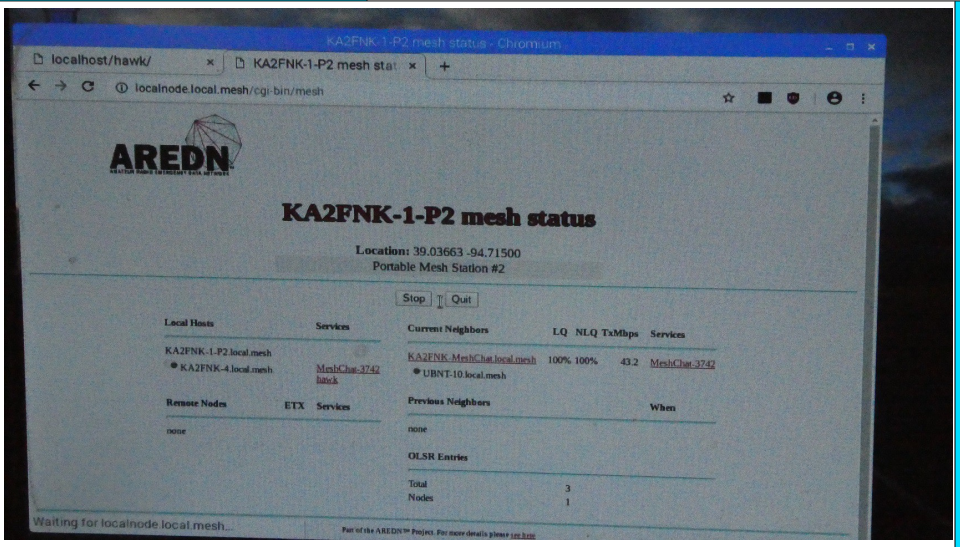
JOHNSON COUNTY RADIO AMATEURS CLUB, INC.
P.O. Box 93
Shawnee Mission, KS 66201

FEEDBACK

MARCH 2020



On February 14, President Bill Gery followed-up an earlier presentation with more information about modifying off-the-shelf components to build a self-discovering mesh network of amateur radio stations capable of passing high-speed digital traffic. The photograph shows the status page for an Amateur Radio Emergency Data Network (AREDN) mesh node.

MARCH MEETINGS

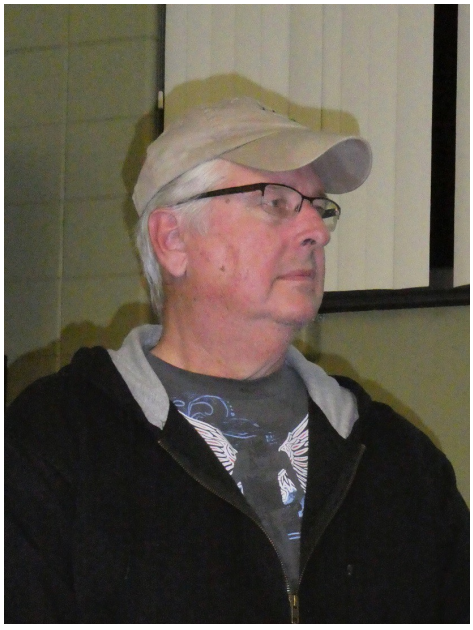
***March 13** -- Fusion Questions and Answers - Bill Brinker, WAØCBW*

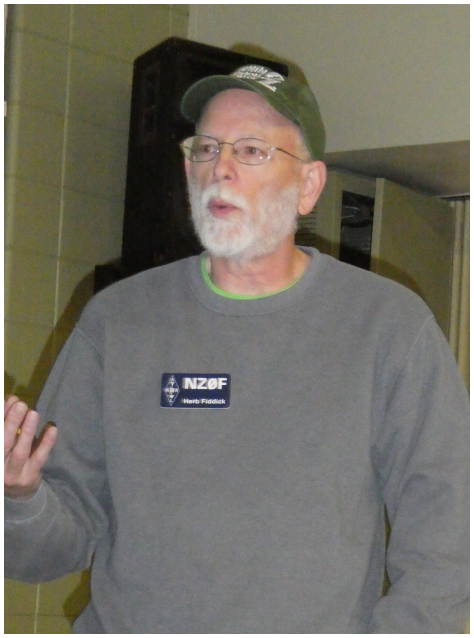
***March 27** – Backup Generator Project - Ted Knapp, NØTEK.*

The Johnson County Radio Amateurs Club normally meets on the 2nd and 4th Fridays of each month at 7:00 PM at the Overland Park Christian Church (north entrance), 7600 West 75th Street (75th and Conser), west of the Fire Station.

