QST NFL

Newsletter for the Northern Florida Section

Come join the FUN!

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From the Shack of the Section Manager

Scott Roberts, KK4ECR (kk4ecr@gmail.com)

As the hot and humid Florida summer rolls on, the calendar page turns on another fantastic month in our shared hobby. It has been a period filled with significant developments, both here in our Northern Florida Section and at the national level. From the personal connections that form the backbone of our community to the critical work being done to shape the future of amateur radio, there is a tremendous amount to be positive about. This past month has been a powerful reminder that our strength lies not only in our technical prowess but, more importantly, in our vibrant community and our collective commitment to service and innovation.

I want to start with a highlight from my own calendar, one that truly embodies the spirit of our hobby. I recently had the pleasure of joining a fantastic group of operators from the North Okaloosa Amateur Radio Club for a virtual meeting via Zoom. What an incredible experience! It was an absolute honor to spend time with such a dedicated and passionate group. Even though we were connected by a digital link rather than sitting in the same room, the energy and enthusiasm were amazing. We had a great discussion as well as thought provoking questions. Seeing the faces of seasoned operators and new licensees side-by-side, sharing knowledge and stories, was a powerful testament to the club's welcoming atmosphere.

The North Okaloosa Amateur Radio Club is a perfect example of what makes our hobby so special. Clubs are the beating heart of our community. They are the places where friendships are forged, where Elmering happens, and where the next generation of amateur radio operators is inspired. They are hubs for technical exploration, emergency preparedness, and social camaraderie. My meeting with them was a stark reminder that while the airwaves connect us across the globe, it's our local clubs that bind us together, creating a foundation of support and fellowship that is truly irreplaceable. To the members of the North Okaloosa ARC, I want to extend my heartfelt thanks for your hospitality and for all that you do to make our hobby so great. Keep up the excellent work!

Beyond our local connections, this past month has shown us all, in a very real way, the vital role amateur radio plays in our communities and on the world stage. We saw this in action at the end of July when a powerful 8.8 earthquake struck off the coast of Russia, triggering tsunami concerns and alerts across the Pacific Rim. As news reports flashed across television screens and social media feeds, amateur radio operators across the affected regions of the United States—from Hawaii to the West Coast—were on alert, ready to provide critical communications. Emergency nets were activated, and hams stood by to assist local, state, and federal agencies if needed.

This real-world event was a vivid, sobering, and yet profoundly encouraging display of amateur radio's motto, "When All Else Fails." We saw once again that our networks, independent of commercial infrastructure, are a crucial asset. This event underscores the importance of every drill, every net check-in, and every training session. It reminds us why we practice, why we maintain our equipment, and why we are so passionate about our craft. It is in moments like these that the public truly sees the value of our service, and I am immensely proud of the way hams responded to the call, showcasing their readiness and professionalism.

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Moving to the broader national picture, I have a number of exciting updates to share from the ARRL Board of Directors. I recently had the opportunity to review the summary of the Second Board Meeting of 2025, which took place from July 18-19 in Connecticut. This meeting was a testament to the League's continued focus on strengthening the hobby, supporting its members, and advocating for our future. The Board took several key actions that are worth highlighting.

One of the most exciting announcements is the creation of a brand new award: the **10-Band DXCC**. This new challenge will recognize those dedicated operators who achieve DX Century Club status on all ten of the amateur bands from 160 meters to 6 meters (excluding 60 meters). This is a fantastic new challenge that will inspire many of us to hone our station capabilities and operator skills, pushing us to work DX under the myriad conditions presented by each band. It’s a wonderful way to encourage experimentation and continued growth.

Furthermore, the Board has officially established **2026 as "The Year of the Club."** This is a truly visionary initiative that will put our local clubs front and center. The League plans to roll out a number of programs throughout 2026 to support and recognize our affiliated clubs, including special acknowledgments for clubs that maintain a high percentage of ARRL membership. This focus on the club level is exactly what we need. As I experienced firsthand with the North Okaloosa ARC, clubs are where our hobby truly takes root. By investing in them, the League is investing in the very foundation of amateur radio.

Finally, I want to share some critical news about the League's ongoing advocacy work. The ARRL continues to be a powerful voice for us in Washington, D.C. This month, the League filed comments to protect the 70-centimeter amateur band from a proposed satellite application that would have encroached on our valuable spectrum. This is a constant, ongoing battle, and it is a battle that the ARRL is fighting for us every single day. Their efforts are crucial to ensuring our operating privileges are protected for generations to come.

The League is also making progress on its mission to modernize our rules. They continue to work with the FCC on rule changes that would provide Technician-class licensees with access to more digital and voice modes on portions of the HF bands. These changes, if adopted, will be a game-changer for new hams, giving them more opportunities to "get on the air" and truly experience the magic of long-distance communication. This is a clear sign that the League is committed to attracting and retaining new operators by making the hobby more accessible and exciting.

As we look ahead, let's carry the momentum of this past month with us. Let's continue to be the shining examples of what amateur radio can be: a hobby of service, a community of innovation, and a lifeline when all else fails. I encourage you to get on the air, join a net, and check in with your local club. Be an Elmer, welcome a new ham, and share the passion that brought you to this wonderful hobby.

Thank you for everything you do. Your dedication, your enthusiasm, and your commitment are what make the Northern Florida Section a truly special place to be a ham.

From the Section Emergency Coordinator

Arc Thames, W4CPD

Before the storms roll in, it's time to check your gear! Hopefully many of you tested your backup communications gear during field day this year but, if not, it's not too late. One of the things I strongly encourage our counties to do is test their ability to communicate via simplex to their neighboring counties. Having relationships with those agencies around you can be of great service if you lose the ability to communicate yourself and need something relayed in.

The same goes for communications within your counties. Looking back at hurricane Sally that impacted us in Santa Rosa County, our main amateur radio repeater antenna system was damaged and wasn't operating properly. It's important to not only have identified backup repeater systems but to test simplex communications among your volunteers as well as between your EOC and shelters or other locations where emergency communications may be needed.

If you haven't already this year, touch base with your local ARES Emergency Coordinator to offer your assistance and see what you may be able to help with before, during, or after an activation. For those of you looking to possibly deploy to other locations if needed, make sure you have personal supplies to keep you going for at least 72 hours (such as food, medicine, toiletries, etc.) Remember, we **do not** self-deploy. Any requests for deployment within the state will be communicated from either myself or David Byrum, who is the State AUXCOMM coordinator.

Make sure you have floridaemergency.net bookmarked as that is where all information related to activations will be posted. This information includes incident action plans as well as frequency information to communicate to and from the State EOC if needed. SARNET and Winlink will always be the primary methods, but we also list voice HF frequencies just in case.

Please remember, at the current State EOC, we only have access to 2 HF antennas. One stays on Winlink for their RMS system and the other is what we rely on for voice. We do not have the capability to monitor numerous HF bands or frequencies at once. Thankfully, in the new State EOC which will open next spring, we will have more options and the ability to directly access the roof to deploy additional antennas if needed.

Thank you for all you do to support your communities!

Monthly Radiogram Challenge

Want to practice using the national traffic system (NTS)? instructions on using the NTS on our website at arrl-nfl.org/nts/ For the month of August, please send me (W4CPD located in Pace, FL) a radiogram via the NTS with your answer to this question "Do you feel prepared to support emergency communications this year if called upon?" Starting next month, I'll feature the participants in the challenge in my monthly articles.

Website updates

If you find information that is out of date on the section website (arrl-nfl.org), please fill out the online form and one of the team will take care of it as soon as possible.

Monthly EC Reports

Out of the 34 appointed ARES Emergency Coordinators we have in the section, we only received monthly reports for 14 last month. If you're an EC and are having trouble submitting your reports, please reach out to me. This information is so critical to knowing who of our teams are still out there and also hearing about the incredible work that's being done. Last month ARES volunteers provided over a whopping 2,524 hours of service to our communities! Thanks to the following counties for providing their reports: Alachua, Bay, Citrus, Gadsden, Gilchrist, Leon, Seminole, St. Johns, Santa Rosa, Sumter, Suwanee, Volusia, Walton Washington.

	Number	Person-Hrs
8. Exercises this month:	7	618.00
9. Training events this month:	8	164.00
10. Public service events this month:	7	644.00
11. Community service events this month:	5	547.00
12. Emergency events this month:	0	0.00
13. SKYWARN events this month:	4	16.00
14. Meetings this month:	20	291.00
15. Unclassified events this month:	20	245.50

Call signs of DECs/ECs reporting:
K4SOP, KC4NVU, KD4EZW, KD4IMA, KF4ZZ, KM4BTW, KM4QQO, KO4KUS, KO4YGV, KO4YOL, KX4LEO, W4UFL, WA4MN, WE4MJ

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Newsletter, *QST NFL*
Earl McDow, K4ZSW

QST NFL *is a monthly publication of the ARRL Northern Florida Section.* ***QST NFL*** is intended for wide distribution within the NFL Section, including club Leaders and all licensed Amateurs in Florida. A current issue of this publication can be found at the ARRL Southeastern Division web site, Northern Florida Section. www.***ARRL-NFL.org*** Opinions expressed by contributors are their own, and may not express the positions of the ARRL.

Submissions may be made to the editor: Earl McDow earl.mcdow@gmail.com.

All submissions are subject to editing prior to publication.

Looking for Something?

Gordon Gibby, KX4Z, has taken the time to index the articles from all the 2021 issues of ***QST NFL***!
https://arrl-nfl.org/wp-content/uploads/2021/12/2021QSTNFLIndex.pdf

What's Inside…

NFL Section Member of the Month!

We are always accepting nominations for the NFL Section Member of the Month. To submit a nomination, please email Section Manager Scott Roberts at kk4ecr@gmail.com. Include the nominee's name, call sign, county, reason for the nomination, and a photo of the nominee. Arc and I will review the nominations and contact you with any questions

Digital Library of Amateur Radio & Communications

Marty Brown, N4GL

Digital Library of Amateur Radio & Communications is now archiving ***QST NFL*** issues. DLARC is a project of the Internet Archive (the not-for-profit online library best known for The Wayback Machine.) DLARC is growing to be a massive online library of the past and present of ham radio and related communications. It is funded by a grant from Amateur Radio Digital Communications. You can see what we have so far at https://archive.org/details/dlarc .

Three years of QST NFL are now online, and I am working with the curator, Kaye Savetz, K6KJN, to eventually get all the issues that I have edited since 2014. DLARC can also scan paper issues. So if you have any stashed in your attic, let me know.

