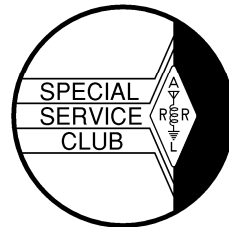




# SIGNAL



de NINC

March 2014 Volume 23 Number 3

## This Month's Meeting

March will be a great meeting. Dale, AF1T, and Mickey, W1MKY, are coming down from the Contoocook (NH) Valley Radio Club and will give us one of Dale's famous show-and-tells. We had earlier advertised this as the one about transmission lines but it will actually be about phasing and stacking antennas. There's more pizzazz to Dale's demonstrations on this subject. And anyone who's seen one of Dale's talks knows that they are packed with pizzazz.

An important reminder: because the Community Center is used for the Pepperell Library's book sale, the Pepperell Recreation Department and the Library host us in the Library's meeting room. The Library is just up Route 113 from our normal meeting place West of the rotary. When exiting the rotary go West away from Pepperell Center (business area -ed) and towards Townsend.

This month's meeting is March 20th at the Pepperell Library at 7:30 PM.

## Last Month's Meeting

Dan, KW2T, has been studying the history and use of low-voltage filament tubes and has prepared an informative talk. These tubes saw a lot of service during World War II and found their way into post-war portable radios like the famous Zenith TransOceanic. His talk covers both the what's and the why's of these tubes, and he's amassed quite a collection of example radios. This should be a good talk!

February meeting attendees

Jean K1AVM, Bruce K1BG, John K1JEB, Ken K1JKR, Dennis K1LGQ, Leo K1LK, Skip K1NKR, Gary K1YTS, Phil KB1JKL, Peter KB1LZH, Ken KB1UVP, Dan KB1YGB, Stan KD1LE, Ralph KD1SM, John KK1X, Dan KW2T, Don N1NWE, Les N1SV, Ed N1YFK, Peter N1ZRG, Jim N8VIM, Larry W1ESR, Dick W1LTN, Bob W1XP, Rod WA1TAC

## President's Corner

de Skip, K1NKR

I was out on an errand the other day, up in the land of "I don't need to follow no steenkin' rules; it says so on my license plate." Well anyway, I heard an announcement for a radio program that was going to air Sunday evening: Addressing Climate Change, brought to you by IEEE Spectrum magazine. My first reaction was to question why a bunch of electrical and electronics engineers, and software types, would presume to be experts on the subject. Then I thought a little bit. Weather is a lot like circuits and data flows. Climate is all a big feedback loop with initial conditions, variables, inputs, and outputs. These engineers are adept at analyzing cause-and-effect relationships. And they certainly know a lot about setting up adaptive systems. They're just applying their skill set to an existing or future problem.

The same thing goes for Amateur Radio. We often hear questions like, "Where will Amateur Radio be in the coming decades?" or "With all the changes in technology (or "With the Internet...") is there a future for our hobby?" Frankly, I'm not worried. Things will change. Almost a hundred years ago we moved entirely out of spark gap into coherent signals. But later CW transitioned to AM phone and CW never went away. AM went to SSB and AM never went away. Digital caught on and analog never went away. We added other modes. We added other technologies. What comes next? I don't know, but I'm not worried. We'll invent whatever comes next! We're *amateurs* because we *love*

what we do. And we are the only people in the world who own, build, maintain, and operate radio stations. (With virtually no exceptions, all other licensees are governments, businesses, or organizations.) Our skill set is an inquisitive, experiential, exploratory one. And we're good at what we do.

Besides, technology aside, it's all in the "internals" of the signal. Ragchewing is still ragchewing. Contesting is still contesting. Emergency communications is still emergency communications. DXing is still DXing. Even on-air and off-air experimenting is still experimenting. And on, and on.

The rigs of tomorrow won't look any more like a K3 than a K3 looks like a DX-35. But I'm not worried. I'm looking forward to it. We could use a few newbies, though. Have you got any inquisitive, experiential, exploratory acquaintances or relatives?

