



SIGNAL

A club since 1992



Since 1993



Since 1996

de N1NC

July 2020

Volume 29 Number 7

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Last Month's Meeting

The June meeting was yet another nicely done virtual conference thanks to Jim, N8VIM, and Medtronic. Several dozen members attended.

The June meeting contained a "Special Meeting" to vote on changes recently proposed for the NVARC Constitution. A quorum was confirmed. The polling was done via WebEx and absentee voting. The changes were approved

Club initiatives were discussed, with volunteers needed for teams to focus on:

- Doing License Classes in the Fall, maybe. (See Bruce, K1BG);
- Kit Building Projects. Several possibilities are being evaluated by members.

Jessica then shared a short video of a WES Program MODEM project she did that involved designing an innovative radio beacon geolocation system for tracking wildlife. It was a quite detailed, high-level, overview of the project¹.

The Main Event of the evening was a presentation of a very detailed COVID-conscious plan to do Field Day from The Orchard. Jessica and her team put together The Plan, and successfully lobbied the town of Pepperell for a permit to hold the event, even during this time of COVID.

This Field Day would be like no other, in many ways. See follow-on articles in this issue of Signal.

This Month's Meeting

By custom, NVARC meetings are not held in July or August. However, since we are doing Virtual meetings, we **WILL** be having meetings in July and August.

The July meeting will feature another of Jessica's cool videos on Radio Beacon Geolocation.

Next Month's Meeting

The August Virtual meeting will feature, Paul, W1GHZ, VHF/UHF author and QST/QEX columnist. Check out Paul's website: <http://w1ghz.org/>

¹ Jessica's video: <https://www.youtube.com/watch?v=j45f3L-cij0>

From The Prez
de Jessica, WU3C

Greetings All!

I began this past week of vacation with the NVARC Orchard Field Day effort, which was a really wonderful event!



I felt my Ten-Tec failing on Thursday night before Field Day may have been a bad omen, but it surely was not!

Field day is my favorite of all Amateur radio events. I was really elated that our little team made this year so successful, even in light of the challenges of the COVID19 restrictions.

Everything was done according to plan, and the team performed wondrously well.

Jim AB1WQ, Jim N8VIM, Bruce K1BG, Peter N1ZRG, and Dan KW2T were the set-up crew.



N8VIM laid down the power and Ethernet like a pro, AB1WQ had the Luxury Porto-Potty in place ahead of time and coordinated innumerable loose ends,

Everyone pitched in to raise 38' of my military mast², on which we hung one end of AB1WQ's excellently performing end fed wire antenna³, and the opposite end was hung in the tree on the knoll.



Peter and I brought and set up the shade and Ops kitchen, while Bruce and Dan got a station set up so

as to be on the air as soon as the starting gun sounded.

Bruce was on the air just after start with his amazing station and talent.



Bruce was also a really great motivational support all through the planning and execution of the Field Day exercise.



Peter and I, set up our "U-Haul" station.

A special thanks to Peter for absorbing the U-Haul cost and some last-minute panic expenses on the logging computer. Also, thank you to Bob, KE1JH, and Sandy, for letting us use their camping gear: a huge help!



I was sad that no one signed up for any operating slots. But despite that, the Ops crew of 5 kept the station on the air almost 24 hours.

The bulk of the QSOs were logged by Bruce: he is a MACHINE!

Peter and I were a great team, he was logging while I was operating.

I felt very excited that I was able to rise to Bruce's winter challenge to get on CW, and I actually made 60 contacts on CW! That is more for me than the previous 10 years combined! I think.

Jim, AB1WQ, wrapped it up with a great SSB performance on his "pop up folding table" station.

Way to go Team!

I also had one very special Ten-Tec surprise from Richard, W1LTN, on behalf of Ralph, KC2EQB. I am forever grateful for that, Thank you so much!

My take away was this: **We did it!**

Our little team put together a great Plan and executed it like a well-oiled machine.

² [Ed: NSN 1080-00-108-1173
<https://www.armyproperty.com/nsn/1080-00-108-1173>]
³ EFHW-8010P from myantennas.com

And our team represents about 10% of the membership. What that should mean to the club is this: just a few people, backed by the club, can do wonders.

That is just what the club is for, in my opinion. We collectively create the opportunities for the members to do fun and interesting things!

