The Local III Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Not Just a Job

2011 was a very busy and pivotal year for our company, especially KBRT. Our lease on Catalina Island was about to run out and local governmental approval of our plans to construct four

towers, a transmitter building and numerous site improvements. Southern California is not a friendly place to build a tower site.

It was at the Orange County Planning Commission meeting that some wonderful things happened. I was very nervous going in. We had done all our homework, we had met with neighborhood groups and had addressed every environmental issue

we could think of. It would all come down to whether those commissioners would grant our application.

I had enlisted host Rich Buhler, since relocated to heaven, to help by getting a select group of KBRT supporters to attend the meeting. Certainly we could have packed the room and had a few hundred people standing outside had Rich put out the call, but I didn't think that would be wise. The commissioners might well see that as us trying to bully them into a vote in favor of our proposal and the whole thing could backfire. Instead, Rich brought in a select group of listeners, maybe 20 people total of which four or five signed up to speak in support of KBRT.

The last person to speak was a young woman in her early twenties. With a breaking voice, she stepped up to the podium, gave her name and address, and told the commissioners a story. The story was of a young woman who, two decades earlier, was driving herself, barely able to see the road and other traffic through tear-blurred eyes, to an abortion clinic to have an unexpected and unwanted pregnancy terminated.

As she drove, she tuned around on the radio

looking for something – anything – to take her mind off what she was doing. She stopped on a station with a man talking who sounded gentle and caring.

This host was talking on the phone with a woman who called herself "George" who was dealing with an unexpected and unwanted pregnancy. He told her that she was not without options. He told her about how God is the author

of life and how the Bible tells us that God sees the unformed unborn in the womb. He told her about the options that she had available to her and encouraged her to explore them.

The young woman driving to the abortion clinic heard that and stopped, tearfully considering that she, too, had options and that she was carrying a God-created person in her womb. She made the decision that minute to abandon her plans to terminate her pregnancy. She carried the baby to full term and gave birth to a healthy girl.

You've probably figured it out by now, that the man on the radio was *Talk from the Heart* host Rich Buhler and the young woman who found him on the radio in the car that day was the mother of the young woman speaking at our planning commission hearing. She told those commissioners that had it not been for KBRT and its ministry some 20-plus years



prior, she would not be alive. The commissioners were visibly moved.

The young woman took her seat and the chairman called for a vote. Our proposal was unanimously approved. We still had a long way to go before we could build anything, but we had cleared the first and biggest hurdle, a miracle if you ask me. But the bigger miracle was that young woman's story.

I was completely unprepared for that story. I had not heard it before, and it impacted me in ways beyond the others in that room. It confirmed something for me that I had long thought but only in an abstract way: my vocation as a broadcast engineer for Crawford Broadcasting Company is not just a job or a way to support my family. It is a *calling*.

After that hearing, I stopped to consider what that means. I considered that this was just one story of untold thousands of lives saved, souls saved and changed lives in which I had a hand. I thought about our great radio stations, their signals and their impact on people in their listening areas. I thought about how if we had not kept those stations maintained, kept the performance of their transmitters and antennas as the very best they could be, kept the audio processing crisp and loud, kept them on the air, a lot of people could have been negatively impacted in ways with eternal consequences. Each of you, our very capable, skilled and dedicated engineers have this same heavy responsibility, and that people can clearly hear our radio stations and their programing is, in large part, because of what you do on a daily basis.

It's not just a job. It's a calling, and with each of you, I stand blessed to have received that calling and have my life's work mean something much, much more than a career spent earning a living.

I would encourage anyone who is interested to listen to the entire account of the KBRT transmitter site move on *The Bottom Line*. The audio file can be accessed at:

https://crawfordmediagroup.net/Eng_Audio/ TBL_022813.MP3.

It's quite a story.

A Mystery

In last month's issue, I told you about an anomaly with the WDJC-FM main antenna, which was replaced a few months ago but until recently we have not been able to use it because of high reflected power. We and ERI used all the test equipment at our disposal and found nothing. The problem would only show up when we ran the system at power for a few minutes. The reflected power would slowly climb up to a few hundred watts from a starting value in the mid-teens.

We sent our FLIR camera to Todd Dixon in Birmingham, and he ran the system for a few minutes until the reflected power came up, then he flew the FLIR camera up the tower on our drone. He did this in the very early morning on a couple of days so that solar heating would not be a factor. The result: nothing. We saw nothing that was not explainable by the type of material, the color/finish or the lack of differential with adjacent items.

It was after those disappointing results came in that I told Todd to just turn it on and run it, thinking that if something were heating up, sooner or later it would manifest itself and we could identify and deal with it. So that's exactly what he did, and that's when we got a surprise... after a few minutes of operating with elevated reflected power (around 400 watts with 27 kW forward power), the reflected power started coming back down. It would bottom out at around 40 watts, then climb back to the 90-100 watt range and stabilize.

Discussing this with Gary and Cindy Cavell, the consensus was that there could well be some trapped water in the transmission line that would get boiled to a vapor after a few minutes of high-level RF excitation was applied.

