

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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More Metadata

At the spring NAB convention, we got a good look at TRE Plus, the latest version of The Radio Experience from Broadcast Electronics, which is now part of Elenos. I had actually been looking at TRE Plus before the convention as a possible replacement for the now defunct Arctic Palm, which we used in Chicago. I sat through a demo of the program and was impressed with its capabilities. The decision was soon made to implement it in Chicago, where we have dashboard info sold.

we have dashboard

Amanda and I sat through a metadata session at the Broadcast Engineering Conference that featured TRE Plus, and that led to a booth visit and some questions



The On Air Now dashboard screen of TRE Plus.

for the developer. That, in turn, led us to the Inovonics booth and yet another related conversation. I came away convinced that TRE Plus is exactly what we need on our FM stations, and perhaps someday on our AMs as well. It is exactly what we need to take care of metadata export to RDS and PSD, and it will permit interleaved advertiser messages, logos, graphics as well as whatever other messaging and graphical displays we want to put up on the listener's dashboard.

Chicago got the product first, and I opted to let our very capable crew there be the test pilots and get it all figured out before I installed it anywhere else. I really thought that might take a week, maybe two, but I was off by quite a bit. It ended up taking the better part of a month. The reason: TRE Plus did not have an ingest template for RCS Nexgen.

BE Support originally told us to use the template for RCS Zetta, and we tried that without success. The formatting of the Zetta export was sufficiently different from Nexgen's that TRE Plus could not parse the data. We circled back with support and they, in turn, got with development and a specific Nexgen ingest template was added to the program. Problem solved! Sort of.

The rest of the issues we had were really part of the learning curve. It took our Chicago folks a few days to figure out the program, and then we had an issue with an external database that we had to wait on for resolution, but they got it and soon had not only title/artist info up on the RDS of our four FMs there but also station logos along with album art and



Buffalo and get TRE Plus running on WDCX-FM.

Rick Sewell provided me with some good notes and screen shots to help me get the initial setup done for WDCX-FM, and we had title/artist data and the station logo up and running in short order along with a test interleave for one of our biggest commercial advertisers.

But a problem very shortly became apparent – the Nexgen export and TRE Plus ingest only provided for song and spot metadata, not shows, and WDCX-FM is a program-heavy station. We needed program title information to be displayed on RDS and PSD. Once again BE support helped us get that configured and working, but there were still some issues. In particular, TRE Plus was not honoring the program length being sent out in the export. It would time out and revert to the default message fairly early in the program. Support jumped into their back end and somehow got that fixed.



WDCX-FM Fichter Wealth Management www.fichterwm.com • 29-May-24 10:02:15

This advertiser graphic and message are interleaved with title/artist data on WDCX-FM. For now, this is just a test, but we hope to generate revenue with this capability soon.

Another issue we had was that the RDS export was only to PS, not to RT. As discussed in these pages in recent months, because of the variations in which automobile entertainment systems handle Radio Text (RT) and Program Service (PS) data, it's important to export title/artist and any other messaging to both. Inovonics has, in its 730 and later RDS encoders, implemented a DPSTEXT= command that will send metadata to both. We needed TRE Plus to use that command and we expressed this in the strongest terms to support. Once again, they got into the back end and created an export that uses DPSTEXT=, and soon we were populating both fields with metadata.

We're still fine-tuning some of the parameters, and we're learning what works and doesn't work. One thing we notice is that the database used by TRE Plus to pull album art does not include a lot of Christian and Gospel music. Hopefully that will change in the near future.

Moving Indoors

Back in 2017, we jumped at the opportunity to pair most of our AM stations with FM translators. Some of these translators represent little more than placeholders for some future upgrades, but some perform very well. Still others are sort of in the middle. K232FK, a 250-watt 94.3 MHz translator paired with KLVZ, is one of those in the middle.

What I mean by that is that the translator has co-channel interference from the north (Wellington) and south (Colorado Springs), but with 250 watts at 158 feet of antenna height, it still has a respectable coverage area of several hundred square miles, most of which is densely populated. It serves the northeast metro area of Denver, from roughly Thornton to Erie and east from there into farmland. The AM also has a 95.3 MHz translator on Lookout Mountain that has no co-channel interference and covers much of Denver Metro, but the northeast is, because of distance, a weak area and the 94.3 translator does a great job of filling in that area. Since we put K232FK on the air, it has been housed in a temperature-controlled, weatherproof cabinet at the base of the north tower of the KLVZ daytime directional array north of Brighton. We use an ERI two-bay half-wave spaced antenna, with the half-wave spacing designed to prevent a secondadjacent interfering contour from reaching the ground. That half-wave spacing gives the antenna a "gain" of -2 dB, so we have to feed it with close to 400 watts of power at the antenna input, and with line and isocouplers losses, that required over 500 watts out of the transmitter, a BW Broadcast TX600V2.



The new home of K232FK inside the KLVZ transmitter building. Note the new VX600 transmitter near the top of the rack.

The issue we had with that transmitter and temp-controlled weatherproof cabinet was that the temperature would go up and down in sawtooth fashion, reaching 140 degrees or more before the A/C unit would kick on and drop it back into the 70s for a minute or two before kicking off and letting the temperature climb again. That resulted in some problems with the transmitter.

