SUMMER OF PRODUCTS HEATS UP — Page 15

FUTURE

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NEED TO KNOW: CYBERSECURITY

Every enterprise is at risk as attacks diversify and adversaries get smarter

BY PAUL McLANE

Editor's Note: Welcome to Future's third edition of Need to Know, a series exploring complex topics like blockchain, 5G and artificial intelligence — and how they apply to each industry served by our websites and magazines.

"We keep building new things on old infrastructure that never seems to get fixed."

Chris Wysopal is a hacker who was quoted in a Washington Post column about the state of internet security (or perhaps we should call it insecurity). In

(continued on page 6)

BARRY MISHKIND
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Tech Industry Remembers Eric Small

The co-inventor of the Orban Optimod 8000 died in March

APPRECIATION

BY TOM VERNON

Photo: LinkedIn

The highlights of Eric Small's life and career are many. He was a lifelong designer and developer of innovative entertainment technology, including broadcasting and recording.

He was the co-inventor of the game-changing Orban Optimod 8000 FM audio processor.

He held numerous patents and published countless white papers and articles, as well as authored chapters in several editions of the NAB Engineering Handbook.

In the aerospace industry, Small developed the software and hardware for the visual portion of the F/A-18 Hornet combat flight simulator.

Most recently, he participated in the

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Connectiv The Business Information Association, a division of SIIA

Photo by Kim Sacks, courtesy AES

Eric Small, standing at far left, participated in a 2011 panel featuring influential FM radio engineers at the AES Convention. Rear, from left, are Small, Richard Mertz, Skip Pizzi, Frank Foti, Herb Squire, Bob Orban and David Bialik. Seated: Bill Sacks, Richard Burden, Arno Meyer, Scott Fybush and Jeff Smith.

SMALL

(continued from page 1)

Intelligent Vehicle Highway System initiative, authoring and presenting several papers on highway communications. Small also developed two products for IVHS applications.

But as friends and colleagues took time to reflect on the life of Eric Small, they also recalled personal traits, such as his tenacity, kindness and willingness to help others.

On March 15, Small was leaving a Publix grocery store in Delray Beach, Fla., at 5:09 p.m., when the driver of a car lost control and accelerated towards the store. The car struck Small first and then crashed into the Publix building, according to the Palm Beach Sheriff's Office report. The driver and Small were transported to Delray Medical Center, where both died from their injuries.

Small, who was 71, is survived by wife Roberta; sister Linda and brother-in-law Don Sussman; children Gary Moskoff and Eric Moskoff; daughter-in-law Shannon; and three grandchildren.

EDUCATION AND EARLY CAREER

Small spent most of his youth in and around Brooklyn, N.Y., and began his broadcast career in 1964, at age 17, working for WNCN, a classical music station in New York.

In 1965–66, he attended Shimer College, a Great Books-based curriculum college then located in Mount Carroll, Ill. It was about this time that he met Warner W. Johnston, a fellow Shimer student, lifetime friend and now retired ABC television engineer.

"When I met Eric, he already had his FCC First Class license," Johnston recalled. "He had some connections in the business and was able to get a console and some audio gear for our college radio station at a discount."

Johnston recalls that around 1963, Small had won a Westinghouse Science Challenge. His entry involved satellite radio, and the prize included a college scholarship. Shimer was Small's sole venture into higher education; he only attended for about a year. Johnston adds that although Shimer was a liberal arts college, a surprising number of alumni went on to have careers in science and technology.

For his vast technical knowledge, Small was largely self-educated. "Eric was a voracious reader," Johnston said. "When we combined our libraries in 1978, he had around 2,400 volumes."

In 1969, he went to work for A&R Recording as a member of the technical department. While there, he worked under Phil Ramone, considered by many to be one of the most innovative and talented record producers in the industry.

Small was hired in 1972 by New York's WOR(AM/FM) as chief engineer. The FM soon changed its call sign to WXLO, and his first job was to separate the AM and FM operations, which had been sharing facilities. Small hired Johnston as the second person in the two-man engineering department.

ERIC SMALL ASSOCIATES

In 1974, Small, along with Bob Orban, developed the original Optimod 8000, a revolutionary device in FM audio processing.

Eric Small Associates was founded in San Francisco in 1975, as a base for Small's broadcast consulting business, and to fulfill a two-year contract with Orban to provide technical support and marketing for the Optimod 8000.

Small also had ideas for products he wanted to develop on his own, but he spent a great deal of time on the road consulting for most of the major radio groups and stations in North America. In 1974 and '75, Small consulted with CPB on FM SCA subcarrier transmissions, which were growing in use by public radio stations to carry radio reading services and second-language programming.

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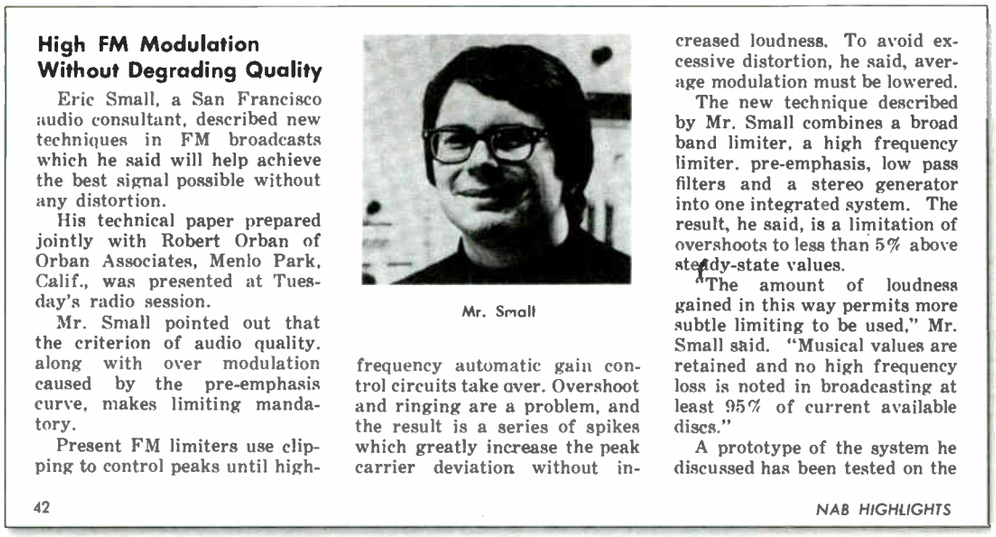
SMALL

(continued from page 3)

Eric Small Associates had a staff of seven: Small; Jesse Maxenchs, the marketing manager; John Kean, who handled technical support; two contract engineers who worked on software and hardware development; an office manager and a bookkeeper.

Johnston recalls that at the Eric Small Associates booth at the 1976 NAB Show, there was an attractive young woman, not wearing very much, passing out 8000 fortune cookies inscribed with the fortune: "There is an Optimod in your future."

Eric Small Associates closed in the summer of 1979. Johnston helped Small load the contents of his firm into a 22-foot Rider truck and the two made a cross-country journey to Brooklyn.



High FM Modulation Without Degrading Quality

Eric Small, a San Francisco audio consultant, described new techniques in FM broadcasts which he said will help achieve the best signal possible without any distortion.

His technical paper prepared jointly with Robert Orban of Orban Associates, Menlo Park, Calif., was presented at Tuesday's radio session.

Mr. Small pointed out that the criterion of audio quality, along with over modulation caused by the pre-emphasis curve, makes limiting mandatory.

Present FM limiters use clipping to control peaks until high-

Mr. Small

frequency automatic gain control circuits take over. Overshoot and ringing are a problem, and the result is a series of spikes which greatly increase the peak carrier deviation without increased loudness. To avoid excessive distortion, he said, average modulation must be lowered.

The new technique described by Mr. Small combines a broad band limiter, a high frequency limiter, pre-emphasis, low pass filters and a stereo generator into one integrated system. The result, he said, is a limitation of overshoots to less than 5% above steady-state values.

"The amount of loudness gained in this way permits more subtle limiting to be used," Mr. Small said. "Musical values are retained and no high frequency loss is noted in broadcasting at least 95% of current available discs."

A prototype of the system he discussed has been tested on the

42 NAB HIGHLIGHTS

Eric Small co-invented the original Orban Optimod FM audio processor in the 1970s. This clipping is from a 1975 NAB publication containing brief bios of presenters.

MODULATION SCIENCES

In 1981, Small founded his second company, Modulation Sciences Inc. He remained founder and chief technology officer of MSI until it closed its doors in May 2012.

At the first headquarters, Johnston recalls, Digital Equipment Corp. refused to provide a service contract for his DEC PDP-11 computer because it was located next to a wood-burning stove. The company was originally in Brooklyn and later moved to Somerset, N.J.

Mod Sciences entered the broadcast equipment market with equipment focused on FM signal processing and subcarriers. Its first product was the CP-803 composite processor. Similar devices were on the market but all suffered from the same problem: If pushed too hard, the station's stereo pilot could be disrupted, inviting citations from the FCC. The innovation of Small's design was that he found a way to route the pilot around the clipping function, ensuring a means of composite clipping without risking a violation of FCC rules.

Other MSI products of the time included the ModMax, Sidekick FM subcarrier generator, FM ModMinder peak deviation meter and StereoMaxx spatial image enhancer.

By the late 1980s, the company had redirected its energies towards television audio and was active in the development of the BTSC standard for stereo TV sound. MSI's line of BTSC encoders and test instruments played a key role in bringing stereo audio to analog TV.

In 2011, MSI announced that it would no longer manufacture or support U.S. standards products. Instead, the company redirected its efforts towards the Latin American and Mexican markets, where its ISDB-TB (Integrated Services Digital Broadcasting, Terrestrial, Brazilian version) products had been quite successful.

Throughout his career, Small devoted his energies to the broadcast industry, serving on numerous committees and writing countless white papers, opinion letters and editorials.

ON THE SCA

Small's interest in FM subcarriers went beyond the technical aspects. He authored the chapter in the CPB Handbook about setting up an SCA-based radio reading service for the blind, and remained an active advocate for them.

Dave Andrews is chief technology officer for the Minnesota Department of Employment and Economic Development. He recalls his first contact and growing friendship with Small.

"I had been trying, unsuccessfully, to find an FM subcarrier that we could use for a radio reading service for the blind in central New Jersey. I got the idea that TV stations also had FM audio and could generate subcarriers. Someone suggested I call Eric and talk to him. He ultimately told me, 'I don't think it will work, but I will work with you and try.'

"He did work with us and became a friend, as well as a colleague. We put up the first TV SAP on New Jersey Public TV stations, and it worked great. We modified some UHF Pay TV decoders and got virtually free receivers. Eric was able to use what he learned with me to develop a SAP generator, a TV stereo generator and other television products. These products became the backbone of his company. He also developed the Sidekick, which, simply put, was the best sub-carrier generator that was ever developed," Andrews said.

Andrews said Small was always supportive of projects that benefitted the blind, the deaf and others. "In the early 2000s, he helped us represent reading services in the standards-setting proceedings for HD Radio, so that existing subcarriers didn't get wiped out. He also worked with us to try and get DRM, Digital Radio Mondiale, to work on a subcarrier. He was always available with advice, and testing assistance.

"He always had lots of good ideas — and defended them vigorously. Eric also listened to my ideas and thoughts carefully because he knew I was in better touch with the blind community and its needs than he."

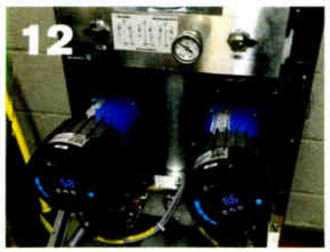
OPTIMOD 8000

It was Small's work on the Optimod 8000 that brought him to national attention. An Orban company spokesman shared the details of his contributions to that product's success.

