The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Main Studio

True to his word, Chairman Pai, with the help of his fellow Republican commissioners, voted to repeal the main studio rule at the October 24 meeting. This is an effort that we had strongly supported, filing comments in response to the NPRM several months ago and finding those comments referenced several times in the draft Report & Order.

What this means for us is a relaxation in some of our infrastructure requirements. For example, we have had a real challenge keeping our Rockford studio connected to the WYRB transmitter site in Illinois. We use Worldcast Horizon codecs for this, and it has been difficult keeping the codecs running and connected. Some of this has to do with the codecs – they are first-generation Horizons, and some of it is IP related (we have to use wireless internet at the transmitter site because there are no other options). Believe it or not, it will be easier to connect the Rockford studio to our main cluster studio over in suburban Chicago and then back out to the WYRB transmitter site over the T1, a 160+ mile path, than it is to send it directly from Rockford a few miles south to the site. This will also make EAS management easier.

We can also operate KNSN in San Diego out of our Costa Mesa studio. This primarily affects the EAS setup – we will no longer need two ENDEC units (one at the studio and one at the transmitter site), but even that will reduce the workload of our people and the opportunities for things to go wrong. We can relocate the studio codec from El Cajon to Costa Mesa and create a new IP-based Costa Mesa-to-KNSN path that will serve as a backup to the satellite uplink/downlink that we use as the primary link.

These may seem like small things, but they are both real aggravations that we can do without. Multiply them out all across the nation, and the impact and benefit of this rulemaking becomes apparent.

WMUZ(AM)

As you read this, our new 50 kW blowtorch in Detroit, WMUZ(AM), should be on the air. It was scheduled to sign on November 1.

The final hurdle to getting the station on the air was cleared on October 18, and that was establishment of an 11 GHz microwave link from our Radio Place studio and the new site. We purchased a Trango Apex Lynx 11 for this, and our friends at Great Lakes Tower installed the 3-foot dish on the studio end a few days in advance of the work at the transmitter site. Chief Engineer Brian Kerkan opted to use a Ubiquiti PowerBeam 5.8 GHz link to get the Ethernet data from the tower-mounted Trango radio into the network in the building, eliminating a fairly long run of shielded CAT6 cable that would be prone to induced currents from lightning strikes on the tower.

At the transmitter site, Great Lakes Tower removed a large, 950 MHz grid dish, transmission line and isocoupler from tower #3 of the ten-tower directional array. The new 3-foot 11 GHz antenna was mounted near the top of the tower. We purchased and installed a Kintronics two-wire lighting choke to feed 120 VAC onto the insulated tower to power the radio. At that end, Brian used single-mode fiberoptic cable to connect the Trango radio at the top of the tower to a Ubiquiti PowerBeam at the base of the tower. A companion PowerBeam was installed on the transmitter building to complete the Ethernet path.

After rough alignment, the signal strength was in the -70 dBm range, very marginal, but a link at least. After fine alignment of both ends, the signal strength came right up to the path budget number of -44 dBm. I love it when the math works!

Shortly after getting the microwave link up and running, Brian floated the other nine towers and measured the base impedance of tower #3 in accordance with §1.30003(b)(2) of the FCC rules. Allowing for the manufacturer's published accuracy of the OIB, the measurement showed that the base impedance was within the ±2-ohm and ±4% window for resistance and reactance, so a new moment-method proof is not required. Whew!

The station is going on the air with a new Nautel NX-50 transmitter, in analog for the time being, although we purchased the full HD Radio package with the transmitter. I have been told by the consulting engineer who did the antenna work at the site that the common point rotation is wrong for HD Radio, but I've also been told that the station operated in HD for a good, long time until the first-generation HD Radio exciter (Harris Dexstar) died and they pulled it out (that dead Dexstar exciter is still on the shelf at the transmitter site as evidence of this). At some point down the road, we will give HD Radio a try on the station. If we need to, we can add a line-stretcher network to flip the common point to the right orientation.