This spring, we bought a new Nautel VX600 transmitter for this translator, and I did not want to subject it to the same harsh conditions that its predecessor experienced. The answer was to move the translator, including transmitters, processor and ancillary gear into the AM transmitter building, which is a clean environment with well-regulated temperature from a pair of HVAC units. The problem is that the AM transmitter building is some 200 feet from the base of the tower that supports the FM antenna. We would have to get the RF from the FM transmitter out there somehow.

We contacted the electrical contractor that we have used for many years, and he came out and gave us a quote for trenching in 200 feet of 2-inch PVC to get the line out to the tower. \$4.600! Some \$3,000 of that was for the trenching, and I quickly concluded that we could do it ourselves for under \$300. So we rented a trencher from Home Depot and got the trench dug in just a few hours' time. The next day, the electrician came and did the conduit work. By mid-afternoon, the station was back on the air using its new Nautel VX600 from the AM transmitter building. The TPO had to be increased to 620 watts to compensate for the loss of the additional 250 feet of 7/8-inch line, and I filed for a license modification to cover this increase.

The 94.3 station sounds great, and RDS is working like a hose. Remote control hookup was a snap using SNMP. Amanda will have more detail and her perspective on this project in her column later in this issue.

The New York Minutes By Brian Cunningham, CBRE Chief Engineer, CBC – Western New York

Hello to all from Western New York! Memorial Day has come and gone, which signals the unofficial start of summer. In Western New York in

the month of May, we have seen six or seven days of temperatures well into the eighties, which is highly unusual for this time of year.

As most of the country has also noted, weather conditions have expounded well beyond the normal, case in fact, the southern and central states have seen over 850 tornadoes as of May 28th! Other areas are experiencing massive flooding with rain

totals from just one storm measuring nearly a foot of rain.

I have no clue as to why our weather conditions are way out of whack, and there is no shortage of opinions. Some blame it on global warming, others the April eclipse, while the extremists blame it on the government conducting some type of secret weather experiments. And it goes on. There is never a shortage of people expressing their opinions. I just wish that they had proof to back up their statements.

Getting back on track, we have seen exceptionally high temperatures here in Buffalo, coupled with some pretty hefty rainstorms, which have resulted in our tower fields exploding with heavy growth, kicking off the mowing season at least a month earlier than usual.

In last month's report, I touched briefly on the use of AI in communications, posing the question, does it really have a place in the broadcast industry? Just three days after the May edition of *The Local Oscillator* came out, Warner Music of Nashville came out with a new Randy Travis song, vocals of which were created by Artificial Intelligence. The interesting part is, Randy had a near-

death stroke in 2013, and has not had the cognitive functionality to sing or perform since his stroke occurred.

Previous recordings of Randy's singing style and voice were sampled and data stored in the computer to be accessible by AI. After months of touching up vocal samples millisecond by millisecond, "Where That Came From" was released as the new Randy Travis single.

I have listened to this song created by AI, and quite frankly, was not impressed with what I heard. Yes, it does sound like Randy, but certain phrases and words within the song do not. The human element of creativity and emotion has been



removed, those are two elements that cannot be electronically recreated by AI.

According to Warner Music, Randy has been completely transparent with this whole process and how it was produced, and was involved with the entire process step by step, but it still does not change the fact that the artist did not create the vocal recording; only a "likeness" or "clone" of his voice was used.

It is interesting to note also that James Earl Jones has sold to Lucasfilms the rights forever to use his voice as Darth Vader, for any future Star Wars films that they wish to include Jones' characters voice. Imagine that, long after his passing, his ancestors will still be able to hear his voice, or at least a computerized artificial version of James Earl Jones. AI can never replace the artist, it is only a tool, and tools cannot create.

On May 8, I began installation of our new Inovonics Model 526 AM modulation monitors at the WDCZ and WDCX transmitter sites. This did not go so well at WDCZ.

First off, I had trouble reverting the firmware back to version 1.0.0.0 as Cris instructed. It would begin the upload, but after about 7% loaded, it would error out that the file type was unsupported. I got the technical support guys at Inovonics involved, and even they were unable to get the firmware uploaded. After trying several different things with no success, I hooked up the 526 and my local computer through an independent switch, and the upload worked! I was able to load in the revised firmware version 1.0.0.5. I'm still not sure why the firmware would not load through our Cisco 20 port network switch at the transmitter site, and I guess that will remain a mystery for now.

I still had a problem, however, with the new monitor's modulation meters! The old Inovonics 520 mod monitor showed the positive modulation peaks near +120% and the negative peaks at -98%. The new 526 monitor showed the positive peaks at or near 70% with negative peaks at 82-84%...

After trying several different things, I found that the modulation sample from the Harris Dax-5 transmitter was way too high for the RF input of the 526 monitor, overloading it. Switching over to the antenna input, and using a length of RG-8 coax, I was able to obtain an accurate measurement of the modulation. I was able to tweak the Omnia.9 to obtain +125% modulation peaks along with -98% negative peaks with no complaints (faults) from the transmitter.

