engineering staffers took considerable pride in how little cash they spent to keep the radio revenue engine running. Older equipment was rebuilt, modified and repurposed. In an era when station valuations are stable to declining, a culture that celebrates cheap and nothing wasted was and should be encouraged.

The dark side of this frugality comes when Mr. MacGyver gets an offer from another show. Suddenly the efficient Borg Cube of inexpensive parts becomes the dreaded black box. The clock is ticking towards the inevitable death of the XT motherboard and the electronics from that old toaster oven … What happens then?

PATH TO SUCCESS

How can we find the best of both worlds: technical uniformity and supportability with economies of scale alongside the MacGyver culture of clever, low-cost solutions customized to circumstance?

It's by unleashing local creativity and resourcefulness, supported by the robust back end connectivity that a centralized IT department can provide.

Here are nine suggestions for how to get there.

1. ***Bring Market Staffs Into Larger Networking Architecture Planning.*** Ours is a business that earns its money in the local markets where our facilities operate. Every expenditure should show a measurable return on investment and should compete for priority with other capital outlays.

For all the reasons above, a carefully considered outcome is likely to be different from market to market. An elegant solution in New York may be untenable in Peoria. Any solution proposed for everywhere deserves strict scrutiny and comment. The best case is a close collaboration when the design is happening. Use that creativity but temper it with parts that are obtainable in Peoria. This may add a few dollars but in the end much less grief.

2. ***Improve Communication.*** In an environment of complex interlocking processes, it is easy to assume that some inexplicable technical failings were caused by unseen changes in the network connectivity environment. It shouldn't surprise us that changes made to the same system by individuals in separate places without coordination leads to problems. Of all the challenges, this might be the easiest to fix.

Trouble ticketing systems are a common management tool in IT. These systems record the reported symptom, the applied solution(s) and time stamps for all steps taken and parties who took them. This system could be used as an alerting method, such that affected markets would be copied on these tickets. But to be effective, every change to the networking environment must be similarly treated, even if the need for a change originates within the IT core staff. Front-line experience has demonstrated that seemingly innocuous changes to configuration have caused revenue impactful unforeseen problems.

Ditto at the market level. Incorporate local ops managers and engineers into the ticketing system. Changes in the local environment should be subject to the same ticketed documentation. This increases the likelihood that a quick review of documented changes yields clues to what is wrong. Besides, given the differing architectures and technologies, market to market, assuming that a change will have only a positive effect is needlessly risky.

This does not mean local markets should dictate the flow of software updates or needed configuration adjustments, only that they know changes are made so that any impact can be identified and reported. Similarly, the centrally managed IT core staff needs to know when connected assets change. No matter whose phone rings with trouble, having as much information as possible is always a plus.

Traditionally engineering and IT folk have similar skills, education and background. The diversion happens when it comes to the production environment. Engineers are specialists; they are intimately involved in configuring and supporting the automation tools and delivery systems that drive the broadcasts. The IT teams are responsible for moving the information around the LAN and WAN as required, as well as supporting the connectivity to the network directory services.

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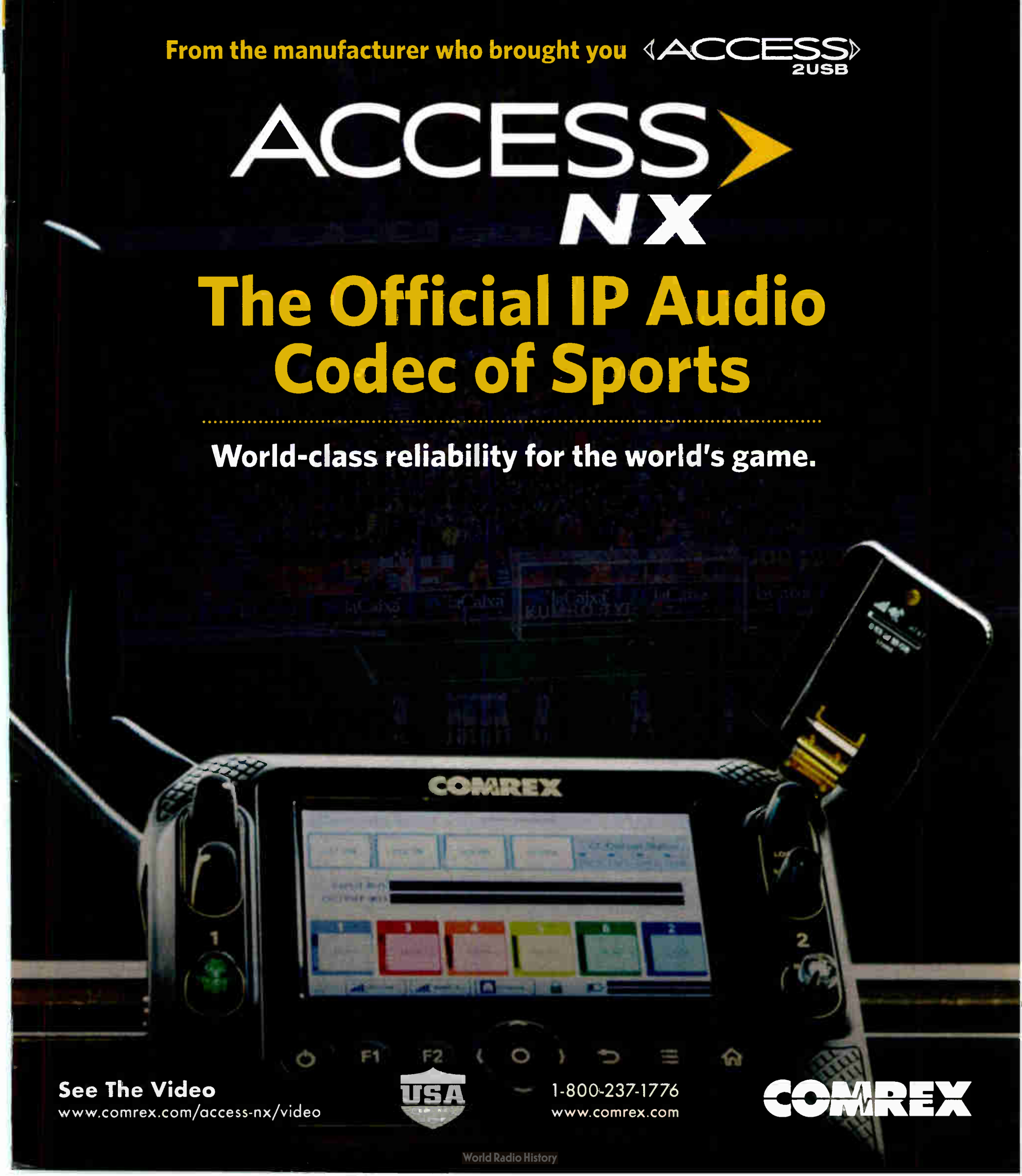

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MACGYVER & IT

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The point is that these groups should have the DNA required to back each other up. Cross-training can solve many of the challenges faced by both groups and tighten collaboration.

3. ***Create a Knowledge Base.*** Radio stations tend to grow ad hoc systems, driven by need. Often only the individual who created it has an understanding of how a system works. This is an invitation to disaster.

On a periodic basis, perhaps once or twice a month, some system should be chosen and "written up" with a summary description of the functionality, components, device locations and external connections. Identify obvious failure modes when possible. Over time every system would be similarly documented. As these systems change, this forms the core of a journal.

An external provider like Google Docs is probably a good choice to house this, since access is supported anywhere from almost any device. Such a system would foster understanding and is a resource for other markets with similar environments and challenges.

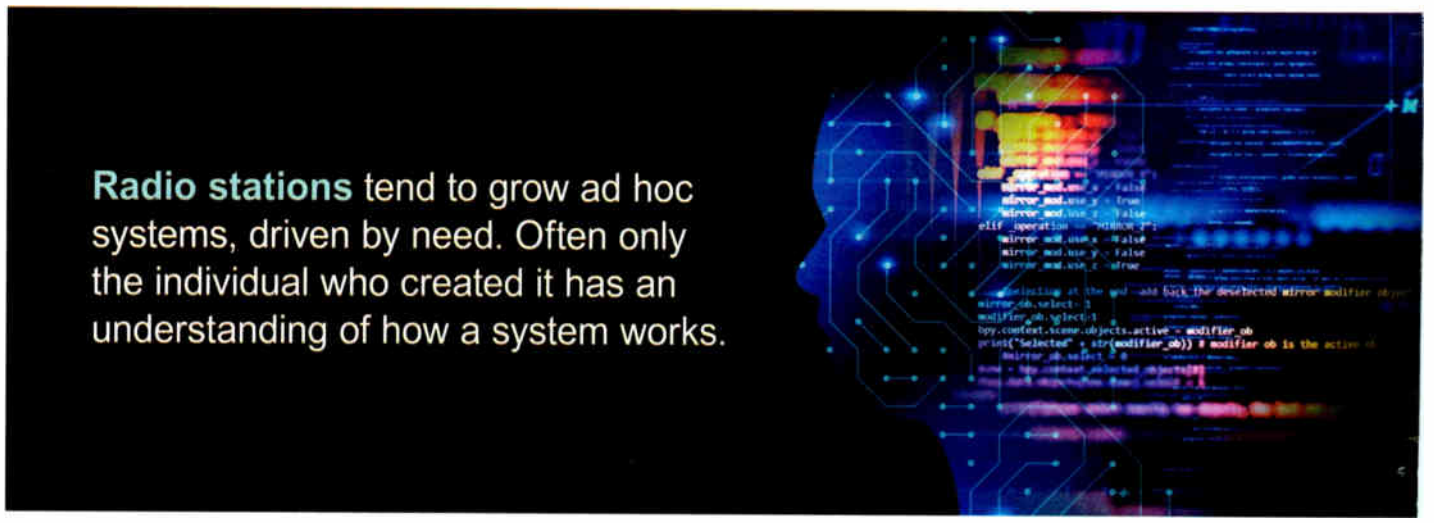
4. ***Encourage Adoption of Small-Scale Automation.*** Increasingly, the IP environment is being used to automate routine activities and monitor itself. These functions involve everything from simple scripting through IP codecs and even original software for the Raspberry Pi and other open-source embedded systems. In most cases, these new uses extract added value from the existing network in new station services or fewer employee hours. Initiatives of this kind are essential for increased productivity but don't come in a one-size-fits-all package.

This brings us back to the MacGyver-moves-on problem, though. Original designs and one-off solutions can be a headache for the next engineer or IT person if they are not understood.