Madison and Suwannee ARES® Field Day Expedition 2025

Gordon Beattie Jr W2TTT

The Madison and Suwannee ARES® teams combined on a "Field Day Expedition" to Hamilton County as an exercise in readiness preparation. As is our practice, operators were notified of the event and its location in advance, but we given the task of setting up Field Day in a "bare bones" environment consisting of suitable shelter, outdoor space and nothing else. The expectation is that each operator would bring communications assets to the site and operate their station including radios, computers and other supporting elements such as networks from batteries that were charged from solar and brought to the site for the 24 hour operation.

On arrival at 10 am, deployment began with each operator being "assigned" to a small classroom in the Corinth Baptist Church education building. Immediately, the HF stations were rapidly deployed by their experienced POTA operators Bryan K4BHP, Ken KI4IMN and his Dad Junior KC4VPJ, and Jim K4DBC assisted by Lance KQ4TGY. End-feds, Wolf River Coils and other deployable antennas quickly filled the open areas surrounding the building.

The VHF station provided by Gordon W2TTT, also began deployment when the Pastor came over and asked that a specific classroom be kept clear for Sunday morning activities. This meant that the VHF station had to be moved and rethought, which lengthened the deployment timeline and most importantly, the exposure time to the amazingly strong hot Florida sun! This was made more challenging as the VHF station's antennas required a team effort to be raised above the steel building. However, the 6m Square Loop, the compact 2m/70cm yagi and the 2m Cellwave vertical all got up in good order.

A cautionary note here is that when antenna and cable deployment requires exposure to the hot sun, it is better to get help early to make things flow faster and reduce exposure to the heat. Fortunately, we had plenty of water and other beverages. Jim's stock of powdered electrolytes went a long way towards mitigating any negative effects of the Sun!

Before eleven-thirty all the antennas were up and ready and everyone was safely indoors. The stations were placed on tables near the windows in each classroom which made indoor setup much more convenient and saved on the length of our feedlines.

Shortly after 1 pm, it was recognized that we could start operating and so it began! The HF bands were reasonable and so was 6m! This provided a steady stream of contacts well into the evening. We'll have more details next month, but here are some photos of the operation.

Bryan Phillips K4BHP

Jim Shanklin K4DBC

Continued on next page...

Ken Odom KI4IMN and Bryan Phillips K4BHP

Lance McCain KQ4TGY

2m vertical

Vertical on swings

2m Omni vertical and 6m loop above a 2m/70cm yagi on military poles

Military pole tripod

Improvised support for an end-fed balun

Long end-fed with a guyed mast

Get on the Air!!

Building a "Poor-Man's" Amateur Radio Satellite Ground Station

Part IV: Cross-Polarized Yagi's

Gordon Gibby KX4Z July 2025

This multi-part series presents the trek toward building an inexpensive amateur radio satellite ground station, all the way from an overview of satellite communications to successful contact. **The previous Parts, their coverage, and how to find them are presented in a Table at the end of this article.** In this Part IV, I'll go over how to build *very inexpensive homebrew cross-polarized yagi antennas* for 2meters and 70cm for satellite work. I can't claim that these are perfect or optimized -- I don't have the ability to do that level of work -- but they work! The goal was QUICK, SIMPLE, and INEXPENSIVE entry into the fascinating realm of satellite communications.

The Primary Question: Whether To Be Circular Or Not

A fundamental issue when building a satellite ground station is that most amateur satellites are spinning. The data that I've seen suggests a spin rate of one rotation every 2-3 seconds for several satellites. This may be a part of their delivery from the rocket, or it may be to assure that their antennas do somehow point at the earth. The simplest antennas are single-plane (e.g. horizontal or vertical) antennas. I have read many successful satellite ground operators who have used either horizontal or vertical (single polarization) antennas quite successfully, and even with a fixed elevation (usually about 15 degrees). This is a quite reasonable beginning! However, we can fairly easily do even better

The voltage induced by the passing radio wave, onto a single-polarization antenna declines as the angle between the E-field of the radio wave increases toward 90 degrees. The induced voltage is reduced by the factor cos(theta) where theta is the difference angle between the (rotating) E-field of the radio wave, and the fixed polarization of the antenna (the plane of its elements). Because power can be modeled as V2/R, the power induced varies by the square of the cos(theta); and in dB, this is

$$\text{Power multiplier} = 10 * \log_{10}(\cos^2(\text{theta})) \qquad \text{Equation 1}$$

How much of an issue is this? Using a spreadsheet, I graphed the dB loss caused by using a single polarization antenna, as a function of the discrepancy angle.

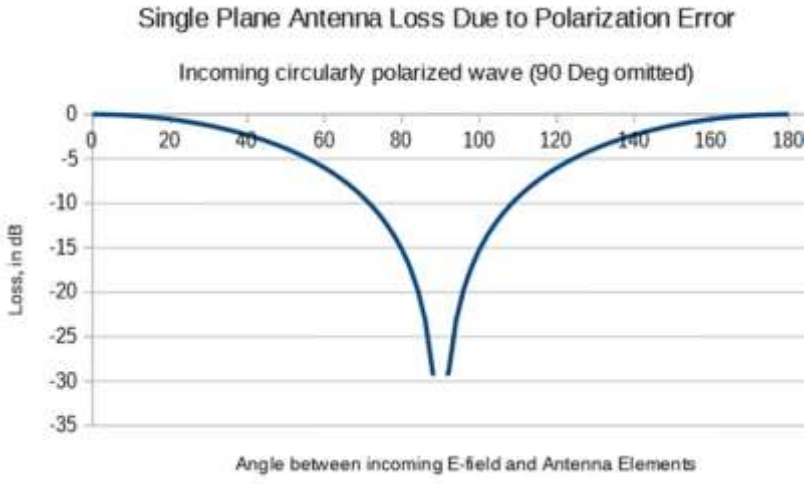

Figure 1: dB loss versus discrepancy angle between incoming radio wave and polarization of single-plane antenna.

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The exact loss at 90 degrees is theoretically infinite, but published sources suggest it is actually on the order of -20dB. This suggests that practical antennas do not perfectly inhabit a single plane and thus have some tiny response to an out-of-theoretical-plane wave. I omitted the 90-degree point as a result. The Signal to Noise ratio that I've typically observed from linear satellites isn't any higher than 10dB most of the time, so for a range of up to 1/3 of the rotation, the signal might be difficult to copy.

A loss of 5 to 20dB (-5dB to -20dB) is however quite significant. Even adding a simple dipole (gain 2.2dBi) at 90 degrees to the original plane would appear to be a quite significant improvement! (This probably explains why the starting point for receiving the relatively high power VHF 137MHz NOAA satellites is to use a simple "Y" antenna that has basically zero gain, but responds to all polarizations.)

However, there is a downside: adding the radiation resistance of the 2nd antenna in parallel to the first unavoidably loses some received (or transmitted) power in the desired angle when the signal is perfectly aligned with one antenna; a 3dB loss. Still, much less than 20dB loss! It isn't difficult to get 6+ dB of gain from a simple Yagi antenna, so with two simple Yagi's at 90 degrees to each other, and each with 6+ dB, one would still have 3+ dB gain at basically *all* angles. This seems like a better solution, significantly avoiding spin-induced loss of signal.

As a result of those theoretical issues, I concluded it was worthwhile to try to have some cross-polarization to my ground station antenna. I then searched for the simplest home-brew antenna building possibilities.

Phasing Yagi's 1/4 Wavelength Apart

Two methods exist for getting the 90 degree phase difference. The antennas need to be co-axial to be sure they intercept the same wave. Phasing can be done using coaxial cable delay line if the two antennas are simply right on top of each other. With complicated relays, interconnections can allow the polarization to be shifted from RCP to LCP -- but the difference is said to only be 3dB at worst, so not that important?

A simpler method ("Physical") is to put one antenna 1/4 wavelength (in space) ahead of the other, co-axially. This avoids the need for delay lines. To get RCP: from either the front (received wave) or the back (transmitted wave), visualize a wave moving along your boom, rotating clockwise circularly as it moves forward. Arrange the center-conductor side of the driven elements so that the wave moves properly from the center-conductor side of the first antenna it encounters, to the center-conductor side of the second antenna it encounters. If you need to change from RCP to LCP simply pull out the driven element and insert backwards (from the other side).

Helpful References on Physical vs. Phased Circular Polarization	
1	Circular Polarized 70 cm Yagi, 2020, https://km4nmp.com/2020/02/15/circular-polarized-70cm-yagi/
2	Antenna Circular Polarization https://www.qsl.net/sv1bsx/antenna-pol/polarization.html

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Simple Yagi's

In 1994, Kent Britian WA5VJB published some simple designs for satellite antennas, based on non-conductive boom material (thus avoiding the need for length adjustments needed for conductive booms.) The ARRL apparently published (in print format) the proceedings of the Central States VHF Society Conference Proceedings of 1994 (held at Memphis, TN), which is one of the great things the ARRL does; but I cannot find the original publication. The essential design information is currently available online: http://www.fredspinner.com/W0FMS/CheapYagi/vjbcy.html

Figure 2, copied from W0FMS's presentation of WA5VJB's original work, demonstrates the basic construction:

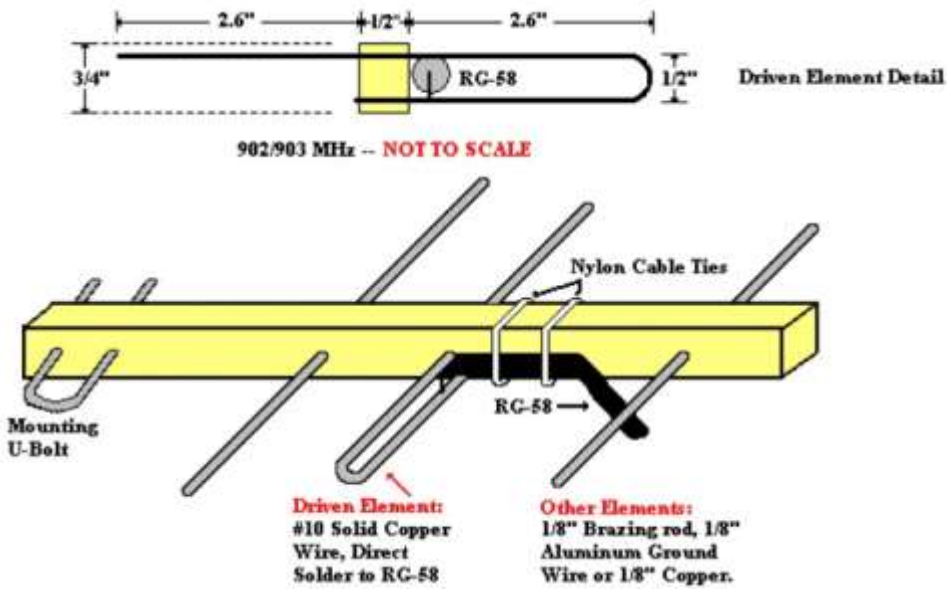

Figure 2: Drawing of original simple antenna design, found in : http://www.fredspinner.com/W0FMS/CheapYagi/vjbcy.html

The essential features of this antenna design include:

- It was designed for 1/8" diameter elements (e.g. welding rod) -- and a small amount of shortening, 0.2", was recommended for using 3/16" elements.
- Element lengths were selected for a non-conductive boom -- so using PVC should work fine.
- A half-folded dipole "J" driven element design was used in an attempt to avoid the typical low feed point impedances of Yagi antennas with close coupling of parasitic elements to the driven element.