On an entirely separate note, let me be the first to plug the Groton Road Race. The 2014 running will be held Sunday, April 27. It's a big event for the club. Those of you who know me know that I really appreciate public service but it's certainly not my bag. That said, let me tell you participating in the club's support of the GRR is rewarding and a heck of a lot of fun. Thanks to Ralph, KD1SM, GRR communications is a very organized affair, yet it is easy for a newcomer to fit right in. If you've never done something like this, come on along. There will be plenty of opportunity to participate, learn, and have fun. Public service season is coming up. Try it; you'll like it. (Even if, like me, you don't take it hook, line, and sinker.)

### February Treasurers Report

Income for February was \$15 in membership renewals, \$2.37 in bank interest, and \$31 from the book raffle at the February meeting.

Expenses were \$19.60 for newsletter postage and \$88 for the annual Post Office box fee, leaving a net income for February of \$28.77.

Current balances:

General fund	\$2,645.28
Community fund	\$4,836.41

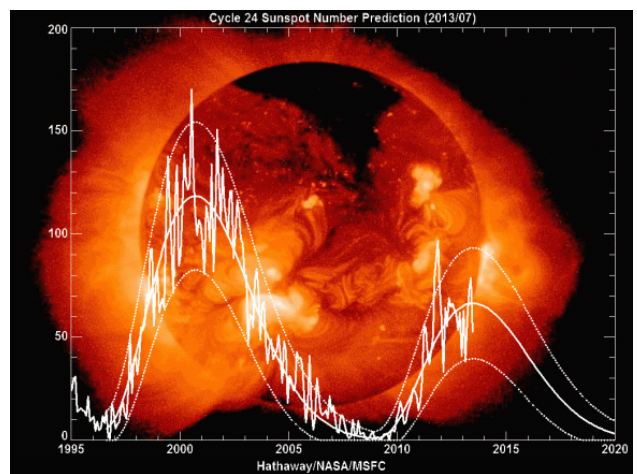
As of 10 March we have 42 members who are current with their dues and 30 renewals outstanding. Please check your renewal status on the roster circulated at the monthly meeting or ask Ralph.

If you are joining ARRL or renewing your membership please consider letting Ralph send in the paperwork for you. The Club will buy the stamp and will get a commission from ARRL. ARRL membership checks should be made payable to NVARC; Ralph deducts the Club commission before forwarding your paperwork to Newington. As an Special Service Club, the ARRL expects a majority of Club members to also be ARRL members.

Ralph KD1SM

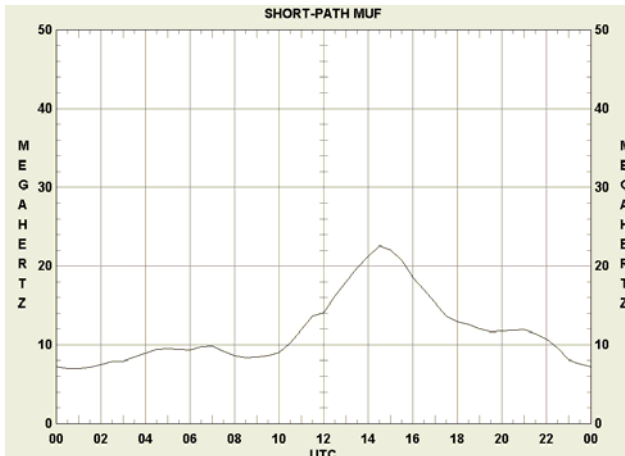
### DXing – Propagation

To be successful at DXing it helps to have a good knowledge of propagation so you'll know what band or bands are most likely to support DX communications. You'll also have a better idea of what time of the year or even time of the day that you're most likely to work into a particular continent.