But maybe there's an opportunity to make lemonade from these lemons. If original designs are presented in document form (schematics, text explanations, etc.) to the corporate tech staff before prototyping and deployment, useful ideas that originate in one market become off-the-shelf solutions for other stations and markets with similar needs.

5. ***Create a Sandbox for Local Programming and Control Functions.*** Given the difficulty in meeting the security requirements for business data on the same network platform as broadcast operations, one possible solution is to firewall off the programming and operations side.

In today's M&A environment, it is important to separate the automated production environments and tower facilities from the business-side back office environment. When and if a market is separated, partially or wholly, it is not unusual for the buyer to take over the production automation systems and program delivery assets. The seller then retrieves any and all equipment holding proprietary intellectual property and/or configurations.



Designing these from the beginning as separate entities with *strong* edge protection makes sense. In this way, full access can be given to the local market technical staff while the corporate IT group keeps the global access separate. The log reconciliation process between automation and traffic systems provides a logical boundary and cross check for the firewalled entities.

6. ***Give Local Operations and Engineering Staffs Some Administrative Control Over the Network Assets They Rely on*** — at least to the level that allows maintenance of workflow software and directory tree access specific to the production and program delivery environment. Local technical staffs could then more easily maintain software and troubleshoot problems, often working directly with a vendor. In cases where outside connectivity providers like local telephone networks or ISPs are part of the program delivery system, local staffs need quick access to edge connectivity equipment.

This is acknowledged to be a break from traditional IT architecture and management. Levels of local autonomy may need to be staged based on local staff abilities. And the desire for autonomy might be an incentive for local staffers to pursue IT industry certifications, a worthwhile goal.

7. ***Acknowledge That Local Staff Will Make Use of Alternative Access Methods.*** Free or modestly priced remote access applications drive this process. Some are products of companies with a history of security.

For example, LogMeIn is a product owned and supported by Citrix, long in the application access business. Others like TeamViewer and Dualmon have different backgrounds. VNC is still around. There are and will be others. They'll have differing feature sets and will be adopted as needs arise. In some cases, access to station assets will be granted to clients or to talent with home studio origination capabilities.

Work-from-home options broaden the pool of possible employees, a retention and cost reduction strategy needed in today's tight labor market. But all these connectivity schemes breach the customary corporate-login firewall VPN approach usually granted to remote employees, vendors and customers. This is another reason to sequester programming and operations from other network functions. (See "sandbox," above.)

8. ***Grant Configuration and Administration Rights Commensurate With Evidence of Competence.*** Nearly every well-known vendor of networking hardware grants certification. Cisco and Microsoft certification are both industry standard touchstones. There are others, but all the meaningful ones require study and proctored testing.

An employee who passes these tests has demonstrated initiative and interest. Broadcast groups should encourage and support continuing technical education through reimbursements, bonuses or both. Individuals so credentialed should be given preference in hiring decisions and compensation.

While this would qualify hands added to the access list, it does not address the importance of keeping up with global changes that are made outside the local market and, more importantly, strategic global changes that are being considered.

This would broaden the audience that would be required to participate in these changes and must be considered when evaluating the breadth of inclusion in decisions. If every change must be unanimously approved, progress would halt. Perhaps a small power-users group of tech-savvy market staffers, serving on a rotating basis, would be a solution.

9. ***Replace Corporate-Provided Local Market Services With Cloud-Based and/or Barter Providers Where Possible.*** The best example of this is found in on-air telephone systems. The requirement that a VoIP phone system be connected to the public switched telephone network has led some groups to combine office and on-air back-end VoIP services. This, in turn, has moved the boundary of security concerns into the operations and programming domain. There are dozens of highly secure VoIP connectivity providers; and some might even consider a barter arrangement for connections.

This same solution might be used for other services, where provisioning and routing through the corporate network presents a security concern or where revenues are insufficient to support a local IT staffer.

Radio will continue to demand more efficiencies. As an example, Chicago, once a market that supported $100-million-plus valuations, has seen a recent sale of an FM with full market coverage for near $20 million. This underscores the reality that a major part of the capital value of radio groups is no longer the broadcast licenses or other tangible assets. It's in the productivity of its employees. Finding new revenue, efficiencies and economies at both the group and local market scale is essential as competition for advertising dollars gets ever tougher.

For this to happen requires that everyone pull on the oars in the same direction. For the sake of the industry we all love, this is an imperative we must all embrace.

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How We Recognize Excellence in Wisconsin

State association builds a strong awards program around fun, flexibility and competition

STATEASSOCIATIONS

BY LINDA BAUN AND KYLE GEISSLER

The authors are, respectively, the vice president and the director of operations and public affairs of the Wisconsin Broadcasters Association.

Radio and television stations from around Wisconsin submitted 1,784 entries to the most recent Wisconsin Broadcasters Association's Awards for Excellence. Nearly 400 broadcasters attended the Awards Gala.

The awards program wasn't always the largest state broadcast awards program. In 2006, the awards were handed out over a lunch with 586 entries. A new program launched in 2007 with numerous changes, but the key difference was that a committee was formed that would continually reassess the awards program to address fast-moving changes in the broadcasting business.

This year's theme was the Kentucky Derby. Members leapt on the opportunity to dress up.

Veteran broadcasters Lindsay Wood Davis, Broadcast Management Strategies, and Tom Bier, retired general manager of WISC(TV) in Madison, spearheaded this new program. It generated more than 800 entries in its first year, an increase of more than 200 in just one year. It's grown every year since then.

The other key change made to the program in 2007 was the introduction of Station of the Year awards. These awards are given to newsrooms and stations based on a point system. The point system encourages stations to enter as many categories as they can, although there is a limit to the number of submissions allowed in each category.

The Station of the Year award comes with tremendous promotional value and is a source of great pride for stations and employees.

SERIOUS EFFORT ...

The WBA Awards Committee has 12 members that provide their expertise in the categories of music radio, news and talk radio, television and social media.

WSAW(TV) in Wausau was named Small-Market TV Station of the Year.

The guiding principle for the committee is to encourage broadcasters to be the best broadcasters they can be. This often means a focus on community engagement and staying relevant with new technology.

The committee meets after every awards program to review statistics from the most recent program and make changes to keep it fresh and dynamic. The committee is dedicated, hard-working and committed to providing the best of the best in awards programs.

The WBA works very hard to make participation in the awards program as easy as possible. All submissions happen online. We use a vendor named BetterBNC to manage our award submissions and judging. Our submission deadline is at midnight and we always have staff available until after midnight to answer any questions.

The WBA partners with other state broadcast associations to have submissions judged which has been one of the challenges of having an ever-expanding awards program. We are now asking numerous states to help complete the job.

When we get the results, we tell stations which entries have won a first, second or third place award, but we don't tell where they placed. They also don't know which stations also placed in each category and the Station of the Year awards are also a surprise to all members on the night of the gala. Those awards are handed out at the end of the night.

... FUN EVENT ...

The Awards Gala itself has become a huge event. The event has been at the Madison Marriott West for many years and draws broadcasters from all over the state. Managers use the gala as a way to reward their teams for a job well done. It's a cost-effective team building activity. We see many people at the gala that we don't see at other WBA events.

And it's fun. A theme is chosen for each gala. Last year was the Great Gatsby. This year was the Kentucky Derby, playing off the timing of our gala on the same afternoon as the famous horse race. Our members leapt on the opportunity to find derby-worthy hats, bow ties and a jockey, bugler and rubber horse head mask were also spotted.

We put a heavy focus quality video and audio production, décor, food and the quality of the actual awards given to our members. When someone wins an award, they go home with something they're proud to display. Visit most WBA member stations, and you'll very likely notice the WBA awards they have proudly displayed in their lobby.

We promote the #wbagala hashtag, which gets a lot activity on gala day and the days that follow. This year the hashtag reached more than 830,000 people. In recent years we've also added a Snapchat filer and Facebook livestream of the Station of the Year awards to further expand our reach.

YEAR-ROUND EFFORT

While awards season is only once a year, we're talking about it year round. It's important for promotion, but it's also important for stations to be thinking about it so they can identify their award-winning work during the course of the year.

Promotion, relevance and hard work will certainly do a lot to strengthen an award program, but much of the WBA's success comes down to quality: quality member services, quality event planning and inspiring members to produce their own quality work that everyone in the association can celebrate.

"The awards show how broadcasters support each other in their public service mission and take pride in their important work," said WBA President and CEO Michelle Vetterkind. "The friendly competition at the awards gala is a great way to celebrate the best in Wisconsin broadcasting. When broadcasters are doing their best work, we all win."

Radio World invites submissions from state broadcast associations about their activities. Email radioworld@futurenet.com.

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WAZE

(continued from page 1)

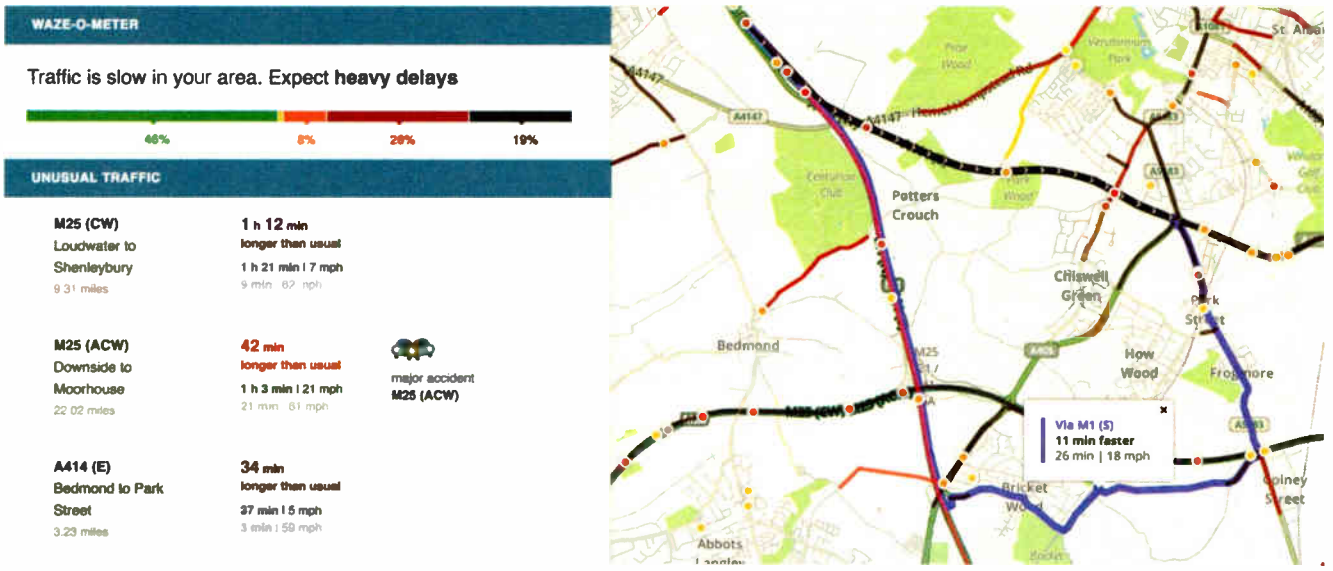
Show. We asked her about the company's message for radio stations.

