NVARC
Nashoba Valley Amateur Radio Club

SIGNAL

A club since 1992
Since 1993
Since 1996

de N1NC May 2019 Volume 28 Number 5

This Month's Meeting

The presentation will be by Harry Chase WA1VVH. Harry will talk about his experiences over multiple years doing maintenance at a large South American shortwave broadcast station.

Last Month's Meeting

Terry Stader, KA8SCP, gave an informative presentation on various emergency communications organizations in Massachusetts. Terry illustrated how the various organizations, how they relate and report.

Terry is a member of PART in Westford. He is the ARRL EMA District Emergency Coordinator, as well as the MEMA Region One Communications/RACES Officer.

(KD1SM photo)

NVARC member Phil Erickson, K1PJE, then gave a fascinating talk about the recently published "picture" of a super massive black hole.

Phil and his colleagues at Haystack Observatory in Groton were part of the "Event Horizon Telescope Collaboration", which set out to study spectral data on emissions from the center of galaxy M87 (53 million light years away).

[ed: "A long-standing goal in astrophysics is to directly observe the immediate environment of a black hole with angular resolution comparable to the event horizon. Such observations could lead to images of strong gravity effects that are expected near a black hole, and to the direct detection of dynamics near the black hole as matter orbits at near light speeds. This capability would open a new window on the study of general relativity in the strong field regime, accretion and outflow processes at the edge of a black hole, the existence of event horizons, and fundamental black hole physics."[1]]

M87 is one of the brightest radio sources in the sky. The effort was to collect data that might provide evidence of a supermassive black hole and confirm Einstein's unsavory (to him) conclusions about space & time.

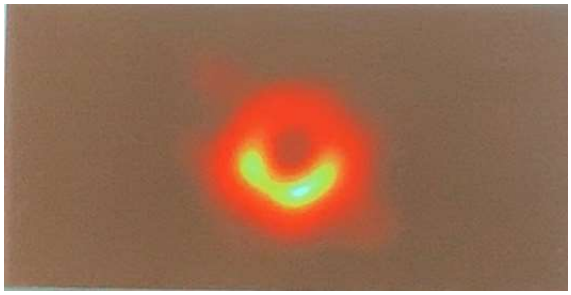
They gathered data over two weeks in 2017, using 13 "borrowed" large radio telescopes situated at sites around the world. "Borrowed" in that their data gathering had to be slotted in between other users of the telescopes, bad weather, and technical glitches.

Petabytes of spectral data from each site were shipped to Haystack, where collaboration members

[1] From the eventhorizontelescope.org website

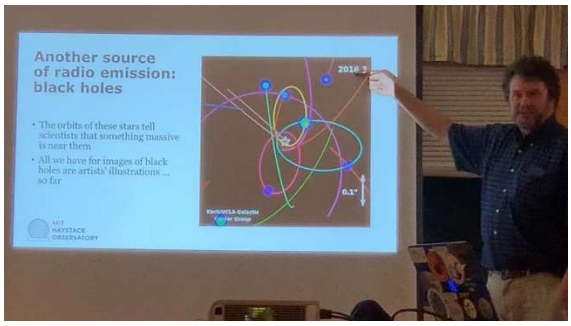
correlated the data from the 13 sites to filter out all but the common datapoints.

These remaining data make up the image, which shows emissions at 230GHz from material spiraling into the black hole. The brighter arc is due to the doppler shift of that material that is moving towards us. [ed: Or ***was*** moving towards us, eons ago.]



(Event Horizon Telescope Collaboration Team photo)

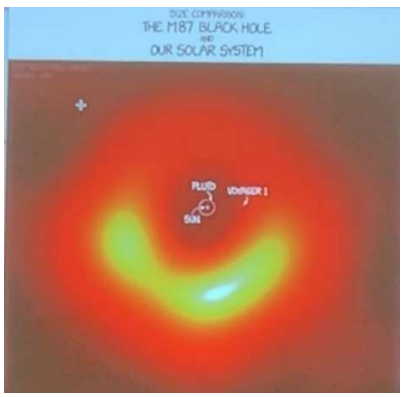
Phil also illustrated the results of 20 years of observations of radio stars that are seen to be orbiting something ***very*** massive (a black hole?) in the center of our own galaxy:



The ovals trace the paths of radio stars over 20 years of observations.

