NVARC
Nashoba Valley
Amateur Radio Club

SIGNAL

SPECIAL SERVICE CLUB

de N1NC

March 2008 Volume 17 Number 3

This Month's Meeting

This month's meeting is Thursday March 20th at 7:30 PM. Meeting site info and maps on the back page and the NVARC Website.

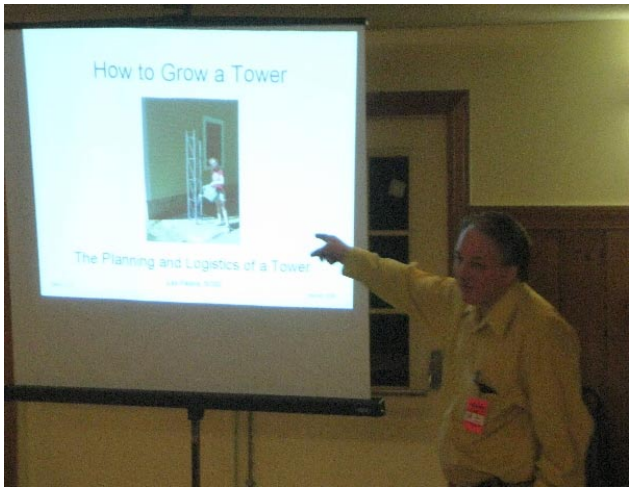
This month's speaker is Rick Hampton WD8KEL who will be discussing RF (Wireless and RFID's) in Hospitals. Rick is the Wireless manager for Partners Health Care System.

Wear your badge to the meeting so new members can tell your name and you can introduce your self to them. It may be worth your while.

Need a Ride?

Do you need a ride to the club meetings? Do you know someone who does? If you do please contact Bob W1XP 978-448-6559 and leave a message. We'll see that you get to the meeting.

Last Month's Meeting



Last months meeting program was "Growing a Tower" by Les N1SV. Les talked about planning for a tower project, covered the various tasks that need to be accomplished, he covered some tasks you might do yourself and some you might be better off having someone else do.

The regular raffle was won by Joel W1JMM who chose an ARRL Satellite Book.

The Badge Raffle was won by Dick W1LTN who received an NVARC Mug.

Dick W1LTN showed a customized clock he made for gifts using software that makes dial faces.

Stan KD1LE, Dick W1LTN, and Earl WR1Y brought items for reuse such as cables, plastic bags, a laptop computer, meters, wall warts, meter cases, computer parts, and a variety of other items.

February meeting attendance:

Skip K1NKR, Tom K1NNJ, Gary K1YTS, Wolf KA1VOU, Larry KB1ESR, Phil KB1JKL, Peter KB1LZH, Stan KD1LE, Ralph KD1SM, John KK1X, Peter N1PQ, Les N1SV, Peter N1ZRG, Jim N8VIM, Joel W1JMM, Richard W1LTN, Jim W1TRC, Bob W1XP, Erik W1ZBT, Rod WA1TAC, Earl WR1Y

Guests KB1JLE - Jim, N1ONE – Bill

From The Editor

I want to encourage members to write up activities or projects for the newsletter. Articles don't have to be long or complex. They can be about operating in a contest, building a kit or your own project. Local content is always better.

Please update your contact information with Ralph so it will be correct in the Yearbook update.

Welcome New Member

Welcome to new member Peter Quinn N1PQ from Harvard.

How to Measure Velocity Factor

By Bob Reif W1XP

The other day a friend asked me how he could measure the velocity factor or velocity of propagation of a piece of transmission line. It is a piece of balanced cable and he does not have any published specifications for it. I thought the question might be of general enough interest to provide the subject for an article in the Signal. So here goes.

What is Velocity Factor?

