NVARC
Nashoba Valley Amateur Radio Club

SIGNAL

A club since 1992
Since 1993
Since 1996

de N1NC September 2017 Volume 26 Number 9

This Month's Meeting

Welcome back! There were no meetings, but plenty of activity, this summer. Now we're into the swing of the "program year."

Continuing our club-to-club cooperation and outreach, this month we'll be joined by Andy Wallace, KA1GTT, from the PART of Westford club. He'll speak about bugs.

Also, Jim, AB1WQ, will close out June's Field Day activities with awards and recognition.

The President's Corner

Excerpted from the beginning of Part 97:

Amateur Radio Service
Subpart A—General Provisions
§97.1 Basis and purpose.

The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

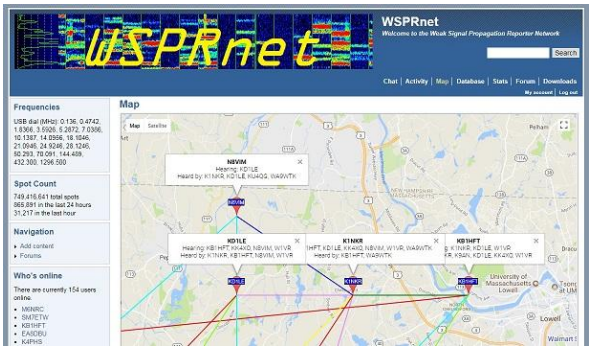
Congratulations to NVARC on another challenge taken. In remembering the goals and challenges set out for Amateur Radio by the FCC (for which we get the benefit of spectrum) we often fulfill paragraph "a" above by our participation in road races, canoe races, Boston Marathon, Groton Road Race, RACES, ARES, and things like TDOTA—all in preparation for emergencies and for promoting STEM. But many fewer of us have the opportunity to contribute to paragraph "b," which is often left to Amateurs in the scientific community and a few more scientifically oriented Amateurs. This year, though, we had the opportunity to do more by contributing to the HamSCI project. Our affiliation with the folks at Haystack encouraged our participation.

Thanks to the following NVARC members who participated in the WSPR aspect of the HamSCI experiment: Harvey W1HBS, Skip K1NKR, Bill AB1XB, John KK1X, Stan KD1LE, Bob W1XP, Jim N8VIM, George KB1HFT, Ralph KD1SM, Dan KW2T, Jim AB1WQ, Jesse W1DEA, Greg WY1X, Peter N1ZRG, and Steve K1SMD. I hope I didn't miss anyone.

From the information I received, NVARC put at least 25 WSPR stations on the air for the eclipse. In addition, each of the clubs I visited and made the Eclipse/WSPR presentation to reported at that least a few members would participate.

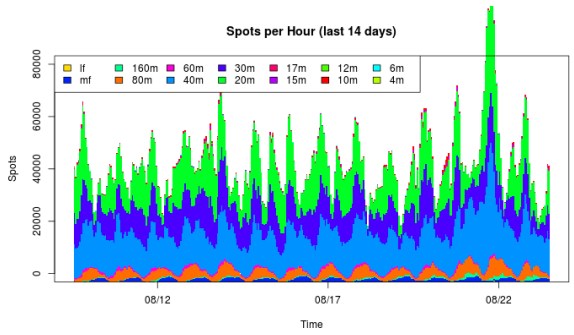
Some other of our members reported they were participating in other activities such as

the QSO Party and others related participating in scientific experiments.

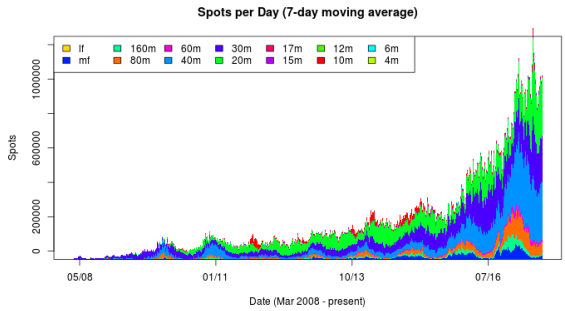


Prep time. Four NVARCers find themselves beaconing on 10m at the same time.

Kudos to all for your contribution to "the advancement of the radio art." As you can see below that NVARC helped push the WSPRnet site "Spots per Hour" off the top of the chart at over 100,000 spots per hour. (Unfortunately, the graph chopped off the very peak hours, which are higher than what is shown.)



