JULY 2022

NEWSLETTER

PROPAGATION

LONGVIEW EAST TEXAS AMATEUR RADIO CLUB

HF VERTICAL ANTENNA ISSUE

LETARC Activities

LETARC held our monthly meeting on Saturday, July 23rd, 2022. We were glad to have Paul Bradley KD0NG and Nathan Chilton N5NDC as guests that day.

Our next LETARC dinner social will occur on Tuesday, August 9th at 6:30 P.M. at Papacita's Mexican restaurant located at 305 W Loop 281, Longview, TX 75605. Thanks to Dave KL7BX, dinner coordinator.

IN ARRL VE TESTING NEWS Imre Forro KI5WJP of Gilmer, Texas upgraded from General to Extra. Our friend and Vice-President Bert Sharp KI5DYI also reported that he has upgraded to Extra. A big congratulations to both gentlemen from LETARC.

LETARC Field day 2022

LETARC operated in the ARRL Field day event from Mims Volunteer Fire Department near Avinger, TX. Many thanks to our President Ross Bennett KI5SR for organizing the event and for staying up at Mims for 24+ hours. Many of our hams came out and had a good time. James Wark AG5MP made his first HF contact and Peter Xu K1GER had his first voice HF contact. Congratulations to both!

Many hams have complained about the band conditions during field day. It seems as though our hex-beam antenna at Mims helped us have a better time than some other clubs. A huge thank you to Jim Perry KA5BCM and Jim Rogers N5VGQ and everyone that has helped create our station at Mims VFD. It sure is nice to have an air conditioned radio room in June.

Ross KI5SR and Peter K1GER at Field day

Peter K1GER logging SSB contacts

John AE5OY takes a break during FD

LETARC meeting minutes from Saturday, July 23rd, 2022

I. Opening ceremonies - meeting called to order at 9:12 A.M.
   A. Invocation - John Zenter
   B. Pledge of Allegiance - John Zenter
   C. Welcome and introductions

II. Adoption of agenda

III. Reading and adoption of minutes

IV. Reports from officers
   A. President - not present
   B. Vice President - not present
   C. Secretary/treasurer - not present
   D. Media director - The Shreveport hamfest is Saturday, August 13th. The Texas QSO Party starts Saturday, September 17th.
   E. Communications director - not present

V. Report of the board
   A. none

VI. Reports by members
   A. none

VII. Program
   A. none

VIII. Unfinished business

A. APRS Digi-peter progress - Dave KL7BX and Jim N5VGQ have equipment to build an APRS digi-peter and would like to set it up on Richard K5RRB's tower North of Longview. We need someone to climb the tower and to coordinate a schedule for installation.

IX. New business

A. Kilgore Broadcast Museum - The Upshur Area Amateur Radio Club has expressed interest in touring the Broadcast Museum. Discussion was held about combining a tailgate sale with a museum tour one day with the permission of the owner, Chuck Conrad KD5TZT.

