



# The Wave Bender

October 2020

AWARD WINNING NEWSLETTER



## WRARC PREZ

Hello everyone,

I hope that this issue of the wave bender finds you all in good health. I would assume you've all been washing your hands and not touching your faces. As you all know, the meeting had to be canceled. Originally I had inquired to some of our health care inclined members and some other friends of mine in the field, and we had all agreed that as long as we followed the CDC and WHO guidelines the meeting could take place. However the Governor had other plans a few hours after I had made the decision. Nothing yet is known about if we will be able to hold our meetings at this time.

Along with our meetings a few of the workshops and events I've been working on will also be postponed until later times. Nothing had been set in stone yet so the dates are going to be more fluid for those.

Now with many of you being off work or working from home, this is a great opportunity to get on the air. The line of work I'm in, we are on the front lines of battling the Covid-19 pandemic so I am working even more than normal. I would like to hear some of your on air stories, contacts you've made, maybe a new DX station you've never worked before.

This is also a great time to try building an antenna. There are many different antennas from simple dipoles and 1/4 wave verticals all the way up to end fed antenna, half wave antennas, yagis or even magnetic loops. The end fed myself, I've never been able to build, and have work, for some reason. Must be my impatience for winding a balun. Hi hi

I, along with the rest of our Board, will be trying to keep everyone updated with any changes to meetings and events. As always, if you have questions or just want to chat about something, feel free to give me a call. On the phone or on the radio I've been hanging out listening on 52.525, 146.520, and 146.575.

73 - WF8U, Chris  
WRARC/President



### Electrical Teaser

Does resistance in series decrease or increase the current?  
Think about it for a bit.

If you just can't figure out  
the answer to this teaser with a pictorial appears on page 12.



## FROM OUR VP

Hello once again. These months seem to go by quickly enough even though we are still so far from normal existence and here we are again facing a new month. I hope you are all well. As has been the case in the last several months, there is not much to tell. Please share with us any Amateur Radio related activities you have been doing. We would love to read about anything and everything you all are doing. Sharing our thoughts and stories helps us to still feel connected.



We still don't know when in person general meetings will resume as we are still under state COVID restrictions as to how many can gather and we exceed the limit of no more than ten in any group. In addition, I was in touch with Davidsons in early September, although I didn't get the opportunity to speak directly to Mr. Davidson this time. However, I was informed that they are only doing carry out on Monday, Tuesday, and Wednesday evenings, not opening until 4:00 PM at that! There is indoor dining with limited capacity as per state guidelines on Thursday through Sunday. There is some mechanism in place for private parties during the times the public is not coming in, but I don't have the details on this. It looks to stay this way for a while.

We also know for sure that the Peace Race will be done as a virtual event this year, they will not need us this time. As for a plan for next year, I don't have a date for it in 2021 yet. I have not yet heard from the Youngstown Marathon organizers as to whether there will be that smaller 5K run event on their originally scheduled race date that they talked about earlier. Still, "save the date" of October 25 just in case!

I guess that's the sign of our times for sure in that more things get cancelled or modified in some way than continue on as originally scheduled these days all for our protection to keep us all as healthy as possible. Some day we will be back to normal. Hang in there!

While we are all hanging in there, it's a good time to think about the nominations for the next offices up for election as soon as we can get back to meetings. The offices to be filled are Vice President and at least one trustee's position. Think about nominating yourself for one of them. Fresh ideas from new folks on the board are always good! It takes all of us working to keep things going.

Over the last couple of weeks, we have done a just for fun club activity on simplex on Sunday mornings. We are having a 2-meter simplex net on 146.565 to check out what our own equipment can and cannot do. Antennae, radios, locations, etc. all being explored for how far in our area we can reach on transmit and receive. It's been fun. We have had a good mix of strong base stations with really good antennas, mobile units with car top antennas, and HTs. We started out operating on 5W of power then upped it to 20W. We have gotten a good feel for relays of contacts to net control depending on who can hear whom. Not surprisingly, some can hear more than others depending on equipment and location. This is a for fun activity that can help keep us connected to each other during this time when we can't have in person meetings. Join in on Sunday mornings at 9:00 AM on 146.565. You can contact Steve, KC8SOY, for more information. Take care 'til next time - Stay well.