At the WDCX(AM) transmitter site, the installation went without incident. We are currently operating in analog only, as our IBOC Exciter and Exporter Plus had to be sent back to the mother ship for repairs. After a recent commercial power outage, the IBOC signal would not come up.

Incidentally, there were no faults showing on either the AM-IBOC exciter nor the Exporter Plus, but there was no input to the IBOC interface in the transmitter. I checked for signal with an oscilloscope at the phase input and found nothing there. After discussing the problem with Nelson at Nautel (and trying several different additional tests and measurements), they determined that both units should be sent in for repair. As of this writing, I am still waiting for repairs to be made and the units shipped back to us.

With the higher temperatures I mentioned earlier, the air conditioning at the WDCZ transmitter site in Hamburg wouldn't come on when I started it on Thursday the 16th. I checked everything in the IDU and found nothing out of the ordinary, and determined the problem resided in the condenser unit located on the roof. I called our HVAC contractor, Solly Industries, and they sent out a repairman on Friday the 17th. After checking the condenser unit, he found that the capacitor on the fan motor was bad and replaced it.

The unit was cooling when everyone left, but upon arriving on Monday the 20th, the transmitter building was extremely hot. No A/C! I called the service guys back out and they found that the starting capacitor was blown again on the fan motor. After checking the blower motor, they found that the bearings were shot, and the motor had to be replaced.

After tracking down a suitable replacement motor, they came back and replaced the defective motor and cleaned out the entire condenser enclosure from leaves dirt and debris that accumulated over the winter months.

So far, the unit has been cooling without any problems. Just a reminder: clean out your A/C units and replace those filters before the really hot weather gets there! The A/C won't cool if the air can't get through!

That about wraps up another month here in the great northeast, and until we meet again here in the pages of *The Local Oscillator*, be well and happy engineering!

The Motown Update by Mike Kernen, CSRE Chief Engineer, CBC–Detroit

GV me ASAP!

I left you last month with somewhat of a cliffhanger. Most of you probably guessed what I

meant when I said, "I'm expecting a big heavy box from Canada with two doors and a touch screen monitor on its front." Well, that big box arrived in its own big wooden box, and it's installed and working great!

The big box I'm talking about is, of course, a new Nautel GV40, 40 kW solid-state transmitter.

For the whole of twenty years WMUZ-FM has been on the air with Nautel's NV40 transmitter; serial number H103. H103 was the first NV40 delivered to a customer,

and that was only after it had made a trip to Las Vegas where it was the center of attention at Nautel's booth at the NAB show. H103 has been by all



Moving the GV40 down a narrow and uneven sidewalk.

received its share of software updates, some replacement power supplies and PA modules, a new SBC "single board computer," had a few fans replaced (it has 109 of them), and has been given some new internal interconnecting cables, too. To say the NV40 is reliable is an understatement. Because of its design, when we have had failures, I've only ever known because of an error message, not because we've been off the air.

While the NV40 has been a truly amazing piece of equipment, it was time for it to move it into standby role. We also needed to put to pasture our old Continental 816R-4C, which had an in-service date

of 1993. The old Continental still worked but cannot support HD Radio because of its nonlinear tube-type final amplifier. Its useful service life was over quite a

> long time ago and the fact that it soldiered on until now is a testament to its quality and engineering.

A Good Trick

The WMUZ-FM transmitter room is long and narrow, accommodating two transmitters and one rack filled with support gear. The room is so narrow that there isn't room enough at the front or rear to move one transmitter past the other. Since the Continental was installed prior to the NV40 and the room's

only door was at the far end just past the NV, removal and replacement of the Continental meant we'd have to move the rack and the NV40 out, move in the new GV40 followed by the rack followed by the NV40. This would be lots of work and significant off-air time.

To get around this, I decided it was feasible to install another door. As luck would have it, the wall directly in front of the Continental transmitter was relatively free inside and outside the building. Rather than unload the entire room from the one end, move out the Continental, move in the GV40, move back in the equipment rack, and the NV40, and rush to reconnect everything, we elected to install a new door directly in front of the Continental and a extend the sidewalk to it. Doing this allowed us to stay on the air uninterrupted. We also were able to move the Continental out one day prior to the GV40's arrival, which meant we could take advantage of the delivery company to place the new transmitter exactly where it belongs, leaving any possibility of it being damaged while moving it their responsibility.

I have installed GV series transmitters before, so I was confident this installation would be familiar and relatively easy, which it was. What wasn't easy was moving it. When the transmitter arrived, it was 100% crated and accompanied by a small crate full of accessories. The crated transmitter weighs in at a hefty 844 kg (1,860 lbs.); shedding the crate only dropped it to 744 kg (1,640 lbs.). For comparison, that's 40 lbs. more than a 1951 Volkswagen Beetle!



A peek through the new outside door at the installed GV40.

In all my prior transmitter moves, I've used a forklift and pallet jack. Some transmitters arrived separated from their power supply cabinets, meaning they were easier to handle and that the heaviest pieces were much lighter than if they were connected. Nautel's NV and GV series are shipped as one cabinet.

