



PCARA Update



Volume 24, Issue 4 Peekskill/Cortlandt Amateur Radio Association Inc. April 2023

More Morse, more hams

The Saturday March 4, 2023 PCARA monthly **Membership Meeting** at the Putnam Valley Free Library featured a presentation entitled “Morse Code – Ancient Technology or Vital Tool?”, courtesy of Charles N2SO. An in-depth history of Samuel Morse and his development of an integrated telegraph “system” was provided. There was an audience of 20 and a bibliography was made available by Charles to members of PCARA Google Groups. There was a short question and answer session at the conclusion. On behalf of the PCARA membership, I wish to THANK Charles for a most excellent and informative talk.



Charles N2SO begins his presentation on ‘Morse Code - Ancient Technology or Vital Tool’ at Putnam Valley Library.

During the meeting Bob N2CBH gave a brief overview of the status of the 2 meter repeater and some of the happenings with infrastructure on the hill. There are upgrades in the works, like tweaking the programming for the 449.925 MHz machine, but everything is functioning well.

At the conclusion of the meeting, a Laurel VEC **VE Test Session** was held by Dave KF2BD, for which there were two candidates. After all was said and done, there was one new Technician and one upgrade to General. Congratulations! Thanks to Dave and our dedicated group of VEs — we’re still going strong licensing and upgrading Hams.

Yes, yet another **PCARA Breakfast** was held on

Saturday March 18, 2023 at 9:00 a.m. at the NEW Uncle Giuseppe’s Marketplace in Yorktown Heights. As expected, there was a good turnout with 11 members in attendance and we took over three tables at one end of the “café”. These Breakfasts continue to be very popular.



PCARA Breakfast at Uncle Giuseppe’s.

Here are some **upcoming events** that you can add to your calendar:

- Wednesday March 29, 2023 at 7:00 pm: ARRL VEC VE Test Session at the Putnam / Northern Westchester BOCES in Yorktown Heights, NY.
- Sunday April 2, 2023 at 3:00 p.m. Monthly meeting and Antenna Workshop.
- Saturday April 15, 2023, at 9:00 am: PCARA Breakfast at the NEW Uncle Giuseppe’s Marketplace in Yorktown Heights, NY.

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- Sunday April 16, 2023, 2:00 p.m. Simplex Challenge.
- Sunday May 7, 2023: Orange County Amateur Radio Club Hamfest at a NEW location – Black Rock Fish and Game Club in Mountainville, NY. PCARA has booked an indoor space. Please visit: <https://ocarcny.org> for details.

Our next monthly PCARA membership meeting is scheduled for Sunday April 2, 2023 at 3:00 p.m. at the Putnam Valley Free Library. There will be an **Antenna Workshop** following the meeting. We will be building VHF and UHF tape measure Yagis suitable for foxhunting. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Board

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Net night

Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

Join the roundtable to find out what members have been doing or join the Old Goats with net control Karl N2KZ for news and neighborly information.

Antenna workshop

PCARA's next monthly meeting takes place on **Sunday** April 2nd, 3:00 p.m. at the Putnam Valley Library, 30 Oscawana Lake Road, Putnam Valley, NY. After the formal meeting there will be an **Antenna Construction Workshop** with an opportunity to build a tape measure Yagi for use in upcoming foxhunts. All are welcome at the workshop.

Detailed instructions for building a tape measure Yagi for 2 meters are available at: <http://theleggios.net/w->

Graphic courtesy of Lou, KD2ITZ.

b2hol/projects/rdf/tape_bm.htm. This design relies on four lengths of 1"-wide steel tape measure, three lengths of ½" schedule 40 PVC pipe, PVC tees and crosses plus stainless steel hose clamps. Several examples of the design were constructed at an earlier PCARA workshop held on April 26, 2017 at Mohegan Fire Department Headquarters. They have proved their worth in subsequent foxhunts.

For members who have *already* constructed a tape measure Yagi for 2 meters, there will be an opportunity to construct a similar design scaled down for the 70 centimeter / 440 MHz band. Foxhunting close-in to a hidden 2-meter transmitter can be assisted by monitoring the transmitter's third harmonic, $3 \times f$, for example: $3 \times 146.565 \text{ MHz} = 439.695 \text{ MHz}$. Instructions for constructing a 440 MHz tape measure Yagi are available from the Hurst Amateur Radio Club at: <https://w5hrc.org/media/2020/11/Tape-Measure-Yagi-440.pdf>. (PDF file.)

Parts for both antenna designs are available from local hardware stores such as Home Depot, Lowes or Ace. Verle W2VJ has been investigating group purchase. You will also need a short length of 50 ohm coaxial cable (RG-58, RG-316) terminated with a connector-adaptor suitable for your Foxhunt VHF/UHF transceiver — usually SMA or BNC.

Test equipment will be available at the workshop to verify performance of completed antennas. Bring along your VHF/UHF handi-talkie for a chance to test reception.

Adventures in DXing

- N2KZ

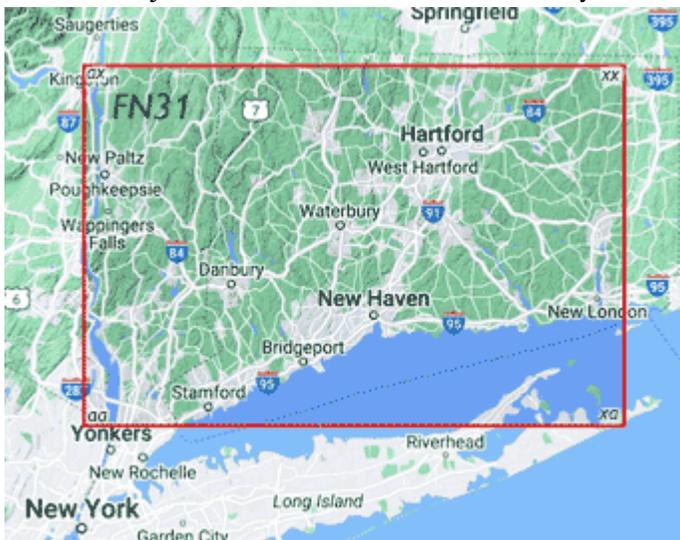
Congratulations! You earned your amateur radio license. Do you already have a portable HT or a base station set up in your house? Great! Have you talked to other hams on the air? Maybe you joined in on a chat net? OK... but now what?

Several new hams have asked me recently: *How can you DX on 2 meters?* Hopefully, this article can help you go the distance! Want to learn about all your equipment can do? All sorts of ideas and activities and await. Read on! I will show you how!

Get Oriented

VHF/UHF DXers measure their loggings with much more geographic detail than you are accustomed to. You can still talk about what countries, states or even counties you worked but the main system of measure is by referencing *Maidenhead grid squares*. With this system, the entire world is divided into precise blocks so you'll instantly know where that distant signal is coming from!

The Maidenhead Locator System is very accurate. Most PCARA members live inside grid square **FN31**. Your author lives exactly in **FN31eh**. This covers my area within just a few houses! We know where you live!



Map shows extent of Maidenhead Grid Square **FN31**. Each grid square is sized 1° of latitude by 2° of longitude and can be subdivided into 24 x 24 subsquares (aa-xx).

