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Months After Hurricane, WTJX Fights On

Pubcast FM/TV combo continues a messy and expensive recovery process

BY JAMES CARELESS

In September 2017, Category 5 Hurricane Irma devastated the U.S. Virgin Island of St. Thomas along with much of the rest of the Caribbean. Among the victims was WTJX(FM). The hurricane knocked the station —

which rebroadcasts NPR national content — right off the air and destroyed the facilities of sister PBS TV station WTJX.

“As well, Hurricane Irma knocked down our STL (studio-to-transmitter microwave link) at the St. Thomas transmitter site on Mountain Top,” said

Robert Dickinson, WTJX’s director of engineering. In March, more than six months later, it was not yet restored.

DEVASTATING STDRM

Before Irma hit, the stations broadcast from Mountain Top, one of the highest points on St. Thomas. Their shared facility included a transmitter building and a 250-foot antenna tower, used by both stations and third-party

(continued on page 8)

WMMR Philadelphia: Still Rockin’ at 50

Learn from a half-century of great radio programming and talent

21ST CENTURY PD by Dave Beasing

Much like restaurants, new radio stations open almost every day. Unfortunately, most fail within their first five years on the air. So when a radio station keeps serving up tasty music for several generations of locals, that’s something to celebrate.

In Philadelphia, observing WMMR (FM)’s 50th birthday is a responsibility that current Program Director Bill Weston takes seriously.

“I wake up in the middle of the night thinking, ‘Am I doing enough?’ There’s

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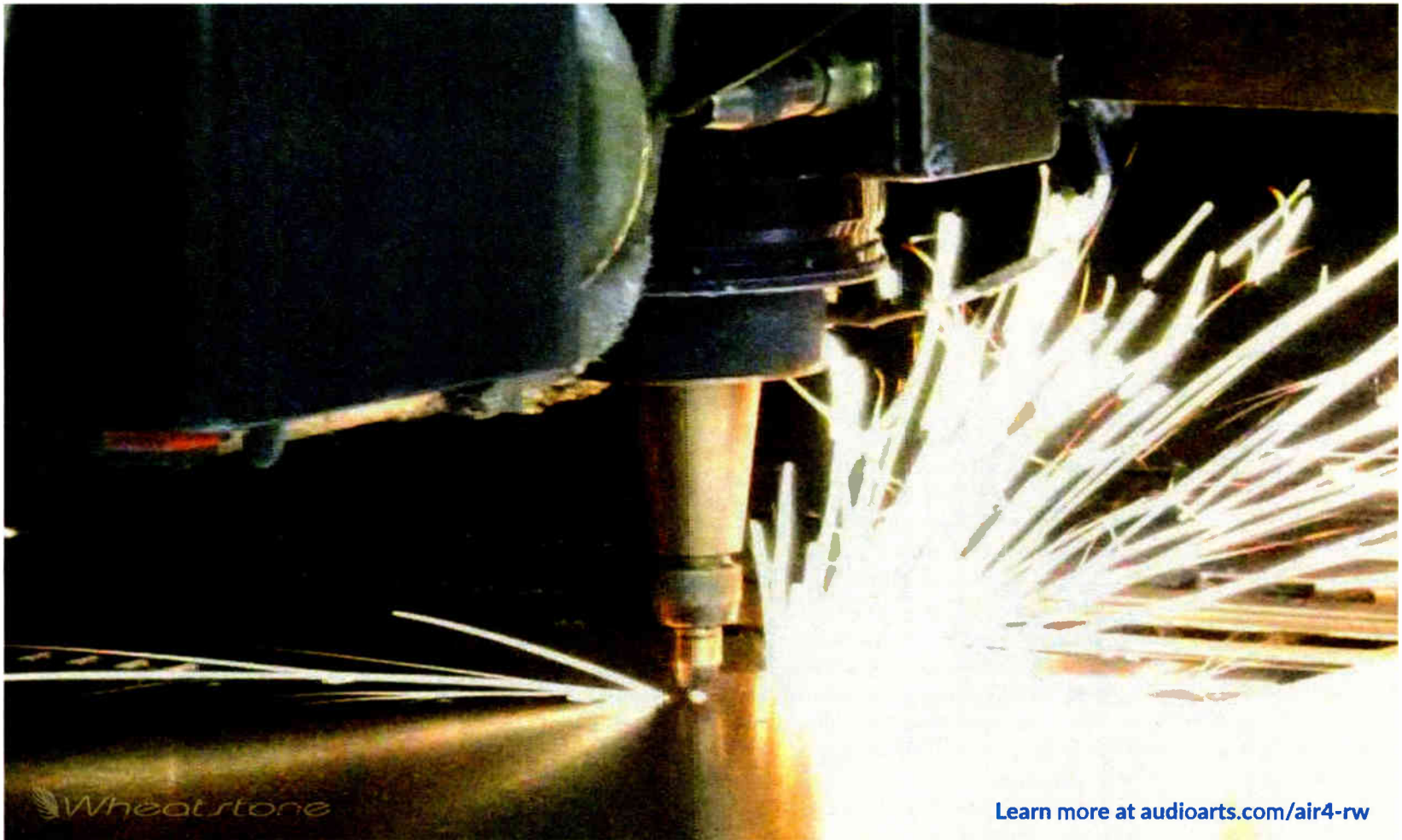
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RadioHack Drives Lively Radio Innovation

Developers and researchers recently met at EBU's headquarters to share their vision of radio's future

BY DAVIDE MORO

GENEVA — The European Broadcasting Union's RadioHack event, which takes place each year during the EBU Digital Radio Week, brings together hardware and software developers from various organizations, including non-EBU members, to share projects and ideas.

The event aims to push technology a step further by modifying it. Radio is traditionally "live," but it is safe to say that during each RadioHack, radio becomes "lively!" It is a place where coders, solderers and thinkers collaborate and innovate together, working on new ideas and technologies and exploring how existing ones can be linked together.

ASKING BROADCASTERS

Probably one of the least formal events organized by the EBU, RadioHack has no dresscode, and once inside the "laboratory," participants find evaluation boards, software-defined radio platforms, test-bed hardware, as well as "donor" off-the-shelf devices to be "hacked."

The 2018 edition of RadioHack focused on broadcasting tools for small and community stations, new hybrid services and smart speakers.

Matthias Brändli, lead developer for Open Digital Radio, fine-tuned a set of tools capable of turning any computer into a microrange digital audio broadcasting transmitter, and ran a live demo. Open Digital Radio is a nonprofit organization with the goal of enabling small and community radio stations to step from analog transmission to digital radio.



Photos by Benjamin Poor, EBU

Pictured from left to right are Ola Palm, Sveriges Radio engineer; Jean-Pierre Evain, principal project manager at EBU; Floris Daelemans, innovation researcher at VRT; and Rosie Smith, project manager, Automotive, WorldDAB.

"This set of tools have been tested in several locations," Brändli explained, "and we've also been able to prove, using this set of technology tools, that digital audio broadcasting can be used for small coverages and for projects on a small scale."

On another topic, the entertainment system of the current Audi A8 can seamlessly switch across FM, DAB and online streaming emissions of the same station. On hand was Florian Hoffmann, a radio development engineer at Audi who worked at their development platform for in-car hybrid radio receivers.

Radio slideshows now appear in low-resolution on a receiver's display, but on Audi's prototype attendees could preview the same slideshows in high resolution coming from the RadioVIS service of RadioDNS. "We ask broadcasters to support and implement the RadioDNS standard so we can implement these pre-development features on the next generation entertainment systems released for production," Hoffmann said.

SMART SPEAKERS

Also during the event, Rashid Mustapha, senior broadcast specialist at Ofcom, explains his "hack" based on IPTV boxes to fellow attendees.

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Rashid Mustapha, senior broadcast specialist at Ofcom, explains his "hack" based on IPTV boxes to fellow attendees.

Mentoring Program Confronts Training Gap

SBE initiative, now in its second year, seeks to pass precious knowledge to young engineers

CAREERS

BY JAMES CARELESS

It's widely agreed that the U.S. radio industry is not attracting enough new broadcast engineers to replace those who are retiring. Not as well publicized is that many incoming engineers lack the diverse skill set — the “all-roundedness” — of their predecessors.

Trained in IT-focused schools, these engineers have minimal knowledge of RF equipment management and operational safety, let alone the day-to-day details of plant maintenance, HVAC servicing and how to get along with their radio station bosses.

It is for these very good reasons that the Society of Broadcast Engineers created the SBE Mentor Program. Now in its second year, the program pairs experienced broadcast engineers as mentors with engineers who are new to broadcasting. The pairing allows a mentor to pass on their years of hard-won knowledge and experience to the mentee. In turn, the mentee benefits professionally (and personally) from the relationship, especially during times of broadcast crisis when a calm, experienced advisor is just a phone call, email or text away.

“There are so many elements of broadcast engineering that today's IT-focused new engineers just haven't



been trained to deal with,” said Kimberley Sacks, chair of the SBE's Mentoring Committee and director of engineering at iHeartMedia in Fort Collins, Colo.

“Having access to an experienced broadcast engineer who has dealt with all these problems already and wants to pass on their knowledge is definitely helpful.”

The SBE Mentor Program is free to all society members. The terms of taking part are straightforward: Participants sign up for a year at a time, and try to

meet by phone at least once every two weeks. Nothing stops the mentor/mentee from communicating by whatever means works best for them and as often as they see fit. Face-to-face meetings are also just fine with the SBE, and if the two continue to work together once the mentoring term has passed: well, that's just fine too.

Mentors have to have been in broadcast engineering for at least five years to take part. Mentees have to have less than five years' experience in the profession and be currently employed.

MENTORS GIVING BACK TO RADIO

Chuck Kelly, Nautel's sales manager for the Asia Pacific region, is an SBE mentor. A past president of the society, he has considerable broadcast engineering experience. Chris Tarr, director of technical operations for Entercom in Milwaukee, manages six stations in Wisconsin; he too is a mentor.

These SBE members became mentors to give back to radio, the medium they love so well. “It is important for those of us who have the time to share information and tips with younger people, and encourage them to get into our business,” said Kelly.

“I've been in this business for two decades, and had lots of help from mentors over the years,” Tarr said. “Even today, I have what I call ‘a Rolodex of people smarter than me’ who I can call for advice and insights.”

Both men provide their mentees with



Chuck Kelly



Chris Tarr



Maria Oliver

all kinds of broadcast engineering information. It ranges from trouble-shooting aging transmitters to integrating the various generations of production technology found in U.S. radio stations — especially those in smaller communities — and everything else in-between.

Teaching engineers how to stay safe is a big priority for Chuck Kelly.

“We're going to see situations where an IT-trained engineer who has never worked with anything beyond 5 volts is going into an 8,000 volt transmitter in the middle of the night to fix it,” he said. “I worry about that.”

Meanwhile, Chris Tarr advises his mentees “on how to allocate their time when managing multiple stations, which can be extremely complicated to deal with,” he said. “I also like to educate them on how to avoid the political infighting that can occur at any radio station, so that they can stay focussed on actual engineering.”

LEARN FROM THE MASTERS

Maria Oliver, an audio engineer with KSJO(FM) Bolly Radio 92.3 FM in San Jose, Calif., is a mentee. She joined the program after the passing of an earlier mentor, Bill Brown of SBE Chapter 39 in Tampa, Fla.

“He was an awesome human being,” said Oliver. “He took me to my first SBE meeting, where everyone was so open and supportive. As well, Bill's twisted sense of humor worked well with my twisted sense of humor, which

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RADIOHACK

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cast specialist at the United Kingdom's broadcasting regulatory authority Ofcom, explained how the organization is facilitating the development of innovative ideas and tools for smaller stations.

"We would like to develop new ideas and software tools for small radio stations, specifically community radio and other special interest broadcasters. Moving from one of the nowadays popular IPTV boxes which are very low-cost mass-produced things for watching YouTube or Netflix on turn any TV into a smart TV," he said. At Ofcom we replaced the standard Android operating system IPTV boxes usually run on with a Linux OS."

The new operating system enables researchers to control the hardware and build their own software tools. During RadioHack the modified IPTV box ran a DAB source encoder, a DAB multiplexer and a DAB modulator, which fed a software defined radio transmitter via a USB cable. Users were able to upload and store audio content and music files to the same modified IPTV box, which also featured an embedded web-based payout system.

