



NVARC

Signal



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NVARC would like to thank Littleton Lumber for their gracious donation of materials to make repairs at the repeater shack in Pepperell. (I stole the photo.)

Next Meeting

This month's meeting will be held 7:30 PM on October 15 2026 at the Pepperell Community Center at 4 Hollis Street in Pepperell Massachusetts.

Our guest speaker will be Mark Noe, KE1IU. Mark will Zoom in from Connecticut and teach us about pico balloons.

Weekly 2-meter Net

The NVARC Information Net is held Monday nights at 7:30PM local time on the 2m N1MNX repeater – 147.345MHz+100pL. An informal net on 28.400(+/-) may follow the VHF net.

President's Corner Les N1SV

As I write this, I've just returned from NEAR-Fest up at the 4H Fairgrounds in New Boston, NH. While there, I bumped into a bunch of our members there including Steve NA1T, Bruce, K1BG, Dennis, K1LGQ, Jean K1AVM, Rod WA1TAC, and Charlie AB1ZN (apologies to anyone I might have seen on Friday but missed). The weather was nice and warm on Friday with only a slight sprinkle occurring as I was leaving. While I didn't bring anything to sell, I did purchase some zip cord that I had run out of and some RF adapters (in my opinion you can never have too many RF adapters). I hope everyone had a good time and was able to get something for their shack.

At the October Board of Directors meeting, I was able to announce that thanks to John K1JEB, we were awarded a grant from Littleton Lumber Company for the clapboard, Tyvek, nails, and corner moldings to repair the side of our repeater shack at no cost to us. The only thing the grant doesn't cover is the paint (they don't sell paint - Ed). John K1JEB, who prior to retirement was a contractor and did a lot of business with Littleton Lumber, filed the application along with a photo of the side of the repeater shack. I expect by the time you read this the material will already have been delivered and that John and others will be working on repairing the shack. Kudos to John for taking the initiative to find this grant program saving the club well over \$1,000!

While I don't seem to have as much time these days to get on the air as much as I'd like to, I do try to regularly participate in the Tuesday 222 MHz activity night. The 222 MHz activity night is the brainchild of Dave Olean K1WHS up in ME that tries to increase activity on that band.

Stations that are 222 MHz capable get on the air from 7:00 – 10:00 PM and try to work each other using weak signal modes like CW, SSB, FT8, or via EME (moonbounce).



President's Corner

Les N1SV

The 222 MHz community is a sub-VHF culture of its own as the 1.25m band has been mostly forgotten with commercial radio manufacturers having not included this band for very many years. Stations on 222 MHz therefore use transverters that convert signals from other bands like 28 MHz to 222 MHz. Most stations run 100w or less and those that do run high power either build their own amplifiers or convert surplus commercial VHF amplifiers (something I did). On an average evening, I can usually communicate up to 300-400 miles with my 16-element Yagi beam antenna. There was some nice tropospheric ducting (a weather-related atmospheric phenomenon that acts as a natural waveguide) that occurred on September 16th where I was able to work stations over 500 miles away.

This month's guest speaker will be Mark Noe KE1IU who lives in East Lyme, CT and will be speaking remotely via ZOOM on Pico balloons. Mark is a chemist by trade, makes his own hydrogen, and has successfully launched many Pico balloons. Pico Balloons have been a hot topic with our members this past summer, and I'm very interested in getting more information on this genre. I look forward to seeing everyone at our meeting on October 15th.



On October 3, Bruce K1BG, Bob AB1EO, and John KK1X visited Gary K1EBM in Brookline NH to erect a new 80m doublet antenna Bruce built. We also relocated his 40m end-fed half wave nearly perpendicular to the doublet. Gary will have plans for a 40m bobtail curtain, which will be fun! Bruce and John were making a return visit to help Gary, who has difficulty getting around. This is a picture of Bruce making final arrangements before hoisting the antenna aloft.

Treasurer's Report Ralph KD1SM

Income for September was \$60 in membership fees. Expenses were \$1.34 in PayPal fees and \$26.25 for the W1 QSL outgoing bureau leaving a net income of \$32.41 for the month.

