NVARC
Nashoba Valley Amateur Radio Club

SIGNAL

A club since 1992
Since 1993
Since 1996

de N1NC February 2018 Volume 27 Number 2

This Month's Meeting

Steve, NA1T (formerly K1SMD), a club member (and someone whom you just might know from HRO) will be with us this month to speak on ARES and show some Go Boxes he has put together. Steve is active in New Hampshire's ARES.

We also expect to host Mike Raisbeck, K1TWF, the ARRL New England Deputy Director, Tom Walsh, K1TW, the Massachusetts Section Manager, and (possibly) Pete Stohrer, K1PJS, the New Hampshire Section Manager, for a presentation of the QST Cover Plaque award to NVARC member Joe Dzekevich, K1YOW.

Last Month's Meeting

January's meeting was Short Subjects Night.

On 2/1/2018 9:22 AM, Skip Youngberg via NVARC_Board wrote:

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Does anyone have any photos from SS
Night that I can put in the Signal?
73,
Skip
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On Thu, Feb 1, 2018 11:10 am, John Griswold replied:

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They were all too dark...
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So, here they are:

NVARC photos

The President's Corner

It has taken a few years to get it done but I have finally added backup power option for my house and garage. The picture below is the new power pedestal with meters and generator transfer switches for the house in the center and the garage on the left. The generator connects on the bottom trough.

KD1LE photo

An additional purpose for this was to install a solar array on the roof/ground. But that project has ended due to a combination of Federal and State actions. The Federal Government has imposed a 30% tax on imported solar cells and solar panels. Most PV panels are produced outside the US and even among companies with a US presence 90% of their panels are produced elsewhere. So, this tariff will have a significant effect on the solar industry for which the solar panel is just one part they use. That is on top of tariffs already in place. In Massachusetts several things have taken place. The SREC II program has ended and the replacement plan cuts the return rate in half. The Massachusetts DPU has also approved new rules and charges, for Eversource (probably National Grid and the other power providers as well), on net metering solar

users. They include a minimum monthly charge of about $12 and put net metering users under "demand charges" which impose a penalty charge based on the peak usage in any one-hour period of the month. That charge is independent of what are actual peak energy use hours for the electrical system. That charge is calculated by multiplying the maximum kilowatt rate in the "peak" hour times $2.71 (There is a lower rate for low income residential.) So, if you run your clothes dryer (3KW), washing machine (1.2KW), toaster (1.5KW) along with general power use you might be using 7 or 8 KW peak. Using the 8 KW peak that would be a demand charge added to your bill of 8 times $2.71 or $21.68 slapped on your bill on top of the regular electric rate charge. This could also detract from plug-in vehicle adoption in conjunction with solar as the large power usage over an extended period will bump up any other peak usage.

All of this is on top of the bureaucratic red tape to install net metering and benefit from the SREC programs. It was never clear to me how to go about this. But based on what I do know I suspect it was purposefully made difficult in an attempt to discourage applicants.

Thinking Day On The Air is coming up the 17th and 18th of February. If you can help out contact me.

73, Stan KD1LE

News and Happenings

What is this "Arduino Group", and Why?

Late in 2017 several intrepid NVARCers, intrigued by the idea of build-it-yourself computer-controlled devices, arranged to get together to investigate and discuss what one can do with an Arduino.

An "Arduino" is a small (usually less than several square inches) but powerful computer that can be paired with a wide variety of peripheral "shields" (small circuit boards) that provide input/output data to/from the computer. The open source Arduino specification allows the enthusiast relatively easy access to today's crop of single chip processors. There are dozens of types of Arduinos made by many companies. Arduinos come with various configuration options (*i.e.*, differing number of input/output lines, differing types of analog inputs, interrupts, and timers, *etc*.), but they all conform to the Arduino Specification and can be loaded with software using the same tools.