The behavior we observed tracked with that and so we ran the system for a couple of weeks at full power with no issues other than that bit of reflected power. On the first day we could get a tower crew when it wasn't raining, we shot three 230 c.f. tanks of nitrogen through the line, hoping it would pick up the moisture, but it didn't make any difference. Not enough volume and flow to pick up what is likely liquid water hiding on top of a Teflon disk inside the line or antenna.

So what do we do? One thing I plan to do is on a hot day (plenty of those to choose from in Alabama in the summer), use a refrigeration vacuum pump to pull that system all the way down to -30 Hg. Hopefully that will get at least some of the moisture out.

Otherwise, we're just going to run it. At full power. The signal is fine and there is nothing indicating a problem other than that low-highmoderate reflected power cycle that happens at power up and the steady 100 watts of reflected power after the initial bounce.

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

Hello to all from Western New York! Equipment woes continue at the WDCX-FM transmitter site. Last month our generator began have been in place nearly 80 years. That's a lot of paint and corrosion over the years, I'm hoping that I can get everything busted loose and removed without

a lot of problems.

pumping oil out of the exhaust port. Our generator technician was called out to troubleshoot the problem and found that the piston in cylinder 1 had failed. After investigating replacement parts, Mike found that there are no parts available to repair the Perkins diesel engine, therefore replacement is our only option.

Generators, much like commercial A/C units,

are not readily available, and in some instances, lead time is a full year. We have solicited several different quotes, and are awaiting the final results of our inquiries. Once we have received all the quotes, we can then make a decision on the best unit to purchase.

In the meantime, we are looking into a longterm rental on a 100 kW generator to protect us in case of commercial power outages. The transmitter site is located about 25 miles south of Buffalo, and has a poor track record of dependability, so the rental is good insurance if (and when) power goes out. More on this saga next month.

At the WDCZ transmitter site, as reported last month, we are revamping our tower lighting for towers 1, 2 and 3. In order to get full-time power to tower #2 to power our Cambium PTP820S and Ubiquiti PowerBeam radios, we must send full-time 120VAC to the towers. In order to do this, I have built three tower light controllers to replace the existing flashers on each tower, and by the time this goes to press, they should be installed and working. In theory, this should be an easy install, but I realize that I will be removing rigid conduits/wiring that



Additionally, we are still awaiting the tower #5 base insulator replacement that busted over the winter months. Austin Insulators in Mississauga, Ontario has manufactured and shipped a replacement insulator, which arrived the first week of June. Cris has secured the services of a tower crew out of California to assist in replacing the insulator, which is scheduled

for July 26-27th. I'll make sure to take lots of photos to share on this replacement. I have been keeping a close eye on the busted insulator, checking it several

times a week. During a recent windstorm, more of the insulator has broke loose, so we are keeping our fingers, toes and eyes crossed that it holds out until the end of July.

That about wraps up another month here in the great northeast,

and until we



WDCZ Tower Light Control Box

meet again here in the pages of *The Local Oscillator*, stay safe, and happy engineering!

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

As we head into summer, I'm happy as a clam in mud. I live in Michigan where skies are often

gray and warm weather is limited. I'm fortunate to have an old convertible, and driving it with the top down always reminds me to be grateful for not only the warm sunny day, but for family, friends, love, and health.

I'm also grateful for an opportunity to work in a field (sometimes in an actual field!) that always engages me and feeds my hunger for new experiences and knowledge. I hope my readers all feel the same way; a career in



more of water directly to the new Kubota tractor's fuel tank. Grrr...

Fortunately, no permanent damage was done – draining the tractor's tank, replacing its water separator and fuel filter and refilling it with known good fuel was all that was needed to restore it to operation. I subsequently used a hand pump to remove the remaining water from the bottom of the drum, so the fuel was salvaged. I'm happy we'll now be able to store our fuel inside. Read on.

Transmitter Site Storage Building Sometimes the varied

experiences and responsibilities of a broadcast
engineer find him or her working in an actual field.
Our 50 kW 10-tower site in Michigan's Huron
Township sits on 54 acres, which requires
maintenance if only to keep the land from reforesting
and consuming the towers, ATUs, guy wires, and
transmitter building. We also have 50 acres in
Monroe Township, most of which is farmed for hay,

but we still need to mow some areas.

It would be impossible to keep up with the vegetation without our Kubota LX3310 and an old but well-maintained John Deere 4100. Unfortunately, we had only a small side room in the transmitter building to store this equipment, so much of it spent the winter outside, which is tough on it. This year, we decided to build a steel storage building to provide shelter and security for the outdoor maintenance equipment.

The project took quite a long time to get approval from the tiny township building department, but once we had a green light, I wasted no time contracting the installation of a concrete foundation and flatwork. Given just enough time to cure, a steel building was then constructed. Three people arrived on site with the entirety of three buildings on 1 trailer. Sheet steel, tube steel, rollup doors, roof trusses, roof and wall panels – the lot! It took them two days to build, one of which was probably the rainiest day in memory. They were wetter than a school of fish by the end of the day!

The building is complete apart from an electrical service, which will be handled by Steve and

broadcasting engineering is truly a privilege.

