

The LongPath

A North Alabama DX Club Publication

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How to Join

- * Come to a club meeting;
- * or send in an application by mail (form on www.NADXC.org)

From the President

I normally only work DX and contests. Since DX was essentially cancelled for the whole year, my station wound up spending far too much time turned off. Well, the contest season is now underway. November is the time for lots of contests, and last weekend we enjoyed one of my favorites, CQWW CW. Some of the bands were just chock full of signals, every 200Hz from the top of the band to the bottom. Thank heavens for the assisted category, which made operating a whole bunch more efficient for me. My Flex transceiver now shows spots from numerous sources right on its spectrum display! Some of the time they are even correct. So for the whole time I had these spots all over my screen, even color-coded to tell me if each was a new mult, new band, or B4. My energy isn't what it used to be, so this help allowed me to work a lot more stations than I might have otherwise. I just love the change in technology.

Last month we took our annual vote on DXer of the Year. Tom/KG4CUY collected the ballots and will announce the winner at the December meeting. Drum roll...

Each month I get to talk about finding new volunteers to write Long Path articles or do the presentations. A lot of folks have indeed stepped forward and we're all better for it. We have a team in the NADXC with a ton of skills and experi-

ence. Since the group is small, everyone really needs to contribute more often. I know exactly who attends our zoom meetings. If you haven't contributed in the last two months, please consider it. If you'd like to contribute and don't exactly know how, I'll be more than glad to help. There aren't any members I know of who aren't able. Getting past your very first article is the hard part.

I think most of you know by now, but we lost long time member Ron Shaffer/W4VN to cancer a few weeks ago. Ron attended many of our meetings, and was quite an outspoken guy when it came to his favorite hobby. Ron spent many years as the head of the NARA group maintaining our repeaters.

Last month I spoke about how detail-minded I am about station setup. I see so many stations where the operator arranges his operating position so he can see all of his "stuff." I see ham radio as a competitive sport. I don't merely like to talk to people on the radio; I like to work a pileup or contest and **score**. Efficiency is everything. Piling all my "stuff" in front of me doesn't help me achieve what I want; actually it hurts since it gets in the way. This month's program, from Bruce/AC4G, is an excellent example of the principals of efficient setup.

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Ergonomically Feasible Ham Shacks

December Program by Bruce Smith, AC4G

The details of AC4G's shack transformation is chronicled in recent editions of the LongPath. In this presentation Bruce will cover ergonomics as one of the motivations for his shack work, and specific measures taken to improve ergonomics. Look for an email from Bob with log-in details for Tuesday's ZOOM meeting and Bruce's presentation.



Retirement and COVID Project Update 8

By Steve Werner, AG4W

This month we started the holiday season with less than favorable news on the Covid front. Instead of focusing on all the bad news it is more helpful to be thankful for what went right this year. Being grateful and thankful is easier than you think. I have written about my projects the last 7 months and I am grateful that I had the time to spend making them work. I am also grateful for all the help I received from others on those projects. With the exception of the Swains DXpedition I met my goals for this year even with the pandemic and Swains is just delayed. The delay will be rewarded with much higher sun spot numbers. American Samoa is still in the process of organizing a flight/boat to get Samoans from Hawaii back to Samoa. They have had some 600 people stranded and separated from their families for many months.

In November I met my goal to have 100 grid squares confirmed on 2 meters for VUCC on LOTW. I have applied for the award and the 425 grid square endorsement for 6 meters. Six meter E skip propagation was much better than previous years. I now have my converted SB-220 amplifier for next year. I also have the new FTDX-101MP that I got to use all summer on 6 meters. It was sure more fun to operate with the nice panadapter than my old FTDX-5000D. On 2 meters the improvement I made to horizontal polarization sure made a big difference for EME. I also now run a 1000 watts from my homebrew amplifier. That got my total number of unique stations worked on 2 meter EME now to 200. If someone told me 4 years ago that I would work 200 different stations on EME I would of told them they were nuts.

This month I was able to work 2 stations with single yagis and 400 watts on EME. One of them I have been trying

to work for 4 years. Was part of it luck? Absolutely, but it also helps that I don't give up easy. EME is not for someone who enjoys instant gratification, but the rewards for making every contact is amazing. It was also exciting to work 7Q7RU on 160 meters this month. This is one of the few DXpeditions that made the trip even during the pandemic. They had planned to visit 3 exotic African countries, but just Malawi is open to foreigners. It was exciting so see a real pileup again. I was sad to hear that 2 of the operators got Covid and had to extend their stay in Malawi.

This year the second weekend of the ARRL EME competition was the same weekend as CQWW CW. Instead of picking one I entered both. I spent most of the time in the EME competition. It went from 00:00-08:30 UTC both days when the moon was up. In the EME contest with both weekends I made 60 contacts instead of 44 last year.

I entered single band 10 Meters in the CQWW CW contest during the day. With an SFI of 116, an A=6, and K=1 it was an easy decision. I got to work some Europe, Africa, Hawaii, New Zealand and lots of South America. I did this mostly to get my code speed up for the Swains DXpedition.

This month I decided I was not going to burn up my second 1 KW Daiwa wattmeter on 2 meters and asked Santa for an early Christmas gift. I am thankful Santa understands EME contests. It arrived just in time. I got a new 2500 watt Coaxial Dynamics wattmeter (see picture next column.) What a treat that was to use. It can use any of the Bird elements too. The 4.5 inch meter is amazing. I enjoy a high quality piece of test equipment you can trust.

If you are interested in an early Xmas gift I have 2 pictures of equipment I am



interested in selling. They would have gone to the Huntsville Hamfest for sale. They include a 350-400 watt 2 meter AM- 6154 FAA amplifier, Yaesu FT-1000MP, TenTec 2510 Satellite Mode B Transverter, LP-Pan, Tokyo Hy-Power HL-60U 435 MHz Amplifier, and TenTec RF Speech Processor. Call or email me for details.



Equipment for sale—see above for details.

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Retirement and COVID Project Update &

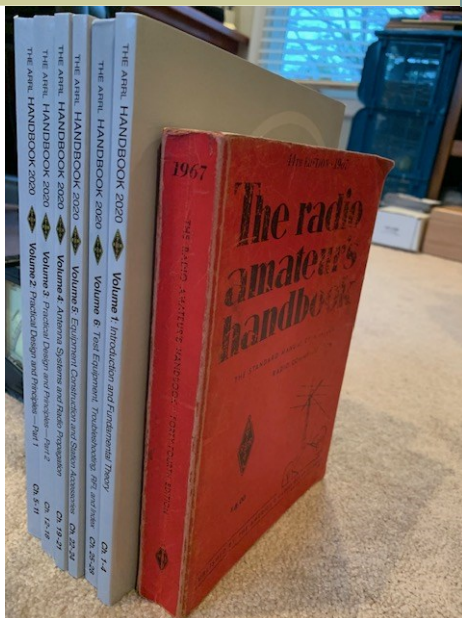
(cont'd from p. 2)

I just put a deposit down on a new puppy for my wife Kathy. I got to name her Eme. She said where did you get that name from? We pick her up in 7 weeks. A new DX dog.