(K1HFT photo)

Phil showed a relative size comparison: the ring of particles swirling into M87's black hole compared to the size of our solar system. The sun is shown here approximately where the black hole is located, the white circle is the orbit of Pluto! Yiikes, that is one huge doughnut!



(Randall Munroe of XKCD illustration)

See: eventhorizontelescope.org for more information on the Event Horizon project.

The President's Corner

We have been busy since the last meeting:

Following the Boston Marathon, which several members supported, we again ramped up to support the Groton Road Race. We had a good turnout of over 30 hams for the race and the rain held off until we had wrapped up.

By the time I had unpacked from the road race I had to start repacking for the Townsend Lions Club Canoe Race. Maybe I shouldn't have bothered unpacking.

Because of a change in date, the canoe race conflicted with NEARfest, so we had fewer radio operators participate, but since the race slowly moves like a wave down the river we were able to shift people downstream in sync with the canoeists and covered the course well.

Looking back through the Signal I believe members have been supporting the canoe race since at least 2003.

I was pleased with the response for the New England QSO Party. It was a last-minute thought to get NVARC members on the air. I had responses from at least ten members who said they would try to get into the contest. I know some had difficulty putting things together at the last moment as I did.

Not being intimately familiar with N1MM it took me a while to get it set up for the contest. In the mean time I logged some of my first contacts on paper. Remember that? Logging on paper.

But eventually N1MM succumbed to my effort so I quickly entered the few contacts that were on paper. The next part will be figuring out how to create the file and submitting it. But that was what it was all about. Trying and learning and hopefully being better at it come Field Day.
Everyone who submits a log should list NVARC as their club.

I want to thank Bruce K1BG for his support of my NVARC NEQP effort. His help with N1MM and his post contest reflector emails made it almost painless.

In the area of Public Service, one thing I do is participate with other clubs or organizations. We might think we are the “best” at doing some of these things, but you can always learn something. It will at least let you put the quality of our efforts in perspective.

In the past year I participated in two marathons, a triathlon, a road race, canoe race and a parade. Later this month I’m going to see how PART runs their Apple Blossom Parade support. This can be for the learning, helping support other clubs or organizations, or just because it can be satisfying which are all good reasons.

de Stan, KD1LE

Public Service

In addition to rain showers, April brings the start of the Amateur Radio public service season.

Within a three week span we had the Boston Marathon, the Groton Road Race, and the Townsend Canoe and Kayak race. NVARC members assisted in each in organizational roles as well as being part of the communications crew.

Seven NVARC members were among the 265 Amateur Radio volunteers for the Boston Marathon. The radio communications crew for the Groton Road Race is fully coordinated by NVARC with 18 members in a crew of 39. Then six days after the Groton Road Race seven radio operators were positioned along the Squannacook River in Townsend to track the participants in the Townsend Lion's Club Canoe and Kayak race.

Thanks to the following NVARC members who contributed their time, training, and equipment for these events:

Boston Marathon:
Jim AB1WQ, Dan K1RAU, Stan KD1LE, Ralph KD1SM, John KK1X, Jeanine N1QIT, and Jim N8VIM.

The Boston Marathon Operations Center where the BAA and all public agencies are represented along with Amateur Radio.
(KD1SM photo)

Groton Road Race:
AB1CV, Jim AB1WQ, Ken K1JKR, Dan K1RAU, Stew K1YET, Gary K1YTS, George KB1HFT, Peg KC1EIV, Craig KC1ETB, Stan KD1LE, Ralph KD1SM, John KK1X, Dan KW2T, Jim N8VIM, Steve NA1T, Paul NW1U, Jessica WU3C, and Greg WY1X.

Runners in the Groton Road Race 5K race pass Net Control.
(KD1SM photo)

Runners in the 10K race start up the Rt. 40 hill.
(KB1HFT photo)

Townsend Canoe and Kayak Race:
Jim AB1WQ, Peg KC1EIV, Stan KD1LE , Ralph KD1SM, John KK1X, and Jim N8VIM.

Canoeists on the Squannacook River in the Townsend Lion's Club Canoe and Kayak Race.

(KD1SM photo)

In each of these events NVARC members serve on the organizing committees, as Net Control operators, or are stationed along the course. If you are curious about how these events are done any of the above folks will be happy to talk with you about their experiences. And if you are thinking of possibly volunteering for a future event please definitely talk with Stan, or Ralph.

