



# PCARA Update



Volume 7, Issue 4

Peekskill / Cortlandt Amateur Radio Association Inc.

April 2006

## Harmonic time

I'd like to begin this month's column by thanking Malcolm, NM9J who filled in for me last month. Due to preparations for a harmonic's birthday party, I just simply ran out of time. In excellent fashion, Malcolm handled the job. Thanks Malcolm!

Bob, N2CBH has been busy up at the repeater site playing with antennas. The 146.670 MHz repeater had some work done on its antenna, while the 449.925 MHz repeater has been placed on a new antenna. The new antenna seems to have reduced the case of the crackles on the 925 machine, allowing for more enjoyable IRLP contacts. Thanks Bob!

The PCARA schedule of events is filling up quickly! Here are a few upcoming events:

• **April 23, 2006 PCARA Club Table:** Mt. Beacon ARC Hamfest, Tymor Park, LaGrangeville, NY.

• **May 6, 2006 PCARA Foxhunt:** 3:00 PM Beach Shopping Center, Peekskill, NY. Registration 2:30 PM.

• **May 28, 2006 Special Event Station:** Muscoot Farm Spring Fest, Somers NY.

• **June 24-25, 2006 Field Day:** Muscoot Farm, Somers, NY (b/u: Bear Mountain)



Please come out to the April 2<sup>nd</sup> meeting at Hudson Valley Hospital Center and share your thoughts and ideas! I hope to see each of you there.

– 73 de Greg, KB2CQE

Spring forward to Daylight Saving Time — and PCARA's 3:00 p.m. EDT meeting — on Sunday April 2.

## Club table

PCARA organized a club table at the Orange County ARC hamfest on Saturday March 18. The weather was fine, but there was a bitterly cold wind, as



Joe WA2MCR, Marylyn KC2NKU and Ray W2CH man the PCARA club table at Orange County ARC hamfest, Mar 18.

the outside vendors soon discovered! Inside the hall, business was brisk and PCARA members were successful in selling several items of club and member equipment.

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## PCARA Officers

President:

Greg Appleyard, KB2CQE kb2cq at arrl.net

Vice President:

Joe Calabrese, WA2MCR; wa2mcr at arrl.net

Secretary/Treasurer: open.

# Adventures in DXing

- N2KZ

## Far Out!

Are there any limits on how distant a signal can be heard? Signals from the two Voyager spacecraft are now being received from beyond our solar system. If transmissions from beyond the heliopause can be resolved on earth, just how far out can we go?

My first experience with exotic deep DX was in the winter of 2002. At work I have access to a powerful amateur radio station maintained by The Broadcast Center Amateur Radio Society (BCARS) using the call sign NY2TV. Their Kenwood TS-940S transceiver feeds a Kenwood 700 watt linear amplifier. This huge signal feeds an equally huge antenna: A M<sup>2</sup> 8 element log periodic mounted about 200 feet above street level. During periods of heavy solar activity, when reports of auroral activity were rampant, I would point the station's beam due north, and send my CW signals out with all my might, trolling for DX. Often, I could hear my signals echo back to me, sometimes with a slight Doppler shift. Echoes, warbles, fluttering and other distortions were not uncommon. Where were my signals going? Why were they coming back?

The recent NASA SuitSat experiment, launched out of the International Space Station, piqued my interest in weak signal DX on VHF and UHF. Here was an opportunity to hear an orbiting signal operating in the milliwatt range. A more tempting challenge is hard to imagine! I won't speculate what my neighbors were thinking as they watched me pointing Yagi antennas at the sky at 4 a.m. each morning! My initial target was SuitSat's Kenwood HT on 2 meters and the ISS repeater on 70cm. Although I never captured these signals, I could hear a distant din of warbly signals suffering from long distance propagation and Doppler shifts. It was a frustrating pursuit. The presence of the signals was obvious but way beyond any comprehension. I even heard small bursts of data that might have been PSK-31.

I placed a query on one of the Internet reflectors I subscribe to, looking for more information. I was directed to the North East Weak Signal Group based in Enfield, Connecticut. Their website (<http://www.newsvhf.com>) is a good launching pad into the world of DX in the land of centimeters. There are dozens of links listed here creating an informal school of weak and tiny DX.