To complicate matters, our transmitter room does not allow for a vehicle to park nearby. The closest the truck could get is about 300 ft. to the south. There is a walk, but it's narrow and unlevel in spots. Fortunately, I had the foresight to have a pair of heavy-duty machinery moving dollies on hand!

Once the transmitter found its final location, all the connections for RF, electrical, network, MPX audio, etc. were made and the transmitter was tested into the dummy load at low power. I also had a hood placed over it collecting its hot exhaust air and channeling that into our HVAC system's return air duct.

The GV40 isn't a sea change from the NV40. It's evolutionary, not revolutionary. That said, there's everything I love about the NV40 plus higher efficiency power amplifiers, new and smaller RF PA modules, and vastly improved power supplies. It also sports a revised controller with the SBC inside, support for UPS connection to keep alive everything but the PAs during a power failure, and a more conventional arrangement for the exciter with a redundant one being offered as an option.

Once we fired up the GV40 and directed it to the antenna it has been on and working flawlessly. Having installed these before, I had no doubts.

Nautel Multicast+

As part of the new transmitter project, we received a new combined HD Radio importer/exporter. This is my first experience having both of these units in one box. It's also my first experience with Xperi's Gen4 software.

Having worked for years with the foundational software, then with the first release versions, I was well familiar with the limitations of its primitive and sometimes even command line interfaces, modifying text files, using Java applets and entering in license keys for different modes of operation.

The MSAC client, which is necessary to enable Artist Experience, had no GUI at all. In fact, when it was running, only an empty box opened – no status, no user interface, nada..

Gen4 fixes all of this. Inside the Gen4 control panel exists everything you'll need to configure and control both the importer and the exporter. It divides each piece of the HD Radio operation into its own window which can be maximized/minimized/iconified, etc.



The new HD Multicast+

Gen4 is much easier to understand, too. I was able to set up the HD2 and HD3 channels, load the station logos, and connect to the Exgine, all with relative ease.

Having worked at the second station ever to implement HD Radio, I can tell you how much I appreciate this easy and complete software. With the included new Reliable HD Transport, it's possible to keep the Multicast+ unit at the studios, where it's convenient to the station networks and audio sources, with the Exgine component (lives in the transmitters' exciter) being miles away on the other side of the STL and not have time alignment issues.

The Multicast+ is available with either Orban or Omnia processing onboard, but I've not tried those. We already have adequate audio processing for our HD2 and HD3 channels and didn't purchase those options. Nonetheless, I was surprised by the audio quality.

The only thing that tripped me up was not setting the Multicast+ internal Lynx audio card's sync source correctly. Our house sample rate is 48k,

and of course HD Radio is 44.1k, which is not a problem because Lynx includes SRC capability on each input. Even so, the card itself needs to be locked to the 10 MHz from the GPS board, which Nautel provides to Lynx's header connector internally. Once I knew that and selected it, our timing was spot on. Next month we'll talk about tower lighting.

News from the South by Todd Dixon, CBRE Chief Engineer, CBC–Alabama

Twenty-Two

Today, as I write this on May 28th, is the end of my 22nd year of employment at Crawford Broadcasting.

I think back to one of my first experiences being Stephen Poole's freshly minted assistant when he asked me to cross my arms over my chest and watch for a "spark" in the rear of one of our transmitter cabinets while he applied power to it. I look back on that moment (and a few others) and sometimes think, "Did I really need this job that bad?" but most of my time has been filled with real blessings where I see that God has given me exactly the skills I needed to really impact a lot of people in our Birmingham market

and to often make things easier and better for those we work around daily.

When I got hired, the Crawford Birmingham market had already brought their third station, 850 AM, under the umbrella, but the future involved acquiring a couple of other stations and updating the transmitter buildings at the two older sites. Stephen said he basically needed someone to "take the computer monkey off of his back" so that he could focus on getting that work done.

Fortunately for me, computer networks didn't stop at computers. They moved right into the same real estate of almost every piece of equipment that we have and created a connectivity between devices that I don't think most of us saw coming.

At any rate, I continue to be blessed to work here and to know that God put me right where he needed me.

I am Borg...

I know when people mention AI, it can seem like this far off, esoteric thing that is literally going to have no impact on anything during your lifespan. It's kind of like when people say, "Nuclear Fusion is 20



years away," you know it is there and people are working on it, but the idea of controlling something as hot as the core of the sun in a magnetic field seems beyond human comprehension.

I've kind of felt that way about AI, Skynet[™] and all, in the sense that man creating a sustainable super intelligence sound both biblical and, at the same time, impossible. I wrote about ChatGPT about a year and a half ago in these pages. At the time, ChatGPT was kind of a difficult, unnatural experience – typing out your question, waiting for a response, typing another response to clarify your question, waiting for another response. While the answers you got were great in the sense that you may not have wasted as much

time in a web search as you did initiating questions to ChatGPT, it still was awkward.

OpenAI, the creators of ChatGPT, introduced a new version of their software called GPT 40 (the "o" stand for Omni, i.e. it's a multimodal AI). If you want to get a glimpse at the power of this multi-modal version, a link is provided herehttps://openai.com/index/spring-update/.

