Smoky Signals

Smoky Mountain Amateur Radio Club

WINTER 2025

Editor - Jeff Buffington, N4POD

info@w4olb.org

OFFICERS

Andrew Lawson, N2AL - President
Michael Foley, K4MJF - Vice Pres.
Bob Loving, K9JU - Secretary
David Andrews, N1ESK - Treasurer

Nets

SMARC Weekly Net.
Thursday 1900 hrs
146.655 & 443.075

KK4XA Morning Net
M-T 0900 hrs
146.655 & 443.075
KK4XA DMR 444.075-TG-314742

Club Meetings

4th Monday Monthly*
1900 hrs
USW Union Hall
339 Hall Road
Alcoa, TN 37701
*Excludes June and Dec

Typical Gatherings

Tech Lunch
Thurdays @ 1130hrs.
Windy City Grill
2641 Hwy 411
Maryville, TN

Eyeball Net (Breakfast)
Friday's @ 0830hrs
TC's Grill
2514 Old Niles Ferry Road
Maryville, TN

SMARC Annual Christmas Dinner

The Smoky Mountain Amateur Radio Club's Annual Christmas Dinner took place on Saturday, December 14, 2024, at Saint Andrews Episcopal Church Fellowship Hall in Maryville, Tennessee.

The event featured a group photograph, highlighting the enjoyable fellowship, excellent cuisine, and engaging conversation among members, spouses, guests, and friends.

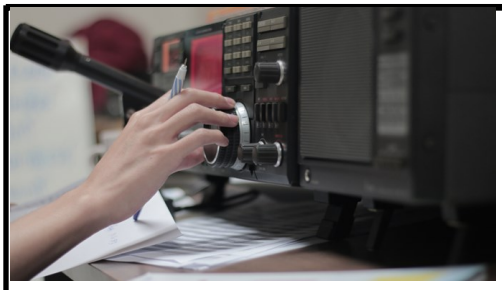
Cracker Barrel provided catering services, offering a variety of dishes, including sliced turkey, sliced ham, dressing, green beans, mashed potatoes, biscuits, cornbread, butter, and jelly.

Members who attended brought drinks and desserts to complement the evening's offerings.

The club expresses its appreciation to all who helped set up the event and to those who attended, making it a memorable evening for everyone.

Let us endeavor to establish this as an annual tradition.

Michael J. Foley, K4MJF
SMARC Vice President
SMARC Net Manager
ARRL Technical Specialist



Contesting Roundup

JANUARY

- North American QSO Party (CW): Jan 11 1800z-Jan 12 0559z
- North American QSO Party (SSB): Jan 18 1800z-Jan 19 0559z
- ARRL January VHF Contest: Jan 18 1900z-Jan 20 0359z
- Winter Field Day: Jan 25 1600z-Jan 26 2159z

FEBRUARY

- CQ WW RTTY WPX Contest: Feb 8 0000z-Feb 9 2359z
- ARRL School Club Roundup: Feb 10 1300z-Feb 14 2359z

MARCH

- ARRL International DX Contest (SSB): Mar 1 0000z-Mar 2 2400z
- CQ WW WPX Contest (SSB): Mar 29 0000z-Mar 30 2400z

Note: All dates and times listed are Zulu/UTC, unless otherwise specified

For more Contests, QSO Parties and Sprints check out the WA7BNM Contest Calendar at www.contestcalendar.com/

SMARC 2025 Club Goals

SMARC: It's All about Our Members

- Support Amateur Radio and the members of the Club
- Caring for Each Other
- Accomplishments, upgrading your license and sharing knowledge with other Club members
- Sharing ideas with others in the Club
- Friendships, old and new
- Outreach to our community, and to other hams

2025 Goals and Objectives

- Continue to Grow the Membership, keep them informed and involved
- Support, and become more active in Club Activities
- Meet member needs, and help "elmer" new Hams
- Have MORE Club activities

Upcoming Hamfests

DATE	NAME	CITY, STATE
Feb 7-9	Orlando Hamcation, Southeast Division Convention	Orlando, FL
Feb 22	Dalton Hamfest	Dalton, GA
Mar 7-8	MTARS Tullahoma Hamfest	Tullahoma, TN
Mar 15	Sevier County 2025 Hamfest	Sevierville, TN
Mar 22	West TN Hamfest and Swapmeet	Trenton, TN
Apr 12	FreeFest	Bartlett, TN
Jun 21	Knoxville Hamfest, ARRL State Convention	Knoxville, TN