Much of the membership travels to the Pizza Shoppe at 8915 Santa Fe Drive for pizza buffet and an informal continuation/criticism/clarification of the topics raised at the meeting ... or anything else.

LEAVE THE CHURCH, TURN RIGHT (WEST) ON 75TH. TURN LEFT (SOUTH) ON ANTIOCH. TURN RIGHT (WEST) ON SANTA FE. THE PIZZA SHOPPE IS JUST PAST THE SONIC ON YOUR LEFT.





On February 28, public service warriors Steve Rainey, WDØDPB, and Herb Fiddick, NZØF explained the "hows", "whys" and joys of public service operation. *All photography by NØCVW.*

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A publication of the
Johnson County Radio Amateur Club, Inc.

Bill Gery, KA2FNK, President

Jaimie Charlton, ADØAB, Vice President

Ted Knapp, NØTEK, Secretary

Cal Lewandowski, KCØCL,Treasurer / FEEDBACK distribution

* * *

Chip Buckner, ACØYF, Editor

Charlie Van Way, NØCVW, Photography

Deb Buckner, KDØRYE, Contributing Editor

All email addresses are available at w0erh.org

First Time Visitors During February

Chan Masselink - KBØECO

Jason Jenkins - KEØYRP

PRESIDENT'S CORNER

March has started will really nice weather. Hope this trends continues. For me that would aid in getting some tree limbs trimmed and clear of my HF antennas. These antennas have taken a beating from these limbs and need so care.

For Field Day 2020, Jay (WJØX) has already asked for and received this permit for park. Yes we will be in the same location as the last several years. We will have a planning meeting most likely April 21. When is Field Day 2020? June 27-28, so please mark your calendars. We will start setting up Friday afternoon.

Watch Larry's List for upcoming public service events. We are planning to have a workshop on mesh networks. We will announce the location and time of the workshop on Larry's list.

We are looking into having several hands-on building programs this year. At the present the first may be a hand held radio direction finding kit.

– Bill Gery – KA2FNK

Johnson County Radio Amateurs Club - February 14, 2020

Meeting Date: Friday February 14, 2020. The meeting Started at 7:00PM.

Attendance: Self introduction with name and call sign. 28 signed the check in sheet. This was followed be the Pledge of Allegiance.

The Minutes from the January 24, 2020 meeting were read and accepted unanimously.

The Treasurer's report, as follows, was read and accepted unanimously.

Cash on Hand	$ 90.00	Repeater Operating Reserve	$ 1,523.83
Checking Account	$ 952.97	Memorial Fund	$ 310.00
Savings Account	$ 13,611.62	Active Members	145
PayPal Account	$ 0.00		
Total	$ 14,654.59		

Old Business:

- We welcomed all 1st time visitors to the meeting.
- Repeater Update – All are working well.
- Field Day 2020 – This year's Field day will be June 27 – 28. We have again secured the Old Hutton Farm at Shawnee Mission Park. This is the same location we had last year.

New Business:

- None.

Reports:

- 6 m – N0CRD has a 6m Repeater local in Olathe. Frequency is 52.97 MHz with an offset of -1.7 MHz and a tone of 91.5 Mhz.
- 10 m SSB Roundtable – NR.
- 40m SSB Roundtable – 5 participated on February 13.
- Fusion Digital 440 net – 15 Check-ins on February 12 and 13 Check-ins on February 5.
- 2m Wheat Shocker net – 11 Check-ins on February 13 and 17 Check-ins on February 6.
- HF Activity – Japan on 160m CW around 6:00 AM.

Announcements:

- ARRL DX CW Contest – February 15-16.
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:23 PM.

Program:

- The Program for this evening was an update on mesh networks by Bill Gery, KA2FNK.

Submitted by Ted Knapp, N0TEK, Secretary.

Johnson County Radio Amateurs Club - January 28, 2020

Meeting Date: Friday February 28, 2020. The meeting Started at 7:00PM.