"The modified box can also pull web streams and podcasts from the internet, so that it actually contains a complete radio station," Mustapha added.

Software defined radio peripherals and open standard digital radio encoders were part of the hack by Belgium's Dutch-speaking public broadcaster VRT, which also focused on smart speakers. The broadcaster developed a skill for Amazon Alexa that allows listeners to talk to their radio station of choice.

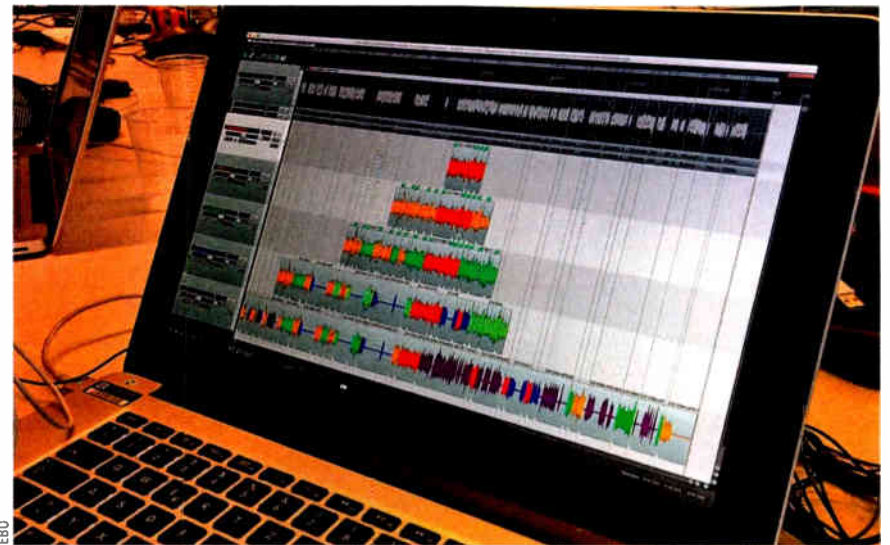
As an example, Floris Daelemans, VRT innovation researcher, prompted an Amazon Echo Dot device running Alexa: "Alexa, can you tell Radiohack I'm feeling fine and dandy?"

The smart speaker acknowledged the request and whispered "Message has been sent." In response to this, the system sent an email to the radio station and immediately the dummy RadioHack station received an email reporting that that listener is feeling fine.

"There are multiple emotions that can be conveyed, easily and immediately shared with radio stations. With this, listeners can give an immediate feedback to the radio station," Daelemans concluded.

NEXT GENERATION AUDIO

Orpheus is a project funded by the European Union, focusing on the research and development of next generation audio. Werner Bleisteiner, creative technologist at Bayerischer Rundfunk explained how speech intelligibility, 3D audio, as well as advanced features like

NEWS

A five-level "importance" tree of a sound bite within the Orpheus Project; each level is presented with a different color on the receiver display.

user-definable lengths of sound bites are among the features enabled by the Orpheus project.

"We're going to make audio more interactive and responsive, delivering audio objects to the end user device where they get assembled in the way that suits listening conditions, the preferences, and the choice of the user," said Bleisteiner.

At RadioHack, Bleisteiner demonstrated an audio piece built with five levels of "importance"; each one of them

is presented with a different color on the receiver's display.

"In this example, the most important level is highlighted in red," he said. "In case the listener wishes to listen to more levels, the user experience can become longer and more in-depth regarding information." Through a dedicated app, developed by the Orpheus partner Elephantcandy, listeners can "read-just the length of the program to their needs."

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Why Do I Need a Middleware Application?

Metadata differs from system to system, making it difficult to send from automation directly to the encoder

BY **STU BUCK**

This article appears in the Radio World eBook "RDS Basics and Best Practices." Read it at radioworld.com/ebooks.

Stu Buck is founder of Arctic Palm.

When asked what Arctic Palm does, we reply: "When you look at the radio and it tells you the name of the song that is playing — that's what we do." The only response we have ever gotten is "I love that!"

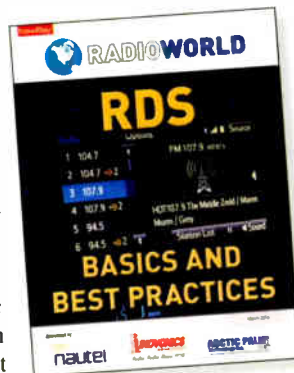
We utilize the Radio Data Service functionality to insert text into the FM transmission. This content is available from most automation systems and satellite services that output some form of "now playing" information. We also capture content from web services such as Content Depot's MetaPub and program websites providing metadata for the current song or a playlist log of the day's events.

We insert the metadata in the FM broadcast using an RDS encoder. There are a number of those on the market; and some FM transmitters have built-in encoders.

With metadata and an RDS encoder, we are ready to insert text into the FM broadcast. Sounds simple, but how do we get the text from the source to the encoder?

Metadata differs in content and format from system to system, and most RDS encoders accept text commands, but these also differ for each manufacturer. This makes it difficult to send information from the automation system directly to the encoder.

To accommodate these differences, we require a middleware application to capture, filter and format the metadata and send it to the encoder as well as other devices and services. Some automation vendors have their own applica-



tions; and there are several commercial applications on the market, such as our own award-winning Center Stage Live with CSRDS.

TIPS

The first step is to establish communication between the source and the middleware application. The

connection to an automation system may be IP, a disk file or a serial connection. Satellite services usually link via a serial port, while others may be available from an internet service or an internal application on the local network.

In a closed system, where the source and RDS encoder are on the same network, the middleware may be installed on the on-air computer. However, if metadata is coming from or going to other devices and services, the middleware may be installed on another computer to keep the on-air computer isolated. In this case the network can be configured to give the middleware one-way access to the on-air computer output and still access the outside world.

Metadata may include events other than music or commercials, so the middleware must filter out events such as voice tracks, jingles and PSAs. Music and commercial events are parsed and the individual fields examined to filter



Display from a GM Silverado.

characters that may not display properly or are re-formatted for a better display. For example the artist name may arrive as SMITH,BOB while we want to display *Bob Smith*. While commercial events may be included in the display they are normally sent to streaming services for commercial substitution.

We are now ready to send the text to the encoder, which is via a serial or IP connection. For our purposes, we will limit this discussion to four commands: the Program Service Name (PS), Radio Text (RT), Dynamic PS (DPS) and Radio Text Plus (RT+).

The Program Service Name (PS), is an eight-character static field that contains the station call letters, frequency or street name. The Radio Text field (RT) is a 64-character with the artist and title, program name, local weather or other information.

Unfortunately, some older receiver designs only display the PS and either do not display RT or require the listener to press an "Info" button. Even if the receiver displays now-playing information for a SiriusXM station, it will revert to the PS for FM stations.

This brings us to the controversial Dynamic PS (DPS), which is a process where the encoder breaks the 64-character RT message into eight-character segments and sends it as the PS. While in violation of some standards, this process was introduced in the early 2000s and for the first time listeners responded to RDS with "I love that." On occasion, an engineer will call about RDS not working and we tell them how to turn on DPS and get a "It's working now."

Today's receivers have better displays, which may eventually eliminate

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MENTORS

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really helped."

Dave Hartman heads up engineering/IT for PraiseFM, a four-station group in Osakis, Minn. "Chris Tarr is my mentor and the SBE did a fantastic job of pairing us up," said Hartman. "Chris took the time to understand where I came from and what I needed. From that first meeting we try to connect once a week usually to discuss some question that I have but Chris has made himself available any time, day or night if I really need his input."

Oliver's mentors have made the difference in helping her handle the technical aspects of program production at Bolly Radio.

"The people at the station are great talents when it comes to speaking and providing content, but they have zero tech skills," she said. "I make sure that the vision the talent has for their programs happen, including when they are out of state or out of the country, and still needing to do their shows."

Hartman's mentor helps fills the gaps in his RF education;

particularly when he is on the job at a remote transmitter site somewhere in rural Minnesota.

"Coming from a technical background but being new to broadcast engineering, there are skills that I lacked which I found were not easily available, especially if you do not live in a larger city where there are a number of engineers to connect with or a senior engineer to work under to develop those needed skills," Hartman said.

"Already in just a few weeks I have learned so much. We have had discussions on FCC regulations and reporting, antenna and RF theory, and AoIP routing and control. I always look forward to connecting with Chris as I know I will be walking away with some great knowledge and better understanding than I did before the call."

The mentors and mentees who spoke with Radio World benefit from the program, but so do the stations that employ Oliver and Hartman, and the radio industry as a whole, as engineers learn from the best in the industry — and all for free.

Find more about the program at sbe.org/mentor. Interested in becoming an SBE mentor or mentee? Contact Education Director Cathy Orosz at (317) 846-9000 or corosz@sbe.org.



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WTJX

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clients, and a 100-foot auxiliary/STL tower. The site was backed up by a 190 kW main generator and a small 8 kW unit used with the station's mobile production unit.

The STL was connected to the TV station's offices/studios on the southwest on 158-158A Haypiece Hill. The FM had offices there and used the TV's studio to record promos.

Hurricane Irma devastated this facility, gutting the TV production studio down to its massive steel support girders and even damaging some of them. Add wind and rain damage to the rest of the facility, and "our St. Thomas office/TV studio was destroyed," said Tanya-Marie Singh, WTJX's chief executive officer.

Up on Mountain Top, "Hurricane Irma knocked down our 100-foot tower, and severely damaged the 4.5 meter Ku-band satellite dish we used to downlink NPR via satellite," said Dickinson. To make matters worse, the main generator developed issues that couldn't be fixed without parts coming from the U.S. mainland, which wasn't going to happen soon. As well, the station's 8.1 meter dish that provided the downlink for PBS TV programming was seriously damaged.

On St. Croix to the south, WTJX(FM)'s offices had survived because Irma skirted the island. But although the station had purchased equipment for a production studio, it was not ready to go to air. Besides, "With the STL down on Mountain Top, there was no way for us to link this studio to the transmitter," Dickinson said. "And with telephone, power and internet down all over St. Thomas, there was no way to create a backup path to the transmitter."

MAKING DO

Determined to get the FM station back on air as soon as they could, Dickinson and his staff made adjustments to an old 3.8 meter dish so that it could receive the NPR satellite feed on C-band. Given that this antenna was an abandoned Ku-band dish, this was no small accomplishment.

Add the lack of adequate landline and generator power, and it took nearly two weeks to get WTJX back on air



with national NPR programming.

When Radio World spoke to WTJX in late March, station staff reported that the St. Croix radio studio had yet to be activated. "We are still without an STL connection between Mountain Top and St. Croix," Dickinson said. "Meanwhile, using an internet connection hasn't been an option until recently, due to the island's internet being down."

As a result, WTJX listeners were still unable to get local content on the U.S. Virgin Islands' NPR station. But still, having access to a national NPR feed was a welcome relief for many.

MAKING PROGRESS

Faced with a difficult post-Irma recovery, WTJX did what it could to get local content out by other means.

As of February, "The station has managed to put out regular airings of its 'Full Circle' public affairs program via Livestream (on the web) ... and rebroadcast the legislature's LegiTV streaming coverage of both the State of the Territory and the legislature's response," according to an article in the U.S. Virgin Islands Daily News.

As for replacing the St. Thomas production facility, Singh estimates that it would cost \$15 million to \$20 million to build a new office/studio tough enough to weather the next Category 5 hurricane.

"I'm looking at trying to get the power up at our facility, power, water, fiber underground," she told the Daily

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MIDDLEWARE

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the need for DPS; but for now, DPS is still popular. When using DPS, set it to block mode showing eight characters at a time and set to the recommended scroll speed of 4 seconds.

talk stations to provide dynamic content; but note that music stations often have 30 percent or more of the day in non-music segments. This time can be used to promote the station, program, weather, contest or other events.

Middleware application can also switch between input sources and post metadata to other devices and services



Display from Center Stage Live Simulator.

The last item is RT+ that sends a special command to RT+ enabled receivers. The can extract the artist and song title from the RT field and, when connected to the Internet, the listener can purchase and download the song.

WHAT TO LOOK FOR

In addition to RDS encoders, middleware can provide a process for scheduling informational, promotional or commercial messages by station, date, time of day and day of week with an option to link the message to an on-air event. This is very important for

such as HD Radio, streaming services, websites and services such as TagStation/Next Radio.

As broadcasters, we need to balance the listener experience while minimizing driver distraction. As such we should limit message rotations, keep messages short and easy to read.