Below you can see the interest climbing with the "spot per day" hitting above 1.3 million on the day of the eclipse.



Besides our contributing to the database, I hope everyone learned a little something from participating in the event. By watching the spots over a couple of days on my systems it became obvious when the best propagation was on the bands I beacon on and monitor. Plus, if you installed WSPR-X you now have the option of trying some of the other modes Joe Taylor and his team have created.

I have received emails from several people I don't know about their observations on how signals between us varied over the eclipse period. I'm sure more will follow and that doesn't even begin to use the vast amount of data in the WSPR database which will be queried on questions known and eventually on questions yet to be asked.

On the lighter side, in cleaning out our coat closet I found I have 14 Pepperell Fall Classic ball caps. They go back to the early 1990's. I'm sure a couple bit the dust for various reasons, but we did have a good run supporting that event.

On the first day of Boxboro (Friday) there were not many people there as is usual, but a number of people stopped me and thanked me for the Eclipse/WSPR talk. They said it had encouraged them to run WSPR during the event and they found the analysis of their data interesting.

Upcoming activities for which member participation is needed; December Homebrew Night, January Members Short Subjects, February TDOTA.

73, Stan KD1LE

News and Happenings

Arduino Group Meetings Start

On August 28th, the Arduino Group met for the first time. In attendance were Skip K1NKR, George KB1HFT, Bill AB1XB, Stan KD1LE, Peter N1ZRG. The meetings are taking place downstairs at the Pepperell Community Center Monday mornings at 10am. Access to the building has changed so if you are thinking of attending contact me for information. The goals for the meeting were to familiarize everyone with the Arduino board and its layout, what a sketch (a program) looks like, and setting up the Arduino Integrated Development Environment (IDE). We explored some of the IDE features and loaded and modified an example program. Everyone then uploaded their new sketches to their Arduinos. That process compiles and links the sketch and if it completes suc-

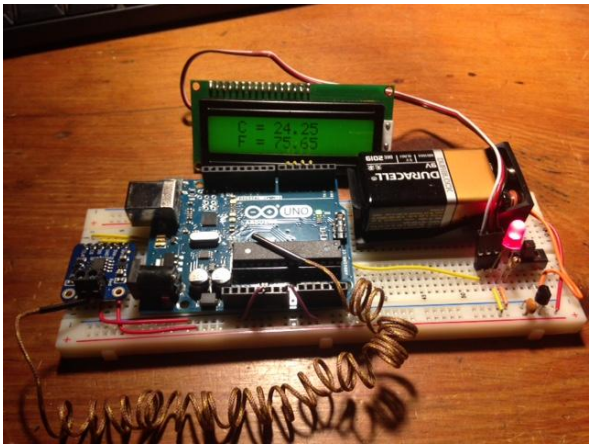
cessfully does the actual upload. If the IDE compile fails, it suggests possible problems.

KD1LE photo

We have scheduled the meetings for four more weeks at the Pepperell Community Center and have the option of extending, since the CC is available during this time.

The format is not a presentation, but a show, explain, and do. If you want to join you need a laptop with the Arduino IDE installed, an Arduino, and an appropriate USB cable. A small breadboard would be useful.

There is no fixed plan for the sessions. Some members have already decided what they would like to build with their Arduino. So the session topics will be targeted to specific functions or hardware that support those identified projects.



KB1HFT's thermocouple sensor and display. ***K1NKR photo***

The second NVARC Arduino Group meeting took place Monday September 11. George KB1HFT started off with a discussion of C programming constructs and then explained the hardware and sketch (software) for his kiln temperature monitoring system which utilizes a thermocouple, an Arduino thermocouple shield, and a display. George explained that using shields may require adding libraries to the IDE. A shield-specific library adds commands used to interact with the shield.

Stan continued the session with a demonstration of using the Pulse Width Modulation (PWM) pins on the Arduino to control a transistor to fade an LED in and out. That was followed by using the PWM output to drive an FET to control a fan speed. He also outlined some considerations when using the PWM outputs.

de Stan KD1LE

From the AUG 2017 EMA Section News
WELCOME NEW EMA STAFF MEMBERS

Jesse Creamer, W1DEA, has been appointed as an Assistant Section Manager (ASM) for Eastern Massachusetts. Jesse's primary responsibility in the section will be as our IT Director and Manager, web design and web support.