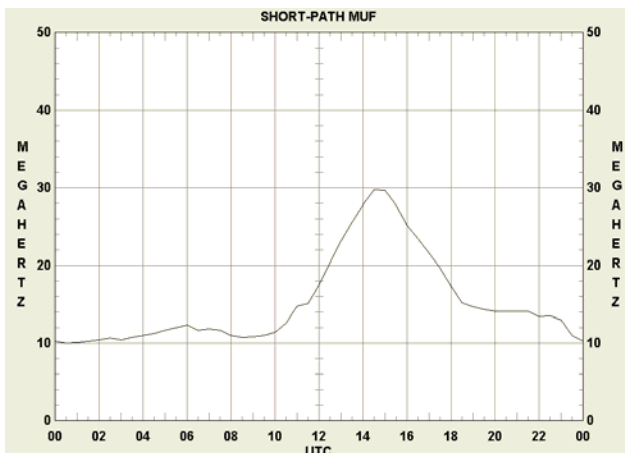
### Solar Cycle

The number of sunspots is constantly changing but goes through an 11-year cycle with a peak in the number followed approximately six years on average by a minimum. Sunspots have the effect of ionizing the F-layers of the ionosphere allowing us the ability to refract our signals back to earth. As the number of sunspots becomes greater the refracting surface becomes a more effective medium. This provides more reliable and more distant communications as well as refraction on higher bands. To illustrate this affect I have entered some realistic values into my W6ELProp propagation prediction program for this time of the year. In the first graph I have used a solar Flux Index (one gauge of sunspot activity) of 100 and you can see from the first graph that there is about a 2 hour opening to Turkey from W1 land from 13:30-15:30z on 21 MHz with no opening on any higher bands.



### New England – Turkey with SFI=100

But if the SFI were 150, the opening on 15m would be much longer in duration and there would also be openings on 12 and 10m as well.



### New England – Turkey with SFI=150

During years of high solar activity the higher bands (20-10m) can be full of DX signals from all over the world. But as we begin to approach the solar cycle minimum conditions on the higher bands become poor and DX activity migrates toward the lower bands (40-160m). At the bottom of the solar cycle 160m can sound a lot like 20m and 10m can be like a ghost town when it comes to DX!

### 27-day Solar Cycle

The sun rotates around the earth approximately every 27 days. Because sunspots and other phenomena can last for several cycles you can expect similar radiation conditions from the sun to return every 27 days. While this is not always true it is a somewhat reliable gauge.

### Electromagnetic Radiation

Solar flares and Coronal Mass Ejections (CMEs) can release huge amounts of electromagnetic radiation. When this radiation reaches earth it causes HF radio signals to be absorbed by the D-layer of the ionosphere. The amount of absorption depends on the amount of radiation reaching the earth and can temporarily knock out HF communications all together.

### Seasonal Cycle

The specific time of the year also plays an important role in propagation. During the winter months the Northern Hemisphere is in the greatest darkness. With few local thunderstorms electrical noise is at a minimum (QRN). This provides opportunities for communications using polar paths as well as an optimum time for East – West paths.

During the summer months the Northern Hemisphere is in the least darkness. Local thunderstorms are at their greatest so electrical noise is at a maximum (QRN). There are still good opportunities for East West paths.

During the spring and fall (especially near the Equinoxes) the Northern and Southern Hemisphere share the same propagation. This is the best time for North – South paths or diagonal ones, Northwest – Southeast (NA – South Africa) or Northeast – Southwest (NA – Australia).

### Daily Cycle

Certain bands are most active during daylight hours like 10, 12, 15, or 17m. They support DX communications when the path between both stations is in daylight. The bands open to the East after our local sunrise and stay open in that direction until sunset at the distant location. In the afternoon as the sun moves to our west the band gradually opens farther to the West until our sunset. These bands also open to the South during a large portion of the day. Bands like 40, 80, and 160m are most active during nighttime hours. They support DX communications when the path between both stations is in darkness. These bands open to the East after our local sunset and until sunrise at the distant location. As local darkness spreads to our West these bands gradually open farther to the West until our sunrise. They are also open to the South during a large portion of the night.

