VU4W Andaman Islands DXpedition, p. 36

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CQ Amateur Radio

COMMUNICATIONS & TECHNOLOGY

FEBRUARY 2023

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Mini Antenna Special!

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On the Cover: Robert Ferrero, W6KR, President of Ham Radio Outlet, at HRO Plano, Texas. Some history of this 3-generation family ham radio business on page 105.

The SteppIR Advantage

PROBLEM SOLVED!

Yagi antennas are basically single frequency devices that work well only over a very narrow range, typically 0.5% change in frequency. Fixed length yagis compensate by using a variety of techniques, all of which result in serious degradation of performance, especially in Front to Rear rejection, and added complexity, size, and weight. Dipoles have a much broader bandwidth but still cannot cover the entire 80m and 40m bands and maintain a low SWR (<1.5:1). Our patented solution is to simply adjust all of the antenna elements to the optimal length for the desired frequency with none of the compromises in performance that all fixed antennas require. This is accomplished remotely using an electronic controller that can automatically follow the radios' frequency. SteppIR antennas enjoy optimal performance on all frequencies within their specified frequency range (varies by model), and that includes non-ham radio frequencies as well!

THE INHERENT ADVANTAGES OF A STEPPIR:

Create/Modify Mode

The create modify mode allows the user to change the length of each individual antenna element on all bands of operation -and frequencies outside the ham bands as well – and then save the new antennas to memory. This can be incredibly useful to "tune" out potential objects that may be causing interaction with the SteppIR antenna, or to create your own custom antenna designs.

180 Degree Mode

The 180 degree mode feature is one of the most popular among SteppIR owners. For our Yagi antennas, this feature allows a user to electrically "rotate" the antenna from the forward beam heading, to the reverse (180 degrees) beam heading, with a click of a button – the entire process takes approximately 2 seconds.

Bi-Directional Mode

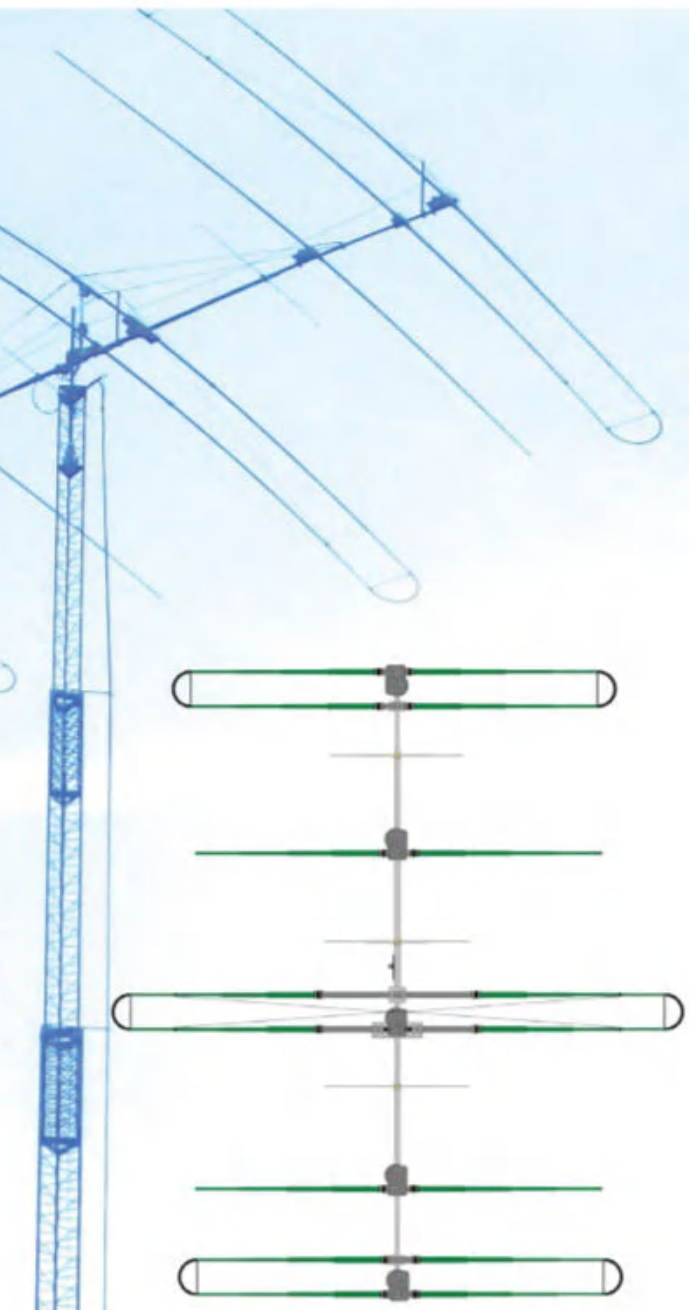
The bi-directional mode works similarly to the 180 function, except when enabled, the Yagi antenna will now be operating with gain in both directions – forward and backwards, simultaneously!

Retract Elements

With a touch of a button, SteppIR antennas can be fully retracted into their housing, which helps to protect the most valuable part of the antenna during extreme weather events.

Emergency Communications

Many times, emergency communications occur outside the standard amateur radio allocated bands of operation. All SteppIR antennas are optimal within the entire scope of their specified frequency range.



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Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO

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FT-710 Aess | *HF/50MHz 100W SDR Transceiver*

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FT-891 | *HF+50 MHz All Mode Mobile Transceiver*

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FTM-300DR | *C4FM/FM 144/430MHz Dual Band*

• 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WiRES-X Portable Digital Node/Fixed Node with HRI-200

FT-2980R | *Heavy-Duty 80W 2M FM Transceiver*

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FTM-200DR | *C4FM/FM 144/430MHz Dual Band*

• 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX

FTM-400XD | *2M/440 Mobile*

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FT-70DR *C4FM/FM 144/430MHz Xcvr*

• System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging

FT-5DR *C4FM/FM 144/430 MHz Dual Band*

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FT-65R | *144/430 MHz Transceiver*

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announcements

FEBRUARY

ORLANDO, FLORIDA — The Orlando Amateur Radio Club will hold **HamCation 2023** and the **2023 ARRL Southeastern Division Convention** from 9 a.m. to 5 p.m., Friday, February 10; 9 a.m. to 5 p.m., Saturday, February 11; and 9 a.m. to 1 p.m., Sunday, February 12 at the Central Florida Fairgrounds and Expo Park, 4603 West Colonial Drive. Phone: (407) 841-0874. Email: <info@hamcation.com>. Website: <www.hamcation.com>. VE exams, special event station K1AA.

DANVILLE, INDIANA — The Hendricks County Amateur Radio Society will hold the **Hendricks County Hamfest 2023** from 9 a.m. to 2 p.m., Saturday, February 11 at the Hendricks County 4-H Fair Grounds Conference Center, 1900 E. Main Street. Website: <http://n9hc.org>.

FAYETTEVILLE, OHIO — The Olivia Digital DXers Club will hold the first ever Ovilia Digital Mode Weekend QSO Party will be held from 1400 UTC Saturday, February 11 through 0200 UTC, Monday, February 13. Frequencies include 14.071 and 7.071 MHz. QSL to Tomas Hood, P.O. Box 110, Fayetteville, OH 45118. Website: <www.oliviadigitalmode.org>.

TRAVERSE CITY, MICHIGAN — The Cherryland Amateur Radio Club will hold its **48th Annual Swap-N-Shop** from 8 a.m. to noon, Saturday, February 11 at St. Francis High School Gymnasium, 123 E. 11th Street. Contact: Joe Erlewein, N8CN, (231) 668-4223. Email: <swap@cherrylandarc.com>. Website: <http://cherrylandarc.com>. Talk-in 146.86- (PL 114.8). VE exams.

ELKTON, VIRGINIA — The Page Valley Amateur Radio Club will hold its **Winter Indoor Mini-Hamfest** from 7 a.m., to 2 p.m., Saturday, February 18 at the Elkton VFW Hall, 13958 Spotswood Trail. Email: <pvarccarrie@gmail.com>. Website: <https://tinyurl.com/48cphmha>. Talk-in 146.625 (PL 131.8).

LIVONIA, MICHIGAN — The Livonia Amateur Radio Club will hold the LARC Annual Swap and Shop from 8 a.m. to noon, Saturday, February 18 at the Monaghan Banquet Center, 19801 Farmington Road. Email: <swap@livoniaarc.com>. Website: <www.livoniaarc.com>. Talk-in 145.350 (PL 100) and 444.875.

MARLBOROUGH, MASSACHUSSETTS — The Algonquin Amateur Radio Club will hold its **Amateur Radio Flea Market** from 9 a.m. to 1 p.m., Saturday, February 18 at the Marlborough 1Lt. Charles W. Whitcomb School, 25 Union Street. Email: <fleamarket@n1em.org>. Website: <http://n1em.org>. Talk-in 446.675- (PL 88.5).

ST. CLOUD, MINNESOTA — The St. Cloud Amateur Radio Club will hold its **2023 Hamfest** from 9 a.m. to 1 p.m., Saturday, February 18 at the St. Cloud Armory, 1710 Veterans Drive. Website: <www.w0sv.club/hamfest>. Talk-in 147.015. VE exams, card checking.

BRIGHTON, COLORADO — The Aurora Repeater Association & Rocky Mountain Ham Radio will hold **The Swapfest** from 9 a.m. to 1 p.m., Sunday, February 19 at the Adams County Fairgrounds, 9775 Henderson Road. Contact: Wayne, NØPOH, (303) 699-6335. Email: <rockymountainham@gmail.com>. Website: <http://rmham.org>.

GEORGE, WASHINGTON — The Columbia Basin DX Club will air special event station **WS7G** from 1800 UTC, Sunday, February 19 through 23:59 UTC, Wednesday, February 22 in honor of George Washington's Birthday. Frequencies include 14.0322 / 14.255, 7.222 / 7.26, 3.855 / 3.960 plus or minus QRM. Website: <https://cbn.homestead.com/ws7g.html>.

BISMARCK, NORTH DAKOTA — The Central Dakota Amateur Radio Club will hold the **CDARC 2023 Hamfest** from 7:30 a.m. to 12:30 p.m. Saturday, February 25 at the Bismarck State College Career Academy, 1221 College Drive. Contact: Lorne Campbell <lorne@bis.midco.net>. Website: <http://cdarcnd.com>. Talk-in 146.85-. VE exams.

COLCHESTER, VERMONT — The Radio Amateurs of Northern Vermont will hold **Ham-Con 2023** from 8 a.m. to 1 p.m., Saturday, February 25 at the Hampton Inn, 42 Lower Mountain Road. Phone: (802) 879-6589. Email: <w1sj@arrl.net>. Website: <ham-con.org>. Talk-in 145.15-. VE exams, card checking.

ORANGE, TEXAS — The Orange Amateur Radio Cub, **Jefferson County Amateur Radio Club**, and **Beaumont Amateur Radio Club** will hold the **Orange Hamfest 2023** and **2023 ARRL Texas State Convention** from 7:30 a.m. to 2 p.m., Saturday, February 25 at the Orange County Convention & Expo Center, 11475 FM 1442. Contact: Rocky Wilson, (409) 988-8906. Email: <n5mtx55@gmail.com>. Website: <www.qsl.net/w5nd>. VE exams

PERRY, IOWA — The Hiawatha Amateur Radio Club will hold its **Winter RF Fest** from 8 a.m. to noon, Saturday, February 25 at the Perry National Guard Armory, 2930 Willis Avenue. Contact Bob Ray, KDØBR, (515) 334-7231. Email: <hamfest@harciowa.org>. Website: <www.qsl.net/kd0neb>. VE exams.

MARCH

ROSENBERG, TEXAS — The Brazos Valley Amateur Radio Club will hold the **Greater Houston Hamfest** and **2023 ARRL Texas State Convention** on Friday, March 3 and Saturday, March 4 at the Fort Bend County Fairgrounds, 4310 Texas 36. Phone: (713) 826-6917 or (713) 569-8799. Website: <www.houstonhamfest.org>. Talk-in 146.94 (PL 167.9). VE exams.

TRUSSVILLE, ALABAMA — The Birmingham Amateur Radio Club will hold the **BirmingHAMfest 2023** and **2023 ARRL Alabama Section Convention** from 4-7 p.m., Friday, March 3 and from 8:30 a.m. to 4 p.m., Saturday, March 4 at the Trussville Civic Center, 5381 Trussville-Clay Road. Contact: Rosalind Fazel, KD4ZGO, (205) 853-3220. Email: <rfazel.rf9@gmail.com>. Website: <www.birminghamfest.org>. Talk-in 146.88 (PL 88.5). VE exams.

CAVE CITY, KENTUCKY — The Mammoth Cave Amateur Radio Club will hold the **47th Annual Cave City Hamfest** beginning 7:30 a.m., Saturday March 4 at the Cave City Convention Center, 502 Mammoth Cave Street. Contact: Larry Brumett, KN4IV, (270) 651-2363 or (270) 308-1417 (cell). Email: <lbrumett@glasgow-ky.com>. Website: <http://ky4x.org>. Talk-in 146.35+. VE exams.

DARDANELLE, ARKANSAS — The Arkansas River Valley Amateur Radio Foundation will hold the **Arkansas River Valley Hamfest** beginning 8:30 a.m., Saturday, March 4 at the Dardanelle Community Center, 2059-2099 State Highway 22. Email: <arvhamfest@gmail.com>. Website: <https://tinyurl.com/4pppjp59>. VE exams.

IRVING, TEXAS — The Irving Amateur Radio Club will hold the **Irving Hamfest 2023** from 8 a.m. to 2 p.m., Saturday, March 4 at the Betcha Bingo Hall, 2420 W. Irving Boulevard. Email: <president@irvingarc.org>. Website: <www.irvingarc.org/hamfest>. Talk-in 146.720- (PL 110.9). VE exams.

MCCLELLAND, IOWA — The South West Amateur Radio Club will hold the **SWIARC Hamfest** from 8 a.m. to noon, Saturday, March 4 at 117 Main Street. Email: <hamfest@swiradio.org>. Website: <www.swiradio.org>.

CONCORD, NORTH CAROLINA — The Mecklenburg Amateur Radio Society will hold the **Charlotte Hamfest** from 3-7 p.m., Friday, March 10 and from 8:30 a.m. to 4 p.m., Saturday, March 11 at the Cabarrus Arena & Events Center-Gold Hall, 4551 Old Airport Road. Phone: (704) 948-7373. Website: <www.charlottehamfest.org>. Talk-in 146.655 or 146.940 (PL 118.8).

ANNANDALE, NEW JERSEY — The Cherryville Repeater Association will hold its **Hamfest and Technology Expo 2023** beginning 8 a.m., Saturday, March 11 at the North Hunterdon Regional High School, 1445 Route 31. Contact Tony Ploski, W2HWW, (908) 256-9568. Email: <aploski@comcast.net> or <w2hww@arrl.net>. Website: <www.w2cra.org>. Talk-in 147.375+ (PL 151.4). VE exams.

(Continued on page 110)

ham radio news

Two Ham Radio Bills Introduced in Congress

Two bills aimed at helping hams were introduced in the waning days of the 117th Congress. The ARRL reported that H.R. 9670, introduced by Ohio Rep. Bill Johnson, would pre-empt most antenna restrictions imposed by homeowners' associations, and H.R. 9664, introduced by Arizona Rep. Debbie Lesko, would instruct the FCC to replace symbol rate limits in HF amateur radio communications with bandwidth limits, a topic on which the ARRL has had a rulemaking request pending for several years without Commission action. HOA antenna restrictions, of course, have been the subject of ARRL lobbying efforts over several decades.

As both bills were introduced in the final days of the 2021-22 Congressional session, they died without action at the end of the year. At press time in mid-January it was unclear if either bill had been reintroduced or whether the sponsors had plans to reintroduce them.

Ohio Distracted Driving Law Exempts Hams

Amateur radio operators, first responders, and utility workers are among motorists exempted from a new distracted driving law that took effect in Ohio at the beginning of the year. According to *Newsline*, Ohio's new law makes holding a cellphone or similar device in your hand while driving a primary offense, meaning that a police officer may pull you over for that, even if you aren't doing anything else wrong. It isn't clear whether the exemption applies to all devices that an amateur may be using, or only to a non-cellphone radio transceiver.

Milestones: Orlando Award Winners Named

The Orlando Hamcation® has announced the winners of this year's Carole Perry Educator of the Year award and the new Gordon West Ambassador of the Year award. The 2023 Carole Perry award is being shared by Ken Lyons, KN4MDJ, and Jim Storms, AB8YK. While neither one is a professional educator, both have helped develop the next generation of hams and ham radio leaders. According to the award committee, Lyons is deeply involved in educating youth about radio through the Scouting program, regularly organizing and coordinating events that introduce amateur radio to more than 1,000 Boy Scouts and Girl Scouts each year. Storms is co-founder and current team leader of the Dave Kalter Memorial Youth DX Adventure, a program that hosts young hams and their parents in Costa Rica each summer to "be the DX" — at no cost to the participants. Many of the previous attendees are already demonstrating leadership in the hobby.

John Bigley, N7UR, has the honor of being the first recipient of the Gordon West award, presented to "an individual who represents and inspires others, embodies the amateur radio spirit, and has made outstanding contributions to the amateur radio community." Bigley is the creator of a one-day "boot camp" program for prospective amateurs and supports group activities and licensing classes, appearing in various alter egos, including Professor Elmer Sparkgap, Captain Coax, and Jordon West (Gordon's long-lost twin). He also hosts a weekly radio program about amateur radio and shortwave, and serves as the ARRL Nevada Section Manager.

Both awards will be presented at this month's Orlando Hamcation. (Full disclosure: *CQ* Editor W2VU serves on the Carole Perry award judging committee.)

Milestones: W7SAR Receives National Award

Civil Air Patrol Colonel Jerry Wellman, W7SAR, was named the 2022 National Volunteer Emergency Manager of the Year by the International Association of Emergency Managers. According to the *ARRL Letter*, this is the highest award bestowed by the association on a volunteer emergency manager.

Wellman is former commander of the Utah wing of the Civil Air Patrol, and has taught emergency management communications classes in Utah, Arizona, and Colorado. He has also served on the Utah State Emergency Response Team and as ARRL Utah Section Emergency Coordinator. He received the award at a ceremony in November.

Milestones: Arnie Coro, CO2KK, Silent Key

Longtime shortwave radio host, professor, and former *CQ VHF* columnist Arnaldo "Arnie" Coro, CO2KK, passed away in early January, according to Region 2 of the International Amateur Radio Union, which he served as Area C Emergency Coordinator at the time of his death.

Many readers will recognize Arnie as the longtime host of "DXers Unlimited" on Radio Havana. He was also a college professor in Havana and very active in emergency communications through the FRC, the Federation of Radio Amateurs of Cuba. Coro received Cuba's National Radio Award in 2017. He was 80 years old at the time of his death from complications of chronic health conditions.

Also joining the list of Silent Keys recently were noted contester and CQWW Contest Committee member Fred Laun, K3ZO, and longtime *CQ* technical illustrator Hal Keith. For more on Fred and Hal, see "News Bytes" on page 7 of this issue.

RRI Extends Digital Network to Puerto Rico

Radio Relay International, an independent amateur radio messaging organization, has expanded its Digital Traffic Network (DTN) infrastructure to Puerto Rico. According to the organization, the DTN is a hybrid mesh network utilizing HF for long-haul traffic and VHF/UHF gateways for local emergency communications activities. Over the past year, according to RRI, the group has been providing training to volunteers in Puerto Rico as well as technical support and one-on-one assistance. During Hurricane Maria, it says, "one RRI volunteer alone handled over 2,000 welfare messages out of the stricken area." The system also utilizes Winlink and says it is fully interoperable and integrated with other emergency communications resources. RRI also sponsors the National SOS Radio Network and Neighborhood Radio Watch programs.

Volunteers On the Air Are On the Air

The ARRL's yearlong "Volunteers On the Air" event is under way. The League has declared 2023 to be the Year of the Volunteer and this on-air activity is part of its broader program. Points are awarded for each contact with an ARRL volunteer. Like many recent short-term ARRL activities, contacts must be uploaded to the League's Logbook of the World (LoTW) electronic confirmation system. For details, visit <vota.arrl.org>.

Nominations Open for RCA "Young Ham Lends a Hand" Award

Young amateurs who are especially generous in giving time to help an older person, a veteran, or the community at large, or active in recruiting other young people to get their ham licenses, may be candidates for the Radio Club of America's annual "Young Ham Lends a Hand" award. Winners will be presented with their awards, as well as a $100 stipend, at the Dayton Hamvention® Youth Forum in May. Nominations are open until April first and should be emailed to Carole Perry, WB2MGP, at <wb2mgp@gmail.com>. Nominations should include the nominee's name, call, age, contact information, and reasons for the nomination.

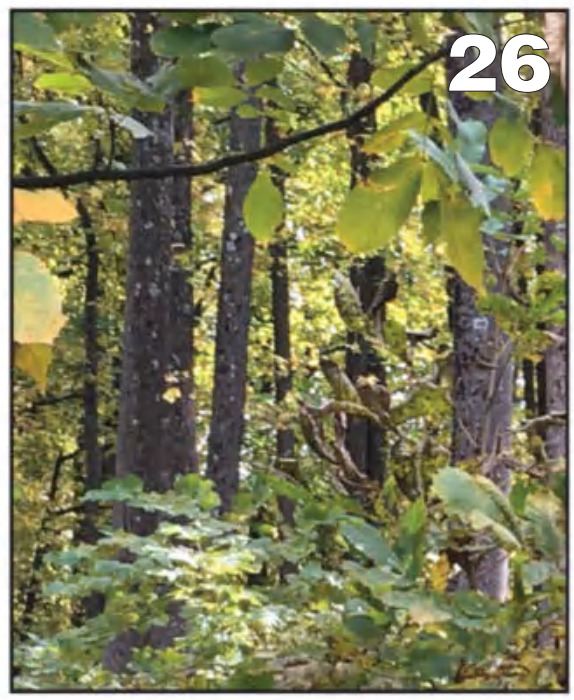
RCA has also just released a free training module, "Introduction to Wireless," which provides basic information on the wireless industry, including types of available jobs, education needed for those jobs, and resources for finding openings. The module is presented as a PowerPoint™ deck. The package may be downloaded from the RCA website at <www.radioclubofamerica.org/Careers>, and then clicking on "Introduction to Wireless" on the red bar.

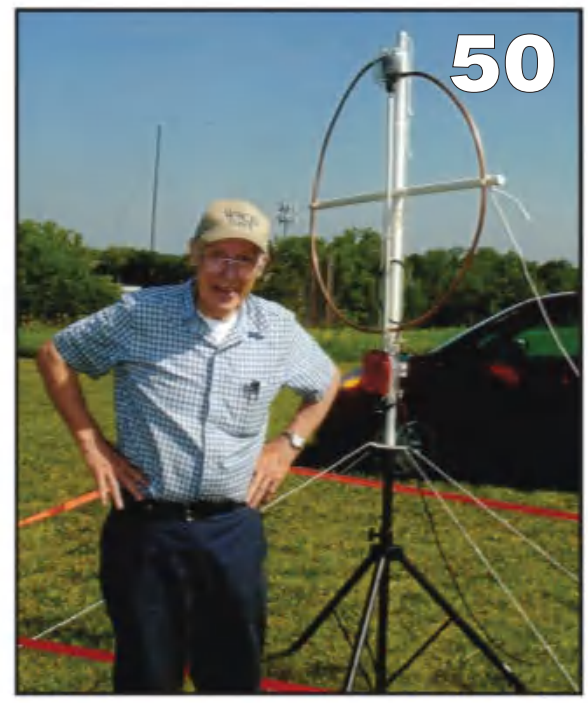
contents

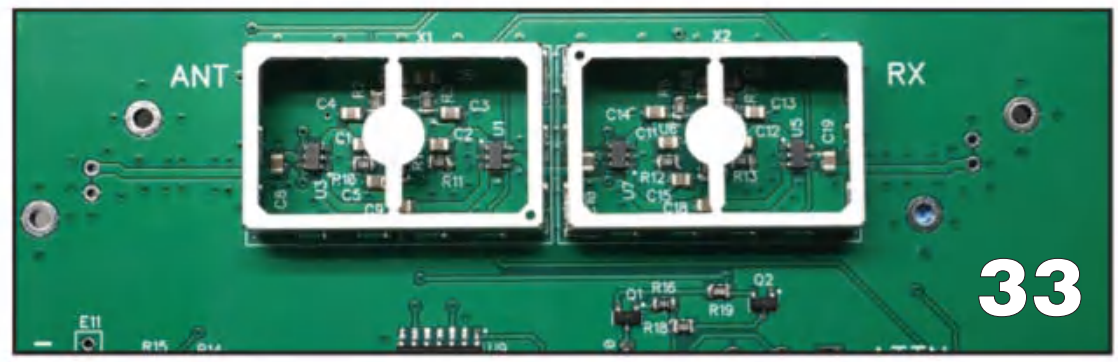
FEBRUARY 2023 • VOLUME 79 NUMBER 2

ON THE COVER

What's better than visiting a ham radio candy store? Owning a ham radio candy store! Robert Ferrero, WK6R, heads up the 13 stores of Ham Radio Outlet's retail and mail-order operation. Here, he's at the company's Plano, Texas location. More about HRO and the Ferrero family on page 105. (Cover photo by Carolyn Ferrero)







features

ANTENNA MINI-SPECIAL: Antennas are the single most important piece of any ham radio shack. Without a good antenna system, even the most expensive transceiver will not get very far. This month, CQ peels away at the science and art of good antennas with stories on pages 17, 23, 26, 33, and 50. CQ's Antennas Editor looks at the ubiquitous rubber antennas that come equipped with every handi-talkie on page 83 and our QRP Editor, Scott Rought gives tips on some low-power antennas on page 86.

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miscellaneous

zero bias: a cq editorial

BY RICH MOSESON,* W2VU

The Lost (?) Art of Conversation

Do we really talk to each other on the radio anymore? As in having real conversations with our fellow hams? Making friends over the airwaves? Ragchewing? Or have our frenetic lifestyles made the art of conversation a luxury of time that we don't think we can afford?

This magazine's subtitle is "Communications and Technology." We sometimes fall into the trap of focusing on the technology part of that phrase to the exclusion of the communications part. But the technology exists primarily to allow us to communicate. And if we aren't communicating, are we getting all we should be out of our hobby?

Several things got me thinking about this topic and before I say anything else, I confess to being as guilty of this as anyone else. I consider myself very lucky if I can find or make time to get on the air for a few hours during one of our contests. Other "radio time" is frequently spent building kits that then go onto a shelf and wait to be used.

What got me started was a bit of nostalgia. I'm writing this just after New Year's but started thinking about it around Christmas when I remembered something that happened over 20 years ago, something I've written about here in the past. It was Christmas morning. I'd turned on the radio and heard a station in England calling CQ. I called. He answered, and thanked me for "inviting me into your home on the holiday." We chatted for a while, then he went off to visit other hams. Several months later, we bumped into each other on the air again. By this time, my family and I were planning a trip to England during the week between Christmas and New Year's of the following year. He had some great suggestions for less-touristy places to visit, mailed me a road atlas (this was before the days of widespread GPS) and even arranged to meet up with us during our visit. We met in his hometown for hot chocolate and snacks, and had a delightful time talking about ham adventures and more. This, to me, is the essence of ham radio.

Next was a letter passed on to me by Mobiling Editor Jeff Reinhardt, AA6JR (who's stepping back from that role; more on that later), from a reader commenting on a recent column in which Jeff talked about making a cross-country road trip and finding nearly no one to talk to on any repeaters along his route. The reader echoed Jeff's experience but said he still has faith in ham radio and still calls CQ. That evening, while working on my latest kit, I put my FM dual-bander on scan and listened. I live in the metro New York City area — packed with hams — but aside from one net, I could find only one repeater with an active QSO. Again, I plead guilty here. I used to have an FM rig mounted in my home office, to listen during the day for drivers needing assistance or hams just looking for someone to talk to. It's been gone for years. Maybe it's time to hook it up again.

Finally, one of the awards highlighted by KI4KWR in this month's Awards column is the Straight Key Century Club's Rag Chew Award, offered to club members who engage in lengthy CW contacts, using mechanical keys, of course. Many of you may remember the ARRL's Rag Chewers' Club — for many of us hams of a certain vintage, that sky blue RCC certificate was our first piece of shack "wallpaper." The League discontinued it nearly 20 years ago, a sign of changing times.

Of course, this is not limited to amateur radio. How frequently do most of us our "mobile devices" (formerly known as cell phones) to actually *talk* to people? Most people I know (myself included) use them far more frequently for texting, emailing, web-surfing and posting / reading messages on social media than for making phone calls. Very little actual conversation!

If you scan the ham bands today, it seems that most of our communication is utilitarian and focused on achieving a specific goal. I have nothing against DXing and contesting, of course, but so many ham radio contacts today are nothing more than very brief exchanges of very basic information. This is taken to an extreme by the prevalence of FT8 and its derivatives — nothing more than a basic information exchange is *possible*. Again, I have nothing against FT8 or the chase to work new countries or score more contest points — DXing and contesting are this magazine's lifeblood, after all — but our growing reliance on these modes and activities seems to be coming at the cost of another essential component of amateur radio — *talking* on the radio. It could be voice, Morse code, or a keyboard mode, but we need to bring back the art of *conversation* as part of our hamming activities. And once again, I include myself in this.

So, here's my New Year's resolution (this is the February issue but I'm writing this in early January) … to find more time to spend on the radio and to use that time to have actual QSOs, learning more about the person on the other end than my signal report and his or her location. I hope that you'll resolve to be that person on the other end of the contact.

Hittin' the Road

After 20 years of writing both our Mobiling and Magic in the Sky columns, Jeff Reinhardt, AA6JR, has decided to drop back to only one. Jeff will continue to wave his magic wand and John Kitchens, NS6X, will be stepping up as our new Mobiling Editor, effective with this issue. John introduces himself in this month's column on page 76. We thank Jeff for his longtime dedication to an important aspect of our hobby and are glad that he will still be contributing to *CQ* via his Magic in the Sky column. And we look forward to working with John as the new driver of our Mobiling column.

Also, you may have noticed that we don't have our usual QRP Special this month. We are trying an experiment this year with dropping the special-focus issues in order to have the greatest amount of flexibility in publishing the best possible mix of articles each month on a variety of subjects, without trying to cram eight or nine articles on different aspects of a given topic into a single issue. It doesn't mean that we will be any less committed to covering low-power operating, outdoor operating, emergency communications, and amateur radio technology, just that these articles will be spread across the entire year instead of being packed into one issue. It will also give us the flexibility to produce *ad-hoc* mini-specials based on available content, such as this month's antenna mini-special, with articles on three different types of antennas you can build, along with the impact of trees on your antenna's signals and an attenuator to keep your antenna from overwhelming your receiver while foxhunting. And even though it's February, it's never too early to start thinking about antenna projects. After all, spring is right around the corner!

– 73, Rich, W2VU

*Email: <w2vu@cq-amateur-radio.com>

news bytes

COVID's Continuing Toll

Mourning Two Members of the CQ Family

The pandemic may have quieted down, but COVID-19 continues to exact a toll, including the recent passing of two members of the CQ "family," one of whom may be familiar to you and the other whose work may be familiar even though his role here was always behind the scenes. Both succumbed to complications of the COVID virus.

Alfred "Fred" Laun, III, K3ZO

CQ Contest Hall of Famer and longtime member of the CQWW Contest Committee Alfred "Fred" Laun, III, K3ZO, became a Silent Key in early January at age 85. He was also a director of the YASME Foundation.

Fred Laun, K3ZO, was awarded this plaque from the U.S. Secretary of State for "courage and stamina during kidnapping by terrorists at great risk to your life," in Argentina in 1974. He also received a letter of commendation from then-President Richard Nixon. (Photo courtesy of K8CX Ham Gallery) →

Fred served for many years in the U.S. Foreign Service at posts around the world, at one time being kidnapped and shot by rebels in Argentina while serving as director of the USAID (Agency for International Development) program there (see plaque from the Secretary of State).

Fred spent many of his latter years living in Thailand as well as his U.S. home in the Maryland suburbs of Washington, DC.

CQ Illustrator Hal Keith

Closer to home, longtime *CQ* technical illustrator Hal Keith passed away in late December at age 88. You probably never saw his face in the magazine (until now), but his work graced

(Continued on page 22)

How do you find out what motivates today's young hams? Well, the Intrepid DX Group figures the best way is to ask them. The group sponsors an annual "Dream Rig Essay Contest," with a different theme each year and a "dream rig" prize to the winner. We are pleased to present this year's three winning essays.

"How Amateur Radio Factors In My Career Plans"

Winning Essays from the Third Annual Intrepid DX Group "Dream Rig" Essay Contest

The Intrepid DX Group <http://intrepid-dx.com> sponsors an annual essay contest for young amateurs called the "Dream Rig Essay Contest" because the top prize is a brand-new ICOM IC-7300 transceiver. The topic for this year's competition was, "How amateur radio factors in my career plans." Group president Paul Ewing, N6PSE, recently announced this year's winners:

"We received essays from young amateurs from all over the world," he wrote. "Each essay was unique in thought and very well written. Extra consideration was given for correct grammar, punctuation, and spelling. The essays gave interesting perspectives on how to reach out and connect with the youth of today..."

As noted above, the first-place winner will receive an ICOM IC-7300. The second- and third-place winners each receive a Yaesu FT-65R handheld. This year's prizes were funded by Robert Chortek, AA6VB.

CQ is pleased to present the three winning essays in full. We ask you to keep in mind as you read the first-place essay that its writer, Maria Polyanska, VE3OMV, is only 12 years old, which should make her incredible essay even more amazing! –W2VU

Here is the winning essay, from Maria Polyanska, VE3OMV:

Ham radio. When I tell people that one of my hobbies is amateur radio, they simply reply by telling me, "Oh, you play songs on the radio?" I then go on to explain this completely fantastic hobby and what it really entails. It often leaves them somewhat puzzled, yet also intrigued at the same time. Although many do not know about ham radio, I am fortunate enough to have discovered it at an early age. But what if I could also tell you that our knowledge and experience of ham radio can easily help us advance in our careers? Let me explain.

When I was 7, my Dad, VA3UKR, introduced me to ham radio. I was fascinated with all the strange things in our basement, which were producing interesting and often mysterious sounds. My father had this almost magical-like lair which he could delve into at any time. He had wires leading to our backyard that initially looked like clotheslines to me! I quickly became interested and started off learning Morse code when I was 9. Then, one and a half years later, I was able to obtain my amateur radio

Dream rig essay contest winner Maria Polyanska, VE3OMV, with her curtain-rod based cobweb antenna. (Photos courtesy Intrepid DX Group)

callsign, VE3OMV. My Dad inspired me by making all of our antennas from scratch, which we still continue to do today. I am currently 12 and I am working towards getting my Canadian Advanced license.

Amateur radio has helped me with my education — particularly when it comes to STEM (Science, Technology, Engineering, and Mathematics) subjects. By being exposed to electrical and circuit components, I was able to expand my knowledge greatly. Although my initial hands-on encounter was with a circuit snap-on constructor, step by step, I gained a basic understanding of electrical components. My curiosity would eventually lead me to continue spending my free time learning more about science and mathematics to make more connections with ham radio. When I first heard the words "Technology" and "Engineering", I immediately thought about programming, coding, and just building things in general. I was not wrong — but I missed so much.

Engineering electrical pathways and circuits with all of the other complicated technological features were also a part of it. The experiments that I was able to conduct hands-on made it a lot easier to understand what was actually happening rather than just reading it in a textbook. For example, all of the antennas that my dad and I have were constructed entirely by us. My dad would always tell me stories of how when he used to be an amateur operator in Ukraine, he only had one antenna, a straight CW key, and a rig that was homemade. That's probably where he gets all his creative energy.

I know that I would enjoy a career in STEM and ham radio has repeatedly reinforced that. My dream for my future career is to become a cryptographic analyst. Cryptographic analysts rely heavily on scientific backgrounds in their work. After all, Morse code is still a code. Furthermore, I have seen that ham radio has helped me to comprise and develop the four crucial C's: Critical thinking, Creative thinking, Communication, and Collaborating. These learning / working skills are qualities that many employers look for.

Critical thinking is an important skill that ham radio has taught me. When on the air, we never know who will respond to our CQ. The signal can be 59 +40 dB, making it very easy to hear or it can be a far DX that is difficult to copy. Critical thinking is beneficial in these situations. You may want to reduce the band-pass filter of the signal or turn up your DNR. I remember in the 2022 CQWW WPX CW contest when I was able to very quietly hear Australia and that was such a pleasure (especially since most of my antennas are laying on the fence HiHi)! However, the pile-up was immense and hard to get through. I quickly thought to myself on how I could make it easier for the DX and me? I worked between two of my 15-meter band antennas and moved myself a bit off the center frequency — it worked! This wonderful skill can be easily applied in real life. Critical thinking helps us analyze information and make educated judgments — oftentimes under pressure. In workplaces, choosing between important and arbitrary facts to develop a broad perspective results in a conclusion or problem-solving strategy that has a positive impact. In the same scenario, we used our communication skills to bring forward ideas and communicate proficiently. Sending information to a station that cannot hear us just once is practically useless, but sending it a couple of times gives them the necessary input to have a successful contact with us.

Ham radio allows me to continue learning this skill which will be useful to perform my work. Communication and collaboration are two of the most important workplace qualities. In amateur radio, these two traits remarkably occur during on-air nets. This is especially crucial during emergency nets. Everyone has to listen to the net controller and collaborate appropriately to have the right action taken. Additionally, ham radio communication has given me more opportunities to learn more languages. Currently, I am learning Spanish and I appreciate having conversations on the air with native speakers. It definitely helps and is a unique and exciting method to progress my knowledge. It is important that cryptographic analysts are aware of different writing systems and languages and are able to appropriately collaborate with team members.

Now creative thinking is something that I have personally always struggled with and always felt would be a great disadvantage to me when I have a career. From how to design a PowerPoint to everyday clothes to building antennas, I have always had a fixed, basic mindset. A ham radio perspective changed that. I remember when we had to create a presentation in school about how technology changed the world. I could not think of any unique ideas. All of mine were basic like everyone else: Internet, computer, phone. But then, I reminded myself that I have such an interesting thing in my life — radio communication. So, I went down to the shack and started seeing what I could present. We had to show an example so, what better way to do it than make an antenna? But not just a normal dipole or Yagi, what if I made a cobweb prototype? Might as well give it a go. I went around thinking about what I should use for this antenna. I did not really have anything helpful or interesting at that moment but a ... curtain rod. The two curtain rods were metal, not in use and fair in size. So two curtain rods, a coax cable, pipe, wire, and wooden planks with anchors to hold it all together. It took about half a day to build and I really enjoyed the process. From soldering the wire ends and raising it up 20 feet high with a pipe, it was exciting. The project was a huge success. It is now one of my best-performing antennas (even though I think I scared most of my classmates) ...

Jokes aside, design, problem-solving, and facing problems with no obvious solution are all situations where creative thinking will definitely be helpful. Being creative allows us to be able to view different perspectives and helps us find unordinary solutions. Thinking "outside the box" is an essential skill for cryptographic analysts to possess and amateur radio is definitely helping me to develop it.

Finally, while work and career are both important, aiding your community should always come first. Radio saves lives. The sentence is that simple. When the internet and phones are down, the radio will still work. From a flood to armed conflicts, areas affected by damage need to know what is happening. Is it safe? Am I going to be alright? Where can I get water and food? Communicating this information is vital. Shortwave listening (SWL) is excellent in view of the fact that affected communities do not need a license to listen to what dispatchers and first responders are saying. After an astonishing number of hurricanes in the U.S. in 2017 (including hurricanes Irma and Harvey), the U.S. Senate passed the "SANDY Act" which stressed the importance of radio communication. Having the ability to help and serve the community with just our hobby is an amazing thing to do.

Overall, ham radio not only helped me to pursue my interests in STEM disciplines but also helped me gain skills and a sense of community which I thought I never had. From mathematical calculations to normal everyday chats with somebody across the world, ham radio has so many elements that many people overlook!

I am proud to be a member of this wonderful community and hope to continue to apply all the aforementioned skills both on radio and in my everyday life. I am positive that the knowledge and skills that I have learned will be useful in my future career and also within my community!

The second-place essay was submitted by Ryan Kocourek, N7RSK:

My name is Ryan Kocourek and I am a 16-year-old, extra-class amateur radio operator with the callsign N7RSK. I first became licensed in January of 2021 as a general-class operator because I took the first two exams at the same time. I got my extra less than a month later. Ever since I started to interact with technology, I always sought a deeper understanding of the inner mechanisms and logic that build the things I use every day. My curiosity has led me to many hobbies, including ham radio, software engineering, and building small electronic gadgets. The part that intrigues me the most is the fact that many of these hobbies are deeply intertwined with each other and that the knowledge of one hobby increases the understanding of another. My self-taught knowledge of these hobbies currently pushes me toward a career in a computer-science related field, or perhaps electrical engineering.

Amateur radio was the missing link for my computer-centric mind. Not only has the technical knowledge of radios allowed me to have a better understanding of technology such as Wi-Fi, but it has also opened me up to a whole group of people I would have otherwise never met. The people in the club I am a part of, Lakeshore Repeater Association, are some of the most talented and knowledgeable people in their fields. They have had such a positive impact on my future by allowing me to learn things I didn't even know existed. This club has people representing every one of the broad skillsets that come along with ham radio. The exposure that this hobby and club has provided me with has given me a head start on many future careers.

Ryan Kocourek, N7RSK, took second place in this year's essay contest.

Amateur radio contains a treasure trove of opportunities for any teenager who is interested in technology. Take, for example, computer programming and networking as a hobby. I always wondered how fun it would be having a block of IPs, something that is generally reserved for large companies. Well, it just so happened that I found a way of achieving this dream as well as combining it with amateur radio. I found AMPRNet, a network run by the ARDC, which holds a large section of IPs in the now-exhausted IPv4 space. They allow any licensed amateur radio operator to apply for their own block of IPs to use exclusively for experimentation in ham radio as well as educating oneself. I obtained a block of IPs from them and found a Linux VPS server that will allow me to announce these IPs. I also wrote a detailed technical explanation of how I did it on my personal website. I once heard that teaching someone about a topic increases your own understanding of the topic, and I think that writing articles about my projects and how they work is a great way of achieving this. Of course, this is just one example of the many computer-science related fields that amateur radio touches on. This opportunity has set me up with a professional-level education that ties in with what I want to do when I graduate college, all because I decided to get my amateur radio license almost two years ago.

As well as providing opportunities in software, amateur radio has given me experience in hardware, specifically with building electronics and radio systems. For instance, I put together a panadapter using an RTL-SDR receiver and a Raspberry Pi, and I hooked it up to my TS-480's IF line. I wrote a script on the Raspberry Pi to automatically open the software that shows the waterfall and I tuned it to the IF frequency of the radio.

In addition, amateur radio contains an amazing amount of literature about all forms of electronics theory, including antennas and grounding systems. These books are not just useful for ham radio operators, but also for anyone who is interested in learning about electrical engineering as these books include many of the most basic ideas to many fairly complicated electrical ideas. Reading about antennas led me to get first place on my first fox hunt a few months ago. Tinkering with my radio setup has given me hands-on experience with most of the ideas that these books teach. This experience can prove to be incredibly useful for a future career in electrical engineering.

It will never cease to amaze me how much impact this hobby has had on my future career in as little as two years. In my opinion, ham radio is the ultimate form of education, yielding many topics, resources, and experience. Education is the key for a successful future career, especially for a teenager with a lot of extra time and with a strong urge to learn.

Third place went to Toby Latino, AG5ZM:

My name is Toby Latino, AG5ZM, and I am currently an 18-year-old college freshman majoring in electrical engineering at Louisiana Tech University. My involvement in the university amateur radio club reminds me every day that I have picked the perfect major, and it is becoming clear very quickly that amateur radio will play strongly to my future career endeavors.

I was introduced to amateur radio in 2018 during my middle school years. My mom was largely responsible for my

introduction to the hobby because she knew I was very interested in electronics and more specifically, working with my hands. She gifted me a beginner's kit to soldering for Christmas and I absolutely fell in love with it. I started looking for ways to use my new tool and I stumbled upon circuit bending, CB radio, and then ham radio. Ham radio quickly became my new passion as I tried to learn everything I could. My elmer, John Stevens, K5JS, was a massive help. I couldn't believe I had found such an underappreciated hobby with so much breadth. It has everything from do-it-yourself electronics building to assisting FEMA with emergency response. I earned my technician and general class license in 2019. I started studying for my extra class license when we got let out of school due to the COVID-19 pandemic and earned my license as one of the first few batches taking the online tests from HamStudy. I built up my shack at home with donated equipment from local amateurs, namely, an IC-745 and an old electronic keyer. I set up a random wire antenna and started playing around on CW.

While ham radio used to be a common childhood hobby, its popularity among the youth has declined significantly. Recipients of this award in previous years have discussed this issue, so I won't go in depth about it here, but I can say that at least in my local community, I was successful in raising interest in the hobby wherever I went. During high school, I spread — at the very least — a conversation to the powerlifting team, the marching band, and many school friends. I have continued to do the exact same thing in college but to a much greater extent.

I joined Louisiana Tech's ham radio club and was elected secretary a few weeks into the school year, and I have worked alongside officers Jordan, Ian, and Josh as well as our wonderful faculty advisor Dr. Andrew Stroud to help reboot the long dormant club. While working on inventorying and organizing our club room, I wrote and presented a talk on VHF/UHF basics in which I covered many technician level topics to help prepare our members for an upcoming ham cram, helped lead that cram session, and was part of the volunteer examiner crew that licensed two brand new technicians, three general upgrades, and one extra upgrade at our club exam. After that, I wrote and presented a talk about the inner workings of the ionosphere and its relevance to HF propagation. Behind the scenes, I have built a prototype tape measure beam antenna and the fabrication and

Third place went to Toby Latino, AG5ZM, an engineering student at Louisiana Tech.

assembly instructions for an upcoming club workshop where club members will build Yagi antennas to use in a fox hunt. I have marketed these activities during morning powerlifting workouts, around my dorm, to my TA's, basketball student managers, classmates, and other members of a wide variety of social circles. I have been able to raise awareness and respect for a newly rebooted ham radio club, and I take great pride in that fact.

Regarding a future career, my experience with the club has offered me valuable opportunities in writing, public speaking, procurement, and arguably, marketing. I have been granted the opportunity to advertise my passion to people who never would have thought they would be listening to a speech about the ionosphere. On a more technical level, the amateur extra exam material has a strong overlap with the electrical engineering curriculum at Louisiana Tech. For example, the semiconductor material on the exam is covered over an entire course in the curriculum. I have yet to be anything short of amazed by the capabilities of our hobby. My eyes light up when I research or speak about the hobby. Spending time in the club room with older equipment like tube testers, Heathkit tuners, Army Corp signal generators, etc. brings me endless joy. It is a constant and ever-growing reminder that I am in the correct field. I am infatuated with the possibilities of electrical engineering.

However, electrical engineering isn't everything. The experimental nature of amateur radio has opened my eyes to another option: A career in research. This is most easily pursued at Louisiana Tech with a double major in electrical engineering and physics. The electrical engineering degree offers a great path towards a career in power distribution or generation or possibly even a specialization in radio. The physics degree offers a strong path to research. I look forward to future conversations with Dr. Stroud to home in on what exactly the best course of action is for me. While none of these conversations would be possible without my passion for amateur radio, they would certainly not be possible without my mother pushing me into the STEM field and always getting me to trying something new. It is undeniable that ham radio has impacted the trajectory of my life and will always be part of whatever path I choose to pursue.

About the Intrepid DX Group

You might think that an essay contest is outside the "wheelhouse" of a DXing organization, but the Intrepid DX Group recognizes that excellent communication skills, along with technical abilities, are important both for ham radio and for encouraging young people to pursue careers in science, technology, engineering, and math. Here is an excerpt from the group's website:

The mission of the Intrepid-DX Group is:

- To conduct and support amateur radio DXpeditions.
- To conduct scientific research exploring electromagnetic wave propagation.
- To promote interest and proficiency in amateur radio communications with respect to improving operating and technical skills.
- To help educate students and to enhance reading, writing, mathematics, geography, and communications skills.
- To perform classroom instruction to help students learn about electronics and radio communications techniques.
- To promote goodwill and cross-cultural understanding.
- To support and encourage local amateur radio societies.

The Intrepid DX Group is a 501(c)(3) tax-exempt organization. You can learn more on its website at <http://intrepid-dx.com>.

It's kind of a cross between Armed Forces Day and a DX contest … amateurs around the world looking for contacts with stations in Brazil, with extra points for stations at military facilities and the director's station at the Brazilian Army Communications School. Contributing Editor PT2ZDX/LU9EFO takes us behind the scenes at contest headquarters.

Inside the 63rd Green and Yellow Contest (CVA)

BY MARTIN BUTERA,* PT2ZDX/LU9EFO

Most radio amateurs know what contests are. In general, within a set period of time, stations operated by one or more radio amateurs try to make as many contacts as possible, searching for countries, distances, locations, or regions to multiply your points according to the rules of the competition. The best-known contests worldwide are those sponsored by *CQ* magazine, the CQ World Wide DX (CQWW), and CQ WPX Contests.

But, of course, there are other different and interesting contests around the world. Today I invite you to learn about one of the most important contests that takes place in Brazil, the "Verde e Amarelo" contest, or Green and Yellow, the colors of Brazil's flag (*Photo A*).

The Green and Yellow Contest, in Portuguese "Verde e Amarelo" or simply CVA, is a competition between civilian and military radio amateurs, held annually for more than 60 years by the CRAEC (Clube de Radiomadores da Escola de Comunicações — *Photo B*), the radio club at the Brazilian Army School of Communications (*Photo C*). The CRAEC was founded in 1955 with the mission of promoting amateur radio activities among the members of the school, as well as the integration of the Army with Brazilian radio amateurs.

The CVA Contest always takes place in August — the third weekend for CW and the fourth weekend for SSB. Originally, the CVA contest was restricted to Brazilian stations, but as of 2011, the contest opened its doors to foreign radio amateurs and since then it has been gaining ground on the international stage.

The CVA was officially incorporated into the Soldier's Week celebrations in 1972, with the aim of promoting cooperation between radio amateurs and civilian and military radio amateur associations around the world.

The CVA is one of the biggest radio parties in Brazil, in which military and civilians participate together, being one of the most traditional contests and one of the most important and anticipated activities of Brazilian amateur radio. For more than half a century, it has demonstrated the affection and enthusiasm that the Brazilian Army has for radio amateurs in Brazil and around the world.

Opening Ceremonies

Unlike most on-air competitions, each weekend of the CVA has an official opening ceremony and first contact at the school's station, PT2CVA. I had the opportunity to attend both modalities of the event last year. The opening of the CW event was conducted by Colonel Flavio Fernandes, PT2IW, a veteran of the class of 1972, one of the oldest and most consistent telegraph operators in the various editions of the contest (*Photo D*). The first contact recorded in the log was

Photo A. CVA contest logo

Photo B. Logo of the Brazilian Army Communications School Radio Club

** Contributing Editor, CQ*
Email: <martin_butera@yahoo.com.ar>

Photo C. General view of the antennas located in the communications school of the Brazilian Army, in Brasilia DF (Capital of Brazil)

with Roberto da Costa Santos, PY4ARS, from the city of Cambuquira, in the state of Minas Gerais, Brazil.

A video of the official ceremony opening the CW contest may be viewed at <https://youtu.be/eCpqKZjwmTI>.

Videos of Colonel Fernandes's first QSO are available at: <https://youtu.be/orFDoN8VeEU> and <https://youtu.be/fwHNIzv5smE>.

The SSB portion of the contest was opened in similar fashion on August 27th, although this event was more emotional than the CW opening. For the SSB portion, Mr. Pedro Paulo, Head of Information Technologies and Communications of the Department of Science and Technology, made his first call (Photo E) and was answered by Mrs. Therezinha Félix, 93 years old, wife of retired Colonel Félix, former commander of the School of Communications, thus starting the contest.

Photo D. Colonel Flavio Fernandes, PT2IW, makes his first official call, opening the 2022 CW contest.

Videos of the opening ceremony of the SSB segment of the contest may be found in several locations on YouTube including <https://youtu.be/7gmgEmdhqS0> and <https://youtu.be/q2uMjgXUUkc>. Videos of Mr. Paulo's first contact may be found at <https://youtu.be/4PmTWdWmRiE>, <https://youtu.be/SZb2P3xI7z0> and <https://youtu.be/bipNtJHVrLA>.

Inside Headquarters Station PT2CVA

Every year, a special tent is set up inside the army communications school, located in Brazil's capital city of Brasilia. In the shack tent (*Photo F*) are three different operating positions, the first one with a Yaesu FT 2000 transceiver and a VL 1000 amplifier; the second position consists of a Yaesu FTDX3000 transceiver and another VL 1000 amplifier; and the last one is also equipped with an FTDX3000, plus an Ameritron AL80B amplifier. Of course, all three stations can work at the same

time (*Photo G*). The antennas include dipoles for 160 and 80 meters plus directional antennas for 40, 20, 15, and 10 meters.

Integrated Participation of Civilian Radio Amateurs With the Military

For the third consecutive year, the army operated its official station, PT2CVA, with the help of members of the UBRO (Brazilian Union of Radio Operators).

This is an association that aims to promote brotherhood and cooperation between radio operators and associates. UBRO provides public service communications to the community, especially in cases of calamities or public catastrophes.

UBRO arose from the idea of a group of friends from southern Brazil to create a club that would unite radio operators from all over the country, in addition to participating in various national and international contests.

The participating UBRO members (*Photo H*) came from several different regions of Brazil: Rodrigo Gonçalves, PP5BT, a founding member of the group, along with Edinei Cirilo. PU5ETC; Valmiré da Silveira Ouriques, PU5ADF; Mario C. O. Montemezzo, PY5JR; Paulo Ricardo de Oliveira Toledo, PY3DX; José Osvaldo Figueiredo Araújo, PY9BR; and Leonardo Sena, PT2ZM.

This year, the amateurs at PT2CVA were joined by Nelson de Almeida Costa Filho, PS8NF, an operator from ARPI (Associação de Radioamadores do Piauí), as well as Ed Francisco Freitas, PS7DX, who hosts the popular Logcheck program on his website <https://contestbr.org>.

The President and Vice President of LABRE DF (Liga de Amadores Brasileiros de Rádio Emissão – Brasília Federal District) — Gustavo de Faria Franco, PT2ADM, and Orlando Pérez Filho, PT2OP — were also invited, thus making this a real exchange between civilians and military, not only on the air, but also physically at the official station. Many soldiers were also interested in the ham radio activities (*Photo I*).

Videos of the antennas and inside of PT2CVA may be found in various places on YouTube, including: <https://youtu.be/Rkxm8USBYSI>, <https://youtu.be/REqi7hrzH24>, <https://youtu.be/quTeETpeRQk>, <https://youtu.be/

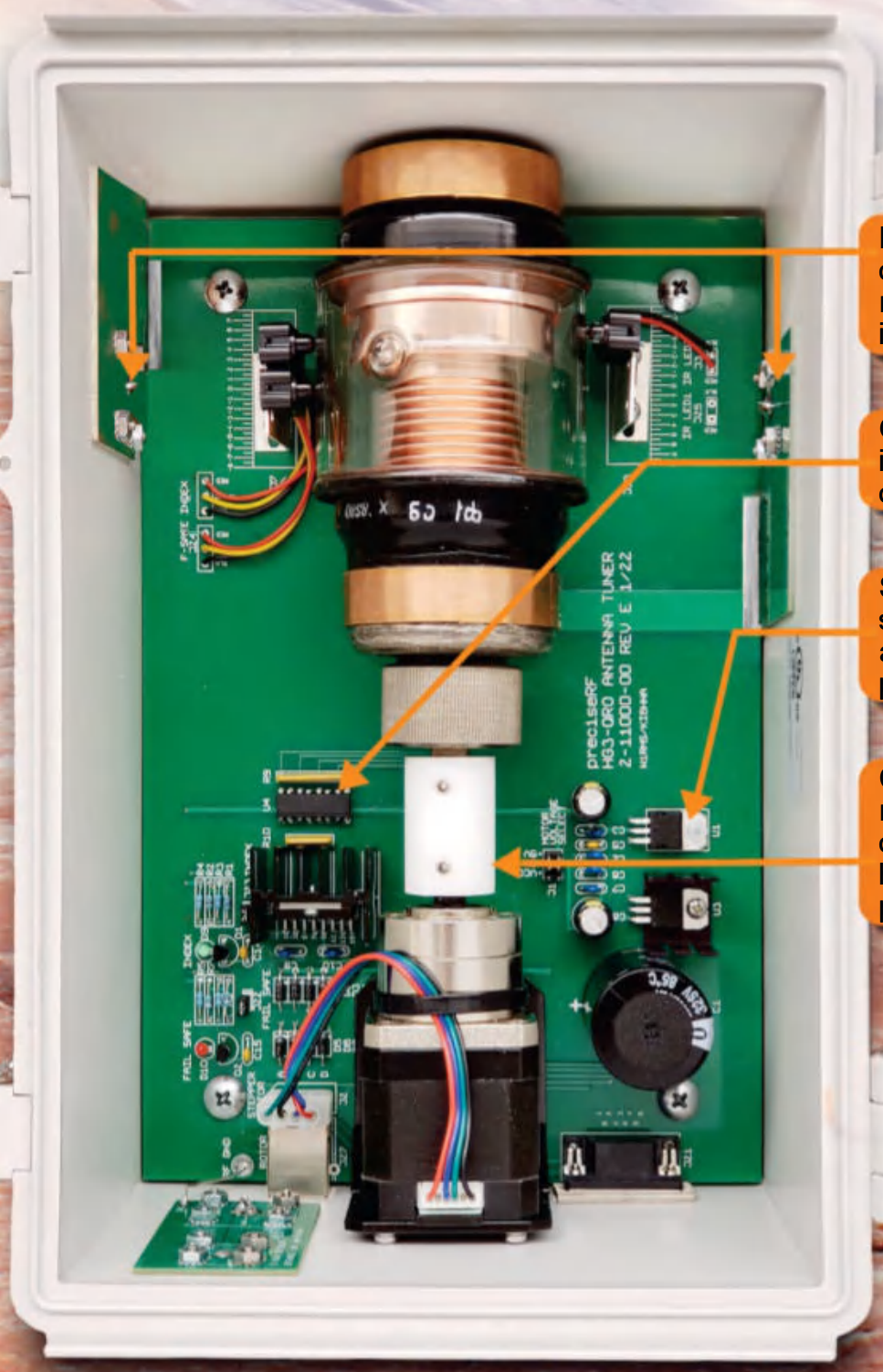
Photo E. Mr. Pedro Paulo, Head of Information and Communication Technologies of the Department of Science and Technology, making the first official call to inaugurate the "Verde e Amarelo" 2022 SSB contest.