You'll find your precise Maidenhead locator on your QRZ.com page. Search your call sign then click the "Details" tab and look for "Grid Square." A nice grid square map can be found at: <https://www.icomamerica.com/en/downloads/default.aspx?Category=352>. Take a look and you will instantly get the idea!

Each four character grid square you work and verify becomes a credit toward contest points and operat-

ing awards. On HF you can earn your DX Century Club (DXCC) award by working 100 different countries. On VHF/UHF, you can earn your VHF/UHF Century Club (VUCC) award by working 100 different grid squares! Touch base with someone on Long Island and you've worked FN30.

Contact someone sitting up on Bear Mountain and you'll work FN21. Bergen County, New Jersey is FN20. Make sure to work



Grid squares near to FN31. [Credit: Icom]

someone nearby! Your own grid square is a point, too!

Two very important caveats: To earn a grid square, you can NOT reach your target area using a repeater or an Internet link like Echolink. You have to make your contacts on a one-to-one basis only — known as *simplex*. Also, your contacts are measured *per band*. Work the same DX station on both the 2 meter and 440 MHz 70cm band and you've earned *two* points! Read all the VUCC award rules at: http://www.arrl.org/files/file/Awards/VUCC_Rules_Jan_2023.pdf. (PDF file)

What's the Frequency?

"Where can I find other stations using one-to-one simplex on 2 meters FM?" The band plan is simple! Most activity is found on 146.520 MHz — the nationwide 2 meter simplex calling frequency. In theory, this is supposed to be a place to *call* and make initial contacts. If you want to have a long 'ragchew' conversation, it is polite to move to another frequency so others can use '52.

Part of ARRL 2 meter band plan	
146.01-146.37	Repeater inputs
146.40-146.58	Simplex
146.52	National Simplex Calling Frequency
146.61-146.97	Repeater outputs
147.00-147.39	Repeater outputs
147.42-147.57	Simplex

In our local area, the secondary FM simplex frequency is 146.580 MHz. You might even hear a chat 'net' going on '58. Looking for simplex communications or transmissions of slow scan pictures from the International Space Station? Tune to 145.800 MHz. Finally, if you need to find a fox hunt beacon or an experimental test, PCARA often uses 146.565 MHz.



Fox & Verle W2VJ.

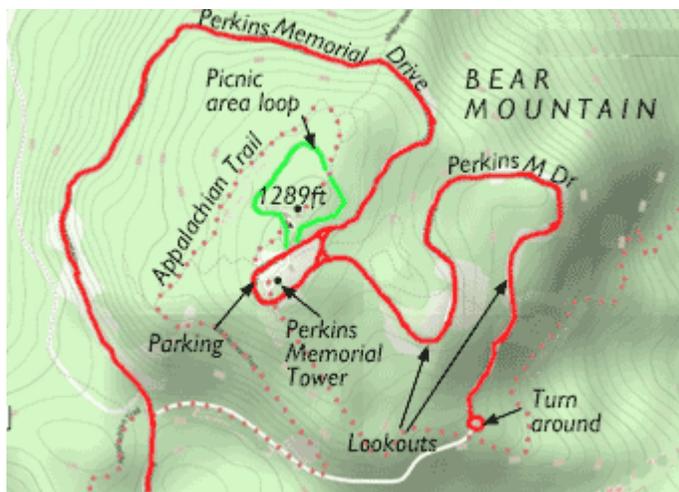
Please be mindful and cautious when you use your HTs or mobile transceivers on simplex. Although several amateur radio organizations may suggest very specific alternative simplex frequencies, others may have already commandeered these spaces for repeater inputs, data transmission or other tasks. Always listen carefully to a possible frequency for a long period of time before attempting your transmissions. Please call out 'Is this frequency in use?' before you go further. Nobody likes an uninvited guest!

Take a Hike!

Unfortunately, you can't go to the post office to send your signal to faraway places. You have to rely on your operating skill. Just like in real estate, the most important factor is **location, location, location**. As a rule of thumb, it helps to operate elevated up on a bluff, a mountain top, atop a tall building or even on a fire tower. Your signal has a much better chance of reaching its target if there is nothing in its way. High is good!

Tune your signal to your liking with terrain! You can use your surroundings to block interference from other signals. Why is this important? If you are in a contest setting, with hundreds of other hams competing for contacts, you can concentrate your efforts by literally being on the right side of the hill.

If you are at the pinnacle peak of Bear Mountain your signal and what you receive could be coming in from all directions. If you drive around the stone tower and follow Perkins Drive just a short distance down to the lookout turn-around circle you are now concentrating on all points east toward New England. Park in one of the very first parking spots atop Perkins Drive just before you get to the stone tower. Walk into the woods, up and over the Appalachian Trail path, to the west side of the peak and you will have Western New York and Southeastern Pennsylvania in focus.



Locations in Bear Mountain State Park.

Your choice of spot can make all the difference. Maximize your catches: Sit in one location for a while

then move to another one for variety. Let everyone have a chance to work you!

Spot On!

I recently asked many friends on the air what their favorite VHF/UHF operating spots were - and the list was almost endless! You can discover all sorts of wonderful tips by asking around!

In no particular order, here are our favorites. Give some a try and let me know your results!

Bear Mountain State Park — Route 9W North, Bear Mountain, NY 10911. The peak of all peaks at 1289 feet. Nearly a 360 degree view. Follow signs to Perkins Memorial Drive and head up the hill. Explore the area around the tower and then drive or hike down to the Hudson River overlook. Guaranteed DX results!



Mount Beacon — Wolcott Avenue and Howland Avenue, Beacon, NY 12508, 1611 feet — the top of the world! Not a casual hike but unparalleled views and expanse. Allow at least three hours for your adventure. Don't wimp out! Make it to the fire tower and climb up! Complete hints: <https://hikethehudsonvalley.com/hikes/mt-beacon/>



Mount Beacon fire tower.

Anthony's Nose — Route 9D, Cold Spring, NY 10516. East of the Hudson, high above the Bear Mountain Bridge. 927 feet. A steeper, more challenging hike and a PCARA favorite. Spectacular shot to the west towards Southeastern Pennsylvania. Complete directions and parking and hiking hints at: <https://hikethehudsonvalley.com/hikes/anthony-nose/>

Serious hikers looking for another challenge along the Hudson Valley must try (Bull Hill) Mount Taurus and Breakneck Ridge.

Goat Trail Overlook — Route 202 / Route 6 on the way to the Bear Mountain Bridge from Peekskill. This is about as close as you will ever come to a drive-in DX spot. Food trucks are common here during the summer months. Right across the Hudson from Iona Island. Great views of Peekskill Bay and beyond — looking down the Hudson and towards Long Island and parts southeast.

Ninham Mountain Fire Tower — Mount Nimham Ct, Carmel Hamlet, NY 10512. 1273 foot summit — 1314 feet in the tower crow's nest. Park and walk uphill for about 15 minutes. Great view of the Hudson River valley. Don't chicken out! Climb the tower to the

top! Spectacular for operating with a HT transceiver.