Internet research provided me with a wealth of knowledge about VHF and UHF weak signal work. I was not alone! Hundreds of hams search for holy grails high above the beaten path on a daily basis. I dusted off



*Karl's vintage UHF equipment.*

a vintage 1296 MHz transceiver and matching needle-nose antenna and began experimentation. Frequencies near 1296 MHz serve as the home of most amateur radio attempts at EME (Earth-Moon-Earth) moon bounce communications. Could I catch a signal off the Moon or another far distant source? I could hear a faint chorus on some frequencies, but never strong enough for positive identification. I needed more "reach."

## Grazing In The Grass

Great adventure can be found under "the grass." Using an oscilloscope crafted for RF work, called a spectrum analyzer, you can actually see radio signals. First, adjust for the frequency and bandwidth you desire, the amount of sensitivity, and the speed of the 'scope's sweep. Your RF "eyes" are now focused. The noise level looks like a fuzzy bottom line with dozens of spikes of noise jumping up and down. This part of the display is known as "the grass." By carefully adjusting the filters included in the analyzer, you can often see signals that are below the noise level. This can be a very powerful tool for RF investigators!

Using a spectrum analyzer, along with my needle nose antenna and integrated preamp, I achieved much better resolution than I could with just my ears. After hours of sweeping the 1296 MHz region in the night, antenna pointed to the sky, I found myself focused on one area that seemed to have consistent activity. Could these signals be demodulated? They appeared as tiny blips peeking out of "the grass," with a repetitious cycle



*The spectrum analyzer is a powerful tool.*

of transmission.

These signals would alternate for 43 seconds with a short blip followed by a long blip. On and on it would drone: dit...dah dit...dah. Dead silence would last for exactly 6 minutes and 17 seconds and then the 43-second pattern would start again. Experimentation with antenna positioning proved that the signals were tracking the bright star Arcturus in the constellation Bootes. Arcturus is easily spotted in the northern spring skies. Was there a correlation?

### Can You Hear Me Now?

Seeing the signals was not enough. I needed a way to demodulate what I was seeing. I remembered I had some old Ameco converters in my basement. Luck was with me. I actually had a 1296 MHz to 20-meter converter. I was concerned that the tubes in the converter would be too noisy for weak signal work. I was wrong! I connected the output of my 1296 antenna preamp to the Ameco converter and fed the output to my Small Wonder Labs DSW-II QRP transceiver. The noise level was obviously much higher than usual, but, lo and behold, I heard the alternating signal just slightly higher than 14.043 MHz on the DSW-II.

Aiming the antenna was critical. If I moved the antenna slightly, the signals would disappear. There was an obvious "sweet spot" I needed to hit for the signals to appear, but they were consistently there throughout the night following the beacon of light called Arcturus.

I performed another quick experiment with an aluminum baking pan. I wanted to confirm that I was not picking up a nearby microprocessor or other RF emitting device. I used the pan as an RF shield and could not attenuate the signal unless the pan was directly in front of the antenna. One evening, I even moved my operation to a nearby park, The Ward Pound Ridge Reservation, and could still hear the signal using the same bearing. It seemed distant and focused. The signal was always warbly, weak and very unusual sounding. Where did it come from? Why did it follow a strict pattern like a beacon? It often exhibited long echoes and varying flutter. The signal was simply not available during the day or at dawn or dusk. The only time it would be revealed was in the deep dark of night.

I maintained a fairly regular ritual of reception of this beacon using a freeware program called Skyglobe as a road map for my antenna. It is available at many sites in both a DOS and Windows version. Try <http://www.sidewalkastronomy.com/skyglobe.html> as one source of download. With the sky charts it produced, I could determine a precise bearing on where Arcturus shone in the sky. A couple of minutes of careful adjustment and I would be reunited with the beacon again. When Arcturus was not above the horizon, I panned the

skies slowly and carefully for what felt like hours and heard no signals at all. The mystery continued!

Good friend and fellow PCARAN Gerry, WA2GF, gave me a terrific lead into the search for all things extraterrestrial. He introduced me to the work and writings of Dr. H. Paul Shuch, N6TX, also known as

"Dr. SETI" (Search for Extra-Terrestrial Intelligence.) Dr. Shuch authored a best-selling book offered by The ARRL called *Tune In The Universe!* The book is now available on CD-ROM and contains many of Dr. Shuch's personal experiences and photos of his search for the distant and unknown. He included a beginner's tutorial on the subject and some history of our human fascination with the world beyond. It proved to be quite inspirational to me and encouraged me to continue my determination to make a new discovery in the skies.