During the time when one station is near sunrise or sunset also called gray-line, signals are temporarily enhanced. During this period weak distant signals can get a well needed bump. This enhancement plays an important role for working long haul DX on 40-160m.

### What to expect on each band

The following are some of my general observations for each band.

**160m** – During years of low solar activity worldwide communications are possible during winter months with gray-line playing an important role in long haul DX (Asia). D-layer signal absorption tends to be the greatest on this band with receive capability limited by atmospheric noise (QRN). During years of high solar activity DX communications still occurs but openings are much shorter and much less frequent.

**80m** – During years of low solar activity worldwide communications are possible during winter months. Gray-line plays an important role in working into Central and Southeast Asia. D-layer absorption is less than on 160m but still limits receive capability due to atmospheric noise (QRN). During years of high solar activity DX communications still occurs but openings are shorter and much less frequent.

**40m** – This band has some of the most reliable low band conditions including long path openings to central and Southeast Asia. Propagation is similar to 80m though the band starts to open (to the East) several hours before our sunset and stays open 1-2 hours after our sunrise (to the West). Pacific and Asia stations actually get stronger after our sunrise.

**30m** - This 50 KHz wide band with its 150w power limitation and phone restriction shares propagation with its upper and lower neighbors. The band opens (to the East) in the early afternoon and stays open (to our West) several hours or more past our sunrise.

**20m** - This band is the most popular band for DX communications as it has the most consistent propagation. During years of high solar activity the band can be open 24 hours a day worldwide. During years of low solar activity it basically becomes a daytime only band with shorter openings and less frequent long haul DX.

**17m** – During years of high solar activity this band can provide some very reliable long-haul DX into South East Asia late into the evening. It has propagation nearly as good as 20m but is less competitive making it a good choice for new DXers. During years of low solar activity openings are shorter and much less frequent and may be limited to shorter paths like South America or Western Europe.

**15m** – During years of high solar activity this band can provide some great long-haul DX openings to Asia in the early morning and / or late into the evening. This band is also less competitive than 20m

and also can be a good start for a new DXer. During years of low solar activity only local communications are possible.

**12m** - During years of high solar activity worldwide communications are possible depending on the maximum usable frequency (MUF). During years of low solar activity only local communications is possible.

**10m** - During years of high solar activity worldwide communications are possible depending on the maximum usable frequency (MUF). During years of low solar activity only local communications is possible.

### Online Resources

Here are a few online propagation sites that I have found helpful;

[www.spaceweather.com](http://www.spaceweather.com) – A great site for current & historical propagation data, and solar news.

<http://www.qsl.net/w6elprop/> - FREE propagation prediction program, maybe a little dated but still does the job well (prior graphs made using it).

<http://www.voacap.com/prediction.html> - online VOACAP propagation prediction web page.

<http://www.swpc.noaa.gov/> - Good resource for satellite imagery.

<http://www.arrl.org/propagation> - ARRL propagation resource page.

Les Peters, N1SV

## March Board Meeting Notes

Board Meeting delayed till after the newsletter went to print.

## Ultrasonic Arc Detectors

Larry W1ESR and Stan KD1LE have been working on an ultrasonic arc detector to help identify specific points where power line insulators are arcing.





The arc detector was a construction article by former club member Jim Hanson W1TRC (SK) that was published in the April 2006 edition of QST. Jim's construction was breadboard style but a printed circuit board is available from Far Circuits to make construction easier.



Above Larry holds a portable function generator with an ultrasonic transmitter (think speaker) attached facing to the left. The transmitter is only the speaker used to output the 40 KHz supplied by the function generator. This was used as "arc" noise source for testing the receivers.



The receiver electronics are mounted behind the dish and are connected to the ultrasonic receiver (microphone) located on the arm at the focal point of the reflector. The gain is a function of the area of the reflector focused on the receiver.