Grayheads

I had the privilege of attending the SBE National Meeting, which was held right here in Aurora, Colorado, on October 26. Hopefully, many of you were able to join us via the webcast.

As Amanda and I sat in that hour-long meeting, I looked around the room at a lot of familiar faces, people I have known and worked with through the years both at the SBE and in conjunction with Crawford Broadcasting Company. One thing struck me as I looked around – except for Amanda and maybe one or two others, every head in the room was gray or white. I conveyed this observation to former SBE president Barry Thomas, who we were sitting with, and he noted he had made the same observation.

The lack of hair pigment aside, what this means is that there is very little in the way of young talent making its way into the broadcast engineering field these days. Even now as I think about it, the average age of the engineers in our company is in the 50s. It's true that we have a few younger folks, and I thank God for them, but as an industry we are not attracting millennials to our profession. Why is this? I can think of a few reasons.

Back in the day (Amanda says I use that phrase a lot – I say, better get used to it!), people were attracted to our profession because of the mystique and even glamour of "show business." When I landed my first job in radio, I was thrilled to be "in the business." Today, that mystique and glamour no longer exist. With few exceptions, the on-air personalities are just voices, not the bigger-than-life personas that DJs and hosts used to be. And the ties to the music industry, while still in place, are no longer exclusive – anyone can program their own "radio station" right on their smartphone or tablet these days.

Another factor is that there are few educational paths to a broadcast engineering career today. There are a few, but those are niche and not widely available. And let's face it – the IT career field is much more attractive to millennials. They can work regular, daylight hours, have weekends/holidays off, never have to answer a call-out at 3:00 AM, and work in a nice, clean environment (as opposed to transmitter sites that can be anything but nice and clean).

Back in 2007, I was at a committee meeting at NAB headquarters in Washington, sitting at the big conference table with a bunch of other engineers. I believe it was Ron Rackley that said something to the effect of, "We're just a few funerals and retirements away from losing a lot of our core radio knowledge." He was right. When this bunch of grayheads is gone, will there be anyone that knows how to engineer radio?

Some in our ranks might argue that this isn't our problem. Once we retire or leave the planet, it's not our problem whether there is anyone to carry on our profession. That is an incredibly short-sighted and even selfish viewpoint. If we want the next generations to enjoy free, over-the-air broadcast radio, we'd better be thinking about and planning for the future, particularly the technical personnel that will design, build, operate and maintain radio stations after we're gone.

There was a theme that emerged at the SBE event last month – mentoring. Almost to a person, every engineer there said they had been mentored by someone in their profession. My question for you, as you consider the issue I have outlined above, is: who are you mentoring? If the answer is nobody, then I challenge you to identify and make an investment in the life of a young person, hopefully one that shows an interest in and aptitude for the technical side of broadcasting. The future of our industry depends on it.

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

Hello to all from Western New York! October 15th marked my 15th year as chief engineer of CBC's New York Stations. It is truly amazing how fast the years went by, I can still remember my first week on the job, evaluating the needs of all our stations, making a list of those items that needed immediate attention, and noting other things that could wait until later. I recall feeling "back at home" in the chief engineer's position, after spending the previous 11 years as a contract engineer, not having any one station that I could call "home."

Looking back at all the events that have happened in the past 15 years, I realize that I am where I am supposed to be, doing a job that I have been passionate about since I was just a young lad. I have seen the hand of God at work, guiding my career along, putting the right people in my path to help me along my journey, right up to today. I have had a lot of hard lessons to learn along the way, seemingly impossible deadlines to meet, learned new ways of doing things, technological changes that have challenged me to continue learning new procedures and equipment.