Fuel Grief

It all started last fall when I was filling one of those new five-gallon "smart" jugs with diesel. These new safety jugs are no doubt created by the same prophetic visionary who gave us "New Coke" and automatic paper towel dispensers. They all leak profusely, especially when you dispense their contents into your mower and onto your shoe. That same genius removed the 5-cent plastic vent so air can neither escape nor enter the jug creating a pressure vessel that will neither accept nor deliver its contents without constant burping.

A diesel pump's nozzle is a bit larger than one for gasoline (that keeps dodos from putting diesel in their Kias). This larger nozzle fills the jug's opening when filling, and with no vent, the jug eventually spits diesel fuel in your eye. Yes, and it was terrible, trust me!

With that horrific experience still fresh in my eye, I decided I'd order a 55-gallon drum of fuel from our fuel supplier, which they happily delivered. I also ordered a pump and a filter along with a few fittings, and then along came winter. Spring finally arrived, and we assembled the pump and hose to the handle and marveled at a new age of fueling – no more shuttling stinky, messy diesel fuel in those awkward, balky, not too "smart cans."

Well, as I like to say, the best laid plans... Over the winter, the drum's bungs allowed entry of some rainwater, resulting in my delivering a quart or

me in the very near future. We plan to install a few outlets and some interior and exterior lighting as well as a POE network switch and POE IP security cameras. We will install a couple of shelves, relocate all our outdoor related bits and pieces, and maybe even add a workbench to complete the structure. Of course, the drum of diesel has a new, dry home, too.



The new equipment storage building at the WMUZ(AM) site.

Studio Generator Project

Regular readers may recall reading about our studio building's emergency generator failure and subsequent replacement. Our new 150 kW Generac natural gas generator has been placed, wired, and connected to the natural gas utility. In anticipation of the additional fuel need, we had a plumbing contractor investigate the underground piping from the utility meter to the new generator.

Unfortunately, testing showed that we have a natural gas feed that is too small for the fueling needs of the big Generac. Static fuel pressure should be no less than 7 inches water column, which is only about 0.25 PSI. The generator also requires that the pressure drops no more than 2 inches from idle to full load, a test which failed when only a 50% load saw gas pressure drop to just 3.6 inches. We are presently working with our natural gas utility to upgrade our service while keeping our rented diesel generator.

Wheatstone Updates

In preparation for the new Telos VXs broadcast telephone system, we have a few tasks to do. While Wheatnet is AES67 capable, it does require a PTP4 license key and a few other clicks to make it work with the Telos VXs. We had to request the license and designate a blade to support it. Whichever Blade 3 is chosen will no longer be able to provide the two onboard virtual utility mixers, so we found one where we weren't using the UMX and selected the mode for AES67 1mS support.

Once that was done, we added a couple of AES67 sources and three destinations to the blade for the phone system's hybrids and program over hold. We also added in a new Sonifex grand master clock to keep everything synchronized.

Telos VSx functions by using a Docker server as its host hardware – no rack mounted (or otherwise) dedicated hardware is used. Our Dell 1RU server is on its way to Detroit as I write this, having been configured with Docker software, which allows the Telos VXs code to live and breathe in a containerized environment provided by Docker running on Ubuntu.

Once it's installed it will give us the flexibility to add lines via SIP and hybrids as our needs grow. It's a far cry from the Western Electric speakerphones we used to jeep for studio use. I'll write more about this next month.

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

Red Mountain Update

I'm sure sometime in the future I'll look back on this time with the WDJC-FM main antenna

via the *Local Oscillator* archives online and do the equivalent of a Netflix binge on all of the details of this ordeal, but when you're living it out in real time, it literally seems like it is never going to end.

I mentioned last month that Cris was sending me a FLIR camera module that you plug into the iPhone's lightning connection. The plan was to use our DJI Phantom 4 Pro Plus company drone and attach the phone and module to the landing gear. Then, we would feed the antenna line with enough power to

the line to create some heat in the presumed bad spot and send the drone up while filming with the IR camera to see where that spot was in the antenna or feed line.



This connection was one area we were concerned about, but the FLIR imaging showed it to be the same temperature as other items in the vicinity with the same material and finish.

After Cris had talked with Gary and Cindy Cavell (that have high end drone systems that do this very thing), it was determined that the best time to do something like this was in the early morning or late evening before the sun had heated up the components or after they had cooled down. We both thought it was best to do a morning flight. We have several tenants on that tower, and the last thing I wanted to do was a night flight with the our drone and my phone at 700 feet.

So armed with a roll of electrical tape, the drone and my phone with the FLIR module, I got to the site at 5:00 a.m. on Wednesday, June 5th. Without spreading the details out too much, the first morning was a bust, the IR camera froze about 100 feet up so nothing was determined that day.

Thursday the sixth, I got 15 minutes of really good footage and had a couple spots to really investigate. Cris encouraged me to try one more time on Friday with a real focus on the apparent hot spots we had seen. Friday's flight resulted in another frozen video about

halfway up the tower.