X. VE testing headcount

A. We have enough VE's

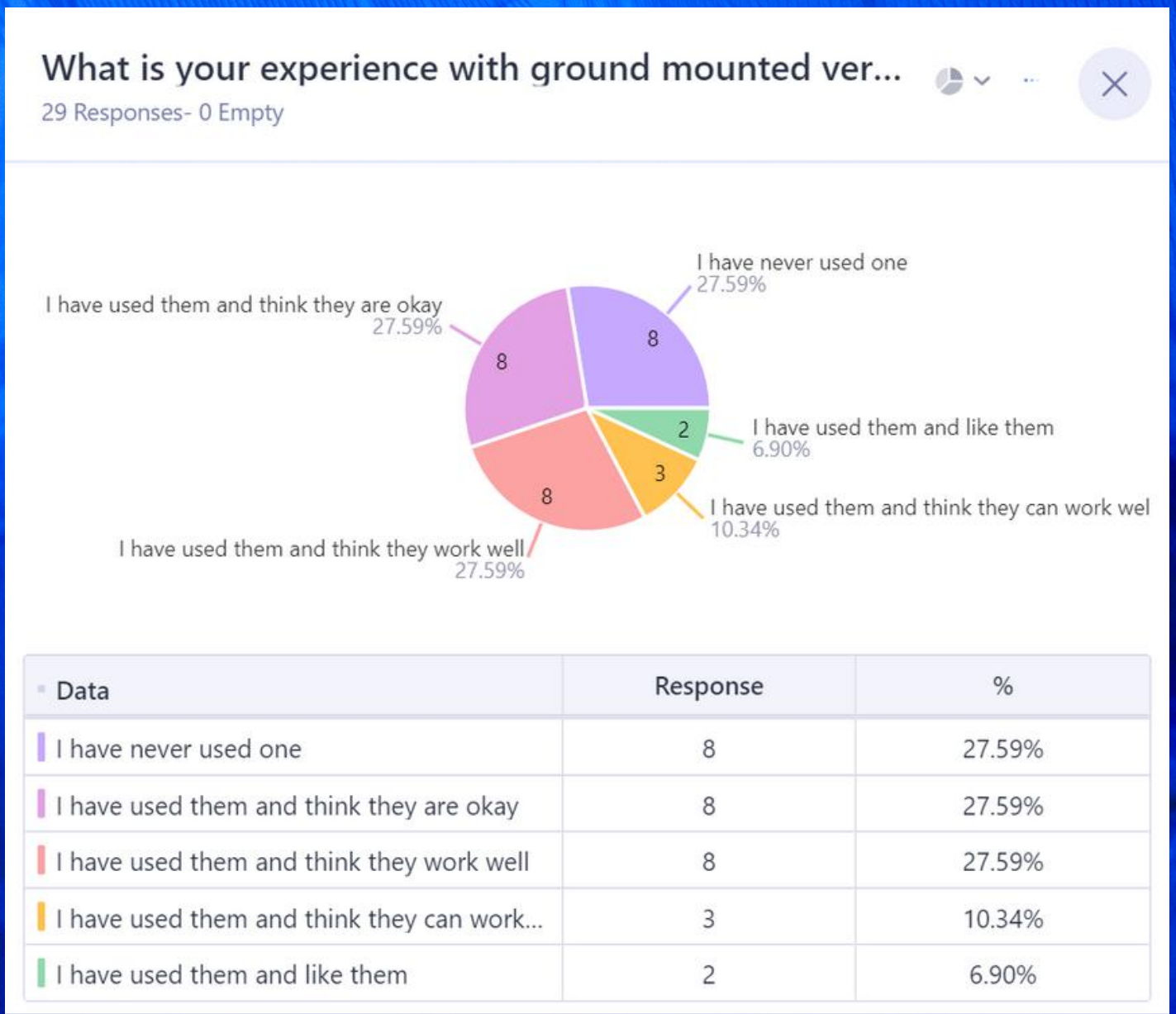
XI. Adjourn - 9:39 A.M.

Wolf River Coil coil section

LETARC Survey

"What is your experience with HF verticals antennas?"

27.6% I have used them and think they are okay
27.6% I have used them and think they work well
27.6% I have never used one
10.3% I have used them and think they can work well in some cases
6.9% I have used them and like them



Data	Response	%
I have never used one	8	27.59%
I have used them and think they are okay	8	27.59%
I have used them and think they work well	8	27.59%
I have used them and think they can work...	3	10.34%
I have used them and like them	2	6.90%