Radio World: *What prompted Waze, known for its driving app, to launch a program called Waze for Broadcasters?*
Mona Weng: In July 2011, the Interstate 405 in Los Angeles shut down for 53 hours between the 10 Freeway and the 101 Freeway for construction. The event was named "Carmageddon," and ABC 7 Los Angeles reached out to Waze for crowdsourced insights and alternate routes they could offer their audience.


Mona Weng

After Carmageddon, Waze realized we could help more local media partners with real-time insights and actionable recommendations that would in turn benefit the greater driver community. In the last seven years, we've expanded exponentially from one to 850 partners in 70 countries. We partner with radio and TV stations, and news publishers.

RW: *What is it exactly, and what can it do for stations?*
Weng: We offer our partners a suite of different data and tools that enable them to create meaningful and relevant traffic content on-air, on social and web. For radio, partners can access a web tool called TrafficView that gives them access to their curated Watchlist of top routes (automatically sorted from worst to best conditions currently), an unusual traffic alert feed of newsworthy incidents, as well as a "Waze-O-Meter" that provides an overall pulse on the city, i.e. "Please expect heavy delays; 39 percent of your coverage area is stuck in bumper-to-bumper traffic."



TrafficView here displays the Waze-O-Meter, local map and a feed of unusual traffic.

RW: *What is the business relationship required to become a partner; and what costs or revenue can stations expect?*
Weng: Waze for Broadcasters is completely free. We offer our partners tools and data in exchange for on-air mentions. Since our relationship is not commercial, our partners have seen significant reductions to their bottom line. Our offering can also help our partners deepen their engagement with audiences, and consequently, increase their revenue.

RW: *What are the hardware or technical requirements?*
Weng: For radio partners, all you need is good internet to access our web tool via your browser. TV partners need an iPad running the latest iOS, Apple TV to Airplay from the iPad to the studio as well as good internet. Our set-up works for 99 percent of all studio systems globally.

RW: *You don't offer regional exclusive arrangements or white-label solutions. Why?*
Weng: Waze was created by the community for the community. We believe it's our obligation to remain an open platform, and serve the community equally. That being said, partners work with us in different ways, so we are always open to discussing what works best for them.

RW: *You talk about station partners being able to add unique value by "focusing on context and solutions." What does that mean, specifically?*
Weng: It's crucial to consider why people listen to or watch traffic news daily. It's important to be informed, but their biggest motivation is to understand how road conditions impact their specific commute.

Waze enables our partners to move away from "there are accidents and slowdowns due to a five car pile-up" to "because of the 7:45 a.m. accident at the Shoreline exit, expect average speeds of 27 mph compared to the usual 43 on Mondays around 9:30 a.m. Take the Middlefield Way exit through Rengstorf to save 17 minutes and go roughly 40."

The context is the current speed/drive times compared to the historical speed and drive times, and solutions are alternate routes that we provide so people know there are other options that can speed up their commute.

RW: *What are W on Air, Traffic View and Waze Live Map?*
Weng: W on Air is our iPad app for TV broadcasters to easily create visual illustrations of traffic conditions. You can see a few partners around the world using it on YouTube [search Waze Broadcast Program Global Sizzle Reel].

Traffic View is our tool primarily for radio broadcasters. It tells them the pulse of the city (e.g. 33 percent of San Francisco is currently in bumper-to-bumper traffic), displays an automatically updated feed of unusual traffic alerts, with current speeds/drive times listed in comparison to usual/historic speeds/drive times, and also allows them to build a Watchlist of their top routes *and* usual suspects. The Watchlist is automatically sorted with the worst traffic routes at the top.

Waze's Live Map is a real-time map that partners can embed to supplement

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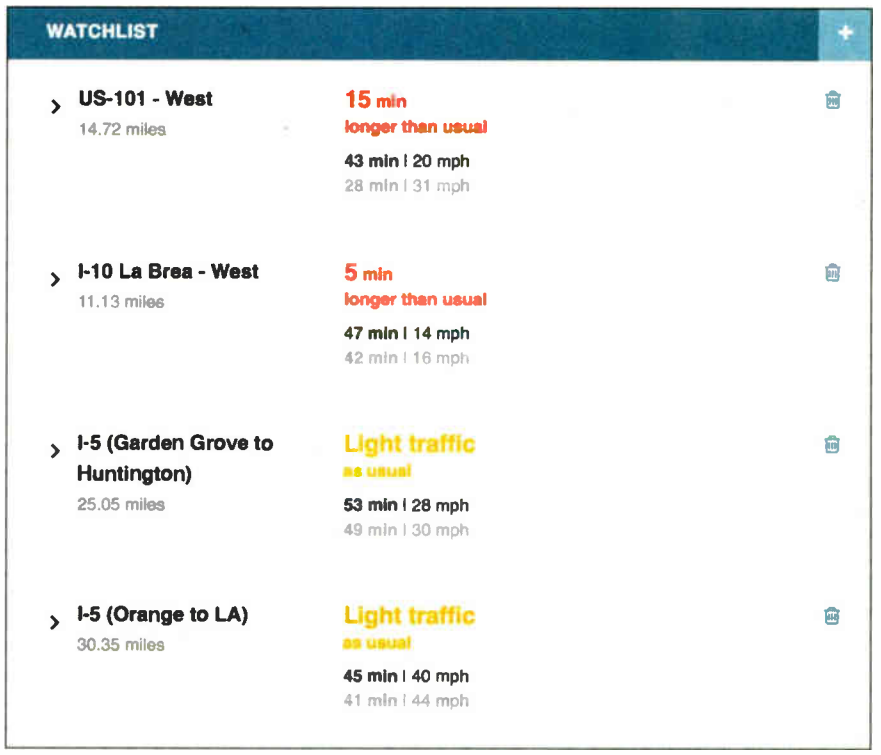

Sample Watchlist

NEWSWATCH

NAB WORRIES ABOUT COMPETITIVE VIABILITY OF SMALL-MARKET STATIONS

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

So writes the National Association of Broadcasters in a filing to the FCC recently. NAB was commenting about competition in audio programming, part of the commission's preparation of a congressionally-required communications marketplace report.

NAB's comments provide a snapshot of the competitive environment facing U.S. radio broadcasters in 2018.

They explored the "transformation" of the market for delivery of audio programming since the 1990s, when free terrestrial radio and purchased recordings "were the only options for obtaining audio content and the only listening devices were AM/FM radios, turntables and tape/CD players."

Today, NAB wrote, even though 92 percent of U.S. adults listen to linear broadcast radio during an average week, millions of consumers use the range of digital options available in an increasingly fragmented listening market. It noted that an estimated 160 million persons 12 and older listen to online audio weekly. "Streaming music platforms have grown dramatically during this decade, and podcasting's 'share of ear' has doubled in just the past four years." Younger listeners in particular have embraced digital audio sources and devices, it said.

And it noted that SiriusXM is set to become a much more formidable competitor among streaming services with its merger with Pandora, creating what has been described as the world's largest audio entertainment company.

The association said the FCC's upcoming Communications Marketplace Report "must reflect how digital technologies have significantly expanded the number of audio content providers and the marketplace choices available to listeners."

Though it shies from specific large-scale policy suggestions, there are areas wherein the association urges that something be done. It points to traditional radio's (and TV's) community attachment: "Given the importance of OTA radio service in rural areas and small communities often lacking other media outlets, including locally-licensed TV stations, NAB and the radio industry are particularly concerned about the continuing competitive viability of small-market radio stations."

Read the filing at *https://tinyurl.com/rw-audiomarket*.

(continued from page 12)

news articles. For example, ABC 10 used our Live Map embed to keep their audience updated on the roads impacted by the fires in California. We also offer a free iFrame that partners can embed on their home or traffic pages.

***RW:** Give some examples of U.S. radio broadcasters who are active partners.*

Weng: WTOP in Washington was our first radio partner in 2014. We work with a number of radio partners in the U.S. and beyond. Waze for Broadcasters is always looking to expand our presence. If you are interested in becoming a partner, sign up at our new Partners Portal [available via *www.waze.com/broadcasters*].

In October, Waze also launched Waze Audio Player and announced audio partners including iHeartRadio, NPR One, Pandora, Deezer, Scribd and TuneIn. The company was already partnering with Spotify.

Repair and Protect Type "N" Connectors

And what's a Multiport, anyway?

WORKBENCH
by John Bisset
Email Workbench tips to johnpbisset@gmail.com

It's happened to all of us: The center pin of a Type "N" connector gets deformed, as seen in Fig. 1. The resulting poor connection can be frustrating. As Murphy's Law would have it, there is no spare connector or pigtail to use as a replacement.

Frank and Dave Hertel, principals at Newman-Kees RF Measurements and Engineering, have a great solution to the problem, so don't throw out the connector just yet.

If the center pin flanges are not broken off, merely bent, a package of plastic fuel line costing less than $5 may correct the problem (Fig. 2). Cut several 1/4-inch pieces and store them in a resealable container. Contract engineers in particular will want to keep several of these on hand.

The next step is to bend the splayed contact fingers slowly and carefully back into shape. It's important to take your time. Use a dental pick or similar fine-tipped instrument to coax the spring fingers gently back in place. If you are aggressive, you will break the fingers.

Fig. 1: Don't throw away damaged Type "N" connectors.

Make the bends in very small increments (demonstrated in Fig. 3). If you are patient and wait 10 to 15 seconds between each small bend, you will have a better chance of reforming the center conductor fingers.

Once the fingers are bent back into position, you need a way of keeping the fingers snug around the center pin of the corresponding connector. That's where the 1/4-inch piece of silicone fuel line comes in. Slip it over the center conductor fingers. A pencil eraser is the ideal size to press the silicone fuel line sleeve over the fingers, as seen in Fig. 4.