Public Service events are one of the ways that the Amateur Radio service fulfills our mission under the FCC Part 97 rules and justify the frequency allocations that we are granted. Our personal reward is the numerous thanks we receive from the participants and organizers of these events. And certainly, our visibility in the community reminds everyone that Amateur Radio continues to be an active part of the communications network available in times of emergency

de Ralph, KD1SM

Treasurer's Report

Income for April was $170 from membership renewals and $2 from ARRL membership renewals. We had no expenses for the month, leaving a net income for the month of $172.

Current balances:

General fund	$2,968.11
Community fund	$5,311.52

As of 2 April we have 47 members who are current with their dues and 19 renewals outstanding. Thank you to those of you who mail or hand in your dues before Ralph comes to you. Please check your renewal status on the roster circulated at the monthly meeting or ask Ralph.

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

de Ralph, KD1SM

Board Meeting Notes

Field Day Planning is continuing. Jim, AB1WQ, is our Field Day Chairman.

Jim is working with Leo, K1LK, on food. They are trying to change the menu and to enable better planning a $5 advanced commitment will be required for Saturday dinner. [ed: see the following FD article.]

The permit was obtained to use the orchard.

We continue to plan ahead for meeting presentations and we look to be set till we resume in the fall. But as always, we are looking for suggestions for subjects or presenters that you may hear of or see. Think about this as you explore Boxboro in September.

Bruce is wrapping up the visits to Haystack for the Harvard Science Fair winners. The Board approved the purchase of some SDR dongles as an additional prize to the winners to give them something radio related to maybe spur or continue their interest.

We were asked by Owen, the Boy Scout Bruce and Stan supported for a radio merit badge meeting, to talk at his robotics group meeting about STEM. Bruce has taken that mission.

The Board meeting broke early so the members from Pepperell could attend an organizational meeting for CERT in Pepperell.

de Stan, KD1LE

Field Day – June 22 - 23

Mark Your Calendar Now!

Saturday, June 22: 9AM → Midnight

12PM Lunch
2PM Operating begins
6PM Dinner
(New and Improved!)

Sunday, June 23: 0:00 → 4:00PM

8AM Breakfast
2PM Lunch
2PM Operating ends, takedown begins
4PM Exit

Since 2015, the first year I got involved in planning NVARC's annual Field Day, and every year since, my objective has been the same: To maximize participation by NVARC members in this fundamental activity of the club. You may have noticed that the same core group really puts their shoulders to the wheel each year to put on a good Field Day and they share that objective: Full participation by all NVARC hams. Note that PARTICIPATION MAY ONLY MEAN ATTENDANCE, if that's what your circumstances allow.

So come on out, we'll be there, and the weather may be fine.

Ideally, ALL members would find some time during each Field Day weekend to drop in and engage in this core activity of what it means to be a ham. Join YOUR club for some "operatin', eatin', and educatin'".

NEW THIS YEAR: THE $5 DINNER TICKET

Leo Hunter, K1LK, has traditionally prepared the core of the Saturday evening meal. In recent years, that core has been Leo's tasty roast chicken. That's been supplemented by some excellent pot-luck contributions from others, but Leo has prepared the mainstay. Leo is still going to be involved, but less as the chef and more as the menu director: the current plan is to offer attendees a choice of several entrees:

1. BBQ - A choice of pulled pork, pulled chicken, and ribs; along with side dishes of cole slaw, corn on the cob, baked beans with bacon, etc.

2. THAI - Traditional pad thai rice noodles, a mild curry with rice, scallion pancakes, and spring rolls.

3. PIZZA - You know what this is. A choice of pepperoni and a vegetarian option will be offered.

4. WHATELSEWOULDYOULIKE - If you know you wouldn't be happy with one of the three entree options above please reply with an email to fd@n1nc.org and voice your recommendations. If there's a significant mass of input around one or more alternatives, Leo and I will do our best to accommodate.

NB: In call cases, our plan is to obtain the entree choices from commercial food service establishments, i.e., restaurants and/or catering operations.

TICKETS, PLEASE!

Now that you get your choice of delicious dinner options, you might say: "What's the catch?" There is a small catch: to have everyone's choice of food ready, in the right amount, on June 22 at 6:00PM, we'll need to have everyone register their choice of entree and buy a $5 ticket for that selection.

In other words, if you're looking forward to a scrumptious BBQ ribs dinner on June 22, but your spouse would prefer THAI food, you'll buy one $5 BBQ ticket and one $5 THAI ticket.

TWO POINTS

1) If you're thinking $5 won't go very far toward a nice dinner, you're right. NVARC's Field Day budget will be supplementing the income from ticket sales to cover costs.