Mountain Lakes Park — 201 Hawley Rd, (to Mountain Lakes Park Road) North Salem, NY 10560
Two terrific spots: 982 feet — Bailey Point benchmark: hidden up a little hill in the trees is a trail marker noting the highest point in Westchester. Phenomenal VHF/UHF coverage. Also, Lookout Point - slowly enter the park and you'll find a tiny parking lot on the right side of the road (Spruce Lake Parking) for Lookout Point. A very short walk uphill brings you to a nice bench, a permanent set of outdoor binoculars and a great view. Sit and work simplex for great catches! Google Maps has the best



Mountain Lakes Park-Lookout Point. [N2KZ]

detail for you to follow the path to the top.

Indian Hill Park - Donald J. Trump State Park, north of Route 6 along Indian Hill Road, Putnam Valley, NY. This location is higher up than you may think! Al K2DMV has enjoyed this site during our PCARA Simplex Challenges. Active PCARAn Verle Johnson W2VJ activated Indian Hill Park last September 17th with great results! Read about Verle's adventures in the October 2022 edition of PCARA Update: <http://nm9j.com/pcara/docs/pcud1022.pdf>. (PDF file.)

Some things to remember before you put on your hiking shoes: Bring writing materials — pen and paper or electronic media — to log your contacts. Note time, frequency, call sign, location and Maidenhead grid square of all the stations you work. Know what grid square *you* are in! A water bottle and snacks come in very handy! Make sure your HT batteries were charged the night before and carry a second battery pack if you have one.

When you gain sophistication, you might consider bringing extra equipment with you: A full-sized vertical or Yagi antenna, connection coaxial cable and additional battery packs. A chair might be nice, too. Just remember, always do a test run before you leave your home to make sure you are not leaving out a critical part like an adapter or needed hardware. See if you can find a friend or two to help you carry all your



Steve WG0AT and pack-animals.

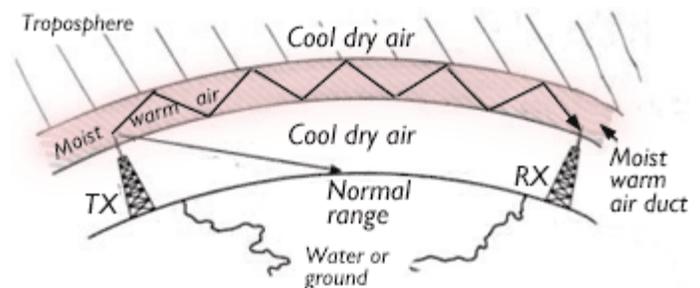
gear uphill! Famous mountain-topper Steve Galchutt WG0AT discovered a 'baa'-ter solution! Have a goat walk your gear to the summit!

Many hams really enjoy hiking and working DX from mountain tops and scenic parks! Two amateur radio groups can help you to go even further: Check out POTA Parks-on-the-Air (<https://parksontheair.com>) and SOTA Summits-on-the-Air (<https://www.sota.org.uk>). You'll find terrific information and lots of new friends by joining in!

Go The Distance

Nature can lend you a hand getting your signal to travel great distances. Two kinds of propagation can bring you miracles: *tropospheric skip* and *E-skip*.

Tropospheric skip provides you with a free ride up and down the Atlantic coast and inland, as well. Think of tropo as a long vacuum cleaner hose. When atmospheric conditions align just right your signals can be transported to distant places, sometimes with great strength. The DX signals will arrive at your location from one concentrated area with nothing in between. It really acts like the crest of a wave. Catch it when you can!



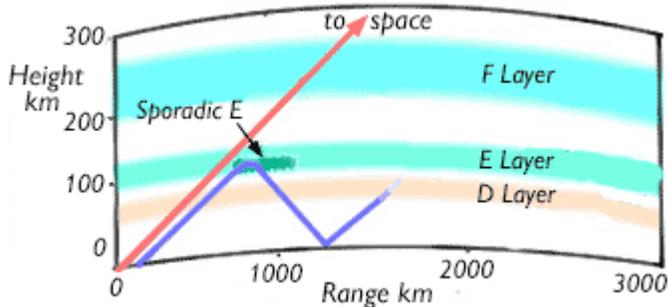
Tropospheric ducting takes place when a temperature inversion creates a layer of warm moist air trapped between (or beneath) layers of cool dry air. VHF and UHF waves entering the duct are reflected and travel long distances.

Tropo most frequently occurs in the steamy summer months of June July and August. From the New York City metropolitan area I have been able to work tropo from Maine all the way down to South Carolina. The finest tropo can be had when a hurricane is approaching or passing by. Also, watch for misty mornings and early evenings. Many, many summer mornings include some tropo lifts. Hurry up and work stations as fast as you can. They might be waiting for you!

For excellent forecasts of predicted tropo skip, look to: <https://www.dxinfocentre.com/tropo.html>. William Hepburn's DX Info Centre Tropospheric Forecasts are renowned worldwide! Another very useful up-to-date tropo map can be found at: <http://vhf.dxview.org>.

Sporadic E-skip is simply amazing! When sunspots excite and aggravate electromagnetic particles of magnetic meteor dust floating in our atmosphere's E-layer (about 30 to 600 miles above the Earth) your signals can travel from 500 to 1500 or even 2000 miles away.

The E-layer acts like a field of pieces of broken mirror and reflects your signals back down to Earth.



VHF radiation normally goes straight through the D, E and F layers of the ionosphere (red line) to outer space. "Sporadic E" propagation occurs when a cloud of intense ionization in the E layer reflects VHF waves back to Earth (blue line). The thin, dense layer of ionization is believed to be composed of metal ions originating from meteorites.

E-skip can be very strong from very specific areas when the signal geometry is just right. You'll often discover this effect from June to mid-August and then during the middle weeks of December. You can log Newfoundland to the Mississippi River to the Caribbean Antilles and even Europe when VHF signals make multiple hops!

How can you get an early warning that VHF/UHF propagation is brewing? *Listen to broadcast FM radio!* Tune up and down the dials looking for seemingly unused channels and browse them patiently. A good car radio or a component FM home receiver with good selectivity and sensitivity is very helpful. You may hear both tropo and E-skip stations invade the band. FM stations from the deep south (Florida, Georgia, Alabama and Mississippi) can be often heard on E-skip. Similarly, early morning tropo can be amazing, too. I once heard WKYS 93.9 MHz from Washington, DC completely overtake powerful local WNYC-FM New York for several hours one steamy summer morning.

A fine introduction to chasing skip on VHF and UHF can be studied at The Worldwide TV-FM DX Association (<https://www.wtfda.org>) Get to know what serious DXers can catch and the facilities they build to bring in the DX! Long Yagis in high places are a regular event with this crowd! Always welcome is the ARRL's Operating Guide with great tips and ideas for all amateur radio operators.

I Have a Dream

You can't work somebody if no one is listening. You can't work somebody if you don't know who is out there. Start the ball rolling today! Pick up your HT or mobile transceiver and call CQ on 146.520 MHz 2 meter sim-



plex! The more people you work, the more people may want to contact you. If the band is active, more people might come aboard! Spread the word! Collect your Maidenhead grids! They are waiting for you!



Jon KC2BNW can often be heard from local high spots on 2 meter FM simplex.

Three great contests can fill your VHF/UHF logbooks rapidly. ARRL's Field Day brings thousands of stations on the air. Join PCARA's Field Day station this coming June 24th and 25th, 2023. Keep an eye out for the next PCARA Simplex Challenge on April 16. ARRL VHF contests appear twice a year: now scheduled for June 10-12, 2023 and January 2024. Full information at <http://www.arrl.org/june-vhf>.

