The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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sUAS Inspections

For the past couple of years, I have been playing around with small Unmanned Aerial Systems (sUAS in FAA parlance). In early 2015, I bought a DJI Phantom 2, which was the current model at the time, along with a 3-axis gimbal/GoPro mount. Over the next months, I added first person view (FPV), which provided me with a real-time video downlink on 5.8 GHz – I could see what the camera was seeing, which allowed me to frame my shots and maneuver with respect to various objects of interest.

Not long after this acquisition and upgrade, I started seeing the value of using it to look at our towers. The Phantom could go where and see what I couldn't. Just playing around, in the summer of 2015, I buzzed around the KLVZ tower site while a crew was painting the towers. Just having the Phantom in the air changed the whole dynamic of the tower work. I'm not saying that this particular very professional crew (who we continue to use) did anything differently, but the workers on the towers certainly knew that I was looking over their shoulders. It was the best tower paint job I have ever received!

During the time that I have had my Phantom 2, the federal regulations governing sUAS aircraft have been evolving, from essentially no regulation at the outset to a whole subset of FAA rules at this writing (Part 107). It went from "do what you want" to fairly restrictive operational requirements – a 400-foot ceiling, must remain in sight, daylight only and no flying in controlled airspace. Commercial use of sUAS aircraft first required special FAA permission, but when the Part 107 sUAS rules were enacted, provision was made for pilot licensing and commercial operation.

I had toyed with the idea of getting licensed to commercially fly sUAS aircraft for the specific purpose of inspecting our many towers. When I initially looked into it, the process seemed to be sort of a pain in the backside, so I more or less tabled the idea. Then, the SBE began advertising a webinar, *Using Drones in Broadcast Operations*, hosted by my friend Sam Wallington. I knew that Sam and his crew had been using sUAS aircraft commercially for some time, so if anyone would know about the licensing process and rules, he would. So, I signed up for the live webinar and tuned in. As expected, the webinar was very informative, and I learned a lot. It also re-piqued my interest and got me to researching how I could become licensed.

One thing I found in my research of local options and that I believe Sam lightly touched on in his presentation was that current, licensed pilots could obtain their Remote Pilot sUAS certificate by taking an FAA online safety course and filling out an application – no test would be required. Since I am a licensed pilot, that would save several hundred dollars and make the process straightforward and easy.

The online FAA sUAS safety course took less than an hour, and once done with that, I got the online application filled out. I still had to get a certified flight instructor (CFI) to certify the application after looking at my photo ID (to make sure I was who I said I was), but that was no issue. I

am a member of a flying club that has several CFIs on staff, so I grabbed one and got him to log in and certify my application. Within a week, I had my Remote Pilot license.

Amanda had been noticing what she thought was peeling paint on the KLZ west tower, so on a day when she was going to be at the site anyway, I went with her and brought my Phantom 2. With her acting as spotter, I flew it vertically up the tower, watching the FPV screen as it went and recording HD video on the GoPro. We found that indeed there were patches of peeling paint, not an immediate safety or regulatory concern, but certainly a maintenance item to be budgeted and scheduled.

That little exercise reinforced in my mind how useful an sUAS could be in a broadcast engineering operation. It also made me worry more than a little how easy it would be to run my $2,000 Phantom 2 into a guy wire or the tower itself when it was way up near the top at 450 feet AGL. Again, Amanda was standing at the tower base looking up as my spotter, but the reality is that the Phantom is pretty hard to see – just a dot, really – at 450 feet. Surely there had to be a better way.

It didn't take me long to figure it out. The current Phantom, specifically the Phantom 4 Pro+, has a 360-degree array of sensors that measure proximity to nearby objects. It is equipped from the factory with FPV, a really great 4k HD camera, and the remote control allows the operator to start and stop video recording as well as snap still shots at will. That was just the ticket, so we bought one.

When it arrived, we first took it out to KLZ to test it out and confirm its capabilities. First, I flew it toward a dumpster. The monitor started beeping and showing me the proximity to the dumpster before it put on the brakes and wouldn't let the Phantom get any closer. Next, I tried approaching a utility pole. Same result. Then I tried approaching a guy wire (for the utility pole). The Phantom "saw" the wire, warned of the proximity and then wouldn't let me get any closer than 4 feet to it. That gave me some confidence, so I sent it up a tower. It had no issue going all the way to the top, and I was able to easily avoid running into the tower, appendages and guy wires. I had Amanda spotting (from a distance, not right under the tower) for FAA rule compliance, but otherwise I was able to fly the Phantom without worrying about running into something.

