



# SIGNAL

A club since 1992



Since 1993



Since 1996

de N1NC

December 2020

Volume 29 Number 12

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### NVARC Monthly Meetings

NVARC general meetings are scheduled for the third Thursday of the month at 2430 UTC (7:30pm, Eastern Time).

Non-members who are interested in attending may send an email to [meetings@n1nc.org](mailto: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.

### Last Month's Meeting

At the November meeting Paul, W1SEX, gave a well composed and narrated video presentation on oscilloscopes.

### This Month's Meeting

The December meeting's Main Event will be the annual "NVARC Homebrew Night".

Show us, via Zoom, your latest creations, in-progress projects, or nascent innovations. This is always fun & interesting!

### Next Month's Meeting

The January meeting's agenda is up to YOU, since the featured event is to be our annual "Short Subjects Night", wherein members are encouraged to share a short presentation on a subject of interest.



### From the Prez

Hello Gang, hope everyone's antennas survived the Ice! I had to go shake mine off a few times during the storm, as they were looking mighty droopy.

Bruce K1BG's Class should be going strong, lots of thanks to him for pulling the "get more hams" wagon. Awesome Job Bruce!

I have 6 entries for the 18650 Challenge, and waiting for the power source materials to come in. Entries are officially Closed! So, if you wanted to participate in a contest you could get a huge score with a just handy talkie, you will just have to wait until next year!

There are strong rumors Bob, W1XP, is going to build an all tube battery operated 630M rig for a run at the ONE BILLION POINTS. I know he can do it and I can't wait to see the product!

Jim, N8VIM, will be helping design and construct the battery packs, and Bill, AB1XB, volunteered to make some logging automation for us. Peter, N1ZRG, has

been sweating away on his Phasor 40 project, and I'm sure he will have that on the air along with several others. GoooOOO T-e-a-m Team!!

Meanwhile I finished up my Grid Driven Push-Pull 811A 630M power amp, and it is on the air! It makes that satisfying "Whhhhaaaaaa" power noise – the old timers know what I mean, ok that is mostly everyone haha.

Thanks to Bob, W1XP, for the transmitter chassis I used as the deck and a beautiful power transformer for the HV power supply.

We had many good conversations about how to build it, and how not to make the flames – That last part I didn't quite follow well enough haha.

I did built the amp with hopes of showing it off (and hopefully not the flaming wreckage) for Home Brew Night, which is this month! I have to make some slides for it, it was a fun and challenging project.

I know there is a lot of other building and designing going on out there. I hope to see all of the wonderful things you all have been working on. This will be an interesting home brew night (my otherwise second favorite event) where even the meeting is a new kind of project!

Ham radio is the ideal hobby for shelter in place, so let's count at least a few of our blessings that there is lots to do in this strange time, and stay healthy and strong! I hope to see you all at the meeting, 73!

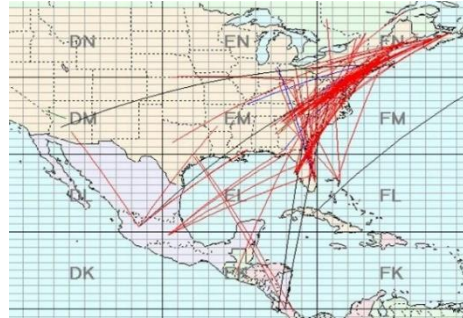
de Jessica, WU3C

**Winter Sporadic E-like Propagation on 6m  
A HamSci Citizen Science Investigation  
de Joe, K1YOW**

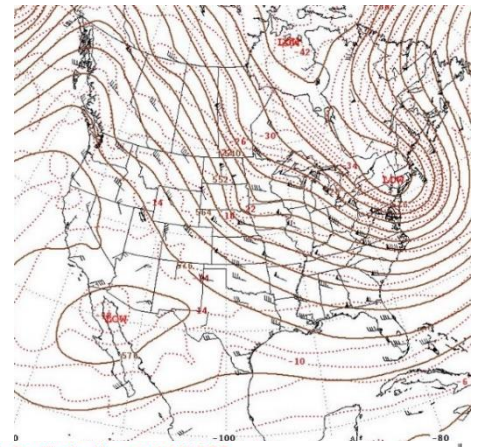
[Ed: The full text of Joe's following article appeared in the November 2020 CQ magazine [https://hamsci.org/publications/winter-sporadic-e-propagation-6-me-ters?fbclid=IwAR3D1dxmFDm6IFHvrtbAz2Qj37MkkVeDVyhexCsNq\\_306azE4AiU0Nwlqal](https://hamsci.org/publications/winter-sporadic-e-propagation-6-me-ters?fbclid=IwAR3D1dxmFDm6IFHvrtbAz2Qj37MkkVeDVyhexCsNq_306azE4AiU0Nwlqal)]]