"Eric was involved with Orban in the mid-'70s, in a marketing and technical consulting capacity. When Bob Orban showed him the prototype of the Optimod 8000A, with its non-overshooting lowpass filters, he immediately grasped

THIS ISSUE

JULY 18, 2018



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its potential as an industry game-changer and helped commercialize it by showing Orban, then a studio products company, how to do bullet-proof EMI-resistant packaging and how to get the processor/stereo generator package approved by the FCC by making it look like a composite STL, which the commission had just sanctioned.

"He made innovative technical measurements (using the original CBS Loudness Meter) to prove that it could increase loudness by up to 3 dB over prior approaches, and placed early production units with important industry influencers. He presented technical papers on the concept at industry conferences. Orban is forever grateful to Eric for his tireless efforts to make the 8000A successful, and Orban with it. With his senseless death, the industry has lost a true innovator."

Not all of Small's ideas for new products were successful. John Kean, former senior technologist at National Public Radio, recalls his time working for Eric Small Associates in San Francisco. Kean was hired in 1975 as the first technical support engineer for the Optimod 8000, and recalls one of Small's lesser-known ventures of the time.

"Eric was pursuing a design for an advanced remote control system for broadcast stations. His approach was ahead of the times: It used a DEC LSi-11 computer, programmed in Pascal, supporting many sensors, performing calculated decisions, with a user-friendly GUI. Unfortunately, it took longer to productize than his company could afford, and after two years he had to close up shop, and moved back to New York, after making sure all the staff had secured other jobs first. I always admired his brilliance and his vision, and this job marked a major step in my career. His passing is sad news, but I will always remember him as a great mentor and friend."

Frank Foti, president of The Telos Alliance, remembers Small for his tenaciousness in defending a cause that he believed in, as well as vast education that extended beyond broadcast topics.

"I was very fortunate to have known Eric on a broader scale. He was truly an innovator, but I really admired his chutzpah. He was well read and educated on many levels."

Foti remembered attending a National Radio Systems Committee subcommittee meeting where the topic of composite clipping was up for debate.

"I sat with awe, as Eric single-handedly took on all who tried to block the use of the tech. He was not to be denied, and I knew he was right regarding the topic at hand. Afterwards, he invited me out for a bite, and just laughed off the efforts of those who tried to derail him. He just 'knew' what was right, and wasn't going to back down. I learned something that day, and have never forgotten it, in my own ventures."

Foti remembered conversations with Small and Telos Systems founder Steve Church just to discuss views of the industry and technology.

"Since both Eric and Steve were very academic, those conversations could get a bit 'heated' at times, but always with incredible mutual respect for all involved. He was a good friend, and since he got into business long before Steve and I, he was always in our corner, and at times was almost like a big brother to these two 'radio-rat' engineers trying to build their own company."

For Small, the genesis of a project often began when others said "it's impossible" or "it can't be done."

Shortly after Small closed MSI, he closed up his New York residence and moved with his wife Bobbie and sons to Delray Beach, Fla. It was then that he became interested in intelligent vehicle-highway systems and began to write on the subject and products.

Eric Small was one of a rare breed of engineers who in small numbers are able to move an industry ahead dramatically.

For Small, the genesis of a project often began when others said "it's impossible" or "it can't be done." At the same time, he is remembered for his generosity of spirit, standing up for what he believed in and willingness to help those less fortunate than himself.

Comment on this or any story by emailing radioworld@futurenet.com.

CYBERSECURITY

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May, Wysopal — also known by his hacker name "Weld Pond" — joined several others in a return visit to Capitol Hill, where 20 years earlier they'd testified in a congressional hearing about the insecurities of software and networks.

Their 1998 appearance helped put the issue of cybersecurity on the national stage. A central part of their 2018 message is that digital security isn't much better today.

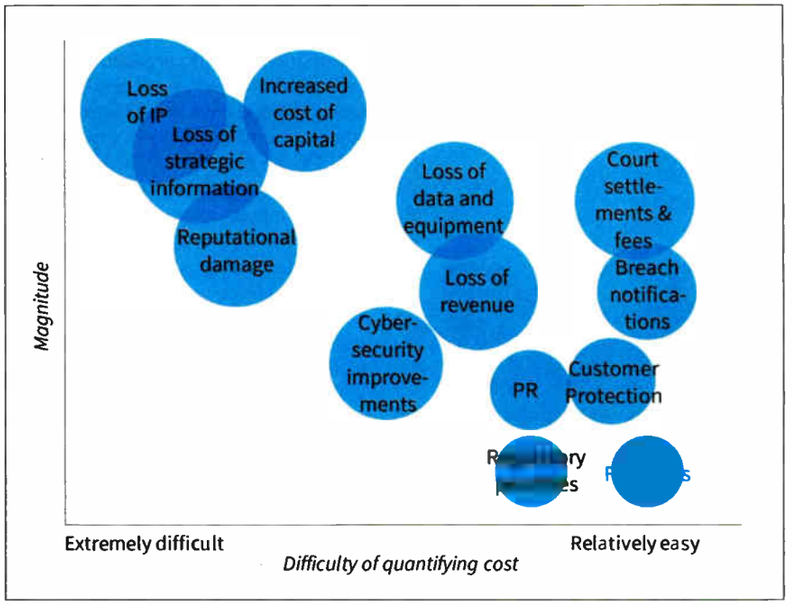
COSTLY AND DANGEROUS

Malicious cyber activity cost the U.S. economy between $57 billion and $109 billion in 2016, according to the White House Council of Economic Advisors. Cyber threats are ever-evolving, and the sophistication of adversaries keeps growing. But, according to the White House report, the private sector may, for any number of reasons, be tempted to underinvest in cybersecurity.

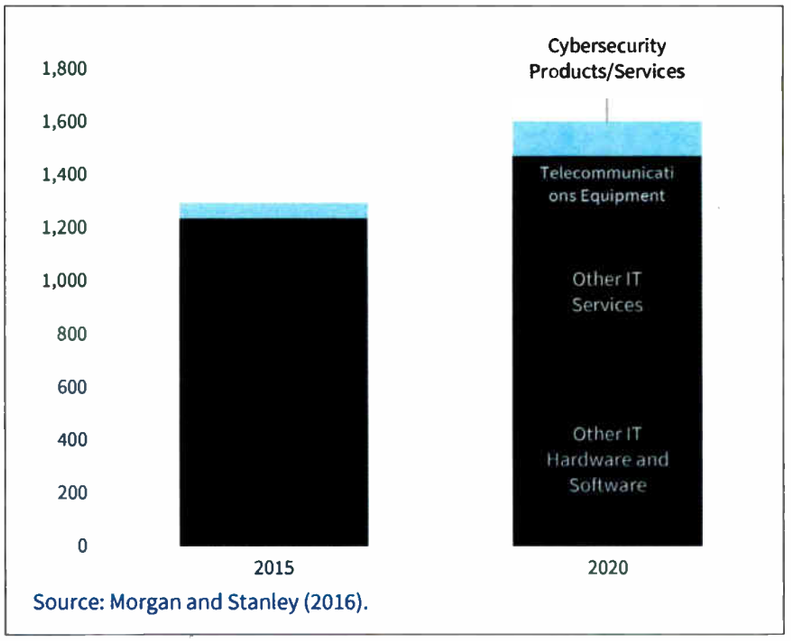
National security officials echo the concern.

Homeland Security took particular note of a growing concern about the threat of "wide-scale or high-consequence events" that could cause harm or disrupt services on which the economy and millions of people depend. "Sophisticated cyber actors and nation-states exploit vulnerabilities to steal information and money and are developing capabilities to disrupt, destroy or threaten the delivery of essential services."

How might your own business be hacked? A threat can come via denial of service attacks; destruction of data and property; disruption of business, perhaps for ransom; and the theft of your proprietary data, intellectual property and financial and strategic information. Reports of data breaches and cyber attacks are everyday news. Lewis Morgan on the IT Governance Blog curated more than 60 such stories in the month of May and counted the total of breached records that month at more than 17 million — "actually quite low when compared with previous months."



An "adverse cyber event" can cost your business in numerous ways. This graphic is from a report by the White House Council of Economic Advisors.



Investment projections in cybersecurity (in billions of dollars).

As cloud services and applications continue to expand, I would also keep the cloud cybercrime landscape or "Cybersecurity-as-a-Service" on my radar.

– Wayne Pecena

"Our daily life, economic vitality and national security depend on a stable, safe and resilient cyberspace," says the U.S. Department of Homeland Security in explaining why it devotes a large web resource to the topic.

The department this spring released a strategy hoping to help reduce vulnerabilities, build resilience, counter malicious actors and make the ecosystem more secure. It identifies 16 "critical infrastructure" sectors where a loss of networks would have a debilitating effect on the country. But even trying to define the sectors demonstrates how broadly the subject touches every corner of American life; they range from commercial facilities and manufacturing to the communications sector and health care.

In 2018, virtually every major and minor business or organization relies on the global, interdependent IT ecosystem. The degree to which leaders take the subject seriously could, in the long term, determine the survival of those enterprises.

To learn what trends businesses should be watching, we turned to several sources approaching the topic from various angles.

THREATS IN BURSTS

In its 2018 Annual Cybersecurity Report, Cisco said malware is definitely becoming more vicious and harder to combat. "We now face everything from network-based ransomware worms to devastating wiper malware," the company stated. "At the same time, adversaries are getting more adept at creating malware that can evade traditional sandboxing."

While encryption can enhance security and is used by roughly half of global web traffic, Cisco continued, encryption provides bad actors with a powerful tool to hide command-and-control activity. "Those actors then have more time to inflict damage."

Artificial intelligence may help. "Encryption also reduces visibility. More enterprises are therefore turning to machine learning and artificial intelligence. With these capabilities, they can spot unusual patterns in large volumes of encrypted web traffic. Security teams can then investigate further."

Cisco made note of several other trends and findings:

- Short, pernicious "burst attacks" are growing in complexity, frequency and duration. "In one study, 42 percent of the organizations experienced this type of DDoS [distributed denial of service] attack in 2017. In most cases, the recurring bursts lasted only a few minutes."

- Many new domains are tied to spam campaigns. "Most of the malicious domains we analyzed, about 60 percent, were associated with spam campaigns," Cisco reported.

- Security is seen as a key benefit of hosting networks in the cloud. "The use of on-premises and public cloud infrastructure is growing. Security is the most common benefit of hosting

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CYBERSECURITY

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networks in the cloud, the security personnel respondents say."

- One bad insider can be a big threat, and a few rogue users can have a huge impact. "Just 0.5 percent of users were flagged for suspicious downloads. On average, those suspicious users were each responsible for 5,200 document downloads."

- It's not just your IT assets that are at risk. Expect more attacks on operational technology (OT) as well as the internet of things (IoT). "Thirty-one percent of security professionals said their organizations have already experienced cyber attacks on OT infrastructure."

- The multivendor environment affects risk. "Nearly half of the security risk that organizations face stems from having multiple security vendors and products."

IOT RANSOMWARE

Another observer taking stock is Aidan Simister, the global SVP for Lepide Software.

Writing in a post on the CSO website, he too predicts artificial intelligence will take a bigger role. But while AI may help the good guys, he notes, hackers too can use it to launch more sophisticated cyber-attacks.

Further, new strains of malware can work around "sandbox" defensive techniques, waiting until they are outside the sandbox before executing their malicious code. Meanwhile, Simister agrees that the "internet of things" could become more of a target for ransomware, with hackers targeting power grids, factory lines, smart cars or home appliances to demand payment.

Many businesses, Simister predicted, will not comply with the European Union's new General Data Protection Regulation on data protection and privacy (the thing you've been getting all those emails about). He predicts some companies will choose to ignore it, accepting the risk.

We're also likely to see a growing number of companies adopt multi-factor authentication in response to data breaches involving weak, stolen or default passwords.

He expects that more sophisticated security strategies may find wider adoption. These may include the use of "remote browsers"; deception technologies that imitate a company's critical assets; systems to spot and identify suspicious behavior; better network traffic analysis; and "real-time change auditing solutions" that do things like detect abuses of user privileges or suspicious activity in files and folders.

But Simister too sees the risk of more attacks backed by hostile governments; in response he predicts more efforts to train staff and to develop international sharing of information.