### Rise And Shine

Filled with motivation, I looked forward to waking up very early each and every morning to try, once again, to capture the signals of SuitSat and keep an eye on the odd beacon in the direction of Arcturus. By now, a nightly routine had been adopted. I would check the NASA J-Pass site (<http://science.nasa.gov/RealTime/JPass/25/JPass.asp>) for the next pass of the space station and check <http://www.suitsat.org/results.cgi> for the latest SuitSat loggings. My alarm clock would be set for half an hour before the next pass. I would try to get as much sleep as I could, but my passion for discovery was strong.

Just for fun, I decided one night to fool around and send a CW signal in the same direction that I was receiving the beacon. I used the frequency of 1296.1 MHz, known as the calling frequency for EME and other out-of-this-world experimenting. I realized that the chances of receiving a reply was next to impossible, but it was worth a try.

Using a Whiterook Model MK-60MC Mini Memory Keyer attached to a Texscan 1296 MHz transceiver, I



Paul Shuch, N6TX.

sent a very slow QRS CQ out into the galaxies using the same bearing as my extraterrestrial beacon signal. I used the frequency of 1296.835 MHz, just five kilohertz higher than the beacon I was receiving. My CQ was sent for five minutes, and then I dropped my carrier searching for replies. I tried this routine for four nights while continuing to track and search for SuitSat with no results. I was discouraged and annoyed. Was I crazy to spend days on end searching the skies in the middle of the night?

On the fifth night, March 13, one day before the full moon, I heard the distant echoes of far away signals as I pointed my antenna towards the eastern horizon. These new signals seemed to travel in a low to the horizon electromagnetic pipe scattering around to me from great distances away. The direction of the signals was much tighter in range than broad tropospheric openings I had enjoyed for years DXing UHF TV. This opening was not related to my recurrent beacon reception. Arcturus was high in the sky in the south-southwest. Were these events clues to a bigger puzzle?

The night of a full moon has always been thought of as a time of mystery, wonder and anticipation. The morning of March 14, I expected a pass of the ISS from 3:24 to 3:40 am at a desirable elevation of 42 degrees. I pointed my 2 meter Yagi to the north-northwest and put my audio cassette machine into record just in case I got lucky. It was a very clear and dark night and the sky was filled with stars. The moonlight was very handy and made tonight's setup much quicker than some nights when I endured drizzly or rainy horror. Several nights were cancelled due to snow and blizzard-like conditions. This was not the best time of year for outdoor pursuits! I was not to be dissuaded! My determination to capture the SuitSat signal, or any signal was at its peak.

Since the moonlight was so bright, I decided to take a shot or two using very long time exposures to capture the interesting effect and shadows projected by the moon. I placed my camera on a tripod and shot away with exposures as long as ten seconds. The results were interesting and remarkable.

### **Ready To Rumble**

The full moon was beaming as the clock passed 4 a.m. I was just about to fold up my folding chair, pack up my gear, and start getting ready for work. I heard a deep, low rumble, which sounded like a passing subway train (maybe an earthquake?) I paused, wondering what this might be. A blinding flash of light completely filled my vision followed by a powerful burst of wind. A distinct pattern of yellow and red stars, looking almost like glitter, briefly spangled the sky like falling fireworks. A stony silence followed. I wrote it off as an odd flash of lightning or a wild discharge of static electricity. My lack of sleep deadened my response. I must admit I



*“The last image in the camera’s memory revealed a shot of the the driveway and garage door.”*

was a bit twitchy and ruffled as I packed up my gear to go inside.

In all the excitement, I had forgotten that my camera was doing a time exposure during this amazing event. It wasn't until an hour or so later that I noticed I had collected a souvenir of this flash in the pan. The last image on my camera's memory revealed a shot of my driveway and garage door with what appeared to be a short white being radiating a powerful light. Maybe I had been listening to Art Bell too much, but this stunning image was quite remarkable and fascinating. What could emit such a powerful light, with a tremendous burst of energy, and suddenly disappear?

The following night, Wednesday, March 15, I was presented with another chapter of the mystery. The Arcturian beacon had changed its tune. It still came from the same bearing at about the same signal strength, but now it was a complex pattern, that sounded like Morse code, in two long bursts. Its song went like this: dit-dah-dah-dit-dit-dit-dit-dah-dah-dah-dah-dit-dit (pause) dit-dit-dit-dit-dah-dah-dah-dah-dah-dit followed by another pause, and then it would repeat over and over again. Did the message have meaning?

I should have cherished that evening. It was the last time the beacon was heard at my QTH. No matter what I did, no matter where I pointed my antenna, no further signals have been heard. What was the source of this curious signal tracking Arcturus? I can only look into the skies and wonder. If I am going to identify this beacon, I only have until April 1st to discover its identity. The next PCARA meeting is April 2nd! Until next month, happy trails (and keep your eyes to the sky!)