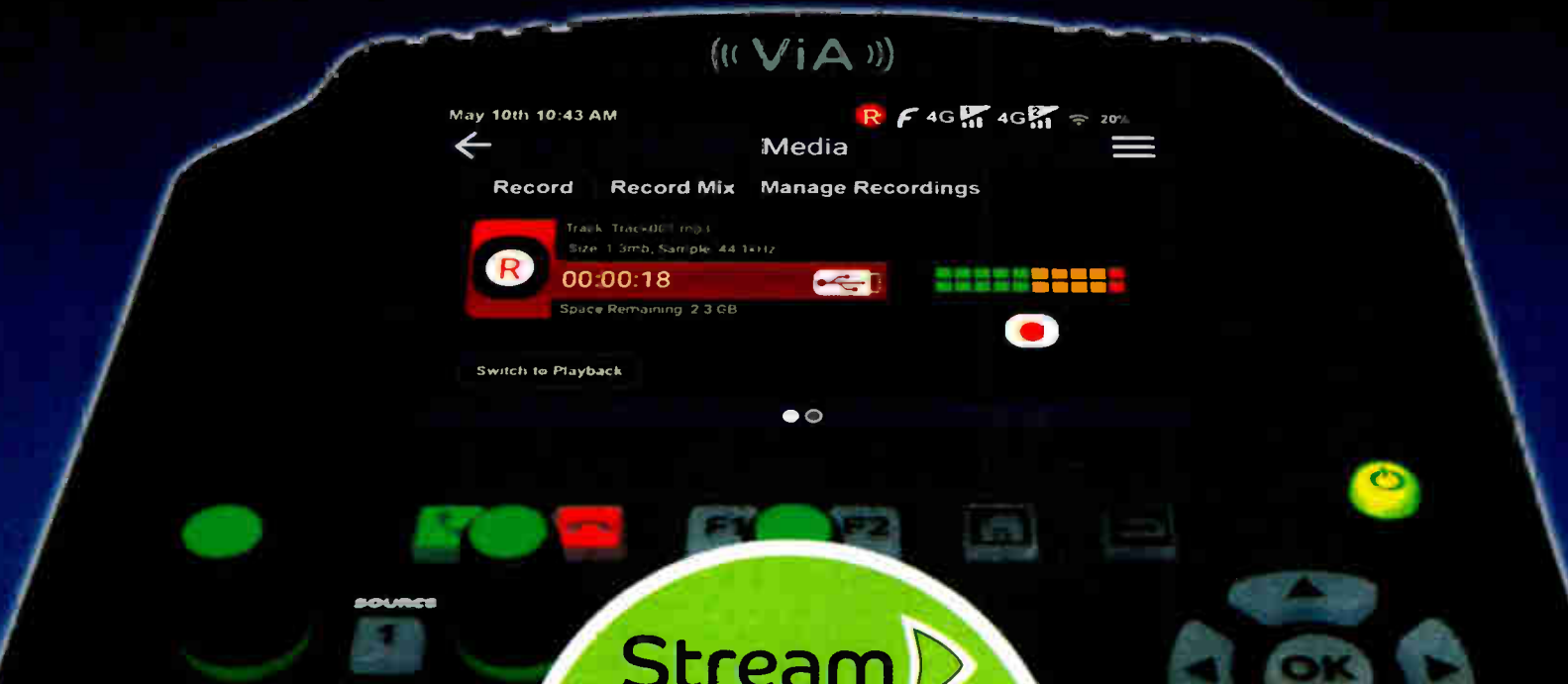
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The screenshot shows the ViA Media interface on a device. At the top, it displays the date and time (May 10th 10:43 AM), signal strength (4G), and battery level (20%). The main menu includes 'Record', 'Record Mix', and 'Manage Recordings'. A recording progress bar is visible, showing a track named 'Track Trac-001.mp3' with a size of 1.3mb and a sample rate of 44.1kHz. The progress bar is at 00:00:18, and there is 2.3 GB of space remaining. A 'Switch to Playback' button is located below the progress bar. The interface also features various control buttons like 'source', 'F1', 'F2', and 'OK'.

Record

- Select & record any input, return audio or file playback
- Stream, Record & Play simultaneously
- Record to SD card
- View & manage recordings

Stream

Playback

- Create playlists of local & imported recordings
- Route file playback to any output or record media
- Offline Cue monitoring

Record & Playback AVAILABLE SOON!

(((ViA)))

Tieline 
The Codec Company

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WTJX

(continued from page 8)

News. "I'm hoping to make this station completely resilient. That's what we're hoping we can do."

Dickinson, in his interview with Radio World, expressed gratitude to NPR and PBS for coming to St. Thomas and helping out.



In March, FCC Chairman Ajit Pai, center, and members of the commission's Hurricane Task Force met with station CEO Tanya-Marie Singh and toured the damage caused by Irma. This image is from the FCC's Twitter feed.

"NPR sent down a crew and supplies to replace the 4.5 meter dish, which we are now using on again to downlink NPR network programming," he said. Meanwhile as of late March the TV station was back



An image from the FCC Twitter feed in March shows TV station equipment.

on air, though the 8.1 meter dish was damaged "and is limping along," Singh said. "We are working with PBS and General Dynamics to get it fully restored."

Looking ahead, WTJX's priority is to create some sort of temporary production facility on St. Thomas close to Mountain Top, so that it can produce programming related to the 2018 elections. In particular, Singh wants local candidates to be able to make their cases over the air to voters. "Everyone needs a chance to be heard," she said.

As for the long term? Raising millions for a new facility in St. Thomas is going to be a daunting task for the stations. To help out, NPR "Fresh Air" host Terry Gross recorded some fundraising PSAs, and the company advertised for a new director of development and fundraising to get things going. Singh herself is hoping that a combination of FEMA funds and public donations will be sufficient to put WTJX back on its feet.

"Relatively speaking, we're in okay shape, but we have a massive amount of work ahead of us," said Singh.

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.)

► FCC Proposes to Streamline FM Translator Interference Processes

Current complaint process is "nasty, brutish and long," the FCC chair said; so at its Open Meeting on May 10, the commission released a proposal that would provide greater certainty to full-power stations regarding complaint requirements, limit contentious factual disputes and ensure prompt and consistent relief from actual translator interference, the commission said.

► Pirate Radio Bill Formally Introduced

Rep. Leonard Lance (R-N.J.) and Rep. Paul Tonko (D-N.Y.) introduced a bill to stiffen pirate radio penalties; it includes a max fine of \$2 million.

► Feds Confiscate Gear From Alleged NYC Radio Pirate

Even as broadcasters gathered in Las Vegas and were hearing from several of the commissioners about regulatory issues including pirate enforcement, FCC agents, the U.S. Attorney's Office and the U.S. Marshals Service seized transmission equipment, armed with a court order.

► More Broadcasters Weigh in on C-Band Sharing

Comments continue to roll on the issue of the whether C Band spectrum should potentially be opened up for sharing with wireless operators — with more broadcasters and consultants expressing concern.

NEWSWATCH

EMMIS COULD BE OBLIGED TO SELL OFF NEXTRADIO

Emmis Communications has been in the selling mood — consider the sale of KPWR(FM) in Los Angeles in 2017 along with that of its St. Louis radio cluster this year — but the future of its NextRadio radio app will depend solely on how other radio broadcast groups view the asset.

The consortium of radio groups that helped fund NextRadio has a call option it could exercise in August of 2019 to take possession of the hybrid radio app that allows users with radio-enabled Android phones to tune in local FM stations. It was developed by TagStation LLC, owned by Emmis. TagStation is a cloud-based software platform that allows stations to manage album art, metadata and enhanced advertising on various devices.



The call option is an agreement that gives an investor the right, but not the obligation, to buy a stock or bond at a specified price within a given time period. Emmis issued it as part of an agreement with radio broadcasters in 2013.

At the time, in an effort to kickstart NextRadio's foothold in the marketplace, a consortium that included Emmis, iHeart-Media, Beasley, Urban One Inc. (formerly Radio One), Hubbard Radio, Townsquare Media, Bonneville, Entercom Communications and others, agreed to pay Sprint \$15 million per year over a three-year period in return for the wireless provider activating the FM tuners in a minimum of 30 million FM-enabled wireless devices.

The call option can be exercised by eligible radio broadcasters in August 2019, according to paperwork filed in May with the U.S. Securities Exchange Commission. No radio operator, other than Emmis, would be allowed to own more than 30 percent of the NextRadio and TagStation businesses.

This is actually the second call option for broadcasters to gain possession of NextRadio. The first, in August 2015, passed without action by the consortium.

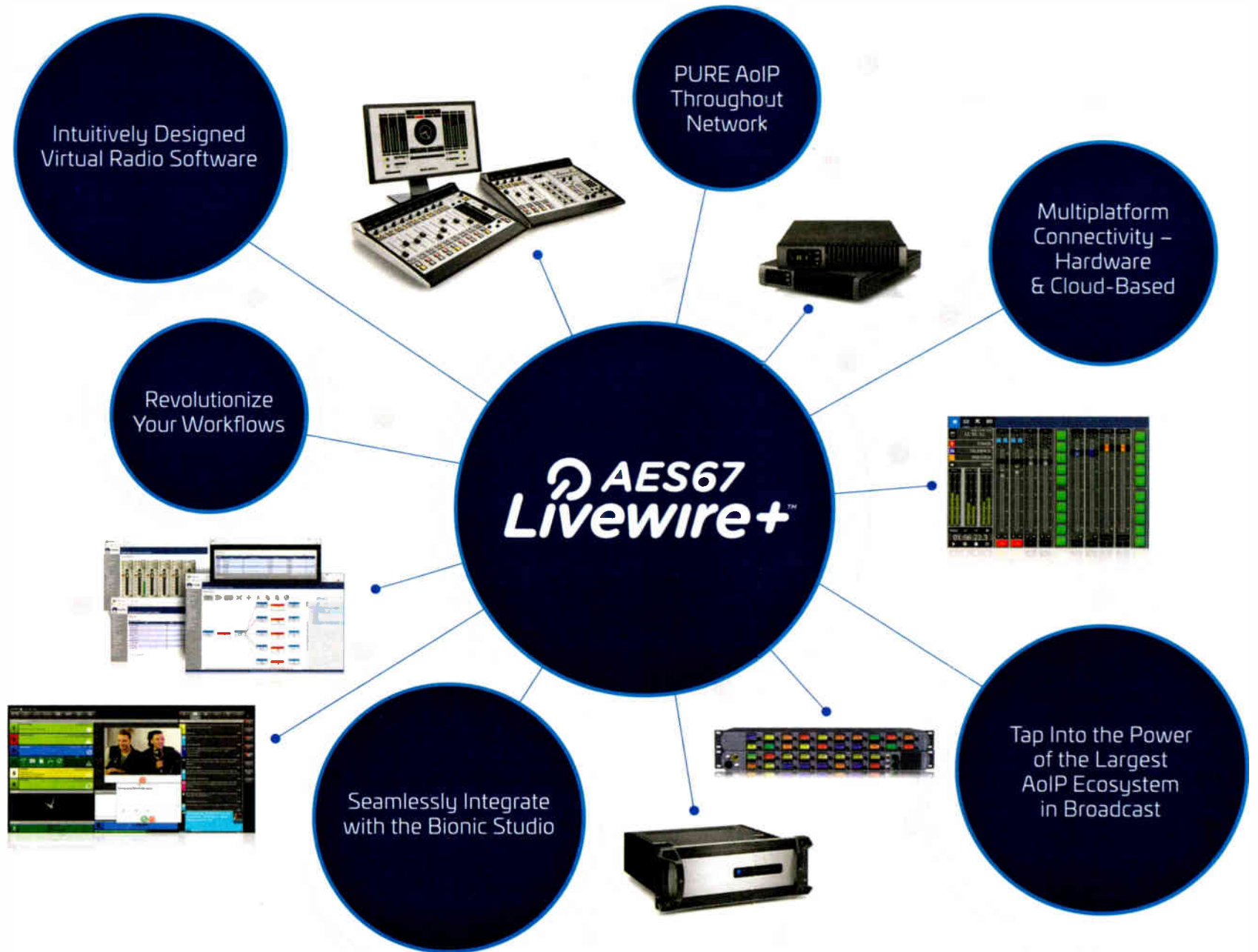
"The call option may be exercised in August 2019 by paying Emmis a purchase price equal to the greater of the appraised fair market value of the NextRadio and TagStation businesses, or two times Emmis' cumulative investments in the development of the businesses through August 2015," according to the SEC filing this month.