Every January, you can participate in the nationwide Winterheat simplex contest: <https://www.hamactive.com/WH23/index.php>. A good time to reach Eastern Pennsylvania is on Saturday nights at 8:30 p.m. on 146.580 simplex. Details at: <https://simplexradio.net>. Looking for Maine? Try the yearly Maine Simplex Challenge: <http://www.ws1sm.com/2-Meter-Challenge.html>. I have reached Maine, Massachusetts and Rhode Island from atop Bear Mountain. Give it a try!

Finally: If you want to set up a scheduled 2 meter simplex contact, drop me an e-mail at n2kz@arrl.net. I love invitations to get on the air!

Important postscript: VHF 2 meter DXing is not easy! You have to learn to become skillful to become successful. Keep trying and keep experimenting. You will never forget your first good 2 meter catch! Good luck! I hope to catch *you* on the air soon!

[For the first article in this series look to the January 2023 PCARA Update pages 3 to 5: <http://nm9j.com/pcara/docs/pcud0123.pdf> (PDF file).

Until next month, get on the air! See you on '52! 73s and dit dit de N2KZ "The Old Goat."



Note from the Editor

Karl's article describes simplex operation on 2 meter FM as this is the mode most likely to be used by a new radio amateur.

During VHF/UHF contests and DX band openings, the modes more likely to be in use will be SSB, FT8 or CW. For that you will need a **multimode** VHF/UHF transceiver such as the Yaesu FT-857, FT-897, FT-991A, Icom IC-7100, IC-9700 etc. -Ed.

Simplex Challenge - N2KZ

We are anxious and excited to announce our 2023 PCARA Simplex Challenge. The event will commence



Simplex Challenge.

This is not a contest or a competition. The Simplex Challenge is designed for newcomers and old goats to enjoy and learn. Are you a newbie and just getting started in ham radio? Come join us!

The main goal of this exercise is to see just how far our signals can travel unaided by repeaters, one-to-one, in a simplex fashion. The test will be held on a single 2 meter FM simplex frequency: 146.565 MHz.

Participating amateurs or groups of amateurs will be situated in a variety of places of their choice. We encourage everyone to find a location of high elevation and clearance but any place is acceptable. Choice of equipment, operating power and antennas is solely up to the discretion of the participants. Please take pictures of your set-up for the next issue of *PCARA Update*!

Please make sure you allow ample time for travel to your site and for equipment setup. It would be a good idea to include a second rig to monitor the PCARA 2 meter repeater during the simplex tests. If we cannot hear you directly, we will defer to the repeater to instruct participants as necessary.

We will first check-in all stations using the PCARA repeater with an output frequency of 146.67 MHz using a -600 kHz offset and a 156.7 Hz PL. You should be prepared to describe to the hosts your location, equipment and antenna configuration. We encourage everyone participating to take accurate notes regarding all they see and experience. Please follow along and keep track of what order the stations are being called by the hosts. This will aid you during later rounds of the test.

Please remember that our Simplex Challenge is indeed in simplex! When transmitting on our 146.565 MHz simplex frequency, turn off your PL transmit tone and turn off your tone squelch (PL decode). It may be best to open up your squelch to hear weak signals among the static received!

on Sunday afternoon, April 16, 2023 at 2:00 pm. Our hosts will be Malcolm, NM9J and Karl N2KZ, situated high atop Bear Mountain on Perkins Drive. All licensed amateur amateurs are welcome to participate.



Karl N2KZ operating from the summit of Bear Mountain during PCARA's first Simplex Challenge in May 2016.

The second round will be the beginning of the adventure. The hosts will attempt to reach each remote station via simplex. The operating frequency for all simplex tests will be 146.565 MHz FM.

Again, a full roll call of stations will be held in the order of first check-in. While the hosts are touching base with each station, make sure your squelches are turned off. By all means, attempt to hear all the other stations from your QTH as we call the roll.

The third round will be the most challenging and interactive. While the host station atop Bear Mountain acts as coordinator, each remote station will try to contact all the other remote stations one at a time. After you contact other remotes at 'full power', we will also encourage you to attempt contact at lower QRP powers, as you desire.

Keep in mind that it is quite likely that each station will not be able to hear or contact all other stations. We are expecting participation from remote stations in several counties within a wide range from the Bear Mountain host. Try your best to catch them all! An amazing time is guaranteed!

If you have any questions or suggestions about the event, please contact Karl, N2KZ, via e-mail at: pcaraevents@gmail.com or by telephone at 914-346-0304. This telephone number will be active during the test as a final method of contact should you not be heard or you have other urgent concerns. Please advise us, via e-mail, of your intended locations and plans. We want to be ready for you!

After the event, all participants and friends are welcome to join us at the Westchester Diner, 300 Albany Post Road in Peekskill (914) 734-4949 to celebrate and compare notes. We expect to be gathering at the diner at approximately 4:00 p.m. right after the Simplex Challenge has completed. Please feel free to publicize this event to your friends. Everyone is welcome!

- Karl, N2KZ

NY QSO Party Results 2022

PCARA took part in last year's New York QSO Party on Saturday October 15, 2022. The fixed station effort in the "NY Multi One Low Power" class was hosted by Joe WA2MCR with additional operators Lou KD2ITZ, Vincent KD2VAV, David KD2EVI and NM9J. Meanwhile David K2WPM was taking part in the Portable Single-Op class from two different locations in Rockland and Putnam Counties. A full report with claimed scores was published in the November 2022 PCARA Update on page 6.

Results of the NY QSO Party appeared around March 21 on the official web site: <https://nyqp.org/wordpress/>. Here are the results for the **Fixed Multi-operator** class

Op Class	Power	Call	Score	QSOs	Mults	Counties
Multi-Multi	Low	W2SO	403	16	13	3
Multi-One	High	W2CCC	81,795	861	95	44
Multi-One	Low	NJ1F	58,381	386	79	44
Multi-One	Low	W2NYW	39,411	396	87	51
Multi-One	Low	W2E	14,070	201	70	42
Multi-One	Low	W2OW	10,788	174	62	43

Below are the scores for the **Portable Single-operator** class.

Power	Mode	Call	Score	QSOs	Mults	Counties
Low	Mixed	K2WPM	10,553	163	61	43
Low	Mixed	KD2PTX	2,904	66	44	29
Low	Mixed	N3OJP/P	195	15	13	11
QRP	Mixed	N2JJ	25,312	242	56	28
Low	Phone	N2FMS	8,308	134	62	43
Low	Phone	W2EMC	7,650	153	50	33
Low	Phone	N1GBE	2,378	58	41	35
Low	Phone	AC1KQ/P	1,395	45	31	22

Note the excellent position achieved by David K2WPM. He will be awarded with the plaque for "NY Portable Mixed Low Power", sponsored by Rochester DX Association.

David K2WPM's score of 10,553 was combined with the W2NYW score



Vincent KD2VAV and Lou KD2ITZ operating New York QSO Party Club Station W2NYW from Joe WA2MCR's sun room in October 2022.

of 39,411 for the **Club High Score**. Here are the **Top ten club** scores out of a total of 101 clubs.