New DX dog—some training required.

This month I also got to read some of the 2020 ARRL Handbook. My original 1967 handbook was \$4 and the new one is \$60. The size of the 6 volume set and the amount of design information and data is amazing.



Now is the time to start thinking about your ham radio goals for next year. You should start by reviewing the goals you had for this year. I think setting goals makes things happen. Think big and big things happen. Tell someone about your big goal and that improves your odds of it happening. Write down the goal and that helps too. Some goals may take some time to implement. K3LR, W3LPL and D4C didn't look like they are today overnight. It helps to do those large projects

in steps. The most rewarding goals have substantial challenges. I started my journey on EME that way. Each year I have made improvements to my station, DXCC Challenge count and contest scores. Next year I plan to get my 125 grid square endorsement for 2 meters and be well on my way to 150. On 6 meters I plan to get my 475 grid square endorsement. On DXCC challenge I plan to pass 2700. I am also optimistic that the Swains DXpedition will happen in the fall of 2021. That is why I plan to improve my code speed in contests and pileups this coming year.

73 Steve AG4W

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A Safer Method for Working on My Antenna

By Fred Kepner, K3FRK

Two years ago, I decided I needed to upgrade my antenna. After weighing my options and considering the limitations imposed by my lot and my spouse, I settled on a hex beam. Once I selected the antenna, I had to figure out how I was going to mount it. I did some research and ended up finding a very economical mast in a 22 ft. long steel pipe sourced from a local metal supply company. I found appropriately sized axle mounts (u-bolts) to attach the new mast to the existing metal post outside my shack. I attached the mast to the peak of the roof with a swiveling

mount that allowed me to rotate and "tip" the mast about 45 degrees. I added the rotator and a short piece of aluminum pipe to the top of the mast. I was now ready to attach the antenna. I constructed the hex beam on the ground and, somehow, managed to carry it up the ladder and mount it on top of the aluminum pipe from the roof of my shack. I was only able to reach the top of the pipe by standing on the very edge of the roof while reaching well above my head. It was hard and awkward. I could have easily fallen off my roof as I was stubborn and didn't

want to wait for my buddy to come and help. I rotated the mast upright, bolted it in place with my u-bolts, and added guy wires. I was exhausted but it worked and I was thrilled. The setup was a major improvement and I was able to work a lot of new DX over the next two years.

A few months ago, I started experiencing issues with intermittent high SWR on several bands. I broke out the handy antenna analyzer and started troubleshooting. After eliminating my tuner as the problem, I started working

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Remote Starting Flex

By Kevin Hibbs, KG4TEI

Over the last couple months Bob De Pierre, K8KI, and I have been having an ongoing conversation about how he might be able to turn on his Flex radio remotely over the Internet. Bob already has a Flex Maestro, but the Maestro, while quite capable of remote controlling the radio over the internet, lacks a way to remote start the rig. That leaves two options: leave the radio on all the time when you're away, or find a solution to turn the radio on and off.

The engineers at Flex radio had enough vision to include an interface on the back of the radio to help with this problem. Connecting one of the interface pins to ground will cause the radio to turn on. After doing some research we found an article in the Flex forums (<https://edge.flexradio.com/www/uploads/20200818184956/FLEX-6000-Remote-On-Kit-QSG.pdf>) that outlined hardware which could accomplish the goal. The key parts were a remote-control capable switch from Kasa, and a plug-in relay that toggles when power is applied. Given the cost and ease of setup this seemed like the most expedient means to accomplish the task.

Bob purchased the required parts, and over Thanksgiving gave it a try from his daughter's house. By all accounts there was great rejoicing when the Flex came to life and was controlled over the Internet from the Maestro.

So, how does this work? The remote-control outlet outlined in the Flex article is made by Kasa, a TP Link company. TP Link has been around for many years providing routers and switches for home applications. The plug can be controlled from an Amazon Alexa or Google Home, but it can also be controlled from an App on a smart phone. After a considerable amount of configuration and signing up for a TP Link Cloud account, Bob was able to control

the outlet from anywhere his cell phone had a signal. Anytime the power is turned onto the outlet, the plug-in relay trips and closes the contacts connected to the rig interface. Based on what I can find on the Internet, this configuration has been used to turn on and off all sorts of devices that are not generally considered smart, such as gas fireplaces, fans, sump pumps, garage door openers, and more.

This is just one of many ways this task could be performed. If I were going to do this at my home I would consider using a product like a NodeMCU WIFI controlled relay (https://www.amazon.com/WayinTop-NodeMcu-Internet-Development-Automation/dp/B086ZM1HSJ/ref=sr_1_5?crid=3ALI41W49YKPC&dchild=1&keywords=nodemcu+relay+board&qid=1605635771&srefix=nodemcu+re%2Caps%2C212&sr=8-5). This is because I have invested in a home automation server with remote access capabilities enabled. I could program this device to talk to my server and control the relay with the push of a button from

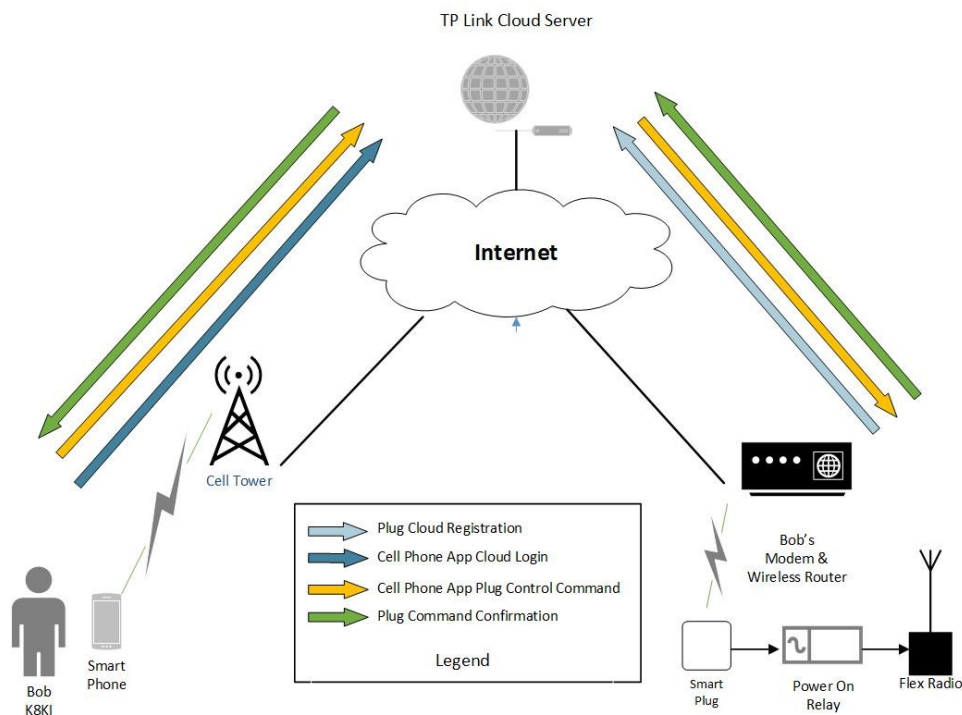
anywhere with my phone. There are also solutions that could use a Raspberry Pi and remote access software to trip a relay. In Bob's case, he didn't have the internal infrastructure already set up for home automation. The smart plug allowed for a relatively easy setup with a cloud service that already existed at a low cost and little time investment. I call that a win any day. If you have any questions about how this works, please feel free to email me.