A day or two later, we took it out to the KLTT site and ran it up all four towers out there – with me standing in one location for the whole

Figure 1 - KLTT tower 2 -- the lightning rod is loose.

operation instead of going from tower to tower as I had to do with my Phantom. We got them all inspected inside one 30-minute battery life, then brought the Phantom back to the launch point for an

Figure 2 -- Another loose rod, this one at KLTT T4. We also got a good look at the microwave and translator installations on that tower.

automatic landing. The results? We found two lightning rods that had lost their securing hardware and were just sitting in the mounting holes. We'll have to send someone up to fix those, and the climber can go prepared with new hardware in his bolt bag.

For a look at some of the photos I took and the incredible detail contained in the photos, go to: http://crawfordbroadcasting.com/Eng_Pics/.

The more I use the Phantom to go where and look at what I cannot, the more convinced I am that this is a big part of the future of tower work. The new ANSI/TIA 222-H standard revision contains a requirement for post installation/modification inspection. Could the sUAS platform be the vehicle of choice for such inspections, in whole or in part? I suspect so.

I do intend to make it a part of our own company's maintenance procedures, giving us eyes on our towers that we've never had before. It's going to be a game changer.

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

Hello to all from Western New York! Well, another year has passed, and I am looking forward to seeing what 2018 has to bring!

We had a remarkable 2017 at CBC's Western New York stations! The year started off with the addition of a new phone system for our Buffalo facility, immediately followed by a rather large and complex studio remodeling project with the addition of a new WheatNet-IP audio delivery system. Even though we preplanned practically each phase of the project, we kept running into unexpected problems, most being construction issues. These, along with a contractor that preferred to work on his own schedule, caused the studio renovations to drag out a lot longer than they should have. Aside from the delays, we ended up with a facility that we are proud of, and should serve us well for years to come.

Recently, we have had to replace a number of older NexGen computers in our Rochester AM station. First, the studio workstation failed, and not too soon afterwards, we lost the audio server and DRR computers. These three computers were the last of the original computers I installed some 12 years ago, so we definitely got our money's worth out of them.

We still have a couple of the original Dells in Buffalo, so we should look to replacing these before they fail. One is a production workstation, so if we wait until a failure, we can work around it until a replacement is obtained. The other is a DRR, which is vital to our operation, as it performs all of our background satellite and AMBOS recording. Losing the DRR would definitely cause problems with our daily programming, as most programs are received days and up to a week in advance of their air date. Therefore, replacing this computer will be the first little project of 2018!

From time to time, I help out a friend of mine who purchased a local AM station that was going to go dark. She has never owned a station before, and certainly was not prepared for all that is required for station ownership, especially in the technical end of the business.

Over the past three years, she has made her share of mistakes, but she has learned from them and is actually doing fairly well for a daytimer operating at 1kW. It was in her plans from the beginning that when she was financially able, she would add an FM translator, which would extend her revenue earning well beyond her daytime limitations. Not long ago she secured the services of a consultant who found a frequency that he said would work in the Buffalo market. After running the numbers and performing analysis of co-adjacent stations, he recommended she purchase the translator.

After completing the purchase and installing the equipment, she is experiencing interference from 96.1 (she is on 96.5 at approximately 60 watts) a 50 kW half-wave spaced FM located approximately three city blocks away from her antenna. She recently reached out to me and Mark Humphery, asking for advice on how to get her signal cleaned up.

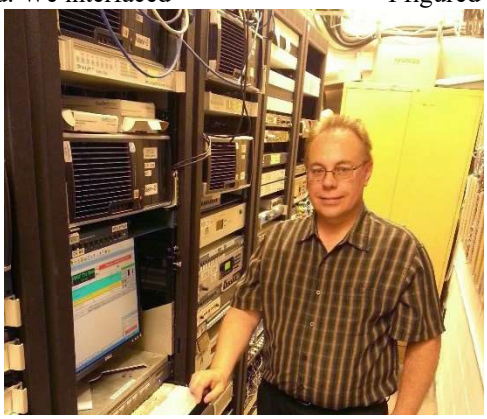
Using a spectrum analyzer outside her studios in downtown Buffalo, we set the center frequency for 96.1, span +/- 1 MHz, and the resolution bandwidth at 10 kHz. The analog carrier of 96.1 MHz measured about -12dBm, and the digital sidebands were fairly symmetrical about -23 dBm each, however there appeared to be some spectral regrowth products on both sides at 95.3, 95.6, 96.6 and 96.9 To insure that what was being noted on the screen was not being generated within the analyzer, the sensitivity was changed in 10 dB steps, and the regrowth also changed by 10 dB It is important to note that the product at 96.6 measures about -59.9

dBm, only 10.5 dBm less than 96.5's translator.