First of all what is it we are trying to do? Velocity Factor (VF) is the ratio of the Velocity of a wave traveling on a transmission line or antenna to the Velocity of Light. The velocity of light (c) is 3 hundred million (300,000,000) meters per second. But because the dielectric constant and permeability of the materials that make up a transmission line are greater than those of air the electro-magnetic wave travels at a velocity less than it travels at in air. The Velocity factor is simply the velocity of the wave in the transmission line divided by the speed of light.

$$VF = vl/c \qquad \text{Eq. \#1}$$

VF is the velocity factor
Where vl is the velocity in the line
And c is the velocity of light

So knowing the VF for a type of transmission line we know the speed of the wave in the line. This allows us to know the length of a transmission line in wave lengths. We can calculate the length of the wave in air and then just multiply by the VF and we know the wave length in our transmission line. To find the wave length in air divide the velocity of light by the frequency or using the formula:

$$Wl = 300/F\ (MHz) \qquad \text{Eq. \#2}$$

Where Wl equals the length of the wave in Meters.

So if we want to know the length of a quarter wave matching section at 14.1 MHz for a line with a VF of 0.66. The wavelength is 300/14.1 = 21.28 meters. Using the VF of 0.66 the length of the wave in a piece of RG213 coax for example is 21.28 X 0.66 = 14.4 meters. Now our quarter wave is ¼ of 14.4 meters or 3.6 meters. Just because most of us don't have a meter stick, to convert to feet multiply by 3.281. Our quarter wave length of cable is 11.8 feet (rounded it the nearest tenth of a foot). And my tape measure has inches so subtract the whole number of feet and multiply by 12.

(11.8 – 11) X 12 = 9.6 inches Nine and 5/8 inches is close enough. So the total length of a quarter wave length of transmission line with a VF of 0.66 at 14.1 MHz is 11 feet, nine and 5/8 inches. This is much shorter than the 17.45 feet in free space. An easier equation for calculating a quarter wavelength line will be given later in this article.

So why would I want to know how to measure and cut a cable a quarter or any other fraction of a wave length? Well there are many times that using a specific cable length can be used to advantage in constructing an antenna. For example a full wave vertical loop antenna will have an impedance of about 100 ohms. This is a two to one SWR which is not particularly high. If your transceiver has a built in antenna tuner it can easily and quickly tune it out. If you don't have a built in coupler you can still quickly tune out the SWR with an external antenna tuner. But if you connect a quarter wave long length of 75 ohm coax cable between the antenna and the 50 ohm cable the impedance transforming properties of the quarter wave section will "tune out" the Two to One SWR to almost one to one. That is just one example of the use of a specific length of a transmission line. Specific lengths of transmission lines are very useful and practically necessary to build phase antenna arrays like two phased verticals and four squares (four phased quarter wave verticals.) Transmission line stubs can be used for impedance match and as interference suppression filters. A four to one impedance, balanced to unbalanced, matching transformer (balun) using a half wave line segment is common in both HF and VHF yagi antenna feed systems. This is not an all inclusive list but it is fair to say that if you build many antennas, sooner or later you are going to be trying to cut a transmission line to some specific electrical length.