If sporadic E is mainly a summer time set of events, where we have long daylight hours with long UV exposure to the ionosphere, why do we see sporadic E during the winter at all with winter's very short daylight hours, and thus minimal UV exposure to the ionosphere? In fact, could winter sporadic E be also related to tropospheric weather such as storm and frontal systems, and can we use amateur radio to investigate this? The answer at the present appears to be "yes" to both questions from my ham radio-based data studies.

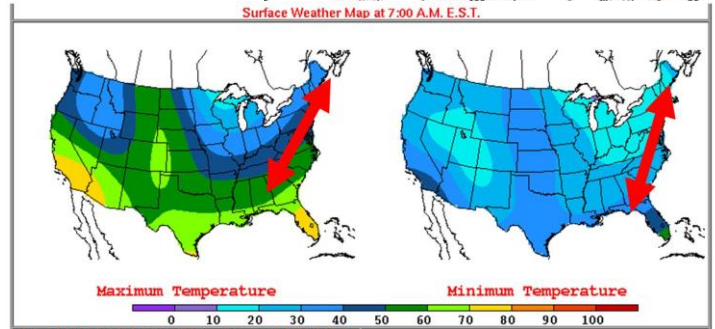
In particular, looking at the DXMaps map below, we see on that we had a nice 6 meter sporadic E opening in the Eastern USA on December 13, 2017.



What was the tropospheric weather doing at the time?



The map at right depicts a strong Jet Stream dip occurred in the same location as the 6 meter sporadic E event as measured by QSO rates.



Strong Jet Stream troughs also have sharp temperature and wind speed boundaries.

The map above shows the sporadic E path overlaid onto that day's temperature boundaries. The sporadic E cloud was above the eastern edge of the Jet Stream trough as that trough moved eastward with the steering currents.

Just as the North Atlantic strategically placed storm systems seemed to allow for transatlantic 6m communications, very sharp jet stream pressure and thermal boundaries seem to allow Winter sporadic-E like communications.

de Joe, K1YOW

## Arecibo Observatory's Platform Collapse What Happened, and What Comes Next?

de Phil, W1PJE

[Ed; All photos by W1PJE]

The week of 1 December 2020 will be permanently marked as a terrible one in the history of radio science.

NVARC members may have seen widespread press coverage of the unthinkable: the catastrophic collapse of the Arecibo Observatory's telescope platform into the reflector below.

As you can imagine, the events were personally wrenching for me and also a very difficult loss for the entire community.

I've been involved in science and observations at Arecibo over different portions of my career since my first visit in 1990, and a major portion of my Cornell PhD thesis was accomplished using the megawatt class UHF ionospheric radar at the facility.

Our UHF ionospheric radar at MIT Haystack dates from the same period, has many parallels (save the reflector size), and uses the same ionospheric measurement technique of Thomson or incoherent scatter as at Arecibo.

Indeed, we use many of the same analog radar hardware elements, in particular WR2100 rectangular ultra-low loss waveguide (1 dB loss per 2000 feet!) and Litton L3403 / L5773 four cavity final klystron amplifier tubes in the 70 cm band capable of 1.25 megawatt peak power at 6% duty cycle.

Such landmark events such as the Arecibo collapse often raise general questions.

For NVARC interest, this article provides information to help answer some of them. It contains:

- a brief summary of the observatory's main features,
- a synopsis of key events in the last few years leading to the platform failure, and
- a status check on what might be next.

### Arecibo Observatory overview: some key facts

Puerto Rico is home to the world's largest combined radio and radar telescope in the north center of the island, 2 hours west of San Juan.

