

2013: My Loopy New Year's Resolution

by Kirk Kleinschmidt,
NTØZ, KPCØZZZ
<kirk@cloudnet.com>

"I merely have to look at my logbook for verification that the Loop Skywire is the best single-wire antenna I have ever used for multi-band operation"

If you're reading this after the New Year, it probably means that we have survived the apocalyptic hijinx from any prophesied "end of the Mayan Calendar" events — or the Holiday season in general. So at this point we're stuck with the usual non-glamorous New Year's Resolutions that deal with weight loss, exercise, and finally learning Morse code.

But even the usual reflections — Mayan prophesies aside — helped along by a healthy dose of seasonal nostalgia, got me thinking about the best advice I could give beginning hams.

In any endeavor, ham radio included, if you stay with it long enough you come away with a set of "best recommendations" that you wish you would have known (or heeded) much sooner than you finally did. With the benefit of hindsight it's much easier to see how a few simple things made huge differences — how just a simple twist on an otherwise established standard or practice can turn failure into success, or frustration into satisfaction.

Learning the piano as a kid is one of those things that offers universal benefits throughout life — especially after the initial learning phase! I wasn't fortunate enough to have done this — or

forced to do this — and I can now appreciate the loss more than ever.

There are many such distinctions in life, but to stay on topic, let's stick to ham radio. And in this case, SWLs benefit just as much. Once operating skills are addressed, the single most important thing that affects your success on HF is your antenna. And it's here that a simple "twist" on the most popular beginner's HF antenna can make a huge difference in performance and success.

Because they're in every antenna book, they're the foundation of most beam antennas and they're so easy to build and get working, most beginners start with dipole antennas, and stay with them, despite the fact that another simple wire antenna is just as easy to build and offers greatly improved performance, especially when used on multiple bands: *The horizontal loop*, **Photo A**.

A Twist of Good Fortune

Switching from a wire dipole to a wire horizontal loop is one of those "twists" that can make all the difference on the HF ham and SWL bands. (**NOTE:** *It's just like having learned the piano at*

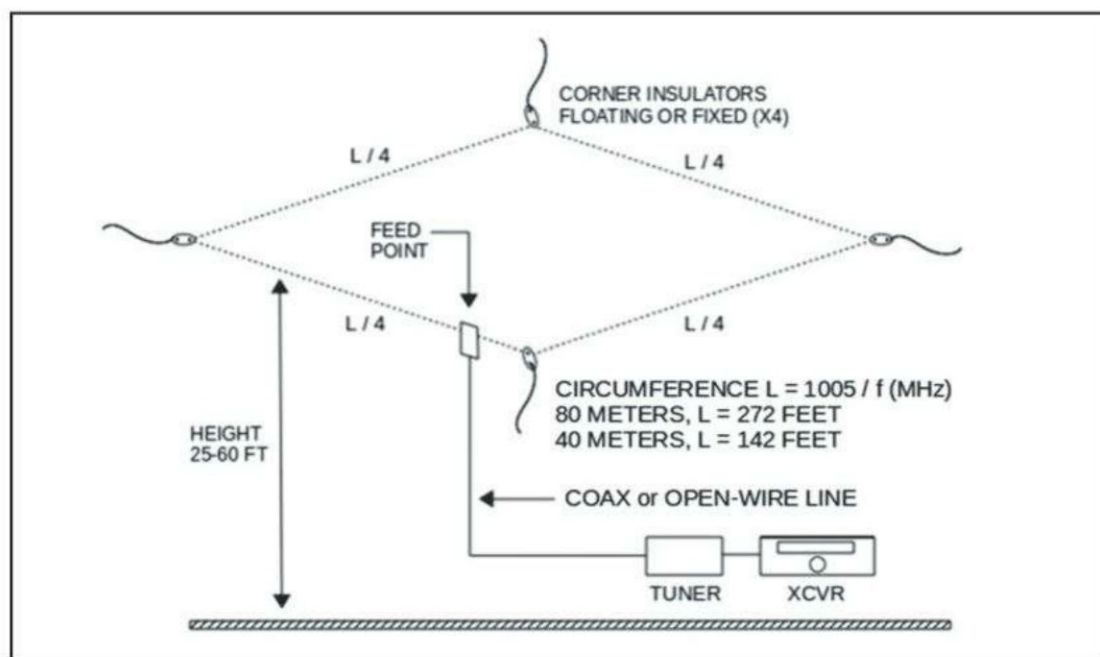
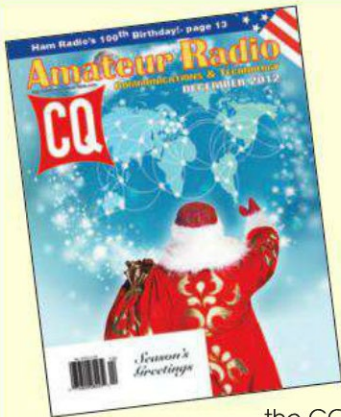


Photo A. For such a high-performance, single-wire, multi-band antenna, building a HF horizontal loop couldn't be much simpler. Put up as much wire as you can, keep it as square or as "loopy" as you can and feed it with an antenna tuner on all bands at or above the design frequency! *See text.* (Courtesy of KPCØZZZ)

If you enjoy Amateur Radio...you'll enjoy **CQ**



It's a different kind of ham magazine.