73, Merry Christmas and Happy New Year!

For Sale

Icom IC-718. Comes with short power cable and microphone. DSP unit installed. Small scuff mark on the side of the case from transport and use. 100% functional with full power out. Email for price and availability.

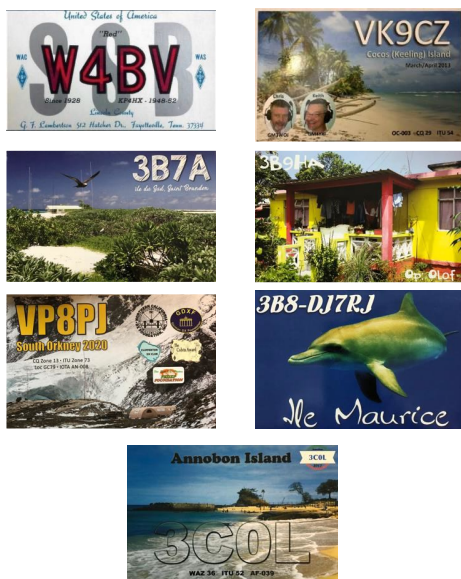
Kevin KG4TEI



QSL Card Collecting

By Bruce Smith, AC4G

There are many ham operators using the bands to make CW, Phone, and digital QSOs every day and night as the ham bands are typically open all day and night to somewhere. Many ham radio operators take advantage of the bands by operating on the High Frequency (HF) bands and collecting the coveted QSL card to confirm their QSOs. QSL replies (whether paper form or electronic form) are a way to verify a contact. One way to view the QSL card is that they are a collectible verification which proves the details of your QSO such as time, location, frequency, mode, and signal report. QSL cards are not only a means to prove your contact, but can be used to apply for many amateur radio awards such as certificates and plaques. The QSLs are also good for showing off your ham radio accomplishments to visitors who stop by your ham shack. Reference Picture 1.



Picture 1—Photos of QSL cards received either direct or via bureau

Now that you have made a QSO with a foreign operator (DX) from a faraway place or to another ham operator located in the U.S., how do you prove it? In the past, hams would buy the Flying Horse Ham Callsign Book which had the callsigns for US and foreign ham

operators to include their mailing address. Today, the first place a ham would go to find an address is via online at the QRZ.com web site or perhaps the GO LIST which is a collection of QSL managers. Many hams list their QSL information along with unique facts about the operator such as DXCC totals, antennas and transceivers used to make the contact on QRZ.com. When a ham looks up the other ham operator's callsign on QRZ.com, one can typically see that they have listed one or more options for sending and receiving a QSL card. Some are obvious, but others require explanation. Exchanging QSL cards directly with your QSO partner can be very expensive. If you calculate the cost of postage to send an envelope overseas, plus any money enclosed to cover the return postage or a simple donation, a single QSL card request can cost up to five dollars or more.

Many DXpeditions today offer a free QSL card and immediate LOTW (ARRL Web site) upload for those making a donation to help pay curtail the cost of putting on a Dxpediton. Transportation is one of the most costly items for a Dxpediton. Many offer donation convenience via PayPal. Many hams also send a donation after the DXpedition while requesting a QSL card to confirm their contacts. Below are some of the methods for exchanging QSL cards.

SENDING and RECEIVING QSL CARDS (Snail Mail Method):

From the very beginning of ham radio, ham operators exchanged QSL cards. These cards moved through the postal service adding the tangible element to contacts made on the air. Each card shares the personality of the ham requesting a card. Some cards are very creative, while others are picture QSL cards of many various topics such as radio equipment, the scenery in a re-

gion, pictures of personal items such as vehicles, trains, and people, to name a few. Electronic methods have increased in popularity; however, the QSL cards is still highly sought after. Below is a description explained describing ways to send cards via the postal system and direct via managers. Also, today electronic means are providing almost instant, cheaper QSL means. First, we will look at the non-electronic means of QSLing, then describe briefly the electronic means of QSLing.

a. Direct – The most obvious method is “direct”. You just cannot send your card to an address and expect to receive one in the return mail without adding a donation to pay for return postage. Most all stations require a Self- Addressed-Stamped-Envelope (SASE). In the past, one could get away by sending along one green stamp (\$1.00 – dollar bill). Currently, many require \$2.00 - \$3.00 to cover postage for the return QSL from foreign hams. Many hams in the U. S. only require an SASE to receive their QSL card. International Reply Coupons (IRCs) are gone by the way side and are not used any more. See Picture 2. Note: At one time, a ham would include one IRC (instead of green stamps) along with a self-addressed (SAE) envelope and the QSL in order to get one in return from a ham.



Picture 2—Int'l Reply Coupon

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b. QSL Manager – Many DX stations where mail with the U.S. is difficult, make use of QSL managers. In order to get a QSL from a foreign ham or Dxpedition, one would send their QSL request to another hams (called a SL Manager) who handles the QSL cards for that ham. The QSL manager is listed on QRZ.com or in magazines and ham newsletters. For example, I am QSL Manager for V73C, Ken Wells who was stationed on Kwajalein Island, Marshall Island in the early 1990s.

I very often receive requests from ham operators all over the world wanting to receive his QSL card confirming a valid QSO.

c. Bureaus – The “Buro” is an inexpensive and efficient means of getting QSL cards distributed via the bureau. Almost all countries have a central bureau operated by a club or volunteer ham that handles cards for a country. In the U.S., the American Radio Relay League (ARRL) operates our bureaus, one or more for each district. In order to receive QSL cards via the bureau, a ham must send their bureau large envelopes with postage to cover their return. When a bureau receives a number of cards, they stuff your envelope and add sufficient postage and send to you.

