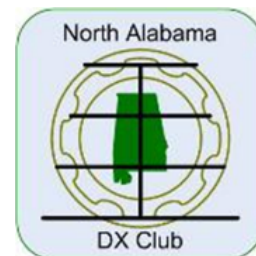


# The LongPath

March —2021 Volume 45 Issue 3

A North Alabama DX Club Publication



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\* or send in an  
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(form on  
[www.NADXC.org](http://www.NADXC.org))

## From the President

By Bob DePierre K8KI

I was all excited about the new March Antenna Issue of the Long Path – until I got deflated last week on hearing of the death of Tom Duncan, KG4CUY. Everyone in the community knew Tom, and what a great personality he brought to every occasion. I've heard him called everything from eclectic engineer to Renaissance Man. Indeed he was both of those and more. We knew him from all the years as president of both HARC and NADXC, from the HARC auctions, as publisher of the LongPath for 17 years, the theremin, the eulogy for the deceased ice chest, the Hamfest Forums Chairman, and his red Thunderbirds. He was a rock in the community. Any time I had a problem, I knew who to call for advice. There wasn't anyone in the club who didn't know him well. Rest in Peace, dear friend. I look forward to meeting you again someday.

I was planning for a bunch of antenna articles this month, and then a discussion of them. We do have some good antenna articles this month, mostly aimed at those considering installing a new high performance antenna, and what others have found useful. If you are looking for good advice on your next antenna, these articles are for you. I'd like to aim the next issue toward "Why did I buy my amp," in similar fashion to what we did last month on transceivers. If you have an HF amp, and I know many of you do, then I'd like to hear from you. Why did you get that one rather than something else?

I'll plan to conduct Tuesday's meeting in

the same fashion as HARC did last Friday, a remembrance of Tom. He was scheduled to do the presentation this month. It would have been on the history of the early days of FM, and would likely have been better than Empire of the Air. But instead we'll just talk about what we remember about him. If we run out of conversations I'll invite Ward Silver, NOAX, to talk about Bonding and Grounding for half an hour.

So come join us for another COVID-free virtual meeting of the NADXC on Tuesday, March 9. We'll use Zoom again. I'll send you another invitation, but the sign-on will be exactly the same as in the past. I'll open Zoom for informal discussion at 6:30, and start the meeting at 7pm.



Thomas Kirby Duncan KG4CUY

August 20, 1953—February 24, 2021

**Upcoming Zoom meeting:**

**Tuesday March 9, 2021**

**6:30 PM open chat**

**7 PM meeting starts**

## From the Publisher

By Mark N4BCD

The sudden loss of Tom Duncan KG4CUY saddens us all. Tom was one of the first hams I met when joining the Huntsville club back in 2008. Even then he was an honorary member for his exemplary service to the club. As Tom became the Publisher of the NADXC club's LongPath newsletter, he solicited someone to take over publishing the VOX newsletter; and I volunteered.

I am honored to publish this LongPath issue full of memories of Tom.

Someone, I think it was Kevin K4IVE, said in the Feb 26 club Zoom meeting that when Tom talked, everyone stopped to listen. Tom's wit and thinking, whether a rejoinder or a considered response after careful thought will be remembered and cherished. He was an expert on so many things.

We'll miss you Tom.



## Memories of Tom KG4CUY

By Members of NADXC & HARC

Chuck Lewis, N4NM

"All the things Tom did for me and for our extended community have been articulated very well and reflect his character. Tom and I shared a love of Classical Music and often traded emails and YouTube links of great performances. We were both involved in Mentoring a High School Robotics team, too. I'll miss all of that. But the loss I feel is more fundamental; Tom was one of the rocks I have in my personal yard: you know, the yard you see with your inside eye. It has all the really good things you treasure...your values, your loves, your successes, your hopes, your wishes, and for most of us, a few rocks...really solid rocks we can lean on...sources of stability, beacons of wisdom and good sense. I have a few. Tom was one. And now there's a big hole in my yard."

Jim Spikes, N4KH





## Memories of Tom—continued

"I will remember Tom for so many things. I don't know where to begin. His practical knowledge of radio and electronics seemed almost limitless. More importantly, he was quick to share that knowledge and help anyone, while doing it in a kind and often humorous way. Tom was humble and didn't talk down to people that knew less than he did. I never heard Tom say anything bad about anyone. His numerous HARC and DX Club programs were top notch and entertaining. And when he was auctioneer we were all in for a treat. He could make an old power cord or speaker sound like your next best ham shack accessory.

Tom helped me with the 40m CW station at Field Day each year. He was always on site early field day morning, had everybody's antenna locations marked off, and our station's antennas assembled and starting to go up before I even got there. Then he would go help put up other station antennas. Yet after all his hard work, Tom resisted taking a turn operating the radio, saying didn't want to hurt our score. Tom was a much better CW operator than he gave himself credit for.

Tom's example is one we would all do well to follow. Rest in peace my friend, we are blessed to have known you."

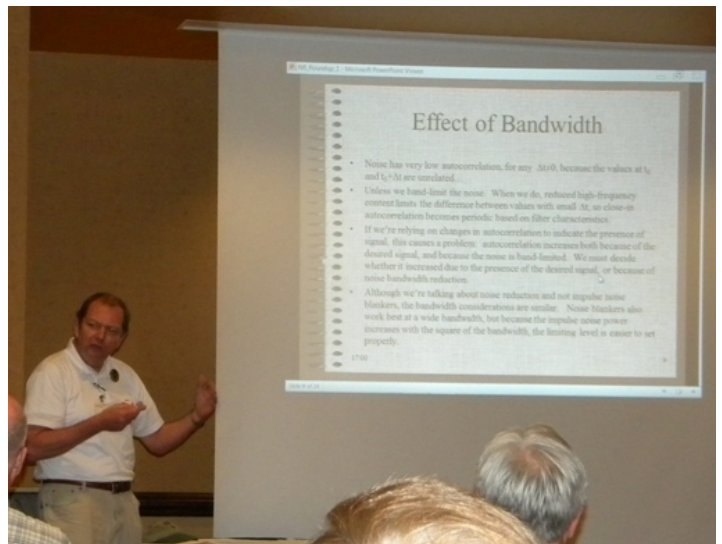
Steve Werner, AG4W

"He was always willing to help others"

Steve Conklin, AI4QR

"Tom was such a mentor to everyone he encountered. When I was first licensed, I was talking with him at a meeting about all the options I had for an HF antenna, and I was worried about living with a mountain between me and Europe. Typical engineer "analysis paralysis".