I chose to build a **4-element original horizontal Yagi 2m antenna** and **6-element horizontal Yagi 70cm antenna**, on 3/4" PVC pipe, as a start. Later, I added the vertical 2nd plane - which was positioned exactly 1/4 wavelength FORWARD of the original antennas. The 2nd plane does not have to have as many elements. As a result, you'll need to have some extra boom in front of the original horizontal antennas! You won't need any additional boom on the reflector side of the original antenna. These spacings/ dimensions are said to be appropriate for 3/16" Diameter elements and are reasonable for arrow blanks. (Notes are added for how I adjusted after real testing.)

My "2nd plane" 2m antenna was a 3-element Yagi, using the dimension of the Reflector, Driven and Director 1. My "2nd plane" 70cm antenna was a 5-element Yagi. There is enough room for me to add a 6th element if I wish.

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144.1 MHz YAGI	Reflector	Driven	Director 1	Director 2
4 Element	41.8" @ 0.0 position Adding ~ 3/4" to each side may improve performance in the desired 144-146 MHz segment	38.3" @ 8.50" position, spacing 1" on J Adjust length for resonance @ desired freq 144-146 MHz.	37.3" @19.25" position Experiments suggest adding small bit of length to this (? 1/2")	32.8" @ 40.50" position Experiments suggest adding small bit of length to this (? 1/2")

432.1 MHz (design freq)	Reflector	Driven	Director 1	Director 2	Dir3	Dir4
6 Elmt	Initially: 13.3" @0" Good F/B @ 420-430 Shortened to approx 13.1" to move F/B to 430-440MHz	12.8" @2.50" H= approx 3/8" Adjusted length for good SWR in 430-440MHz range (had to shorten by approx 1/4")	Initially12.3" @5.5" Good F/B @ 420-430MHz Shortened to approx 13.1" to move F/B to 430-440MHz	11.8" @11.25"	11.8" @17.5"	10.8" @ 24.0"

Building the Elements

The aluminum arrow blanks are individually not long enough to make an entire 2-meter element. (They are plenty long enough for 70cm elements, so these can simply be cut to length with a hacksaw.) The archery community has developed 8-32 threaded inserts to fit the blanks. Then, by using an 8-32 threaded rod, one can easily connect two aluminum arrow blanks together tightly to make a 2-meter element, and cut to length using a hacksaw.

The problem that I found with the chosen arrow blanks was that the available inserts simply didn't fit tightly; indeed they were quite loose. Another volunteer found inserts that did fit tightly, but I do not know the source and my local archery shop didn't seem to have tight-fitting ones either. If your inserts are loose (as mine) I tried two different techniques to secure them:

1. Attempts at "crimping" using a RG-8 coaxial cable crimper required some effort and judgment were about 50% successful.
2. Attempts at "welding" the edge of the insert to the edge of the arrow using a propane torch and aluminum wire were reasonably successful with some complete failures (burn through of the material). Use the hottest portion of the torch. Work slowly, adding wire aluminum right to the joint portion. Even a little welding around a portion of the circumference will be sufficient. In order to maintain the same diameter, grinding down of the welt will likely be necessary.

I could easily see that one might wish to go back to using 1/8" welding wire for the elements after my efforts with the arrow blanks, even though the wire may corrode over time. If you use the smaller diameter elements, add about 0.2" to the element lengths listed in the tables.

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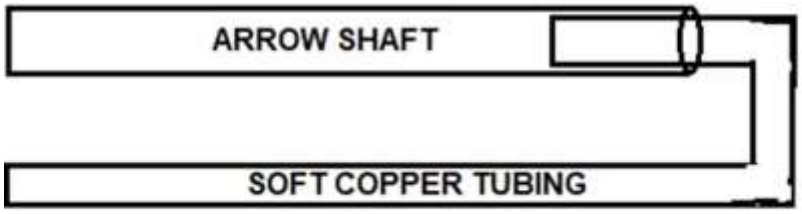
Figure 3: View of welds in each of two arrow blanks, with an 8-32 threaded rod connecting them (not tightened up all the way) ; view of one of the many types of inserts available. Inserts are made in various diameters, because there are multiple different arrow diameters.

Building the J-driven element

For the 70cm antenna, this is easy; simply make the entire element out of 1/4" Diameter soft copper refrigerator copper tubing. I had unavoidable flattening of the tubing when I made the 90-degree bends needed to make the angles; this didn't seem to cause a problem.

For the 2-meter antenna, I felt the refrigerator tubing would not be stiff enough to avoid excessive sag by itself, so I used the aluminum arrow blanks for the main structure and then attempted to crimp the aluminum arrow around the soft copper, to form the folded portion, as shown in the following Figure. (Possibly an alternative would be to simply insert a stiffening steel rod down the length of the top portion of the driven element and use soft copper for the entire J-piece!)



1. Abraid inside of arrow shaft for approx 1/2" for better connection.
2. Clean copper tubing with mild acid (vinegar / lemon juice)
3. Add PENETREX A or similar anti-aluminum oxidation material to outside of soft copper tubing.
4. Bends as needed for approx distance between arrow shaft and tubing (1" for 2 meters). Of course, my tubing tended to flatten for the bends (OK).
5. Insert approx 1/2" of tubing and CRIMP arrow tightly on top of (I used a RG58 coax crimper tool. Alternative is to drill and place screw through both for electrical connection.

Figure 4: Effort to connect soft copper tubing to the end of stiff arrow blank.

CRIMPING

My attempts at "crimping" were with a crimper intended for RG8 Coax crimp connectors, and were "partial crimps" using appropriate diameter openings in the crimper. These take some judgment. It might be a good idea to simply drill a hole through the aluminum and copper overlap, and use a tight-fitting zinc-plated steel sheet-metal screw to assure electrical content, covered in a bit of either grease or Penetrex A.

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Here is a technique for connecting the coax to the center of the 2-meter driven element:

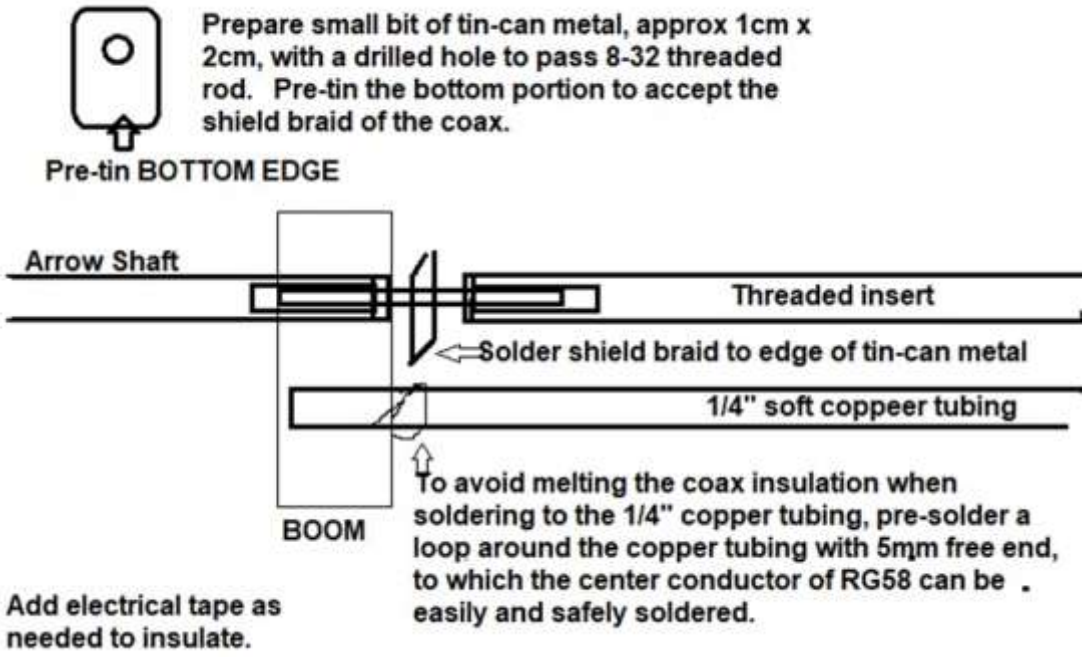

Figure 5: Method to bond 1/4" soft copper tubing to Aluminum Arrow Blanks

Once the driven element is constructed, use a nano-VNA or other item to find resonance and make small adjustments to bring the resonance into the region of 145MHz (2m) and 435MHz (70cm).

Thanks to my antenna rotator system, it was easy for me to "spin" the antenna array around. Using a Siglent spectrum analyzer and a simple mag-mount 1/4 wavelength antenna mounted on a metal BBQ grill outside my living room, at a distance of about 30 feet, I was able to get a polar chart of my 2-meter single-polarization antenna when in vertical polarization as follows:

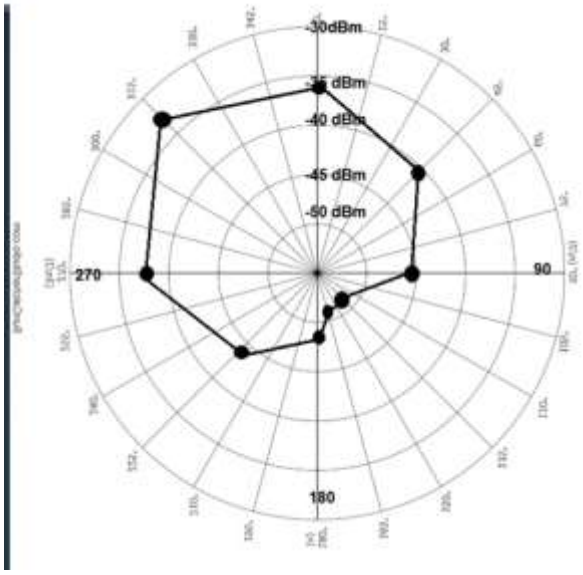

Figure 6: Polar plot of single polarization antenna response, 2 meters to a 1/4 wavelength mag-mount approximately 30 feet away, Siglent spectrum analyzer. Demonstrates significant front to back ratio.