Club	Score	
Niagara Frontier Radiosport	1,590,187	In-State Winner
Hudson Valley Contesters & DXers	998,758	
Rochester (NY) DX Assn	795,407	
Frankford Radio Club	711,826	
Yankee Clipper Contest Club	355,392	
Order Of Boiled Owls Of New York	157,029	
Potomac Valley Radio Club	86,046	Out-of-State Winner
Contest Club Ontario	61,169	
Squaw Island ARC	51,410	
Peekskill / Cortlandt ARA	49,964	

In 2022 PCARA sponsored the NY QSO Party plaque for "Non-NY SSB Low Power". This award was earned by Art N3AAA in Washington PA.

The organizers invite participants to join in the New York QSO Party for 2023, scheduled for Saturday October 21, 2023, from 10:00 a.m. to 10:00 p.m. ET, or 1400z October 21 to 0200z October 22.

Repeater News – N2CBH

VHF repeater

Recently I acquired a Motorola model MTR3000 series for use on the PCARA 146.670 MHz repeater. So now the club will have access to **three** repeaters all using the same technology. The MTR3000 series is a rugged, commercial radio system designed to handle the rigors of public safety and professional organiza-



Motorola MTR3000 base station/repeater is available in VHF, UHF and 800/900 MHz versions.

tions — and to this day is utilized by many police and fire departments in addition to commercial applications. The new equipment (which is new to us) will enable better reliability, particularly when it comes to environmental variations up on the hill. The unit is capable of 100 watts output but we have it set to 50 watts to enhance long term reliability — much the way the present equipment was set up. This MTR3000 supports FM and digital communications utilizing the DMR format. The equipment consists of an integrated power supply, receiver with preselector and transmitter. Both the power supply and transmitter power amplifier have thermostatically controlled cooling fans to enhance reliability and temperature stability. All in all a solidly built piece of equipment from Motorola.

MTR3000 Standard Features:

- Operates in analog or MOTOTRBO™ digital mode with LED indicating mode of operation
- Reliable 100W continuous duty cycle operation
- 12.5 or 25 kHz programmable channel spacing
- Analog and digital conventions are all standard in one base station without the cost of additional software or hardware
- RoHS (Restriction of Hazardous Substances) compliant

MTR3000 programmed in MOTOTRBO mode provides:

- Supports two simultaneous voice paths in digital 12.5 kHz TDMA, 6.25e compliant
- Divides existing channel into two timeslots, delivering twice the capacity through a single repeater
- Supports MOTOTRBO IP Site Connect for increased wide area coverage and Capacity Plus single-site trunking without a separate hardware controller.

Improvements in performance should be notable including better frequency stability. The current equipment — some of which dates to the 1970's — is crystal controlled and subject to frequency variation due to

temperature. The new equipment utilizes frequency synthesis for the transmitter and receiver circuits.



The new Motorola MTR3000 repeater producing 50 watts output while on-test into dummy load. [N2CBH pic.]

temperature. The new equipment utilizes frequency synthesis for the transmitter and receiver circuits.

Work still to be done will include mounting the equipment into an enclosure so it will fit into the exist-

ing cabinet that I installed in 1999 up on the hill. We will also be taking the duplexer — the filter system that allows the transmitter to share the same antenna as the receiver — and inspecting it for proper bandpass and notch tuning. I suspect that over the past twenty years the duplexer has some oxidized



Decibel bandpass/reject duplexer at the 2 meter site.



440 and 2m repeater antennas.

components that may need cleaning up. In addition, I would like to replace the existing transmission line with a new section of semi-flex hard line and inspect the antenna — a Command Technologies Super Stationmaster™ collinear system. (This antenna has a series of stacked dipoles soldered together to produce 5.5 dB gain.)

I expect the timeline to complete this work will be on the order of a few weeks as I have time to complete assembly and bring the equipment up on the hill. In the meantime, I appreciate everyone's patience as we should have the intermittency issues with the current W2NYW/R system corrected soon.

Continued on page 10 ⇨

UHF repeater happenings

As indicated earlier, we now have the same MTR3000 series equipment running on both of the UHF repeaters, N2CBH/R and KB2CQE/R. We had a productive meeting with officials at the BOCES Yorktown campus on the possibility of locating the 448.725 MHz machine — which will provide the club with enhanced coverage in the greater Yorktown area. I submitted a detailed set of specifications for use at the site to the Facilities Director and we await approval on a timeline for installation.

The other machine on 449.925 MHz has been operational for a few months now. One thing to note is

that this repeater currently has no hang time. The feature can confuse some people as to whether the repeater is responding due to the fact that when you unkey your microphone the repeater carrier isn't audible. Rest assured it is working. We will correct the setting as it is more common to have a 4 second hang time where the transmitter continues to transmit after you drop your carrier.

So, to sum up I would say we have been very busy enhancing our capabilities and preparing for a digital future if we decide to go that route.

- Bob, N2CBH

Local low power and DX - N2KZ

The table below of local low power and DX FM broadcast stations for Northern Westchester was compiled by Karl, N2KZ.

Local low power and DX stations, Northern Westchester, NY				
Peekskill NY				
91.9	New City	W220EG	10W	WFMU East Orange, NJ - Alternative
94.3	Pomona	W232AL	250W	WPLJ New York - Christian
94.3	Peekskill	W232DQ	1W	WLNA Peekskill - Classic hits
95.9	Peekskill	W240CR	10W	WAMC - Albany - Public Radio - via WOSR 91.7 Middletown
106.1	Beacon	W291CQ	25W	WPDH -FM Poughkeepsie - Today's rock
Mount Kisco NY				
88.5	Brewster	WANR	235W	WAMC - Albany - Public Radio
88.9	Mt. Kisco	WWES	400W H 272W V	WAMC - Albany - Public Radio
89.7	Mt. Kisco	WMNR	38W	WMNR - Monroe CT - Classical
90.1	North Salem	WPUT	440W	Dennis Jackson - American standards
Danbury CT				
93.3	Danbury	WFAR	15W	Community radio - Ethnic
94.1	Danbury	W231DJ	99W	WLAD-AM Danbury
94.5	Danbury	W233CF	99W	WDAQ-FM HD4 - Classic Hits
96.1	Danbury	W241CA	250W	WSHU - Fairfield - Public Radio - talk and news
97.9	New Milford	W250CH	250W	WDAQ-FM HD3 - Country - 97.9 and 107.3 The Bull
103.7	Danbury	W279CI	250W	WDAQ-FM HD2 - Alternative
107.3	Danbury	W297AN	99W	WDAQ-FM HD3 - Country - 97.9 and 107.3 The Bull
DX Super Stations - Wide Area Coverage				
88.5	Amherst, MA	WFCR	1300W	New England Public Radio
89.7	Boston, MA	WGBH	98,000W	GBH Public Radio
90.3	Mt. Greylock, MA	WAMC	10,000W	Albany - Public Radio - Main transmitter
93.7	Wilmington, DE	WSTW	47,100W	"Today's Best Variety"
94.9	Mt. Washington, NH	WHOM	48,000W	"Light favorites"

Say no to noise

Amateur radio can be brought to a standstill by unexpected NOISE. Have you ever switched on your transceiver and faced a wall of interference that wiped out all but the strongest signals? Read on for a suggested way to fix it.