Emmis would have the right to participate in the exercise of the call option and retain a stake in TagStation/NextRadio. Emmis, which says NextRadio has yet to generate a significant amount of revenue, has not indicated whether it's aware of interest from the other broadcast companies in the consortium.

The company says it continues to work aggressively to increase the number of smartphones and other wireless devices that contain the enabled FM tuner, including Apple's iPhone.

— Randy Stine

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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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A Look Around, Once Inside the Transmitter Site

We continue our visual inspection

WORKBENCH

by John Bisset

Email Workbench tips to johnbisset@gmail.com

In our previous column, we covered what to look for as you drive up to the transmitter site building. Now let's take

a look inside.

First, if you don't have an emergency flashlight with fresh batteries right inside the door, make that a priority. Showing up at a site at night, with no power, can be a dangerous proposition. Keep a flashlight right inside the door as good insurance. Many hard-

ware stores sell inexpensive bright LED flashlights. Figs. 1 and 2 show a model found at Ace Hardware.

Pictured in Fig. 3, Walgreens offers a light that looks like a light switch, and includes a variable brightness control. This particular LED light has a magnet on the back, making it convenient to stick

(continued on page 14)



Fig. 1: Inexpensive and bright, this compact LED flashlight is sold at Ace Hardware.



Fig. 2: Look for this display case at Ace.



Fig. 3: This dimmable LED flashlight has a magnet on the back, for easy placement.

NEW

D.A.R.C. Virtual Radio Console

8:50:35 PM 00:00:00.17

PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM PGM

AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD AUD

UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL UTL

ON ON ON ON ON ON ON ON ON ON ON ON ON ON ON

OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF

Phone Timer

Pgm Up

Aud Down

Util Set

Start

Ext 1 Stop

Pgm Reset

Aud Auto

Up

Cue

Monitor Headph

Introductory Sale \$1,000 off

12 channels

3 stereo Busses

Mix-minus phone buss

With phones, tablets, and PCs all touch screens, Virtual is the wave of the future. So, Arrakis introduces DARC, the NEW Virtual Radio console that works right out of the box, like a console should. DARC software on a Windows PC is the mixing engine for the console, which is connected to Arrakis Simple-IP IRU boxes (by a single cable) that have all of the analog, digital, and AoIP connections to your station. No network to configure. Just plug it in and you are on air. And yet DARC features world standard Dante AoIP connectivity so interconnecting studios is just an ethernet cable away. Available in 4, 8, 12, and 15 channel models, amazing Digital Virtual consoles at traditional analog console prices

\$3,900

DARC-Virt 12 (list price \$4,900) (PC not included)

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- No Dead Air—audio failover to SD Card or Web Stream
- Dynamic Web Interface for remote control & monitoring



Remote Web Interface



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SDR Design



Reception Tools
For Total Control



Audio Protection
No Dead Air



Rear Panel



Better Radio Since 1972

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WORKBENCH

(continued from page 12)

on steel walls, conduit or steel door frames.

Once inside the building, if everything is operating normally, take a set of readings of your critical on-air equipment. If you don't like paper logs, snap pictures of the test meters. You want a set of "normal" readings that can be compared when a problem arises. This composite set of readings is not just for the transmitter but includes the STL gear, audio processor and any other critical equipment. On subsequent visits, before adjusting anything, check these readings. They become your baseline for normal operation.

If you know what's "normal," a problem can be more easily diagnosed.

Make sure the readings include power supply voltages too. Power supply component failures can cause a multitude of problems. If you know what's "normal," a problem can be diagnosed more easily.

Next, use your ears, eyes and your sense of smell and touch.

Does a high-power transmitter blower motor have a squealing bearing? When you entered, did you notice a rodent scurrying for cover out of the corner of your eye? Is there a burning smell or overheated insulation smell? And if you have rigid transmission line, are the elbows and junctions warm or hot to the touch? Do you know which LEDs or pilot lights indicate normal operation? Again, snap a picture of normal operation of these lamps, using your smartphone's camera.

Do you have a flowchart for your signal paths? A notebook outlining signal paths and equipment for each site can be invaluable, as displayed in Fig. 4. Dwight Morgan, broadcast engineer with Entravision Phoenix, shares this with Workbench readers. The notebook also allows Dwight's boss, VP of Engineering Rick Hunt, to identify the signal paths for all the equipment in any

of the Entravision chain of stations.

Readers who follow this column know the advantage to having drawings and standardizing on-site equipment as you upgrade. The process just makes maintaining equipment easier. Keeping an eye on operating parameters can also help identify future problems. We'll continue our inspection in our next column.

If you built, or are in the process of building, the Audio Controlled Switch shown in the March 14 issue of Workbench, note that the schematic contained an error. Thanks to the keen eye of faithful reader Ron Jones, K7RJ, for spotting the error.

Pins 4 and 10 must be connected to Pin 14 (+5 Volts) for the circuit to function properly. The corrected schematic is shown in Fig. 5. Our contributor Frank Hertel wanted to apologize to readers for making this "elementary mistake," as he terms it.

If you find yourself building circuits, try this trick that I learned years ago from the engineers at the home of the OIB (Operating Impedance Bridge), Delta Electronics.

As each wire is connected on the breadboard or soldered on the perf-board, trace that wire on your schematic with a bright yellow highlighter marker. When you have completed the wiring, check to make sure every wire or connection on the schematic has been highlighted. This process is particularly helpful when building complex projects, as it reduces the chance of a wiring connection being missed. Hope this helps!

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.

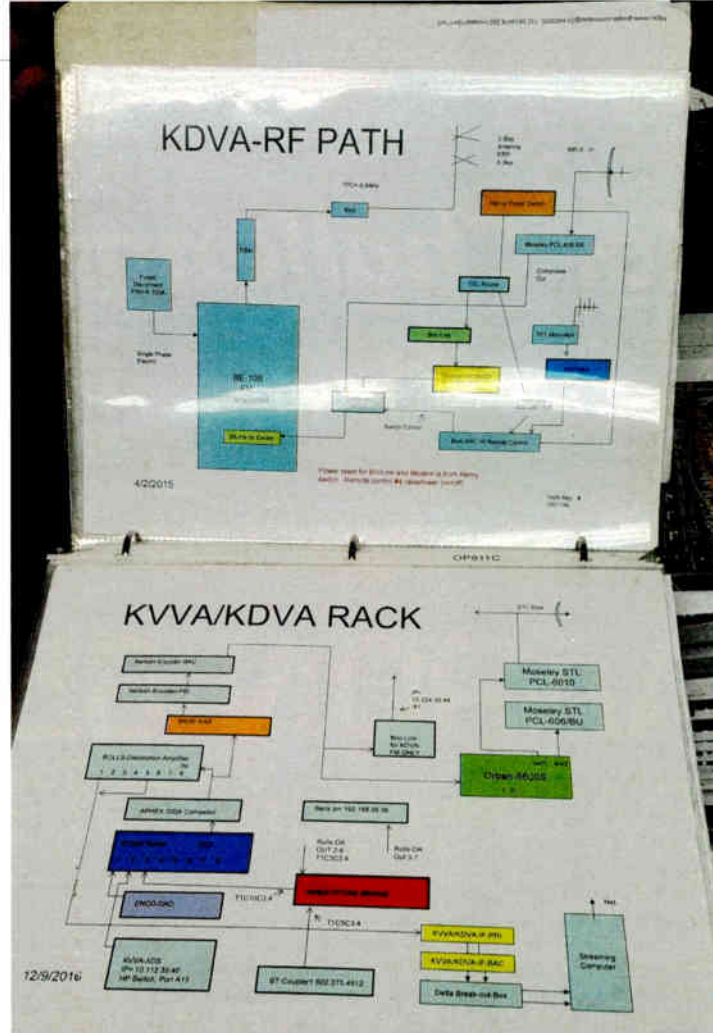
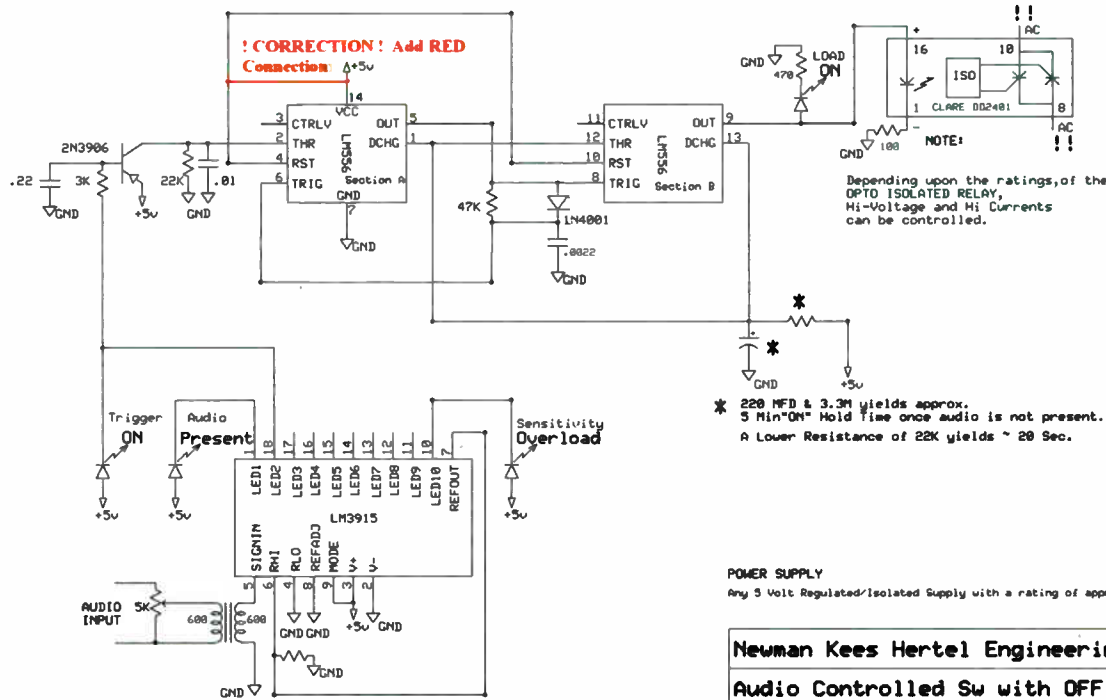


Fig. 4: Keep drawings of your signal paths in a notebook for easy reference.

AUDIO CONTROLLED SWITCH WITH "OFF" DELAY WHEN AUDIO IS REMOVED

Build this in an INSULATED Enclosure CAUTION ! CAUTION !

These terminals (!!) can have DANGEROUS Voltage present when switching the Power Line (120 V or 240 V)



POWER SUPPLY Any 5 Volt Regulated/Isolated Supply with a rating of approx. 500 ma.

Newman Kees Hertel Engineering		
Audio Controlled Sw with OFF Delay		
Frank Hertel	Rev 1.0 1/16/2014	Page # 1 of 1

Fig. 5: The corrected version of the Audio Switch Schematic published in the March 14 issue.



HIGH CAPACITY EVENT STUDIO TRANSMITTER LINKS



outdoor unit



TAKE ADVANTAGE OF WIRELESS HIGH PAYLOAD STL/TSL CAPACITY

Moseley EVENT STL/TSL systems provide up to 155 Mbps combined IP, T1/E1 payloads. Multi-station clusters can convey multiple linear uncompressed audio pairs for a truly cost-effective STL/TSL link. Connect your existing T1/IP audio hardware directly into the EVENT system, or use Moseley Rincon for your audio payloads. An optional DVB-ASI module is available for full duplex video.

EVENT systems are fully bi-directional including a Software Defined Indoor Unit (SDIDU) and Outdoor Unit (ODU), eliminating the need for costly waveguide hardware. The ODU is available in the license free 5.8 GHz band, or licensed 11, 18, or 23 GHz bands. Appropriate external antennas are selected based on path length.



indoor unit



INTELLIGENT SYSTEM DESIGN

Spectrum-scalable digital radios with user-selectable data rates enable broadcasters to have greater flexibility in STL planning and future growth. The integrated T1/E1 and Ethernet interfaces allow for a combination of T1/E1 and IP packet data.



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From the transmitter site, offers backup of business records and programming content to get you back on the air quickly in the event of a studio outage.