The problem, of course, was that I didn't know the video had frozen either day because it was on my phone, which was electrical tape strapped to the drone 350 feet in the air. Also, as a side note for anyone that attempts this in the future, my phone with the IR module was strapped below the landing gear of the drone, so a hand launch was required. As you might surmise, it was effectively a wind foil as well for the down force of the quadcopter's propellers.

Needless to say, I was pretty dismayed about my one out of three success ratio.

Curiously, one thing that I had noticed was that each day it took slightly more power from the transmitter to reach the same level of reflected power as the day before. We had routinely been seeing 700 watts reflected at about 15,000 watts forward. Yet, on that Friday, I was at 22 kW and only registering 380 watts of reflected power.

So in my despair after the failed flight, I decided to do a full send at our TPO of 27 kW. The reflected power held at 380 watts and then curiously started to go down. Over the course of the next hour, the reflected power bottomed at 28 watts and then stabilized at about 100 watts. I dropped an SNMP alert on the GV 40 in PRTG for 250 watts and we let it run at full power.

Since then, we had a tower crew come and we ran 750 cubic feet of nitrogen through the line and



antenna while they opened the top. We suspected water in the line, but that effort did not lower the reflected power, and it remains at or around 110 watts. I'm lining up a refrigeration vacuum pump, and we're going to see if we can drop the pressure enough to boil and evacuate the water out of the system. After that, we're running out of things to try.

If you're reading this, maybe do an archive binge on the situation and if you can think of anything we haven't tried, I'd love to know about how you solved your issue.

USB Swiss Army Knife

In late May, I came across a USB multitool called Medicat USB. I could probably do an article in the *Local Oscillator* for the next year about all of its features and the tools that it has on it. It's a pretty large file (21 GB) and I put it on a 64 GB USB 3.0 stick. Not only does it have things like Windows 8 and Windows 10 recovery solutions, but it also has programs that diagnose computer memory, hard drive (both spinning and SSD) and hardware issues. It provides at least eight backup and restore fixes as well as various disk partitioning aids and hacks.

Included in the offering is a "mini" live Windows 10 environment with a load of portable apps that contain things like AV software, zip software and even one distraction 3D pinball... It is a "live" system, which means it boots from itself and doesn't need to be installed onto your machine, but once it is booted with whatever option you asked it to load, it can run the operation on hardware, disks or be an operating system without your hard disk's help.

The tool is based off of Ventoy. Ventoy is a live USB environment that you can add ISO disk images to which allows you to boot multiple operating systems when you boot your computer. So not only could I have Windows ISO images on it, I can have various flavors of Linux on it as well and it gives me opportunity at boot time to choose whichever OS I would prefer to load.

The only problem I've run into is that occasionally I have to choose to use a lower screen resolution for a particular tool, but it gives you the ability to change it via a function key at boot time.

I've already used it several times in the month that I've had it. It is free software and may be useful to you as well, so if you're a Crawford engineer and would like a copy, I'll gladly send you one. Otherwise, you can download the installer at https://medicatusb.com/installer/.

We'll visit again next month, and until then, may your work of your hands and minds be blessed.

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

All y'all should know that, while working inside because of the constant storms here (Figure 1), I was invited to join the Illuminati. Seriously. I

received a spam email a few days ago with the offer. But given that I'm already busy enough, and that I believe that God should be in charge and not me, they'll just have to make do without my balding presence.

I must confess, though, that at times I've dreamt about what I might do if I was Supreme Dictator or something like that. I would not force people to believe as I do. True Christianity is a personal relationship with God through Jesus Christ and is

a matter of faith, not force. (I'd love to build a time machine so that I could go back and explain this to the Crusaders; if you hold a sword on someone and



ask if they believe in Jesus, they're likely to say, "yes!" ... but has their heart changed?)

Dictator Stephen would be sorely tempted to Dictate some things, if I had the power. For example, I'd ban speed bumps in parking lots. They don't work; they just rattle your teeth even if you're driving slowly. I would also outlaw those ridiculous plastic clam shells that everything is packaged in nowadays ... you know, the ones that require a razor knife (or better yet, a CO2 laser) (or dynamite) to open. Poof; gone.

> But there are other things. Some people have no sense of smell.

I'm not talking about the sweet lady who bathes in perfume before she arrives, reeking, at your church on Sunday; I'm thinking of manufacturers who put in so much scent nowadays that my sinuses bind. As I

type this, I'm washing some clothes and my entire house smells like a half-rotten blueberry. And c'mon: trashbags? Really? I'm going to pour foul-smelling junk in them. There is nothing so outstanding as a box of gamey old Chinese take-out or fried fish in a bag that reeks of Febreze.

Ah, we can dream, I s'pose. But now for important stuff.

Security, Security ...

I know that I natter about security all the time. But the CISOs (Chief Information Security Officers) at the major corporations are really worried about this nowadays. You may have noticed that most websites that deal with money now require twofactor authentication (that's "2FA," if you're kewl), or at least want you to re-enter your password anytime you want to do anything.

Government offices and healthcare have become the most common victims now. The Bad Guys don't just encrypt your hard drive anymore; they'll also drain your data and then use blackmail to ensure payment. "Send us a zillion dollars or we'll release your ultra-sensitive information."