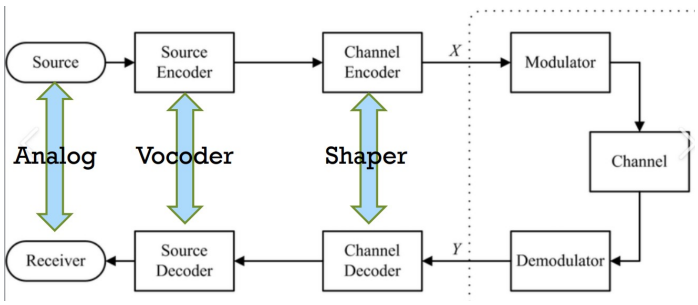
Let's Talk Digital Voice Radio via the Internet

Dave N9KMY

There are two primary methods whereby operators talk around the world with just a handheld (portable) radio, and you have likely heard something about D-Star, DMR, Yaesu System Fusion, P25, NXDN and soon - M-17. Of course there are other modes, even FM analog, but this short article is going to primarily focus on DMR and Fusion. The three most common methods used for radio over the Internet are a repeater with a gateway, a direct radio interface and Hot Spots.

Interfaces, the Internet and Servers

Let's dig in a bit deeper. The internet serves as the primary method making distant communications possible though a radio link is utilized as the method to connect to the operator. Most think about the use of a repeater or an amateur radio Hot Spot to make the connection to the Internet. Just what happens behind the curtain? The first and last thing that happens is to convert voice to digital and then back again to allow us humans to talk and hear. The DMR and Yaesu System Fusion radio each makes use of a coder-decoder (vocoder) followed by digital shaping to accomplish this A to D and D to A conversion. Both use nearly the same DVSI chip. In between the vocoders of each radio are digital shaping circuits creating/deciphering packets plus modulating and demodulating.



The next step in the process is to somehow get the RF signal from the radio to the internet and as stated, this might happen by a repeater or Hot Spot as the two most common methods. Then the sender and distant receiver must be linked via proper addressing of packets which occur via a server set up on the internet.

With DMR, the most used server system is called Brandmeister, and it is maintained by a group of amateur radio operators. There are actually multiple Brandmeister servers interconnected that transfer voice over IP packets.

With Yaesu System Fusion, the servers are owned/operated by Yaesu and located in Japan. (The shaping is different from DMR.)

There are also servers identified as YSF and FCS which can support Yaesu System Fusion Radio to connect and even interoperate with DMR, D-Star, NXDN or P25.

Each digital radio system is unique to its mode/technology plus note the conversion between modes can also happen inside the Hot Spot.

So, let's summarize and discuss this special A to D and D to A device. Remember the actual analog-digital conversion utilizes the radio's internal vocoder (voice coder/decoder). The vocoder converts analog audio from its microphone to digital code and decodes the incoming digital code to analog, sending audio to the radio's speaker. It also accepts the raw decoded data from the radio and then creates packets to be sent via the internet using IP. Packet addressing is also added to get packets to the intended destination.

With Yaesu System Fusion, it is also possible that the connection between the radio and the Internet makes use of a physical wired connection. With DMR, one can purchase a device where the codec and audio circuit are within, and no radio is involved. The diagram below shows DMR but it could look the same for NXDN, P25 and M-17.

Let's go back to the two most common methods:

Personal Hot Spot is a portable device used near the operator's radio, and it contains a micro power radio/decoder/shaper to create IP packets and makes a connection via Wi-Fi to the internet such as your cell phone or home access point.

KK4XA Repeater can also be equipped to perform the intended interface function. The internet interface is integral to the KK4XA DMR

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repeater where a RJ45 Ethernet cable connects to a cellular modem to gain Internet access.

W4OLB UHF Repeater is connected to the internet and Yaesu System Fusion servers with an external radio and HR-200 interface (not co-located).