One can save a lot of money by using the bureau and the Outgoing QSL service of the ARRL if one works a lot of DX. To use this service, you only need to provide proof of ARRL membership and pay the fee according to the schedule below. Cards sent via the Bureau are sorted by the Outgoing QSL Service staff, who handle approximately 700,000 each year. Cards are shipped from HQ on a quarterly basis. If you are a member of the ARRL, you are allowed to send

cards in bulk. You don't have to address them each one, but have to put them in order per the ARRL instructions. DX managers can use the Outgoing QSL Service at the standard rate described in the ARRL Outgoing QSL Service information paper. You may also send QSLs via the bureau to any QSL manager who manages a non-US call sign. However, you must look up the QSL manager and clearly indicate the QSL manager's call sign on your outgoing card. For example:

Example 1: V73C via AC4G. Sort this card in with other cards going to US managers.

Example 2: EA8BH via OH2BH. Sort this card in with cards to Finland.

The ARRL Service ships QSL cards to QSL Bureaus throughout the world, which are typically maintained by the national Amateur Radio Society of each country. Please be advised that the ARRL QSL Service cannot be used to exchange QSL cards within the 48 contiguous states [US to US]. Sending QSL cards via the bureau takes a little longer than mailing them directly, but keep in mind that what you might lose in speed is more than made up in the convenience and savings of not having to address and mail each QSL card separately. Effective May 15, 2019, the cost to use the bureau is: \$2.00 for 10 or fewer cards in one envelope; \$3.00 for 11-20 cards in one envelope; or 75 cents per ounce, for packages with 21 or more cards. For example, a package containing 1.5 pounds of cards – 24 ounces, or about 225 cards – will cost \$18. There are no transaction service fees. One should use an accurate scale to weigh their QSL cards. Most post offices have scales that you may use. When submitting cards to the ARRL Outgoing

QSL Service, you must pay by check (or money order) and write your call sign on the check. Be advised that there are several countries which no longer served by the Outgoing QSL Service. More information can be found on the ARRL web page.

The **North Alabama DX Club (NADXC)** offers bulk mailing to the ARRL Bureau. Simply get your sorted QSL cards along with the correct fee per pound (as described earlier) to Steve Smith (KY4G). Steve routinely sends card to the ARRL, which saves NADXC members money.

SENDING and RECEIVING QSL CARDS (Electronically):

In today's modern age of digital, electronic distribution, electronic QSL cards have become very popular. This method of QSLing saves time and money. Two popular electronic QSL services are Logbook of the World (LOTW) and eQSL, which we will briefly describe below.

□ LOTW- Developed by the ARRL as an economical means for ham operators to confirm QSOs for various awards. Both hams must have LOTW accounts and must upload their logs periodically. When LOTW finds a matching QSO meaning same date, time, band, and mode, both users get credit for the contact. To achieve the DX Century Club (DXCC) award or Worked All States (WAS), there are fees that justify the ARRL staff to handle the award. CQ Magazine is now recognized by the ARRL and allows a ham to seek CQ Magazine awards such as the WPX award and other awards via LOTW. The ARRL describes LOTW service in detail.

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QSL Card Collecting

(cont'd from p. 6)

□ eQSL – Another popular QSL confirming service is eQSL (www.eQSL.cc). This service allows you to design a QSL card. When two users who have an account submit QSO information, the QSL card becomes available for both to print. eQSL also tracks your contacts for various online awards and is recognized by CQ Magazine. eQSL allows you to print your QSL card as soon as a QSO match occurs.

Perhaps there are other methods to electronically request a QSL card confirming a QSO or non-electronically

seeking QSL cards via snail mail. This article was merely a brief explanation of several ways to obtain a QSL card for a QSO match to add to your QSL collection as many of us cherish the moment we worked a “new one”. So, the next time you work rare DX or a ragchew QSO with a local American station, go online to find out how to get your well-deserved QSL card. Many radio amateurs (hams) still like receiving QSL cards especially rare ones that took a long time to work and confirm. Perhaps you can show your friends and family

something from a foreign country and briefly explain how you obtained it. Each QSL card has its own story revealing how you made that single QSO. Share the memory with other friends and family members. Remember, a picture is worth a thousand words.

VP's Corner

by Steve Molo, KI4KWR

Happy Holidays from both Jessica KN4JJA and myself first and foremost. This year has been very interesting to say the least but hopefully this all will end soon and we be back monthly at Newk's seeing everyone's smiling faces. Hope to see you on the 160 contests in the next few weeks and don't forget about the ARRL 10m Contest next weekend which I will work after the tower teardown if needed that weekend still.

Yes...I did say tower teardown!! There was a call out for anyone interested in a tower from Jim Harris WA4NTM (SK) QTH which I accepted and visited last weekend. Planning on doing as much this weekend and next to have it removed and former location cleaned up for the family. So like many at work have asked; What you got?

40ft BX Tower / CL-33 and what appears to be a 2m 6 element quad and a few dipole antennas which look QRP grade which is perfect for using with the IC-705.

Stay safe and enjoy the solar wx while it is amazing!!



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The First in a Series of Articles on Propagation and Antennas

We QRPers really love to communicate over long distances, and we enjoy challenges such as the Thousand Miles per Watt award. Long distance QRP communications invariably involve the Earth's ionosphere. However, to benefit from an ionosphere we need to be in a solar system with a planet that has an atmosphere and a planetary magnetic field. The Earth-Sun system shown in Figure 1 fits the bill nicely! For added interest and complexity, Earth spins on a tilted axis as it revolves around the Sun. This causes our four seasons, as well as interesting seasonal space-weather in the ionosphere. The ionosphere has been studied for more than a hundred years, and what we thought we knew about the characterization of the ionosphere has been repeated in print for almost that long. However, our understanding of how the ionosphere works is partly a product of the space age. Here we explore some of the legend, lore, and physics (in general terms) about the ionosphere as it pertains to QRP DXing. We also allude to some specific complex phenomena which can make QRP DXing an interesting and memorable pursuit.

200m and Down!

1.5 MHz, a wavelength of 200m, was once thought to be the upper limit of frequencies useful for long range radio communication. In ground wave propagation, range increases with decreasing frequency. So, the "valuable wavelengths" longer than 200m were seized by commercial and government interests, while wavelengths shorter than 200m were deemed "useless" and left to experimenters and radio amateurs. The experiences of those early experimenters and radio amateurs [1], of course, showed that the interesting

radio phenomena involving long range terrestrial communications occur at wavelengths considerably shorter than 200m, and that they involve the ionosphere. It turns out that the most useful frequencies for portable communications are in the High Frequency (HF) range, between 3 MHz and 30 MHz. Signals at these HF frequencies are subject to ionospheric phenomena, including reflections and refractions, and hence are the basis of traditional worldwide radio communications.