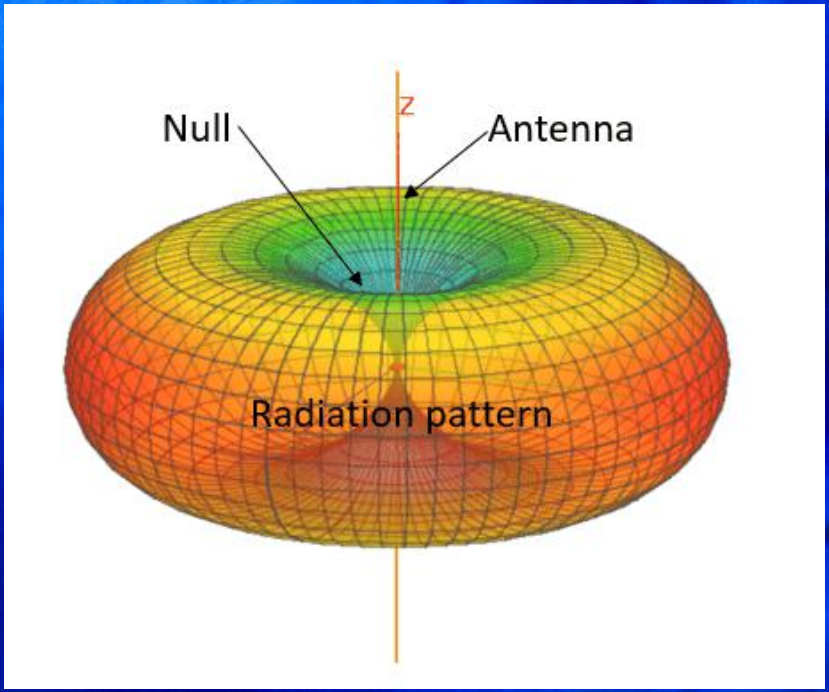
Vertically polarized HF antennas

The first antenna we learn about in amateur radio is almost always the half wave dipole. For HF purposes a center fed dipole is often deployed horizontally or in an inverted V configuration.

Many amateurs do not have the space for a dipole resonant on 7 MHz or 3.5 Mhz. Enter the vertical HF antenna. By rotating our antenna elements 90 degrees we can change how the antenna is deployed.

There are several variations on this antenna. Bert Sharp KI5DYI did a good presentation in January about vertically polarized center fed dipoles. Keep in mind that the coax for these should be horizontal to the dipole elements.

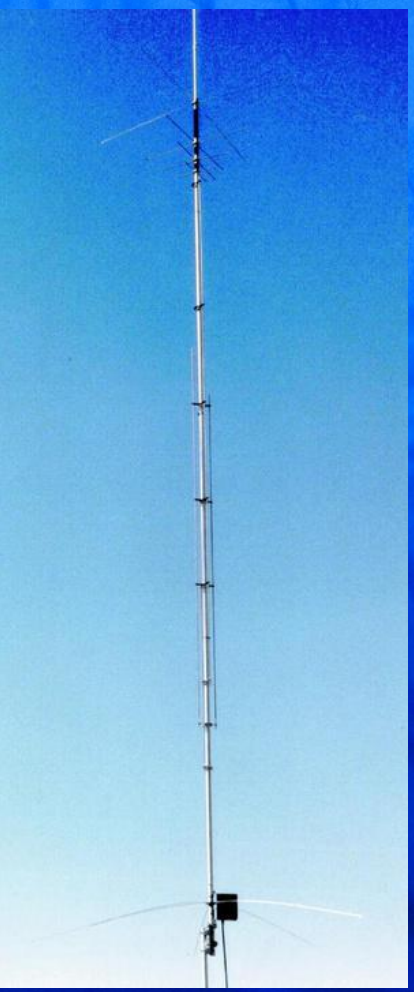
Radiation pattern of a vertically polarized HF antenna



Another variation is the ground plane antenna. This is still a dipole, but instead of one antenna element connected to the shield side of the coax there are two or more.

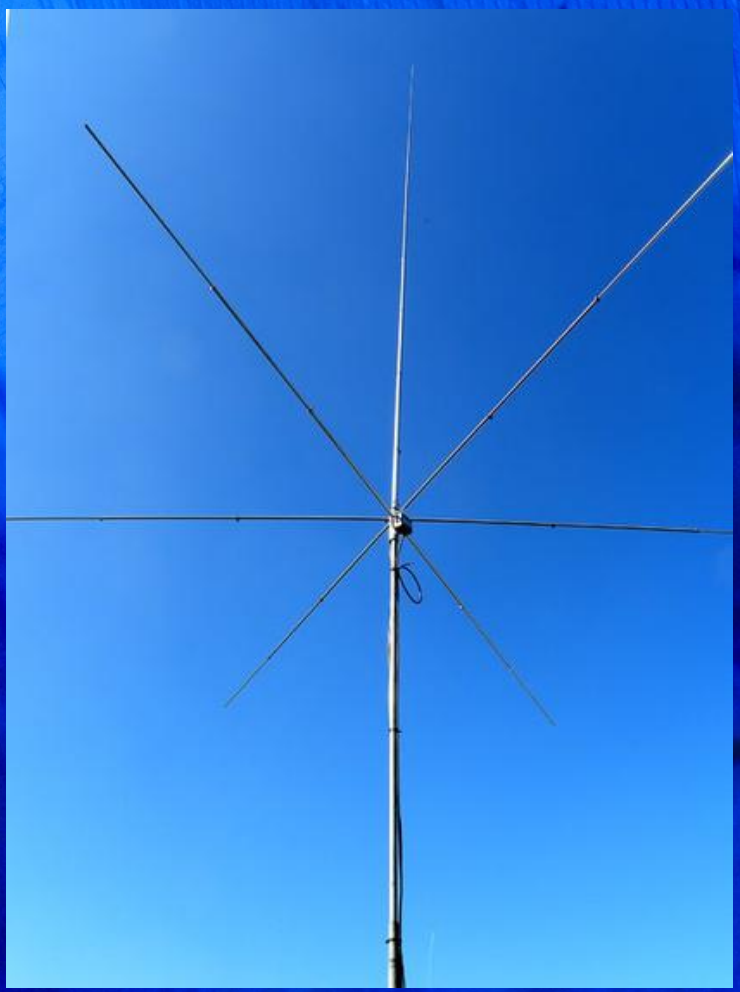
Ground plane antennas deployed in the air need fewer radials but they must be tuned. For example, a 20 meter dipole would have a vertical element about 17 feet and 2-4 radials deployed diagonally that are also about 17 feet.