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NAB Senior Director of Engineering & Tech Policy says cyber attacks are a very real threat for radio

BY EMILY M. REIGART

If you want to know the National Association of Broadcasters' stance on whether or not cybersecurity is important to modern radio stations, a recent nomenclature change should give you a hint.

In 2017, the NAB tweaked the name of the annual educational conference held in conjunction with NAB Show. Originally known as the "Broadcast Engineering Conference," it was rechristened the "Broadcast Engineering & Information Technology Conference."

It's no secret that silos that long divided broadcast engineers and IT guys are going the way of the dinosaur. As everything from transmitters to apps to security cameras becomes networked and reliant on the Internet of Things, this trend is not likely to reverse.

What is also clear is that locking the doors and gate at your transmitter site and studios is no longer an adequate security procedure, at least not on its own. Copper thieves and vandals continue to cause problems, but hackers and others with malicious intent have joined the ranks of threats to radio stations of all sizes and locations.

It's easy to cite several recent, high-profile incidents of hacking that have challenged radio stations. Among them: Portland, Ore., station KBOO(LPFM) was hacked this spring as part of Drupalgeddon2; Indiana station WZZY broadcast a fake EAS alert about zombies; San Francisco's KQED(FM) was temporarily crippled by a ransomware attack; and a number of stations had egg on their faces when hackers exploited a default password to play an anti-Trump song last year.

WHAT SHOULD YOU WORRY ABOUT?

According to NAB Senior Director of Engineering and Technology Policy Kelly T. Williams, broadcasters need to focus on defending stations' IP infrastructure — the network — from cyber attacks. Increased incidents of phishing and other cyber breaches, like those that targeted KBOO or KQED, worry him, Williams said.

He encourages stations to have "an action plan in place so that you can detect a breach and recover from it." In an email, Williams said broadcasters should remember: "It's not *if* you will be breached; it's *when*. So be ready."

"The number one goal is to not let a breach take your station off the air," he said.

Nonetheless, Williams noted, "The significant increase recently in cybersecurity awareness by broadcasters encourages me."

NOW WHAT?

Assuming you need no further convincing that this issue is relevant to you and your radio station, what should you do next to beef up (or perhaps establish) your cybersecurity presence?

A good first step is to review standards and best practices recommended by organizations like NAB (*https://www.nab.org/cybersecurity/broadcasterResources.asp*), the Society of Broadcast Engineers (*http://www.sbe.org/sections/edu_seminars.php*) and the World Broadcasting Union (*https://tinyurl.com/y9se43j6*).

"NAB's focus is on educating broadcasters about cybersecurity issues," Williams said. "NAB has put together white papers that stations can use, and we are in the process of rolling out online courses to educate station personnel on how to implement a cybersecurity program."

Williams added, "We are very bullish on something called the NIST framework. This is a document that outlines how to take a risk assessment approach to cybersecurity in your organization. "

The NIST cybersecurity framework was developed by the U.S. Department of Commerce's National Institute of Standards and Technology.

The NIST framework breaks down the elements of a good cybersecurity plan into 1. Identify, 2. Protect, 3. Detect, 4. Respond and 5. Recover.

According to the NIST website, "This voluntary framework consists of standards, guidelines and best practices to manage cybersecurity-related risk.

The Cybersecurity Framework's prioritized, flexible and cost-effective approach helps to promote the protection and resilience of critical infrastructure and other sectors important to the economy and national security."

The most recent version of the NIST framework was published in late April and can be found online here: *https://tinyurl.com/y8a92mp7*. According to the website, "Version 1.1 includes updates on: authentication and identity, self-assessing cybersecurity risk, managing cybersecurity within the supply chain and vulnerability disclosure."

An article in the June 6 issue of Radio World entitled "Do You Know If Your Broadcast Plant Is Really Secure?" summarized KAMU Director of Engineering Wayne Pecena's BEITC presentation on network security for broadcasters.

According to Pecena, basic elements of a contemporary cybersecurity plan may include — but are not limited to — controlling access to the physical network components; for Ethernet switch port programming, use VLANs to segment traffic for user groups or functions; implement physical and software firewalls; and add encryption tools.

Of course, all of these steps require an investment of time and money, but a hacking incident could cost your station much more — just ask any broadcast engineer who has had to recover from a cybersecurity breach.

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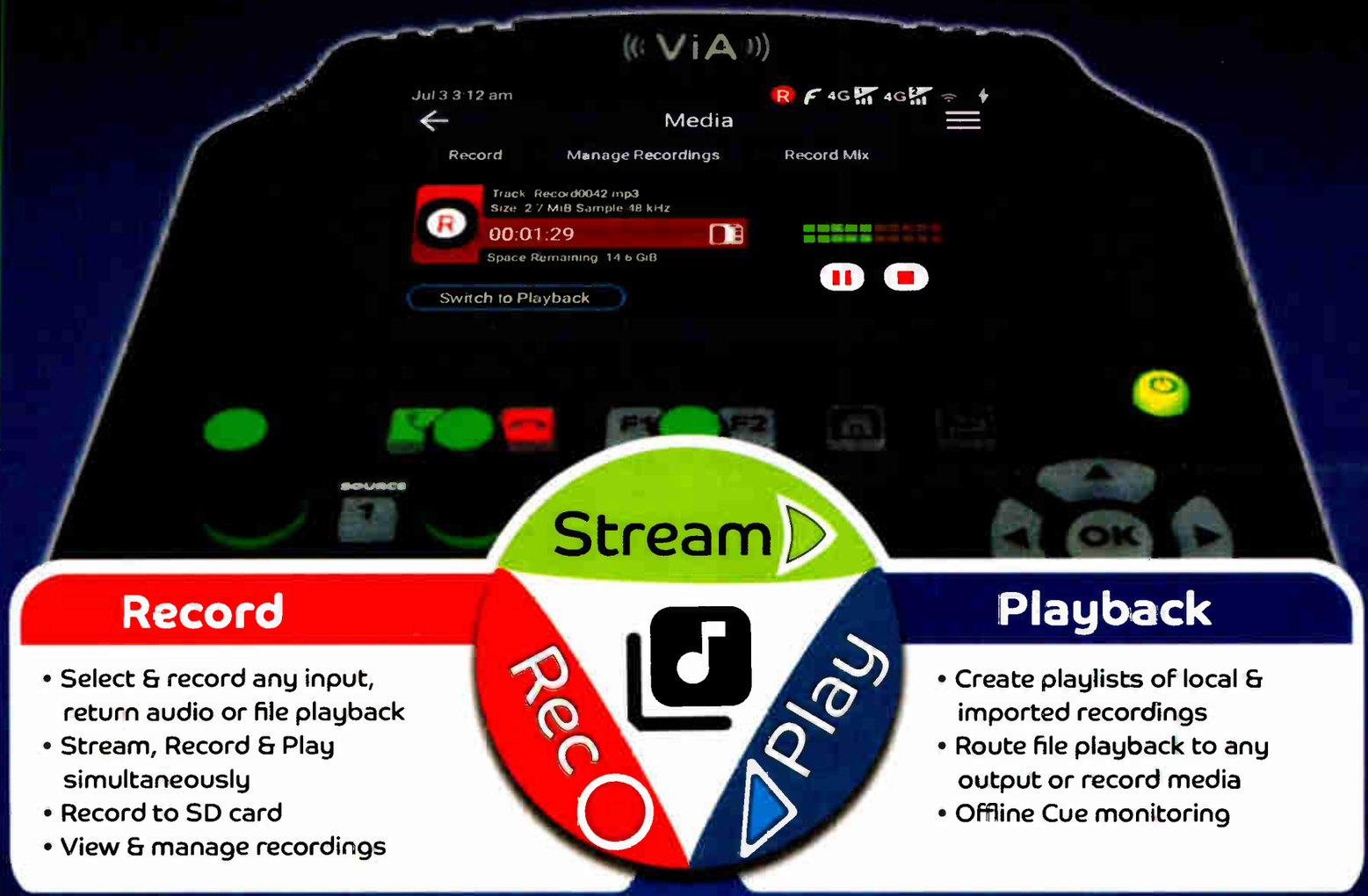

Stream

Record

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- Stream, Record & Play simultaneously
- Record to SD card
- View & manage recordings

Rec

Play

Playback

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CYBERSECURITY

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PRIVACY PARADOX

One change in mindset visible in the market is a deemphasis on the idea of "perimeter security."

"You are not safe behind the perimeter, because the perimeter itself no longer exists," Akamai argues on its website. "Today's world is cloud- and mobile-driven, and the traditional moat-and-castle approach to enterprise security is no longer applicable for modern business practices."

With applications hosted in various places and a workforce on the move, the company says, there is no longer a delineation between inside and outside the network. "As a result, seemingly every week there are new reports about high-profile data breaches and cyberattacks."

Akamai Chief Technology Officer Charlie Gero argues in favor of what he calls zero trust security architecture. "Companies must evolve to a 'never trust, always verify' zero trust model to secure against the wide variety of threats that exist and are constantly evolving," Akamai states.

Looking at the consumer economy more broadly, cybersecurity is only likely to become more crucial thanks to ongoing developments in areas as diverse as cryptocurrency, interactive smart speakers and mobile payments.

For example, a major trend toward platform personalization — whether it be on Facebook or Spotify, Wave or NextDoor — raises the privacy stakes. Venture capitalist Mary Meeker of Kleiner Perkins notes the massive amount of personalized data that people have put into such platforms.

That data, she said in remarks at the Code 2018 conference, improves engagement and leads to better experiences for consumers — but it also helps creates what she calls a privacy paradox: "Internet companies are making low-price services better in part from user data. Internet users are increasing their time on internet services based on perceived value. Regulators want to ensure data is not used improperly, and not all regulators think about this in the same way." Regulatory considerations are thus a big, uncertain element in this picture.

THE WEAK HUMAN LINK

IT expert Wayne Pecena, who works in the broadcast and education sectors, says security should be an ongoing process. Yet that at many business, unfortunately, it tends to be treated as a one-time, set-it-up-and-forget-it event.

Pecena is assistant director information technology of educational broadcast services at Texas A&M University and director of engineering for KAMU Public Radio and Television; he says cybersecurity never has an end.

"It is a continuous process of monitoring, evaluation, analysis and prevention as the threat landscape is always in a state of change and evolution," he said.

"I would also not lose sight of the past, as ransomware, phishing [and] distributed denial of service will likely continue at an accelerated pace. As cloud services and applications continue to expand, I would also keep the cloud cybercrime landscape or Cybersecurity-as-a-Service (CaaS) on my radar."

In Pecena's experience, most organizations do spend plenty of time and money in protecting their IT environment, but often the simplest areas can be overlooked while the focus is on higher-tech matters.

"Social engineering remains one of the largest threats to an organization, and the human factor remains a weak link. The internet of things movement brings challenges, as most of these types of devices lack any real internal security capability and instead rely on external protection means."

He also finds "crypto-mining" a fascinating area of concern as computing resources are hijacked for someone's bitcoin mining applications. "Not necessarily destructive — like DDoS or ransomware — to an organization, [but] host computing resources can be [affected] such that legitimate application use is impacted. Malicious mining scripts can easily be picked up from a casual website visit, and this opens a new area for anti-virus protection software." Pecena said for him this recalls the days of desktop computers being unknowingly hijacked to serve music or distribute porn.

Those well-meaning hackers who returned to Washington recently hoped to draw attention once again to the issue of digital security. At least one pushed for government to play a larger role. But another said companies also need to take advantage of the tools and knowledge that are already available.

It was Robert Mueller — yes, that one — who is credited with saying back in 2012 that there were only two types of companies: Those that have been hacked and those that will be hacked.

Today that wisdom is often updated to read: "There were two types of companies: Those that know they've been hacked, and those that don't know that they've been hacked."

Manage accordingly.

Paul McLane is managing director, content, of Radio World and the Future Media — Technology group.

Watch a video on this topic and find other resources at *https://www.radioworld.com/needtoknow/cybersecurity.*

NEED TO KNOW MORE?