By keeping our efforts going, we can keep doing events of all sorts. The comradery of our club is especially important now that we are all more isolated than usual. I thank you all for helping Field Day work so well.



The next big event is the:



I will hold it at my house on August 22nd. More details to come.

I'm hoping we can harvest fresh sweet corn from my garden! The storms last night flattened some if it - so if it doesn't work out, I'll have corn anyway.

Ragnar is feeling much, much, better and he will be delighted to see, thank, and play with all of you.

I have a newly constructed fire pit, so we will have a fire also! There will be plenty of room inside and out for people to gather any way they want.



Also brewing is the "Kits Task Force". We have three great things on deck: A pocket spectrum analyzer⁴, an FT-8 mono-bander⁵, and the 630M transverter kits⁶. Stay tuned for more details.

I had been totally focused on the Field Day effort so haven't worked this idea too much, but I will in the coming months: I suspect we will make a Zoom meeting series for people to share what and where they are with the kits and to share information on them. I'll also make my Lab available as needed for participants.



I am also thinking about a Mobile HF clinic – Get your car on HF will be the theme. I'd like to make that happen to support my seedling of the "HF mobile rally contest" – another future event!



⁴ [Ed: While an intriguing addition to one's toolkit, the "tinySA" referred to is not a Kit, nor is it yet quite available. Stay tuned in via:

<https://groups.io/g/tinySA/>]

⁵ Phaser FT-8 Transceiver Kit: <https://midnightdesignsolutions.com/phaser/>

⁶ Minikits.com EME223: <https://www.minikits.com.au/eme223>

Last, we will be having summer meetings this year! Woot!

In July, I will be presenting "MORE-on-MODEMs a further discussion of Radio Beacon Geolocating. I hope to see you there.

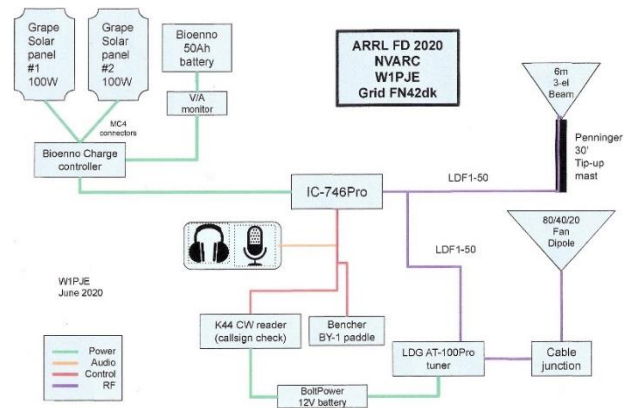
Here is a link to the video I showed last Month on one of my MODEM Geolocating projects:

<https://www.youtube.com/watch?v=i45f3L-cij0>
de Jessica, WU3C

W1PJE Operations during Field Day 2020 New Challenges, Failures, and Successes de Phil, W1PJE

COVID-19 conditions as we approached June of this year made it clear that Field Day participation in the Orchard was not going to be an option for this household due to medical issues. So, in mid-May, I began making plans and assembling equipment for a solo class 1E backyard operation here at grid FN42dk in Clinton - just over the line in the Western Mass. (WMA) section within Worcester County. This was a considerable and welcome challenge mainly because I had not done a personal temporary deployment of radio gear all on my own. (Professionally, Haystack has done multiple science campaign field deployments including Peru, Puerto Rico, Sweden, Norway, Germany, and Alaska, but there we have expert technicians to help.)

Setup (with embedded challenges): After much puzzling and drawings, Figure 1:



and Figure 2:



show the backyard setup I used.

A spare camping tent was the base of operations, with a card table within for gear and a surplus chair harvested long ago from the Westford School District's give-away pile.

Radio: Adopting a “beginner’s mind” approach was a requirement since radio gear here at home is between implementations. In particular, at the moment, I had ready access only to two older borrowed HF radios (the club’s Kenwood TS-450s and a severely compromised Icom IC-718), neither of which covered 6 meters.

Skip K1NKR and I have done 50 MHz NVARC FD operations over the past couple years, so I also wanted to operate on that band, and was looking forward to it seeing as inter- and trans-continental Sporadic-E has been exceptional this summer.

In the end, the single radio used was provided by a Icom IC-746pro (HF + 6 meters + more) graciously loaned by Bruce K1BG, since he wasn’t using it in typical camping style.