Arecibo Observatory, a 20th century IEEE Milestone and ASME Landmark, was built and commissioned during 1959 - 1963 as the brainchild of Professor William Gordon, a Cornell University electrical engineering

faculty member and later dean at Rice University in Houston, Texas.

(In the game of connections, my advisor Don Farley was Gordon's graduate student, so my "Gordon number" is 3.)

Professor Gordon's realized vision was to construct a 1000 foot (305 meter) spherical reflector in the karst landscape of the island as a UHF frequency radar, powerful enough to directly measure the full altitude profile of ionospheric electron density, plasma temperature, ion composition, and line-of-sight velocity using the at-the time new technique of Thomson or incoherent scatter.

The telescope is so huge because the original theoretical calculations on the gain and peak power needed were in error - effects of electrons only were considered, with later work proving that much heavier ions set the bandwidth of the received signal as much narrower.

This meant that Arecibo was **overdesigned** by a factor of **50-100** for its primary purpose (62 dBi gain at 430 MHz!!), leading to its unique sensitivity and eventual use as not only an ionospheric radar but a world leading radio astronomy and S band planetary radar facility.

It is also known in amateur radio circles as the TX site for a famous Earth-Moon-Earth (EME) QSO party at 70 cm wavelength in 2010 conducted by a group including Prof. Joe Taylor, K1JT (Princeton), who received the Nobel Prize for binary pulsar discoveries there in the 1970s with Russell Hulse.

Some of you might have seen the telescope featured in popular films: the 1997 film Contact from the novel by the late Cornell astronomer Carl Sagan, or Goldeneye, a Bond franchise film.



A key element of Arecibo's design, and important for my event summary later in this review, was set when Professor Gordon realized that with a 305-meter reflector set in a karst hole, conventional ways of steering a



beam by moving both feed and reflector would not work.

Instead, the reflector was set to be spherical, focusing to a line not a point.

By hanging a movable feed over the telescope, the radar beam could then be "steered" to ~15 degrees off vertical. So, it came to be that a huge triangular platform was erected nearly 500 feet in the air near the set of focal lines, supported by cables to three concrete towers surrounding the reflector. This platform weighed almost 400 tons and was held up by 12 bridge strand cables, 3" thick, with ~170 individual strands each. Four cables went to each tower. In 1995, a vastly upgraded capability was added with a Gregorian style secondary and tertiary reflector in its own radome, improving focusing ability to much higher frequencies.

A 1-megawatt, CW capable, S band radar transmitter,



unique in the world for high fidelity planetary radar and asteroid imaging, occupied the mid-level of this Gregorian, keeping it as close as possible to the focus point.

This added over 500 tons additional weight and necessitated

adding 6 more auxiliary weight supporting cables to the corners of the platform, bringing the total cable count to 18. (Consider that the deionized water cooling loop alone for the S band transmitter required 10,000 gallons.)

### 2020 Events and the Collapse

For any facility with nearly 60-year old elements, especially ones in a highly corrosive salt air environment - the Atlantic Ocean could be clearly seen from the platform itself - time takes an inevitable toll without large maintenance expenditures.

Under US federal science budget restrictions, these have never been available to facilities like Arecibo at anywhere near a sufficient level to keep pace.

Furthermore, Puerto Rico has experienced several terrible natural disasters in the last few years, which accelerated the decline of mechanical elements of the 900 ton feed platform including its support cables.

These included Hurricane Maria in 2017 which devastated the island and exposed the platform to high winds, and a series of intense earthquakes in the Ponce area earlier this year. (See article in the February 2020 Signal for NVARC's outreach in response to these events.)

Ultimately, a final event sequence started on August 10 of this year when one of the 1990s era auxiliary cables abruptly detached from its socket on Tower 4<sup>1</sup>. This caused extreme safety restrictions, but more importantly placed extra load on the main cables going to Tower 4.

Three engineering firms began intense monitoring of the platform cables, with twice daily drone flights to the tower tops and close eyes kept on the platform height monitoring system. Analysis is still proceeding as to the ultimate reason why the cable came out of its socket.