Photo F. Different images of the composition of the official Brazilian Army station PT2CVA.

COMPROMISE WAS NOT AN OPTION FOR THE NEW HG3 QRO-A!

No Compromises Mag Loop
The new HG3 QRO-A raised the bar again for Magnetic Loop Antennas (MLA). MLAs are well known for their superior performance. The remotely tuned HG3 QRO-A MLA covers 80*-10 meters with stepper motor precision and resolution. The high Q vacuum capacitor allows for 1.5 KW PEP*. The 45,000-step resolution delivers an unprecedented 511 Hz resolution bandwidth allowing you to set your band preferences spot on. Rapid-Tune automatically scans each band for the lowest SWR and works with most HF radios.

It Pays to Pay Attention
How do you make a great product even better? You listen to your customers.The heart of an MLA is the tuner. We made so many improvements to it that we now call it the HG3 QRO-A. The HG3 Plus Controller also received new firmware and an improved SWR function. *Some limitations may apply or are optional.



HG3 QRO-A Improvements:

- Integrated capacitor to radiator connections with six times more copper surface area for improved efficiency
- Optical isolated driver interface allows for a longer control cable and RFI rejection
- Separate logic circuit and stepper motor power supplies allow for smoother and more precise tuning
- Custom high voltage Delrin motor to capacitor shaft coupler provides for greater high power and high voltage protection

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Photo G. Soldiers on CW made use of equipment that might be deployed in the field, such as these keys that clamp onto an operator's leg that are used by paratroopers.

Photo H. UBRO members (from left) Paulo Ricardo de Oliveira Toledo, PY3DX, and Valmiré da Silveira Ouriques, PU5ADF, calling on CW.

F8sUW8JTM_4>, and <https://youtu.be/EkH4pxv8Z8g>.

New Contest Categories

2022 was the second year in which the contest incorporated 160 meters, to the great joy of "top band" operators in Brazil and around the world. And since multipliers count once on each band, the addition of 160 meters adds 27 possible new multipliers to the scoring tables.

In addition, there is a new category called "Single Operator – Tri-Band: 10, 80, and 160 Meters," within which there are Low Power (up to 100 watts) and High Power (above 100 watts) subcategories.

If you are operating the CVA contest, be careful if you use the N1MM program. Stations with exchanges of "MIL, YL, TEEN, FD, MIL, QRP, HQ, or RB" are not being counted as multipliers by the program, but are counted in the CVA contest calculation program. For more information visit the rules: <http://cvadx.org/rules.pdf>.

A Win-Win

The activity of radio amateurs is very important and the Brazilian Army knows this, which is why the contest is also used in order to test the different military stations distributed throughout Brazil.

It is a way to test the military radio operation among civilian radio amateurs in Brazil and around the world. Participating military members experiment with alternative sources of electrical power, operate fixed, mobile, and portable equipment and test their prowess on both phone and CW.

The different military stations that participate in the contest are registered and specially selected and then an analysis is made of the data reported by the Intelligence Section of the Brazilian Army. This procedure aims to facilitate the use of military and civilian radio amateurs in emergency situations.

Don't forget to add the great CVA to your world contest calendar for August!

Photo I. Left, soldiers look attentively at the activity cluster; Right, soldiers watching on-air operations in the "Verde e Amarelo" contest.

Students of World War II will recognize "Little Boy" and "Fat Man" as the names given to the atomic bombs dropped on Hiroshima and Nagasaki, respectively, in 1945. Author AH6CY, who was born in Hiroshima three months before the bombing, has "repurposed" the names to much more peaceful uses, identifying two portable antennas that he's designed.

"Little Boy" and "Fat Man" Portable Antennas

BY HIROKI KATO,* AH6CY

Because my home is located in a severely antenna-restricted area, most of my High-Frequency (HF) on-air activities in the past two decades have been outdoors. Fortunately, I live in the San Francisco Bay area where we have many good days throughout the year to enjoy all kinds of outdoor activities, including operating ham radio. Designing my own antennas for outdoor operating has been part of my enjoyment. This article describes two of them, the "Little Boy" multi-band QRP antenna and the "Fat Man," a high-performance, three-band, center-loaded portable vertical antenna with wireless remote band switching.

"Little Boy"

As HF QRP operations have become popular, a number of very small, lightweight, shortened portable vertical antennas have been appearing in the ham market place[1] and many hams have also homebrewed similar antennas. They are, of necessity, compromise antennas but have their definite place in our arsenal of ham equipment. For traveling and hiking hams, they are an indispensable tool and, despite their limitations, they do often perform "miracles," when you operate from a high-altitude QTH, near saltwater or when the band conditions are unusually good. Many great DX contacts have been reported. Many hams are constantly in pursuit of more and more efficient designs within the limitation of size and weight. Here is one of my recent attempts that turned out to be more efficient than the other short vertical whip antennas I have constructed in the past, and which I have dubbed the "Little Boy" (*Photo A*).

Common among the typical short multi-band portable vertical antennas is the use of a loading coil with a small diameter which is tapped at different points to tune to a target band. The coil, either wound on a dielectric material or a toroid, actually is part of a radiating element in the antenna system and sustains a considerable loss; the smaller the diameter and the smaller the gauge of the wire, the greater the loss. To counter this, I designed the antenna with a large diameter AirDux-like air wound coil. Actually, it is something I picked up in a swap meet; probably a coil taken out of an antenna tuner. The result is a much more efficient portable antenna. The bands are switched by a rotary switch and it can be tuned to the 20-, 17-, 15-, 12-, and 10-meter bands. The precise and fine turning can be accomplished by short-

Photo A. Here I am operating WSPR with the 200-milliwatt ZachTek transmitter and the "Little Boy" antenna.

* *Email: <hiroki@pacbell.net>*

Photo B. The telescoping whip is mounted to the top of the loading coil via a BNC connector.

Photo C. The coil is 3 inches in diameter and has 19 turns, wound with 1/8-inch spacing. The rotary switch changes taps for different bands.

Photo D. In addition to the whip and coil assembly, the antenna system consists of a repurposed chocolate tin as a base, rolled-up radial wires, and a 3-foot-long feed line.

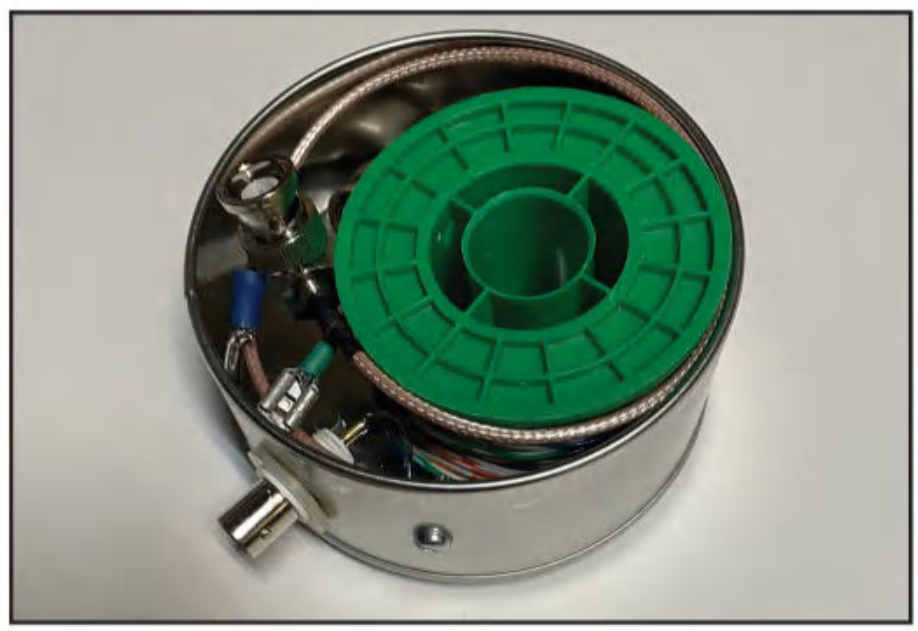

Photo E. All of the components except for the whip and coil assembly can be packed into the base.

ening or lengthening the telescopic whip. On all bands, I was able to attain lower than 1.2:1 SWR.

Here are the particulars:

1. The height when the telescopic whip is completely extended is 32 inches including the coil and the base; the whip is connected to the coil with a BNC connector to easily mount / remove it for storage (*Photo B*).
2. The coil is 3 inches in diameter and has 19 turns, wound with 1/8-inch spacing (*Photo C*).
3. The base is a repurposed chocolate candy tin. Inside is a cavity where radial wires and the 3-foot, 50-ohm coaxial feed line from the transceiver are stored when not in use (*Photos D* and *E*).
4. The radial wires are 15 feet long and made of six strands of thin telephone wire.

The whole antenna package, consisting of the telescopic whip, the coil, the radial wires, and the coaxial lead, is very

small and light to make it easy to transport. The longest element for storage purpose is 6.5 inches and the total weight, including the radial wires, is 12.8 ounces.

The "Fat Man" – A Coffee Can Vertical

Over the years, I have used many different commercial and homebrew portable antennas, including wire, magnetic loop, and vertical varieties. Recently, I constructed an antenna that performs well in terms of signal radiation, reception, and operational convenience. The major components are repurposed flea market finds and empty coffee cans. This antenna meets my own specific operating needs and my style of operating better than any of the others I have constructed.

As you see in *Photo F*, the antenna is supported by a stripped and repurposed old bicycle rack attached to the back of my SUV with a trailer hitch. The support can tilt (*Photo G*) to facilitate quick mounting and raising of the antenna, which is stored inside the car when not in use. It takes only a few minutes from the moment I park the car at the outdoor operating QTH to the time I am settled into an operating position. I can either sit in the driver's seat or outside the vehicle. The antenna can also be mounted on a tripod when I want to oper-

Photo G. The antenna support pole can tilt for easy attachment / detachment.

Photo F. The author's car with the "Fat Man" antenna mounted on a trailer hitch. The ribbons are computer ribbon cables used as radials.

Photo H. The "Fat Man" can also stand on a tripod for operating away from a vehicle.

ate away from the car (*Photo H*). I do not operate a radio while the car is in motion — I'm too old for that; my multi-tasking days are over.

Construction Details

The key to the design of this antenna (*Figure 1*) is to use as large a diameter as practicable for the vertical elements and the loading coil. The bottom half of the antenna (*Photo I*) is an aluminum tube which is 4 inches in diameter; 3-feet, 2-inches long. I bought it as a swap meet. The loading coil is an old, repurposed B&W transmitter coil also found at a swap meet. It may even date from World War II. Its diameter is 5.5 inches and it has 11 turns. The top half is made of five *Illy* coffee cans soldered together (including the metal lids)[2] that are 3 inches in diameter.

The total height of the antenna, including the coil, is 6 feet. I arrived at this height by trial and error. The standard formula for determining the height of a vertical antenna, customarily built with a slender metal tube or wire, does not apply. To achieve resonance on a given frequency, the larger the diameter of the vertical element, the shorter its required height.

This antenna is designed for three bands: 30, 20, and 17 meters. By adjusting the height of the top half (i.e., by changing the number of the stacked *Illy* cans) as well as the tapping the coil at different positions, the antenna can be tuned for any or all of the 40- to 10-meter bands. The three bands above are my favorites and this antenna is optimized for them.

The capacitance hat (*Photo J*) is made of a stiff antenna wire that I twisted into a flower shape and attached to the lid of the topmost coffee can. The lid can be twisted on and off for transport.

Band switching is accomplished with an inexpensive infrared remote relay switch,[3] which operates with a common 9-volt battery. In this case, the switch is a set of two remotely activated switches, of which each is referred to as a "channel." The 30-meter position is an unswitched position, hence no need for a switch. The switch board as well as the battery are physically attached to the coil (*Photo K*). The coil is sturdy and stiff enough to hold these components steady and secure. The whole switching sub-system can be placed inside the coil, if desired. The battery current drain is very small; a fresh battery lasts for a few months at the rate I operate outdoors which may be once or twice a week at most, for a few hours at a time. Of course, as they say, "your mileage may vary."

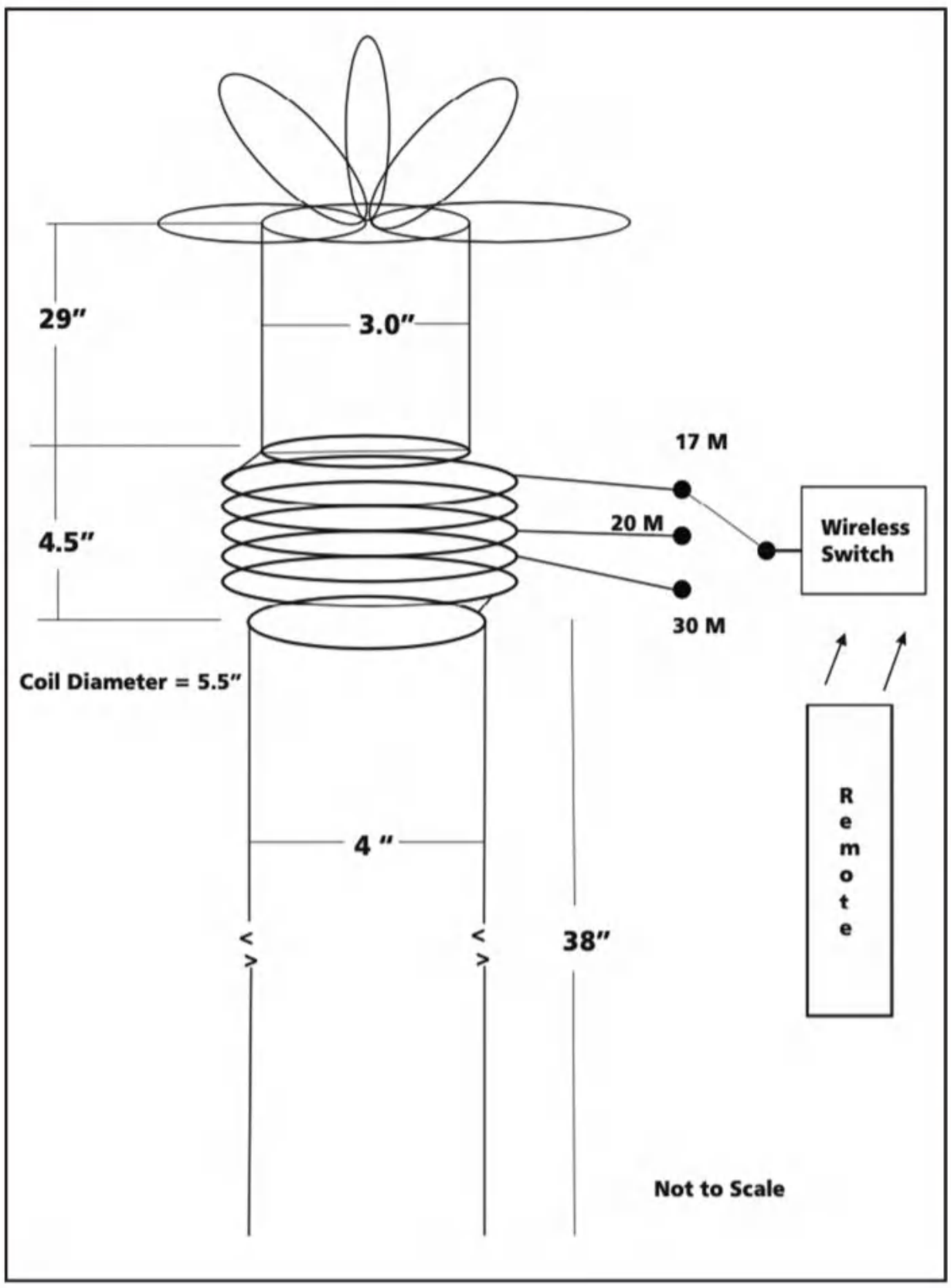

Figure 1. Schematic drawing of the "Fat Man" antenna. (Drawing by Rich Bonkowski, W3HWJ)

Photo I. The coil is center-mounted between the pole below and the coffee cans above. Retuning may be done by adding or removing coffee cans as well as changing taps on the coil.

The fasteners to connect the band-switch leads to the coil are so-called "split bolt" connectors (*Photo L*), commonly used by electricians to connect two or more wires together and readily available at many hardware stores. These connectors come in different sizes, but I used size 8 for this project. The split-bolt connectors allow you to slide the connecting points precisely and securely to set tuning to each band. Once tuning is set, you can tighten the bolts and there is no need to further adjust them in the field, as each usable tuned bandwidth is wide enough to maintain the SWR lower than 2:1. (More on this point below.)

The radial wires are made from computer ribbon cables. Three sets of 15-foot-long, 25-wire cables comprise the entire bundle of 75 wires. I discovered this portable radial system technique many years ago and have used it with other portable vertical antennas, such as the MP-1,[4] with good results (*Photo M*). These can be rolled up easily for storage and transport and it does not easily get tangled or twisted.

Observation

The efficiency of this antenna derives from a variety of techniques I have learned over several decades of constructing and operating portable vertical antennas. First, the larger the diameter of the vertical element, the more efficiently the antenna radiates. Also, the larger the diameter, the shorter the required vertical element becomes, compared to a wire

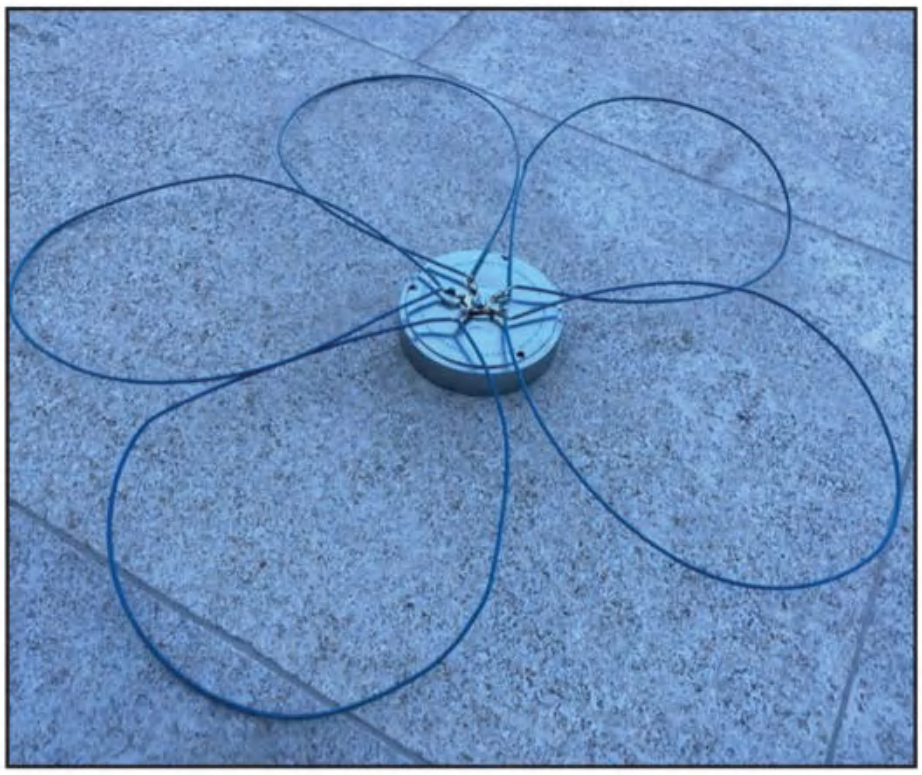

Photo J. The capacitance hat is made of a stiff antenna wire twisted into a flower shape and attached to the lid of the topmost coffee can.

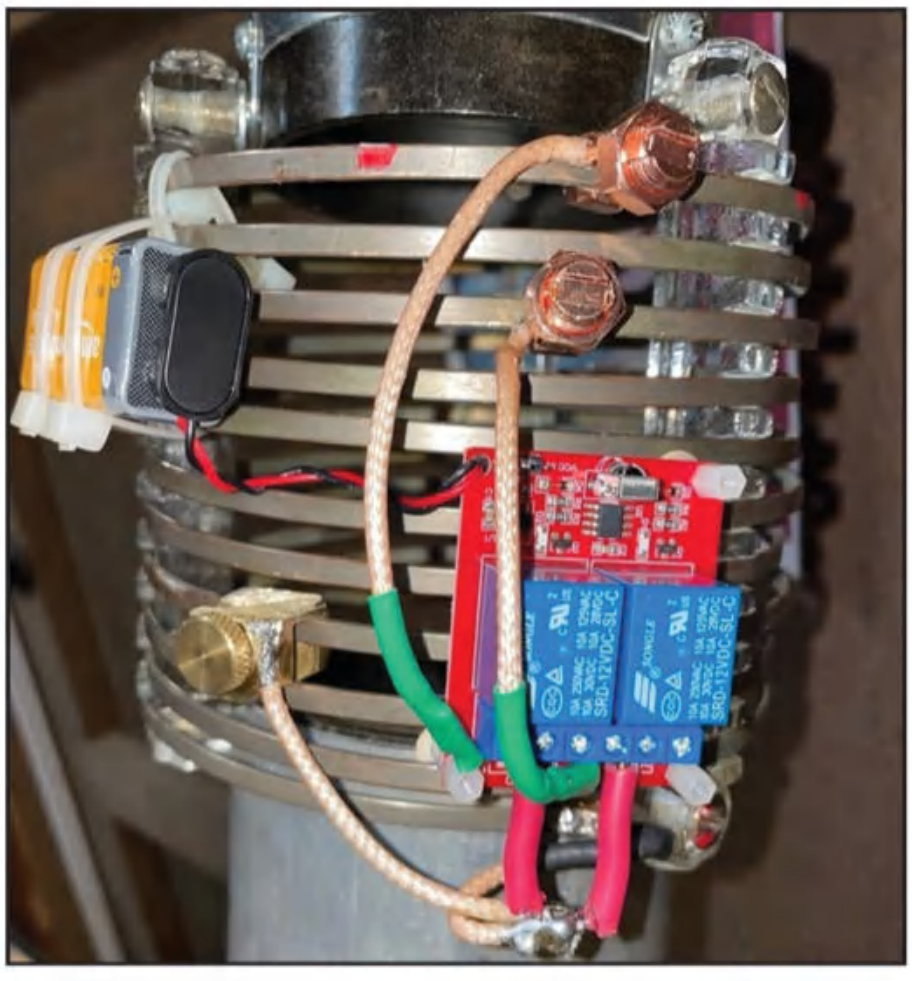

Photo K. Relay switch and battery attached to the coil.

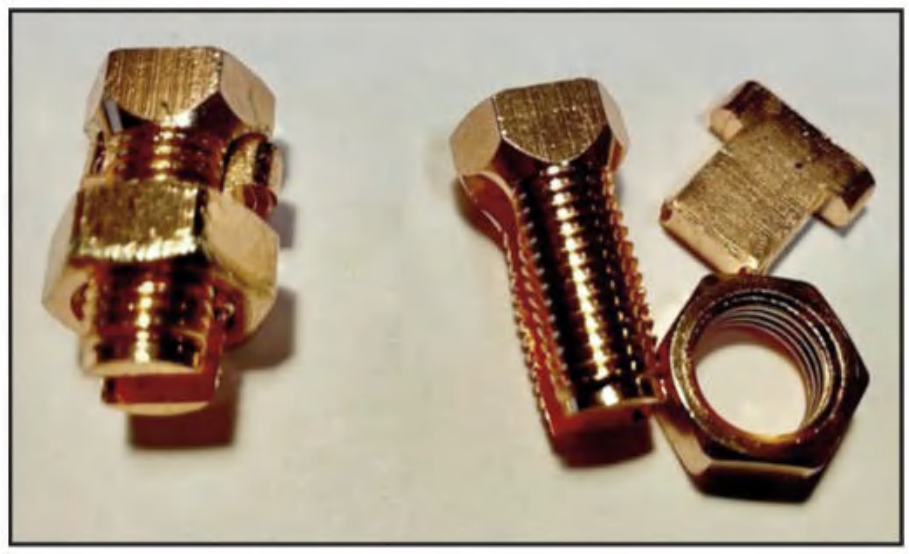

Photo L. Split-bolt connector

Photo M. Detail showing connection of feedline and computer-cable radials to the base of the antenna.

or a thin rod / whip as the radiating element. Second, I have learned that, if other things are held equal, the center-loading design of a shortened vertical is more efficient than base loading or top loading. This is a key feature of at least one popular commercial portable vertical antenna, the MP-1 by SuperAntenna. Third, the larger the diameter of the loading coil, the more efficiently the antenna radiates. After all, the loading coil is itself a radiating component in the antenna system. This feature explains why some commercial antennas that use this design have been considered very good portable / mobile performers. The Texas BugCatcher and the Tarheel Antenna are two good examples.[5]

Performance

So how does this antenna perform? The on-air experience has been excellent. I have operated QRP with the Fat Man often at the Open Preserve public park on the San Francisco Bay in Palo Alto, California, where my QRP buddies and I get together every Friday afternoon. The Fat Man has successfully given me CW and SSB contacts with JAs, VKs, and U.S. East Coast stations using 10 watts or less from the IC-705 on all three bands (except no 30-meter SSB contacts since voice operation is not permitted there). EU contacts have not been as abundant. With WSPR and FT8, I could reach the world easily and regularly, including Europe, Oceania, and South Africa, the farthest point from our park QTH.

I wanted to obtain more objective quantitative data to show the performance of the Fat Man. So, I did an A/B comparison on October 26, 2022, by transmitting a WSPR signal on the Fat Man and the MP-1 simultaneously. I used 500 milliwatts of power on the 30-meter band. The MP-1, like the Fat Man, is a center-loaded shortened portable vertical antenna with an almost identical height to the Fat Man. The major difference in the physical structures of the two antennas is the diameters of the vertical elements. I placed both antennas 6 feet apart inside my shack in the basement of my wooden house, not an ideal RF propagation environment but a handy place for me to set up the WSPR transmitters and accessories. WSPR is an excellent tool to test how well an RF signal propagates; it is like you have thousands of field-strength meters placed at different distances.

The raw data is too long to publish in the magazine, but here are some salient findings:

1. Many more stations received and decoded my signal from the Fat Man than from the MP-1 during the same period (during an hour period between 19:50 and 20:50 UTC, October 26, 2022, for instance, the Fat Man signal was received at 41 spots vs 24 spots from the MP-1;
2. When the same stations reported receiving signal from both antennas, the received signal strength was stronger with the Fat Man. For example, K6RRP received my signal from the Fat Man at -16 dB S/N at 20:46 UTC whereas the signal from the MP-1 was received at -23 dB S/N at 20:48 UTC. For another example, W7PUA received the signal from the Fat Man at -8 dB S/N at 20:42 UTC vs. -12 dB S/N at 20:42 UTC from the MP-1. In no case, was the signal strength indicated for a transmission from the Fat Man lower than the strength reported for the MP-1 signal;
3. The Fat Man's signal reached farther than the MP-1. During the same 1-hour period in question, the greatest distance achieved with the Fat Man was 1,140 kilometers at WA6OUR-K. For the MP-1, 888 kilometers was the farthest distance at W7OWO.

Although most of my HF operation has been at QRP levels (under 10 watts), the Fat Man antenna can comfortably be used for QRO operations as well. I have occasionally run 500 watts at my home QTH using the Fat Man placed temporarily on the second-floor deck without any issues.

Acknowledgements

The CAD drawing of the Fat Man was made by Rich Bonkowski, W3HWJ. Eric Norris, WD6DBM, and his wife Cindy; and John Swartz, WA9AQN, read the earlier draft and helped improve the article. I wish to thank them for their generous help.

Notes:

1. The "Miracle Whip" has long been favored by many hams. See <https://tinyurl.com/ytm24wra>. The AX1 by Elecraft is another popular portable whip antenna. See <https://tinyurl.com/2yyeft63>. There are many others you can find online.
2. I like repurposing *Illy* coffee cans and have constructed several ham items. See my article in Aug. 2021, *QST,* p.38, 39. See also the UpFront photo in Aug. 2022, *QST,* p. 24.
3. There are several eBay vendors from China from whom you can purchase one or the other remote-controlled relay switch inexpensively. For example: <https://tinyurl.com/mtphs95y>.
4. MP-1 by Super Antenna <https://tinyurl.com/3kr98p54>
5. <www.tarheelantennas.com>

news bytes *(from page 7)*

Longtime CQ technical illustrator Hal Keith loved travel and reading. He and his wife, Judy, moved to South Carolina from New York after retirement. (Photo courtesy of Judy Keith)

our pages for nearly 50 years! From 1973 until very recently, most schematic diagrams and other technical illustrations accompanying *CQ* articles were Hal's handiwork, as he transformed authors' often-hand-drawn circuit diagrams into professionally laid-out schematics. While electronics was not a particular interest of Hal's, he was frequently able to catch errors or inconsistencies in schematics, and never hesitated to question anything that didn't "look right."

Outside of his work, Hal was a voracious reader and loved going to book signings where he had a chance to meet various authors. He and his wife, Judy, also loved to travel and were planning another trip when he became ill.

N2EWS continues his tale of getting back on the air after a many-year absence, and operating from an antenna-restricted housing development.

The Continuing Anticlimactic Adventures of the Perverted V (Part 2)

BY NICHOLAS PETRELEY,* N2EWS

This is Part 2 of the ongoing misadventures of the Perverted V antenna. I'll get to the Perverted V in a moment, but first, let's talk about what it means to be an amateur. I can't remember the precise title, but there is a book of baroque clavichord music called something along the lines of "music for amateurs." I almost felt insulted when my piano teacher gave me the book. But he enlightened me that the word "amateur" in this context means "lover of." So "music for amateurs" is music for lovers (of music). And you had better be a lover of music if you're going to play the clavichord. It produces a sound so soft that you're the only one who will hear and enjoy it. It's not a performance instrument.

That's how I envision the word "amateur" in "amateur radio." It describes a love of the craft. And in this case, one must love the craft to put up with so many obstacles in getting desired results. For example, I decided to try out the WSJT-X software and FT8 communications.

FT8 communications go something like this: I'm calling you. You answer and tell me how strong or weak my signal is. I reply and tell you how strong or weak your signal is. Goodbye. There's no conversation. It's just one contact after another, and it's almost completely automated. People often use FT8 to get awards like DXCC (contact 100 countries) or Worked All States. It's not for people who want to chat. I'm more of a chat person, but I want to try FT8 just for giggles.

I connect my computer to the ICOM IC-7410 via USB and configure the software. Once everything is ready, I call CQ on 20 meters with FT8. The USB disconnects upon transmit, the software fails, and the transceiver is stuck on transmit. The USB reconnects when I turn off transmit. Obviously, this is an RF interference problem.

Photo A. The ladder line runs under the lip of the roof for most of its length.

I put a common mode choke between my tuner and the antenna. Same problem. I replace the USB cable with one that is shielded. Same problem. I put a ferrite choke on the USB cable at the PC. Same problem. I choke every wire at the PC with the ferocity of the Boston Strangler. CQ succeeds at last.

Not one to leave well enough alone, I put ferrite chokes at the other ends of the USB cables near the devices. Now calling CQ once again disables the USB connection. I'm not sure what lesson I should learn here besides the obvious, "if it ain't broke, don't fix it," but I simply remove all the excess ferrite chokes and it goes back to working again.

Now, this all happens to take place on Field Day weekend. On this weekend, you try to contact as many people as possible. So, I work Field Day with WSJT-X and FT8. Over the entire weekend, I log three contacts. Three. 3. (Count 'em), three.

I'm inclined to blame my Perverted V antenna. The Perverted V is an inverted-V in which the center is only 20 feet high, attached to a flagpole in the corner of the yard, and the two legs of the antenna are at right angles to each other. My postage stamp yard and homeowners' association (HOA) allow nothing more sophisticated than that.

** 1034 Chad Loop*
Round Rock, TX 78665
Email: <nicholas@petreley.com>

Photo B. The flagpole rests on a brick and is not buried.

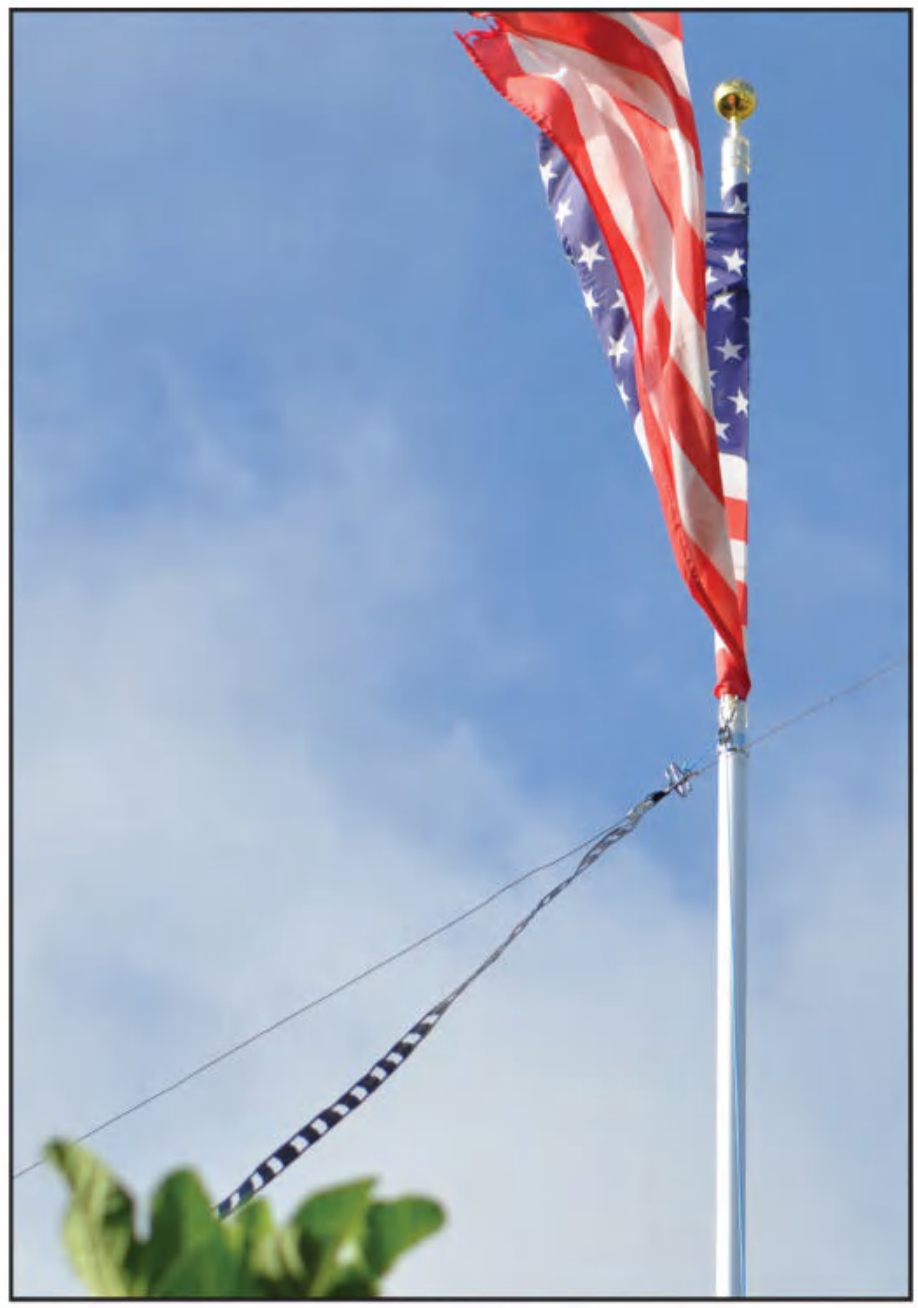

Photo C. Not much of a stroke of genius to use a pulley for the antenna.

I decide to change my antenna to the dimensions of a G5RV. According to the online literature about this type of antenna, a doublet, the ladder line should be a multiple of 30.9 feet. About 93 feet reaches my window pass-through perfectly. Unfortunately, almost the whole length runs just under the lip of the roof where it won't do much good (*Photo A*), so I doubt if using the recommended length will make a difference.

To work on the antenna, I need to collapse my flagpole to replace my Perverted V. Reviews of this flagpole complain that it collapses on its own, so I put pipe clamps on the pole to prevent that. I loosen the first clamp so I can turn the first collar.

It turns out that the collars on MY flagpole require the strength of the Incredible Hulk to turn and allow me to collapse a section. It won't budge. I buy a rubber strap wrench. It arrives the next day, and I *try* to use it to turn the bottom collar. Even a rubber strap wrench doesn't work. I ask my young son, Ming, to give it a shot. He can't turn it. Not even if I make him angry.

It's a stroke of luck that I didn't follow the instructions for installing the flagpole. Instead of properly burying the bottom PVC section in cement, the PVC and pole rests on a rock and is held in place with U-clamps attached to the fence (*Photo B*). This makes it easy to tear the whole thing down if the HOA complains. And not burying the bottom gives me an extra foot of height as a bonus. We pull the flagpole up out of the U clamps and lay it down. Before re-attaching the antenna and raising the pole again, I have a stroke of genius. And by "stroke of genius" I mean "something so obvious I'm embarrassed to admit here that I didn't do this in the first place." Nevertheless, that's two strokes in as many paragraphs, which I consider to be par. I attach a pulley to the pole, and paracord to the center of the new antenna (*Photo C*). Now if I need to service or replace the antenna, I don't need to pull down the pole. I just lower the center using the paracord.

All I need is one of those doohickies to wrap the paracord around at the bottom of the pole. I get disappointing results when searching for "flagpole doohickie" on Amazon. I google "parts of a flagpole" and discover what I need is a "cleat." I never would have guessed that. I search Amazon for "flagpole cleat" and sure enough, I find one that should be suitable.

I admit I am prone to do things easy rather than doing them right. I attach the cleat to the fence instead of the flagpole (*Photo D*). This way, no drilling into the metal pole is necessary.

I have the appropriate balun for this antenna, but I try connecting the ladder line directly to an SO-239 connector. To my surprise and delight, the antenna tunes on the entire 20-metrer band and the voice portion of 40 meters with just the internal tuner on the IC-7410. For all other frequencies, I must use my MFJ-949D Deluxe Versa Tuner II.

Adding a 4:1 balun to the mix mysteriously makes things worse. I eventually discover why, but I'll save that for Part 3.

Photo D. The pole is clamped to the fence where the cleat is installed.

But I do have a question: If you want an antenna to look like 50 ohms to your transceiver, why is the recommended balun for an antenna fed with 450-ohm ladder line a 4:1? It seems more logical to use a 9:1 balun, as it would bring the 450-ohm ladder line down to 50 ohms. But I know impedance isn't determined by the feed line alone, so I'll just assume 4:1 is correct. Hopefully, I'll learn the theory while studying for my Extra.

The MFJ-949D is a fantastic tuner. It gives me nearly 1:1 SWR on every band. But I switch frequencies and bands like someone with ADD. It doesn't help to write down the settings. The tuner always needs tweaking after every change.

I buy a used MFJ-993b automatic antenna tuner on eBay for some relief. An automatic antenna tuner shouldn't require any action by me to use it on different frequencies.

Unfortunately, this unit refuses to detect the right frequencies, let alone tune. Upon close inspection, I see that the centers of the SO-239 connectors on the back look like they're charred black. I suspect this tuner was in a shack that was involved in a lightning strike. I don't want to clean or replace the connectors only to find that the internals have been damaged, too. I return the unit for a refund.

So far, this whole experience reminds me of a time when I used to repair everything on my old 1963 Volkswagen Beetle, myself, always with the wrong tools. One day, after replacing the clutch cable for the third time and jamming my hand with a screwdriver while replacing brake shoes, I decided it was time to abandon doing everything the hard way and take the car to a professional.

That's how I feel after the frustration of trying to make my antenna and all these used items work. So, I get a little more professional, which I'll describe in Part 3.

It's well established that trees can attenuate RF signals, particularly at VHF and UHF, and particularly in summertime when leaves are added to the equation. But there hasn't been much attention paid to the impact of trees on HF communication. W3DIY and G3WRT have concluded that close-in trees not only introduce signal loss but also change polarization and radiation patterns.

Trees and HF RF Interactions

BY HENRY L. "RICK" CIOTTI, W3DIY AND IAN J. DILWORTH, PH.D,* G3WRT

In 1976, G3WRT wrote a tongue-in-cheek letter in *Wireless World (UK)*, commenting on the influence of a single tree on HF radiation, after reading that trees were being used by the military as makeshift HF antennas in the tropical jungles of the world by exciting the sap structure. My current (2022) interest was spurred by a contact with someone who lives in a densely wooded deciduous tree area in the U.S.,

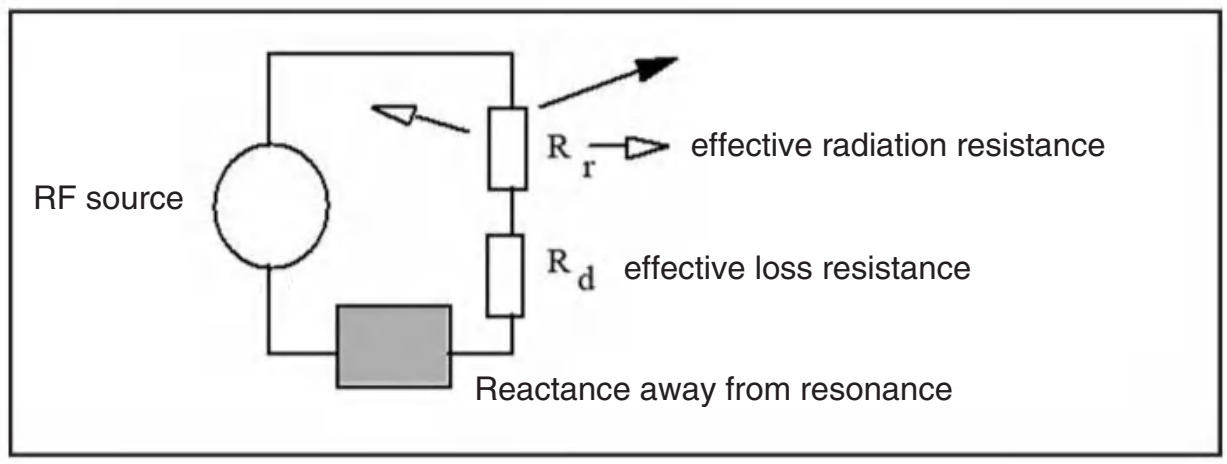

Figure 1. A model of an antenna. (illustrations by G3WRT)

* Email: <G3WRT@btinternet.com>

Photo A. Poplar trees in summer, all closely planted. (Photos by W3DIY)

Winter Specials for the Hams in Your Life...

DITS and DAHS

The A B C's of Morse Code Operating

by Ed Tobias, KR3E

This small by solid guide is the perfect read for those interested in learning or improving CQ operating techniques!

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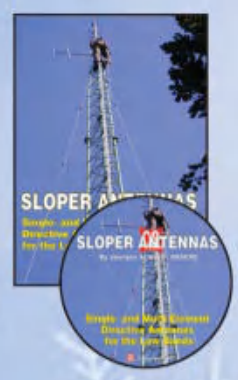

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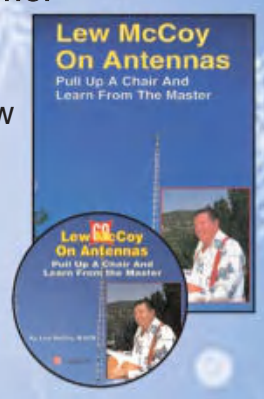

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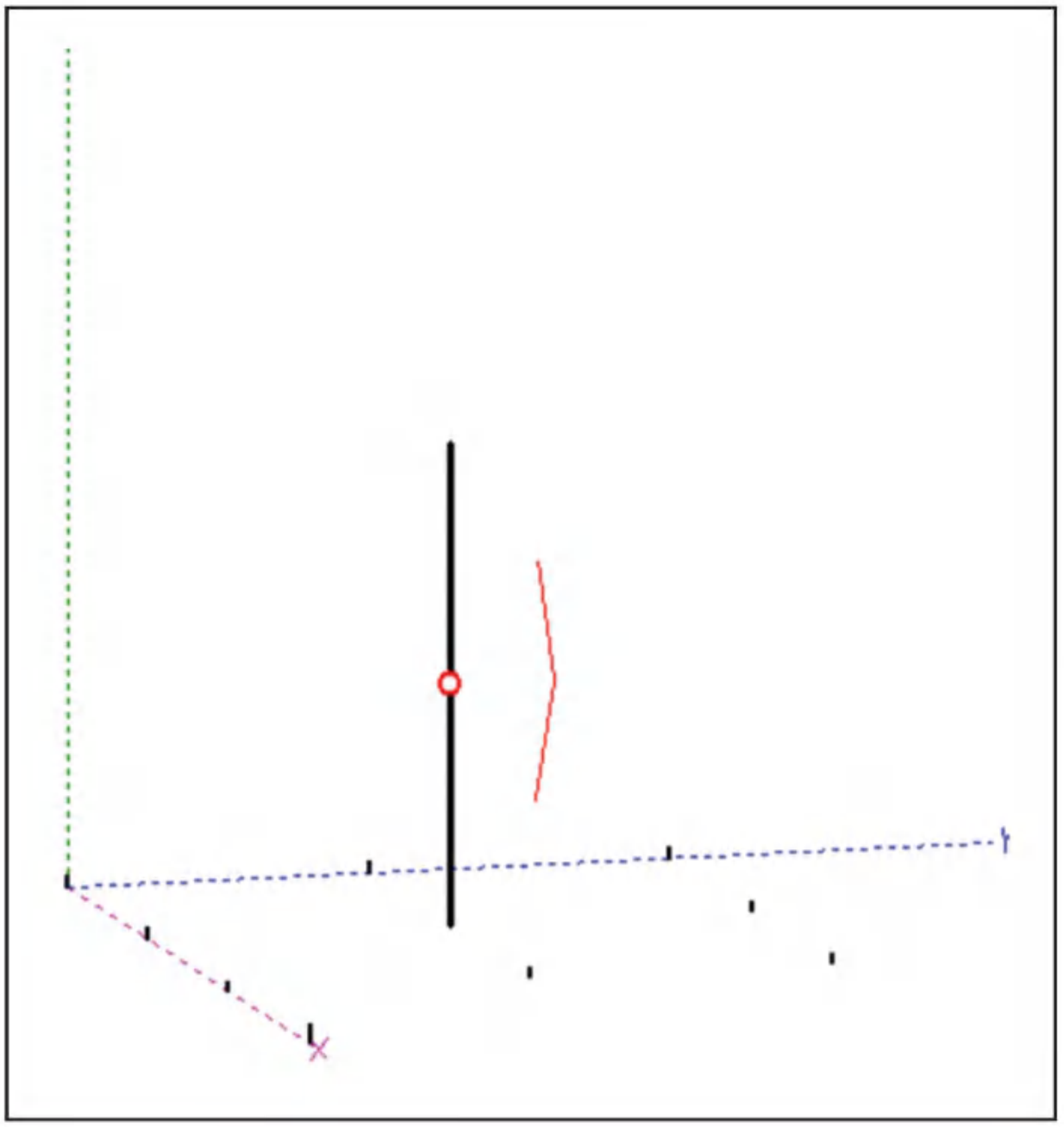


Figure 2. A single vertical dipole 3 meters (10 feet) above normal ground, producing low-angle radiation and a hint of high-angle radiation.

W3DIY. The trees in question are shown in *Photo A* (summer) and *Photo B* (winter). His experience has been particularly disappointing for HF DX in his dense woodland location. Measuring and then modeling the influence of trees on HF propagation is the subject presented here using his wood dimensions and spacings as an example.

An excellent article in *QST*[1] detailed modeled attenuation interaction of trees with HF radiation. Two aspects not covered, however, are polarization effects and radiation elevation angles. We have modeled and qualitatively measured these effects, including radiation angle, and found the latter to be a more significant parameter than loss.

The ionosphere and HF polarization effects are largely dismissed in the literature. However, short-term measurements indicate otherwise in our experience. Since ham radio contacts rarely last longer than a few minutes, this is a relevant factor to consider. Beacons and repeaters have proven to be a good way to make longer-term measurements and observations of HF propagation. Ham repeaters are usually +10 dB or more powerful compared to the usual HF beacon and are thus practically more helpful, albeit unreliable, in measurement campaigns when weak signals are the norm. (The AMTOR "station response" era was by far more helpful in this respect.) I found I could always test the propagation between Europe

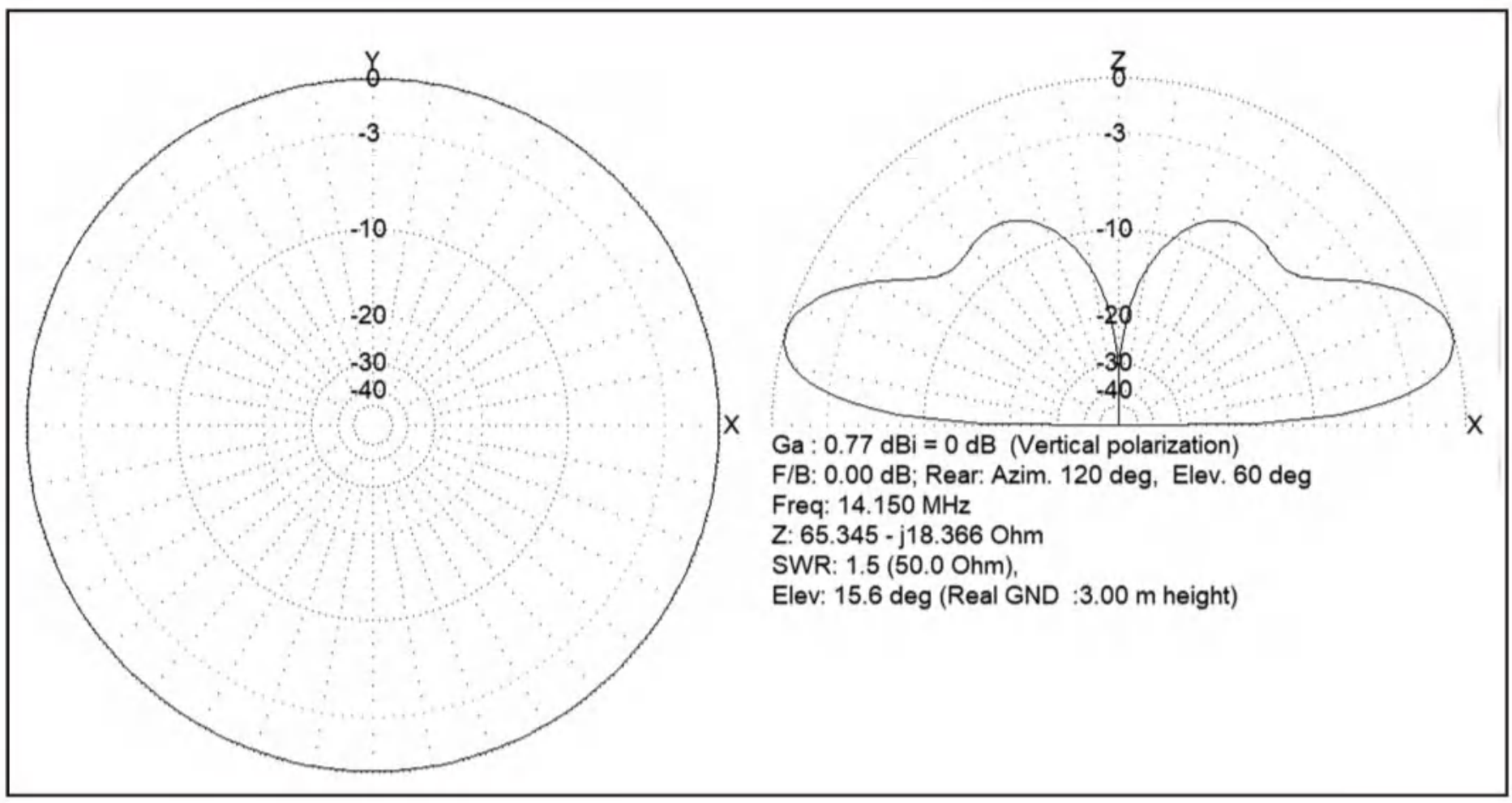


Figure 3. The resulting radiation pattern 3 meters off the deck.

and, say, Singapore or Hong Kong, even when they were asleep. In a sunspot upsurge (let's hope) in 2022/3 and transatlantic propagation e.g., 29.620 MHz FM repeater in the New York hills and others received in Europe have proven invaluable as they did in the last sunspot cycle.

As tree sap rises, it is to be expected that the attenuation at HF increases but so does the radiation resistance, helping radiation because the ratio of the frequency dependent ratio of the radiation resistance to loss resistance governs the radiation effectiveness. *Figure 1* illustrates a simple model of a radiating antenna. Even in winter, for a deciduous tree, wood and residual sap produce significant interaction. A simple model of a real-life planted poplar tree forest with typical spacing of trees of about 20 feet (~6 meters) and heights of 60 feet (~20 meters), representative of W3DIY's location, using the electromagnetic *method of moments* (MoM) — the same as NEC, Eznec, and Mmana (method of moments antenna analyzer), readily available on the web for download — indicate that in addition to attenuation (loss), the most significant effect can be to elevate the main antenna lobes. This is first indicated in *Figure 2*, a simple vertical dipole 3 meters (10 feet) off the ground and the resulting radiation pattern, *Figure 3*. Next the dipole is surrounded by interacting trees as illustrated in *Figure 4* and the resultant radiation pattern, *Figure 5*. *Figure 6* illustrates the addition of one more tree and the resul-

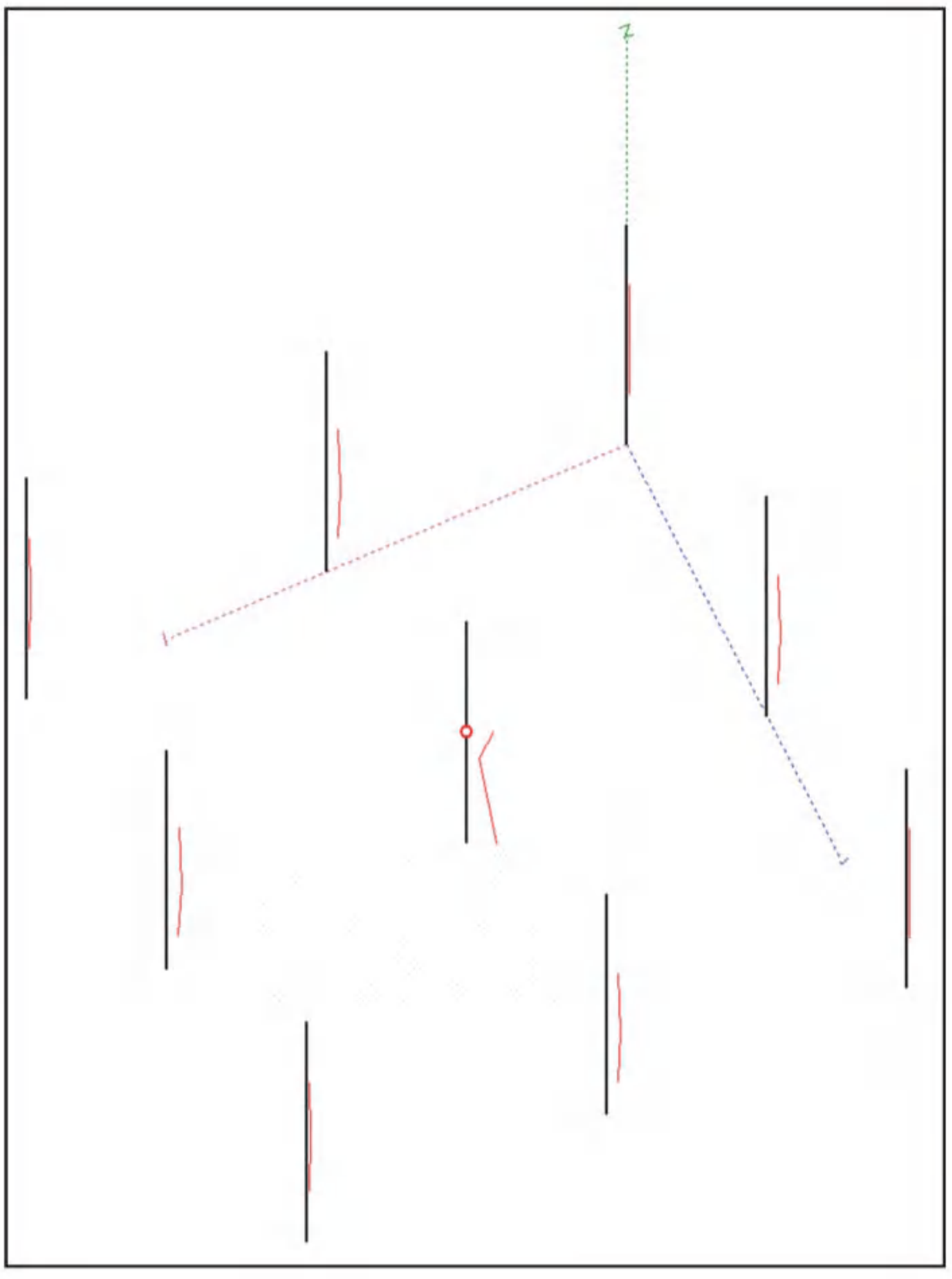


Figure 4. This is a model of the dipole surrounded by trees.