Ground plane antennas that are ground mounted have the radials laying or slightly buried in or on the ground. These radials are often "detuned" once on the ground and the length is less critical. Ground mounted verticals often have many radials to improve the effiiciancy of the antenna.



A ground plane HF vertical

A Hy-gain AV-640 ground mounted vertical HF antenna



Many verticals are multi-band. Some achieve this through the use of traps or LC networks. One option is to use a 43 foot vertical element and many radials and use a remote tuner at the base of the antenna. Callum McCormick M0MCX of Youtube stardom sells a fan vertical, the DX commander.

There are some pros and cons to ground mounted verticals. On the positive side they usually take up less real estate and are often good for DX as they have a low take off angle for radiation. Multi-band capability is also useful. As far as negatives with verticals, first we have the issue of noise. Most noise is vertically polarized and may be troublesome to an amateur. HF verticals are also sometimes "deaf" to stations within a few hundred miles due to their radiation pattern. If a vertical uses traps often the lower bands will have a very limited bandwidth. Most verticals make you choose between the 80 meter CW/digital part of the band and the 75 meter voice portion of the band.

So what verticals are available?

That is quite a question. There are hamsticks, which are usually mono-band. Several companies make metal telescopic antennas that you extend to the length that you need. There are always companies ready to sell you an antenna, but take their claims with a grain of salt. Here is a list of a few antennas, click on the title to be taken to their site.

DX Commander fan vertical

Chameleon MPAS Lite

Hustler BT series of antennas

Butternut antennas (now part of DX Engineering)

Hy-Gain and Cushcraft series of HF antennas (MFJ)

Steppir verticals

Wolf River coils TIA portable antenna

Buddipole portable verticals

Hamsticks from MTC.com

Skip Brown AK5SB shares pictures of his Hustler 6BTV HF Vertical - Thanks Skip!

A close up of the 12 Meters add on section

Skip's 6BTV Vertical

Dave Luchak KL7BX shares info and pictures of his Butternut HF9V Vertical - Thanks Dave!

From Dave - So..... You're thinking about installing an HF Vertical Antenna for your station? There are NUMEROUS antenna publications on the market that can help guide you through the decision-making process of choosing a vertical antenna that would be right for your needs. I can't possibly cover them all in a this article, but here I will address some features, pros/cons of HF vertical antennas, and my personal observations and experience with them.

A. Here are some of the very BASIC points to ponder, EXCLUDING monetary limitations, HOA restrictions, or property Covenants that may affect your ability or freedom to use a vertical HF or other Band of antenna on your property. These are NOT all the items to consider. I'm sure I have missed some. They are NOT listed in any sort of prioritized order.

1. How much land area/real estate do you have available to work with, to practically & safely locate a(n) HF or other Band Vertical antenna?

2. How many different Bands do you want your vertical antenna to be able to cover?

A. Mono-Band antennas generally have wider usable Bandwidths, compared to multi-band antennas, due to the requirement for length-compensation devices on a multi-band antenna system. Antenna-length compensation devices (traps, coils, L-C networks, etc...) generally reduce usable bandwidth as compared to a straightforward mono-band antenna.
b. Multi-band antenna tuning can be more complex and time-consuming for initial setup as compared to a mono-band antenna tune-up procedure.

3. How will you route the feedline from your radio ops location to the antenna? (Aerial , laid on the ground, or buried?)

4. How long of a feedline run will be practical, for feedline signal loss considerations? (HF losses aren't as serious as VHF+.)