In a nutshell, the past 15 years have been exciting, sometimes boring or redundant, but what isn't at times? All in all, I have learned to never be complacent in my job. It is a privilege to be where I am today, and I am thankful for all the good (and bad) memories I have accumulated along the way, people I have met and worked with and alongside, and the accomplishments I have made that have molded me into the person I am today. I look forward to the next 15 years with great expectations, and prayers that God will continue to guide me along the way. No-one knows what the future will bring, but judging from the past, it will certainly be a ride worth sharing, and I hope you are along this journey with me, as we continue to work for the Lord in Christian Radio.

Over in Rochester, after changing out the tube in the Continental transmitter in September, during power-up I noticed the reflected power readings were jumping up and down on the transmitter. I first checked to ensure that the slugs were in their correct position in the directional coupler on the transmitter's output – all OK there.

I then checked the transmitter's tuning and found that I could not bring the VSWR readings down by adjusting the tuning/loading controls. That pretty much told me that I had an impedance issue, either with the IBOC injector or reject load.

After plumbing the main transmitter directly into the main antenna, I confirmed that the issue was definitely not a transmitter or antenna problem, as I was able to tune the transmitter with practically no VSWR. I shut down the digital transmitter and measured the impedance of the reject load, and found it to be well above 50 ohms. That explained the high VSWR in the main transmitter!

Interestingly, the BE digital transmitter seemed to operate fine into the injector, with only 1 watt reflected showing on the transmitter's power meter. I guess that since the output power of the digital transmitter is less than 1 kW into the injector, with 90% of that power into the reject load, the differential of impedance in the load was not enough to cause problems in the digital signal.

For the moment. the main FM analog signal is being fed into the main antenna directly, while the digital signal is being fed into the auxiliary antenna until replacement resistors and resistor mounting clips from Altronic Research can be installed in the reject load.

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

The Motown Update
by
Brian Kerkan, CBTE, CBNT
Chief Engineer, CBC – Detroit

The chill is in the air in the Motor City. October was a very busy month preparing for the launch of our new station, WMUZ 1200 "The Salt." Our new Nautel NX50 transmitter is now installed. Getting that huge transformer off the pallet was fun, but two come-alongs made the project a little easier.

We installed our new remote control system, and interfaced the transmitters and 10-tower (!!!) phasor control system. The interlocks and carrier inhibit circuits have been tested and are ready. I then installed a Kintronics two-wire lighting choke to supply the 120 VAC for the microwave radio on tower 3 of the array.

We worked with our tower crew to get the microwave link up and running just before the weather started getting colder. The crew took my drawings and had prepared everything we needed to get to work to install the Trango Apex Lynx radios and Ubiquity PowerBeam links. I did have concerns about the high level of RF that the electronics would be subjected to.

There was a day for each site to rig and install each end of the link, and about an hour of alignment and peaking time. We also removed a 950 MHz grid dish and Yagi, along with their associated transmission lines from the AM tower to unload it a bit.

After the microwave link was installed, it was time to look at the impedance of tower 3 as well as the array parameters to see the amount of change that occurred. To my delight, there was not much change in the tower 3 impedance; it was within the FCC-specified margin.

It took a few hours to get the day and night patterns back to where they needed to be. The 10-tower night pattern is a lot to keep track of, but everything fell right back into place. I took a lot of pictures, and kept detailed notes of the changes.

After that, it was time to run the transmitter at 50 kW into the antenna and verify that the microwave link was still operating without dropouts. We turned everything on, and there were no dropped packets at all. Audio was stable, and the network was stable. That was a relief.

Next, I installed the exporter and ran some tests of the antenna system. This also gave me an excuse to finally install that HD tuner I had. My preliminary tests were good. We plan on running music for eight hours during the day. The plan is to time-shift the morning and afternoon drive shows.

I want to make sure that the AM HD sounds as good as it can. There will be a few more driving tests around Detroit to make sure.

Even though I have been busier than I have been in a very long time, there is nothing better than doing what you love to do. There have been a lot of long days, but it has all paid off in the end.

The sign-on for WMUZ 1200 is Nov 1. Until next month, God Bless and take care.