The Satellite Era

Recent advances in Earth-orbiting satellites have slowly replaced HF commercial and government services with comparable satellite-based services. An irony of the satellite era is that our modern understanding of how the ionosphere works required the development of the space program that replaced the HF services which used the ionosphere. It also required the satellite probes that were launched recently to monitor solar activity and its effect on modern communications satellites. Space probe-derived measurements of the solar wind and of "space weather" have up-ended our understanding of the ionosphere. Thus most text books, while basically correct in their characterization of the ionosphere, have not yet caught up with this understanding and are not complete!

Ionization is the Key

The gasses in the ionosphere are in a complex balance between the processes that cause ionization of those gasses, and processes that recombine ions (deionization). Solar and cosmic radiation, meteors and meteorites, natural radioactivity, lightning sprites, and other phenomena serve to dissociate free electrons (negative ions) from gases in the atmosphere. Because the mixture of gasses varies with altitude,

ionization also varies with altitude and tends to peak up in clumpy layers at various heights. There is nothing homogeneous or uniform about this layering in the ionosphere.

It's All in the Spin and Revolution

The Earth spins on a tilted axis, which, with rotation around the Sun, produces our four seasons. The daily spin results in a day-night variation. Couple that with uneven heating on the sea and land and we have weather—lots of it and with great variation. The same happens at high altitudes, except there the atmosphere is comprised of charged, ionized gasses. These gasses are also subject to a daily cycle and to annual seasonal cycles. Solar radiation, likewise, varies most notably in an 11 year cycle of solar activity and solar magnetic field reversals. This is evident by the creation, motion, and disappearance of sunspots. The revolving Earth additionally encounters both annual and sporadic meteor showers. Meteorites dump hundreds of tons per day of new material on the Earth and they also influence ion creation. Hence, we have many inputs to the ionospheric system to keep things stirred up. There is nothing uniform or constant about the ionosphere!

Bring on Earth's Magnetic Field

The real fun begins when the whole system is set in motion under the influence of Earth's magnetic field. Figure 1 shows a rendition of Earth's magnetic fields distorted by solar wind. High altitude Earthly winds containing ions deflect due to their motion in Earth's magnetic field, just like an electron beam does in a cathode ray tube (CRT). Shearing ionospheric winds can cause ionized gasses to clump together in sporadic fashion, allowing refraction of waves up to VHF in some locations

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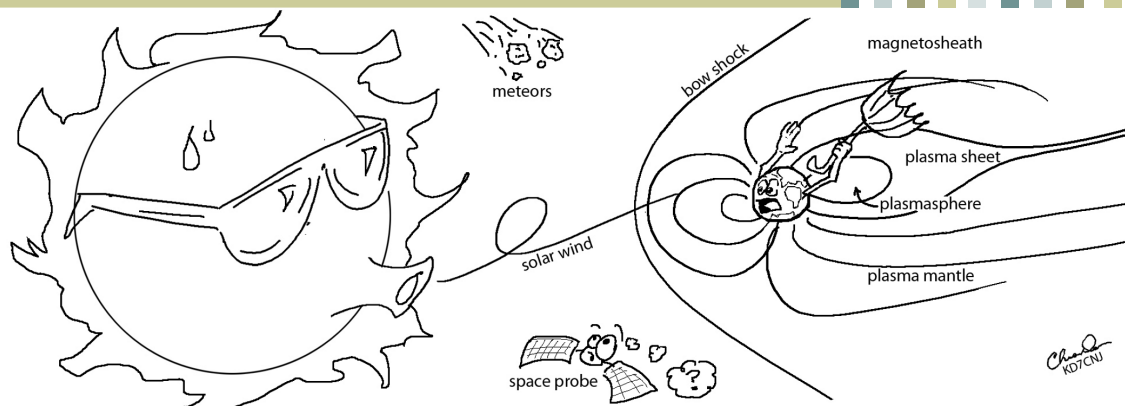


Figure 1—Space probes are revealing the complexity of our Earth-Sun system which influences the ionosphere. Copyright 2013 Chris Dean, KD7CNJ, used with permission.

even when the average maximum usable frequency is considerably lower. This may account for some of the to Sporadic-E propagation that we enjoy at VHF. Waves propagating in the ionic plasma under the influence of the magnetic field will decompose into a pair of counterrotating elliptically polarized waves having differing propagation characteristics [2]. A linearly polarized wave (horizontal or vertical) will cross-couple into two counter-rotating elliptically polarized waves after refracting through the ionosphere under the influence of Earth's magnetic field. Those two waves might reach differing locations on Earth. If the Earth were compared to an orange, all of this happens within the orange peel. That's proportionally the thickness of the Earth's outline in Figure 1.

What This Means to QRP DXing

Polarization cross-coupling is good news for our QRP portable operations: we can hang our antennas in whatever way is physically expedient and let the ionosphere take care of rendering the polarization usable by the DX station! We should also be aware of the average cyclic behavior of the ionosphere. We should be prepared to operate frequency bands that are open for DX. During the years of low sun-spot activity in the approximately 11 year solar cy-

cle, we might favor operations at 40m and longer wavelengths. During the years of high solar activity, the ionosphere supports wonderful propagation through 10m wavelengths. Now superimpose the annual behavior on top of that. During winter, the ionosphere tends to be somewhat lower in altitude than in the summer. During winter days, the maximum usable frequencies could be double those of the summer months. Ah, winter DX! Finally, we have the day-night variation. During daylight hours, signals propagate best on 15m-10m. At night time, wavelengths shorter than 17m become quiet as the maximum usable frequency drops. Worldwide propagation then becomes possible on the 80m-20m bands. The QRP station operator should be ready to handle as many ham bands as possible to ensure a high probability of communication success; this means using efficient multiband antennas [3], [4] and multiband / multimode radios.

Stay Tuned!

Next time we'll poke around some of the details of how our antennas couple RF energy into and out of the ionosphere. Later we'll explore how propagation predictions can enhance our QRP experience. Some propagation resources are at <www.qrparci.org/propagation>. If you have questions or ideas on this topic, please write QRP

Quarterly and let us know. Finally, don't forget to have fun!

References:

1. DeSoto, C. B., *Two Hundred Meters and Down*, ARRL, Newington, CT, 1936.
2. Davies, Kenneth, *Ionospheric Radio Propagation*, National Bureau of Standards Monograph 80, April 1, 1965, Washington, D.C.
3. K. Siwiak, KE4PT, Off-Center-End - Fed Dipole on a "DX Fishing Pole" for QRP Operations, *QRP Quarterly*, Spring 2012, pp. 34-35.
4. A. Findling, K9CHP and K. Siwiak, KE4PT, How Efficient is Your QRP Small Loop Antenna?, *QRP Quarterly*, Summer 2012.