73 - Maureen. KD8NXS

## WHAT IS AN **Elmer** ?

What's an Elmer? An Elmer is an experienced Ham who mentors beginners, would-be Hams, or the less experienced, advancing their knowledge in a personal way, usually with much hands-on radio operation and oversight. Finding a good Elmer can be a huge advantage for rapidly moving ahead with your Amateur Radio.

In short, almost everyone that is a HAM (Amateur Radio Operator) is an "Elmer." Because, we are all friends, and we help each other. Some Hams know more than others. The term Elmer first appeared in the March 1971 issue of QST magazine. In that issue, Rod Newkirk, W9BRD, called them "the unsung fathers of Amateur Radio." . . . There are lots of websites and mailing lists that are geared towards helping people become better amateur radio operators, and There is a list of knowledgeable WRARC Elmers, on page 4 of this newsletter, waiting to answer your questions. Remember, "**the only dumb question, is the one you don't ask.**"

A FEW WORDS FROM ROSE

Greetings to all. I hope everyone is safe and observing all the Covid-19 rules.

I am happy to say that thanks to one of our Elmers, Steve KC8SOY, I am back on the Friday night net. I was off the net for quite a few months, due to the fact that the antenna I was using at the time was too short to reach out to the repeater. Steve was kind enough to replace the short antenna with a higher eighteen-foot antenna, (unfortunately I do not know what kind of antenna he used.) He did this



Friday, August 21 in the morning and I was able to transmit that night on the net and was received from everyone checking in that I was coming in loud and clear. Because of that change over, I am now back doing the net control and enjoying every bit of it. I missed doing it. I hope this information will help those new and existing members who need help to rely on our Elmers to give you a hand. I also hope to hear some new voices checking in on Friday nights with whoever is doing net control.



I am hoping our General Meetings will be returning soon and all our members will be sticking around for that day. Until then, have a safe remainder of the year.

73 - Rose, KD8TII  
WRARC/Trustee

THANK YOU FROM YE ED



Just a sort note thanking those of you who took the time to write an article, send a Joke, or take a picture. You are what makes our newsletter a winner in so many ways, and makes my job so much easier. Now that I'm not there to participate in all the fun things y'all are doing, I can no longer tell you all what a good time I had doing them with you. I have to rely on all of you to tell those fun stories. Please don't be shy - Those stories are more important than ever. I'm so proud to be a member of WRARC! Thanks in advance for the stories and pictures you will be sending me - hint, hint. Sorry, no pictures were taken from any meetings lately because of that covid thing. Sure hope we can get back to our 'normal' activities very soon!

73 & 33 - Jane, K8JAA  
WRARC/NL Editor



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CONTACT WRARC ELMERS WITH YOUR QUESTIONS - [QUESTIONS@WRARC.NET](mailto:QUESTIONS@WRARC.NET)

Fabry, Steve KC8SOY  
Haren, Roy KD8IJF  
Williams, Russ NR8W

Yaesu FT8900, FT8800, Mobile  
???  
Electrician, tele-data, Amateur  
Extra

kc8soy@yahoo.com  
harens@juno.com  
rwiliams@neo.rr.com

Articles from members for the Wave Bender are encouraged. They must be received by the editor by the 20th each month. Please send your articles to: [k8jaa@arrl.net](mailto:k8jaa@arrl.net), and put WRARC on the subject line of your email.

Join us for the WRARC Friday night Net 9:00 P.M.  
KD8DWV - 145.270, PL -110.9

WRARC Simplex Frequency 146.565

**Mahoning County ARES® Nets**  
1st Monday 8.40 PM ET W8QLY Repeater - 146.745 (PL 110.9)  
&  
3rd Monday 8.40 PM ET W8QLY Repeater - 146.745 (PL 110.9)  
ARES thanks MVARA for the use of their repeater

W8SGT is facilitating The Ohio HF net every Tuesday - 7:00 PM  
The net is run from the State of Ohio EOC on the  
Ohio ARES Admin frequency 3875 kHz LSB  
moves to 7240 Khz after 20-min.  
All are welcome to check in.