Fun to read, interesting from cover to cover, written so you can understand it. That's CQ. Read and enjoyed by thousands of people each month in 116 countries around the world.

It's more than just a magazine. It's an institution.

CQ also sponsors these world-famous award programs and contests: The CQ World-Wide DX Phone and CW Contests, the CQ WAZ Award, the CQ World-Wide WPX Phone and CW Contests, the CQ World-Wide VHF Contest, the CQ USA-CA Award, the CQ WPX Award, the CQ World-Wide 160 Meter Phone and CW Contests, the CQ World-Wide RTTY Contest,

the CQ 5 Band WAZ Award, the CQ DX Award, CQ IDX Award, CQ DX Field Award, CQ DX Marathon and the highly acclaimed CQ DX Hall of Fame. Accept the challenge. Join the fun. Read CQ.

Print Edition & New Digital Edition Combo Sale!
Buy both at a Combo price and save!

1 Year	Print	Digital	Both
USA	\$38.95	\$27.00	\$55.95
CN/MX	\$51.95	\$27.00	\$68.95
Foreign	\$63.95	\$27.00	\$80.95

CQ The Radio Amateur's Journal

25 Newbridge Road • Hicksville, New York 11801 • Phone 516-681-2922 • FAX 516-681-2926

www.cq-amateur-radio.com

The Loop Skywire

Looking for an all-band HF antenna that is easy to construct, costs nearly nothing and works great DX? Try this one!

By Dave Fischer, WBMHS
P.O. Box 888578
Atlanta, GA 30338



There is one wire antenna that performs exceptionally well on the HF bands, but relatively few amateurs know about it or use it. The purpose of this article is to present what one user has described as the "best kept secret in the amateur circle."

The Loop Skywire antenna is simple and easy to construct, costs nearly nothing, and eliminates the need for multiple antennas on the HF bands. It is made of only

has not been fully studied, analyzed and researched. Those who are able and curious should investigate the polarization of this one. This article does not offer a technical explanation of its performance or operation. Rather, it is a description of the antenna accompanied by construction hints and actual user comments. Take some time to erect the Skywire and decide for yourself whether it works.

Novice and Extra take note: Here is a

Given any length of wire, the maximum possible area the antenna can enclose will be with the wire in the shape of a circle. Since it takes an infinite number of skyhooks to hang a circular loop, the square loop (four skyhooks) is the most practical. Reducing the area enclosed by the wire loop further brings the antenna closer to the properties of the folded dipole and both harmonic impedance and feed-line voltage problems can result. TV noise

Photo B. "My introduction to the horizontal full-wave loop antenna came in the article, 'The Loop Skywire,' By Dave Fischer, then WØMHS, now W7FB, in the November 1985 issue of *QST*," writes NTØZ. The full article can be read by ARRL members on the organization's website in *QST*'s print archive. (Reprinted with permission of the ARRL, <<http://www.ARRL.org>>)

a young age — only better, because you didn't really have to learn the piano! — KPCØZZZ)

My introduction to the horizontal full-wave loop antenna came in the article, "The Loop Skywire," By Dave Fischer, then WØMHS, now W7FB, in the November 1985 issue of *QST*, **Photo B**. From 1977 to 1995, all of my loops were vertically oriented and I used a wide variety of quads, quad loops, and suspended delta loops. I was an experienced looper who had a lot of results-based faith in the full-wave loop. When I saw that Dave was advocating "laying the loop on its side," I was intrigued, and immediately strung one between reasonably appropriate tree limbs. The entire thing was 20-30 feet above ground and not terribly symmetrical. Seeing that, I was unprepared for how magnificently it worked!

Having used these things for nearly 30 years now, I have heard all kinds of gruff from hams who have never used them telling me why horizontal loops are only good for short-range (NVIS) communications, how they have ridiculously high-angle radiation patterns, and so on. There are plenty of charts, graphs, and simulation plots — both online and in magazines

— that support their negative claims. I think that's *just great*, because I merely have to look at my logbook for verification that the Loop Skywire is the best single-wire antenna I have ever used for multi-band operation.