Current balances:

General fund	\$3,645.58
Community fund	\$7,243.25

As of 1 October we have 87 members who are current with their dues. NVARC dues are still a bargain at just \$15/year or \$20/year for an entire family.

Welcome to new members Matthew Bedard KC1EMI of Groton and John Keesee AC1UG of Shirley.

The NVARC Members' email distribution mechanism moved to groups.io in July - specifically nvarc-members@groups.io. If you are a member and missed your invitation to join that group you may login to groups.io and submit a request to join. Posting to the group is restricted to group members. (if only I could make this blink... Ed)

To pay membership dues via PayPal see the instructions in <https://n1nc.org/membership/>

If you are in doubt about your dues status please send me (Ralph) an email and I will be happy to answer your questions.

If you are joining ARRL or renewing your membership please note ARRL's instructions to enter your NVARC membership information. As a Special Service Club, the ARRL expects a majority of Club members to also be ARRL members and will send a portion of your new or renewal ARRL membership fee back to the Club. Contact me (Ralph) for further information if you need it.

Board Meeting Report John K1JEB

Attending: Les N1SV, Bruce K1BG, Don N1NWE, John KK1X, Jim N8VIM and Ralph KD1SM

Les N1SV asked Bruce K1BG about photographs previously provided for a POTA activity. Bruce said related material was already on the club website and Facebook page, while John KK1X noted that newsletter content was also available online.

Les N1SV reported that John K1JEB secured donated clapboard siding and supporting materials from Littleton Lumber for one side of the repeater shack, with delivery scheduled for October 6 and volunteer labor needed shortly afterward. In return, the club agreed to acknowledge Littleton Lumber on its website, in the newsletter, and on a field-day sign if provided.

Don N1NWE outlined preparations for the upcoming pico-balloon presentation.

Don planned to draft an announcement promoting the upcoming homebrew session and short-subject presentations, send it to Les for approval, and then distribute it to the group so members had several months to prepare.

Les N1SV confirmed an October 10 POTA event but he's unavailable and asked Bruce K1BG and John KK1X to select and publicize a location; they proposed Silver Lake State Park in Hollis, NH.

The group noted the November card sort and pizza party, upcoming NEAR-Fest attendance, and Bruce's K1BG tentative plan to schedule the next technical class for early November after completing the CW Academy.

Notes on Yagi-Uda Antennas

Don N1NWE

Yagi-Uda Antenna - The Patent - How It Works !!

Key Patent Details:

Inventors: Shintaro Uda and Hidetsugu Yagi (Invented at Tohoku Imperial University in Sendai, Japan).

Filing Date: September 3, 1926 (US filings).

From the Japanese patent (# unknown):

"The Yagi Antenna is a directional antenna invented by Dr. Hidetsugu Yagi of Tohoku Imperial University and his assistant, Dr. Shintaro Uda. This groundbreaking invention combined a simple structure with high performance. Most ultra short or extremely short wave receiving antennas, such as TV antennas, use this structure".

US Patent 1,745,342 Specification:

"The present invention relates to a directive wireless system or more particularly to an antenna system comprising a plurality of vertical conductors or antennae having special lengths or natural frequencies located in a definite relation with a main vertical antenna, and has for its object the provision of simple and effective means for transmitting or receiving wireless signal or electric wave energy in a definite direction with utmost sharpness and intensity".

How It Works:

The Yagi-Uda antenna functions as an end-fire traveling-wave array, where a single active element uses electromagnetic coupling to excite nearby passive (parasitic) elements, focusing radio waves into a sharp, directional beam.



Notes on Yagi-Uda Antennas

Don N1NWE

The Elements:

1. Driven Element - Cut slightly shorter than a half-wavelength (typically 0.45 to 0.48 wavelength) to achieve pure electrical resonance.
2. Reflector - 5% to 10% longer than the driven element.
3. Director Elements(s) - 5% to 10% shorter than the driven element.

The Physics:

The driven element creates the field when transmitting, the driven element receives RF power directly from the transmitter, creating an alternating electromagnetic field around itself.