The Ohio ARES/OES Digital Emergency Net held every Tuesday at 8:00PM.  
held on 3585 kHz USB.

Please note all digital communications are Upper Side Band.  
<http://www.http://ohden.org/> for net details. Net Manager Gary NJ8BB



*New Contest!*

October 3 & 4, 2020  
[foxmikehotel.com/challenge/](http://foxmikehotel.com/challenge/)

## Portable Operations Challenge

**New Contest for Portable Stations to Debut**

A new amateur radio contest for portable operators -- the Fox Mike Hotel Portable Operations Challenge (POC) -- will debut October 3 - 4. The event is aimed at leveling the competitive playing field between fixed stations and portable stations. Scoring for the POC, based upon a kilometers-per-watt metric, will be handicapped in favor of the portables. The contest is the brainchild of Frank Howell, K4FMH. Sponsors include National Contest Journal (NCJ) -- an ARRL publication -- but the POC will not be an official NCJ or ARRL contest.

"NCJ's role is to encourage hams who don't contest to give it a try," NCJ Editor Dr. Scott Wright, K0MD, said. "It will encourage activity by operators who are limited by real estate and do not have a full-blown contest station. Events like this stimulate more interest in contesting, and this will have an international scope to give chances to snare some new DXCC entities."

The contest rules say scoring will be calculated using the distance between stations (Maidenhead grid squares) in kilometers divided by power output in watts. Fixed (QTH) stations will compete against portable (P) stations on 80, 40, 20, 15, and 10 meters. Allowable modes include phone, CW, and digital. The exchange is call sign, station class (P or Q), consecutive serial number, and four-character grid square.

<<http://foxmikehotel.com/challenge/>>



FROM THE SECRETARY



I hope everyone is doing well, and safe! Not much to report since as those of us in Ohio, know we are extremely limited in how many people can get together. We can still legally only have 10 people at a time to have a meeting.

Many of us have found out that ham radio parts and equipment is all on backorder up to 4 months or was given no time frame at all! So my projects will have to wait till spring from the looks of it, unless we have a mild winter. I will do what I can now but will just have to wait like everyone else. Stay healthy -

73 Mike, KC8UNR  
WRARC/Secretary



Some pics of the hole for my tower

PS. Yes I know i need to bail the water. Once my parts are here I can get the base of the tower set up. 🛠️

MAYBE THIS IS YOU?

Could YOU be the one I'm looking for? This is the editor of YOUR Newsletter. We have plenty of room for YOUR article(s)! If something is of interest to you, odds are that we all will enjoy your thoughts and activities! Have a favorite radio? Have some reminiscing to do? Maybe you have a question for one of our Elmers. OR, a Tip or Trick you learned that would help one of YOUR WRARC friends. You are warmly invited to contribute! Don't worry about writing or formality - we can help you with that. Your article could go in this spot, or one bigger, next month!!



**Semi-Monthly  
Ham Community  
Breakfast  
Second and Fourth  
Tuesdays  
9:00 A.M.  
Eat 'n Park Restaurant  
in Austintown  
Join Us!**

## ARRL SEEKS NATIONAL CLUB COORDINATOR

ARRL is seeking a National Club Coordinator who will act as the primary point of contact for Section Affiliated Club Coordinators. Section Affiliated Club Coordinators work with clubs to foster and coordinate activities to promote recruiting and training of new radio amateurs, endorse ARRL membership, and impart a positive image of amateur radio within the community. In addition to maintaining lines of communication with Section Affiliated Club Coordinators, The National Club Coordinator will develop presentations for in-person audiences and electronic media.



The National Club Coordinator will also maintain affiliated club records and provide information and support to Affiliated Club Coordinators so they can assist clubs in keeping the ARRL affiliated club database current. This individual will also process applications from clubs seeking ARRL affiliation.

The National Club Coordinator will design, write, and produce a newsletter and contribute content for QST, the ARRL website, and social media venues. The incumbent will also represent ARRL at amateur radio events, deliver presentations on the work of ARRL and the value of membership, and interact with members on behalf of the organization.