News from the South
by
Stephen Poole, CBRE, AMD
Chief Engineer, CBC–Alabama

October wasn't too bad for us weather-wise. We had another busted tropical storm roll through, but by the time it got to the Birmingham area, it was mostly just a breezy rain. None of our transmitter sites were affected, thank the Lord.

I have long been a defender of the National Hurricane Center. I know that they have a very difficult job to do, and I know that the tendency will be to overstate things a bit, erring on the side of caution. But I think the local National Weather Service offices need to be more careful, or there's going to be a "cry wolf" effect. Twice now, they've forecast a worst-case scenario for these storms in the Birmingham area, but nothing really bad happened. People are going to become jaded.

We, of course, always have to take any warnings seriously, because you never know. If we decide that a storm isn't going to be much of a thing, that's going to be the one time that the generator runs out of fuel or a backup STL goes down. To be safe, we had Jack at the studios to keep an eye on things when Nate came through. But all was well, again, thanking the Lord.

But overall, not much has happened in October. It has been a time to get budget requests completed and to catch up on things that have been on the back burner. With my wife, Sandy, still in the hospital as I write this, I haven't had a lot of spare time. Todd and Jack, the two best engineering assistants in the business, have been going the extra mile, and I can't thank them enough.

New Lights

We're finishing up a project that was budgeted for this year: new lights for the parking lot at the 120 Summit studio building. We had gotten quotes to repair the old light poles that are currently in place, but the cost was staggering. Our studios and offices sit on a hill, just south of Red Mountain, that is essentially just a thin layer of soil atop solid sandstone and granite. The underground cabling to the existing lights has deteriorated, and it would cost tens of thousands of dollars to repair or replace it. The contractor would need a trencher that is capable of cutting through that rock, and then, we'd have to repair the parking lot surface.

After discussing it with several local contractors, we decided that the most cost-effective solution would be to install new "stadium-style" lights around the building, aimed at the parking lot. These are very efficient LED units that draw only a fraction of the power, and they should last for many years. The cost to do this is about the same as it would be to replace the underground wiring for just one of the existing poles. It's a win-win.

Cullman Tower Lights

WYDE-FM in Cullman has been under a NOTAM because of a defective AOL (top beacon) since April. We had a tower crew make several climbs to replace everything but the cabinet, but it still either wouldn't sync, or wouldn't flash properly. The manufacturer, TWR Lighting, sent a complete replacement assembly, but it didn't solve the problem.

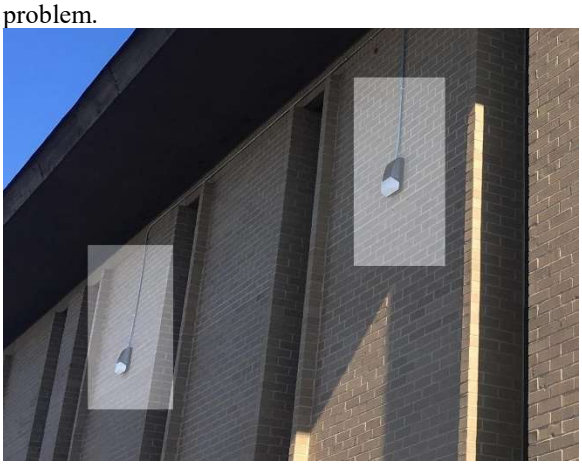


Figure 1 - The new LED fixtures (highlighted, they were in the shade).

Strobes are actually pretty simple. You place a high voltage on a xenon tube, just under the value that would cause it to fire and flash. A boost voltage

Figure 2 - The new LED parking lot lights really push back the dark.

is then applied, pushing it over the limit. The tube blinks, then the power supply recharges for another flash. The power supply is usually a relatively crude affair that simply charges up a capacitor bank with the needed energy. That part is easy to troubleshoot.