To insure that the noted interference is indeed coming from regrowth in the 96.1 digital sidebands, we will co-ordinate with their engineer to drop the digital carrier at a specific time to see if the interference goes away. This has been an interesting problem, and definitely a learning opportunity for me. More information to come next month as we further investigate this issue.

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

Happy New Year from the Motor City. December was a frigid month here in Detroit. We had a number of projects that we tackled. We interfaced our NX-50 transmitter at WMUZ AM to our Burk remote control system.



By using SNMP, we are able to directly monitor the parameters from the transmitter over the network. This eliminates the need for wiring IO, and having to worry about calibration. The values are read directly from the Nautel transmitter controller in real time.

Installation is very straightforward. SNMP must be enabled by purchasing a key, and a MIB - Management Information Base, must be provided for the equipment that you will be monitoring. The MIB is a database which contains OIDs - object identifiers. The OIDs contain the parameters to be controlled or monitored.

SNMP uses SET or GET commands to retrieve or change values. The wonderful thing about SNMP is that you can monitor equipment in your plant across the network and access critical parameters such as equipment temperature, fan speed, and network connectivity. Most MIBs contain more than enough OIDs to comprehensively monitor a device. SNMP eliminates IO cabling, and provides direct control of devices.

We have been working with Comcast to deliver all of our telecom and internet services via fiber. We will be transitioning our telephone and data to high speed fiber. We will be able to streamline everything to this new dependable connection.

Our area has been plagued with outages, which most of the time are related to pole-mounted amplifier failures. With the fiber, we will have a service level agreement and proactive monitoring. I can't wait until this transition is complete.

I figured I would share an experience with all of you that happened to me on Christmas Eve. This story highlights why it is necessary to have good remote monitoring in place. I ended up being sick on the weekend before Christmas and stayed home while my wife and daughter traveled to Ohio. It was late afternoon on Christmas Eve while I was resting. I heard a loud banging coming from the basement. I went downstairs to check where it could be coming from. It sounded like the water heater at first, so I initially thought it might be a time to drain and refill the heater.

It wasn't the best time, as I had a fever and wasn't feeling well, so I went back upstairs and sat back down. The banging started again, but this time it got much louder. I proceeded back down to the basement to discover that the banging was coming from the furnace. I reached over and grabbed the top panel, and all of a sudden, a small arm reached over and grabbed my hand. I wasn't really prepared for that!!

I grabbed a flashlight, and sure enough, there was a little hairy leg curled around the top edge of my furnace door. There was a squirrel in my furnace. So, at 4:30 PM on Christmas Eve, I had to come up with a plan to get this squirrel out. By the way, it was 6 degrees outside.

I went upstairs to look up traps or methods to remove this squirrel. All the stores closed at 5, so there was no chance of getting a trap. While looking for options, I noticed my furnace had stopped working. The temperature was set higher than the house temperature, and the fan stopped. I turned the fan to manual and it still didn't come on.

Well... now I had a squirrel and a non-working furnace. I ended up going back downstairs to come up with a plan. I saw the squirrel through the furnace door and tried to move it with a stick. I heard it go back up the flue pipe into the chimney and remembered I had bought screen for one of the windows.

I quickly cut a piece of screen off, unscrewed the flue and put the screen in between the flue pipe and the furnace. This kept the critter out and gave me the opportunity to determine what happened to disable the furnace.

Upon investigation, I discovered the squirrel had chewed through the door interlock wire, which shut the entire unit down. It couldn't have picked a better wire to chomp on.

I was able to repair the wire and get the furnace up and running. You never know what can and will happen.

If I would have left on Friday with my family, it is possible that I wouldn't have known that the furnace was out for several days. With the temperatures well below freezing, I would have come back to a real mess with frozen and ruptured pipes and most likely a flooded basement. The reason I shared this is to show the importance of our remote control systems.

