PCARA Update

Volume 18, Issue 4 Peekskill/Cortlandt Amateur Radio Association Inc. April 2017

Spring stirring

The trend continues… Last month's PCARA membership meeting was **very** well attended! Many topics were discussed, including a Special Event Station, 2017 Field Day, Foxhunting, PCARA Workshops, and PCARA Breakfasts.

The next **PCARA Special Event Station** will be held at the celebration of the 250th Anniversary of Old Saint Peter's Church on Saturday September 9, 2017, at the intersection of Locust Avenue and Oregon Road in Cortlandt Manor, NY. We have been invited back thanks to David K2WPM/KD2IRA's participation last year in an ARRL National Parks on the Air activation from the same site. Details are sure to follow.

The next **PCARA Workshop** will take place on Wednesday April 26, 2017. **F**oxhunt **Y**agi **C**onstruction **a**nd **T**esting (FYCAT) will begin at 7:00 p.m. at the Mohegan Volunteer Fire Association Headquarters, 1975 Main Street in Mohegan Lake, NY. Instructions will be provided for construction of the WB2HOL tape-measure Yagi. Please see the article from Lou KD2ITZ on page 13 of this month's newsletter for more detailed information regarding tools and supplies needed.

Just a reminder that the next **PCARA Foxhunt** is scheduled for Saturday May 13, 2017, starting at 3:00 p.m. Assembly for the foxhunt will begin at 2:30 p.m. at the Beach Shopping Center on Dayton Lane in Peekskill, NY. There are foxhunt articles in this newsletter and full rules will appear in the May issue. All are welcome!

PCARA has taken an indoor table at the Orange County Amateur Radio Club (OCARC) **Spring Hamfest** on Sunday April 30, 2017 at the Town of Wallkill Community Center, 2 Wes Warren Drive in Middletown, NY. If you have any items that you wish to sell, please feel free to bring them along to the club table. Details regarding the OCARC Hamfest can be found at: http://www.ocarc-ny.org/hamfest17.shtml .

The March 11th **PCARA Breakfast** at Turco's in Yorktown was attended by about a dozen members. It was great to see so many friendly faces on a Saturday morning! We had an outstanding time and I really enjoyed the feeling of friendship and camaraderie shared over breakfast with those that have a passion for our wonderful hobby. The next PCARA Breakfast is scheduled for Saturday April 8, 2017 at 9:00 a.m. at Turco's in Yorktown, NY. Please consider joining us. Thanks to Jared KD2HXZ and Lou KD2ITZ for organizing these events.

The third PCARA breakfast, held at Turco's on Saturday March 11, was well-attended. [Pic: KB2CQE]

Our next regularly scheduled meeting is **Sunday April 2, 2017** at 3:00 pm at New York-Presbyterian/ Hudson Valley Hospital in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Officers

President:
Greg Appleyard, KB2CQE; kb2cqe at arrl.net
Vice President:
Joe Calabrese, WA2MCR; wa2mcr at arrl.net

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Welcome to Ham Radio!

Springtime inspires new beginnings and adventures. Without a guide, discovering ham radio can be quite challenging. Newcomers to our hobby often have to assemble all sorts of little bits of information to start understanding what ham radio is *really* all about! Let me try to bring everything together in one place to welcome you to amateur radio... the quicker — the better. No matter how long you have been a ham there is always something new to learn or recall. Let's go!

Congratulations!

Congratulations! You passed your Technician exam and now you are a ham. You have just joined a fraternity of about 750,000 ham radio friends all over America! Your new callsign will be assigned in a couple of days. But wait... what is the next step?

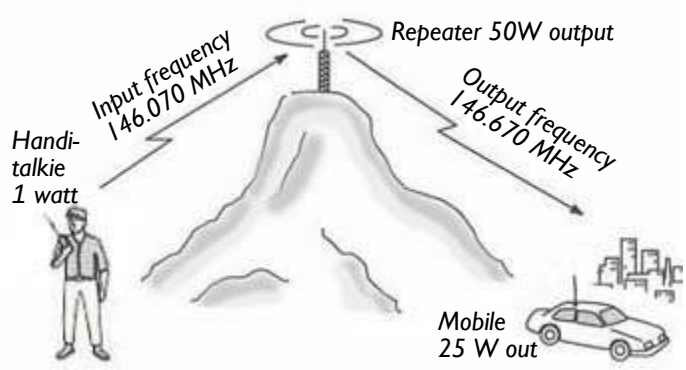
Well, it can be a little overwhelming. There is so much to learn and become familiar with. For most, the first move is to find yourself a HT. **HT** is short for 'handi-talkie' or 'handheld transceiver.' You know it as a walkie-talkie. It's all the same thing!

Acquiring a HT is a good learning experience for every beginner. The easiest way is to borrow a handheld transceiver from a friend who is already a ham. This is a quick way to get your feet wet and join the club. You'll be able to listen in to ham conversations and get acquainted with the many people and personalities already on the air. Joining a local ham radio group can make all the difference. I know an excellent club to try! Take a look at http://www.pcara.org/.

A HT is ham radio's answer to instant gratification. It is a self-contained transmitter, receiver and antenna all in one. Just push the 'talk' button and you'll be on the air! One question... How do I reach local repeaters? There is a formula for tuning in and talking. You need to know the input and output frequency and the PL tone frequency. Here's how it works...

The local PCARA 2 meter repeater has an output frequency of 146.670 MHz with a negative (minus) 600 kHz offset. This means that you transmit 600 kHz lower than the repeater's output frequency. Do the math and you'll see the input frequency is 146.070 MHz. When you press your push-to-talk button, this is the frequency you are transmitting on to reach the repeater's input. Let go of the button and you are listening to 146.670 MHz — the repeater's output. Fancy stuff!

The repeater receives your signal on 146.070 and rebroadcasts it onto the more powerful and wide-range repeater output frequency — 146.670 MHz — so everyone else can hear you better. This offset is sometimes



This hilltop repeater installation extends the range of low-power handi-talkies and of medium power mobile stations that would otherwise be shielded from each other. The repeater station receives signals on its input frequency and retransmits the audio on its output frequency.

entered automatically when you program an HT. You enter the output frequency and you will usually see a minus or plus on your display. If you do, you should be all set! If not, consult your HT's manual to learn how to enter the offset manually. If you have just a simple receiver, like a scanner, you'll want to tune into the output frequency to hear the repeater.

As you configure your HT, make sure you also enter our PL™ tone frequency. Our PL (private line) tone of 156.7 Hz keeps signals not meant for our repeater out of the system. Consider it like a key to a door. No PL tone? Wrong PL tone? You won't get into our repeater. Make sure you program your HT for our 156.7 PL or you won't be heard! *[PL or **P**rivate-**L**ine, is a trademark of Motorola. It is also known as CTCSS – continuous tone-coded squelch system. – Ed.]*

PL or 'Private-Line' is a trademark of Motorola.

Where to Look?

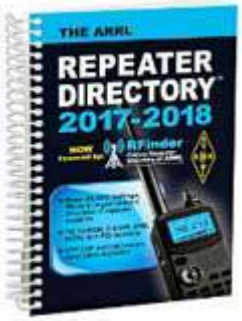
Besides the PCARA repeater, here are some other local clubs' 2 meter repeaters that tend to be pretty active and widely heard:

PEARL: 145.130 ⊖ offset, 136.5 PL http://www.pearlk2put.org/
WECA: 147.060 ⊕ offset, 114.8 PL http://www.weca.org/
Mt Beacon: 146.970 ⊖ offset, 100.0 PL http://wr2abb.org/home/
Rockland Reptr Assn: 147.165 ⊕ offset, 114.8 PL http://rra.net/

Also try the RRA's 70 cm repeater on 443.850, +5 MHz offset, 114.8 PL. Program these repeaters into your HT and we guarantee results!