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This is a very respectable front/back ratio! This suggested to me that my antenna would have significant gain and that the design was reasonable. By allowing the tracking generator to sweep the bands, I was able to determine where in the bands maximum gain occurred and I made modest adjustments to lengths to put good gain at the point where typical satellites are located in frequency. These adjustments are reflected in the tables in this paper.

Building the Booms

My first effort was using 1x2 lumber from a big-box store. I then replaced this with a 3/4" PVC pipe for the boom. Approximating the center of mass, I inserted a PVC "T" connector to allow a slip fit onto the horizontal (elevation-rotation) mast. I carefully drilled a 1/4" hole through the mating surfaces of the T connector and the 3/4" horizontal mast and used 1/4" nylon bolt/nut to secure them. This allowed the antennas to be removable from the horizontal mast, but indexed for anti-slip.

I drilled the holes for the elements by hand, using a battery-operated drill. 5/16" holes for the aluminum arrow elements, and 1/4" holes where 1/4" refrigerator soft copper tubing was used. I marked each hole carefully and attempted to drill "straight and true" with variable results. One could of course do better with a drill press! The results were adequate.

Once elements were inserted and centered, simple zip-ties were used to secure them against movement. Amazingly, I was able to move this antenna assembly in the back of a pickup truck 15 miles across town at speeds up to 45 mph without apparent movement of elements..

Getting the 90 degree Antennas Connected

There are complicated instructions published to use 1/4 wavelength matching sections to raise the impedance of typical 25-ohm yagi driven elements, and then to connect the coaxial cables together. I found these difficult to make work. Instead, my J-driven elements actually had impedances that were reasonably above 50 ohms, and I decided the simplest solution was to prepare 1/2 wavelength sections of RG58 (shortened from the theoretical free space length by the velocity factor of my cable, affix BNC connectors to the free ends, and then simply use a BNC T-connector to join them. To my surprise, this worked much better than I would have expected. To deal with a few rain showers, I suggest some application of dielectric grease on the connections. (My prototype antenna system is NOT designed to be left in the weather for more than a little while.)

My antennas don't have perfect matches by any analysis....but when measured with a VNA they were in the SWR 2:0 - 3:0 range, and for my "Poor Man's" first effort, I deemed those within reason and simply proceeded forward.

Improvement on F/B Ratio on 70cm Antenna:

Again using the spectrum analyzer, I did plots of the front and rear response to analyze front to back gain and used that to make final adjustments on the 70cm elements. You could do the same thing with a nanoVNA.

Continued on next page...

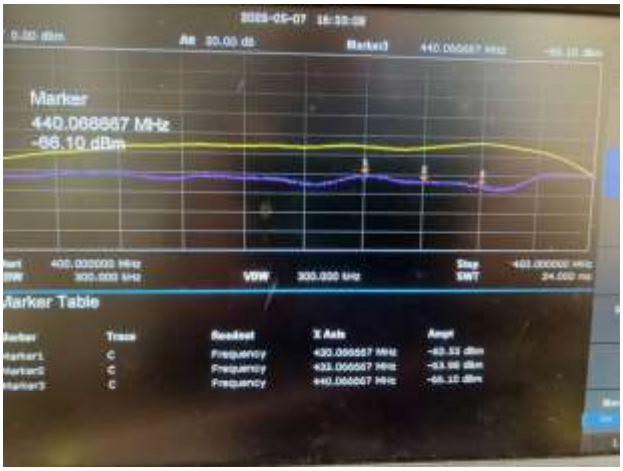


Figure 7: Front (yellow) and Back (blue) signals from 70cm yagi after shortening Ref, Dir1. Plot used to improve the sizing of directors and reflectors to move gain to desired part of band. Original plot showed best performance 420-430MHz before shortening.

Final SWR on Connected 70cm Yagi's:

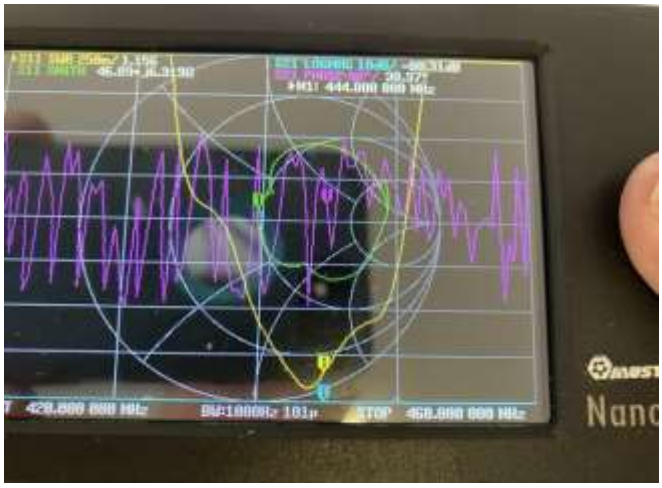


Figure 8: NanoVNA SWR on connected 70 cm Yagi's shows unexpectedly GOOD SWRs. 2:1 is approximately halfway up this display. The SWR at 444.8 MHz is 1.2:1

Figure 9: Final antenna setup on homebrew dual-axis rotator system.

RF Isolation between antennas

Satellite work is enhanced by full duplex. This requires the ability to transmit and receive (on different bands) simultaneously without overloading the receiver by the transmitter The isolation between the two antennas is therefore important, so I measured it using the spectrum analyzer.

Figure 10: Sweep from 100 MHz to 500 MHz normalized to 0dB, showing side to side transfer function between 2m and 70cm antennas. Roughly -40dB or better.

CONCLUSION

These antennas have worked admirably well for me, especially when using a simple preamplifier (such as this inexpensive $20 item: https://www.amazon.com/dp/B07T59B9C5) and one side of a "diplexer: as an additional filter ahead of the preamp. My setup uses an older ICOM 820H with perhaps 30W output, and 50 feet of LMR400 coaxial cable. Although I'm still quite new at this, I've been able to make connections on packet and (CW) linear satellites. I can see my signal and I'm in the right ballpark considering its strength compared to others on the same satellite It is very impressive how the signal jumps up when the antenna faces the predicted position of the satellite. A very inexpensive antenna system, providing a lot of learning for individuals or clubs trying out satellite communications!

Continued on next page...

USEFUL MATERIALS

No.	Item	Reference	Comment
1	Arrow shafts	https://www.amazon.com/dp/B07L5M5MLR	30" long OD 7.6 mm ID 6.5mm
2	Possible inserts (require welding or crimping) Easton Archer 6.5 mm Insert (silver)	Easton Archery https://eastonarchery.com/shop/components/inserts/6-5-cb-orange-insert/	Don't fit tightly; required welding or crimping
3	Flux Core Aluminum Welding Rods	https://www.amazon.com/dp/B0CDRGKRJJ	Weld in hottest part of propane flame; use care
4	BNC T connector	https://www.amazon.com/dp/B0933NZ936	Use to join different planes, using 1/2 wavelength feed from here to antenna (correct for velocity factor)
5	BNC female to female connector	https://www.amazon.com/dp/B07KF63QDH	
6	BNC crimp connector for RG8X	https://www.amazon.com/dp/B07Z8XFY54	Allowed me to build my own cables.
7	8-32 threaded rod	https://www.amazon.com/dp/B00JDU8TQU	You will probably want to shorten these somewhat, using a hacksaw.

Building a Poor Man's Amateur Radio Satellite Ground Station: Parts		
No.	Title	Availability
Part I	Introduction	https://www.nf4rc.club/how-to-docs/satellite-system-part-i-overview/
Part II	Inexpensive Manual/Computer-Controlled Rotator Controller	https://www.nf4rc.club/how-to-docs/satellite-system-part-ii-rotator-control-board/
Part III	Inexpensive Antenna Rotator	https://www.nf4rc.club/how-to-docs/satellite-system-part-iii-antenna-dual-axis-rotator-system/
Part IV	Cross-Polarized Yagi's	https://www.nf4rc.club/how-to-docs/satellite-system-part-iv-cross-polarized-yagis/

Multipurpose Camping Trailer Solar/Battery Power Inverter System

Gordon Gibby KX4Z

Nancy and I are planning a huge (for us) Travel Trailer camping trip all the way to the West and back, while we're still "young at heart" and able to travel. Our trailer is an older one, with a ton of repairs, and it relies on an inexpensive electric refrigerator/freezer. Not only will we be "on the road" about 10 days, but some of the places we'll be camping at have no electricity and limitations on the usage of generators. (And besides, gasoline generators are horribly inefficient and just chew up fuel!)

Solar/Inverter System. (Protective insulation not yet on 100AHr battery terminals)

So I wanted to come up with some kind of system that would tide us over cold mountain nights when we needed to run the furnace blower (about 4 amps @12V, approx 40% duty cycle) and through the days when we need to have refrigerator powered (runs on 120VAC, with inverter inefficiency uses approx 72W from batteries, but needs large inrush AC current to start).

That indicated we needed

1. significant battery storage of energy;
2. both 12VDC and 120VAC available;
3. ability to be recharged from generator (120VAC) and
4. ability to take advantage of solar panel input.

Power System Components			
No.	Item	Source	Comment
1	EcoWorthy 100 AHr LiFePO4 batteries x 2 $189	https://www.amazon.com/dp/B09L89LW3P	Includes Bluetooth or Wi-Fi monitoring -- amazing!
2	Xantrex 2kW Inverter $556	https://www.amazon.com/dp/B002LGEMOQ	There are newer models that would suffice, likely at a much lower cost. This was purchased years ago and was on hand.
3	LairtPOW 40A MPPT Solar Power Charger $76	https://www.amazon.com/dp/B0CY29MBYM	Allows up to 100V Voc input. Able to work with 12 or 24V battery system. Charge up to 40A Loads up to 20A
4	EcoWorthy LiFePO4 20A AC Charger $100	https://www.amazon.com/dp/B0BZD48NDC	20A Charger able to limit current to 20A and run at that level continuously. Does get warm.
5	75Amp power pole connectors	https://www.amazon.com/dp/B0812TY6V6	Connectors to the Inverter
6	Optional: Current - Voltage - Power Energy Meter $16	https://www.amazon.com/dp/B013PKYILS	Optional measuring system for inverter.

Continued on next page...