Beyond the fact that their engineers were able to simply converse with the AI model with almost humanlike latency, they were also able to interrupt its responses and clarify their question. The AI was asked to change its voice on the fly to something more dramatic, soothing or even robotic. I need to be careful in saying this, but it also appeared to get creative with its responses, almost like it had a personality.

Using a computer to interface with it, they were able to copy and paste images that gave the model the ability to "see" as well. The seeing aspect definitely still creates some amount of lag, but it was certainly tolerable and something that most of understand-video and images require more bandwidth than audio or text. No matter the case, the jump in AI ability in the course of 1.5 years should give us pause and also some understanding that it isn't the same as nuclear fusion, and we'll see effects from the technology sooner than we might think.

A Personal Borg...

You might think that you cannot even fathom how you might use AI in your daily life to help you complete tasks. I think that eventually, we'll all have some form of AI assistant, whether in the form of our cell phones, computers, or even wearables (glasses). They'll help us with document summations ("Give me a synopsis of this 10 page document"), search ("Scan this document and find what ports need to be open for this equipment to see



Figure 1 - The FacebookTM app uses their AI model to complete your searches.

the network"), and speech-to-text ("Log into my webmail and send an email to everyone reminding them that we have a meeting today"), just to name a few.

As AI gets more sophisticated and integrated into our software, we'll see that it will be able to

generate things for us much faster than we ever could. Microsoft's Co-PilotTM is a prime example of how AI will be integrated into software. In fact, my wife Kim's company (a large accounting firm) is about to start using Co-Pilot in their Office 365TM licenses. If any of you are FacebookTM users (their AI model is called LlamaTM), your searches are done with their Meta AITM. This also includes their other products like MessengerTM, WhatsAppTM and InstagramTM as well. These companies are training their models with their large information databases and our continual input to continue to be more precise in their findings and to become more tightly integrated into every part of their workings.

In its simplest form, AI is a tool. It's a tool that is going to be used in some form or fashion by every piece of technology around us. If you want to begin to wrap your head around how pervasive these models are and the training that is going on, go to <u>https://huggingface.co</u> (I didn't make the name up) and simply look at the number of models that software developers have created. Anything with a "B" in the name denotes billions of parameters, and they would obviously be more resource intensive. These have generally been created by these bigger companies and then others have made derivatives from them. It is way too early to say which one will become the 800 lb. gorilla in the room, but I don't know what is coming tomorrow, either.

One of the things I've seen is a number of people using these AI models locally on a single machine. These local models don't reach out to the internet for answers and as such are isolated from influence, but you can then train them, in a local way, to help you with a number of task. I'll share more on that next month when we visit again. May God continue to bless the work of your hands!

Tales From Cousin IT by Stephen Poole, CBRE, AMD CBC Corporate IT Specialist

There's a guy in my neighborhood who likes to drive his go-cart up and down the street in front of my house. He will drive up to the corner, turn around,

then go back (I assume) to his house. He repeats this, over and over. For hours at a time. As I write this, in fact, I keep hearing "BUURRRRP ..." that fades until he reaches the corner, and then "BUURRRRP ..." again on the return trip. It sounds like Godzilla has been to Taco Bell, over and over. For hours at a time.

But I'm tough; I can handle it. And besides, it's June! Once again, the year is almost half done, and I still have a list of projects to do.

I've been working with Josh Meyers in Buffalo on the MyHopeNow Website and app. Turns out that this is going to be an even more major project than we thought. More on that in a moment. I've got some changes (such as searching and archiving) that I want to add to the online POR system. Hard to believe that it has been running for two years now, but it has.



Figure 1 - Testing the RDS/HD PSD/whatever splitter/forwarder.

One other project that I've been doing for Cris is a metadata duplicator and translator. Figure 1 shows me testing the thing on my computer. The original program didn't do any translation; it simply forwarded RDS, HD or META packets, unaltered, to two or more different destinations. But reality rears its ugly head again: different RDS encoders (and for that matter, the decoders in consumer receivers!)



behave differently. To address that, we need to be able to translate DPSTEXT (Inovonics' standard for Radio Text + Program Service) to plain DPS and RT.

See Figure 2. I've written the code for that and, Lord willing, will do the final troubleshooting with Todd very soon.

Serverless Web Servers

It sounds like a contradiction in terms, doesn't it? After all, we don't have enough buzzwords in IT yet; let's add a few more! So-called "Artificial Intelligence" (that's anything but), "Cloud Computing" (which simply means you're using

someone else's server over the Internet), and so on, and so on.

Anyway. The way "Serverless Servers" work, instead of having your own dedicated, in-house web server, you pay for access to a server that will build a page for you on demand. Visit serverless.com for enough info to cave in your head. But this

This data forward is part of the Group WYDE_RDS
Target IP:
Port:
Data Type:
ТСР V
If translation from DPSTEXT desired: To RT □ To DPS ☑
Comment: 92.5 GV3.5 at PC
Save Cancel

Figure 2 - Note the checkboxes. You can choose DPS, RT, or both.

sentence caught my eye on their main page, at the end of the first paragraph: "[this system] ... demands so little maintenance it feels 'serverless'.