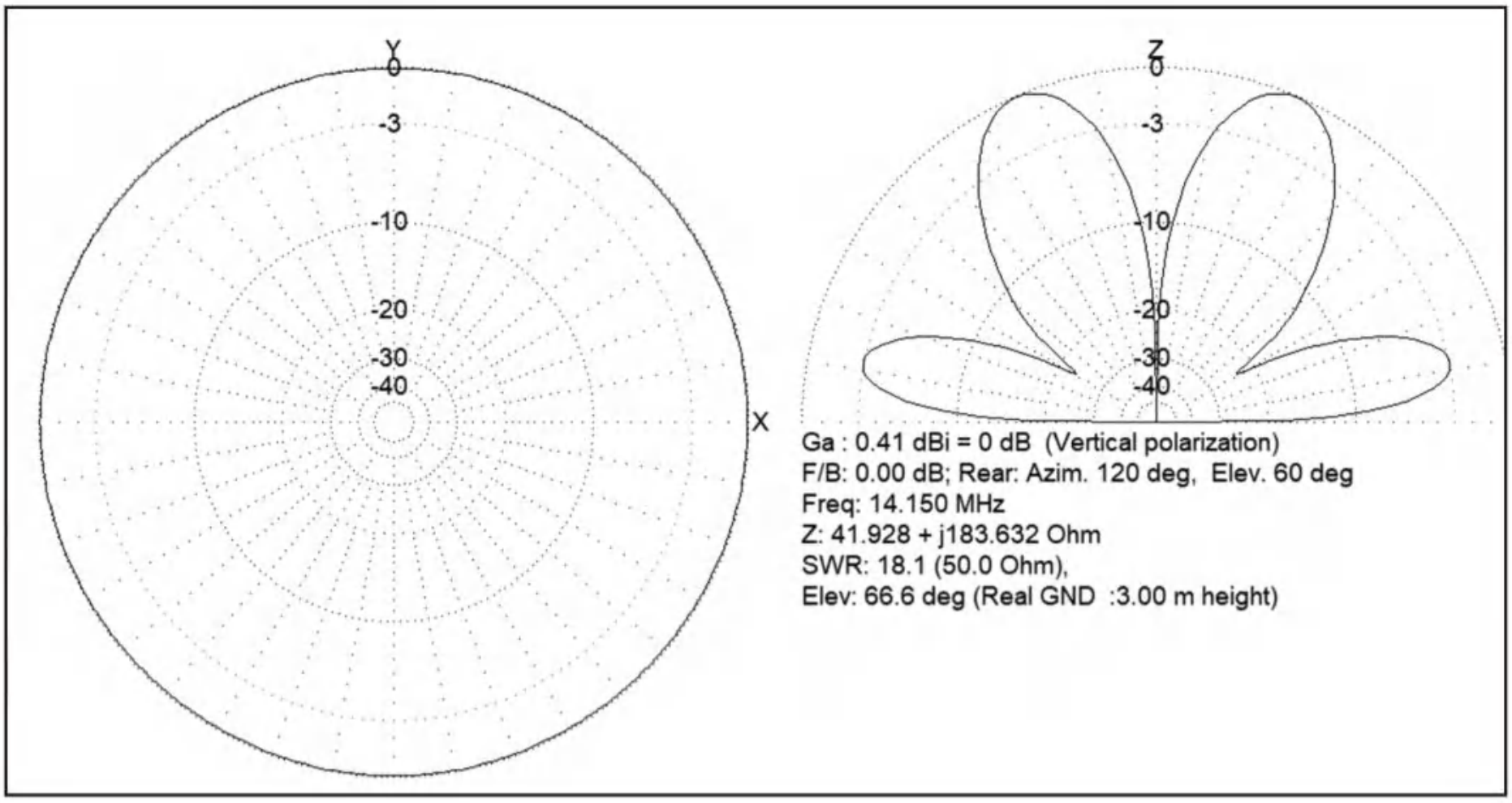


Figure 5. The resultant radiation pattern of the dipole surrounded by trees. Note the increase in high-angle radiation and the decrease in low-angle radiation.

Photo B. Poplar trees in winter … still RF-interactive!

tant radiation pattern in *Figure 7* and, in 3-D, in *Figure 8*.

For brevity, no more trees have been added here but examining *Figure 7* illustrates the trend … producing a quasi NVIS (near-vertical incidence skywave) antenna. Not useful for DX. In the tropics where trees are not governed by the seasons, an NVIS antenna might well prove advantageous in a forest / jungle environment.

In temperate areas with deciduous forests, clearing trees out to a distance of about one wavelength nearly eliminates the interactions in terms of elevated lobes but not in terms of low angle attenuation, presumably until in the far field. i.e., ~ *[2*(antenna length^2)] / wavelength*. All these interactions are wavelength dependent. At W3DIY, 160- and 80-meter DX are the main interest so clearing trees out to one wavelength is no simple or practical task but it may be in certain directions. How big those clearances must be is presumably dependent on the Fresnel zone clearance possible. Quite an experiment there and I think I can model that before chopping down trees. Anyone interested?

Conclusions

The attenuative losses due to trees at HF (and UHF / microwave[2]) can be significant. Frequency (only 14.1 MHz illustrated here for brevity) and, of course, the density of the trees are parameters which have a bearing on the actual radiation and losses. It is, however, not necessarily that loss is the most significant factor. Resulting radiation patterns, almost always vertically polarized, can be seriously elevated by a forest of trees and their interaction, i.e., NVIS-appropriate but not helpful for low elevation angle propagation. Even if a horizontally polarized antenna such as a Yagi is mounted above the canopy within a few fractions of the wavelength, the beam is still significantly elevated by tree interaction in both summer and winter.

Doing the Math

Radiation resistance, loss, and reactance model:

The radiating efficiency of an antenna may be defined as:

- The ratio of the power radiated to the power input to the antenna.
- The difference between the power radiated P_r and the power supplied P_{in} is the power lost in dissipation P_d in this case the tree and its sap.

The equivalent circuit of an antenna is shown in *Figure 1*.

The terminal impedance of a dipole includes some reactance in series with R_r as indicated in the diagram (i.e., R_r is the resonant value of the terminal impedance, assuming sinusoidal current distribution). Plus, in the case of surrounding trees "detuning" the radiating element from interactions, I had to shorten the radiating dipole to get a decent match.

Also, R_r is the value of resistance that would appear at the terminals of the antenna connected at a current maximum. Since a change in electrical length varies the current maxima on the antenna it must be referred to the terminals for such length.

A plot of R_r (referred to a current maxima) against the length in terms of wavelength is shown in *Figure 9*.

Quick Summary

We have shown by qualitative demonstration and ham band operation over protracted summer / winter periods, plus by EM (MoM) analysis here, that nearby deciduous trees to an HF anten-

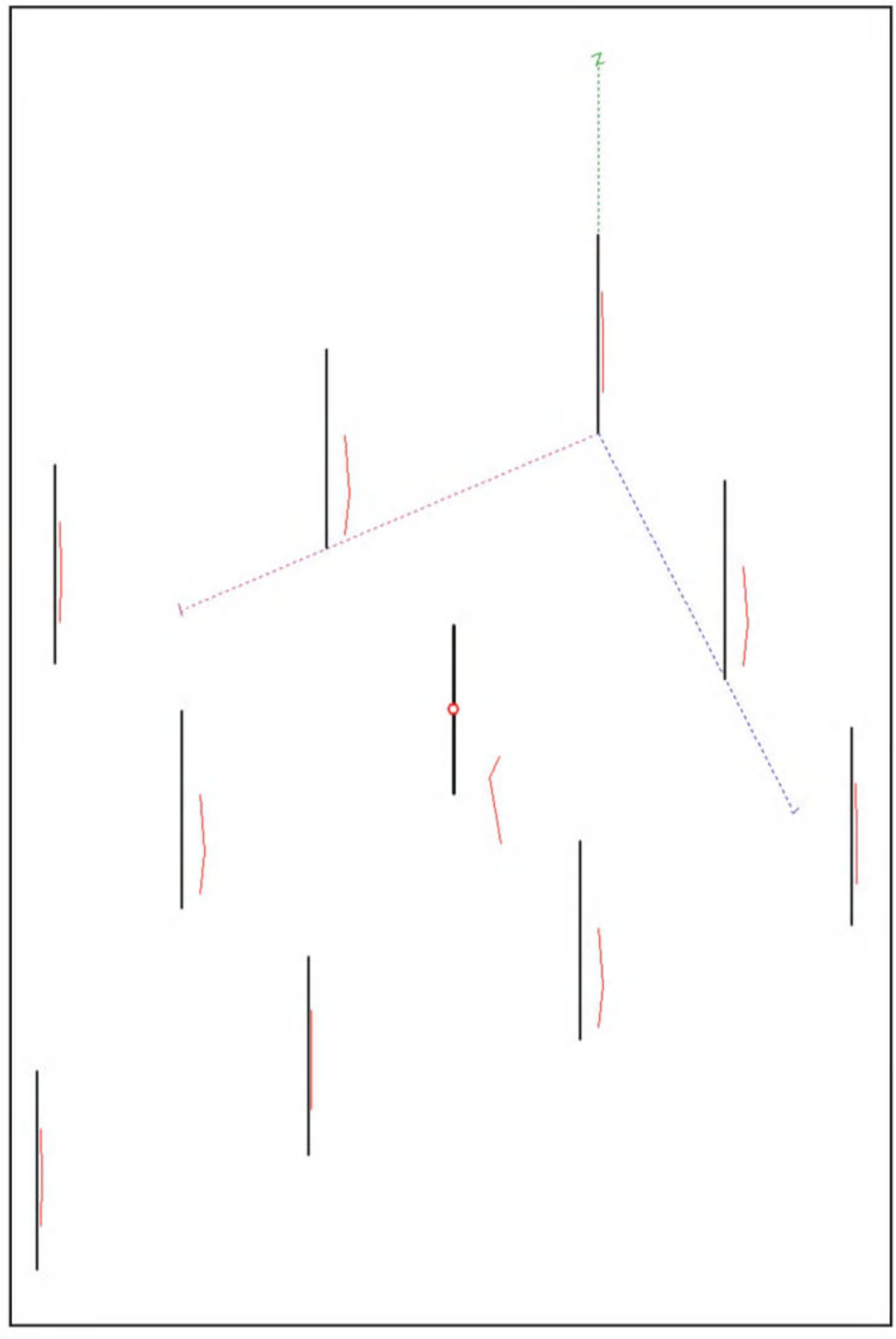


Figure 6. Adding one more tree … Will it make a difference?

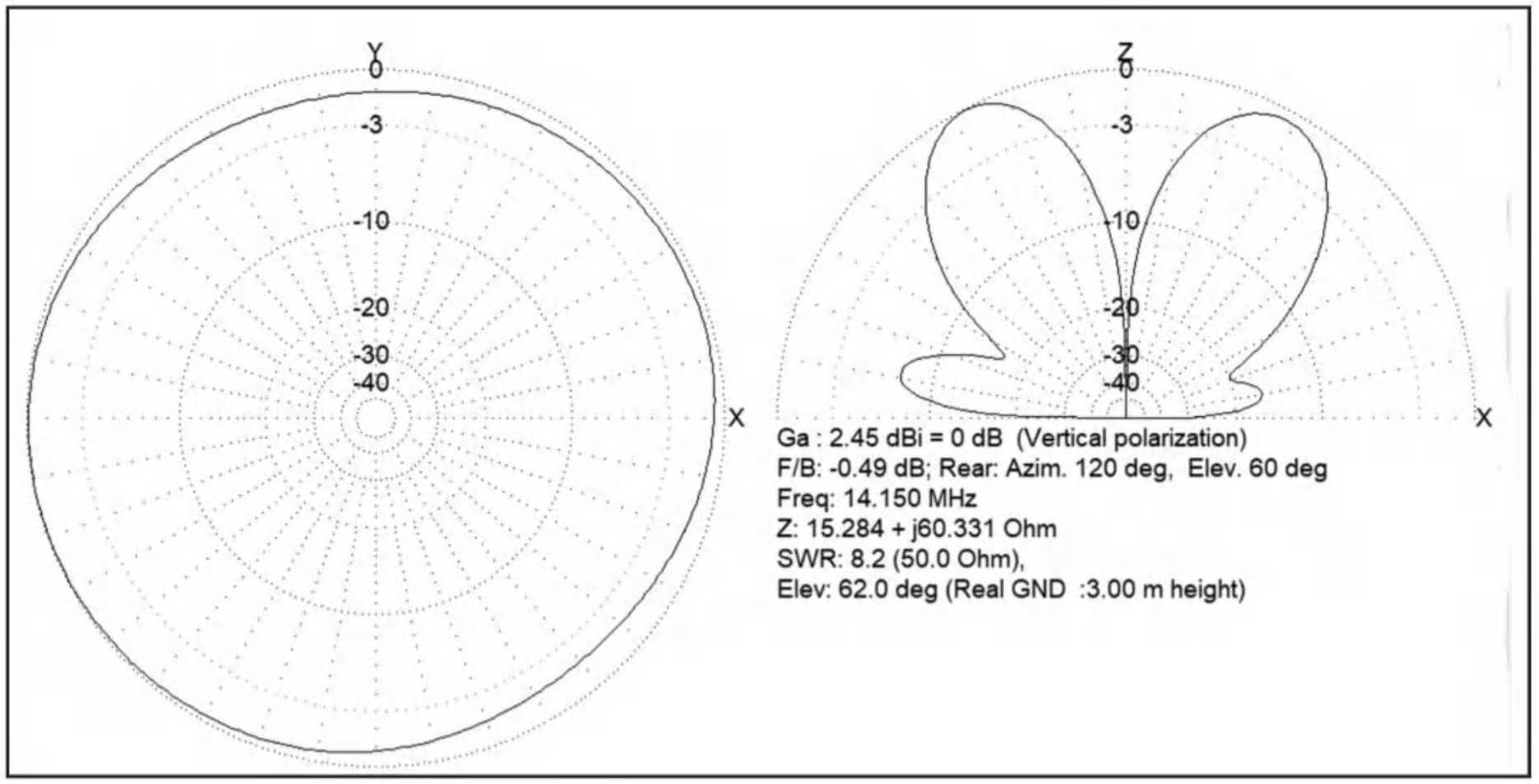


Figure 7. Yes … This is the resultant asymmetric radiation pattern, now resembling the pattern of an NVIS antenna.

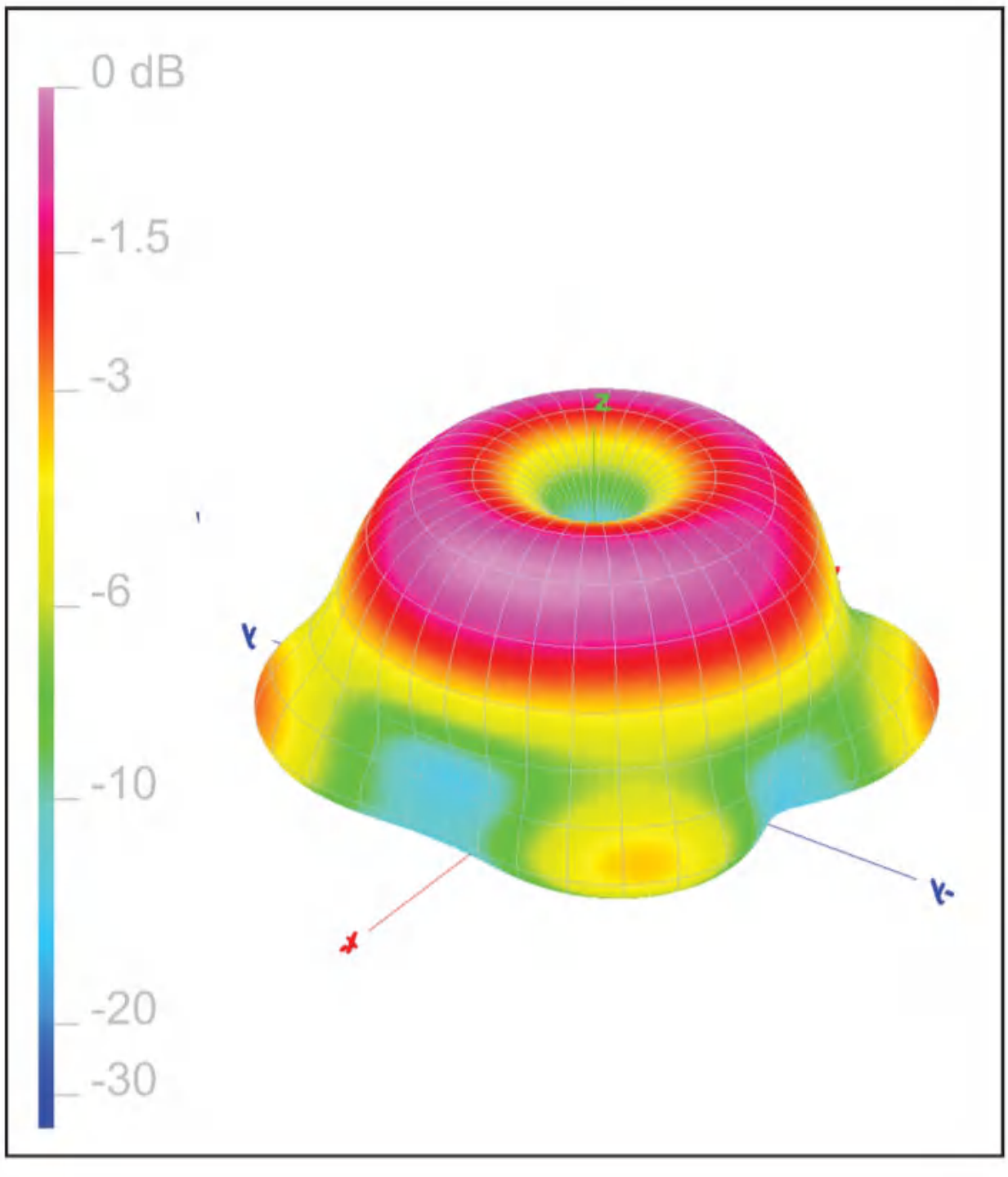


Figure 8. A 3-D depiction of the pattern in Figure 7*.*

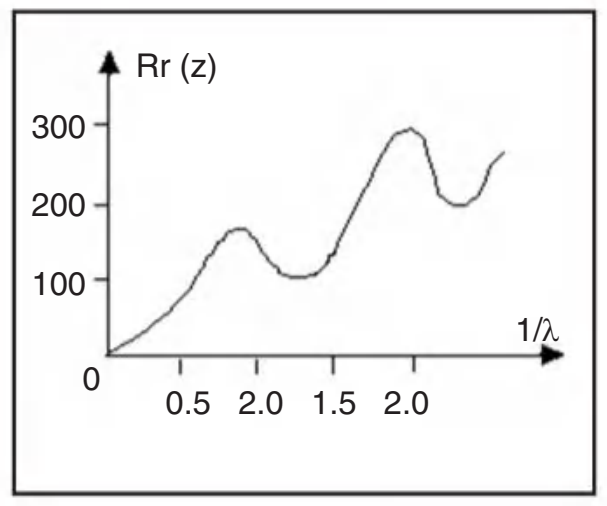


Figure 9. Plot of R_r (referred to a current maxima) against the length in terms of wavelength.

na, in winter and especially in summer, elevate the main lobe in any polarization and effectively produce NVIS antennas. This can be an advantage. Clearing trees to about *one wavelength* distant can significantly reduce interactions, which all occur in the near field region, to allow low angle HF propagation, which is better for DXing. However, even at a wavelength distance, the trees still introduce a small amount of loss.

Notes:

1. "Live tree effect," KE4PT and W4RQ, *QST*, Feb. 2018, pp 34-37

2. "Attenuation and cross-polarisation due to trees at millimetre wavelengths," *Electronic Letters*, Vol 32., No. 5, pp 488-489, 29th Feb. 1996. I.J. Dilworth.

Hidden transmitter hunting, or foxhunting, is a fun challenge that also helps develop skills in tracking down unknown signal sources. But once you get close, a signal may overwhelm your receiver. Step attenuators will help, but they tend to be very expensive and difficult to use in the field. WA4KFZ came up with a very effective and reasonably priced solution that you can wear on your belt.

Build a Foxhunt Variable Attenuator

BY MARK D. BRAUNSTEIN,* WA4KFZ

In the summer of 2020, hams in our area were desperate for something, *anything*, to do while faced with COVID-19 restrictions on group gatherings. Two clubs, the Woodbridge Wireless and Ole Virginia Hams, got together and sponsored a foxhunt activity that could be safely held outdoors.

Although I'd never participated in a foxhunt, I did have prior work experience in basic direction-finding systems using antennas and receivers. Figuring that I'd be "a natural" for this event, I thought I'd have no problems finding the hidden fox. Instead, I failed miserably. In my haste to get my handheld radio and antenna ready, I had forgotten to borrow a step attenuator from the laboratory at work. Instead of being able to attenuate the strongest signals, I had to rely on peaks and nulls in the antenna pattern to determine bearings. Unfortunately, multipath reflections due to the suburban surroundings caused so much confusion in finding the signal, that I basically got trapped in chasing "ghost" signals.

* *Email: <wa4kfz@cox.net>*

After licking my wounds, I decided to explore attenuator options. I considered purchasing a step attenuator but was put off by the price. I considered building a traditional switched step attenuator but concluded that the size and weight weren't ideal for quickly attenuating and homing in on signals. I did research the frequency-offset attenuators, which were inexpensive, but read about their limitations of high insertion loss and problems with intermodulation products overwhelming handheld radios. In the end, I chose a different approach and built my own attenuator, optimizing the design for the way I thought best for operating in the field.

Design Goals

I wanted to come up with a design that was optimized for usability as well as performance. My criteria were:

- Battery operation with low current drain for long-duration (multi-hour) hunts.
- Avoid the size and weight of conventional step attenuators that use toggle or slide switches.

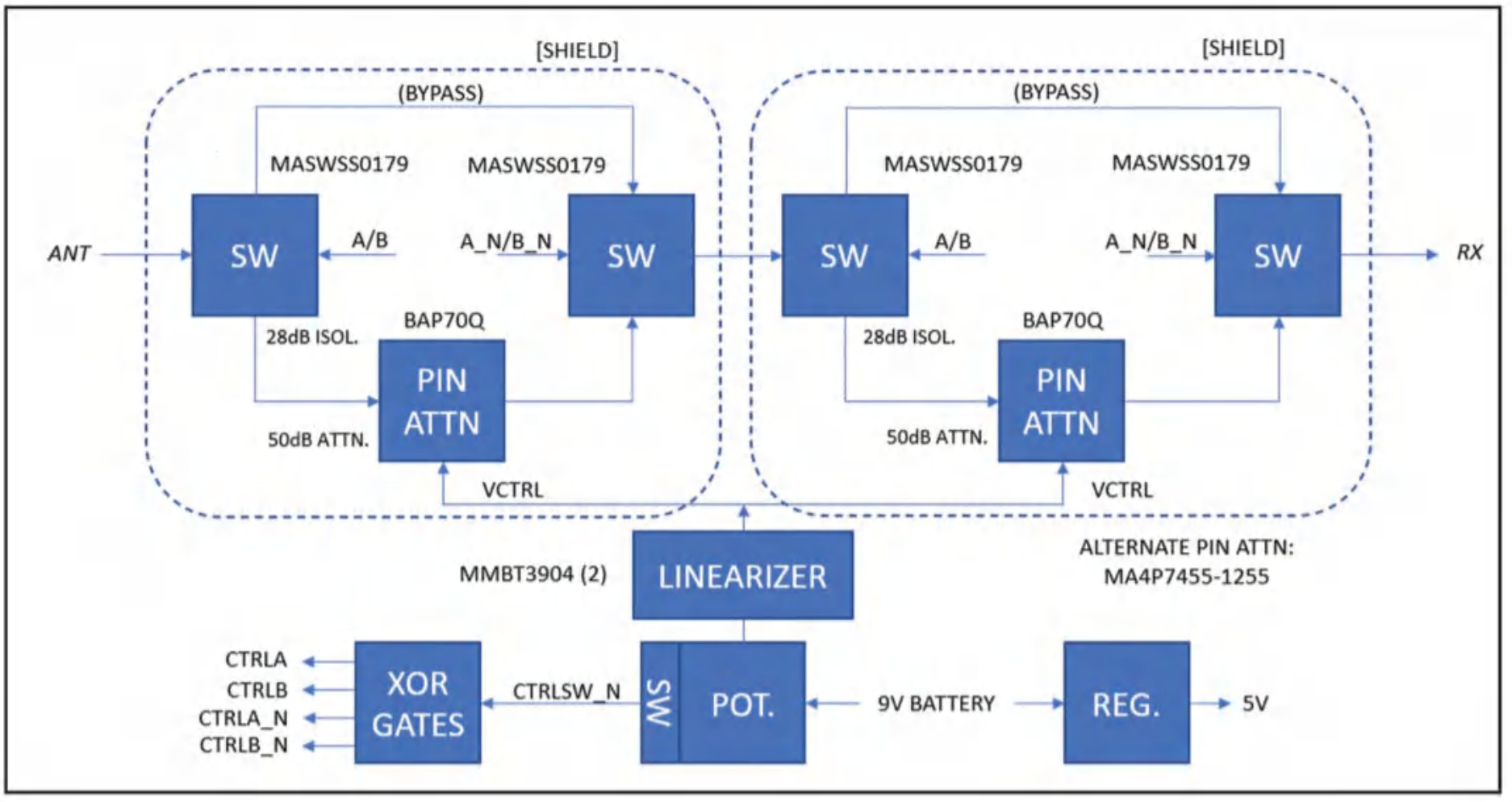


Figure 1. Attenuator block diagram

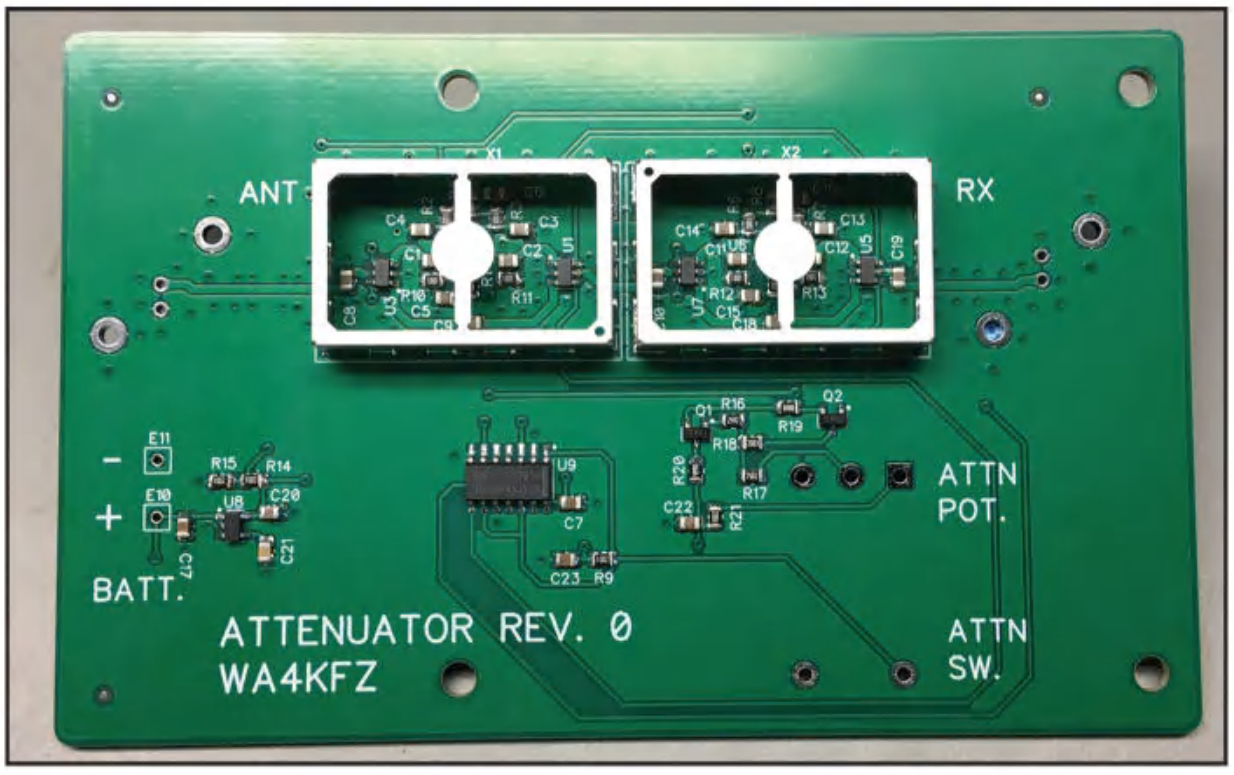


Photo A. Attenuator PCB layout, top view. The RF shield covers are removed. The voltage regulator, switch logic, and linearizer circuit are near the bottom of the board. The RF bypass switches, and PIN attenuators are contained within the RF shields. The BNC connectors, potentiometer, and 9-volt battery connector are mounted on the back of the board.

• Avoid the inherent ("baseline") insertion loss and poor noise / intermodulation performance of mixer-based systems that rely on a diode and 4-MHz offset oscillator to place the signal at the skirts of the radio's IF filter.

• Allow immediate tuning to the third harmonic of the VHF fox transmitter signal without having to disconnect in-line equipment.

• Support a "wearable" form factor that made operation of the antenna hassle-free while listening to the radio and/or watching the signal strength display.

Block Diagram

I investigated various RF attenuator ICs on the market and finally settled on low-cost PIN attenuator ICs, typically used in consumer products like satellite receivers and cable TV boxes. To avoid the baseline insertion loss of the PIN attenuator, I found low-cost CMOS RF switches that would allow the attenuator path to be bypassed when not in use. This allows the antenna and receiver to operate normally until attenuation is needed. To control the RF switches, CMOS logic gates are used to generate the complementary control signals. The PIN attenuators can operate at voltages as low as 9 volts, so I settled on using a 9-volt battery as the power source and used a low quiescent current voltage regulator to generate the 5 volts needed for the CMOS gates.

The complete variable attenuator block diagram is shown in *Figure 1*. It should be noted that, although there are ports labeled "ANT" and "RX," the design is *reciprocal*. This means that the "ANT" and "RX" connections can be swapped with no change in performance.

Schematic Diagram

The schematic diagram and parts list for the attenuator have been posted to Hackaday.io <https://tinyurl.com/2r5k59nk>. Since the potentiometer has only one integral switch used to select the bypass mode of operation, I didn't want to add a separate switch just to control the ON/OFF function. When the attenuator is not in use, the battery is disconnected.

PCB Layout

The PCB layout of the attenuator is shown in *Photo A*. The BNC connectors, potentiometer, and 9-volt battery connector are mounted on the back side. Since I wanted to support a "wearable" form factor, I found a Hammond plastic enclosure with belt clip that would accommodate the PCB and battery. The PCB is a simple two-sided board design. To maximize inter-stage shielding, readily available RF shields were used to contain the two identical attenuator / switch sections.

Theory of Operation

Since the attenuation range of one PIN attenuator is only about 50 dB at the *lowest* frequencies of interest, I used two cascaded stages to ensure well over 60 dB of attenuation control over the entire VHF/UHF frequency range. RF shields were employed to maximize isolation between the stages. Two RF switches were used in each stage to further increase the isolation when the PIN attenuators are active.

For the PIN attenuators, almost all the dynamic range is restricted to a limited control voltage range. Referring to *Figure 2*, the steep curve between 1 volt and 2 volts shows that the attenuation varies primarily between these two points. To "spread out" the tuning range a bit further, I experimented in LTSpice with a few "linearizers" to extend the potentiometer's rotation and prevent the attenuator from rapidly varying between the two attenuation extremes.

One fortuitous aspect of using PIN attenuators in this application is that maximum attenuation occurs at minimum current draw. Similarly, while in the bypass mode, the current consumption of the RF switches is also exceptionally low, allowing the circuit to operate for long periods of time during the hunt.

The attenuator operates from 50 MHz to 2000 MHz. The upper limit is determined by the performance of the RF switches. The lower limit is determined

Mode	Current (mA) @ 9-volts DC
Bypass	0.5507
Full Attenuation	1.0517
Min. Attenuation	4.929

Table 1. Attenuator DC power consumption vs. operational state

Mode	VHF (144-148MHz)	UHF (420-450MHz)
Bypass	1.8dB	1.8dB
Full Attenuation	80.0dB	78.0dB
Min. Attenuation	13.5dB	13.6dB

Table 2. Attenuator RF insertion loss in the bypass mode and attenuation mode extremes

by the value of the DC blocking capacitors in the RF path. The frequency range can be extended downward by increasing the capacitance values. Power consumption and insertion loss figures are shown in *Tables 1* and *2*, respectively.

Concept of Operation

The belt-worn attenuator configuration is shown in *Photo B*. Coaxial cables are used to connect the attenuator to the radio and the antenna. The antenna is held in the dominant hand, while the potentiometer is controlled by the non-dominant hand. The audio output of the radio is monitored with headphones or by turning up the speaker volume.

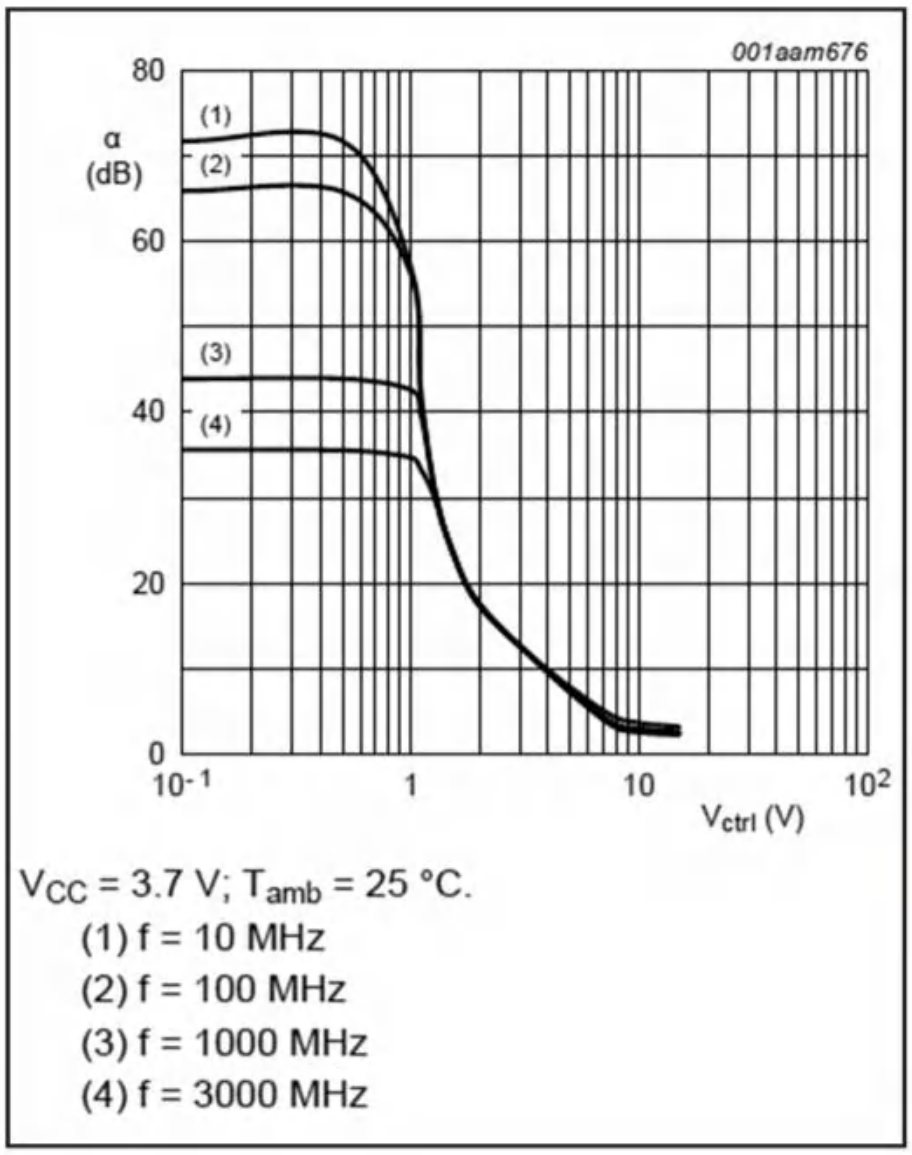


Figure 2. Excerpt taken from NXP datasheet for the BAP70Q quad PIN attenuator (Rev. 3, 3 August 2018). Attenuation vs. control voltage at various frequencies is shown.

Photo B. Attenuator concept of operation. The unit is belt worn. Tuning is performed by rotating the potentiometer with one hand while holding the antenna in the other.

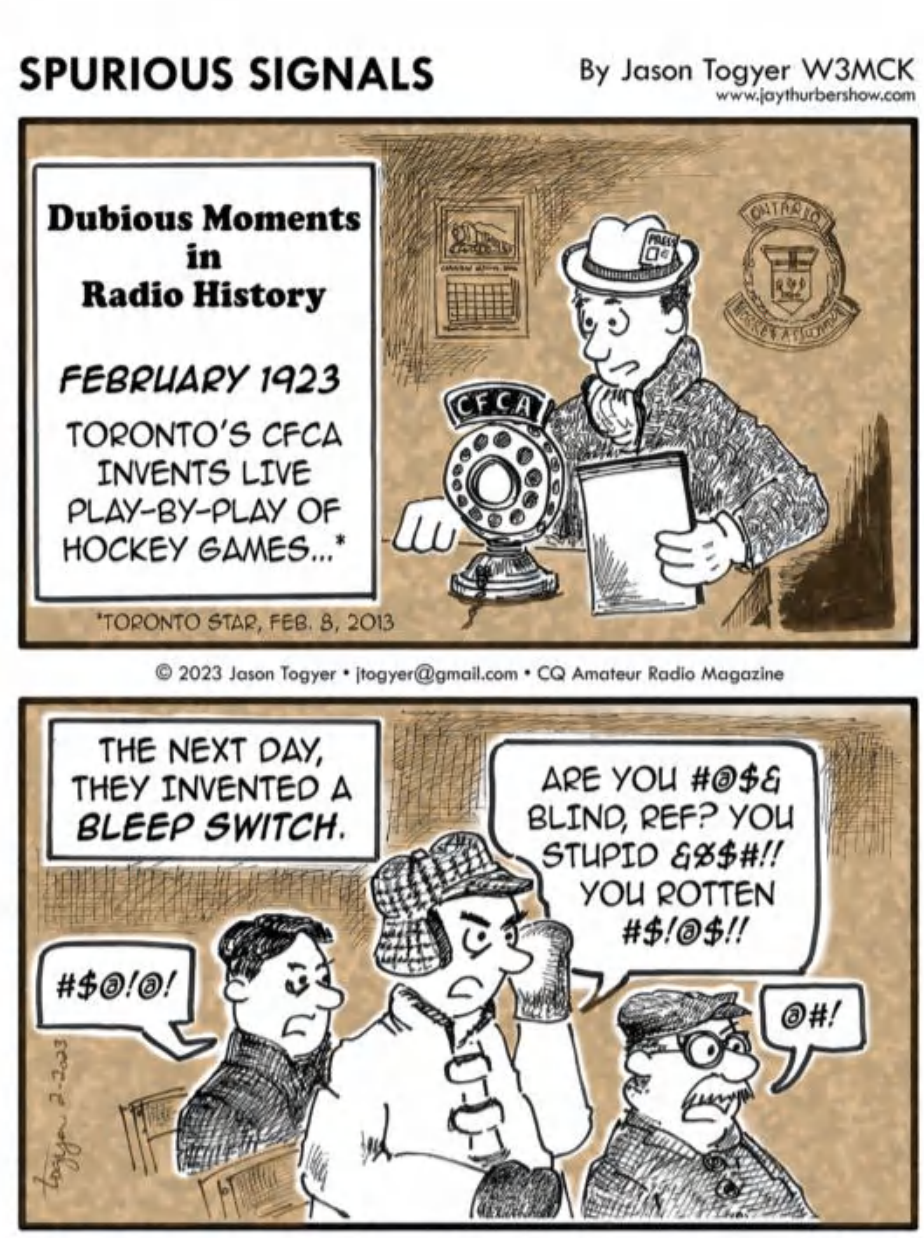
Attenuator operation starts off in the bypass mode. When the signal is heard, the operator immediately rotates the potentiometer and switches into the attenuation mode. Rotating the potentiometer back and forth allows the operator to "ride" the attenuation while moving the antenna around for maximum audio output. It should be noted that the attenuation starts off at maximum and diminishes with clockwise rotation. This was a personal choice and is determined by the connections to the potentiometer's terminals.

An Important Warning

The MASWSS0179 RF switch can handle a maximum RF input signal level of 0.5 watts without damage. When using a handheld transceiver as the receiving device, it is **IMPERATIVE** that the operator prevent high transmit levels from being applied to the attenuator. Lowering the TX power level to the minimum setting is highly recommended. The easiest way to prevent accidental transmissions on a handheld is to enable the *PTT lockout* feature. On Baofeng radios such as the UV-5R (which do not have a PTT lockout capability), set the TX frequency to 0 Hz.

Conclusion

The RF performance of the attenuator was a bit better than expected and should provide sufficient dynamic range for foxhunting. The PCB is physically larger than necessary but was sized to accommodate the mounting holes in the Hammond wearable enclosure. It would be possible to use a different enclosure, rework the PCB layout, and place the attenuator on the antenna boom, for example. I'm looking forward to testing the attenuator out during the next foxhunt!



BY BOB SCHENCK,* N2OO

VU4W Andaman Islands DXpedition Apr 28 – May 16, 2022

BY JURIS PETERSONS,# YL2GM

Our story this month comes from Juris Petersons, YL2GM, who made a one-person DXpedition to the Andaman Islands last year (even though it wasn't planned that way!). This story first appeared in the INDEXA newsletter and is published here by permission. 73 and See ya' in the Pileups! – Bob, N2OO

On the 28th of April, I started my journey to South Andaman Island with a Finnair flight from Riga, Latvia to Delhi, India via Helsinki, Finland. I had to stay in Delhi for two days and I planned to use this time for sightseeing. After stepping outside of the airport and discovering the very hot temperatures outdoors (about 42 to 44° C or 107-111° F), I changed my plans and stayed in the hotel instead.

My flight to Andaman left on the evening of May 1st, and arrived at the Port Blair airport the next morning (*Photo A*). The temperature was around 32° C / 90° F and you could also feel the humid sea climate there so it was challenging. A taxi brought me to the "Princess Beach Resort" hotel that was 28 kilometers (18 miles) away from the airport.

This hotel was chosen to be the most suitable for the expedition and a previ-

Photo A. YL2GM waving the flag at the Port Blair airport. (Photos courtesy of YL2GM)

Photo B. The detached conference room that became the VU4W shack.

Photo C. Interior of the DXpedition shack.

*email: <n2oo@comcast.net>
#email: <yl2gm@inbox.lv>

Photo D. The RA6LBS vertical antenna.

Photo E. The Spiderbeam antenna, set up along the fence.

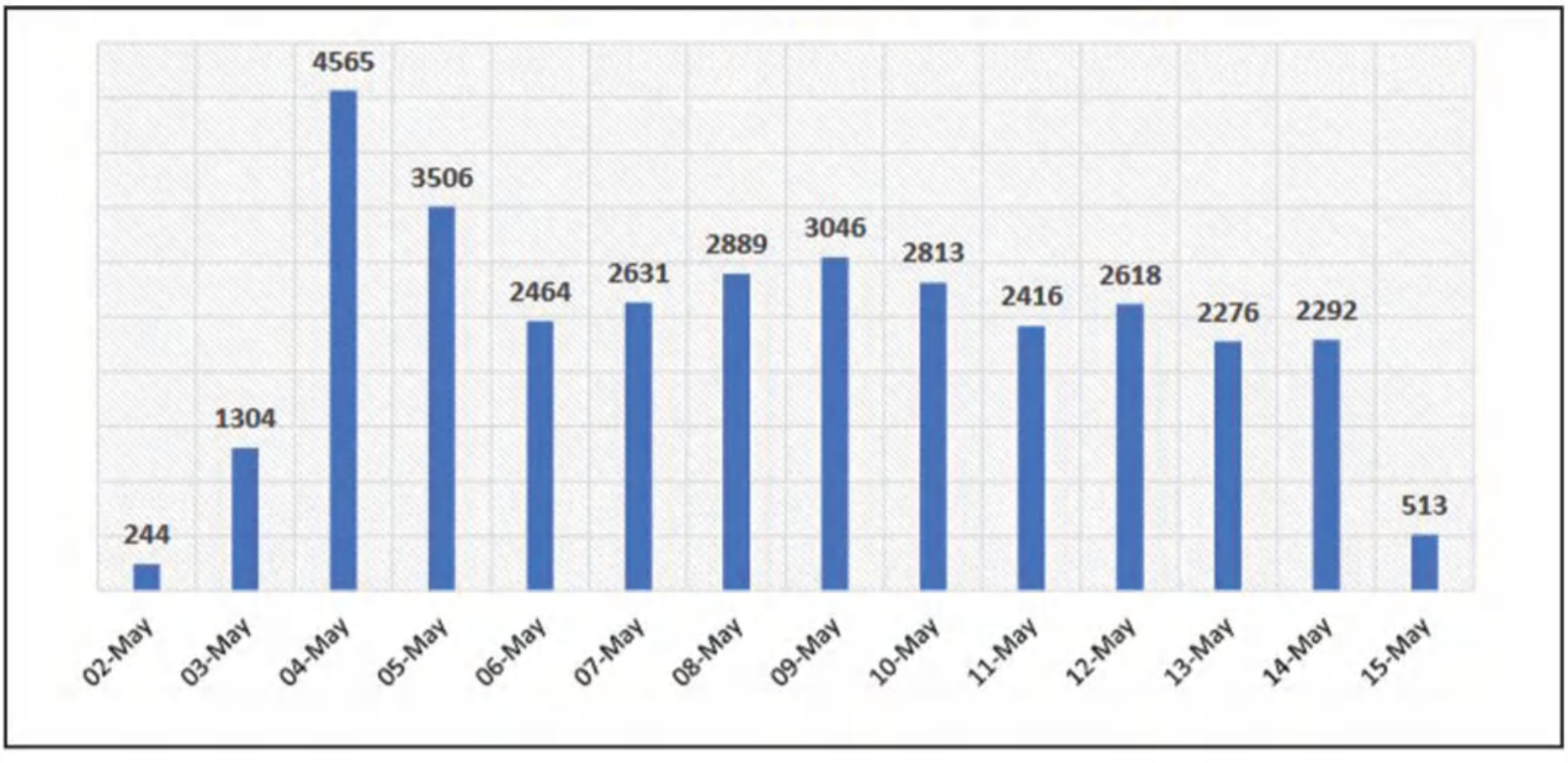


Table 1. Daily breakdown of QSOs for the VU4W DXpedition.

ous VU4G expedition worked from there as well. John, G4IRN, also suggested it for me.

Operation from VU4 is allowed only for amateurs with VU callsigns. In the license, we were three operators, two of whom were Indian. However, my Indian friends were not able to join the DXpedition because of work matters.

The hotel staff was very friendly and welcoming and showed me a room that I declined. After explaining my needs for space for antennas, they proposed for me a conference room (at additional cost) that was located in a separate building next to the yard with palm trees (*Photos B* and *C*). This actually was a good location because the antenna cables could be much shorter than originally planned. Sleeping quarters were in a different room.

Right after settling in, I started setting up the RA6LBS vertical (*Photo D*) but quickly realized that I wouldn't be able to complete it before dark so I left it for the next morning. Instead, I worked on 40- to 10-meter vertical intended for FT8 so I could make first QSOs as midnight arrived and the license for VU4W went into effect.

While unpacking my gear, I found out that screen on my K3 was smashed. This probably happened when the carry-on bag in which it was packed fell

(Continued on page 98)

The WAZ Program

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15 Meter CW

383 ..... WB4DNL

17 Meter CW

138 ..... RV9CX

17 Meter Digital

30 ..... WX2S

20 Meter Digital

59 ..... JG1AID
60 ..... JJ1XHI

30 Meter CW

172 ..... RV9CX

30 Meter Digital

20 ..... DK1FW
21 ..... WX2S

160 Meters

699 ..... YL2BR, 30 Zones
700 ..... W2IRT, 31 Zones
701 ..... LZ3YY, 30 Zones

ALL BAND WAZ

CW

1214 ..... NØXM
1215 ..... UT7KF
1216 ..... RV9CX
1217 ..... W8GEX
1218 ..... YO2MNZ
1219 ..... F8CRS
1220 ..... DJ3CQ

Digital

405 ..... JE3MDQ
406 ..... WX2S
407 ..... WM4W
408 ..... JR3DXJ
409 ..... JF1ENF
410 ..... N1HO
411 ..... IZ4DPV
412 ..... KC5RR
413 ..... SP6DVP

Mixed

10345 ..... WØGN
10346 ..... PT7YV
10347 ..... N1AH
10348 ..... BH3DHE
10349 ..... EC7B
10350 ..... WB9TFF
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10358 ..... N8HO
10359 ..... N1HO
10360 ..... KC5RR
10361 ..... DJ3CQ
10362 ..... DL2TR
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10364 ..... N4QS

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41 ..... DL2GRC

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The WPX Program

CW

4070 ..... OE8MOS
4071 ..... K5VG
4072 ..... DL7AQT
4073 ..... WB8BZK

SSB

4450 ..... OE8MOS
4451 ..... DG2GG
4452 ..... EA3EQS
4453 ..... WB8BZK
4454 ..... 9A5VV
4455 ..... SQ3LHB

Mixed

4518 ..... VK6YO
4519 ..... ZZ4WTT
4520 ..... NR6AM
4521 ..... N9ATF
4522 ..... JJØWAJ
4523 ..... DG2GG
4524 ..... KT4QD
4525 ..... WB8BZK
4526 ..... W8DCS
4527 ..... 9A5VV
4528 ..... W9MDT
4529 ..... 7L3JAR
4530 ..... K7BXQ
4531 ..... W3REP
4532 ..... KB3IAI
4533 ..... W7JKC

Digital

1854 ..... VK6YO
1855 ..... NR6AM
1856 ..... DK4BN
1857 ..... BI1NKM
1858 ..... DG2GG
1859 ..... JA5ICH
1860 ..... AE8FP
1861 ..... WB8BZK
1862 ..... W8DCS
1863 ..... KD9TLI
1864 ..... 9A5VV
1865 ..... W9MDT
1866 ..... VE3UZ
1867 ..... W3REP

CW: 350: EA3EQS, K5VG. **400:** N6DHZ. **450:** VE3FAC. **500:** OE8MOS. **1000:** WB8BZK. **1350:** VE3UZ. **1700:** G4FJA. **2850:** KB1EFS. **2900:** K3LR.

SSB: 400: N5JED. **450:** DG2GG, N6DHZ. **550:** SQ3HLB. **600:** PU4MMZ. **950:** WB8BZK. **1100:** VE3UZ. **1150:** KB8VAO. **1300:** HB9BOI, N6PEQ. **1350:** HB9BOI. **2350:** KB1EFS. **3000:** K3LR.

Mixed: 400: ZZ4WTT, NR6AM. **450:** KIØHA, 7L3JAR, KB3IAI. **500:** VK6YO. **550:** VE3FAC, W7JKC. **650:** JI5USJ. **700:** N9ATF, ZZ4WTT, W3REP. **750:** NA7KR. **800:** DG2GG, 9K2TV. **900:** K5VG. **950:** JE1WBA, KC5CMX. **1000:** OE8MOS, JJØWAJ. **1050:** DF8FT, N6DHZ. **1100:** N5JED. **1150:** VK4ZP. **1200:** JG1JPE, IZ4DPV, VE4MAR. **1600:** N8IK. **1650:** HB9BOI. **1700:** KB8VAO. **1800:** JA7FVA. **1900:** WD8ANZ, WB8BZK. **1950:** PU4MMZ. **2000:** VE3UZ. **2387:** AE4WG. **2400:** EA3EQS. **2650:** G4FKA. **3500:** K3LR. **3900:** KB1EFS.

Digital: 350: VK6YO, NR6AM, DK4BN, KIØHA, W8DCS, W9MDT, K7BXQ, N6DHZ. **400:** ZZ4WTT. **450:** KB3IAI. **500:** DG2GG, JI5USJ. **550:** N6PEQ. **600:** IZ4DPV, JA5ICH. **650:** K5VG, HB9BOI, ZZ4WTT, W3REP. **700:** DF8FT, HB9BOI, NA7KR, VE3UZ. **800:** IZØFYW, 9K2TV. **850:** N5JED. **950:** VE4MAR. **1050:** KB8VAO. **1100:** VK4ZP, K3LR. **1200:** JG1JPE, N8IK. **1500:** WB8BZK. **1700:** G4FKA. **1750:** JA7FVA. **2100:** AE4WG. **2400:** EA3EQS. **3000:** KB1EFS.

160 Meters: OE8MOS, DF8FT, WB8BZK
80 Meters: K5VG, DF8FT, WB8BZK
40 Meters: NR6AM, K5VG, DF8FT, JE1WBA, WB8BZK
20 Meters: N9ATF, K5VG, DF8FT, WB8BZK, W7JKC
17 Meters: DF8FT
15 Meters: JJØWAJ, WB8BZK, 9K2TV, KB8VAO, N6DHZ
12 Meters: ZZ4WTT, JA7FVA, 9K2TV
10 Meters: N9ATF, WB8BZK, ZZ4WTT, KD9TLI, 9K2TV, JF2OHQ
6 Meters: KIØHA

Africa: DF8FT, NS4P, WB8BZK, K3LR
Asia: VK6YO, BI1NKMM, JJØWAJ, DG2GG, DF8FT, N8IK, JA5ICH, WB8BZK, NA7KR, K3LR, VE3UZ, 7L3JAR, KB8VAO
Europe: OE8MOS, VK6YO, ZZ4WTT, DK4BN, N9ATF, JJØWAJ, VE3FAC. DG2GG, PU4MMZ, K5VG, DL7AQT, DF8FT, WB8BZK, KIØHA, VE3UZ, SQ3HLB, W3REP
Oceania: VK6YO, JJØWAJ, DF9FT, JA5ICH, WB8BZK, G4FKA, KB1EFS, JI5USJ
North America: NR6AM, N9ATF, K5VG, JE1WBA, AE8FP. KT4QD, WB8BZK, ZZ4WTT, W8DCS, KD9TLI, W9MDT, VE3UZ, K7BXQ, WB3REP, KB3IAI, W7JKC
South America: PU4MMZ, WB8BZK

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. and the ARRL Logbook of The World (LoTW).

***Please Note:** The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

CQ CLASSIC

The Day the World Discovered Andaman

With the focus of this month's DX column on last year's VU4W DXpedition to the Andaman Islands off the coast of India, we thought it would be appropriate to look back to the first relatively recent DXpedition there, in late 2004, which turned on a dime to disaster response after the islands were ravaged by an earthquake and tsunami, and the only communications off the islands were via the ham radio stations that were reluctantly allowed by the Indian government to set up and operate there. Our first-hand report, by Bharati Prasad, VU2RBI/VU4RBI, appeared in our April 2005 issue.

Talk about being in the right place at the right time. . . . After a 17-year effort to get permission to operate from India's Andaman and Nicobar Islands, Bharathi Prasad, VU2RBI, and her team of hams were set up and on the air when December's massive earthquake and tsunami struck. Their DXpedition immediately turned into a three-week-long emergency communications mission. Here is VU2RBI's story. . . .

From DXpedition to Disaster Aid:
Ham Radio on the Andaman & Nicobar Islands

BY BHARATHI PRASAD, VU2RBI/VU4RBI

How do you explain a DXpedition to someone who is not familiar with amateur radio? That was one of our early challenges in planning last year's trip to operate from the Andaman & Nicobar Islands, a chain of islands in the Bay of Bengal that are part of India but actually closer to Indonesia and Burma than to the Indian mainland. Access to these islands is restricted for a variety of reasons.

When we approached government officials seeking permission to operate amateur radio there, we explained that a DXpedition is a radio sport activity for ham radio operators worldwide that involve hams traveling to a remote location with the aim to contact more distant countries. One favorite type of expedition is to various islands around the world. These expeditions generally feature continuous operations, which help in studying propagation conditions and conducting research work in wireless activity with state-of-the-art equipment privately owned by hams. The VU4RBI and VU4NRO trip to the Andaman

The NIAR DXpedition group (from left to right): R. Sarath Babu, VU3RSB; D. S. Varun Sastry, VU3DVS, the author's 15-year-old son; the author, VU2RBI; her husband, D. N. Prasad, VU2DBP; and S. Ram Mohan, VU2MYH. (Photos courtesy of the author)

VU2DBP gets help assembling a Yagi antenna from two members of the Indian Army Signals Unit, Mr. Mishra (left) and Mr. Sridharan (right).

VU3RSB works the pile-ups as author VU2RBI looks on. Five operators made approximately 35,000 QSOs before the earthquake and tsunami struck.

Islands sought to prove the capabilities of Indian hams to reach out to millions of people across the globe by establishing direct radio contact with as many people as possible, which in turn promotes international understanding and tourism.

A Team of Five

The Department of Telecommunications in the Indian Ministry of Information and Technology permitted a team of five amateur radio operators under the leadership of the undersigned, Mrs. D. Bharathi Prasad, VU2RBI, to proceed to Andaman & Nicobar Islands on a DXpedition from 3 to 31 December 2004 with the special callsigns VU4RBI and VU4NRO. The other hams in the group included D. N. Prasad, VU2DBP; S. Ram Mohan, VU2MYH; R. Sarath Babu, VU3RSB; and D. S. Varun Sastry, VU3DVS, age 15 years and the youngest of all.

The expedition was sponsored by the National Institute of Amateur Radio (NIAR)—a non-governmental organization with its headquarters in Hyderabad, India, which promotes amateur radio communication in the country and has a track record of more than 25 years in disaster management—the Indian government's Ministry of Information Technology, and hundreds of individual hams around the globe. In addition, Mr. Charles Harpole, K4VUD, had visited me and encouraged me for years to get a VU4 license and also gave me a beam antenna for my home station. That antenna went instead to Andaman and gave us many good contacts.

The DXpedition was formally inaugurated by the Governor of Andhra Pradesh (a province of India) on 25 November 2004. Team members met at the headquarters of NIAR before proceeding to Port Blair, Andaman's capital city, to select the equipment needed for the communications from NIAR's inventory and arrange for packing of the same for safe transport to Port Blair. The equipment consisted of high-frequency transceivers; several antennas, including Yagis, verticals, and dipoles; masts; amplifiers, etc. We also decided on the frequencies and modes of operation for communication (see Table I).

To the Islands

Three members, including myself, proceeded by air and reached Port Blair on 1 December 2004. The rest of the team members and other technical assistants from NIAR—and the radios—came by ship from Chennai on 2 December. On reaching Port Blair, we met the local authorities—including the Chief Secretary of the Government of Andaman & Nicobar, the Secretary of General Administration, and other officials, including the Principal of the Government Polytechnic College—and explained to them about the expedition. They extended their complete support to the team.