The schematic of the assembled system is shown in the accompanying Figure 1. Heavy battery wiring to the 2kW inverter was accomplished with 6AWG wiring, and 75-ampere rated power pole connectors. Wiring for the remainder was a mixture of 14AWG and 16AWG. Because the travel trailer utilizes a flooded lead-acid battery (resting full charge voltage 12.6VDC) while the solar power system utilizes LiFePO4 batteries (resting full charge voltage approx 13.8VDC), the interconnection between the two was accomplished by a silicon voltage dropping diode pack with a parallel capacity exceeding 15A, while the \interconnection (which is not expected to see currents greater than 5A due to LED lighting and only one furnace blower) is fused at 10A.

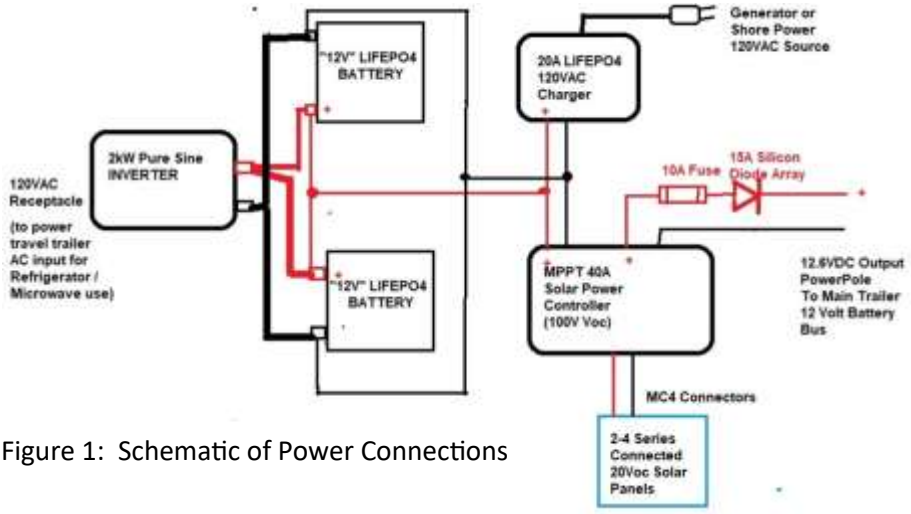


Figure 1: Schematic of Power Connections

Large batteries can produce enormous currents if accidental short-circuits occur. Prior to installation, the battery terminals and the high-power connections to the inverter were all covered in multiple layers of insulation as protection. All interconnections were via insulated connectors, and the MPPT controller has recessed clamp terminals to accept connections.

Solar Power & Usage

When sunlight is available, 2-4 panels (rated Voc 21VDC, 100W max each) can be placed in series using their MC4 connectors, and connected to the MPPT controller, which has a max input voltage of 100VDC. When shore or generator power is available, the 20A LiFePO4 charger can be manually plugged in to charge the system. Testing showed no difficulty having both chargers interconnected. An ohmmeter check showed that the AC input leads of the charger were not connected at all to its DC output, removing risks of current loops. 24-hour full testing with "bargain basement" supposedly 100W 18V panels showed that two panels with good sun produced enough energy to stop battery discharge and provide slight (1A) charge to each battery. Adding a 3rd "100W" panel in series resulted in a solid charge of 3-4 Amps with full sun. Without any external generator charging provided, the battery system is expected to slowly discharge over a period of 2-3 days, but with a few hours of generator time, it will reach back to 100% state of charge each day.

Refrigerator Issues

Refrigerators typically have high inrush starting currents to an inductor motor in their compressor. The Xantrex 2kw pure sine wave inverter is a relatively large unit with significant input capacitance. Testing showed that it easily started the refrigerator when powered by a single LiFePO4 battery at only 30% state of charge. Worst-case estimates suggest that the two batteries in parallel (100 AHr each) should be able to power the refrigerator for > 25 Hrs at 100% duty cycle, even without solar power input.

Using for Communications/Field Day

Communications radios could be directly connected to either nominal 12V LiFePO4 battery. One such battery easily powered an ICOM 7300 for most of the 2024 Field Day in CW operation at 100W output.

Armstrong Broadcast Returns to New Jersey in June

42.8 MHz will broadcast from the Alpine Tower for first time in a decade

By Nick Langan ·Published: May 26, 2025 · Updated: June 6, 2025

The Armstrong Field Lab as it looks today with the original W2XMN building and the radar tower

The commemorative Armstrong broadcast station will return next month to 42.8 MHz in the New York City Tri-State area.

On Thursday, June 19, Steve Hemphill and the staff at the historic Alpine Tower in Alpine, N.J., will celebrate with a commemorative broadcast the 20th anniversary of the Armstrong Memorial event, which Hemphill originally organized in 2005 to honor the man who made FM radio possible, Edwin Armstrong.

[Related: "Radio World's Visit to the Alpine Tower"]

Hemphill credited Alpine Tower owner Chuck Sackermann of CSC Communications, who allowed the first memorial broadcast to be conducted 20 years ago and funded most of the event's site logistics.

WA2XMN, the Armstrong Memorial broadcast station, will return to the air on June 19 beginning at 12 p.m., broadcast on 42.8 MHz — Armstrong's original low-band frequency. During previous transmissions, its signal has been heard from as far as 100 miles away. Most police scanners can monitor the VHF low-band, as do software-defined radios.

The tower and original brick transmitter building were finished in 1937 to aid in Armstrong's FM radio experiments. The call sign is still etched in cement above the front door of Major Armstrong's original station building on the site today.

The Alpine Tower staff has worked to preserve the history of the site nestled in the Palisades of Bergen County — about 15 miles northwest of the Empire State Building. Fairleigh Dickinson University's Class B1 89.1 WFDU(FM) transmits from the Alpine. It was also used as an emergency site for several New York City TV and FM stations following the Sept. 11, 2001 attacks.

Hemphill with the WA2XMN Phasitron 42.8 MHz transmitter, taken from the 2005 broadcast.

With hand-built vintage parts, Hemphill said his restored Phasitron transmitter, running 250 watts of power output, will feed into a Ringo vertical antenna mounted on the Alpine Tower at approximately 400 feet above ground level. Transmissions of the experimental station are in wide-band frequency modulation, using the same technical standards as modern FM broadcast stations.

"Although the Phasitron was not even invented yet when Armstrong began his broadcasts, the technology is approximately correct for the era," Dave Hershberger wrote in his 2004 profile of Hemphill's reenactment.

[Related: "AES 70th Anniversary of FM Broadcasting: A look at Major Armstrong's Contribution to Broadcasting"]

Continued on next page...

Hemphill said he will be broadcasting programming from the 2005 event, which includes their original Armstrong panel discussion and interviews with Major Armstrong's niece, Jeanne Hammond, and Tom Lewis, author of "Empire of the Air." He will also be airing David Osman's production of "Empire of the Air: The Men Who Made Radio," based on Lewis' book.

Hemphill added that he is planning a collaboration with Kirk Harnack's "This Week in Radio Tech" podcast as part of the 42.8 MHz coverage.

He said that plans to stream online coverage of the 42.8 MHz broadcast are still being discussed.

The last time WA2XMN broadcast was in 2015, Hemphill said. A 2018 broadcast to honor Hammond — who had recently passed away — was cancelled due to problems with the station antenna's transmission line.

The Radio of Club America honored Hemphill with a Special Appreciation Award in 2005 for the 70th anniversary broadcast. A consulting engineer since 1969, he is the founder of Solid Electronics Labs, which manufacturers and sells FM broadcast exciters and stereo generators.

"FM radio has had an enormous impact on my career, and there's only one man who is truly responsible for giving me the opportunity to use that technology," Hemphill said of his efforts to preserve the memory of Major Armstrong.

The Armstrong — or Alpine — Tower is the site of the world's first FM broadcast station, W2XMN, broadcasting primarily on 42.8. It first signed on in 1938 and broadcast until July 1949, when the FCC shifted frequency allocations to 88–108 MHz band we know today.

Hemphill also noted Major Armstrong's "high-band" FM broadcast station. It signed on in 1945 with the callsign W2XEA on 92.1 MHz. It moved to 93.1 in 1948, with the KE2XCC callsign. That station broadcast until March 1954 when it signed off a month after Armstrong died.

It was 90 years ago when the pioneer who made FM radio possible put forth the first public demonstration of the technology. According to Columbia University — where Armstrong graduated with an electrical engineering degree — he described FM radio and then turned on his receiver in front of the audience during a November 1935 Institute of Radio Engineers conference.

An FM transmission from a friend's house in Yonkers came in free of static with a fidelity never heard before.

[Sign Up for Radio World's SmartBrief Newsletter]

Nick Langan is a content producer and staff writer for Radio World, having joined the editorial team in 2024. He has a lifelong passion for long-distance FM radio propagation and is a faculty advisor for 89.1 WXVU(FM). He is also the creator of RadioLand, an FM radio location mobile app, which he completed for his Villanova University graduate thesis.

Alachua County Amateur Radio Emergency Service (ARES®)
North Florida Amateur Radio Club (NFARC)
Alachua EOC Radio Club
(*three groups that work together*)
Gordon Gibby KX4Z

CONTACT: Gordon L. Gibby MD
Public Information Officer,
NFARC/ARES 2025 Fall Technician Class
Email: docvacuumtubes@gmail.com

PRESS RELEASE
FOR IMMEDIATE RELEASE

Alachua County-Affiliated Ham Club Provides Entry Level Amateur Radio Course
This Fall at Alachua County EOC

Get ready to enter the exciting world of local and world-wide personal radio communications on Amateur Radio! Our local EOC-affiliated Ham radio club is opening up a 13-week Thursday night class to pass your Technician FCC license test and get going on ham radio! You can sign up here:
https://forms.gle/xpGb9EZvs8ZBTPEa6

These volunteers have years and years of experience serving our county during hurricanes, providing backup communications for all our resident shelters, and also providing multiple backup methods for reaching the State of Florida, even if Internet and cell phone quit. Not only that, but they are very experienced at ham radio and routinely score at or near the top nationally, in summer and winter Field Day emergency exercise competitions.

Their course is completely free and taught at the EOC, at 1100 SE 27th Street, in the EOC conference room, 7-9 PM, beginning September 4th and continuing every Thursday night except the week of Thanksgiving. Most sessions will end before 9PM. You'll be ready to take your entry-level ham radio test on December 4th -- or at any of multiple other dates. You will need to procure either print or online educational materials for the Technician license course from a group we have found to be extremely easy to use and interesting: https://www.hamradioschool.com/ Their materials are in the $30 range and include access to a wealth of great educational material.