I have since installed a remote control thermostat so I can monitor the house temperature from afar. The rest of my holiday break was great, and I could rest well knowing I had some level of protection. The same type of issue could happen at our transmitter sites at any time. Having good telemetry and notification is very important.

I hope everyone has a wonderful 2018.

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

Happy New Year! I hope everyone had a blessed Christmas! I want to again thank everyone for praying for Sandy. She's not in as much pain, but it has become obvious that she won't be returning to work. We're filing for disability. If she's well enough, we might be able to catch some midget wrestling or monster trucks or something. You know, totally Alabama.

The Special Election

The special election for the US Senate is over, and of course, you know that Doug Jones (the Democrat) won. In spite of all the revelations about Judge Roy Moore being involved with teenage girls in the past, until a few days before the election, I was still sure that that he would pull out a squeaker.

Then some things happened that probably finished him off. Look: Sandy and I know Judge Moore and have spent time with him. He can be arrogant and condescending. I think that came through in some of his speeches, especially one done the day before the election (and which was widely covered here in Alabama). Moore said that if people didn't trust him, they shouldn't vote for him. What he said wasn't the problem so much as the *way* he said it. When I saw the video later that day, I shook my head.

The bottom line is that he ran a terrible campaign, as badly-run as Clinton's campaign in 2016. Moore's people concentrated on rural Alabama, which did indeed turn out heavily in his favor. But the numbers just weren't there. Moore did very little campaigning in the Birmingham Metro, the most densely-populated region in the state. Jones won here in a landslide. Enough said.

The Year in Review

As we start a new year, I like to look back at some of the things we've done in the past. Believe it or not, one source that I use is old *Local Oscillator* issues! For example, in January of 2009, I reported that Cris had decided that we would use modeling to address long-standing problems with the WXJC night array. (Was it really nine years ago???)

In the past year, we had more storm damage than usual, including one serious lightning strike on

Alabama means quality entertainment. Not pictured: a sign advertising some riding lawnmower races in the same area.

WDJC's new Nautel main transmitter. On the to-do list for 2018 is to keep a closer eye on the grounding at each of our sites. While we haven't had much trouble from copper thieves lately, it's still a good idea to physically inspect *all* grounding, everywhere.

All of us have remarked at times how much information technology ("IT" if you're a hipster) has become part of our jobs. One year ago, we were wrapping up a new web server installation. We've addressed more than one hacking incident on our servers. Our email server has landed on a blacklist twice because one of our users had a compromised password.

Speaking of the email server, a few months ago, we had to rebuild the thing after a failed update. That was a tense and unhappy time, but we got it working, thank the Lord.

I've learned more about the Apache Web server, Postfix, and MySQL than I ever thought I'd need to. Todd and Jack have been a huge help as well, but it's a constant job. Not a day goes by that something computer related doesn't come up: someone has lost a password, or one of our Websites isn't responding properly. I've become a regular in several online support forums, and all of us are outright Google Ninjas™. (The key to using Google is knowing *how* to phrase the query.)

I'll let Todd finish us up this month. He's always on the lookout for neat, cost-effective solutions, and he's found some others. I'm really intrigued by this Cleanfeed thing. I do wonder how they plan to pay for it – right now, it's free, but are they going to start charging a fee in the future? We'll see.

Until next time, thanks for praying for my wife, and keep praying for this nation.

Journey Through Some Remote Audio Applications
Todd Dixon, CBRE

Being radio engineers, I can imagine that each of you has had relatively similar experiences in your markets as those in ours. You're trying to provide the best possible audio for the lowest possible cost. In our market, a lot of times I end up dealing with potential clients who want to do their audio primarily from remote locations. We have people who want to broadcast high school football games and even contracted employees who are otherwise employed, but who broadcast as well.

We have a Tieline Bridge-IT codec for our remotes, with a full-on remote kit to make sure that it can work in a number of different environments, but sending it with contract employees or clients is what I would call a "gray" area. Additionally, most contract employees or clients don't have the couple of grand to get their own equipment.

About three years ago, I found a solution for one such client called *Mixlr*. It is a smart phone app that can ferry audio back to the station. Our client paid ten dollars a month for unlimited three-hour broadcasts. The drawbacks were that the audio was one-way and delayed by about 10 seconds. On a positive note, the audio sounded way better than his previous phone hybrid audio, and we found a way to work around the delay and to communicate back to him. He used *Mixlr* for over three years with a pretty high rate of success

Recently, one of our contract broadcasters asked if there was a similar solution for him. He needed to be able to broadcast from home occasionally and at different events. It had been a while since I had actually done some searching for remote audio solutions and I found a couple that I would like to pass on to you. Both solutions use the Opus audio codec, provide bi-directional audio and are free to use.