5. Will the HF Vertical be "ground-mounted", or raised on a mast above ground? (Does antenna require a "ground plane"?)

6. How will you provide a usable "ground" (the OTHER half of a typical vertical HF antenna), regardless of which mounting height you decide to use? The grounding half of the antenna simulates the operation of making your vertical antenna into a basic "dipole" antenna, that is vertically polarized, vs. a typical horizontally polarized antenna.

7. Will the antenna be out in an open area, subjected to high winds, or will it be relatively protected? (Will it need to be guyed?)

8. Are there any overhead electrical lines nearby that could be inadvertently contacted during antenna installation/repair work?

9. Are there any BURIED utilities in the area you intend to use your antenna, that could impact or prevent a practical installation? (Electrical power lines, phone lines, cable TV cables, water lines, septic lines, etc....)

10. Will the antenna be accessible by humans, whether transmitting or not? (RF Safety Hazard, & antenna damage prevention.)

11. How effective is a vertical antenna, as compared to a horizontally polarized antenna? (Will receive signal strength be usable?)

A. The typical type of vertical antenna is referred to as a “Marconi” style antenna, which refers to a radiating element mounted vertically either on the ground, or at some height above ground, which forms only the “Positive” or fed HALF of the overall antenna “system”. There needs to be an opposing Negative “Half” of the antenna system, to make the overall system work properly. (Think about the “ground plane” requirement for a typical MOBILE vertically polarized antenna system. Without the “ground plane” surface on a vehicle providing the second half of the antenna system, your antenna won’t be very efficient, or effective.)

C. Now, I will pass along my personal true-life experiences concerning my present multi-band Vertical I am presently using a Butternut HF9V Vertical HF Multi-Band Antenna system at my residence. It covers 6 Meters thru 80 Mtrs, right out of the box, with the option to ADD on a 160 Mtr Band Kit. HF antenna.

I chose it for numerous reasons, but basically it was the most effective choice of antennas to just get me "on the air", on multiple bands, without extreme expense, and without having a tall tower and antenna(s) available to me for HF operations at the time. I also have a large, spacious area available to locate my vertical antenna. I also don't have any children living at home, reducing the risk of RF Safety Hazards to humans, and also limiting possible antenna damage from human vandalism/accidents, lawnmowers, etc... My antenna location is also fairly well protected from high winds, by numerous tall height trees surrounding my antenna location, which pretty much eliminates the need for any stabilizing guys on my 26' tall vertical antenna. (I have also previously used HY-GAIN 3-Band and 4-Band ground-mounted Vertical HF antennas, at previous residences, during my active duty military service and being bounced around to several assignments in the U.S.)
I chose to ground-mount the 9-Band HF Vertical antenna out in an open area of my yard, and feed it with LMR-400 Coaxial Cable enclosed inside 1.5" ID PVC Conduit, all buried roughly 15" below grade level in the yard. Line losses for ½" OD style coaxial cables aren't extreme, over longer distances, when used at HF frequencies, as compared to VHF and higher frequencies, so my distance is a bit longer than most, from my operating equipment. My feedline is approximately 200' from the radio to the antenna feedpoint.

I chose multi-band over mono-band, simply to give me the capability of using more bands without the expense, and hassle of having multiple feedlines for separate band antennas in the yard. There is ALWAYS a compromise when choosing one over the other.

It is really a personal choice on your part, to decide whether better bandwidth (mono-band) is more important, or more bands available to use (potentially narrower bandwidth on each band, & more complex tuning).

The LOWEST frequency band you choose to operate will determine the overall height of the antenna system, and whether or not it uses compensation devices (tuning coils/L-C networks) to reduce the overall height. More height means higher risk of needing non-conductive stabilizing guys to prevent wind damage, etc...

Tuning a multi-band antenna requires more extensive tuning procedures, because one band tuning process may interact with another previously tuned antenna section for a different band, and may require bouncing back and forth on the tuning procedures, before getting everything “perfect”. On a tall height multi-band antenna, that could mean dismounting and re-mounting the entire antenna from the mount base numerous times, to tune the highest elements of the antenna. The larger the physical diameter of the radiating element, the wider the bandwidth will be. Large diameter tubing elements are sturdier than simple wire conductors, but can become unwieldy if trying to dismount/re-mount a tall vertical antenna by yourself.

My Butternut HF9V antenna has 32 buried ground radials, consisting of 16 each 65’ length runs of 18 gage insulated copper wire, buried approximately 1.5” to 2” beneath the grass in the yard. The shallower the better, without being at risk of being snagged/cut by lawn maintenance equipment and tools.

