SOUTHEASTERN DX CLUB

Bulletin

DX CODE OF CONDUCT

March 2018

From the Pres

Mike ND4V

The club year is winding to a close, only one quarter left! Our treasurer informs me that we spent every bit of this year's allowance for DX funding (and a little more). So, it is time for a push to boost the treasury so that we don't leave next year's officers handicapped. The bylaws state that dues should be collected by June 30 each year. You won't get an invoice for dues, just friendly reminders from our webmeister and squawks from me on the reflector. So, please help the club out: Renew your membership and make the payment **well** before June 30. You can easily renew online here: **dues.sedxc.org**

I'm looking forward to hearing K4UEE, Bob talk about the challenges and disappointments of the Bouvet DXpedition. He has promised us the first look at his Dayton presentation at our April meeting.

We extend condolences to the family and friends of Carl Hays, W1ABO. Carl lived in Milledgeville and was a member of the club for seven years. His passing reminds me to talk to you about your equipment!

It is amazing how much stuff one accumulates around this hobby. I've assisted in liquidating three large ham radio estates in recent years--one in excess of fifteen

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Inside This Issue

Veep's Report

Dick K5TF

This Month's Meeting

Date/Time: **Thursday March 15th** @ 7:30 PM
Location: Rich Auditorium, Piedmont Hospital
Details at www.sedxc.org

Program Title: **Taking the Gray out of Gray-line DXing**

A panel of long-time Dxers will discuss this special form of short-term long-path propagation extending completely around the world at sunrise and sunset. Contacts are often possible **then** that are difficult or impossible at other times. Come with your questions and experiences to hear Bill/N4NX, Dave/K4SSU, Dick/K2UFT, and Dick/K5TF discuss what opportunities the gray line provides for Low-Band Dxers.

73,

Dick K5TF

Around the Shack

Hal N4GG/4

Questions come up now and then about **end-fed half-wave antennas (EFHW)**, particularly since they are regaining popularity. Do they work? How do they work?

Simply – yes, they do work and there are a lot of new EFHW antennas to choose from. MJF makes several. A company called MyAnetnnas.com makes multi-band models. Some of the most popular ones come from PAR electronics – they call theirs EndFedZ ™. PAR is a good company and their EndFedZ™ antennas are good products.

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From the Pres (cont.)
thousand dollars. It isn't unusual for there to be three to five thousand dollars of equipment at hamfest prices on the operating desk and that much or more in the workshop! Please discuss your wishes with your family. We'd all like to see the equipment wind up where it will be used. This can be achieved by donating the equipment directly to a club or by having a liquidator sell it and donating the some or all of the cash.

Equipment is typically sold at a hamfest, and the question that I'm most often asked is, "Does it work?" Most often my answer has to be, "We haven't tested it, I don't know." Hal, N4GG suggested we keep a Station Engineering Notebook. I want you to add a section in that notebook for the projects you have going. Start journaling! Write about where you got it; what you paid; and the status of that boat anchor! Has it been recapped? Does it work? What mods and repairs were done? What filters were added?

The other question I'm asked about equipment is "What is it?". You know: that exotic piece of test equipment they were throwing away at work that you thought you'd find a use for or cannibalize! Yep, too interesting to throw away, but will the liquidator have a clue as to it's worth or should it have gone to the scrap yard? Put it in the Notebook! Your ARRL equipment list for their insurance (or just an inventory spreadsheet) would be another item for your Notebook. Collect the manuals for your station equipment and put them in a file. More information makes a potential buyer more comfortable and increases the value of the equipment.

I hope everyone is getting a new one or band fills from the Equatorial Guinea and Easter Island guys. Another semi-rare one, 4B4B was on 20 SSB yesterday (March 4) from Socorro Island (in the Revillagigedo Islands). He is planning on being there March 1-15, 2018. Socorro Island is IOTA NA-030 and Grid DK48mr. Go get 'em!

As always I hope to see you at Panera Bread or at the Club meeting.

73 es gud DX,

Mike ND4V

Treasurer's Journal
Jeff K1ZN

Checkbook Balance as of March 1, 2018 = $ $7120.86

Checks written February:
-- Baker Is. DXpedition: $2000
-- VP6D Ducie Is. DXpedition: $500
-- ARRL Memorial Brick for Neville Cheadie, G3NUG, $250

73,

Jeff K1ZN

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SEDXC Chat Room: details on webpage

SEDXC Reflector: details on webpage

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All these new (last ten years) wire-based products might make the concept appear new, but it's not. Going back twenty years or more, aluminum antennas such as those made by GAP arrived. Many GAP models are a half-wave tall, and end-fed (at the bottom) – at least on some bands. Take a look at GAP verticals. They all have short "radials" at the bottom. Those are the counterpoise against which the antenna is fed. More on this in a moment.

We can go further back in time, right to the very beginning of radio. The wire antennas above Zeppelins of the 1930s were end fed – from which we get the term Zepp. The J-pole, used mostly on VHF, is another EFHW antenna. As an aside, I once built a J-Pole for 15 meters. J-poles are big – they are three-quarters wavelength tall – a half wave vertical on top of a quarter wave matching section.

If you are interested in the operating theory for EFHW antennas there are many places to read up. They are covered in both the ARRL Handbook and the ARRL Antenna Book. Tom, W8JI, has an excellent write-up at WWW.W8JI.COM.

Here are a few summary notes about theory:

The end of a quarter-wave element (wire, aluminum, any conductor) presents an impedance at resonance of approximately 35 ohms. This is why a vertical fed against a good ground system (zero ohms) appears to be 35 ohms and matches pretty well with a 50 ohm transmission line. It's also why half-wave dipoles appear to be around 70 ohms – think of each side of the dipole as 35 ohms and you are driving the two sides in series from the center – 70 ohms total.