2) It may be obvious that we'd like to sell tickets as soon as possible to get a head start on the food planning. To simplify and speed things up, we'll be enabling ticket sales by email: If you have a PayPal account, you'll be able to "Send to friends and family" your ticket purchase amounts to my email address, "jimwilber@gmail.com." (This avoids any processing fee by PayPal.) I will transfer all funds received this way to Ralph Swick, NVARC's treasurer. I have discussed this collection mechanism with him and have received his approval. If you don't have a PayPal account but would like to set one up, you may let me know and I can send a request for payment to you via PayPal that will guide you through the setup process.

MORE COMMUNICATIONS TO FOLLOW
Stay tuned for additional communications on the NVARC email reflector regarding precise menu options and ticket purchasing instructions.

Here's to you and NVARC and a sensational Field Day 2019!

de Jim, AB1WQ
jimwilber@gmail.com

Leo Hunter, K1LK

Further Notes on 630 Meters
de Bob, W1XP

First of all, I would like to acknowledge the excellent article by Les, N1SV, in last month's Signal. Well done Les. But I would like to add a few of my recent experiences on this interesting new band.

Although amateurs have not had the band in this country for very long (the fall of 2017) I have been operating on the band with an FCC, part five, experimental license for over ten years. This was part of an ARRL program to convince the powers that be that Hams could operate in the MF region below the AM broadcast band without the world coming to an end.

With the granting of amateur privileges at 2200 and 630 meters we have two bands that have a radiated power limit, as Les mentioned in his article: **one** watt EIRP for the 2200 meter band, and **five** watts EIRP for the 630 meter band.

These bands are truly QRP bands. But as Les mentioned the small size of practical antennas makes reaching even these low radiated power levels a challenge for most hams. When any antenna is small compared to the wavelength it is difficult to achieve good efficiency.

So, with all this as background, I want to describe the recent activity I had operating portable on 630 meters. I was in North Carolina operating from a location on the coast in the south east corner of the state. (I have a second location there.)

The main antenna is a modest crank up tower a stone's throw from salt water. I've also got an inverted L for 160 (and 80) meters but in this case these bands are added to the 630 meter antenna. This antenna is still in the measure, cut, and try, stage of construction but seems to work well.

The rig I was using was an Icom 735 HF transceiver. This radio has been modified per an online article to operate on 630 meters. The modification is not difficult. This radio is old enough that it is through hole construction which simplifies modifications. The modification consists of removing diodes to allow the radio to transmit from below the BC band to 30 MHz. This modification is done by many hams to allow operation outside the ham bands for services like MARS. Several coupling capacitors are increased in value to allow for improved operation at the lower frequencies.

Although the author of the modification article claims an output power near the 100 watts the radio normally develops, my experience is much less.

The output meter indicates 50 - 60 watts but most of this I think is manly third harmonic. The simple metering circuit in the radio measures the peak voltage of the output and bases the meter reading on that. This produces a large error in the measurement.

I measure about 5 to 10 watts of power on 630 meter.

How I did this is a subject for a later article, but I built a special filter to suppress the harmonics and connected the resulting 4 to 5 watts of clean, fundamental-only, RF to my 55 ft. inverted L antenna.

Bob's Special Filter: [ed: IMHO, A Thing of Beauty]
(KB1HFT photo)

The antenna is comprised of an 80 meter trap at the top of the vertical antenna wire and then a sloping wire that resonates the antenna on 160 meters. A limited radial field of wires is under the antenna. An inductor wound on a bucket is at the base of the tower. The antenna is resonated by adjusting taps on the coil on the bucket.

The SWR matching is done with a mutual inductor with a tap at the ground end of the bucket loading coil. This is still the cut and try stage of the tuner work.

But the amazing thing is: **IT WORKS!** With the QRP output power I was working stations in the states of IL, IN, OH, PA. That was the DX!

I had little trouble working stations south of these stations. Not that I had a rock crushing signal. But this operation was under very noisy band conditions in late April.

I called a lot of unanswered CQs, and made many replies that where not acknowledged. But most nights I was able to make a few QSOs via WSJT X, mode JT9. This digital mode operation went a long way to contribute to the success I was having.

I was really impressed with the success of this QRP operation on 630Meters, considering the antenna inefficiency.

An amplifier has been planned and now I can't wait to see how this set up is going to work when I'm closer to the five watt EIRP limit.