The Chief Secretary desired that a station should be established in the Science Centre, where students would have opportunity to learn about amateur radio communication, in addition to a station at the Polytechnic College. If possible, he also wanted us to go to some other islands as well. One station was erected in a dorm room at the Polytechnic College, the second at Hotel Sinclair's, where some members were accommodated, and the third in the Science Centre. All three stations were separated by at least two miles, resulting in little inter-station interference on most bands.

In addition to the support extended by the local administration, the officers of the India Army Signals Unit of Port Blair also extended their cooperation to the team by providing the technical manpower to help erect the antennas and also for some local logistics. Erection of Yagi and dipole antennas was very interesting. It took almost two days to assemble and erect the seven-element triband Yagi. Dipole antenna erection was comparatively easier. Many of the dipoles were of the fan configuration, giving multi-band performance.

We also had some visitors during the course of the DXpedition, all arriving

Mode: Band	PSK (Computer modem)	CW (Morse code)	SSB (Phone)
80 m	—	3.510	3.795
40 m	7.030	7.010	7.060
30 m	—	10.060	—
20 m	14.071	14.010	14.190/14.285
17 m	—	—	18.130/18.160
15 m	21.071	21.010	21.285
12 m	—	24.070	24.930/24.960
10 m	—	—	28.530/28.560
2 m	—	—	145.500 (local contacts)

Table I- The frequencies and modes above were operated by the team members, per the Indian rules and regulations.

after 15 December. Mr. Suri, VU2MY, the chairman of NIAR, stayed until the 25th; Mr. Charles Harpole, K4VUD, joined us until the 27th; and Mr. Henryk Kotowski, SM0JHF, stayed until the 25th. They all inspired us with their experiences and helped with some ham demonstrations for local people at the Science Centre in Port Blair. Also, the SteppIR antennas shipped by the German DX Foundation arrived in Port Blair around 15 December and were useful, especially for the WARC bands.

On the Air

Propagation on 7 MHz was open from about 3 AM to 8 AM (local time) for distant contacts, and from 9 AM onward 14, 18, 21, 24, and 28 MHz were active for SSB/CW. The propagation was observed starting in the east, covering all the eastern countries including Japan, and moving back to the west, covering European countries as the day went on. After 6 PM North American stations were prominent on these frequencies.

Different types of antennas—i.e., Yagi, SteppIR, dipole, vertical, and mobile antennas—were used for communication purposes at different points of time. It was possible to contact long-distance stations even with a simple dipole antenna, perhaps due to the nearness to the seacoast.

It was a pleasure to talk to hundreds and hundreds of radio amateurs around the globe and to control the pile-ups each

Putting VU4 On the Air: The Story Behind the Story

By Charles Harpole, K4VUD

"I've waited 57 years for VU4," a ham declared in his letter to me, which included a nice donation to the DXpedition. Others exclaimed, "This is my last one for working 'em all." "My grandson asks me on every visit, 'Did you get your DX stuff, Grandpa?' and now maybe I can tell him, 'yes!'"

Scores of letters from all over the globe came to me with these kinds of stories, all including anything from a single dollar bill to nice, fat checks. Letters and e-mails pleading with the Indian authorities to grant the VU4 permit also poured in, thankfully. The warmth and faith of all these hams, sending money and support with no real proof of an operation yet, made me know that this ham radio endeavor is much more than a hobby.

VU4 DXpedition leader Bharathi Prasad, VU2RBI/VU4RBI, operates a makeshift outdoor station soon after the earthquake and tsunami. While she was soon able to return to her main station inside the hotel using generator power and a Yagi antenna, everyone there slept outside for several days due to cracks in the building and continuing tremors.

Their faith was well-founded: VU4 came up as promised with nearly a month of delightful stalking of VU4RBI and VU4NRO. Over 35,000 QSOs got into the logs before the tragic earthquake and tsunami struck.

For over four years I had pleaded with VU2RBI, Bharathi of New Delhi, to seek VU4 operating permission. After all, she had led the 1987 Andaman DXpedition and knew Sonia Gandhi, VU2SON, a leader of a major political party in India. When I met Bharathi in her family's modest apartment during my first visit, I saw a remarkable woman. I saw not just the gentle mother, the careful homemaker, and the supportive wife. I saw an inspired, resourceful, determined ham radio operator. I saw that her persistence and patience were equaled by her profound joy of life. I knew this was the person to get the permit, and get it she did! During the DXpedition phase of the VU4 operations, Bharathi led with quiet strength, spending impossible hours awake and on the air.

Getting the Job Done

Several times I saw Bharathi fall asleep at the mic, but every time she roused, drank some tea, and forged on, piling up the filled log books. The other team members soon learned what it is to "be the DX" and regularized their operations. This unique DXpedition, lacking as it did any of the usual "crack operators," nevertheless showed hamdom they could do the job. There was no teeth-clenched operation; these folks were having great fun. Of course, they and I know there is still strong demand for a VU4 contact, especially on the "other" bands and modes, but the team demonstrated they could activate quickly and then be effective. What other rare DXpedition was put together in about two weeks? What other rare one was launched with a bare minimum of money and just the gear on hand? What other was totally a "developing nation's" effort? The operators met their goal of offering "an all-time new one" to as many callers as possible.

I know many of you reading these words enjoyed the chase, and the pile-ups were colossal. However, all hams should be congratulated in that once the DXpedition turned to emergency communications, not one station called to try to sneak in a VU4 contact. That fact is remarkable in itself and should make us all proud of this hobby that is also a vital public service.

Now every contact wants that VU4 QSL card, of course. The National Institute of Amateur Radio in Hyderabad is the exclusive QSL address. See the NIAR website at <http://www.niar.org/qsl.html> for all needed data.

In closing, I must say how much fun I had watching this great operation unfold. How often does one get to go to a paradise island, help a super DXpedition, pal around with some wonderful ham friends, survive a 9.0 earthquake, dodge a killer tsunami, relay emergency traffic, and come back to tell about it—and have eager listeners? This is ham radio!

P.S.: Please help me spread the idea that "HAM" stands for "Helping All Mankind." That puts the emphasis where it really rests—the ham as a helper, a "first responder," a person who can get messages through when all else has failed. The VU4 total effort did just that and gave us renewed pride in our great "HAM" endeavor!

Charles Harpole has operated from many locations in southern Asia and holds calls from India (VU3CHE), Thailand (HS0ZCW). Nepal (9N7UD), and Bhutan (A52UD).

The author's son, 15-year-old D. S. Varun Sastry, VU3DVS, was the youngest member of the DXpedition team.

day of the expedition. Sometimes it was difficult to catch up with low-power operators, as high-power operators tried to "hijack" the situation. However, I took every care to exchange reports with such low-power operators, including mobile operators. We communicated mostly on SSB, CW, and PSK, as well as having a few test contacts on SSTV (slow-scan television) and RTTY (radioteletype).

I operated the radio for the DXpedition from the early hours of 3 December to the early hours of 26 December with only three to four hours of sleep a day and made about 23,000 contacts individually with almost all the countries. Altogether, the team made a total of about 35,000 contacts before the earthquake and the associated tsunami struck our location in the wee hours of 26 December, which was terrible.

Disaster Strikes

In the early hours of 26 December, while the other guests in the hotel were fast asleep, I was continuing with my DXing with the usual spirit and was talking to an Indonesian ham. All of a sudden, I felt tremors at around 6:29 AM. I realized it to be an earthquake and shouted "tremors" into the microphone, and then rushed out of the room, raising the alarm to alert the others. All the occupants of the rooms rushed out and gathered on the lawn of the hotel building. I was concerned about Charles, K4VUD, who had a room nearby but who did not immediately appear outside the hotel. I discovered that he rode out the tremors in his room and then came out to find everyone on the hotel lawn.

Immediately after the tremors, my team members rushed from the other shacks to my hotel and joined me, and by God's grace, we all were safe. After about half an hour, I went back to the hotel radio shack and checked on the antenna on the rooftop, which had been disturbed by the tremors, and quickly re-erected it. There was no electric power, so the hotel management put on the generator. Immediately I went on the air and contacted hams from Thailand (HS0ZAA, Mr. John) and the mainland of India (VU2UU, Mr. Shanker from Chennai, and VU2MYL, Mrs. Rama from Hyderabad), who confirmed the tremors in their locations as well. I could guess the magnitude of the damage due to the earthquake and decided to suspend the DXpedition operations and started emergency communication with the Indian mainland and other people from then on, first from a table on the lawn with a mobile whip, and later (as the aftershocks seemed mild) back in my hotel room with the Yagi to help.

The telephone lines went out of order, and within a few hours we came to know the extent of damage in Port Blair through local people. While the news of death and devastation caused by the tsunami/earthquake in other parts of India was quickly transmitted around the world, the situation in the Andaman & Nicobar Islands was not known. I went on transmitting information to anyone who could hear my signals. Simultaneously, I sent my team members to the office of the Chief Secretary of the Government of Andaman & Nicobar Islands to express our willingness to extend our support for establishing emergency communication to help the administration.

The Deputy Commissioner (DC) requested for our services on 27 December, and we immediately established a radio station in the control room of the DC's office, operated by Sara, VU3RSB, and me. At the additional request of the DC, two of our team members (VU2MYH and VU2DVO) proceeded to Car Nicobar Island in a military aircraft on the morning of 28 December and established communication between Port Blair and Nicobar.

Ham Radio—The Islands' Only Link

We were to handle hundreds and hundreds of messages each day from the mainland and the affected areas due to the collapsed communication infrastructure. Ours was the only link for thousands of Indians and people from other countries who were worried about their friends and families in the islands. Also, our station in the control room became the center of messages between Port Blair and Nicobar Island. Survivors in Car Nicobar were communicating with their relatives in Port Blair through our stations. Other VU hams located in the mainland helped us in relaying the messages whenever propagation prevented direct contact between our stations in the islands. Amateur radio stations in Thailand (HSØZAA, HSØZDY, HSØZCW, and others) and elsewhere also did relays from time to time.

When some of the telephone lines were restored on Tuesday, 28 December, the information received via radio about the survivors from Car Nicobar was conveyed to their anxious relatives on the mainland. We also helped about 15 foreign tourists, including several from the USA, to send news to their families. At the request of the DC, one of our newly arrived team members (Jose, VU2JOS) was sent to Hudbay Island along with other government officials for relief activity. The common man was totally happy in utilizing our service and the magnitude of their satisfaction on receiving the information about the welfare of their kith and kin is beyond one's imagination.

Sleeping Outside

We did not dare sleep inside the hotel rooms during the nighttime and instead slept in the open air on cots on the lawns

Station Callsign	Location
VU2LIC	DC's office, Port Blair
VU2LFA	APWD office, Port Blair
VU3RSB	Nehru Yuvak Kendra, Port Blair
VU2MYH	Port Office, Nicobar Islands
VU2DVU	Andaman
VU2DSV	DC's office, Nicobar Islands
VU2MCK	Andaman
VU2JOS	Hudbay Islands
VU2CPV & others	Cambel Bay Islands
VU3VCC	Naval Base, Cambel Bay

Many other stations outside the affected areas assisted the above stations on the islands, including: VU2RBI, after arrival in New Delhi; VU2HFR in Mumbai. Kolkata, VU2PEB in Kerala, and VU2HIT in Mumbai.

Table II- The above stations operated in Andaman & Nicobar Islands as of 7 January 2005.

After the earthquake and tsunami struck, the DXpedition turned into an emergency communications operation. Here, VU4RBI is on the air soon afterward from the lawn of her hotel, operating with a whip antenna and power from batteries provided by the Indian Army Signals Unit.

The emergency communications operation soon moved to the office of the Deputy Commissioner of the Andaman & Nicobar Islands government. Pictured here, from left, are the author, operating as VU4RBI; Mr. Brahma, a senior official from the Indian Ministry of Home Affairs sent from New Delhi to Port Blair on a special relief visit; and Mr. Mishra of the Army Signals Unit.

of the hotel. Tremors continued all during the six days of my stay. Charles, K4VUD, observed our handling of emergency traffic on 26 December and left for Thailand on the 27th to be with his wife and her family; he did relay work from there.

Members of the team had gone to points in Port Blair and photographed the still-swirling waters and sea wall damage. Fortunately, Port Blair is on the north side of the island, and with the tsunami having come from the south, it sustained relatively little damage, with only four lives lost there.

I continued emergency communication till the forenoon of 1 January 2005, the day of my return to Delhi. However, my team members stayed on in Port Blair, Nicobar, and Hudbay Islands, and a few more VUs from NIAR joined them on 2 January, proceeding to other islands which had no other means of communication (see Table II). All visiting hams were back home on the mainland by mid-January.

Helping All Mankind

Although we went to Andaman & Nicobar Islands for a DXpedition, the circumstances led us to conduct emergency communication, which was a sheer coincidence. Representatives of different media agencies—including the Associated Press, Washington Post, Zee News, CNN, MSNBC, and many others—witnessed our service to society through amateur radio in an hour of need and acknowledged the same. I am thankful to them for spreading amongt the public the awareness of amateur radio emergency communication. The potential of amateur radio communication in bringing people together has thus been established once again. Truly, “HAM” stands for “Helping All Mankind."

I am proud of my team members, who extended all of their support for the operations during the period of my stay in Port Blair. However, I left Port Blair with a heavy heart for the many departed souls.

I am thankful to the government of India for permitting me to conduct the DXpedition, particularly the authorities of the Ministry of Information and Technology, and to the National Institute of Amateur Radio for sponsoring the DXpedition. I am also thankful to the Indian Army Signals Unit for its help with technicians and batteries, to K4VUD and the Disaster Preparedness and Emergency Response Association (DERA, <http://www.disasters.org>) for collecting donations, and especially to the many, many fellow hams worldwide who made the DXpedition successful through their individual efforts and to those who helped in conducting emergency traffic.

what’s new

MFJ-419 CW-Elmer

MFJ has introduced the MFJ-419 CW-Elmer, which is a multi-function training tool for learning International Morse Code. It is both a receiving and sending trainer to help you learn the code by ear and teach you how to send clean code from one little box.

In the Send mode, the MFJ-419 will act like a code practice oscillator allowing you to practice sending Morse code and will display the characters both in code and in text. The Analyze setting will display your speed and timing to help you to send better code.

The Receive mode of the MFJ-419 will send code to help you to learn the characters. It can send in normal spacing or two Farnsworth speed modes, sending the characters faster but spacing to the programmed speed (*This is the method of learning code recommended by most instructors – ed*). There is also a USB Text mode in which you can use a terminal program to send text either from a keyboard or a short text file to the MFJ-419 CW-Elmer so you can listen to real text.

There is also an Exercise mode that will help you with training to make correct length dits and dahs, as well as the proper spacing between the dits and dahs and between characters and words.

The MFJ-419 CW-Elmer will run on either USB power or battery power. The battery will take precedence over the USB source. When battery powered, the CW-Elmer will operate until the battery runs down to about 6 volts which is well below the point at which a 9-volt battery is normally considered to be dead.

The MFJ-419 is set up to emulate an Arduino Nano so the firmware can be updated or modified the same way as an Arduino Nano and programmed through the USB port using the standard Arduino IDE.

The hardware uses an Atmel ATmega328P processor and an FTDI FT232RL USB IC. A standard LCD display is used in 4-bit parallel mode.

The MFJ-419 will be available in June and has a suggested retail price of $159.95. For more information, visit <https://tinyurl.com/5cfs33cb>.

2023 WPX Crossword Puzzle

BY ANTHONY LUSCRE,* K8ZT

You probably have seen it before … you write down the callsign of a station you just worked and then do a double-take when you realize it looks like a familiar word such as K1LT, MØOSE, SK1RT, etc. This puzzle takes this a step farther. In this puzzle, each word is actually an amateur radio callsign in which most numbers represent letters according to either physical resemblance to a letter (1 = I, 5 = S and Ø = O) or a common "cut number" (e.g., 9 = N) used by CW contesters.

Clues contain hints to both the word and the country that might issue the callsign. Some are genuine callsigns, and some are fake, but none are meant as comments on the possible current, past, or future holders of the callsign. Hopefully, guessing the countries of these prefixes will be good practice for any of the three CQ WPX Contests <www.cqwpxrtty.com> and <www.cqwpx.com> this year: RTTY February 11-12th, SSB: March 25-26th and CW: May 27-28th, 2023.

I have been busy over the past few years doing more than 275 online presentations for clubs around the world. One of the presentations is "Choosing Your Ideal Callsign." You can view the slideshow at <tiny.cc/idealcall> and watch a video of the presentation on YouTube at <tiny.cc/icvideo>. While you are at it, you may also want to search for Mike Ritz, W7VO's, "The Storied History of the Ham Radio Callsign." Also, if your club would like a free, live, online presentation, take a look at my list <tiny.cc/k8zt-p>.

This puzzle is also available online if you don't want to write on the page or if you're reading the digital edition. You may find it at <https://tinyurl.com/kp4vwzdr> or by using your mobile device to scan the QR code on the next page.

* *Email: <k8zt73@gmail.com>*

Across

2. Came ashore in Norway
3. Hidden as with clothes or fog in Maritimes
8. Opposite of concave in Cuba
9. One of the reindeer in Germany
10. Drives in England
12. Covers a canvas with pigment in the Netherlands
14. Put a worm on a hook in China
16. It's way over there in Romania
20. _____ kleine nachtmusik, a little night music in Cork
21. Not as hard of a task in Alicante
22. Spice used in Christmas biscuits (cookies) in Northern Ireland
26. We landed on the _____ in Novosibirsk
27. To move or act swiftly; hurry in Budapest
30. Likely to have an unfortunate and inescapable outcome in Berlin
32. Relating to the nose in Texas
35. A very dark word used for piano keys in Spain
36. The person overseeing deposits and loans in China
37. Aged corn liquor in New England
38. Cut into very small pieces in Northern Ireland

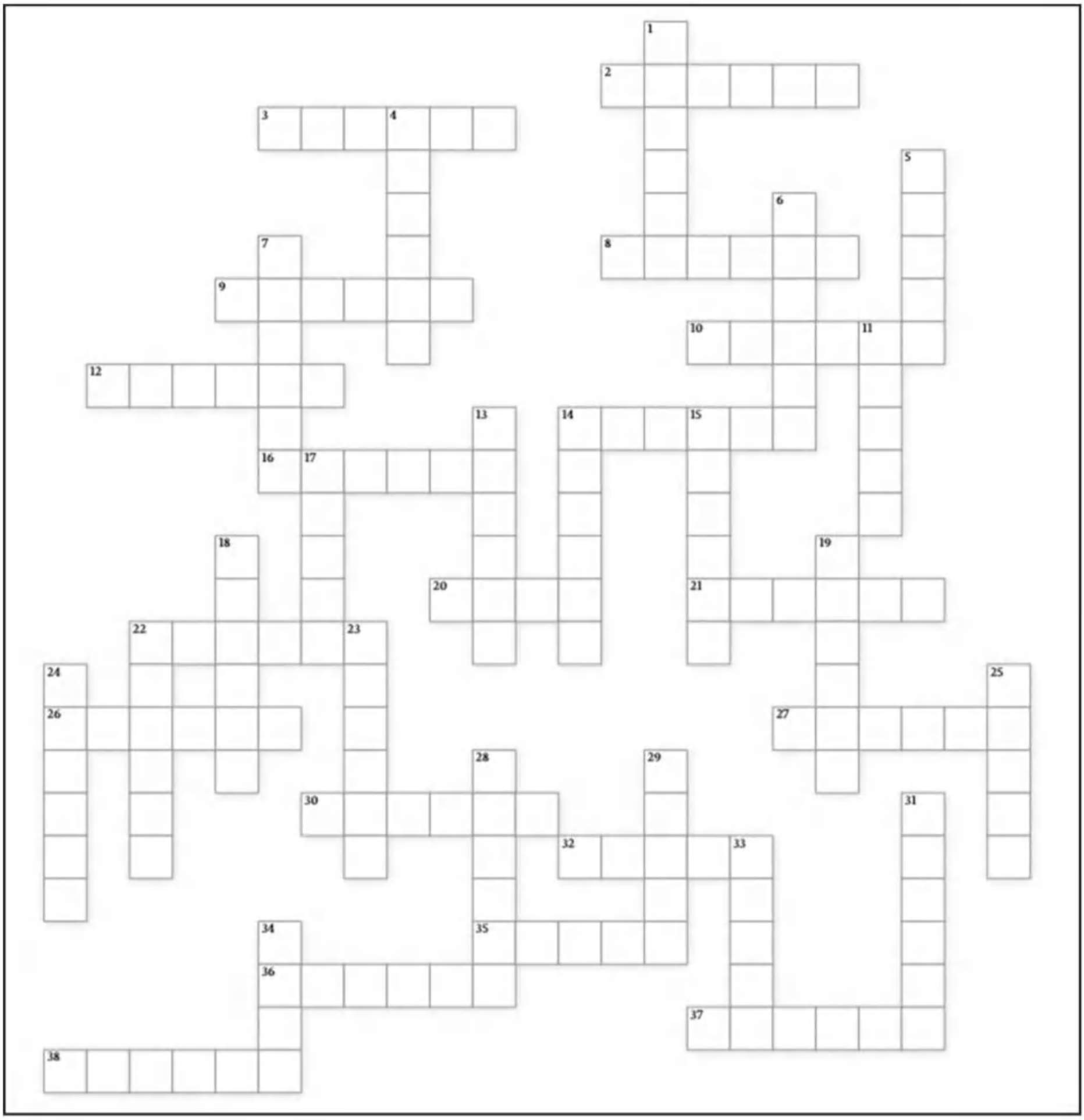
Down

1. The way in which someone's locks are cut and arranged in Hungary
4. It went on for a long time in Oslo
5. Leaves out facts in Slovak Republic
6. Prevented lint and hot air entering the room from clothes dry in New Brunswick
7. Danish, cookies and cake in the Netherlands
11. With a grating voice in Nenetsky
13. The root, start, or birth of something in Belgium
14. Enjoyed being in the sun of China
15. Threw in the trash in Martinique
17. Unstable, poisonous allotrope of oxygen in Denmark

18. A group of Italian grandmas visiting Zagreb
19. Lose your keys in Northern Ireland
22. One of the warrant officers aboard a ship in the Channel Islands
23. Happening, done, or chosen by chance rather than a plan or pattern in Omsk
24. Fried Chicken is _____ in Azores
25. Bulbous allium in Belgium
28. In the middle, but at the bottom of the globe
29. Foggy air in Belfast
31. Lumpy knees in the Rockies
33. Midday meal in Argentina
34. Said at an auction in Piemonte

Scan QR code for digital version

(Answer Key on page 82)



WB9YBM continues his series on getting the most from your scanner (and yes, there's still plenty to listen to!), this time focusing on keeping the many frequencies you may be monitoring well-organized.

Scanner Frequency Organization

BY KLAUS SPIES,* WB9YBM

When we first get a new scanner, our enthusiasm dictates we throw in a bunch of frequencies right away so we can start playing with our new toy as soon as possible. When the initial excitement wears off, we realize a bit of organization is called for. Luckily, most scanners today have their memory channels organized in banks. For example, a 100-channel scanner may have 10 banks of 10 channels each. This makes organizing easier without us having to do much of anything beyond collecting similar frequencies (like local airports, places we travel to on vacation, and so on) together onto one list.

Although there are a lot of logging programs available on the internet, I've found it easier (and much less expensive) to create logs in the spreadsheet program already residing

* Email: <wb9ybm1@yahoo.com>

Figure 1. Example of tabs of individual spreadsheets in this one file

	A	B	C	D	E	F	G
1	**status**	**frequency**	**location**	**alleged user**	**actual user**	**rating**	**notes**
2	active	123.0000	IL, Schaumburg	airport--tower	[same]	1B	
3	active	154.3400	IL, Skokie	FD, Skokie	other FD	1B	very active; in the clear
4	active	450.4870	IL., Chicago	TV channel 2	ch. 2 news	1B	TV audio feed at times
5	active	450.5500	IL., Chicago	TV channel 5	ch. 5 news	1B	TV audio feed at times
6	active	154.8400	IL., Oak Park	pd	Oak Park PD	1B	still in the clear 7/20
7	active	119.9000	IL., Wheeling	airport, Chicago Municipal	[same]	1B	
8	active	125.0000	IL., Wheeling	airport, Chicago Municipal	[same]	1B	short range
9	active	121.7000	Wheeling, IL	Chicago Municiple Airport	ground	1B	heard only local to airport
10	data	453.0000	IL., Des Plaines	Oakton Community College		2A	during school year only?
11	data	463.3625	IL., Park Ridge	Lutheran Gen. Hosp.	[unknown]	2A	
12	data	463.9000	IL., Park Ridge	Lutheran Gen. Hosp. maint.	[unknown]	2A	
13	data	464.4875	IL., Park Ridge	Lutheran Gen. Hosp.	[unknown]	2A	
14	inactive	858.3625	IL	American Taxi		0	CAD?
15	inactive	155.7450	IL, D.P.	PD	DP PD	1B	encrypted on...? 7/20
16	inactive	854.8625	IL., Chicago	Chicago Flash cab		0	CAD?
17	inactive	155.7450	IL., Des Plaines	PD, D'Plaines	[same]	1B	encrypted on...? 7/20
18	inactive	157.5600	IL., Des Plaines	community cab		0	CAD?
19	inactive	470.7625	IL., Glenview	PD	[same]	1B	encrypted on...? 7/20

Figure 2. Example of data in the "freq log" table

rating	definition
0	nothing heard. Frequency may be low use, secondary use, or unused.
1A	signals heard. User not identified. (no ID heard, too weak to ID, etc.)
1B	signals heard. User identified (as either spec'd user or other).
1C	signals heard, but only one side of the conversation (simplex, repeater input, etc.)
2A	unuseable signals--non-voice (i.e. data, dead carrier, etc.)
2B	unuseable signals due to interferance (on- or adjacent channel, etc.)

Figure 3. Example of frequency rating system

on my computer. This allows for customization of a variety of different types of logs into one file, each spreadsheet (independent of each other) of a type customized for a certain aspect of the sorting I'm trying to do. By creating one file with different tabs, we have several different files, as shown in *Figure 1*. In the example shown, the tab named "freq log" is a spreadsheet that I use as the "dumping ground" for all of the frequencies I have, or want to check. I garnered these frequencies from external references like the internet, notes from friends, band searches, etc. along with initial notes of the alleged service, notes of the actual service I've heard, location, and rating (discussed more in the next paragraph).

	date: 27 July 2014		bank 1	local area		date: 27 July 2014		bank 2	local area
channel	frequency	use claimed	use actual	notes	channel	frequency	use claimed	use actual	notes
1	35.1800	Niles Cab	same		21	450.1120	WWBZ		
2	470.7125	misc PD	NORCOM	local area	22	450.3500	TV ch 2	news feed	& stn audio
3	154.4450	misc FD			23	450.4870	TV ch 2	news feed	& stn audio
4	470.4875	PD, Park R.			24	450.5500	TV ch 5	news feed	& stn audio
5	470.7825	PD, Skokie			25	455.5120	TV ch 7	news feed	& stn audio
6	470.7625	PD, G'View			26	464.6750	LGH		
7	155.7450	PD, D.P.			27	464.8750	LGH		
8	154.3400	FD, Skokie			28	464.4875	LGH		
9	467.7625	Home Depot			29	463.3625	LGH		
10	467.8375	Home Depot			30	463.9000	LGH		
11	467.8500	Home Depot			31	463.9000	LGH		
12	461.7125	JC Penny			32	463.8500	LGH		
13	466.9625	JC Penny			33	163.2500	Holy Fam.		
14	154.8400	PD?			34	462.0750	OCC		467.075 pr?
15	157.5600	Comm. Cab			35	463.3075	OCC		
16	858.3625	Amer. Taxi			36	464.7750	OCC		469.775 pr?
17	119.9000	PWK twr			37	453.0000	OCC		
18	121.7000	PWK gnd			38	453.0500	OCC		458.05 pr?
19	854.8625	Chi Flash			39	468.3875	OCC		
20					40				

Figure 4. Local area frequency banks

	date: 27 July 2014		bank 5	multi area		date: 27 July 2014		bank 6	multi area
channel	frequency	use claimed	use actual	notes	channel	frequency	use claimed	use actual	notes
81	462.5500	GMRS	2ndary FRS	RPTR	101	151.6250	red dot		simplex
82	462.5750	GMRS	2ndary FRS	RPTR	102	151.9550	purple dot		simplex
83	462.6000	GMRS	2ndary FRS	RPTR	103	151.7000	unnamed		simplex
84	462.6250	GMRS	2ndary FRS	RPTR	104	151.7600	unnamed		simplex
85	462.6500	GMRS	2ndary FRS	RPTR	105	464.5000	brown dot		simplex
86	462.6750	GMRS	2ndary FRS	RPTR	106	464.5500	yellow dot		simplex
87	462.7000	GMRS	2ndary FRS	RPTR	107	467.8500	silver star		simplex
88	462.7250	GMRS	2ndary FRS	RPTR	108	467.8750	gold star		simplex
89	462.5625	GMRS	2ndary FRS	simplex	109	467.9000	red star		simplex
90	462.5875	GMRS	2ndary FRS	simplex	110	467.9250	blue star		simplex
91	462.6125	GMRS	2ndary FRS	simplex	111	467.7625	J		simplex
92	462.6375	GMRS	2ndary FRS	simplex	112	467.8125	K		simplex
93	462.6625	GMRS	2ndary FRS	simplex	113	467.5625	FRS		simplex
94	462.6875	GMRS	2ndary FRS	simplex	114	467.5875	FRS		simplex
95	462.7125	GMRS	2ndary FRS	simplex	115	467.6125	FRS		simplex
96	151.8200	MURS		simplex	116	467.6375	FRS		simplex
97	151.8800	MURS		simplex	117	467.6625	FRS		simplex
98	151.9400	MURS		simplex	118	467.6875	FRS		simplex
99	154.5700	MURS	blue dot	simplex	119	467.7125	FRS		simplex
100	154.6000	MURS	green dot	simplex	120	146.5200	ham call		simplex

Figure 5. "Generic" frequencies (i.e., GMRS, FRS) used in multiple areas.

I can then sort by whatever topic I choose: For example, if I know I'm going to a certain location on vacation, I can filter by that column and pre-program in a bank of frequencies to check out when I get there. Alternatively, I can sort by nearby locations & service type if I want to do some scanning from home (excerpt shown in *Figure 2*).

When coming across information from other sources — or finding an as-yet undetermined signal on a band segment scan — I'll file these frequencies in the "freq log" spreadsheet, and then I'll enter a few frequencies to monitor the activity and try to figure out if the specified user is actually the entity using it, or whatever else might be going on. So that I don't have to spend a lot of time writing out notes by longhand, I developed a rating system that I'll enter into a column next to the frequency, as shown in *Figure 3*.

The "Band Plans by Frequency" tab in the spreadsheet is optional; I use it primarily as a reference source so that I can focus on the frequencies of the service I'm in the mood to listen to. Optionally, it can provide insights to who might be using a frequency that I'm trying to identify.

The "abbreviation" spreadsheet serves as a dual-purpose reference: It lists abbreviations provided in external reference sources that might not be obvious as to their definition (especially easy-to-forget abbreviations because they don't get used often), as well as reminding me of abbreviations I developed for my own shorthand use.

The final spreadsheet tab (*Figures 4-6*) is for keeping track of what gets programmed into each bank of the actual scanner. These lists don't need as many notes as a general-purpose list, since by the time we get around to programming our scanner we already know what we want to listen to. Therefore, the information listed here is primarily a reminder of what got programmed where. This list is tailored for a 200-channel scanner with 10 banks of 20 channels each but can easily be modified for whatever your scanner is capable of. The most important part of these lists is bank and channel numbers (so you know which to turn on at different locations or for different services), and the last time it was updated (to make sure you're operating from the most current reference). The wider black lines between the bank listings are to make it easier to cut these lists apart with scissors when printed out. This way, I have a small pamphlet-type arrangement (stapled in the top left corner) instead of harder-to-store 8- x 10-inch sheets. This pamphlet can be loosely attached to the scanner's belt clip or looped around the antenna with a tie-wrap (feeding it through a hole in the paper made by a hole punch at a convenient corner — typically next to the staple).

The frequency banks not shown in the examples are empty on my scanner — they're set aside for future expansion of my listening interests and/or for frequencies I enter only temporarily while I'm evaluating their use.

Scanning Challenges

One challenge being faced by scanner enthusiasts is a decreasing number of frequencies we can find to scan. This started when cell phones became affordable, and has been made worse with the shift to encrypted communication by many police departments and limousine & taxi cabs going to CAD (Computer Aided Dispatch). Even modern cordless phones have gone encrypted (and have gotten shorter in their range when they went from 49 MHz to 900 MHz). At least aeronautical and ham services are still transmitting in the clear. An additional note on CAD: Police departments have been using it for many years before their radio channels went encrypted, leading to the complaint by many scanner enthusiasts that the really "juicy" traffic was never heard on the radio.

	date: 27 July 2014		bank 9	WI. Dells		date: 27 July 2014		bank 10	Milwaukee
channel	frequency	use claimed	use actual	notes	channel	frequency	use claimed	use actual	notes
161	155.5800	PD		Dells	181	151.0250			
162	154.2050	FD		Dells	182	446.5750			
163	158.7600	PD		Baraboo	183	156.2100			
164	154.3100	FD		Baraboo	184	453.9500			
165	154.0400	PW		Dells	185				
166	150.9950	PW		Baraboo	186	154.8750			
167	155.0100	EMS		Baraboo	187	155.6400			
168	453.4750	parks/event		Baraboo	188	155.6800			
169	150.9050	Boats		Dells	189	155.6350			
170	151.7450	Boats		Dells	190	153.1300			
171	464.8750	Ducks		Dells	191	462.5500			
172	151.8350	lumber co		Dells	192	462.5750			
173	152.3900	Tanger mall		Dells	193	462.6000			
174	463.9125	cement co		Baraboo	194	462.6250			
175	464.3250	circus world		Baraboo	195	462.6500			
176	160.1250	camp gnd		Dells	196	462.6750			
177	160.1700	camp gnd		Dells	197	462.7000			
178	464.7750	Best Western		Dells	198	155.9250			
179	452.9750	lumber co			199	473.7125			
180	462.2750	foundry			200	470.7125			

Figure 6. Example of banks used during vacations or road trips. These are for Wisconsin Dells, and Milwaukee, Wisconsin areas. Example of other possibilities: A bank for ham radio operations (scanners make for great back-up receivers, or providing an extra set of ears to our ham radio monitoring.)

In response to that challenge, I not only monitor FRS & GMRS frequencies, but also make the effort to scan certain bands (like 30-50 MHz), even though the services that used to use these bands have moved to higher frequencies when they updated their communications equipment. Who can tell what communications will move (or have moved) into these currently unused bands? Especially in large cities where RF spectrum is at a premium, anything's possible.

Additional resources include other scanner enthusiasts, and several internet groups also exist that not only share frequency information but have discussion forums as well (my favorite is RadioReference.com, and there are others). One caveat I've found in some reference material is misleading location information. For example, the "location" listed is quite often the location of the office where paperwork for the license application is filled out or where the person in charge of the radio equipment has his / her office, and not where the actual transmitter is located.

Another challenge faced by scanner enthusiasts is traffic laws. Before distracted driving was an issue, ordinances existed in many places to restrict the use of scanners. Since a certain "bad element" used to take scanners along in their cars during the commission of a crime to let the getaway driver know when police were dispatched to the scene, laws in many places no longer allow people to have their scanners in their vehicles. In some cases, it was an absolute ban while in other areas it was okay to transport a scanner as long as it was in the trunk (or simply turned off and laying in the back seat), or if the driver was a licensed amateur, all depending upon the specifics of the laws in a given area. In many places, restrictions have gotten stricter under the auspices of "distracted driving" laws, and to make things more complicated, these laws can vary quite a bit from one municipality (or state) to another. So, if you're planning to take your scanner along on a road trip, check the laws in your area and make sure to get updates often.

I started a skeptic, and ended a believer regarding magnetic loop antennas. Here I describe my several attempts to build and use small loops, and what changed my mind about them.

A Mag Loop? – You Have to Be Kidding

BY DAVID A. GAUGER,* W9CJS

Can a dinky 3-foot loop antenna really work? I decided to find out. Take a moment, if you please, to follow me through my experience of building and using several different magnetic loop antennas, one for 100 watts and two for QRP, and trying them in the real world of ham radio (*Photo A*).

At the start, I'd heard all the comments, mostly negative, about these antennas. "*They're hard to tune, they're so sharp" — "Every time you change frequency, you have to retune" — " A small loop like that can never compete with my half-wave dipole." — "What about capture area?"*

Like the bumblebee, which theoretically can't fly, yes, I found that mag-loops *do* work. A well-made mag-loop is a surprisingly good antenna and provides us with the ability to work stations from the confines of an apartment or private home where outside antennas are forbidden or at least severely limited by the Rules Police, also known as the homeowners' association, or HOA.

I am not here to say that a mag-loop will outperform your three-element Yagi at 40 feet, or your half-wave dipole either. Of course not. But I do work stations all around the country while using CW on a QRP rig and a mag-loop antenna, *all inside* my home. Recently, while operating POTA (Parks on the Air) using QRP to my mag-loop, we worked Spain, among 20 stateside contacts.

A 100-Watt Mag-Loop Antenna

I designed my first loop to work at the 100-watt level with my Icom 7300 transceiver. It uses a 39-inch diameter piece of 1/2-inch copper tubing (*Photo B*). The 39-inch diameter wasn't the result of a calculation, rather, the box of tubing I bought was about 10 feet in length and, when uncurled into a single turn, it yielded the 39-inch diameter. So much for scientific design.

I tune the loop with a motor-driven 40- to 300-pf vacuum variable capacitor. I need the loop to be remote for safety concerns from electromagnetic radiation when running 100 watts. Remote tuning is almost a must-have convenience at the 100-watt level, unless of course, you enjoy running back and forth from the rig to the loop for tuning. This loop is set on a 4-foot tripod, on an open patio beneath a second floor three-season room. It's outside, but somewhat sheltered by the structure above.

The tuning capacitor is at the top of the loop for no other reason than for safety since very high voltages can occur across the capacitor. The copper loop is wired to the capacitor using the braid removed from RG-8 coax. The little drive motor is mounted at the bottom and turns the shaft of the capacitor at the top via a piece of Lucite rod using appropriate couplings.

The support structure, like most, is made of PVC tubing and in this case made into a cross by screwing the cross piece to a 54-inch vertical member using nylon quarter-inch x 20 screws. The capacitor is held in place by two small wooden pillow-blocks and cushioned by pieces of rubber from a

Photo A. The author at Field Day with his 100-watt magnetic loop (mag-loop) antenna, tuned with a motor-driven vacuum-variable capacitor. (Photos courtesy of the author)

** 4352 Terrace View Lane*
Rockford, IL 61114
Email: <w9cjs@arrl.net>

Photo B. Close-up of the100-watt mag-loop construction. The vacuum-variable capacitor is at the top and the drive motor is at the bottom. The two are connected by a drive rod mounted on a sheet of Lucite.

Photo C. This is the QRP mag-loop, seen here with the box in a vertical orientation. In this photo, it's held up by a small vise but would be mounted on a tripod in actual use.

bicycle inner-tube. Then the entirety is strapped using tie wraps, to a piece of 1/8-inch plexiglass 4-inches wide, which in turn, is strapped to the vertical PVC support tube which extends to the motor assembly at the bottom.

Being able to vary the motor speed provides a nice vernier action on the tuning speed. I use a $15 12-volt DC PM (permanent magnet) geared motor with a 3 RPM output turning rate. I bought the small motor on eBay and it works well. By using a DC power supply, I find that the speed of the motor responds nicely to the supply voltage and runs well from 12+ volts down to 6 volts with a corresponding reduction in the tuning speed.

The DC is fed to the motor using a pair of 18-gauge supply leads bound with the RG-58 coax. This cable was originally purchased from High Sierra when they were in the screwdriver antenna business. Similar cable offerings are currently available. Do an internet search using "Siamese cable." I purchased a 200-foot roll of this dual-cable for $39 (including shipping).

There are some builders who demand complete automation by using stepper motor drive software which senses the SWR and turns the motor appropriately. In my view, this is nice but complicates the antenna significantly, and raises the cost as well. My drive doesn't have limit switches; the motor simply stalls at the end of the capacitor travel and the overload light on the DC supply tells me to reverse the direction. This happens, but very rarely. Plus, while my motor requires two wires, a stepper motor requires several more.

We see commercially advertised loops costing upwards of $1,000 which boast fancy tuning boxes with auto-sensing circuitry. This is simply overkill for my needs. Speaking of costs, I have less than $200 invested in this mag-loop, including the $40 tripod. The most expensive item, the vacuum variable capacitor, cost $100.

At my home, I have an "*HOA approved*" pseudo inverted-L over the backyard. It is a little shorter than what would be resonant even on 40 meters, but it works reasonably well when tuned by an SGC-230 auto-tuner. Received signal levels from A-B tests show that the mag-loop is about 8-10 dB lower than the L, but the high ambient noise with which I contend is about 15 dB lower on the mag-loop than the L, effectively improving the signal-to-noise (S/N) ratio. What is 10 dB? … about one and a half S-units. If the band is open at all, the difference in signal strength is insignificant and the improved noise reduction is welcome.

One hears the comment, "*Yeah, but you have to constantly re-tune when moving frequency."* It is interesting that the above comment usually comes from one who has never used a mag-loop and doesn't have any real-life experience. Retuning is really not a problem. With the IC-7300 connected to the mag-loop and the waterfall bandwidth set to ±500 kHz, one can see a mountain-shaped "peak" of white noise on the

display corresponding to the resonant frequency of the loop. When tuning the loop, this peak moves left or right across the waterfall, providing a convenient tuning indicator.

With the band-scope I can see where the activity is. Generally, I settle in on one spot and from there, I can see and hear stations well, up or down some 20 or more kHz. If I decide to call a station, I simply touch the up/down switch on the loop motor and watch the peak move to the target station. I fine-tune by inserting a little carrier to tune for minimum SWR.

A Note of Caution

When I first set up this loop on the driveway of my previous home, I inadvertently positioned it too near a telephone line to the garage. In the shack, while tuning up, the SWR was highly erratic. I came to find out that the high voltage at the top of the loop was arcing to the phone line.

Speaking of high voltages, my friend Dennis Johanson, K9VMY, pointed me to an online article which gave some approximate voltage levels for different power levels. I whipped out my homebrew PC program and derived an equation for voltage versus power in a loop. My equation looks like this:

$$V = (P_{watts}/7.5 \times 10^{-6})\text{^}0.5$$

Take this equation with a grain of salt, but my calculated voltage values are very close to published values from other sources.

Advantages of a Mag-Loop

- No antenna tuner is necessary (The antenna is resonant)
- No radials are necessary (or very effective)
- Mounting it high is not necessary as ground effects are much less than for a dipole
- It is resistant to most natural or man-made noise.
- It is very small and easily carried to remote operations, such as SOTA, POTA, or IOTA (or Field Day, which is where I was in *Photo A*)
- It is somewhat directional and, if rotated, allows peaking of incoming signals or
- Nulling out loud interfering signals or QRN (side nulls are sharp and very deep).

A Second Mag-Loop – With a Dual-Mount

With my interest in POTA operation, I built up a mag-loop which is lighter and smaller, manually tuned, and used at QRP levels, 5 watts typical (*Photo C*). It will stand up vertically on a picnic table or on a tripod, thus eliminating the need to shoot a wire antenna into a tree or to string out several counterpoise wires. What's not to like? Incidentally, some

Photo D. Close-up of the PVC elbow used for operating the QRP mag-loop on a tabletop. The box is horizontal on the table and the loop support is vertical.

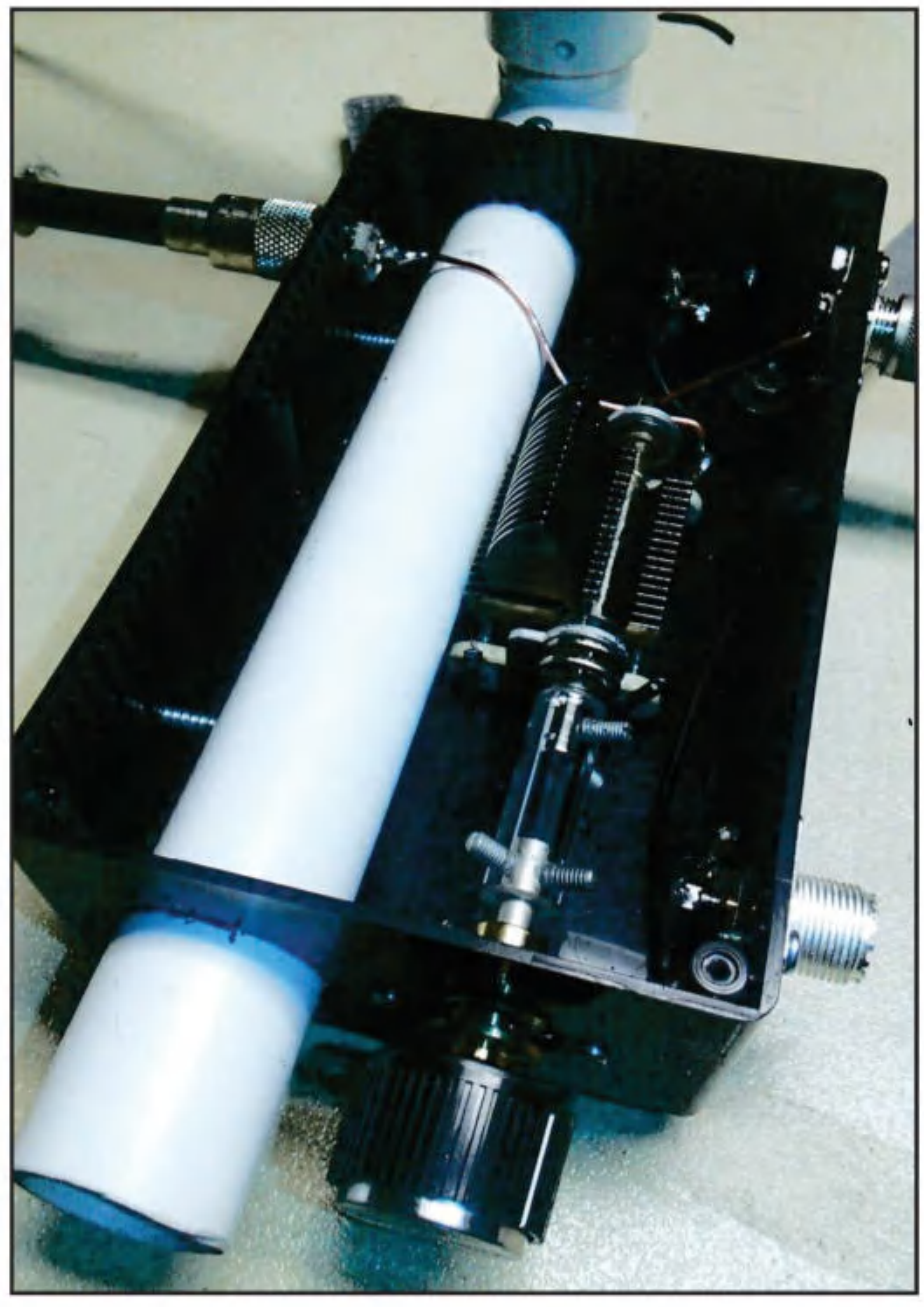


Photo E. Close-up of the tuning box for the QRP mag-loop, showing internal construction. Note that the PVC support pipe runs through the box, which may be used horizontally on a table (with the elbow connector in Photo D*) or mounted vertically on a tripod.*

Photo F. The author's third mag-loop, using a motorized capacitor mounted inside the tuning box. The PVC tube segment is slid into the pole of a tripod.

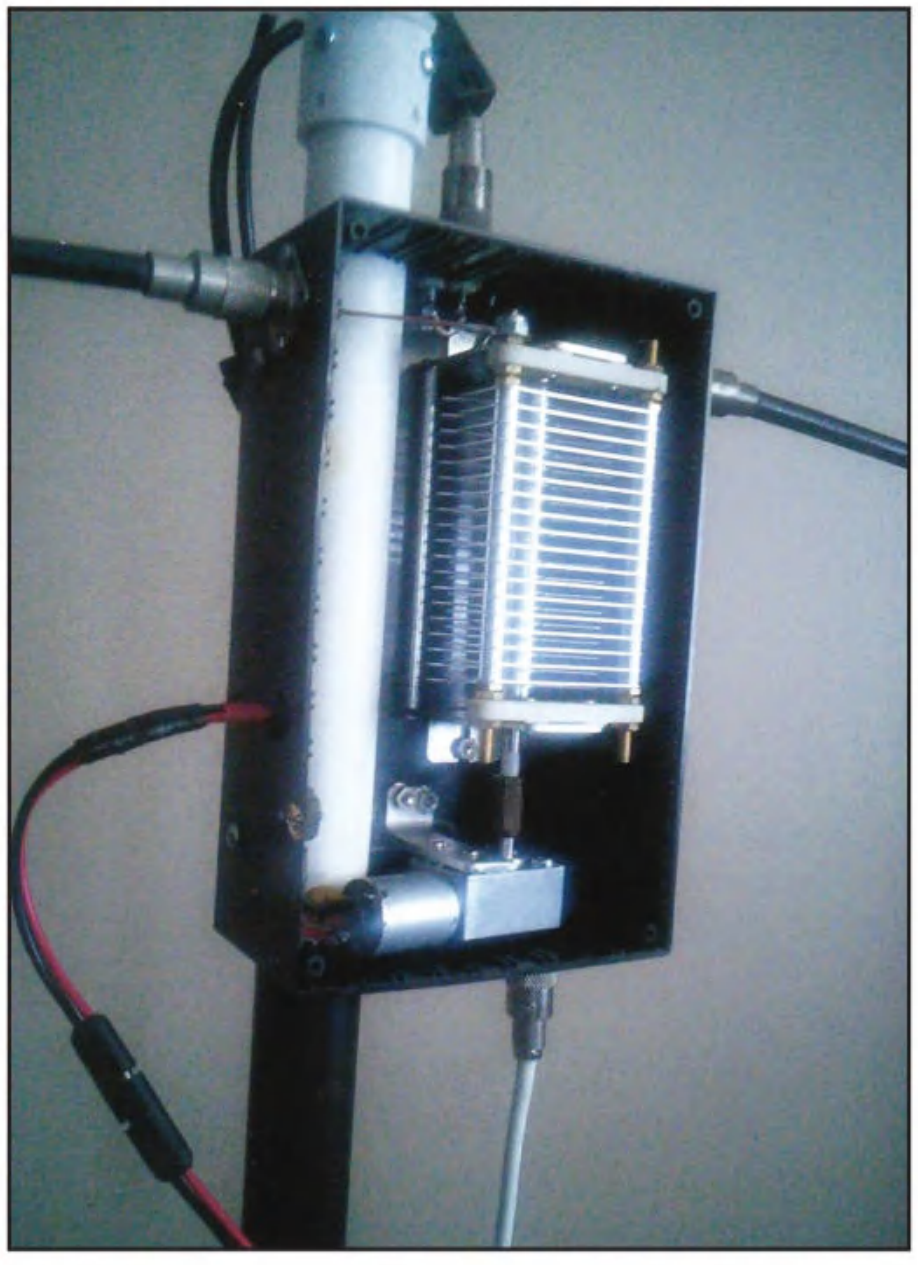


Photo G. Close-up of the tuning box for the third mag-loop, with the motorized capacitor at the top right and the drive motor at the bottom.

parks frown on using a tree for a wire antenna anchor or for stringing counterpoise wires which can be tripping hazards.

The only different feature of this portable QRP loop is the ability to use the loop when mounted on a tripod or when it sits on a table. With the tuning box flat on a table and using a PVC elbow (*Photo D*), the loop is vertical. Removing the elbow allows me to slip the tuning box with its PVC tube, into the down-tube of the loud-speaker tripod. The box is now vertical with the tuning knob on top. Thus the name Dual Mount Loop.

I mounted the loop tuning capacitor and an MFJ 6:1 vernier drive (MFJ 729-0142-1) in a plastic project box purchased from Hammond Manufacturing. I used 1-inch PVC tubing which goes through the box and is firmly screwed to the box itself and extends a few inches out of each end of the box (*Photo E*). The loop is supported on a removable 36-inch PVC pipe out of the top of the box which will now be vertical when the bottom tube extension is on the tripod.

To minimize de-tuning by hand capacity, the tuning knob and vernier drive to the internal tuning capacitor are isolated through a short coupling made of plastic tubing.

I mounted four SO-239 coax receptacles, one pair to connect the loop to the tuning capacitor and the other pair to feed the small sensing loop cable through the box and out to the transceiver. Whoa! Did I learn something.

I ran this last connection, 8 inches of RG-174, inside the box past the tuning capacitor. Immediately I noticed a severe degradation in received signal levels and much broader tuning. By re-routing this coax to the far side of the box away from the tuning capacitor, received signals were back to normal levels and the tuning was once again very sharp. I didn't need to run that lead through the box but wanted to, purely for appearance and convenience. Apparently, the capacitive coupling between that short piece of coax and the tuning capacitor degraded the high Q of the circuit.

The cost of this QRP loop was about $80 plus a tripod. I used RG-8U coax but one may elect to use LMR400 or other high-quality coax; however, the main loop ties the braid and the center conductor together so low-loss may be a moot point since there is no potential difference between the two. My PVC vertical support pipe includes a cross piece of PVC tubing to help the loop retain its shape. A round loop shape is the most efficient.

A Third Loop, With Motorized Tuning

I have just finished a QRP-level mag-loop (*Photo F*) which includes a variable transmitting capacitor from MFJ (MFJ 282-2112-1; 20-250 pF, 2500V), and a small motor purchased on the web for about $15 (*Photo G*). Using Siamese cable, I feed RF and DC for the motor out to the mag-loop some 25 feet away.

The motor tuning was excellent. Using a 1 RPM motor changing from 40 meters to 30 or 20 was very fast, but the tuning rate was far too fast for fine tuning. I found that a 1k 1-watt resistor slowed the motor down, making fine tuning much easier. A switch changes from the fast to the slow tuning speed.

All other build considerations are similar to the first two loops. The tuning box is a little larger to accommodate both the larger tuning capacitor and the motor drive, but other than that they are the same. The Siamese cable feeds both the RF and the DC for the motor, to the antenna and from a small box, mounted near the IC-705 which contains a motor reversing switch, DPDT, center off and both sides momentary return.

Loop Efficiency

Mag-loop efficiency can be loosely expressed as:
Pwr Radiated / Pwr Fed To The Loop.
A more scientific definition might be:
Radiation Resistance / Ohmic Resistance.

Using a main loop whose material has a large surface area increases efficiency, since the high RF currents are a skin-effect phenomenon. Some builders have used large diameter tubing to increase the surface area, and some have silver-plated the main loop to reduce its surface resistance, both of which increase efficiency.

Radiation resistance for a small loop will be near or below 1 ohm, and has to do largely with shape and construction. Thus, in order to raise the Q, we need to change what can be changed to minimize the ohmic resistance.

It would follow that, especially when using QRP, we need to eliminate all possible losses, so building with meticulous care to minimize ohmic resistances is paramount. Additionally, removing metal from close proximity to the loop, as using non-metallic screws, will reduce Eddy-current losses. Take precautions to reduce the resistance of every joint by using heavy wire or braid for connections.

Using butterfly capacitors eliminates wiper connection resistance. Resistance of connectors and wiring, and wipers on variable capacitors all contribute to increased ohmic resistance and should be minimized. All of these actions help, but just where the point of diminishing returns kicks in is a question. At QRP levels, a receiver type variable capacitor works because RF voltages are relatively low.

Some builders elect to make the loop hexagonal by soldering eight straight pieces of copper tubing together using 45° elbows. It makes for an attractive appearance but introduces up to 16 soldered joints to the assembly. Since solder has more resistance than copper, it seems to me that the hexagonal shape must have greater ohmic resistance than a circular, seamless tube.

MFJ sells a formed aluminum loop made with 1.05-inch O.D. tubing. (Part No 10-1786-11). This could be made up into an efficient and attractive mag-loop. MFJ also sells motorized butterfly capacitors of varying capacity ranges, and other parts which one could use in loop construction. See the MFJ Enterprises online catalog.

In Operation

The first observation one makes when using any mag-loop is that it has sharp tuning. Sharp tuning loosely relates to a high Q factor, which in turn relates to high efficiency. A very sharp tuning loop likely indicates higher efficiency than one with broad tuning. It also will mandate the need for a vernier manual drive, or a very slow motor drive for the tuning capacitor.

I repeat this because it is important: Mag-loops are significantly quieter than other types of antennas. When compared to my inverted-L antenna, loops present received signals down about 6-10 dB as compared to the L; however, noise is down near 15 dB, meaning that the signal-to-noise ratio and hence readability of incoming stations is significantly better when using the loop. I can often copy CW stations on the loop which are masked by QRN on the inverted-L antenna. The signal-to-noise ratio is more meaningful than the S-meter reading.

I originally made the smaller sensing loop into a Faraday shielded loop by using a piece of RG-8 coax connected by a coax tee at the bottom and having the shield removed for about 2 inches at the top to produce a gap. This arrangement provides a shield which is intended to reduce noise pickup. In practice, I've noticed no discernible improvement in noise rejection over a bare wire sense loop so I replaced this coax loop with a simple piece of household #10 solid copper wire.

For whatever reason, I've found that the placement of the sensing loop affects the SWR. For 40 and 20 meters, the SWR is approximately 1.2:1, but with that same sense loop position, the 30-meter SWR runs about 4:1. Sliding the sense loop toward the center reverses these numbers. The textbooks suggest making the sense loop diameter 1/5 that of the large loop. Mine is closer to 1/4. By simply scaling pictures on the web and in catalogs, I find that most sensing loop diameters appear to be about 1/4 that of the main loop, and some even as large as 1/3. Continuing experiments may yield a solution.

To accommodate moving the sense loop up and down, I simply attached the loop to a small clear plastic sheet sized 3- by 12- by 1/8-inch which, in turn, is tied to the support rod with tie-wraps. This way I can slide it up and down easily to adjust for minimum SWR. I can easily reduce the SWR to below 1.5:1, usually 1.2:1.

Lately, we've operated POTA from a local state park using my mag-loop, an IC-705 transceiver, and a battery. Our results have been spotty but so has propagation. It is not unusual to work 22 stations one week and only two or three the next week in the same park. I must say that the loop on a tripod engenders considerable public interest. Bicycle riders and joggers stop and ask "*What are you guys doing*?" which allows us to explain and thus promote ham radio.