Establishing the Connection

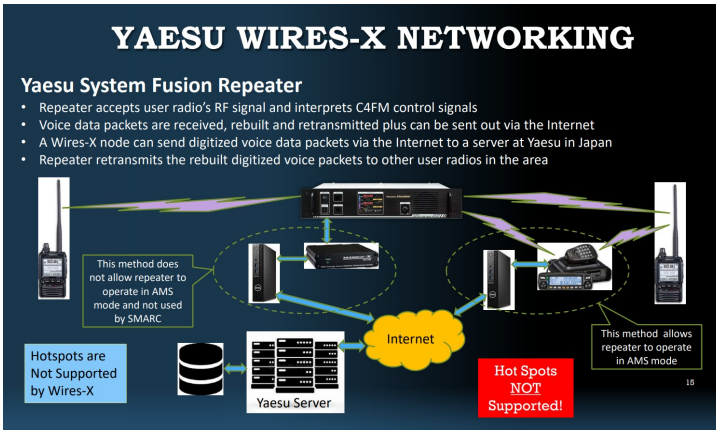
Using a Hot Spot the radio and Hot Spot must be pre-programmed with frequencies, operator ID, server access and the connectivity means to the Internet. The radio also needs to have desired talk groups preset in memory. If using a Yaesu System Fusion radio and Hot Spot, then the DX key on the radio is used to bring up the internet connection.

The operator now only needs to turn on the Hot Spot and establish a connection to the Internet by authenticating on the desired DMR server such as Brandmeister or special YSF or FCS server. [Note: YSF is not short for "Yaesu System Fusion."] The operator turns on the radio, selects the Hot Spot channel and desired talk group before pressing the PTT to send the digital modulated signal to the Hot Spot. The Hot Spot receives the RF signal, decodes and the data converted to VoIP packets which are sent to the server (Brandmeister). Any other radio and Hot Spot connected in the same way will hear the call and the QSO can begin.

[Note: A YSF connections via a Hot Spot cannot directly connect with Yaesu Wires-X servers. There are, however, gateways between various protocols established at some of the non-Yaesu servers.]

Yaesu Wires-X is a network service created by and supported by Yaesu to use the internet for extended worldwide voice connectivity via Yaesu System Fusion. It operates in a slightly different way than DMR and YSF. The W4OLB UHF repeater operates in a hybrid mode to support FM and digital narrowband for Yaesu Internet communications (Wires-X). An operator can set their radio to access Yaesu Wires-X mode by doing a long hold on the DX button which changes the radio from local to long-distance communications. Wish to leave this mode, just do another long press on the DX button.

It is also possible for an operator to connect a Yaesu System Fusion Radio to the internet using a dedicated computer and special interface computer and/or a Yaesu device, HRI-200. This is what is used off premise to connect the W4OLB UHF repeater to the internet.



WHAT are ROOMS vs. TALK GROUPS vs. IDs

From an operator perspective Rooms and Talk Groups basically serve the same function. They each create a place where multiple operators can QSO. Yaesu Wires -X, YSF and FSC establish connections to a ROOM and DMR connects to a TALK GROUP.

Also, it should be noted that a DMR radio or Yaesu System Fusion radio can establish am internet-based voice radio link radio to radio is the calling radio operator knows the ID of the called radio operator.

Amateur operators have also created a means of interconnecting DMR Talk Groups and YSF Room and even Wires-X Rooms. One such example is Americalink.

Note that I have a much more detailed look at this technology for an upcoming SMARC meeting

SMARC Shirts Now Available

The SMARC polo is made with a dry wicking material, very light weight, is very comfortable to wear and easy to care for. Washing and care instructions are included with every order.

If you want to order a shirt, please make sure you send me an email with "SHIRT ORDER" in the subject line at the email address listed below, make sure you give me your name and callsign exactly how you want it to appear on your shirt, if you want a long or short sleeve shirt and the size.

After you place your order, I will send you an invoice via email, with the total amount due, including tax. Before I place your order, I will double check with you to make sure everything is correct, as once I place the order with the vendor, it cannot be changed.

There are no refunds or exchanges.

Payment can be made by cash or check payable to me, as the Club is not funding this project. Delivery will be made at the Club meeting(s) or at breakfast, is local only! If you are out of state, or outside of the Greater Knoxville area, you are responsible for postage and shipping to your address!

TAXES WILL BE ADDED TO ALL ORDERS, AS I HAVE TO PAY TAX ON EACH ORDER

The sizes and pricing are as follows:

If you have any questions, please feel free to reach out to me, and I will try to answer any questions you might have. You can send me an email at k4mjf.1@gmail.com

Thanks for your time! I look forward to hearing from you.