Then on November 6, one of the main cables from the same Tower 4 to the platform unexpectedly broke at about 7:40 p.m. Puerto Rico time. Unlike the auxiliary cable that failed on August 10, however, this main cable did not slip out of its socket. Instead, it suffered complete mechanical failure.

The cable broke and fell onto the reflector dish below causing additional significant damage to the dish and other nearby cables.

No one was hurt, but access to the platform and all buildings surrounding the telescope was cut off to maintain life safety. Quick engineering estimates showed that the main cable broke through its core strands, and that all other cables to the platform were likely at or beyond their breaking strain, including most critically those to Tower 4.

After some short deliberation, a joint decision at NSF was made to decommission the facility by safely lowering the feed platform.

Ultimately, however, time ran out before lowering plans could be made. Monitoring on the main cables over the weekend of November 28-29 showed that 10-15 surface strands out of ~170 were breaking per day on random cables, raising concerns that a final nonlinear acceleration towards cable failure was going on. (My colleagues reported that these strand breaks could be heard audibly, as if a giant was plucking a piano wire.)

Events came to a head at 7:54 am Atlantic Standard Time on December 1, when all remaining cables to

<sup>1</sup> Towers are numbered as on a clock face; the others are 8 and 12.

Tower 4 gave way. This started a horrifying uncontrolled descent of the 900 ton platform, which was still attached to Towers 8 and 12 by the other tensioned platform cables.

In a sequence lasting 30 seconds, the platform swung down 500 feet and sideways, shedding the 400-500 ton azimuth arm and Gregorian along the way. This arm landed north of center, punching through the reflector and obliterating the Gregorian feed (itself 4 stories high).

The main platform impacted the edge of the dish northwest of the control room and visitors center and was totally destroyed. All three cable towers had their upper third sheared off from sideways force, spraying tons of concrete and bending core rebar over at 60 degree angles. Rocks and debris from snapped cables and tower pieces fell on some buildings and the landscape, along with more than 1000 feet of shredded heavy WR2100 waveguide (21 inch width) as the catwalk to the platform was twisted apart.

Most importantly, though, no injuries occurred to any AO staff despite the extreme energy release that occurred during the platform descent - a true miracle.

### **Whither Arecibo?**

In the immediate disaster aftermath, the community has strongly rallied in multiple ways to support Arecibo staff and the scientific community that used the telescope. An ongoing series of meetings has been underway to both provide this support and to consider the future.

However, to end this article, I would like to emphasize that NVARC readers should by no means assume that the site is a total loss, good only for the recycling trade. A large amount of equipment is salvageable for future science use in ionospheric science and radio/radar astronomy.

For instance, some of the HF heating facility antennas on the bottom of the dish are still standing. The HF facility's transmission lines are intact below the damaged reflector panels. Aside from the area of the main platform impact, the reflector ground screen is untouched. Reflector use at lower frequencies may be possible at reduced effective gain with relatively modest repairs using existing panel material already on site. Most of the supporting reflector cables and panels are still in place. HF and UHF transmitters, modulators, control hardware, data servers, generators, and other ground equipment remain intact in Buildings 1 and 2, the optics facility, the 12 meter VLBI telescope area, main warehouse, and other areas away from the main reflector.

Ultimately, for nearly 6 decades, Arecibo has been to Puerto Ricans what the Statue of Liberty is to US citizens - a national symbol. But moreover, it is a crowning technical and scientific achievement providing a great source of pride and education for its citizens. (All high school students on the island go through an Arecibo tour at least once.)

The facility's key asset is undamaged - its people, and the science community is now working hard on ways to reinvent the facility for future use as a world leading radio and radar observatory. These ideas require large funding so the future is not at all certain, but Arecibo has weathered extreme challenges before. So, the phrase from the 2017 Maria event is appropriate here - "Puerto Rico se levanta": in one form or another, Arecibo will rise up, again.

de Phil,W1PJE

### **CW Courtesy de Bruce, K1BG**

I was recently asked [Ed: By me, KB1HFT.] to comment here on CW courtesy. That is, how does one be "polite" but "successful" in working pileups. Or, is it not possible to be both? Where does one draw the line?