There are several antenna measuring tools on the market that will allow you to measure the VF of a transmission line. One example is the MFJ 269. This will allow you to measure the VF of a line and then allow you to verify that you have cut the line correctly. If you happen to have one of these useful instruments just consult the manual. But the older or less expensive instruments of this type are more simple and don't provide that type of direct measurement. But there is a simple way that you can make measurements of nothing but the SWR and determine the VF of a cable. All you need besides the simpler antenna analyzer is a 50 load and a coax T connector. The procedure is really quite simple. You connect the 50 ohm load to the antenna analyzer with a coax T adapter in between. The 50 load doesn't even have to be very accurate. A 51 ohm or two 100 ohm composition resistors in parallel will work just fine. Do not use wire wound or other resistors that have high inductance. If you have a reasonable length of the cable you can make the measurement at a low frequency. You need to tune the antenna analyzer through the expected range. Ideally this is the range for which you plan to prepare your quarter wave section. Using our example of the quarter wave section of line at 20 meters you would want to use the load over the 14 to 30 MHz region. I'll explain why in a minute. Tune the instrument over this range and note the SWR. If it isn't exactly 1 to 1 don't worry. Just note the reading. It should be fairly constant over this range. Now cut a length of the cable about what you suspect it to be, but on the long side. Put a connector on one end and short the center conductor to the shield at the other end of the cable. Now measure the physical length of the cable. This is science so take notes. Now connect the cable to the coax T connector on the antenna analyzer. Tune the analyzer for minimum SWR. It should be the same minimum SWR as was noted before. What you have done is tune the frequency of the antenna analyzer to the frequency at which the shorted line is a quarter wavelength long. The short at one end looks like an open circuit at the other end of the quarter wavelength of line. And the "open circuit" has no effect on the SWR. Above or below the frequency that the line is a quarter wave long the impedance at the open end of the line is either capacitive or inductive and this increases the SWR. So we have measured the frequency at which the cable is exactly one quarter of a wave length long. Since the line is exactly ¼ wave length long it takes the time of ½ a cycle for the wave to travel down the line and back. We know how far the signal traveled and how long it took so we should be able to calculate how fast it is traveling. The velocity of the wave is just the distance traveled divided by the time of the travel which is one-half the period of the frequency of the SWR minimum. Then we can compare that to the speed of light. See equation 1 above. But this is really messy because you have to get all the units right to do the comparison correctly. You can calculate the VF using the simple equation:

VF = F1 X LL / 246 Eq. #3

F1 is the frequency in MHz of the SWR minimum.

LL is the length of the shorted cable in feet

The constant 246 makes the equation work for a quarter wave length and the line length in feet. Rearranging the terms in equation 3 it can be used to calculate the line length for a quarter wave at a different frequency or for a different VF.

LL = 246 x VF/F1 Eq. #4

Now as a comparison let's remove the short on the end of the transmission line. To have the same minimum effect on the SWR, the transmission line has to operate as an open circuited half wave line section. (a half wave length line section repeats the termination) This should happen at about twice the frequency of the Quarter wave line. Now you know why we wanted to check our dummy load over the 14 to 30 MHz frequency range. Tuning up in frequency we should find a SWR minimum at about twice the earlier frequency. Based on the 14.1 MHz example it should be at 28.2 MHz. Now use the same expression for VF with the exception of using the constant 492 in place of the 246. With reasonable accuracy you should obtain the same VF. If not repeat the measurements being careful to find the minimum SWR. Note the short on the end of the cable should be done with minimum lead lengths.

Now if you haven't picked up on it yet there is a simple way to determine the length of a quarter wave or half wave length line. If you want to cut and try, you don't need to know the VF at all. For our example of the required quarter wave matching transformer for 20 meters, you just trim the cable taking small cuts till you obtain a length of cable that has no effect on the SWR of our 50 ohm dummy load at the desired frequency. As you trim the cable the frequency of the minimum SWR should move up in frequency till you get to the desired frequency. You need to short the cable after each cut. If you move to twice the desired frequency and cut the cable a half wave long, you don't need to short the cable after each cut. This will probably be more that accurate enough for most applications.

Now using the measured VF and calculating the required length may speed up getting to the end point. I would still cut the cable a bit long and trim to the final value. Remember that you have to connect into the cable after you trim it. At the higher frequency this can be a significant part of the length so you need to plan for this when you are doing your trimming. (Just for reference, it takes about 4.7 feet of VF =.66 coax to change 100 kHz at 160 meters but only about an inch at 20 meters and a quarter of an inch at 10 meters) It is a good idea to recheck the length after putting on a required connector in a critical application. It also means you may need to make a cable more than once in a critical application. But most applications are not that critical. For most applications close is good enough.