The Reflector Pushes It Forward:

Because the reflector is longer than the resonant $\lambda/2$ length, it behaves inductively. The current induced in it by the driven element is out of phase, causing it to re-radiate a wave that cancels the signal behind it and reinforces the signal moving forward.

The Directors Pull the Beam:

Because the directors are shorter than $\lambda/2$, they behave capacitively. The induced current causes them to re-radiate waves that constructively interfere in the forward direction, focusing the beam into a narrow, high-gain main lobe.

In Essence:

Uda provided the first empirical data mapping how varying the length of the passive rods altered their electrical phase. He proved that elements shorter than $\lambda/2$ became capacitive (acting as directors) and elements longer than $\lambda/2$ became inductive (acting as reflectors).

Notes on Yagi-Uda Antennas

Don N1NWE

Interesting followup reading:

Radar in World War II Using the Yagi Design -

https://en.wikipedia.org/wiki/Radar_in_World_War_II

Source Data:

Japanese Patent -

[https://www.jpo.go.jp/e/introduction/rekishi/10hatsumeika/hidetsugu_yagi.h
tm](https://www.jpo.go.jp/e/introduction/rekishi/10hatsumeika/hidetsugu_yagi.htm)

US Patent -

[https://patentimages.storage.googleapis.com/77/3a/57/cd5b7b3135d80b/US
1745342.pdf](https://patentimages.storage.googleapis.com/77/3a/57/cd5b7b3135d80b/US1745342.pdf)

Wikipedia: Yagi-Uda Antenna -

https://en.wikipedia.org/wiki/Yagi%E2%80%93Uda_antenna

Working POTA John KK1X

I had plenty of POTA activity this month. The club POTA event was held at the Delaney WMA (Wildlife Management Area) in Stow, and I spent a few other sessions there as it's a pretty nice operating site.

I did a fair amount of antenna testing while out there, including a 71 foot (21.6m) random wire as an inverted-V, a 17 foot (5.2m) vertical on the car roof, and a ground-mounted vertical with varying numbers of radials on the ground.

There was a fair amount of travel involved, too, as my wife and I drove to West Virginia for her (I won't say which) high school reunion. We stayed in Kingwood, which is very close to Maryland and Pennsylvania. On Saturday morning I went out to Coopers Rock State Forest near Morgantown WV, and made my first activation for the day, then drove to Garret County MD, activating Herrington Manor State Park within Garret State Forest, so this was a two-fer.

On Sunday morning I drove north into Pennsylvania, to the Fort Necessity National Battlefield, and after that, drove about ten minutes west to Laurel Caverns State Park. There I met some resistance from the staff. Apparently I was supposed to contact the Pennsylvania Department of Conservation and Natural Resources in advance. I found nothing even *mentioning* radio on their web site. Regardless, they were gracious enough to let me operate. I have just heard back from the mothership in Harrisburg. The Caverns property was recently acquired by the DCNR, and apparently not all policy changes were passed down to all employees... I was invited back any time to play radio in Pennsylvania.

So, five activations in three new states. A pretty good month. I do wish I'd had taken some pictures.

All told, I managed 19 activations, tested six different antenna configurations, and made 481 contacts.

17' Whip on a Magmount John KK1X

In my POTA operations, I've used roof mounted "ham stick" style antennas to great effect. This style antenna is heavily base-loaded, so efficiency suffers, according to those with opinions (everybody...). I wanted to compare this to a 17' (5.2m) telescoping whip mounted the same way, hoping for better efficiency.

The antenna in question is an MFJ-1979, and simply was not long enough to tune down to 14.074MHz, the FT8 frequency. But the tuner in my radio was up to the task, so I carried on. At Hunting Hills WMA in Townsend, I made 41 contacts over just over two hours. But the SWR was lowest around 14.300 MHz, well above the 14.100 I shoot for. The "space weather" reported by solarham.com was G0, or really good.

I salvaged the top three sections of a broken whip, to which I soldered two large alligator clips spaced several inches apart. This kludge, clipped to the top of the extended antenna, makes the antenna long enough to tune to 14.100 MHz, with a SWR of 1.9:1.