The really baffling problems that I've had with strobes over the years have been in the control and monitoring circuits. Under the Rules, all strobes must flash in a certain sequence. For tower lights, they're required to flash together, simultaneously. To make that happen, the controller at ground level sends a command for each flash event. If one of the flash units doesn't sync, it's still required to flash, but the failure is obvious: you'll have one light that flares randomly. It sticks out like a sore thumb.

Older strobe designs weren't terribly sophisticated. The ancient EG&G system that was in place when we bought WYDE-FM sent a simple voltage pulse up the tower to all lights. This newer TWR system uses an RS422 serial link to send the commands. This is certainly more elegant, but it doesn't take a genius to see that there's more to go wrong, too.

The Rules also require that all strobes must be monitored. If a unit doesn't flash, or if it flashes out of sync, you have 15 minutes for the problem to resolve itself, after which, you need a NOTAM. The old EG&G system used a relatively-crude serial link that would transmit a failure code if one of the units misfired. The newer TWR system uses the RS422 link to send status information from all of the lights.

A complicating factor is the design of the cable that TWR uses for this RS422 link. It's a balanced pair, inside a shielded cable, which itself is inside of a much larger cable containing the AC wiring and another overall shield. The inner shield must float above ground. We found that out the hard way several years ago when one of our strobes stopped syncing and reporting data. The impedance of the link must also be maintained at 75 ohms. TWR does this with two 150 ohm termination resistors, one up at the top, in the AOL, and one inside the controller unit in the transmitter building.

When replacing everything in the AOL didn't solve the problem, I suspected the cable running up to the top beacon. We've had trouble with it before. Since it runs up the top section of the tower, right behind the antenna, it's subjected to a pretty strong RF field. If one of the clamps or ties comes loose, allowing the cable to move in the wind, it could strike one of the antenna bays and burn. We've had that happen as well.

But this time, the cable checked out thoroughly and passed every test we could throw at it. There were no signs of burning and it was still fastened securely to the face of the top section opposite of the antenna bays. TWR finally told us to send both AOL assemblies to them for examination ... and that's when we had our answer: they had apparently sent us a defective replacement.

This is a wonderful thing, because we've paid a tower crew for several trips to inspect and replace everything in the AOL. As I write this, we're waiting for TWR to either repair one of the "cone" assemblies (that's what they call it) or to send us a known-good new one, entirely. And how could this have happened? Todd called them a couple of weeks ago to check on the repair and the tech said, "The serial numbers on both cones don't match what we've sent you." Obviously, they sent us a defective cone by mistake. I have no idea who received the new, functional one. But the mix-up is on their end, not ours, and we're waiting for them to make it right.

As I write this, the top beacon isn't flashing at all, because the "guts" are at TWR in Houston. Hopefully, we're going to get this fixed before next month, at which point I'll finally be able to report success. But, while this is the longest we've ever been under a NOTAM, it's nothing new. We had a bunch of trouble with the older EG&G system, and were hoping that the TWR replacement would serve for at least 10-20 years. It hasn't failed as often as the old system, but it has failed more than I like. I'm not sure what the answer is.

Little Things

It's always the little things that get you. A few examples:

When our new studios were built back in 2006, we specified a rubber seal around heavy wooden doors for sound proofing. But I guess the

contractor discovered that typical door knobs wouldn't quite fit with that 1/4" seal on the door frame. He solved this by using non-standard lengths on the door latches. The knobs are mounted farther into the door by about 1 to 1-1/2". We discovered this happy fact when one of the latches failed, and none of the locally-available replacements were long enough. Yay.

I'm currently working on a better archiving and backup system for our company's email server. Once again, I've been slowed and frustrated by the fact that copying 400 gigabytes of data takes a long, long time. Even on a gigabit Ethernet link, or with a separate hard drive temporarily placed inside the server, it takes the better part of a day.