Feenphone is the first one I found. Of the two solutions, it is definitely the more complex to setup. It is a complete software solution and sets up a server-client(s) type environment. It requires opening a port in your firewall and installing the software on the client's computer as well, but once you connect to the server the first time, everything is pretty well point-and-click from there out. The program also provides for multiple users to be connected to the server. Their 30-page manual is well documented and handles the complete setup.

The other solution is the one we have already tested and tried and required very little setup.

The solution is through a website called cleanfeed.net. *Cleanfeed* creates a connection between two computers so that they can share their audio with each other. The main requirement is the use of the Chrome web browser.

I established an account (in this case WXJCcr) with *Cleanfeed*. Generally, I am not a fan of opening up a lot of accounts on the internet, but the Terms of Service/EULA for *Cleanfeed* are short and straight forward. They don't permit you to use it as a communication platform for space exploration!

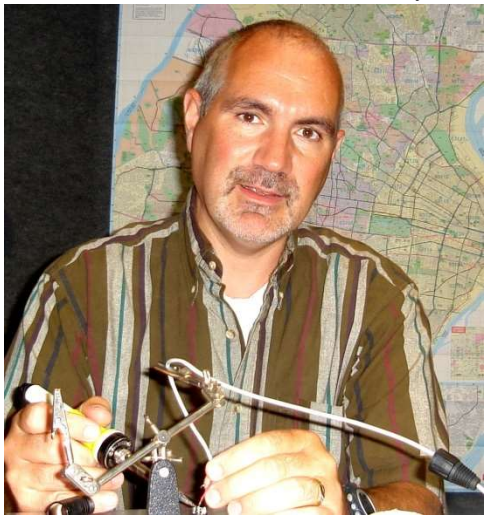
From there, I can invite any client to join my computer clicking "+ connect," typing their name and sharing the link to the connection as long as they're using the Chrome web browser. While it doesn't include iPhones/iPads (iOS), it does include Chrome in Windows, Linux, Mac or Android (phones and tablets) devices. The audio quality can be adjusted between five settings from "low quality talkback" (1) to 320kbps stereo (5). The "speech optimized" setting (2) was less than optimal for broadcast, while the "256kbps mono" (4) setting sounded like they were sitting in the studio. The only one we haven't tested is "music optimized" (3).

The best part for us has been that *Cleanfeed* is so easy to use. We plan on setting this up in our other control rooms as well and possibly a couple of production rooms to record testimonials and other interviews.

Let me know if you try out either of these solutions and provide me your feedback.

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

A couple of years ago, I decided to move the WYRB ENDEC EAS encoder to the transmitter site. Under the current main studio rule and the operations divided between two studios, separated by almost 100 miles, it made sense. With the ability for the operators to read the logs and interact with the ENDEC through its web page, I had wanted to do this shortly after I took the post so I could take care of both studios with the same ENDEC. This would certainly make logging a lot easier with only one log necessary as it would cover both studios.



The other benefit would be that we didn't have to send back the three EAS audio sources, the LP1, LP2 and the National Weather Service through our T1 STL to the remote studio, which again was 100 miles away. Now, you wouldn't expect that to be an issue, but we did lose some activations and monthly tests due to some T1 outages.

What finally precipitated the actual move to the transmitter site was when we moved the main studio two years ago. It became apparent that in the new building, we were going to have a tough time getting the EAS audio sources. Rather than spend a lot of money on outside antennas, it was time to make the move.

The real difficulty in making this move was the delay of audio from the remote studio. We have 25 seconds we needed to deal with in syncing EAS audio with the station audio: 20 seconds of profanity delay and 5 seconds of buffering on our audio codec. Since the operators could still potentially start the tests and relay the alert manually through the web page, we could have them listen to delayed audio from the transmitter site through the STL return and then fire off the EAS from the web page when they hear the appropriate spot between audio. This sounded fairly complicated so we nixed this idea in favor of the things happening at the transmitter site more automatically through the ENDEC Encoder.