Mike, K4MJF

SMARC Vice President, Net Manager

ARRL Technical Specialist

SMARC Short Sleeve Polo w/logo (Small to XLarge size)	$28
SMARC Long Sleeve Polo w/logo (Small to XLarge size)	$32
Upcharge for 2X	$2
Upcharge for 3X	$3
Upcharge for 4X	$4
Tall Short Sleeve Polo (upcharge)	$4
Tall Long Sleeve Polo (upcharge)	$4
Add Name and Callsign	$4

Winter Field Day

It's that time of year again.

Winter Field Day is Saturday, January 25- 26, 2025.

It will be held again at Boy Scout Camp Pellissippi in Anderson, TN.

Address: 262 Boy Scout Camp Road

Andersonville, TN 37705

https://easttnscouts.org/about/camps/pellissippi/
Paul Galentine, W4LSM has currently secured a cabin with details later to be disclosed. The reserved cabin has minimum amenities, however Paul is working with the camp ranger to secure a better cabin.

Definitely more planning in progress----So stay tuned. Details as I have them.

All are welcome to come and play radio!! Paul and I will provide antennas and radios, however if you're coming you're welcome to accommodate more equipment. We have permission from W4PCA (license trustee) to use the club call sign:W4OLB

Here is the Winter Field Day site with rules: https://winterfieldday.org/

PLEASE LET ME KNOW IF YOU PLAN TO PARTICIPATE! You can spend the night with Paul and I or just come Saturday or Sunday morning.

Just wanted to get the word out so please stay tuned.

Bob Wilson-"BOBBOB" KK4XA

Retired Broadcast Engineer
ARRL-Technical Specialists

ARRL- Instructor
FCC-GROL-PGGB006061
865-755-3810

Bob KK4XA

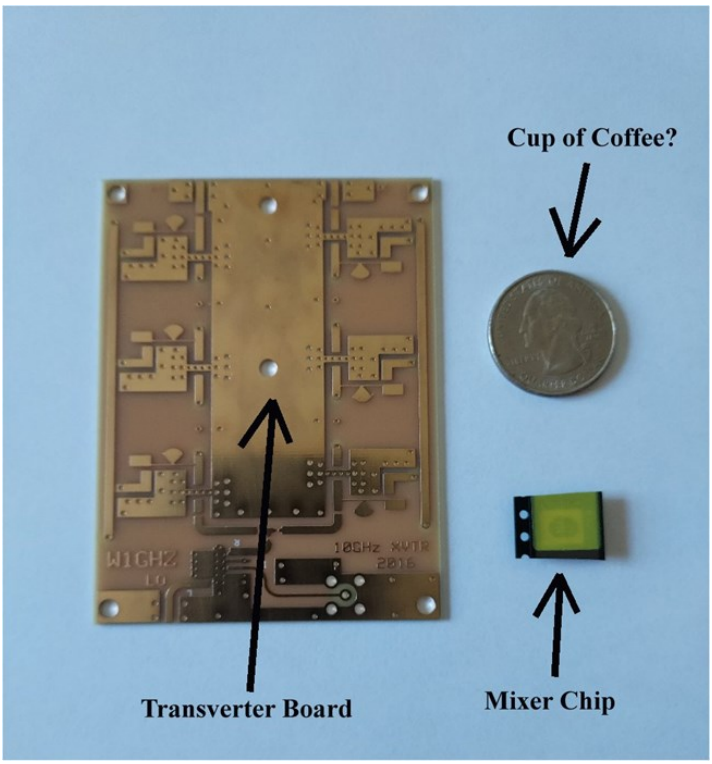
VHF, UHF and Microwave Musings, by N0EDV

Scott N0EDV

Well, it's winter time in East Tennessee and what's a ham to do? Build some microwave equipment! In my case, build a 10 GHz system for fellow club member Paul, KI5MIV. Paul has expressed an interest in the microwave bands and he also happens to like SDR stuff as well. That will play into this system as we will see later.

OK, so what do we need to make up a complete system? We need an antenna. We'll start with a simple homebrew horn type of antenna. First because they are simple to build and second, because they are easy to use. They have moderate gain and are quite forgiving on aiming at the other station.

Next, we will need a way to transmit and receive at these "Super High Frequencies" that are well above the bands that most of you all operate on normally. I'm afraid you can't just call your favorite ham store and order equipment for 10 GHz. Wait a minute…you can now! It's called the Icom IC-905. It comes at a fairly steep price though, somewhat above the $3,000 mark. We can build our own system for less than about $200, or the price of a nice 2M HT.