— 73 de N2KZ The Old Goat.



# Well done Joe!

Joe, WA2MCR recently received this fine looking certificate from *CQ Magazine* for his showing in last year's Worldwide WPX contest. The SSB leg of the WPX contest runs on the last weekend in March, and the CW leg takes place on the last weekend in May.



*Joe, WA2MCR's certificate.*

The certificate reads as follows: "CQ The Radio Amateur's Journal takes pleasure in awarding this Certificate of Merit to WA2MCR In Recognition of the achievement of winning the 2005 third place low power SSB World Wide WPX Contest for the Single Operator - All Band - 2nd Area - division, for a total score of 202,300 points." In WPX terms, low power means 100 watts or less.

The object of the WPX contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible. Scoring is based on total contact points from all bands, multiplied by the number of different prefixes worked. Stations with unusual prefixes are especially popular.

## PCARA Foxhunt Rules

### Saturday May 6, 2006

1. Transmission – FM simplex on 146.565 MHz, horizontally polarized.
2. Transmissions start at 3:00 p.m. for 5 minutes, followed by 5 minutes off. Second transmission commences at 3:10 p.m. 3 minutes on, 7 minutes off. The fox will not move during this time. This cycle repeats at 10 minute intervals until the last transmission ends at 4:30 p.m. when the fox will announce its location.
3. The opening transmission will include a time check for watch synchronization.

4. All contestants who wish to be eligible for a prize must book in at the **Beach Shopping Center car park**, in Peekskill before the start. Contestants will count as one team if more than one person occupies a car. (i.e. if three in a car, they don't get first, second and third prize.)

5. No contestant is allowed to move his/her car until the end of the first transmission, so take your time with the first bearing and make it a good one. The transmission will be audible from the start without a super-sensitive receiver.

6. Radio silence will be maintained by all contestants on all frequencies from the first to the last transmission.

7. No excess mileage penalty will be incurred but all contestants are reminded at all times to stay within the law and observe speed limits, parking restrictions etc.

8. The fox will be hidden not more than 5 miles from the start. The location of the fox will not be on property which is inaccessible by car.

9. Upon a contestant finding the fox, please do not shout or in any way give the location

away to other contestants. Report your name/callsign to the fox and retire to the place of refreshment immediately. This will ensure that other contestants do not "discover" the fox because a group of people is hanging around nearby. It is requested that you maintain radio silence even though the fox has been found and the fact that you have found the fox should not be revealed to anyone until the place of refreshment has been reached.

10. The first competitor to locate the fox and positively identify him/her will be presented with a certificate. This competitor will be invited to assume the role of fox for the next foxhunt event.

11. Competitors should convene from 4:30 p.m. at the place of refreshment, which will be announced on-air by the fox.

Rules adapted from Bury Radio Society Fox Hunt, Malcolm, NM9J

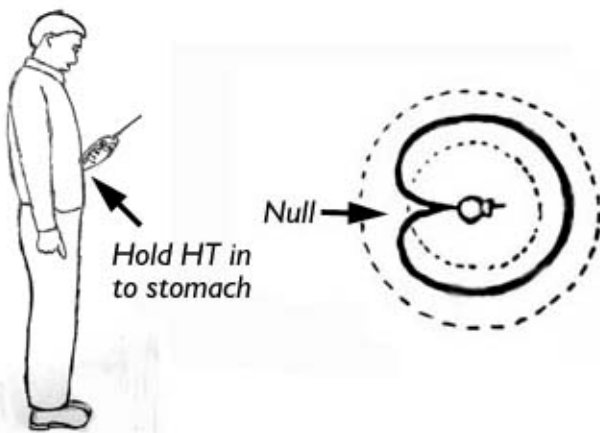


*The PCARA fox will be in hiding again on Saturday May 6.*

# Foxhunt focus

The next PCARA foxhunt is scheduled for Saturday May 6 – just a few short weeks away. Now is the time to get your 2 meter foxhunting equipment ready. If you were thinking of taking part in a foxhunt for the first time, here are a few suggestions, starting at the low cost end.