Kayla Creamer, W2IRY, has been appointed as Public Information Coordinator (PIC) for Eastern Massachusetts. Kayla has worked for seven years in the world of community media, is currently a Programming Coordinator for local community access television and a freelance photographer. Kayla has been engaged in promoting Amateur Radio in Eastern Massachusetts for the past year or more. She is currently working with the Boxboro Committee to capture forum sessions on video.

NVARC and the 2017 Eclipse: Participation, and Some Early Results

As you are likely aware, a major eclipse passed through the continental US this past August 21. It was hard to miss the public interest in the spectacle, and you probably know a neighbor or friend who experienced the eclipse first-hand, either from home here in Massachusetts (where a partial eclipse happened, and the weather "mostly". cooperated) or by traveling a long distance to be right under the totality path. I've heard several reports that this was a truly amazing experience.

Seventy percent totality. Still a lot of energy coming in from the sun. ***K1NKR photo***

But NVARC members were part of the action even if they didn't end up under a totally eclipsed sun. Many had their own amazing eclipse experiences and got into the act, whether here at home or out in the field, through doing what hams do best: using their honed observation powers to make radio contacts and observe changes in propagation during the event. These changes occurred as the ionosphere experienced a very rapid descent into nighttime and then back out into daytime again. On a national level, such observations and data collection were coordinated through the HamSCI initiative (hamsci.org), a relatively new organization whose goal is to advance the field of radio science. NVARC and HamSCI have partnered through W1PJE and Haystack Observatory's ionospheric research programs. In particular, the 2017 eclipse provided a focused and exciting collaboration between HamSCI, ARRL, and the scientific community to collect data to advance the understanding of D- and E-layer propagation. (As hams, we all care about knowing more on D and E layer propagation as these are the factors influencing our ability to work the rare DX contact: band openings being different from day to night, DX through sporadic E and skip, and on and on.)

The major activities organized by HamSCI included a Solar Eclipse QSO Party (SEQP) on CW, phone, and digital from 1400 to 2200 UT on the eclipse day (with subsequent uploading of logs), encouragement of receive monitoring stations for the Reverse Beacon Network, and adding Weak Signal Propagation Reporter (WSPR) stations monitoring HF paths and uploading results to WSPRnet.

So how did NVARC do? In a word: spectacularly. The club came through during the big day by being a vigorous participant in many ways. Before the event, Stan KD1LE beat the bushes and made the rounds of local clubs (*e.g.*, Contocook, Billerica, Granite State) with a presentation, drumming up interest and support. His efforts resulted in a final count of 23 WSPR stations from NVARC and 3 from Army MARS associates all across the bands (a great turnout). For instance, Stan himself provided a 10, 15, 80, and 160m WSPR station. Skip K1NKR went all-out with a WSPR monitor on 10m and 40m from both FN42gp and FN43mo, plus SEQP participation. Bill AB1XB tipped in with a 250 mW end-fed wire on 40m (getting pre-eclipse spots from US, EU, and ZL!), WSPRing from his enviable position under the totality path in Missouri at grid EM38tw. Not to be outdone, Bob W1XP was also under totality in North Carolina with two HF radios running multiple WSPR beacons. George KB1HFT worked 10m and 6m with his own WSPR station. John KK1X went with one HF radio on 80m and another flexibly moving around the bands. Others running WSPR nodes included Greg WY1X, Dan KW2T, Craig KC1ETB, and many more (forgive the lack of a complete list). Joe K1YOW did his own science experiment looking for enhanced sporadic E effects on 6 meters. (I was kept busy scanning the ionosphere with Millstone Hill's UHF ionospheric radar.)

And they produced early intriguing results too. A small sampling: Craig KC1ETB, John KK1X, and Bill AB1XB all saw WSPR beacon signals increase in strength during and after totality passage. Bob W1XP noticed that at almost the exact time of maximum eclipse in North Carolina, 160 meters opened for about 30 minutes and then closed down again until the normal gray line occurred - as the D layer responded to the shadow of the moon to some extent. And Millstone Hill saw electron density drop by more than a factor of 2 overhead in Massachusetts, far away from the totality path.

All of these stellar efforts were noticed at the national level and received particular commendations from Ward Silver N0AX, others at ARRL HQ, and the HamSCI lead Prof. Nathaniel Frissell W2NAF (NJ Institute of Technology) in an email to W1PJE shortly after the eclipse concluded. Bob W1XP's first light results on 160m changes were even picked up by Rick Lindquist WW1ME,

the ARRL news editor, and appeared in the ARRL Newsletter for September 7.