In my opinion, it's not only possible, I'm personally committed to it. Generally speaking, the "DX Code of Conduct"<sup>2</sup> (which I adhere to) pretty much defines the "do's and don'ts" of working a pileup. Most of the issues discussed revolve around causing unnecessary interference or interfering with the operation of the pileup.

When in a pileup, think of the station who is "running" on frequency as the orchestra leader.

People in the pileup should only call when instructed to do so, and the running station will let you know with a "green light". For instance, you come across me in a contest, running stations. I'll finish my last contact with:

"TU K1BG". - Sending "TU", or thank you, is the green light indicating the end of the previous contact, and my callsign. Immediately after I stop sending, everybody calls. When I pick a call out of the pileup, I will call that station back. If I reply to another station, STOP CALLING UNTIL THAT CONTACT IS FINISHED.

To continue calling on a QSO in process is not polite under any circumstances. You'll know that the current contact is finished when you hear me send "TU K1BG".

Sometimes, the running station will not immediately be able to pick a callsign out of the pileup. Again, do not

<sup>2</sup> <http://dx-code.com/>

call over and over (and over). Call once and wait. Don't call twice, or three times (or more!) It adds to the noise and confusion, particularly if you continue calling while the running station has called someone else (or worse, while he/she is calling YOU!). If the running station has not come back to anyone in a few seconds, call again, BUT ONLY SEND YOUR CALL ONCE.

Sometimes, the running station will get a partial callsign. It could be the beginning of the callsign, or the end of the callsign. He/she may respond with a partial callsign, with a question mark after it. If what he/she is calling is not similar to your call, do not call again! This is particularly frustrating for the running station who is trying to pick a call out of the pileup.

When the running station is working someone else, be patient and wait for a "green light" signal. "TU" and their callsign, or "QRZ", are both "green lights". Sometimes, in a large pileup, the running station will not give their call at the end of every QSO. If you hear "TU", and then no call, you should feel free to call. "TU" is basically the green light to go ahead.

Many DX-peditions and contest operators will "black list" operators who display rude behavior. I'll try to make a mental note as to who an offender is and avoid calling him back immediately.

Much of this becomes evident as you get used to operating in pileups, but I am still amazed at the number of people who break these simple rules. I'm not sure if it's operators trying to use software decoders for copying CW, or just plain bad behavior, but this kind of thing seems to be on the upswing. Have a look at the "DX Code of Conduct" at [dx-code.com](http://dx-code.com), and do your best to comply with the simple rules.

Next month, I'll talk about tips on being successful in pileups.

-de Bruce, K1BG

### Notes from the Field

Dennis, K1LGQ, writes:

I was introduced to FT8 two months ago and found that it's pretty addictive.

I used my Xiegu G90 (20 watts) and a looong wire while sitting in my kitchen wondering if my first transmission would snag anybody. After the first 15 QSOs, I think I got my answer.

Since then, I have switched to my IC-746PRO and Mosley CL-36 to work the world.

It was a humbling moment when a few weeks ago I was the pile-up for 30 plus JA stations (Japan) wanting to QSO a New Hampshire station.

Since then, the direct requests for QSLs just keep on rolling in. Bottom line...when I walk into the shack, my instinct is CW first then followed by digital-FT8.

I love CW and now I am spreading the joy with FT8.



Tony, KX1G, writes:

My focus since moving into a new home in June has been to assemble my station and get antennas up in the air.

I use wire antennas, an 80m Windom and two 5-band Hex Beams designed by Mike Traffie of Ashby. Using ropes, they are all 40-50 feet in the air and doing a decent job.

My current effort is on setting up the station so I can operate it remotely.

See you in the ARRL 10m Contest, Dec 12-13.

### For Sale: SK Estate Items

[Ed: Prices are estimates: make an offer.]

BC 348 Receivers	\$400.00 each
Johnson Viking Valiant	\$650.00
Heathkit DX100 Transmitter	?
ME 165 GSWR/PWR METER	\$200.00
National ANURM 215	?
R-390 Receiver with manual	\$950.00
Heathkit AT-1 Transmitter	\$175.00
Heathkit Dip Meter HD 1250	\$85.00
TV-7U Tube Tester	\$475.00
VS 1500A Barker Williamson Antenna Tuner	\$125.00
Heathkit Audio Generator	\$50.00
TS 382 D/U Audio Oscillator	\$100.00
8012A Digital Multimeter	\$75.00
Dual Power Supply	

Many components, tubes, pots, switches  
Many Manuals: eEmail your needs.