A couple of months ago, the Jefferson County Board of Education here in Birmingham was taken down by ransomware. Their systems were offline for several days. I don't know how they fixed it, but it was all over the news here. All it takes is one employee clicking a link in an email (especially ones from the Illuminati) to potentially expose every system on your network to Bad Stuff.

A vulnerability in the MOVEit file transfer software, which is apparently used by large corporations (I'd never heard of it before now), is being blamed for a bunch of hacks and data grabs. Victims include the University of Rochester, the government of Nova Scotia and many others. Our own federal government has been hit. Hacker groups that rejoice in names like "Cl0p" (a personal favorite, that one) have used MOVEit to directly break into the databases of these institutions. The vulnerabilities have been fixed, but there are still unpatched instances exposed to the web. Do your patches, people!

Siemens Energy has admitted that they were hit by "Cl0p" and immediately said, "Thud." One of Siemens' biggest new markets is providing cybersecurity services to energy providers. Oops. But these "Cl0p" clowns also hit the BBC and the payroll service company Zellis, among many others, so I guess we shouldn't point fingers.





Watch Them Devices!

You may have locked down your facilities. You have a good, content-analyzing firewall on your Internet access. You keep everything from hairdryers to file servers patched with the latest software. All outside access is by secure, encrypted VPN. But in walks an employee with a Widget that he/she wants to connect to your network. Doesn't say anything to you. If you're lucky, you might spot this weird blinky-thing in a studio and wonder, "How'd that get there?" If you're not lucky, well ... there you go.

Don't forget physical security. Ensure that your coworkers log out of a workstation when they're done. Really critical servers should be behind a locked (or at least lockable) door. Don't let folks connect anything that you haven't vetted. Use good, complex passwords on wireless access, if you have it. Place and configure that wireless access point so that it doesn't spray a signal all over the parking lot.

And – drum roll, please! – this is why every workstation in your facility should have its firewall turned on, and why Cris Alexander mandated that ESET antivirus must be installed and running. What if a guest with a laptop full of crud comes in and hops on your wireless network? [Guest access wireless should be on the <u>outside</u> of the firewall – guests should never be given access to wireless or other networks behind the firewall! – Ed.]

Two Factor Authentication

I haven't been idle on this. Lord willing, by the time you read this, we will have this in place on

some of our systems. The problem I've run into is that everyone wants you to pay for a service, and the emphasis is on texting to smartphones. All we really need is a simple, "Send an email with a one-time passcode." I've been testing that, but it was hard to find code examples for comparison. Most of the articles that I found in multiple Google searches were essentially advertisements for one service or another (including, naturally, Google themselves).

I have also been working on extending our "fail2ban" protection to every server or service that I can get my fingers on. This, of course, is in addition to patching all of our servers as soon as critical updates are announced.

The Human Factor

A couple of years ago during the COVID thing, I walked into a convenience store near my home after running to a couple of transmitter sites. There was a girl sitting on the floor being thoroughly baffled by one of those handheld price-sticker-printer things, while another (equally baffled) girl was behind the register. Register Girl hollered, "Hey, what's the passcode for the register?"

Floor girl yelled back, "It's 1-2-3-4-5-6."

You can't make this stuff up. But all we can do is all we can do. We can tell people not to click a link in email (again, not even from the Illuminati) and hope they listen. These phishing attacks are amazingly real-looking now, too. I have a site on DreamHost, and I received an email that looked exactly like one of their newsletters. It said that my website had outdated software and that I needed to click a link to upgrade. I mentioned last time that Thunderbird will show me the actual links in email – where they actually go. This one went nowhere near DreamHost. I deleted the email and continued the mission.

The obvious answer here is backups, routinely and regularly done, and checked. There are few things more heart-stopping than needing a backup, only to discover that it's stale or busted. Ask me how I know.

Radio!

I sounded obsessive above, which is unfortunate. No, it's not possible to protect against every known threat; again, you just do all that you can. And from time to time, you should take a break! I visited my brother and two sisters on the Emerald Coast of NC in early June, a much-needed respite from worrying about Cl0p-clods and stuff like that. And yes, I still consider myself a Radio Guy at heart.



Figure 2 - The HD display in my rental car, driving in NC.

My rental car was a Toyota RAV4 from Enterprise. To my delight, I discovered that it had HD radio! To my disappointment, the radio itself didn't sound very good at all – honky midrange and distortion. But I did enjoy the full-color display with graphics (Figure 2). Of course, the left half invited (begged) me to subscribe to various satellite services, but ... no.

As for the state of radio in my home state, it was a very pleasant surprise to find so many HD signals. Curtis Media Group, a company that I worked for many decades ago, had HD with multicast on every one of their FMs that I tried. The displays were well done, too. Good job, Don Curtis. Capital Broadcasting (WRAL TV and FM) was in HD with multicasts, as were (of course) the iHeart stations. Cumulus wasn't so well-represented, but there were a couple in digital.