Conclusion

I used my portable mag-loop for Field Day … CW only … QRP only … battery-power only … using a solar panel for recharging. I love the x10 multiplier that I claim on Field Day scoring. I find that during the initial Field Day afternoon rush, it is difficult to compete with the QRO stations, but later at night and the next morning, I am "Norman New-Guy" and I have a mini-pileup waiting for me. Remember, each contact is 10 points.

Why use QRP and a mag-loop when it is so much easier to use a kilowatt and an antenna on a 40-foot tower? I suppose it's for the challenge, or for avoiding HOA-imposed mandates, or for the same reason that some hunters use a bow and arrow during deer hunting season, just for thrill of the hunt.

Building mag-loops has been a great diversion for me, with a number decisions to make in their design and construction, and adjustments to make while operating. It's been great fun to play with.

Mag-loops have been around much longer than I have, but seemingly have garnered a significant following of late, possibly because many hams are aging and may move into retirement facilities which put a limitation on outside antennas.

I find that it is an amazing challenge to work QRP using CW and a mag-loop antenna, all inside my home. It is amazing to me and has breathed new life into my ham operations.

Yes, mag-loops work and work well. They are simple to build and when "homebrewed," they cost far less than commercially produced units.

Try one, build one. You will be pleasantly surprised, to say the least.

Have you ever had a switch fail for no apparent reason? Or start to melt when you try to solder on a wire? "Sherlock," our intrepid failure detective, rounds up some likely suspects…

Sherlock Investigates: Switch Failures

BY "SHERLOCK"*

Switches are all very different for various applications but some common generic defects have been around for a long time and still persist.

The number one failure that shows up in my scrapbook of failures is ROSIN FLUX. Flux is still used on most solder terminal switches and if the flux penetrates the contact area, failure is certain. When flux is very hot during soldering, it flows very easily into the switch if it is not sealed. Even switches that looked sealed have failed because of the melting of the case material. Switches made of polycarbonate can melt during soldering and flux can seep into the switch and cover the contacts. Flux is an insulator and, when it is activated and hardens, it becomes a sheet of film that can prevent the switch contacts from making electrical contact.

When performing a failure analysis, the film of flux can be seen as a white crumbly powder where the contact has been attempted; or it can be disturbed by probing and the same white powder will be seen.

It is really hard to get high magnification pictures of these defects through my magnifying glass (*Photo A*).

The obvious remedy is never to use liquid flux during soldering and to keep soldering times short with rosin core solder. An environmentally sealed switch should be used whenever possible.

The second switch failure seen in modern times is caused by the manufacturer molding the switch body with a low-temperature (250° F) plastic (typically polycarbonate) that looks like a high-temperature (450° F) diallyl phthalate.

When soldering to these switches, the terminals tilt or loosen from the switch body, causing catastrophic mechanical failure. These switches have been sold off to surplus sellers and sold at very low prices on the internet. The only way to use these switches is to find a press-on terminal and to never solder them.

You can test your selected switch by applying force with your hot soldering iron to an unused terminal and watching the mechanical stability (*Photos B* and *C*).

– Sherlock

** c/o CQ magazine*

Photo A. White powdery residue from rosin flux can be hard to see on a switch contact — even with a magnifying glass — but can create a thin layer of insulation that prevents current from flowing.

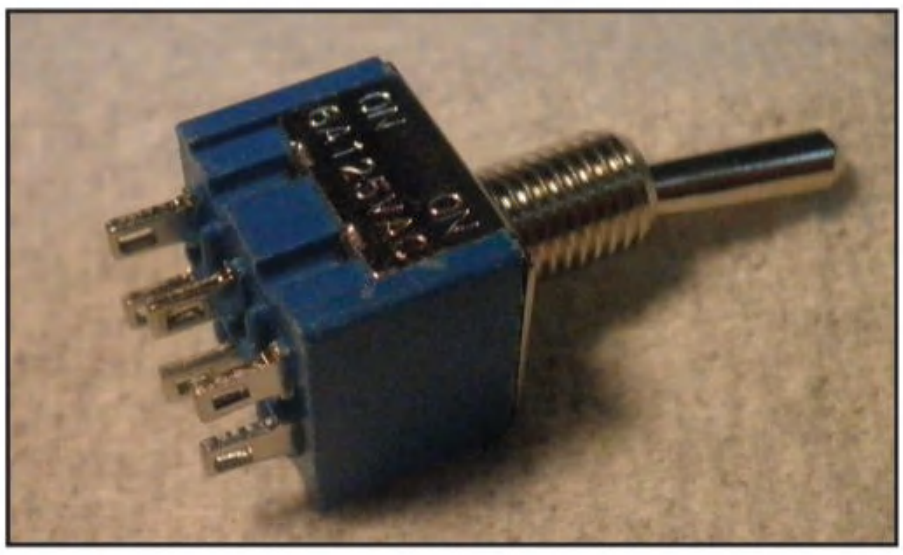


Photo B. A typical double-pole double-throw (DPDT) switch. Can the plastic stand the heat of a soldering iron?

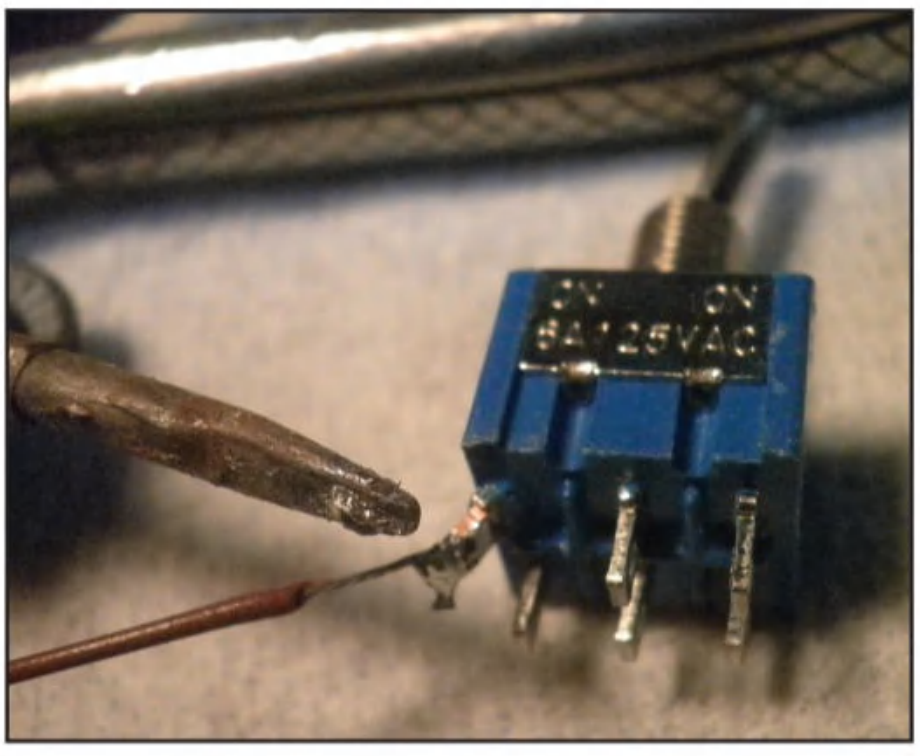


Photo C. Nope … only no-solder press-on terminals will be appropriate for a switch like this one.

math's notes

BY IRWIN MATH,* WA2NDM

Simple RF Circuits

As promised last month, we will continue with a couple of simple easy-to-build circuits we have used from time to time to make some of our amateur radio measurements easier.

First, *Figure 1* is an ultra-simple, four-component, untuned field strength meter that will come in handy when making antenna measurements, especially for the newcomer. It is specifically untuned as it can be used over a wide range of frequencies without any adjustment other than a sensitivity control. Although not intentionally calibrated, it is used by locating it somewhere in the vicinity of your antenna and then adjusting your transmitter for maximum output power in the direction you wish (at various frequencies) if it is a directional antenna or just for maximum output power if it is not. When using it in this manner, the lowest possible SWR should obviously be maintained so as to not damage the finals of your transmitter.

You can also use this meter to plot a graph of the (horizontal) antenna pattern if you walk around the antenna and record the meter readings at various points. Note that when using this, you must always adjust your transmitter to the minimum output level required to get a usable reading. You do not want to create undesirable QRM from an unmodulated carrier.

The circuit uses a low forward voltage drop germanium diode such as a 1N34 or 1N60 which, although they are "old timers," will perform quite well into at least the HF bands and can usually be obtained on the internet. We used a 100-micro-amp panel meter from our "junk box" which was on hand, but you can use any movement you have from 50 µA to a milliampere. Obviously the more sensitive the meter, the more sensitive the device. The germanium diode used has a much lower forward drop compared to conventional silicon devices and, as we mentioned, should work well at least throughout the HF range. When building the circuit, the leads from the diode to the rest of the circuit should be kept as short as possible for best HF response. The RF choke can be anything around 1 to 2.5 mH or so and is not critical. The capacitor across the potentiometer is also not critical and can be anywhere from 100 pF to 0.1 µF. The antenna we used when we built our unit was a telescoping device from a discarded portable radio that was not worth repairing but you can even use a 12- to 14-inch length of #12 or #14 solid copper wire from a short length of house wiring cable if you wish. When we built ours, we also contained everything in a small aluminum mini-box we had available. Obviously, since no power supply is needed, no battery will have to replaced.

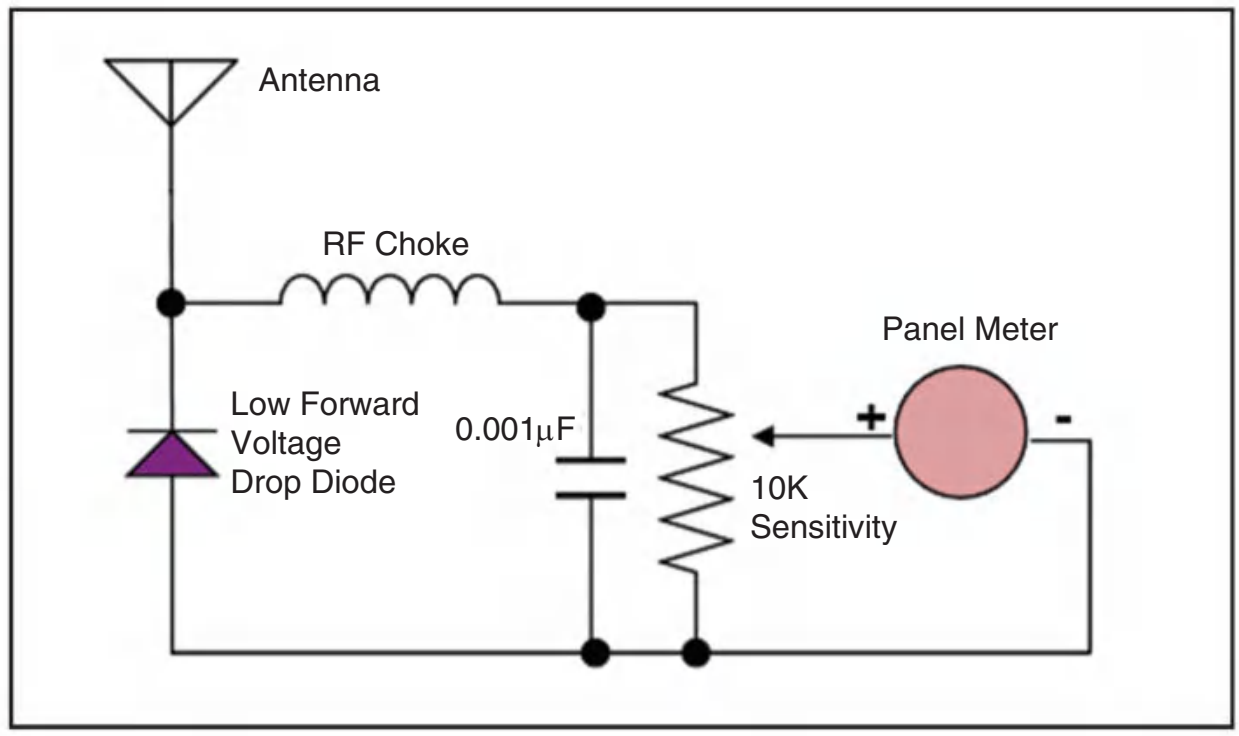


Figure 1. Ultra-simple field strength meter

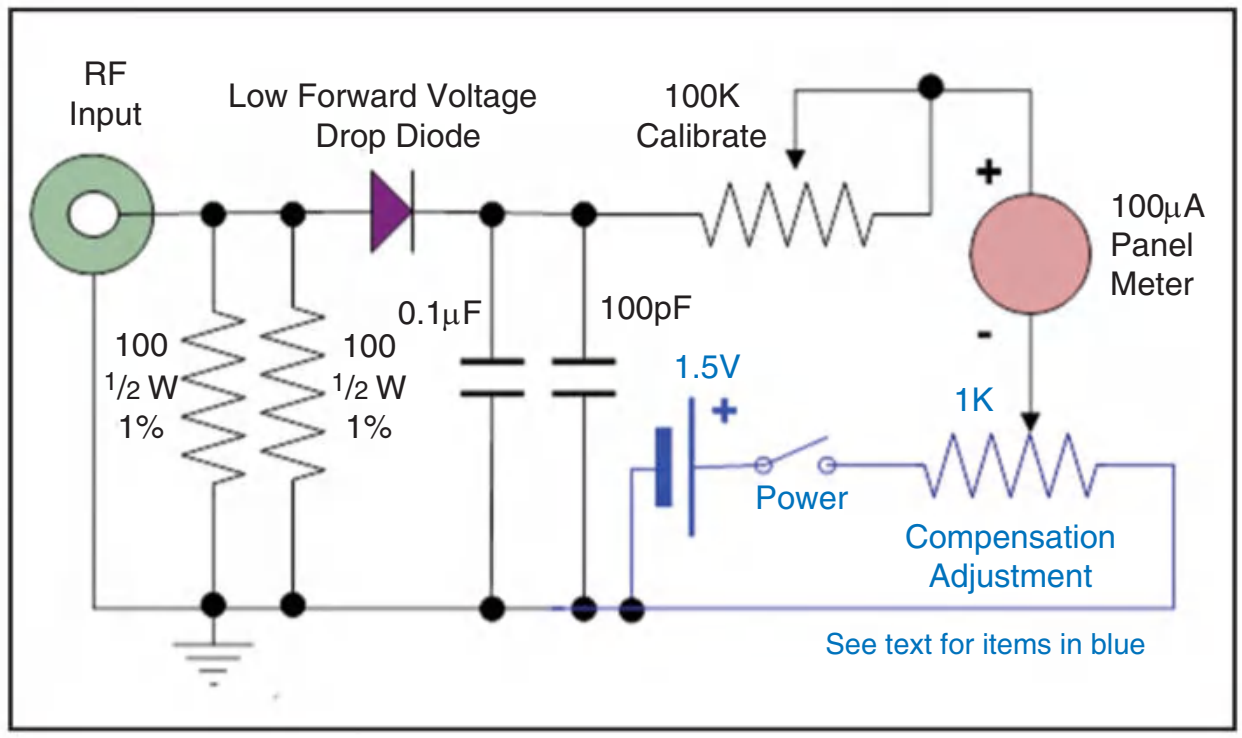


Figure 2. A 1,000 mW (1-watt) RF power meter

Figure 2 is somewhat more complex. It is an RF power meter useful for measuring power levels of 1,000 milliwatts (1 watt) or less, ideal for QRP experimentation applications. It is also untuned and with a 100-microampere meter movement (using a common 0-100 scale), you should be able to resolve RF power levels as low as 10 microwatts per minor division of the meter if its scale allows.

*c/o CQ magazine

Referring to the schematic, the circuit also consists of a simple low forward voltage drop diode such as the 1N34, 1N60 or possibly even a Schottky device. In operation, the RF is directly applied to a 50-ohm load consisting of two 100-ohm 1% 1/2-watt carbon film resistors in parallel which results in a 1-watt non-inductive load. The resulting RF voltage is then rectified by the diode and the peak value is displayed by the current meter and series resistor. With 1 watt of RF, the peak value is 10 volts (across 50 ohms) and for 100 microamperes of current, requires a series 100K resistor. The actual voltage reading, however, is really 10 volts minus the voltage drop in the diode so the 100K resistor is adjustable and used as an actual calibration control. You will note that there is also an optional 1K potentiometer connected to the negative lead of the meter movement, which can used to compensate for the error from the diode drop which might be necessary when reading very low power values. This also adds another 1K of resistance in series with the meter and produces an opposing voltage which can be either be ignored or used as a compensation adjustment control for the forward voltage drop of the diode you are using.

This optional circuit gets its opposing voltage from a simple 1.5-volt AAA battery and can be left out if desired. If it is to be omitted then just delete the battery, switch, and the 1K pot (all colored blue in the circuit) and simply return the negative lead of the meter to the common ground. For best results, especially at higher frequencies, when building the unit, try to keep the leads from the RF connector to the load resistors and then to the diode as short as possible. Also connect the two filter capacitors from the cathode to the diode as close to the diode (and ground) as possible. It is also a good idea to build the unit in an aluminum mini-box with the case connected to the ground lead to be sure you only measure the RF you want to and not stray pickup.

To calibrate the meter, you will need an adjustable DC power supply. The procedure is to apply 10-volts DC to the input RF connector with the positive going to the center pin and the negative going to ground. Then adjust the “calibration” control to just read full scale. Do not keep the power supply connected too long when doing this as the load resistor will be dissipating the 1 watt of power you are providing. You can then reduce the DC input to 1 volt and you should read 10 milliwatts. If this is not accurate enough, then you will need to keep the 1K pot and battery portion of the circuit and they should be able to provide enough offset to compensate for the internal diode drop. As a final note, as we have mentioned, although germanium diodes are not commonly manufactured today, you can easily find many sources for them with a quick search on the internet.

In conclusion I hope these two units are useful to you but don’t try to compare them to commercial RF meters as they are quite simple and are really intended for basic measurements. However, both will give you a fairly good idea of what is going on for very little cost.

– 73, Irwin, WA2NDM

the listening post

BY GERRY DEXTER

WRMI Relays Voice of Mongolia

~ Mongolia may be three quarters of the globe away, depending on where you live, not to mention it was a seldom heard target when it aired in the mornings on 12085 kHz, but that allowed no pause to WRMI when it came to relaying their programing. The Voice of Mongolia is carried by WRMI Tuesday-Saturday at 0130-0200 UTC (in English, no less) on 5800 kHz. WRMI also carries relays of Radio Ukraine International, Radio Slovakia, Radio Prague, Radio Taiwan, Radio Tirana, RAE-Argentina, and, just lately, the Voice of Indonesia, which airs daily in English on 7780 kHz from 0800-0900 UTC. The full lineup of these foreign relays tends to vary a bit. Several of these broadcasts are otherwise gone from shortwave.

The Voice of Mongolia is being relayed by WRMI.

~ Russia's war against Ukraine has affected the amateurs there (of course!) and one of them has written a book about it. Vlad, US7IGM, has authored "War Diaries, A Radio Amateur in Kyiv" which tells the story of how his ham friends helped him get his family out and how the war has kept him there. The book is available through Amazon in a Kindle edition.

~ Spring used to be time to check for the Papua New Guinea outlets down on 90 meters. Those days have vanished, as have most of the PNG stations. All that's left are Radio Vanuatu and maybe its harmonics, SIBC and perhaps the Aussie hopefuls down in the 4- to 5-MHz range. The spring season tends to put an emphasis on a particular global area but the hunting's not so good anymore.

~ Late word has it that WTWW, Lebanon, Tennessee, has tossed in the towel. The station aired commercial religious programs, also one program on ham radio hosted by Ted Randall. It ran using 50- and 100-kilowatt transmitters variously on 5085 and 15810 kHz (with standbys 5830, 9475, 9830 kHz), and was only active for a dozen years (from 2010).

Listener Logs

Your shortwave broadcast station logs are always welcome. But please be sure to double or triple space between the items, list each logging according to the station's home country and include your last name and state abbreviation after each. Also needed are spare QSLs, station schedules, brochures, pennants, station photos, and anything else you think would be of interest. The same holds for you amateur radio operators who also listen to shortwave broadcasts ... I know you're out there! You, too, are also most welcome to contribute.

Here are this month's logs. All times are in UTC. If no language is mentioned English is assumed.

ALASKA—KNLS on 9555 via Anchor Point at 1725 with possible religious lecture in Chinese then woman talks / vocals. (Barton, AZ)

ALGERIA—Radio Algerienne on 17800 via Bechar, several men with a discussion in Arabic then vocals from 1835. (D'Angelo, PA)

ASENCION ISLAND—BBC-North Atlantic Relay on 11810 via English Bay at 2007 discussing the British PM election. (Sellers, BC) On 11830 at 0641 with nice station ID prior to close at 0659. (D'Angelo, PA)

AUSTRIA—Radio Austria Intl. on 6155 via Moosbrunn with instrumental opening German program. (D'Angelo, PA)

Adventist World Radio on 7340 at 0252 man preaching in French, closing at 0257; on 11880 via Moosbrunn, more talk with music, address in Cote d'Ivorie, more music and off. (Sellers, BC) At 0212-0259 with short religious talks in Urdu, music and an English station ID before opening in Punjabi. (D'Angelo, PA)

AUSTRALIA—Reach Beyond on 11900 via Kununurra in Hindi at 1224. (Brossell, WI)

BRAZIL—(*All in Portuguese – GLD*)

Radio Clube do Para via Belem on 4885 at 0316 with long talk, program close, jingles, station ID, announcements, more talk. (D'Angelo, PA)

Radio Nacional Amazonas on 6180 via Brasilia at 2153 with two men having a long talk, woman with several announcements, followed by another discussion. (D'Angelo, PA) At 0930. (Barton, AZ)

Voz Missionaria via Camboriu on 9664 at 0154 with a radio play, woman with station ID at 0202 then a longer talk. (Taylor, WI)

BOTSWANA—Voice of America (VOA) Relay, on 9775 at 0303 with VOA news; on 15580 via Mopeng Hill, with an interview on climate change at 1941. (Sellers, BC) With Afro pops at 2051. (Brossell, WI)

CANADA—CFVP on 6030 via Calgary at 2316 with commercial broadcasting schedule, traffic report, station ID, and a George Carlin comedy routine. (Sellers, BC)

CFRX via Toronto on 6070 at 0316, commercial broadcast programming to 0320 station ID, back to talk. (Sellers, BC)

CHU time station via Ottawa on 7850 at 2331 with French / English time announcement; additional signal on 3330 was poor. (Sellers, BC)

CHINA—China Radio International on 7290 via Xian at 2235 with male and female announcers speaking in Korean with brief instrumental music; on 15275 via France at 1641-1659 in Amharic. (D'Angelo, PA) On 9440 via Kunming at 2044 discussing music; on 9600 via Kashi discussing music and movies at 2025. (Sellers, BC) On 9550 via Beijing in Vietnamese at 1225; on 11620 via Xi'an in Japanese at 1235; on 15335 via

**c/o CQ magazine*

Shijiazhuang in Russian at 1252. (Brossell, WI)

Voice of Jinling on 6200 via Nanjing at 1233 in Cantonese with light Chinese vocals. (Taylor, WI)

Firedragon jammer on 11590 at 1618, at a great level against RFA via Kuwait. (Taylor, WI)

CUBA—Radio Havana Cuba on 6000, fair at 0133; harmonic on 6185, nothing on 5040, 6060, 6100, or 11880 at 2251 with piano jazz, but a low audio level, not on at an earlier pre check; on 15240 via Bauta in English at 1946 with station ID, website, and jazz. (Sellers, BC)

CZECH REPUBLIC—Radio Prague on 9850 via Okeechobee at 2330 with station ID by Jeff White then into the Prague relay. (Sellers, BC)

FRANCE—Radio France International on 7205 excited talks in French; on 15300 via Issoudun in French with long discussion in French by two men and off by 2000; On 17620 with man and woman talking in French, light instrumental music, brief English before close. (D'Angelo. PA)

EGYPT—Radio Cairo on 9440 via Abis with Arabic music to 2130, time pips, man reading the news, but at a weak level. (Sellers, BC)

ENGLAND—BBC on 6195 (*via Ascension? –GLD*) with World Service at 0510. (Barton, AZ) On 7285 via Oman with long discussion at 1946, off at 2000. (D'Angelo, PA) In English at 0326 with an interview; on 11825 via Philippines with world news at 2301. (Sellers, BC) On 15325 in French at 1818. (Brossell, WI)

FRANCE—RFI on 17850 via Issoudun in Hausa at 1620. (Brossell, WI)

GERMANY—Deutsche Welle on 15215 via France in Hausa at 1858. (Brossell, WI)

GUAM—KTWR/Trans World Radio on 9920 via Agana at 1158 with multilingual station ID, and into Mandarin. (Brossell, WI)

KSDA (Adventist World Radio) on 11695 via Agat in Khmer at 1300. (Brossell, WI) On 15680 at 2206 in Ngangela with man giving a low-key talk. (Taylor, WI)

INDIA—All India Radio on 13695 via Bengaluru at 0039 in Mandarin, playing Hindi songs. (Sellers, BC) On 15030 in Swahili at 1227. (Brossell, WI)

JAPAN—Radio Japan on 7265 via France at 0324 in Japanese with romantic pop and English oldies; on 11625 via Yamata in Japanese at 2018 with two

Tennessee's WTWW is no more. Goodbye ham radio program, so long old-time radio classics (both of which have moved to WRMI – ed.).

women talking. (Sellers, BC) On 11630 at 2230 with banter in JJ. (Barton, AZ) On 7430 via Yamata in Russian at 1028 with IS, Russian and Japanese station IDs then into news, at 2031 with apparent news with woman speaking in Japanese and occasional sound bites by a man. (Taylor, WI) On 11815 via Yamata in Japanese at 1218; on 15130 via France in Japanese at 2013. (Brossell, WI)

MADAGASCAR—African Pathways Radio on 11965 via Mahajanga on suddenly with hymn, station ID with frequencies and list of events on this day in history. (Sellers, BC) At 2000 with religious lectures then African vocals. (Barton, AZ)

World Christian Broadcasting on 9765 via Mahajanga at 2245 with music followed by man speaking in Portuguese, off suddenly on the hour. (Barton, AZ)

MONGOLIA—Voice of Mongolia on 5800 via WRMI at 0130 with sign on station ID in Mongolia, then woman in English and sked. (Sellers, BC)

NETHERLANDS—The Mighty KBC on 5960 via Nauen at 0014-0047 with several oldies, ads for KBC imports in English and Dutch, nice station IDs. (D'Angelo, PA)

NEW ZEALAND—RNZI on 9700 via Rangitaiki with movie reviews at 1210. (Brossell, WI)

NORTH KOREA—KCBS on 15180 at 1250 with victory music. (Brossell, WI)

OPPOSITION—Radioni Diree Shaggar (via France to Ethiopia) on 15330 at 1600-1629 in Somali. (D'Angelo, PA)

Dimtse Woyane (via France to Somalia) on 17870 in Somali at 1551-1558 with HOA vocals, off without announcement. (D'Angelo, PA)

Nippon No Kaze (via Taiwan to North Korea) on 7295 at 1321 in Korean, man giving a stern lecture. (Taylor, WI)

National Unity Broadcasting (via Taiwan to North Korea) on 7200 at 1237 with man with slow ballad, woman briefly talking, man and woman in light chat all in Korean, occasional ARO interference and near continuous CW; on 5900 in Korean with a male announcer; at 1600 with fanfare, station ID and woman doing news. (Taylor, WI)

Shiokaze (Japan to North Korea) on 6080 in Japanese at 1334 with man giving a slow intentional speech. (Taylor, WI)

Echo of Hope (South Korea to North) On 9105 at 1340 with extended talk by woman. (Taylor, WI)

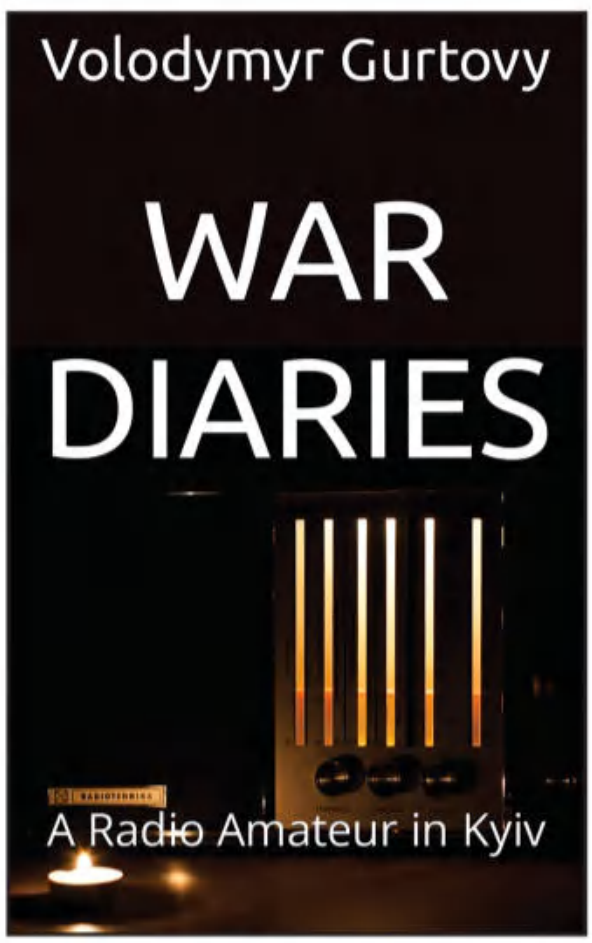
Voice of the Martyrs (via France to South Sudan) on 7315 at 0330 just after sign on with man talking in Sudanese Arabic. (Sellers, BC) On 11620 via unknown location to North Korea at 1512 in Dhivehi. (Taylor, WI)

Radio Tamazuj (via France to South Sudan) On 15550 at 1500 with man and woman talking in local dialects, man talking at 1538 with interesting local music. (Barton, AZ)

Denge Welat (via Bulgaria to Turkey) on 11775 at 1513 with usual Kurdish music. Not Recep Erdogan usually heard. (Taylor, WI)

PIRATES—Radio Monster on 6930 upper sideband (u) at 0105 with scary talks, others heard it as Radio Nowhere, but "live" and on the recording it sounded like Monster. **Voice of Hell** on 6930 at 0118 with Night on Bald Mountain, station ID in a scary voice, threats to listeners

Here's one of the several studios at Radio Brazil Central in Goiania.



Vlad, US7IGM, has authored "War Diaries, A Radio Amateur in Kyiv."

CFVP in Calgary, Alberta, is a hard one to catch, running just 100 watts and often blocked by other powerhouses on 6030 kHz.

souls, hard rock, many station IDs. **Edmund Fitzgerald Memorial** on 6930u at 0112 on 11.11 on the anniversary of the sinking, just barely audible by 0035. **WWWW** on 6925u at 0014 with barely audible rock, indistinct talk, but clear station ID at 0036. (Taylor, WI)

KASS on 6933u at 0006 with old heavy metal. **Cross and Boner Radio** on 6925u at 2233 weak but clear with old rock. **Blood Lust Radio** on 6950u with progressive rock at 2341. **Cool AM Radio** on 6855u at 2311 with Stones from a live concert, more progressive rock. **Mushroom Head Radio** on 6035 at 0134 with heavy metal and dead air. **DB Cooper Radio** on 6950 at 0011 with old CBS News item on Cooper, off at 0018. **B-Side Radio** on 6915 at 0238 with just bits of audio. (Hassig, IL).

PREVIOUSLY REPORTED—Outhouse Radio, **Ballsmacker Radio**, **Mix Radio International WTF**, **Radio Free Whatever**, **Thunder Chicken**, **Wolverine Radio**.

ROMANIA—Radio Romania International on 5990 via Galbeni at 0139 with classical piano; on 9740 via Galbeni ending English news at 2037 into the week's news, harmonic on 11850 was very poor, 13650 barely audible; on 7325 in Egnlish about a school; Harmonic on 7220 good with ARO interference; on 9620 good and best of three (Sellers, BC) On 9440 via Tiganesti at 0730, weak and obviously not intended for my area with man and woman in German, IS at 0725 and off at 0727. (Barton, AZ) On 9575 via Galbeni at 2004 with woman reading the news in French. (D'Angelo, PA)

SAO TOME—VOA Relay on 6080 at 0300 with news; on 11900 via Pinheira in French at 2005 ending news and station ID; on 9470 via Botswana was fair to good. (Sellers, BC) On 15460 in Shona at 1700 sign on. (Barton, AZ)

SAUDI ARABIA—BSKSA on 13775 via Riyadh at 1429 in Urdu with man talking into a music bridge, announcements, possible station ID sequence. (Taylor, WI) On 15435 with Arabic and Qu'ran at 1614. (Brossell, WI)

SINGAPORE—BBC-Far East Relay on 7465 via Kranji at 2212 with news in English but very poor, Philippines was also very poor, (Sellers, BC)

SPAIN—Radio Exterior España on 11940 via Noblejas with 2300 sign on in English and time pips, station ID, news, poor and harmonic on 12030 was barely audible; 11685 very poor; 9690 was poor. (Sellers, BC)

SLOVAKIA—Radio Slovakia International on 5850 via WRMI with English news at 0031. (Sellers, BC)

SRI LANKA—SLBC on 11905 via Trincomalee at 0159 open with Hindi music, female announcer at 0201, seemed an all-music program and off before 0230. (Sellers, BC)

THAILAND—Voice of Thailand on 13750 at 0001 with woman reading the news in English. (Sellers, BC) Heard at 2359-0029 O/C before start of English service, not as good as 15 MHz was before the seasonal change. (D'Angelo, PA)

TURKEY—Voice of Turkey on 5960 via Emirler at 2350 with two woman and talk features, closing announcements for English service, 5-time pips, into the German service. (D'Angelo, PA) On 15375 in Turkish at 1525. (Brossell, WI)

UNITED STATES—Voice of America on 11720 via Greenville at 2137 with pops and station ID; on 12070 via Umm al-Rimam (Kuwait) at 2029 with music for a few seconds, then off until 2030 and back on in Hausa, VOA jingle and news. (Sellers, BC) On 12045 via Thailand relay in Korean at 1449; on 15250 via Philippine relay in Mandarin at 1246. (Brossell, WI)

Radio Free Asia on 7510 via Tajikistan at 0052 in Burmese. (Sellers, BC)

Adventist World Radio on 9800 via Germany at 2123 with man preaching in Nigerian Pidgin, contact information given at 2126. (Sellers, BC) On 11985 via Madagascar at 2100 in Nigerian Pidgin; on 12060 via Sri Lanka with soft vocals at 2215, then man and woman talking in Chinese. (Barton, AZ) On 15355 via Madagascar at 2004-2028 with woman giving religious talk, several religious vocals. (D'Angelo. PA) On 15515 via Tajikistan at 1418 poor in English, only partly copyable. (Taylor, WI) On 9900 via Taiwan relay in Korean at 1304; on 11570 via Kuwait relay in Tibetan at 1342. (Brossell, WI)

RFE / Radio Liberty 15255 via Thailand in Tajik at 1444. (Brossell. WI)

Mashaal Radio on 15365 via Thailand in Pashto at 1233. (Brossell, WI)

WMLK on 9275 via Bethel Pennsylvania at 2053 with Jacob Meyer promoting religious books and mentioning "we are not a cult," off with several station IDs, program continued to 2200 close. (Taylor, WI)

VATICAN—Vatican Radio on 15595 in Arabic at 1552. (Brossell, WI)

VIETNAM—Voice of Vietnam on 7220 via Sontay in Mandarin with man and woman talking and occasional sound bites, poor and harmonic on 12020 feature "Program One"; on 11720 at 2312 in Vietnamese with woman with a man sound bite, later a bit of French and explanation in Vietnamese. (Taylor, WI) On 11855 via Sontay at 2139 with English service. (Sellers, BC) On 12020 in Arabic at 1552. (Brossell, WI)

As Time Goes By

~ **VSI8 Radio** via Grand Turk, Turk and Caicos Islands on 4788 at 0134 on August 25, 1971 broadcasting hurricane warnings through Cable & Wireless West Indies Ltd.

Thank You, Thank You

Back slaps, man hugs and high fives to Harold Sellers, Vernon, BC; Mark Taylor, Madison, WI; Rich D'Angelo, Wyomissing, PA; William Hassig, Mt. Pleasant, IL; Rick Barton, El Segundo, AZ; and Bob Brossell, Pewaukee, WI.

Until next time, keep on keepin' on and Celebrate Shortwave!

emergency communications

BY JOHN FERGUSON,* K3PFW

Practicing EmComm Skills at Non-EmComm Events

Rehoboth Beach, Delaware, December 3rd, the 32nd running of the Rehoboth Beach Seashore Marathon kicked off with nearly 3,000 participants in cold, rainy, windy, miserable weather. The supporting staff for the event included 25 Sussex County (Delaware) AUXCOMM volunteers directed by Bill Saunders, N3ID, the Operations Section Lead and the Sussex County EOC Deputy Auxiliary Communication Leader.

This combined marathon and half-marathon is a well-established calendar event for the area, anticipated by the many businesses and people in the City of Rehoboth and surrounding areas. A qualifier for the Boston Marathon, the course has undergone changes every few years, and is now an interesting, resource-conserving course that has the participants in a see-saw back and forth pattern. This leaves only about 18 miles of course to cover, which stretched the coverage provided by the members of the Sussex County AUXCOMM Group. By contrast, the Boston Marathon has a lot more participants, stretches the full 26.2 miles in almost a straight line, uses a lot more hams, and has an incredible and complex communications plan. If you are looking for an exemplary effort, the Boston Marathon is an excellent example.

Hams working with the Sussex County EOC have been part of the event for many years. The relationship is probably best described by the comment made by Tim Bamforth, Race Director of the Rehoboth Beach Seashore Marathon, at a safety meeting in late November as he was passing out material to the group gathered at the Rehoboth Convention Center. Addressing Bill and me, he said, "you guys have done this for decades and therefore I don't need to worry about your coverage," when it came time for us to present our plan.

We did anyway.

The safety meeting brings all the agencies and groups supporting the event together to review, discuss, and put the final touches on the overall plan for the event. It should be an integral part of the planning for any event. Three law enforcement agencies, Rehoboth Fire and EMS, Sussex County EOC and Paramedics, Sussex AUXCOMM, Delaware Department of Transportation (DelDoT), City of Rehoboth, and Cape Henlopen State Park, along with the sponsor and race director, were the primary agencies attending.

The safety meeting is a critical sharing of information, plans, resources, and issues. (An added issue that can disrupt the planning: the event course runs within a half mile of the "Summer White House" of President Joe Biden. Thankfully, he was not due to be in town this time.) The more all the entities know about each other's planning and perspectives, the better the event will run, and most importantly, the safer it will be for all. There have been a lot of positive relationships built at these meetings. The race director manages the event with a very personal touch, and starts off each year's cycle by hosting the safety meeting as a pizza party.

If you and your group want to support public service events, you would do well to look at developing relationships with the sponsors and the other agency representatives. It will pay off for you, and for ham radio in general; if you do a good job. Working these types of events and interacting with the other agencies involved, along with the spectators and participants, can put a very positive face on ham radio. Screw up, and it can go the other way, and has in other instances. You must be ready, you must be trained, and you must put your best effort into all the aspects. We are very much aware, as we plan for each event we do, that each event is "new," even though we've done it 20 times before.

Jay Rutherford, K3BH, at net control in the MCU, or Mobile Command Unit. (Photo by N3ID)

Between September 2021 and this last marathon, the Sussex AUXCOMM group has done three Coastal Delaware Running Festival (CODEL), two Rehoboth Marathons, and two Apple Scrapples, and not one of them had the same issues as the previous event when the smoke cleared. Yes, we often joke about "rinse and repeat" of these events. However, we do review our performance from the previous year, study the After-Action Reports (AARs), and cross-check the event package that had been distributed. It's a starting point. I've discussed the planning process in previous columns. It's something we do for every activation.

We are very focused on the relationships we have built over the years. Yes, Sussex County is relatively quiet and rural,

** 20116 Donovans Rd., Georgetown, DE 19947*
Email: <K3PFW@cq-amateur-radio.com>

but does face the same issues as groups in more urban areas. Having been a resident of the area for over 50 years, I've met and worked with any number of people, and also a huge number of former students. I've been associated with EOC as the amateur radio contact person for over 20 years. For the Marathon, Sussex County was responsible for providing the paramedics, the EOC's Mobile Command Unit (MCU), and AUXCOMM. The Operations Support Officer for the Sussex County EOC is Joey Pepper and his office is next door to the AUXCOMM Operations Room. Bill, N3ID, and I are recognized by many of the representatives of the agencies involved in the events we support. It's solid performance over time that has won their recognition and trust.

The AUXCOMM Group posts a calendar of events, as soon as a date is determined, sometimes a year in advance. This allows those volunteers interested in working a particular event to keep that date clear. The Apple Scrapple Festival in Bridgeville, Delaware is probably the most popular event that we support. A month or so before the event, a notice is sent via the email list that registration for the event is now

Jim Moore's, KC3BTV, completely functional and comfortable setup. (Photo by KC3BTV)

Doug, KB3PRW, and "Lucy" (see sidebar) under the pine tree. (Photo by KB3PRW)

Jake Carpenter, KC3TUB (Photo by KC3TUB)

Neil Carey, K3RNC (Photo by K3RNC)

open, and the sign-up begins. The management team then begins to work out locations, positions, and assignments. Event information, rosters, etc., are emailed to the volunteers in the week before the event. For the Rehoboth Marathon the package had a ICS 202, 205, and 208 forms; along with a roster and two maps of the course. The roster has each operator's name, callsign, tactical callsign, location, and personal cell number. The ICS 208 Safety Message did include a comment on hypothermia, based on the long-range forecast. An update on hypothermia issues was emailed the day before, as the forecast now indicated it would be an issue.

Ready, Set, GO!

So, on to the event. The operators who had previously volunteered for the event were all there and at their assigned positions on the course on time. The Mobile Command Unit was located near the finish line and paramedic tent was placed on Main Street of Rehoboth. Net control for the event

The 2022 Rehoboth Rainathon

The start of the 2022 Rehoboth Marathon in less-than-ideal conditions. (Photo by WAØCIE)

It was a dark and stormy morning when Lucy (my Go-Kit on wheels) and I pulled out of the driveway at 0601 local time for our appointment with destiny at Cape Henlopen State Park. The drive down was uneventful, until I pulled into the driveway of the park office — my designated position for the race. As I stepped down into a puddle, I was greeted by a park ranger's booming warning, "you can't park there!" Innocently, I asked, "Where can I park?"

"Parking lot 'bout a half mile down the road," was his still not very friendly reply.

After a brief explanation of who I was and why I was there, he gazed upon all the antennas growing out of my truck and said, "I guess you want to be near the truck?"

"Yes," I replied, quickly adding that it would make my morning a lot easier.

He mellowed after that, but said, "You can't stay there — you block my line of sight." Wanting to appear helpful, I suggested another spot in front of the office on the other side of the running path.

"Nope, there's a hump there — you can't park on a hump!"

I suggested another spot.

"Nope, septic tank. You can't park on a septic tank."

I was quickly sensing a pattern developing. I looked across the driveway at a space under a large pine tree. "Think you can fit over there?" he queried — much more friendly now.

"Yes," I quickly responded, "if it is OK for me to drive along that stretch of the path." I took my cue as he turned and walked away. The rain was already falling when another person came in and pulled up past the park office mailbox, turned onto that road and parked. I was expecting to hear a challenge but instead it was a friendly greeting — this was a park volunteer, known to the ranger. The three of us got well acquainted on that soggy and cold morning. As the race began, we each volunteered whatever information we received, and the contest was on! Who could get the most accurate information the quickest? Ham radio won that contest without even working up a sweat. As the morning progressed, so did the rain. At about 10:15 a.m., the last two runners passed our location. The other two went on to new assignments and I was, happily, informed that my services were no longer needed at that location, and I could head for home and dry clothes. My HT worked reasonably well until the windscreen on my mike got waterlogged and I had to switch to the mobile. I had two other HTs and spare batteries, but only one headset with me. - Doug Covert, KB3PRW

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was Jay Rutherford, K3BH, and Bill, N3ID, who was also the Operations Officer, was present. I was in my mobile at the north end of one of the course legs with another paramedic unit. I would become Net Control if the primary Net Control at the MCU failed. I also had my assigned 800-MHz trunked system portable to interface with the first responder units, if necessary. Normally I would have been "bicycle mobile" on one of the remote trails. However, recent medical issues precluded that.

The members of the management team. all having experience with this event, placed operators at "best guess" locations where we might tend to expect issues of some type. For example: The team of Donna, KC3IHV, and Lars, NS3F, Spencer, were at the turn where the full and half Marathon split to assist runners who might become confused as to which way to go. Butch Wlaschin, WAØCIE, was also at a trail split on the other end of the course. Neil Carey, K3RNC, and Jake Carpenter, KC3TUB, were on the Gordon's Pond Trail. Neil was familiar with that trail and helped Jake, who was new to the event, get familiar with landmarks and such. Don Smith, W3DCS, was a new "bike mobile," although he had done the event before at a fixed location. He and Debbie Libertore, AJ3L, new to this event, were on the Junction and Breakwater Trail section between Butch, WAØCIE, at the trail split, and me, several miles north at the end of the course and turnaround, if they needed advice.

Ted Allen, K3RTA (Photo by K3RTA)

Author with a hypothermia victim, who was warmed in the author's car. (Photo by KC3LGE)

Hypothermia was an issue for the participants. Several miles of the course were exposed to the very windy conditions coming off the Atlantic Ocean and Delaware Bay. With temperatures in the thirties and a drizzly rain, it was a problem for those not properly prepared. One young lady came out of the race at Wolf Neck. The paramedics there didn't have immediate transport available, so she was placed in my car until a friend could come and pick her up. It was a good opportunity to introduce her to the public service aspect of amateur radio.

Yes, I worked the event, in the car, with the heat on.

Despite the rain, the event went relatively smoothly. The operations report from Bill Sanders, N3ID, was a short paragraph, with no notable discrepancies.

In closing, let me share a short narrative from Doug Covert, KB3PRW (see sidebar). Doug, an Air Force veteran, is the former ARRL EC for Kent County, Delaware. His replacement, Jim Moore, KC3BTV, a Navy veteran, also worked the event. There is a valuable lesson to be learned from this simple piece, that we all would be well to make note of when we participate in public service events. Positive personal interactions pay off. *– Later, 73 de K3PFW*

kit building

BY JOE EISENBERG,* K0NEB

No Static at All: An FM Stereo Receiver Kit for Beginners

Often, I get asked about kits that are appropriate for beginners and for specific kits that are not only beginner-friendly, but also can be used to teach a specific building skill as part of a group kit-building experience. Over the last year, I have had great success with a kit that incorporates a surface mount IC as well as a relatively low parts count. This combination is perfect for a group kit-building experience for both beginners and experienced kit builders. A simple FM stereo receiver kit fits the bill.

The fun part of this kit is that it gives the builder a very useful device at a very low cost. Because younger builders are not always licensed, this kit still makes it an enjoyable experience. The FM stereo radio kit is made by EQKIT, is sold on Amazon, and costs around $10 for two kits. Yes, these kits cost around $5 apiece.

In order to make this a full kit, you will need to print the assembly manual, which is available as a download on the kit page. In addition, you will need to get two AA batteries and a set of wired stereo earbuds or headset to complete each kit. I have found affordable alkaline AA batteries on sale at Harbor Freight as well as at a dollar store. The earbuds can be found at stores like Walmart, but if buying them in quantity, they can be found on Amazon as well for well under a buck apiece.

In putting these kits together for a group kit-build, I use a Ziploc®-type sandwich bag and place the kit, the two AA batteries, and the earbuds in the bag, along with the printed manual sheet folded up. I have found that using a color inkjet or laser printer in the duplex mode and printing the manual as a brochure, all the pages fit onto one sheet. The drawback is that a magnifier might be needed to see some of the fine print.

This FM radio kit actually receives from 76-108 MHz in order to accommodate the different FM broadcast band allocations in different parts of the world. In the U.S., the frequencies from 76-88 MHz are occupied by low VHF TV channels 5 and 6. Because many TV broadcasters have abandoned those lower channels and moved on to high VHF (channels 7-13) or UHF (channels 14-36), channels 5 and 6 are not often used. However, some major sporting venues use these frequencies to carry a non-delayed version of the live radio broadcast of the game. Big events like the Super Bowl almost always do this. Many professional and college stadiums and arenas also provide this service for users of a special receiver. These receivers often resemble a pendant and are sold at the event if that service is available. So, taking this radio to a major sporting event may bring the possibility of hearing these broadcasts without the need to buy a special receiver.

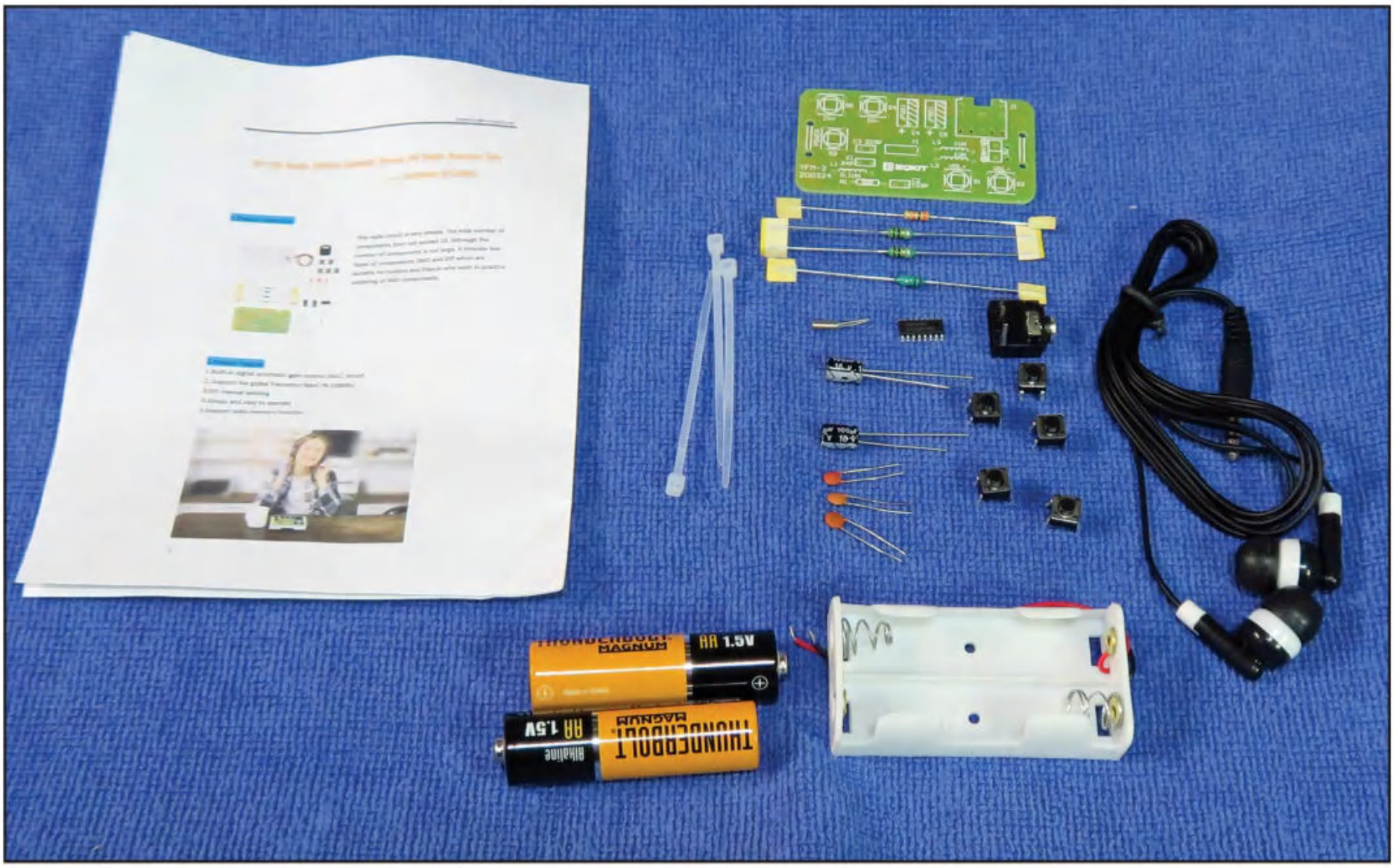
I package the kits I use for a group kit-build using Ziploc® bags and insert a printed manual, two AA batteries, and a set of stereo earbuds, as well as the kit itself.

Building the Kit

The first thing that needs to be done when building this kit is to mount the surface-mount IC, which resides on the bottom of the PC board. There are two methods I have found effective for this situation. The first is to put a tiny dab of solder on one of the corner IC pads on the PC board. Then, using tweezers, I align the IC making sure the dot on the top is on the side where the indentation mark is on the IC outline on the board. I then bring it to the pad while heating it with the soldering iron and let it cool before releasing the tweezers. If aligned correctly the remaining IC legs should be exactly centered on the rest of the pads. I then solder the opposite corner pad to secure the IC in position before soldering the remaining pads.

I suggest using the sharpest tip available on your soldering iron for dealing with this IC. I follow up the corners by running the iron along with solder down each row of pads ensuring each is soldered on both sides of the IC. Don't worry if you leave a solder bridge between pads as that will be corrected after the IC is soldered. Just solder them

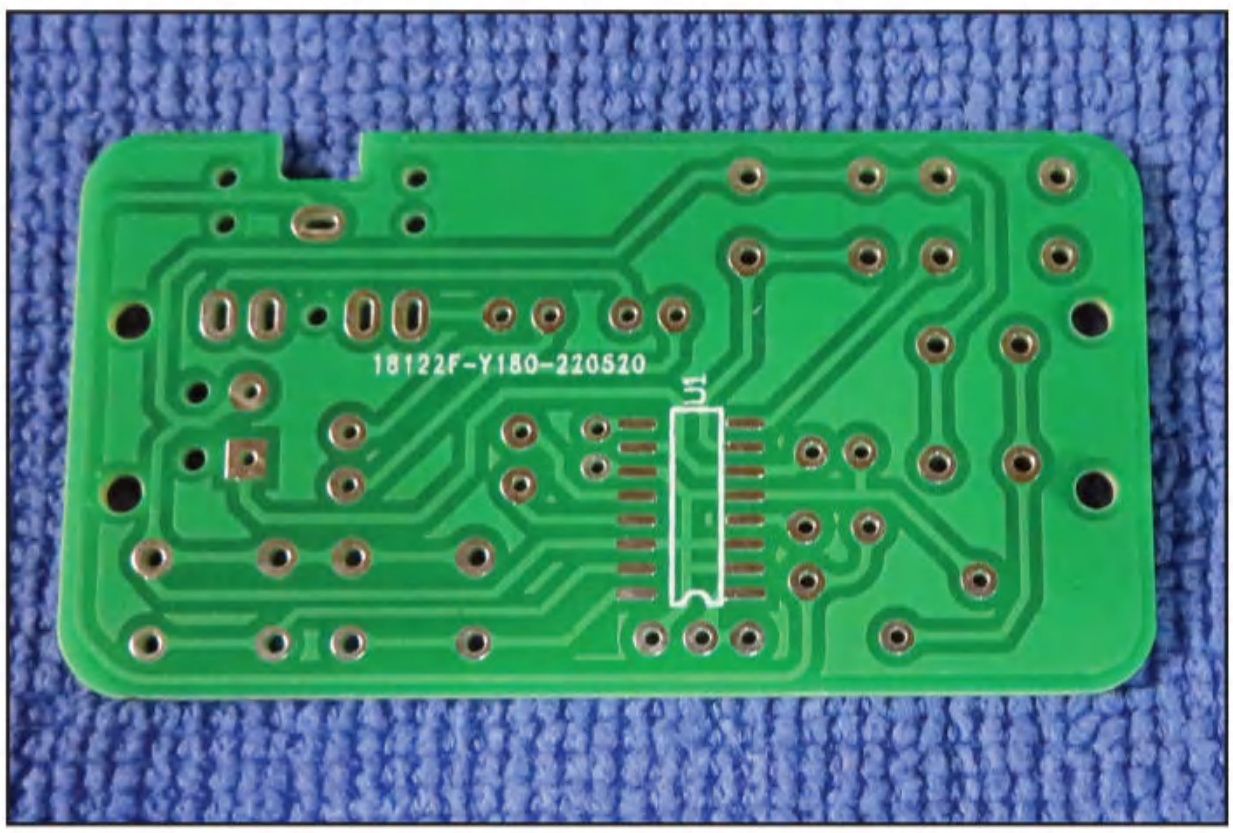
*7133 Yosemite Drive,
Lincoln, NE 68507
email: <k0neb@cq-amateur-radio.com>
Hamfest Hotline #5855



The low parts count and simplicity of this kit make it ideal for a group kit-building experience, especially for beginners.

quickly to not overheat the IC. Once all IC pads are soldered, I tip the PC board on its side and use the tip of my soldering iron to draw the excess solder causing bridges away from the IC and on to the tip. I use gravity to help draw the excess solder onto the soldering tip. I then clean my tip and proceed to the next set of pads that needs attention. Using solder wick can help as well.

The other way to solder the IC is to use solder paste and a heat tool. Solder paste is a grayish compound made of solder and flux. I simply draw a tiny line of solder paste over the rows of pads without worrying about any in between the pads as long as there is paste on each pad. Heating it with the heat tool releases the flux and then the solder, which is almost magical. You see the flux flow first, then it turns silvery, and you see it flow onto the pads and usually clearing the space between them due to surface tension. Once again, don't panic if there are solder bridges left as you can remove them using the same method I described earlier. The solder paste process is similar to the process used to manufacture most electronic devices that use surface-mount parts.



The bottom of the PC board is where the surface-mount IC is attached. The dot on the top of the IC goes on the end with the indentation mark on the IC outline.