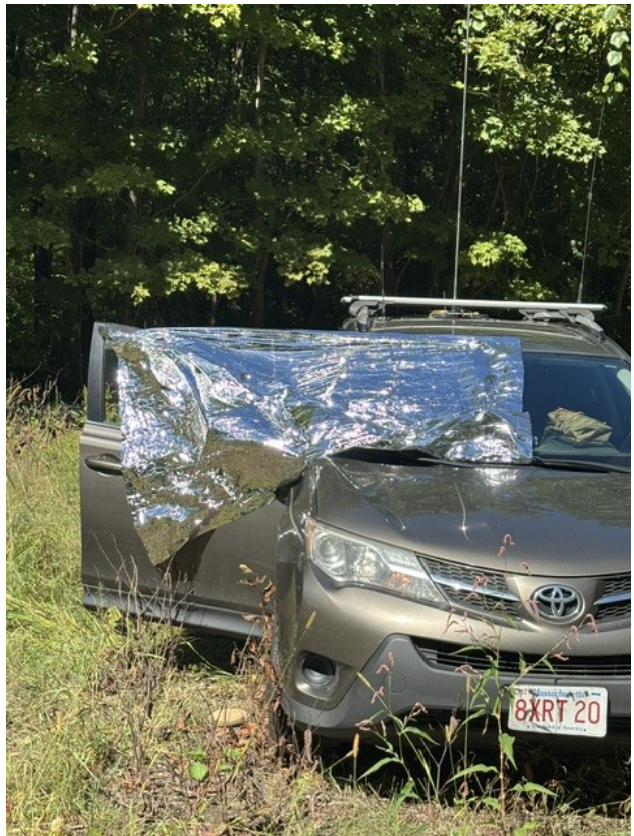
I went back out to the Delaney WMA in Harvard, where the club had its September POTA Extravaganza. It's conveniently located, flat, and has plenty of parking. I set the antenna up, and tuned it to 14.100 MHz. I checked solarham.com and found the conditions to be G1. I honestly don't know what these numbers mean, but they nicely color code them. Green and yellow are usually OK. Orange and Red less so.

In just over two hours (comparable time period) I managed to collect 53 contacts using essentially the same methods used before - foremost call CQ (to determine who can hear you) and also try to work other POTA stations and unworked entities and zones. For testing, I don't spot myself to avoid being called by lids who can't hear me and just tie things up.