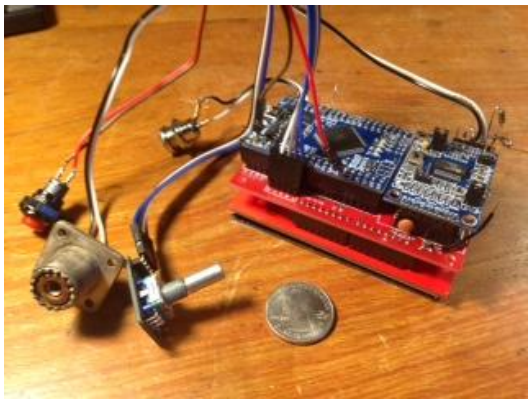
Available shields include LCD displays, keyboards, signal generators, Wi-Fi & Bluetooth connectivity, as well as many types of sensors such as motion, temperature, atmospheric pressure, GPS, video, audio, *etc*. Most shields sell for less than $30-$50, while many are less than $10. Today there are thousands of people in the Arduino user community, many of them Hams, high schoolers, and younger kids. "10-in-1 Build it Yourself" Arduino-based experiment kits for the budding young engineer are so popular that even Barnes & Noble sells one. Several internet sites and mailing lists are dedicated to sharing Arduino software, knowledge, projects, and insights.

The NVARC group has discussed, built, dissected, and redesigned several Arduino-based devices. To get our feet wet we had initially devised individual Arduino-based devices to build. These included a scary motion-sensor-activated Halloween jack-o-lantern with googly LED eyes and eerie sounds; a high temperature sensor for use with molten silver that includes a WiFi link to an iPad for large font readout of the temperature; and a GPS-based time server for a home PC network. These projects were fun to build, and each served a purpose.

The Current Project

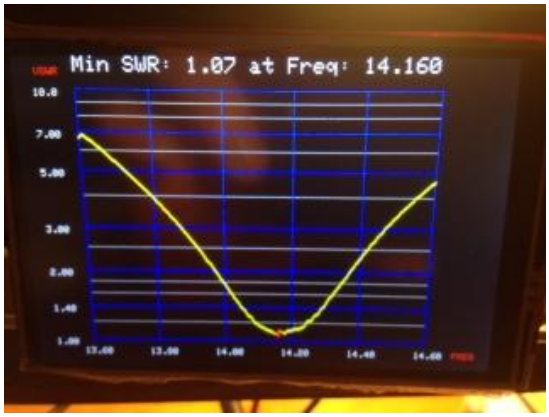
In searching for a common project related to Ham Radio, Peter, N1ZRG, suggested that we build the Antenna Analyzer (AA) that was described in the November 2017 QST. The AA is used to scan and plot the SWR profile of one's antenna system over a range of frequencies. Peter went so far to purchase and QA most of the small parts needed (resistor, caps, diodes) and to make them available to group members. Thank You Peter!

In the AA an Arduino interfaces with three circuit boards in a "sandwich" arrangement that, when assembled without a case, is about the size of two packs of cards. The Arduino we are using can be seen as the larger of the two blue boards in the photo. The other blue board is a DDS signal generator, the middle board is a "mother" board that contains the analog RF circuitry and serves to connect all together. The bottom board is a color TFT LCD display.



KB1HFT photo

Here is a typical scan of my G5RV-lite antenna system:



KB1HFT photo

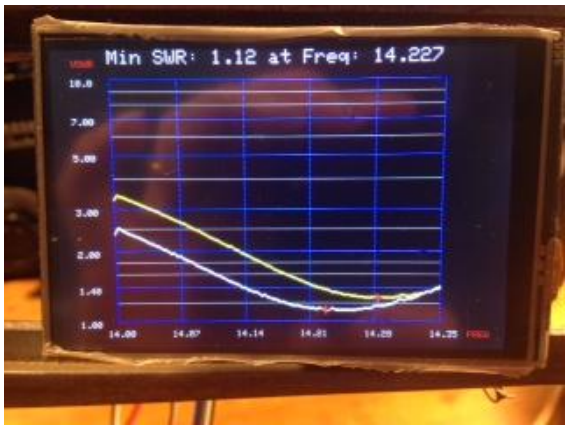
Most of the construction does not occur during our meetings, and we are not yet really writing the software, rather just loading the awesome software available in the user community. We spend our time together sharing what we had learned since the previous meeting, Elmering each other about general construction techniques, parts sources, and, due to the current AA project, discussing transmission line parameters, their theory, and their measurement.

But Why?

"What good is this AA?", one may ask. Why would I build such a thing?