Our system will be comprised from a 10 GHz transverter board from W1GHZ. This will convert signals in the 10 GHz band to/from the 2M band. Paul Wade, W1GHZ, designed the PC board and sells them for about $15 for the bare board. He can also supply the mixer chip for about 12 bucks, which is the heart of the board.

The transverter needs a local oscillator signal running at 10.224 GHz to be able to do its magic and convert signals to and from the 2M band. The basis for the

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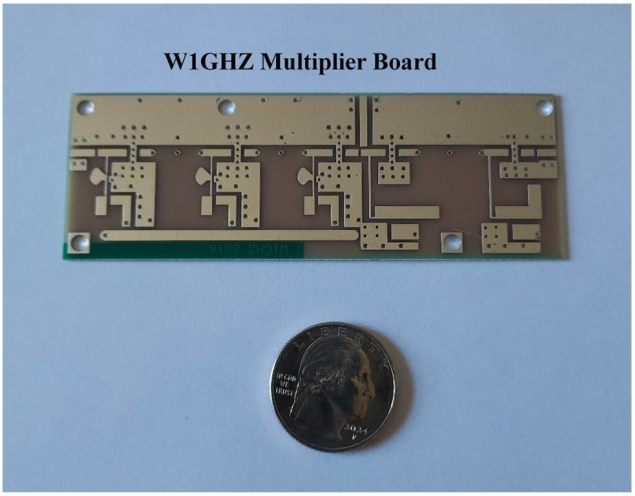
local oscillator relies on a PLL (Phase-Locked Loop) board available assembled from Q5 Signal for about $100. It has multiple frequencies it can generate, but we will utilize a signal at 1136 MHz and feed that into a multiplier board that multiplies it by 9, giving us the final 10,224 MHz local oscillator frequency required.

Fortunately, W1GHZ also makes a PC board that can do that and sells them on the super cheap as well.



Paul, KI5MIV, will be using an SDR radio that can both transmit and receive on the 2M band to drive the transverter. At least I believe it can. Well, let's assume it can for now. The SDR radio outputs very low power (in the low milliwatt range) which is perfect, since the mixer chip only requires about 1 milliwatt at 2M. Paul is the "SDR Guy" and he would be able to answer any questions about those!

These PC boards are bare boards. The surface mount components will need to be purchased from your favorite supplier. I like Mouser Electronics. I order the parts online and usually have them within a week, delivered right to my door.

In the next installment of my column, I will write up the construction of these boards.

If anyone that doesn't do VHF and up weak signal work (CW, SSB, etc.) has an interest in learning more about operating on the VHF and up bands, here is a conference that is fairly close to home coming up in April. I have never been to this conference, but since it is so close, I plan to go up there for the two days of the conference. Good place to rub elbows with the bigshots of VHF work!

Scott N0EDV

Southeastern VHF Society

The Southeastern VHF Society will hold it's 2025 Annual Conference on Friday April 4th through Saturday April 5th at the Quality Inn (Exit 4) in Clarksville, Tennessee.

Clarksville is located about 45 miles north of Nashville TN which is the hub for Country Music and Entertainment.

We hope to have an Antenna Range and Noise Figure Measurements.

Details to follow soon at Southeastern VHF Society website www.svhfs.org

The World of DX

Hello again fellow SMARC members. Welcome back to the fascinating world of DX.

Bob K9JU

In the previous columns, I touched on the basics of DX: what is DX; what is DXCC and the minimum requirements; what is an entity versus a country; what is a DXpedition; and, a few of the common terms used with DXing and DXCC. The last column implored the Technician operators in our Club to get on the 10M band. In this column, I want to outline some ways you can expand your operating in this popular facet of the Ham Radio.

Let's assume you have dipped your toe into 10M and contacted a few DX stations. You will be considered a newcomer to DX and a starter in this facet of Ham Radio. Now you are upgrading to the General Class license to expand the frequencies you can use for DX chasing. As before, I will assume you are using a basic 100-Watts output power transceiver; you may have an older separate receiver and transmitter pair with the 100-Watts output power, but it is essentially the same thing. The *ether* and your antenna don't care if the RF is generated with transistors or vacuum tubes because "RF is RF." Your antenna is just some kind of wire in the air radiator.