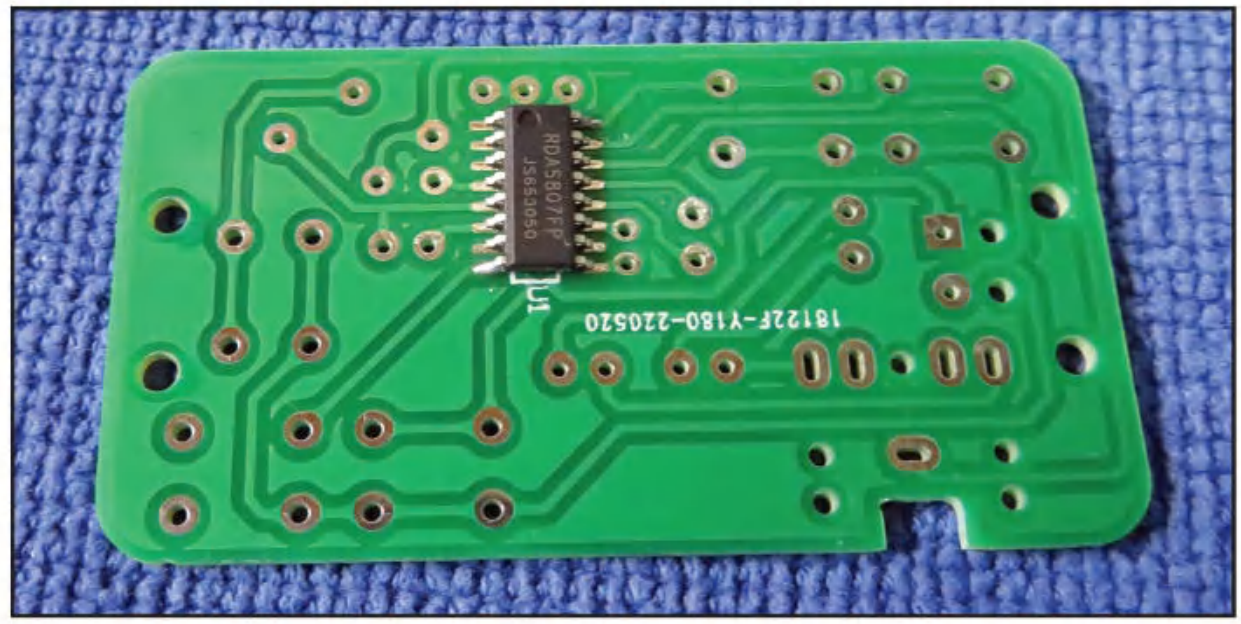
Once the IC is placed, the rest goes easily. Be sure to properly identify the RF chokes as well as the resistor and position the switches correctly before soldering them. Be sure to trim the excess leads under the board as well. If you are using a metal cookie sheet, you must test your kit by placing it on an insulated surface. I highly recommend testing the kit before using the supplied zip ties to mount the PC board on the battery holder. It powers on as soon as you place the batteries in it, and

hitting the CH+ button starts it scanning from 76 MHz up into the FM band at 88-108 MHz. The audio quality and sensitivity are surprising, and using a higher quality headset or a wired amplified stereo speaker instead of low-cost earbuds will bring out that quality. The cord on the earbuds or headphones or speaker makes up the antenna for the radio, so moving it around can significantly improve the signal quality if it is noisy. I was able to hear all of my local FM stations, including the lower power outlets as well as most stations from Omaha, about 50 miles away.

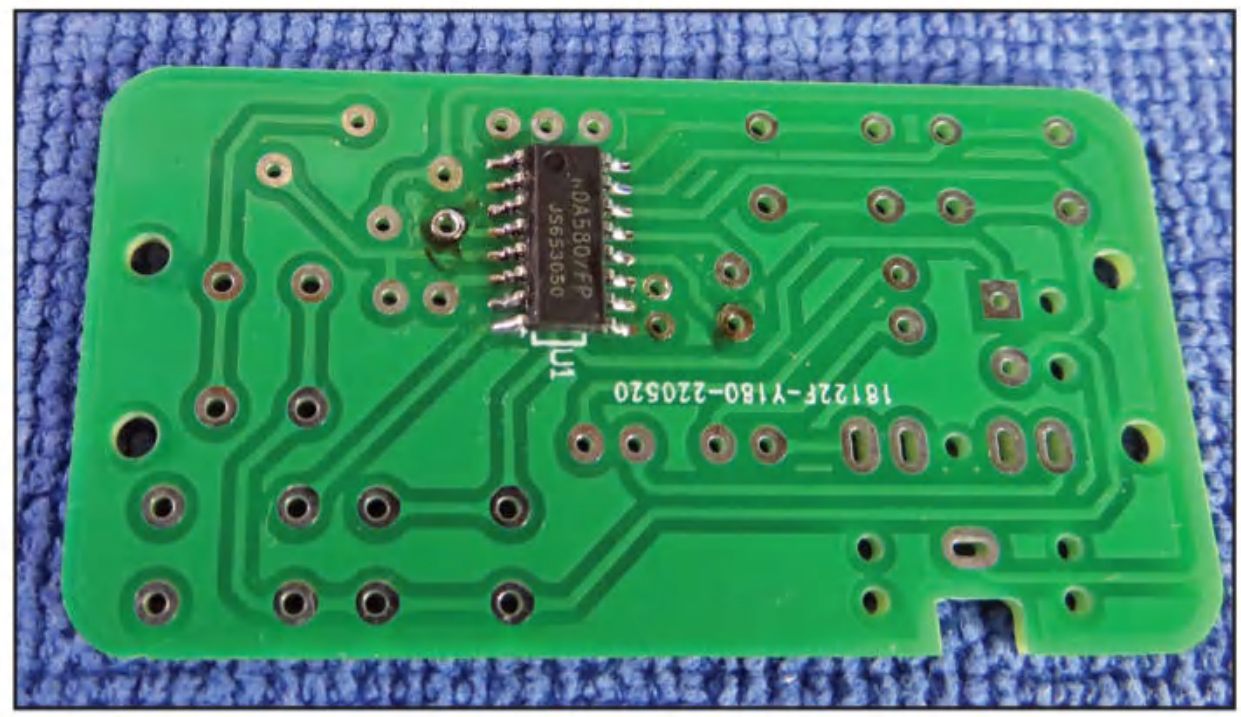
The EQKIT FM Stereo radio kits sell for about $10 for two kits on Amazon at <https://amzn.to/3BOn11B>. The stereo earbuds are about $30 for 50 of them at <https://amzn.to/3hH4kpH>. You can find solder paste for about $16 and is available on Amazon at <https://amzn.to/3v1BTpE>. I am available to put on a group kit-building experience with this kit as well.

I look forward to seeing everyone at the Orlando Hamcation® as well as many other hamfests coming up.

– Until next time, 73 de KØNEB



I soldered the upper left and lower right pads on the IC to begin the process.



All pads on the IC are soldered and the excess solder and solder bridges have been removed.

The finished FM stereo radio kit is completed and attached to the battery pack with the supplied zip ties. Ready to rock and roll!

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homing in

BY JOE MOELL,* KØOV

Results of the 25th CQ World Wide Foxhunting Weekend

It was a quarter century ago when CQ Communications, Inc. embraced the idea of a yearly weekend when hidden transmitter hunting activities would be promoted and encouraged. Originally named the CQ National Foxhunting Weekend, it was expanded in 2007 to become the CQ World Wide Foxhunting Weekend. In most years, Foxhunting Weekend has been the second weekend of May to ensure warm weather throughout the country, but any time when hams get together can be a good time for a radio direction finding (RDF) contest.

The 25th annual CQ Foxhunting Weekend was May 14-15, 2022, but the fun began early in the year with the traditional New Year's Day foxhunt on the Box Mountain repeater in Connecticut. Hunters assembled to start at a schoolyard in South Windsor. Organizer Paul Gibson, N1TUP, was waiting somewhere within a 20-mile radius with his rig and tailgate treats.

Transmitter hunt participation in the Nutmeg State has grown in recent years with several hams regularly deploying unattended foxboxes during the pandemic for others to activate and safely locate at their leisure. Frequent Sunday afternoon start-from-anywhere hunts in the Wallingford area now feature multiple low-power transmitters for hunters to track down on foot and in vehicles.

It has become an annual tradition to have hidden transmitter hunting on foot at the Yuma Hamfest in Arizona on Presidents' Day weekend. Marvin Johnston, KE6HTS, gave a presentation on the sport and hosted a building session for measuring-tape Yagis and offset attenuators in the early afternoon of February 19, 2022. That was followed by an opportunity to hunt some 2-meter transmitters set out by Joe Corones, N6SZO, and Joe Loughlin, KE6PHB, of the San Diego area transmitter hunters.

A little winter rain didn't deter over a dozen foxhunters from participating in a Sunday afternoon hunt organized by Bryant Bischof, W7BDB, and Dale Hunt, WB6BYU, in Hillsboro, Oregon on February 27th. Four transmitters were placed within a 7-mile radius for mobile hunting and two were set out for on-foot hunting around a shopping center.

Participants in the Pottstown Area ARC foxhunt in Pennsylvania on April 16, 2022. Not shown is Tink, a runaway pet pig that showed up to greet the hunters and was later reunited with her family. (Photo by Bill Hewitt, W3FRB)

Bryant wrote, "Dale and I both concurred that, besides the weather, the fox chase had some [difficult] challenges. We think most of the folks who did the on-foot hunt found only the two hidden close by. Of the four mobile transmitters, we heard from four hunters that each found only one.

"The one I found took way longer than expected," Bryant continued. "Robin and I got a good heading from the start and then it all went sideways. We probably put on 20 miles driving around a transmitter only a shade over a mile away. We circled the area multiple times with signals bouncing off industrial sites, office complexes, and shopping centers. We were very close to tossing in the towel and considering ourselves skunked, but persistence finally paid off."

Hamvention Hunt Rained Out

The annual Saturday morning foxhunt forum at Hamvention® on May 21st drew over 60 attendees for presentations by Dick Arnett, WB4SUV; Brian DeYoung, K4BRI; and Bob Frey, WA6EZV. Unfortunately, the traditional Hamvention transmitter hunt, planned for James Ranch Park with 37 transmitters to find, had to be cancelled at the last minute because of a thunderstorm.

March 26th was Foxhunt Saturday for South Africans in Greenside, Johannesburg, as Keith Barker, ZS6HI, transmitted on 2 meters from somewhere near Emmarentia Dam. Then on May 29th, the Sandton Amateur Radio Club sponsored a family-friendly VHF foxhunt in the Johannesburg suburb of Craighall, including a picnic and grill.

Bill Hewitt, W3FRB, submitted a report on the April 16th foxhunt of Pottstown Area Amateur Radio Club in Pennsylvania. Bill wrote that this hunt proved to be a challenge. "As usual, Mr. Murphy paid a visit. The signal meter on Jim Toth's (K3CHJ) equipment was not working. Luckily, he had a backup audio meter which worked quite well, but with an annoying pitch that we had to get used to."

Bill continued, "Bob Rex, K3DBD, a master fox, decided on a close in hunt. The perfect driving distance would have been about 11.7 miles to Mildred Hess Preserve where Bob was hiding. K3CHJ and I won with the shortest distance of 15.1 miles. In addition to the

** P.O. Box 2508, Fullerton, CA 92837*
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Mobile T-hunters are lined up for Event 2 at the Australian Foxhunting Championships at Mt. Gambier in June. The events take place on several bands, so each vehicle has multiple RDF antennas. (Photo courtesy of SERG)

Marvin Johnston, KE6HTS, led the antenna-building workshop at Fullerton Radio Club's "Antennas-in-the-Park" event. At the far end of the table is Devon Day, KF6KEE, advisor to Sota Academy's amateur radio program. (Photo by Joe Moell, KØOV)

main fox transmitter, there were three smaller foxes for on-foot hunting. Our transmitters are usually on 2 meters, but Glen also brought an 80-meter fox to try."

Moving Down Under, the annual South East Radio Group convention at Mt. Gambier took place June 11-12th with presentations, a homebrew contest, and the Australian Foxhunting Championship. This RDF contest had 11 separate events on various bands and modes. Eleven teams competed for the big trophy, which was captured by the four-person VK3FAST team.

Pent-up pandemic enthusiasm brought out the biggest turnout ever for the annual Fullerton Radio Club "Antennas-in-the-Park" get-together at Hillcrest Park in California. Culinary expert Al Solomon, AG6OF, filled the grill with hamburgers, chicken, and brats. For dessert, there was the traditional Foxhunting Weekend cake furnished by April Moell, WA6OPS.

Marvin Johnston, KE6HTS, arrived from Santa Barbara with a box full of 2-meter RDF antenna and attenuator kits for the building workshop. Among those participating were high-school students from Sota Academy of Math and Science in Long Beach and their mentor, Devon Day, KF6KEE. To test their antennas, they took on my practice transmitters near the Izaac Walton

cabin. Then there were five more 2-meter foxes throughout the park sending the international ARDF transmission sequence plus a practice transmitter on 80 meters.

After a hiatus of two years, the San Diego T-Hunt Group sponsored its annual international-style, on-foot transmitter hunt at Felicita Park in Escondido, California, on May 21st. Forty-three people signed in, of whom 28 were licensed hams. Ages ranged from 3 to over 85. Many came from out of town, as far away as Santa Barbara. Marvin Johnston, KE6HTS, provided an antenna-building clinic for Michael Gillen, KK6RWK, and Chelsie Power, KM6WAS, so they would have their own gear with which to locate some foxboxes.

Gathering for the on-foot transmitter hunt in San Diego County on May 21, 2022. (Photo by Joe Corones, N6SZO)

Organizer Joe Corones, N6SZO, reported, "We had 22 total participants out on the course. Some did not yet have their ham licenses and were trying it for the first time. Others had years of experience and completed the short course in less than an hour. Over half of them found all five foxes with the rest finding between one and three. The grand winner was Bill Wright, WB6CMD, from Winchester, a frequent ARDF championship medal winner, with a time of only 35 minutes for all five."

Old Ideas Come Back

In some areas of the country, including Los Angeles, San Diego, and Chicago, mobile T-hunts continue to take place almost every weekend. Hiders are on the lookout for new ways to keep the hunters interested and enthusiastic. In Chicago, Pete Walter, K9PW, likes to use a crossband repeater in a foxbox to "throw his voice."

Pete wrote, "My approach is to do it in

a way that the hunters do not realize that the hidden transmitter is actually a repeater. That means careful attention to receiver squelch settings, minimizing drop-out delay, careful adjustment of repeated audio level, etc.

"I usually stay out of sight until several hunters are very close, or one of them finds me. At that point, they usually ask if I'm the fox and I give them a 'no' reply, which confuses them. (Rules state that they must find the actual 2-meter transmitter, not me.) Once several hunters are in the area, I often walk around with one or more of them and transmit through the fox with my UHF portable. It can be very entertaining to watch the hunters!"

Pete's story took me back a couple of decades when I used my IC-32AT dual-band handie-talkie as the fox. It had crossband repeat as an undocumented feature. I'd put it in an ammunition can with a gel-cell battery, hide it, then park a couple of blocks away to talk to the hunters and watch the fun. The crossband repeater is more difficult for hunters than a simple timed fox controller because fox transmissions can be made (or not made) at crucial times as they approach it.

The most unusual hidden transmitter of 2022 may have been in San Diego, where Robert Dexter, N9SCD, was huntmaster on December 3rd. He wrote, "Back when I started T-hunting, I heard of some unique hides. One of them had a balloon floating out of sight, in the dark. About then, I happened to wander through a Walmart and there was a pallet of helium tanks for party balloons at the front door. I couldn't resist."

Robert's primary fox for this hunt was a micro-power transmitter hanging under a few 30-inch helium balloons. A second micro-power fox was concealed behind a fencepost and a third was in the corner of a nearby pedestrian overpass. Robert also placed a mag-mount whip in another location on the overpass as a decoy.

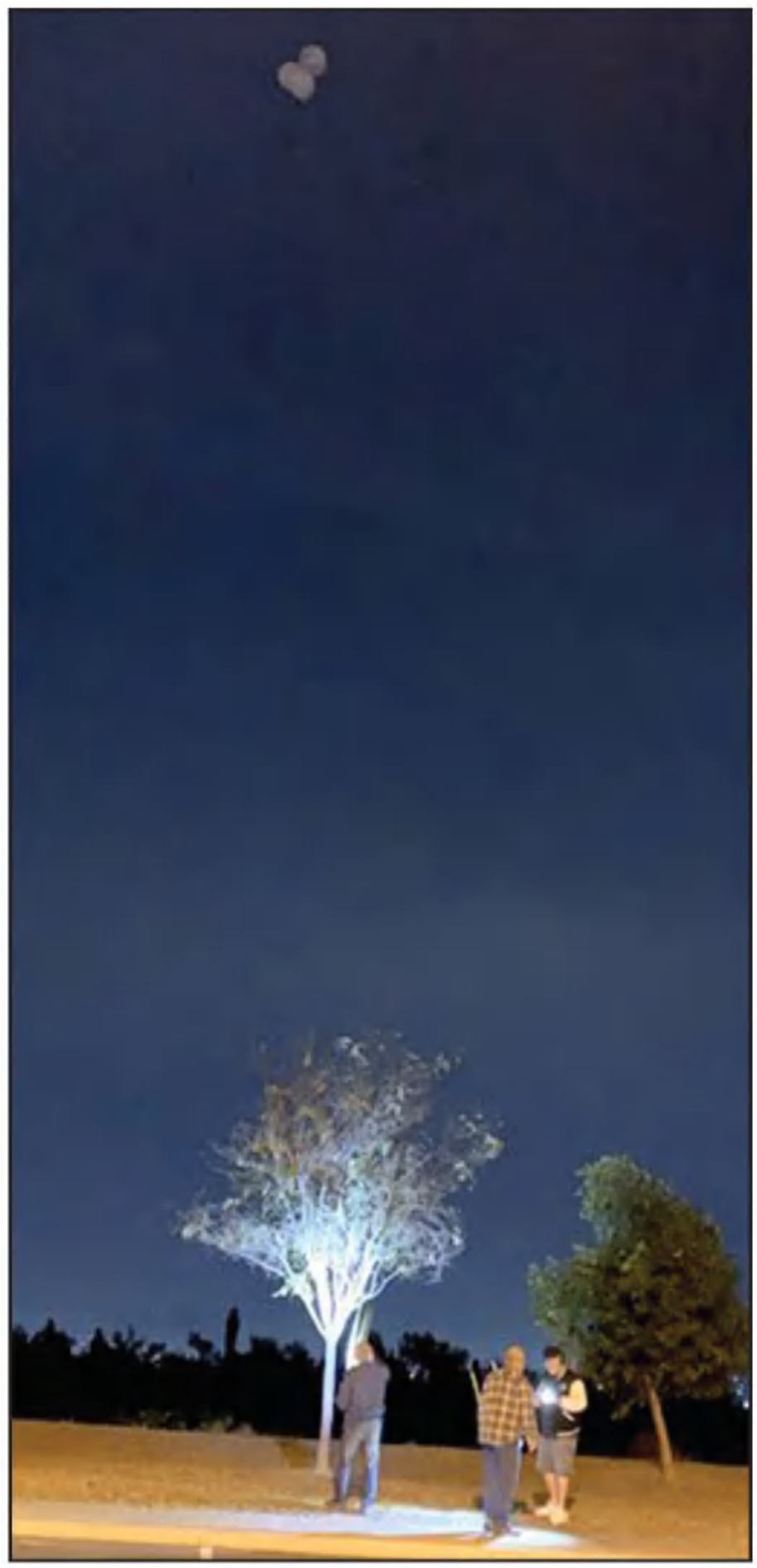
"My hiding place was Town Center Community Park," he continued. "The sky had thin clouds with just a slight wind. Unfortunately, the moon was nearly full. I would have preferred it to be completely dark."

To ensure that the hunters located the actual transmitters and not the decoy, Robert instructed them to text a photo of each transmitter to him as they found them. The timestamps on the photos would determine which hunters found each transmitter first.

Teaching and Training

A foxhunt can be intimidating to newcomers, so many groups are providing training to give people a good start. At least 17 would-be foxhunters participated in a transmitter hunting clinic at Keizer Rapids Park near Salem, Oregon on April 30th. Organizers were Bryant Bischof, W7BDB, and Dale Hunt,

K9PW's crossband repeater fox (at right) hides under the traffic cone (at left). Hunters sign in on the sheet when they find it. (Photo by Pete Walter, K9PW)



The balloon-carried hidden transmitter of Robert Dexter, N9SCD floated over the hunters in San Diego on December 3rd. (Photo by Joe Corones, N6SZO)

WB6BYU. Bryant wrote, "We endured the few passing showers for the great presentation Dale provided, showing different antenna types and discussing the importance of having an attenuator and a sense of humor. Then folks used their newly learned skills and various types of equipment to track down some of the five hidden transmitters that I had set out."

High school students in Edgewood, Kentucky learned about foxhunting and tried it for themselves on May 10th. Prior to a hunt on 80 meters and 2 meters on the school grounds, there was a presentation by Dick Arnett, WB4SUV; Bob Frey, WA6EZV; Jack Prindle, AB4WS; and Bob Carlin, KA4CTW. The Dixie Heights Ham Radio Tech Club has its own club station, KY4DH. Sherri Edmondson, KJ4MOB, is the club's advisor.

Andy Jones, AJ6WB, is leading the effort to kick-start foxhunting for the Barstow Amateur Radio Club in the California desert. On December 3rd, he organized a full day of it. In his announcement, he wrote, "The goal of this event is to equip, train, and practice the fundamentals of direction finding for all ages. There will be gear available for those who need it so that all can enjoy the event."

At 10 a.m., would-be hunters met at a residence in Yermo for a talk on the basics, followed by constructing tape-measure Yagis. At noon, everyone adjourned to a local restaurant for a pizza lunch and then a practice on-foot foxhunt in the parking lot there. Afterward, everyone carefully measured their odometer mileage as they drove to the parking lot of Eddy World, the highway rest stop where the mobile T-hunt would begin. These recorded mileages were used to compute a correction factor that would aid in scoring the 2-hour mobile T-hunt that began at 2 p.m.

I look forward to receiving your news and photos of mobile and on-foot transmitter hunts in your locality, whether they are on Foxhunting Weekend or any other time.

USA's Championships Coming in April

Eastern Texas will be the site of this year's national championships of international-rules, on-foot transmitter hunting (called radio-orienteering and ARDF). New Mexico Orienteers will host the USA ARDF Championships from April 19-23rd, using terrain maps provided by North Texas Orienteering Association. Meet Director and Registrar will be Jerry Boyd, WB8WFK. Course designers will be Nadia Schlarlau, KO4ADV, and Charles Scharlau, NZØI.

All events will take place within the 3,026-acre Cooper Lake State Park near Sulfur Springs, Texas, about 95 miles northeast of the Dallas / Fort Worth airport. Practice, training, and equipment testing will take place on Wednesday, the first day. That will be followed by four days of competitions, the sprint, foxoring, and classics on 2 and 80 meters. Medals will be awarded for each event in each of the IARU age / gender categories.

USA's ARDF Championships are open to anyone of any age who can safely navigate in the woods with hand-carried radio gear for several kilometers. Don't worry if you are inexperienced at radio-orienteering, as this is a chance to learn from experts.

Bulletin One[3] from the organizers has more information about the categories plus transmitter frequencies and schedule details. Registration and lodging information is expected soon and links will be provided in the "Homing In" website.

– Happy Hunting!

Plan for Foxhunting Weekend 2023

It's time to start planning for the next CQ World Wide Foxhunting Weekend, which will be May 13-14, 2023. Your hunt can be in mobiles or all on foot. Since the primary objective is lots of participation, we don't insist that your event be on that weekend. Any time is fine with us. *CQ* doesn't impose any rules or offer any awards for this activity. That's up to you and the hams in your hometown.

For mobile T-hunts, some groups prefer the formalities of carefully crafted boundaries, specifications for signal parameters, time limits, and so forth. Others are content just to have one or more signals to hunt. No need for any regulations, they say. For on-foot hunts, use the international rules[1] or make up your own. Talk it up on the local repeater and social media to find out what your friends have in mind.

Foxhunting teaches an important skill — the ability to find the source of signals from afar. RDF is useful for public service and volunteer enforcement. It can even save lives, but — most of all — it's fun. Give it a try, but make sure your group has safe fun. See to it that no one can be injured by your hidden transmitter or by trying to get to it.

Don't let the excitement of the hunt make you an unsafe runner or driver. Ensure that all transmitting and receiving antennas are eye safe. Always be mindful of your own physical limitations and never take chances behind the wheel or in the forest.

Afterward, write up the results and send them to me. The list of information in a complete CQ Foxhunting Weekend report is posted in my website[2]. In addition to the details of date, location, hiders and winners, CQ's readers also want to know what was unique about your hunt and what lessons (positive and negative) you learned from it. Don't forget to include some sharp action photos. The higher the resolution, the better.

Notes
1. <www.homingin.com/intlfox.html#rules>
2. <www.homingin.com>
3. <www.homingin.com/files/USA2022BulletinOne.pdf>

Looking Ahead

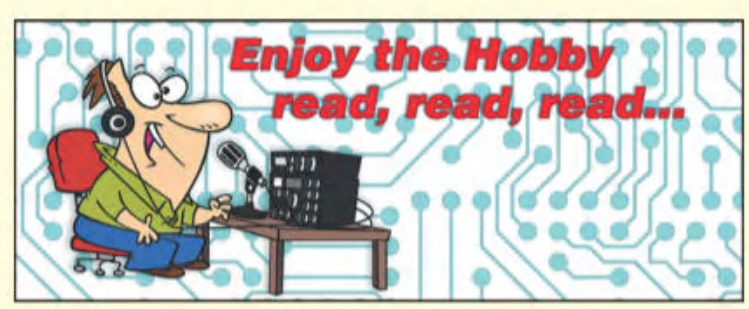
Here are some of the articles we're working on for upcoming issues of *CQ*:

- Results: 2022 CQWW RTTY DX Contest
- Learning ICR (Instant Character Recognition) for Morse Code
- Profile: Carolina DX Association
- Basics of MF and LF Amateur Radio

Plus…

- Gordo's Short Circuits: HF Tuner Considerations
- The "Perverted V" Antenna – Part 3
- Portable Operation of HTs and Scanners

Do you have a hobby radio story to tell? A new circuit you've designed? An operating adventure? *CQ* covers the entire radio hobby. See our writers' guidelines on the CQ website at <http://bit.ly/2qBFOdU>.



analog adventures

BY ERIC P. NICHOLS,* KL7AJ

Fifty Years of Hamdom

All of this has caused me to wonder ... what will it take to compel the next generation to become hams, and not merely to "do" ham radio. Perhaps the issue extends far beyond amateur radio, and into the very concept of work and career.

Some time between the last Analog Adventure and this one, I passed the half-century mark of being a radio amateur. Alas, I cannot remember the exact date my ticket arrived, but it was near the end of September 1972. I had graduated from Mira Costa High School in Manhattan Beach, California, just the previous spring.

A lot of photons have flung off the old skywires since then.

In early October 2022, I went back down to L.A. to attend our 50th year high school reunion, and afterward got to meet with two of my Elmers for lunch — Mike Aust, WB6DJI, and Phil Jaque, KD6CKS. Mike's twin brother, Tim, WB6ZUF, couldn't make it to our luncheon, but I was glad to learn he was still very active on the air and as a professional electrical engineer, as were Mike, Phil, and I.

It was very evident that amateur radio had been very good to all four of us, and continued to be so. Amateur radio had launched us all into rewarding careers in radio in some capacity, and not too surprisingly, none of us had any immediate plans for retiring. I can't say the same for many of our fellow students, some of whom I remember expressing that their greatest ambition after graduation was to retire as early as possible and spend their remaining years surfing. Well, to be perfectly fair, a good number of our classmates *did* move on to successful careers in everything from finance to film-making, but almost everyone except for us radio nerds were retired or greatly desiring to do so.

Were / are we exceptional? Probably not for hams who began hamming during the era we did. For those of us of a certain vintage, ham radio isn't something you do, but something you *are.* I know for a fact that FAR more people on the planet recognize my callsign than my name. The same is true for any number of my Elmers and other radio heroes.

All of this has caused me to wonder ... what will it take to compel the next generation to *become hams,* and not merely to "do" ham radio. Perhaps the issue extends far beyond amateur radio, and into the very concept of work and career.

There was a time not too long ago when it was normal and healthy to identify with one's job or career. "I'm a doctor; I'm a writer; I'm a chemist; I'm a piano tuner; I'm Leonardo da Vinci." Now we're told that it's unhealthy to derive too much of your identity from your work, especially since that job may not exist in a few years. There's a certain practicality to this, of course. We've learned that the average American male has eight *entirely different careers* in his lifetime, not just eight different jobs. I don't know what the statistics are for women, but I suspect the numbers are fairly comparable. There's no question that we all have shorter attention spans than we did in the past, and a lot of our "yutes" cannot possibly fathom working for the same company for 40 years. But I can't put away the nagging suspicion that having a "life's work" in mind is the best key to longtime satisfaction. Most of us spend the majority of our waking hours doing work, and it probably behooves us to find the most rewarding work possible. Life's too short to be stuck in the wrong job.

Of course, perhaps our youngsters don't see any problem with job-hopping for 40 or 50 years. Maybe it's just that very sense of uncertainty that motivates them. Perhaps they realize it's better to be stuck in the wrong job for only five years than 40 years. I'm sure there's a happy medium somewhere.

I'm not sure what the answer to this dilemma is; or even if it is a dilemma that needs answering. I'd be very interested to hear your thoughts on the matter.

At any rate, I have been perusing the various ham radio periodical archives from the year I was licensed as a reminder of how far we've progressed. By the way, propagation in 1972 was magnificent ... not quite matching the sunspot numbers of the famous 1957 cycle, but hot enough to make my stuttering foray into ham radio filled with countless "beginner's luck" encounters that assured that I would never be frustrated with amateur radio.

Like all Novices of the time, I was fully "rockbound." It was only a few months after I got my ticket that we were given the go-ahead to use VFOs. As timing would have it, this occurred almost *immediately* after I had hand-ground a dozen or so FT-243 crystals for every few kilocycles of the existing 80- and 40-meter Novice bands. And yes, the terms kilocycles and kilohertz were *still* being used with approxi-

** 138 Shenandoah Drive*
Fairbanks, AK 99712
email: <KL7AJ@cq-amateur-radio.com>

Fifty years has certainly been a ham radio adventure for me, and I hope to have a lot more...

mately equal frequency. Also, within a year or so, Novices were given 10 meters. This was a long and hard-fought victory, although I didn't know it at the time. I worked my first real DX on 10 meters, a certain PJ2HA in the Netherlands Antilles. Needless to say, I was forever hooked on 10 meters AND DXing.

I had so much fun (and success) as a Novice that I almost forgot to upgrade before the 2-year "move up or move out period" had transpired. In fact, my General Class license arrived the very day my Novice expired (whew!)

Something else was marinating in the background in addition to my actual on-air activities. It was at this time that a seminal series of articles, "Another Look at Reflections," by Walt Maxwell, W2DU, appeared in *QST*. I was immediately captivated by the clarity and style of Maxwell's writing, and it caused me to think a lot more analytically about technical topics. It also gently compelled me to think about trying my own hand at technical writing. I'd always been good at English, having won my first spelling bee in second grade, but published technical writing was an entirely different level of writing. It took over a decade before I actually had an article published. However, in the intervening 10 years, I had accumulated a lot of ideas of things that *should* be published, and I gradually submitted these articles with increasing frequency of acceptance. As it turned out, it wasn't long before I was spending as much time at the keyboard as I was on the air. At some point I realized I had assumed the exalted status of Elmer. Not a bad development.

Incidentally, I was recently surprised to learn that the term Elmer did not exist since the beginning of hamdom as did the Old Man and the Wouff Hong. Not even close. In fact, the term was coined only about a year and a half before I was licensed; it first appeared in *QST* in a March 1971 "How's DX" column by Rod Newkirk, W9BRD.

Well, I suppose I should return to the main thoroughfare after this trip down memory lane. Fifty years has certainly been a ham radio adventure for me, and I hope to have a lot more Analog Adventures to share before we pull the big switch once and for all.

– 73! Eric

our readers say...

Silent Repeater Syndrome

The following letter was directed to outgoing Mobiling Editor Jeff Reinhardt, AA6JR (meet our new Mobiling Editor in this month's column)

Jeff,

Your August 2022 article ("Mobiling: On the Road Again") was really enjoyable and as soon as I began to read it, I was going to send you an email and ask you where in New York State you visited, but as I read further the answer was there. I am in the Catskills region, about 100+ miles northwest of New York City, but you were in a beautiful area, the Finger Lakes, a region that I like to vacation in.

Yes, repeater usage is way down. Back in the day, say in a big city like New York, at 5 p.m. rush hour, it was difficult to get on a repeater because of so many mobiles on frequency. Today, the "airwaves" are essentially dead. But I still have faith in ham radio, so I still put out CQs and pray for the best.

I hope you had a good holiday season.

– 73, Ken Slusher, N2DF

We Should Have Used Our GPS…

Editor, *CQ*:

In my youth, I spent many happy times in the Henry Radio store shown in the picture on page 33 of the December issue of *CQ*. The store was located on West Olympic Blvd. adjacent to the 405 Freeway, visible to the left in the picture. The nearest major cross street, however, was not Bundy as was stated in the caption. It was Sawtelle. The store later moved farther west and just north of Olympic Boulevard to a location on South Bundy Drive.

– 73, Jeff Wolf, K6JW

W2VU replies: Thanks for the clarification, Jeff. It looks like we zigged when we should have zagged … and probably should have looked at a map as well!

Christmas Island

Editor, *CQ*:

I was curious about the Christmas Island story (CQ Classic, December 2022), so I read the whole thing. Very interesting DXpedition.

Back in 1961, I worked several months for a farmer who had flown C-47s in China, Burma, and India during World War II. He had many tales to tell. One was when flying over the jungle during a thunderstorm, lightning struck the trailing antenna wire and dropped the heavy lead weight. He always wondered if there was anyone on the ground to notice it.

Another story was when his was one of the first planes to land on Christmas Island after it was retaken by Allied forces. Lots of dead Japanese and he had to be careful not to drive over them.

Thanks for the great magazine.

– 73, Paul Drahn, KD7HB

mobiling

BY JOHN KITCHENS,* NS6X

Keep On Truckin' (Maybe)

and Introducing a New Mobiling Editor

Jeff Reinhardt, AA6JR, has decided to pass the Mobiling baton to a new columnist after 20 years of writing both this column and "Magic in the Sky," which he will continue to do. So, with tremendous gratitude to Jeff for two decades of covering amateur radio on the road, we are pleased to introduce our new Mobiling Editor, John Kitchens, NS6X. John will tell you a little more about himself and his background toward the end of this month's column. – W2VU

NS6X's new Ford F150 pickup seemed like a perfect platform for mobile operating ... until he discovered that all of the exposed sheet metal is aluminum and won't support a magnetic-mount antenna. He's still waiting for a Ford technical bulletin to provide guidance on installation of radios and antennas.

I recently bought a new truck, a replacement for my 2014 Toyota Tacoma that had 250,000 miles on it. The Toyota still ran well, but life circumstances provided me with the excuse to get a new 2022 Ford truck. The F-150 is a hybrid that has a 2.4-kilowatt battery power source available with two 120-volt receptacles and two 12-volt power sources, one each in the bed and the cab. The hybrid F-150 was the only truck available with the power sources. I am able to power all of my portable radio equipment with the truck, leaving it on idle as needed to charge the hybrid battery.

I wanted to quickly get on the air mobile, plugging the handheld radio into the 12-volt power source. I like to use an external antenna when I can, as the rubber duckies, although getting better, are not efficient antennas. So I found one of my trusty dual-band mag-mount antennas and placed it on the rooftop. It fell off. All of the sheet metal exterior surfaces of the truck are sheet aluminum and won't allow a mag-mount to connect. Back to the proverbial drawing board.

Efficiently and effectively working HF mobile, and reaching VHF/UHF repeaters as I drive, is proving to be a bit of a conundrum. How will I do it? Portable operations have been no problem. I still use my lithium-iron phosphate batteries to power my various portable radios, and have been experimenting with the truck power. Operating mobile, while driving, on both HF and VHF/UHF, is the plan, as I did with my Tacoma. VHF contesting is one of the activities I enjoy. I was planning to be a rover for the first time, using some truck-mounted equipment.

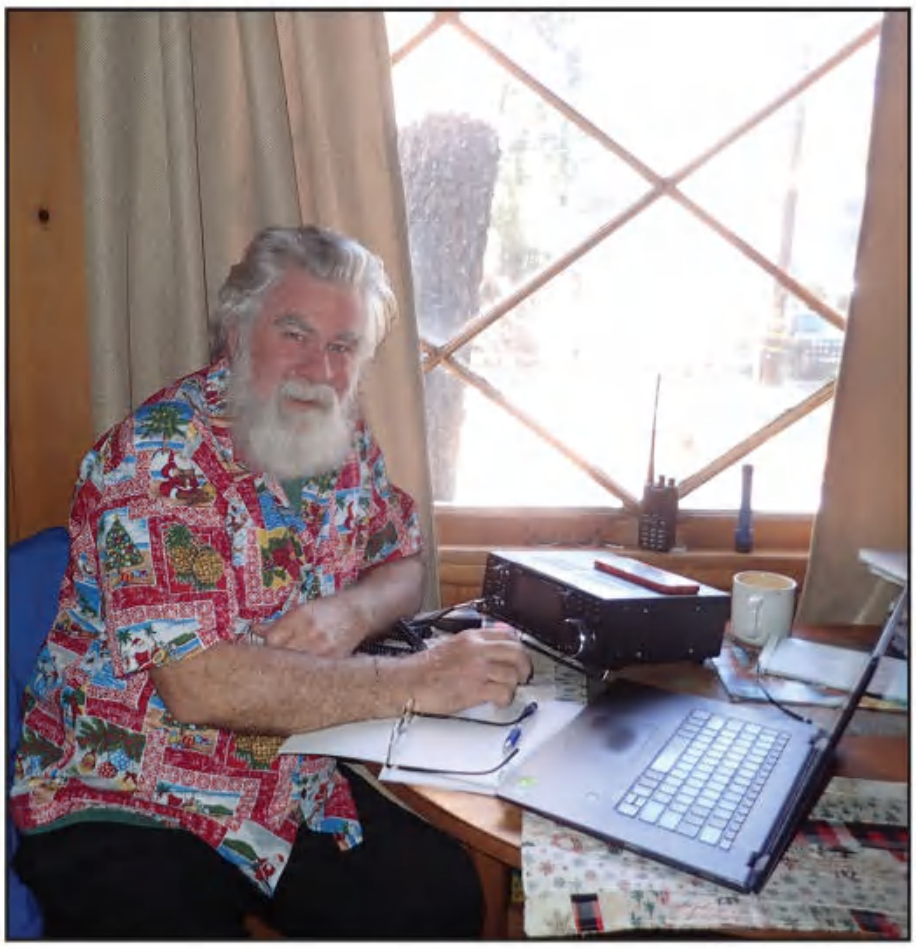
Talking with the Ford dealer was little help. I was told that installing radios into the truck was not suggested. Several local fire departments have the same truck, with 800-MHz and UHF radios installed, antennas on the rooftop. I showed the dealer pictures of two of the trucks, and asked if there was a Ford technical bulletin showing the details on how to install the radios. The service manager admitted that there was such a bulletin, but that I would have to write to Ford corporate to get a copy. I have written, and will hopefully be able to report in the next column on my findings, and my installation. He did tell me that there was a way to connect to the truck's battery system without using the hybrid battery outlets. He was not aware of RF problems with the truck's computers. There are many computers operating the truck.

Truck-supplied 12-volt and 120-volt receptacles will likely be able to provide power. However, using a separate battery in a battery box, mounted in the truck bed, charged by a solar panel on the roof of the *Leer* bed cover, is an interesting option. The Tacoma had a Tarheel HF antenna mounted to the fiberglass bed cover that worked exceptionally well. A similar installation in the F-150 should be able to be done. I am trying to get back to using repeaters, including 222 and 900 MHz, as well as 10-meter FM and 6-meter repeaters. I will report on my installation progress, and definitely solicit your suggestions. Send them to my email address at the bottom of the first page.

Who is This New Guy?

Jeff Reinhardt, AA6JR, has been this column's editor for many years. Jeff, a few other hams and I meet for weekly

** P.O. Box 178*
Somis, CA 93066
Email: <ns6x@cq-amateur-radio.com>



New CQ Mobiling Editor John Kitchens, NS6X, at his mountain home in California. He has another home in metro Los Angeles.

breakfast bull sessions. Jeff mentioned that he was backing away from this column, and asked if anyone wanted to take it over. I talked with my new boss, *CQ* Editor Rich Moseson, W2VU. Rich and I came up with a direction for the column that will go beyond strictly mobile radio. The column will listen to you, the readers, and report on your input. I will be traveling a bit, going to hamfests and conventions between fishing stops. Look for me to interview mobile and portable operators, and hams in general. I want to know how you are operating in the various 'OTAs, and maybe the new groups such as Lakes on the Air. I enjoy POTA, trying to activate the many parks in the western U.S.

A little about me, your intrepid columnist: I was first licensed in 1966 as WN6UYJ. Donald Ulrey, WA6TRX, was the electric shop teacher at Robert Peary Junior High School in Gardena, California. There were mandatory shop classes for boys, one of which was electric shop. Mr. Ulrey had a "radio room." If we went into the radio room as part of our 10-week course, we received an automatic A. We had to learn Morse code, which was pretty easy at 12 years old. Didn't have to send it, just know the numbers and letters. Didn't have to get a license, but that was the intent of the radio room. There were four or five of us who went into the radio room, learned the code, and studied for the Novice exam. Mr. Ulrey gave us the test, and most of us passed (*At that time, any ham with a General Class or higher license could administer the Novice exam. – ed.*). After the first try that I failed, I upgraded to General in 1967. Code has always been easy for me. The theory more difficult.

In the 1980s, when I began contesting, I wanted those extra CW KCs (oops, kHz), so I upgraded to Amateur Extra, when I was given the callsign NS6X. In addition to mobile and portable operations, I like to activate parks as part of my camping and fishing activities. After 38 years with the Los Angeles City Fire Department, I am retired, which allows me to travel a bit as part of my hobbies. I tow a small travel trailer that is fully self-contained, which allows me to enjoy some remote operating.

QRP has always been a part of my operating. When stationed at a fire station on Mulholland Drive in the Santa Monica Mountains, I continued to use my HW8 with an inverted-V antenna, working DXCC and 5-band WAS (Worked All States). I originally used the HW8 during a cross-country trip, operating when my little girl went to sleep, making a QSO each night with a random wire antenna about 8-10 feet off the ground, the tent trailer frame as the ground or counterpoise, and tuned with a Dentron wire antenna match. The QRP operating allowed for portable operations from mountaintops before there was SOTA. My daughter, at four or five years old, would hike with me. She became used to me calling CQ during VHF contests operating as QRP portable, where I would be on a mountaintop, giving out sections or, later, grid squares.

I am looking forward to reviewing portable equipment, such as the new BuddiHex beam that I recently received, but haven't used. I will set it up when I am at Quartzfest near the end of January. I look forward to having people stop by with their radios to try out the antenna.

Reporting on you, the readers, is another goal. I will be looking at mobile and portable installations at Quartzfest, interviewing people and reporting on the fun of ham radio.

Clubs and individuals can help with the excitement of operating and ham radio. Keith Elliott, W6KME, helped to coordinate the BORED Net during COVID shutdowns. The original intent was to simply check-in on people, seeing how they were doing, and giving them an outlet to connect with other people. As a function of the Conejo Valley Amateur Radio Club, Keith continued supporting other ideas. He is now coordinating micro field days, and even pico field days. These monthly events provide any interested person, licensed or not, with the outlet to setup a portable station, try out new equipment, and connect with other hams at a different site each month. Located in Ventura County, California, the micro FDs have become a fun and anticipated event. Keith connects with other clubs to have co-located field days. More than a club event, actually considered a non-club event, Keith simply is helping people have fun with ham radio.

Although I live outside of Los Angeles, I am writing this from Big Bear City in the San Bernardino Mountains, at almost 7,000 feet elevation, sitting at my station window looking at the snow. The thermometer indicates 18°. Might count as an FYBO event, if I decided to go outside to operate.

When my wife (SK) complained about my ham radio hobby, my mom would remind her that I wasn't hanging out in bars or out with other women. I was talking to people around the world, building radios and radio equipment. As part of ham radio, I have flown in the Goodyear blimp, been able to be an ARRL Section Manager, through which I meet many interesting and fun people, and learned a tremendous amount of information regarding electronics, meteorology, geography, antenna theory, RF propagation, and about people. I continue to learn and look forward to reporting on what we learn through this column. Oh, and my name is John Kitchens.

Please contact me with comments, complaints, information, questions, requests to visit a hamfest or about any topic you wish. I plan to be at SalmonCon QRP conference near Snoqualmie, Washington, this coming July; Dayton / Xenia, and various hamfests. Feel free to email me. I will even respond to a letter or QSL card sent to my post office box. Thank you for giving me the opportunity to be a reporter by reading *CQ* magazine.

learning curve

BY RON OCHU, KOØZ

What's Up? 10 Meters Is Up!

I consider myself a tried-and-true Midwesterner. However, I was born and raised in southern California. I learned how to scuba (self-contained underwater breathing apparatus) dive when I was a teenager. Surf conditions are a regular part of local news. Although scuba divers prefer not having rough surf conditions, surfers live to hear, "Surf's up!" So, what does this have to do with amateur radio? Just as surfers wait for exciting, optimum wave sets, so too, do ham radio operators wait and get excited when 10 meters is up.

There are several factors contributing to good 10-meter conditions. Over the past few months, this column looked at space weather effects on our Earth's ionosphere. Solar flux values are consistently above 100 — as I am writing this article, the SFI is 155 — and this means better and longer DX (long distance) openings on 10 meters. As Solar Cycle 25 continues to ramp up, conditions will continue to get even better over the next few years for HF (high frequency) bands and for 10 meters in particular. Best of all, Technician licensees can avail themselves of this exciting HF band.

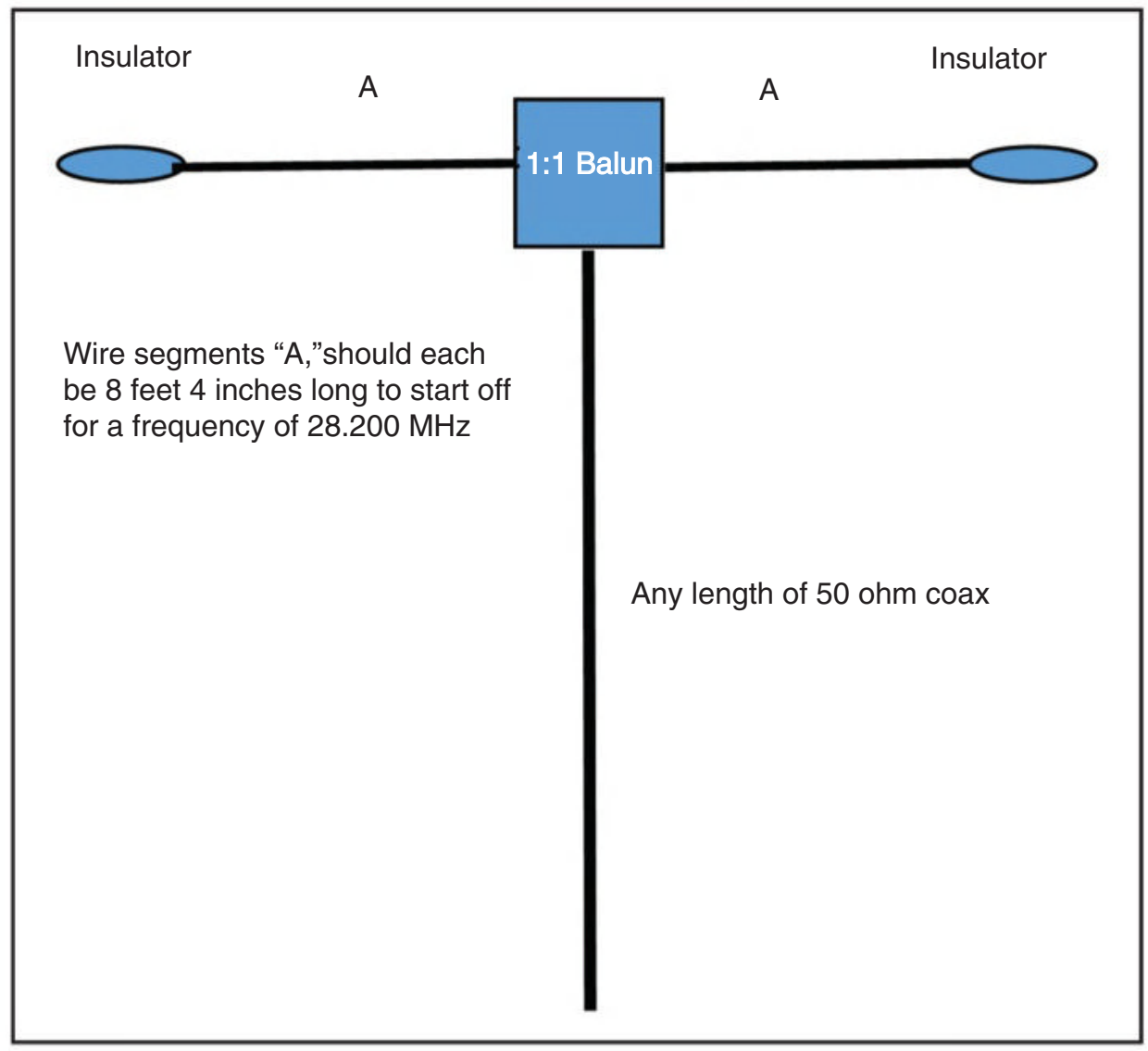


Figure 1. Here's a simple wire 10-meter dipole that is easy to build. It is capable of worldwide coverage. It's less than 18 feet long and not too noticeable. The dipole can be strung between two supports (trees), the side of a house to a tree, etc. It can also be supported by the center insulator and each element draped towards the ground in what's called an Inverted-V configuration. (All photos by KOØZ)

Technician 10-Meter Privileges

Tech licensees can join in the fun on the 10-meter band. The more the merrier. Ten-meter privileges for Techs extend from 28.000-28.500 MHz. The band segment of 28.000-28.300 MHz is reserved for CW (continuous wave / Morse code) and data. No phone/voice in this segment. However, phone is allowed in the 28.300- to 28.500-MHz section of the band. As a cautionary note, just to be safe and rule compliant, don't operate right up to the band edges. For example, I would not operate my transmitter right at 28.000 MHz. My signal, even a CW signal, has bandwidth and if my transmitted RF (radio frequency) is even a smidge below the band edge (27.999 MHz) then I am not operating my station in accordance with FCC (Federal Communications Commission) rules and in good amateur radio practice. The same advice applies to phone operation. As a Technician licensee, I would not want to operate my SSB (single-sideband) phone signal near the band edge of 28.500 MHz. I could be at 28.499 MHz, but my modulated SSB signal can be 3-kHz wide. This would put my transmitted signal over the band edge. Not cool and not good operating practice. Furthermore, for Technicians, there is a 200-watts PEP (Peak Envelope Power) output limit. That's okay, 100-watts PEP is more than enough to work the world when the band is open.

Simple Antennas

You don't have to spend the family savings to get onto the 10-meter band. Simple antennas will do the trick. For you do-it-yourselfers, I offer you *Figures 1* and *2*. I freely admit that I am not a graphic artist, but my crude drawings accompanied with text will hopefully get the idea across. *Figure 1* is a simple wire dipole specifically cut for 10 meters. It can be constructed with 14-gauge wire, either solid or stranded.

This antenna was designed for a resonant frequency of 28.200 MHz. Each leg of the dipole should be 8 feet, 4 inches long and I suggest a 1:1 balun to connect the dipole elements and the coax, but if you're in a hurry or cost is a factor, a simple insulator will suffice. Hang the dipole at least 6 feet off the ground and check the SWR (standing wave ratio). The SWR should be below 2:1, with 1.5:1 or lower being ideal. You may have to trim each leg of the dipole to lower the SWR. Try pruning 0.25 inch-

**Email: <ko0z@cq-amateur-radio.com>*

es off each dipole leg each time you "prune" your antenna and before taking another SWR measurement. Do this as many times as needed until you obtain the best SWR. Now erect the dipole as high up as you possibly can. Dipoles radiate most of the RF broadside to wire. In other words, if your dipole wire is configured in a north-south direction, most of your RF signal will radiate west and east (*Figure 3*).

A 10-meter vertical is simply a dipole antenna with one dipole leg pointing up (vertically) and the other leg lying on the ground (*Figure 2*). To make a vertical more DX-efficient, we need to lower its radiation pattern closer to the horizon. We can accomplish this task by adding more quarter-wave radials along the ground. Three will work, but 20 or more will be better. I found using yard staples or garden stakes (*Photo A*) is a great way to secure a ground radial in the yard. The staples keep the wire anchored along the ground and in a few weeks — if enough staples are used — the grass will grow over the radials, rendering them invisible, and it will be safe to mow over them without tangling up the mower blade.

Chain-link fence posts make great pipes to drive into the ground for antennas. A block of wood can be used as an insulator to hold the vertical element to the ground pipe. Wood will work temporarily, but its insulating properties will diminish when it gets wet from rain and snow. Some type of plastic or plexiglass would serve as a better insulator. U-bolts can secure the insulator to the pipe and to the vertical element. For the vertical element, an 8-foot, 4-inch length of electrical conduit will work just fine. Any length of 50-ohm coax will feed the antenna. The coax's center conductor will connect to the vertical element (conduit) and the coax's braid will connect to the radials spread out along the ground. To keep costs low, I suggest soldering a 1-foot long, 14-gauge wire into a circle. Next, solder one end of each ground radial to the circle. If you have a short piece of braid, solder one end to the radial circle and the other end to the coax braid. Try to keep the coax feed 4 inches or so off the ground. Distribute the ground radials in a circle to create a more even radiation pattern.

In terms of procuring parts, ease of assembly, and mechanical construction and durability, commercial antennas can't be beat. *CQ* advertisers offer many from which to choose, so it should not be too hard to find one to meet your specifications of cost, available space, and purpose.

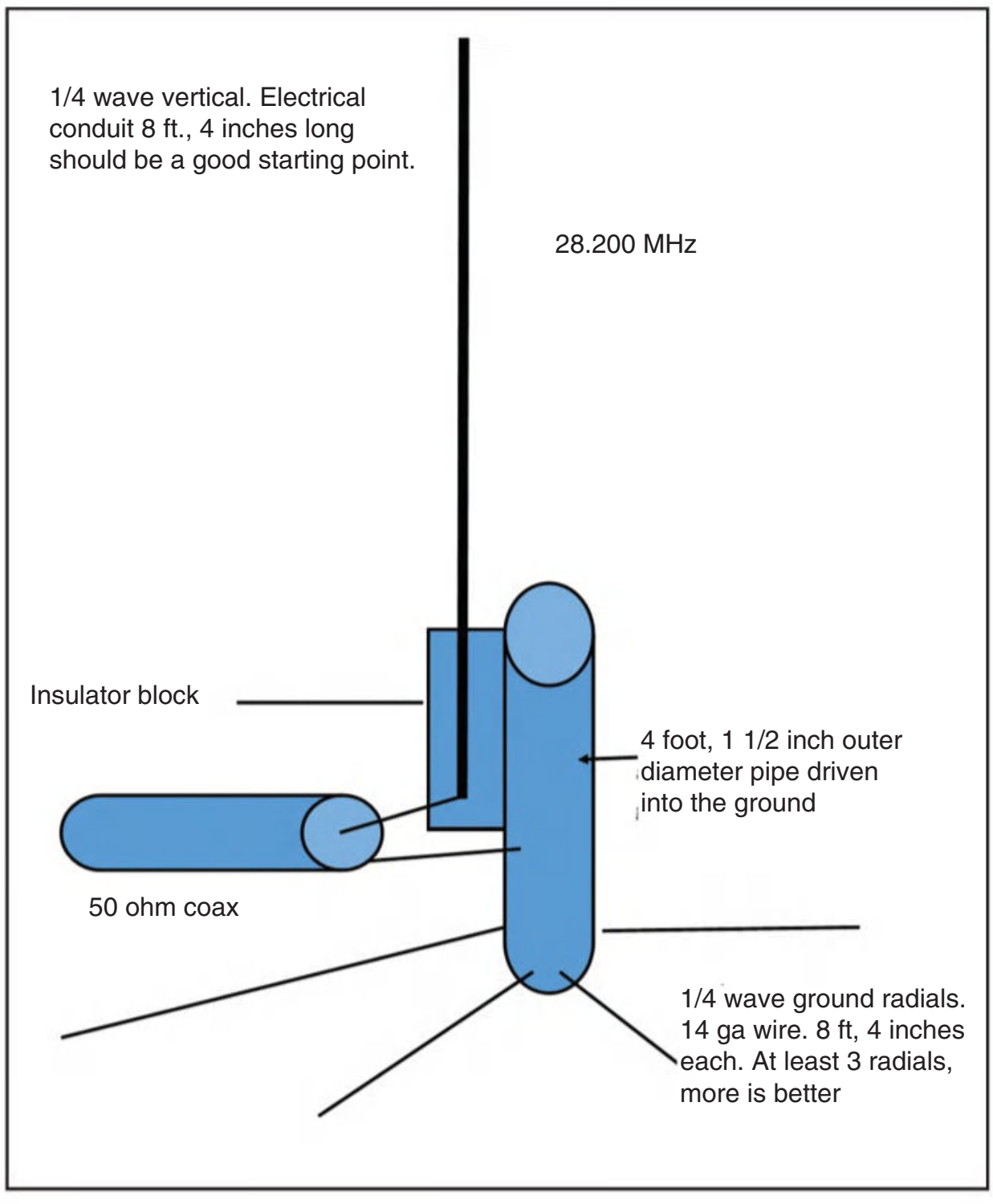


Figure 2. Interested in building your own 10-meter vertical? The information in this figure should give you some ideas that will put you into the ballpark. Think of a vertical as a dipole with one quarter-wave element pointing toward the sky and the other quarter-wave element stretched along the ground. Adding more ground radials will go a long way toward lowering the vertical's main radiation pattern toward the horizon, which is just what the doctor ordered for working DX.

Purpose

In many ways, intended antenna purpose is as important as cost. Do I want an omnidirectional antenna or a directional one? Commercially manufactured omnidirectional antennas are generally less expensive than directional ones. Omnidirectional antennas radiate RF 360°, however directional antennas focus their energy in a single direction. Since directional antennas — such as Yagis — focus their energy, they offer more gain than an omnidirectional. To better utilize that gain, Yagi antennas need to be at least a half-wavelength above ground. This requires a tower and a rotor to point the antenna in the desired DX direction, which adds significant costs.

