

Nacogdoches Amateur Radio Club

2021 CLUB OFFICERS

Pres: Bill Rascher - KT5TE

Vice Pres: Steve Bartlett-WB5IDY

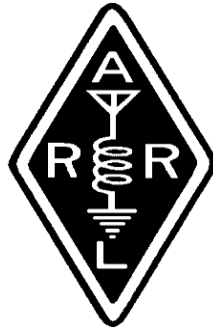
Sec/Treas: Army Curtis - AE5P

Visit our web site at

<https://w5nac.com/>

MISSION STATEMENT

The Mission of the Nacogdoches Amateur Radio Club is to support and promote Amateur Radio by public service, offering training to unlicensed interested parties and licensed Amateurs, mutual support of other Amateurs, engaging events that promote Amateur radio to the general public and other Amateur radio operators, and continuing fellowship by regularly scheduled organized meetings and events and having fun.



DECEMBER MINUTES

The December meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on December 2nd. This was our annual December meeting / Christmas Party and was celebrated with a dinner at the Fredonia Hotel. **President Bill KT5TE** opened the meeting at 6:05 p.m. Self-introductions were made of members and guests present. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

An outstanding dinner was had and enjoyed by all present.

Several club members paid 2021 dues at the meeting/dinner.

With the start of the New Year, club dues are payable to the club treasurer. Dues are just \$20 for the year, and cover all licensed Amateur Radio operators within a family. Dues can be paid to the treasurer at our January meeting or can be mailed to his callbook/QRZ address. New operators who obtained their first license through the NARC VE test sessions in 2020 are exempted from paying dues for the following year.

FROM THE PRESIDENT

A new year, a new location for meetings, but 2020 headaches still follow us. This year should prove to be very interesting and my hope is that in the months to come our world gets closer to normal. This past fall has been very distracting for me and because of that I haven't recorded any contacts in my main logbook. For 2021 I have plans to sit at my radio a little more often. Which means I'll have to plug it all back into the power supply and climb a tower to replace the rotator. In May 2019 I bought a new radio, but haven't received it yet because the radio is made in a state that keeps shutting everything down. This means everything from boards to components have stopped being manufactured or production just gets started then everyone is forced to shutdown the whole show. Minor items like rolling power outages

due to fires or just not enough power to go around didn't help.

Tom's (W5TV) tower was never taken down in November so maybe January will be a good month to disassemble his tower. So it is time to watch the weather closely for a good date. My wife Lauren helped me assemble my VHF tower, so maybe she'll help with Tom's.

Last month I mentioned that I was working on my Massey Ferguson no. 74 trip beam four bottom plow since the shares are plum worn out. New shares and new shins made a huge difference. For this spring we made a watermelon deal, so it looks like after the best melons are harvested we'll have melons the rest of the summer if the crows don't get to them. This puts the sprigging off until fall, but moves up the timeline up for running a fence between the lake pasture and the coastal burmuda hay field.

The idea of putting a HF radio in the cab is still on the drawing board, but maybe...

Now is the time to start thinking about the VHF roving contest in January. I'm working on making a few changes to the radio mounting setup. I have a new VHF/UHF antenna to replace the one I broke in Kansas City while on the way back from picking up the shoeing stocks. Lesson learned? Always look at a map and don't trust any GPS.

Hope you'll join us for the VHF contest.

73, Bill KT5TE

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FROM THE VP CHAIR

Don't Give Me No Static

Like most radio operators, I can't leave well enough alone and I am always fiddling with my gear hoping to improve it somehow. The soldering, building, and trying new ideas are probably the best parts of our hobby. Being a simple 100-watts-and-a-wire kind of a guy, I decided to elevate my wire antenna to about 50 feet. I found a remarkable improvement in my DX contacts to Europe, especially on lower frequencies. I also noted a decrease in the noise floor on most bands except on 40 and 80 meters, which were S7+. I was still able to work stations, but it was hard. Later, I noted that the noise floor had grown to S9 +10 with an angry saw tooth pattern showing on my scope. What have I done?