Tom said "Don't over-think it. Get an antenna up. Grab some wire, make a 34 foot dipole between some trees, and get on 20m. Put it as high as you can reach with



## Memories of Tom—continued

whatever ladder you have."

I did that, and made my first contact with Turks and Caicos, then a handful of U.S. contacts, and never looked back."

Chris Reed, AI4U

"Chris Reed, AI4U shared "Tom was excited to become a "HAM" or Amateur Radio Operator. Less than a year after earning his license, Tom ran for office with the Huntsville Amateur Radio Club in 2001. Tom was elected Vice-President and me the President. I had never chaired a meeting, and had much to learn about leadership. Tom provided me with advice and encouragement.. He also shared his humor and laugh in that Tom way. He loved communicating in Morse code. Tom became proficient in the code and was elected President the following year. That was just one of many leadership roles that Tom would fill for multiple organizations. Tom also served as an instructor to help others get their Amateur Radio license. That was Tom. Always helping others. Tom lived by the commandment "love thy neighbor as thy self". He didn't say it. He didn't have to."

Dr. John Stensby, N5DF

"Tom was the type of person that I wish there were more of. He was always ready to lend a hand. His advice was always "spot on" and exactly what was required. On most things, he was a great source of knowledge and practical experience. He had a terrific sense of humor and could crack a joke that would lighten up any situation. I miss him."

Anita Vibbert, KD2KAG

"My husband and I are sitting here in relative shock and amazement...He was healthy and kept active and his weight down...No reason to expect such an occur-





## Memories of Tom—continued

rence. We have no way to know what is coming and, while I comprehend that, inside I still can't come to terms easily with it... To both of you who knew him so well, my condolences...I only had the privilege to have been around him peripherally and surely did enjoy the few conversations I did have with him! and also enjoyed his Dx presentations...and the fact that he made the theramin and did a presentation...and engineered our coffin funeral! I have had great affection for him in just a few years so, again, my condolences to you who knew him so much better."

JohnStrohm, WB5Y00

"Requiem aeternam dona ei, Domine, et lux perpetualuceatei. Requiescat in pace. Amen.

Tom was one of those guys. You never knew what he was going to do next, until he showed up at the club meeting with a new project show-and-tell. The theremin, the analog computer, the UHF data link I think was his, the "interesting tubes" talk and demo box, those are the ones I remember off the top of my head, and my memory isn't what it used to be. And then there were the auctions. Part of the fun was Tom's antics during the auctioneering. You never knew what he was going to say or do next.

It is going to be a while before someone manages to step into his shoes." "Mighty big shoes..."

Bob Burns, K4RHB

"This is indeed sad news. Tom helped me get the Technician Class Course going my first year as Training/Education Coordinator. He had a wealth of knowledge about Ham Radio and electronics. Tom will be sorely missed!"

Randy Moore, KS4L

"So shocking and sad. Tom will be missed by many!!!



Billy Gold, KM4BGF

"Tom was one of the smartest, wittiest and nicest people I have ever met. Tom has done so much for the Ham radio over the years and the Huntsville Radio community will never be the same without him."

## Memories of Tom—continued

Condolences to his family.

It is very sad for all. I'll certainly miss Tom and his enthusiasm for life, ham radio, and DXing, but mostly his friendship for so many years. I remember his excitement when he earned DXCC!"

M.D. Smith, WA4DXP

"I am stunned. From the time I became active again in 2012, Tom was a good friend and one of the funniest and best humored guys I have ever met. I always looked forward to his program presentations. No matter the subject, we knew were in for an entertaining evening. His wit and humor with his side comments made me smile or laugh throughout the show.

Who could ever forget our auctions with Tom as our auctioneer? He had a way of describing even the worst of junk gear that made everyone want to bid on it, just because of the description that went with it. Sort of like a Pet Rock of yesteryear. He always participated in our other events, and was a big help to me for the Apollo Moon landing events in 2014 for the 45th and the 2019 50th at the Space and Rocket Center. Everyone knows he helped do everything at Field Days.

To say Tom will be missed, would be an understatement. There are hardly words to express how much I will miss him. I can't imagine how something this sudden is for the family. My prayers to all of them.

May Tom make fantastic DX contacts in Heaven. 73 to my friend."

Ritz, KO4LYX

"Reading all these wonderful tributes to Tom, the stories I'm sure I'll hear in the future, I'm deeply saddened by his passing. Yes, I'm sorrowful for his family and extended ham radio family, but to be honest, I'm selfishly grieving the fact that I never got to know this high caliber gentleman."