Frank and Dave recommend using these sleeves on new connectors and jumpers as well. That's why you'll cut a number of these 1/4-inch pieces and keep them in your tool box. Slip the sleeves over new connectors during installation to guard against damaging the connector.

There's another benefit: dealing with water damage. One of the biggest problems with STL type "N" jumpers is the ingress of water. Over time, a good weather-proofing seal can go bad. The resultant moisture entering the connector can reduce signal level.

The Hertels say that their experience shows adding this little sleeve greatly reduces the moisture problem. The silicone gas line sleeve acts as a water barrier, should moisture enter the connector.

There is no need for concern regarding signal loss or mismatching of the system using the silicone gas line. Within the 950 MHz range of the STL spectrum, no mismatching or losses have been measured or noticed. Since you buy the

(continued on page 16)

Fig. 3: Slowly coax the splayed fingers back into position.

Fig. 2: Cut a length of plastic fuel line into 1/4-inch pieces.

Fig. 4: Use a pencil eraser to press the silicone fuel line sleeve gently over the center conductor.

NOW PLAYING

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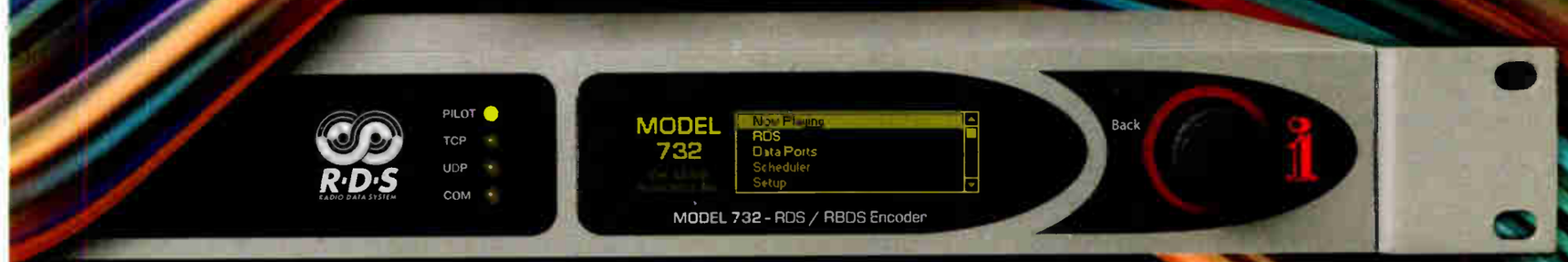

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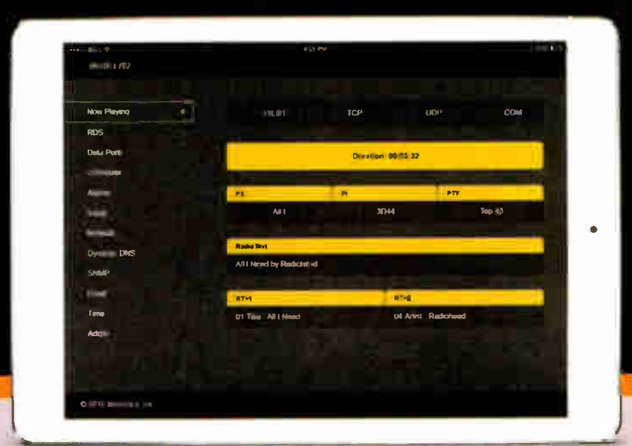

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Shared Passion Builds Community for Student Broadcasters

Hundreds of students gather in Seattle for tips, training and camaraderie

STUDENT BROADCASTERS

BY JENNIFER WAITS

From drones to #MeToo, the 2018 National Student Electronic Media Convention covered much ground during its recent gathering in Seattle.

For four days in October, student broadcasters met and mingled at College Broadcasters Inc.'s NSEMC. The annual event drew a near-record crowd of 416 attendees from 28 states, from Florida to Alaska. With sessions geared towards not only the radio crowd, but also television and web-oriented media outlets, the conference featured a mix of workshops, panels, station tours — KEXP(FM) and KOMO Radio and TV — a student media awards ceremony and even a film festival.

Half-day pre-convention workshops provided opportunities for participants to hone their skills in podcasting and audio storytelling through sound. Additionally, a full-day deep dive into MusicMaster allowed attendees to learn the ins and outs of that popular music scheduling software.

During the main three days of the conference, up to seven simultaneous sessions took place, making for a jam-packed schedule. The dizzying number of options included pragmatic primers (Slack, Adobe Audition, Gselector, etc.), deep dives into FCC rules and legal issues, marketing and social media tips, case studies on station success stories, as well as programming-oriented panels and more.

FUTURISTIC TECHNOLOGY — AS WELL AS THE CLASSICS

With sessions like "Introduction to Drones" and "Pick up the Slack in Your Organization" sharing tips and tricks for operating drones and using the hot communications tool Slack, the Seattle event touched on some of the newest tech and trends. Yet student presenters also lauded the use of old-school practices, like handmade paper 'zines.

Students broadcast live from the Cybercast at CBI's National Student Electronic Media Convention.

Jennifer Waits

During "Zines! A Brief History and Workshop," representatives from KALX(FM), KUSF.org and WKNC(FM) gave an illuminating presentation on fan zine history, tracing links to science fiction culture in the 1930s and 1940s, to the punk music scene in the 1970s and 1980s, through to the 1990s riot grrrl movement. College radio stations have published 'zines for decades, and the panelists shared that it's an easy and inexpensive way not only to promote one's radio station but to express its unique identity.

Some specific tips from the panel included using online templates (to make construction of the 'zine easier), taking advantage of copyright-free images and hosting a 'zine-making party with your station. They also pointed out that a 'zine could even be made using just one sheet of paper that's been folded into a small booklet.

FROM MENTAL HEALTH TO #METOO

Serious topics like mental health and sexual harassment were broached in packed sessions.

The Saturday morning session, "Supporting Female Broadcasters Through the #MeToo Movement," was full of lively roundtable discussions. Those who woke up early for the chat shared personal experiences and strategized about how to make student media outlets safer spaces for women and people of color.

Similarly, "Managing Your Mental Health and Your Staff" delved into the importance of taking care of oneself and one's staff, while attending college and working in broadcasting. Therapist Kelly Orchard and professor of psychiatry and behavioral sciences Dr. Patricia Areán offered wisdom to an overflowing room of conference goers.

Loyola University Maryland's WLOY General Manager Tara Howell organized and hosted the mental health panel. "I decided to propose the session because it is something that is important

(continued on page 18)

WORKBENCH

(continued from page 1)

silicone gas line in three-foot lengths, you might think it will last a long time.

As soon as your engineering friends and associates see what you are doing, they'll ask for a 6-inch or 1-foot piece to cut their own 1/4-inch sleeves. If you're looking for an SBE meeting activity, buy a length of line and some polybags, and snip a bunch of sleeves for everyone to use.

Frank and Dave used Team Associated Fuel Line 3-7725, found at *www.activepowersports.com* for less than $5.

Thanks guys for sharing this useful tip. Contract engineers can use it as a fee-added or a value-added service for clients. Chief engineers will find that this sleeve provides peace of mind for all their Type "N" connections.

Fig. 5: A Henry Engineering Multiport provides easy I/O to any studio.


Fig. 6: The rear of the Multiport panel.

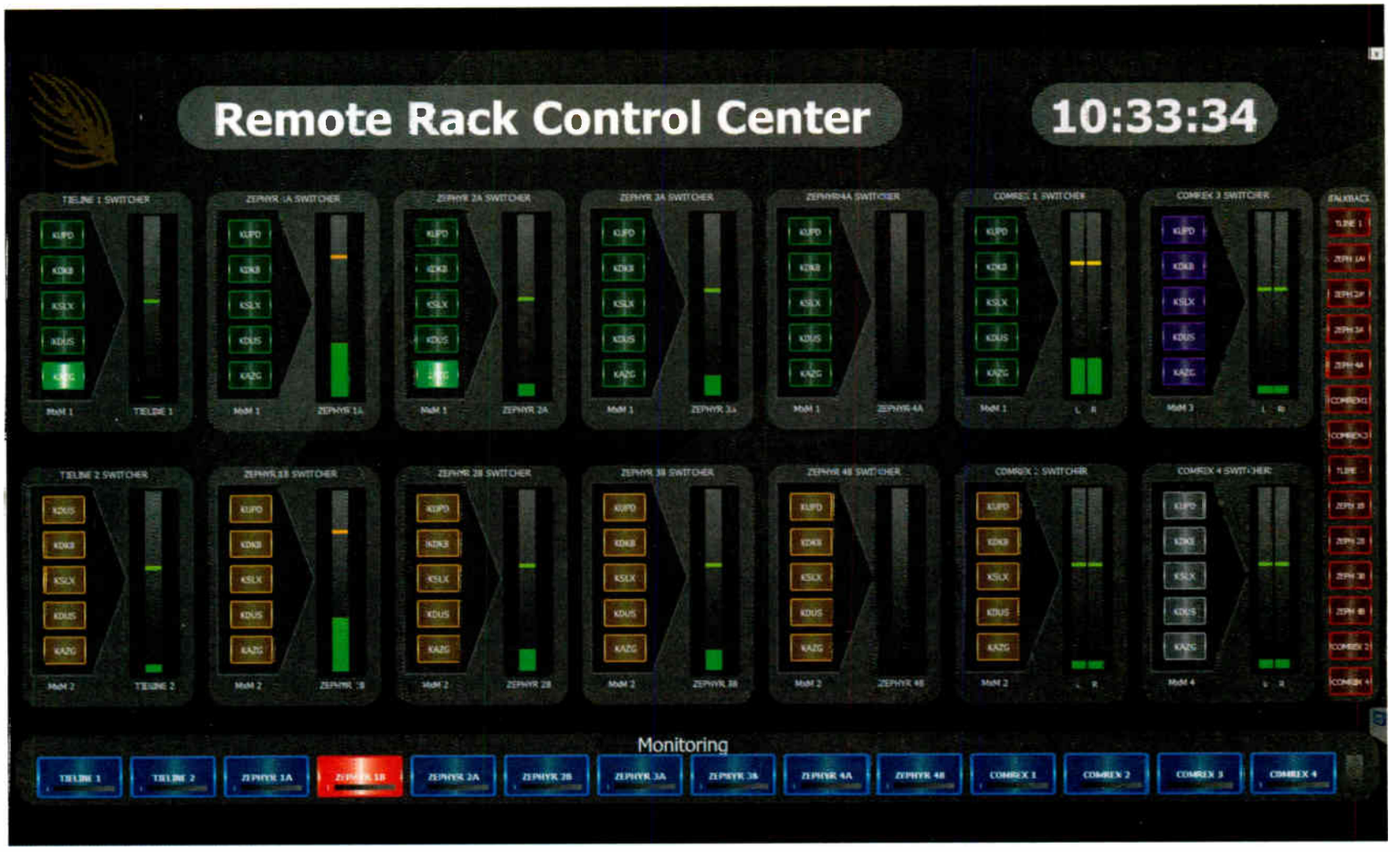
Nearly all the new studios I've seen recently being planned and installed have specified at least one Henry Engineering Multiport.