The successful candidate will be able to conduct business in a professional manner, effectively represent ARRL at amateur radio events, and maintain productive working relationships and open communication between staff and the Field Organization. He or she will have at least 3 years of similar or related experience; past service as a club officer is a plus.

Applicants should have a 2- or 4-year college degree or possess job-specific skills acquired through on-the-job training or an apprenticeship.

The ideal candidate will exhibit courtesy, tact, and diplomacy on the job and be able to build relationships and solicit cooperation both within and outside the organization. Other skills include a working knowledge of Microsoft Office, desktop applications, online videoconferencing tools, and managing social media platforms.

For complete information on this opening, see the full job description, which includes instructions on how to submit a resume.



### To ARRL Members:

Members are reminded that there are contested elections in the Dakota, Great Lakes and Midwest Divisions. Unfortunately, incorrect information regarding the use of electronic balloting in ARRL Division elections was disseminated in the Midwest Division. ARRL does not use electronic voting. The only way you will be able to cast a vote is by U.S. Postal Service mail and, as a member driven organization, we urge you to participate by casting --mailing in -- your ballot. Ballots will be mailed out to members, accompanied by photographs of each candidate and a 300-word statement (if provided by a candidate) by October 1, 2020.

If you do not receive your ballot by October 16, please contact [cpereira@arrl.org](mailto:cpereira@arrl.org).  
Thank you for being a loyal member of the ARRL.

The Ethics & Elections Committee of the Board of Directors,  
Fred Hopengarten, K1VR, Chairman  
Jeff Ryan, KORM  
Mike Ritz, W7VO

### SOLAR CYCLE 25 HAS BEGUN

Solar Cycle 25 is officially underway. NASA and NOAA made the announcement during a media teleconference earlier today. According to an international panel of experts, the sunspot number hit rock bottom in Dec. 2019, bringing an end to old Solar Cycle 24. Since then, sunspot counts have been slowly increasing, heralding new Solar Cycle 25.



Click here to view NOAA's interactive sunspot plotter  
<<https://www.swpc.noaa.gov/products/solar-cycle-progression>>

"How quickly solar activity rises is an indicator on how strong the next solar cycle will be," says Doug Biesecker of NOAA's Space Weather Prediction Center, co-chair of the Solar Cycle 25 Prediction Panel. "Although we've seen a steady increase in sunspot activity this year, it is slow."

The panel believes that new Solar Cycle 25 will be a weak one, peaking in 2025 at levels similar to old Solar Cycle 24. If their prediction is correct, Solar Cycle 25 (like Solar Cycle 24 before it) will be one of the weakest since record-keeping began in 1755.

"While we are not predicting a particularly active Solar Cycle 25, violent eruptions from the sun can occur at any time," warns Biesecker. Indeed, even Solar Minimum can produce a superstorm, so Solar Cycle 25 should not be taken lightly despite the panel's low expectations. Radio blackouts, power outages and severe geomagnetic storms are possible in the years ahead. <https://spaceweatherarchive.com/2020/07/29/the-solar-minimum-superstorm-of-1903/>



## SOLAR CYCLE 25 - CONTINUED FROM PAGE 8

Above: Solar Cycle 25 auroras photographed on Sept. 14, 2020, by Jani Ylinampa in Finland.

For now, solar activity should remain generally low. Sunspot counts still have a long way to go before they reach levels typical of Solar Maximum. For the rest of 2020, periods of quiet will be occasionally interrupted by minor solar storms, with only a slight chance of big events.

On the bright side, the first Northern Lights of Solar Cycle 25 are dancing around the Arctic Circle right now, and the coming season for aurora watching promises to be the best in years. Stay tuned! <[https://spaceweath-gallery.com/aurora\\_gallery.html](https://spaceweath-gallery.com/aurora_gallery.html)>



## AIR FORCE RESEARCH LABORATORY TRACKS SPORADIC E

Researchers at the Air Force Research Laboratory (AFRL) in New Mexico have discovered a new way to track and characterize sporadic E, which occurs when large structures of dense plasma form naturally in the upper atmosphere. These plasma structures, which occur at mid-latitude locations around the world, can affect radio wave propagation in both positive and negative ways. VHF enthusiasts frequently take advantage of sporadic-E propagation (or E-skip) to work stations outside of their local area.