*The editor wishes to thank everyone for submitting the mountain (61MB) of photos. Not all could fit in this space and it was impossible to credit the individual contributors. Again, thank you.*



## The COVID Hamfest of 2020

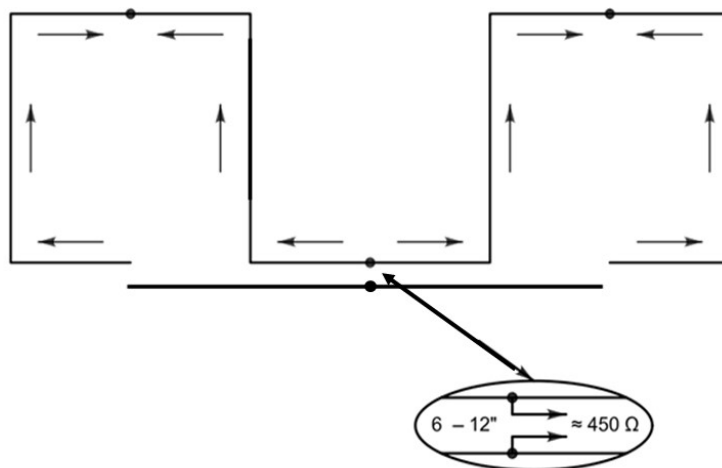


With Hamfest 2020 officially cancelled, some intrepid volunteers put on a “virtual Hamfest” in the parking lot of the VBC on Friday night, August 21. The volunteers performed multiple roles due to being short-handed. Tom easily managed to conduct Forums, Exams, organized the Flea Market, and still had time for 2m Talk-In.

# Antennas That I Have Built That Worked Well for Me

By Warren K4MMW

I love antennas. I particularly enjoy wire antennas because they are easy to build and when installed in trees they are very hard to see. The first antenna that I built was a twenty-meter Bruce Array. It was a four-element vertical phased array made from a single wire that is two wavelengths long.



I fed the antenna between the center of the array and the center of the ground line. The current directions are shown by the arrows in the picture above. The impedance of the antenna at this feed point is 450 ohms. I bought a 9 to 1 transformer and this antenna worked great. The antenna has a 5.1 dB gain over a  $\frac{1}{4}$  wave ground plane vertical. The details of this antenna are given in the ARRL Antenna Book, chapter 8 in the broadside array section.

What I learned by using the Bruce Array antenna. A high gain antenna gives you a narrow beam width. This produces a narrow footprint for your operating space if you cannot steer it. You need the ability to rotate or point a high gain antenna. The Bruce Array had a relative narrow beam width and this became a limiting characteristic over time. I kept making the same contacts while there were a lot of countries I could not contact. So, I replaced the Bruce Array with an antenna with a wider beam width and, of course, less gain. Nothing is free, it's always a trade-off. You have to determine what works for you at your location.

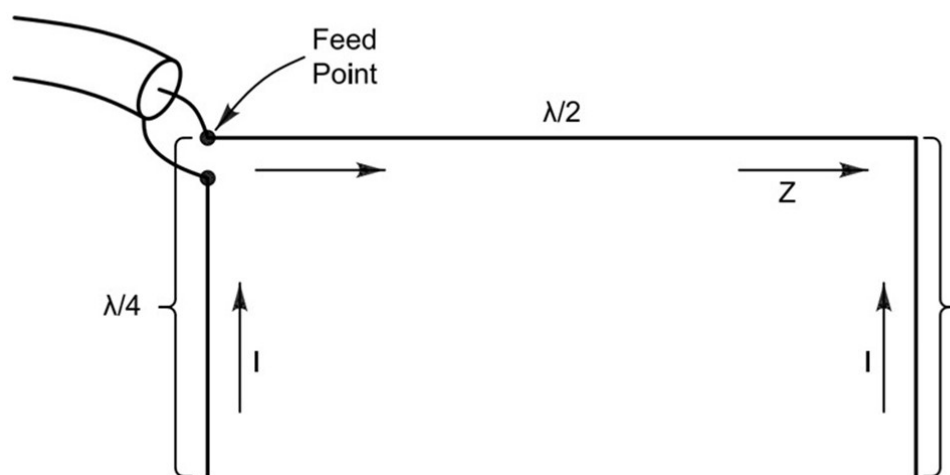
The Bruce Array antenna has a history. It was invented by Edmond Bruce while he was working at Bell Laboratories. Edmond Bruce and Harold Friis are the inventors of the rhombic antenna. Karl Jansky used the Bruce Array in his research of noise in radiotelephone transmissions across the Atlantic. Karl's research and findings helped to start the science of Radio Astronomy. You need to research Karl Jansky, Edmond Bruce and Radio Astronomy for the details. It's a great story but I want to point out that the Bruce Array antenna was part of that story.

Another great wire antenna is the Half Square. This is a 2-element phased array antenna producing a figure 8 pattern broadside to the face of the antenna. The antenna is  $\frac{1}{4}$  wavelength high and  $\frac{1}{2}$  wavelength long. It is fed in one of the corners and has a 50-ohm impedance. You do not get any easier than this. The only trick is to keep the feedline AWAY from the vertical radiating elements. If the feedline gets within 5 to 10 feet of the vertical elements it will change the impedance and the pattern, making the antenna useless. I've read stories of people complaining about this antenna not working. I had some trouble when I first built mine. But when I got the feedline separated from the vertical elements this antenna worked just like the book stated. I made two of these antennas for 40-



## Antennas That I Have Built That Worked Well for Me —Continued

meters and mounted them perpendicular to each other. One antenna gives a NE/SW direction while the other antenna provides a NW/SE direction. This provides a 360-degree coverage by switching between the two antennas. This is my 40 meter go to antenna when I want to get off shore from the US. This antenna (for me at my location) is much better than a 40-meter dipole at 50 feet when I'm trying to make a DX contact. This is due to the low take-off angle of the vertical antenna. This antenna gives a modest gain of 4.2 dBi.