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Zenith Trans-Oceanic Radio in War and Peace

This iconic portable receiver was known for durability and quality

RADIO RECEIVERS

BY DENNY SANDERS

They say necessity is the mother of invention. Nothing proves this more than the story of how the iconic Zenith Trans-Oceanic portable radio receiver came into existence.

Commander Eugene McDonald (1886–1958), the founder of Zenith Radio, was a stickler for quality and insisted that any Zenith product represented cutting edge technology and design integrity.

He was also an accomplished yachtsman. During his many ocean voyages, he constantly was frustrated with the inability of any portable commercial radio set to perform reliably at sea. In about 1939, he ordered the Zenith R&D department to come up with a rock-solid, portable AM receiver sensitive enough to pull in signals from great distances. He insisted that the radio be a multi-band unit including shortwave, marine and aircraft bands.

The Zenith crew came up with a gem: the Trans-Oceanic, a gorgeous piece of engineering housed in a robust and dramatic cabinet designed by the brilliant Zenith industrial designer Robert Davol Budlong.

RADIO IN WAR-TIME

The first Trans-Oceanic was placed on the market just as America was entering World War II, and due to war restrictions on the manufacture of civilian goods shortly after its introduction, only about 35,000 of these first units were made.

You can identify the pre-Pearl Harbor version because a sailboat was etched

on the grill cloth, later replaced with a bomb-er after the Japanese attack.

In those wartime days, many Americans were anxious to hear direct reports via short-wave from Europe, especially from the BBC, so it was common to see shortwave bands on many commercial radios of the era. But nothing on the market pulled them in with the clarity and sensitivity of the Trans-Oceanic.

The radio became a godsend to soldiers and sailors stationed in remote areas or at sea. Not only was it sensitive enough to pull in far-off stations (with an extra-wide band spread to isolate co-channel interference) but the thing was bulletproof. Literally. Members of the Armed Forces wrote glowing wartime reports back to Zenith about how their Trans-Oceanic was shot at, caught in an explosion, damaged in a fire, fell overboard or was involved in any number of calamities and kept right on playing.

On the insistence of Commander McDonald, the unit was resistant to humidity, with wax coatings on many critical components. This not only made the Trans-Oceanic a robust unit for sea voyages but was an added advantage in the humid conditions of tropical military outposts.

PEACE AND LEISURE LISTENING

Due in part to the wartime reputation of the Trans-Oceanic, the scarcity of the first units and the pent-up desire for consumer goods after years of rationing, the post-war Trans-Oceanics became



Author, journalist and adventurer Ernest Hemingway with his Trans-Oceanic unit.



The first Zenith Trans-Oceanic was made in 1942.



Trans-Oceanic in combat.

the world's top-selling, high end portable radio receiver for many years. With Americans becoming increasingly mobile and affluent in the 1950s, the Trans-Oceanic was the one unit that could be relied upon to pull in AM stations clearly at distant vacation locations and deep woods camping trips and remained a favorite of the military right up until the final, true Trans-Oceanic was made in 1962, the last tube portable ever manufactured.

On a personal note, I am the proud owner of a Zenith Trans-Oceanic B-600,



An advertisement of the day.

the final model made in the early 1960s.

After cleaning it up, replacing the dial cord and dial light, I hooked it up to a long-wire antenna in the attic and the radio exploded with an AM dial full of stations from one end to the other. At night, the skip reception was just fantastic, with selectivity that isolated KDKA 1020, WBZ 1030 and WHO 1040 (for example) from each other beautifully.

The shortwave reception was equally as impressive, and I only wish that there was more to listen to on shortwave these days than quasi-religious, right-wing broadcasts.

The tonal quality is superb, with various buttons for voice, music, etc. The result is an audio clarity rare in an AM radio, even today.

Although the Trans-Oceanic name lived on for several years in more modern and compact Zenith transistorized units, nothing has the appeal and romance of those big first-generation Zenith Trans-Oceanics, with their superb engineering, brilliant industrial design, tonal clarity, matchless sensitivity and historical importance.

 <p>Studio Items Inc.</p>   <p>Mic Booms On-Air Lights Speaker Mounts www.studioitems.com</p>	 <p>TORPEY TIME <i>(The Good Time People)</i></p>   <p>Clocks Up/Down Timers www.ram68.com</p>	 <p>Dixon Systems</p>   <p>News Mixers Line Matchers USB Audio Codecs www.ram68.com</p>	 <p>RAM Systems</p>   <p>Broadcast Furniture Systems Integration Sound Absorption Panels www.ram68.com</p>
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THE INTELLIGENT NETWORK



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ZETTA

GAIN +12.0 dB

EQ CUE



NEWS FEED
DEC 20, 2039

GAIN +12.0 dB

EQ CUE



Z ROCK 1
ZETTA

GAIN +12.0 dB

EQ CUE



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World Radio History

“Sorry, Not Enough Engineers Available ...”

Musings on how we got here, and what we can do to change course

CAREERS

BY CHRIS WYGAL

At the NAB Show in April, I attended a session titled “Radio Hacks.” I expected an hour-long discussion about bad morning show talent; as it turned out, it featured two college radio general managers presenting ideas about how to repair, replace, improve and scrape by when budgets are slim.

Examples included playing top-of-hour legal IDs from a CD boombox in the wake of an automation computer crash, and stringing mic cords down the hall to bypass a defunct control room console. One of the GMs described having two sports announcers, working side by side, each calling in on their cell phones so they could both be on the air when their portable gear failed. The most interesting hack involved using a single console for live air shifts and production work simultaneously.

It was fun to hear how nitty-gritty radio serves communities, educates students and drives radio management to “get it done” by any means possible.

As the session was winding down, a rabbit trail sparked up among the moderator, presenters and audience. The question was posed, “What do you do for engineering services?” Answers varied. One GM said she was able to pay for contractors in the area. The other said he had the benefit of using the university TV engineers when necessary.

But one question left everyone stumped. “Are any of these schools teaching kids how to be broadcast engineers?” The answer was a saddening “no.”

AN ANECDOTAL EXPLANATION

As the week rolled along at NAB Show, I began polling acquaintances and friends with many years of engineering experience. My question was, “Why is there a shortage of radio engineers? Where did they go?”



An older workforce is great ... but who replaces them when they retire?

Several answers emerged, including one that goes something like, “We used to need 20 engineers at our company. Today we need 15. But there are only 10.”

Another answer suggested that the shortage of radio engineers is the fault of the current generation. “We’re not doing anything to make engineering an attractive venture. I mean, look around [the NAB Show floor]. We’re getting older. And some of us speak as if we hate our jobs.”

This particular engineer went on: “When I was a kid, the guy who ran sound at my church worked at a local radio station that needed some weekend help. So I took a board shift. One day, the engineer showed up and took the lids off the equipment in the studio. I was amazed at what he was doing and I said, ‘I want to do that.’

“He took me under his wing and started showing me the trade. More than 40 years later, I still love what I do.”

An engineer from Los Angeles assumes that kids don’t tinker with electronics anymore.

“Sure, kids are still technical. Look at what their hobbies are. They’re gamers. They program websites and are highly proficient at writing code. They’re still into things like ‘Star Trek,’ but I would urge some young ‘Star Trek’ fans to consider how the buttons on the bridge of the starship Enterprise work. Somebody wired those things up.”

This engineer pointed out that he and many contemporaries gained invaluable electronics experience and RF theory from ham radio. And many kids grew up

mantle when it comes to building integrated circuits. Someone will need to build wiring harnesses and be able to use a soldering iron. Our technology doesn’t magically build itself, and our entertainment doesn’t simply arrive at our streaming devices out of the clear blue sky.

THE SOLUTION – IS THERE ONE?

When perusing the exhibition halls that pertain to radio, the expected players were present. Automation systems, consoles, streaming products, social media delivery, microphones, on-air processors and antennas, to name a few.

The demographics of the convention-goers who visit certain exhibition booths support the thesis of this article. To be frank, rarely does anyone younger than 50 visit an antenna manufacturer. This is a strong indication of where the interests lie in today’s rising engineering generation.

Where are the young people? Many of them are crowding into the video and film production areas of the convention

To be frank, rarely does anyone younger than 50 visit an antenna manufacturer’s booth.

dismantling electronics and appliances just to see what made them tick. This may have resulted in a messy garage or workshop, but those youngsters of yore became well-prepared to assume vital technical roles in broadcast.

One night at dinner I was talking to an engineer in his late 30s. I said, “You’re younger than most engineers. What made you get into this profession?”

His story had a similar thread. He was a musician and liked to do audio work. One thing led to another, and he was hired by a local radio station that needed some technical help in their studios. That led to his acquiring transmitter and RF experience. But he’s a rare breed, in that people his age simply don’t seem to be drawn to broadcast engineering as they were in the past.

This article is not an exposé about a looming secret engineering crisis. We’ve seen this coming for a while. As more of our daily accoutrements become increasingly digital and IP-centric, our youngsters’ set of interests will migrate in the same direction.

But this shift won’t affect only the broadcast industry.

Someone will need to assume the

hall. Why? Because video is a pervasive force in social media platforms. Film production continues to thrive on Netflix and YouTube.

Where does this leave the antenna and transmitter sites that need servicing? Or the radio facility that needs to relocate and build new studios?

WORKING ON IT

In the “Radio Hack” session, one of the general managers pointed out that across the parking lot from her radio station is a technical college. Students learn IP networking and electronics, but they’re not consequently lining up to offer their broadcast engineering skills at the radio station next door.

Coincidentally, on returning home from the convention I visited a radio group that was also located about 100 yards from a technical college. The engineer at this particular radio operation said that the school did, in fact, send students over for internships. I asked if any of the kids knew how to use a soldering iron. He chuckled and said, “No, no. That’s something we’re working on. They need to be teaching that stuff, too.”

(continued on page 20)

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DMX
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World Radio History



Destination Broadcasts for Fun and Profit

Take the show on the road and reap the benefits

Remote broadcasts from fun tourist destinations are now cheaper and easier to achieve than ever. Plus, when executed with proper planning, these trips can generate revenue for stations seeking to make money beyond spot advertising.

For a great example, look no further than “Elvis Duran’s Dysfunctional Family Vacation.” Z100’s legendary morning man is doing his fourth annual broadcast and trip — this time, live from Miami. Elvis fans can win a vacation, buy a trip, or at least listen to Z100 while the event is happening. Take a peek at the pics and videos on their website of past trips, and you’ll see why you should explore this idea further!

There’s a lot to love about these excursions, but they do take time to put together and find sponsors. It’s also very important to work out story lines that will be interesting for an audience to hear during the broadcast from the trip.

For those not acquainted with this old-school radio promotion, it basically involves either approaching — or being approached by — a destination or airline that wants a ton of promotion about their location or new flights.

Most remote travel broadcasts are planned by stations. This can start with a concept from one of your drive time shows, either morning or afternoon drive personalities picturing how they could do an engaging live show from a specific distant location.

The next step varies quite a bit. Sometimes it involves getting in touch with a specific resort or hotel with a pitch on why they should be interested. Maybe the station is asking for sponsorship dollars, but it’s more typical that the station is simply asking for a certain number of complementary rooms, meals and space necessary to do a live broadcast.

There may be some money you can make together in selling trip packages via your radio station, website and social media. In other words, the station receives a cut on each trip sold.