Attendance: Self introduction with name and call sign. 33 signed the check in sheet. This was followed be the Pledge of Allegiance.

The Minutes from the February 14, 2020 meeting were read and accepted with 2 opposed votes.

The Treasurer's report, as follows, was read and accepted unanimously.

Cash on Hand	$ 90.00	Repeater Operating Reserve	$ 1,552.83
Checking Account	$ 493.72	Memorial Fund	$ 310.00
Savings Account	$ 13,911.62	Active Members	146
PayPal Account	$ 0.00		
Total	$ 14,495.34		

Old Business:

- We welcomed all 1st time visitors to the meeting.
- Repeater Update – All are working well. Bill Brinker, WA0CBW reminded those that have a PDN or Hot Spot on Fusion need to have a "control operator" present at all times per FCC requirements.
- Field Day 2020 – This year's Field day will be June 27 – 28. We have again secured the Old Hutton Farm at Shawnee Mission Park. This is the same location we had last year.

New Business:

- Bill Brinker, WA0CBWinformed the Club that Yaesu is running another special on their DR-2X FM/Fusion Repeater. The price is normally $1,795. They are currently on sale for $700. A motion was to purchase one of these DR-2X Repeater while they are on sale. The motion was seconded and passed unanimously.

Reports:

- 6 m – NR.
- 10 m SSB Roundtable – 5 participated on February 27.
- 40m SSB Roundtable – 2 participated on February 26.
- Fusion Digital 440 net – 15 Check-ins on February 26 and 9 Check-ins on February 19.
- 2m Wheat Shocker net – 17 Check-ins on February 27 and 13 Check-ins on February 20.
- HF Activity – NR.

Announcements:

- ARRL DX SBS Contest – March 7-8.
- A Bill was recently introduced in the Kansas Senate (SB 441) relating to distracted driving. In the Bill they have excluded amateur or ham radio devices for the definition of "wireless telecommunications devices". Thanks go to Steve Waltz, K0UO for working with the legislators to exclude ham radio from this Bill.
- Campfire at Ensor Saturday February 29.
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:38 PM.

Program:

- The Program for this evening was Public Service Events by Herb Fiddick, NZ0F and Steve Rainey, WD0DPB.

Submitted by Ted Knapp, N0TEK, Secretary.

A Hambone Story - Jaimie Charlton, ADØAB

Hambone and Trouble Beneath the Noise Floor

The school year is in full swing in fly-over country with no prospect of a day off in sight. The clock says it's midday, but the heavy sky lets through only the gray shades of light putting that in doubt. Although it's a cool thirty degrees or so outside, Hambone is hot inside the lounging/eating/drinking and partying room of his frat house.

"That guy really pisses me off! He thinks he's king of DX with his JT65 and other dumb modes."

"C'mon bro, tell me what you really think," responded Dude to Hambone's continuing diatribe.

"You know who I mean, Marty, Marty Pestle. That tall skinny senior with the girlish giggle. I think his real name is Mortimer, but he insists on being called Marty.

He's always bragging about how many countries he's logged or awards he's gotten. Whenever we're comparing our contest results, he always chimes in with something he's done that's better."

"You mean when you're bragging about your results, he out-brags you, don't you?"

"Shut up."

"Okay, but my shutting up doesn't change the fact that he's really racking up the countries towards his DXCC wallpaper. I think he's way ahead of you and he just started," added Dude with a smirk.

"Yeah, he's way ahead of me. But it's his laptop that should get the award, it does all the work. He just presses a button. He says the old-time ham trying to pick a beep or two out of the noise – he means me – is being replaced by the new digital guys, like him. He says that even his laptop's 'ears' are better than mine. It can hear signals below the noise floor, which I can't do. I don't understand how that's even possible."

"Hammy, you're older than me, you're a ham and you do spend a lot of time trying to find something going beep in the noise. I think that guy's right." Jumping aside to dodge the empty can Hambone threw at him, Dude bumped smack into the tall skinny guy with the girlish giggle.

"Hey, excuse you, Dude," said Marty. "Hambone, why do you keep letting your little bro hang around here? Is it because he's better at CW than you? I hope he's not making contacts for you. He's unlicensed you know.

By the way, I logged another country today so I'm that much closer to a DXCC award. For you, the bands are down, for us digital guys, they are always open."