Now the beauty of this method is that it works with a transmission line of any impedance. Balanced line can be used if you are careful to keep the line away from other conductors. Tie it up with string to keep it off the ground or away from other objects. The distance should be at least several times the wire spacing. Ten is a good number and not that far for most balanced lines but closer is ok.

If you need a half wave section then use the open circuit technique to trim your cable. If you require some other unique cable electrical length other than a quarter or half wavelength you can use the VF value you measured for the line to calculate the physical length of the cable. Then just cut it to that length. There are procedures for measuring the odd cable length but we won't go into that here.

Once you have measured the VF of a cable, label the roll. That way you won't have to go through the measurement a second time. As a guide to cutting lengths of unknown cables for testing or checking your results, solid dielectric cables are probably in the 0.65 to 0.70 range, foam dielectric cable is probably around 0.8 to 0.9 and open wire and other balanced lines are probably in the 0.8 to 0.95 range. If you get a VF of greater than 1.0 measure it again!

Till next time, 73 Bob W1XP

PSLIST

**** Every event listed is looking for communications volunteers ****

Date Location Event Contact Tel/Email

Apr
5 Newton, MA Multiple Sclerosis Journey
Bob WA1IDA 508.650.9440 wa1ida@arrl.net

13 Boston, MA Multiple Sclerosis Walk
Bob WA1IDA 508.650.9440 wa1ida@arrl.net

20 Boston, MA Women's Olympic Marathon Trial
Bob WA1IDA 508.650.9440 wa1ida@arrl.net

21 Hopkinton, MA Boston Marathon Start

Bob K1IW 508.393.4148 http://marc.amateur-radio.net

21 Hopkinton, MA Boston Marathon Route/1st Aid
Steve W3EVE 508.384.7697 http://marc.amateur-radio.net

21 Boston, MA Boston Marathon Finish
Paul W1SEX 978.632.9432 http://marc.amateur-radio.net

27 Needham, MA Run of the Charles Canoe Race
Bob WA1IDA 508.650.9440 wa1ida@arrl.net

May 4 Boston, MA Walk for Hunger
Eric KA1NCF w4h@nsradio.org

Jun 8 Boston, MA Bikes Not Bombs Bike Ride Bob WA1IDA 508.650.9440 wa1ida@arrl.net

July
12 Woburn MA New England Classic Tour
Mike K1LJN 978.244.0417 k1ljn@arrl.net
see http://www.newenglandclassic.org

13 Durham NH New England Classic Tour
Mike K1LJN 978.244.0417 k1ljn@arrl.net

14 Biddeford ME New England Classic Tour
Mike K1LJN 978.244.0417 k1ljn@arrl.net

15 North Conway NH New England Classic Tour
Mike K1LJN 978.244.0417 k1ljn@arrl.net

18 Rindge NH New England Classic Tour Mike K1LJN 978.244.0417 k1ljn@arrl.net

Oct 12 Boston MA BAA Half Marathon
Bob WA1IDA 508.650.9440 wa1ida@arrl.net

Board Meeting

The monthly Board meeting was held March 13th

Ralph submitted the Treasurers report.

Need ideas for new items for the raffle.

Present at the meeting KD1SM, N1SV, KB1ESR, W1XP, KD1LE.

Adopt A Highway

Next road cleanup is Sunday, April 20, 2008

Treasurers Report

Income for February was $40 in membership dues, $60.88 in savings interest, $27 from the book raffle, $15 from PowerPole connector sales, and $4 from coffee mug sales. Expenses were $16.40 for newsletter postage, $50.16 for additional yearbook binders, and $2.99 for a greeting card leaving a net income of $77.33 for the month.

Current balances:

General fund	$4,255.45
Community fund	$2,386.83

As of 13 February we have 53 members who are current with their dues and 13 renewals outstanding. Please check the member roster that is circulated at the monthly meeting if you do not remember your renewal date. Your membership date also appears on your newsletter mailing label.