Radio Frequency Interference (RFI) is noise that reduces our ability to hear desired weak signals. RFI can emanate from household items, emitters, power utilities, computers, and probably space aliens. If you have a high noise floor, here are some steps to follow to play RFI detective:

First, it may be YOU! The most common culprits for RFI and other interferences are located inside your own home. Yep, one of your other toys may be causing the elevated noise including computers, routers, and chargers. To find the culprit, power your radio receiver on a battery. If you don't already have a good battery box for emergencies, now is the time to make one! Next, kill every circuit breaker in the house. At this point, your spouse will yell something we cannot print and you will be resetting all the clocks in the house to make things right. If the noise floor drops then you are on the right track. Turn on the

breakers one by one and check the noise levels by looking at your S Meter or Spectrum Scope until you find the circuit with the offending device. Once the general circuit is located, start removing or powering down every item on that circuit until you locate the offending noisy device. In my case, it was a USB charger (wall wart) at the other end of the house. I unplugged it and It made an unbelievable difference. The noise dropped from S9+ to S2 on 40 meters. Wow, there are actually people talking on the band now!

If killing the power in the house does not work, look for adjacent power system items like transformers, parallel power lines, LED lights, high pressure sodium lights, and PLCs used to control equipment. Moving your antenna away from the source or even changing the orientation can help. You can also use notch filters to reduce 60 Hz signal noise. Many quality receivers have filtering available to

attenuate some noise levels.

Check your own radio equipment. Some switching type power supplies generate noise, as well as your computer and even Wi-Fi routers or access points located near your receiver. I recently had a 60 cycle hum in my transmissions that was coming from a linear power supply in the shack.

As a last resort, if you can get access to a mobile HF radio and antenna, drive in the vicinity near your shack to see if you can locate the source by monitoring S meter levels or listening to QRN. Sometimes an AM radio, tuned to dead air, can also be used to generally find increased noise or static. Even a neighbor with a plasma TV can cause some serious interference. Killing your neighbors TV might involve some form of jail time and is usually not recommended. A Black Friday coupon for a new TV might be a good Secret Santa gift.

ARRL has compiled a list of audio samples and signal waveforms to help you identify possible sources of interference. They also have several good articles on all kinds of electronic interference including RF your equipment might be generating for your neighbor. Maybe payback for that plasma TV?

<http://www.arrl.org/sounds-of-rfi>

Don't simply accept noisy bands as bad luck of your particular QTH. It is possible to improve your reception in many cases. Seeking alternative solutions for RFI generators outside your property can be difficult. If removing RFI from your environment is just not possible, it may be time to get interested in SOTA and POTA ... Most bunnies and squirrels generate minimal interference.

Happy hunting!

73

Steve, WB5IDY

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NOTES FROM OUR EC

Happy New Year to one and all. Was Santa Clause good to you?

2020 was such a strange year. Corona Virus #19 played havoc with all of us. May were affected, some worse than others. Many of us have contracted it or have family or friends that have contracted it and sadly most of us know some who have passed because of it.

That being said, how much radio have you enjoyed?

Ray, W5NRF, said this event has given him more opportunities to use some of the new digital modes.

Who else has stretched out a little and tried some of the new modes or maybe even an old mode like RTTY or the ever popular CW? What was your experience, new contacts, re-newed contacts? Dr Tom, did you make your 6m contact to Alaska, yet?

My crystal ball is all frosted over, so I can't really make any good predictions of what 2021 will bring to us. It was just announced that Ham Com will not happen. I expect that 2020 will have a new meaning and become an "expletive deleted" type word, "How's the day been?" "It was a real 2020."

Some observations from the calendar, astronomy and tired after work. Dec 21st was the Winter Solstice, that day with the least number of daylight hours in the northern hemisphere.

The moon was waxing from half to full. As the days progress, the hours of light will lengthen and the moon will brighten leading up to the full moon on the 30th. Those thoughts and \$2.50 may get you a cup of coffee someplace.

Time to close out this missive. As always thanks to everyone for checking into our nets

73 de John Chapman
KC5MIB

kc5mib@arrl.net

VE TESTING

The December VE session saw five individuals present themselves for exams. Three members of the Keller family drove over from Crockett. Father David, KI5MHE, passed his Technician test in November, and upgraded to General this month. Son Calan, who also passed his Technician test in November, upgraded to

Amateur Extra this month. Another son, Elijah, in his first outing, passed his Technician test and is now KI5MTF. Doug Durham from Wells passed his Tech as well and is now KI5MTG, while Nic Farmer KI5KEZ from Converse, LA, who had passed his Technician test with NARC in June, was back to upgrade to General.

A first-rate showing and our congratulations to all five of these fellows.

Two big items regarding our VE testing program. Beginning with the October testing session, anyone who passes their Technician exam will be given a current copy of the ARRL General License Manual in the hope they will return to upgrade to General. It's important that we do all we can to promote new additions to our ranks.