Highly recommended are various repeater guides available on-line: Try the New York Repeater Directory,

http://www.nyrepeaters.com/ and New England Repeater Directory, http://www.nerepeaters.com/ along with the classic ARRL Repeater Directory: http://www.arrl.org/shop/The-ARRL-Repeater-Directory/. A new edition for 2017-2018 has just been published. Using these guides, you can program distant target repeaters and see just how far your signal can be heard. The results are often astounding!

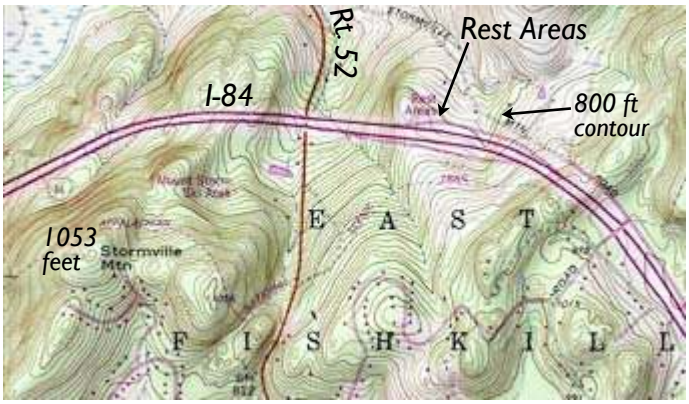


For starters, here are three wide-area super repeaters to try to reach:

Overlook Mountain Amateur Radio Association, (near Woodstock, NY) 146.805 ⊖ offset, 103.5 PL
Terryville, Connecticut 147.315 ⊕ offset, 88.5 PL
Hazleton, Pennsylvania 146.670 ⊖ offset, 103.5 PL.

Yes, the last listing is exactly the same frequency as the local PCARA repeater but with a different PL frequency.

For example, if you want to try for Hazleton, ride along I-84 heading westbound passing Fishkill. Just as you see the vista to the west before your eyes, there is a rest stop usually filled with trucks. This is a good spot to pull off and try your luck. Remember to enter the new PL frequency of 103.5. Make a call and, if you are lucky, the repeater will come up and possibly identify as W3OHX. This isn't easy! No luck? Try another spot with a good view to the west. Mount Beacon comes to mind!



Stormville and East Fishkill Rest Areas on I-84 lie between Exit 16 (Taconic State Parkway) and Exit 17 (Ludingtonville Road).

Keep It Simple

Another approach to making new contacts is simply being simple. If you transmit and receive all on the same frequency, you are using a mode called *simplex*. No offsets or PL tones or repeaters are necessary. You make your call directly and then listen intently. On the two meter band, the national simplex calling frequency is **146.520** MHz. This is the spot where you will most likely make a one-to-one contact. Meet here then move to an unused nearby frequency. Our foxhunts are conducted on **146.565** MHz. Another local simplex watering hole is 146.580 MHz. Several groups use '58' as their home.

Your First Rig

Would you like to buy your own HT? There are a lot of choices to consider. We highly recommend purchasing a dual-band unit, covering the 2 meter and 70 cm bands, with at least 5 watts output — including the solid and reliable Yaesu FT-60R, Icom's IC-T70A HD and Kenwood's TH-D72A.

Three recommended dual-band FM handi-talkies. L to R, Yaesu FT-60R, Icom IC-T70A and Kenwood TH-D72A.

Buyer beware: A good HT should last you ten years or more. Spend a little extra money and invest in a good quality radio. Ask friends for recommendations and advice! You'll find some extraordinarily inexpensive handheld transceivers for sale but buying quality equipment is a better deal. Throw-away nearly disposable radios are often hard to program and understand and might ruin your fun. Nobody likes a 'buzz-kill!' Purchase quality designs you will really enjoy for a long time.

Listen Carefully

Probably the most important rule for amateur radio operators is: **Be a Good Listener!** Make it a habit to listen to a frequency *before* you transmit — and — just be polite and courteous. You'll be an expert in minutes.

Something to always remember: **height is everything!** No matter where you are or what you do, the higher up you are with your antenna, the better you will be heard. Starting out with a brand new HT, have fun and experiment by visiting high places.

Height is everything!

Our local **Bear Mountain** is a great place to start.

Even old-timers are amazed at the long distances you can be heard when you have serious elevation. "Wow! They heard me!"

Even locations of modest height can produce rewarding results.

As you try different locations, you'll find nice sweet spots where your signals will seem to carry forever. Upstairs bedrooms, nearby rolling hills, fire towers and highway vistas can become newfound heavens for you and you new HT. Does it have a good view? I bet it's good for radio, too! Give it a try.

Fire towers can provide a high, sweet spot.

More hints: When seeking a good perch to test your transmit range, try to stay away from being enclosed by steel and concrete. Wood-frame houses are usually better than apartment buildings or business offices as a transmit location. Being inside a house with metal siding often brings disappointment. Even leaded windows can ruin your day. Try everywhere! Experiment!

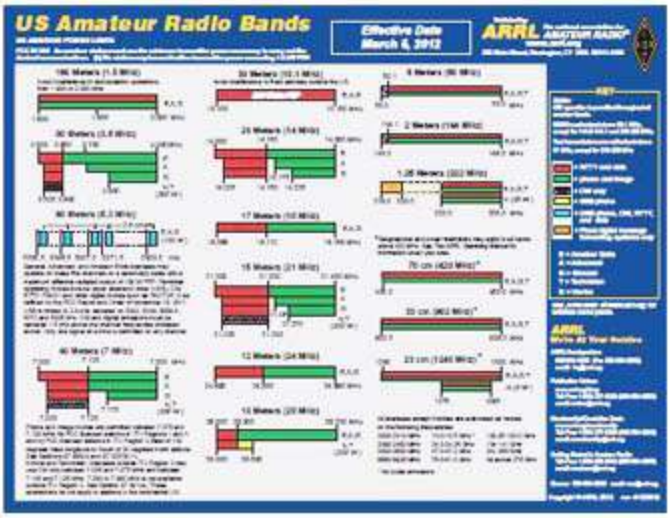
*Try an **outside** antenna.*

But wait! Maybe I could convince you to try a huge step forward? An external outdoor antenna! Trying to work hams around the world or even just in your neighborhood might be quite a challenge using just a six inch long 'rubber duck.' An outdoor antenna will not only widen your reach, it will inspire you to go further. If a rooftop chimney or mast is a problem, you could tuck one away in an attic or somewhere more convenient. Fellow hams are sure to share all kinds of suggestions and advice. They might even show you how to build one for yourself! Just ask!

Also remember: A HT is always a lot of fun, but there is a great big world out there to explore. Operating ham radios on *shortwave* (**HF**) can easily send your signals around the world. You can start your expedition for free — by listening right now on the Internet at http://websdr.org/ . Dozens of shortwave radios are instantly available for you to try... now! Go listen.

Take a listen on the HF bands!

A Technician license is a powerful document. If you have *any* ham radio license, you can try the HF (high frequency) shortwaves today. Technicians can operate on segments of the 80, 40 and 15 meter bands using Morse code. Techs also have voice and Morse privileges on 10 meters and can operate all over the 6 meter band. Don't miss the fun! You can work the world today. Check out the ARRL's band chart at: http://www.arrl.org/files/file/Regulatory/Band%20Chart/Hambands_color.pdf.



Free chart from ARRL shows U.S. Amateur Radio Bands, with modes and privileges for different license classes.

What's Up?

One thing you will notice early on: strength of signals and the direction from whence they come rarely stay the same. The constantly changing combination of several natural phenomena will always charm and fascinate ham radio operators. You just never know where your signals may be heard or what signals you will hear!

A terrific way to discover which way the radio winds are blowing is to listen to the seven broadcast frequencies used by the National Weather Service. You'll find them on 162.400, 162.425, 162.450, 162.475, 162.500, 162.525 and 162.550 MHz. These stations transmit information 24 hours a day and indicate their locations frequently.

If you hear a weather station or two from far off places, chances are you may be able to reach two meter hams from similar areas. Get out your repeater guide and/or try simplex frequencies and see what you can catch! A beautiful and useful map of this nationwide network can be seen at: http://www.nws.noaa.gov/nwr/resources/NWR_poster.pdf.