The half square antenna is in the ARRL Antenna Book in Chapter 8 under broadside arrays. A Half Square antenna is easily scalable. This would make a great stealth 20-meter antenna because you do not need much height and wires disappear in bushes and trees. A 40-meter  $\frac{1}{4}$  wavelength is 32 feet, so you need 32 feet height and 64 feet length to use this on your property. A 20-meter  $\frac{1}{4}$  wavelength is 16 feet., so 16 feet height and 32 feet linear distance and this antenna fits your space. If you are a little short on height you can fold a few feet of the ends of the vertical elements back under the antenna. Details on this feature in in the ARRL Antenna Book. Also, you cannot see the wires of the antenna when you are 15 or more feet from the antenna. One last point. This is an unbalanced antenna; you will need excellent isolation where the feedline connects to the antenna. A good balun is necessary, otherwise you will have RF radiating in your shack. I know this!!

Warren K4MMW

### NADXC Officers and Directors

President	Bob De Pierre, K8KI
Vice-President	Steve Molo, KI4KWR
Secretary/ Treasurer	Chris Reed, AI4U
At-Large	Kevin Hibbs, KG4TEI
Directors:	Tom Duncan, KG4CUY (SK)
(Ex-Officio)	Steve Werner, AG4W

## Reason(s) for Liking My Antenna: BevFlex-4 Receive Antenna

By Bruce Smith AC4G

This month as I answer the data call for my favorite antenna and why I like it, I wanted to inform our readers of a high performance receive antenna called the BevFlex-4 that I have been using for a few years to receive weak signals on the low bands, particularly for 80m and 160m. My article in this month's NADXC newsletter will explain how well my BevFlex-4 receive antenna performs in all conditions and what attracted me to this design. In the past, Pixel Technologies began manufacturing and marketing this receive antenna system. Afterwards, JK Antennas manufactured and sold this antenna system. Currently, UNIFIED Microsystems Incorporated (UMI) are producing and selling the fabulous antenna receive system. They sell for about \$350.00. Some might think these kits are pricey, but I have to admit, it is a proven fact that this antenna system works great as my current DXCC 80m/160m totals attest to this fact. Let us discuss some details of the BevFlex-4 receiving antenna system. My BevFlex-4 receive antenna system can be seen in Picture 1.



Picture 1: AC4G's BevFlex-4 Beverage Receiving Antenna

Before I dive further, I must add that the recent ice storm to hit northern Alabama and southern Tennessee, caused a connector on the BevFlex-4's feed unit (one of the plastic boxes that comes with the system) to fail after a heavy, ice loaded cedar tree limb fell on one side of the antenna leg, but did not do a lot of collateral damage to the circuit board where it was mounted. The repair should be fairly benign and I hope to have it up and running very soon to finish out the next few months when the low bands are still in good shape for quiet low band DX conditions prior to spring time and before the low bands shift to a less optimal condition. Lessons learned, either do not hang under a tree or add a large relief loop of coax to absorb falling limbs. Picture 2 show the damage I received associated with the system's feed unit. More discussion on the particulars of the BevFlex-4 system to follow.



Picture 2: Damaged Feed Unit from the BevFlex-4 system during recent ice/snow storms



## Reason(s) for Liking My Antenna: BevFlex-4 Receive Antenna continued

The original design of the Beverage antenna has been around since 1910. The Beverage antenna consists of a matching transformer to match the shack equipment (9:1 match) to the terminating resistor (non-variable 450 Ohms, carbon resistor) terminated to ground on the far end of a long wire typically a 75 ohm system. The Beverage antenna is unidirectional as described above. However, an un-terminated beverage antenna exhibits bidirectional reception; that is receives equally well in both directions at the same time. Most of the time receiving a signal in one direction provides more gain and ability to receive and/or copy a signal. The typical Beverage antenna needs to be kept straight, but can wonder left and right and up and down to some degree. See Figure 1 showing the classic Beverage antenna schematic.

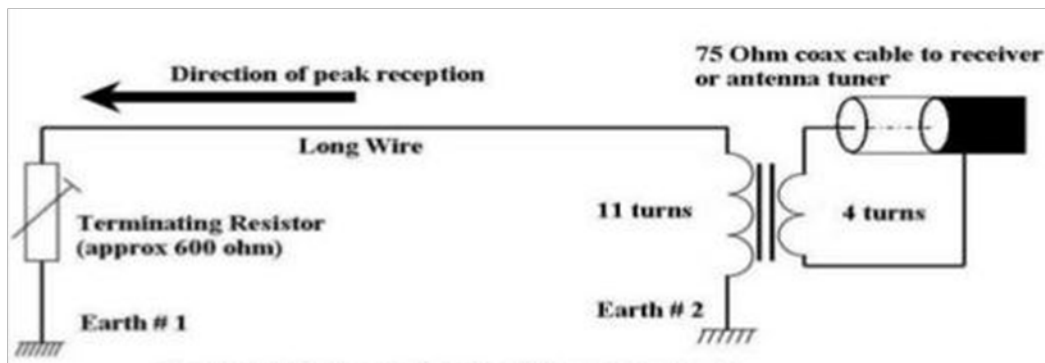


Figure 1: Basic Beverage Antenna Noting Direction of Reception towards Terminating Resistor

The BevFlex-4 system is four antennas in one depending on how one configures their particular antenna. This system provides any one of four variation receive antennas described below. A nice high dipole is a good transmit antenna, but you cannot work DX if you cannot hear the DX because of the high noise received on a vertical transmit antenna. In order to work DX, you need a receive antenna with high signal to noise (SNR) ratio (lower the noise if possible in order to pull out the intelligent signal of concern). The BevFlex-4 system can be configured to one of four receive antenna types which can also provide reverse direction switching: the Beverage antenna, Beverage on Ground (BOG), Inverted EWE antenna, or Flag antenna reducing the noise and pulling out the DX signals. The BevFlex-4 consist of four weatherproof boxes (see Picture 3) that allows one to configure their receive antennas to one of the configurations listed above. One of the unique features of the BevFlex-4 is that it uses RG-6 coax instead of wire. RG-6 coax is cheap (\$50 for 500 feet per roll) and readily available from your local home building stores such as Lowe's and Home Depot. The RG-6 coax is also used to feed signals received back to the shack.