If I had the time and energy, I'd develop my own mail server. But that'll never happen, which means that I'm stuck with what the Neckbearded Geek Community decides is best for the job. The fact that they're a pain to back up and restore, and make it very difficult to retrieve passwords, doesn't matter to the geeks. The final joy is that they'll get a system working perfectly, then decide to change things. "To upgrade to version 8, you *must* use 64-bit libraries," or, "You *must* have caching enabled," (and that's when you learn that you have to make a bunch of changes to your configuration, by hand, to get that working). Yay!

But hey; I guess it's job security. The amount of stuff that we have to know nowadays just to do our jobs is staggering at times.

Sandy

As mentioned above, my wife Sandy has been in and out of various doctor's offices for months now, finally culminating in a trip to the hospital while they try to figure out what's going on. She has severe spams in her legs, among other things, that have been misdiagnosed and mistreated in too many ways to count. One reason she's in the hospital is because the previous neurologist decided that she was having epileptic "partial" seizures and put her on anti-seizure medication. She had a terrible reaction to that.

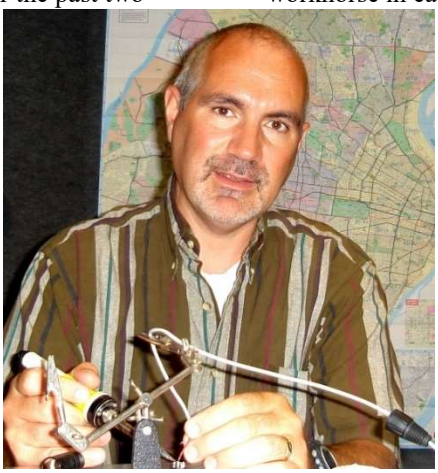
But I deeply, deeply appreciate everyone's prayers. People who don't believe in God don't know what a tremendous comfort it is to know that the community of faith is remembering them to God in prayer. I can feel when this is happening. A sense of peace will come over me, even in the midst of the storms, even when it seems like nothing is going right. So ... thanks, and God Bless to everyone who has been praying. It has been priceless.

Until next time, keep praying for this nation, too!

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

We were recently able to address a problem that has stuck out like a sore thumb for the past two years. Two years is a long time for a sore thumb. When our production rooms were shifted to the Wheatnet-IP system two years ago, most of what was in the room was completely digital, with the obvious exception of the microphones.

The other exception to that was the USB sound cards in the Macintosh editing workstations, which were fairly inexpensive, off-the-shelf, analog units. They were well used, noisy and required regular reboots because of the sound.



These Macintosh computers are the main workhorse in each production room, so just about every piece of production that hit the airwaves on our four-FM-station cluster went through these cheap, noisy, analog units.

More than just being a sore thumb, they were the weak link in these production rooms. Here we were with fairly new Macintosh computers, brand new Wheatnet digital blades with new control surfaces, and every piece of audio was going in and out of the analog interfaces.

The other computer in each of the rooms is the NexGen production workstation. These

computers had the Wheatnet WNIP driver installed, so the inputs and outputs are all digital (IP) there. So, when we did the upgrade to these rooms two years ago, we stuck with the analog USB cards in the Macs, mainly because there was just a ray of hope that there would eventually be a Wheatnet driver for Mac computers.

In all likelihood, the demand for a Mac Wheatnet driver probably just wasn't there, and we had to abandon any plans that it would happen anytime soon. I began looking for a new sound card.

I knew what I wanted, digital and more importantly AES digital, since these rooms were geared toward that standard. XLR connections would be nice, but I could live without them if I couldn't find them on the right card. The reason AES is so hard to find in sound cards is the fact that the large majority of buyers for these cards are part of the home music industry. If they use digital, it is, for the most part, SPDIF.

My search got more intense when one of the production personnel was telling me that she was rebooting her sound card several times a day. It was also quite embarrassing when she had to have clients re-record their scripts because the sound card had messed up the audio.