If you are not yet an ARRL member please consider joining and showing your support for the programs developed by our national organization. If you let me send in your membership then the Club pays for the stamp and receives a portion of your ARRL dues. Bring your check to a Club meeting or to Saturday breakfast payable to NVARC in the amount of your ARRL renewal and I'll do the rest.

Ralph KD1SM

ARRL Letter

ARRL, FCC, DEPARTMENT OF DEFENSE REVIEW NEW DEVELOPMENTS IN PAVE PAWS INTERFERENCE MITIGATION

The FCC, ARRL representatives and agents of the various US Air Force units working on developing a plan to mitigate alleged interference from 70 cm ham radio repeaters to PAVE PAWS radar systems on both coasts met February 20 via conference call. The purpose of the conference was to review the status of the mitigation plans at both sites: the Massachusetts Military Reservation on Cape Cod and Beale AFB, north of Sacramento, California.

Thanks to the cooperation and assistance of the involved repeater owners on Cape Cod, ARRL Regulatory Branch Manager Dan Henderson, N1ND, said, "I am pleased to be able to pass along that at this time, the Department of Defense has determined that the levels of harmful interference to the PAVE PAWS radar site on Cape Cod have been sufficiently

reduced. As part of this determination, they are not rescheduling additional follow-up testing for that area until sometime in 2009."

Henderson said that this decision doesn't mean New England is back to pre-mitigation repeater operation: "Any mitigation steps that have been taken should remain in place. A repeater that has gone off the air should not be simply turned back on at its original power level -- its previously determined mitigation standard still applies in order to protect the primary user from harmful interference."

Henderson stressed that the entire process is ongoing. "The high degree of voluntary cooperation shown by the owners of Air Force-identified repeaters has helped demonstrate to the DoD that the amateur community takes its responsibility seriously. This should help us retain access to the band in the long run."

During the discussion of the Cape Cod radar during the teleconference, the ARRL broached the topic of allowing the resumption of coordinating new repeaters on the 70 cm band in New England. The Air Force has agreed in principle to allow the New England Spectrum Management Council (NESMC) to resume coordination efforts under certain conditions. "These include that in addition to NESMC's normal coordination policies, Longley-Rice signal strength plots are prepared to determine expected signal strength at the radar site," Henderson said.

Henderson said that the ARRL has a "fairly good understanding of what strength level at the site should be workable, even though the DoD has not given us specific information on the sensitivity of the radar. The Longley-Rice plots should indicate if the operating parameters of the proposed repeater might be sufficient to prevent harmful interference to the radar site. The Longley-Rice plots are not the 'last word' in the process, but are a good tool giving the repeater owner and NESMC a reasonable assessment of possible problems."

Henderson reiterated that "any specific mitigation number from the Air Force is an exact measurement, not a 'predicted' number from a computer analysis."

Once NESMC approves a tentative coordination, Henderson explained that NESMC would forward the complete information on the new repeater to the Air Force for authorization on a case-by-case basis, as provided for in Title 47 §2.106 Footnote US7. "During a 60 day trial period, the Air Force would contact NESMC for an immediate shut-down of a new repeater causing harmful interference. If that happens the new repeater would have to remain off the air until it can be successfully mitigated."

While this new process is a bit burdensome to NESMC and the repeater owners, it goes a long way toward keeping Amateur Radio in a position where 70 cm operation can grow with careful attention to the effect of our operations on the primary users.

During the update discussion of the Beale AFB PAVE PAWS site in California, the DoD was able to report that there was a reduction in harmful interference at the radar, though work remains to be done to bring the situation at that site to a successful conclusion. DoD officials announced that a new round of testing is scheduled during the spring at Beale, and that they will share the results after the next round of testing is complete.