Picture 3: Picture of the BevFlex-4 Kit  
allowing several configurations



## Reason(s) for Liking My Antenna: BevFlex-4 Receive Antenna continued

The difference with this antenna system and other Beverage antennas is it is all passive, meaning that there are no relays, remote switches, or DC on the feedline. All four configurations listed above use RG-6 television type coax for the antenna element and each configuration is reversible. The braided shield of the RG-6 coax is the antenna element. These antenna configurations are bi-directional. These systems also have lightning protection built-in. How does this antenna function? Reference Figure 2 below in this discussion.

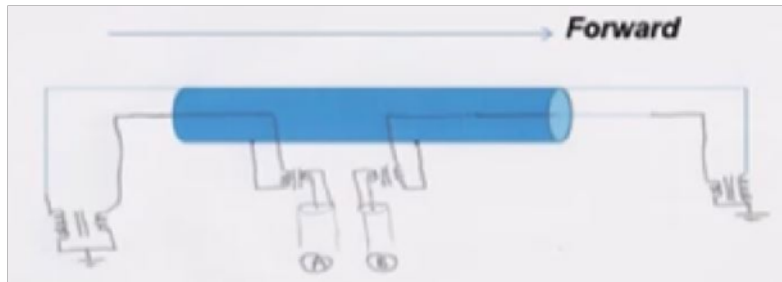


Figure 2: BevFlex-4 Basic Operation of Concept

In the classical “Beverage antenna” configuration, the termination resistor(s) is/are typically at the far end of the antenna. With the BevFlex-4 system, they are now reflected back to the shack depending which is the feed or termination direction. The termination resistors can be adjusted in the shack instead, rather than at the end of the wire elements where they typically are placed as with the classic beverage antenna. See Picture 4 showing the termination box and an internal look at the resistors in the BevFlex-4 system. Also, the antenna does not need to be fed at mid-point of the antenna, but any point along the antenna. As mentioned, the shield of the RG-6 coax making up the antenna (a long piece of wire) is the antenna element. At the far end instead of having termination resistors (Reference Picture 4 in this discussion), the antenna is impedance matched to reflect it back using the differential mode of the coax, then it is 1:1 transformed back to the ham shack and put in termination resistance at other end. This antenna sees in one direction. So both ends are reflected back, and depending which is termination or which is feed, you can switch the direction the antenna is looking. Reference Figure 2. When “A” is the feed line and “B” is the termination resistance the “forward” direction of Figure 2 is shown. The “reverse” direction is when “B” is the feedline and “A” is the termination resistance. Once again, using the shield of coax which is the actual antenna, and using the fact that the coax differential mode can transport the signal back and forth, signals are received and heard. RG-6 coax losses are insignificant and are good up to 10MHz.



Picture 4: (Left) Termination Resistance Adjustments & Forward & Reverse Direction Switch and (Right) Looking inside Termination Resistance Box

A summary of the specifications of the BevFlex-4 System discussed previously can be seen in Figure 3.

- continued-



## Reason(s) for Liking My Antenna: BevFlex-4 Receive Antenna continued

Specifications	
Antenna element:	75 Ohm RG-6 coax Beverage and BOG, Single conductor Flag and EWE
Feed line:	75 Ohm RG-6 coax
Antenna feed point:	Any point along length of antenna (Beverage and BOG)
Lightning protection:	Gas discharge tubes at each end
Overload protection:	Diode protection for close Tx antenna
Impedance match:	75 to 50 Ohm impedance match
Direction switching:	Forward / Reverse Switch
Design:	All passive components
Connectors	F-Female
Directionality null:	All passive components
Frequency range (length dependent):	150 kHz- 30 MHz

Figure 3: The BevFlex-4 Specifications

The BevFlex-4 Radiation Pattern for 500 feet, 1.8 MHz Beverage Antenna is shown in Figure 4. The gain is 15 dB having an elevation angle of 30 degrees and beam-width of 86.2 degrees. Obviously, for differing lengths of the coax shield (antenna length), the gain and other parameters of the antenna can be improved or changed. My experience has resulted in the longer the antenna length, the better the performance on the low bands than a shorter antenna as one would expect.