Recent experience

I was checking around the amateur bands during the daytime when I came across a surprise. I found that daytime noise levels had increased markedly on both 80 meters and 160 meters. My Yaesu FT-991A transceiver has a built-in panoramic spectrum display with waterfall which can highlight excessive noise — the radio was showing an S-meter reading of S7 - to - S9 on 160 meters and 80 meters.

What it looks and sounds like

Wideband noise can arise from various sources, for example:

- Electric motors
- Switch mode power supplies
- LED lights
- High voltage discharge tubes
- Arcing or tracking insulators
- Solar power installations
- Thyristor (SCR) power/speed controllers

When heard on an AM or SSB receiver, some sources have a distinct sound of their own. Broadband noise caused by a spark from the 60 Hz AC power supply can sound different from the wideband noise produced by a switch-mode power supply operating at a frequency of 50 kHz to 300 kHz.

When viewed on a panoramic display, 60 Hz AC sparks appear as short spikes, apparently moving across the frequency spectrum, with a diagonal pattern on the waterfall display.



Broadband interference caused by sparks from 60 Hz AC electrical equipment appears as spikes on the FT-991A scope display, apparently moving across the frequency spectrum, producing diagonal lines on the waterfall. [The source was an electric drill with sparking commutator].

In contrast, switch mode power supplies generate a continuous spectrum of noise, with wide peaks at roughly steady frequencies.

(A software defined radio with panoramic display can also be helpful in visualizing noise sources.)



Noise level experienced on 160 meters. Broad peaks at steady frequencies on the waterfall display suggest problems with a switch-mode power supply.

Tracking it down

There are several approaches to tracking down a source of electrical noise. The first observation should be — is the noise continuously present? Or does it come and go, perhaps when some other equipment is switched on and off?

If the noise is continuous and you suspect something in your own home as the cause, try switching off circuit breakers on the main electrical panel one at a time. You may find that one particular circuit is involved. If you have individual power strips for collections of equipment, turn off or unplug each power strip. Finally, try unplugging individual appliances.



Using this technique, I recently found a noisy 12V DC 'wall-wart' power supply for my Uniden BCD996P2 scanner that was generating wideband noise on the AM broadcast band. Needless to say, the wall-wart was a modern switch-mode design.

Portable RX

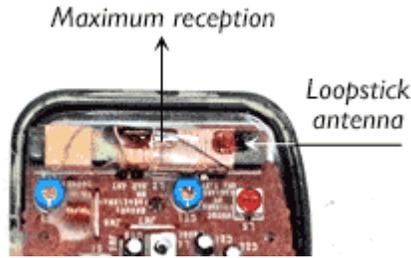
Rather than relying on the transceiver in your shack to monitor noise, it may be more convenient to employ a portable radio. I have a Radio Shack DX-398, equivalent to the Sangean ATS-909. This radio covers long wave, medium wave (AM), short wave and FM broadcast — complete with a built-in S-meter. You may find that an old-style AM transistor radio is almost as useful. Most sources of electrical noise have a strong component in the AM broadcast band.



Tune the portable radio to an unused frequency that is being affected by your noise source then walk

around the house — inside and out — searching for the loudest signal. It is probably best to do this in daylight when natural noise levels are low, long distance reception is unlikely and you can see where you are going. You may find that electrical wiring behind walls is a conductor of interference. AC cables can be a wonderful way of carrying RF noise from a misbehaving appliance all around the home — especially if the cable has non-metallic sheathing, marked “NM” (also known as Romex®) — rather than metal clad “BX” cable (also known as Armorlite®).

The ferrite rod loopstick antenna in a portable radio is directional — you should be able to sense where the interference is coming from by rotating the radio. Maximum sensitivity is *broadside* to the ferrite rod, minimum pick-up is off the ends.



Into the garage

I was tracing the source of my 160 / 80 meter interference using an empty AM frequency on the portable radio. The noise was increasing as I entered the garage. What could it be? The tool charger was unplugged so that was not the cause. I unplugged the garage door opener and the noise disappeared immediately!



LiftMaster® 8355W garage door opener.

The garage door opener was replaced a couple of years ago after the old one stopped working. The end of my sloper antenna was close to the garage... so that might explain the strength of the interference. It was odd that I had not noticed the high noise level before — I guess 160 and 80 meters are pretty noisy at night anyway.

Problem fix #1

I could have left the opener unplugged during radio operations, but that was hardly convenient. I have had success in the past using Tripp-Lite Isobar® surge-protected power strips to supply filtered power to radio equipment. The Isobar Ultra range boasts isolated filter banks to eliminate line noise, as well as metal oxide varistors for surge protection. I had a 4-outlet model in-stock, so I secured this surge protector to a garage cross-beam then plugged the door opener in, us-

ing its short 3-wire cable.

Checking inside the radio room, I found that while noise level was reduced on 80 meters, the improvement was less on 160 meters. I tried some clip-on ferrite cores over the opener’s power cord, but without any improvement.



Tripp-Lite Isobar Ultra surge protector mounted in garage.

Problem fix #2 – through the loop

Internet sites by Palomar Engineers® and W1AEX suggest that one solution is to pass the opener’s power cord several times through a large ferrite toroid, preferably made from Mix 75, which is good for RFI suppression from 150 kHz – 10 MHz. Palomar Engineers sells a Garage Door Opener RFI kit containing one such 2.4" OD toroid — plus three snap-on ferrite suppressors for the sensor and control switch wiring.

By a lucky fluke, I had a suitable toroid in stock, purchased at Sussex County ARC Hamfest a few years ago. I unplugged the grounded power cord for the door

opener and managed to thread three turns through the ferrite toroid. Palomar Engineers suggest that four turns may be possible through their toroid’s 1.4" inner diameter, but I did not want to force the plug through and possibly crack the ferrite material.



Door opener’s power cord looped three times through the ferrite toroid.

The improvement was significant. Noise on the portable receiver close to the door opener power cable dropped to a barely perceptible level. Back in the radio room, noise level on my transceiver, still tuned to

1.860 MHz, had dropped to the same S-meter reading as when the garage door opener was unplugged.



Noise on the DX-398 portable receiver tuned to 1404 kHz had dropped to a barely perceptible level.

1.860 MHz, had dropped to the same S-meter reading as when the garage door opener was unplugged.

FT-991A S-meter readings 1.860 MHz

Noise level with garage door opener powered: S 6½
Noise level with Isobar 4 Ultra in line S 6
Noise level with ferrite toroid only S 4
Noise level with Isobar 4 and ferrite toroid S 3
Noise level with garage door opener unplugged: S 3

While the Isobar filter did reduce noise on 80 meters, looping the power cord through the ferrite toroid was far more effective at reducing noise on 160 meters. Depending on individual circumstances, the toroid alone might offer sufficient improvement, without the need for adding an Isobar filter and surge protector.



Noise level on 160 meters was back to the same S-meter reading as when the garage door opener was unplugged.

Conclusions

If you are suffering from electrical noise on the HF bands then you can try the methods described here to track down the source. Once you have located the cause of the problem, you may be able to simply switch the device off or affect a cure with an external filter.