Ah. "Feels." So there is a server, it just doesn't feel like one. Gotcha. At the risk of sounding like a dinosaur, honestly, I have been less than

impressed. What we're using currently integrates with Amazon Web Service's Lambda, but speaking from my experience working on the MyHopeNow stuff, it's very difficult to troubleshoot. As I've mentioned here in the past, viewing a page's source code will give you tens (or even hundreds!) of thousands of lines of gibberish that all runs together and makes my eyes water.

This matters to us in the case of MyHopeNow because that site is (supposedly) automated. Josh should be able to add a ministry to the database and have it automagically appear in the correct place, ready to display, in the web page. If you have problems – and we do – it's extremely difficult to find what's wrong because we don't have the original developer's command-line environment. That has been lost with time.

Again: call me a dinosaur, but give me a dedicated server running Apache and PHP, maybe with WordPress on top. Serverless supposedly costs less, because you're only charged for actual time used. In reality, if for any reason you use a bunch of time in any given month (including an outside hack that floods your "serverless" environment with requests), you could be hit with an eye-watering invoice.

My (Not So) Wonderful Sangean!

I had heard of this brand, it was at a good price (Figure 3), so I ordered it on Amazon. It supports RDS display, which I need to troubleshoot the aforementioned data splitter. It was only about \$60 with tax, and it arrived within a couple of days. I pulled it out of the packaging, plugged in the wallwart power supply ... and the display would flash at about 1 second intervals. The unit wouldn't come on.

Installing batteries made it come on, and I keep the supply connected anyway, but that was the first aggravation. Next, setting the clock requires that you hold your mouth just right and close one eye by approximately 80%. I can't tell you how many times the menu hopped back to the tuning screen, because you use the up/down buttons to the right to tune AND to adjust the menu settings.

Finally, it doesn't sound very good. There's a low-grade, blurry distortion in the audio that would be annoying if I was trying to use this as my primary table-top receiver. Bottom line: not worth it. I'll use it to troubleshoot the displayed RDS, but then it'll probably gather dust when I'm done.

More Security Stuff

It's easy to get ... what's the word I want? Jaded? Numb? ... with all the news about institutions that have been hammered by ransomware. My phone's Chrome start page shows me the headlines, and it's one organization after another on a daily basis.



Figure 3 - Not impressed.

As I said last time, the most common way that this gets into your network is someone clicking a bogus link or downloading an attachment in email. All it takes is one person, too.

It does look like the Bad Guys are really working the "your receipt is attached" angle lately. I received one while I was writing this, in fact. I use Thunderbird as my email client, and it shows me the actual destination of the link when I hover over it. This one said, "log in to confirm your email" – but the link went to something overseas, a hideous mix of gibberish.

To be honest, Microsoft's products are troublesome in this regard. I wanted to be fair to them, so I did (yet still another) Google search before I typed this. One hit was to a guy who pointedly asked if Outlook could be made to act the same as Firefox/Thunderbird – i.e., to show the actual link destination. No response. Outlook also wants to obscure email addresses, though you can view that with an extra click or two. Don't be surprised if an email from "customer_support@yourcompany" actually comes up as "asdfasdfwerwe@fdsdsdf!!" when you ask to see the actual email. That's a genuine red flag, obviously.

Everyone rewrites links nowadays, including our company. The actual link to one of our station websites might be some cryptic text that goes to a strange-looking server, but your browser will show "wmuz.com" (or whatever). That's a good thing in many ways, and it's required for good "SEO" (Search Engine Optimization). Most web servers allow you to define "rewrite rules" that can replace something like "mastersite.org/~hoodat/jiminy/cricket" with "BuyMoGoodies.com." The latter is what the user sees in his/her browser.

It's also essential if you're going to host more than one site on the same server, as we do. Very old browsers won't show the correct text in the address bar, but all modern browsers accept rewritten links. The bad news, of course, is that rewritten links could trick you into going to a fake site, too. Stay alert and remember the old rule: if it sounds too good to be true (or nowadays, if it just sound weird or came out of the blue), it's probably too true to be good.

That's enough for now. Until next time, keep praying for this nation!

The Chicago Chronicles by Rick Sewell, CSRE, CBNT, AMD Engineering Manager, CBC–Chicago

Last year, we upgraded our generator at the WPWX transmitter site in Burnham, Illinois. The plan was to add greater capacity to the backup power

system at this site while replacing a generator that was aging. We purchased and installed a

we purchased and installed a 150-kilowatt Onan generator to replace the 100-kilowatt unit that had been there for more than 20 years. For the most part, 100-kilowatts should suffice for normal minute to minute operation. However, we found that during the transfer process from power loss to generator the load was higher than the 100-kilowatt capacity.

This was due to the fact that we have a flywheel UPS handling the power within milliseconds of the power loss until the generator would

come online. The flywheel UPS has about 45seconds of runtime until it runs out of energy and will go into bypass if the generator is not up and running.