You'll have an exciting experience learning a bit about radio and electronics! Most Thursday nights, your volunteer instructor will have your group get right on the air for a moment, to check into our weekly practice radio meeting, known as a "net" which has been running in Alachua County for decades and provides the emergency communications backup during hurricanes. You'll become quite familiar with our high-power ham radio station at the EOC, and with the steps to become a volunteer for the county, if you wish.

Ham radio is a hobby of 1,000 sub-hobbies, as it is the premier method our nation uses to allow citizens to dabble into electronics, radio, microprocessors, and transmitting and receiving. You can do Morse Code, voice and even world-wide radio "texting" and radio "email." Our local group is experienced in all of these techniques and is even building expertise in using about ten amateur radio low-earth-orbit satellites for communications. Quite an accomplished group serving our county!

Club Updates

Editor: Mike Walters, W8ZY

ARRL Affiliated Clubs are asked to do an annual update. The instructions on how to do the update are in a document on the ARRL website at www.arrl.org/club-update. The person attempting to do the update must be an ARRL member and signed into the ARRL website. Then they must go to the club listing under the Find-a-Club function. Once they find their club, the edit link is in the upper right corner. The only people who will see the edit link are those listed on the page as the Club Contact or a Club Officer. Clubs that are out of date and need assistance can contact us at clubs@arrl.org.

North Okaloosa Amateur Radio Club's Annual Autumn Amateur Radio Hamfest!

Calling all Radio Enthusiast, Amateur Radio Operators, GMRS, FRS, CBRS, Aviation Band, Shortwave, Communication Dealers, Wholesalers, Distributors, and anyone else who loves or is involved in all modes of radio communication! Gather your gear, set up your booth, and partake in one of the BEST Hamfests in Sunny Florida! Over the nearly last half of a decade, the North Okaloosa Amateur Radio Club in Crestview Florida has been hosting an absolutely wonderful Hamfest! This Annual Autumn event is lauded by many and always brings out a surprise or two during its course! Stay tuned with the links below to follow along for more announcements!

Bolstering 40,000 useable square feet, this facility offers ample space inside with HVAC, restrooms, refreshments, meal hosting, ample parking and more! The house is packed with Vendors and Patrons alike filling the capacity of the facility!

What: Noth Okaloosa Amateur Radio Club's Annual Autumn Amateur Radio Hamfest!
When (Day 1): Friday October 10th, 2025, **VENDORS SET UP ONLY** 1030 - 500pm. NO SHOW.
When (Day 2): Saturday October 11th, 2025, **0600 Vendors, 0800 Show Start** and goes until 100 pm!
Where: 1446 Commerce Drive, Crestview, Florida in the Crestview Community Center! Do not let them name fool you; this place is massive!
Admittance for Visitors & Guests: $8.00 each person. Boy Scouts in Uniform FREE! 12 and Under FREE! 90 and above FREE!
Prices: Vendor Tables/Table Spots: $15.00 each spot/space/table (good for the entire show). First reserve first served. If you are a walk-in on the day of the show, tables may be limited as this show typically sells out.

Food: Meal & bake sale services provided by Live Oak Baptist Church! Menu to be announced! If you recall them in the past, you know you're going to be eating just as well if your grandmother was baking you a pie for that after dinner desert!

TALK IN: 147.360, +, 0.6, 100 Hz Tone
Want to have us advertise your business as attending? Just email us or drop us a line!

Activities Offered:
License Testing at 10:00 Saturday, Oct 11th, 2025!
Refreshments!
Local Vendors!
National Vendors!
Area Club Booths and Tables!
Private Individual Tables!
Raffles & Prizes!
Deals, Deals, Deals!
More to be announced!

Links to the Hamfest Website(s):
W4AAZ.ORG
https://w4aaz.org/noarc/hamfest-2025/

ARRL.ORG
http://www.arrl.org/hamfests/noarc-annual-hamfest

NOARC Facebook Page
https://www.facebook.com/NorthOkaloosaARC/

NOARC Instagram
https://www.instagram.com/noarc.fl/

Contact Information: Hamfest Hotline 850.359.9186 or email: NOARCINC@Gmail.Com

Alachua County News

ARES(R) / North Florida Amateur Radio Club
Alachua EOC Radio Club
Gordon Gibby KX4Z

New Licensees From Our June Technician Course

Tara S. KR4EXR
John G. KR4EXV
Jessica W. KR4FAA
THANKS to the GARS VE Team for a Special Licensing Session at the Alachua EOC!

The Rush of Field Day is Over!

Our team settles back into some *rest* and the normal cycles of training and exercises. Our "hotwash" candid review was held at the July regular meeting. Preliminary FD results: we slightly improved contacts with 1661 QSO's, predicting a score of 9,100, a 15% improvement over our score last year. **We're hopeful we are near the top of the 4F Pile!** The big news was the totally unexpected success of our GOTA station, which had at least 17 operators, was thoroughly overwhelmed by the public coming through the EOC doors, and engaged a lively 7th grader who made ***scores and scores of contact!*** His family kept bringing him back for more!

Key to growth has been listening to our volunteers, whose every comment goes into our After Action Report. This year **31 distinct great comments** into the Appendix that goes into our AAR. Huge improvements this year -- Earl Sloan working with Gary and Dory providing meals suitable for an expensive sit-down restaurant, and Leland's POTA-turned-GOTA station hitting it out of the park! Mr. Murphy provided glitches here and there. The coaxial cable failure in the 175-foot donated piece, that took hours and hours to find....everything goes into our list. It is very candid.

Alachua County EOC 2025 FD Top Three Contacts

David H. W4JIR - 271
Mike H. WB2FKO - 271
Gordon G. KX4Z - 215

Two major areas of growth over the last several years stand out. **First, we have successfully encouraged our group's members to steadily divert resources into improving our available radio assets.** Members have gotten modern equipment; some have put them into portable go-boxes. That allows us to easily put together several Field Day stations just out of our own private systems. Thanks to Fire Rescue Chief Theus, we also received a complete new HF/VHF/UHF go-box system from the County as well. Earl McDow K4ZSW's networking crew has solidified our secure private microwave network and made it and our satellite-based Network Time Protocol server very portable. System and server reliability have become awesome! Thanks to entire team work, and Stewart Reissener's welding, we can now trailer in a full HF beam and tower, and put up 6-meter / 2m / 70cm systems as well! We have the beginnings of a solid homebrew linear satellite ground station. Our HF Antenna Multiplexers, while still not perfect, are now solid performers for us, and we also have access to hundreds and hundreds of feet of low-loss coaxial cable lengths -- purchased by our participants.

Continued on next page...

Secondly, we have a lot of growth in the skills and capabilities. FCC Part 97.1 emphasizes developing a cadre of technically qualified personnel. Modern amateur radio and emergency response systems involve facility with simple computer applications, like email, Winlink, web browsers, online sign-up forms, and modern modulation systems employed in FT8/FT4, and in logging systems like N3FJP. Our volunteers have gotten more and more in-tuned to these systems. They are now able to easily handle online documents and sign up on Google Documents for time slots. Many of our members -- especially newer ones -- quite easily adapt to WSJT-X and FT8/FT4-- no "mic fright" there! That allows even newly licensed Technicians to rack up impressive contributions! Our GOTA station alone made 203 FT-type contacts, while our other participants added another 906 -- the total being 67% of all our contacts, and each garnering 2 points! Then add 132 traditional phone contacts, and 417 CW contacts from two of our participants, who leveraged the automated capabilities of N3FJP to assist. We use every technique! And we go entire distance on purpose -- it is practice!

Mentoring and helping our volunteers become more up-to-date with computerized systems is one of the big ways that we benefit them. Chances for them to get used to popular social connection online conveniences that help them in their daily lives, keep them connected, and reduce deadly isolation…

Ham Classes Lead to Unexpected GOTA Joy

After a lull, we are back into the business of holding introductory ham radio classes, spurred on by volunteers like **Reid Tillery K9RFT**, who has held several in the far reaches of eastern Alachua County, and **Ron Lewis KN4ZUJ**, who has provided radio instruction for Scouts. Trying to mentor active teenagers at a local magnet school, we threw together an online course in June that had mixed results, with 15 entrants but only 3 finishing (all successfully getting their licenses!!) -- but all of this together with our publicity efforts are thought to be the genesis of the *overwhelming GOTA crowd, something we've never experienced before*. The skills & assets that **Leland AA3YB** uses in his POTA station turned out to be phenomenally successful in making FT8 contacts. We'll repeat this new-found trick!

Mike Hasselbeck WB2FKO teaching FT8 @ GOTA Station NF4RC. Main station NF4AC

FEMA Coursework

It is time for us to push a few more volunteers onto higher level leadership training, and **Reid Tillery K9RFT** rose to the challenge and as I write, is taking the 300-level ICS course (G-300) at the Alachua County EOC. A welcome addition to those in our group who've already had this incredibly important course!

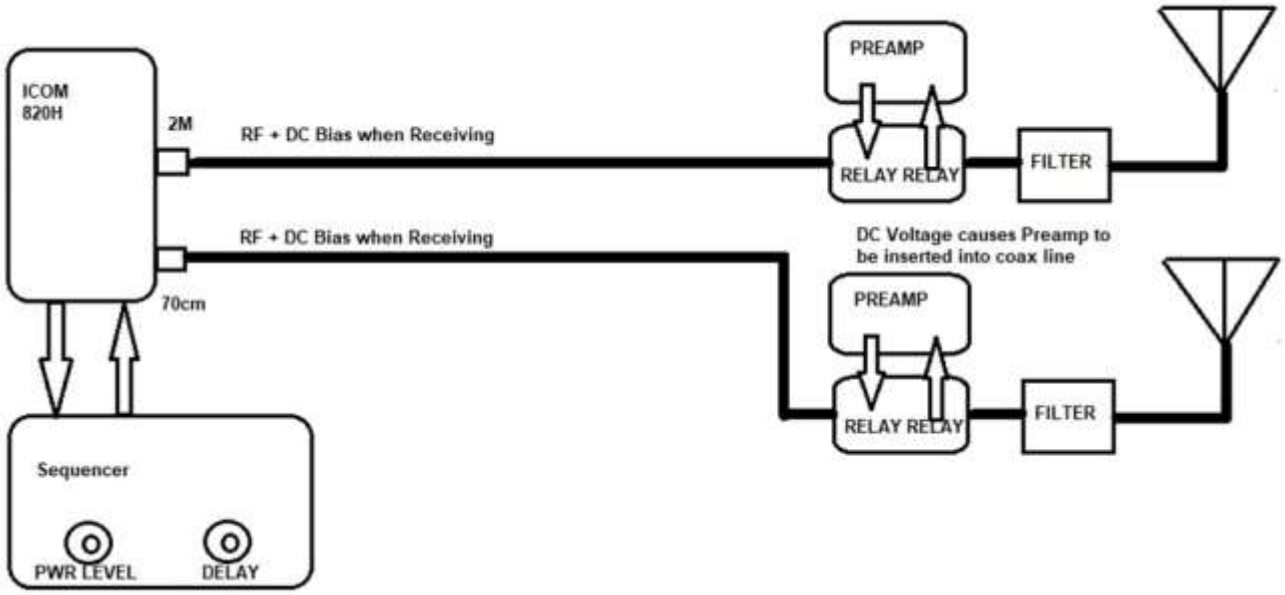
More Technician Courses!