Kazimierz (Kai) Siwiak, Ph.D., KE4PT, holds an Extra Class amateur radio operator license and is QRP ARCI member #2194. Dr. Siwiak specializes professionally in antennas and propagation, and in digital communications. He is an ARRL Technical Advisor and a member of the ARRL RF Safety Committee.

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Cushcraft MA-160V 160m Vertical Antenna

By Steve Molo, KI4KWR

Back in August I sat in the backyard trying to figure out a way to get back on 160m which was easy in New Jersey from the N2CW Contest Station. For those that may not know what we have there; 300ft tower (240ft point was apex for 160m delta loop), top is a WYRS 90.7 Christian Radio Station. Four 70ft freestanding towers that are utilized for TA-33 on one / 40m full-wave dipole / 80/75m full-wave dipole and the other is being planned for a 15m beam. This all sits on 26 acres which is all saltwater marsh with full beverage array all directions 900-1200ft each way with a 4 Square 160/80m 500ft away from the Shack itself. Spoiled is hard to say!!

So I got to looking what options were offered at the Store and would work in the backyard. After debating making an inverted L, I decided on the Cushcraft MA160V vertical...and bought it. Packaging was not too bad for being a Cush-

craft item thru MFJ. Were pieces missing you wonder? I had a missing radial plate and one assembly piece was not drilled out correctly which is common from everyone's comments to me and eHam.net also. Fixed the issues and assembly to my amazement was very easy. Instructions could have been better detailed but not difficult at all. Got the antenna erected center in the yard leaving the last piece to be done radials.

The Instructions stated 3 100ft long radials and 16-20 20ft length also. Not too hard to accomplish but for sure burying them still has not happened as of December 1st and will happen this weekend. The three long ones have been cut down to 50ft each which did not affect SWR reading at all. So end result with 3 50ft radials with 16 25ft radials in a circle has proven it will work for my needs. The stinger on top allows for adjustment for a 40 kHz seg-

ment on the band so set it where you want to work and your set. Currently set on 1840 (FT8) area and the RigExpert AA-55ZOOM shows 1825-1865 1.3:1 across that area and goes back up. So doing some minor map work I figured out how to get it where I want it for now and will adjust for the CQ 160 Contest coming up soon.

Opinion; for being a Cushcraft item which many will always give mixed reviews I was amazed on ease of setup and use without any major problems. Radials being as short as they are and not even buried yet and still SWR low satisfied me for sure. Price tag of around \$319.95 for a seasonal antenna for a setup for someone who cannot do all on...worth it. Does it cover the world? Well putting some heat thru it with the ALS-600 on SSB and CW a few nights ago no problems at all.

A Safer Method for Working on My Antenna

(cont'd from p. 3)



Image 1: K3FRK's shack and hexbeam prior to project.

towards the antenna. I eliminated the feedline, the Paradan antenna disconnect, and the lightning arrestor. I unbolted the antenna mast, disconnected the guy wires, and rotated the antenna mast to position the hex beam near my roof. I again found myself stretching as far as possible, on my tip toes and on the edge of the roof, trying to reach the antenna. I was successful and determined that the very short piece of coax that connected the choke balun to the feed point, at the very top of the antenna, was the issue. I replaced it, put everything back, and was up and running again. The experience was not fun and I felt lucky to have survived it. I decided I needed to find a better way to work on my antenna, preferably from the ground.

I came up with a design that would allow me to stay on the ground and also took most of the physical labor out of lowering the antenna. The antenna mast is pretty heavy and the length of it results in the need for quite a bit of force to get it upright, even with my rotating mount acting as a fulcrum. The fact that I already had most of the key hardware for my plan was a bonus. After a quick trip to Walmart and the hardware store, I was ready to begin.

The first step was raising the mast a few inches. I loosened the u-bolts and lifted up the mast, sliding a block of wood under it. I then measured up from the bottom of the mast and marked where I would drill my hinge hole. Because the antenna was going

Cont'd on p. 11

A Safer Method for Working on My Antenna

(cont'd from p. 10)

to be lowered out and away from the wall of the shack, the point needed to be low so that the wall wouldn't inhibit the mast from rotating. I also wanted the hinge point a bit higher than one might expect because I have a garden fence a few feet away. The hex beam will be in the middle of the garden when the mast is lowered. By putting the hinge point up a little bit, the end of the mast holding the antenna will be closer to the ground when the mast rests on the fence. A secondary advantage of my bolt hinge is that the mast cannot rotate. This means that the antenna should not need to be re-oriented after re-raising the antenna/mast system. After locating the appropriate spot for the hole, I drilled straight through both the 2 in. steel mast and the 2 in. galvanized steel post. I inserted a stainless steel bolt through the holes, which will act as my hinge. I removed the wood block and the hinge easily supported the weight of the mast.

The next step was to install the winch I would use to raise and lower the mast. I already had a DC powered winch, mounted on plate that can be installed into a trailer hitch receiver. I procured a trailer hitch receiver extension at Walmart. I used a u-bolt to attach the receiver extension to the post supporting the mast. The receiver ex-

tension has a hole in it that the u-bolt fit through perfectly. Additionally, a bolt goes through the post and prevents the u-bolt from sliding up the post when the cable is released or retracted. Using this system, the winch can be stored inside my shack and attached very quickly when needed.

The winch is oriented facing up when installed in the receiver. When the mast is lowered, the system can be visualized as a triangle. The winch cable will travel parallel to the shack wall, which is the adjacent side of the triangle. It will then change directions at the top of the wall and move away from the shack; this is the opposite side of the triangle. The mast itself represents the hypotenuse. I needed a mount for the cable to change directions at the top of the shack. I drilled a hole through the wall and installed a forged eyebolt. A stainless steel shackle was added to the eye of the bolt so that a pulley could be installed when the winch is used. A u-bolt was mounted at the appropriate point on the mast. Although not necessary, I installed another stainless steel shackle on the u-bolt in case I decide to remove the locking hook on the winch cable. When the system is used, the winch cable runs vertically to the pulley, through the pulley, and then clips onto the u-bolt on the mast. All hardware is rated well

above the forces that will be experienced.

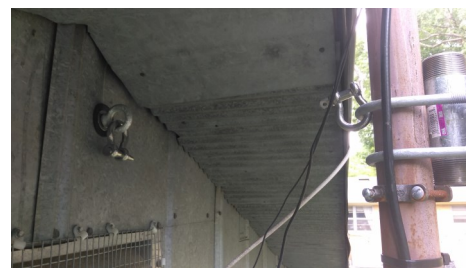


Image 4: The anchor and shackle at the peak of the wall (pulley assembly not present) and (opposite) the mast u-bolt/shackle assembly.