**Body fade:** Some PCARA hunters have used the “body fade” effect. The cost of the antenna for this technique is very low because you simply use your handi-talkie’s own rubber duck. If you hold the handi-talkie on your stomach with the antenna close in to your body, you will find that the normal antenna pattern is modified from a circle to a cardioid, with a deep null in the direction of your back. While watching



*A handi-talkie held close to the body has a directional antenna pattern with a deep null in the rearward direction.*

the S-meter or listening to the noise, slowly turn around for minimum signal... at this point the fox should be directly behind you. As you approach the fox and the signal becomes stronger, tune off-channel by 5 or 10 kHz to weaken the signal. When the signal is very strong, remove the antenna completely and recheck the null. By this time, when you turn round, you should be staring at the fox! Hint — try this technique beforehand on a steady signal from a known direction, such as a repeater station.

**Small size:** One of the requirements for a foxhunt antenna is that it should be small enough for easy removal from the hunter’s vehicle, while still having useful directional properties. My favorite small antenna is the HB9CV, described in the September 2005 issue of the *PCARA Update*. (Back-issues available at: <http://home.computer.net/~pcara/newslett.htm>.)

**Tape measure beam:** Several PCARA members have had success in past foxhunts with Yagi antennas that use sections of steel tape measure for the elements. Apart from the low cost, this type of antenna will survive bangs and knocks as it is taken in and out of the vehicle, and the elements can be folded over to take up



*Mike N2EAB shows his 3-element tape-measure beam to Mike N2HTT.*

less space. The original design is described by Joe Leggio, WB2HOL on his web page: [http://home.att.net/~jleggio/projects/rdf/tape\\_bm.htm](http://home.att.net/~jleggio/projects/rdf/tape_bm.htm). Most of the parts can be found at Home Depot — all you need is a cheap, 1 inch wide steel tape measure, some PVC pipe, PVC fittings and hose clamps. UK readers can find a modified design by G3ZOI that uses 2-hole-fixing plastic saddle clips to secure the elements instead of the hose clamps and PVC crosses used by WB2HOL. See: <http://www.open-circuit.co.uk/tape.php>.

**Doppler DF:** At some of my past foxhunts in England, one team of contestants used a Doppler-direction finding setup. (The same technique is now employed by the police to track down stolen vehicles



*For Doppler direction finding, rapidly rotating antennas on the roof of a moving vehicle are not very practical.*

equipped with a LoJack transmitter.) The theory behind a Doppler DF setup is that a single RX antenna is continuously rotated in a horizontal circle – the motion of the antenna changes the frequency of the received signal by Doppler effect, and this continuous frequency modulation can then be detected, filtered out and used to determine the direction of the signal source. Rapidly rotating antennas on the roof of a vehicle are not very practical, so several fixed antennas are normally used, with electronic switching to connect each antenna in turn to the receiver input. Further circuitry acting on the receiver output displays the direction of the transmitting source, for example on a ring of LEDs.

These Doppler DF setups have proved useful for getting close to the fox in the first few minutes of a hunt. As the directional antenna hunters were stopping to take bearings, the Doppler hunters could drive directly toward the fox while the transmission was still on the air. However, vehicle-mounted Doppler arrays are not very helpful in the later stages of a hunt, when some running around on foot is usually required.

Mike Cossor, WA2EBY described a Doppler direction finder in the May-June 1999 issues of *QST*, with just four quarter-wave magnet-mount vertical antennas. The design is available from Ramsey electronics as the DDF1 - Doppler Direction Finder Kit for \$169.95.

**Dual antenna:** For portable direction finding, Ramsey sells their DF1C - Foxhound Direction Finder Kit. The kit employs two telescopic whip antennas, which are connected to an FM transceiver and manually turned until an analog meter shows the lowest reading. See <http://www.ramseyelectronics.com>.

**Really close in:** If you are using a single directional antenna for finding the fox, things get difficult as you get close to the fox's lair. The signal becomes so strong that the S-meter reads full scale, no matter where you point the antenna. The low-tech solution is to insert an RF attenuator in the antenna cable, allowing you to reduce signal strength to a point where the S-meter begins to work again. Some PCARA hunters use the MFJ-762 attenuator, which provides 0-81 dB



*MFJ-762 attenuator with push button controls as used by Ray, W2CH.*

attenuation in 1dB steps. List price is \$69.95.

My own preference is for a home-built switched attenuator, but I also have several in-line BNC attenuators, such as the “Mini-Circuits” 10dB units shown in the picture.