This occurred from time to time, especially during the summer months when all the air conditioning at the site was running. The generator would come online and not only have to carry the normal load but also must begin charging the mostly spent flywheel UPS. This would increase the load

enough to choke the generator and it would go into alarm mode and shutdown. This was the motivation to increase the

capacity and install the new 150-kilowatt generator. After the installation, the Cummins generator tech was questioning whether we had enough fuel capacity with the setup as installed. To be honest, we were very specific about the amount of pressure that the tank regulator had to deliver to the regulator at the generator, that being 2 lbs. of pressure. However, flow and pressure are two different things.

So, we scheduled a load bank test. This did



not go well. When we got to about 100 kilowatts of load, the generator began to choke and then stalled when even more load was added. The tech was using

> gauges on either side of the fuel regulators and could see the tank side was going low first.

When we examined the situation more closely, we realized that although the regulator installed on the tank was at the necessary 2 lbs. of pressure, its BTUH, flow rate over an hour, was at 14.2 million. The generator required 18 million BTUH. This was obviously the issue, or at least a main issue.

The thought was that we just needed another regulator that gave us 2 lbs. of pressure with 18 million BTUH or greater. The problem was finding

that regulator. After a lot of research, the propane



Balancing the regulators the unscientific way.

techs said they couldn't find a regulator with those specs. They did find a little used method to increase the flow without increasing the pressure. They would put a second regulator, the exact same model, in parallel to the current one.

They came out recently and installed the two regulators together. To make sure both regulators were in play, they would have to use the fine

adjustment set screw on each to make sure they were balanced.

They used gauges at the output of each regulator to set them both at 2 lbs. and then the combined output also. That was the technical method, but to really make sure they were balanced they used the ear method. Putting their ear on each regulator and listening to the pitch of the gas rushing through the regulator to make sure the pitch was about the same.

It was interesting that when the regulators were not balanced well, they started humming with a vibration that was noticeable.

We haven't been able to schedule another load bank test yet due to a medical issue with our main tech at Cummins. Once he is back at work, we will schedule the test. Hopefully, this is the last change we will have to make to get to the full 150kilowatt load capability that we need.

Rocky Mountain Ramblings The Denver Report by Amanda Hopp, CBRE Chief Engineer, CBC - Denver

A/C Update

We finally have a working A/C unit at the KLTT transmitter site. The issue is still baffling for

sure, but contractor Wern Air came back out and got it fixed.

I happened to be at the site repairing a power module from the transmitter. After doing some more troubleshooting, the tech replaced the thermostat... again. This seems to have done the trick. I've never had a thermostat go bad, but that seems to be what happened, one bad thermostat and one lemon thermostat. I am happy to say

that we've had a working A/C unit for a few weeks now. And just in time for warm weather!

Our studio A/C unit and the evaporative cooler at KLZ are both acting up, so those will be my next repair items for Wern Air. At the studio, I am fairly certain it is the outside air thermostat that is the issue. We began having issues with it last year. It works after a power cycle of the unit, and it will work for days. Then one day it stops working and just blows hot air. We reset it and it works again. I am currently waiting for it to stop working again before I call Wern Air back out. They can't do much with a working unit after all.

The KLZ evaporative cooler gives an error message on the screen that says "service" along with a numeric code. Not very helpful. All the manual says is to call a professional. We can get it working ourselves with a power cycle, but it will stop again after a few days. Much like the studio, I am waiting for the issue to return before I give Wern Air a call to go fix it.

were no signs of a

assumption is that

got spooked or in a

process got tangled

up a bit and ripped

the old worn out

strap off. The torn

strap was still lying

there on the ground,

I went out

so it wasn't theft.

and attempted to

repair it on my own.

Truth is, I have not

fight and in the

was actually missing. Our

I am happy to report that the nice, new minisplit A/C system we installed at KLVZ last year is



still working. I am very impressed with the units, and I hope they continue working great, especially once the dead of summer hits.

KLTT Grounding Issue

My assistant, Dylan, went out to KLTT to do some mowing inside the tower bases last month. He ended up finding that one of the straps at the base of tower 2 was ripped off. There



had to do a repair like this in years, so trying to remember how not to destroy the strap was difficult. The other thing that was affecting things which I did not realize was that we were nearly out of acetylene. The next day I dragged my very busy dad out and he refreshed my memory and together, we were able to get it fixed.

KLVZ-FM (94.3) Move!!

We did it in two days. On Tuesday, May 21, my dad and I went straight to Home Depot to rent a trencher. The plan on Tuesday was to trench from tower 3 to the building, right at 200 feet.



My dad ran the trencher while Dylan and I dug.

Years ago, when we had to replace the ground system, we chose to asphalt over the screen and radials at the tower bases to prevent that infrastructure from disappearing again. We had the general contractor put in a PVC pipe that would get us from inside the asphalt area to the dirt. The problem is, the end of that 3-inch conduit was never marked. Looking down into the conduit, it quickly curved from vertical to horizontal in the direction of the building.

We ran a fish tape and got a length and used that sophisticated measurement to begin digging in hopes of finding the end of the pipe. Dylan and I dug and dug and dug and dug.... and I continued digging once Dylan gave up. At one point I was nearly chest deep in the hole and we could not find the end of the pipe.