Seen in Fig. 5, the Multiport is an interconnect panel that facilitates the interface of external audio equipment to the studio for both analog and AES/EBU connections. Also called a world feed panel, this product permits interconnection of both broadcast professional and consumer gear to the studio console. Multiport also provides two "pass-thru" connectors for easy access to USB and RJ-45 circuits.

The USB connector is reversible; either the square or rectangular jack is available on the front panel. The rear of the Multiport is seen in Fig. 6. Contact your favorite broadcast equipment dealer for more information.

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

Author John Bisset has spent 48 years in the broadcasting industry and is still learning. He handles western U.S. radio sales for the Telos Alliance. He is SBE certified and a past recipient of the SBE's Educator of the Year Award.



This screen in the Hubbard Phoenix rack room provides easy touchscreen access to the group's assortment of codecs for its five studios. Included are monitoring and talkback buttons for set up and testing of remotes. Screen courtesy of RadioDNA

NSEMC 2018

(continued from page 16)

to me, as well as something that I felt was missing from the discussion at CBI … In the past, management and how to step into management has been a topic for discussion and sessions, but not necessarily how it can take a toll on your mental health, as it did for me.

"The combination of stress in college, stress at work and my suffering mental health was not easy for me," she said, "and I felt like now, as a grad student and as the general manager for WLOY for the third year, that I was in a place to reflect and share the lessons that I had learned the hard way in the hopes that someone else didn't have to."

As to why this conversation is so important at a student media event, Howell said, "College seems to be the time where people are the busiest, but also running their bodies and selves to the ground. It's an incredible period of growth and learning, but also incredibly draining. You can't be your best or get the most of your experience if you are burnt out. It is also incredibly important to teach the skills and emotional intelligence to take mental health and wellbeing seriously now, instead of later."

THE POWER OF GRASSROOTS ORGANIZING

"It's a story about saving something that you love," proclaimed Joey Cohn, president and general manager of KNKX(FM) during an inspiring session on "The KNKX Miracle — How Community Support Saved a Station."

When KPLU(FM)'s license holder, Pacific Lutheran University in Tacoma, Wash., announced its intention to sell the FM channel to University of Washington's competing public radio station KUOW(FM), fans of the long-time music and regional news station KPLU fought back. The community galvanized, forming a nonprofit and raising $7 million in four months to match the existing offer for the license. Ultimately successful in their efforts, the former KPLU has carried on with its long-standing programming with new call letters KNKX, while being run by an independent nonprofit.

A truly grassroots effort, the station averted a takeover by KUOW largely because of broad listener support. Community meetings were held across western Washington and fans organized more than 100 fundraising events in the Puget Sound region. More than 24,000 donations came in, ranging from 43 cents to $250,000. Defying most fundraising wisdom, the new nonprofit brought in millions of dollars comprising mostly small donations from individuals.

Lessons learned from this endeavor are applicable to all radio stations, even if there is no impending crisis. Matt Martinez. KNKX director of content, suggested that all stations accept help from fans when help is offered. He also said that it's important to "invite the community in," and remarked that as KNKX plans for its new studio, it wants to have a "very public space," where the station can interact with its listeners.

"Our work is super important to people," KNKX Director of Development Mary Dunaway relayed, adding that supporters "stretched themselves" to give more than ever before to save the station's local newsroom and jazz programming. She reiterated that "people care about your work."

THE MURKINESS OF INDECENCY

At the start of "FCC Regulation of Indecency, Obscenity and Profanity: From Pacifica to Colbert," attorney Daniel Kirkpatrick posted a warning that the session would contain "offensive language and offensive government policies." The dry humor extended throughout the discussion of how FCC-licensed stations navigate policies about obscenity and indecency.

Walking the audience through numerous Federal Communications Commission decisions, Kirkpatrick pointed out some confounding inconsistencies on what has been judged to be indecent over the years. Looking ahead, he pointed out that in the current political landscape, it's likely that news reporting will touch on "controversial matters" and that the "partisan atmosphere" could lead to more content-related complaints being filed with the FCC.

Kirkpatrick said that indecency regulations typically are clarified based on specific cases, so guidance on what is appropriate for stations to air is ever-changing.

SWAG SWAPPING

The annual Swag Swap Social was the place to be on Thursday night. As stations arranged piles of promotional items on tables throughout the room, participants roamed about, stuffing as many stickers, magnets, T-shirts, drink koozies, sunglasses, keychains, cups and chip clips into their tote bags and backpacks.

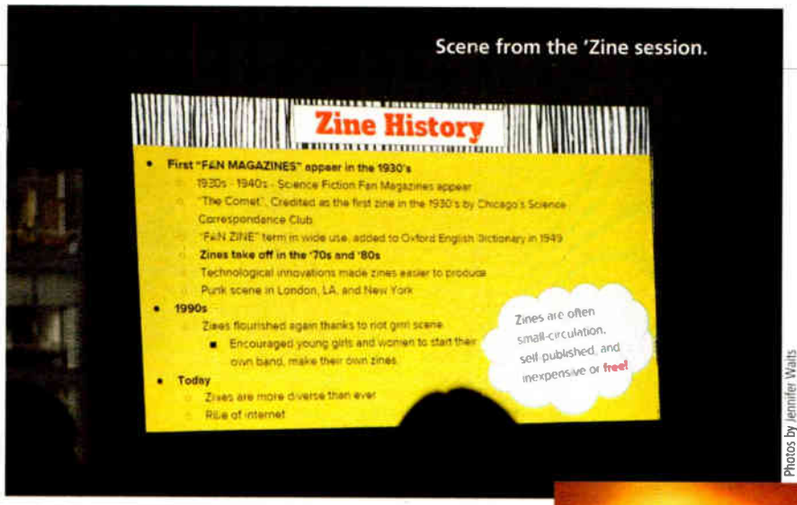
The camaraderie of mingling and trading advice with one's peers was a vital part of CBI's Seattle gathering.

"I enjoyed the opportunity to network and converse with people from across the nation about our shared interests," reported CBI's Student Representative Ave Martin, a junior at Colorado State University.

Reflecting on the convention, CBI Development Director and WSOU(FM) General Manager Mark Maben said that his students are putting what they learned in Seattle into action.

"I was inspired by how much my own students got out of the convention this year," Maben said. "So many of them came back motivated to be better at what they do … This is what you want to see, students taking what they learned and using it back home. In addition to that, it's always inspiring to me to see how easily our attendees get along with one another. A shared passion does build community."

Planning is underway for CBI's next convention in St. Louis, Mo., Oct. 30 to Nov. 2, 2019. Baltimore is in the books for October 2020.



Scene from the 'Zine session.

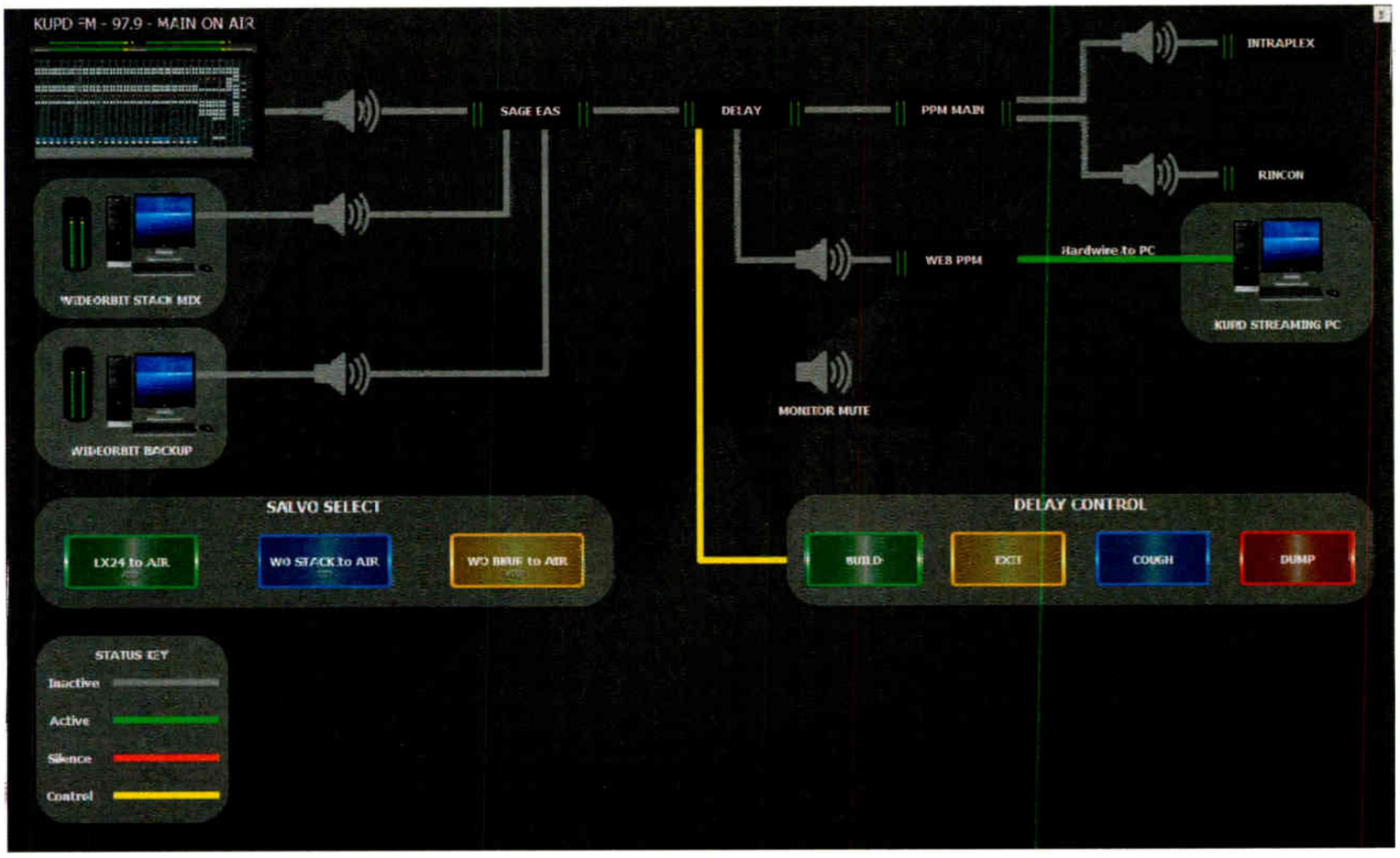
Photos by Jennifer Waits


Ernesto Aguilar (NFCB), Will Robedee (KTRU Rice Radio) and Jennifer Kiser (KCSB) hanging out between sessions.