Now that the hardware was installed, I had to deal with the feedline and rotator cable. The feedline and the rotator cable were not long enough, as installed, to allow the mast to rotate to the downward orientation. Fortunately, I had excess rotator cable inside the shack and was able to feed enough slack through the wall to allow rotation. The feedlines required more work. I cut the feedlines for both the hex beam and the 2m antenna that is also installed on the mast. I then mounted a waterproof utility box on the mast. I grounded the box, installed lightning arrestors, and ran the feedlines into the box from the top. The line coming from the shack looped under the box and entered through slots, allowing them to be easily removed from the box when the antenna mast is lowered.

Cont'd on p. 12



Image 2: Receiver extension installed at base of post and mast. The bolt/hinge assembly is also visible.



Image 3: The winch installed in the receiver extension.

A Safer Method for Working on My Antenna

(cont'd from p. 11)

I added connectors to the feedlines, attached the arrestors, and coiled the excess rotator cable up and tucked it into the box. The project was done.

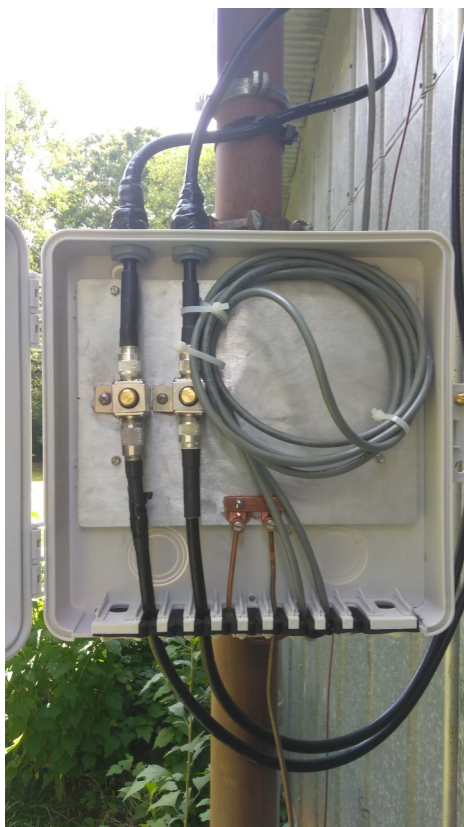


Image 5: The watertight utility box
(feedline disconnect point)

In order to lower my antenna, I can now follow these steps:

1. Mount the winch
2. Run the winch cable through the pulley and attach it to the u-bolt on the mast.
3. Unhook or loosen the guy wires.
4. Unbolt the swiveling roof mount.
5. Open up the utility box and unscrew the PL259 connectors.
6. Unhook the u-bolts that hold the mast to the support post.

Let out the winch cable until the antenna is at the desired level.



Image 6: The antenna mast as typically positioned for operation.

In order to raise the antenna, I simply execute the steps in reverse order.

This project was one of my first forays into homebrewing, one of the oldest traditions of ham radio. It was relatively easy, inexpensive, and utilized hardware I already owned. I will no longer need to put myself at risk by working on a hard-to-reach antenna from the edge of the roof. Future antenna repairs and installations will be conducted from the ground and will require very little physical labor. In fact, and I hope I don't regret saying this, I'm kind of looking forward to my next repair.

To raise the antenna again, I simply follow these steps in reverse order..

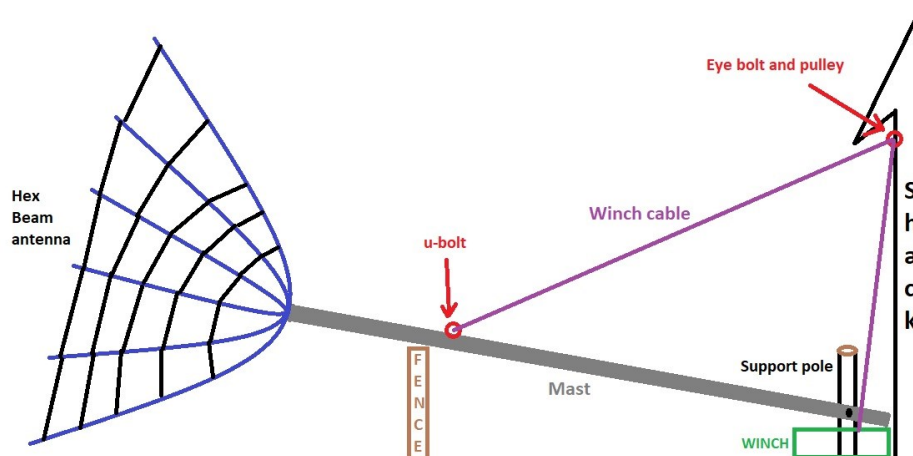


Figure 7: Diagram of the system in the down position (weather did not cooperate for a picture)

DX Contests for December

By Chuck Lewis, N4NM

ARRL Ten Meter Contest, (SSB & CW), 10 meters only

Dec. 12, 0000Z to Dec. 13, 2359Z

Exchange: RS(T) plus State/Province;

DX: RS(T) + Ser. #

See page 63, Dec. QST and

www.arrl.org/10-meter

Russian 160 Meter Contest (CW/SSB) 160 meters

Dec. 18, 2000Z to 2359Z

Exchange: RS(T) + Serial #; Russian

Stns: RST + Oblast

See page 63, Dec. QST and

www.qrz.ru/contest

Croatian CW Contest, (CW), 160 – 10 meters

Dec. 19, 1400Z to Dec. 20 1400Z

Exchange: RST + SER. #

See page 63, Dec. QST and

www.9acw.org

OK DX RTTY Contest, (RTTY), 80 – 10 meters

Dec 19, 0000Z to Dec. 19, 2359Z

Exchange: RST plus CQ Zone

See page 63, Dec. QST and

www.okrtty.crk.cz

RAEM Contest (CW), 80-10 meters

Dec. 27, 0000Z to 1159Z

Exchange: Serial # plus Lat/Long,

(e.g., 57N 85E)

See page 63, Dec. QST and

www.srr.ru/en/main

DARC Christmas Contest, (CW & SSB), 75/80 & 40 meters

Dec. 26, 0830Z to 1059Z

Exchange: RS(T) [+DOK or special

code for DL]

See page 63, Dec. QST or

www.darc.de

GEDEBAGE DX Contest, (CW), 80-10 meters

Dec. 26, 0000Z to 2359Z

Exchange: RST + Serial #

See page 63, Dec. QST or

www.olkb.or.id

RAC Winter Contest (CW & PHONE), 160-2 meters

Dec 28, 0000Z to 2359Z

Exchange: RS(T) plus Serial No.; VEs

send RS(T) plus Province

See page 63, Dec. QST and

www.rac.ca



Stew Perry Topband Distance Challenge, (CW), 160 meters

Dec. 26, 1500Z to Dec. 27, 1500Z

Exchange: 4 Char. Grid square

See page 63, Dec. QST and

www.kknnet/stew

OTHERS

EU CW 160m Contest

2000Z-2300Z Jan. 2 and 0400Z-

0700Z Jan. 3.