On the other hand, Yagi antennas offer further advantages in that a savvy ham radio operator can open and close a band earlier and later. By opening and closing a band earlier or later, a Yagi user operating at sunrise or sunset can hear distant signals earlier than an op using an omnidirectional antenna. The omnidirectional antenna may detect distant signals, but a Yagi offering more gain will have the decibel (dB) edge over an omnidirectional antenna.

During a contest, this can translate into more multipliers and QSO (contact) points. That's not to say omnidirectional antennas are a handicap and not worth the effort. Believe it or not, there are times when a vertical antenna will

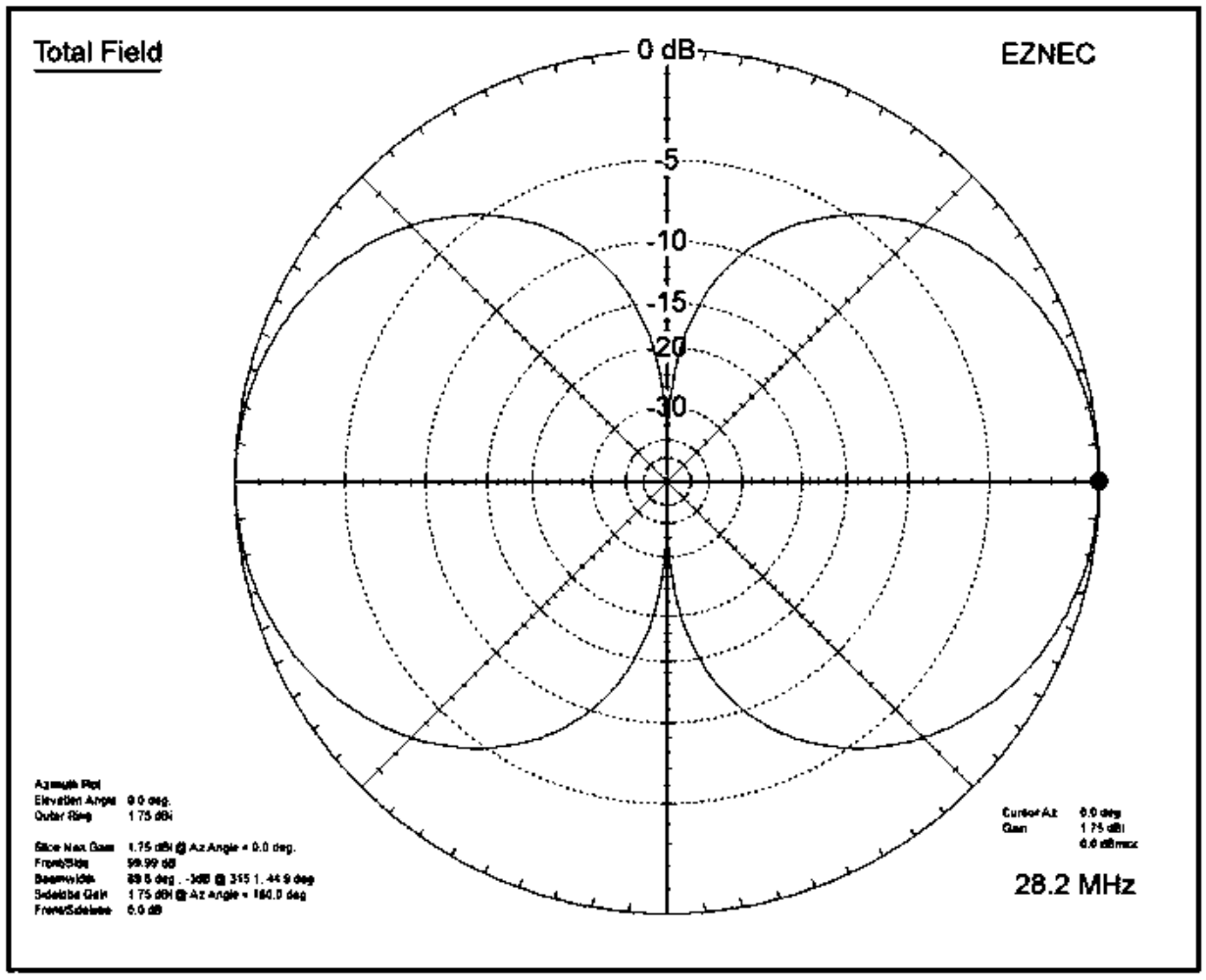


Figure 3. A 10-meter wire dipole antenna radiation pattern. Note the RF (radio frequency) energy radiates broadside to the dipole's wires.

outperform a Yagi. This has a lot to do with RF signal ionospheric redirection angles. Generally, directional antennas are excellent in detecting signals in one direction. If the Yagi antenna is designed correctly, it is good at detecting signals in a single direction, but not so much off its sides or rear. This is intended by design. This signal rejection is what gives a Yagi its gain. On the other hand, an omnidirectional antenna may detect an unexpected opening in another direction or signals redirected by the ionosphere from higher elevation angles. Purpose is an important consideration. Are you interested in casual on-the-air operating or a more "competitive" station?

Competition is Fun

Ham radio competition, also known as radiosport, is a very fun activity. Stations range from small, suburban lots with modest antennas and low power known as "little pistols" in ham jargon all the way to very competitive super stations known as "big guns." Craig Thompson, K9CT, and Tim Duffy, K3LR, are two FB (fine business) examples of many worldwide "big gun" contest stations. These hams are consummate, competitive, world-class competitors and gentlemen in every sense of the word. I've worked both of them in many contests. On occasion, when I've come across Craig at a ham radio function, he's taken the time to thank me for working him in a contest. I am only one QSO out of thousands, but he made me feel like my station, KOØZ, made a difference. These gentlemen are always encouraging hams to get involved with radiosport.

With that in mind, even though my tower is down for repairs and my Yagi is disassembled, I am still active with contesting. Recently, I decided to participate in the ARRL 10-Meter Contest over the December 10-11, 2022 weekend. I also convinced my wife, Debbie, KC9ULA, to operate with me (*Photo B*). We entered the contest as a low-power (100 watts or less) multi-operator, single-transmitter station. We had only one vertical antenna with a few ground radials and limited time to operate over the contest weekend. Not ideal, but what the heck, KOØZ is on the air and giving out needed points. Best of all, both Debbie and I are having fun. The contest rules allowed us to operate 36 out of the 48-hour contest period, but with a busy schedule that weekend we managed to be on the air for 11 hours.

One of the major benefits of operating a worldwide contest is there are world-class ham radio contesters with well-equipped stations yearning for contacts. These stations can pull signals out of the noise level, which gives us "little pistols" incentive to participate and to work some "rare" DX. It's satisfying to make contacts with distant lands. What's interesting is some local contacts (same continent) with loud signals can be challenging to complete, while more distant, weaker signals can be made on the first or second try. In addition, this worldwide DX contest involves only the 10-meter band. Instead of five HF bands — each with its own propagation characteristics — participants need to only concentrate on 10 meters.

QSO Point and Multipliers

Making a QSO (contact) counts for points. Each phone (voice) contact is worth 2 QSO points. CW contacts count for 4 points each. In this particular contest, multipliers (mults in ham parlance) consist of U.S. states, the District of Columbia, Canadian provinces and territories, Mexican states, DXCC entities, and ITU (International Telecommunication Union) regions. The ITU divides the world up into three regions with the U.S. in region 2. Each multiplier counts once on SSB and CW. Your total score is a combination of QSO points multiplied by total multipliers. It doesn't take too long to start building up points. See the contest rules for a better description <www.arrl.org/contest-rules>.

In just under 12 hours of casual operating, Debbie and I made 158 contacts (some on phone, some on CW) for 468 QSO points. We contacted 63 multipliers for a total claimed score of 29,484. I say "claimed" score because my final score may be lower. I am assuming I copied every callsign and exchange correctly. For example, let's say I made a contact with W8DAY, but I copied and entered into my log W8BAY. I mistook the letter D for the letter B. My contact (and points) becomes invalid. DX stations give out callsigns and serial numbers. A serial number is a sequential number of contacts. DL1ABC (Germany) may give out serial #1201. The next QSO will get 1202. Not only do I need to get the callsign correct, I also need to get the serial number right. That's some of the fun and frustration associated with contests. Now add QSB (fading) and QRM (interference) into the mix and things become interesting. The main thing is to have fun. Compete against yourself. What will you do differently next year and what will your score be when the contest ends? Will you beat last year's score?

Rates, Runs, and Hunt and Pounce

QSB, QSN and QRN (static) can affect QSO rates, usually negatively. Contest-

ers pay close attention to their QSO rates, which are determined by the number of QSOs per hour. Typically, CW rates tend to be higher than phone rates. But that topic can be a fun, serious point of banter among contesters. That's why every year, contest propagation conditions makes it a new and different contest.

A run occurs when a station occupies a frequency calling CQ and continues to make successful contacts one after the other with no apparent end in sight. It's exciting when you complete a QSO and another station is immediately calling.

Photo A. Most hardware stores carry garden staples or yard staples in their garden department. They are about 4 inches long and they are easy to drive into the ground. They will hold a ground radial snugly to the yard. No need to bury the radial. In a few weeks, the lawn will grow over the radial and it will be "safe" to mow the lawn.

Photo B. Debbie Ochu, KC9ULA, participated in the ARRL's 10-Meter Contest with her husband Ron, KOØZ, as a multi-operator, single-transmitter station. We had a lot of fun, even with a very modest station and limited time over the weekend to operate.

It gets hectic when a pile-up — many stations calling simultaneously — develops. Rates increase dramatically. This is a great way to rack up some serious QSO points. At times it becomes overwhelming, especially while attempting to make contacts and log at the same time by yourself. This is a situation in which someone to log comes in handy.

The other method is to "hunt-and-pounce," also known as "search-and-pounce," or S&P. Hunting and pouncing means turning the dial in search of stations calling "CQ." This is a good method for seeking out needed multipliers (mults). I also use this method when I'm unable to get a run going. In this year's contest, I was using a vertical with only a few ground radials. It wasn't the most efficient antenna I've used, and that one is on me in terms of contest preparation. I wasn't putting out a very loud "CQ" presence. Consequently, I was only able to sustain a few runs during the contest. Hunting and pouncing was our primary strategy. It works, but it isn't as exciting as a good run and QSO totals are smaller. Nonetheless, this method netted us contacts on every continent except for Antarctica. We had QSOs with 32 different DXCC entities. Not too shabby for 11 hours.

Team Operating

Eleven hours isn't all that long to operate in a weekend-long contest, especially when operating as a team. Cheering each other on during the contest is encouraging. One team member operates either CW or phone while the other logs the QSOs. Check each other for contest exchange accuracy (callsigns, states, and serial numbers) to eliminate any typos or incorrect information. Switch seats to give each other a break. Take some time out to stretch your legs and to hydrate.

Contest Logging Programs

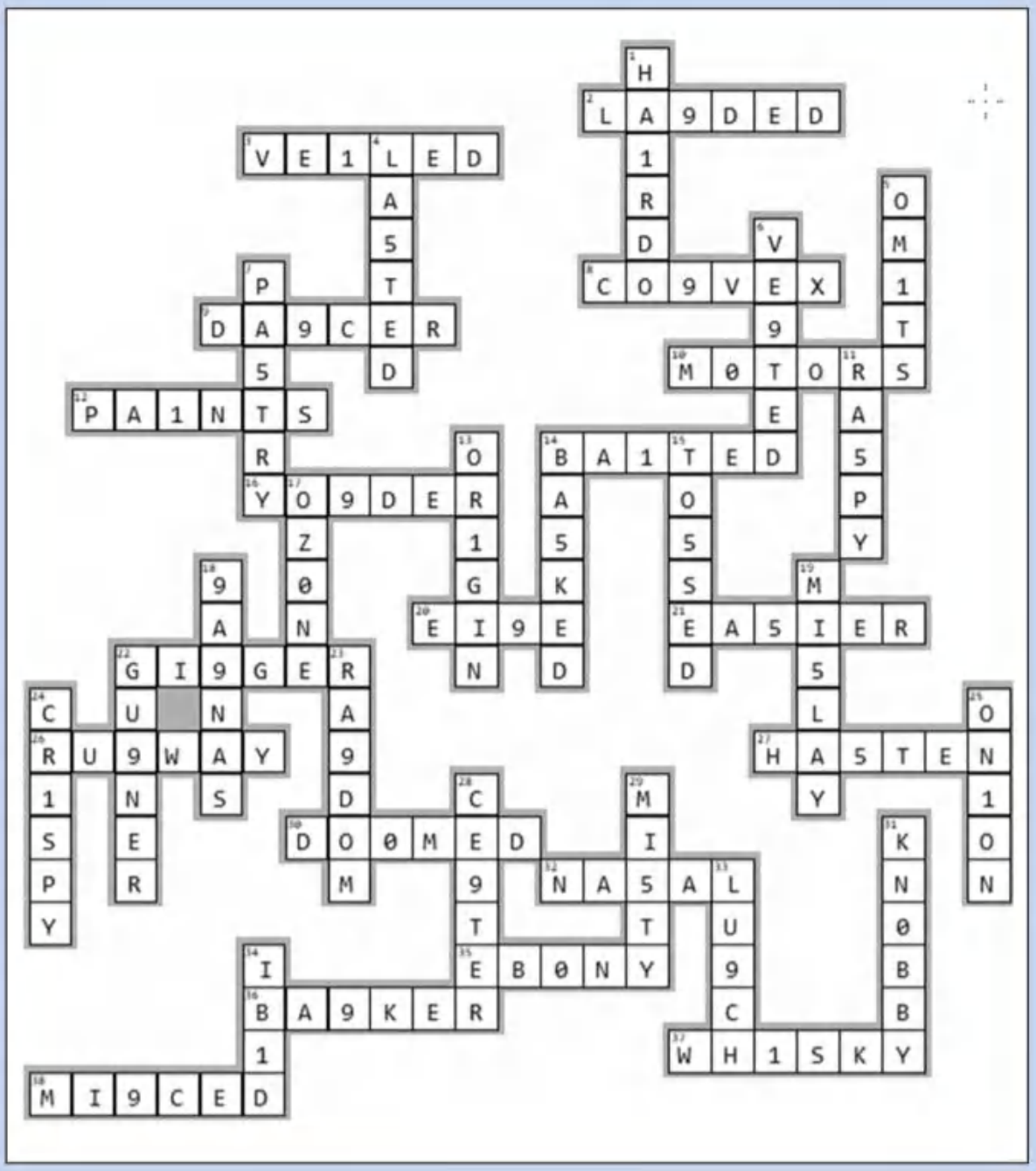
Contest logging programs make contesting a lot more fun. With a little skill and a lot of practice, a single operator can make QSOs and log at the same time. Each program is tailor-made for most radiosport contests. All programs keep track of the housekeeping features such as points, mults, and dupes. Dupes refers to a duplicate QSO during the contest on a particular band. For instance, if I work KØABC early on in the contest on 20 meters phone and later on the next day, I work KØABC again on 20 meters phone, the program will alert me that I am about to make a dupe. If you happen to make one, the program won't count the dupe in your total score. These programs will also keep track of QSO rates, mults worked, and logged against needed mults.

I've only touched on a few of the features available with good logging programs. NIMM Logger is a very popular and free logging program, with robust support groups. Another logging program is WriteLog, which I use because I've been using it for decades and I am familiar with it. It interfaces with my RTTY (radio teletype) setup quite nicely. WriteLog isn't a free program to download, but I feel its nominal price is worth it.

10-Meter Propagation

The ARRL 10-Meter Contest spans a 48-hour period. However, the 10-meter band tends to support propagation mostly during daylight hours. Soon after sunset, signals begin to fade and other than local stations, there's not too much to put into the logbook. This is where a directional antenna, a half wavelength or more off the ground, offers an additional advantage. The extra gain provided by the antenna's directivity can discern signals out of the noise level that will add to your contest score. This band also follows the sun's path

Answers to Crosswood Puzzle *(from page 45)*



I hope reading this article will influence you to think about "trying on a contest on for size," even if for a limited amount of time.

around our globe. From a stateside perspective, just after sunrise, northern European and Asian signals are coming across polar paths ... provided there isn't a huge space weather event affecting the day-lit side of our globe. Remember our earlier space weather discussions in this column? Mid-morning sees openings to central Europe and northern Africa. Around noon, trans-equatorial paths open from North America to South America. In the mid-afternoon, Oceania opens up to North American stations and in late afternoon, Japan and eastern Asia open up for an hour or more.

Time Well Spent

These types of contests are a great way to work towards DXCC or the CQ DX Award. Before I discovered the "fun" of radiosport contesting, I would seek out DXCC entities (countries and islands mostly) when we both happened to be on the air. It took me over five years to earn my DXCC certificate. Not only did I need to make contact with 100 different entities, I also needed confirmation (QSL cards) from each one.

Since then, I've gained a lot more experience and I've worked well over 100 countries in a single weekend contest, several times over. Contests provide the DX. Besides that, contesters are hungry for points. Twelve hours into a weekend contest, even a very "small pistol" operator can make DX contacts without a lot of effort. Your motivation to be in the contest may be centered on solely working DX, but be careful, it is addicting. Before long, you'll be setting your eye on obtaining your own CQ WAZ (Worked All Zones) award.

I hope reading this article will influence you to think about "trying on a contest on for size," even if for a limited amount of time. Read the rules ahead of time and come up with a plan. Talk a friend into assisting you with logging while you operate and vice-versa. It's fun. Although spring and summer are still a few months away, why not think about involving yourself with the various VHF contests? Thank you for reading *CQ* and I hope to hear you on the air.

– 73, Ron, KOØZ

antennas

BY KENT BRITAIN, WA5VJB

Rubber Antennas

I really have trouble thinking of a few inches of rubber hose as an antenna, but there are a heck of a lot of them out there (*Photo A*). And on one of the VHF reflectors there was a lot of traffic recently on "duckies" and a lot of misunderstanding.

First off, *Photo B* from a recent column shows a 1/4-wave antenna over a ground plane. In *Photo C*, we have a bit of flesh around a small bit of metal. This is NOT a ground plane. For that 2-meter talkie, a proper ground plane would be 1 meter by 1 meter. So we can't think of that short rubber antenna as a quarter-wave antenna.

In *Figure 1* we have a half-wave antenna and the impedance of that dipole antenna when fed at different points. Feed it exactly in the middle, with the antenna in an ideal condition, and the feed point impedance is 72 ohms. Ideal condition would be the antenna in free space, nothing near it for some distance, element diameter quite small, and source completely isolated. Good math model, but it doesn't exist in the real world HIHI! But you can see the basis for some of the offset feed dipoles popular on the HF bands.

So, if you wanted to think of a handheld talkie in a more realistic model, then we have *Figure 2*, consisting of an antenna element, a bit of metal (the case of the talkie), and then a big blob of dielectric material representing the user. In a way, this is also an offset feed dipole, and to make this resonant, the rubber duckie, or antenna element has to be longer than a quarter wavelength. It is not uncommon to measure a duckie antenna over a proper ground plane and find that it has a poor SWR at 146

Email: <wa5vjb@cq-amateur-radio.com>

Photo A. Lots of rubber ducks.

Photo B. A quarter-wave vertical over a ground plane.

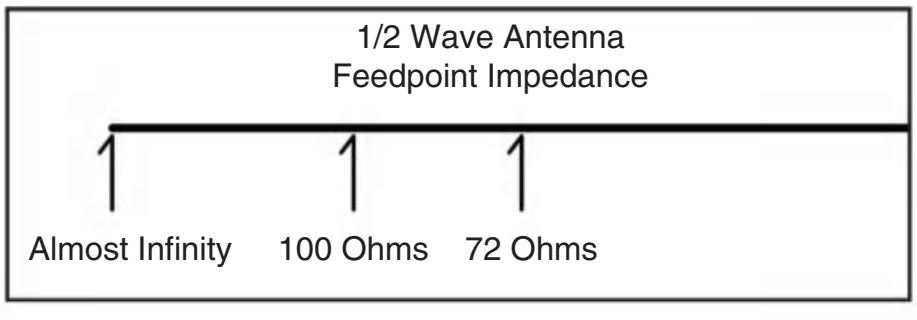


Figure 1. Dipole antenna feed at different points, showing changes in impedance.

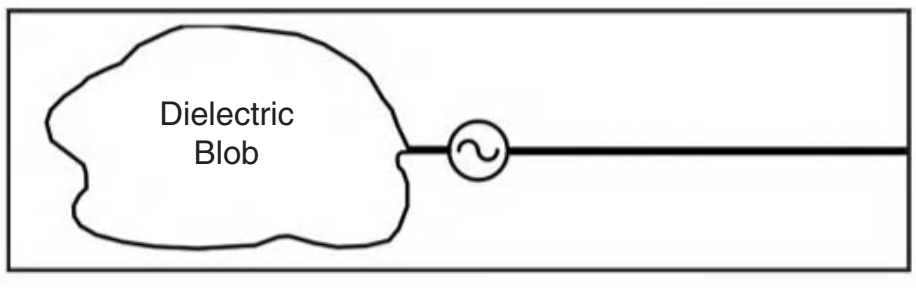


Figure 2. Representation of holding a talkie … from right to left, an antenna, a little bit of metal (whatever's in the radio) and a blob of dielectric (you).

MHz and appears to work best at about 120 MHz. It is simply the longer half of an offset feed dipole.

Rolling Your Own

If you like building your own talkie antennas, the only way I have found to test them is by field strength. We get to add in another variable: How well does your transmitter work as the load impedance moves around? Set up some kind of field-strength indicator, such as a classic diode and meter movement or even a Tiny SA Spectrum Analyzer. Get back 5 to 10 feet and transmit while looking at the signal level. Now adjust the antenna for best field strength while holding it in your normal position. You have maximized all the variables.

In *Photo D* is an industrial cell phone, typically wired into equipment for monitoring or remote control. Got a big pile of these from a scrap dealer a while back. But the antenna was quite interesting. Note the fold-over in the element shown in *Photo E*. A sweep of the antenna showed it worked nicely in both the 800- and 1800-MHz cell bands. I tried playing with this design a bit in NEC. But NEC doesn't like such closely coupled elements and sharp / close 90° bends. Looks like it is more of a scrap wire, wire cutters, and network analyzer research project. But a very interesting way to get an antenna to work on two non-harmonically related bands. Might even have applications on the High-Frequency (HF) bands. Research continues!

NiCrome Antennas?

Now a question for our readers. Some years ago, I was told that one commercial "talkie" company was making its rubber ducks using high-resistance NiCrome wire. Certainly an interesting idea, using a linear resistor as the antenna element. I was told that they used the same element on all radios, VHF-low, VHF-high, and UHF. Certainly made inventory control easy. And in a way it makes sense. Those short-loaded antennas have a narrow bandwidth even under the best of conditions. How you hold the radio changes body loading. And the transmitter is always happy with its SWR. So there

Photo C. Ground plane? Not …

Photo D. An industrial cell phone, the type usually built into other devices.

probably is not as much performance loss as you might first think. For the fun of it, I did try building one. It ain't easy to attach NiCrome wire to a coax connector. It doesn't take solder so I had to crimp it to a bit of copper wire and solder that to the coax connector. Didn't act quite as much like a dummy load as I was expecting, but there are a lot of NiCrome alloys.

If anyone can confirm NiCrome as an antenna element, please let me know, and even better if you can supply some details.

If you have any antenna questions or a possible column topic, you can use snail mail to my QRZ.COM address. For email use <wa5vjb@cq-amateur-radio.com>. For many additional antenna projects, have a look at <www.wa5vjb.com>.

Photo E. Dual-band cell phone antenna. See text for details.

qrp: low-power communications

BY R. SCOTT ROUGHT,* KA8SMA

"V" is for Victory!

Plus QRP Antenna System Tips and Two New Transceivers

Welcome to this month's QRP column. QRP is sometimes dubbed the "big world of little radios," and this could not be truer. This month, I provide a peek at two exciting QRP transceiver kits becoming available in early 2023 that you do not want to miss, discuss a few QRP mishaps that can lead to less-than-desirable results, and give an update on the homebrew inverted delta loop I highlighted in the December column.

Standing Tall after the Storm

I promised in the December column that I would keep readers informed about the integrity of the inverted delta loop (dubbed the "V") I constructed last fall. The V was constructed with two extendable fishing poles that I mounted in my roof tripod (*Photo A*) to determine how well this antenna (and more importantly the extendable fishing poles) would fare over a harsh northern Michigan winter and whether these materials may be suitable for use as a backbone for permanent or semi-permanent antenna projects.

I am happy to say thus far that even the Gales of November could not wreak havoc with the V. To date, it has withstood wind gusts over 60 miles per hour and an early winter storm that produced 18 inches of snow. In late November, unseasonably warm weather provided me an opportunity to safely access the roof (no snow or ice pack) and remove the V from the tripod for an inspection. The 18-inch PVC base (constructed of 1-inch diameter schedule 40 PVC pipe) in which the fishing poles are mounted was in good condition with no apparent stress. The topcoat (spray paint) I applied to the fishing poles and PVC showed no evidence of peeling or cracking and the 22-gauge insulated wire (radiating element) appeared to be in good condition with no damage to the wire's insulation.

The V (which covers 10 through 20 meters) is proving to be a great performer, especially on 15 meters, and produced a lot of contacts for the CQWW and ARRL Sweepstakes contests last fall. In past contests, I relied on my horizontal skyloop (which covers 10-80 meters with the aid of an antenna tuner) as my workhorse antenna; however, this year I used the V for the upper HF bands as it provided some directionality which was helpful in working areas of the world (especially South America) I was not able to easily work in the past. The ability to turn the antenna with a lightweight TV antenna rotator and focus some of my pipsqueak signal in a particular direction was a great help. Unfortunately, I lost countless contacts during each contest as I spent too much time switching between the V and skyloop to determine which was the better antenna. I learned that when the V is rotated in a direction (i.e., South America) that my skyloop does not favor (modeling of my skyloop suggests its primary lobe beams Europe with a gain of nearly 12 dBi), it outperforms the skyloop, but the skyloop is far superior when working European stations, even with the V pointed in that direction.

I'll provide a short update on the integrity of the V in the April column, but if it stays together for the duration of winter, I may begin working on plans for a two-element version … my wife will be thrilled *–hi*.

QRP Mishaps

From time to time, I receive comments from readers who gave QRP a try dur-

Photo A. My fishing pole inverted Delta Loop. See last December's QRP column for details.

*<ka8sma@cq-amateur-radio.com>

ing a contest and made fewer contacts than anticipated or ventured into the field for a portable operation and made only a handful of QSOs. When I ask about their operating conditions, I often find these hams are using higher-loss coaxial cable (such as RG-58) for their feedline and in some instances, have an extra 25 feet or more of coaxial cable coiled up on the floor of their ham shack. In some instances, it is good to have some extra cable available, but when running QRP the length and type of feedline used has a significant impact on your signal. It is important to keep your feedline as short as possible and avoid higher-loss coax. When the feedline is carrying only a few watts between the transmitter and antenna, every milliwatt counts. There are several RF feedline loss calculators available online that will calculate the effective radiated power (ERP) and decibel loss based on the type of feedline, its length, and power input. If you have not fiddled with one of these online calculators, be sure to check them out as it is interesting to compare loss between various types of feedlines. Just do a web search on "feedline loss calculator" or "coax loss calculator."

Many years ago, I experimented with a 100-foot length of RG-58 and an identical length of RG-213 to determine if there was a discernable difference between the two feedlines using the same antenna (20-meter dipole at 40 feet). In short, I proved (at least to myself) there is a notable difference. Not only was a difference noted by the operator on the other end of the QSO, but there was a dramatic increase in signal on my end (receive) when using RG-213 over RG-58. Feedline loss (decibel loss) not only impacts your transmit power (ERP) but also what your receiver can hear, an important element to consider when choosing feedline. Today, I use open wire line (600-ohm ladder line) or 450-ohm window line for feeding my antennas at the QTH and 300-ohm twinlead for portable operations. These types of feedlines have even less loss than RG-213 and other types of coaxial cable, which is important when working QRP. I shared the results of my experiment with a reader who was having a difficult time making contacts with 5 watts. A few weeks after our initial email exchange, I received an update indicating he replaced his higher loss coaxial feedline with 450-ohm window line and was making lots of contacts and was trying out QRPp for the first time.

Another common mishap is using a compromised antenna when working QRP portable. Portable QRP operations are a lot of fun, but shy away from shortened verticals, small magnetic loops, and other types of compromised antennas. These types of antennas may provide a quick and easy setup and generate lots of contacts when transmitting more power (i.e., 100 watts); however, they do not shine when running only a few watts. An end-fed halfwave or inverted-V dipole are two antennas that I find work well for portable low-power operation. If your portable location offers no tall trees or other supports, consider investing in a telescopic mast. As always, higher is better.

Lastly, QRP is a mindset and having the right attitude makes a world of difference when operating low power. I know a lot of QRO operators who would never consider trying QRP because they abide by the "more is better" principle. QRP operators are generally minimalists who subscribe to "less is more" and often accomplish what others have done with much more power. I may take some flack here, but I am aware that some hams flip on their amplifier, call CQ a few times, and if no contact is secured within a minute or two, place blame on band conditions (or something of the like) and quit operating until they believe conditions improve. These operators seem to have little patience and want instant gratification. As a full time QRP operator, I readily admit I have spent hours on the air fruitlessly calling CQ and made only one or two contacts, but those contacts are always cherished and not forgotten.

In general, QRP operators have a "get it done" attitude and as Randy Shirbroun, NDØC, stated during an interview for a previous column, "I'll either get it done with QRP or it won't happen!" That is the mindset of a true QRP operator and is the belief that separates much of the QRP crowd from others in the ham community. Albeit, this may be a bit over the top for some operators, it demonstrates the spirit and persistence of the QRP operator. Being successful in QRP does not mean you need to have an unwillingness to admit defeat, but rather develop a "get it done attitude" and acknowledge what can be done with hundreds of watts can also be done with milliwatts. For me, one or two contacts made long distance QRP-style are worth 100 "easy" contacts made with high power.

More QRP Transceivers on the Horizon

Two new transceivers that have the eye of the QRP community are the Four State QRP Group's (4SQRP) T41 SDR transceiver and the TR-45L QRP transceiver by John Dillon, WA3RNC.

The T41 (*Photo B*) is a 5-band software-defined radio (SDR) transceiver designed by *CQ* Microcontrollers Editor Jack Purdum, W8TEE, and Al Peter, AC8GY. The transceiver will be kitted and sold by the 4SQRP Group and covers 10, 15, 20, 40, and 80 meters. This is a CW and SSB transceiver with adjustable power from 1 to 20 watts. The transceiver will feature DSP filters with adjustable bandwidths, two VFOs, an adjustable electronic keyer (5 to 60 words per minute), a spectrum waterfall and audio displays, and several other bells and whistles.

I reached out to Ron Potter, AG1P, one of the volunteers and Secretary / Treasurer of the 4SQRP Group for more information about the T41. Ron indicates, "this kit is appropriate for experienced builders, but there is nothing especially difficult about it. There is no cutting, drilling, or tapping required. The most difficult part is assembly of the insulation-displacement connectors on

the power distribution ribbon cable." Ron also indicates that although W8TEE and AC8GY have published a book (available online from Amazon) explaining the theory and construction of the T41, instructions for building the kit will be provided. Ron points out that since the radio is designed with the experimenter in mind, the book would be very helpful, if not essential, for those who want to experiment and tailor the radio to individual preferences. Lastly, Ron indicates, "there is a lot more potential in the radio than the initial release. The Teensy 4.1 code is a continuous work in progress with a number of independent contributors offering up improvements to the open-source code. This radio will keep the experimenter occupied and happy for years to come. This radio is not just a build and put it on the shelf after a few QSOs where it will gather dust."

4SQRP anticipates selling the kit in the neighborhood of $320 at the time of this writing. Additional details about the T41 and ordering information is available on 4SQRP Group's website <www.4sqrp.com>. As a sidenote, for those who are not familiar with this group, it is a non-profit, 3,000-member organization that has been in existence for 20 years. The group also hosts OzarkCon, a QRP conference held in Branson, Missouri, each spring for QRP enthusiasts to gather and discuss QRP-related activities.

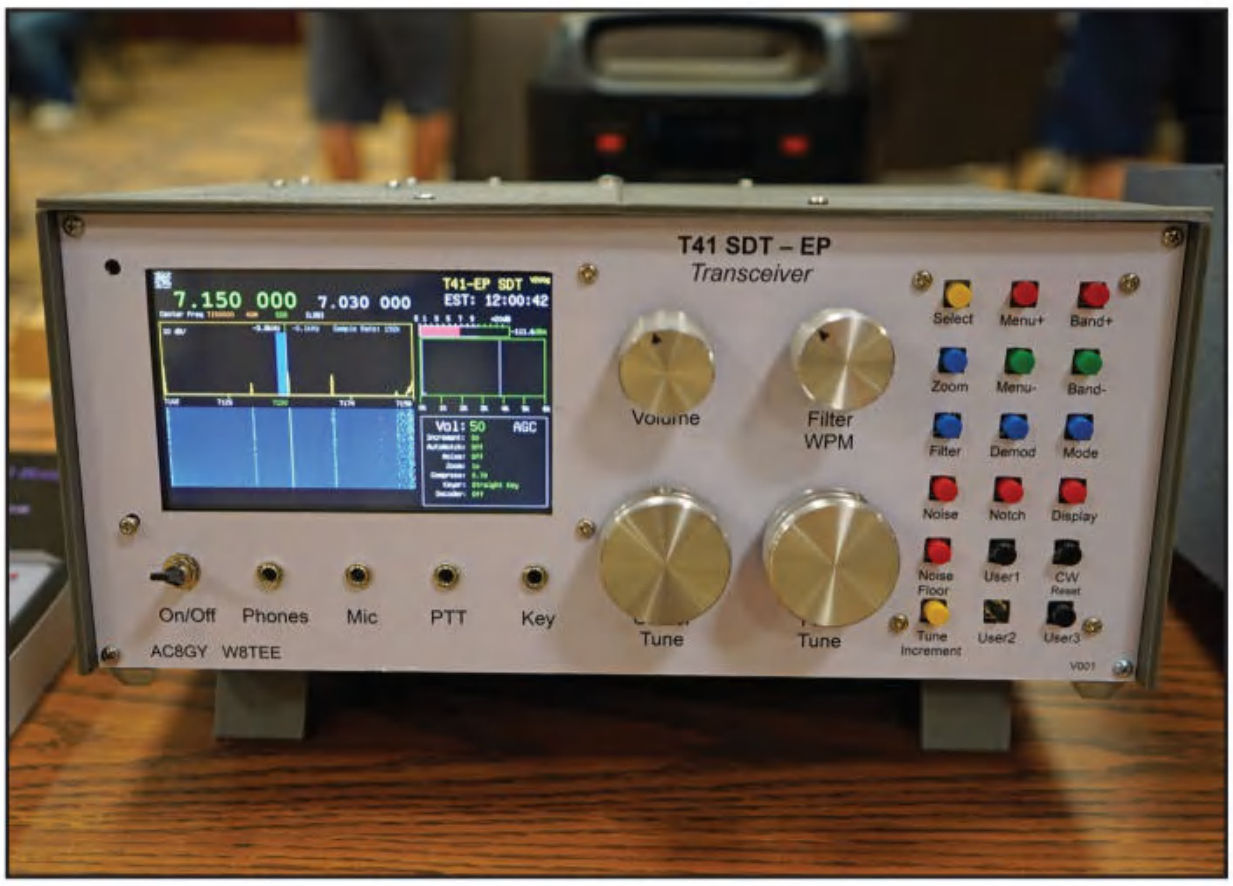


Photo B. The Four State QRP Group's T41, a 5-band CW/SSB QRP transceiver offered in kit form. (KØNEB photo)

Photo C. WA3RNC's TR-45L, a 5-band CW QRP transceiver offered in kit and built form. (Photo courtesy of <wa3rnc.com>)

Another QRP transceiver to be on the lookout for is the Penntek TR-45 Lite (TR-45L), a 5-band, 5-watt, CW-only SDR transceiver covering 17, 20, 30, 40, and 80 meters (*Photo C*). The transceiver is offered by WA3RNC and, as of this writing, was still being beta tested but should be available as a kit or built unit (wired and tested) by the time you receive this column. John is not a newbie to designing and selling kits. He authored "The Neophyte Receiver" which was published in the 1988 edition of ARRL's *QST* magazine, and later sold over 3,000 Neophyte kits. John has also brought us two other QRP CW transceivers, the TR-25 which covers 20 and 40 meters, and the TR-35, a compact four-band transceiver covering 17, 20, 30, and 40 meters.

The TR-45L has a '60s era appeal and has an illuminated front panel meter showing S-units and power output. The illuminated panel meter, frequency display, and accompanying knobs and switches give this rig a rugged appearance that begs for it be taken outdoors and used in the field. Some of the radio's features include adjustable power output from 0.5 to 5 watts, a high SWR warning indicator, receiver incremental tuning, a built-in electronic keyer (adjustable from 5 to 45 words per minute), and options to add a built-in, 5.2-mAh lithium battery pack / charger; and a Z-match antenna tuner. The radio also has a built-in speaker, operates on 12-volts DC and pulls 1.3 amps on transmit and 130 mA on receive. One of the radio's more desirable features (at least in my opinion) is that its functions are controlled by knobs and switches (no confusing back menus), a nice blessing for many hams, including me.

The TR-45L will be offered as a kit for $430.00 (at the time of this writing) per unit. The optional internal 5.2-mAh battery pack and charger is expected to be priced at $80 and the internal Z-Match antenna tuner is anticipated to be $60. Additional information about the TR-45L can be found online at <www.wa3rnc.com>.

– Until April, 73

microcontrollers in amateur radio

BY JACK PURDUM,* W8TEE

Using C Pointers: Step 3

The last two columns explained what pointers are and how they are used. In this month's column, we will continue to show how to use pointers. A very useful feature of the C language is the structure. It allows you to collect different types of data, but organize them together. For example, recently I added a beam heading feature to our T41-EP SDT (Software Defined Transceiver). What I needed was a way to keep track of the ham radio prefix of a country, that country's name, and the longitude and latitude for the country's capital city. The table would look similar to this:

```
"A2", "BOTSWANA", -24.66, 25.98,
"A3", "TONGA Is.", -21.19, -175.18,
"A4", "OMAN", 22, 58,
"A5", "BHUTAN", 27.5, 90.1,
"A6", "UNITED ARAB EMIRATES", 24.43, 54.39,
"A7", "QATAR", 25, 51.2,
"A9", "BAHRAIN", 26, 50.5,
"AP2", "PAKISTAN", 30, 70,
"BS7", "SCARBOROUGH", 15, 118,
"BV", "TAIWAN", 24, 121,
"BV9P", "PRATAS Is.", 21, 117,
"BY", "CHINA", 39.86, 116.42,
      etc.
```

Table 1. The raw data table

I did this table for all 300+ DXCC prefixes. To organize the data, I used the following structure:

```
struct DXCC {
   char prefix[10];
   char country[30];
   float lat;
   float lon;
} countries[ ] = {
        // The full table of initializers went here
  "A2", "BOTSWANA", -24.66, 25.98,
  "A3", "TONGA Is.", -21.19, -175.18,
  "A4", "OMAN", 22, 58,
  "A5", "BHUTAN", 27.5, 90.1,
        // ...and so on
};
```

You can see why my friend, Kim Brand, called structures "arrays for adults": They allow you to gather different data types (called *structure members*) into one place and treat them as a single unit. Normal arrays can only cope with a single data type.

The goal was for the user to be able to enter a call prefix (e.g., ON for Belgium), look up the lon/lat for that country's capital city, and then calculate the bearing for the beam antenna. A sample run is shown in *Figure 1* (the image looks much better on the T41's 5-inch display). So, rotating your beam to 54.35° would aim it at Brussels, about 6,800 kilometers (4,225 miles) away from my QTH. The world map is an azimuth projection with my QTH in Cincinnati, Ohio, as its center point. You can make your own map by visiting <https://ns6t.net/azimuth>.

I needed to do a lookup in the *countries[]* structure array, but need to return both the longitude and latitude values for use in the map calculations. The problem is: How can you use pointers to fetch the requisite values from a structure?

Using Structure Pointers

Structures are such a useful data structure that C provides its own way of using pointers with a structure member. *Listing 1* presents a sample program that uses structure pointers.

There are several things to notice. First, the comparison between the target call (e.g., BY for China) and the *dxCities[]* structure array uses the standard C library function stricmp(). You don't see this function used very often but it can prevent search failures common to some programs. The function does a case-insensitive compare on the two strings. That is, the function doesn't care if the target string is lower case and the table string is upper case. If the characters match, regardless of case, it's a match. Many of my students failed to account for case differences or used *toupper()* or *tolower()* macros for the comparison. This, too, however, can fail if the table has mixed case entries in it. Using *stricmp()* gets around this problem.

The second thing to notice is a new operator that is used with pointers to structure members, often called the arrow operator.

The Arrow Operator (→)

In the *GetInfo()* function in Listing 1, we use the arrow operator to use indirection on the temp structure:

```
strcpy(temp->callPrefix, dxCities[index].callPrefix);
strcpy(temp->country, dxCities[index].country);
temp->lon = dxCities[index].lon;
temp->lat = dxCities[index].lat;
```

If we use the more familiar indirection operator (*), we could write the equivalent code as:

```
strcpy((*temp).callPrefix, dxCities[index].callPrefix);
strcpy((*temp).country, dxCities[index].country);
(*temp).lon = dxCities[index].lon;
(*temp).lat = dxCities[index].lat;
```

The arrow operator is just a shorthand notation that we are doing indirection on a structure pointer. We have to use parentheses because the dot operator (.) has higher precedence that the indirection operator (*). You can use either syntax and the results will be the same. However, since C programmers prefer concise statements, you will see indirection performed with the arrow operator in most cases.

One More Time: Why Use Pointers?

We have already seen how pointers can be used to make permanent changes to variables at different scope levels. We saw how we could permanently change the *min* and *max* val-

* <jack52443@yahoo.com>

Figure 1. Mapping the ON call prefix.

ues in a function by using a pass by reference on the two variables rather than pass by value, in which copies of the values are used in function calls. Because C functions can only return a single new data item from the call, if you need to change multiple variables, you would need to make multiple calls. With pointers, the function can change whatever needs to be changed in a single call, which means less code to maintain.

Another reason is because pointers make more efficient use of memory. If we have to pass the entire temp structure to the *GetInfo()* function, that would require pushing 58 bytes of *temp* structure data onto the stack, and popping those same 58 bytes off once into the function. By using a pointer to *temp*, we only need to pass the lvalue of the *temp* structure to the function: 4 bytes. Pointers save memory and execution time.

As something to test what you've learned, try using pointers to scroll text across the display screen. If the display can hold 30 characters, when the 31st character arrives, scroll the current text to the left one place and place the "new" character on the display in position 30. Hint: *memmove()* and the other *mem*()* functions are about as fast as you can process them without resorting to assembler code. However, they are less robust in that they do less error-checking on the inputs. Properly written, the text scrolling should be pretty smooth.

Pointers are your friend ... get to know them well.

Listing 1. Using structure pointers.

```
struct cities {
  char callPrefix[12];
  char country[30];
  double lon;
  double lat;
};

struct cities temp;

struct cities dxCities[] = {
  // callPrefix country  lat lon
  "A2", "BOTSWANA", -24.662010131725115, 25.985830937499976,
  "A3", "TONGA Is.", -21.195951856891224, -175.18619665039066,
  "A4", "OMAN", 22, 58,
  "A5", "BHUTAN", 27.5, 90.1,
 "A6", "UNITED ARAB EMIRATES", 24.432130918497442,
54.396475468749976,
  "A7", "QATAR", 25, 51.2,
  "A9", "BAHRAIN", 26, 50.5,
  "AP2", "PAKISTAN", 30, 70,
  "BS7", "SCARBOROUGH", 15, 118,
  "BV", "TAIWAN", 24, 121,
  "BV9P", "PRATAS Is.", 21, 117,
  "BY", "CHINA", 39.863358033355176, 116.42528406249997,
  "C2", "NAURU", -.5, 167,
  "C3", "ANDORRA", 42.5, 1.5,
  "C5", "THE GAMBIA", 13, -17,
  "C6", "BAHAMAS", 25, -77.5,
  "C9", "MOZAMBIQUE", -20, 33
        // ...and so on...
};
/*****
```

Listing 1. Continued

```
Purpose: To search a list of call prefixes for a match. If found, the function
         fills in the country and lon/lat data. It returns -1 if no match is
         found.

  Argument List:
       struct cities *temp        pointer to a struct of type cities
       char *target               pointer to the prefix to be found

  Return value:
       int                        the index number of the dxCounhtries[] array
                                  or
                                  -1 if not found
*****/
int GetInfo(struct cities *temp, char *target)
{
  int index;

  for (index = 0; index < 17; index++) {
    if (stricmp(dxCities[index].callPrefix, target) == 0) {
      break;
    }
  }
  if (index < 17) {
    strcpy(temp->callPrefix, dxCities[index].callPrefix);
    strcpy(temp->country, dxCities[index].country);
    temp->lon = dxCities[index].lon;
    temp->lat = dxCities[index].lat;
    return index;
  } else {
    return -1;          // No match
  }
}
void setup()
{
  int retval;
  struct cities temp;

  Serial.begin(9600);

  retval = GetInfo(&temp, "C3");

  if (retval != -1) {
    Serial.print("prefix = ");
    Serial.print(temp.callPrefix);
    Serial.print("   country = ");
    Serial.print(temp.country);
    Serial.print("   lat = ");
    Serial.print(temp.lat, 5);
    Serial.print("   lon = ");
    Serial.println(temp.lon, 5);
  } else {
    Serial.println("Prefix not found");
  }
}

void loop() {
}
```

vhf plus

BY TRENT FLEMING,* N4DTF

Scatter Modes from Planes to Rains

As I write my column this month, it is just before Christmas (not as soon as my editor wanted it, to be honest) and I am thinking about January VHF — hoping to hear some reports from those who worked the contest and looking ahead to the spring season. Next month we will dive deeply into one of my favorite bands, 6 meters, to help you get ready for spring Sporadic-E (E_s) season.

One of my goals with this column is to explore a wide variety of propagation modes. This month, we have a guest column from Pat Coker, N6RMJ, regarding scatter modes on the microwaves. All of us have experienced aircraft scatter in some form. If you are old enough to remember broadcast TV, you have experienced altered signals from a plane passing between your antenna and the transmitter. Occasionally on 2-meter simplex, I will hear the telltale flutter of a plane moving between my station and another. This is especially important to me because the Memphis airport (home of FedEx) is located about 20 miles southwest of my QTH and I often experience this phenomenon. And after reading Pat's article, you can bet I am going to further investigate those opportunities.

Scatter also comes into play during thunderstorms. When HF operators are unplugging to avoid lightning damage, microwave operators are gearing up to take advantage of rain-scatter modes between two stations offered by thunderstorms. You can read Pat's article in the sidebar.

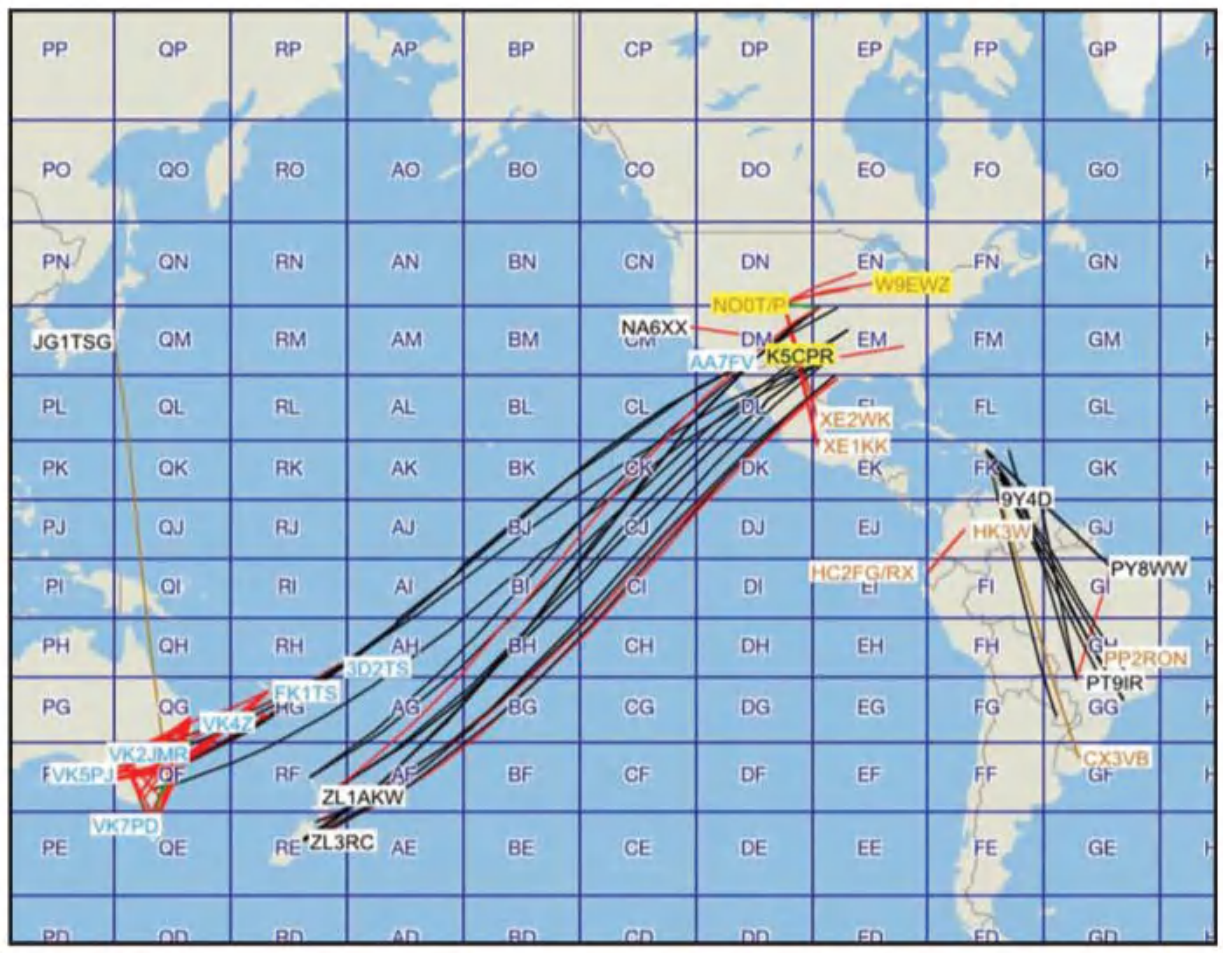


Photo A. A strong opening on 6 meters on December 1 led to many contacts between the U.S. West Coast and Australia / New Zealand.

VHF and Up Propagation and Activities

As a follow-up to last month's column on beacons, Don Woodward, KD4APP, who operates in EM84, reports that in November he and Ott Fiebel, W4WSR, put the 902-, 1296-, and 2304-MHz beacons back on the air at Joanna Bald (EM85cg) in western North Carolina. The 902-MHz beacon frequency shifted slightly to 902.312 MHz and it now has 35 watts of power to the original Alford Slot antenna.

The 1296.305- and 2304.305-MHz beacons were restored with their original 1-watt output, and are also on their original Alford Slot antennas, while the 432.370-MHz beacon has been on the air continuously. You can find pictures on his blog <https://kd4app.blogspot.com> plus information on the construction of the 902-MHz beacon. Don asks for signal reports on these beacons if you hear them.

Don also provides some information about on-air activities that check propagation while offering opportunities for contacts. He advises that another way to check VHF / UHF / SHF propagation is through set operating times and directed nets. Every morning between 6:30 and 7:00 a.m. Eastern Standard Time in the south, there are a number of stations active on 222.100 MHz including KD4APP in Blairsville, Georgia; KC4JD in Dawsonville, Georgia; WB4SLM in Macon, Georgia; KG4WLX in Knoxville, Tennessee, and me (Germantown, Tennessee). There are also several in Florida, and recently one in Ohio. Starting at 7 a.m., those stations as well as a couple more in Knoxville; Hayesville, North Carolina; and Lilburn, Georgia, meet on 432.095 MHz and report the propagation on each other's signals. Afterwards, some of the stations in North Carolina and Tennessee work stations in Charlotte, North Carolina. Several of us who have 902 MHz and 1296 MHz will often QSY to those bands to check propagation as well. Finally, after that, we have the "Afterglow Net" on 3.818 MHz to discuss the propagation further as well as rag chew — the net is led by Ott, W4WSR. All are welcome to join.

Don is currently working on a 10-GHz beacon using the VHFDesign board and a DEMI 3-watt amplifier using a slot antenna — he's unsure yet where that will be located — this will be the first 10-GHz beacon in north Georgia that he is aware of.

On the Air

As usually happens, the Magic Band (6 meters) has offered some late fall (late southern springtime) openings to New Zealand and Australia (ZL and VK). On December 1st, KW7E, W7USA, W5LE, N9RD, and N3PS all worked Bob, ZL1RS on FT8. Bob is a regular on the band and many stations report having worked him many times over the years. See *Photo A* for an example of the strong opening that many experienced in late November and early December.

* <n4dtf@cq-amateur-radio.com>

2023-2024 calendars

We have two calendars to choose from this year.

The CQ Ham Radio Operator's Calendar with fifteen spectacular color images relating to amateur radio shacks and antennas from around the world; DXpeditions to exotic places and fellow hams!

The CQ Ham Shack Project Calendar which features fifteen spectacular color images of amateur building projects.

These 15-month calendars (January 2023 through March 2024) include dates of important Ham Radio events, major contests and other operating events, meteor showers, phases of the moon and other astronomical information plus important and popular holidays.

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Beyond Line of Sight with Microwaves

BY PATRICK COKER, N6RMJ

In the past 10 years or so, microwave radio equipment has become more readily available while the cost has come down and performance has gone up. This has led to more hams getting on the microwave bands and experimenting. Manufacturers have even started testing and are soon to release SHF gear, including the Icom IC-905. This "SHF Project" as Icom calls it, offers 10 watts of output on 144 / 430 / 1200 MHz; 2 watts of output on 2400 / 5600 MHz; and a half-watt of power on 10 GHz (with an optional transverter).

The microwave bands have traditionally been the domain of homebrewers and experimenters, but newer radios from major manufacturers are beginning to offer 1200 MHz as an option, plus the above-mentioned rig from Icom, are making such equipment available to those who would prefer to operate rather than build.

Several hams have written programs to help with the different propagation modes and other useful enhancements that have helped to extend the distance of contacts, and simplify the process of making contacts. One of the programs with which most of us are familiar is the WSJT suite of programs with its various modes. We are currently using the Q65 sub-mode at B 15 seconds on aircraft scatter, for example. WSJT-X can be downloaded for free at <https://sourceforge.net/projects/wsjt> or look up WSJT on the web for more information. If you're reading the digital edition, click this link to save wear and tear on your fingers <https://tinyurl.com/4pkfnkub>.

The next program being used, especially on 10 GHz, is called Aircraft Scatter. It can and has been used on 6 meters (50 MHz) and up. This is an internet-based program and can be downloaded from <https://tinyurl.com/4ybarx33>. For more information on airplane scatter, you can find an article by the creator of the program at <https://tinyurl.com/yc858fdc>.

Airplane scatter is used to reflect your signal off an aircraft. This has been done for years without many of us realizing what was happening. While flying, aircraft produce what is called a *reflective cross-section* (RCS). This is the size of the image that the aircraft produces when your signal reflects off the aircraft. As you might expect, the larger the aircraft, the larger the RCS produced. Using plane-scatter propagation on aircraft in your line-of-sight is generally avoided because it is too close. Plane-scatter propagation works better when the aircraft is flying between the path of the two stations trying to make a contact. Knowledge of flight patterns is critical to the success of plane-scatter efforts or you are just shooting "in the blind." So when there is no tropospheric ducting or other propagation enhancements, such as rain scatter, give plane scatter a try.

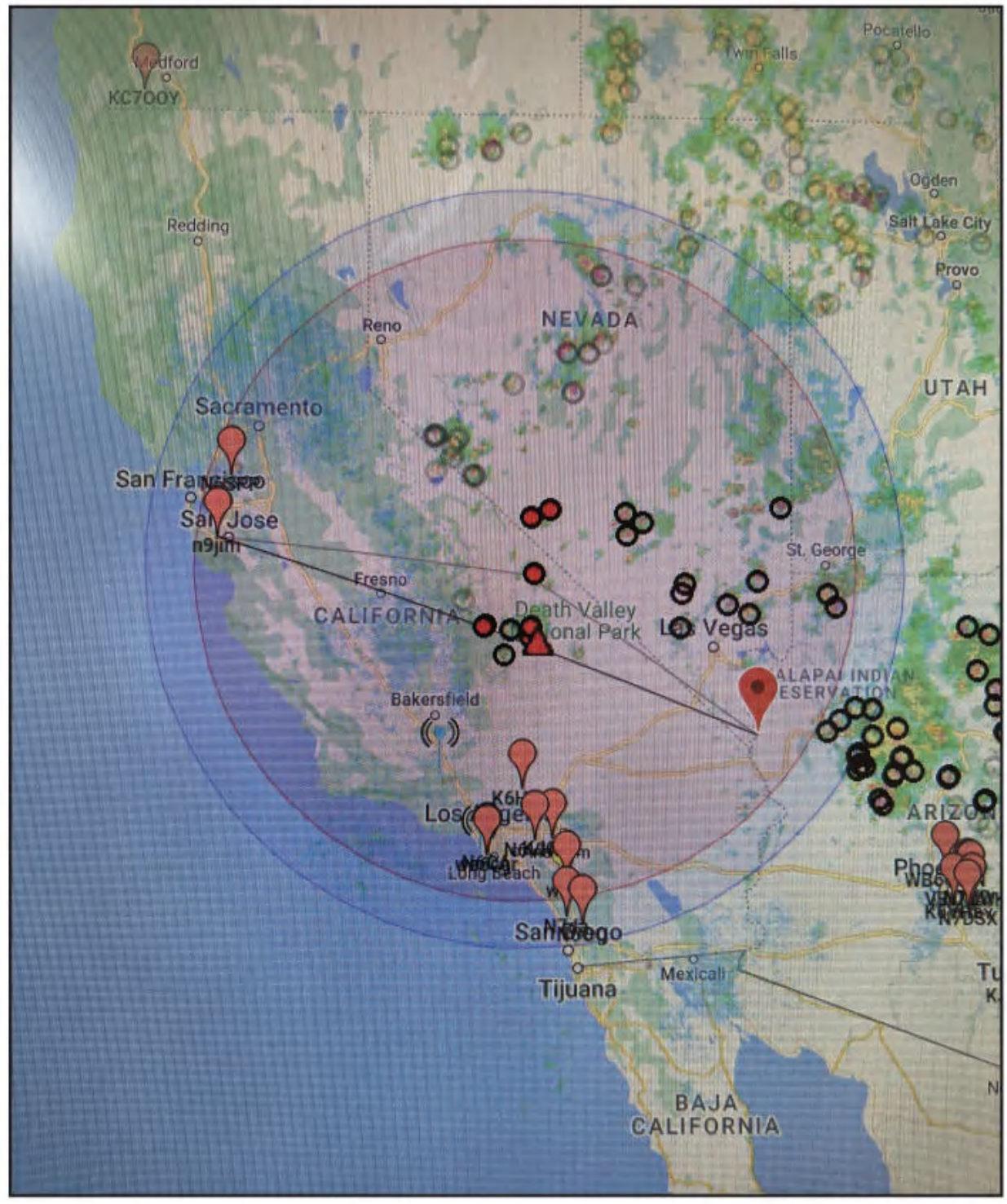


Photo B. A screenshot of the Rainscatter application, which shows possible paths open through rain scatter propagation. (Photo by N6RMJ)

Another scatter mode that I use as much as I can is *rain scatter*. The program and more information can be found here <https://rainscatter.com>. When there are thunderstorms between stations trying to work scatter modes, there is often the opportunity for such propagation. Rainscatter is a web application designed to aid radio amateurs in making contacts on microwave frequencies by using precipitation particles as a scattering medium.