Somebody Say, 'Amen!'

Every ham I've ever known who has bothered to put up a horizontal loop has become a believer. A few have even sold their rotatable beams (or didn't bother putting them up after moving to a new QTH) after experimenting with big horizontal loops.

As mentioned, antenna performance is a key success determiner in amateur radio. You can have a pair of \$10,000 transceivers, each with matching legal-limit amplifiers, but if you don't have a good antenna you'll wind up in a classic Defense Secretary Donald Rumsfeld scenario: never knowing what you've been missing: "There are known knowns . . . known unknowns . . . and unknown unknowns." (*WATCH: Secretary Rumsfeld explaining knowns and unknowns, <<http://bit.ly/RiBQgR>>. - KPCØZZZ*)

If you already have a massive antenna farm or have already shelled out for some "heavy aluminum," you may not need to investigate the amazing performance of a simple horizontal loop antenna. But if you're like most of us and can have only a single wire antenna on a small suburban lot, the "sideways loop" may very well put you on the path to Five-Band DXCC — or ragchew quality QSOs at will.

To be specific, I'm not saying that dipoles, end-fed wires or vertical antennas can't be made to work well, or even very well, especially on one or two bands. But when it comes to making a single wire antenna perform well over a wide frequency range, the horizontal loop is the clear champion.

Loop Skywire Benefits

A horizontal loop is a quad loop that's laying on its side. Compared to traditional vertically oriented loops and other wire antennas, it offers some tremendous advantages.

Even — or especially — when mounted "too close" to the ground, horizontal loops completely outperform dipole-type antennas. Most beginners don't know that dipoles and inverted Vs don't perform anywhere near their full potential unless they're at least a half-wavelength above

RF ground. That's roughly 60 feet at 40 meters and a whopping 120 feet on 80. The same goes for Yagi-type beam antennas, which are really "dipoles on a boom."

Horizontal loops aren't immune to height-above-ground limitations, and no immutable laws of physics have been broken, but there's no mistaking that when you turn the full-wave loop on its side, close-to-the-ground performance exceeds that of dipole-type antennas.

Loops — horizontal and otherwise — are quiet on receive and usually suffer less from static and man-made noise when compared to dipole- and vertical-type antennas. If fed with balanced or open-wire feed lines they can also exhibit impressive immunity from locally gener-

ated noise — even pesky noise from your shack computer.

Horizontal loops tune up easily on all bands at or above their fundamental frequencies, and can be made to work well on lower frequencies if fed with open-wire feed lines or via antenna-mounted auto-couplers. Dipoles and vertical loops can't do that. They only work well at certain harmonics of their fundamental frequencies. And even if they could, the impedance matching required is much more complex. These factors alone make the horizontal loop the easiest single-wire antenna for use on multiple bands. The awesome performance is just icing on the cake!

Horizontal loops work well for close-in rag chews and faraway DX pileups.

For 45 years
our volunteers have
endured long hours
and tough
working conditions
for no pay.



And 9 out of 10
would do it again.

TO FIND OUT WHY
contact

REACT International, Inc.

(301) 316-2900 • (866) REACT-9-9

12114 Boydton Plank Road, Dinwiddie, VA 23841

REACT.HQ@REACTintl.org

www.REACTintl.org

Ironically, the fact that they do everything well is also their greatest potential weakness! Because these loops receive well in every direction, copying weaker DX stations through throngs of strong stateside stations can be frustrating. Of course, the fact that you can actually hear and work the DX stations — which you often can't do with a dipole — helps calm you down.

I've been mostly talking up horizontal loops in amateur radio applications but, for all of the reasons I've mentioned so far, SWLs get all of the benefits as well, with one interesting caveat: If you're using an entry level SWL receiver, be sure to use an attenuator to decrease the received signal. Without even trying, large loops can overload a receiver's front end, resulting in images, birdies, distortion, and a host of other unwanted side effects. Ah, the luxury of having too much signal.

Inexpensive and Easy to Build

The horizontal loop is simply a full-wavelength loop that's "lying on its side," supported at various points some 15 to 60 feet above the ground. Mathematically, loops are circular, but putting up a horizontal loop that's perfectly circular is needlessly tedious.

Four strategically-placed supports gives us a "square loop," which is an ideal shape.

Three supports, on the other hand, provide a "triangle loop," the limit of what you can get away with.

A slightly rectangular shape is okay, as is an irregular but generally square shape, but an elongated rectangular shape starts to lose its loop-like qualities.