Have a burning question about cybersecurity — or maybe request for a different topic you'd like to see us tackle? Email us at *needtoknow@futurenet.com* and we'll put our top minds on it!

SOURCES AND MORE READING

Derek Hawkins, The Washington Post, "Hackers: Internet Security Threats From 20 Years Ago Persist"
https://tinyurl.com/HawkinsWashPost

Department of Homeland Security, "Cybersecurity Strategy"
https://tinyurl.com/DHSStrategyGuide

Adam Simister, "7 Cybersecurity Trends to Watch Out for in 2018"
https://tinyurl.com/SimisterCSO

Cisco, "2018 Annual Cybersecurity Report"
https://tinyurl.com/Cisco2018Report

Mary Meeker, Kleiner Perkins, "Internet Trends 2018"
https://tinyurl.com/MeekerTrends

White House Council of Economic Advisors, "The Cost of Malicious Cyber Activity to the U.S. Economy"
https://tinyurl.com/CEACyber

Charlie Gero, Akamai, "Moving Beyond Perimeter Security"
https://tinyurl.com/GeroAkamai

IN CASE YOU MISSED IT

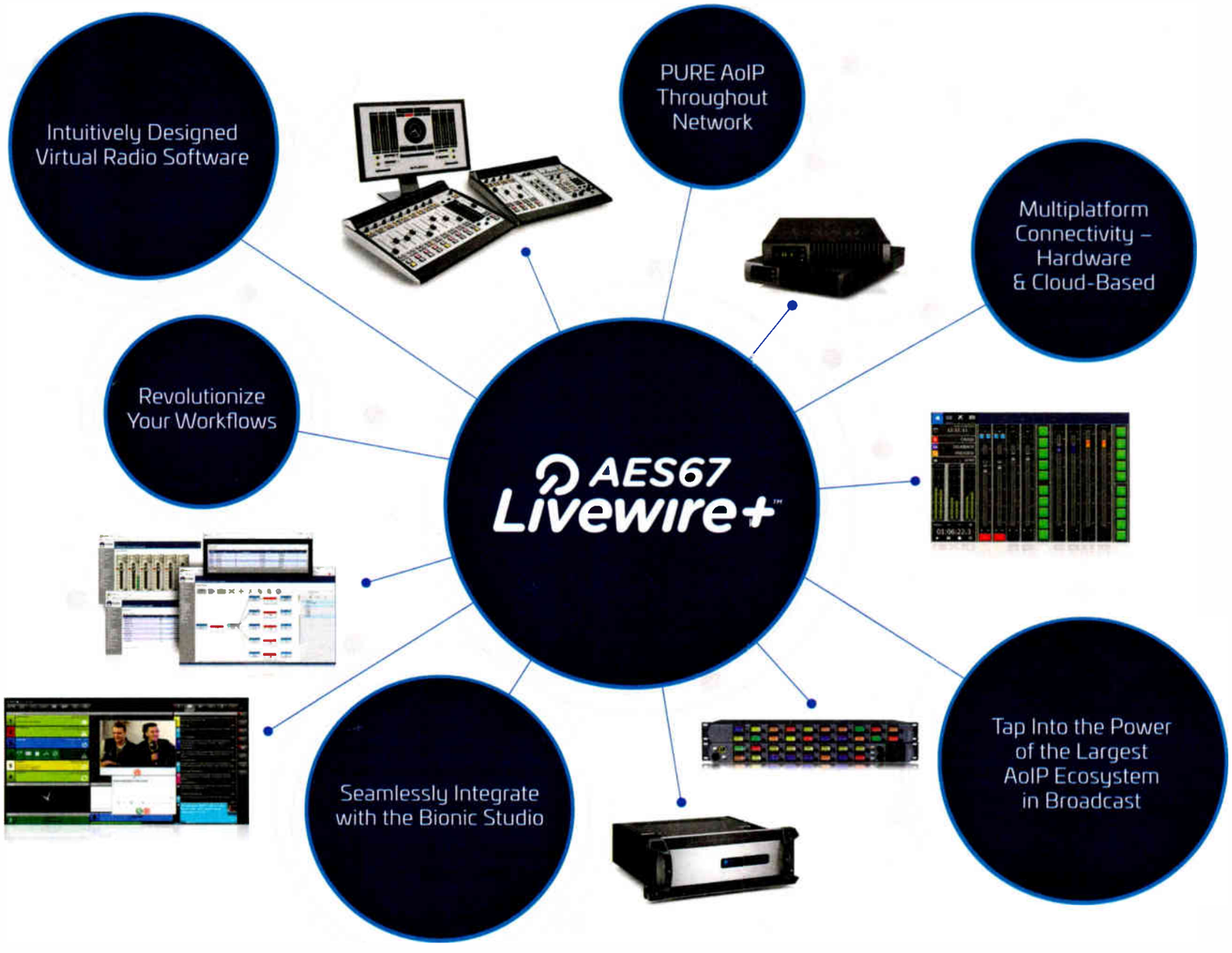
A sampling of recent headlines delivered to Radio World readers in their free daily NewsBytes e-newsletter. (Click the Subscribe tab at radioworld.com, *then Newsletters.)*

➤ Rep. Cole: Noncoms Must Be Protected in C Band Sharing
The chair of the House Appropriations Subcommittee wrote to Chairman Pai to advise caution as the commission pondered remaking the band to allow wireless use, either by dividing up the band or allowing for sharing. ISPs and broadcasters are concerned about potential interference.

➤ SBE Announces Location, Dates for 2018 National Meeting
Chapter 11 will host the 54th SBE National Meeting Oct. 2–3 in the Boston suburb of Danvers, Mass., held in conjunction with the annual Media Resource Expo on Oct. 3. The dinner program will conclude with the presentation of the Fellow honor to Jerry Massey.

➤ BBC Radio Aims to Reinvent Itself for Next Generation
Despite reports, the U.K.'s public radio broadcaster is not surrendering the airwaves to commercial radio.

Welcome to the Ne(x)twork



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While other AoIP broadcast protocols still rely on TDM-based systems to work—whether this concerns routing, mixing, distribution, or intercom—Axia operates purely in the AoIP domain, eliminating antiquated, expensive, cumbersome, and hard-to-maintain equipment.

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AXIA THE TELOS ALLIANCE

Liquid Cooling Promotes Efficiency and Savings

Also: SNMP might not be simple but it's powerful

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

Liquid cooling for transmitters seems a bit exotic to many radio engineers, but truthfully, it's anything but. I was speaking with Don Backus of Rohde & Schwarz recently; he reminded me that liquid cooling has been used for years with the large AM "flamethrowers" of the '50s and '60s, as it was the only efficient way to push the heat out of the high-power AM tube transmitters.

Engineers who have exposure to TV transmitters will know that liquid cooling is prevalent there, both with solid-state and IOT-based transmitters. Liquid cooling is becoming more prevalent in FM transmitters lately. Don said that today's liquid-cooled transmitters are actually safer, simpler and easier to maintain than air-cooled models — and far more efficient overall.

Most engineers have heard the "horror stories" of liquid-cooled transmitters springing a leak and spraying water all over the transmitter, causing major problems. Rohde & Schwarz has taken a number of steps to prevent this kind of problem, starting with the design of the amplifier and power supply modules. A channel is cut into the actual heatsink, through which the coolant flows. The modules use a quick-disconnect to the liquid cooling system, so that even if you forget to turn off the valve to the module before removing it, there is no fluid leakage.

To further simplify operation, liquid coolant is delivered to the modules and combiner from a single intake port inside the transmitter and then, after circulating, exits from a single outtake port seen in Fig. 1. There are no multiple hoses. Both ports are connected to the pump stand (Fig. 2), and the heat exchanger (Fig. 3), using industrial-rated hoses. A cross section of one of the hoses is shown in Fig. 4.

Another misconception is that liquid cooling requires more maintenance. So what are the regular maintenance tasks regarding the liquid cooling inside the transmitter? Don says there are none — plain and simple. Since a liquid-cooled transmitter has no fans for amplifiers, no fans for power supplies and no general cabinet exhaust fan or blower, there are no fans to check, bearings to replace or filters to clean or change. This also results in a much cleaner environment.

Besides the reinforced hoses, the system includes two additional components, the pump stand and the heat exchanger. The pump stand typically will have two fully redundant pumps per cabinet, and a cabinet can run up to 40 kW of FM power. Should one pump fail, the other can pick up the entire load and you remain on the air at full power. Typical maintenance on the pump stand is to change or clean the liquid filter once per lifetime, at about the one year mark of operation. Since it's a closed system, you're not likely to have any contamination of the fluid after any possible flakes or grit left over from manufacturing are removed with that first filter cleaning, so one filter change will typically suffice.

In addition to keeping the transmitter cleaner, Don pointed out, you don't need to run your HVAC system for a liquid-cooled transmitter. Users will find their HVAC load will be greatly reduced, and power savings can be considerable, typically in excess of 13 percent.

(continued on page 14)

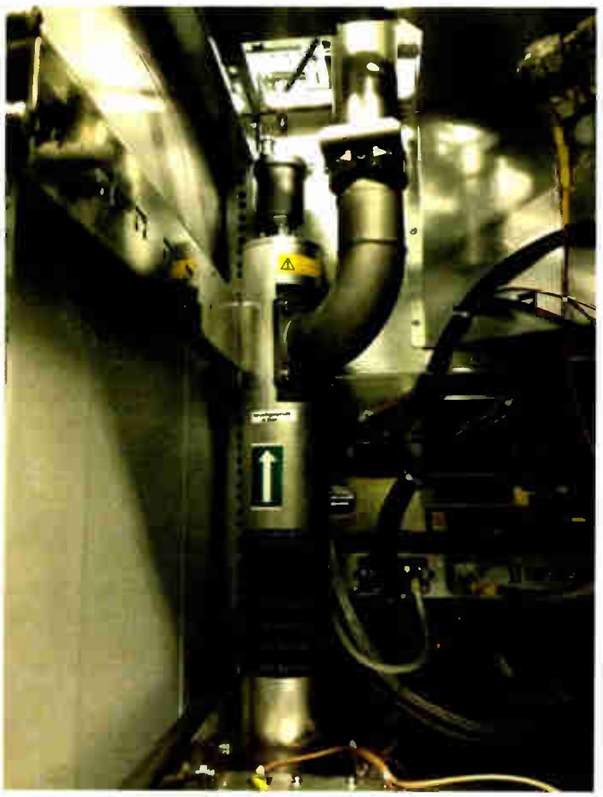

Fig. 1: The liquid coolant outflow port.

Fig. 2: The coolant pump stand showing the dual pumps.

Fig. 3: Nathan Briton Smith, the CE at WYCT(FM), Pensacola, Fla., stands behind the heat exchanger outside the transmitter building.

Fig. 4: A cross-sectional view of the reinforced industrial hoses.

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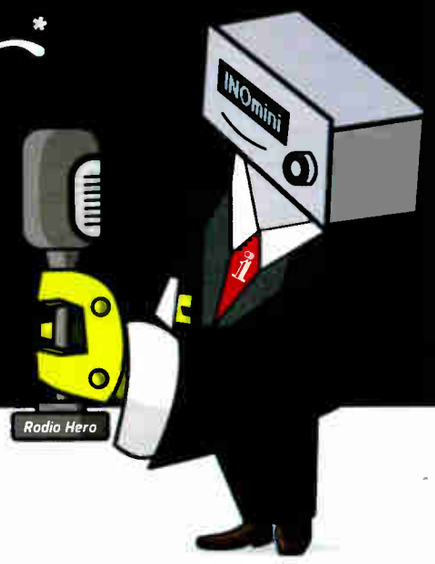

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Internet Radio Monitor

NEW **NOVIA FAMILY OF AUDIO PROCESSORS**

For AM (236), Stereo (262), and FM (272)

WORKBENCH

(continued from page 12)

The SNMP/GUI interface of your liquid-cooled transmitter will alert you to issues that may come up with the integral cooling system so you'll know about any performance issues.