"I hope your computer enters those contests as a single operator because it sure doesn't get any help from you," retorted Hambone. I think I'll make some more contacts, see ya."

"Geeze, I hate that guy." muttered Hambone to no one in particular.

Later, in Uncle Elmer's ham shack

"Unck, I just don't understand it, how does that guy make all those contacts when I can't even hear a signal? He says he can, or his laptop can, read signals over 20dB below the noise. How is that possible?"

"I'm not surprised, Hammy, that your 'friend' is making the contacts with JT65 that he claims. I've tried it and it is truly amazing."

"So, that idiot is right, with his laptop's ability to hear signals under the noise, regular ham radio is dead?"

"Not exactly, JT65 or whatever the digital mode of the day happens to be, isn't a replacement for hams, it's a tool for hams to use and experiment with. You're too young to remember, but when SSB, single sideband, first came out, everyone said it spelled the end of AM and CW. But that didn't happen, did it?"

"Okay, Unck, I sort of see your point. CW and AM are both still here. But how can that software hear a signal where I can't hear anything but noise? It seems like magic."

"Hammy, it's not magic. You and the software aren't listening to the same signal. The noise you hear isn't the same noise the software is 'hearing'."

"Yes it is. I've seen it."

"Not really, Hammy. I've seen such demonstrations, too. They are impressive, but somewhat misleading.

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The story always goes that this marvelous new mode can pick out signals so weak that you can't even hear them. The demo usually shows an SSB receiver with a receiving bandwidth of around 2300 Hz playing only noise. Then, the demonstrator flips on his PC and lo and behold, it displays a signal. The implication is that this is nothing short of magic."

"That's what I said, Unck, it is magic."

"JT65 and other digital modes are amazing, but not magical. First, their transmitters concentrate their signal power into a very tiny bandwidth. Then, at the receiving end, their receivers select only that tiny bandwidth, decode it and apply forward error correction."

"I don't get it. I heard the noise, it was all over the signal."

"You're thinking of noise as just bothersome signal that happens to be on or near the frequency of the signal you really want to hear."

"Yeah, so?"

"It's not. You know that the signal you want to hear, your target signal, occupies a single or very small range of frequencies. That's why you have to tune it in, so to speak. You tune your receiver to accept that narrow range of frequencies. Ideally, you want your receiver to accept only signals within that narrow range. If the receiver isn't tuned to those frequencies, you don't hear your target signal."

"That's because the far-end transmitter is sending its power only on those frequencies, right?" asked Hambone.

"Right you are. Further, you would like your receiver to accept only the range of frequencies used by your target signal. That way, you get all of the sender's power that comes your way.

Noise is different. More specifically, thermal or white noise, is different. It's present on all frequencies. That's why it's called white noise, like white light includes all frequencies of light. You can see that for yourself by tuning your receiver off your target signal's frequency. The target signal goes away, but the noise is still there. In fact, it's everywhere."

"Unck, why don't we just turn off the source of that noise?"

"We can't. It comes from the jiggling motion of electrons in the wires and receiver components. We can reduce it by cooling the receiver components, but it never quite goes away.

The best way to talk about noise and signals is to use the power signal to noise ratio, S/N, which is really nothing more than the signal power, in watts, divided by the noise power, in watts expressed in dB or:

S/N = 10 log(signal power/noise power) dB.

There are other ways of expressing the relation of signals to noise such as (S+N)/N, which is signal plus noise to noise ratio. It's popular because it's a lot easier to measure than S/N. But we'll stick with S/N for now.

So, when your friend says he can receive signals with a signal to noise ratio of -10dB, he really means that the received signal power is 10 dB lower than the noise power or 10 dB below the noise floor."

"That's right, Unck, he calls it a negative signal to noise ratio. How can he possibly hear a signal that's down in the noise?"

"Think about it this way, Hammy. Since the noise is present on all frequencies, the wider the receiver's bandwidth, the more noise it will pick up. Let's say you start with your receiver set to a zero Hertz bandwidth. You pick up nothing. As you open up, or increase the receiver's bandwidth, you start to receive the target's signal plus some noise. As you increase the receiver's bandwidth, you get more and more target signal until the receiver's bandwidth equals the target signal's bandwidth. At this point, you're getting all the target signal there is. Further increasing the receiver's bandwidth doesn't get any more of the target signal but it does get more noise."