17' Whip on a Magmount John KK1X

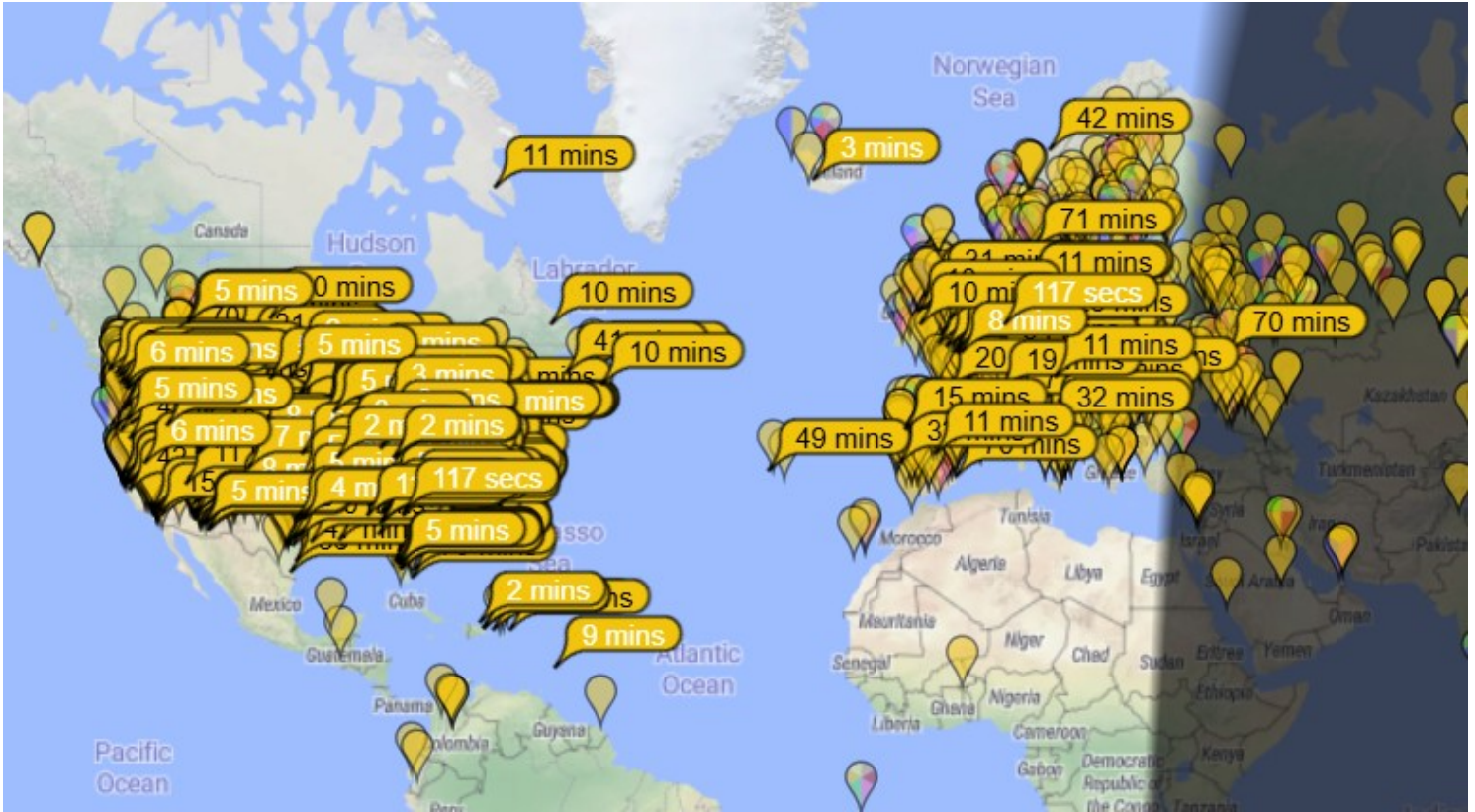
So, from a wholly innocent view, it would appear that this combination works relatively well. The conditions were measurably worse, and results numerically better. I do have concerns that a good gust of wind could rip the antenna from the car, but it was a pretty windy day...

I am oh-so tempted to get one of the 25' (7.6m) whips, but Yankee frugality is currently winning that argument.