Contact Charlie, AB1ZN, at [vintagem5@hotmail.com](mailto:vintagem5@hotmail.com) if interested.

### Monday 2m NVARC Information Net

The NVARC Information Net is back! Monday nights at 7:30pm, local time on the 2m Pepperell repeater, N1MNX. 147.345MHz, PL: +100.

The net is formatted as a formal/informal roundtable discussion wherein folks share, inquire, or just Rag-Chew on Radio Subjects. Usually. Over the sum-

mer we did share the progress of our victory gardens.

Several non-members have recently joined in as well.

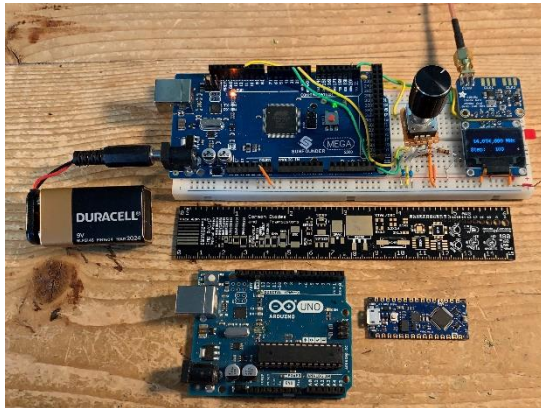
So, if your rig can hit the repeater, please join the discussions!

### From the Shack de George, KB1HFT

OK, so I haven't done my promised spectrum analysis of the under-construction VFO for the Phaser 20m QRP rig. I have been focusing on Arduino software and hardware.

I've decided to implement the control software in an Arduino "Nano Every", which is significantly smaller and more powerful than the Arduino Uno that we had been using in the Antenna Analyzer project of 2018-2019. The Nano Every sports 48KB of program memory, 6KB of RAM, 2KB of EEPROM, a 20MHz clock, and USB, SPI, I2C, & UART communication interfaces. All for ~\$10 retail! Cool!

Here is a shot of the current prototype of the VFO, implemented with an Arduino Mega clone, along with an Uno and Nano Every for size comparison.



The control knob selects the operating frequency to be sent to the si5351 breakout board (upper right), The OLED display shows the current frequency and step size. Surprisingly, this layout was just published as part of an article in this months QST. Great Minds, etc.!!



Here is the 20m Phaser alongside the Nano Every.

Only four wires will extend from the Nano to a 14pin DIP header that will replace the PIC processor on the Phaser board (yellow oval).

The four wires will carry +5, Ground, to power the Nano, and the two I<sup>2</sup>C communications lines, SCL & SDA, which will to control the Si5351 signal generator chip (yellow arrow). Quite a clean interface, IMHO.

-de George, KB1HFT

### Board Meeting 4DEC2020

Attendees:

Jessica, WU3C	Jim, N8VIM
Skip, K1NKR	Bruce, K1BG
John, KK1X	Ralph, KD1SM
Jim, AB1WQ	Peter, N1ZRQ
George, KB1HFT	

- Lantern Battery Challenge - open to other clubs?
- New member: Fred, KB1RGT, of Townsend
- Potential for a paddle kit? Bruce has it cleared.
- George - Signal being distributed. 2m net slowly building.
- Several members having fun with "Phaser" xcvr kit.
- Facebook page coming along.
- Bruce has heard nothing from Owen regarding youth programs.
- Bruce presented accounting for introductory class.
- Future agendas:
  - December - Homebrew
  - January - Short Subjects
  - February - W3NOZ on radar and stealth tech
  - March - WA1JXR to speak on Nano VNA
  - Open offer for presentation from W3LPL.

-de John, KK1X

### Treasurer's Report

Income for November was \$60 in membership renewals. Expenses were \$0.74 for PayPal fees, leaving a net income of \$59.26.

Current balances:

General fund	\$2,575.17
Community fund	\$5,948.25

As of 3December we have 41 members who are current with their dues and 24 renewals outstanding.