Published in antenna books for years, the standard equation for determining the size of a loop antenna is 1005 divided by the frequency (in megahertz). That's $1005/f$. Eighty-meter loops

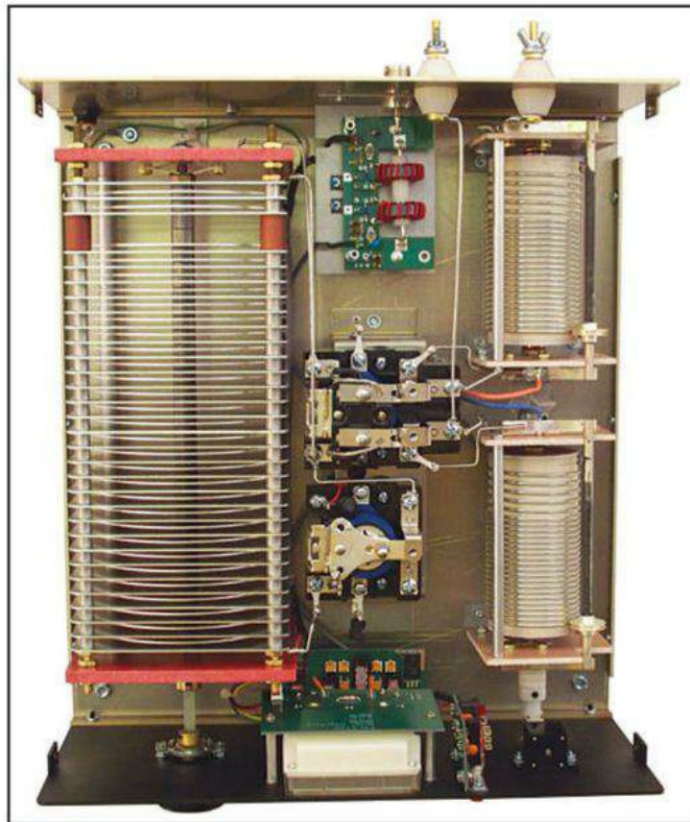
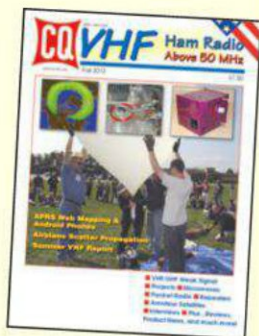


Photo C. If you want even better performance from your horizontal loop antenna, or if you want to use it on frequencies below its design frequency, feed it with open wire line and a balanced antenna tuner such as this Palstar BT1500A. Unlike most tuners, this heavy-duty model is rated for full legal power, although it's perfectly comfortable at QRP levels, too. (Courtesy of KPCØZZZ and Palstar <<http://www.palstar.com>>)

Good News for the VHF/UHF Enthusiast

The all-time favorite magazine for the VHF/UHF enthusiast, CQ VHF is better than ever and here to serve you!

By taking advantage of our subscription specials you'll save money and have CQ VHF delivered right to your mailbox. Only \$28 for four information-packed quarterly issues. Or better yet, enter a two or three year subscription at these special prices. As always, every subscription comes with our money back guarantee.



**DON'T MISS OUT
CALL TODAY**

	USA	VE/XE	Foreign Air Post
1 Year	28.00	38.00	41.00
2 Years	56.00	76.00	82.00
3 Years	84.00	114.00	123.00

Please allow 6-8 weeks for delivery of first issue

Mail your order to:

CQ VHF • 25 Newbridge Road • Hicksville, NY 11801

Subscribe on line at www.cq-vhf.com

FAX your order to us at 516 681-2926

Call Toll-Free 800-853-9797

have a circumference of about 287 feet, or about 72 feet on each "side." A 40-meter loop is about 144 feet, making 20 meters about 72 feet.

These "reference lengths" are just that. In practice, simply put up as much wire as possible — keeping it as circular or as square as possible — and let your antenna tuner handle the impedance tweaking, while shooting for a 40-meter loop size or larger, if possible.

Feed it with 50- or 75-ohm coax through a standard antenna tuner and use your new Loop Skywire on all bands at or above the loop's resonant frequency. Feed the loop anywhere along its circumference, corner or side.

For improved flexibility and performance — especially on bands below the design frequency — replace your conventional shack-mounted antenna tuner with an auto-coupler mounted at the loop's feed point. This will give you lightning-fast band changes and low SWR on the coax that runs from the auto-coupler to your radio.

If an auto-coupler is out of the question, consider replacing your coax with 600-ohm, open wire line and a balanced antenna tuner such as those sold by MFJ Enterprises, Palstar, **Photo C**, or even an old Johnson Matchbox.

Don't worry about the Loop Skywire's ultimate shape, height or even how you feed it. Just put one up and give it a try. It's a real "twist" that can make all the difference, and I'm betting that you'll soon agree that it's your new favorite HF antenna.