All activations and the monthly test would go automatically upon reception. The weekly test was more complicated. I decided to use the Random

Weekly Test option in the ENDEC. The cool part of the random feature in the ENDEC is that it creates the "random schedule" ahead of time for an entire year. You can then make adjustments to this schedule. So, I was able to nudge the time the random weekly test would run away from spot blocks and it would only then interrupt music on the station. This wasn't ideal, but it would only be once a week and for 18 seconds.

Now, flash forward to 2018, and we know the main studio rule is going away. I had thought about moving the ENDEC back to the remote studio, which will host our operations. I decided to not do that because of the issues with keeping the audio returns from the transmitter site back to studio.

Knowing that we would keep the unit at the transmitter site, I wanted to make the EAS work without so much interruption to the music on the station. When I was working for another station, I had made it so our automation system would launch the weekly tests through a relay closed by the NexGen Audio Server. This was done on the older legacy ENDECs. I entertained this idea, but was not really excited about having several relay steps taking place through the audio codecs on the T1 between the studio and transmitter site. However, in looking at the way the newer digital ENDECs work with our NexGen automation system, I was rather pleased to learn that it no longer needed a hard, physical relay closure for the automation system to trigger events. It now used the IP structure of the ENDEC to communicate between the two systems.

In my mind, this increased the reliability and ease of making this work. As long as our network is up, we're good. We did the necessary configuration in both systems and then tested to see if it would work, and it did. Even though we could control the test through NexGen, I still had the problem of the 25 seconds of delay to deal with.

NexGen uses a designated cart number for the weekly test. When the cart number finishes it then uses a macro to run the test on the Digital ENDEC or any other EAS encoder. The first thing you put in the macro is the relay to trigger the ENDEC to run the test and then a delay for the amount of time you want to pause the Audio Server while the test runs.

In our case, the relay is an IP relay we configured in NexGen. I didn't want to put a delay to pause the audio server into the macro since I already had a delay issue to start with. I needed the trigger to take place at the appropriate time at the transmitter site. Knowing that the trigger would take place when the EAS cart finished its audio meant that the cart had to have at least 25 seconds of audio in it, to go around the 25 second delay for audio to get to the transmitter site.

We were also looking at the cart number containing a vocal start of about six seconds. So, in reality the trigger would have to take place 25 seconds after the vocal ended. That meant the total cart length had to be 31 seconds. Now, the actual EAS test is about 18 seconds, which leaves me another six seconds or so of time to fill. I decided to have a vocal close to the cart announcing again that, "This has been a test of the Emergency Alert System."

The only thing left was the dead time sandwiched between these two vocals. For the listener, this would be filled with the actual weekly test audio. However, we have silent alerting and switching that takes place with ten seconds of no audio on the chain. We couldn't have this occurring during the test. We went with playing a music bed during the 18 seconds of silence between the opening and closing announcements on the cart. This would also serve to keep audio active on our Internet stream during the test that is running at the transmitter site.

I didn't want this bed to show up on the air at all, so I sandwiched the bed with a second of silence on either side, allowing a little bit of time for the EAS switching to occur.

It took us a few times of actually running the test on air, then making slight adjustments, to get all this timing correct, but once we did this, it sounded as smooth as if we were running this from the studio.

We still need to figure this out for the monthly test, but we should be able to make it work as well, so we don't have it interrupting the music or even more importantly, the commercials on air.

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

In much of talk radio, the term "snowflake" has been used to describe a person who wilts under pressure and then demands unearned assistance and protection. This new connotation displaces the original meaning of white fluffy frozen atmospheric precipitation. In Portland, both definitions apply.

In Portland it's "snowflake season," any three of which are grounds for total panic on the streets and roads, as snowflake drivers do everything wrong. Snowflake drivers are perpetually underequipped and overconfident

Even drivers that are severe weather capable and equipped can't do much about the seven vehicles in the road blocking progress ahead. Your driving skills can't do much about others blocking the road and locking progress to a standstill.

At KKPZ, I have used the approach of adaptation to conditions to increase "severe" weather resilience. Often, adaptation is an adventure in discovery.

Some years ago in "Radio Guide," I saw a segment entitled, "What's wrong with this picture?" In one particular photograph, the 3-inch FM transmission line penetrated the building just above the HV power supply cabinet. In this particular example, the take-away was that rain water could follow the transmission line into the building and enter the HV power supply cabinet. Far less obvious is that high temperature or flame from the HV power supply cabinet could ignite the transmission line jacket with fire following the transmission line up the tower.