The AM reception in the RAV4 was pathetic. Unless you were sitting at the tower in question, you couldn't hear it. Even when you could, it was badly distorted and noisy. I had to give up on the AM not long after driving off the rental lot. There's a deeper thought behind our current efforts to keep AM in cars: it'd be nice if we could make the auto manufacturers realize that AM is still relevant; it'd be even better if we could convince them to spend more than 25 cents on that portion of the receiver!

I know, I want too much. But that's it for this time; until next month, keep praying for this nation.

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

We have been very busy the past few weeks as we are gearing up for and in the middle of several projects, along with the usual popup issues. The

main action is taking place at our Burnham transmitter site where, due to supply chain issues, we have two major changes taking place.

The new generator installation should have been completed in 2022. However, due to supply chain issues it was not even delivered until a few weeks ago. The contractor has begun some initial work on the installation but will not begin in earnest until after the 4th of July holiday.

The other project at the site is the installation of a new Nautel GV30 transmitter, which is set to be delivered at the time of this publication.

There has been much to do in preparation for the transmitter delivery. A big one was the removal of the previous BE FM30T auxiliary transmitter. It was a beast, and it was not fun getting it out of the tight building. But we do have it out now.

Another was the move to put the Nautel NV40 transmitter from main antenna to the aux antenna port on the coaxial patch bay. This took a little longer than I thought it would, but I wanted to get it moved over during the time period between removal of the BE and the new incoming Nautel transmitter. This made it a little easier, as we didn't have to work on the stretch of rigid line with another transmitter in the way as the NV40 is set in place at the front of the building with the coax patch toward the back.

So, we are quite excited about installing the new transmitter. Not looking forward to physically moving it from the truck to inside the building, but ready to dig in and get it done.

While all this has been going on, we have been experiencing some challenges with our HD operations at the WSRB transmitter site. A few weeks ago, we had issues with the HD Multi-Cast Importer/Exporter on our main transmitter, which is a Nautel GV5. We went to reboot it and lost it all



together. The motherboard needed to be replaced. Unfortunately, we were told that we could no longer replace that in the field because there are issues with

Windows licensing. So we had to send it back to the factory for repair.

In the meantime, we moved the HD Multi-Cast Importer/Exporter from the backup transmitter to the main. This was really important because we had a very large sponsor that included the sponsorship of the HD graphics on two of our stations, and WSRB is one of them.

So it seems that we were in good shape as the HD signal was on the air and the sponsorship graphic was working as well. However, a few days later, we noted that the HD diversity delay was off and not aligned

with the HD audio. Thinking it was just something that we forgot to set when we moved the HD Multi-Cast Importer/Exporter to the main transmitter, we set the delay. But we again noted within a few hours that the delay was once again off.

After resetting it several times, I looked at the settings, especially anything to do with the GPS operations. The GPS monitor software on the HD Multi-Cast Importer/Exporter showed the GPS was working. In fact, it was picking up 12 satellites and the information was accurate. All the rest of the settings in the HD Multi-Cast Importer/Exporter and Exgine within the exciter were correct. But we kept on drifting.

We got Nautel support involved, and they did the same thing I did. Check the GPS and all the settings. They came to the same conclusion; the settings are good and they couldn't find any reason for the drifting diversity delay. My guess is that the HD Multi-Cast Importer/Exporter probably needs to be sent for repair as well.

I guess I could turn off the HD until we got the original HD Multi-Cast Importer/Exporter back from repair, but with the critical sponsorship at stake, I'm just trying to maintain the diversity delay within reason. Having to adjust this several times a day is the best answer for now.

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

Can I say that it's been a busy month? Because it has been. Mowing took up much of my time. Tower lights at KLZ and KLTT became an

issue for me, and while investigating one issue at KLTT, I found yet another one to deal with. Rain became a hot topic around town as it rained and rained and rained and...well, you get the point. And the Denver metro area had a tornado!!! Flooding became an issue in places. It was a whirlwind month (pun intended), that's for sure.

Severe Weather

Spring 2023 has been very wet here. At times, my home weather station measured over an inch of rain in a short period of time. Places that are usually brown are super green. We had a bunch of severe weather days.

I remember one night around 10 PM, I began hearing a noise on our windows. It began increasing and soon we had a 20-minute hailstorm. I am grateful it never really got bigger than pea-size, but man, it was loud! We had a number of days like this.

Most of the weather would come sometime between 1:30-5:00 PM. That meant I was either in my 12th-floor office watching things happen out the window or at home watching it happen. I kept a close eye on things at the transmitter sites, and they all rode through these storms, thank God.

I have been very impressed with the new KLDC location. At the old site, any time it stormed (or the skies got gray), the station would get taken off air by static discharges across the ball gap. I'd try to put it on the backup transmitter, and it would be a battle to keep things running at a reasonable power. At this new site, there have been absolutely no hiccups. Each storm came and went and the station stayed at full power with no loss of link or on-air signal.

Remember that tornado I mentioned? Yeah, that was crazy. The last time a tornado hit the metro

area was back in 2015. The one from Thursday, June 22 of this year was crazy.