Second, effective with the November VE testing, we will meet at the Nacogdoches County EOC, which is located off FM3314, just west of Loop 224. Turn off FM3314 at the soccer fields, and

continue west on the interior road to the EOC. This is the same location we used for our Field Day operation in 2019.

For the latest updates, please check the club website at:

<https://w5nac.com/ve-testing/>

73 de AE5P.

email: ae5p@arrl.net

TWO METER CLUB NETS

Remember to join us each week for the two meter nets sponsored by NARC. Each **MONDAY** is the **NARC ARES/RACES** net, at 8:00 p.m. on the club's 146.84 repeater (PL 141.3). Second, on **THURSDAY** evenings at 8:00 p.m. is the **Deep East Texas Skywarn Emergency Weather Net** on the 147.32 repeater (PL 141.3). Please join us for one or both.

NEXT MEETING

Our January 6th meeting will be a return to our normal face-to-face style, meeting at the City/County Emergency Operations Center off FM3314.

We will have our monthly book raffle, with everyone present receiving a raffle ticket without charge. One ticket will be drawn and the winner will be given a book on a ham radio subject.

Meeting will start at 7:00 p.m. Doors open at 6:30. Hope to see you there.

UPCOMING EVENTS OF NOTE

Mark your calendars for the following events coming up in the next few months. Full information on these events and much more can be found at <http://www.hornucopia.com/contestcal/contestcal.html>

Note that all dates shown here are local, CST dates while all contest logging uses UTC dates and times.

ARRL RTTY ROUNDUP

Jan 2 -3, 2021

<http://www.arrl.org/rtty-roundup>

NAQP - CW

Jan 9, 2021

<http://www.ncjweb.com/NAQP-Rules.pdf>

NAQP - SSB

Jan 16, 2021

<http://www.ncjweb.com/NAQP-Rules.pdf>

ARRL JANUARY VHF CONTEST

Jan 16 -17, 2021

<http://www.arrl.org/january-vhf>

CQ WW RTTY WPX

Feb 6-7, 2021

<http://www.cqwprrtty.com/rules.htm>

SHUTTLE COLUMBIA SPECIAL EVENT

STATION K5C

Feb 6-7, 2021

ARRL INTR. DX-CW

Feb 20-21, 2021

<http://www.arrl.org/arrl-dx>

SAN JACINTO DAY SPECIAL EVENT

STATION K5T

April 24-25, 2021

FEEDLINE LOSS and SWR

by

Thomas Atchison W5TV

Probably the most important question we raise regarding antenna systems is how well does the antenna system match the output of your transmitter so that maximum power is transferred to the part of your system that radiates the RF signal? We realize that we get the signal from the transmitter to the antenna using a transmission line or what is sometimes referred to as a feedline. This feedline usually consists of either a coaxial line or a parallel conductor line. For a coaxial line the RF signal that is generated by the transmitter propagates down the coaxial line as an electromagnetic wave that is basically contained inside the outer shield. For a parallel conductor transmission line the electromagnetic wave propagates down the dual wires but is not contained within a shield. For this reason many people prefer a coaxial transmission line, however, coaxial line usually has more loss per foot than parallel conductor line. We will determine how this may affect your choice later.

There is a characteristic impedance associated with every transmission line. The characteristic impedance of the transmission line is related to the physical construction of the line. Some factors are conductor size, space between conductors, and what insulation was used in the construction. Generally, the transmission line manufacturer will list the line impedance and there's nothing you, as a user, can do to change it. There are some things you can do to make your chosen feedline operate more efficiently.

In the typical ham station setup, a transmitter is connected to a feedline, which is then connected to the antenna. When you key the transmitter, it develops a radio frequency (RF) voltage on the transmission line input. The voltage travels down the feedline to the antenna at the other end and is called the forward wave. In some cases, part of the voltage is reflected at

the antenna and it propagates back down the line in the reverse direction toward the transmitter. The forward wave and the reverse wave interact so that at some points the voltage will be more and at other points the voltage will be less. That is, the two waves would add or subtract in such a way to create a resultant wave. We usually refer to this resultant wave as a standing wave. One measure of this standing wave is to look at the ratio of the maximum voltage to the minimum voltage on the wave. This ratio is called the voltage standing wave ratio (VSWR). This is one measure of how much of the forward wave was reflected at the far end. In particular, a smaller ratio means that less signal is reflected therefore more signal was transferred to the antenna. We usually refer to the VSWR as simply the SWR of the antenna system.