Also used on occasion was a LDG AT Pro 100 auto-tuner, since the one in the 746pro had a strange habit of forgetting its tuning now and then for the HF antenna port (but was fine for 6 meters??).

Antenna: For HF antennas (not in photo), I used my default homebrew fan dipole for 80, 40, and 20 meters at ~40 feet above ground, provided a couple years ago thanks to my colleague and Barre resident Will, KD4FOV.

For 6 meters, I used a rover-class Directive Systems DE3-50 three element beam kindly loaned by Les N1SV. It was placed on a portable base and 30’ push-up mast from Penninger Radio - well machined and highly recommended - with Armstrong rotator.

The mast was straightforwardly raised by myself with some help from junior computer technician/son James, who steadied the guy ropes as it went up. There was some initial horror as the poles waded horizontally a bit once up until we had things nicely tied down. Coax was surplus Andrew LDF1-50 low-loss heliax.

Power: I decided to push myself and go completely green/solar, so two Grape Solar 100W panels were used with MC4 connectors to a Bioenno charge controller and a hefty 50 Ah Bioenno LiFePO4 battery.

The solar panels were used to charge the battery over 2-3 days, and when combined provided reliable 11-12 amp output in full sun.

This battery was great and highly recommended; I only used ~30% of its charge for the whole FD operation. A small Amazon.com purchased volt/amp “fuel gauge” was connected inline, and this is highly rec-

ommended as well to keep track of total Amp-hour usage.

Digital and Logging: Unfortunately, I had to abandon this totally.

The hope was to use FT8, but my USB-to-serial converter cable - supposedly a real Prolific FTDI chip - had intermittent failures and refused to talk to the IC-746pro, even when verifying serial waveforms on a Tek oscilloscope. (Bruce has since used CI-V on the 746pro successfully, so I have no idea what failed.) This ate multiple hours of my nonexistent free time. N1MM+ wasn’t much help either without CAT control.

Modes: Given the FT8 failure, I stuck to 100 watts on CW and SSB and emphasized mostly CW. A K1ELSystems K44 CW reader/keyboard box was used to check my current bad proficiency reading callsigns (so de-rate your opinion of my skills), but I am relying on it less and less and I sent by hand the whole event at maybe 15 WPM using a classic Bencher BY-1 paddle.

Weather: Very humid and pretty hot but no thunderstorms. These held off until 1 hour after I (quickly!) broke down the setup at 1400 LT after seeing weather radar with angry red spots out by the Quabbin, moving this way fast.

Results: Using 100% search-and-pounce mode by ear with paper logging - no computer and therefore no spotting networks or waterfall were available - I was reasonably pleased. 85 contacts, 80% CW for about 9 hours in chair.

The farthest section heard was in the Bay Area of California and also up in Saskatchewan, so I know I was getting out well. On Sunday, 15 meters and 10 meters were open. But a big disappointment: 6 meters was totally closed for the weekend (sometimes even the FT8 band was nearly silent) - except for one 30 minute interval, in which I had a long chat with my colleague Ethan K8GU out in Ohio where we sounded like we were next door. It was still a great learning experience to put the mast and 6 meter beam up, and I have future plans now.

And in a bizarre twist, Skip, K1NKR, could not make the link from Marlboro to me at the same time that Ohio was wide open on 6 meters, no matter what we tried. Ground wave, sky wave - we experienced “no wave” even at 100 watts! Magic band, indeed.

Lessons:

1. Plan better, and in particular avoid the need to borrow radios if possible, especially at the last minute.
2. Radios with full USB interfaces for CAT control and digital are in my future - I've had enough lifetime experience fiddling with serial converters.
3. CW is a lovely mode for quiet ops, especially in your backyard at 0200 LT with neighbors close by.
4. Computers or tablets that run off of 12V or 5V DC and with enough compute power to handle N1MM+ and WSJT-X would be good for a full battery power setup running FT8.
5. Do not accept spare school chairs from the Westford School District, which apparently assumes kids need to use seats made of a material with hardness equivalent to granite. I'm now officially too old for those.
6. Efforts in putting up multi-element beams do not convince 6 meters to open. The Radio Gods Have Spoken (tip of the hat to Pete Juliano, N6QW, of [SolderSmoke](#) podcast fame).
7. LiFePO4 batteries are great, as are solar panels.
8. Field Day is a lot of work when solo, but it is still fun.
9. NVARC is a wonderful collection of generous people who will help out immensely if you ask!

de Phil, W1PJE

QSO Today Virtual Ham Expo

This Just In:

[QSO Today Virtual Ham Expo Confirms Packed Lineup Of 70+ Speakers](#)

QSO Today host Eric Guth, 4Z1UG, announced that the first QSO Today Virtual Ham Expo taking place on August 8-9, 2020 has now confirmed a packed lineup of over 70 great speakers for the event. For more information about the speakers and to register, go to www.qsotodayhamexpo.com. Attendance is free and there are early bird prize incentives (donated by sponsors) for registering by July 24, 2020.