We have already gotten permission to hold a weekly Technician License Course starting September 4th and finishing just before the GARS VE Dec 4th testing. We were surprised at the attrition in our online June course....so we're going to try primarily "in-person" this time, at the Alachua County EOC. Thursday evenings at 7 PM. More information and SignUp can be found here: https://forms.gle/e4nwur6Zv3z6E325A

Continued on next page...

My Satellite Efforts

I'm targeting the "linear" CW/SSB satellites, while **Ron Lewis KN4ZUJ** continues his incredible successes with the FM birds. He has extreme frustration during Field Day, however, because only the strongest signal gets through then. My beginner's setup has been overly complicated and requires a lot of manual connections -- so I'm coming up with remote relay systems to switch $16 very-low-noise-figure preamps and in out, and a homebrew "sequencer" to protect them from the older ICOM 820 transceiver. Lots to experiment with and learn from here! I've never done "microstrip" 50-ohm pcb lines before.



The figure above shows what I'm currently trying to build. If I can get it to work, I'll be able to (a) continuously vary the ICOM's output power and (b) create a variable delay before actual RF output power, to allows inexpensive relays to bypass fragile preamps. I have greatly benefited from incredible research and documentation done by Jim Klitzing W6PQL (https://w6pql.com/), especially his insightful evaluation of using inexpensive Omron relays at VHF/UHF https://w6pql.com/using_inexpensive_relays.htm I can heartily encourage studying all of Jim's amazing work!

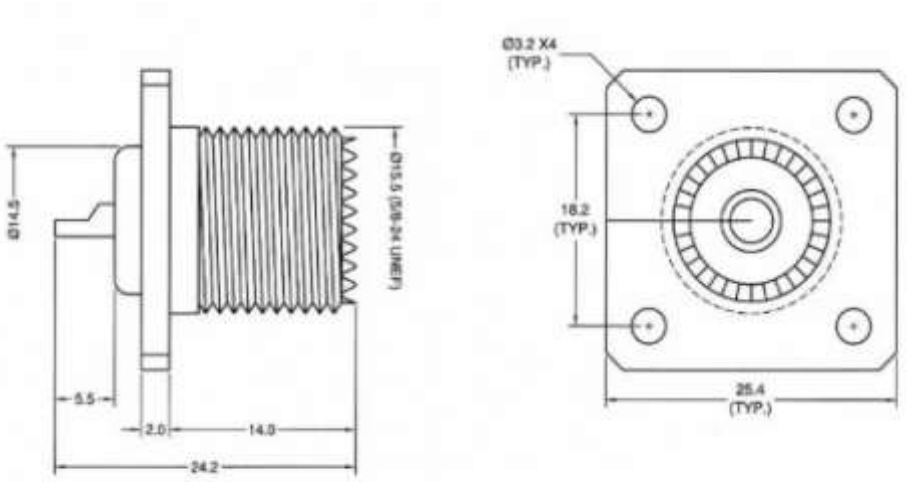
Contact Email docvacuumtubes at gmail	NFARC Web Page: https://www.nf4rc.club/ CALENDAR: https://qsl.net/nf4rc/CALENDAR.html	Monthly Meetings: 2nd Wednesday 7PM August: Alachua County EOC Sept: Queen of Peace Church
LAB 'n LUNCHES Irregularly scheduled Saturday afternoons building and learning great projects for cheap, after lunch at 39th Avenue/I-75 Wendy's @ 12 Noon	NFARC Groups.IO https://groups.io/g/BITX20 (approaching 100-member limit!)	Monthly Tech Nite Zoom First Thursday Night, 7 PM https://us02web.zoom.us/j/89530741792

PL259—SO239 Evaluation

Gordon Gibby KX4Z

Everyone these days knows that the SO239 and PL259 aren't really suited for REAL uhf applications, despite being named the "UHF" connector. I bet many of the older experienced hams know WHY, but I didn't. I had always heard there was an impedance issue, but I didn't know what it was.

So, I got out my trusty machinists' calipers and made some measurements, and then I put those into an online calculator of impedance of coaxial conductors. There are two different typical insulators used in the SO-239 (socket) -- phenolic resin (dielectric constant anywhere from 4-7) and Teflon (dielectric constant more like 2). I tried both of those dielectric constants along with the diameters that I measured on a stock SO239.



https://cdn11.bigcommerce.com/s-47f02/images/stencil/1280x1280/products/622/8787/UHF_7603_DWG__17724.1627936283.jpg

Sure enough, the increased dielectric constant of the phenolic (brown) resin and the dimensions of the center jack and such made the impedance considerably lower than 50 ohms -- more like 25-35 ohms.

If you went with the Teflon (or even better, with AIR or with a honeycomb structure or some air-filled gaps) you got the impedance up significantly closer to 50 ohms....

So, if you want to do things at UHF (like I'd like to build a simple capacitively-connected "DC BLOCK" out of two SO-239's and a capacitor) then you are smarter to use TEFLON based SO239's.... Smaller impedance bump. And because impedance bumps exist only for a short DISTANCE on the smith chart, you don't have that much trouble with a small bump.... not perfect, but not the end of the world, either.

https://cdn11.bigcommerce.com/s-47f02/images/stencil/1280x1280/products/622/8787/UHF_7603_DWG__17724.1627936283.jpg

MERT

Marion County Sheriff's Office
Division of Emergency Management

COMMUNICATIONS UPDATE

August 2025

MERT's primary role is to support all open Evacuation Shelters throughout Marion County during declared Emergency events. We also support EOC and emergency personnel along with Community Emergency Response Teams (CERT) with voice, image and data communications resources. "*Call MERT… When all else fails*!"

Next Bimonthly Meeting

Sept. 20th, 10:00 am at the EOC

All Amateur Radio Operators are Welcomed!

Meetings conducted in Jan, March, May, July, Sept. and Nov.

Why Volunteer Emergency Communications Matters During Hurricane Season

Every hurricane season reminds us just how fragile basic utilities and conventional communication systems can be. In the face of powerful hurricanes, electrical power networks go dark, cell towers fail, Internet services go offline, and even public service radios can falter under strain. What remains is the steady, practiced voice of the emergency communicator – a licensed amateur radio operator whose NIMS trained, prepared, and ready to keep information flowing when it's needed most.

Volunteer emergency communications (EMCOMM) play a vital role in ensuring public safety when Marion County faces severe weather. Through MERT, our trained team of dedicated radio operators' steps in to support the **Division of Emergency Management**, Emergency

Operations Center (EOC), Hospitals, CERT communities and other vital agencies when needed most. We become the eyes and ears across Marion County, relaying conditions, vital shelter updates, resource needs, and emergency calls that would otherwise go unheard (like we did in 2022's Hurricane Ian when members responded to emergency radio calls requesting help for a 65-year old female in Lee County, FL needing SAR help off the roof of her flooded home.)

Participation isn't just important - it's personal. By volunteering, **YOU** become part of a network that prioritizes community care over chaos. Whether you're stationed at a shelter, at the EOC monitoring local, state and national networks, or reporting from your residence, your voice helps provide information that decision-makers need to act quickly and confidently. You help ensure that families stay informed, responders stay coordinated, and operations run smoothly under pressure.

"As you grow older, you will discover that you have two hands — one for helping yourself, the other for helping others." - Audrey Hepburn

Continued on next page...

MERT's infrastructure – all our repeaters, towers, radios and field gear - is only as strong as the people behind it. During hurricanes, **it's our members** who embody resilience, stepping in when others step back. It's your calm under stress, your technical skill, and your service-minded spirit that brings stability to turbulent and chaotic situations.

We train for the worst, so our neighbors experience the best possible outcome. Every volunteer brings value, whether you're a seasoned MERT radio expert or new to amateur radio communications and the Incident Command System (ICS).

What matters most is being present, being prepared, and being willing to act. This hurricane season, please step forward! Be the link in the chain that keeps everyone in Marion County connected. When everything else goes silent, your signal could be the one that makes all the difference. Our moto is our guide.

HRCook

"When all else fails. Call MERT!"

L-R) Bill Gillespie, Ray Woody, Nick Kiddey, Cindy Sheffield and Harlan Cook

Thank you, members, for your participation and support!

With Coordinator Harlan Cook and Deputy Coordinator Bill Gillespie out of state last month, these members stepped up to ensure MERT was ready for any assignment. Please thank them for their leadership.

- Ray Woody (WB6FKJ) acting Coordinator on Duty
- Cindy Sheffield (K9LRX) Deputy Coordinator
- Nick Kiddey (W4NFK) Deputy Coordinator

MERT NEEDS YOU!

Please renew your participation in MERT activities, practicing Winlink messages and weekly radio Nets.

Shelter Audit Update – Forest High School now Operational!

(L-R) Jim Lowe AU4JL, Nick Kiddey W4NFK, Royce Hagerman KD7SNN, Cindy Sheffield K9LRX, Ray Woody WB6FKJ and Harlan Cook KN4VRM.

Radio test setup.

Robert Miller

Continued on next page...

In late-June, a team of members visited Forest High School to re-test and if necessary, make additional repairs to the MERT radio connections which had been moved by the facilities staff due to some building changes.

We are happy to report SWR testing along with on-air radio tests confirmed the relocation of the cabling from the antenna to a new improved site in the Teachers' Lounge passes the necessary technical requirements for successful operations (SWR from 1.3 to 1.8).

We sincerely thank Robet Miller, Facility Mgr., MCPS for his support and work prior to our visit to complete repairs.

Acting Coordinator Ray Woody (WB6FKJ) led a refresher class on a resource available to all Members in the Radio Room called the "**Red Book**". It is a detailed step-by-step reference guide for anyone assigned or filling the position of MERT Incident Commander (IC).

Using the Red Book will help guide the IC through the Pre-Activation, Activation and Post-Activation steps in detailing what activities are important to conduct in maximizing the overall ability of members to be safe and successful in completing every activity and assignment.

Since Hurricane Nicole in 2022, the "**Red Book**" has been used for every activation with it continuously updated with new steps, information and reminders added after every event.