They are equally spaced, in the pattern of a spoked bicycle wheel, around the antenna base. I addition to the 16 long radials, I also have 16 more wire ground radials that are each roughly 35' long, installed into the spaces BETWEEN the 65' length radials. That gives me a total of 32 spoked radial ground wires, that all tie together at the antenna base, and all are bonded to a buried 8' copper-coated steel ground rod electrode next to the antenna base. This radial "system" provides the second half of my "simulated vertical dipole" antenna system. The soil in my area is not very conductive, and doesn't provide a good enough ground counterpoise, if simply using nothing more than a ground rod driven into the earth's surface at the antenna mounting location. Therefore the need for multiple ground radials. "More is better", when talking quantities of grounding radials, whether ground-mounted or mast-mounted, but the cost of radials can become an expensive affair. Quantity 4 is better than NONE, quantity 8 is better than 4, etc... But ANYTHING is better than NONE.

I used the sharp edge of a square-tipped shovel to cut a slice into the yard's grass, for the entire length of each ground radial, and literally just pushed the wire into the slice, until it bottomed out in the slice. TRUST me, this takes TIME, and a lot of elbow grease! Be PATIENT! Good results sometime require a bit of "blood, sweat, and tears", and personal time sacrifice, but can be worth it in the long run. (You'll only need to do it ONCE, thankfully, unless you accidentally forget, and till your ground radial area for a home garden later!)

My end results were fairly good, all points considering. Some bands of my 9-band antenna tuned up better than others, as far as usable low (below 2:1) VSWR, but as I said, there are always compromises involved with any decision of one particular style of antenna over another.

I did my best, without taking forever in the tuning process, to get the individual bands within tolerable 2:1 SWR bandwidths, but some just flat didn't cooperate, and I will be using my Tuner to make those usable for my transmitting rig, as needed.

I have found that the RF Signal Receive strength ("S" Units) using my HF9V are USUALLY within 1 or 2 S-Units of the received signal on my HF transceiver, as compared to using my horizontally polarized home-brew multi-band "spider/fan" dipole antenna, and/or my horizontally polarized Cushcraft A3S 10M/15M/20M/40M HF Beam antenna atop my 60' tower. (Added-on 40M kit on tthe basic A3S tri-band beam antenna is simply a rotatable dipole, with no directors or reflector.)

Refer to the included SWR graph photos, of each of the 9 bands of my HF9V antenna, as measured by a portable Comet Antenna Analyzer, at the radio end of the LMR400 coax cable. Each photo shows the VSWR plot, with the associated spread of the frequency MEASURED, at the lower corners of the respective photo. Not all bands were measured using identical frequency spreads. Some had larger spreads than others. Some bands of the HF9V uses dedicated band-tuning coils, whereas some bands use strictly the aluminum tubing itself, while still others are using nothing more than a thin wire conductor. Not all HF vertical antennas use the same style of elements.

And I forgot to mention one detail in my research data. Vertically polarized HF signals don't necessarily STAY vertically polarized as they bounce off of the Earth's Ionosphere, and other reflective objects, so there are LOTS of signals out there that START OUT as horizontally polarized, but end up being vertically polarized by the time you receive them at your geographic locale.

That means a VERTICAL HF antenna IS still a viable choice to pick up HF signals from around the world. But the signal will most likely be NOISIER than if the receive antenna were horizontally polarized, because the majority of the noise generated by electromechanical devices around the world (to include nature's LIGHTNING) IS vertically polarized.

---------- END OF NARRATIVE ----------
---------- Narrative Created : JULY 17, 2022 ----------
Best wishes for a good, well-educated decision, when it comes to choosing an HF antenna to use!

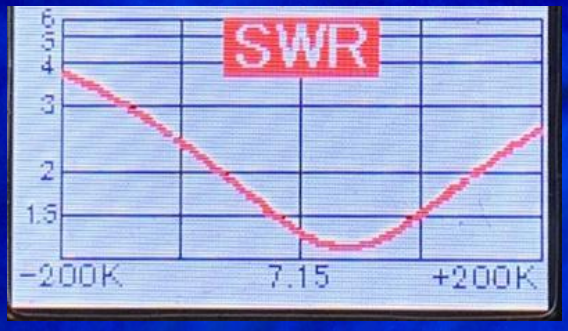
Dave Luchak / KL7BX / LETARC Member
Electronic Technician's Association Certified Electronic Technician
Motorola Certified 2-Way Radio Repair Technician
AAS Degreed Electronic Technology Instructor
MSgt, USAF, Retired

Thanks Dave!