At some point, after my dad had finished trenching, he asked me, was the building over here when we did the asphalt? I checked my pictures on Facebook and sure enough, the asphalt was installed in 2008 and the new building in 2009. When the asphalt was laid, the building was far to the south adjacent to tower 2. We decided that the conduit probably has another 90 in it that redirects it toward tower 2 and the location of the old building. With that decided, I stopped digging, we filled the hole most of the way back and went to "plan B" with the electrician.



Steve, the electrician and PVC conduit magician, feeds the 7/8" line into the building.

We had Dylan help us replace the security light at tower 1, which had fallen off a couple years ago. He was eager to do the work, and who am I to say no? My dad and I were there and monitored things, making sure he had everything he needed so he could be securely strapped to the tower. He was able to get it done with no issues and I'm happy to say it works!

The following day, my dad and I got to the site early and began by moving the equipment from the cabinet at the tower base into the building. We made sure we had enough power cables and network cables for everything. Oddly enough, we somehow misplaced one power cable. Thankfully we have plenty of spares.

The electrician showed up early and started his prep work while he waited on the delivery of all the 2-inch PVC conduit. My dad and I finished making the rack in the building nice, finishing up the AC power feed and affixing the ground strap to the

building ground.

Once the pipe was delivered the real work began. We unspooled all the 7/8" foam dielectric transmission line and worked to sleeve on several pieces of conduit. The electrician had a very nice PVC heater, so he could make nice 90s, offsets and sweeps for us.



The new underground run of 7/8" line connects directly to the isocoupler, eliminating a short piece of $\frac{1}{2}$ " "Superflex."

We got the upwards part done that goes from the ground up into our building. If you don't remember, the building is like 12 feet up in the air due to the flood plain. After that was secured to the building, we took the remaining PVC to the far end and began with the rest of the sleeving. This was tough to be sure, but we got it done... a lot easier than pulling that line through a finished conduit for sure. We actually finished this part shortly before lunch... well, my dad and I finished and went to lunch while the electrician stayed and finished the job. He got the PVC up part of the base of the tower and secured it so it was more protected to where it



The 7/8" line exits the 2-inch conduit at the base insulator.

connected to the antenna system.

While the days weren't long by way of hours, they were long physically. And to make things worse, as I write this, I am a day out from helping my dad at his mountain home in Grand Lake demo his old deck (he and my husband Jordon built a new deck the next day). I don't think I have done so much physical work in years. It's been fun, but I'll be glad for a break with some days at my desk.

Upcoming

Now that the FM project is done, I can really begin to focus on mowing. My plan at this point is to spend Mondays and maybe Tuesdays for the next several weeks at the various sites with the equipment and getting the growth cut back down. Hopefully before it blows up and gets out of control like it was last year.

That's about it for this edition. I pray you all stay safe and well!

KBRT • Costa Mesa - Los Angeles, CA 740 kHz/100.7 MHz, 50 kW-D/0.2 kW-N, DA-1 KNSN • San Diego, CA 1240 kHz/103.3 MHz, 550W-U KCBC • Manteca - San Francisco, CA 770 kHz/94.7 MHz, 50 kW-D/4.3 kW-N, DA-2 KLZ • Denver, CO 560 kHz/100.7 MHz, 5 kW-U, DA-1 KLDC • Denver, CO 1220 kHz, 1 kW-D/11 W-N, ND KLTT • Commerce City - Denver, CO 670 kHz/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2 KLVZ • Brighton-Denver, CO 810 kHz/94.3 MHz/95.3 MHz, 2.2 kW-D/430 W-N, DA-2 WDCX • Rochester, NY 990 kHz/107.1 MHz, 5 kW-D/2.5 kW-N, DA-2 WDCX-FM • Buffalo, NY 99.5 MHz, 110 kW/195m AAT WDCZ • Buffalo, NY 950 kHz/94.1 MHz, 5 kW-U, DA-1 WDJC-FM • Birmingham, AL 93.7 MHz, 100 kW/307m AAT

WCHB • Royal Oak - Detroit, MI 1340 kHz/96.7 MHz, 1 kW-U, DA-D WRDT • Monroe - Detroit, MI 560 kHz/107.1 MHz, 500 W-D/14 W-N, DA-D WMUZ-FM • Detroit, MI 103.5 MHz, 50 kW/150m AAT WMUZ • Taylor - Detroit, MI 1200 kHz, 50 kW-D/15 kW-N, DA-2 WPWX • Hammond - Chicago, IL 92.3 MHz, 50 kW/150m AAT WSRB • Lansing - Chicago, IL 106.3 MHz, 4.1 kW/120m AAT WYRB • Genoa - Rockford, IL 106.3 MHz, 3.8 kW/126m AAT WYCA • Crete - Chicago, IL 102.3 MHz, 1.05 kW/150m AAT WYDE • Birmingham, AL 1260 kHz/95.3 MHz, 5 kW-D/41W-N, ND WYDE-FM • Cordova-Birmingham, AL 92.5 MHz, 2.2 kW/167m AAT WXJC • Birmingham, AL 850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2 WXJC-FM • Cullman - Birmingham, AL 101.1 MHz, 100 kW/410m AAT



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