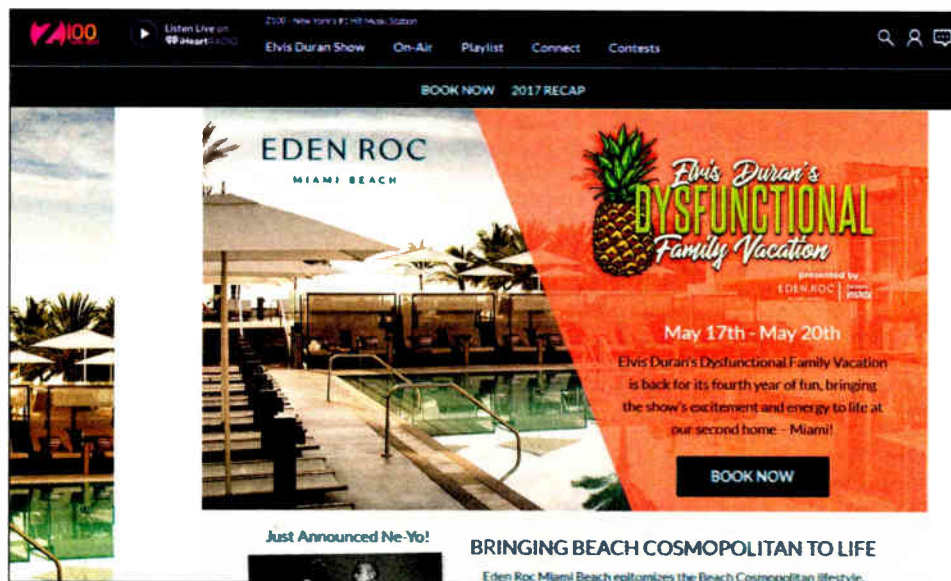
OTHER BEST PRACTICES

One thing I highly recommend is for stations to make it clear to destination

partners that they intend to keep any associated sponsorship revenue, unless the destination brings sponsors to the table. Title sponsors would typically receive mentions in a specific number of promotional announcements, plus hourly plugs during the broadcast. It’s also fairly common to include a trip for the sponsors to give away or to use for themselves to come along.

and some pre-recorded pieces, so you’re not entirely relying on something magical to happen by chance. This probably means sending a producer to the location to record audio with locals a day or two in advance — or at least getting some phone interviews pre-recorded that match the story line you’re creating.

If the broadcast is multiple days, you should cut promos wrapping up that day’s trip and promoting what’s going to be happening the next day on-air. If the



A promotion for the Elvis Duran event is seen on the Z100 website.

Giving away a few free trips to listeners is a must. The contest showcases how valuable the prize is and presents the station with many more opportunities to plug the entire enterprise. Don’t cheap out giving away trips for one. Every trip needs to be — at minimum — for a couple. (Unless, of course, this is a singles-specific promotion.)

The content of the broadcast needs a pre-planned story arc, an hourly outline

destination is game, it’s also cool to give away one more special trip to people listening back home.

PROBLEMS TO AVOID

Here are a few common pitfalls that I have witnessed firsthand.

You do not want your talent complaining about jet lag, lack of sleep or how hard they are “working” during these live broadcasts.

CAREER

(continued from page 18)

Jim Leifer, CPBE, president of the Society of Broadcast Engineers recently commented on this issue for Radio World.

“We are aware of the lack of engineers, and the need to cultivate new engineers. The SBE Mentor Program is one of our recent efforts to share career experiences with new technical talent. We are increasing our education efforts across multiple platforms, including webinars, and working with our members to help find solutions,” Leifer said.

“In addition, the SBE will hold a strategic planning meeting in June to address the needs of our members. This will likely include more ideas on how attract the next generation of engineers to broadcasting.”

He brings up an important point when he addresses mentorship. The long-lasting interests in broadcast engineering usually were seeded by prior generations motivated to seek out young prospects.

PROMO POWER



Mark Lapidus

Be sure to have a bad-weather plan. You don’t want to get stuck broadcasting poolside or on a beach in a thunderstorm.

And you will most definitely need liability insurance and information with you on how to reach your insurer in the event of accidents or other bad incidents.

INTERNATIONAL REMOTES

If you’re broadcasting from another country, it’s fun to involve a radio station in that country. Their personalities can be very useful in adding color on-air and if you get along with each other, they may even tag along, showing you special places to go.

If you have a technical emergency, having a local station can also be very useful.

And there’s no question that this can work domestically, as well.

How long does a live destination broadcast take to plan and sell? I’ve seen it done in two months. Having three or four months is certainly better and less stressful.

Finally, there’s something interesting that happens during the promotion phase that will tell if you’ve got a hit on your hands. The first is obvious: If you start to sell a lot packages, you know all is cool.

Another clue foreshadowing success is that people you work with and others you know will start asking you if they can come along!

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

Fast-forward to today. What if a promising young student were invited to a local SBE chapter meeting? What if the kid running sound for the high school band were invited to a transmitter site to look around? It takes time and effort.

Mentorship is not always fun, but for the sake of the trade, somebody has to do it! When an aspiring, potential engineer wants to see how radio stations operate, showing him or her around for the day may seem like a waste of time. On the contrary, planting seeds for the future has never been an ill-advised effort in any profession. In this season of a lack of engineering types, seeds need to be sown in fairly short order.

Seeking out young engineers in today’s technical climate presents extra challenges. Young minds have their sails set in the direction of IP. Convincing them that broadcast engineering offers them a relevant career path might be tough. Nonetheless, if young technical types see passion and career fulfillment in the current generation of broadcast engineers, they — much like the generation before them — will learn to fall in love with the profession.

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Who says small can't be mighty? ruby's mixing engine, Power Core, is equipped with redundant IP networking, dual-redundant power capability, and tons of built-in I/O — 384 stereo channels, standard — with room to add even more. There are dozens of DSP channels, and a built-in routing switcher, too. It's like 12 rack units of power, packed into only 1RU.

WMMR

(continued from page 1)

no budget line for station birthdays, but this is an historic moment. I'm pretty sure this is the longest-lived rock station in America."

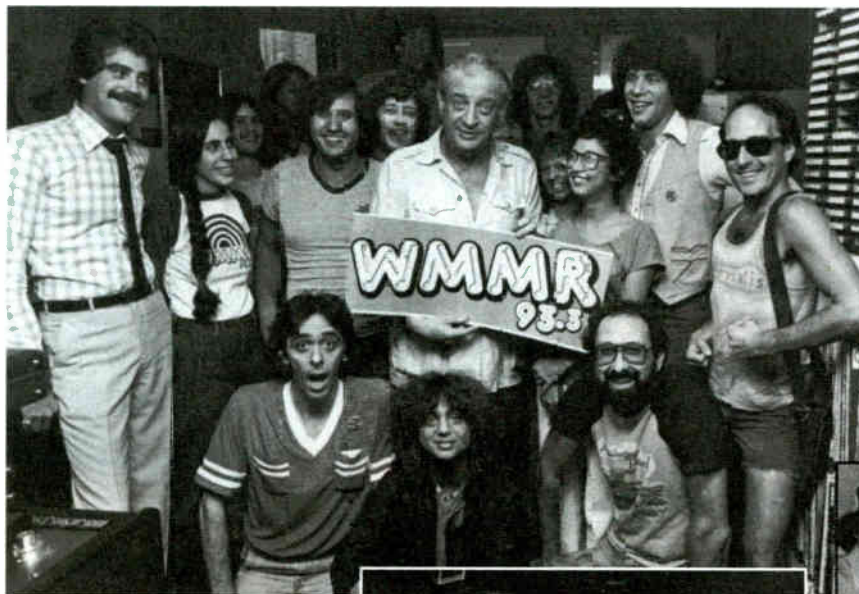
Radio historians recognize those WMMR call letters as the last of the so-called "underground" rock stations built by MetroMedia Broadcasting in the late '60s. Others included legendary stations that have long since passed, like KMET/Los Angeles, the original KSAN in San Francisco, and WNEW in New York. WMMR in Cleveland started rocking around the same time and still is doing so today, but — unlike WMMR — it had a couple of music format detours along the way.

Although Weston has been at the helm for 14 of those 50 years, and WMMR has been ranked #1 among 25–54 year-olds most of that time, he's humble.

"The real geniuses are people who came before like Joe Bonadonna, George Harris, Jeff Pollack, Charlie Kendall, Dick Hungate and many others. I just made the right morning show hire," he says, referring to WMMR's popular "Preston & Steve."

He's equally proud of his first major hire, Jaxon in afternoons, and of one of his newest, "a crazy guy" named Jacky Bam Bam at night. Having a live overnight DJ like Brent Porsche is rare these days, one of the many ways that current owner Beasley Media Group gives WMMR its full support.

Anchoring many of the yearlong cele-



Rodney Dangerfield was among the many celebrities who have stopped in.

bration's events is WMMR's past, present and future midday DJ Pierre Robert, a 36-year WMMR veteran. On Sunday, April 29, Weston logged 50 songs for Robert's 10 a.m. to 3 p.m. shift — the most-played songs from each year of WMMR's existence.

"That was the plan," says Weston, "but he was on for 11 hours straight, and every minute of it was amazing. Pierre took calls about listeners' favorite 'MMR memories, played old airchecks of — for example — the afternoon DJ in 1970 with a hippy-dippy delivery, old commercials and artist interviews. His producer Pancake helped, and our music coordinator Sarah Parker operated social media. I couldn't



Nighttime DJ Michael Tearson, right, greets Jerry Garcia.

ven Clear adding a note of gratitude, "Thanks for the checks!"

Programmer Jerry Stevens hired longtime nighttime DJ Michael Tearson in 1970, and Tearson says the early WMMR staff-



Above: Tom Petty visited WMMR.



Left: Pierre Robert and Bill Weston.

WMMR, one that continues to embrace its past. "People think the station's archives are in a tidy little warehouse that everything's alphabetized, and nothing could be further from the truth."

But he says the 50th birthday has encouraged them to dig around and find some treasures. "A couple months ago, Pierre started a feature every day at 1:30, a song from the 'MMR-chives. It's fun to hear, for example, a live acoustic performance of 'A Horse with No Name.'"

Weston is also making sure WMMR is accessible wherever people listen in 2018 and beyond. "With [consultant] Fred Jacobs' help, our apps activate on the car dashboard, Alexa plays our content, and Beasley is very forward-thinking about audio on demand."

So happy birthday, 'MMR! With big personalities, the best rock (both new and old), and a finger on the pulse of pop culture, there will be many more.

After 9-1/2 years as the architect of LA's "100.3 The Sound," Dave Beasley's new branded podcasts are garnering record downloads. Subscribe to his blog "Buzz From Beasing" at SoundThatBrands.com.

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I couldn't turn off the radio all day, no one could. I was so proud."

— Bill Weston

turn off the radio all day, no one could. I was so proud."

Of course, with 50 years of great radio from which to draw, Robert probably could have gone on forever. He could recall how he used to dangle a live microphone out of the window at WMMR's original studio on historic Rittenhouse Square. Or how General Manager L. David Moorhead gained the on-air nickname "L. Nuclear Warhead." He could tell the story about when Bruce Springsteen guest DJed, or when Tom Petty autographed an LP for DJ Ste-

ers were well aware they were creating a new art form. "Album rock radio had no history and no rules. The very way we spoke on the air, in natural voices instead of the contrived 'radio voices' of the time, was revolutionary."

Original MTV VJ Mark Goodman, now hosting on Sirius XM's "Volume" channel, grew up listening to WMMR. "People like Michael Tearson, Ed Sciaky and the others ... Those were the guys that I looked up to and I wanted to be."

Goodman eventually got his chance, first as an intern and then as a fledgling



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Remote Monitor and Control Systems in a NOC Environment

The IP revolution is opening up almost unlimited potential for remote control systems

TRENDS IN TECHNOLOGY

BY DOUG IRWIN

Not that long ago, having a “network” of transmitter sites to maintain meant having a long list of telephone numbers you would use to reach specific remote controls. Today, you likely have a list of IP addresses.

What’s behind this evolution in technology? For starters, more and more remote sites have access to IP connectivity (either via the public internet or private IP links). Furthermore, transmitter manufacturers have added IP-based user interfaces, along with SMTP, user-configurable alarm generation and SNMP support for control and alarming to their product lines.

Solid-state transmitters have become more reliable over the last couple of decades; and now when they do experience failures, it’s often of a “soft” nature, involving one power supply, or one power amp, out of many. Power output is reduced, but the transmitter can keep on running. (If you are still using vacuum-tube transmitters, you should consider that.) This means that the engineer responsible for the site can essentially be farther away.

In reality it’s now more practical than ever to build a network operations center or NOC that can be used to gather information, and to provide control, to transmitter sites widely spread out geographically. That’s the topic of this article: use of remote monitor and/or control systems in a NOC environment.

CORTEX 360

Davicom recently introduced the Cortex 360. In addition to its normal, locally-based remote control functionality, Cortex 360 can be used in the construction of a widespread network of station control systems. I asked John Ahern, president of Comlab, the parent company of Davicom, about the new product.

“The Cortex 360 is actually Davicom’s third generation of remote site management system. We started building these in the 1990s. We’ve incorporated many of the suggestions that have come from customers over the years, and we think we’ve added lots of capability that allow it to monitor and control stations with a great variety of equipment,” he said.