Phil, W1PJE, NVARC's resident radio-astronomer, will give one the technical talks.

Saturday Morning Zoom Breakfasts

John, K1JEB, has been hosting Saturday morning "NVARC Zoom Breakfasts" that do a good job at recreating the conversational benefits that we miss not having Tiny's at which to congregate.

Instructions on how to join in are sent to the NVARC mailing list. Keep an eye out!

Tech Morning CW Net

A Daily "Tech Morning CW Net" continues, NCS-ed by Stan, KD1LE. Mornings at 09:30 eastern time, at 3.562 MHz.

Several folks meet up for 30 minutes or so of idle chatter on the day's doings at 10 – 15 wpm⁷. Lately the talk has been on the productivity of our flower and vegetable gardens.



Bob McArthur, K1QT, from New Hampshire, has joined in several times recently.

Bob was an NVARC member many many years ago, before he moved out of range. Now he's back!

Tech Monday Zoom Sessions

Another channel on which we-all can confabulate is the "Tech Monday" sessions, now virtually hosted on Zoom by Bill, AB1XB.

These sessions are an outgrowth of the former "Arduino Group" that got together at the Community Center on Mondays to gab about different radio applications & build-it projects that involved Arduino's computer smarts.

Technical issues, not lately involving Arduinos, and questions of the day are cussed and discussed from 10:00 – 12:00 Eastern time, Monday mornings. Contact Bill for an invitation.

⁷ [Ed: I'll say it again: I can't copy faster than 8wpm or so, so I use GetCW.exe to decode for me. I do so with "neither apology nor regret". Sending, I can stumble along at 15wpm or so, and Hey!, it's RADIO! And, I enjoy gabbing with the folks. Come join us!]

What I learned on Field Day
-or-
How to add a Panadapter to your Transceiver
de Bruce, K1BG

Field Day 2020 was a departure from NVARC's usual Field Day.

Personally, I "live-to-operate" and "love-to-Elmer". Field day is no exception to this, except that during Field Day, I prefer to Elmer.

With all the social distancing going on, I did not get much of a chance to Elmer this year. Instead, I tried some new technology, and learned a bunch during Field Day.

Specifically, I tried adding an SDR (Software Defined Radio) to my Icom IC-7600 station for the purpose of adding a spectrum scope capability. The scope in the 7600 is poor at best. It's not an SDR, so you cannot export the I/Q streams needed for digital signal processing.

While contesting at K1TTT during last year's CQWW CW and ARRL DX CW contests, I saw this technology in play: Dave used a Yaesu FT-1000MPs and FT-2000s in his multi multi station, and had spectral displays on all of them. How did he do this?

Most higher end transceivers these days have "external RX antenna inputs" for attaching receiving antennas like beverages or inserting bandpass filters to help with inter-station interference.

Inserting an SDR at this point in the signal path allows for sharing the antenna being used at the station with both the transceiver and the SDR. It also disconnects and protects the SDR when transmitting

(BTW, if your transceiver does not have this capability, MFJ offers the [MFJ-1708B-SDR](#)).

After researching what K1TTT is using, I selected the Airspy HF+ Discovery (\$169 List). Physically it was easy to install: I downloaded and saved the .dll file in the N1MM Logger+ root directory, started N1MM, and opened the SDR window. EASY!

How did this help during Field Day?

The spectrum display capability has all kinds of benefits. It shows how busy a band is, and where there are clear spots to call CQ.

If a band is just opening, it will instantly show you where those first stations are. Rather than tuning a

transceiver to look for stations, you can search visually.

N1MM has some really interesting features – by using the "Shift/Up Arrow" (or down arrow), you can jump from one signal to another (while N1MM moves your VFO frequency accordingly). Great for hunting and pouncing!