Maybe you have been listening to the chatter on the Club repeater or at a Club meeting between a couple of guys whom you consider DX-ers. They were speaking about a certain DXpedition to an isolated island and how to snag that one. To you, it sounds interesting but starting in DX with a major DXpedition just may scare you away. There are better ways to do get started. This is especially important if you are running "barefoot" (no amplifier). Here are a few pointers for you to consider:

You can tune the bands looking for strong signals and call the station. It may take one or more calls but you should eventually make a contact. Crossing your fingers can help. This method is the classic way to work DX before the repeater and computer ages.

There might be a repeater within range with announcements of DX activity. This was popular back in the 1970s and 1980s but much less so today. It doesn't hurt to announce a DX station on the SMARC repeater if you come across one.

Search the internet for a "DX Spotting Network." These networks display very close to real time DX stations, where to find them on which band and mode.

One of the more popular and very easy to use spotting networks is www.dxsummit.fi. It is a Finnish website operated by the Radio Arcala, OH8X.

Once your interest in DXing matures, you might subscribe to one of the DX magazines or publications or online e-zines/bulletins. These are good for your planning on future DX operations chasing.

The above are all viable means with which to whet your DX appetite at the get go, besides getting on 10M now at the peak of Solar Cycle 25. The number of entities you work may seem excruciatingly slow in increasing although it doesn't have to be. It is a matter of how much "BIC' [Butt In Chair] time you want to spend. Most of us have other family duties we must address "or else" with the "or else" varying among us.

By the way, how many times have you thought about firing up on the air on a weekend for a casual, friendly ragchew (i.e., chewing the fat conversation) and found the band or mode subband loaded end to end full of "CQ Test"? What is this all about? You can check QST, the ARRL Contest Calendar or the WB7BNM www.contestcalendar.com website to see if a DX contest/contests is/are listed. Well, there goes the ragchew.

Not all is lost. The WARC bands of 30M (10.100- to 10.150-MHz), 17M (18.068- to 18.168-MHz) and 12M (24.890- to 24. 990-MHz) are off limits for contests. You can escape to those bands for your ragchew. Note that the 30M band authorizes only CW (Morse

Code) and digital (FT8, anyone?) transmissions. Being only 50-kHz wide, even 25-kHz of the band would fill rather quickly with a few phone signals.

OK, you want to be on one or more of the HF DX bands during a DX contest. In fact, DX contests are one of the best ways to increase your beginning entity totals in a rather short amount of time. Even a few hours here and there on a weekend can reap rewards. As an example, former SMARC club member, Ann Backys, K9ANN, had been in only three DX contests in 2018 starting in March and continuing through July. In her case the contests were all SSB. The contests were the ARRL International DX SSB Contest in March, the CQ World Wide WPX Phone Contest also in March and the IARU HF World Championship in July. In those three contests she made contact with 75 different entities, a very good start toward the basic DXCC Mixed and, in her case, DXCC Phone awards. How much time did Ann spend in total over those three weekends? Only 15 hours! And best of all, she had a lot of fun doing it. In all fairness, she was not exactly running barefoot but the antenna was not a fancy 3-element beam at 75-feet, it was an OCFD (Off Center Fed Dipole) with the apex at about 40-feet.

Ann, having a female voice, was a definite P-L-U-S! It really sticks out on the air. Remember what I said in an earlier edition of the "The World of DX"? Namely, higher voice frequencies carry the articulation or information to be said and the lower frequencies act as a "carrier" with no information other than, "hey, I'm here!" Reduce the low frequencies ("Bass") and increase the high frequncies ("Treble:) with a frequency equalizer if your transceiver has one. Some microphone models have the higher frequencies purposely emphasized over the low frequencies for a punchy audio for DX and contests.

As an aside, the reason SSB (Single Side Band) predominates in HF voice communications is because all of the power to be transmitted is in one sideband. The power of the output stage of yor transceiver/transmitter is not wasted in the other sideband (due to the modulation process) and a carrier that used in the AM mode. AM made for simple, inexpensive detection and was used for decades until SSB came on the scene in the late 1940s, the 1950s and really got going with specialized receivers in the 1960s.

One benefit of working DX is a gain in knowledge of geography. Amaze your friends when you can tell them something like, "the Spratly Islands are in the South China Sea between Vietnam and the Philippines. It is a hotly disputed group of islands, islets and cays claimed by the Philippines, Vietnam, Taiwan, Malaysia and China." All DXpeditions are not to the tropics for fun and radio games. One DXpedition to the Spratly Islands was fired upon by the Vietnamese as it approached Amboyna Cay back in 1979. DXpeditions can have perils and not just from the weather or diving sea gulls and disgruntled sea lions.