What next? HamSCI is now gearing up for the long, careful scientific analysis of all this data and more to advance our understanding of eclipse effects and, more importantly, ionospheric propagation and the ways it affects the hobby we all enjoy. I'll keep NVARC posted as findings emerge, and I hope we can continue in the future to participate in these exciting citizen science activities for the benefit of all. Great job all around, and as W1XP said, "come on 2024!"

73 *de* Phil W1PJE

Tech Night (or Nights)

Dan, KW2T, who led our Tech Nights for well over a year and a half, has struck out on his own. Per his posting on **http://www.danstechnight.com/**, "Dan's ideal participant is a 10 year old kid who is very curious about technical things and needs a mentor to show him the way and teach the basics."

This may have led to some confusion, since NVARC has had difficulty in finding someone to facilitate our own Tech Nights. In fact, our TN was even recently described as having "gone by the wayside."

We are still looking for a facilitator, but the NVARC TN group has not dispersed and continues to meet at the Community Center the second Thursday evening of each month.

Editor's Note

Brag time. On Friday the 8th of September, Bob, W1XP, and I got together to do a little "what-if" experimenting. My digital ATV equipment can be programmed to transmit/receive anywhere between 50 and 1300 MHz. (The only legal ATV frequencies ate 70cm and above. Typically, I operate on 429MHz.)

Well, what about the 10HGz band? I looked at various IF, LO, and output combinations and concluded it could be done. We cranked the DATV gear down to the 2m range and connected the equipment to our 10GHz transverters. Voila! 10GHz DATV—probably (certainly?) the first in the Northeast.

K1NKR photo

There's still a way to go. We never did optimize signal levels. And the configuration we used was half-duplex, one-way. So a little PTT cabling is on the books. But the big thing is that Friday mornings aren't always a waste. It's great that it's a learning-experimenting hobby.

73, Skip K1NKR

On the Air

Digital Modes

With the advent of FT8 and the ease of using "sound card" software, the digital modes have become even more popular. On the plus side, previously "impossible" contacts are now possible. On the negative side, most of the modes pass only the minimum amount of information necessary to complete a legitimate QSO.

Where do you stand? The debate is on and we'll follow it in these pages.

CW Academy

Although it hasn't always been that way, every ham who knows me knows that Morse code (CW to us) is my favorite mode of operation. Over the last year or so I've become an advisor for the CW Academy ("CWA").

CWA runs Morse code classes at three different levels, three times a year. Level 1 is for beginners and those whose code speed is 10 WPM or less. Classes are held on line

using SKYPE. Level 2 is for intermediate operators who know Morse and can operate comfortably at speeds between 11 and 15 WPM; meetings are held online and on the air. Level 3 is for more advanced operators who can operate at speeds between 16 and 20 WPM; meetings are held online and on the air. In all cases, classes have no more than 5 students for each "advisor" (teacher). Classes meet twice a week, and 30–45 minutes of practice per day (including the days the classes meet) is expected. In fact, it's considered essential to learning Morse code.

One might think that interest in Morse code is dying, but the popularity of CWA seems to dispute that. Classes start in January, April, and September, and I am now advising my 4th class. Several NVARC members have signed up for these classes, and at least one has also taken the level 2 class. Every semester has more instructors than the previous one, since the waiting list gets longer as time goes on.

Some statistics. This semester there are 44 level 1 classes with 219 students, 12 level 2 classes with 60 students, and 4 level 3 classes with 20 students. Each class meets twice a week. A number of students who graduated level 1 a couple of years ago have improved their skills to the point that they are CWA advisors! I have no idea how many people have graduated these classes, but I would expect the number is well over a thousand. Of my 15 previous graduates, I've had several women, a student who was blind, and a student in Bangalore, India. All learned the code. No problem!

BTW, if you are proficient in Morse code, consider becoming an instructor. It takes 2 hours per week, and it certainly a great way to "pay it forward".

There are many ways to learn Morse code. Some are good, some are not. Since we all learn differently, I can't say that (of the good ways) any one is best. But one thing is certain: The learning process requires consistent practice until the skills are learned. A half hour to 45 minutes of practice per day is essential to learning Morse code. If you would like to get an idea as to what is involved, the entire CWA curriculum is on-line at the CWOps website, **http://www.cwops.org/cwacademy2.html**. Besides the curriculum (for instance, level 1 **http://www.cwops.org/cwa/PIHA-Level1.pdf**), CWA offers some great on-line tools for practice and learning. For instance, an online tool to help you learn the sound of the Morse characters and practice the curriculum is located at **https://morsecode.scphillips.com/trainer.html#**. All of the materials—and CWA for that matter—are free. All CWA advisors work on a volunteer basis.