"I think I get it. You want the receiver to accept only the range of frequencies you are trying to receive and no more. Because if the receiver accepts more, it's accepting only noise. That's why the wider the bandwidth the louder the sound coming out of the speaker."

"That's right. It's all about limiting noise power by limiting bandwidth. Since noise power varies in proportion to the bandwidth, to cut the noise power in half, you have to cut the bandwidth of the receiver in half. But that's pretty easy to do with digital filters.

The JT65 signal is composed of 65 tones occupying a total bandwidth of about 178 Hz. Each tone or symbol occupies only about 2.7Hz of bandwidth. Therefore, to decode each symbol, you

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only need to look at 2.7Hz of bandwidth centered on that symbol's frequency. This is part of what the software does, it narrows its bandwidth to only about 2.7 Hz per tone."

"Oh, I think I see what's happening," said Hambone. "When I hear the noise through the receiver's speaker, I'm hearing the noise in 2300Hz of bandwidth. But the decoding software is hearing the signal after having its bandwidth limited to about 2.7Hz. That's a lot less noise."

"Yes! You're getting it!", cheered Elmer. "By reducing received bandwidth to that of the transmitted bandwidth, you greatly improve the signal to noise ratio. In fact, there's a formula that tells how much of an improvement you can expect. It goes:

S/N narrow bandwidth = S/N dB + (10log(wide BW/narrowBW)) dB"

"Okay Unck, let's put in some numbers that guy was bragging about. His receiver was set to 2300Hz bandwidth and he said he was receiving a signal with -10dB signal to noise ratio.

S/N narrow BW = -10 + (10log(2300/2.7) dB

S/N narrow BW = -10 + (29.3) = 19.3 dB

WOW! With just that filtering, the decoder is seeing a signal with a signal to noise ratio of 19dB. That's really strong. No wonder it can read it."

"But Hammy, it gets better. JT65 also uses forward error correction, or fec, to improve the signal even more. That's why it seems to be so amazing."

"Well," sighed Hambone, "I guess that guy is right. With its fine filters and error correction, it is a better operator than I am."

"Not so fast," said Elmer, trying to cheer things up a bit. You also have amazing abilities. In fact, you have the best fec of all right between your ears. You can tell when a garbled signal doesn't make sense and then figure it out, most of the time."

"He probably is a better operator than Hammy," said Dude, who slipped unnoticed into the ham shack and now, into the discussion. "But, maybe not. I may just be an unlicensed kid hanging around the frat ham shack, but I did notice that guy logs a lot of contacts during the day when he should be in class. If he sets his station to run by itself without him being in control, none of those contacts is valid."

"I never thought he might be cheating!" exclaimed Hambone. "I just thought that those digital modes were extremely good."

"Maybe it's a little of both," mused Elmer. "Why don't you two do a little digging, maybe even set a trap. Letting a station run without anyone in control is against the law. I'll be interested to see what you find.

But now, it's lunch time. C'mon, I'm buying."

>> JCRAC FEEDBACK <<<

Recovery of the Titanic Radio Room

Dan B. Maloney, N7DPM, writes a series on "The $50 Ham" for hackaday.com. In March, he tood a break from coaching new hams to comment upon the Marconi room on the RMS Titanic, its 5kw transmitter, the use of 300 and 600 meter bands and current efforts to salvage the gear. He writes:

During her brief life, Titanic *was not only the most elegant ship afloat but also the most technologically advanced. She boasted the latest in propulsion and naviagation technology and an innovation that had only recently become [avaiilable], a Marconi wireless room, used both for ship-to-shore and ship communications.*

The radio room of the Titanic *landed on the ocean floor with the bow section of the great vessel. The 2.5-mile slow-motion free fall destroyed the structure of the room, but the gear survived relatively intact. And now, more than a centure later, there's an effort afoot to salvage that gear, with an eye toward perhaps restoring it to working condition. It's a controversial plan, of course, but it is technologically intriguing, and it's worth taking a look at what's down there and why we should even bother after all these years.*

The rest of the article,which includes a diagram of the Titanic's Marconi radio, photographs, bits of history and links to further refernces, appears at *hackaday.com/2020/03/04/raising-the-titanics-radio-room*