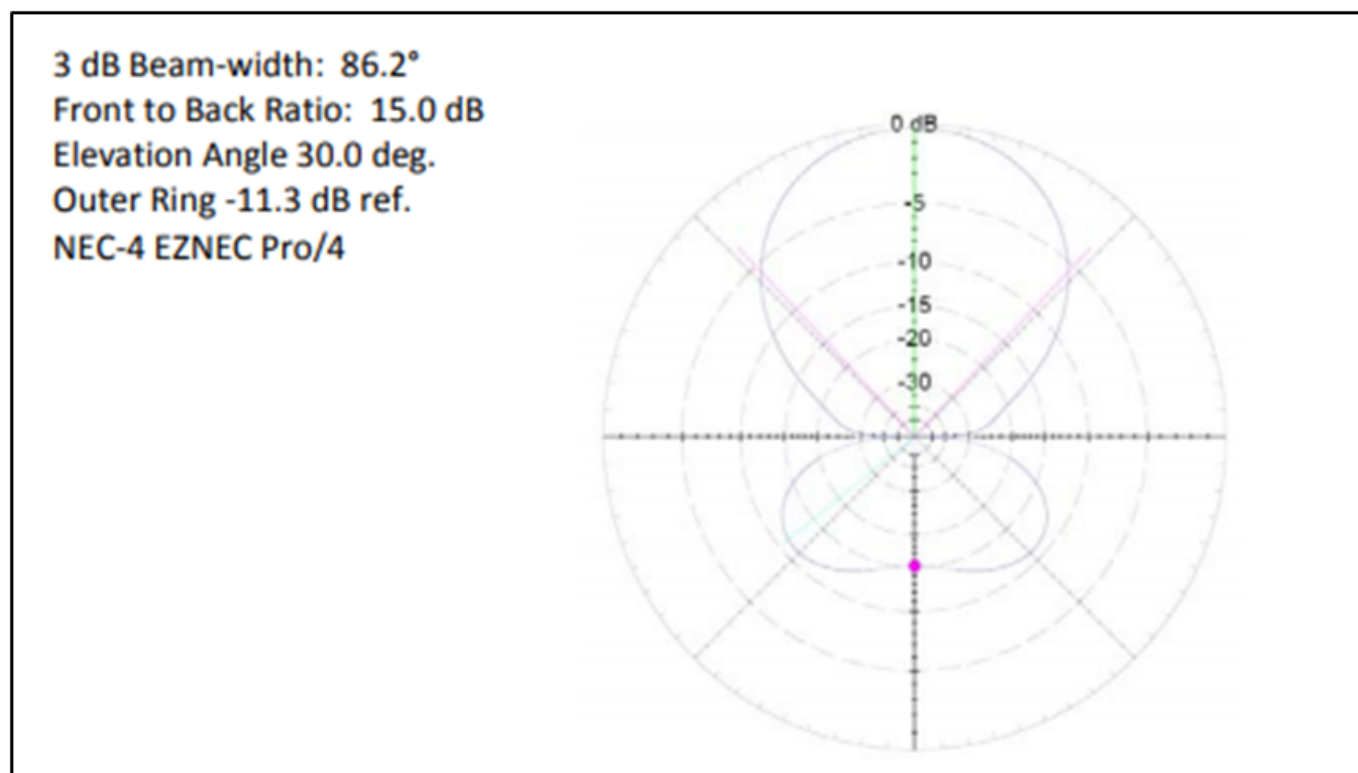
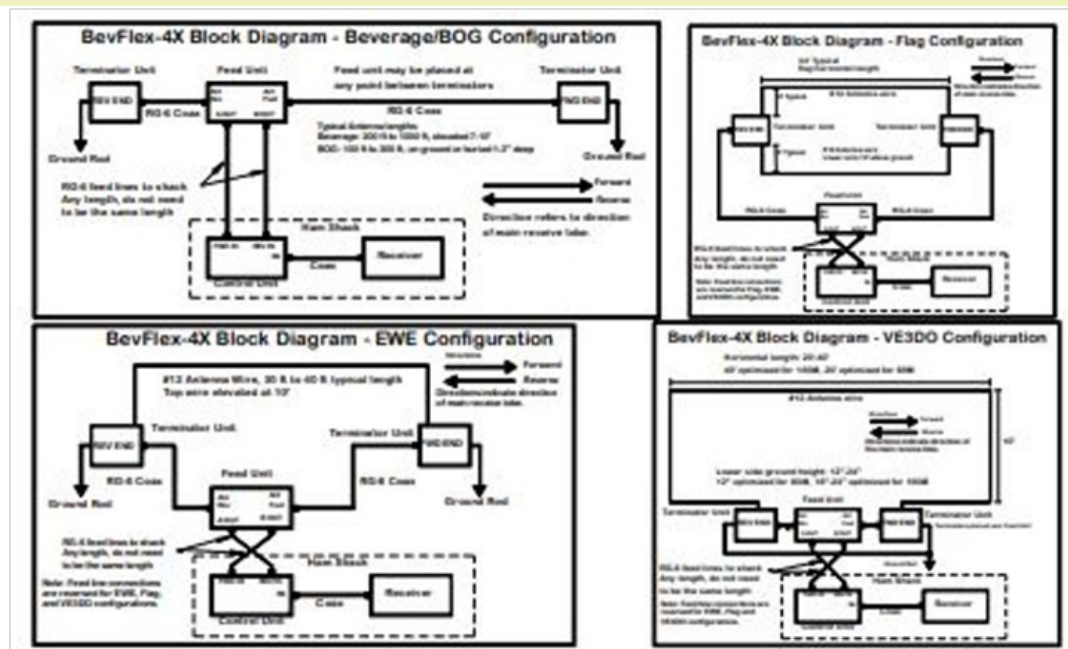


Figure 4: Radiation Pattern for 500 Feet, 1.8 MHz antenna

- continued-

## Reason(s) for Liking My Antenna: BevFlex-4 Receive Antenna continued

Figure 5: Block Diagram Configurations of the BevFlex-4 System



The Beverage/BOG, Flag, and EWE block diagrams are more than boxes. They should be physically configured using the plastic boxes contained in the BevFlex-4 system kit as shown in Figure 5. Operation of the physical BevFlex-4 hardware components are exactly the same as previously explained. The only difference in operation is how each component is attached in either of the four configurations shown in Figure 5. Each configuration has its benefits and shortfalls based on size, area to install, etc., but the gain, beam-width, and other parameters for each separate configuration is not the same and must be balanced by the installer. The ham must decide which configuration is best suited for their size of real estate as well as expected electrical performance.

How does it perform? In my judgement, one of the best ways to measure receive antenna performance is on-the-air QSO's. Yes, in the past we have discussed the relative directivity factor (RDF), the forward gain at a desired azimuth and elevation angle compared to the average gain over a hemisphere, but on-the-air QSO's put things into perspective. So, this antenna has allowed me to hear and make QSO's to stations as far away as the Indian Ocean looking east and looking west such as VK9C (Cocos Keeling); VK's (path varies from 9,000 miles to 10,500 miles); 3B9 (Rodriguez Island); and all Continents on 80m and 160m in between. These DXCC countries are located on the other side of the globe. Wow!