Get more information from Don Backus by emailing *don.backus@rsa.rohde-schwarz.com*. Tell him you saw the Workbench article.

Five years ago, Workbench outlined a project that Rhode Island Public Radio IT and Engineering Director Aaron Read completed to heat the satellite dish used to receive some of RIPR's satellite-delivered programming. Ice is common in this part of New England, and the heated dish saved Aaron from clearing the dish after each storm.

Aaron has added an update to this project, using SNMP.

I had to laugh when reading Aaron's piece. SNMP stands for "Simple Network Monitoring Protocol" but, Aaron writes, "There's nothing simple about it!" Having worked with the protocol myself, I have to agree, but Aaron also points out that it is quite powerful, especially when linked up with the Burk Arc Plus Touch with SNMP Plus.

Aaron includes a useful tutorial in setting up SNMP monitoring, and you can find it online: *http://ripr.org/post/theec-snmp-sfx4104-denkovi-wonkish* and *http://ripr.org/post/theec-satdish-heater-2-son-dish-heater.*

Special projects engineer Dan Slentz writes about the new mics that are using 3 to 5V "Plug-in Power." Headphone and microphone manufacturer Rode is making an adaptor that takes 12 to 48V phantom power, and converts it down to the 3 to 5V needed by these new mics, seen in Fig. 5. A neat feature that I noticed were the threads on the TRS connection (see Fig. 6). The TRS plug can be screwed down so it won't come unplugged — a novel idea.

Fig. 5: Rode manufactures this XLR-to-TRS adaptor for the new "Plug-in Power."

Fig. 6: Note the screw threads to secure the TRS plug.

The 3.5 mm female TRS socket adapts to a male XLR, permitting the newer mics to be used with professional broadcast XLR connections. The adaptor is the Rode model VXLR+ and can be purchased from *www.sweetwater.com* for under $30. Search for Rode VXLR+.

Thanks to Sweetwater for providing the photos.

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.

Thinkstock/nito100

It's new equipment season again! Radio World's "Summer of Products" feature is all about new gear that has come onto the market in recent months, especially during spring convention season. Over several issues we are featuring equipment that caught our eye.

Digigram Introduces Audioway Bridge Range

Digigram's new Audioway range, including the Bridge B1, Bridge B2 and Bridge B3, is designed to distribute and interconnect audio streams in the studio and from outside broadcasts.

The company says the single-box units bridge AoIP streams and legacy signals while ensuring clock synchronization between the systems. Designed to be the backbone of an audio infrastructure, Digigram said, the range promises users the ability to route and monitor low-latency audio in all protocols and eases studio management through its AVS-monitor, Dante Controller and multiple presets.

Audioway Bridge B1 serves as a gateway between MADI and AES/EBU digital audio streams and AES67/Dante synchronous AoIP streams. It routes as well as monitors all I/Os through to the control software supplied. Featuring 64/64 Dante/AES67 full-duplex I/O channels, it is equipped with 64/64 MADI I/O and 16/16 AES/EBU I/O channel digital audio interfaces, as well as a low-latency hardware routing matrix between I/Os.

Audioway Bridge B2 is equipped with 64/64 MADI I/O and interconnects MADI and AES67/Dante workflows.

Finally, Audioway Bridge B3, operating AES/EBU and AES67/Dante streams, provides 16/16 AES/EBU I/O channels.

Info: www.digigram.com

Audio-Technica Releases Upgraded 3000 Wireless Mic System

Audio-Technica has been beefing up its wireless microphone system lineups. The latest is the 3000 series.

The budget mid-range frequency-agile, true diversity 3000 series (shown) is being upgraded to fourth-generation technology. Upgrades include a tuning range doubled to 60 MHz. The 3000 series operates in the DE2 (470–530 MHz) and EE1 (530–590 MHz) bands. A-T has six new microphone capsules that are compatible with the 3000's ATX-T3202 handheld transmitter.

The 3000 series is available in handheld and beltpack transmitter packages with headphone and lavalier mics.

In addition, A-T announced that the 6000 series, optimized for tight RF spaces in the 944–952 MHz band, has added a handheld transmitter to its lineup. The ATW0T6002x offers low handling noise and a metal body, high-visibility OLED screen, soft-touch controls and switchable RF power. It is also compatible with the six new interchangeable A-T microphone capsules.

Info: www.audio-technica.com

MultiCAM Systems Adds Interaction to Streaming Media

MultiCAM Systems has integrated two-way interactivity into its video production systems, which include MultiCAM Radio and MultiCAM Studio.

According to the company, using the ARES Interactive Media platform developed by MultiCAM Systems partner ARES Interactive Media, streaming media originators can receive online comments from in real time. Viewers can also ask the host questions, as well as participate in online contests and polls during streaming events.

When integrated within the MultiCAM Radio automated visual radio system and MultiCAM Studio for local TV and PEG stations and live remotes, the ARES Interactive Media platform allows show producers to contact viewers during live video streams and put them "on air" using the viewers' own web cams. The platform can support an online video window of the host, plus windows of the viewers being interviewed.

MultiCAM adds that the ARES Interactive Media platform further immerses viewers into the event by allowing webcasters to utilize them as production resources. For example, the ARES Interactive Media platform allows on-air hosts to poll audiences on their views during live broadcasts, compile those results automatically and deliver the results in seconds. In addition, the firm says, hosts can deliver a breaking news story by using the links supported by ARES Interactive Media to reach people in the affected area.

Info: www.multicam-systems.com

Dielectric Aims Low and High With Antenna

Dielectric says it has adapted its Powerlite DCR-T antenna for the needs of HD Radio and LPFM broadcasters. The key, according to the company, is added control of directionality.

The circularly polarized DCR-T directional antenna is offered as a cost-effective solution for low- to medium-power FM and translator stations, which traditionally required a more expensive antenna in designs typical of higher-power operations to meet directional pattern requirements.

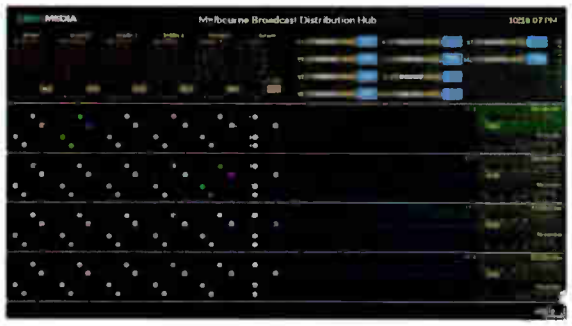
Dielectric says this is possible because software reduces antenna costs and production lead times and, with most FM translator directional antenna requirements, reduces the price of the FCC proof of performance. The software provides the proof data required to confirm directional pattern compliance, as opposed to the traditional method of verifying patterns with physical scale models.

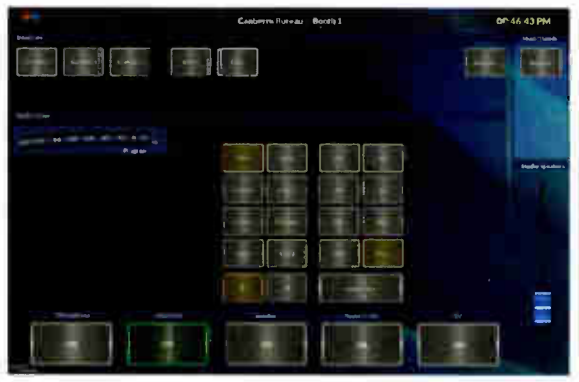
Sales Manager Steven Moreen said in an announcement, "The ring-style design of the DCR-T antenna, with its stable axial ratio independent of impedance tuning, is an ideal platform on which to add directional signal control. And, given the efficiency at which Dielectric can produce these antennas, the antenna can be delivered within weeks as opposed to months, along with the associated FCC proof of performance."

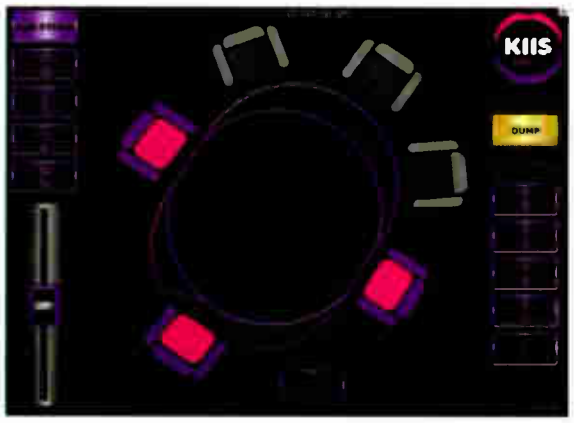
The company adds that the DCR-T's broadband capability offers enough bandwidth to accommodate HD Radio signals alongside analog FM, with in-field channel adjustments should channels change. The low-profile design offers less wind resistance.

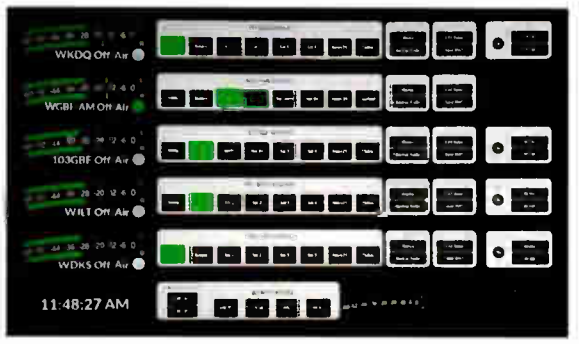
An optional radome is available.

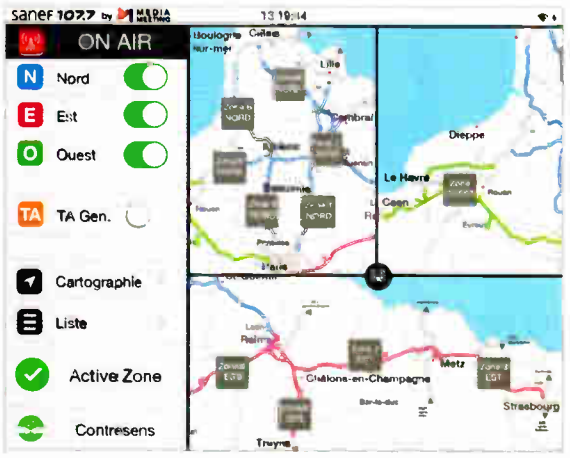
Info: www.dielectric.com

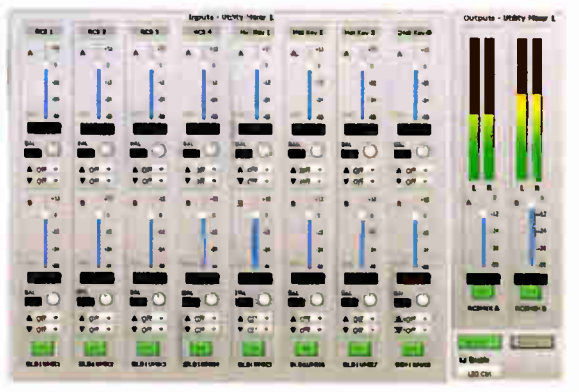












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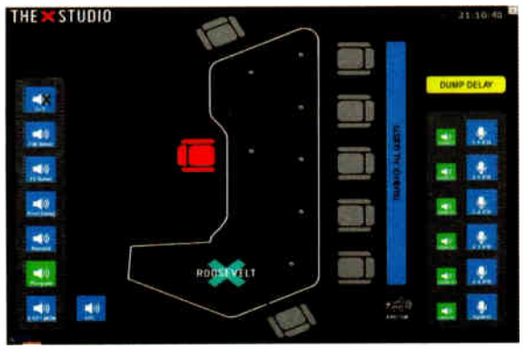