I think the real message here is that you should not let the ability to only set up a small 630 meter station discourage you from giving 630 meters a try.

de Bob, W1XP

New England QSO Party, redux

Please refer to Bruce's, K1BG, recent emails on the reflector describing how & where to send your logs

I used Stan and Bruce's encouragement to reassemble my station so I could participate in the NEQSO Party. The station has been packed away in the basement for the past 6 months while we refurbished the first floor of our QTH. The NEQSO provided just the impetus I needed to get set up, albeit in a temporary location in the basement. I had never set up the station there before.

It was a two-day task to get all the parts together, with the right connecters and cables. Problems aplenty arose: the green wire safety ground at my chosen location was floating. (Oops, tingles!) I measured 28 Vac between the xcvr chassis and ground. That circuit hadn't been used in the 35 years that we have been in this house. Then there was the broken center conductor at the SO-239 on the G5-RV Lite, then I couldn't find the 13.8V distribution panel, then there was… In the end, I got it all working at the stroke of 2400Z Sunday, the end of the contest. <sigh>

But I am now up & running on 20 & 10M!

de George, KB1HFT

"Arduino" Group

The "Arduino Group" meets at the Pepperell Community Center at 10:15 am every Monday. We engage in two hours of wide-ranging conversation on just about any aspect of Ham Radio, but centered on discussions of what can be done with today's crop of microprocessors. Topics from impedance

measurement, thru SDR, to satellite antenna tracking are being discussed in detail. Please join us if you can!

de George, KB1HFT

Dan's Tech Night

Dan Pedke, KW2T, hosts a series of interesting, informal, sessions featuring Dan, and special guest speakers, discussing aspects of RF design. Dan's current unifying theme is an ongoing tour of the details of professionally designing a 6M radio optimized for FT8. They meet at 7pm every second Thursday at the Grady Research Building in Ayer. See www.DansTechNight.com for more details.

A collection of failures over time becomes experience which can lead to success.

de N9LCD via eHam.net

You do not really understand something unless you can explain it to your grandmother. – Albert Einstein

de KI7DG via eHam.net

"The Electric Company would like you to QSL them $200"

Editor's Note

As Skip, K1NKR, so aptly put it last month: "Well, this is it". Skip has declined to re-up for another tour as editor of Signal. His fine stewardship of Signal for the past years has well served the NVARC and Signal's wider readership. Thank You Skip!

Skip has turned the helm of Signal over to me, George Kavanagh, KB1HFT. I am honored, but somewhat uncertain of my abilities to assemble enough content to make up 12 interesting issues of Signal per year. All contributions are welcome. Please flood my inbox: *editor@n1nc.org*

For those of you who don't know me, here is a short CV: I got my Novice at age 16 in 1963, then moved up to Technician, which I let lapse while I was in college (BSEE, 1969). Drafted into the Army in 1970, out by 1972. Those were formative years. I came back to Ham Radio in 2010 as an Extra, and never looked back.

K3FUV on 6M, circa 1964

Rigs were (and still are): Knight Kit T-60 Xmtr.; Hallicrafters S-53 Rcvr

(KB1HFT photo)

I'm a relative probie in the NVARC, having joined in February of 2010. Bob Reif and Larry Sweezy got me oriented and introduced me to club events as well as to Breakfast at Tiny's (they oughtta make a movie with that title!).

I've been off the air for the past 6 months, as I had to take down my antennas so the attic could be insulated. Antennas in the Attic, you ask? Well that's a long story, but I've gotten a WAS via those simple wire dipoles.

I've been programming computers ever since 1966 when I was toying with the Bendix G-21, NCR 315, IBM 1401, and Digital PDP-8 on campus.

My first real "job", in 1971, was programming Intel 4004s to control industrial filling machines. Now I'm retired from Wang Labs (18 years) and Fidelity Investments (9 years), and I am again into microprocessor hacking! Now I'm looking into Arduino and

Arduino-like processors to control ham radio instrumentation, like the Antenna Analyzer that the Arduino Group [q. v.] has refined.

I'm also exploring the various new digital modes and satellite communications.

de George, KB1HFT.

Advertisers

Nashoba Valley Amateur Radio Club
PO Box # 900
Pepperell Mass 01463-0900

http://www.n1nc.org/

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

Editor: George Kavanagh, KB1HFT

Nashoba Valley Amateur Radio Club
PO Box 900
Pepperell, MA 01463-0900