“Previous methods to observe these structures were insufficient for identifying and tracking these structures over large regions,” said Ken Obenberger, a research physicist at AFRL. “It would be advantageous to actively identify where these structures are, where they are going, and how dense they are. And we thought we could find a better way.



“The new method, developed by Obenberger and collaborators at AFRL and the University of New Mexico, leverages unintentional RF emissions from power lines, and using broadband radio noise, they can map and track dense sporadic-E structures.

**The Long Wavelength Array at Sevilleta National Wildlife Refuge is capable of imaging the entire sky at once, allowing AFRL scientists to track and characterize sporadic E. The facility consists of 256 dual-polarization dipoles. [Ken Obenberger, photo]**

“Since power lines are widespread, we can observe sporadic E over a very large region surrounding our observatory, the Long Wavelength Array (LWA), an asset of our collaborators at the University of New Mexico,” Obenberger said. “This technique could be used anywhere in the world where there is an electrical grid and an instrument similar to the LWA, and we are lucky because there are not many. ”This kind of technology could be of interest to those who rely on HF and VHF frequencies, such as radio amateurs, mariners, broadcasters, and the military.

Radio amateurs have long taken advantage of sporadic E for long-range communication in the VHF bands, such as 6 and 2 meters. Climatology of sporadic E can provide a probability that it will occur, but the actual presence of sporadic E can only be determined through trial-and-error observations.

“This is similar to how meteorologists can predict how likely thunderstorms will occur in the afternoons above New Mexico during monsoon season, but use Doppler radar to identify and track specific thunderstorms as they occur,” notes Chris Fallen, KL3WX, one of Obenberger’s collaborators at AFRL. “Ken’s technique basically provides weather radar for sporadic E, only using radio noise from power lines as the radar transmitter. ”Having accurate “now-casting” of sporadic E could prove critical during disaster situations where hams may play a key role in supporting communication of vital information.

“Better understanding will lead to improved design and use of radio systems that mitigate the negative effects and take advantage of the good effects, thereby ensuring a stronger emergency communication network,” Obenberger said. “We are interested in sporadic E and the effect it has on radio wave propagation, both good and bad.” — Thanks to Joanne Perkins, Air Force Research Laboratory



## FCC PROPOSES TO REINSTATE AMATEUR RADIO SERVICE FEES



Amateur radio licensees would pay a \$50 fee for each amateur radio license application if the FCC adopts rules it proposed this week. Included in the FCC's fee proposal are applications for new licenses, renewal and upgrades to existing licenses, and vanity call sign requests. Excluded are applications for administrative updates, such as changes of address, and annual regulatory fees.

The FCC proposal is contained in a Notice of Proposed Rulemaking (NPRM) in MD Docket 20-270, which was adopted to implement portions of the "Repack Airwaves Yielding Better Access for Users of Modern Services Act" of 2018 —the so-called "Ray Baum's Act."

The Act requires that the FCC switch from a congressionally mandated fee structure to a cost-based system of assessment. In its NPRM, the FCC proposed application fees for a broad range of services that use the FCC's Universal Licensing System (ULS), including the Amateur Radio Service that had been excluded by an earlier statute. The 2018 statute excludes the Amateur Service from annual regulatory fees, but not from application fees.

"Applications for personal licenses are mostly automated and do not have individualized staff costs for data input or review," the FCC said in its NPRM. "For these automated processes —new/major modifications, renewal, and minor modifications—we propose a nominal application fee of \$50 due to automating the processes, routine ULS maintenance, and limited instances where staff input is required.

"The same \$50 fee would apply to all Amateur Service applications, including those for vanity call signs. "Although there is currently no fee for vanity call signs in the Amateur Radio Service, we find that such applications impose similar costs in aggregate on Commission resources as new applications and therefore propose a \$50 fee," the FCC said.

The FCC is not proposing to charge for administrative updates, such as mailing address changes for amateur applications, and amateur radio will remain exempt from annual regulatory fees. "For administrative updates and modifications, which also are highly automated, we find that it is in the public interest to encourage licensees to update their own information without a charge," the FCC said.