Part of NOAA's map of U.S. Weather Radio transmitter sites, downloadable from http://www.nws.noaa.gov/nwr/. Symbol shape indicates frequency, symbol color indicates power output.

In our location, along the Eastern Seaboard, weather fronts filled with moisture, combined with rapid temperature changes, often bring in stations from hundreds of miles away. During tropical storm season you might log stations as far away as Virginia and the Carolinas and beyond. In the summer months and right before Christmas, the ionosphere sometimes becomes active allowing reception of stations on VHF and UHF frequencies from 500 to 1500 miles away or more. It can be very unpredictable and exciting, all at once!

For a brief and informative primer all about radio propagation, refer to an article written by world-class DXer Glenn Hauser at: http://www.anarc.org/wtfda/propagation.htm. Yes, there is so much to learn but you will see that adventure follows!

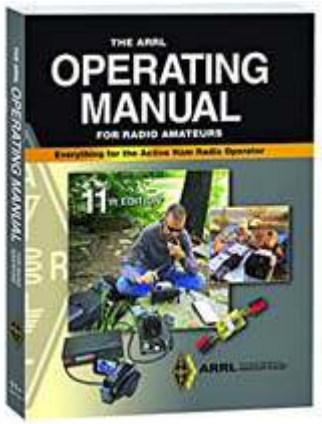
QRZ?

Since you may be new to the world of amateur radio, it is a good idea to get to know your neighbors. Keep a **log** or notebook of everyone you meet on the air, what repeater or frequency you used and when you talked to them. You'll be amazed how quickly your pages will fill up. Ask a lot of questions and you will get a lot of answers. Ham radio operators love to help each other!

ARRL spiral-bound logbook.

Want to learn more about the people you talk to? Try the on-line database site called QRZ.com, https://www.qrz.com/ . (*QRZ* is a ham radio shorthand for 'who is calling me?') Enter the call sign of a fellow ham you hear on the air and QRZ.com will reveal their home location and other biographical information. Registration for QRZ.com is free and easy. Sign up today!

Many other websites serve amateur radio operators. The American Radio Relay League (http://www.arrl.org/) is considered the primary source of information and news regarding the amateur radio hobby. Established in 1914, the ARRL publishes a monthly magazine called *QST* and an entire library of informative books; provides licensing and testing services, a current list of ham radio clubs nationwide and much, much more! Look for their excellent guide book: "The ARRL Operating Manual" available through your public library or direct from the ARRL. Become a League member today!



The ARRL Operating Manual.

Eham.net (http://www.eham.net/) is another popular website. Here you will find very useful equipment reviews, an on-line buy-and-sell swap meet, and a callsign lookup widget. For more detailed information regarding international hams, try: https://hamcall.net/call . To establish your own ham radio website, consult the popular qsl.net: https://admin.qsl.net/index.php .

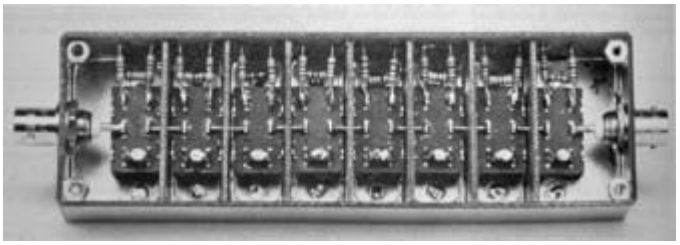
Finally, the best place to learn about ham radio and meet new friends is the PCARA Old Goats Net! Tune in on 146.670 MHz Thursday nights at 8pm to hear the latest news and views of our local ham radio community. Join us! Everyone is welcome! If you have any questions, please feel free to contact me at n2kz 'at' arrl 'dot' net. Many thanks to Malcolm, NM9J for his help with this article. Until next month, 73 es dit dit de N2KZ 'The Old Goat.'

Build a low-power attenuator – N2CKD

Foxhunt friend

Attenuators are used for receiver testing, front-end RF overload protection, signal strength calibration and other applications. Since an attenuator *reduces* the received signal strength, it is a very useful tool to have for a **foxhunt**. During a PCARA foxhunt we are interested in attenuating the fox's signal on 146.565 MHz as received on a 2 meter FM HT. A low power attenuator is quite adequate for this task. The term "low power" is used as ¼ watt resistors and miniature DPDT (double pole double throw) switches are used in constructing the attenuator. (No attempt should be made to transmit through this attenuator).

On perusing the 1989 ARRL Handbook, I came across a description and schematic of a low power eight-step attenuator (see references).



Eight-step attenuator from QST Sept 1982 and the ARRL Handbook is based on DPDT slide switches mounted in an enclosure, fabricated from double-sided PC board.

I used this design to construct a **3-step** attenuator as described below.

Parts list

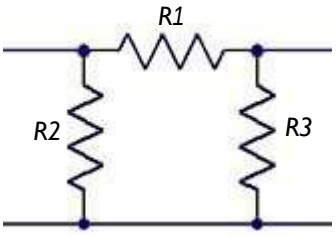
1 × Altoids® metal box made of tin-plated steel
9 × ¼ watt resistors (for values see below)
3 × miniature DPDT switches
2 × female 50Ω BNC connectors (single-hole mount type).

Enclosure

I used an Altoids "Curiously Strong Mints" hinged metal box to house the attenuator. The Altoids tin is just large enough to accept a female BNC type connector. For a more professional build you could use higher-wattage resistors and higher-current switches housed in (for example) a Hammond diecast box, available from mail order vendors such as Mouser: (http://www.mouser.com/ProductDetail/Hammond-Manufacturing/1590G).

Construction

1. I drilled a hole in each side of the Altoids tin and mounted female BNC connectors at each end.
2. I used three miniature DPDT switches (rated 3A) that I found in my junk box. I drilled three ¼" holes for the switches and mounted them in the base of the tin. Since the Altoids tinplate is very thin, I used washers to stiffen the switch assembly.
3. Next I gathered appropriate ¼ watt resistors (R1, R2, R3) for the three attenuator switches as follows:



Switch 1 (-5dB) R1 = 33 ohm; R2, R3 = 200 ohm
Switch 2 (-10dB) R1 = 75 ohm; R2, R3 = 100 ohm
Switch 3 (-20dB) R1 = 270 ohm; R2, R3 = 68 ohm

[Resistors should be carbon-composition or metal film. Wire-wound resistors are too inductive. – *Ed*.]

4. I soldered the resistors on each DPDT switch in a "pi-network" configuration with the first resistor (R1) between the switch terminals on the "attenuator IN" side of the switch and the two other resistors (R2, R3) between the same terminals and chassis ground. On the other side of the switch ("attenuator OUT" side) you solder the two terminals together. The center contacts are soldered from one switch to the next.

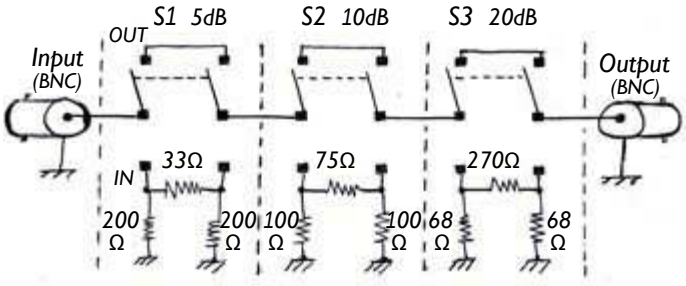
Close-up view of switch wiring. DPDT switch #1 is on the right. Resistor pi-network is wired to the terminals on the "attenuator IN" position of each DPDT switch. The switch terminals on the "attenuator OUT" side are connected together with a wire link. The tinplate case can be readily soldered for a chassis ground connection. [N2CKD pic.]

5. The center lugs of the first and last switch are wired

to the center pins of the female BNC connectors. The body of each BNC connector is grounded to the tin plate. See photo of the wiring inside the open Altoids tin.