As one example, Cortex offers analog inputs that can measure up to 80 volts with excellent common mode rejection. Status inputs are also all provided with individual ground contacts — allowing the installer to keep all the various pieces of gear isolated from one another.

I asked him about the ultimate number of stations that could exist in a network made up of the Cortex 360 units.

“Well, there’s not really any limit. The unit itself is usually installed at a transmitter site, although lots of

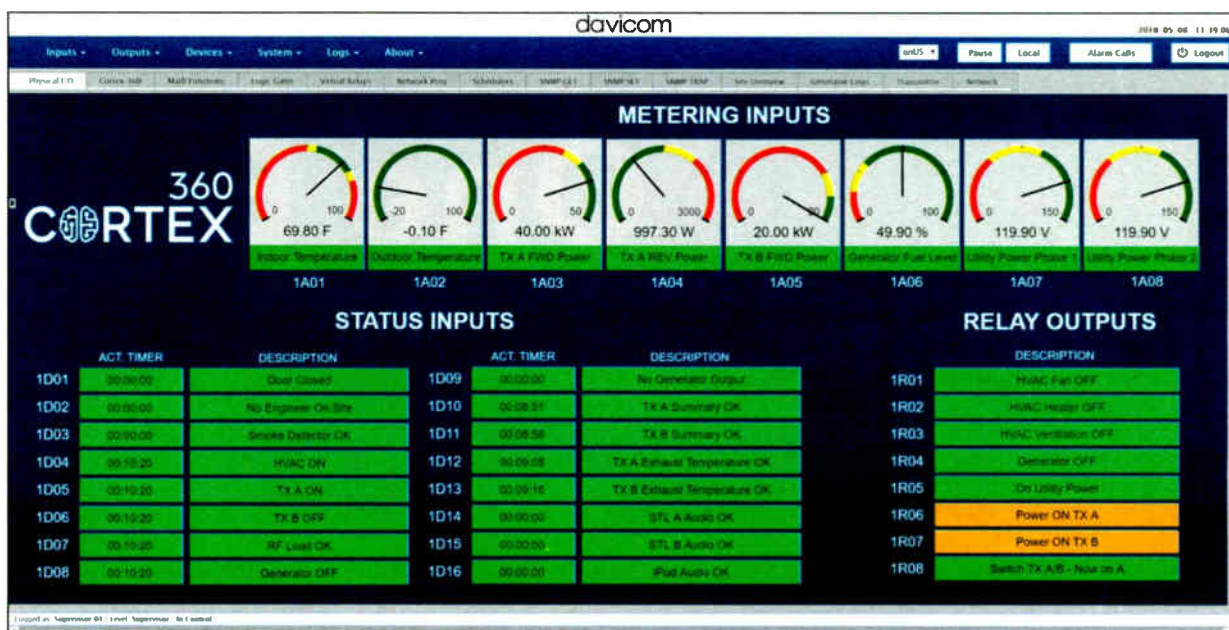
customers are using them at the studios as well,” he said. “If you’ve got a network, you can use a distributed architecture, where you’ve got one unit at each transmitter site, and one back at your studios, along with NOC software that sits at a central site, collecting information, building a database, and connecting to all the sites as required.”

So as a user, I could have a computer and a piece of software running that would go out and poll all the various sites during the day, however many times a

have any rights to make modifications,” he said.

For those new to the concept of SNMP, the letters stand for Simple Network Management Protocol. It was developed early, as part of the internet protocol suite, but has only come into regular use for broadcasting of the last dozen years or so. It is a means by which data can be read, and control provided, between an agent and a manager. SNMP “get” is a way to retrieve a logic state, or other data, from the far end (ideal for reading status and telemetry); “set” is a way to provide a remote command at the far end; and you can think of “traps” as alarms that are configured on the agent, and sent to the manager should they come into being.

One of the most important features of any remote control today is its SNMP capability. The Cortex 360 can act as both an agent and manager, with the capacity of 1,024 SNMP Gets, 1,024 Sets, and 1,024 traps.



Davicom's new Cortex is a third-generation system, with a more contemporary GUI.

minute I wanted to — in order to keep track of what’s going on — but that’s not the only option.

“That’s right — if you have at a central site, but some customers don’t really have that,” said Ahern. “They’ve got the network, but they’ve got local technicians or local engineers maintaining a certain cluster of sites in a town, and they want them to be able to access the units directly and locally, and that is one way of setting it up. You can have your NOC software that’s polling everything, or have it just waiting for information coming in from all the sites, and then it’s advising or notifying personnel that something’s going on.”

Regarding a dashboard display, Cortex 360 provides various options. “The Cortex 360 now operates on HTML5, so you don’t need any special software. You connect to the unit, after which you have access to the GUI that is user-programmed. You can see what is going on locally, but you can also access the NOC software and get an overall view; a map view of all your sites so that you can see what is going on in different regions.”

I asked how easy it would be to have engineers from the next closest company cluster provide vacation relief.

“Up to 16 different user accounts can access any particular unit, and you can fine-tune permissions for various levels of access. In other words, the ‘vacation relief’ would be able to access the device, but wouldn’t

WORLDCAST NMS MANAGER

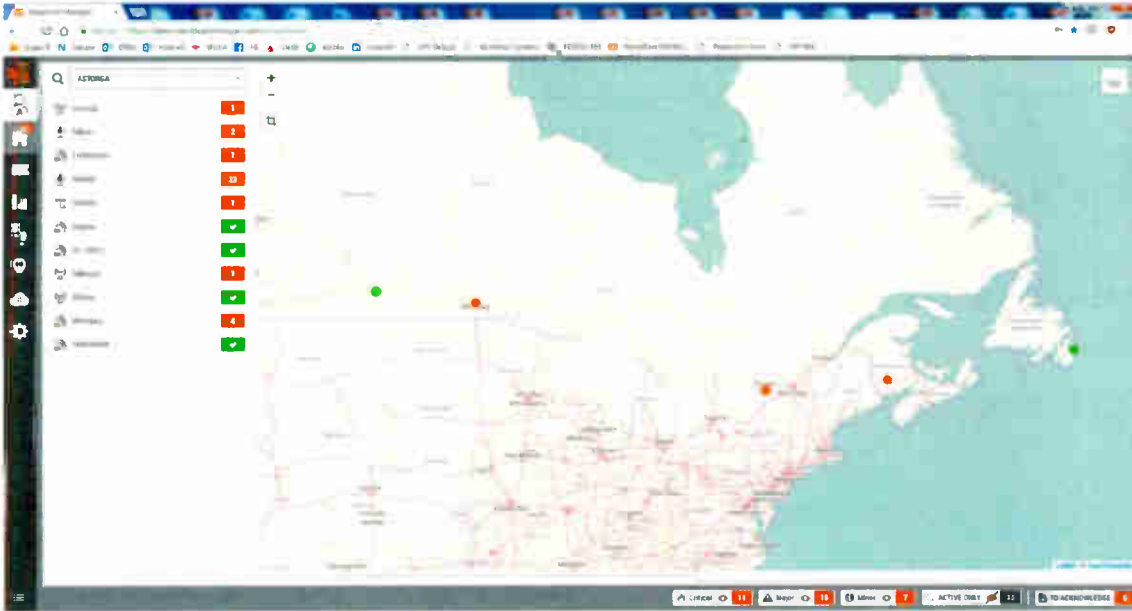
Another option for those that need to monitor a network of remote transmitter sites is WorldCast’s NMS Manager. WorldCast’s U.S.-based engineering rep Tony Peterle discussed the basic hardware requirements with me.

“With WorldCast Manager it depends on the scale of the operation. The operating system is Ubuntu server — I think it’s version 10.8 right now. We find that the OS is very light and efficient, and if you’re connecting 50 units or 100 units, you could probably get away with some fairly insubstantial hardware. If you need to go into the hundreds or thousands of units for monitoring then you might want to invest in something that’s more typical server hardware, with robust dual power supplies.”

For those who have used Audemat Control, or Relio before that, note that WorldCast Manager is designed to work with many different devices, not just remote controls also made by WorldCast.

“One of the significant things about WorldCast Manager is we determined from the onset of the development of this new platform that we were going to be vendor-agnostic,” Peterle said. “In our previous network management software we paid attention to both the Audemat side and the APT side for the codecs. We were very brand-specific.”

He continued, “This time we wanted to do something that was much more open and easier to configure and now we have already integrated into the software



Worldcast's NMS Manager shows sites and status on a live map or other graphics, events and user tickets below.

350 to 400 devices from all different manufacturers all over the world. It's very easy to integrate anything that speaks the SNMP protocol."

Before getting systems such as the Cortex 360 or WorldCast NMS manager to "read" far-end devices via SNMP it's necessary to pick out "objects" using what is known as their Object ID. These OIDs are identified by the user from a text file known as a MIB (short for management information base). Once the appropriate OIDs are identified, the system addresses them via "gets" and controls them via "sets."

Once a user becomes more familiar with this process, it isn't hard to identify the OIDs needed. If that sounds a bit complex to a beginner, WorldCast can help out. "That's something that we can do for the customers free of charge — or if the customers have the tools to do that themselves so they can specifically adjust the software to give them the information deemed most important," said Peterle.

"The other significant thing is that SNMP is not the be all and end all of the WorldCast Manager. We

can speak other protocols as well like Modbus and CANBUS. We also have, both from our own catalog products and from the world market in I/O, a large set of edge devices that can convert older units that don't support SNMP to systems that do," said Peterle. "We have hardware that can convert data points like door sensors and smoke alarms into something that we can more easily network with and integrate into the overall monitoring scheme of the WorldCast Manager."

I asked Peterle about connectivity requirements for use of WorldCast Managers. "It's fairly limited. SNMP is a pretty lightweight protocol and the software gives the customer the opportunity or the ability to adjust the polling rate," he said. "The WorldCast Manager can receive alarm messages from equipment in the field using traps or it can operate as an active polling device and just query parameters at certain intervals. The customer can adjust how often polling occurs, on a site-by-site basis, to compensate weak spots in the network."

(continued on page 26)

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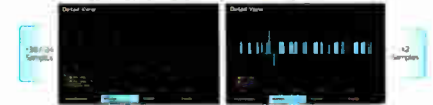


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REMOTE

(continued from page 25)

Finally, WorldCast Manager provides user-configured customized displays so that the user can see the status of your network, and to drill down to the critical issues when you do have problems.

It's important to note that control capability (i.e., "set" commands) will be available in WorldCast Manager in Q3, delivery in September.

BURK AUTOPILOT WITH WARP ENGINE

The Burk Technology ARC Plus Touch, and its companion software AutoPilot, form a well-known remote control system used by many radio and TV stations in North America.

Chuck Alexander of Burk talked about a new standard feature of AutoPilot called Warp Engine. It enables fast, bandwidth-efficient, real-time monitoring of hundreds of ARC Plus or ARC Solo sites at a rate of 100 sites per second, with each site reporting as many as 32 status and/or meter values. Warp Engine requires less than 400 bytes per second of IP capacity for each monitored site. If communications bandwidth is at a premium cost, it can be further reduced by selection of a slower polling rate.

"Warp Engine communicates with one or multiple ARC Plus and ARC Solo systems," he said. "A station can use AutoPilot to monitor and control individual sites, and not strictly transmitter controls, because we can interface with virtually everything at the site through a combination of distributed IO units, which communicate back to the ARC Plus over the IP network, and SNMP."

Increasingly SNMP is used for direct, IP-based communication with any device in a system that supports the protocol. A centralized location running AutoPilot can monitor and control multiple ARC Plus or ARC Solo sites. "Our customers use it for network



Burk Technology's ARC Plus Touch screen in use at Golden West Broadcasting.

operation centers of all sizes at the market or regional or national level, so you could have 20, 30, or hundreds of stations monitored using AutoPilot, again communicating out to the ARC Plus systems at each site," said Alexander.

Burk's system architecture is based on the distributed intelligence of the ARC Plus. "We like to think of ARC Plus as an island of reliability. With an ARC Plus unit at the remote site, even if communications is lost between your central point and that remote site, normal operation can continue because of the automated

capabilities of the ARC Plus for responding to off-air events and timed events like AM pattern changes."

Alexander said that as a NOC grows and handles dozens if not hundreds of sites, efficiency of network communications protocols becomes more important.