Dates & times often change or are misprinted in the journals; beware.

See also: <http://www.contestcalendar.com//contestcal.html>

Chuck, N4NM

From the President

(cont'd from p. 1)

Now Bruce has long been an Honor Roll operator, but he just didn't have the setup he needed. So this year he totally renovated his shack, from the dirt up. And that's the program for our December meeting.

So come join us for another covid-free virtual meeting of the NADXC on Tuesday, December 8. We'll use Zoom

again. I'll send you another invitation, but the sign-on will be exactly the same. I'll open Zoom for informal discussion at 6:30, and start the meeting at 7pm.

The LongPath Staff

Publisher/Editor:

Tom Duncan, KG4CUY

Departments:

Chuck Lewis, N4NM, DX Contests

Chris Reed, AI4U, Minutes

Bob De Pierre, K8KI, From the President

Steve Molo, KI4KWR, VP Corner

Kevin Hibbs, KG4TEI, The Casual DXer

Mystery Antenna Revives DTV Service in Park City

By Mark Brown, N4BCD

Since moving to our rural hilltop QTH in Park City, TN, Julie KK4CLG and I have not had access to Cable TV so we've relied on Dish satellite and over-the-air Digital TV (DTV). When we decided to drop the Dish service the reliability and quality of our DTV service became much more important. We're at 920' above sea-level and 21 miles from the DTV transmitters atop Monte Sano. Bearing is 177 degrees.

A few years ago I installed an outdoor UHF Yagi with corner reflectors mounted on a post at 14' AGL under my 2M vertical. Thirteen feet of decent twin-lead down to a Channel Master preamp with 75 ohm output via F-connector and a lightning arrestor. Then 2 x 25' of barrel connector'd coax to the preamp's DC power injector and a 3' patch cable to the TV. Probably eight F-connectors in this signal chain. This antenna was fine when we lived in Madison, however from here reception has always been spotty and downright poor during rain. We also moved our TV room during a just-completed remodel so the coax run is now even longer.

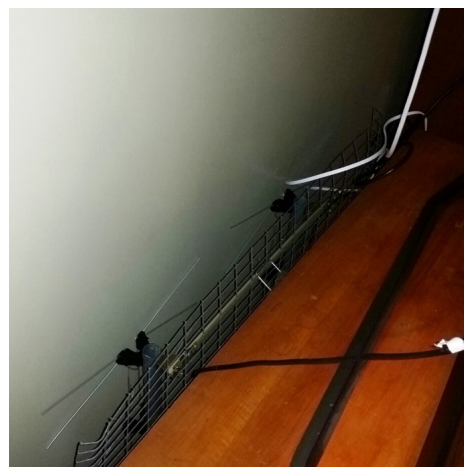
Clearly, we needed something better and my thoughts went to an antenna still mounted on a 4' pole that had been installed in our attic by the previous owner. The coax seemed to go down to the hub of one of those whole-house intercoms / AM / FM radios long since removed, but the element lengths led me to believe it's a UHF phased array. It appeared to be very high quality construction and the ground screen across the back is about 3' square. I horsed it down through the attic opening to assess what I had.

A photo email to Johnny KR4F and Tom KG4CUY elicited enough favorable comments that inspired me to try the antenna while Julie was outside and didn't see me mount that big metal thing behind the TV :)

The Phased Bow-Tie Array antenna is mounted flush facing the drywall behind a large desk supporting the TV. It's pointed at 188 degrees, about 11 degrees off-axis. Used a balun to connect to a single 25' length of coax with molded F connectors. No preamp. ALL channels are full quieting with no pixeli-

zation. Signals are passing through one brick exterior and 4 interior walls. The white wire in the photo is excess length of center channel speaker wire and the black wire is the TV power cord.

This is better than I could have hoped for, but I can't stop thinking about running a few more feet of coax and mounting it higher and outside with a rotor. Working DX (Nashville 80 mi @ 350 degrees) almost demands that I try.



Installed Mystery Antenna



Now-obsolete outside antenna.



Mystery Antenna found my Attic

November Meeting Minutes

By Chris Reed, AI4U

Bob, K8KI called the NADX Zoom meeting to order at 7pm. Twenty-one members were in attendance. Chris, AI4U provided the financial report and membership report. An announcement was made stating the website and email list was updated.

Bob, K8KI turned it over to the election committee. The proposed slate of officers were Bob, K8KI for President, KI4KWR, Steve Molo, Vice President, Chris Reed, AI4U Secretary/Treasurer. Directors are Tom Duncan KG4CUY, Kevin Hobbs, KG4TEI, Former President, Steve Werner, AG4W. A motion was made and seconded. The slate of officers were elected by the membership present in the Zoom meeting.

Discussion was held on the Christmas party. Due to Covid, it was cancelled with everyone's health and safety being the primary concern.

Meeting was adjourned at 7:22pm.

Fred Kepner, KF3FRK delivered a program on Using software tools to work DX with a moderate station.

The next virtual meeting of the North Alabama DX Club will be Tuesday, December 8 at 7 pm. A meeting notice with the Zoom virtual meeting information will be sent out by email.

Treasurer's Report

By Chris Reed, AI4U

There were no transactions during November. The Balance as of December 1 is 8409.68.

2020 Thanks

The LongPath editor, publisher, etc. wishes to thank all who have contributed to a markedly different LongPath in 2020 as compared to "the average" for many previous years. This is due to one thing: contributed articles.

Contrary to a popular rumor, the LongPath does not appear of its own volition, like Venus from a clam-shell, fully-formed underneath the link on the NADXC web site just before the second Tuesday of the month. Some cajoling is required to turn vague indications that an article might be available sometime in the future into completed copy. The chief cajoler is certainly our president Bob, K8KI, who has very effectively done whatever was required to extract articles from contributors.

So, while it is customary at this time of the year for me to belly-ache about flagging content and plea for more, this year I would rather like to say "Thanks for the Articles!", and ask that you keep them coming.

Lest there be any misunderstanding, let me point out that while both the quantity and quality of articles has improved dramatically over the past year, this does not presage rigid requirements aimed at preserving some LongPath standard, with the potential to scare off the novice or occasional contributor. Indeed, we will continue to accept articles for publication based on the same flexible, though unspecified, criteria in use for many years now.

Finally, let me wish all of you a very Merry Christmas and the best in 2021, with the hope that we can resume in-person meetings soon.

73,

Tom Duncan, KG4CUY

LongPath Editor