During the teleconference, the FCC reported that it has received excellent compliance in the wake of their phone calls and letters to repeater trustees and owners. This cooperation has made it unnecessary for the FCC to issue any mandatory shut down orders to date. The Commission will continue to be the initial point of contact with the DoD should further mitigation be required based on additional testing at Beale.

The ARRL will continue to work with the FCC, DoD, repeater coordinating groups and individual repeater owners as requested. "Because of the sheer number of 70 cm repeaters in that area, the Beale problem is taking longer to resolve," Henderson said. "We will continue to work toward a successful, constructive conclusion for as long as it takes."

TENNESSEE AGENCY CALLS ARMY MARS INTO ACTION

The Tennessee Emergency Management Agency (TEMA) called Army Military Affiliate Radio System (MARS) into action as tornados swept across the Southeastern United States February 5-6. According to Army MARS Chief Stuart Carter, "For the first time as far back as we can remember, a state government called for MARS deployment in response to an actual emergency. The resulting teamwork and use of Army MARS Winlink capability gave TEMA its only e-mail link during President Bush's visit to the storm-stricken area." At least 70 messages were sent during the state operation ranging from casualty figure updates and signal reports to staff rosters and photos.

TEMA's Chief of Communications David Wolfe, WA4VVX (MARS call sign AAR4CY), said, "Although there was no commercial power at the deployment

site, TEMA's communications infrastructure was fully operational. Both the VHF high band and 800 MHz repeater systems had good coverage for voice command and control. Our shortage was Internet connectivity, and our unmet needs were e-mail and the ability to send pictures. MARS Winlink provided exactly what was not available by any other means."

Carter said that this event illustrates the importance of detailed preparation and training that has taken place during realistic disaster response exercises over the past several years. "In the case of Tennessee, the story goes back a year and a half. Steve Waterman, K4CJX (MARS call sign AAA9AC) began working with Wolfe in late 2006, preparing for just such a deployment. At the time, Army MARS was just beginning to adopt the Winlink 2000 radio e-mail network system, and with the assistance of the then-Tennessee State Director Paul Drothler, WO4U (MARS call sign AAV4DJ), Army MARS had just signed a Memorandum of Understanding with TEMA. This MOU just served to strengthen an already strong relationship between TEMA and Army MARS. Wolfe led TEMA staffers who were already hams to becoming MARS members and to become qualified MARS Winlink 2000 operators. The rest of Wolfe's team soon obtained their Amateur Radio and Army MARS licenses."

The next step, according to Carter, was joint training for TEMA staff and Tennessee Army MARS members. Some was classroom training followed up with extensive field training. The culmination of the field training was TNCAT07, a massive exercise that included the Central United States Earthquake Consortium (CUSEC), an eight-state alert consortium along the New Madrid fault line. This exercise also included the participation by ARRL Amateur Emergency Radio Service (ARES), Civil Air Patrol and other EmComm services that clearly demonstrated interoperability between TEMA, Tennessee Army MARS, the Amateur Radio community and other municipal communications services.

"To make a long story short," Carter said, "we now have seen a demonstration of seamless collaboration between Army MARS and one of our supported agencies under 'Real World' emergency conditions. This was the first Army MARS deployment since the Katrina/Rita disasters two years ago. Successfully meeting the challenge involved deployment readiness on the part of our members, and it required total Winlink 2000 mobility. First of all came the building of relationships with existing and potential customers, and then came meticulous training of state and federal staffers, and frequent exercising at home and in the field. With this pattern of established collaboration between our customers and MARS members, we enter the new era of Army MARS Emergency communications support."

DUCIE ISLAND, VP6DX: MAKING CONTACTS, BREAKING RECORDS

After 13 days, 7 hours and 37 minutes of continuous operation, the VP6DX Team on Ducie Island <http://ducie2008.dl1mgb.com/index.php> made their 168,723rd contact. Valeri Koursov, RA0ALM, of Krasnoyarsk, Russia, contacted the Ducie Island expedition on Monday, February 25, 2008 at 0437 UTC on 30 meters. According to documents maintained by Jari Jussila, OH2BU, this contact breaks the record for the largest number of contacts made by any radio expedition. The previous record was held since February 8-28, 2001 by the Five Star DX Association's DXpedition to the Comoros Island, D68C.