Thank you to those of you who mail your renewals or use PayPal. **Renewal months are in the member list on [www.n1nc.org](http://www.n1nc.org) in the Member's area.**

- Welcome to new member Fred, KB1RGT, of Townsend.

To pay membership dues via PayPal see the instructions in the same Members Area on [n1nc.org](http://n1nc.org).

Please remember to **UNCHECK** "Paying for goods or a service" **before submitting** your payment via PayPal. **If you neglect to do so, you are costing the club an unnecessary PayPal fee.** (Besides, you are not paying for goods or a service.)



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; Address: NVARC, PO Box 900, Pepperrell, MA. 01463-0900.

Ralph deducts the Club commission before forwarding your paperwork to Newington. As an ARRL 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 <sup>45</sup> PM	7 <sup>45</sup> PM	8 <sup>45</sup> PM	9 <sup>45</sup> 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.

## NVARC Calendar

### December

17 Homebrew Night

### January

21 Member's Short Subjects Night

### February

18 Brint, W3NOZ, on radar and stealth tech

### March

18 Lou, WA1JXR, on the Nano VNA



## STRAYS



### "Little Black Box"

BY MAX P. VANDER HORCK,\* W6GHUW

A little black box of jewels and rocks,  
with lanterns that flicker and glow,

Makes lighter the gloom in my little back  
room, where often I hasten to go.

An anthem it peals of whistles and squeals  
and of voices so ghostly and queer

That you'd never decry, should you chance  
to pass by, what a brotherhood fore-  
gathers here!

Each separate tone has a soul of its own:  
each voice is the voice of a friend,

United through space in this gathering-place  
at the radiant rainbow's end.

Reverberant sounds ride the wave that re-  
bounds like the waves of the sea, from  
afar,

Reporting the doings, the comings and goings  
of brothers, wherever they are.

A curious band, spread over the land,  
yet joined from equator to poles,

Disperses the gloom in each little back room  
by this magic communion of souls.

I could part with a lot of the things that I've  
got, but I'll carry my love to the tomb

Of that little black box and the joys it un-  
locks when I enter that little back room!

\*6351 Wunderlin Avenue, San Diego, Calif, 92114.

[Ed: From QST of Nov. 1966. Tnx, Bruce!]



## Sponsors



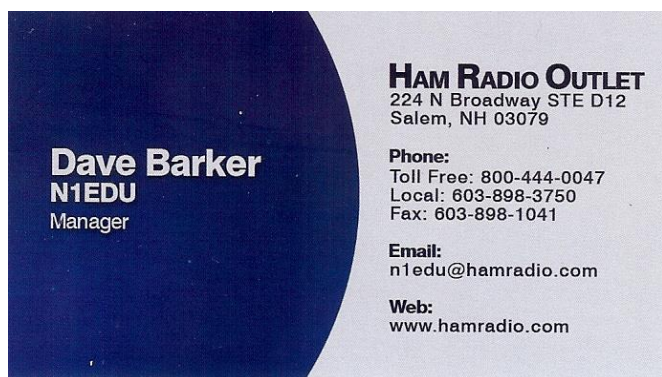
*Fran Purcell*

**Electronics Plus**

480 King Street  
Littleton, MA. 01460

[fpurcell@electronicsplus.com](mailto:fpurcell@electronicsplus.com)  
Hours: M-F 9-6, Sat. 9-5

**(978) 486-3375**



**Dave Barker**  
**N1EDU**  
Manager

**HAM RADIO OUTLET**  
224 N Broadway STE D12  
Salem, NH 03079

**Phone:**  
Toll Free: 800-444-0047  
Local: 603-898-3750  
Fax: 603-898-1041

**Email:**  
[n1edu@hamradio.com](mailto:n1edu@hamradio.com)

**Web:**  
[www.hamradio.com](http://www.hamradio.com)



**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, N1ZRG  
**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 (7:30pm, Eastern Time).

Non-members interested in attending may send an email to [meetings@n1nc.org](mailto:meetings@n1nc.org) requesting the teleconferencing 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](mailto:editor@n1nc.org)

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

Editor: George Kavanagh, KB1HFT

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*Pepperell, MA 01463-0900*