There are several differences between the commercial round dish used in the original article and the repurposed satellite TV dishes used in these implementations. The first is they are larger and therefore higher gain which may not be necessary with the down side being handling them. The large one is plastic so it isn't heavy just bulky. Since the reflectors are not round the beam width is different in the two axis. This isn't a problem other than you notice it. You may also notice in the picture below that the focal point in front of the dish is offset from the center. So it takes a little practice to determine where you are aiming. These are not difficult issues to get used to. The benefit is the dish used in the article costs about \$80 and the salvaged TV dishes are roadside pickup free.



In the above picture Larry is aiming the arc detector at the transmitter/function generator located about 200 feet away. The detector easily picked up the ultrasonic tone. Because of the gain of the antenna the detection angle (beamwidth) is quite narrow.

Larry has been in touch with Groton Electric so they know we may be out looking at power lines in case someone calls asking.

When the weather gets a little warmer we plan to do some arc hunting. Until we find a real example we won't be sure of how well they work. Jim indicated in the QST article that he had located several bad insulators with his device.

Stan KD1LE

### Meeting Coffee "Bar"

Many thanks to Ed Snapp, N1YFK, for his rejuvenating the coffee "bar" at the last two meetings. There's been an incremental increase in socializing, and that's what we meet for.

Don't forget to leave a donation if you partake.

### Strays

40th Eastern VHF/UHF Conference  
April 11, 12 & 13, 2014  
Baymont Inn - Manchester, CT

I am proud to announce the 40th running of our annual New England Conference, just 5 weeks away!

Our website has been updated with our program and preliminary presenters list. We still have room for a few more speakers and papers, please contact W1GHZ at ARRL dot Net if interested.

We will be publishing a Proceedings on CD.

As usual there will be a bountiful Hospitality room on Friday night with snacks and refreshments galore.

Greg WA1VUG of Rohde & Schwarz will be conducting Saturday's measurement lab, a great opportunity to test your preamps and filters through 50 GHz.

Dave K1WHS is hosting our Saturday night Trivia Quiz, and we'll have a great buffet style banquet.

Mickie W1MKY and Tom W1WSO have already accumulated a wealth of doorprizes for this years event.

Mark K1MAP is officiating our Flea Market. This year we are an official ARRL-sanctioned Conference, so come one come all, meet your on-air friends live in person, and help support weak signal VHF/UHF/SHF.

Registration is live via PayPal or USPS mail-in via Dan K1BXC. Please note you do not have to have a Paypal account to register live, it also accepts major credit cards. For complete info see:  
<http://www.newsvhf.com/vhfconf.html>

and don't forget to check back for updates.  
Thank You!

73, Ron WZ1V

### NVARC Club Net

The NVARC Club Net meet's every Monday evening at 8 PM on the 442.900 Pepperell repeater.

Stop in and bring your input and questions.

The net is in need of a regular Net Control Station (NCS).

Recently participants talked about the upcoming Groton Road Race, hopes for Spring weather, antenna work, antenna switches. Also, various SDR dongle projects by members for aircraft radar, signal analysis and interference identification.

Recent attendees were

Jim N8VIM, Stan KD1LE, Skip K1NKR, Larry W1ESR, Les N1SV, Bruce K1BG, George KB1HFT, Dave N1MNX

## March Contests

Date	Contest	Exchange
March		
1	ARRL Int'l Phone DX—rs and state/province or pwr	
8	Idaho QSO Party—rs(t) and ID cty or s/p/c	
9	NA RTTY Sprint—both callsigns,s/n,name,and s/p/c	
15	Russian DX—rs(t),serial or oblast abbr	
15	Virginia QSO—serial and VA county/city or s/p/dx	
22	Oklahoma QSO—rs(t) and OK county or s/p/dx	
22	Louisiana QSO—callsign,rs(t),LA parish or s/p/c	
22	CQ WPX SSB—rs and serial	