Photo of attenuator shows wiring between the three switches and the two BNC sockets, mounted on the shorter sides of an Altoids tin. [N2CKD pic.]

Schematic diagram



Circuit diagram of 3-step attenuator. S1, S2, S3 are miniature DPDT toggle switches. Resistors are ¼ watt, 5% tolerance carbon composition or metal film. BNC connectors are 50 ohm, single-hole mounting type. [Circuit sketch by N2CKD]

Testing the attenuator

Connect one end of the attenuator to a foxhunt Yagi antenna and the other end to a 2 meter FM HT. Move all three switches to the "attenuator OUT" position — this will provide minimum attenuation (0dB), for full signal passed through to the receiver. Tune to a repeater or simplex frequency that you want to attenuate in order to find direction of the transmitted signal. With the signal tuned in, move one or more switches from the "attenuator OUT" to the "IN" position until you reach the desired amount of attenuation. On low-to-medium signal strength, full attenuation may reduce signal strength too far — in which case back-off the 5dB and/or 10dB switches. Even with a strong signal you should now be able to see a variation in S-meter reading and find the desired direction to the transmitter. Practice by turning different switches on and off while pointing the Yagi antenna in the desired direction. *[You have a choice of 0 to 35dB of attenuation in 5dB steps. Be sure to keep your HT on low power to prevent attenuator damage. –Ed.]*

Outer view of the 3-step attenuator showing the DPDT switches [N2CKD pic.]

Build one and get ready for the May foxhunt. Happy hunting!

- 73 de Lovji, N2CKD

3-step attenuator is mounted to the boom of a 3-element tape-measure Yagi, ready for a foxhunt. [N2CKD pic.]

References: *QST* Sept 1982, pp 11-13, "A Step Attenuator You Can Build" by Bob Shriner, WA0UZO and Paul Pagel N1FB. Available to ARRL members through the *QST* Archive, http://www.arrl.org/arrl-periodicals-archivesearch

The same eight-step attenuator design appears in the "Test Equipment" chapter of ARRL Handbooks from the mid-1980s to early 1990s. Check in the Index at the back of the ARRL Handbook for "Attenuators – Low-power step".

MFJ manufactures a similar eight-step attenuator, model MFJ-762.

Original QST article.

Foxhunt preview

PCARA's 2017 Foxhunt is scheduled for Saturday May 13th. We can look forward to an exciting chase followed by a pleasant meal in a family restaurant. If you have not taken part in this event before, here is a preview, with some hints for a successful outcome.

What it is

The start of the hunt.

Amateur Radio foxhunting is somewhat like a real English foxhunt where a pack of hounds and horse riders chase after a four-legged fox with whiskers and a bushy tail. In the amateur radio version the hunters try to find a **hidden transmitter** using the combined skills of **radio direction finding** and **map reading**. A winning entry locates the transmitter in the shortest possible time.

There are various formats for this activity employed by different clubs. Some foxhunts are carried out on an HF band such as 80 meters while others employ VHF, usually 2 meters. Some clubs hide a small transmitter programmed for automatic operation. Others use a mobile station parked in a secluded spot. Portable stations are sometimes employed as well.

PCARA's foxhunt is based on a format successfully used by **Bury Radio Society** in NW England. Bury Radio Society usually met on Tuesday evenings at the local Community Center — apart from one date in August when the Community Center was closed. On that evening fox-hunters gathered at the Center's car park to take their first bearing on a hidden transmitter.

The town of Bury lies at the northern edge of Greater Manchester — so the hunt could head south into the built-up suburbs of the metropolis or north into the Pennine Hills, where there were many reflections off the high ground. Does this situation sound familiar? At the end of the event, everyone met up at a cozy country pub for refreshment and traditional pub food.

Laurence G4KLT (right) admires the foxhunting setup of Mike G4GSY at the start of a Bury Radio Society foxhunt.

Strict tempo

PCARA's event is ruled by the **clock**. The fox makes his (or her) first transmission at 3:00 p.m. on the chosen simplex frequency of 146.565 MHz. That first transmission lasts five minutes, allowing hunters at the starting point sufficient time to obtain a good bearing on the hidden station using directional antennas. As soon as the first transmission ends, hunters have another five minutes to drive to a suitable location, ready for the next transmission.

PCARA's foxhunters prepare to take their first bearing on the fox transmitter during the 2016 event. L to R: Karl N2KZ, Al K2DMV, Lovji N2CKD and David KD2EVI.

The second transmission from the fox begins at 3:10 p.m. and lasts only 3 minutes, followed by 7 minutes of silence. Hunters need to obtain their next bearing quickly and accurately before driving to the next chosen spot.

Further transmissions from the fox follow the same pattern, starting at the ten minute mark (3:20, 3:30, 3:40 p.m. etc.), staying on-air for 3 minutes then keeping quiet for 7 minutes. This provides a steady rhythm for the hunters — who need to choose each subsequent location carefully to obtain increasingly accurate bearings *and* move toward the fox's location as quickly as possible.

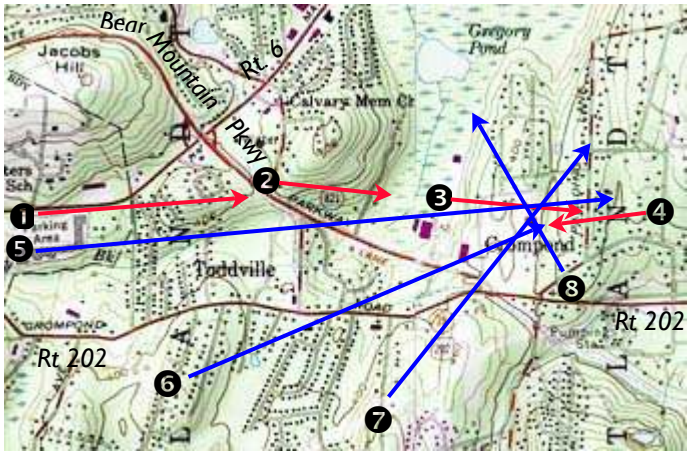
Transmissions from the fox continue, every ten minutes. The final transmission is at 4:30 p.m. when

the fox announces where he or she has been hiding. The location of the diner is also announced for the benefit of those who want to meet up after the hunt for refreshment and exchanging of experiences.

Search strategies

There are several schools of thought on the best way to find the fox. The "faster is better" faction takes a first bearing on the hidden transmitter then drives in that direction straight toward the fox. This strategy is repeated on the subsequent transmissions. Hasty hunters must keep a careful watch on signal strength so they know when they are nearing the fox. There is a danger of approaching too slowly in mini-steps or speeding past and over-shooting the target.

The second school of thought takes a "slow but steady" approach. The first bearing is transferred to the map with the knowledge that the hidden transmitter lies somewhere along the bearing line — or close by. Instead of driving directly in the direction of that first bearing, our careful hunter chooses a route that lies at an *angle* to the first bearing. Stopping for the next transmission, another bearing is taken on the fox and transferred to the map. Those first and second bearings should then intersect at the actual location of the fox — or very close by. This strategy continues, zig-zagging toward the actual position of the fox until multiple bearings intersect, revealing the most likely location of the quarry.



*A hunter using "faster is better" starts from location ❶, takes a first bearing (red line) then proceeds (2, 3, 4) directly toward the the fox — and overshoots. A second hunter using "slow but steady" takes a first bearing (blue line) from location ❺ then travels **at an angle** to the first bearing to take a cross-bearing from location ❻. The two bearings intersect close to the actual fox location. Bearings from 7 and 8 confirm the location with greater accuracy.*

Closing in

Depending on terrain and surroundings, successful hunters can find themselves within a few hundred feet of the fox, but still unable to find the furry fellow. This can be the most difficult part of the hunt, especially if the fox has made efforts to disguise vehicle and antenna.

At this stage an experienced hunter will place an **attenuator** in the coaxial line between directional antenna and radio receiver (or transceiver). The attenuator reduces the strength of incoming signals so the receiver's S-meter is no longer at full-scale and meaningful bearings can still be taken.