Representatives from KALX(FM) pose with an award at CBI's National Student Electronic Media Convention. From left: Caroline Champlin, KALX co-news director; Lena Ghazarian, KALX operations manager; and Kelly Soria, KALX co-news director.


Above: WSOU(FM) skulls are an unusual promotional item.

Left: WKNC koozies at the CBI NSEMC swag swap.



This virtual control panel for KUPD-FM, Phoenix, provides easy control and indication of the station's program flow, including salvo selection and delay control. Courtesy of RadioDNA.

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MARKETPLACE

EEK! A Spider!: Lectrosonics, a company known for its wireless microphone products, has been plowing new ground in recorders.

Adding to its microdigital/handheld recorder line is the SPDR — stereo portable digital recorder — a stereo version of the earlier PDR.

The SPDR records BWAV files to microSDHC cards. It samples at 24-bit, 48/96 kHz. Inputs consist of analog line level and AES digital sources or from lavalier microphones wired for standard TA5M inputs. There is a headphone output.

For more sophisticated operations, the SPDR can be jammed with time code via an industry-standard five-pin Lemo connector, and it has a temperature-compensated (TCXO) time base crystal.

It will work with the PDRRemote, a third-party iPhone/Android control app. Optional battery power is courtesy of two AA batteries. A small high-definition display provides information. It is housed in an aluminum beltpack-style case.

Info: www.lectrosonics.com

Plan B Option: Codec maker Comrex has introduced HotSwap, a new feature for their Access and BRIC-Link II IP codecs.

According to the company HotSwap is a long-sought reliability feature. It allows users to have a backup for their signal in event of a failure. Comrex points to STLs as being ideal partners for HotSwap.

Specifically, HotSwap lets users select a network that will only be engaged if the primary network fails. Comrex says that the switch to the new network should be seamless. It will switch back to the primary network when it becomes functional again.

HotSwap works with wireless modems. For Access codecs, any supported modem can be used as a backup. For BRIC-Link II, only Comrex Connect Modems are supported. 4G LTE Comrex Connect Modems are available for purchase through any Comrex dealer. Verizon, AT&T and international versions are available.

HotSwap also works with Comrex's CrossLock IP network efficiency and redundancy technology. According to Comrex, "CrossLock lets users bond networks together so that more bandwidth is available. Alternately, in redundancy mode, users can send identical streams down both networks."

HotSwap adds a new feature by making it possible to designate one network as primary and another as a secondary network to be used only when the primary fails. HotSwap is included in firmware Version 4.3, which is available now for all Access and BRIC-Link II codecs. Users can download it for free using Device Manager.

Info: www.comrex.com

Update: Lawo has rolled out several major upgrades with the release of R3LAY 4.0 software.

According to the company, a significant new feature in R3LAY 4.0 is the addition of SMPTE 2022-7, which is sometimes referred to as Seamless Protection Switching or "hitless merge."

ST2022-7 is an AoIP standard for simultaneous transmission of dual, identical audio streams via independent network paths. This, says Lawo, allows for instant, undetectable switching to a backup network link should the primary be interrupted.

R3LAY 4.0 also includes multiple independent headphone controls for multi-mic talk shows; preview of external audio sources from AES67/Ravenna network prior to fader assignment; selectable audio processing with user-definable presets on PGM and REC busses; support for GPIO control of VRX8 functions via open-source Ember+ protocol; and enhanced facility integration with remote switching of output streams now possible via Lawo VSM and Matrix Server software, as well as Ember+.

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Consultants Peer Into Crystal Balls

Predict more syndication, more podcasts, same commercials in 2019

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Broadcasters who realize the future is in content, not towers, will be the survivors.

— David Gleason

OUR PANEL OF PROGNOSTICATORS

Alan Burns, president, Alan Burns & Associates

David Gleason, Hispanic market programming consultant

Scott Huskey, co-president, RWPC Inc.

Fred Jacobs, president, Jacobs Media Strategies

Randy Lane, president, The Randy Lane Company

Sam Milkman, EVP/senior consultant, Coleman Insights

Harry Lyles, president, Lyles Media Group

21ST CENTURY PD

by Dave Beasing

They visit dozens of radio stations each year, meeting with weekend DJs, CEOs and everyone in between. Consultants see what's happening in the trenches of radio from coast-to-coast. Who better to predict the future of radio programming in 2019?

With another year coming to a close, I asked seven consultants to answer questions about some possible changes to radio that could lie ahead.

So that they could be candid, I agreed not to report their individual answers, although several of these highly quotable experts chose to comment also.

WHERE THEY AGREE

As you can see from the chart (page 21), our esteemed panel agrees on a lot. For example…

There's good news for radio talent — if they're truly talented. Without exception, these consultants believe the importance of personalities to AM and FM brands will increase in 2019.

"The future of radio is talent," says Randy Lane. "As music becomes even more ubiquitous, talent is the great distinguisher."

One note of caution, though, from Alan Burns: "If we as an industry overreact to in-the-moment ratings… *or* if we choke down too much farther on opportunities for people to get into the business and on the air, we won't have enough personalities to fill the pipeline."

In that case, Scott Huskey says that network/syndicated programming "could be seen as a quick fix, while hopefully developing more local talent."

In fact, all but one of our panelists agreed that that there would be more use of network programming in 2019.

Five even believe that centralization of operations will become more common, moving day-to-day operations of some stations outside of their home markets.

All of our experts expect that time spent listening to audio on mobile devices will continue to increase in 2019, representing both an opportunity and a challenge for radio.

Most of our panelists believe local podcasting by radio will grow in 2019, including Fred Jacobs. "The question," he says, "is whether many of them will enjoy success."

Harry Lyles is even more blunt: "Podcasting is a totally different business than radio," he says. "Radio is radio. Podcasting is podcasting."

WHERE THEY LACK CONSENSUS

Five of the consultants we asked predict that the growth of smart speakers will cause an increase in time spent listening to radio.

Alan Burns believes he's already seeing this happen for one of his clients.

But, warns Jacobs, "Stations have to do a better job of marketing these devices to their audiences."

Although most of our consultants expressed that a high spot load is — as Lyles puts it — "one of radio's biggest problems," only two believe it will be reduced in 2019.

If a few companies take the lead, Lane believes, "Others will be forced to decrease spot loads to stay competitive."

Finally, I asked the consultants if the radio industry might start to see and refer to itself as "audio" instead. Most

didn't think so, at least not yet. "When we start seeing signs for 'Audio Shack,' we'll know something is going on," says Fred Jacobs.

When we start seeing signs for "Audio Shack," we'll know something is going on.

— *Fred Jacobs*

No doubt about it, radio will face some challenges in the year ahead. Still, these predictions include reason for optimism, especially for those of us who create radio programming.

David Gleason summed it up thus: "Broadcasters who realize the future is in content, not towers, will be the survivors."

Veteran radio programmer Dave Beasing predicted podcasting's bright future, so he began a company called "Sound That Brands." Among others, they co-produce "Inside Trader Joe's," the most successful podcast series of its kind.

QUESTION	YES	NO	Not in 2019 (Yet)	No Opinion/ Not Going There
1. Will the importance of personalities to AM and FM brands increase in 2019?	7	0	0	0
2. Will the use of network/syndicated programming increase on AM and FM in 2019?	6	0	0	1
3. Will centralization of radio programming operations — moving day-to-day operations of local stations outside their home markets — increase during 2019?	5	1	0	1
4. Will radio produce more *local* podcasts in 2019?	6	1	0	0
5. Will time spent listening to audio on mobile devices increase in 2019?	7	0	0	0
6. Will the growth of smart speakers cause an increase in time spent listening to AM/FM radio in 2019?	5	0	2	0
7. Will the average spot load of AM and FM stations decrease in 2019?	2	4	0	1
8. Will radio start referring to itself as "audio" in 2019?	2	2	3	0

Thinkstock/Chad Baker

Virtualization Technology Matures

Is it a science fiction technology or a surprisingly practical practice?

BY DOUG IRWIN

In the first part of this article (which you can read in the previous edition of RW, Nov. 21) we defined virtualization and put it into the context of radio broadcasting; we discussed hypothetical applications, and then followed with a dialog about the benefits and pitfalls of those ideas. Finally we also presented a skeptics viewpoint of the use of virtualization in replacing console and router systems.

In this part we'll discuss current applications of virtualization in radio broadcasting, and we'll speculate as too where it will lead us in the not-too-distant future.

Wheatstone Systems Engineer Kelly Parker thinks virtualization technology will be applied in broadcast studio applications sooner rather than later.

"We're already putting processing, routing, mixing — all of that — in to the software realm, and cloud-based is the next step. There are a number of obstacles that we as an industry face, like real time monitoring. In the 'cloud' environment, there's more latency. You press an 'on' button on a screen or a surface or whatever it might be, and there's a reaction time that takes place. It takes time for that information to reach the data center, start the playback or automation, and to get it mixed and then back down to the operator so he can hear what he's doing. That's a big challenge. But we're exploring all kinds of options for the future that will be without hardware. It's where it's all going."

Kelly Parker

I asked Parker about his thoughts on when this kind of transition will start in our field. "I still think that there's enough people out there that like that tactile feel of a fader and switch, so I don't think it's going to happen right away. I think people will accept it over time, but I don't think it's going to happen tomorrow," he said. "The industry is pushing it — we're working with clients on — virtualizing more and more of the operation." When I asked about how this change would affect the day-to-day work of a broadcast engineer, Parker said to expect change, just as our skeptical engineer did.

"Well, it's going to change the structure of engineering. There may not even be studio guys, of which there are fewer and fewer of these days anyway. It'll be more IT centric and probably collocated in some data center some place in the country, or several which back up, so I see that being a challenge, getting the people in to manage that. It will certainly take away from traditional broadcast engineers."

Kirk Harnack

THE VIRTUALIZED BEEB

I also communicated with Kirk Harnack of the Telos Alliance about virtualization.