Well, the AA can be used to scan, plot, save, and print the SWR profile of your antenna system. You can display plot "overlays" to compare the antenna system's SWR profile before and after modifications. It can be used in conjunction with your tuner to watch, in real time, how your tuner adjustments affect the antenna system's bandwidth and the frequency of minimum SWR. Interesting things to know to radio heads like me.

The following photo shows an overlay of before and after scans of the same G5RV-lite antenna system, but with a change in the tuner settings:



KB1HFT photo

Undertaking this particular project has served as a basis for discussion of what SWR really is, why it matters, if it matters, and how to best measure it.

Some argue that building your own instrumentation is suboptimal—better to buy quality professional gear. While it is true that much professional gear is more accurate than what can be built from Arduinos & shields, building your own fairly accurate and quite usable instrument has its own rewards in terms of really getting into the technical details of our Radio Hobby. The educational value and personal fulfillment of "doing it yourself" cannot be matched.

It is expected that meetings & discussions on this SWR project will continue for some time and that our near-term focus will be on implementing modifications suggested by the AA community to make the AA more accurate.

Later on, with some thought, the components that make up the AA might be repurposed to display antenna system parameters differently—on the S-plane for instance, or on a Smith Chart. Even further, the "sandwich" hardware architecture and software basis of this project lends it to morphing into other types of measuring equipment such as a Spectrum Analyzer or an IMD distortion meter. The ARRL books Arduino for Ham Radio and Ham Radio for Arduino and PICAXE have some potential projects.

If you have read this far, you may be the kind of Ham who finds satisfaction in building your own equipment, and then using it in the shack. You may have an interest in the some of the theory behind RF behavior; and if you (optionally) have a familiarity with just about any programming language, then you may be interested in joining the NVARC "Arduino" Group in this and future projects.

We are a small group: Stan, KD1LE; Peter N1ZRG; Bill, AB1XB; and me, George, KB1HFT. Other NVARCers have attended and provided

valuable input to our discussions, notably Bob, W1XP, and Skip, K1NKR.

We currently meet every Monday at 10am for 2 hours at the Pepperell Community Center. We know that 10am is problematic for most people, but if enough interest is shown, we can be flexible in meeting times, and can probably work something out. Saturday after breakfast anyone?

If you are in the least interested in joining us contact KD1LE at **spozerski5090@charter.net**.

de-George, KB1HFT

Editor's Note

For as much as I embarrass myself at the end of each year by checking my miserably low total QSO count, I still firmly believe that Amateur Radio is for communicating. None of these 59-73 contacts!

Yet it's for experimenting, too.

So I started out in the dumps when reading the article about how FT8 has taken over. But I was really pleased that Joe Taylor, K1JT—today's ultimate experimenter—said that the "traditional modes" still have a place. And (in my humble opinion) that place is for really *communicating*.

Thanks, Joe.

73, Skip K1NKR

Technical Side

A Cure for an RF Linear Amplifier Tripping Whole-House Smoke Detectors.

When I used my SB-200 Linear Amplifier above 200 Watts CW all my smoke detectors would sound off.

The cure to this nuisance was to add a 0.01uF disc capacitor across the White and the Red wires as close to the detector connectors as possible.

Then I added a snap-on ferrite RFI core around both the White and Red wires on the house side of the capacitor (*i.e.*, not between the capacitor and the connector).

Now I can go to full power without setting off the detectors.

Note: Test the system after you add this fix to each detector. The alarms work when any activated detector raises the voltage on the Red wire to +9V. This signals all the detectors to sound off. If only the detector you added the fix to sounds off and does not trip the others within the house, then you have a short between the White and Red wires.

Tip: While you are at it, change out your smoke detector batteries.

de John, K1JEB

Ham Radio Web Resources

OR - My favorite Web Sites

Two aspects of radio that have always interested me are radio communications at sea and the history of radio. I recently came across two sites that I not only find fascinating, but pure joy in perusing.

The first is the QRZ page of Frank Wolfe, NM7R. Frank has been a ham for almost 40 years and is a retired merchant marine radio electronics officer. Frank begins his story with an explanation of what happened to maritime radio after the Titanic disaster, and how radio became a requirement on ships. Wooden structures were hastily added to the ships superstructure, resulting in the radio "shack". He then goes on to fully and completely describe his experiences as a shipboard radio operator. Want to get an idea as to what it's like to go to sea AND be responsible for all shipboard communications? **https://www.qrz.com/lookup/NM7R** is excellent.