Home-brew passive attenuator with 12dB and 20dB steps for use in foxhunts.

When really close to the fox, a passive attenuator is no longer useful as the internal circuitry of the HT receiver begins to pick up an equally strong signal. **Hint:** when complete disconnection of the antenna results in an S-meter reading that is still full-scale, you are getting close!

An **active** attenuator may help at this stage — see article by Lovji N2CKD, *PCARA Update* July 2014, p.8. As an alternative, you can make use of a dual-band handi-talkie to monitor the **440 MHz harmonic** of the fox transmitter. With a fundamental transmission on 146.565 MHz, the harmonic frequency to monitor is 439.695 MHz. Under FCC rules, that 440 MHz harmonic should be at least 40dB down on the fundamental, so a small directional antenna for UHF can still be used to close in on the fox.

Central intelligence

You can learn a lot about the fox's habits by reading past issues of *PCARA Update* containing foxhunt reports. Favorite locations from the past have included parking lots at shopping centers, schools and public parks with free admission. The fox is nearly always operating from his or her own vehicle — or in a family member's vehicle. The horizontally-polarized antenna is sometimes in plain view, especially if the location is far away from the starting point — or it


Fox on the top

Reports of past foxhunts have appeared in PCARA's newsletter.

could be disguised by being mounted low down on the vehicle or even *inside* the vehicle. Some foxes begin the hunt on high power then steadily reduce power as contestants draw near.

PCARA rules limit the fox to a maximum distance of five miles from the hunters' starting point at the Beach Shopping Center. This area covers a surprising variety of terrain and our fox transmitters have been located anywhere between 0.05 miles and 4.99 miles from the start. On one occasion, the fox operators set up a portable station away from the public parking lot, powered by a small generator. On another occasion, the lady fox was crouching down in nearby bushes with a battery-powered radio.

In October 2005, Mike N2EAB and Jim W2JJG set up their fox station in a quiet corner of Lents Cove Park, Buchanan.

During transmission, the fox is usually reading from a prepared script — after all, there are 29 minutes of air-time to fill. Listen carefully to the text because foxes sometimes reveal **clues** about their location as the event progresses.

If you are unfamiliar with the terrain, it can be helpful to have another team member in the vehicle who knows the area well. Team efforts are allowed within the rules.

Essential equipment

The minimum requirement for a hunter is a receiver or transceiver capable of operation on the foxhunt simplex frequency of 146.565 MHz. In order to take a bearing on the fox, you will need a sensitive S-meter plus a directional antenna and compass. Some hunters have tried to use the "body fade" effect where the transceiver is hugged close to the body, looking for the null off the back. But the most successful hunters have employed directional Yagi or HB9CV antennas that are sufficiently rugged to survive repeated stowage and removal from the vehicle. Finally, you will need a map of the area — preferably showing named roads and streets, plus locations such as schools, parks and shopping centers. And you will need the means to transfer each bearing from the compass reading to a line drawn on the map.

Some essential foxhunt equipment.

Your editor has seen some variations on this approach. Doppler direction finding techniques can be highly successful as the vehicle does not have to stop to take a bearing. Readout of direction is continuous while the fox is transmitting. But Doppler DF also needs four vertical antennas secured to the vehicle roof so they do not detach at road speed. Another variation is to employ a directional antenna that pokes out of the moon roof and rotates from inside the vehicle. (In your editor's view, this crosses the line for safe operation.)

Where it can all go wrong

There are several traps for the unwary. One item that effects everyone is reflections from high ground — especially when the fox location is shielded from the start point. Multiple signal peaks while rotating the directional antenna can be an indication that reflections are present. The direct signal coming from the fox might *not* be the strongest one.

While traveling around during the hunt, a major concern is choice of location that will be safe and suitable for taking the next bearing. Parking lots are a favorite, but quiet, residential streets are also a possibility if parking is allowed. You will only be there for a few minutes. Try to avoid nearby ferrous metal that might distort the compass reading.

Another problem is reliability and familiarity of equipment. Bring spare items if you have them. Practice beforehand with your HT and directional antenna. You can use local repeaters as a source of steady signals from a known location. Remember that most repeaters are vertically polarized while the fox will be horizontal. Make sure that antenna, coaxial cable, adapters and attenuators are all operating reliably *before* the big day. Fully charge your HT's battery and be sure to have a spare on hand.

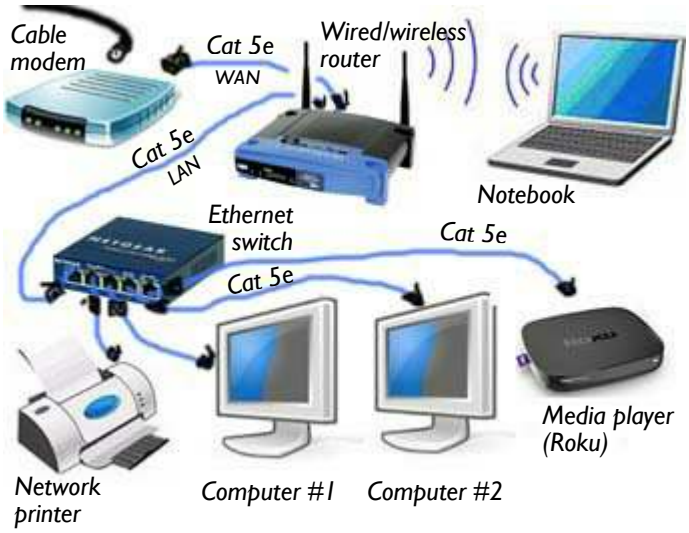
It's an achievement

If you are able to track down the fox and receive a certificate for your efforts — congratulations. Even if you do not find the hidden transmitter this time, foxhunting is a terrific learning experience with many opportunities to improve techniques and equipment for the next event. - NM9J

Network noises

During the PCARA Breakfast on March 11, several people complained about interference from network equipment affecting reception of the PCARA repeater. Your editor suggested a simple solution — replace any *unshielded* twisted pair network cabling with *shielded twisted pair* cables that work just as well.

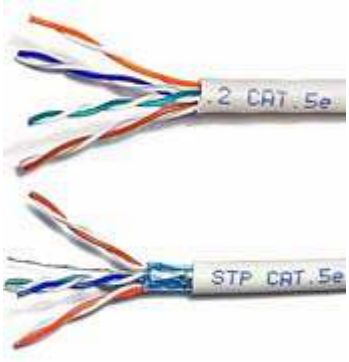
In a typical home network, the cable company or phone company installs a "cable modem" that is connected to the ISP's coaxial cable or fiber optic equipment. The cable modem has an Ethernet port that has to be connected to the Internet port of the home router using a Category 5e cable or better. If the router does not have sufficient ports for all the wired equipment on the home's local area network, it can be connected to an Ethernet switch with another Cat 5e cable. These cables are shown in the diagram below.



Typical home network includes a cable modem, router, Ethernet switch and network devices, all connected by Cat5e Ethernet cables or WiFi.

There can be quite a large amount of Cat 5e cabling in this type of home network, especially if you include "IoT" devices. Standard Cat 5, Cat 5e and Cat 6 cables have a tight twist on the individual pairs to reduce electromagnetic interference, but they are **not** shielded. Since these cables carry broadband signals at radio frequency, they can radiate sufficiently to interfere with sensitive HF and VHF receivers, especially when the antenna is not too far away. There is also the possibility of RF energy from a nearby transmitter entering the network cable and disrupting the digital signals.

The simple way to fix this EMI/RFI problem is by replacing the *unshielded twisted pair (UTP)* cables with **shielded twisted pair (STP)** cables. STP cables are encountered more often in Europe than in the USA. Cat 5e STP cable has an aluminized Mylar® foil shield wrapped around the four twisted pair cables, along with a copper drain wire for good electrical connection. These cables are terminated with a *shielded* RJ45 8-position 8-conductor (8P8C) modular plug that includes a metal cover around the plastic insulation.



Cat 5e twisted pair cables — unshielded UTP above and shielded STP below.