Until next time, "73 ES GUD DX."

Bob K9JU

Please email any comments or suggestions to "k9ju@arrl.net".

FCC Upholds $34,000 Forfeiture in Interference Case

As reported by the ARRL, the FCC assessment against WA7CQ for interfering with firefighters from the US Forest Service and Idaho Department of Lands were directing aircraft that were combating a wildfire near Elk River, Idaho.

Source: ARRL—https://www.arrl.org/news/fcc-upholds-record-34-000-forfeiture-against-amateur-licensee

ARRL Systems Disruption Update—DXCC Application Processing Caught Up

The ARRL reports that DXCC application processing has now returned to normal, following a cyber-attack that left many of the League's systems in disarray.

Source: ARRL—https://www.arrl.org/news/arrl-systems-service-disruption

Two Questions Removed from NCVEC Question Pool

Extra question E2A13 and General question G8C01 have been deleted from the question pool as each question had more than one valid answer.

Source: ARRL—https://www.arrl.org/news/ncvec-question-pool-committee-removes-two-pool-questions-from-use

EMCOMM NEWS TNARES DISTRICT 8

Monroe County ARES Supports Christmas Festival

Monroe County ARES assisted Madisonville with their Christmas Festival on the Square on Saturday, December 14th 2024.

Members of neighboring Loudon and McMinn county EmComm groups joined volunteers from MCARES to direct vendors and exhibitors to their respective areas and vendor parking in preparation for the festival and Christmas parade.

Santa even stopped by after parking his sleigh seeking the quickest route to where the elves were setting up to meet all the good boys and girls.

The city was very happy to have our assistance and have already asked us to participate next year!

New EC for Monroe County ARES Appointed

Long time EC and D8 ADEC, Mike KK6OKU, has stepped down from the positions of Emergency Coordinator for MCARES and Assistant District Emergency Coordinator for Tennessee District 8 for personal reasons.

Mike worked relentlessly to get ARES back in operation in Monroe County. He will continue to serve as a volunteer and in an advisory capacity as time allows.

In his stead he has recommended, and the ARRL officials approved, Caleb KQ4QCJ to fill the role of Emergency Coordinator.

Caleb KQ4QCJ

Caleb is not new to EmComm. He has served as a wildland firefighter for the US Forest Service, the State of Tennessee and the Bureau of Land Management. While with the BLM, Caleb became a Squad Boss for the Eastern Montana Helitack crew. He now serves as a full time wildland fire dozer operator for the State of Tennessee.

As an amateur radio operator, he has been a valuable member of the Monroe County ARES group serving as one of the Assistant Emergency Coordinators. His experience and familiarity with FEMA, the State of Tennessee, and years of experience navigating ICS forms make him the ideal candidate for the position.

Rick KF4QVI

Former Blount County EC Rick Coffey KF4QVI—Silent Key

Sad news for Blount Emergency Amateur Radio Service (BEARS) as former President and ARES Emergency Coordinator Rick Coffey KF4QVI, of Louisville, TN passed away on January 3rd, 2025.

Rick was 64.

If your ARES, EmComm group or other organization has news of interest, please send it to: info@w4olb.org

We encourage everyone to check into their local ARES Nets!

Knox County ARES/METERS - 146.940—Mon at 19:00 ET

Blount County — 146.625—Thu at 21:00 ET

Roane County—147.015—Tue at 20:00 ET

Monroe County—147.315—Wed at 20:00 ET

Sevier County— 146.850—Wed at 20:00 ET

Anderson County—147.150—Thu at 19:00 ET

Loudon County—146.685— Thu at 20:00 ET

Tennessee ARES District 8 is one of the largest districts in the state of Tennessee. District 8 comprises of 16 (sixteen) counties in East Tennessee:

Anderson, Blount, Campbell, Claiborne, Cocke, Grainger, Hamblen, Jefferson, Knox, Loudon, Monroe, Morgan, Roane, Scott, Sevier and Union.

These align with the TEMA district.
The TN ARES District is further sub-divided into 4 (four) distinct areas to provide for better coverage and coordination of activities between neighboring counties:

Area 1: Anderson, Campbell, Morgan and Scott
Area 2: Blount, Loudon, Monroe, and Roane
Area 3: Claiborne, Grainger, Hamblen and Union
Area 4: Cocke, Jefferson, Knox and Sevier