References:

Palomar Engineers: <https://palomar-engineers.com/ferrite-application-experts-2/RFI-Solution-Kits-c21312661>

W1AEX web site: <http://www.w1aex.com/liftmaster/liftmaster.html>

V.E. Test Sessions March

PCARA's first Volunteer Test Session of March 2023 took place at Putnam Valley Library, following the monthly meeting on Saturday March 4. There were concerns about adverse weather affecting Library hours but in the event two candidates arrived safely in time to take their tests.

Edward Hahn KC2ASD of Poughkeepsie successfully passed Element 3 and upgraded from Technician to General. The FCC issued Edward's upgrade on March 6 2023.

Daniel Knowles of Danbury passed Element 2 and

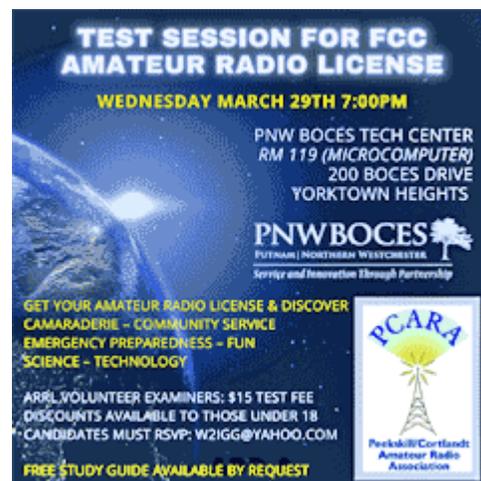


V.E. Test Session held at Putnam Valley Library on Saturday March 4.

qualified for the Technician license. FCC granted his new call sign **KC1SPA** on March 7, 2023.

The session took place under the auspices of Laurel VEC, with Team Leader Dave KF2BD and Volunteer Examiners Lou KD2ITZ, Rob AD2CT, Verle W2VJ and NM9J.

PCARA's next V.E. Test Session (post-publication date) is scheduled for Wednesday March 29, 7:00 p.m. at Putnam | Northern Westchester BOCES, 200 Boces Drive, Yorktown Heights, in Room 119 — Microcomputers. This will be an ARRL-VEC test session, candidates must contact Mike W2IG using w2igg@at'yahoo.com.



V.E. Test Session graphic courtesy of Lou, KD2ITZ.

Under ARRL's Youth Licensing Grant program, candidates younger than 18-years old pay a reduced examination session fee of \$5.00 to the ARRL VEC VE team at the time of the exam. In addition, ARRL will cover the one-time \$35.00 application fee for new license candidates younger than 18 for tests administered under the ARRL VEC program. The \$35.00 FCC application fee will be reimbursed after the ARRL VEC receives the completed reimbursement form and the new license has been issued by the FCC.

Feeding your line

Readers will be aware of problems that can arise when coaxial cable is employed with a badly matched antenna. See for example “40 meter dipole on 20 meters?” in the January 2018 *PCARA Update* where Jay NE2Q described feeder losses of nearly 10dB.

This situation was well understood by Bert Firs, G2LPA. The efforts of this low-profile amateur and experimenter have been reported in these pages before^{1,2}. Bert’s interest in radio sometimes overlapped with his work at a U.K. research center concerned with previously unknown technology.

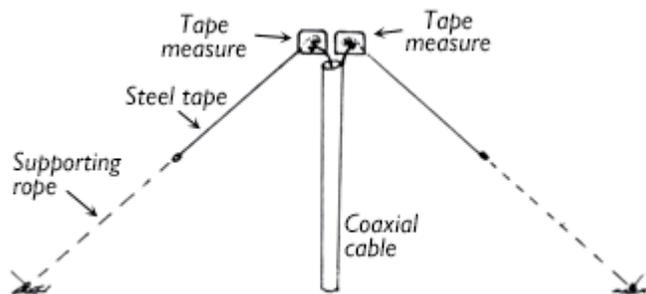
“Radio amateurs often look for wire antennas that can be used on more than one frequency band,” said Bert. “This can be problematic nowadays with ten bands allocated between 1.8 MHz and 29.7 MHz. Even if your antenna has a low SWR on several amateur bands, there will be one or more bands where the antenna impedance is high and feeder losses become excessive.”

“The problem is not confined to power lost in the cable,” Bert continued. “Some of our customers are transmitting high speed data — where reflections on the feeder can cause inter-symbol interference, making signals difficult to decode.”

“I was looking for a solution for commercial customers who might be licensed for a daytime and a nighttime frequency. If this could also be applied to amateur radio, it would be a useful bonus.”

Bert’s first thought was to use a variable-length half-wave dipole element. “This idea was not new,” said Bert. “Think about the antennas from SteppIR which have an adjustable RF conductor housed inside a non-metallic support, with the conductive strip mechanically adjusted for length at a particular frequency using a stepper motor. This is practical for the frequency range 7 – 30 MHz, but the mechanical assembly adds to weight and cost, and isn’t suitable for rapid deployment or lower frequencies.”

“I was looking for a variable-length antenna that could be easily installed using available supports. My first thought was an inverted-V dipole using a pair of metal tape measures that unrolled from the center, but

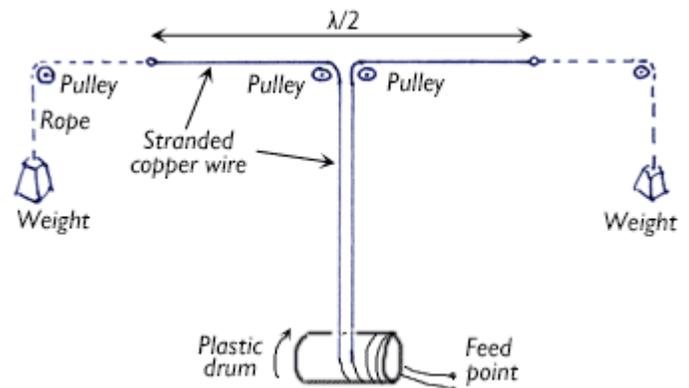


Bert’s inverted-V dipole with variable length elements using two spring-return tape measures.

the retraction springs could not cope with the weight of the supporting ropes.”

“My next design was a dipole using copper wire, plastic rope and pulleys, covering 3 – 30 MHz.”

Bert explained how the system operated. “The copper wires of the dipole continued down to ground level acting as a length of open-wire feeder. The ends of the wire dipole were supported on ropes running over pulleys, with weights on each end to keep the dipole taut. In order to vary the length of the dipole, the open wire feeder was let out from a large insulated drum.”



Bert’s variable-length horizontal dipole was adjusted by unwinding feeder from the plastic drum.

“This would allow the dipole to be adjusted for resonance at any frequency from 3 – 30 MHz, but there were still problems. The dipole-support ropes had to be 70 feet long so the antenna had to be supported at least 70 feet high. Preferred impedance for the open wire feeder was 75 ohms, requiring an air space between the 14 gauge conductors of just 0.08 inches. We could not use plastic spacers, so the design was changed to use plastic-covered wire. This had a tendency to twist around itself then get jammed in the pulleys.”

Bert paused for a moment then continued his narrative. “I had a flash of inspiration,” he said. “If we could not change the length of the dipole elements, perhaps we could change the impedance of the transmission line. What we needed was **variable impedance feeder**.”

“My first thought was to use pressurized coaxial cable. This is a well-established technique in high power TV transmitters and long lines where the feeder is pressurized with dry nitrogen to keep out moisture.”