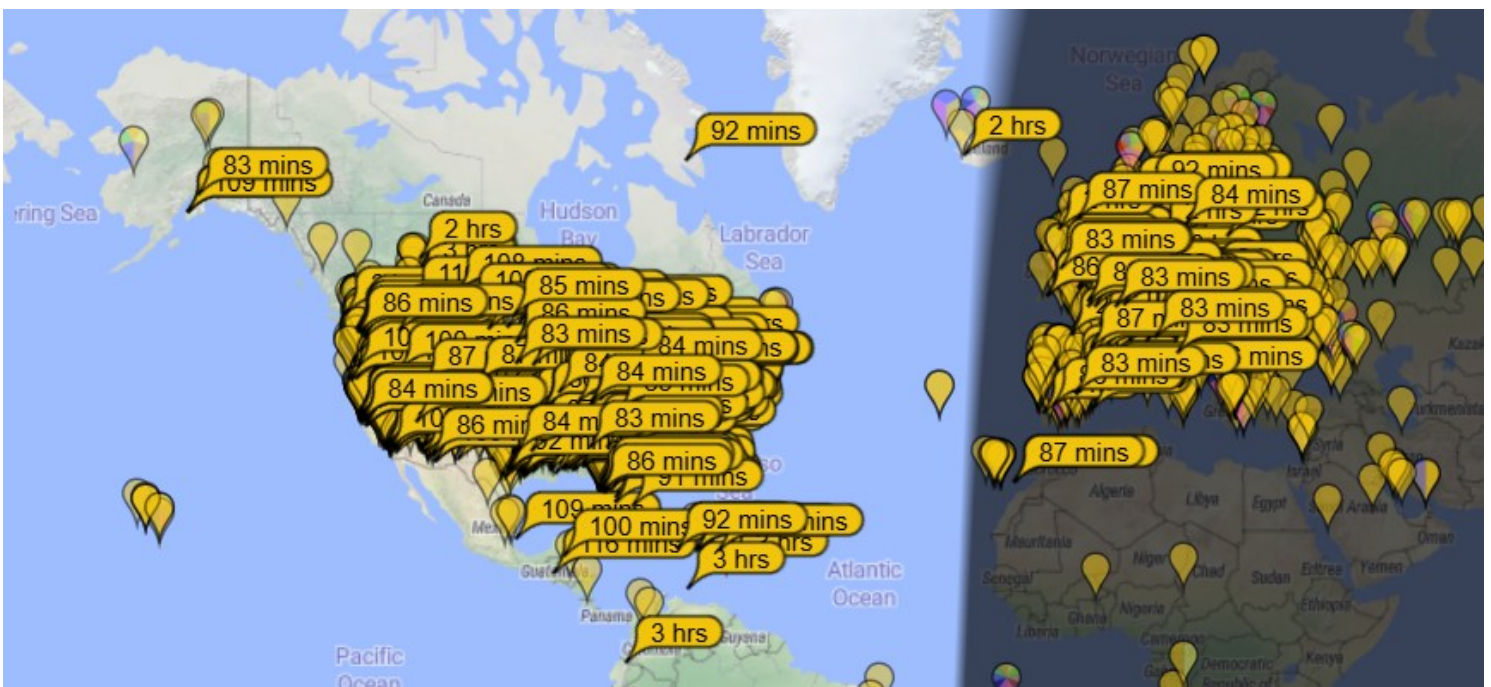


Some room for an operating hint. I had parked out of the sun testing the 17' antenna, but the sun shifted. Neither I nor my radio like being hot, but I remembered I had a “space blanket”. I used my windshield wipers, the passenger side window, and a couple of hook magnets to reflect 90% of the sun away. The blanket and magnets take up little space, and cost about \$10. After some use, you can *almost* see through the blanket to avoid surprises.

17' Whip on a Magmount John KK1X



The differences are subtle. The upper display is for the out-of-tune 17' whip, while the lower display is using the extended 17' whip. The coverage is notably wider for the extended whip.



NVARC POTA Bruce K1BG

Our “second Saturday of the month” Parks-on-the-Air (POTA) activation was a great success! John KK1X, Andrew KF1BER, Mike KC1QKM, and Bruce K1BG all had stations pumping out power and making QSOs! Mary KC1VSQ joined in the fun and made a number of QSOs.

To qualify as a valid POTA operation, each station participating must make at least 10 contacts. So as a group we probably made in excess of 100 contacts. Each of the stations had their own various antennas and equipment configurations. Everything from table-tops to stations stuffed in backpacks.

October 10th happens to be the next second Saturday of the month. Stay tuned for info on NVARC’s next POTA adventure.



Mary



Mike

Andrew



Multiband Fan Vertical

John KK1X

I've previously mentioned a British ham, Callum McCormack, M0MCX. Callum manufactures the [DX Commander](#) brand of antennas which spans several multiband verticals. It's essentially half of a fan dipole, with radials forming the other half of the antenna system. Quarter-wave elements for whatever bands are desired share a common feed point and point upward through wire looms.

Now, Callum's antennas are really nice and all, but take a bit to build, erect, and guy *properly*. They are also somewhat pricey in my book, but are very well engineered and manufactured. It's a pretty great antenna, but I was looking for an easier solution. Well, and cheaper.

So my feeble brain came up with a plan. Cheap PVC pipe segments act as spreaders at fairly uneven spacing, meant more for guiding wire than aesthetics. A piece of cutting board (the corner already had a hole for a anchor rope) adapted nicely to the common feed point bracket. A SO-239 connector was added to the bracket, and that wired into screw terminals for the radiating wires.



Multiband Fan Vertical

John KK1X

The PVC pipes were all cut to about six inches (150 mm), and parallel holes were drilled through at about half inch (12 mm) spacing. Dacron rope was strung from the feed point bracket through the end holes of the pipe, forming a support ladder for the radiating elements. To secure the rope to the pipes, I used safety pins pinned through the rope inside the pipe. This fixed the movement of the pipe in both directions.