Here is a rather photo of what the CW portion of 80 meters looked like during Field Day on Saturday night using the N1MM spectrum display:



The top half represents signal strengths, the bottom half is a moving waterfall display.

ONE WORD OF

CAUTION. The Airspy Discovery HF+ covers .5 kHz to 31 MHz and 60 to 260 MHz. If you are looking for 6 meters or 23 cm and up, you will need a different SDR.

My next experiment will be to compare the HF+ Discovery with a \$20 RTL-SDR. I'll let you know how that goes in a future article.

Regardless of whether you are contesting, DXing, rag chewing, or just plain listening, adding a spectrum scope capability to your existing transceiver will enhance your operating experience.

If you are interested, here are a couple of good links with more information on SDRs and using them on HF.

<http://tcdxa.org/wp-content/docs/Newsletters/Mar2018GrayLine.pdf>

<https://n1mmwp.hamdocs.com/mmfiles/200-panadapter-pdf/>

If you have any questions regarding any of this, please reach out to me on the club reflector. And please, let me know if you decide to give this a try!

de Bruce, K1BG

Field Day Stories
or
What I did on Field Day

Skip, K1NKR, writes:

I'm not much of a contester but I do view contests, events, and activities as incentives to do something

around the shack and then get on the air to check things out.

Maybe a new rig, maybe a new band or mode, maybe an antenna. (That's actually how I got into microwaves years ago--not through my own drive but the "one new band per new contest" incentive.)

This Field Day I re-tuned the 80/40 dipole and re-cabled the audio from the rig to the computer. Voila! FT8 on HF and 6m.

I made fewer than two dozen contacts, but at least I got on the air. That's what the event was all about.

Ralph, KD1SM, writes:

KD1SM operated class 1B (emergency generator) using a temporary wire antenna



stretched between trees.

[Photos KD1SM and N1QIT]

Les, N1SV, writes:

Field Day is usually an excuse for me to run the winter gas out of my generator and operate in the 1E class.

Thanks to K1BG for the heads up on the FD rules waiver as I decided to run 1D HP and contribute to the club aggregate score.

Apologies to anyone who heard my horrible audio but less than an hour before the contest I started to get reports asking if I was wearing a COVID-19 mask.

Being unable to resolve the problem before the contest I just had to muddle through it. I had some good runs late Saturday afternoon and was floored to get called by KC4AAC in Antarctica who had a great signal.

After the contest I had some more time to look into the TX audio problem and it looks like RF from the K3S PA is getting back into the audio.

From the Shack de George, KB1HFT

Your Editor had a significant scare three days before Field Day: just after signing with the Tech Morning CW net, the 756ProIII flickered twice, and died. Yikes!

Visions of no Field Day flashed into my head.

A voltage test showed 14+ vdc at the power connector when unplugged from the rig, but when plugged in, only ~ 3v. WoW! What is loading down the power supply?

I eMailed Mike, N1EQ⁸, who had repaired the radio almost decade ago, asking for advice. He quickly responded that the in-line fuses in the power supply cable assembly are known to be sometimes faulty: testing good, but under load, exhibiting resistance. Sure enough, one of them could be jostled to read 24ohms. Not good for a fuse. Easy Fix. Whew! Tnx, Mike!



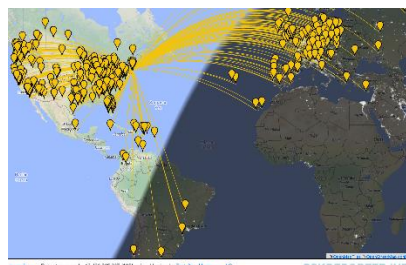
On Field Day itself, I visited The Orchard at ~1400 Eastern, just before operations were to start. The scene was somewhat disarming, as it was significantly more sparsely populated than a "normal" field day.

However, as I nosed about, I found that the small team had EVERYthing set up according to The Plan, under control, and ready for Ops. I was impressed.



Here, Jim, AB1WQ, inventories the anti-COVID supplies.

Returning home, I set out to add points to NVARC's FD total by focusing on 80 & 20m CW and 6m FT-8 & FT-4 by operating Saturday evening and Sunday morning & afternoon..