On my way home, driving east, I could see

things were getting dark to the north and to the south of us. The weather people had been saying it'd get bumpy, and it did. My phone began blowing up with all the Sage ENDEC e-mails. Four stations, four emails per station per warning, plus additional sent emails if our system forwarded an alert. National Weather Service kept putting out flash flood warnings, tornado warnings, severe thunderstorm

warnings and many other watches to go along with those warnings.

I have over the air TV and was flipping between two of our local channels as well as watching radar on my phone. The storms intensified quickly. Before too long radar was indicating a tornado. The meteorologist was having a hard time confirming it, as it quickly became rain-wrapped and the radar couldn't distinguish the tornado from the rain.

The people on the ground did their work and found that there was indeed a tornado that had gone through an area in Highlands Ranch in the south metro area. Once the storm subsided, they were able to show the damage.

Thankfully, no lives were lost, and I don't think any injuries either. They say it was an EF-1 tornado. Many downed trees with minimal damage to homes. Remember, we don't live in the south and the air is thin. Because of that, tornadoes rarely get big. I think the last major EF-5 tornado we had was the one that hit Windsor, Colorado back in 2008.

Tower Lights

At the end of May, the KLZ west tower lights went out. I believe it was sometime after a storm. To be honest, I've slept since then and don't remember the exact circumstances. But a tower light outage is never good. We went out on the first of

June, replaced a fuse and got the lights working. I should say, my dad did. I'm not all that familiar with how that system is set up, and it's hard for him to teach me from the ground. It's also hard to get two people on the tower to work on it. So, he went up a ladder and worked in the box while I went into our field to see if the lights were working (you have to get some distance from the tower to see the LED strobes). The lights were still flashing properly and switching from white to red at the appropriate times.

The lights were working, but the alarm monitoring was not – we use a fiber-optic transmitter/receiver to couple the alarm logic off the hot AM towers, and the 48-to-5-volt DC-DC step down converter to power the fiber-optic transmitter. I looked online and found some on Amazon! They had a five-pack for \$10.95. I ordered it and we were able to easily get the tower lights back operational with tower light monitoring.

The other tower light issue we had was sometime after most of the severe storms were done. I began noticing by remote control that the lights on tower 2 at KLTT were coming and going. It'd be well dark, and I'd get an alarm. I'd look at the security cameras and the lights would be on. Then at some point in the night I'd get another alarm, typically two or three. The alarms are set to re-arm so when the lights do come on the alarm clears. Then if the issue comes back, it notifies me.

I went ahead and did a NOTAM until I could figure this out. This was all right when I was in the middle of mowing two of our sites, so I didn't have a ton of time to drive to the site to investigate, at least not after mowing for 9-12 hours in a day. Once that was done, I did my quarterly tower light checks and made it a point to drive to tower 2. I figured it'd be a photocell issue. I found the photocell nearly destroyed, most likely by hail.

Now, here is the part for all of you to pay attention to. We all do dumb things, try to cut some corners. To get to tower 2, I must go back out to the main road, cross a canal, open a gate, close a gate (don't want those horses to make a run for it) and then drive to the tower which is the one farthest from the road.

My husband was with me, he was handing me stuff that I needed while trying to work on the photocell. The cover of the photocell was all but gone and that left it exposed. When I saw that, I told Jordon I should go turn the breaker off. Did I listen to myself? Not at all.

To make matters worse, that photocell, which plugs into a three-prong twist-lock socket, would not budge. Somewhere along the line, as I was using my channel locks to try and get a good grip on the thing, I ended up shorting it, which produced sparks and a nasty noise.



The KLTT tower 2 lighting control box after I fried it. The hot and neutral wires to the photocell made dandy fuses. Unfortunately, they melted adjacent wiring.

My husband informed me that smoke was coming from the light controller box. I moved over there and opened it up and watched all that smoke escape. I could see that I fried a bunch of wiring. To say I felt dumb was an understatement. I went ahead and drove back to the transmitter building, turned the breaker off and returned to the tower. It took me all of five minutes. I was able to get a better grip of the photocell and removed it. I then taped the socket up good to keep water from getting into it.

I called my dad, showed him pictures, Facetimed him some live video and he explained what I could do to disconnect power from the Austin transformer to make things safe.

I should mention that the tower breakers are paired: east towers and west towers. This was an east tower. When shutting this breaker off, it also takes our microwave link down, which is on the other east tower. This is why I needed to find a way to bypass the Austin transformer of the tower I was working on. I needed to be able to safely turn the breaker back on without destroying it or anything else. It was rather simple, just pull two wires and cap them off with wire nuts.

The next morning, my dad and I went out to the site. I cleaned up the inside of the box as best as I could. Then he went up and figured out what needed to be done. He went ahead and fixed the issue while I hung up some new RF safety signs at the tower base. Once he finished, I turned the breaker back on and we confirmed the tower lights to be working.



The lighting control box after repairs. All good now!

Dehydrator and Other Problems

Before we could work on the tower lights, though, we began having some issues with KLTT audio being lost. I noticed a few times in the night an audio loss alarm. It was always for a short time. Once I was awake, I began listening and did not hear the issue until we were about ten minutes from the site. We had just taken our exit.