The FCC also proposes to assess a \$50 fee for individuals who want a printed copy of their license. "The Commission has proposed to eliminate these services—but to the extent the Commission does not do so, we propose a fee of \$50 to cover the costs of these services," the FCC said.

The Ray Baum's Act does not exempt filing fees in the Amateur Radio Service. The FCC dropped assessment of fees for vanity call signs several years ago.

Deadlines for comments and reply comments will be determined once the NPRM appears in the Federal Register. File comments by using the FCC's Electronic Comment Filing System (ECFS), posting to MD Docket No. 20-270. This docket is already open for accepting comments even though deadlines have not yet been set.




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## BIRTHDAYS THIS MONTH

**Jane Avnet, K8JAA**  
**Bill Davis, K8TUS**  
**Chris Monske, WF8U**  
**John E. Bailey, N8VPD**  
**Bill Egan, KD8HCQ**

**Shirley Boles, KD8SSB**  
**Maureen Stein, KD8SNX**  
**Bryan Bartzi, KF8G**  
**Doug Sage, KB8TPG**

CANDIDATES SET FOR 2020 ARRL DIVISION ELECTIONS

The candidates for the 2020 ARRL Division elections are now official. ARRL members will choose between two candidates for Director in the Dakota and Great Lakes Divisions in this year's election cycle, and from among three candidates for Vice Director in the Great Lakes Division and between two candidates in the Midwest Division. In the Atlantic and Delta Divisions, incumbents are unopposed for both Director and Vice Director. In the Dakota Division, the sitting Vice Director is running unopposed, while in the Midwest Division, the current Vice Director is the only candidate for Director.



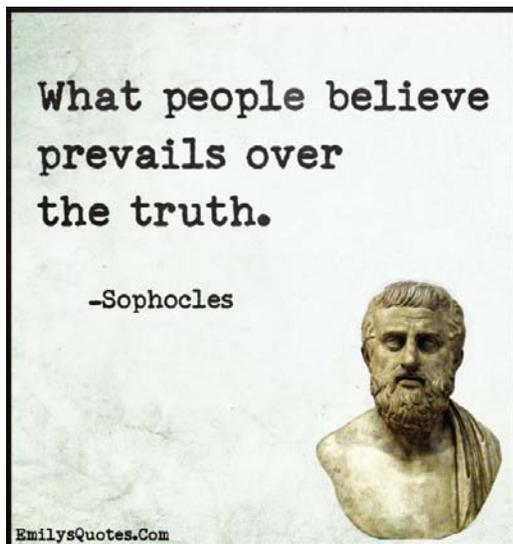
**Declared Elected Without Opposition**

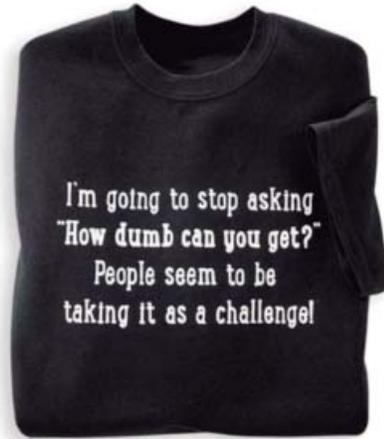
- In the Atlantic Division, Director Tom Abernethy, W3TOM, who has held the seat since 2015, and Vice Director Bob Famiglio, K3RF, elected to a 3-year term (2015 - 2018) and then appointed in 2019 to fill a vacancy when the incumbent stepped down.
- In the Dakota Division, Vice Director Lynn Nelson, W0ND, in office since 2018.
- In the Delta Division, Director David Norris, K5UZ, who's served in that office since 2012, and Vice Director Ed Hudgens, WB4RHQ, appointed in 2013.
- In the Midwest Division, current Vice Director Art Zygielbaum, K0AIZ, will become the new Director in January, succeeding incumbent Rod Blocksome, K0DAS, who is not seeking a new term. Zygielbaum has been Vice Director since 2014.