"As you move toward the larger numbers of sites, going from 20 or 30 sites to 100, or 200, or 300, two factors become important. One is the efficiency of the communication both at the network operations center and the remote site. There's a need for many of our users to be very efficient in bandwidth utilization and

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WHAT'S NEXT

NAB Show Preview Page 18

also efficient in computing capacity at the network operations center. We've designed a series of features, one of which is Warp Engine, to facilitate these very large NOCs."

When the NOC needs to handle hundreds of sites, enabling Warp Engine switches from a TCP connection to connectionless UDP and uses very small UDP packets, polling at a fast rate — typically up to 100 sites per second, bringing back as many as 32 values per site. The user can configure those parameters if there is a need to use less bandwidth overall.

He also described the navigation pane as seen in the user interface for AutoPilot.

"If you do have a large network of stations then likely there's some hierarchy that you will use to manage those stations. It might represent the hierarchy of engineering personnel with the responsibility perhaps — regional responsibility down to market

responsibility. The user can create a network view that represents your management structure. Basically you're just dragging and dropping folders to organize the way you look at your network; you might have a nation view and then three or four regional views, and inside each regional view there can be several market groupings, and these are all represented by folders in the left navigation pane."

According to Alexander, that becomes particularly useful with another feature called summary status indicators, both at site and group levels.

"A summary indicator can be assigned for a particular site or folder of sites and it gives you a numeric and a color-based indication of everything at that group of sites," he said. "Is everything good and green? Or do you have some number of red alarms or yellow alerts all summarized in the little block for that site or group? Warp Engine monitors hundreds of sites very fast, and

if one of them comes up indicating alarm conditions then you can click on that site and establish a full TCP connection. Now while you're monitoring all the other sites fast with UDP you can be in full communication with sites of particular interest using TCP connections, so you always have access to that control."

As engineers get more and more spread out in their daily routines, the ability to "be in more than one place at the same time" becomes more and more important. Fortunately the tools needed to help you do just that are available now, and not expensive or hard to learn.

Comment on this article or suggest other topics for this series. Email radioworld@nbmedia.com with "Trends in Tech" in the subject line.

Doug Irwin, CPBE AMD DRB, is vice president of engineering at iHeartMedia in Los Angeles and a technical advisor to Radio World. His Trends in Technology columns will appear here regularly.

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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.

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

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A Digital Guy Tackles Broadcast Radio Challenges

Sometimes a different perspective can provide interesting insights

COMMENTARY

BY FRANK ELIASON

Scrrips once again is selling its way out of radio. CBS sold all radio assets to Entercom. iHeartRadio and Cumulus declared Chapter 11 bankruptcy. Many incredible engineers are nearing retirement age; few people follow in their career footsteps.

We are in a changing world of radio. Are you ready?

I've heard some lament that we are witnessing the death of radio. This has been sad to watch, but I think many of the wounds within the industry have been self-inflicted — and continue to be inflicted daily.

Radio should be an art form, from engineering to programming; but members of the youngest generation do not even understand the relationship many of us had with local DJs as we grew up. I remember listening to Casey Kasem to hear his stories behind the music topping the charts. I grew up in the '70s and '80s — far from the heyday of radio, but if you looked close enough you could find it throughout the dial. We had our favorite DJs and they would introduce us to songs we did not know, long before they would become hits. How many DJs have that power today?

What is the path not only to survive but to thrive? As a consultant I tell brand leaders to think about people. What I find in radio is what I see elsewhere: We are excellent with process and technology, but we falter in understanding the people side.

My personal journey in upgrading a small 5,000-watt facility outside Philadelphia prompts thoughts about how to survive and thrive in the digital age of radio. It's time to bring the people side back to radio while utilizing the technology aspects to make our lives easier and better.

ODD BEGINNING

My radio story started unexpectedly in 1998. In October of that year I married. A month or so later, my mother told us that my in-laws had just purchased a radio station. I said she must have been mistaken, so she pulled out the notice in the local paper.

This was a shock. My father-in-law was one of the more introverted people I have known. Just before our marriage, I heard my father and father-in-law

say they would never own computers. Neither saw value in it. Yet now my father-in-law was going to own a radio station?

But yes, he'd purchased a 5,000-watt AM just outside Philadelphia; and he proceeded to launch a non-profit Catholic station, Holy Spirit Radio Foundation, an affiliate of EWTN.

My wife and I participated in the project when we could (the station even got a computer, one I'd built a few years prior). We lived nearby and could stop by regularly. I would watch with amazement as engineer Dave McCrork navigated what appeared to be miles and miles of wires. He seemed to know what everything did and could easily fix any glitch that came up.



Eventually my wife and I moved from the area, and our involvement diminished even as a second 5,000-watt AM joined the mix.

I have since had a fairy tale of a career in business, gaining notoriety helping major brands like Comcast and Citibank see an alternative perspective. I like to say I am a simple customer service guy. In 2007 I joined Comcast and helped bring about a focus on the customer. In 2010, in the heart of the financial crisis, I moved on to Citibank with similar success: I was named one of the "most innovative people in banking" two years in a row by Bank Technology News. In 2012, I had the opportunity to publish a book, "@YourService," published by Wiley; and since 2015, I have been a consultant, helping an array of companies deal with the shifting digital world we are living in, but not always in

the way they would expect or chasing the latest fad.

DAVE'S MAGIC

By 2016 my wife and I had moved back to the Philadelphia area. Recent changes at the station meant that my in-laws needed someone to cover it as they traveled, and I agreed to handle it.

That very week, the main computer went bad, beginning a cycle of long-needed upgrades to the station's equipment. Over several months, I would again get to see McCrork work his magic: I spent many nights watching him at work. And I soon came to the realization that when Dave retires, we will never be able to find someone quite like him.



to bring in new listeners. Over a year into the show, all indications are it was a complete success. I feel like there are lessons in that.

KNOW YOUR STRENGTHS

The biggest mistake I see in radio is a mentality to chase competitors. Radio stations are striving to be the next Spotify or Pandora instead of being great radio stations.

One of the best methods to plan for the future is to start with the past. A cool part of owning older stations is digging into their histories; but all the images from back in the day seemed to be "out and about," within the community. Today we have so many stations that seem to run from their communities.

Many executives applaud the FCC's main studio rule changes because it provides clear permission to centralize everything. On paper this looks great; yet community is the key to success. I personally applaud the changes — the rules were long outdated for the digital age — but success in radio will still

(continued on page 30)

He knows radio inside and out. In fact, his hobby is rehabbing old radios. He recently gave me a 1946 Philco and a 1951 RCA that both work perfectly; we also have a 1937 Philco at the station that is a work of art.

As we started the upgrade process, we made changes at the stations that I believe are key to winning in this new digital age. The stations are long-time EWTN affiliates, with much of our programming covered by the network; why would a digital listener elect to listen to the station when they can just as easily listen to the feed from EWTN?

Well, in the fall of 2016, a week after the computer failure, we started a previously scheduled new, live morning show filled with pop-style Christian music and fun-loving banter. It was not the show you would expect on most Catholic radio. It was designed

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DIGITAL

(continued from page 29)

require deep community involvement.

Toward that end we invested in Comrex equipment to broadcast from wherever our listeners are. We bring local and national events live to our audience and in turn bring value that will never be able to be delivered by a national network. From the fall of 2016 to the fall of 2017, we implemented many other upgrades, during which I gained tremendous respect for analog engineers and their ability to troubleshoot, find cost-effective solutions and create an outstanding listening experience.

Yet I developed a fear too: How would we survive when Dave retires? He is past retirement age. He just loves what he does, but someday he may decide to step away. He has earned the right to spend more time with his lovely wife. I've learned a lot from him, but I would never be able to fill his shoes. Yes, there are contractors and companies that can step in, but just calling them has a hefty cost to it.

We decided that one smart strategy was to upgrade everything to digital, from the satellite receiver to the transmitter, building around a Wheatstone infrastructure.



In the transmitter room.

Dave was funny about the idea; he told me his engineer friends loved it but that he was an analog guy. He was a tremendous help running Ethernet cables to prepare for the shift, and I was able to do the vast majority of the upgrades over the course of a weekend with little

help from others. The hardest part was removing some of the old equipment. On Friday we were 100 percent analog; by Monday the shift to digital was complete. We had to make a few tweaks over the next few weeks, but it was relatively easy, and Wheatstone was terrific throughout the process.

do tend to stay the same.

When TV emerged, some said it would kill radio, but radio thrived. The same is true in this digital age. If we want to win, we must focus on the following:

- **People are our differentiating product** — Let's stop turning our people into robots and allow them to thrive in this new age.
- **Radio has always been about community** — It is time for us to get back into our communities in a big way.
- **Embrace smarter technology for the right tasks** — Technology can fill all kinds of voids, but it is not meant for all aspects of our business. If we replace everything with technology, we are not differentiated from any other service; but if we use technology in smart ways we can ensure long-term effectiveness in managing radio that matches the skills of the new generation.

Together we will create the next golden age of radio while celebrating all the great work that has been done before us.

Frank Eliason is a consultant helping Fortune 500 brands with customer experience and digital disruption. He is an author and director of operations for Holy Spirit Radio in the Philadelphia area.

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MY TAKEAWAYS

So, what are my lessons here?

Yes, radio is disrupted, and I fear much of that disruption has been brought on by ourselves. The key to success, I think, is understanding the past and building on it when possible. If you want to succeed, have a differentiated product that listeners will want to support. Do not fear the change but instead embrace it.

We should also recognize that the skills to operate a facility are changing with the digital revolution, and we need to think about the impact of this. How will you maintain equipment when your engineer moves on? What skills are available to you? Might an investment in digital conversion pay for itself in more reliable and modern infrastructure? It's also an investment in delivering in your community. And are you making full use of live remotes, not only to gain unique content but advertise who you are?

The world around us is always changing; but as much as things change they

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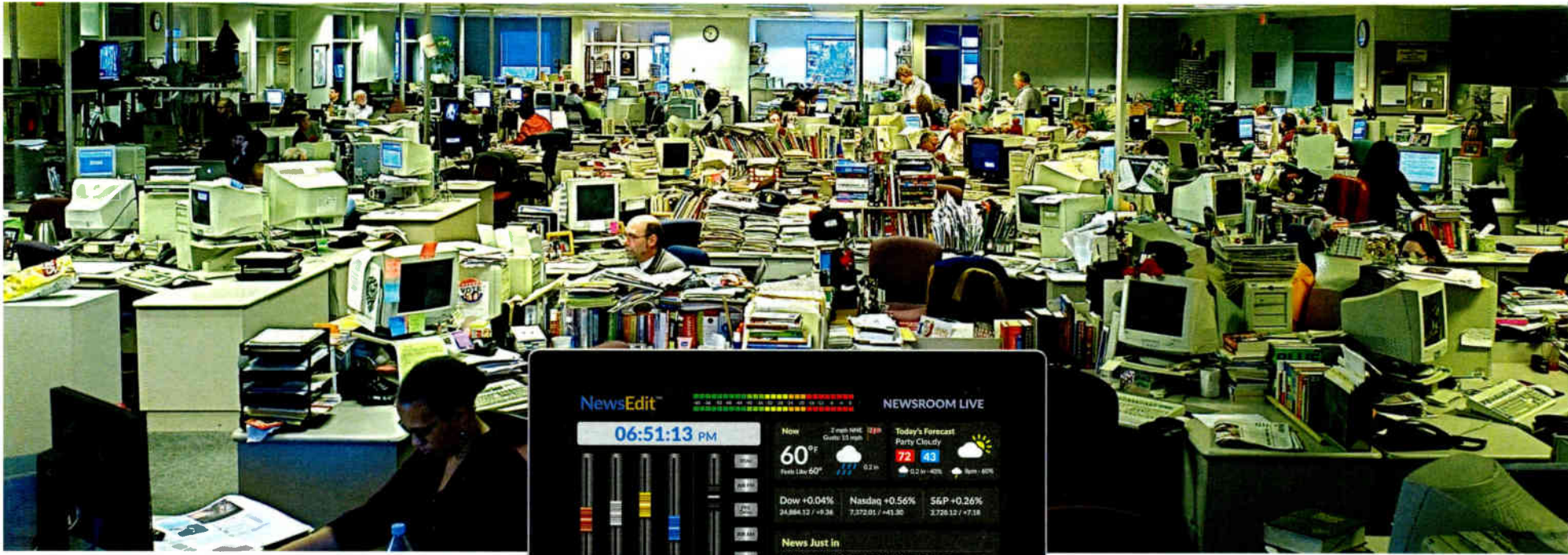


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