"The BBC has been virtualizing its BBC Local Radio studio back-end operations since 2015 in a project called 'ViLoR,' or Virtualized Local Radio," wrote Harnack. "Now, nearly all of all BBC Local Radio stations are using their familiar local studios, but the playout systems, phone hybrid pool, audio codec pool, and even the live console mixing engines are located in redundant data centers. The Telos Alliance and Broadcast Bionics developed and provided all of the virtualized mixing consoles and talk show systems.

"Some users of Axia and other Telos equipment have worked with us on proof-of-concept projects where playout, mixing, and phones are all virtualized in a VMWare environment. Continuing on the success of these proofs and the BBC's proven ViLoR infrastructure, the Telos Alliance is developing systems specifically for 'cloudifying' audio acquisition, transfer, routing, mixing, and audio processing. Users will have options to use these solutions locally, in their own data center, or with publicly-available cloud computing strategies," Harnack wrote.

While console/router manufacturers are now discussing the virtualization of their systems in the not-too-distant future, at least one playout system manufacturer has a product on the market.

ENCO Systems says that its ENCO1 is a "fault-tolerant, virtualized solution designed around a unique specification for the radio automation environment." The traditional automation infrastructure places a workstation in each studio, and that physical box connects to a central server, or operates as part of a separate production or on-air cluster that shares a common network.

Inside of a single ENCO1 "box" are two redundant sets of components: Each represents a complete server, and the hardware is mirrored between them so that any failure of any single component does not take the system down. The entire environment — all the storage, all the databases, all of the play lists and every bit of the workstation environments are preserved within this box, which is installed in the protected environment of a station's technical core.

The traditional architecture can also require more maintenance involving the studio workstations because many of these boxes are different from one another, using different motherboards and hard drives that sometimes require replacement. With ENCO1 , the remote "workstations" are virtualized in the server itself. In each studio lives a small appliance that is used to connect to the server (via Ethernet). It provides the user with the mouse, keyboard and touchscreen control to operate the software. Up to 40 virtualized workstations can be supported.

David Turner of ENCO demonstrates the ENCO1.

OPPORTUNITY

There is certainly plenty of opportunity in the global market to migrate broadcasters to virtualized playout.

"Whether a large network or a small cluster of FM and/or AM stations, most operations have at least several on-air and production studios with dedicated equipment," said David Turner, executive vice president of ENCO. "This means a collection of space-consuming hardware distributed throughout the facility, often operating autonomously."

In an ENCO1 deployment, the use of the virtualized server and remote clients also frees up valuable rack space all while saving on electricity and the generation of audible noise. The thin clients operate as compact and generic computing devices that boot and run remote sessions. which are displayed on the studio monitor.

"The hardware itself has a component that can phone home and tell the factory if there's a problem with any piece of the hardware," said Turner. "Then the factory can react and send a replacement component out to the station. It's done in such a way that you don't require a highly skilled operator or technician to be able to do it. It's generally a replacement of a hard drive or a module within the system."

The evolution of technology in broadcast engineering is on-going and inevitable. The trend towards virtualization will, at least eventually, take hold. "Big groups all over the world are driving this," said Wheatstone's Parker. "It's not just the iHearts of the world — it's Media Works, it's Penumbra in Australia, it's RTÉ in Ireland, and the BBC. Everybody's pushing to change the way we do things and it's going to happen."

Harnack agreed. "It's absolutely inevitable that broadcast operations will move to a virtualized, "cloudified" paradigm. There will be a few bumps along the way, but in a few years, we'll wonder how we did it any other way."

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WANT TO BUY

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Equipment Wanted: obsolete, or out of service broadcast and recording gear, amplifiers, processing, radio or mixing consoles, microphones, etc. Large lots preferred. Pickup or shipping can be discussed. 443-854-0725 or ajkivi@gmail.com.

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I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example newscast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, KTAB, KDIA, KWBR, KSFX, KOBY, KCBS, KQW, KRE, KTIM, KYA, etc, I will pay for copies... Feel free to call me at 925-284-5428 or you can email me at ronwtamm@yahoo.com.

Looking for a broadcast excerpt of a SanFrancisco Giant's taped off of KSFO radio from 1959, interviews with Willie Mays, Dusty Rhodes & some play by play excerpts, also features a home-run by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

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

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

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TUBES

The NRSC Proof Debate Rages On

Radio World readers are impassioned about the idea of dropping NRSC mask measurements for AM stations.

(This photo of Radio Towers Park in Hamden, Conn., is from the 2019 Tower Site Calendar, available for purchase at *Fybush.com* and used here with permission.)

Photo by Scott Fybush

HOME › COLUMNS AND VIEWS › GUEST COMMENTARIES

Let's Toss Another Expensive and Useless Rule!

The seemingly obsolete NRSC mask measurement for AMs is a waste of time and resources

LARRY LANGFORD · OCT 15, 2018

Larry Langford is owner of WGTO(AM) and W244ds in Cassopolis, Mich. He has been in radio since 1965. His commentaries on radio issues such as those facing AM owners are a recurring feature. Read his past articles by searching for "Langford."

OK going back into the memory archives ... When I got in this business in the early '60s (the days before unattended operation) we had to fill out a transmitter reading log every 30 minutes

The FCC required you to write down parameters of the transmitter oscillator and final power amplifier (PA) such as plate current, plate voltage, computed power output in watts, RF line current and frequency tolerance. You had to trim the values if they were out of limits. If you had a directional you had to take phase and ratio readings as well for each tower and common point RF current. It took a few minutes especially if you were on remote control and had to listen to the chunk-chunk as the two-wire remote system counted through the steps as the system responded to the phone dial that you had to use to read different stages.

Larry Langford's commentary sparked a flurry of replies from readers. We've compiled them here: *www.radioworld.com/columns-and-views/should-required-nrsc-measurements-for-am-stations-continue.*

WHY HOLD ONTO THE PAST?

I appreciate the comments from other engineers talking about why it is important, however the missing point seems to be that the FCC does not require these measurements for FM or TV transmitters. All contemporary AM, FM and TV transmitters are equally reliable, and the likelihood of out-of-band emissions is very low.

Why do these engineers imagine AM is so unstable to require yearly check? Factually, out-of-band emissions from FM transmitters or digital TV transmitters, while still remote, have a much higher probability of impacting some operations that people care about: mobile phone systems.

Even in cases where mobile carriers complain about out-of-band emissions, typically the FM or TV station is well within their specification requirements: mobile operators have such sensitive receivers that they are trying to operate much beyond the norms of broadcasting.

In any event, it seems like holding onto the past for no good reason.

Unnamed prominent radio equipment manufacturer

WE DON'T KNOW WHAT WE DON'T KNOW

So, a "prominent" technology supplier says, "Why do these engineers imagine AM is so unstable to require yearly check?" This unnamed supplier goes on to say, "All contemporary AM, FM and TV transmitters are equally reliable, and the likelihood of out-of-band emissions is very low."

I can personally attest to two AM transmitters whose elderly filter caps were the cause of spurs that exceeded FCC limits. I can also attest to measurements that eventually pointed to mixes that, while not caused by the transmitter under test, but in a mathematically and proximity related transmitter at another location.

One other thing to remember: AM transmitters can and do produce splatter if negative peaks exceed 100 percent, the definition of carrier shut-off. How many stations still operate either without accurate modulation monitors or, accidentally or on purpose crank up their modulation to the breaking point in the loudness wars that are still fought in many markets?

As a broadcast engineer with CPBE after my name, I operate under the assumption that what I don't know can hurt my clients. I stand by the case made by me and others to keep this existing AM FCC rule and expand it to cover FM. The cost of such measurements is a small premium on a prudent insurance policy that can help assure licensees their signals are still as clean as the day they uncrated their transmitters.

We've all heard the line that is so well known we don't even know who said it first: "You don't know what you don't know." This excuse is in the class with "the dog ate my homework" as far as I am concerned. Periodically proofing your equipment is not just a matter of trying to avoid getting a citation. It's really a matter of good engineering practice.

Richard A. Rudman
Owner, Remote Possibilities

COMMON FAILURES

Responding to the commentary by Larry Langford in the Nov. 7 issue in which he proposes elimination of NRSC mask measurements for AMs:

The writer might be surprised to learn how many "modern" equipment chains annually fail the equipment performance measurements under FCC 73.44, which requires not only proof of compliance with the NRSC mask but more importantly the harmonic suppression requirements, which can result in interference outside of the NRSC mask.

He might even be as shocked as broadcast engineering consultants, with regard to how many also routinely fail the annual AM EPM requirements, regardless of how current the equipment, and irrespective of NRSC compliance. In fact, what he calls "museum-like" equipment often performs better in that regard, due to its inability to reproduce the kind of interfering signals that the latest-and-greatest, "weaponized" modern equipment can transmit with ease.

FCC 73.44 actually governs much more than NRSC, and as such protects even the writer from either actual interference, or interference complaints, and/or FCC fines. Eliminating the NRSC mask in itself will do little to reduce the cost of an annual EPM for 73.44 compliance, because the NRSC measurements part can now be largely an automated process, but the certifying engineer has approximately the same costs in terms time and travel, labor and amortization of equipment, in making the also-required, out-of-band (including harmonics) measurements.

Richard Hyatt
President
Maine Engineering Associates Inc.
Portland, Maine

WHERE'S THE VALUE?

I have read with great interest the opinions of some of my colleagues regarding the usefulness of annual occupied bandwidth measurements for AM stations. Certainly some engineers earn a significant portion of their income from making such measurements, so I understand that a little bias in the direction of keeping such measurements might exist on the part of some with that underlying motivation.

From a licensee's perspective, however, I see very little value in making annual occupied bandwidth measurements. These measurements are a burden to licensees, and in my experience, they seldom reveal any issues. Indeed, the noise floor is so high in many areas that in some cases it is impossible to resolve emissions beyond 75 kHz removed from carrier that might otherwise be above the 80 dB or 43+10log(P) limit.

There are many transmission parameter limits imposed on broadcast stations, both AM and FM, for which there are no statutory measurement intervals. What comes immediately to mind is monitoring points for conventionally-proofed AM directional stations. Field intensity limits are set for monitoring points, and licensees are required to maintain fields below those limits, but other than "as often as necessary to ensure ..." stations with approved sampling systems have no requirement to measure monitoring points at any particular interval. Arguably, there is a much greater likelihood of interference to a neighbor resulting from a misadjusted or malfunctioning directional antenna than a transmitter producing out-of-band emissions. As such, wouldn't we be well served by taking a similar approach to AM occupied bandwidth measurements?