In summary, my experience has solely been with the classical Beverage configuration and it works great. I have experimented with different lengths and have noticed that the longer the antenna elements (shield of RG-6 coax), the better the performance to receive weak signals. Some local 160m operators have mentioned to me that I hear better than them in noisy band conditions. I have verified with other Beverages antennas that I have installed on my property that my non-BevFlex-4 antennas are much noisier than my BevFlex-4 antenna(s). To this end, I have to recommend the BevFlex-4 system for those hams wanting to operate the lowbands. Is the cost of \$350 worth it? In my humble opinion, I would not have worked several DXCC countries on 80m and 160m having extremely weak signals if I had been having to compete with the noise on those particular bands. The BevFlex-4 system greatly reduces the noise making the cost negligible. Therefore, I recommend this antenna system for any serious low band DX'er. With the ability to reconfigure the components as a EWE, Flag, or BOG configuration to fit a smaller lot and for those hams having more property than a small lot and able to stretch out a long antenna in the Beverage configuration, I recommend this antenna system for sure to all hams. It's a keeper for sure!!

If you are still undecided, come visit me and let's work some DX on 160m! The BevFlex-4 system will make a believer out of you. This is why my favorite antenna is a receive antenna called the BevFlex-4. de Bruce AC4G.



## A Tale of Two Mobile Stations

By Rob Suggs NN4NT

After the last club meeting Pres. Bob asked us to describe our mobile stations. I'll briefly describe 2 different ones I currently use. One is a permanent installation and the other is more of a go-box which I have used from the SUV (Santa Fe), picnic tables, pop-ups and cabins.



Permanently in the car is an IC-7100 driving a set of hamsticks through an MFJautuner. Hamsticks are notoriously narrow-band, hence the tuner. The rig is under the driver's seat and is grounded to the seat frame. The power comes through the "lighter socket" 12V outlet. I know it is best to connect directly to the battery but I haven't found a clear path through the firewall as yet. I can run the rig at 100w through that outlet when the car is running. No fuses have popped yet. My typical mobile operations consist of listening to 40m nets on the morning commute (when I had a commute prior to telework) and listening to W1AW code practice. I generally don't attempt contacts unless I am parked, especially with digital modes on the laptop.



The hamstick mount is a homebrew aluminum plate on the trailer hitch. A ground braid runs to the rear lift gate latch.



The tuner is tucked in the under-deck storage and connected to the cargo area power outlet.

## A Tale of Two Mobile Stations— Continued



The 6U go-box is more elaborate and an earlier incarnation was used from the rear seat of the vehicle during ARRL National Parks on the Air activations. See my QRZ.COM page for pictures. That was a Yaesu FT-897 and manual tuner. The current system is an Icom IC-7300 and LDG AT-200 Pro II autotuner. There is also a Samlex switching power supply for when shore power is available.

The antenna for this setup is typically a G5RV Jr. supported by a tripod and crappie pole or trees when available. I've worked several contests with this and it comprises one of our 2 stations at NASA MSFC ARC Field Day and Winter Field Day operations at the Von Braun Planetarium on Monte Sano. It is typically the CW and digital station while the other station (FT-950 or another IC-7300) handles phone. Both of these mobiles work very well and I've had a lot of fun with them.

73

Rob

## Antenna Targets of Opportunity By Steve Werner AG4W

Some antennas I have done a lot of study to pick the right antenna for my needs. My quad and tower, 80 meter delta loop, 160 meter vertical and beverages fell in that category. I am amazed how many of my antennas came into being as targets of opportunity. My 3



element 40 meter parasitic vertical array is one of those antennas. It is one of my best antennas for contesting and DXing.

That antenna started out because I won a WXOB Stack Match at one of the Dayton Banquets. They are normally used to select any or all of three



yagis on the same band usually on a very tall tower. Unfortunately it did not



motivate me to put up a 120 foot tower with three -8



## Antenna Targets of Opportunity—Continued

element yagis for 20 meters. Instead I read you could build a three element parasitic vertical array using the stack match box to pick the direction. This can be used to drive one element with 2 reflectors, 2 elements with 1 reflector or drive all 3 elements. This antenna performs extremely well because I installed a large number of radials and even tied the ones together that overlapped. I designed and build each of the verticals from telescoping aluminum with some double wall for increased survivability in high winds. The verticals were each mounted to 4X4 treated lumber and required no guying. The only failure I have had with this antenna has been due to a rodent eating the coax. This would of been a fairly expensive antenna that I would not of done had it not been for winning that Stack Match. I also would have never guessed it would perform so well.

Another target of opportunity came when I acquired a DX Engineering receive 8 circle vertical antenna from N4KG, Tom Russell's estate. This antenna was given to Tom, but he never installed it because it had been destroyed by lightning. After inspecting each of the electronic boxes that included the 8 interface boxes, the control box that operates inside and the relay matching box outside I found they all had lightning damage. Some of the damage was easy to discover due to the black marks on the components or board. Other parts were much more difficult to find. I was very lucky to have K8KI, Bob DePierre help me discover how the antenna worked since no schematics were available. I like to have schematics for my radios, amplifiers and other equipment. Without them they become extremely difficult to repair. I had to bury 1000 feet of coax cable and about 200 feet of control cable to install this an-



tenna after I finished repairing the electronics. It usually performs better than my beverages on 160 and 80 meters, but not always. I have heard many times you can never have enough good receive antennas.

My 2 meter EME antenna came from a redesign of my old Cushcraft 20 element satellite antenna. I had not used it in over 10 years and it was my inspiration to try EME on the cheap. I decided to make two- 11 element Loop Fed Array (LFA) yagis using the GOKSC design. I found another 2 meter yagi at the Dayton hamfest that had the extra aluminum I required for the boom and additional elements. Originally I configured the antennas with vertical polarization. After 2 years I added 2 elements and went to horizontal polarization. With that antenna and a kilowatt I have worked over 200 unique stations on EME.