It's never possible to outguess every eventuality, no matter how determined an engineer might be. Single points of failure can still become a problem. A recent prime example is close to home at a local facility housing multiple FM and TV transmitters. At 2:00 AM, the Portland area experienced a light – four ice pellets – ice storm which resulted with the loss of shore power. One local cluster has several transmitters at the location, including the flagship station for the Portland cluster. Generators fired up, transmitters returned to the air, and everyone relaxed.

This facility has several nice features, with multiple generators and a large reserve fuel tank. Each generator runs from a day tank, which is filled from the reserve tank by a small fuel pump. With multiple generators, diversity provides some resiliency to the cluster transmitters.

Additional redundancies are available, which came into play in the recent storm. After about two hours run time, generator number 2 failed, failed taking its transmitter off the air. Engineers arrived to discover a day tank fuel pump failure.

Although much like closing the barn door after the horse departs, the facility does have the ability to hand pump fuel from the reserve tank to be hand transported for filling the day tank. Once the day tank is again filled, the task becomes priming the injector system to restart the generator. Not exactly a simple task.

And now the rest of the story. While filling and priming generator #2, generator number #1, powering the cluster flagship station, shut down. Long story short, it turns out generator #1's day tank pump was powered from a circuit backed up by generator #2. Everything works fine until it doesn't, and when it doesn't, nothing works.

To me, this represents the obscure failure modes that are difficult to detect. These kinds of events are an example of the scenarios that keep the National Traffic Safety Board members up late at night. Pilots know this as an N+1 malfunction, when the number of events, N, exceeds the pilots ability to compensate by one additional failure.

Engineering credentials update: The broadcast engineer credentials program to assist travel during an emergency is operating and issuing credentials.

It's with sorrow that I am called on to report that Don McKay, a local broadcast engineer, an SBE Member, Amateur Radio operator and former VP of Engineering at OPB, has passed away. Don was very active in the broadcast engineer credentials program because he strongly supported broadcasting's duty to

serve the public need during a disaster.

I came to know Don as a close personal friend while working on the broadcast engineer credentials program. Don's dedication to the principals of a broadcaster's duty to provide service to the public contributed to the success of that program.

Don's deep faith colored everything he did, including his support of the credentialing program. Don had a sense of humor, which often provided a reality check. Since we were dealing with both politicians and bureaucrats, sometimes a reality check was really necessary.

I miss Don, although I know he has answered a higher calling. About now I expect he is tweaking the color balance on the cloud bank in preparation for a rainbow.

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

New Year

Happy New Year! I still cannot believe 2018 is already here. December was a slow month in Denver. I am always grateful for things to slow down a bit. I feel like I can catch my breath and get caught up on year-end cleanup. Getting rid of old files/emails. It's a good time to do some spring cleaning in my office.

ARCPlus

The ARCPlus units at our transmitter sites continue to plague us, never knowing if the time is correct or not. I can set them to use SNTP or set the time using the computer. Regardless, at random times, with no warning, the date and time will change and completely mess up things as pattern/power change is not on time. And because the unit thinks it is operating normally, I don't know about it unless I happen upon it. Because of this, I check the time every couple of days in hopes of catching this issue. I tried one last thing just this morning, changed the battery and followed the procedure Burk told me about. Only time will tell if it works.

Another issue I have been having is the units will reboot themselves without warning. I really wish the unit would reboot in its last state. Because it does not I get all sorts of alarms when I shouldn't because they are no longer muted. I am also waiting to see if the battery replacement will solve this issue as well.

Security Lights

When I did my quarterly tower inspections, I found that the KLZ west tower beacon flasher was intermittent. It was flashing, just at random. I went to check on it during the day and could hear the security light making a ton of noise. It was at this point I decided to replace the security light. We decided to go LED instead of sodium. I found a light at Home Depot that has the photocell built in as well. It seems to light the area up well and the photocell is very fast to react to dark. While doing this, we also replaced the flasher to the tower in case that was the issue. I guess it was, since the tower lights are flashing properly now.

Coming Up

January will finally be the month that we get the studio track light replacement completed. We have two production rooms and one office left to go. All the remaining parts came in the last week of December while I was on vacation. I look forward to getting this done. The new LED lights aren't as bright as the old lights, but they are easier on the eyes and don't create heat.

Only time will tell what else January will bring. So that about wraps up this edition, 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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