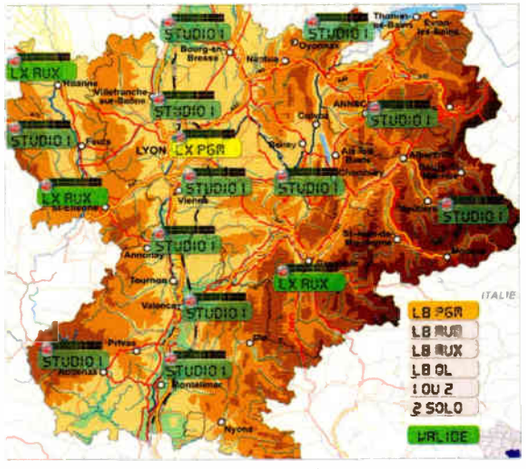

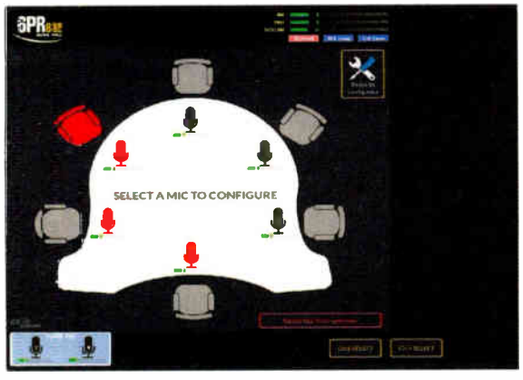

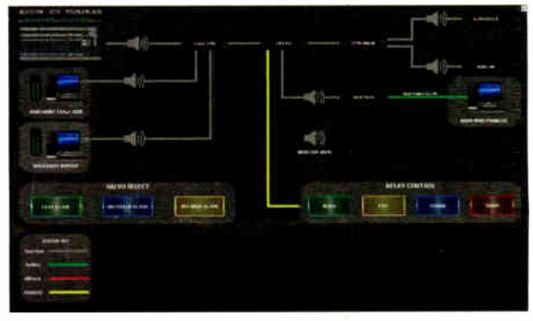

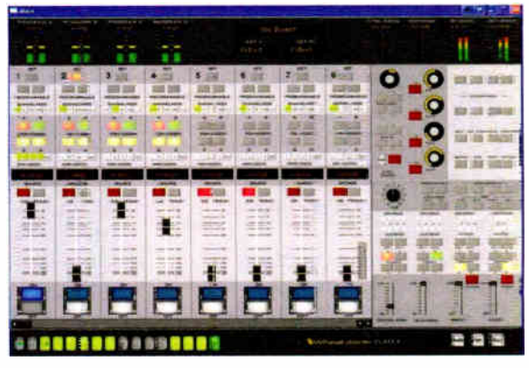

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WHEATNET-IP INTELLIGENT NETWORK

Genelec Has "The Ones"

Powered speaker maker Genelec is thinking small these days. Small as in the new 8331 (far left) and 8341 (middle) miniature monitors — additions to The Ones series.

The wee monitors are built around coaxial drivers. As small as they are though, The Ones are three-way speakers with the coaxial combination concealed within Genelec's Directivity Control Waveguide design and feature Genelec's Acoustically Concealed Woofer technology.

For the 8331 the drivers are two 5 1/8-inch woofers and a 3 1/2-inch coaxial mid-range/tweeter combo. They are driven by a 72 W LF amp, a 36 W midrange amp and a 36 W tweeter amp.

For the 8341 the drivers are two 6 5/8-inch woofers and a 3 1/2-inch coaxial mid-range/tweeter combo.

They are driven by a 250 W LF amp, a 150 W midrange amp and a 150 W tweeter amp. All amplifiers are Class D.

The 8331 and 8341 are compatible with Genelec's Smart Active Monitoring speaker network managing and monitoring system. Both speaker cases utilize Genelec's Minimum Diffraction Enclosure technology.

In addition, a number of mounting options are available for both.

Info: www.genelec.com

DaySequerra Debuts HD Radio Data Monitor

DaySequerra, working with HD Radio technology patent holder and developer Xperi, has created the HD Radio Data Monitor.

The monitor offers advanced multicast scanning along with a suite of features including RDS-RBDS data analysis, simultaneous HD Radio AAS and LOT reporting for all HD1 and HD subchannel broadcasts; SMNP interface, remote Artist Experience artwork and audio streaming capability, email alerts and proprietary weather and traffic reporting given the appropriate broadcast token.

It monitors the 300+ data fields that HD Radio carries, including Artist Experience and data stream. AE is a notable data hog, the company says. Monitoring can be IP.

Xperi provided the core software. Its Senior Vice President of Broadcast Technology Joe D'Angelo said, "We've been working with DaySequerra for years to ensure that broadcasters have the right monitoring capabilities to ensure the highest quality listener experience ... [The] new HD Radio Data Monitor is based on the proven design and functionality developed and deployed in Xperi's own nationwide HD Radio monitoring network."

Info: www.daysequerra.com

Tascam Offers Lav/Recorder Package

Tascam's DR-10L is an ultracompact digital recorder and lavalier microphone combo for mobile and remote applications.

The DR-10L offers dual recording, which captures two files simultaneously at different levels. With dual recording, the lower-level recording serves as a safety track in case a sudden jump in audio level causes clipping distortion on the high-level track. This is one of several level-management features that ensure a clean recording, even in challenging field conditions, the company said. Others include automatic level control, low-cut filter and a built-in limiter.

It can capture up to 24-bit/48 kHz audio and records standard WAV files (compatible with BWF format) to microSD or SDHC card. Its clock function is convenient for editing and searching, and a timed track-incrementing function can create new files at regular intervals during recording.

A micro USB B port enables easy data exchange with computers. It operates for up to 10 hours on one AAA alkaline battery and weighs only 63 grams (2.2 ounce), including battery.

The DR-10LW is a white version, ideal for weddings. It comes with a professional-quality lavalier microphone.

A black lavalier mic is also available, TM-10LB. Both mics are equipped with Sennheiser-type connectors, making them compatible with a range of third-party equipment and accessories.

Info: www.tascam.com

2wcom Upgrades MM01

2wcom has added a number of features to its MM01 AoIP point-to-point or point-to multipoint audio codec.

The unit now supports the Livewire+ standard for compatibility with Telos Alliance radio products and any other Livewire+-compatible products from other equipment manufacturers. In addition, the unit's bidirectional functionality lets users monitor live via GPO GPI routing and GPO to GPI mapping.

The company says the MM01's Easy2connect feature allows operators and reporters in the field to establish a connection easily; users can set up a SIP phonebook via a web interface, which applies the codec algorithm and the corresponding phonebook entry to each network studio or creates the SIP connection according to requirements.

Equipped with DualStreaming, Stream4Sure and Pro-MPEG FEC, the MM01 is appropriate for use in all types of AoIP networks. It also supports all AoIP standards (in compliance with EBU TECH 3326 and AES67 including SAP and RTSP, Ravenna and Livewire+), as well as common codec algorithms (MPEG I/II Layer 2/3, HE-AACv1 and v2, AAC-LD, G.711, G.722, EaptX and PCM).

Info: www.2wcom.com

Aldena Introduces SEP for EMF Control

Aldena's compact Selective Electric Isotropic Triaxial Antenna Probe (SEP) is designed to measure elements of the electromagnetic field in the 100 kHz to 3.6 GHz frequency range.

The spectrum analyzer and three-axis antenna (with an integrated RF switch) are fitted inside one unit. This facilitates the operator's work in the field, who then only has to calibrate just one instrument instead of three (analyzer, cable and antenna).

Aldena explains that SEP's three-dipole antennas are directly connected to the receiver, which minimizes isotropy error. In addition, users can connect SEP to a PC via a fiber-optic cable to control several functions via dedicated software including channel power, multichannel power, settable markers, maximum hold, RMS and average in a selectable time.

SEP weights 370 grams/13 ounces and can be mounted on drones.

Info: www.aldena.it

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Focusrite Fields Production Interfaces for Broadcasters

Focusrite recently debuted a couple of interfaces that may find a home in broadcaster production studios.

The RedNet X2P (shown) is a two-channel networkable preamp with analog inputs. The desktop-style unit outputs line level or Dante AoIP digital signals. The preamps are from Focusrite's Evolution series. Features include phantom power, a high-pass filter, phase reverse and an "Air" processing preset. It also includes headphone and local mixer controls.

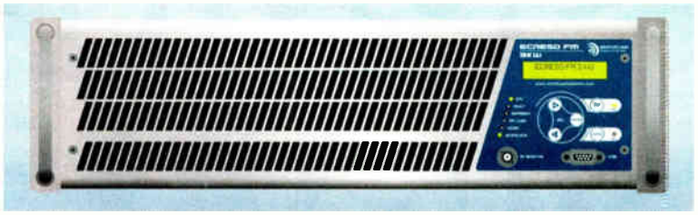
The Red 16Line is a 64-in/64-out rackmount unit with Pro Tools HD or other multichannel DAWs in mind. It offers dual Thunderbolt 3 ports, Dante AoIP, S/PDIF (RCA), optical, D-sub analog line connectivity and more. In addition there's a pair of Focusrite Evolution mic preamps, Word Clock and a loop sync. Headphone outputs are on the front-panel.

Both units are controllable via network remote control.

Info: www.focusrite.com

Worldcast Picks Three for Ecreso

Continuing a recent minimalist branding scheme, WorldCast Systems transmitter-making arm Ecreso has debuted a 3 kW FM transmitter appropriately called Ecreso FM 3 kW Transmitter.



The Ecreso FM line features direct to channel digital modulator, MPX over AES digital input, five-band onboard audio processing, RDS encoder, MOSFET power, redundant power supplies, amps and fans, along with single-frequency network capability.

Ecreso says that the 3 kW is up to 76 percent efficient.

Product Manager Gregory Mercier said the system shares planar design and easy maintenance and access with its higher-power models.

Info: www.worldcastsystems.com

Arrakis Chooses the DARC Side

Arrakis Systems is expanding its IP products line. The latest is DARC, an IP-based virtual console/network platform that leverages the company's Simple IP foray into audio IP technology.

Turnkey packages utilizing preconfigured Dell Optiplex computers and Simple IP I/O boxes will be available in eight-, 12- and 16-input channel/three-out bus packages. Dante-compatible devices can be used as substitute hardware.

The virtual touchscreen-oriented software routes and automatically configures input channels along with allowing access to Dante hardware on the network. The larger network can connect multiple studios and facilities. It is AES67-compatible for interfacing with other networks.

For those wanting to stick with a more hardware-oriented approach, Arrakis offers the DARC Surface, a control surface mixer that is operates within the DARC IP network. It will be available in eight-, 12- and 16-channel models.

Info: www.arrakis-systems.com

Davicom Cuts to the Cortex

At the spring NAB Show remote monitoring and control system developer Davicom launched a new control platform.

Cortex360, according to Davicom, is designed to be energy efficient, yet offer a range of features and performance parameters.

Its operational range is pegged at –40 to 158 degrees F. It has eight analog sensor inputs, 16 status inputs with independent grounds, eight Form C relay outputs and 128 SNMP commands. With a Davicom Modbus interface and SNMP add-ons the number of commands can be expanded to 1,028.

Communications interfaces include voice, dial-up modem, two-way radio, text message and SNMP. A four-port USB hub and four-port network switch are also included.

Dual-module memory allows for rock-solid backup and recovery, even in unstable conditions.

Info: www.davicom.com

GatesAir Adds to Intraplex IP Codec Family

The GatesAir Intraplex IP Link 200A is the latest in the Intraplex line of IP codecs; it provides AES67 digital audio compatibility.

"The IP Link 200A is a hybrid model that interconnects AES67 and analog/AES3 signals simultaneously, and enables conversion between the two formats," the company stated. "With dedicated channels for both, users still operating in analog or AES3 mode have a futureproof path to an industry-adopted audio over IP standard."

An additional feature is GatesAir's Dynamic Stream Splicing technology software, which mitigates IP packet loss and eliminates off-air time through multiple redundant streams. The company said integration of a firewall and advanced packet filtering capabilities strengthen network security, protecting against outside intrusions to ensure on-air signal protection.