The Ducie Island DXpedition has broken other expedition records throughout the course of the DXpedition, including:

* The largest number of RTTY contacts, previously held by the Swains Island N8S DXpedition in April 2007.

* The largest number of SSB (voice) contacts, previously held by the Comoros Island D68C DXpedition.
* The largest number of contacts on 40 meters, previously held by the Libya 5A7A DXpedition in November 2006.

* The largest number of contacts on 30 meters, previously held by the St Brandon Island 3B7C DXpedition in September 2007.

* The largest number of contacts on 17 meters, previously held by the Swains Island N8S DXpedition.

* The largest number of contacts with North America, previously held by the Comoros Island D68C DXpedition.

* The largest number of contacts with South America, previously held by the Peter I Island 3Y0X DXpedition in February 2006.

* The largest number of contacts with Africa, previously held by the Rodrigues Island 3B9C DXpedition in March-April 2004.

The Ducie Island crew received inquiries about the equipment and antennas used on Ducie Island. They reported that each operating position used:
* Elecraft K3 radio. They said "The outstanding receiver and transmitter characteristics allowed us to

run two positions simultaneously on any band -- even the very narrow 30 meter band -- with absolutely no interference. Good design makes the complex appear simple: the ins and outs of this sophisticated radio were quickly mastered by the operator team, none of whom had seen a K3 before the expedition."

* Microham microKeyer II computer interfaces: plug in, turn on, call CQ and get to work.
* Acom 2000, 1000 or 1010 amplifiers: quietly getting the job done without trouble. The position used on 160 meters includes an OM 2500 HF amplifier.
* 200 W W3NQN bandpass filters from Array Solutions and 2 kW bandpass filters from 4O3A.
* WinTest logging software running on Durabook ruggedized laptops.
* Honda EM65is and EM30is inverter supply, gasoline generators. The operators report that the generators offer "100 percent reliability to date. The inverter system has been very tolerant of the widely varying loads presented to the generators as multiple operating positions switch between transmit (high power consumption) and receive (low power consumption), a vast improvement over previous gasoline generator designs."

The seven operating positions were divided into two sites: East (four positions) and West (three positions). The operating sites stood about 1 kilometer apart, a 15 minute walk over a coral shelf bordering the island's inner lagoon. Each site had its own WiFi network; a microwave link tied the two sites together. Sleeping tents and meals were located at the East camp.

The Ducie Island DXpedition closed down operations on Wednesday, February 27. Amateurs who had QSOs with VP6DX can check the online logs <http://ducie2008.dl1mgb.com/onlinelog/index.php>.
-- Information provided by VP6DX Team

NVARC Club Net

Topics discussed on the Club net recently; emergency communications preparedness, NMAEPC radio programming, programming member's mobile radios with common frequencies, HDSCS hospital support group in CA, Winlink between local emergency management and MEMA.

Recent participants include Leo K1LK, Bob W1XP, Larry KB1ESR, Skip K1NKR, Stan KD1LE, Les N1SV, Richard W1LTN, Ken K1JKR, Den KD2S.

The net is a good place to bring information for the club and questions or discussions. The net meets at 8:00 PM Monday evenings on the 442.900 N1MNX repeater.

Flea Markets

2008

April
4-5 Maine State Convention Lewistion
5 IRS Flea Market Londonderry NH
6 Framingham FARA Framingham
19 Manchester NH NE Antique Radio
19 Portland Hamfest South Portland

June
7 Southern Berkshire ARC Goshen CT

July
12 Pen-Bay ARC Union Me

August
9 Rason Hamfest Ledyard CT
22-24 NE Division Convention Boxboro

Advertisements

Tell them you saw it in the Signal. Advertisers should contact the NVARC Treasurer for information.