You will not gain the full advantage of shielded Ethernet cables unless your network equipment has the correct type of shielded modular jack mounted on the chassis. Low cost equipment often has unshielded RJ45 sockets. The type of modular jack that you need has a metal surround with spring tabs on each side of the socket. These tabs make contact with the metal sides of the shielded RJ45 plug as it clicks into place, maintaining the EMI shield around both cable and equipment.

***STP** patch cable terminated with **shielded** RJ45 8P8C connectors.*

When you are selecting new network items, make sure they include a *shielded* Ethernet connector — there may be a photograph on the side of the box to guide you. Ethernet switches are often supplied in a metal case, which is even better for keeping the RF energy in its place.

*Network router with **shielded** RJ45 ports for Internet (left) and for LAN.*

After replacing all your unshielded cables, perhaps you still have one piece of network equipment with an unshielded RJ45 connector. In that case, you may still obtain some relief from interference by clamping a ferrite core over that end of the cable.

Shielded Cat 5e patch cables and above are difficult to find in local stores but they *are* available from vendors such as "Cables To Go" http://www.cablestogo.com and CableWholesale http://www.cablewholesale.com. You can find additional vendors on Amazon. Shielded Cat 5e cables are a little more expensive than unshielded Cat5e, but it is money well spent and they are suitable for speeds up to 1000Base-T (1 Gbps). For higher quality, you can choose Cat 6a and Cat 7 cables — which are fully shielded and good for speeds up to 10GBase-T (10 Gbps).

- NM9J

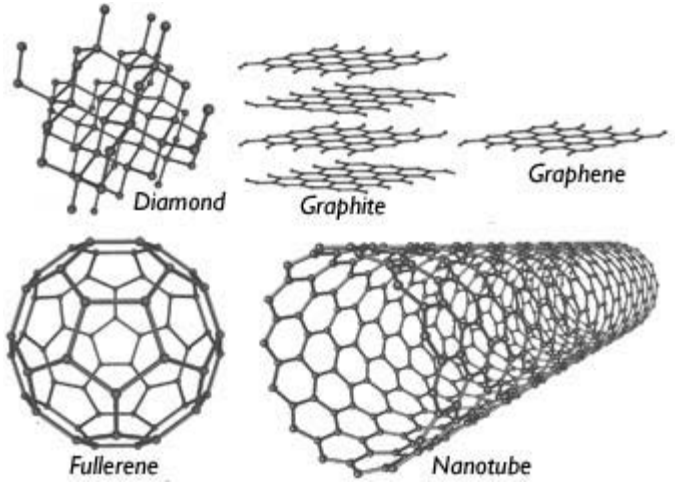
Graphene - KD2ITZ

Goats grab graphene

Radio amateurs are familiar with the progression of electronic components from venerable vacuum tubes to modern semiconductors. On a recent Old Goats Net, the discussion pondered the future of wireless communications. Graphene promises a new world of breakthroughs in technology and will certainly impact our hobby. This exciting paradigm is not built on silicon, but versatile carbon atoms instead.

Carbon chain-mail

Dazzling diamond gemstones and ordinary graphite pencil points are both composed entirely of carbon. The two substances have profoundly different physical properties because of the arrangement of carbon atoms in their molecules. Diamonds are hard because their carbons are tightly bonded in a rigid tetrahedral lattice, which, when viewed at the atomic level, resembles a jungle gym. Graphite is soft because it is composed of layers of carbon atoms that are weakly bonded to each other. These layers are known as graphene. Carbon atoms in graphene are arranged in a flat hexagonal lattice resembling chicken wire. Other forms, or allotropes, of carbon also have fascinating molecular geometries including carbon nanotubes and fullerenes, which resemble soccer balls.



Allotropes of carbon include diamond, graphite, graphene, fullerenes and nanotubes. Each small black sphere represents one carbon atom. [after M. Ströck, Wikipedia.]

Made in Manchester

Although the appropriate tools have been available for many years, it wasn't until 2004 that two scientists working at the University of Manchester in northwest England cleverly found a way to isolate graphene from graphite. By applying Scotch tape to a piece of graphite, Andre Geim and Konstantin Novoselov were able to exfoliate several layers of graphene from the source. By repeating the process and transferring to a wafer of silicon dioxide, they were able to identify a single layer of graphene. At the thickness of one carbon atom, it is considered the world's first two-dimensional material. Geim and Novoselov's amazing discovery dazzled scientists around the globe. The pair were awarded the 2010 Nobel Prize in Physics.

The 2010 Nobel Prize in Physics was awarded to Andre Geim (right) and Konstantin Novoselov (left) "for groundbreaking experiments regarding the two-dimensional material graphene." [Pic: Holger Motzkau, Wikipedia/Wikimedia.]

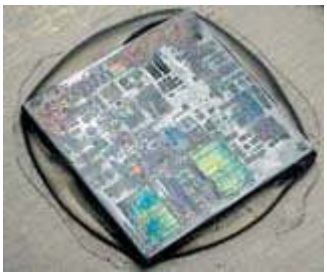
Greatness of graphene

Why is there so much excitement about graphene? Graphene is stronger than steel yet can be stretched like rubber; it is also an excellent conductor of electricity and heat; furthermore, it is almost entirely translucent, but impermeable to gases and liquids. These are just some of many properties that will allow graphene to change the world. Researchers across several fields of study are rapidly devising new uses for this incredible material. The following paragraphs will describe some characteristics of interest to radio amateurs.

Graphene films are so strong that, according to Professor James Hone of Columbia University, "It would take an elephant, balanced on a pencil, to break through a sheet of graphene the thickness of Saran Wrap." Graphene, however, is not the only form of carbon known for high strength and low weight. High-performance carbon fiber has been manufactured for over half a century. The material is used to build cars, airplanes, spacecraft, and many other products. Carbon fiber cables are suspending elevator cars in some of the world's tallest buildings. Audiophiles enjoy the sounds emanating from carbon fiber speaker cones. Graphene is poised to change the way carbon fiber is produced, by eliminating the high heat required for the current manufacturing process.

The molecular structure that explains graphene's strength also accounts for its superb electrical conductivity. Electrons can travel freely across its carbon lattice with minimal interruption. Graphene behaves like a superconductor at room temperature. As

researchers race to build faster microprocessors, graphene will replace silicon. Imagine transistors oscillating at terahertz speeds. In a world where radio signals will transfer data at accelerated rates on the submillimeter bands, both the circuits and the antennas will contain graphene. Let's not overlook the implications on batteries and capacitors. Graphene's conductivity will allow for rapid-charging energy storage devices that weigh less than conventional alternatives.



Intel microprocessor chip. How soon will electronic manufacturers abandon silicon for graphene?

In addition to its strength and conductivity, many products will benefit from graphene's translucency. Photovoltaic cells made of graphene promise to deliver more power at less weight. Why limit solar panels to the roof when wearable photovoltaic garments will power the devices in your pockets? Likewise, computer displays made of graphene will be thinner than anything in use today, but flexible enough to roll like paper. Manufacturers currently use a thin film of indium tin oxide to conduct electrical impulses on touch screens. Their brittle composition is well known to anyone who has shattered a smartphone.

Conventional Photovoltaic Panels. One day graphene may deliver stronger, lighter, more efficient solar panels.

Transparent graphene touchscreen by 2D Carbon Inc.

In conclusion, graphene has started a revolution in science. As more research is published, it continues to demonstrate new and valuable applications. Graphene is merely the first of many two-dimensional materials. Other molecules have subsequently been described and the possibilities are endless. In the near future, these advancements will benefit not just radio technology, but all of humanity. – Lou, KD2ITZ

FYCAT Workshop -KD2ITZ

On Wednesday April 26th at 7:00 p.m., PCARA will be offering a **F**oxhunt **Y**agi **C**onstruction **a**nd **T**esting (FYCAT) Workshop. The FYCAT Workshop will be held at the Mohegan Fire Department Headquarters on 1975 East Main St. (Rt. 6), Mohegan Lake. Please enter through the side door, near Salon 102. Instructions will be provided for the construction of the WB2HOL tape measure Yagi. Additional information can be found at:
http://theleggios.net/wb2hol/projects/rdf/tape_bm.htm

Mike N2HTT (left) and Mike N2EAB (right) discuss a home-built tape-measure antenna at an earlier PCARA foxhunt.