GatesAir Chief Product Officer Rich Redmond said the design simplifies the cabling and interconnection requirements from GatesAir codecs to the wide-area network and provides users with a true AES67 audio over IP device that is interoperable with audio over IP solutions such as WheatNet-IP, Ravenna and Livewire+.

Info: www.gatesair.com

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Social's Limitations Mean Fresh Opportunity for Radio

You should only air commercials that deliver results; the keys are appropriate frequency and great creativity

PROMO POWER

Mark Lapidus

A top agency gave me a recommendation recently to run six-second ads on Facebook and Instagram. I was informed that the short attention span of mobile phone users is continuing to drop, as click-happy fingers seek the next most interesting thing as quickly as you can blink an eye.

Have you ever tried to communicate a marketing benefit in six seconds? Sure, it can be done for some products, but for others, six seconds is merely the warmup before the pitch.

I optimistically view this as a fresh opportunity for radio to offer advertisers something they can't get locally on social media: greater, focused attention. What does it take for radio stations to deliver? Excellent creative and frequency of message. These fundamentals are nothing new — and yet, they are too often left on the back burner.

FREQUENCY

Let's start with frequency and see if anyone on your sales staff has the courage to adjust an advertising schedule to deliver a meaningful result.

Industry wisdom and common sense tell us that it takes multiple exposures to an advertisement for that message to be heard, understood and remembered. Advertising and research professionals typically agree that the magic number for radio is a minimum frequency of three times, generally heard within one week.

Depending on your audience, this might mean that to be effective, the same advertisement needs to air at least three times a day for seven days, or 21 total spots. To be certain, run more. Do not, however, run fewer.

I've heard other opinions that advise running more spots over fewer days, and this is fine for some situations.

Mediocre commercials are a double whammy: They ruin ratings and don't benefit your advertisers.

For example, if the big sales day for Jerry's Trucks is Saturday, start Thursday and run those same 21 spots within three days to increase the likelihood of action.

The best sales managers I've worked with check schedules to ensure proper frequency before signing an order.

With more than 100 finalist commercials, the 2018 Radio Mercury Awards proved that radio can make great creative.

CREATIVE

What is excellent creative? When you receive a horrible spot from an advertiser, do you air it anyway? These are tough questions that require multiple people to get involved in a solution-based process.

The reality is that you must be both proactive and reactive.

To be proactive means that you have an in-house writer/producer who knows how to create entertaining and compelling informative commercials consistently. This person must also be empowered to work directly with clients to create spots that will make them excited to work with your station. Can't afford a full-time person? Next-best step is to outsource this function. There are many freelance talents and agencies who will perform this work for you on a project basis — but even so, you must of course make an investment in quality work.

Also, take note that even when you are blessed with excellent copywriting, at least half the outcome depends on the voice-over and the production. When the same three people voice all of your commercials, regardless of station size, you are in trouble.

As the Nielsen PPM proves, it's hard to keep listeners through spot breaks, so mediocre commercials are a double whammy: They ruin ratings and don't benefit your advertisers.

While a program director would not dream of airing a song she never previewed, few PDs or sales managers think twice about airing a commercial they've never heard. Even after hearing a spot on-air that is terrible, it's likely that nobody will even think of pulling that commercial before the schedule is over. I get it — money is at risk. Unfortunately, so are results.

A bit of diplomatic outreach to your client could convince them that you're there to help. Bad spots — you know one when you hear it — will likely bring an advertiser to voice that phrase we all dread: "Radio doesn't work."

Even if only once a week, it's a smart move for program directors and general sales managers to get together to discuss commercials. We all make time for what we feel is important. And if you are focused on ratings or revenue, now is a great time to reevaluate your priorities.

The author is president of Lapidus Media. He can be reached at marklapidus1@gmail.com.

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Are Morning News Podcasts a New Competitor?

NPR, New York Times and ABC think they're an opportunity

21ST CENTURY PD by Dave Beasing

Are you in the radio business or the entertainment and news business?

National Public Radio answered that question in 2014 with a new strategic plan that states, "To be relevant and fulfill its mission, public radio must create news and entertainment content that serves the needs of the broad American public and innovate on new platforms."

Consistent with that vision, NPR launched a 10-minute daily podcast called "Up First" in April of 2017 to "use people's morning time efficiently and get them up to speed on what they need to know for the day," says NPR VP/News Sarah Gilbert. The growth in listenership has been quick, already garnering a million listeners a week.

Moments before "Up First" is distributed as a podcast, it airs as the first live segment of "Morning Edition," and Gilbert says it's "more fluid, a little more conversational, a little more accessible," a feel that "infused the rest of the show and updated the sound of 'Morning Edition.'"

Does a daily NPR morning podcast compete for listeners with NPR's on-air product? Not really, says Gilbert. The average age of an "Up First" listener is 31, younger than most of NPR's broadcast listeners.

"A large proportion of the [podcast] audience doesn't experience public radio content in any other way. We've brought people into the NPR ecosystem who might not have found us otherwise. Once you're here, you learn how many different exciting, trustworthy and credible things NPR can provide."

The numbers support that theory. While NPR's 42 podcasts are now reaching 20.4 million unique listeners monthly, Nielsen Audio ratings for programs like "Morning Edition" are maintaining peak levels, just under 38 million listeners each week.

NEW DAILY NEWS HABITS

Newspapers like the venerable New York Times have been forced to think about distributing their content on new platforms since the 1990s. Maybe that's why they were the first major media outlet to jump into the morning news podcast category with "The Daily."

"I had wanted to do a daily podcast for a long time," says "The Daily" producer Theo Balcomb. "People would say, 'That's crazy! Podcasts are supposed to be evergreen. You put so much effort into it, you don't want it to expire in six to eight hours.' But I knew that there was a healthy appetite for morning news. You need for people make you a daily habit. That means you have to give them the news when and where they want it."

Having worked for Maine Public Radio and New York's WNYC(FM) previously, Balcomb's résumé set the standard for the Times' new audio staff, with eight people working on "The Daily" and several more on other audio projects.

"The people we hire are reporters and editors in their own right and also have strong audio backgrounds. We have a mix of folks, people who come from doing daily news, but also people who've come from documentary and long-form reporting. That's kind of the magic of what we've made, combining those styles," Balcomb explains.

Like NPR, ABC News has been producing podcasts for years. "But we only decided to create a daily news podcast last year after it became clear that podcast audience measurement was gaining traction with advertisers," says Steve Jones, head of audio for ABC. Once they concluded there was a business opportunity, Jones and his team looked for ways to differentiate. "We thought a 20-minute, highly produced, daily podcast providing context and clarity on the top four or five stories a day would fill a need."

ABC News' "Start Here" gives the network's star correspondents a new outlet to tell great stories.

"I'm asking the same questions I'd ask them at drinks after work," says host Brad Mielke.

Of course, they also don't need to set up a camera to talk to Brad. When Chief White House correspondent Jonathan Karl was in Singapore for President Trump's summit with North Korea's Kim Jon Un, "Jonathan calls us from a van taking reporters to the president's press conference. He tells us, quietly, what question he's going to ask. Then a few minutes later, President Trump calls on him. You just can't get that type of access from most places."

At "The Daily," Balcomb encourages New York Times reporters to ask if they can tape interviews for possible use on the podcast. "Michael Schmidt and Emily Steel recorded an interview with Bill O'Reilly and captured amazing audio of him getting very upset and yelling at Emily and Mike. You would have never gotten that from a print story."

Jones believes local news outlets should consider creating morning news podcasts also, "provided the content is truly local and unique." In fact, the survival of long-established news brands may depend on it.

"Podcast listeners' median age is 29 years old, while radio news/talk listeners are aged 60-plus," says Jones. "By providing high-quality journalism produced in a conversational and lively audio format, we're making ABC News more valuable to a younger audience that wants credible information."

Veteran radio programmer Dave Beasing is speaking at both The Conclave and Podcast Movement this summer to broadcasters who, like him, are expanding their careers into podcasting. He can be reached at his new venture, SoundThatBrands.com.

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CleanFeed.net: Live Remotes on a Budget

It promises "advanced remote audio for everyone." Can this web-based solution deliver?

BROADCAST BASICS

BY DAN SLENTZ

This is part of a continuing series of occasional tips and practices for LPFM broadcasters. If you have any suggestions, let us know at radioworld@futurenet.com.

I'd been looking for a way for low-budget or nonprofit broadcasters to do web-based remotes and came across *CleanFeed.net*, which promises "advanced remote audio for everyone." Here's what I learned.

First some context. Back in the day, when we wanted to do a remote, we had a phone line put in place and did a dial-up. If you were fortunate, you were close enough to the station and had a Marti remote production unit that you could fire up and send wirelessly to the station. (By the way, we also walked through five feet of snow up hill, both ways, to get to/from school.)

But times have changed. Cellphones came along and cellphone interfaces allowed for a wireless connection and POTS (Plain Old Telephone System) lines became a thing of the past. With the advent of improved wireless internet via cellphones (namely 4G), we now had a digital connection to the station. With that, radio hardware and software developers started improving their digital systems with codecs that provided us with high-quality audio and low latency.

Many stations use this digital technology for live remotes (and even studio to transmitter links, both as primary and backup), but unfortunately even the more cost-effective digital STL solutions are out of the price range of some of the smaller stations (including the smallest "mom & pop commercial," small noncoms and most LPFMs).

There are a number of inexpensive, even free, solutions for doing remotes from using the audio of Skype to any number of VoIP solutions. Even social media now allows for experiments like Google Hangouts for audio. This technology will work for both remote broadcasts but also for interview situations where guests are at a remote location.

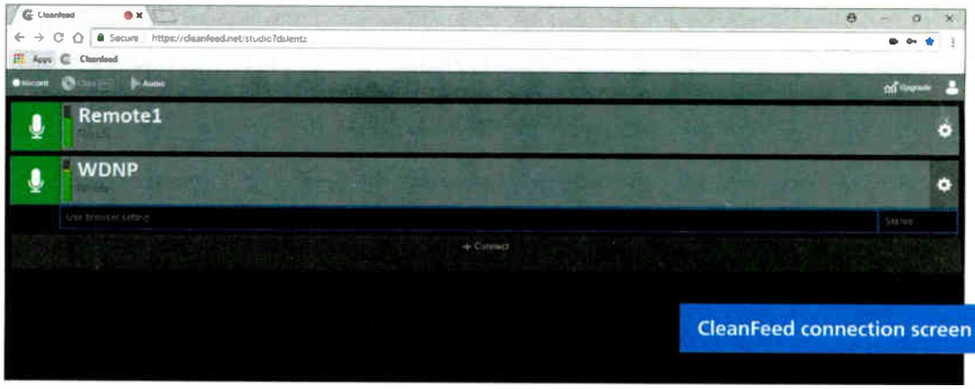
CleanFeed promises to enable anyone to send, receive and record live audio using only a browser.

For any remote system or remote interview system, you do need a good mix-minus system in place to prevent loop-back on your audio (which prevents feedback or looping echo). Nearly all pro broadcast consoles provide mix-minus, and Radio World has had info in the past on how you can set up mix-minus with consumer mixers. The mix-minus allows the remote talent (or person being interviewed) to hear the host and even content airing, but doesn't loop their audio back to them. If you use a phone hybrid, you are likely providing mix-minus to it right now. So utilizing that same mix-minus will work for your low-budget remote.

If we assume the station has a production/auxiliary computer tied to the on-air board, the solution of using a web-based solution is fairly easy. Assuming, again, that the production computer has an input from the audio console, that it can be configured for mix-minus and that the computer has an output back to the console, the hardware is already in place.

In the past, I've used numerous web-based applications for remotes, from the aforementioned Google Hangouts to Skype, and the issue with these is that they aren't meant for broadcast. Latency is a low priority in their systems. Also, they are not always reliable; they can have hundreds of thousands of users on these systems at any one time, adding to latency.

I've been doing some testing using free software called TeamTalk which has low latency for remotes, but this requires I set up a server at the station that can host the software.