Another interesting site is that of the "Old Old Timer's Club", or OOTC, at **http://www.ootc.us**. OOTC members must have experience with 2-way wireless communications (of any kind) for 40 years or more, and have a valid amateur license at the time of application. OOTC considers themselves to be radio historians, and the site reflects this.

Past issues of their journal, the "Spark Gap Times" are available on-line, and have a wealth of information and knowledge. For instance, **http://www.ootc.us/october2017.pdf** has articles on "Gil" Gildersleeve, W1CJD, who was an ARRL/QST cartoonist for years, the "Taft Key", a special telegraph key given to President Taft in 1901 to commemorate the Yukon-Alaska-Pacific Exposition, an article on being a CW operator on the presidential train, and an article called "I Walk the Waterfront". I'll let you find out what that one is all about!

Surfing through the different issues of the Spark Gap Times is a nostalgic walk through memory lane, and it details a lot of radio history. It also will also enlighten you on things you probably never thought about before. I'd never thought about operating on the President's train. Wow.

I'm always interested in your feedback, and if you find any interesting sites you'd like to highlight, let me know via **K1BG.Bruce@gmail.com.**

de Bruce, K1BG.

Operating

Get On the Air! Fill Up the Log

The ARRL has announced a year-long "International Grid Chase" for 2018. You can find information about it at **http://www.arrl.org/international-grid-chase-2018.** But have you heard about CQ Magazine's annual "DX Marathon?"

Starting January 1 of each year, the DX Marathon is the perfect answer for the DXer who needs that extra incentive to get on the air every day! Simply work as many countries and CQ Zones as you can in each calendar year, regardless of the band or mode. Each country and zone counts only once, so you can concentrate on working new ones rather than working the same ones on multiple bands and modes. Many awards are given for the top overall scores in four classes plus top scores in modes, bands, US call areas, and more!

de http://www.dxmarathon.com/

Mode Usage Evaluation: 2017 was "the Year When Digital Modes Changed Forever"

From the ARRL website, 01/22/2018

Club Log author and UK radio amateur **Michael Wells**, G7VJR, has reported that data compiled from 8,000 Club Log users indicates the proportion of FT-8 usage relative to other modes has risen dramatically since FT8's introduction last year. Every few years, Wells has posted charts depicting mode usage on the amateur bands, based on log data uploaded to Club Log. Graphs he posted last week show the proportion of contacts on each mode for the last 20 years and then for the last 12 months.

"2017 was, of course, the year when digital modes changed forever with the advent of FT8," said Wells. "It is a remarkable technical achievement, which has breathed life and enthusiasm into DXing for a whole new audience."

Now out of beta testing, FT8 continues to capture the imagination of the Amateur Radio community, luring away many of those who had been using the popular JT65 "weak-signal" mode. FT8 is included ***WSJT-X***, version 1.8.0-rc3, with several refinements from the original beta release. Among FT8's biggest advantages is a shorter transmit-receive cycle, with contacts four times faster than with JT65 or JT9; an entire FT8 contact can take place in about a minute. Many DXpeditions now routinely include FT8 operation.

The new mode is named after its developers, Steven Franke, K9AN, and Joe Taylor, K1JT. The numeral designates the mode's 8-frequency shift-keying format. Tones are spaced at 6.25 Hz, and an FT8 signal occupies just 50 Hz.

Wells reported that 8,000 Club Log users uploaded FT8 contacts last year, logging 46,000 discrete call signs in that mode. "For reference, in 2017 the total number of QSOs uploaded to Club Log (all modes) was 32 million," Wells said. "Of that total, the number of QSOs made with FT8 was 4.8 million." That works out to 15% of all contacts posted to Club Log, which may or may not be representative of Amateur Radio activity at large.

Wells' graph for 2017 shows a dramatic increase in mid-2017 in the percentage of FT8 contact relative to other modes, by year's end overtaking CW and SSB usage, already trending downward except for a significant bump in CW usage toward the end of the year. RTTY and PSK31 usage remained comparatively stable over the course of 2017. The usage of "other" undefined modes declined dramatically after the introduction of FT8.