## Flea Markets/Hamfests

- 15 Mar Amateur Radio Flea Market (Dayville CT)  
15 Mar WMARC Ham-Fest (North Conway NH)  
16 Mar SARA Flea Market (Southington CT)  
23 Mar CVRC Hamfest (Henniker NH)
- 6 Apr FARA Flea (Framingham)  
19 Apr Portland AWA (S Portland ME)  
20 Apr MIT Flea (Cambridge)
- 2-3 May NEAR Fest (Deerfield NH)  
31 May 23rd Annual Hamfest (Goshen CT)
- 17 July ARRL National Convention (Hartford CT)

## Your Article

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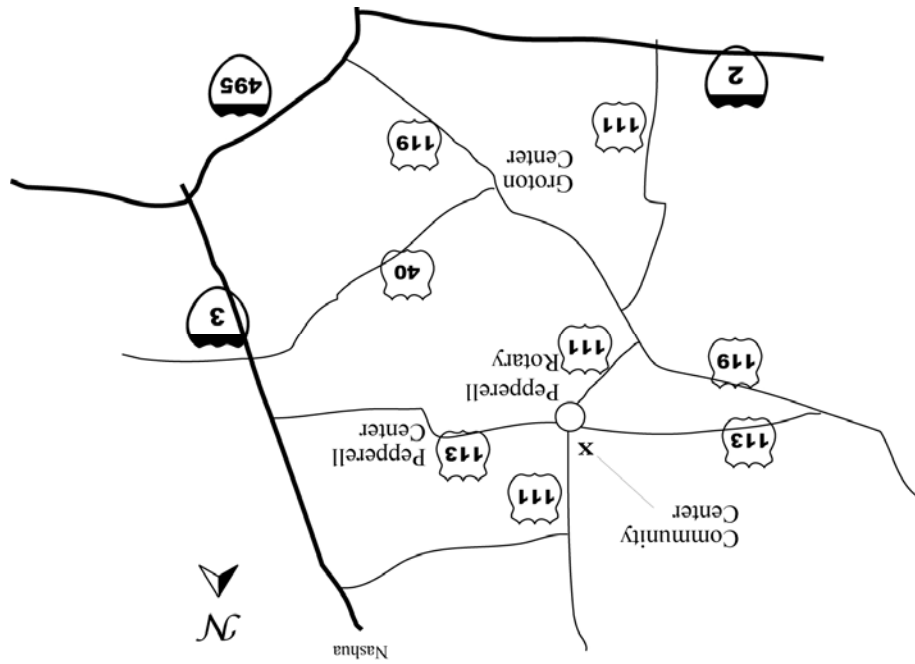
## Nashoba Valley Amateur Radio Club

PO Box # 900  
Pepperell Mass 01463-0900

<http://www.n1nc.org/>

President: Skip Youngberg K1NKR  
Vice President: Jim Hein N8VIM  
Secretary: John Griswold KK1X  
Treasurer: Ralph Swick KD1SM  
Board Members:  
Dan Pedtke 2011-2014  
Rod Hersh WA1TAC 2012-2015  
Bob Reif: W1XP 2013-2016

Editor: Stan Pozerski KD1LE  
Emergency Coordinator: Larry Swezey W1ESR  
Photographer: Ralph Swick KD1SM  
PIO: Roland Guilmet NR1G  
Librarian: Peter Nordberg N1ZRG  
Property Master: John Griswold KK1X  
N1NC Trustee: Bruce Blain K1BG  
Annual membership dues are \$15; \$20 for a family  
Meetings are held on the 3rd Thursday of the month  
7:30 p.m. - Pepperell Community Ctr.  
Talk-in 146.490 simplex  
442.900 + 100Hz Repeater battery power  
147.345 + 100 Hz Repeater  
53.890 – 100Hz Repeater battery power  
This newsletter is published monthly. Submissions,  
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**Nashoba Valley Amateur Radio Club**

*PO Box 900*

*Pepperell, MA 01463-0900*