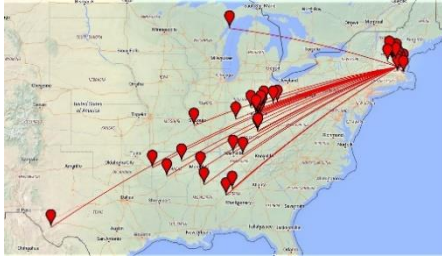


Here's a plot of the stations that heard my 20m field day signal: I certainly did NOT work them all!

⁸ <https://www.n1eq.com/>

On 6m FT-8 & -4 I had significant luck, making several dozen contacts; some DX. Overall, CW + Digital, a paltry 172 points, but it was fun!

Here's a plot of who heard the 50w FT-8 vibrations that I fed into my 6m attic dipole:



de George, KB1HFT

Board Meeting Notes

Attendees:

Jessica, WU3C	Jim, N8VIM
John, KK1X	Bruce, K1BG
Ralph, KD1SM	Skip, K1NKR
George, KB1HFT	

- Vote to purchase a lock NTE \$14 for the Orchard gate or any other Club purpose.
- Field Day went well. Not many operators due to obvious reasons. 11 folks signed in.
- George and Peter working with FT-8 radio kits. More info to come...
- Progress on radio courses hampered by lack of venues.
- We have some volunteers to run the net.
- No outstanding old business to discuss.
- Card sort in November this year (reminder).
- Is there interest in virtual meetings over the summer?
- Need to find more speakers for upcoming meetings.
- Picnic at Jessica's – August 22.

-de John, KK1X

Treasurer's Report

Income for June was \$275 in membership renewals. Expenses were \$3.82 for PayPal fees, \$200 for liability insurance, and \$245.63 for the Field Day portajohn, leaving a net expense of \$174.45.

Current balances:

General fund	\$2,418.47
Community fund	\$5,948.25

Welcome to new members Lamar Smith KC1MNN and Nick Moore KC1KRG.

As of 2July we have 55 members who are current with their dues and 9 renewals outstanding. Thank you to those of you who mail your renewals or use PayPal.

Remember that membership dues can now be paid via PayPal:

Go to <https://www.paypal.me/nvarc>

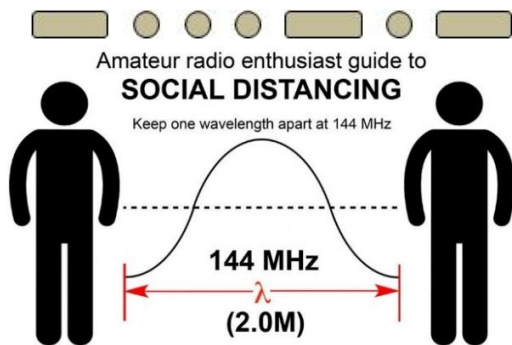
- Please **remove** the checkmark in the box "Paying for goods or a service", as PayPal deducts a fee for their "purchase protection" if you leave this checked. If your "shipping address" is still displayed, then the box is still checked, adding an expense to the Club
- (Optional) enter your callsign in the "Add a note" field.

Again, **Please remember to uncheck** the "Paying for goods or a service" checkbox before submitting your payment.

If you are joining the 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 a Special Service Club, the ARRL expects a majority of Club members to also be ARRL members.

de Ralph KD1SM





Calendar

W1AW Schedule

PAC	MTN	CENT	EAST	UTC	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM	1400		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	1500-1700 1800-2045	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	2100	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	2200	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	2300	DIGITAL BULLETIN				
4 PM	5 PM	6 PM	7 PM	0000	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	0100	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	0200	DIGITAL BULLETIN				
6 ⁴⁵ PM	7 ⁴⁵ PM	8 ⁴⁵ PM	9 ⁴⁵ PM	0245	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	0300	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	0400	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. From the second Sunday in March to the first Sunday in November, UTC = Eastern US time + 4 hours. For the rest of the year, UTC = Eastern US time + 5 hours.

♦ Morse code transmissions: Frequencies are 1.8025, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675, 50.350, and 147.555 MHz.

Slow Code = practice sent at 5, 7½, 10, 13, and 15 WPM.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13, and 10 WPM.

Code bulletins are sent at 18 WPM.

July

- 11 FISTS Summer Unlimited Sprint. CW. 80, 40, 20, 15, 10m. QRP, QRO. <http://www.fistsna.org/operating.html#sprints>
- 14 Worldwide Sideband Activity Contest. SSB. 160, 80, 40, 20, 15, 10, 6m. <https://wwsac.com/rules.html>
- 18 – 19 CQ Worldwide VHF Contest. 6, 2m. <http://www.cqww-vhf.com/>
- 23 NVARC Monthly Virtual WebEx Meeting. Jessica speaking on radio geolocation techniques. Watch your eMail for an invitation.