**Contested Seats**

- In the Dakota Division, incumbent Director Matt Holden, K0BBC, in office since 2018, is being challenged by Vernon "Bill" Lippert, AC0W.
- In the Great Lakes Division, incumbent Director Dale Williams, WA8EFK, who has held the seat since 2014, will face off against Michael Kalter, W8CI, who is treasurer of the Dayton Amateur Radio Association.
- In the Great Lakes Division, members will choose from among three candidates to succeed incumbent Vice Director Thomas Delaney, W8WTD, who is not running for another term. They are current Ohio Section Manager Scott Yonally, N8SY; Jim Hessler, K8JH, who is vice president of the Grand Rapids Amateur Radio Association, and Frank Piper, K18GW, Yonally's predecessor as Ohio Section Manager.
- In the Midwest Division, members will choose between Dave Propper, K2DP, a current Assistant Director, and Lloyd Colston, KC5FM, a past Oklahoma Section Manager, to fill the Vice Director's chair that Zygielbaum is vacating.

Balloting for contested seats will take place this fall. Votes will be counted, and successful candidates announced, in November.





JUST THINKING OUT LOUD (KINDA RANDOM)



It is often discussed what type of PR / Education can we do to get the youth and the public in general involved in the service/hobby. I will contend that most of us on this list got into the service/hobby long before there was the internet. I often hear people who say something along the lines "oh we need to get them into DMR etc etc etc" While I don't necessarily dislike the mode I do take exception that the way DMR mostly gets used and is nothing more than VOIP with a radio on each end instead of a phone. I'm seeing more and more "appliance operators" with no desire to learn anything more about the service/hobby than DMR or other digital modes. They seldom have any serious desire to get into any form of contesting, field day, public service etc etc etc.

This troubles me. Now I do understand that it's a big service/hobby and there is a lot of things for everyone to do but IMHO we are losing ground in the education department. Like many of us on this list we do a number of PR events where we're interfacing with the public at various levels. And I do listen to all of their comments. Soooo I've been thinking about this for some time and have some thoughts.

I personally don't think that most youth get all that much enthused that they can talk to anywhere in the world on a service that they recognize as not much different than any number of other services that do essentially the same thing with devices they already own and doesn't require a license. There is just no magic in DMR.

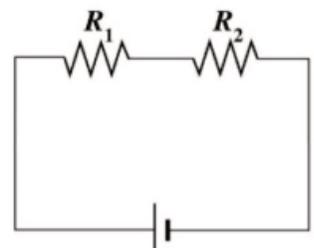
My question is could /should or would we be better off discussing how you can take this radio, gather these other parts, build their own antennas, assemble it together and get it working and on the air and talk to someone around the world who has done the very same and there is no additional layers of technology involved ... now that's what got me interested in the service/hobby A few youth / young adults I have already talked to and it really seems to grab them that we can do what all we can WITHOUT the internet. Now that seems magical.

Mike Urich, KA5CVH  
 PIO Harris County, TX ARES  
<http://ka5cvh.com>  
 From the ARRL PR reflector

We may be Volunteers, but we're professional.

Answer to Electrical Teaser:

Sometimes an extra resistor is added in series circuit in order to limit the current which is known as a current limiting resistor. Typically, the purpose of this resistor is to "Limit" or reduce the current in the circuit for certain applications. Here's the Ohm's Law equation for that:  $I = E/R$  - As the resistance goes up the current goes down. Try it out for yourself --- Use 12 volts for E and 10 ohms for the R and record your answer. Now change the 10 ohms to 20 ohms and see how your answer comes out.



# October 2020

PREPAREDNESS LEADS TO READINESS - MATT W8DEC



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	3
4 National Golf Day	5 ARES Net 8:30 PM 146.745 PL 110.9	6	7	8 National Pierogi Day	9 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	10
11 It's My Party Day	12 Columbus Day	13 Eat'n Park Austintown 8:30 A.M. Ham Community Breakfast	14 Take Your Teddy Bear to Work Day	15 National Grouch Day	16 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	17 Sweetest Day
18	19 ARES Net 8:30 PM 146.745 PL 110.9	20  Last Day WaveBender Articles Due	21	22	23 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	24
25 World Pasta Day	26	27 Eat'n Park Austintown 8:30 A.M. Ham Community Breakfast	28	29 National Cat Day	30 WRARC Net 9:00PM 145.270 Swap n' Shop Ask the Elmers	31 