Before I even installed the antenna I upgraded my old Alliance Tenna rotor elevation rotor to a Yaesu G-550. I also used my old ARR 2 meter pre-amp I used for satellites and some high power relays I purchased at an amazing price at the Huntsville Hamfest.



As I walk through hamfests I always have a watchful eye for targets of opportunity. You many times have to look beyond what initially looks like junk and imagine how they can be repurposed into a treasure.



## My Antennas

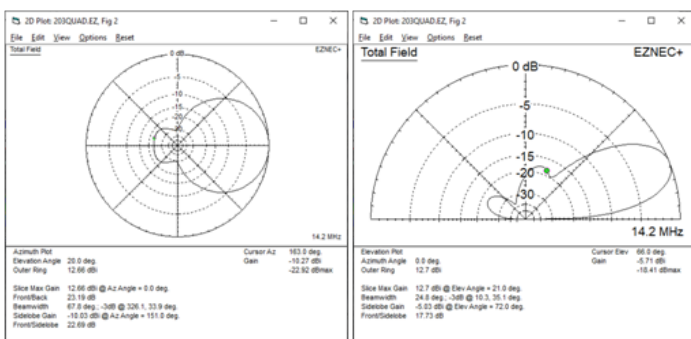
### By Bob DePierre

I've been through a number of yagi antennas and towers over the years. All had been at least second hand and the last of them departed 8 years ago. The system I'm using now is a Universal aluminum tower and the Cubex Mark III, 5-band, 3 element Quad antenna at 40'.

I had been using Rohn towers for years. They were heavy, but stout. Then I tried an aluminum tower. Hard to believe, but you can pick up a 40' aluminum tower with one hand. Mine is a free-standing tower; I have too many trees that fall down. I didn't want one to hit a guy wire. My tower's base is in concrete.



Yagi antennas are easier to install, but multi-band yagis have traps. I didn't like traps (make the SWR bandwidth too narrow) and I wanted something to cover the WARC bands. My Cubex accomplishes this. I also wanted the highest reasonable gain and the lowest launch angle. My EZNEC simulation showed a max gain of 12.66dBi with a 20-degree takeoff angle when installed at 40'. I couldn't find another antenna that would perform at this level.

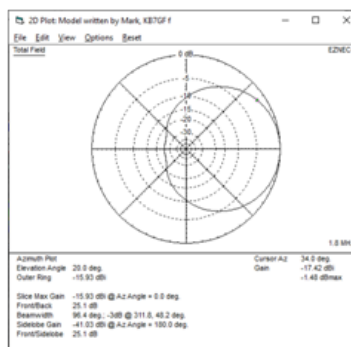


The 3-element quad is a 3-dimensional dragon to install. You can wire each of the elements on the flat ground, but once you assemble the elements to the boom, you have to strap the boom to the tower. That took some effort. The antenna weighs 65 pounds, so you better do some push-ups before you muscle this beast to the top. I was 65-years old when I dragged it up, but I had a gin pole and an antenna party to help with the chore. You'll need a remote antenna switch to mount on the boom, so you'll have cables for the RF, antenna switch, and rotor running down the tower. The feedpoints for each band are only a few inches off the tower, and well below the boom, which makes for easier maintenance. The 2:1 SWR bandwidths are wider than each of the ham bands it covers, so I hardly need a tuner. (I really, really don't like to use high power antenna tuners). The Cubex quad cost around \$1250 and the Universal tower cost around \$1400. Eight years later I consider that a bargain.

The AS-SAL-30 Shared Apex Array Receiving Antenna

### The AS-SAL-30 Shared Apex Array Receiving Antenna

DX antennas for the lowbands are a special problem. For years I just used my transmit antenna. If you use a horizontal antenna it needs to be extremely high, or it just radiates vertically. If you use a vertical antenna, you probably get a negative number for gain. And you can't rotate it like you can an antenna for the high bands.



## My Antennas—Continued

Many use a Beverage antenna for lowband receiving. But Beverages are extremely long and you can't rotate them. After a lot of looking I finally decided to attack the lowbands with a Shared Apex Array antenna from Array Solutions. There are a number of excellent videos from its designer on YouTube. Those videos convinced me. The size of the antenna is remarkably small. Its center pole is about 30' tall, and it comprises 4 loops which are isosceles triangles. Each of the loops has a transformer that feeds a amplifier/combiner unit at the center of the antenna. A 75 $\Omega$  cable then runs back to your shack where it connects to a controller unit. The controller unit electronically rotates the antenna in 45° jumps. You can see from my EZNEC simulation that the directivity is quite good. There is a quality factor for lowband antennas called the Relative Directivity Factor (RDF) that we often use to compare the alternatives. The RDF can be calculated from EZNEC, and it is equal to the Max Gain minus the Average Gain in decibels. For the SAL-30, the RDF is 8.63dB. There are a lot of factors to consider, but for the advantages and the size of my property, I finally decided that the SAL-30 was the best option for me. The SAL-30 is available from Array Solutions and costs around \$900.



The advertisement features a large photograph of the GigaParts store building on the left, with a blue GigaParts service car parked in front. To the right of the building are two handheld ham radios and a black radio scanner. Below these images is a horizontal bar containing logos for various brands: YAESU, KENWOOD, ICOM, MFJ, C★MET, ALINCO, and HEIL. The main logo 'GigaParts' is prominently displayed in blue, with 'Technology Superstore' in red underneath. Below the logo, the text 'Everything you need for your next Ham Radio Project!' is written in bold, followed by 'Rope • Coax • Connectors • Tools' in red. At the bottom, contact information is provided: a phone icon with the number (256) 535-4442, a website icon with www.gigaparts.com, and a location pin icon with the address 1426-B Paramount Dr, Huntsville, AL 35806.

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