“Suppose we changed the gas from nitrogen to something with a different dielectric constant? Most gases have a relative permittivity close to 1.0, or are highly corrosive, so we would need to use a liquid dielectric. If we employed deionized water with ϵ_r 80, we could have an impedance ratio of 9:1. A coaxial cable with impedance of 50 ohms using water as dielectric would have an impedance of 450 ohms when the water was replaced by air. Unfortunately, dimensions of the

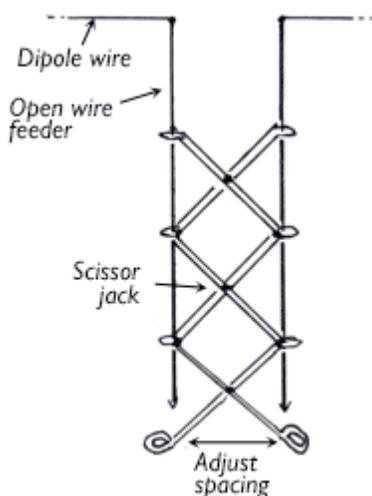
inner conductor proved too small for a reliable design and there was a tendency for the liquid dielectric to corrode the metal surfaces.”

“The next idea was “balloon coax” where the outer conductor was supported on an inflatable rubber tube. Varying the tube pressure would change the distance between inner and outer conductors, modifying the impedance. The only problem was the braid for the outer conductor had to be loosely woven to allow for expansion — and our rubber chemist thought the tube’s lifetime would be too short.”

Bert sighed and I could see that he was reluctant to recall some of these developments. He took a deep breath then continued.

“My next thought was to return to open wire feeder and vary the spacing between the conductors. For example, if we employed 14 gauge wire, and changed the spacing from 0.1" to 12" the characteristic impedance would change from 60 ohms to 600 ohms. The low impedance would be fine for resonant dipoles, while the higher impedance would be suitable for when the antenna has a high voltage feed point.”

“The problem was — how to vary the spacing between open wire feeders? The team came up with several suggestions. One idea was based on a scissor jack that can be opened and closed from one end, with the motion continuing up the scissor sections. A similar design is used in camera jibs and long-arm reacher tools. We designed a variable spacer that could be attached to the feeder wires at the corner hinges, but since the overall length varies with spacing, the top part of the feeder wires had no separator when the spacers were at their widest setting.”



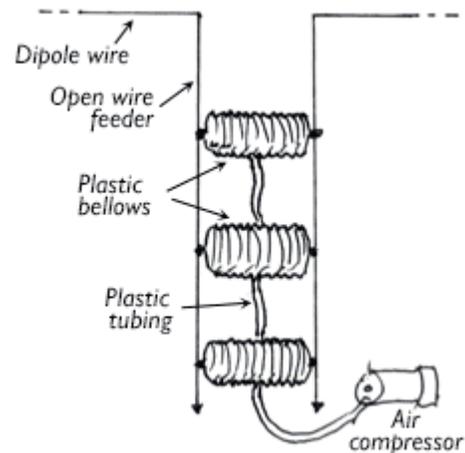
Early design for variable impedance open wire feeder was based on a plastic scissor jack that could be opened and closed to adjust the spacing.

“The next idea was to employ plastic springs between the conductors that could be expanded and compressed by pulling on nylon strings running up the feeders. This design had a tendency to jam when the line iced up and downward tension on the strings caused the dipole to sag.”

“We changed to adjustable air springs to keep the conductors separated. Air-bellow springs have been used on vehicles for years, allowing variable-height suspension. Our loads were much less than a vehicle’s

weight, so we designed a light-weight bellows molded in polypropylene and inflated through plastic tubing from a small air compressor at ground level.”

Bert continued his story. “We set up a test antenna between lighting poles in the car park. This was a 135 foot doublet with open wire



Bert’s final design for variable-impedance feeder employed expandable bellows molded from polypropylene and inflated with compressed air through a length of plastic tubing.

feeder, straight out of the *ARRL Antenna Book*, at a height of 50 feet above ground. The center-fed dipole has a low feed point impedance on 3.75, 10.1, 18.1, and 24.9 MHz but high impedance (2000 - 5000 ohms) on 7.15, 14.26, 21.2 and 28.5 MHz. For the low-impedance bands, we deflated the bellows and connected the open wire feeder through a 1:1 balun to my HF transceiver’s internal tuner. For the high-impedance bands, we inflated the bellows, raising the feeder impedance and connected to the radio through a balanced tuner.”

“Results were entirely satisfactory. There was no deterioration affecting digital modes, and we found that inflating and deflating the feeder bellows would shed ice and snow. After we satisfy demand from commercial customers, watch for us to feed you a line about our new product ‘Puffeed’.”

(PCARA Update, April 2033.)

References:

1. *PCARA Update*, April 2018, pp 11-14, “Seeing it through”.
2. *PCARA Update*, April 2019, pp 10-11 “Hooking back up”.

Peekskill / Cortlandt Amateur Radio Association

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PCARA on Facebook: <https://www.facebook.com/pcararadio>

YouTube Channel: <https://www.youtube.com/@peekskillcortlandtamateur7670>

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Newsletter contributions are always very welcome!

Archive: <http://nm9j.com/pcara/newslett.htm>

PCARA Information

PCARA is a **Non-Profit Community Service**

Organization. PCARA meetings take place every month (apart from July/August break). See <http://www.pcara.org> for current details.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Masks and Social Distancing may be required.

Wed Mar 29: PCARA VE. Test Session, Putnam | Northern Westchester BOCES, 7:00 p.m. See below.

Sun Apr 2: PCARA monthly meeting, Putnam Valley Library, Oscawana Lake Rd., Putnam Valley, NY, 3:00 p.m. Build a tape measure Yagi for Foxhunting. (See page 2.)

Sat Apr 15: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

Sun Apr 16: PCARA Simplex Challenge, 2:00 p.m. (See page 7.)

Hamfests

Check with organizers before leaving.

Sat Apr 15: Splitrock ARA N Jersey Tailgate Hamfest, Landing Park Recreation Complex, 165 Landing Rd, Landing, NJ. 8:00 a.m.

Sun May 7: Orange County ARC Hamfest, Black Rock Fish and Game Club, 5 Pleasant Hill Rd, Mountainville, NY. 8:00 a.m. **Club table.**

VE Test Sessions

Check with the contact before leaving.

Mar 29: PCARA, 7:00 p.m., Putnam | Northern Westchester BOCES, Tech Center, 200 BOCES Drive, Yorktown Heights, Room 119. 7:00 p.m. Must contact VE. Mike W2IG, w2igg'at'yahoo.com.

Apr 1, 8, 15, 22, 29: Westchester ARC, 19 Hunts Bridge Rd, Yonkers NY. 11:00 a.m. Must contact VE, ac2f'at'arrl.net.

Apr 1, 8, 15, 22, 29: NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE, k2ltm'at'aol.com.

Apr 21: Orange County ARC, Munger Cottage, 40 Munger Dr, Cornwall NY. 6:00 p.m. Joseph DeLorenzo, w2bcc'at'arrl.net

Apr 22: PEARL, Mahopac Public Library, 668 Route 6, Mtg Rm 3rd Floor, Mahopac NY. Michael F. Troy, carmelink'at'aol.com



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