It would seem to me that we would all be better served if the rules were consistent and the AM emission requirements in §73.44 mirrored the requirements for FM stations in §73.317. If a problem exists and a spectrum neighbor complains, measurements would then be made to determine whether the AM station is indeed the source of the problem, and then the underlying emission limitations of §73.44 would compel the AM licensee to bring his emissions into compliance. I believe such an arrangement would work very well, and it would save broadcast licensees the often substantial costs, time and trouble associated with compulsory annual measurements.

Cris Alexander
Director of Engineering
Crawford Broadcasting
Aurora, Colo.

KEEP THE RULES IN PLACE

Larry omits a few of the factors involved in a proper NRSC study. The proper NRSC study includes transmitted products that can be far removed from the NRSC audio limits such as mixing products created by a nearby transmitter site, harmonics and various spurious products created inside the subject transmitter caused by aging components.

Any qualified person conducting a NRSC study should go to the transmitter and observe all working parameters of the transmitter and the modulation on a properly working modulation monitor or with a scope. Then the examined spectrum should be studied at a nearby location for harmonics, spurs (noise) and suspected mixing products predicted by a few + and – calculations using the basic and harmonic frequencies with any nearby AM transmitters in the area, and a listening scan.

Don't hire a NRSC service that drives through town and sends you a report that you didn't know was completed that day. They don't even know if you are operating in the proper and normal mode.

Hear are a few findings from my history of studying these situations:

- Before any spectrum measuring, I found an AM with the asymmetrical modulation upside down, causing some carrier blanking with minor shotgun noise outside the envelope. The station also did not achieve the signal loudness as compared to other competitors as noted on the way to the transmitter. That alone was worth the cost of the study to the station, as one employee added that he always thought they did not have the presence they should on the dial. Or I will add, why sound like a 1 kW transmitter when you are a 5 kW station.

- Old electrolytic capacitors — How many of us have lived through this era of capacitors drying out and letting PDM products find a home outside the NRSC envelope? I know of one large company that had a 50 kW state-of-the-art transmitter in storage for about one and a half years before installation, and when installed about half of those large blue caps had to be replaced before the transmitter calmed down and became a good neighbor to other stations on the AM band. That same broadcasting company found that caps were the largest problem in all their newer transmitters and the caps are not cheap, almost as if we were trading the cost of tubes for the cost of regular cap replacements.

- Factory problems — I found a relatively new transmitter with real nice and strong harmonics ... the problem being a missing bolt, probably shaken out during shipping. Restoring the output tuning hardware cured the problem and a group of local hams were happy on 80 meters again.

- Another modulation problem was corrected when I was listening to a small AM station on the way to the site. I listened carefully and said to myself, "What in the world is wrong with this sound?" I could not put my finger on it and thought it was the oddest sound I had ever heard on music. After meeting with the station's "all around guy" and following what his audio line had in it, I found that when they added a streaming feed, he merely lifted the stereo output from the board and fed one line to the streaming and left the other line going to the AM audio processing path. "Why not? There are two coming of the board."

I have many other stories, but I hope the thought about NRSC is more than just the immediate modulation mask.

I also believe that FM stations should have regular spectrum studies conducted as stations seem to move their locations without regard to other nearby assignments. Also, there seems to be a trend to have a "heavy foot" on the deviation throttle by many broadcasters. It seems that little is being done by the commission on this issue, but if we all obeyed the rules, we would be better off. Remember, the aircraft band is right next door to the FM band and many interference issues to aviation come up due to spurs and other issues from our FM band.

(continued on page 30)

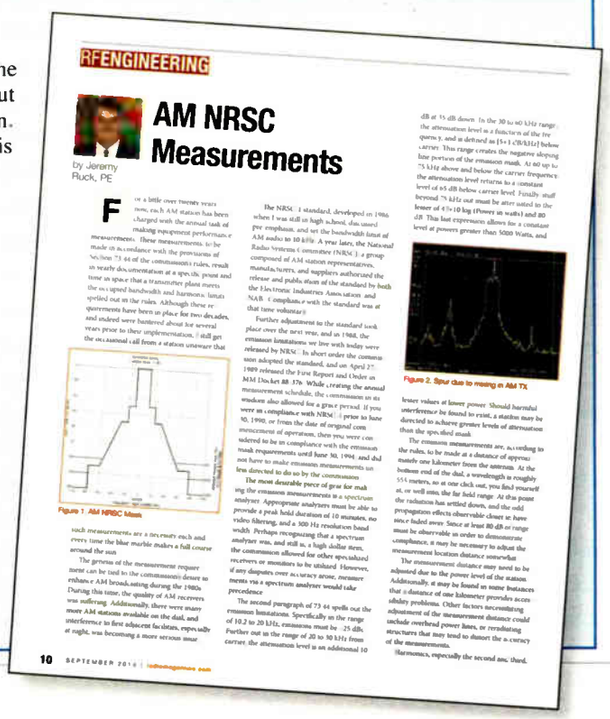
THIS CONVERSATION ISN'T NEW

Consulting engineer Jeremy Ruck is a longtime Radio magazine and Radio World contributor. In 2014, he wrote an article about AM NRSC measurements as part of his "RF Engineering" column.

If you read the article, you'll note that the NRSC ambivalence is not new. Ruck writes:

> *A colleague and friend of mine has quipped that NRSC measurements are the "annual albatross" due to the resources spent on their acquisition. Too often, the holders of the purse strings also view the measurements as a fatuous exercise. Like any coin, there are always two sides, and the NRSC measurements are in reality another beneficial tool in the box.*
>
> *Regardless of your view of them, they must be performed no less frequently than once every 14 months, and are one of the things the commission looks for when paying a visit. Since the requirements have been around for two decades, it is a challenge to have to explain to the inspector why they are absent from your files.*
>
> *Don't be that guy.*

Read the full article at *www.radiomagonline.com/industry/am-nrsc-measurements*.


RFENGINEERING

AM NRSC Measurements

By Jeremy Ruck, PE

DEBATE

(continued from page 29)

Today, stations are on tight budgets and have decided that as long as the needle is still bouncing, they do not need any extra engineering oversight.

I find this to be totally wrong, and many cures and prevention can happen with a qualified extra set of eyes overseeing the facility annually. Just be there with the NRSC person and have them give the station a good listening and check up before even starting the NRSC measurements.

Let's keep the NRSC rules in place.

Hal Williams, N6TZ
Camarillo, Calif.

DITCH THE REQUIREMENT

A few engineers whom I highly respect have weighed in on this subject both for and against the annual occupied bandwidth measurement.

Richard Rudman is correct that old capacitors in some AM transmitters can cause issues; I recently repaired a Gates one that had bad caps in it. And other issues can cause distortion or noise outside the FCC limits, yet we don't have annual audio proof requirements.

Transmitters can drift out of frequency tolerance, but we don't require frequency monitors any longer or mandate frequency measurements at all. Many things used to be required to be checked daily, weekly, monthly or yearly and are now at the discretion of the licensee (including monitor point readings or in some cases no requirement to read AM antenna base currents).

I remember reading base currents for both day and night patterns once a day in my early years of working as an engineer, and driving around weekly to the monitor points, both with day and night patterns. We don't do this any longer. We don't do monthly frequency checks or annual audio proofs of performance. Heck, we don't even have to check tower lights daily, if we have the right type of monitor/alarm equipment!

All those other things have been relegated to an as-needed basis, the commission putting the burden of compliance on the licensees. Why is one issue more important than another? Interference you say? Overmodulation causes splatter and interference. But we don't require a station to have a modulation monitor, yet the licensee is expected to be in compliance. An AM station with its directional antenna out of tolerance can cause interference. Again, it is up to the licensee to determine compliance.

I say ditch the requirement and put it in the same category as all the other things that we used to do on a required basis but now only as the licensee deems necessary.

Hal Kneller
Engineering Consultant

OPERATING IN TECHNICAL LIMBO

Larry: It is with some hesitation that I question your so-called "useless rule" regarding the FCC's mandated, yearly NRSC Occupied Bandwidth and Harmonic Testing.

Without a doubt, every one of us has our own perspective on just about everything.

More now than ever before, many a broadcaster's perspective is motivated by cost. This is completely understandable, but sometimes it is motivated by bad experiences, or whatever our mindset might be.

When cost becomes our motivation, often coupled with a partial or incomplete understanding, as to "why" the FCC has mandated a particular regulation, or when we find it personally difficult to eek out their guidelines and technical reasoning, as to why certain things that "broadcasters and their engineers" are required to do, by the FCC, in order to satisfy "consistent standards of operation," then our "perspective" can sometimes become erroneous. I am no exception!

Regarding "perspective:" I will admit to being an engineering service. I will admit to NRSC measurements being one of the sources of our income. I will admit that approximately 65 to 70 percent of the stations that we measure are fairly consistent in passing the "NRSC Occupied Bandwidth and Harmonic Proof." However, it isn't always the same stations that "fail or pass" the yearly NRSC and harmonic proof standards.

Thus, I would ask: Is a 65 to 70 percent passing grade a "good enough" goal for anyone, or anything? I would never get on a plane that has a 70 percent rating. I would not buy a car that has a 70 percent rating. ("And so it goes," as Linda Ellerbee says.)

The FCC's yearly mandated NRSC and harmonic proof is the only documented "proof of performance" requirement that stations have.

Sorry Larry, but from my perspective, I don't feel that very many of the stations that I measure are ready to go without a (basic) FCC yearly checkup. Many stations do not have a routine engineer, or the necessary equipment to assure that their station is meeting "FCC standards," and thus those stations are often operating in technical limbo. Admittedly, they make an honest, daily, effort to stay on the air as best as they can.

Just like you, I, too, have owned and operated a station and know the "nickel and dime" costs that eat at the heels of broadcasters. All too often it seems that our regulators (local, state, federal) don't realize that, especially the small-market broadcasters (let us include all broadcasters) are in a delicate and competitive situation. However, this also affects all businesses, not just "broadcasters," and it isn't going away.

Larry, I do understand your frustration. I wish I had a good answer, to put you at ease with the mandate.

Keep in mind that, at present, the FCC's yearly mandated NRSC and harmonic proof is the only documented "proof of performance" requirement that stations have. It lets the stations know what may need fixing, in order to make their broadcast system compatible with their listener's receivers, and at the same time not interfere with other stations.

All things will eventually change — some for better — some for the worse.

Frank Hertel
Newman-Kees Hertel
RF Measurements & Engineering
Evansville, Ind.

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