For show and tell, participants are encouraged to bring other antennas or devices used in radio direction finding. There will also be a discussion about foxhunting techniques.

Please gather your tools and supplies in advance. The materials for this project are readily available in hardware stores, with the exception of the coax. An entire kit with all the parts needed for the project is also available at the following site:
http://www.west.net/~marvin/wb2hol.htm . All are welcome.

Most of the components for constructing a tape-measure Yagi antenna can be found at Home Depot. (One exception is the antenna cable.)

PCARA would like to thank Barry K2BLB for his assistance. Additional information is available on the PCARA Yahoo! Groups site. Please contact Lou KD2ITZ with questions and RSVP to the following address: radiocassetta 'at' gmail.com.

- Lou, KD2ITZ

Kite-hung antennas

– K2WPM (ex-KD2IRA)

Among the many facets of ham radio is the fascinating field of kite-hung antennas. As far back as Marconi... and probably farther, radio operators have experimented with the use of kites to loft their antennas to great heights. This article addresses the basics, the author's experiences with kite antennas on HF frequencies, and collects some of the resources for those who might like to try this. Comments and suggestions appreciated.

History of kite antennas

Most of us know that Guglielmo Marconi, in December 1901, completed what is regarded as the first successful transatlantic code communication using wireless — between Signal Hill, Newfoundland, Canada, and Poldhu near Cornwall, England. What many don't know, is that he used a kite-hung antenna for the Canadian location.

Guglielmo Marconi (left) watches as his helpers prepare to fly a large kite from Signal Hill, St. John's, Newfoundland in December 1901. The kite would support an antenna for reception of transatlantic signals.

Descriptions of this feat — focusing on the use of a kite antenna — may be found in the Winter 2002 issue of the American Kitefliers Association magazine *Kiting*. The article "Bridging the Atlantic with Wireless Signals – Marconi Receives Aerial Assistance From a Kite" by Bob White begins on page 25 of *Kiting* Vol 23, issue 5: http://kite.org/mdocs-posts/kiting_2002_v23_i5_winter/ and is reprinted at the "Best Breezes" web site: http://best-breezes.squarespace.com/guglielmo-marconi/.

In World War I, a form of box kite was used to lift French observers high enough to monitor the battlefield. That kite is still referred to as a "French Military Kite." Captain B.F.S Baden-Powell, brother of the founder of the scouting movement, had used kites in similar fashion in the lead-up to the Boer War.

Selection of a kite

There are many different types of kites. Which one to use for a kite-hung antenna? There's not one answer. Here are a couple types of kites I have used, with some pros and cons.

Delta: This is among the most popular kites for kite-hung antennas, usable in a wide range of winds and fairly stable if a good long tail is attached.

Homebrew 'Delta' kite, photographed in flight. [K2WPM pic.]

The delta is shaped – well – like a delta. It uses a single flying line and can be built or bought in any number of sizes up to about 20 feet wide. It's easy to make at home; plenty of plans are available on the Internet. My homebrew version was made from a Family Dollar plastic tablecloth, shipping tape and a few dowels. It lasted for five activations before strong wind gusts made it a memory... I will always remember my first DX QSO with the Canary Islands, using this kite. One can purchase a suitable nine-foot Delta for $50.00 to $75.00.

Sled: The sled kite is a heavy lifter. It can also easily be constructed homebrew; again, lots of plans on the Internet. I built mine from plastic drop-cloth and dowels, which worked very well. I brought this kite to use at Field Day 2016, but there was no wind.

The sled kite is prone to collapsing when the wind shifts, but it carries a much bigger payload than a Delta. I broke down and bought a "power sled" kite, designed as a lifter, to use when we activated at Campobello Island for ARRL's National Parks on the Air. The locals boast two exports, wind and fog. But there was not a bit of wind the entire weekend. As can be seen, the "power sled" is a bit more complex in design, containing a number of pockets that enhance its lifting ability. The power sled was a bit pricey at $75.00, but works well and will last for years. 95 × 44 inches, it requires 150 to 250 pound flying line. It can rise high (over 250 feet) and lift a lot — over 200 feet of 18 gauge wire.

Large Power Sled 24 kite from Premier Kites & Designs.

Selection of antenna

There are many types of antennas that can be lifted by a kite. For example, the kite might hold the apex of an Inverted-Vee dipole. However, far and away

the most common form of antenna used with kites is an end-fed wire. The primary reason is that the weight of coax would be too heavy for most kites, requiring the antenna to be end-fed from near the ground. Thus, the kite is only required to carry the weight of the antenna wire.

I quickly selected the 80-10 meter end-fed "dipole" sold on eBay by Nelson Antennas. I'm not sure why they call it a "dipole," since it's generally referred to as an End Fed Half Wave (EFHW). Nelson Antennas sells the 9:1 balun for about $50.00; one can then choose whatever wire, and easily attach it. There are lots of similar products on the market, but I've found this one to work well.

Matchbox for a portable end fed dipole antenna (80-10 meters) is available from "nelson_antennas" on eBay.

The length of wire for an EFHW antenna is also a matter of choice. The wire can be as short as 71 feet, but I settled on 148 feet and 203 feet lengths. My Yaesu FT-450D (internal tuner up to 3:1 SWR) easily tuned up on 80 through 10 meters. There are several web sites which discuss the optimal lengths of wire to use for random wire end fed antennas. See www.hamuniverse.com/randomwireantennalengths.html

The antenna radiates from the center, so the longer the wire, I reasoned, the higher elevation most of my signal will be emitted. I had good success with 71 feet; better for 148 feet and very good for 203 feet.

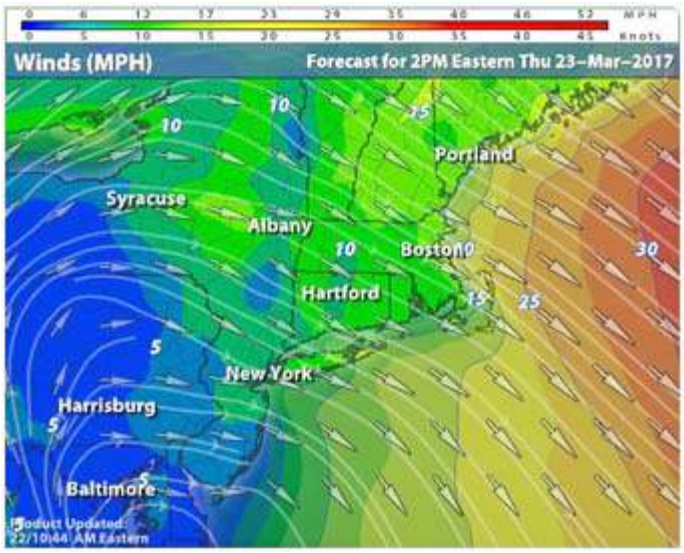
Unfortunately, I cannot say that kite antennas are practical – I often spend hours getting the kite in the air, untangling lines, and setting up all the equipment. After a short time on the air, I find the wind has died, or there's thunder in the distance, or it's just time to go home. Or 40 meters is just dead that day.

Set-up and practical experiences

The author has operated using kite-hung antennas about twenty times, with mixed results.

The first problem is the variability of the wind. It's similar to the well-known rule that carrying an umbrella stops the rain. Carrying a kite often calms the wind.

In seriousness, one learns to research the wind before even attempting a kite-hung activation. Generally one needs more than 5 mph, but less than 20 mph winds. There are many great resources to predict wind speeds. The simplest is the "Weather Channel," or any local broadcast. I have come to rely upon the "Intellicast" web site which offers several days' wind forecasts, for various locations selected by the user. That site is located at http://www.intellicast.com/.