N1MNX Repeater Support

The N1MNX repeaters cover the area of our club members and are supported by user donations. Donations for support of the repeaters should go Dave N1MNX.

Contest, DXpeditions and Special Events

The information for a DXpedition can be quite detailed and may include bands, dates, number of stations, and times of day they plan to work certain continents so I can not list it all here. But if a country or prefix is of interest you can get more information at www.425dxn.org.

Contests 2008

June
14-16 ARRL June VHF QSO Party
28-29 ARRL Field Day

July
12-13 IARU HF World Championships

August
2-3ARRL UHF Contest
16-17 ARRL 10 GHz and Up Contest

DXpeditions

Call	Location	Until

See www.425dxn.org for more listings

NVARC

Nashoba Valley
Amateur Radio Club

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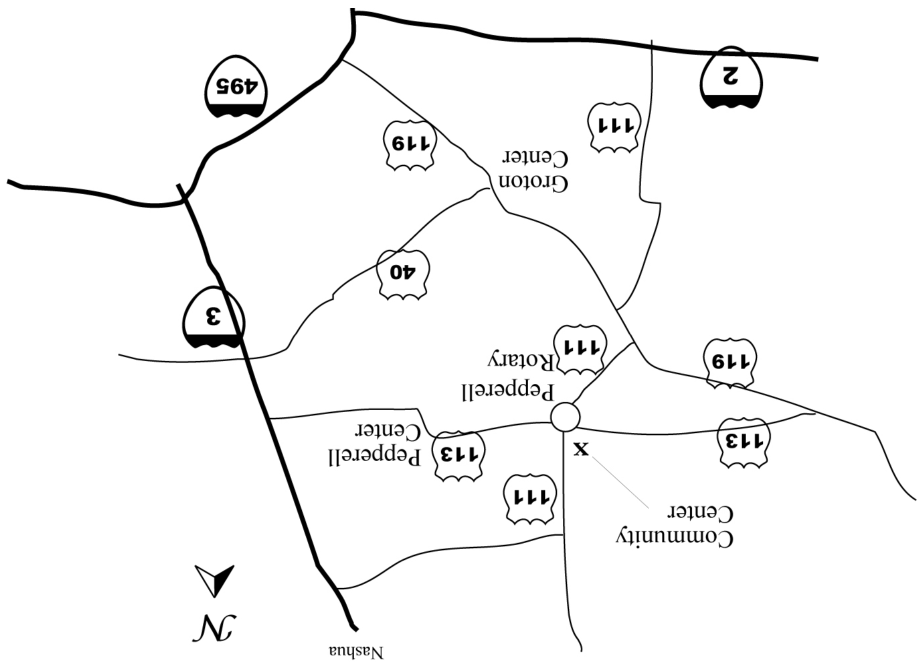
http://www.n1nc.org/

President: Stan Pozerski KD1LE
Vice President: Peter Nordberg N1ZRG
Secretary: John Griswold KK1X
Treasurer: Ralph Swick KD1SM
Board Members:
Les Peters: N1SV 2005-2008
Joel Magid W1JMM 2006-2009
Bob Reif: W1XP 2007-2010

Editor: Stan Pozerski KD1LE
Emergency Coordinator: Larry Swezey KB1ESR
Photographer: Ralph Swick KD1SM
PIO: Dave Peabody N1MNX
Librarian: Peter Nordberg N1ZRG
Property Master: John Griswold KK1X
N1NC Trustee: Bruce Blain K1BG
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
147.345 + 100 Hz Repeater
53.890 – 100Hz Repeater
This newsletter is published monthly. Submissions, corrections and inquiries should be directed to the newsletter editor. Articles and graphics in most IBM-PC formats are OK.



Nashoba Valley Amateur Radio Club

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