A half wavelength conductor looks nothing like a quarter wavelength conductor. A half wave conductor presents an impedance of anywhere from 1,000 to about 5,000 ohms. This is why, when you try to feed a half-wave center-fed dipole (70 ohms) on its second harmonic (now a half wavelength on *each side* of the center insulator), the SWR is near infinity. If you have ever tried to drive a 40M dipole on 20M you know that's how it works. The antenna's impedance is thousands of ohms and not close to matching a 50 ohm transmission line.

(cont. on next page)

Around the Shack (cont.)

So, how do we feed an antenna that presents an impedance of thousands of ohms? What's made end-fed wires resurgent is the advent of low cost ferrite cores. These cores allow for construction of wide-band matching transformers with high impedance rations (4:1, 9:1, 16:1, etc.), and that's what you will find in the little black box at the feedpoint of every EFHW antenna. Using the proper turns-ratio on the ferrite core transformer, EFHW antennas can be brought back to 50 ohms for direct feeding with coax.

But, there are problems and misconceptions!

1. Using Ohm's law, the voltage for 100 watts drive at a dipole's 70 feedpoint is 84 volts RMS. That's not a lot of voltage and easily handled by even the thinnest transmission line. At 1,500 watts it's only 325 volts – still not a problem, but what about at the feedpoint of a 2000 ohm end-fed wire? The voltage there for 100 watts of drive is 450 volts and for 1,500 watts it's 1,730 volts RMS that is 2,450 volts peak! That IS a problem. The matching transformer windings have to be able to withstand that voltage (plus some margin), and that voltage appears at both ends of the antenna as well as on the short counterpoise(s) usually used. Should you (a child, an animal, etc.) come in contact with 2,450 volts of RF, a REALLY severe RF burn is guaranteed. EFHW antennas are rarely rated for full legal power because the matching transformers are difficult and unreliable due to the high voltage present, and the antennas can be unsafe. The instructions for GAP verticals include warnings about preventing contact with the short radials – even if it means building a fence around the antenna!

2. EFHW antennas are usually advertised as "having no radials" and/or requiring no counterpoise. Some of these same antennas come with a short piece of wire hanging out of the matching box. That's the counterpoise that's "not required." How much of a counterpoise, and whether one is required, can become a deeply theoretical discussion, overlaid IMHO with semantics that cloud the issue. I agree with W8JI that there is always a counterpoise present and often it's the shield of the feedline. That can be bad news. Sometimes the "counterpoise" can be internal to the matching box as stray capacitance and related fields, but it always exists. See below.

3. Sometimes we think of EFHW antennas as small – but they are the same length as a center fed half-wave dipole. We are just moving the feed point from the center to one end. The appeal of EFHWs is they eliminate hanging heavy coax down from the center of a dipole, and they may allow easier routing of the transmission line into the shack. There are other ways to get this done of course, including supporting a half-wave dipole from the center as an inverted vee. Per #2 above, if there is RF traveling down the shield of the coax, you may not want the transmission line to immediately enter the shack.

4. EFHW antennas are sensitive to their surroundings. Although we are working at RF, Ohms law is often all we need to assess antenna issues. If a nearby tree loads a 70 dipole by appearing to shunt it with 1000 ohms, Ohms law tells us the antenna now looks like 65.4 ohms. You will never notice that small shift in SWR or performance. If you shunt a 2,000 ohm antenna with a 1,000 ohm load it now looks like 666 ohms. You will notice that! The SWR and radiation pattern of an EFHW antenna vary considerably based on nearby objects, including but not limited to other antennas, mounting orientation, height above ground, and transmission line length and orientation. There may be "magic length" transmission line lengths that work well and not-so-good lengths that work poorly. The SWR and radiation pattern are to a significant degree -- and pardon my language – a "crap shoot". Note also: the smaller the counterpoise, the worse the sensitivity to outside influences. GAP verticals have reasonable large radials and are reasonably insensitive – a good design. The EFHW antennas with little black boxes and no counterpoise at all will be very sensitive to their surroundings, but does that mean they are a bad choice? It depends on what you want the antenna for.

5. Because the transmission line and stray fields are part of the antenna, EFHW antennas tend to be noisy. As an example, if you put that little black matching box under the eave of your house and run the coax down to the ground, you will be hearing whatever RFI radiates from the house.

6. There are multi-band designs for sale. A half-wave wire will be resonant on its harmonics, but each resonance will present a different impedance that requires the matching transformer to be different for each frequency of interest. There are some clever designs that add loading coils part way out the half-wave wire in an attempt to compensate for this, but they are neither perfect in theory or in practice. Expect a multi-band EFHW antenna to have considerable SWR variation band-to-band.

Okay, now to the bottom line. Do EFHW antennas work? Yes. Are they a good idea? Yes, with qualifications:

As a temporary antenna they are fine. If you are QRP and camping/hiking, by all means, throw one end of an EFHW into a tree and get on the air. They also make a nice addition to an emergency go-kit.

If you have a QTH where you are stuck for any other solution – then yes of course, put one up. I cannot think of such a scenario, but maybe you have one?

If you want to run more than 200-300 watts you are pushing your luck. I say this independent of what the manufacturers say. Imagine 2,000 volts at the feedline in a rainstorm.

If you want to do serious DXing, the noisiness of the antenna may be a showstopper in addition to the radiation pattern that is an unknown.

Regarding tinkering… These antennas are cheap, easy to put up and fun to play with. Buy one and play with it if so inclined. If you are the type of ham who wants a minimal-fuss works-straight-out-of-the-box product, this is not your antenna!

Sorry for the length. There is a lot more reading possible about EFHWs if this piqued your interest.

See you in the pileups…

Hal N4GG/4

DXpedition Funding Requests

None at this time.