The waiting list for classes depends on the level of the class, time of year, and other factors (for instance, sometimes there are last minute cancellations allowing students to move up on the list). If you are interested, go to the CWOps website and follow the instructions on signing up.

Who knows? Maybe you will get me as your advisor.

Interested in learning more about CWOps? I'll save that for another article.

73 *de* Bruce, K1BG

Strays

NVARC Trade Zone

I have available for a new owner:

- Hy-gain EXP-14 Broadband Tri-bander 10, 15 and 20 Meters. This is not a lightweight antenna.
- Weller Soldering Station TC-202
- Heathkit Soldering Station model GH-53 (almost antique)
- Heathkit RF Signal Generator model IG-102

HP 17 inch LCD monitor

Stan KD1LE

No matter how smart your phone is, the Saturday morning breakfast toast always hits the floor on the buttered side.

Treasurer's Report

Income for August was $30 from membership fees and $2 from ARRL membership renewals. Expenses were $19.60 for newsletter postage leaving a net income of $12.40 for the month.

Current balances:

General fund $2,670.85
Community fund $5,136.41

As of 7 August we have 41 members who are current with their dues and 21 renewals outstanding. Thank you to those of you who hand in your dues before I come to you. Please check your renewal status on the roster circulated at the monthly meeting or ask me.

de Ralph KD1SM

Board Meeting Notes

Board meeting 9/7/2017

Attending: Stan KD1LE, Jim N8VIM, John KK1X, Ralph KD1SM, Rod WA1TAC, Ed N1YFK. Observing: Skip K1NKR.

- Dan has resurrected Tech Nite under his own "ensign."
- Club meeting set up - we have speakers. Andy on bugs [September *Ed*]. Rod doing November, 20-40 minutes on Solar Farms.
- We are in the community center calendar.
- Arduino slated for four weeks at Community Center (five attendees in August).
- Is there any interest in a night-time Arduino gathering?
- Stan to query for someone to step for for NVARC Tech Night.
- February meeting is [may be *Ed*] a Skype presentation from Arizona.
- Possibility of a donation to the Community Center - perhaps sponsoring WiFi?
- JOTA September 2100-1500.

Respectfully submitted,
de John KK1X

Club Services

W1 QSL Sort. Perhaps the most social meeting we have, our sort for the W1-Area QSL Bureau each October is a "give back" to the hobby. We're a leader in this volunteer opportunity and usually sort over 17,000 cards in an evening.

Meetings. Meetings, meetings! That's what makes a club, right? Monthly get-togethers of folks who love the hobby. News, information, planning, bragging—and an informative program presentation as well. We're an all-interest club and the presentations reflect that.

Calendar

Upcoming Events

September

8-10 N E Division Convention, Boxboro MA
17 Flea at MIT
21 First NVARC meeting of the new "program year"

October

13/14 NEARfest, Deerfield NH
15 Flea at MIT, Cambridge
21 NEARC Antiques, Brookline NH

Upcoming Operating Activities

September

9/10 EME 2.3 GHz & Up
9-11 September VHF Contest
16/17 10 GHz & Up (Round 2)

October

7/8 EME 50-1296
16-20 School Club Roundup

November

4/5 EME 50-1296
4-6 CW Sweepstakes
18-20 Phone Sweepstakes

December

1-3 160 Meter Contest
9/10 10 Meter Contest
17 Rookie Roundup CW

Are you a "contest nut?" See http://www.arrl.org/contest-calendar (Contest Corral) for month-by-month listings of both ARRL and non-ARRL contests.

Advertisers

Nashoba Valley Amateur Radio Club

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http://www.n1nc.org/

President: Stan Pozerski KD1LE
Vice President: Jim Hein N8VIM
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Treasurer: Ralph Swick KD1SM
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Jim Wilber AB1WQ, 2016-2019
Ed Snapp N1YFK, 2017-2020

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PIO:
Librarian: Peter Nordberg N1ZRG
Property Master: John Griswold KK1X
N1NC Trustee: Bruce Blain K1BG

Join NVARC! Annual membership dues are $15; $20 for a family.
Meetings are held on the 3rd Thursday of the month at 7:30 p.m. in the Pepperell Community Center.

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

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