Wells explained it this way. "On any given day [the graph shows] the percentage of QSOs logged with a particular mode, plotted for a year," he told ARRL. "Say 100 QSOs were made on Wednesday, then, 55 of them were on FT8. It is not showing absolute levels of activity, just relative levels of activity."

Wells pointed out that the data is smoothed, and the values are for a 28-day moving average. "Therefore, a weekend of only CW and no FT8 has little effect — the trend is gradually adjusted by ongoing activity, and not by shocks."

Last fall, Taylor expressed some surprise about the "rapid uptake" in the use of FT8 on HF. Rather than viewing FT8 as a game-changer, however, Taylor told ARRL that he sees a dividing line between such digital modes and more traditional modes. As he sees it, SSB and CW are "general-purpose modes," suitable for ragchewing, DXing, contesting, emergency communications, or whatever. ***[Emphasis added. Ed.]***

"FT8 and the other modes in ***WSJT-X*** are special-purpose modes," Taylor said. "They are designed for making reliable, error-free contacts using very weak signals — in particular, signals

that may be too weak for the more traditional modes to be usable, or even too weak to hear."

Taylor pointed out that the level of information exchanged in most FT8 — and other similar digital modes — isn't much more than the bare minimum for a valid contact. In addition to call signs and signal reports, stations may exchange grid squares and acknowledgments.

Treasurer's Report

Income for January was $75 from membership fees, $36 from the January meeting book & stuff raffle, and $15 from PowerPole connector distribution to members. There were no expenses leaving a net income of $126 for the month.

Current balances:

General fund $2,938.09

Community fund $5,061.52

Welcome to new Member Bob Jackson KE1JH of Littleton. Bob joined NVARC at the January meeting.

As of 1 February, we have 45 members who are current with their dues and 18 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, John KK1X, Ralph KD1SM, Rod WA1TAC, Jim AB1WQ, Ed N1YFK. Observing: Skip K1NKR.

- ***K1NKR photo***

- Discussion about Girl Scouts Thinking On The Air day plans, including annotated aerial photographs.
- JOTA takedown messed up the antenna on the tower trailer. Stan will need help fixing that.
- Steve ex-K1SMD is slated to present at our February meeting, regarding NH ARES and Go-kits.
- Need a speaker for March and beyond. Phil Erickson wants to do something with dongles (but not in March).
- Stan and Skip to check internet connection at the Community Center to support a Skype session pursuant to requesting a presentation from Arizona.
- The Arduino group has gathered steam and meets weekly on Mondays 1000-1200 through March. Antenna Analyzer project was a big hit.
- Elections coming up in April. Groton Road Race coming up in April. Townsend Canoe Race also coming up.

Respectfully submitted,

de John KK1X

Club Services

Field Day

The club's premier operating event. Traditionally held on the next-to-last inclement weekend in June, FD is a little bit contest, a little bit EMCOM practice, a little bit publicity, a little bit socializing—and a great way to conclude the program year. (January's not a bad time to start thinking about it, either.)

ARRL Renewals

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.

Calendar

February

9-11 Hamcation, Orlando FL

10 Thinking Day On The Air – NVARC at Londonderry NH Middle School
11 Thinking Day On The Air – NVARC at Ayer-Shirley MA Middle School
17 Algonquin ARC Flea Market, Marlboro MA
23-24 HamSCI Workshop, New Jersey Institute of Technology,

March

4 NEARC Antiques, Nashua Marriott, Nashua NH

April

8 Framingham ARA Flea Market, Keefe Technical School, Framingham MA

Upcoming Operating Activities

2018

International Grid Chase (all year!)
Science Milestones event (all year!)

February

10, 11 Thinking Day On The Air
12-16 School Club Roundup
17-18 International DX contest - CW

March

4-5 International DX contest – Phone

April

15 Rookie Roundup - Phone

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

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Vice President: Jim Hein N8VIM
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Treasurer: Ralph Swick KD1SM
Board Members:
Rod Hersh WA1TAC, 2015-2018
Jim Wilber AB1WQ, 2016-2019
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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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