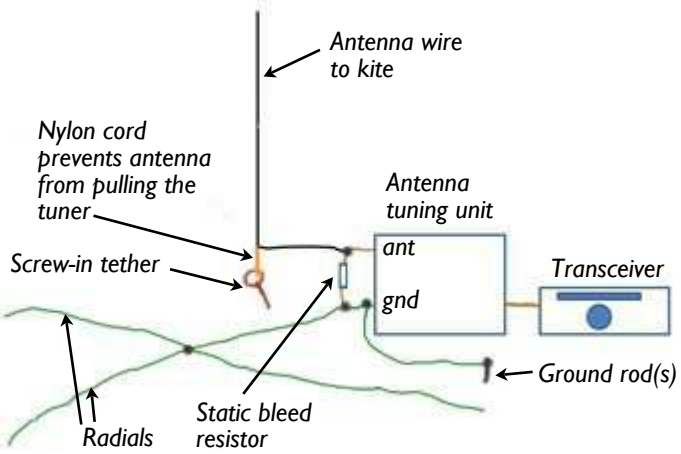


Wind forecast for Northeastern USA from Intellicast.com.

Generally, I operate near the sea shore, where there's often a steady wind for hours at a time. An excellent location close to home, is Jacob Riis Park at the Gateway National Seashore.

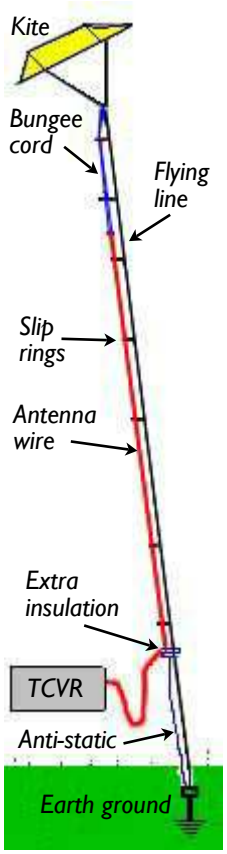
There are lots of things to learn before perfecting this. Safety is always first. One never flies a kite near a utility line — nor in winds too strong to control the kite (20 mph being the highest). Not when lightning is possible, nor near an airport or broadcast facility. And with the size kites used for kite-hung antennas, gloves are required to avoid rope burns and cuts.

I also learned that a long wire extending 100 feet or more into the air collects lots of static electricity. It's therefore absolutely necessary to install a bleeder resistor at the base of the antenna wire, say 3,000 ohms minimum, into a ground rod. The resistor bleeds any current into the ground, while not altering the antenna's effectiveness.



*Use of a **bleed resistor** to remove static electricity at the feed point of a kite antenna. [After SotaBeams UK.]*

Usually, the antenna wire is separate from the kite's flying line (which is usually 150-pound test Kevlar® or similar string — easy to find on Amazon). I use 18 gauge speaker wire, which is fed through carabiners periodically placed along the flying line. An image of the set-up used by YB5AQB (ex-G4VGO) — similar to mine — is alongside. For details see:
http://www.qsl.net/g4vgo/antenna1.htm



Rigging of a kite antenna with bungee cord and slip rings to support the wire. [After G4VGO.]

I have not yet confirmed if a counterpoise is required (some say it's necessary, others say it's not), though I always use one roughly equal in length to the antenna; I also intend to install an RF ground from the coax shield to see if that helps.

Practically speaking, so far at least, my kite antennas have been impractical. It takes quite a bit of time to get everything set up and working, and the antenna has not produced the remarkable effects I envisioned from transmitting at (effectively) 100 feet in the air. Significantly, the antenna is very noisy — at least two full S units noisier than my 50 foot dipole. The best signal reports have come from across the Atlantic — since I generally activate right at the ocean. I blame my lack of success on myself, however and will keep experimenting!

Laws and regulations

The Federal Aviation Administration regulations concerning the flying of kites, are set forth in 14 CFR Part 101. These rules only regulate kites weighing more than five pounds (by comparison, my big sled kite weighs in at about 10 ounces). In that case, it is prohibited to fly such a kite higher than 500 feet, nor within five miles of an airport. Probably good rules to observe, even for smaller kites.

Resources

There are lots of resources out there. Just search YouTube for "kite antennas," and one can find hours of videos illustrating kite-hung antennas. Here are a couple of my favorite web sites, with brief summaries.

University of Hawaii: A great article entitled "Kites for Lifting Antennas," is posted at:
http://www.chem.hawaii.edu/uham/kite.html

South Bristol Amateur Radio Club: Our friends across the pond have truly pioneered kite antennas, and this club presentation is a good example.
https://www.sbarc.co.uk/club-talks/talks-2013/kite-antennas/

– 73 de David, K2WPM (formerly KD2IRA)

Skywarn training

National Weather Service forecasters conduct storm spotter training sessions each year to help prepare spotters for the upcoming severe weather season. The training sessions are roughly three hours long and cover fundamental information that every spotter needs to know, with a focus on safety, identification of key weather features and proper reporting procedures.

Two classes sponsored by neighboring amateur radio groups are scheduled this year:

Orange Cty ARES/RACES, Wednesday May 10th, 7:00 p.m. Orange County Emergency Services Center, Classroom #1, 22 Wells Farm Road, Goshen, NY 10989.

PEARL, Tuesday May 23rd, 7:00 p.m.
Putnam County TOPS Building, 112 Old Route 6, Carmel, NY 10512

Further details with an opportunity to register are available at the NWS web page:
http://www.weather.gov/okx/SkywarnTraining

Sad shack?

Here is a recent picture of the RadioShack store at the Beach Shopping Center in Peekskill. The signs in the window proclaim "STORE CLOSING – ENTIRE STORE ON SALE! – EVERYTHING MUST GO!". Most items in the store were 20% off list price.

Beach RadioShack store on March 25.

Radio Shack has announced the closure of 552 stores after the electronics retailer filed its second bankruptcy in two years.

Peekskill / Cortlandt Amateur Radio Association

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Newsletter contributions are always very welcome!
Archive: http://home.lanline.com/~pcara/newslett.htm

PCARA Information

PCARA is a **Non-Profit Community Service Organization**. PCARA meetings take place the first Sunday of each month* at 3:00 p.m. in Dining Room B of NewYork-Presbyterian/Hudson Valley Hospital, Rt. 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. *Apart from holidays and July/August break.

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

Sun Apr 2: PCARA Meeting. New York Presbyterian - Hudson Valley Hospital, 3:00 p.m.
Sat Apr 8: PCARA Breakfast, Turco's Yorktown, 9:00 a.m.
Wed Apr 26: PCARA FYCAT Workshop, Mohegan Fire Dept, 1975 East Main St. (Rt 6), Mohegan Lake. 7:00 p.m.

Hamfests

Sun Apr 23: Splitrock ARA N Jersey Hamfest, Roxbury Senior Center, 72 Eyland Ave, Succasunna, NJ. 8:00 a.m.
Sun Apr 30: Orange County ARC Hamfest, Wallkill Community Center, 8 Wes Warren Drive, Middletown, NY. 8:30 a.m. **PCARA Club Table**.
Sat May 27: Bergen ARA Spring Hamfest. Westwood Regional High School, 701 Ridgewood Road, Township of Washington, NJ. 8:00 a.m.

VE Test Sessions

April 1, 8, 15, 22, 29: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk, NY. 12:00. Pre-reg M. Rapp, (914) 907-6482.
Apr 9: Yonkers ARC, Will Library, 1500 Central Ave, Yonkers, NY. 1:00 p.m. Pre-reg John Costa, WB2AUL, 914-969-6548.
Apr 13: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.
Apr 17: Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.
Apr 21: Orange County ARC, Munger Cottage 183 Main Street, Cornwall NY. 6:00 PM. Joseph J. DeLorenzo (845) 534-3146.
Apr 30: Orange County ARC Hamfest, Wallkill Community Ctr.

Peekskill / Cortlandt Amateur Radio Association Inc.
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