I found exactly what I was looking for with the Motu 8D sound interface. It has eight digital ins and outs, four of them AES, two stereo pairs and four SPDIF ins and outs, and two stereo spares. This was a little overkill for our application since, in reality, one set of digital stereo in and out was the most they would use on a consistent basis. It had the XLR connections I was seeking as well.

The other nice part of this interface was that the software the production personnel were using on their Mac computers was Digital Performer 9, and that is part of the same company that makes the Motu D8. So, the two should play nicely together without having to call up two different support numbers to make it work.

The Motu 8D Macintosh Sound Interface

The sound card comes with its own mixer software, and even a "patch bay" app that looks an awful lot like the cross point maps we radio engineers use with router and AoIP systems like the Wheatnet Navigator system. Again, this is a bit overkill for the application that we have in mind, but it is nice know it's there in case we need it for another application in the future.

After we ran the cables, it only took minutes for the driver to install and we were already getting sound on the DP9 software once the new card was selected on the Mac. Everyone was immediately impressed with the sound, especially in comparison to the old analog card.

I really like the fact that once audio is into our system, it stays digital the whole route. We're no longer doing the analog-to-digital to analog-to-digital to analog-to-digital conversions. That's literally what was taking place when they would voice a script before it ended up in our automation system for air play.

The Portland Report
by
John White, CBRE
Chief Engineer, CBC–Portland

Post-Mortem of the NPT

With any event, you usually hear the internal speculation and wild guess then nothing further. In Congress, millions are spent producing reports that no one reads. One of the classic radio voices of old, Paul Harvey, became known for reporting and the phrase, "And now, the rest of the story."

You might recall that during September's EAS NPT, in the Portland area, most stations did not have any audio to relay – just headers and the EOM. The mystery behind that circumstance has, it is believed, been solved.

In addition to the normal monitoring sources, Portland and other Oregon areas have implemented a "Local Relay Network" (LRN) to serve as a "when all else fails distribution system to insure propagation of emergency information." This system consists of a local network of VHF / UHF frequencies, which connect local 911 and dispatch centers to local broadcast stations. Broadcast Remote Pick Up (RPU) frequencies are used for this system.

In the current LRN, a UHF uplink frequency is retransmitted on a VHF downlink frequency. The system also includes links to the Salem, Oregon area. Currently, four 911 and dispatch centers are connected to the LRN and also the IPAWS system.

When this year's NPT was released, the first entity to receive the test was one of the local 911 and dispatch centers. The EAS encoder at that facility was configured to only "LOG" an NPT or EAN, not forward it. Nevertheless, that encoder began to relay the NPT on the LRN, and most local Portland broadcasts saw the LRN message source as the first occurrence of the message. So far, everything is working fine, although the message routing was not the preferred path. The test message was now being transmitted throughout the Portland metro area.

At that point all was well, until, well, the rest of the story. As the message was being relayed via the LRN, another of the local 911 and dispatch centers received the NPT from IPAWS. As a result, a second dispatch center also began to relay on the LRN.

Downstream broadcast stations monitoring the LRN heard the opening message header, the alert tones, and the start of the audio message. So far so good. Then the message was interrupted by another set of headers.

This is the same error condition that we saw back in 2011 during the first NPT test. Once this error condition was detected, most of the EAS encoders have been configured to truncate any audio and abort and close the message.

Although all downstream stations relayed the incomplete message properly, most observers view this test as flawed. At the local level, corrective action procedures are being considered. Generally, we believe that corrective action will include several steps:

A. A local 911 / dispatch facility should not ordinarily relay an alert message unless that relay would be the only source to broadcasters of the message. An example of an appropriate relay would be a CAN from a border state to broadcasters in a multistate market.

B. Changes to allow disabling hard-wired automatic relay of NPT and EAN messages are needed for encoders at local 911 / dispatch centers.

C. As the EAS system becomes more complex, the potential for interrupted messages increases. Evaluation and testing is desirable to prevent this problem.