Check out the pictures in the next pages to see his antenna and VSWR measurements.

Dave's Butternut HF9V Vertical

Here are the VSWR readings from Dave's KF9V. You can see that he did a great job tuning the antenna.



Dave included a list of features for the Butternut HF9V Vertical

Features

- Full band coverage for 80, 40, 30, 20, 17, 15, 12, 10 and 6 meters
- Height is 26 feet
- Weight is only 14 pounds
- Feedpoint Impedance is a nominal 50 ohms through the included matching line
- Power handling: 1,500 W full legal limit on 80/40/20/15/10M
  800 W PEP on 17 and 12M
  500 W PEP on 30 and 6M
- Wind load 2.2 ft^2 (80 mph survivability - no ice)
- VSWR at resonance: 1.5:1 to 2.5:1 or less on all bands
- Bandwidth for VSWR 2:1 or less: 30/20/17/15/12/10M - entire band.
- Bandwidth for VSWR 2:1 or less: 140-150 kHz on 40M, 25-30 kHz on 75/80M
- Active Element Lengths: 1/4-wavelength on 80, 40, 30 and 15M
  3/8-wavelength on 20M
  1/2-wavelength on 17M
  5/8-wavelength on 12M
  3/4-wavelength on 10, 6M
- **Requires** radial system

A big thank you to Dave KL7BX for all the info about his Butternut HF9V Vertical

Join LETARC for our next meeting on Saturday, August 27th. Meeting starts at 9 AM at 411 American Legion Blvd, Longview, Texas. VE testing at 2 PM at Glaske building, LeTourneau Univ.

Rhett KG5NWI operates portable HF at the church hours before his wedding. Hopefully good band conditions were a wedding gift.

A vertical antenna thank you to –

Mims volunteer fire department
The Longview fire training center on American Legion BLVD
Dave Luchak KL7BX LETARC dinner Chairman
Jim Perry KA5BCM for our radio room
John Zenter AE5OY and our VE team
Marty Duplissey N5KBP for his great work on the ARRL audio news
Steven Lott Smith KG5VK – ARRL North Texas Section Manager
JoAnn Keith KA5AZK – ARES Section Manager
Ross Bennett KI5SR – Gregg County ARES
David Chenault W5CWT – Rusk County ARES
John Keith W5BWC – Upshur County ARES
Tom Noe W5TDN – Gregg County SKYWARN coordinator
Jim Rogers N5VGQ – Repeater trustee
Ron Case W2RLC – letarc.org webmaster
Jim Quinn AJ1MQ – groups.io coordinator
Dr. Hoo Kim AG5ZS – Letourneau university liaison
Dr. Ron Morton KF5GMA & Carolyn Morton KF5GLT Longview CERT

Thank you for reading our newsletter. We hope to see you at our meetings and dinner gatherings and we hope to hear you on our nets. If you would like to contribute to the PROPAGATION please email Don at gambledon@gmail.com.

Please visit our website at letarc.org.

73 de Don Gamble KG5CMS.

Dit Dit

LETARC August 2022

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	01	02	03 LETARC NET 8:30 PM	04 UPSHUR NET 8:PM	05	06
07 W5TWM NET 7:30	08	09 PAPACITA'S 6:30 PM	10 LETARC NET 8:30 PM	11 UPSHUR NET 8:PM	12	13 SHREVEPORT HAMFEST
14 W5TWM NET 7:30	15	16	17 LETARC NET 8:30 PM	18 UPSHUR NET 8:PM	19	20
21 W5TWM NET 7:30	22	23	24 LETARC NET 8:30 PM	25 UPSHUR NET 8:PM	26	27 MEETING 9AM
28 W5TWM NET 7:30	29	30	31 LETARC NET 8:30 PM			

Upcoming stuff

August 13	Shreveport hamfest
August 13	Maryland-DC QSO Party
August 20	ARRL 10 GHz and up contest
August 20	North American QSO Party, SSB
August 21	ARRL Rookie Roundup, RTTY
August 27	ARRL EME Contest
August 27	Hawaii QSO Party
August 27	W/VE QSO Party
August 27	Kansas QSO Party
August 27	Ohio QSO Party