As I wait at a red light, I tend to go ahead and get on the security system app to disarm the site. As I did that, I noticed an email with that same audio loss alarm. I immediately tuned to the station and my dad began looking into it while I was driving. The Gateway-8 at the studio and the Bridge-IT Xtra at the site both showed connected and audio. The difference was that the site showed a red circle which we aren't sure why. He disconnected and then reconnected the site and that brought up the main audio.

Once we were at the site, we found our internet backup was down. Remember, to do this work I have to shut off AC power to the east towers, which means the main audio will not work. I was having some trouble gaining access to our router, but once I did, I could see the internet was indeed down. A reboot of the wireless internet radio proved useless. I ended up rebooting the router, and once it came back up, so did the internet and our backup audio feed. This allowed me to switch to that audio and take the main link down. We still aren't quite sure what was going on, but you know what they say, when it rains it pours.

While working on getting the internet back up I had mentioned to my dad how the rackmount automatic dehydrator had leaked its desiccant again. We worked on this unit a few months ago, replacing the desiccant.

The unit had been in alarm, but when I saw it the night before it said high humidity. I didn't think much of it as it had been humid. While we were having to stand there and wait for equipment to come back up, my dad noticed another alarm: low pressure. Normally I do check the pressure on the back wall at the site each time I'm out at the site, but the night before, for some reason, I did not. I really don't know why; my mind was clearly elsewhere. But on this day, we saw the pressure was indeed about half of what it normally is. The dehydrator, while running, was not heating anything.

We pulled it and bagged it (to contain the mess of desiccant). I knew we had a spare unit at KLZ. We had to make a stop at Lowe's to get parts to adapt the line to it, but once it was in place, it worked great! We will discuss with Kintronic Labs if repair of the other unit is even worth it/possible. Until then, we at least have an old unit working again.

Mowing

I was able to get to KLVZ and KLTT to mow. My husband is a great man and helps me when I ask. After spending our weekend at our mountain home near Grand Lake, we went home, unloaded our stuff, and then went right back out. He helped me to move the tractor from KLZ to KLTT so I could mow a path to the towers as we were having Security Central out the next day to upgrade our system and they would need a clear path to the towers.

We also mowed inside the tower bases. Thankfully, the tractor fits and the base area is big enough that I could easily maneuver and get things cut (50 kW sites have big tower base fences!).

From there, we took the tractor to KLVZ. My plan was to spend Monday at the site mowing. I wanted to focus on this site first because the county tends to send us love letters about the Canada thistle if we don't get rid of it before it goes to seed, something about the river, water, seeds, and farmland.



My Dad and I flew over the KLVZ tower site before I finished mowing it. It's easy to see the tall thistle around the tower on the right and extending into the corner of the property. All mowed down now!

I spent the better part of the day mowing, and after he got off work, my husband came out to take over. He absolutely loves to mow. He doesn't get to do it as often anymore because he no longer works for a construction company.

By the end of that day, I had spent 13 hours at the site. I needed a little more time on Tuesday, so after doing some work at the office that day, I went out and by lunchtime, I had mostly finished. My dad met me at the site with the truck and trailer and we loaded the tractor and brush hog and took them over to KLTT.

Wednesday was an office day because I was hosting our Society of Broadcast Engineers chapter meeting. Afterwards, I went to KLTT and found the tractor battery dead. And where I had parked it inside the base fence at tower 3, I couldn't even get jumper cables to it. My husband once again, came to the site after work (it's right on his way home too!) and used his jumper pack to get the tractor started. He then took on the mowing.

We didn't have much to do. The grass the

horses will eat. We just had a big patch of thistle between tower 3 (directly behind the building) and the building. While he mowed, I went in search of a new tractor battery, as the one that failed was original to the tractor (2014). We installed it, and then I took the old one back to get my \$5 core refund.

Jordon was able to finish up at the site in a few hours. Him mowing not only allowed me to get a new battery for the tractor but also gave me some time inside the building to do maintenance and cleanup. Moth season was not that long ago and between that and just not having a ton of time, the site was looking run down. I was able to really clean it up good and make it look great.

While all this mowing was going on, we had to put the company truck in the shop. We had noticed when moving the tractor that the check engine light was on. It was running rough, short on power and was just uncomfortable to drive in. The shop had a hard time tracking down the issue, but we now have new coil packs, spark plugs and had the fuel system cleaned. The thing probably runs better now than it ever has.

Coming Up

I still have some mowing to do. However, I will wait for growing season to die down a bit more in hopes of keeping myself from having to do it more than once. I need to hook up our new spray rig and apply herbicide to the thistle at the KLDC site. We'll pull it with our truck and have a water tank in the back to refill the sprayer as needed.

I'll also be helping some of our other engineers remotely with some projects they have going on, which is always fun. I also plan on spending some time at the transmitter sites giving them some TLC. This may mean mowing, but mostly it will mean cleaning inside and getting it looking great again.

That about covers it for me. There's still so much more I can write about, but I don't want to bore you with all the details of my adventures. 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/100.3 MHz, 5 kW-U, DA-1 KLDC • Brighton - Denver, CO 1220 kHz, 660 W-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 • 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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