CleanFeed connection screen

SOLUTION

I have been looking for someone or something that hosts a site that would allow low-budget or nonprofit broadcasters to utilize this type of technology and came across *CleanFeed.net.*

I reached out to the two U.K. broadcast engineers who started CleanFeed LLP and inquired about the service. Mark Hills responded.

"We wanted CleanFeed to be available to college/charity/small radio stations as that's my own background and the exciting thing is it allows people like that to do something they couldn't do before," he told me. "So really that should be out there and being used."

CleanFeed uses the Opus audio codec in their server. Right now, the only limitation (if you can call it that) is that the only web browser that it works with is Chrome.

I set up some tests using WDNP(LP) in Dover, Ohio, and a remote out of Miami Beach, Fla., to put CleanFeed though a trial. The goal was to see if a station could use CleanFeed for remote broadcasts using a smartphone

and the Chrome browser for remote broadcasts. This same technology would easily allow for live remote interviewing of guests (CleanFeed allows multiple users to connect).

On the engineering side, the tests were configured with the station's audio console feeding the studio mics to Program (Air) and Audition.

Audition audio from the console fed the production computer's input. The production computer's output only fed Program (and not Audition, as that would create a loop for the caller's own audio). In other words, a mix-minus was created for the return audio to the remote talent.

Dan's smartphone audio interface

On the remote side, I plugged into my PC's sound card and a USB-to-XLR adapter for a mic. The remote PC was configured to record audio (or input audio) from the USB mic section, and the playback audio (or output audio) from the internal sound card. The web browser would provide my return audio via headphones.

In later testing and actual use, a simple interface was made for a smartphone allowing a pro mic (XLR connection) to feed a smartphone jack, along with a 1/4-inch jack for headphone monitoring. This allows a smartphone to make a superior audio line connection over broadband via the web browser rather than the actual "telephone" portion of the smartphone.

From the browser, I visited the *CleanFeed.net* website and signed up. I received an email with a link. I opened it on Chrome and "accepted," completing the connection. It's not an exaggeration to say the total setup time was under 10 minutes.

The GUI features software meters on each side (station and remote talent). It is important to avoid clipping by making sure neither audio peaks out in the red. Otherwise, I was amazed at the quality and near zero latency of CleanFeed. I estimate the latency to be 0.25 seconds or less.

For small stations, including LPFMs, CleanFeed provides an excellent and free way to do remote interviews or remote broadcasts. The limitations will, of course, be based on having a good signal and bandwidth on the remote side, and, naturally, good broadband at your studio.

The disadvantage is that you are on someone else's server and being hosted remotely. Though the folks at *CleanFeed.net* haven't suggested fees for nonprofits and noncoms, we should understand that their own bandwidth costs them money, so the future could include an associated cost.

A free system is a great choice when a small station doesn't have the financial means to buy a permanently installed system dedicated to just that station and its own use.

It should be noted that CleanFeed now offers a paid version with higher bitrate and even stored audio for on-demand playback. They call it Cartwall. Prices range from $22 to $34 per month (depending on if it's for noncom/educational or commercial use). They're working on additional pro features like more audio control and advanced invitations.

Sometimes we have to find solutions that are within our means. The ideal solution would be to host your own system as it provides the guarantee that it's there when needed and dedicated to just your needs, but *CleanFeed.net* is a great alternative in the meantime.

BROADCAST EQUIPMENT EXCHANGE

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CCA FM8000G Trans 107.9, great cond; 4-Bay Jampro antenna w/deicers; 3-bay Shively antenna FM. D Brockman, 606-965-3436.

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

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WANT TO BUY

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MISCELLANEOUS

WANT TO SELL

I'm selling between 150 and 200 cassette tapes that consist of old-time radio shows, sports shows, some local New York radio talk shows, etc... Must take entire collection and the price is negotiable. Please call me for details and, my phone number is 925-284-5428.

Radio broadcasts of Major League Baseball, NFL, and some college football games that are on cassette tapes, approx 100 to 125 games, time period of entire collection os from the 1950's – 1970's, BO. Must purchase entire collection. Contact Ron, 925-284-5428 or ronwtamm@yahoo.com

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

WANT TO BUY

Collector wants to buy: old vintage pro gears, compressor/limiter, microphone, mixing consoles, amplifiers, mic preamps, speakers, turntables, EQ working or not, working transformers (UTC Western Electric), Fairchild, Western Electric, Langevin, RCA, Gates, Urei, Altec, Pultec, Collins. Cash - pick up 773-339-9035 or ilg821@aol.com.

2" plastic "spot" reels 6.5 or 8" diameter, as used for quad video. Wayne, Audio Village, 760-320-0728 or audiovlg@gte.net.

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.

I'm looking for KFRC radio special of Elvis Presley which aired on January 8, 1978. I'd be willing to pay for a digital copy. Ron, 925-284-5428.

I'm looking for the Ed Brady radio show in which he did a tribute to Duke Ellington, the station was KNBR, I'd be willing to pay for a digital copy. Ron, 925-284-5428.

CONSULTANTS

I'm looking for KTIM, AM,FM radio shows from 1971-1988. The stations were located in San Rafael, Ca. Ron, 925-284-5428.

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 homerun by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

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

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

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

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Johnson Electronic SCA880 module, 67/92 Khz, 417-881-1846.

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AM Stereo radio. Call 417-881-1846.

RECORDING & PLAYBACK HARDWARE

WANT TO BUY

1960s-vintage MacKenzie Repeater machines, magazines, spare parts and manuals, complete or "parts" machines considered, James, 870-777-4653.

Large or small collections of 16" transcriptions or 12" transcriptions, not commercial LPs. Bill Cook, 719-684-6010.

Schnader telescriptions 16 mm musical films produced in the early 50 s. Bill Cook, 719-684-6010.

Standard Short-tune series. Bill Cook, 719-684-6010.

(2) LPFM radio stations for sale, located in the NW part of central Florida on the gulf coast, covers the county, get out of the cold weather, come to Florida, call or write for particulars, 352-613-2289 or email boceey@hotmail.com or Bob, PO Box 1121, Crystal River, FL 34423.

EMPLOYMENT

HELP WANTED

Tieline, The Codec Company is looking for an experienced, enthusiastic, self-motivated individual to join our sales team. A Bachelor's degree with at least five years sales experience is preferred. Meeting or exceeding sales goals will be required, along with some travel to broadcaster trade shows, current/ potential customer locations, and distributors of the Tieline product line. Fluent in Spanish or Portuguese would be a plus but not a requirement. Please contact Dawn Shewmaker at 317-845-8000 ext. 151 or **dawn@tieline.com.**

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Are you a small market station needing a good nuts & bolts engineer in the Los Angeles area? I will make your station shine! CET, fully FCC Licensed. Available for Full/Part-time/Contract work. Available immediately. Mitchell Rakoff, 909-446-6820, mitchellrakoff@yahoo.com.

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AM Revitalization Is Still a Work in Progress

Here's the practical context for the latest revisions

COMMENTARY

BY GARRISON CAVELL

In late March, further progress was made in incrementally easing some of the regulatory challenges faced by AM radio stations. This latest batch of new rules, which covers an array of mostly AM "moment method" proof-of-performance related issues, became effective with the publication of the adopted rule changes in the Federal Register.

The text and background for the changes can be found in the FCC's Third Report and Order in MM Docket No. 13-249 (*https://tinyurl.com/yb46glg9*); I've summarized the changes for you at the end of this article.

Radio World readers know that these new rules are a continuation of the FCC's AM revitalization efforts, which are intended to ensure their continued viability of the AM band. The First Report and Order in MB Docket No. 13-249 (*https://tinyurl.com/ychdnwwz*) started it all by opening the companion FM translator process, modifying principal community coverage requirements, eliminating the "ratchet rule," easing the MDCL implementation process, and relaxing the AM antenna efficiency standards. With more AM-friendly rule changes likely in the future, it's worth taking a moment and reviewing impact of the first R&O and the drivers for AM station relocation and the potential benefits and challenges of collocation.

Garrison Cavell

As has been discussed in Radio World, the AM radio business model increasingly has become challenged by competing services, a rising noise floor and shrinking effective coverage reach. Meanwhile, the rug is almost literally being pulled out from under existing AM stations as rising real estate values and more lucrative land uses pressure these stations to either find a new transmitting location or go dark.

Developing a brand-new site is fraught with time- and cost-intensive processes such as local permitting, legal contracts, environmental concerns and other hurdles. Often the involved costs and timeframes far exceed the costs of on-site engineering, equipment and construction. As a result, station collocation at an existing AM antenna site is becoming the most attractive option.

The collocation of an AM station with "non-AM" towers, such as FM or TV towers, is often possible, but requires a bit of forethought and may not always be a practical option. Typically, these towers are not base-insulated, so a properly designed skirt wires system must be installed on the host tower to accommodate the AM operation. Depending upon the tower height and the involved AM frequency, some skirt systems can become complicated, and involve tuned and detuned (isolating) sections. Also, insulators will have to be installed in the existing guy wires, (for guyed towers), and a suitable ground system still has to be plowed in.

The often "simpler" option to consider is the use of existing AM transmission sites since much of the necessary infrastructure is already at hand. Of course, the existing tower heights and ground system radial lengths must be compatible — for instance, diplexing a 630 kHz station into a 1590 kHz station may not be feasible because of the big difference in wavelengths. On the other hand, the involved frequencies must not be too close either, due to practical filtering considerations.

A non-directional station can, of course, look at collocating at another non-directional station's site. Or in the alternative, a non-directional station can share a tower at an existing directional site. This requires the de-tuning of unused towers at the host site in addition to the customary diplexing system filtering hardware and matching system.

A directional station seeking a host will look for another directional station since the necessarily larger acreage is already available at an existing directional site. Of course, you still need to evaluate existing towers at that site to assess whether the heights are compatible and the geometry (tower layout) can accommodate the design needed for your station's pattern from this new vantage point. Sometimes you can add another tower or towers to an existing site to make things work — and quite often (from a local zoning standpoint) it can be easier to add towers to an existing site than to try to develop a new site from scratch. One caution — even if the tower heights and geometry seem to work, careful consideration has to be given to the involved filter circuits; some situations do not lend themselves to practical (or achievable) solutions.

Site selection and the business case go hand in hand, and the cost implications of collocation are numerous and sometimes complex. What lease terms are available? What replacements, repairs or upgrades will be needed at the site for successful collocation? Are there environmental issues that could become a shared responsibility? An experienced broadcast communications lawyer should be sought to answer these and other related questions.

In all these scenarios, the site location and geometry of the host tower array must meet the tenant's purposes while still satisfying FCC-mandated (day, night and sometimes "critical hours") protection of other stations. The site must also be able to provide the desired coverage into communities of interest as well as the station's city of license. Fortunately, aspects of the FCC's signal protection requirements and, to a greater extent, principal community coverage requirements and antenna efficiency have been revised under the FCC's First R&O, providing greater flexibility for site relocations. Other potentially more significant rule changes remain under consideration in the FCC's "Further Notice."

RELAXED RULES FOR AM PROOFS

Skipping back to this article's beginning topic — the Third Report and Order's rule changes — the FCC relaxed the partial proof rules for conventionally proofed antenna systems by reducing the number of measurement radials required. You need to only measure eight points on each radial that includes a monitor point.

For arrays proofed with Method-of-Moments technique, the FCC eliminated the biannual sample system recertification requirement. (Recertification is only needed when sample system equipment has been repaired or replaced.) They also clarified the base region model shunt capacitance assumptions that can be used in a MoM proof, eliminated the need for a surveyor's certification when an existing AM array's towers are involved for a new station or design (as long as no new towers are added or the existing geometry changed), and deleted the requirement to take new reference point measurements when the same array and pattern is being relicensed.

"Stay tuned" — more changes are likely and warrant our attention and comment as they are being considered.

Gary Cavell is president of Cavell, Mertz & Associates and a past president of the IEEE Broadcast Technology Society.

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