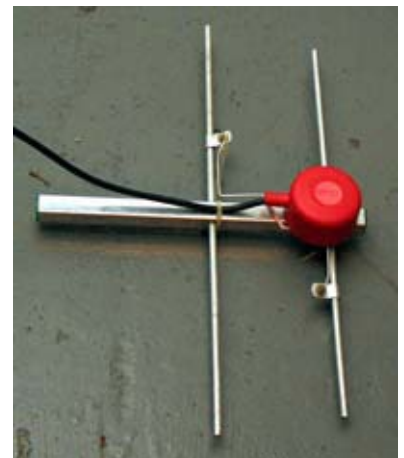


*10dB attenuators with BNC connectors.*

These low-tech attenuators employ simple resistor networks to reduce the signal strength. Another approach is to use a high-tech **active attenuator**. The unit is inserted into the antenna cable and generates an attenuated mixing product on an adjacent frequency, typically 500 kHz or 1 MHz away from the fox's transmit frequency. One circuit using an RC oscillator was described by Anjo Eenhorn, PA0ZR in the November 1992 issue of *QST*. A more modern active attenuator using a 1 MHz crystal oscillator is described by Joe Leggio, WB2HOL on his web site at: [http://home.att.net/~jleggio/projects/rdf/a\\_atten.htm](http://home.att.net/~jleggio/projects/rdf/a_atten.htm). An advantage of this type of attenuator is that you do not need to worry about perfect shielding for your receiver or transceiver to guard against the ultra-strong fundamental frequency from the fox.

Another technique for DFing the fox close-in is to switch from the two meter fundamental frequency to the fox's third harmonic on 432-444 MHz. Once you can hear the third harmonic, you know you are very close, and a small UHF antenna will be adequate to home in on the fox.

**More info:** For more good ideas, there is plenty of material available on the Internet. Recommended sites include Joe Leggio's: <http://home.att.net/~jleggio/projects/rdf/rdf.htm> and Joe Moell K0OV's “Homing in” <http://members.aol.com/homingin/index.html>.



*Small HB9CV antenna for reception of the fox's third harmonic on 430 MHz.*

- Malcolm, NM9J

# Peekskill / Cortlandt Amateur Radio Association

**Mail:** PCARA, PO Box 146, Crompond, NY 10517

**E-Mail:** w2nyw@arrl.net

**Web site:** <http://www.pcara.org>

**PCARA Update Editor:** Malcolm Pritchard, NM9J

E-mail: NM9J @ arrl.net

*Newsletter contributions are always very welcome!*

Archive: <http://home.computer.net/~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 the Hudson Valley Hospital Center, Route 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.

## PCARA Repeaters

**W2NYW:** 146.67 MHz -0.6, PL 156.7Hz

**KB2CQE:** 449.925MHz -5.0, PL 179.9Hz

(IRLP node: **4214**)

**N2CBH:** 448.725MHz -5.0, PL 107.2Hz

## PCARA Calendar

**Sun Apr 2:** April meeting, 3:00 PM. HVHC.

**Sat May 6:** PCARA Foxhunt, 3:00 p.m.

**Sun May 28:** Special Event Station W2F, Muscoot Farm Spring Fest.

## Hamfests

**Sun Apr 23:** Mt Beacon ARC Hamfest, Tymor Park, LaGrangeville NY. 8:00 a.m. **Club table.**

**Sun Apr 23:** Southington ARA Hamfest, Southington HS, Southington CT.

**Sat May 27:** Bergen ARA Spring Hamfest, Westwood Regional HS, 701 Ridgewood Road, Washington Township, NJ. 8:00 a.m.

## VE Test Sessions

**Apr 2:** Yonkers ARC, Yonkers PD, 1st Precinct, E Grassy Sprain Rd, 8:30 a.m. Contact D. Calabrese, 914 667-0587.

**Apr 13:** WECA, Westchester Cnty Fire Trg Center, 2 Dana Rd, Valhalla, NY. Contact Stanley Rothman, (914) 831-3258.

**Apr 17:** Split Rock ARA, Hopatcong HS, Hopatcong, NJ. 7:00 p.m. Contact Sid Markowitz (973) 724-2378.

**Apr 17:** Columbia Univ ARC, Watson Labs, 612 W 115th St. New York, NY, 6:30 p.m. Contact Alan Crosswell, 212 854-3754.

**Apr 21:** Bergen ARA, Westwood Regional HS, 701 Ridgewood Rd, Washington Township, NJ. 7:00 p.m. Contact: Donald C Younger, (201) 265-6583.

**Apr 29:** PEARL, Bureau of Emerg Svcs, 112 Old Rt 6, D. Smith Campus, Carmel, NY. 9:00 a.m. Contact NM9J.



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PO Box 146

Crompond, NY 10517