Elements were cut for 40m, 20m, 10m, and 6m. The 40m element also tunes on 15m. Loops were formed at one end of the element, and the stranded wire was enclosed in a ferrule at the other end. The elements were threaded into the support ladder, and pieces of bungee cord were used to apply just a little tension to each of the elements.

Testing SWR from the shack, the 6m element is displaying a 1.5:1 SWR, the 10m element is about 1.8:1, and 15m about 1.4:1. 20m is way out of whack at 3:1 SWR and needs trimming, and 40m is under 1.2:1. Note that I measure over a pretty narrow bandwidth, as I usually run FT8. These values will work well too for CW, if that bulb ever lights in my brain.

I apologize for the terrible picture of the “installed” antenna (it’s hanging on mason twine), but the construction is reasonably clear.



Multiband Fan Vertical

John KK1X

Was it worth making? Perhaps not. I did learn a little (though enumerating the lessons eludes me). It didn't cost much, and it did work. But it's not terribly portable as it's awkward to deploy and awkward to store. And it only works on five bands. Perhaps as a somewhat extensible permanent structure it might not be bad.

NVARC Fox Hunt

Bruce K1BG

On Saturday September 19th, the NVARC Fox was deployed to the Heald Street Orchard in Pepperell. Notifications to club members were sent using the club's new groups.io email reflector service. Plans are to deploy the Fox again in the orchard on Saturday, October 17th. The Fox will clearly be heard on 146.565 MHz. Look for email announcements regarding the Fox's upcoming deployments.



Les N2SV finding the fox!

Pico Ballooning

Bruce K1BG

I usually don't write about NVARC meetings or the topics our presenters will be discussing before the meeting, but this month is different. I find this topic not only fascinating - I'm becoming obsessed with it!

So, what is it? - Pico Ballooning.

Pico ballooning is the activity of attaching a small transmitter to a small ("pico") balloon, releasing it, and tracking the balloon as it travels with the wind—ideally, all the way around the world! Several months ago, Jim, AB1WQ, Don, N1NWE, and other NVARC members launched a pico balloon. It was a beautiful Saturday morning, and I was there to watch the launch. Unfortunately, that particular balloon didn't travel very far. At almost the same time, I received an email from Mark Noe, KE1IU, about his balloon launch. I was hooked. Mark launched his latest balloon on August 4th, and it has now traveled around the Earth two and a half times.

You probably have a lot of questions about this. So do I! My goal here is simply to whet your appetite for our October meeting, where you can get your questions answered. I'm sure Mark will be able to answer many of them.

In the meantime, take a look at the link for this balloon on the Traquito dashboard (<https://traquito.github.io/>). It shows a balloon launched by KC3LBR that went aloft on January 1, 2026, and was last heard from in August. In just 223 days, it made eight trips around the Earth and traveled more than 273,000 miles! These balloons use WSPR to report their position and status. During those 223 days, this particular balloon was spotted more than 10,000 times.

The amount of information displayed on the dashboard is stunning. Every one of those 10,000+ spots is represented, showing where and when the balloon was heard and providing a remarkable picture of its journey around the world. Does that get your attention?

I'm not sure when NVARC will be launching another balloon. All I know is: I want in! In the meantime, I'm learning as much as I can.

So come to the NVARC meeting on October 15th at the Pepperell Community Center and find out more about pico ballooning.
See you there!

Nashoba Valley Amateur Radio Club
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President: Les Peters N1SV
Vice President: Don Campbell N1NWE
Secretary: John Bielefeld K1JEB
Treasurer: Ralph Swick KD1SM

Board Members:
Jim Hein N8VIM (2024-2027)
Steve Davidson NA1T (2025-2028)
John Griswold KK1X (2024-2029)

N1NC Trustee: Bruce Blain K1BG

Join NVARC! Annual dues are
\$15 individual, \$20 family

Contact us on the N1MNX repeater:
442.900(+) PL100
147.345(+) PL100
53.890(-) PL100

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