D. As the EAS system becomes more complex, the need for more tests opportunities increases. A noninvasive test process is desirable.

Some additional anomalies were noted during this test. While of lesser importance, these should be researched on a lower priority.

We have no idea why the local 911 / dispatch centers received the IPAWS message first. Although who is first is a matter of change, there do seem to be some indications of polling delays. The IPAWS volume capacity should be more than enough to handle a nationwide message. This may not be an actual problem, although research to determine polling circumstances would be worthwhile to better understands the issues.

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

Snow Cover

We finally got the snow cover installed on our dish at the KLZ transmitter site, which is a big deal because of the new orientation of the dish on the AMC-18 satellite. I ended up dragging my wonderful husband out to help me, since it was last minute due to a storm coming in and Keith was unavailable. I am grateful that they made it somewhat easy with straps that we were able to pull it up and over the dish.

The issue we ran into was the bolts. The bolts on the perimeter of the Patriot 3.7-meter dish were facing (tails) out, so the cover catches on them. We were able to get the cover on loosely and I sent Keith out after the storm to start turning the bolts around (heads out). The ones he wasn't able to get to, we put rubber covers on. This should allow us to tighten the thing down really well.

My husband, Jordon, helps install the snow cover on the KLZ C-band antenna.

So far, we've had a couple small snows, and while the EbNo goes down, we have not lost the signal. I guess the real test will be the end of the season when we start getting the heavy snows.

Module Repair

I had been feeling a bit sad about not having any NX50 modules to repair since our Nautel NX50 transmitter has been behaving itself. Out in California at KBRT, they had a module go out last month, so rather than send it in to Nautel for repair, they sent it to me since I have a ton of spare parts and am really proficient at troubleshooting and repairing NX50 power modules.

Repairing it was fairly easy. I must say, most companies don't do step-by-step instructions for troubleshooting. It's typically "call us" or "send it in." I am grateful for Nautel because they have a detailed troubleshooting and service guide. It tells me what exactly I need to test and replace. I don't know if they include this type of troubleshooting guide with the older transmitters; all I know is for our older ND50, I had to remember what to do in order to repair modules.

Changes

It is amazing how things change over time. We began noticing the base current out at the KLDC transmitter site was drifting a bit – not out of tolerance, but getting close. While some of that is most likely IBOC, it could also be a sign of something more. We went to the site, checked the base current meter at the tower and recalibrated with

IBOC off. This gives us a better reading.

It also seems any kind of significant weather affects the towers. In the past, it hasn't been as big of an issue, but it seems in recent years, it affects them more and more. I now know that when it rains or snows, the directional parameters for my towers at KLVZ-night will wander around a bit. I don't know why this change always surprises me. I still panic when I see those readings changing, but I know if I am just patient, that once the weather clears, it will go back to normal.

Upcoming

November is the start of the "holiday season." Normally it means a slower time of year as vacation days get used up, and who wants to start a major project at the end of the year? Thankfully, we don't have anything big scheduled the rest of this year. The next major project will most likely be getting the carpet in the studios replaced.

We do have plans sometime around the beginning of November to get our generator at the office fixed. The block heater has decided it no longer wants to work, and while that may be okay if it were 70 degrees outside, winter is almost here and it has been cold in the mornings. We also hope to get that dish cover tightened down really well so it's taut.

I do look forward to Thanksgiving and time with family. I also look forward to things slowing down a bit, since we aren't going to our cabin due to the snow. I pray you all have a great month.

That about covers it for this edition, so until next time… that's all folks!!!

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
KKPZ • Portland, OR
1330 kHz/97.5 MHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz/100.3 MHz, 5 kW-U, DA-1
KLDC • Brighton - Denver, CO
1220 kHz/95.3 MHz, 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, 2.2 kW-D/430 W-N, DA-2
WDCX • Rochester, NY
990 kHz, 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, 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, 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 • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT
WXJC • Birmingham, AL
850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT

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