August

- 1 – 2 North American QSO Party. CW. 160, 80, 40, 15, 10m. <http://www.ncjweb.com/NAQP-Rules.pdf>
- 8 – 9 QSO Today Virtual Ham Expo <https://www.qsotodayhamexpo.com/>
- 20 NVARC Monthly Virtual WebEx Meeting. Paul, W1GHZ, VHF/UHF author and QST/QEX columnist will present. Check out Paul's website: <http://w1ghz.org/>

Sponsors

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Littleton, MA. 01460

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Hours: M-F 9-6, Sat. 9-5



**Nashoba Valley
Amateur Radio Club**

PO Box # 900
Pepperell Mass 01463-0900
<http://www.n1nc.org/>

President: Jessica Kedziora, WU3C

Vice President: Jim Hein, N8VIM

Secretary: John Griswold, KK1X

Treasurer: Ralph Swick, KD1SM

Board Members:

Bruce Blain, K1BG, 2018-2021

Jim Wilber, AB1WQ, 2019-2022

Skip Youngberg, K1NKR, 2020-2023

Property Master: John Griswold, KK1X

Librarian: Peter Nordberg, N1ZRZ

Emergency Coordinator: [open]

N1NC Trustee: Bruce Blain, K1BG

Join NVARC! Annual membership dues are \$15;
\$20 for a family.

NVARC general meetings are scheduled for the third Thursday of the month at 2330 UTC.

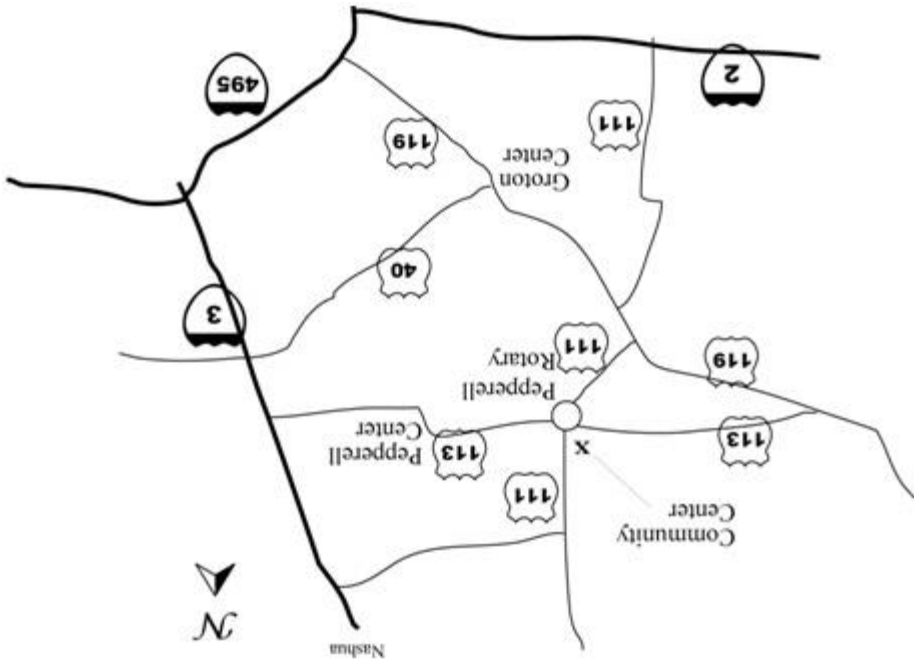
Non-members interested in attending may send an email to meetings@n1nc.org requesting the teleconference details. NVARC thanks Medtronic, Inc for providing the teleconferencing services under their employee volunteer support program for non-profit organizations.

Contact us on the N1MNX repeater.
442.900 (+), 100Hz
147.345 (+), 100 Hz
53.890 (-), 100Hz

This newsletter is published monthly. Submissions, corrections and inquiries should be directed to the newsletter editor: editor@n1nc.org.

Articles and graphics in most PC-compatible formats are OK.

Editor: George Kavanagh, KB1HFT
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Nashoba Valley Amateur Radio Club
 PO Box 900
 Pepperell, MA 01463-0900