Most transmitters used in amateur communication have an RF output that has an impedance of 50Ω . Let's look at what happens when a transmitter is connected to a feedline with a characteristic impedance of 50Ω and the other end of the feedline is connected to an antenna with an impedance of 50Ω . For now, suppose that the feedline doesn't have any losses and the transmitter is producing a 100 W CW signal. If you were to look at the signal on the output of the transmitter with an oscilloscope, you would see a sine wave. The amplitude of the sine wave describes how much power the transmitter is producing. This wave of energy travels down the transmission line and reaches the antenna. If the antenna impedance is 50Ω , just like the feedline, then all of the energy is transferred to the antenna and it will radiate an electromagnetic wave. There is no reflected wave so the AC voltage along the transmission line is the same throughout the line and the SWR is said to be 1 to 1 (usually written 1:1).

The setup described above is under ideal conditions. In the real world, any feedline will attenuate the RF signal by a certain amount per foot depending on the frequency. For example suppose we want to set up a 100 watt transmitter for operation on 144 MHz. Assume the transmitter has an output impedance of 50Ω and we need a transmission line of length 100

feet. The following brief table shows the output we would have to the antenna:

| <u>Cable</u> | <u>dB Loss</u> | <u>Watts Output</u> |
|---------------|----------------|---------------------|
| Belden RG-58A | 5.5 dB | 28.4 |
| Belden RG-8X | 4.1 dB | 39.3 |
| Belden RG-213 | 2.6 dB | 55.1 |
| TMS LMR 400 | 1.5 dB | 71.0 |

This information was taken from the web site: [Coax Calculator \(qsl.net\)](http://qsl.net)

Note that we have not accounted for the loss that would occur if there is a mismatch between the transmission line and the antenna.

The following table show what the loss would be for several different values of SWR:

| <u>SWR</u> | <u>% Loss</u> | <u>% Output</u> |
|------------|---------------|-----------------|
| 1:1 | 0 % | 100% |
| 1.1:1 | 0.3% | 99.7% |
| 1.2:1 | 0.8% | 99.2% |
| 1.3:1 | 1.7% | 98.3% |
| 1.4:1 | 2.7% | 97.3% |
| 1.5:1 | 3.0% | 97.0% |
| 2.0:1 | 11.0% | 89.0% |
| 2.4:1 | 17.9% | 83.9% |
| 3.0:1 | 25.0% | 75.0% |

This information was taken from the following web site: [Power Loss at Various SWR - N6PET - My Ham Radio Journal.](#)

Specifically, if you begin with **100 watts** at 144 MHz and you have a transmission line of RG-8X that is 100 feet long your output in watts for various values of SWR would be as follows:

| <u>SWR</u> | <u>Output (watts)</u> |
|------------|-----------------------|
| 1.5:1 | 38.15 |
| 2.0:1 | 35.01 |
| 3.0:1 | 29.50 |

Based on the information above, if you are going to setup an antenna system at 144 MHz you may want to choose LMR 400. If you do, you get the following table based on 100 feet of LMR 400 transmission line and a 100 watt transmitter:

| <u>SWR</u> | <u>Output (watts)</u> |
|------------|-----------------------|
| 1.5:1 | 68.9 |
| 2.0:1 | 63.2 |
| 3.0:1 | 53.3 |

Note that if you have a perfect match your output is 71 watts. Since you still have 63.2 watts if your SWR is 2:1, the person on the other end will probably not be able to tell the difference. Most hams would be happy with a match of 2:1 or better.

Exploring antenna systems is a large topic and I have only touched on one small area. I hope this will prompt you to look further into your system. Some topics to consider include:

1. How accurate is your measurement of your SWR?
2. What are the differences in SWR meters?
3. What can a matching device do to improve your system?

WE HAVE A NEW HOME!

Thanks to our Vice President Steve Bartlett, and to our Nacogdoches County Judge Gregg Sowell and Emergency Management Coordinator Tara Triana, the Nacogdoches Amateur Radio Club has been granted access to the County EOC to use for our meetings and our VE test sessions.

This is most welcome news and will allow us to resume real meetings rather than virtual ones. We used the EOC for our Field Day operation in 2019 and it worked out very well. There is a lot of room in the facility, with many tables and chairs. Perfect for our use and very easy to allow for appropriate distancing.

Please plan to attend our club meeting on January 6, 2021. The meeting will begin at 7:00 p.m. with doors opening at 6:30. The EOC will also be used for our VE Testing Sessions on January 20 and all sessions in 2021 unless something changes. Check the club website at <https://w5nac.com> for the most current information.

We will resume the book raffles at the January meeting, with everyone present receiving a raffle ticket without charge. The winner of the raffle will receive a current book of interest to Radio Amateurs.