Look for the "**Red Book**" in the EOC radio room next to the SHREK Kit binders in the bookcase top row.

NEW FCC Licensee Santos Pagan – KR4FEP

MERT is very proud to announce member Pagan Santos passed his Federal Communications Commission (FCC) amateur radio Technician test and was awarded license - KR4FEP.

Pagan is now on-the-air as he has already purchased a mobile and HT radio in participating with the
weekly MERT and CERT/MERT radio Nets.

Congratulations Santos!!

If *we can get our license* – so can YOU! If you want to obtain your amateur radio license, please let MERT know so we can help! Email KG4NXO@marionso.com

Continued on next page...

New Forest Tower Repeater Project Overview

As MERT prepares to finally activate its newest amateur radio repeater station at the Ocala Forest, many actions have been undertaken in review and preparation **over the last 3-years**. They have included:

- ⇒ Site inspection and analysis
- ⇒ Propagation studies – Marion County and Atlantic Coast County's
- ⇒ Florida Amateur Spectrum Management Association application
- ⇒ Current MERT license resources
- ⇒ Current inventory analysis
- ⇒ New equipment requirements
- ⇒ Equipment specifications and cost analysis
- ⇒ Multiple product quotations – cable, hardware and tower climbers!
- ⇒ Budget requests and cost justifications
- ⇒ Purchasing support with contact information
- ⇒ Activation plans/activation detail
- ⇒ FCC R&R compliance reviews
  - ◊ Repeater setup & correct CW ID broadcast notices by the unit
  - ◊ Station Log Book

MERT has completed multiple steps leading up to the new repeater activation. A small step was also creating the new station log book (per FCC R&R 97.1103) which will be posted at the site for maintaining the operational records for MERT personnel and possible FCC Inspector review. For more information, visit: KG4NXO.com

Forest Tower Plan Update

Most successful project outcomes start with… a **good plan** and that's what MERT did on July 23rd in regards to the Forest Tower repeater activation. Here's what was reviewed:

- Why is this new repeater important to MERT's Mission?
- Where is it located?
- What type of tower is it and how high will MERT's antenna be mounted at?
- What does the communications room interior look like?
- What repeater will be used?
- What band will the repeater be on and what are transmit and receive frequencies?
- Will it require a PLL code to connect?
- What does the equipment connection drawing look like?
- Will the new site have standby power for reliability?
- Has a Radio Line-of-Site Path Analysis been completed?

Will the EOC radios be able to connect to the new repeater at the Ocala Forest?

Additionally, MERT Repeater Manager Phil Lewis (W4EVV) reviewed the key technical and operational aspects of the Yaesu DR-1X repeater be used at the site. **Thank you Phil!**

Phil Lewis, MERT Repeater Manager, provides an overview on the Yaesu DR-1X 144/430 Dual Band C4FM/FM Digital Repeater to be used at the new Forest Tower repeater.

Continued on next page...

MERT Local News Update

The online news outlet "Marion Citizen" had a fun article about the Division of Emergency Management support organizations **CERT** in the Ocala Palms neighborhood. The reporter also mentioned **MERT**, its responsibilities along with member Dave Gustufson (WB9EEH) support. If you see an article about MERT, email: KG4NXO@marionso.com

Read the entire article at: https://www.chronicleonline.com/weeklies/marion_citizen/life-in-ocala-palms-cert-helps-local-communities-handle-disasters-such-as-hurricanes/article_ad9b8ecd-651e-5399-849d-14afae9222c3.html

Activation Levels

As we reach the historical peak of the hurricane season, let's review the specific description of each activation level to support future events.

Level 1 - Full Scale Activation of Marion County Emergency Response Team

In a full-scale activation, all primary and support agencies under the local and state plan are notified. The Marion County EOC will be staffed by Division of Emergency Management personnel and all Emergency Support Teams and Functions, including **MERT**, are to be fully staffed for emergency operations.

Level 2 - Partial Activation of Marion County Emergency Response Team

This is a Division of Emergency Management activation that may not require activation of every section, branch or Emergency Support Functions. All primary, or lead, Emergency Support Functions are notified. The Marion County EOC will be staffed by Division of Emergency Management personnel and necessary Emergency Support Functions. **MERT** may be activated to support the EOC.

Level 3 - Monitoring Status

Level 3 is typically a "monitoring" phase. Notification will be made to those local Agencies and Emergency Support Functions who would need to take action as part of their everyday responsibilities. The Marion County EOC will be staffed with

Division of Emergency Management staff. **MERT** is at normal operations level.

Since MERT communications capabilities can provide unique information resources to the Division of Emergency Management, MERT activations may be precautionary steps allowing monitoring and reporting conditions to the EOC Incident Commander.

Reminder: MERT MAY BE ACTIVATED AT LEVEL 2 ALERT STATUS AT ANYTIME.

Volunteer Time Reporting - MERTrak

Reporting your MERT Volunteer Hours is very important! On an annual basis, volunteers assigned to the Marion County Sheriff's Office (MCSO) contribute thousands of hours-of-service worth between $1,500,00 to $2,000,000 in saved taxpayers' dollars. During a declared local state of emergency, the volunteer hours and resources by MERT and other organizations may also help save taxpayer money by offsetting local costs under FEMA's Public Assistance Program.

Continued on next page...

What do I report in **MERT**rak?

When reporting your "MERT Hours" please include the following:

- Drive time to and from the EOC for all meetings you attend (2 hours maximum total).
- Time at the meetings and events (no limits).
- Time at all training events, exercises and HAM shows learning about amateur radio systems, hardware and resources including time studying for ICS classes.
- All time listening and talking on your radio as an FCC licensed radio operator practicing your skills (no limits).
- Time setting up, participating in ALL NET's and then shutting down your system.
- Time reading MERT Newsletters and other materials about Amateur Radio.
- Time spent on programming, adjusting and repairing your radios (base, mobile and HT's).
- Time participating preparing, sending and receiving WINLINK messages.
- Time on the telephone or sending/receiving emails about MERT or any other amateur radio activity.

*Special Acknowledgement: MERT recognizes Kraig Pritts (KA2LHO) for his time and skillful expertise creating MER-Trak. Thank you, Kraig!

Fun @ the Silver Springs Radio Club Meeting

A bucket-list adventure!

Harlan Cook fishing on Day 2 in the Valdez Arm narrows for ocean salmon.

MERT Coordinator Harlan Cook shared his "bucket list" trip to Alaska fishing for 7-days in early July was an incredible adventure. While it also had very cold weather, rain, fog and several hours riding out some big waves and challenging weather unique to the Gulf of Alaska, it was an incredible trip of a lifetime.

For more information of the Marion County Emergency Radio Team (MERT), visit:

G4NXO.com

"Volunteering is at the very core of being a human. No one has made it through life without someone else's help." – Heather French Henry

FCC Testing Information

Daytona Beach Amateur Radio Assn (DBARA)
- Monthly, third Monday, 5:30 PM, prior to meeting
- Lehman Building, Embry-Riddle Aeronautical University
- Registration Required
- Info: https://dbara.org/testing/

Hog County Amateur Radio Association, Bushnell FL
- First Saturday, 11:00 AM
- Cross Connection Church, 1451 West County Road 476, Bushnell, FL 33513
- Info: sumterVE@gmail.com

Lake ARA, Leesburg FL
- Monthly on the 3rd Saturday, prior to meeting. (Except December)
- 8:00 AM
- LARA Clubhouse (11146 Springdale Ave, Leesburg – off of CR 473)
- For more information and registration, contact: Dave Templeton N4NG, 386-804-2806 n4ng@icloud.com in advance of the meeting.

Lake Monroe ARS FCC Testing, Sanford FL (LMARS)
- Third Saturday of every month
- Seminole County Sheriff's Office, 100 Eslinger Way, 1st Floor, Sanford, FL
- Registration Required
- For more information and registration, contact Bob Cumming, W2BZY, 407-333-0690 or w2bzy@cfl.rr.com

Milton Amateur Radio Club, Milton FL
- Check date at miltonarc.org
- Walk-in
- Bagdad United Methodist Church
- Info: Chuck, N4QEP, merlinman3@yahoo.com

Orlando Amateur Radio Club
- First Wednesday
- 5:30 PM, Walk-ins allowed
- ARRL/VEC
- William Beardall Senior Center 800 S Delaney Ave Orlando FL 32801.
- Info: testing@OARC.org Robert Cumming, 407-333-0690

Santa Rosa County FL ARES® Testing (Walk-in)
- Information and dates can be found at srcares.org

Testing information is subject to change. Check with the testing venue to confirm the testing session and requirements.

Seminole County
- Every month on the third Saturday
- 9:15 AM
- Seminole County Sheriff's Office off SR 17-92, on 100 Eslinger Way in Sanford, FL
- Info: Bob Cumming, W2BZY, w2bzy@cfl.rr.com

Silver Springs Radio Club, Ocala FL (SSRC)
- Go to http://k4gso.us/class/ to signup for classes
- Go to http://k4gso.us/test-signup/ for testing. Testing is held on the 2nd Tuesday of odd months at 7 PM.
- Note http://k4gso.us/ncvec605/ is requested to be filled out before you show for testing. It is best to download the form and open it as a PDF so you can fill in the blanks.

Suwannee ARC, Live Oak, FL
- Last Saturday of the month
- Suwannee Regional Library
- Contact Gerald Guy, geraldlguy@gmail.com

Tallahassee Amateur Radio Society (TARS)
The Tallahassee Amateur Radio Society (TARS) has begun limited License testing. Please refer to the following for the updated testing dates and requirements for individuals wishing to take exams. https://www.k4tlh.org/getting-started/license-testing

West Volusia Amateur Radio Society
- Second Saturday of each odd numbered month
- 6:00 AM
- St. Johns Lodge #37, 2557 N. Spring Garden Ave, Deland FL
- Info: https://westvars.org/testing

Gainesville Amateur Radio Society
- 1st Saturday of even numbered months
- Tech day two weeks after testing
- https://gars.club/Testing.html

Hernando County Amateur Radio Association (HCARA)
2nd Thursday of each month at 6:00 PM
For details and to register—http://www.hamstudy.org and go to **Find A Session**
Exam cost is free. FCC charges do apply

Statewide Digital Radio Resources
Designated ARES® **DSAR Reflectors & a DMR Talk group?**
DSTAR Reflector 046
REF046A – Florida Statewide
REF046B – NFL ARES®
REF046C – NWS Mobile, AL SKYWARN
DMR Florida State ARES® TG 31127
Link your local repeaters to help create a digital repeater network throughout the state!