Rainscatter automatically downloads the approximately real-time imagery and storm data from the National Weather Service to identify possible propagation paths between stations. The website is designed to eliminate some of the guesswork in identifying potential scattering regions. Rainscatter's developer, Andrew Flowers, KØSM, hopes that it will foster interest in this exciting mode of propagation.

One particular aspect of the micro wave bands that I enjoy is using 10 GHz because of how the signals reflect off most objects, including mountaintops, buildings, billboards, water tanks, metal objects, and towers. As noted above, both propagation modes can and do work on other frequencies. *Photos B*, *C*, and *D* provide examples of scatter activities, including two paths that I find work all the time. Never say never until you have tried the path several times on different days.

Photo C. A common path that is open using plane-scatter propagation from airplanes flying to and from LAX. (Photo by N6RMJ)

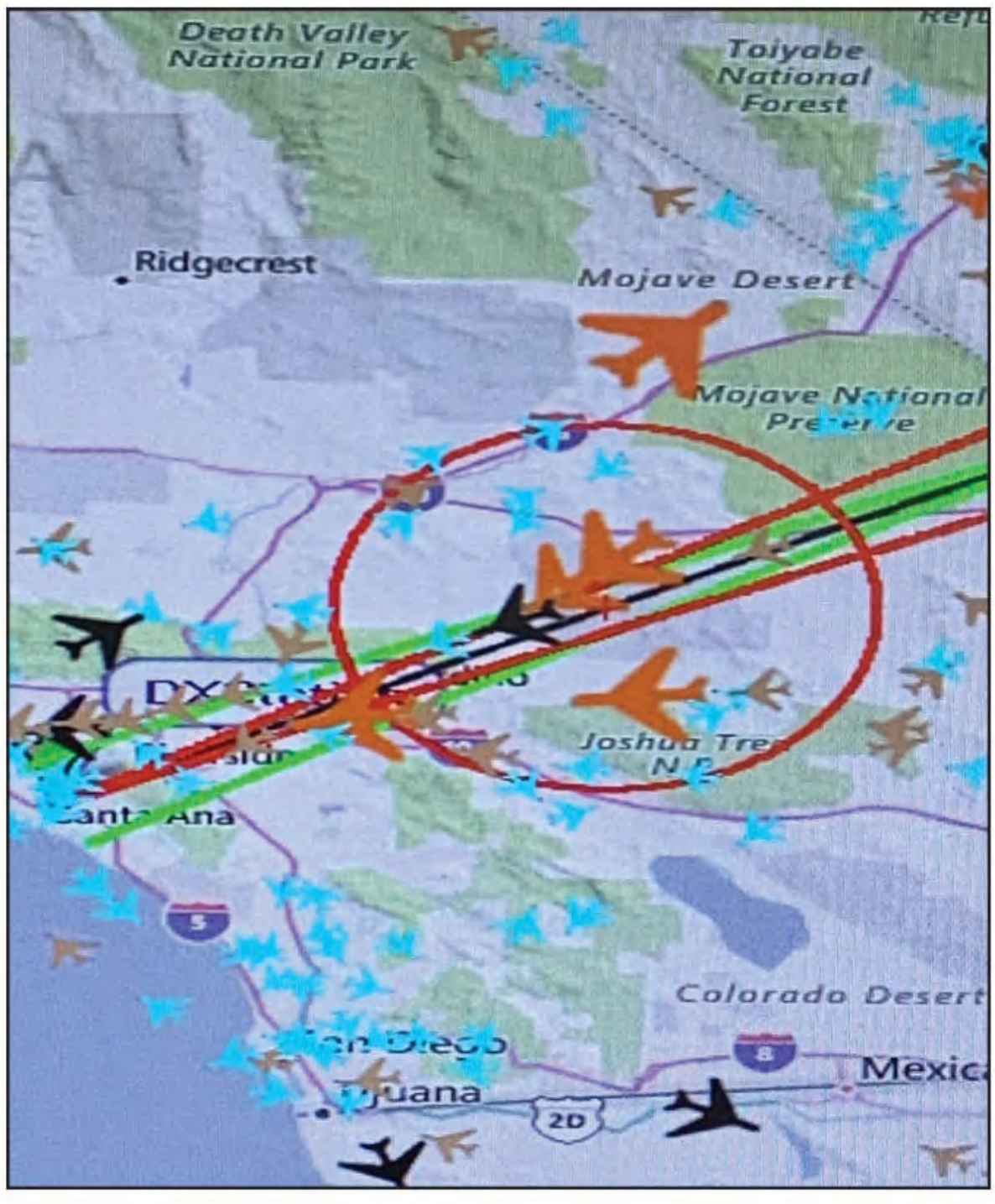


Photo D. Plane-scatter propagation can be effective when there is no other option. (Photo by N6RMJ)

awards

BY STEVE MOLO,* KI4KWR

SKCC Worked All States and Rag Chew Awards

In my ongoing search for award programs across the globe, I came upon a program from a familiar source: The Straight Key Century Club (SKCC), which is not that old of a club and has over 26,500 members as of press time. So, what is the SKCC and what is its purpose, you may ask. The SKCC is the most active group of mechanical-key Morse code operators in the world. It's very easy to become a member since it is free and you must make contacts with manual telegraph keys which can be straight, bug, or sideswiper "Cootie"-style (no keyboards or electronic keyers). Afterwards, the most important activity is to gain experience by swapping your membership number with other members and participating in SKCC operating events such as sprints and contests.

This group has many different award programs that are offered to its members and the rules seem fair. This month, I will focus on two that would be fun and easy to achieve during Solar Cycle 25, which has been improving faster than expected and may provide a higher peak than Cycle 24.

Let's begin with the Worked All States (WAS) award, which is similar to the ARRL's WAS program in that it is a typical work all 50 states concept with three endorsements of Single-Band, QRP, and WAS-Centurion. The basic rules for this Award as listed on the SKCC website <https://tinyurl.com/44a7vhx9> are the following:

1. An operator must submit and the award manager must approve and publicly proclaim acceptance of an application showing contacts in which the operator has exchanged names and SKCC numbers with another SKCC member in each of the 50 states. Contacts may be made at any time and on any band, including WARC bands.
2. An operator applying for the award must be an SKCC member at the time each qualifying contact is made.
3. All contacts must be made with a straight key, semi-automatic key (bug), or sideswipper (cootie). Waivers from this policy are possible. For details, see the club's policy on approved keying devices here <https://tinyurl.com/4jsmfz2m>.

Applicants are encouraged to copy the member station's state carefully. The state you hear the member give you may be different from the state listed for that call in the membership database.

Available Endorsements

Single-band endorsements: As the name implies, operators can earn a WAS for meeting the above requirements on any individual amateur-radio band. Single-band endorsements also may be applied to each of the following additional endorsements.

WAS-QRP: To qualify, an applicant must meet the basic requirements using transmitter output power levels of 5 watts or less.

If you maintain a log in ADIF format, there is a variety of logging and award processing programs available from the Files and Download Section. These programs will use your ADIF log file to create error-free application forms for you. As an alternative, you can download an award application here <https://tinyurl.com/33yxsdf4>.

For questions about the WAS award program or to submit an application, send an email to Mark, NX1K, <was-manager@skccgroup.com>.

This next award is the SKCC Rag Chew Award and this award is based how long you can operate CW within a QSO with another member.

SKCC Rag Chew Award

The SKCC Rag Chew Award <https://tinyurl.com/yh82kvf> encourages members to engage in conversational CW contacts using straight keys, sideswipers, or bugs, which really

*Email: <KI4KWR@cq-amateur-radio.com>

is the basis of the club: straight key operations. For the SKCC Rag Chew Award, a rag chew is defined as an on-the-air CW conversation with another SKCC member lasting 30 minutes or longer and using SKCC-approved keying devices, which would be the only fair way on this in my view.

To qualify for this award, the contact should include the exchange of each participant's RST, name, location, and SKCC number. Rag chews are not restricted to any topic but why not discuss amateur radio and maybe who you have worked.? If more than two stations participate in the rag chew, the contact must last 40 minutes or longer, and I must say multiple ops in the conversation has to be something amazing to listen to.

To earn the SKCC Rag Chew Award, keep a log of rag-chew QSOs with other SKCC members, including each QSO's duration in minutes. Keep a running total of rag-chew minutes. Remember, any SKCC-member QSO lasting 30 minutes or longer counts toward this award and why not do this craft instead of voice if you have this style of key?

The certificate is granted when your rag-chew log shows at least 300 minutes of conversational CW operation, which is only five hours. Endorsements can be earned for every additional 300 minutes of rag-chew activity: Rag Chew 600 Award, Rag Chew 900 Award, and so on. Single-band endorsements for 300 minutes of rag-chew QSO activity are also available. Endorsements beyond x10 will be awarded in increasing increments of 5. RCx15, for example, will require 15 X 300 = 4,500 QSO minutes, RCx20 will require 20 X 300 = 6,000 QSO minutes, and so on. The same principle applies to individual band endorsements.

Please observe the following rules for this SKCC award:

1. Only QSOs made after 0000 UTC, July 1, 2013, qualify for this award.
2. All participants in the QSO must be SKCC members at the time of the QSO.
3. Contacts must be made using a straight key, bug, or sideswiper.
4. Contacts may be made on any amateur band at any time, including WARC bands.
5. Multiple QSOs with the same SKCC member over time may be counted toward this award. However, back-to-back QSOs with the same SKCC member are not allowed. A rag-chew contact with a different SKCC member must appear in your rag-chew log before a previously logged rag-chew callsign may be entered again for award purposes.

Applications for the Rag Chew Award may be submitted in electronic or paper format. Use the SKCC Rag Chew Award application form which is available on the SKCC website <https://tinyurl.com/7wpemf6d>. QSO entries must include the date, callsign, SKCC number, QSO duration in minutes, and S/P/C (State / Province / Country) of each station you worked.

A note on endorsements: The award's manager does not keep an archive of previous logs. Add your endorsement QSOs to your initial log. You must submit your log in its entirety when applying for endorsements. Award applications, as well as questions related to this award, may be submitted to the Award Manager, Mike Morrow, W3QT, <rc-manager@skccgroup.com>.

Overall, the SKCC WAS and Rag Chew Awards are two great award programs available for a CW operator taking it back to the old-school method of using a straight key. If this interests you in any way or if you were already interested in straight key operations, why not join SKCC? Visit <http://SKCCgroup.com> and click the Join SKCC tab and become a member of a free club for straight key operators.

5 Band WAZ

As of December 15, 2022
2431 stations have attained at least the 150 Zone level, and
1111 stations have attained the 200 Zone level.

As of December 15, 2022
The top contenders for 5 Band WAZ (Zones needed on 80 or other if indicated):
CHANGES shown in **BOLD**

Callsign	Zones	Zones Needed
AK8A	199	17
DM5EE	199	1
EA5RM	199	1
EA7GF	199	1
H44MS	199	34
HAØHW	199	1
HA5AGS	199	1
I5REA	199	31
IKØXBX	199	19 on 10M
IK1AOD	199	1
IZ3ZNR	199	1
JA1CMD	199	2
JA5IU	199	2
JA7XBG	199	2
JH7CFX	199	2
JI4POR	199	2
JK1AJX	199	2 on 10M
JK1BSM	199	2
JK1EXO	199	2
K1LI	199	24
K3LR	199	23
K4HB	199	26
K5TR	199	22
K7UR	199	34
KZ4V	199	26
N3UN	199	18
N4NX	199	26
N4WW	199	26
N4XR	199	27
N6PF	199	23 on 10M
N8AA	199	23
N8DX	199	23
N8TR	199	23 on 10M
RA6AX	199	6 on 10M
RU3DX	199	6
RWØLT	199	2 on 40M
RX4HZ	199	13
RZ3EC	199	1 on 40M
S58Q	199	31
SM7BIP	199	31
SP9JZU	199	19 on 10M
USØSY	199	1 on 15M
VK3HJ	199	34
VO1FB	199	19
W1FJ	199	24
W1FZ	199	26
W3LL	199	18 on 10M
W3NO	199	26
W4LI	199	26
W6DN	199	17
W6RKC	199	21
W6TMD	199	34
W9OO	199	18 on 10M
W9XY	199	22
9A5I	198	1, 16
AB4IQ	198	23, 26
DL6JZ	198	1, 31
EA5BCX	198	27, 39
F5NBU	198	19, 31
F6DAY	198	2 on 10M & 15M
G3KDG	198	1, 12
G3KMQ	198	1, 27
HB9FMN	198	1 on 80M & 10M
I1EIS	198	1 & 19 on 10M
JA1DM	198	2, 40
JA3GN	198	2 on 80M & 40M
JA7MSQ	198	2 on 80M & 10M
JH1BNC	198	2 on 80M & 10M
JH1EEB	198	2, 33
KØDEQ	198	22, 26
K1BD	198	23, 26
K2EP	198	23, 24
K2TK	198	23, 24
K3JGJ	198	24, 26
K3WA	198	23,26
K3XA	198	23,34
K4JLD	198	18, 24
K9MM	198	22, 26
KI1G	198	24, 23 on 10M
KZ2I	198	24, 26
LA3MHA	198	31 &32 on 10M
N4GG	198	18, 24
NXØI	198	18, 23
ON4CAS	198	1,19
OZ4VW	198	1, 2
RL3FA	198	2 on 80 & 10M
UA4LY	198	6 & 2 on 10M
UN5J	198	2, 7
US7MM	198	2, 6
W2IRT	198	28, 28
W5CWQ	198	17, 18
W7AH	198	22, 34
W9RN	198	26, 19 on 40M
WC5N	198	22, 26
WL7E	198	34, 37
Z31RQ	198	1, & 2 on 10M
ZL2AL	198	36, 37

The following have qualified for the basic 5 Band WAZ Award:

Callsign	5BWAZ #	Date	# Zones
VA3VF	2413	10/04/2022	157
IT9DAA	2414	10/09/2022	181
JA3ENN	2415	10/10/2022	199
8P6NW	2416	10/15/2022	154
YB2DX	2417	10/15/2022	189
VA3VET	2418	10/21/2022	165
IU3FBL	2419	10/24/2022	157
WT2P	2420	10/25/2022	162
KI2D	2421	10/31/2022	151
KF2DT	2422	11/02/2022	154
JH4DYP	2423	11/12/2022	191
RV9CX	2424	11/19/2022	200
EC7B	2425	11/19/2022	151
WF7T	2426	11/23/2022	170
KC1ERO	2427	11/26/2022	151
JH3LIB	2428	12/03/2022	150
DF9KF	2429	12/03/2022	196
W2XL	2430	12/04/2022	197
N4QS	2431	12/13/2022	197

Updates to the 5BWAZ list of stations:

Callsign	5BWAZ #	Date	# Zones
HI3T	2318	8/19/2021	190
IK5ZUK	1908	6/8/2015	196
K3LR	2051	6/22/2018	199
HI3T	2318	8/19/2021	191
RC2A	2217	5/20/2020	190
UT4EK	1520	10/17/2006	197
EA5B	2305	4/30/2021	174
WX2S	1895	1/5/2015	200
N1EN	2095	12/15/2018	192
K1OA	1312	2/22/2003	200
KDØQ	2163	11/2/2019	194
K3EA	2194	2/22/2020	190
OE1HHB	2330	10/19/2021	167
IZ4DPV	2210	5/5/2020	154
N6PM	2254	11/4/2020	190

New recipients of 5 Band WAZ with all 200 Zones confirmed:

5BWAZ #	Callsign	Date	All 200 #
1895	WX2S	11/16/2022	1109
2424	RV9CX	11/17/2022	1110
1312	K1OA	11/25/2022	1111

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Jose Castillo, N4BAA, 6773 South State Road 103, Straughn, IN 47387. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Jose Castillo. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N4BAA may also be reached via email: <n4baa@cq-amateur-radio.com>.

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

QSL of the Month: K4NI – Navassa Island

Starting with this month's DX column, we are adding some special "QSLs of the Month" provided by Tom Roscoe, K8CX, of <www.Hamgallery.com>. Tom provides the backstories as well as the card images. We hope you enjoy seeing some very cool QSLs from the past! – N2OO

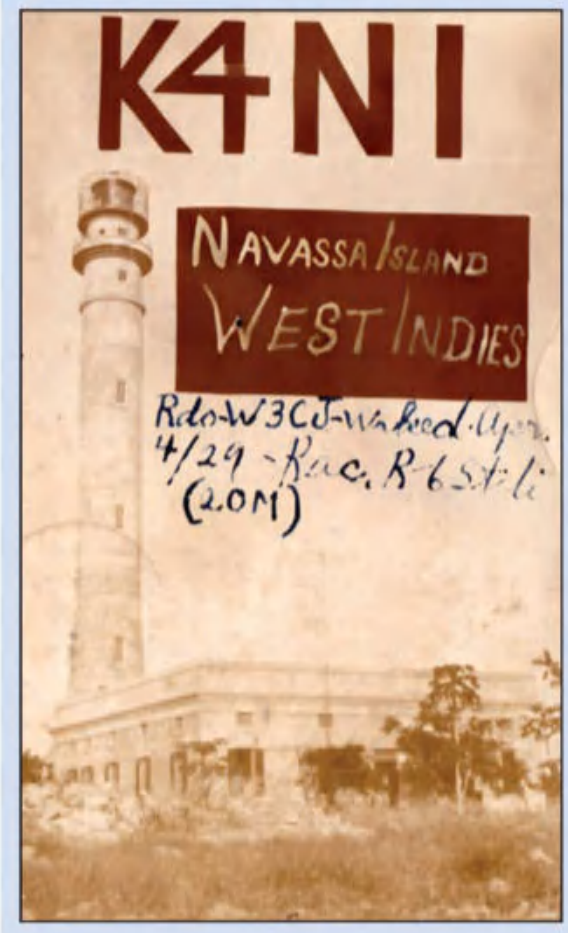
Here is a very rare K4NI Navassa Island QSL card dated April 4, 1929. The operator was Russell Dunaja, Jr. (1905-1989), first licensed in 1921 as 3ADY and later as W3BBF.

Russell was the lighthouse keeper and radio operator on Navassa Island from 1928 to 1929. A spark gap transmitter was used and later a CW transmitter was built. The receiver was a UV199 detector with a UX222 RF stage to an audio amplifier. The antenna was an 80-meter Zepp from the 160-foot-high lighthouse to a 60-foot pole. Amateurs from all over the world were worked, mostly on 20 meters.

The island offered papaya trees, limes, and very hot peppers. Russell and two others on the island would catch goats, tropical fish, red snappers, and crabs. They were supplied from Guantanamo Bay every three months with dried fruit and vegetables, canned fruits, and smoked meat. They drank rainwater collected in a cistern.

Staying on the island was very primitive and lonely. Russell said he would not have stayed on the island if not for amateur radio.

– 73, Tom, K8CX



from the seat on the plane. Not all was lost, though. I connected the transceiver to the computer, which allowed me to change frequencies. For the rest of the DXpedition, I used this K3 only for FT8. The first QSO was completed right after midnight with YB3BBF.

The next morning, I started setting up the Spiderbeam antenna (*Photo E*) and completed it by midday. I chose the location right next to the fence because other places were covered with palm trees. After setting it up, it had SWR above 5:1 on all bands. I checked the antenna and found the problem — a broken transformer cable. After fixing it, the SWR was good and I started to work CW on the upper bands. In the evening, I went to take some sunset pictures for QSL cards (*Photo F*). I was lucky to do it then because this was the only evening with clear sky. The rest of the time was rainy with clouds.

On Wednesday morning, I started by setting up the LBS vertical. The weather had already turned windy and foggy as the monsoon season was about to begin — two months of rain and no sun. We also received weather warnings of a storm and heavy rains for South Andaman Island for the next day.

Next, I set up Beverage antennas behind the hotel fence next to the jungle. Weird noises came from there while I worked and I didn't venture deeper in the jungle because of wild crocodile risks. In the end, the Beverages were 120 meters (394 feet) long. During the night, the wind picked up and started to tear down coconuts from the trees. Their falling and hitting the roof made loud noises like gunfire. From this point on, electricity interruptions also were frequent — at least 10 times a day for 10-20 minutes

CQ DX Awards Program

No Update

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604 USA. We recognize 341 active countries. Please make all checks payable to the award manager. Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 340 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. (Stickers for the 340 level and Honor Roll are available.) Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604 USA.

CW

DL3DXX.....339
HB9DDZ.....339
K4IQJ.....339
K9MM.....339
N4MM.....339
WB4UBD.....339
WS9V.....339
EA2IA.....339
F3TH.....339
K2FL..... 339
K2TQC.....339
K3JGJ.....339
K3UA.....339
K4CN.....339
K4JLD.....339
K4MQG.....339
K5RT.....339
K7LAY.....339
K7VV.....339
K8LJG.....339
N4AH.....339
N4CH.....339
N4JF.....339
N4NX.....339
N5ZM.....339
N7FU.....339
N7RO.....339
NØFW.....339
OK1MP.....339
W3GH.....339
W4OEL.....339
W5BOS.....339
W7CNL.....339
W7OM.....339
W8XD.....339
WK3N.....339
WØJLC.....339
WØVTT.....339
YU1AB.....339
K8SIX.....338
KA7T.....338
WA5VGI.....338
W9RPM.....338
G3KMQ.....337
KØKG.....337
W1DF.....337
W7IIT.....337
K8ME.....336
W6OUL.....336
JA7XBG.....335
F6HMJ.....334
K1FK.....334
K9OW.....334
PY2YP.....334
WG5G/QRPp.....334
WD9DZV.....334
K2OWE.....333
K5UO.....333
N6AW.....333
W4MPY.....333
K6LEB.....331
K9VKY.....331
N7WO.....331
OK1DWC.....331
K6YK.....329
W9IL.....329
IKØADY.....328
OZ5UR.....328
AB4IQ.....327
K6CU.....326
KE3A.....326
EA5BY.....325
KA3S.....325
K7CU.....324
N3RC.....324
N7WO.....324
KEØA.....322
YT1VM.....322
4Z5SG.....321
N2LM.....321
ON4CAS.....321
W2OR.....320
HB9DAX/QRPp.....319
W6YQ.....319
HA1ZH.....318
N4RF.....318
N6PEQ.....318
CT1YH.....316
EA3ALV.....315
RA1AOB.....313
WA4DOU.....312
YO9HP.....312
W6WF.....309
KT2C..... 307
K4DGJ.....307
W4ABW.....306
K7ZM.....305
HA5LQ.....301
RN3AKK.....300
WA9PIE.....298
K4IE.....295
YU1YO.....295
WA2VQV.....292
4XIVF.....286
K6YR.....284
PP7LL.....282
WR7Q.....282
N2VW.....280
K4EQ.....280
W8BLA.....280
WB5STV.....277
YO6HSU.....275

SSB

AB4IQ.....340
DJ9ZB.....340
DL3DXX.....340
DU9RG.....340
EA2IA.....340
EA4DO.....340
HB9DDZ.....340
I8KCI.....340
IK1GPG.....340
IN3DEI.....340
K2FL.....340
K2TQC.....340
K3JGJ.....340
K4CN.....340
K4IQJ.....340
K4JLD.....340
K4MQG.....340
K4MZU.....340
K5OVC.....340
K5RT.....340
K5TVC.....340
K6YRA.....340
K7VV.....340
K8LJG.....340
K8SIX.....340
K9MM.....340
KE5K.....340
KM2P.....340
KZ2P.....340
N4CH.....340
N4JF.....340
N4MM.....340
N5ZM.....340
N7BK.....340
N7RO.....340
NØFW.....340
OK1MP.....340
OZ3SK.....340
OZ5EV.....340
VE1YX.....340
VE2GHZ.....340
VE2PJ.....340
VE3MR.....340
VE3MRS.....340
VE3XN.....340
VK2HV.....340
W3AZD.....340
W3GH.....340
W4ABW.....340
W5BOS.....340
W6BCQ.....340
W6DPD.....340
W7BJN.....340
W7OM.....340
W8ILC.....340
W9SS.....340
WB4UBD.....340
WK3N.....340
WS9V.....340
XE1AE.....340
YU3AA.....340
JA7XBG.....339
KØKG.....339
W2FKF.....339
W4UNP.....339
W9RPM.....339
EA3EQT.....338
K3UA.....338
K7LAY.....338
K9HQM.....338
N4NX.....338
YU1AB.....338
4Z4DX.....338
K1UO.....338
N7WR.....338
WA5VGI.....338
W2CC.....338
W7FP.....338
W9IL.....338
N4FN.....337
IØZV.....336
K3LC.....336
K8ME.....336
EA3BMT.....335
F6HMJ.....335
HB9DQD.....335
IKØAZG.....335
IW3YGW.....335
OE2EGL.....335
VK2HV.....335
W4WX.....335
WB3D.....335
AA4S.....334
EA5BY.....334
K9OW.....334
PY2YP.....334
VK4LC.....334
W8AXI.....334
XE1J.....334
CT3BM.....333
IK8CNT.....333
K8LJG.....333
N6AW.....333
OE3WWB.....333
WD9DZV.....333
AA1VX.....332
KE3A.....332
N2VW.....332
N5YY.....332
W1DF.....332
K5UO.....331
KC2Q.....331
SV3AQR.....331
WØROB.....331
W6OUL.....331
XE1MEX.....331
KD5ZD.....330
WA4WTG.....330
WØYDB.....330
ZL1BOQ.....330
AD7J.....329
N3RC.....329
VE7SMP.....329
WØULU.....329
CT1AHU.....328
N1ALR.....328
N2LM.....328
AE9DX.....327
K7HG.....327
K6GFJ.....326
KE4SCY.....326
KF4NEF.....325
W6WF.....325
W9GD.....325
VE7EDZ.....324
WA5UA.....324
F6BFI.....323
ON4CAS.....323
VE6MRT.....323
W5GT.....323
N6PEQ.....322
W4MPY.....322
K8IHQ.....321
KW3W.....320
TI8II.....320
YO9HP.....320
XE1RBV.....317
N7YB.....315
IV3GOW.....312
N8SHZ.....312
K7CU.....311
OK1DWC.....311
KU4BP.....310
W6NW.....310
I3ZSX.....309
G3KMQ.....308
KA1LMR.....308
RA1AOB.....308
XE1MEX.....308
IK5ZUK.....307
IØYKN.....306
XE1MW.....305
K4IE.....304
K4ZZR.....304
K7ZM.....303
4Z5FL/M.....302
K7SAM.....301
KA8YYZ.....301
4X6DK.....298
K2HJB.....295
F5MSB.....293
W9ACE.....291
N3KV.....289
W6MAC.....289
N5KAE.....283
IZ1JLG.....282
WA9PIE.....282
WD8EOL.....281
IWØHOU.....277
AKØMR.....276
NØAZZ.....275
SQ7B.....275

RTTY

NI4H. 338
WB4UBD 338
WK3N. 338
N5ZM 338
OK1MP 337
K4CN 334
K8SIX. 334
W9RPM 334
W3GH 333
K3UA 332
AB4IQ 323
K4WW 323
N4MM 302
K4IQJ. 300
K8ME 278
IN3YGW. 275

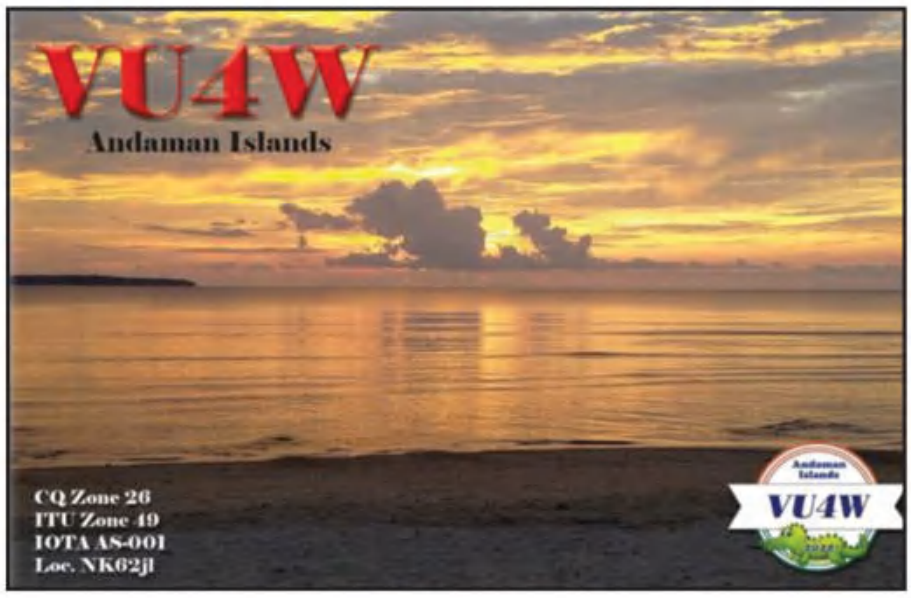


Photo F. The VU4W QSL card.

Band	CW	FT8	SSB	Total	Total %
160	232	151	0	383	1.1%
80	901	1227	0	2128	6.3%
60	0	155	0	155	0.5%
40	699	1514	0	2213	6.6%
30	1041	1778	0	2819	8.4%
20	2800	3603	545	6948	20.7%
17	2329	4095	0	6424	19.1%
15	2551	3476	302	6329	18.8%
12	1524	1755	0	3279	9.8%
10	1469	1425	0	2894	8.6%
6	0	5	0	5	0.0%
Totals	13546	19184	847	33577	99.9%

Table 2. VU4W QSOs broken down by band and mode. As you can see, FT8 accounted for the greatest number of contacts and SSB accounted for the fewest.

Photo G. Sometimes, Juris was the only dinner guest in the hotel dining room.

Band	CW	FT8	SSB	Total
160	32	31	0	38
80	56	64	0	69
60	0	37	0	37
40	63	73	0	79
30	61	78	0	80
20	90	103	55	110
17	83	96	0	105
15	86	90	47	107
12	62	67	0	75
10	67	60	0	73
6	0	2	0	2
Totals	108	119	67	133

Table 3. Number of DX entities worked from Andaman Island on each band and mode of operation.

until the local generator was switched on. This was the reason for my unexpected disappearances from the bands.

On May 5th, I uploaded my log and at that point it was approximately 6,500 QSOs. The internet was accessible only in the hotel reception hall that was 300 meters (1,000 feet) away from the shack. In order to talk with my XYL and also to set the correct time, I had to walk there every evening.

Dinner was usually served at 7 p.m. and some of the evenings I was the only visitor there (*Photo G*). More visitors came, but only on weekends. During the day, the outside temperature was 30-33° C (86-91° F) and very humid. When working with antennas, I had to change shirts often.

For the following days, the aim was to work more on the lower bands. On Sunday, May 8th, the first 300 QSOs were made on 80-meter CW and 40-meter FT8. Propagation changed every day and for the worse. On Monday, I tried 6 meters and managed to get only six QSOs with Japan. Later, I uploaded the log and it was up to 7,732 CW and 10,092 FT8 QSOs. My targeted QSO count was 30,000 for the expedition to meet the mega-DXpedition standards set by GDXF, the German DX Foundation.

I received a message from the WSJT development team asking why I was operating only with the MSHV software instead of WSJT-X Fox-and-Hound mode. I had MSHV from a previous expedition (3DAØWW) because this was the only software that worked with non-standard callsigns. Another problem was that I didn't have an internet connection at all times and couldn't provide my frequency for the Fox-and-Hound mode. For this DXpedition, I operated only on standard FT8 frequencies. I know it's not the optimal solution; however, for this situation, I didn't have other options.

The remaining days went by in the usual routine. On Saturday, May 14th, I made my last QSO, reaching my goal with a final QSO count of 33,577. Unfortunately, there were not many contacts on SSB and majority of them were on FT8, which is today's reality (see tables). Additional statistics are available on the DXpedition website at <www.lral.lv/vu4w>.

On Sunday, I took down the antennas and packed all my gear. My biggest concern was the falling coconuts. If one of them hit your head, you could be injured for life. In the evening, I had a celebratory dinner and photo with the chef and hotel personnel. On Monday morning, the taxi took me to the airport for my flight back home, with time for a little shopping for small gifts in Delhi before boarding my flight to Helsinki and then home to Riga to work on QSL cards!

Thanks to everyone who supported this DXpedition and who worked with us. See you soon on the next one.

contesting

BY TIM SHOPPA,* N3QE

Prepare For the February WPX RTTY Contest By Optimizing Your Contest Exchanges

Like any contest, correctly copying the other guy's callsign is essential to getting point credit for the QSO. In WPX RTTY, copying the callsign incorrectly will not only lose credit for the QSO, but also result in "an additional penalty of the QSO point value for the contact." (WPX RTTY Rule XIII.C.3.). Callsign accuracy is heavily weighted in the rules and we'll emphasize repeating callsigns in our optimized exchanges, up until the point that both callsigns have been acknowledged.

All modes of the WPX contests all involve an exchange of serial numbers, and accurately receiving and effectively sending these sequential numbers is necessary to earn QSO credit. In WPX RTTY, you'll lose point credit for the QSO — but not get any penalty beyond that — for incorrectly copying a serial number. Note that unlike many other contests for which your logger may be able to prefill the CQ zone, or a history file may provide a prefill for name and state, there is no prefill ever available for a serial number. This guarantees that if you're on for the WPX contests in any mode you'll be putting in more effort than in a prefill-oriented contest.

In addition to the call and serial number, the WPX exchange also requires an RST report (e.g. 599). Although our contest software assumes an automatic 599 for every QSO, the RST is a required part of the exchange and must be sent at least once by each side for a valid QSO. We'll see below how a common misprint of 599 is a clue used by savvy operators to help them correctly copy the following serial number.

Before getting into the recommended macros, I'll show an example of less-than-optimal RTTY macros commonly heard on the air, between me (N3QE) calling CQ and a caller with callsign H1SCALL. In the example below, I've highlighted the running station's transmissions in bold, to distinguish them from the search-and-pounce station's responses, and I label them with the typical contest logger function key assignments:

Run F1: CQ CQ WPX TEST DE N3QE K
S&P F4: N3QE N3QE DE H1SCALL KN
Run F2: H1SCALL 599 1234 DE N3QE KN
S&P F6: N3QE PSE AGN DE H1SCALL
Run F2: H1SCALL 599 1234 DE N3QE KN
S&P F2: N3QE DE H1SCALL TU QSL 599 456 BK
Run F3: H1SCALL DE N3QE TU 73 QRZ?

Let's repeatedly apply the principles of contest exchange optimization to these messages, starting with the basic CQ. In the poor example above, the CQ message is 24 characters long — of which the search-and-pounce station is only going to have to copy the four characters of my callsign. Let's trim out the DE and K prosigns — which are hardly necessary in RTTY contesting — as well as remove TEST but keep the shorter WPX. Keeping the WPX serves as an excellent internet search term for helping a neophyte find the rules. Finally, we'll move one of the CQs to the end of the message so that someone tuning in to the end of the CQ knows it's a CQ:

WPX N3QE N3QE CQ

This recommended CQ message is 16 characters long, of which eight characters are my callsign, for a data ratio of 50%.

Now let's improve the search-and-pounce station's reply to my CQ, first by noting that the only thing I need to copy is his callsign. In my example of a poor message above, the search-and-pounce station's message only contained his callsign once in a 23-character message, a data ratio of only 30%. My callsign — which is entirely unnecessary — was in it twice. There are also four unnecessary characters of prosigns DE and KN. A shorter macro that I'd recommend every search-and-pounce operator to use when responding to a CQ, would simply be his callsign repeated twice:

H1SCALL H1SCALL

An aside about this phase of the QSO: In recent years, I have found that for a couple percent of QSOs in RTTY contests, the search-and-pounce station is sending his exchange (e.g. 599 and serial number) before the CQing station has even acknowledged the caller's callsign. This is the convention for the WSJT modes like FT8 — where your response to a CQ is more than just your callsign, it also includes your grid or a signal report — but is not at all correct for RTTY. This is very poor form and is certain to result in anyone tuning in being confused about the phase of the QSO and which guy owns the run frequency.

Now it's time for the CQing station to acknowledge the caller and send the exchange. In my example above, the CQing station included his callsign after the exchange as well as two prosigns; these can all be removed. Further optimization is to repeat the variable element, the serial number, twice. Finally let's add the S&P station's callsign at the end of the exchange, in case (as commonly happens in RTTY) the first part was obscured by transmissions from other search-and-pounce stations. The net result is:

H1SCALL 599 1234 1234 H1SCALL

which is two characters longer but places heavy emphasis the caller's callsign and the serial number, the two variable elements. The RST report, which can be assumed to be 599 anyway, only needs to be sent once. If I know conditions are exceptionally clear and the repeats are unnecessary, I will occasionally hit the escape key on my keyboard after the first serial number because I'm highly confident that it got through. This is the exception rather than the rule, though, and I've found that repeating everything twice is often a net time-saver because it reduces the chance I'll be asked for a repeat.

Speaking of repeats, asking for "fills" — a repeat of the exchange element — and responding to fill requests are far more common in RTTY than in any other mode. It especially makes sense for stations on both ends to have set up a macro button just for a fill request and just to give fills. So let's move on to optimizing the fill request from the search-and-pounce station. He is asking "PSE AGN" a strong clue

email: <n3qe@cq-amateur-radio.com>

that he needs a repeat of my serial number, yet he's also including my callsign, his callsign, and some prosigns. A more efficient way to ask for a fill of the serial number would be specific to the needed element; for example, I prefer the following fill request for the serial number and recommend it be put on a function key in any serial number RTTY contest:

NR AGN NR AGN

Again, applying optimization principles the response to the fill request for a serial number doesn't need any callsigns, nor does it even need the RST. I have my F7 key macro set to send my serial number twice, with no repeat of callsigns or the RST. Hitting my F7 key once yields

1234 1234

and in particularly difficult conditions, to reduce the possibility of further fill request, I'll hit F7 twice to give

1234 1234 1234 1234

At this point the search-and-pounce station has all my information, I already have his callsign, and he only has to send me the serial number. He doesn't have to send a TU or QSL; if I get 599 from him instead of a fill request then I know he's copied my serial number. The optimized search-and-pounce exchange message removes both callsigns, all prosigns, and concentrates entirely on the required RST and serial number:

599 456 456

Finally, as the CQing station, I'll end the QSO with a TU and end with an obvious CQ including my callsign to anyone who has tuned in. The "QRZ?" in the poor example is a very inefficient way to express a CQ, as it is four characters long and the punctuation at the end requires a Figures shift. I don't need to send his callsign (that was acknowledged successfully several steps before) in the TU; a running CW or SSB station wouldn't include the other guys' callsign in the thanks, either. Finally, note that I put my callsign and CQ at the very end, to maximize the chance that someone very recently tuned in knows who I am and I'm ready for more callers:

TU N3QE CQ

Calendar of Events

All year	**CQ DX Marathon**	**bit.ly/3FyPiui**
Feb. 1	UKEICC 80m Contests SSB	https://ukeicc.com/80m-rules.php
Feb. 1	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Feb. 4	AGCW Straight Key Party	www.agcw.de/contest/htp/htp-en
Feb. 4	FYBO Winter QRP Sprint	https://qrper.com/tag/fybo
Feb. 4	Minnesota QSO Party	www.w0aa.org/mn-qso-party
Feb. 4-5	10-10 Int'l Winter Contest	http://bit.ly/1FrFeBc
Feb. 4-5	British Columbia QSO Party	www.orcadxcc.org/bcqp_rules.html
Feb. 4-5	European Union DX Contest	https://eudxcc.altervista.org/eu-dx-contest
Feb. 4-5	Mexico RTTY International Contest	www.rtty.fmre.mx/index.html
Feb. 4-5	North American CW Sprint	http://ncjweb.com/north-american-sprint
Feb. 4-5	Vermont QSO Party	www.ranv.org/ranv.html
Feb. 6	RSGB 80m Club Championship, SSB	bit.ly/3TxCrxl
Feb. 8	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Feb.11	FISTS Winter Saturday Sprint	www.fistsna.org/operating.html
Feb. 11	Asia-Pacific Spring Sprint (CW)	http://jsfc.org/apsprint
Feb. 11	RSGB 1st 1.8 MHZ Contest CW	bit.ly/3TxCrxl
Feb. 11-12	**CQWW RTTY WPX Contest**	**www.cqwpxrtty.com**
Feb. 11-12	Dutch PACC Contest	http://pacc.veron.nl
Feb. 11-12	KCJ Topband Contest	www.kcj-cw.com/e_index.htm
Feb. 11-12	OMISS QSO Party	www.omiss.net/Facelift/qsoparty.php
Feb. 11-12	SARL Field Day Contest	http://bit.ly/H0IqQf
Feb. 11-13	YL OM Contest	https://ylrl.org/wp/yl-om-contest
Feb. 12	CQC Winter QSO Party	http://bit.ly/2Qayte1
Feb. 13-17	ARRL School Club Roundup	www.arrl.org/school-club-roundup
Feb. 14	PODXS 070 Club Valentine Sprint	http://bit.ly/2Rp8LTk
Feb. 15	AGCW Semi-Automatic Key Evening	www.agcw.de/contest/sta
Feb. 15	RSGB 80m Club Championship, DATA	bit.ly/3TxCrxl
Feb. 15	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Feb. 18-19	ARRL CW DX Contest	www.arrl.org/arrl-dx
Feb. 19	FISTS Winter Sunday Sprint	www.fistsna.org/operating.html
Feb. 22	UKEICC 80m Contests CW	https://ukeicc.com/80m-rules.php
Feb. 23	RSGB 80m Club Championship, CW	bit.ly/3TxCrxl
Feb. 24-26	**CQWW 160M SSB Contest**	**www.cq160.com/rules.htm**
Feb. 25-26	Hiroshima Worked All Squares	www.hs-contest.org
Feb. 25-26	North American RTTY QSO Party	http://ncjweb.com/naqp
Feb. 25-26	REF SSB Contest	https://tinyurl.com/p4bbva92
Feb. 25-26	South Carolina QSO Party	http://scqso.com
Feb. 25-26	UBA CW DX Contest	http://bit.ly/W0gZiE
Feb. 26	High Speed Club CW Contest	www.highspeedclub.org
Feb. 26-27	North Carolina QSO Party	http://ncqsoparty.org/rules
Feb. 27	RSGB FT4 Contest Series	bit.ly/3TxCrxl

Applying all my recommendations, the recommended QSO form in full looks like this:

Run F1: WPX N3QE N3QE CQ
S&P F4: H1SCALL H1SCALL
Run F2: H1SCALL 599 1234 1234 H1SCALL
S&P F6: NR AGN NR AGN
Run F7: 1234 1234
S&P F2: 599 456 456
Run F3: TU N3QE CQ

Maximizing RTTY contest productivity heavily emphasizes avoiding fill / repeat cycles, and in WPX the serial number is a key variable element that super check partial and history files cannot help with.

Back to that error hint: Green-machine RTTY old timers know from decades of experience that if the Figures shift is missing, the decoder will print letters instead of numbers, and that there's a simple pattern to these mismatches: The mechanical teletypes used shifted versions of the top alphabetic row of the keyboard to send the digits. For example, if your computer decodes

TOO-QWE-QWE

while copying an exchange in the WPX contest, it's certain that your QSO partner was sending

599-123-123

and the initial figures shift had been dropped. Note that in this example, I've shown a somewhat common practice of putting hyphens, and no spaces, between numeric elements; this economizes by only sending the Figure shift once, but if the leading Figures shift is dropped the result is letters instead of numbers.

The commonly used N1MM package, in its digital interface window, will help you avoid a fill-repeat cycle on numeric exchanges that dropped the Figures shift. If you mouse over text; the "Letters / Figs" header will show you the alternative

Mar. 1	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Mar. 1	UKEICC 80m Contests SSB	https://ukeicc.com/80m-rules.php
Mar. 1-2	AWA John Rollins Memorial DX Contest	http://bit.ly/2WCGT2C
Mar. 4	SARL YL Sprint	http://bit.ly/H0IqQf
Mar. 4-5	ARRL SSB DX Contest	www.arrl.org/arrl-dx
Mar. 4-5	AWA John Rollins Memorial DX Contest	http://bit.ly/2WCGT2C
Mar. 4-5	Open Ukraine RTTY Championship	http://krs.ho.ua/openrtty
Mar. 4-5	Veron SLP Contest	http://bit.ly/2L9eT1L
Mar. 4-12	Novice Rig Round-Up	www.novicerigroundup.org
Mar. 5	SARL Hamnet 40M Simulated Emergency Contest	http://bit.ly/H0IqQf
Mar. 5	UBA Spring Contest 80m CW	http://bit.ly/2KKAtb9
Mar. 6	RSGB 80m Club Championship, Data	bit.ly/3TxCrxl
Mar. 7	AGCW YL-CW QSO Party	www.agcw.de/contest/yl-cw-party
Mar. 8	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Mar. 11	YB DX RTTY Contest	https://rtty.ybdxcontest.com
Mar. 11	QRP ARCI Spring Thaw SSB Sprint	www.qrpcontest.com/qrparci_thaw
Mar. 11-12	EA PSK63 Contest	https://tinyurl.com/5awufshf
Mar. 11-12	Idaho QSO Party	www.pocatelloarc.org/idahoqsoparty
Mar. 11-12	Oklahoma QSO Party	http://k5cm.com/okqp.htm
Mar. 11-12	North American RTTY Sprint	http://ncjweb.com/north-american-sprint
Mar. 11-12	RSGB Commonwealth CW Contest	bit.ly/3TxCrxl
Mar. 11-12	Stew Perry Topband Challenge	www.kkn.net/stew
Mar. 12	AGCW QRP Contest	www.agcw.de/contest/qrp
Mar. 12	FIRAC HF Contest	www.firac.de/html/contest.html
Mar. 12	UBA Spring Contest 2m CW/Phone	http://bit.ly/2KKAtb9
Mar. 12-13	Wisconsin QSO Party	www.warac.org/wqp/wqp.htm
Mar. 15	VHF-UHF FT8 Activity	www.ft8activity.eu/index.php/en
Mar. 15	RSGB 80m Club Championship, CW	bit.ly/3TxCrxl
Mar. 18	AGCW VHF/UHF Contest	www.agcw.de/contest/vhf-uhf
Mar. 18	PODXS 070 Club St. Patrick's Day Contest	http://bit.ly/38ugUiF
Mar. 18-19	Maidenhead Mayhem Sprint	https://w9et.com/rules.html
Mar. 18-19	SARL VHF/UHF Analogue Contest	http://bit.ly/H0IqQf
Mar. 18-19	Virginia QSO Party	https://bit.ly/3IeqHvl
Mar. 18-20	BARTG HF RTTY Contest	http://bartg.org.uk/wp/contests
Mar. 19	UBA Spring Contest 80m SSB	http://bit.ly/2KKAtb9
Mar. 20	Bucharest Digital Contest	https://yo3test201x.blogspot.com
Mar. 23	RSGB 80m Club Championship, SSB	bit.ly/3TxCrxl
Mar. 25	FOC QSO Party	www.g4foc.org/qsoparty
Mar. 25-26	Veron SLP Contest	http://bit.ly/2L9eT1L
Mar. 25-26	**CQWW WPX SSB Contest**	**www.cqwpx.com/**
Mar. 26	UBA Spring Contest 6m CW/ Phone	http://bit.ly/2KKAtb9
Mar. 27	RSGB FT4 Contest Series	bit.ly/3TxCrxl
Mar. 29	UKEICC 80m Contests CW	https://ukeicc.com/80m-rules.php
Mar. 31-Apr. 1	Sasquatch Stomp	www.pnwqrp.org/sasquatch-stomp
May 27-28	**CQWW WPX CW Contest**	**www.cqwpx.com**

numeric representation. Less common but sometimes useful, is to mouse over a conglomeration of numbers and punctuation and find that the unshifted text interpretation was what you wanted. *Figure 1* shows an example of this mouseover alternative decoding.

As you advance in RTTY technique you'll find that running multiple decoders using diverse decoding algorithms can reduce the need for repeats. In particular, the 2Tone and Gritty decoders have built-in autocorrelators that enhance the accuracy of repeated elements such as callsigns and contest exchanges. With Gritty, the autocorrelator has specific selections for serial-number based contests (like WPX RTTY) vs. text-based exchanges (e.g., name and state in NAQP RTTY). You can download the 2Tone package by David Wicks, G3YYD, at <https://bit.ly/3vtlYka>. Gritty, by Alex Shovkopylas, VE3NEA, can be found at <www.dxatlas.com/Gritty>.

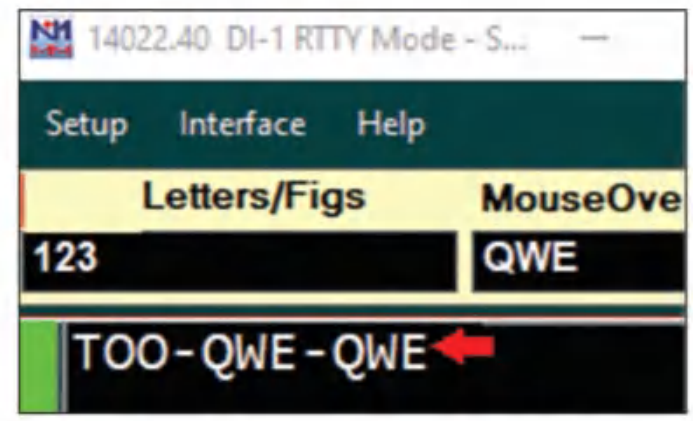


Figure 1. The N1MM Digital Interface window can reduce repeat requests by showing you what would have been printed with a Figures shift.

The ARRL Clarifies Rules on Self-Spotting in ARRL Contests

ARRL Director of Operations Bob Naumann, W5OV, has corrected the incorrect interpretation I made in my November column regarding self-spotting in the ARRL Sweepstakes contests. In particular, Bob notes that "soliciting contacts […] via non-amateur means" when mentioned in the ARRL rule section PROH.3, is intended to capture the case of calling CQ using non-amateur means, which he distinguishes as quite different from self-spotting.

Further, he notes that not only may unassisted entrants self-spot, but also that "unassisted single ops, can self-spot if they want."

To self-spot requires that you're connected to a telnet cluster, whether you're assisted or not. The most effective way to not receive packet spots but allow yourself to self-spot, is to connect to the cluster before the contest and issue a filter command so restrictive that no spotting information will ever flow from that cluster to your logger. With VE7CC-based cluster nodes, this is most easily done with the cluster command "SET/FILTER DXBM/REJECT 160,80,40,20,15,10" to reject all contest-band spots at the remote cluster such that they never get sent to your logger. When the contest is over, you can remove all filters in VE7CC with "SET/NOFILTER".

The N1MM+ logger has added support for self-spotting in the ARRL contests with a new function-key macro. The {SPOTME} macro can be placed in any run function key message or added as a clickable button on the bandmap. The first time it's invoked, this new macro will self-spot you the first time you call CQ on a new frequency, and maintains an internal 10-minute timer to lessen the possibility of spotting network overload. The 10-minute timer is reset if you QSY to a new CQ frequency and invoke the macro.

In preparation for the ARRL contests this year, I have experimented with putting {SPOTME} macros in my N1MM F1 (CQ) messages; my initial tests confirm that these only result in self-spots for the ARRL contests and have no effect in non-ARRL contests.

February and March Contest Highlights

I'm looking forward to the WPX RTTY contest with action on all five HF bands as we move toward the peak of the solar cycle. The low-band point bonus for DX contacts is a valuable incentive to not just make this a daytime high-band contest, but to also plan your weekend around the 40- and 80-meter band openings. Find full WPX RTTY rules at <https://cqwpxrtty.com>.

Apply the same optimization techniques for WPX RTTY to your macros for the NAQP RTTY contest held Saturday, February 25th (full rules at <https://ncjweb.com/naqp>) and the BARTG HF RTTY contest held the weekend of March 18-20th (full rules at <https://bit.ly/3jEqNEy>). As with all RTTY contests, these are "everybody works everybody" events.

The CW leg of the ARRL DX contest is held the weekend of February 18-19th, and SSB is two weeks later on March 4-5th. It seems likely that newly allowed self-spotting will be a strategy for entrants in the SSB mode. I'm sure some large multi-operator stations will capitalize on the new rules explicitly permitting multi-operator and assisted stations to live-stream their activity via social media. I look forward to the largest operations going as far as recruiting a social media manager that will deliver an exciting and positive message about contesting. Find the full text of the new ARRL DX rules at <www.arrl.org/arrl-dx>.

Milwaukee Wisconsin store front with tower

HRO Walnut Creek Team; Rosie, Luke, Erika, Cathy, Mae Ferrero. →

On the Cover – February 2023

All in the family… 52 years ago, a California Highway Patrolman named Bob Ferrero — known on the ham bands as K6AHV (later W6RJ; SK 2015) — started a business with his wife, Mae, in Burlingame, California that they named Ham Radio Outlet. Today, three generations of the Ferrero family work for the company, which has grown to 13 locations and lays claim to the title of the world's largest ham radio dealer.

Bob's son Robert, W6KR — pictured on our cover at the company's Plano, Texas, location — is currently HRO's president. Family matriarch Mae still works in the main office in Walnut Creek, California; Robert's sister Kelly, K6KLF, works at the Sacramento location and his son, Rob — who now holds his grandfather's former call of W6RJ — is manager of HRO Anaheim. Robert's wife and daughter are also hams, and despite its size, HRO remains a family business.

Milwaukee equipment display benches. All HRO stores have most display radios working so customers can evaluate and compare radios before purchase.

Even though it has a large presence on the internet, Robert says HRO is always exploring possible locations for additional stores, noting that, "we believe that brick and mortar stores are very important to our hobby," with experienced staff members who are "able to assist in many areas of the hobby."

Robert is following in his father's footsteps in one other way as well … Bob was featured twice on the cover of *CQ*, once back in 1990 and again in 2014; and now Robert makes it number three in 2023.

(Cover photo by Carolyn Ferrero)

propagation

BY TOMAS HOOD,* NW7US

Something...

Quick Look at Current Cycle 25 Conditions:
(Data rounded to nearest whole number)

Sunspots:
Observed Monthly, November 2022: **78**
12-month smoothed, May 2022: **77**

10.7-cm Flux:
Observed Monthly, November 2022: **124**
12-month smoothed, May 2022: **119**

One Year Ago:
(Data rounded to nearest whole number)

Sunspots:
Observed Monthly, November 2021: **36**
12-month smoothed, May 2021: **26**

10.7-cm Flux:
Observed Monthly, November 2021: **87**
12-month smoothed, May 2021: **81**

Solar Cycle 25 began in December 2019 and is expected to peak in 2025, according to the Solar Cycle 25 Prediction Panel, an international group of experts co-sponsored by NASA and NOAA. Specifically, December 2019 was the *solar minimum* or period of least solar activity between the approximate 11-year cycles of the Sun — between Solar Cycle 24 and Cycle 25.

The previous cycle, the 24th observed since the start of daily observations of the Sun in 1755, lasted 11 years (December 2008 to 2019), which is the average length of a cycle. Cycle 24 was the weakest cycle in terms of solar activity in 100 years. The s*olar maximum* — the peak of Cycle 24 — was in April 2014 with the sunspot count (averaged and smoothed) peaking at 114.

Look at the two charts in *Figures 1* and *2* — the Sunspot Count comparison chart, and the F10.7-cm Radio Flux comparison chart, that compare the same periods of months from the official starting points of Cycles 24 and 25. It is interesting to note that both cycles appear to have a similar activity rise rate, both in terms of sunspot counts and the F10.7-cm Radio Flux numbers.

However, if you compare the progression with the official forecast, we see the rise for the current cycle is much faster than predicted. This bodes well for a possibly stronger-than-expected Cycle 25.

Solar prognosticators postulate that the long-range prediction for Solar Cycle 25 remains a below-average, quiet, cycle. This is very similar to Cycle 24, the weakest solar cycle since record-keeping began in 1755. Even though the rise of Cycle 25 appears to be earlier and faster than predicted, the comparison between 24 and 25 shows much of the same rise rate.

Nevertheless, as we have pointed out before, one recent study suggests that Cycle 25 could be one of the strongest since record-keeping began. This study was published by a group led by Dr. Scott McIntosh. Some evidence remains that this could be the case, but we won't know for sure until another year is in the record book.

Stay tuned for updates and other space weather and radio propagation information about this current cycle. And please report to us any exciting news about how your on-air activities track with the steady increase in solar activity.

February Shortwave Propagation

From the middle of February through early April, typical equinoctial propagation conditions can be expected on the High-Frequency (HF) bands. This usually means a noticeable improvement in conditions between the northern and southern hemispheres. Look for improvements between the U.S. and South America, Africa, Australasia, Antarctica, and parts of Asia. Equinoctial propagation occurs during the spring and fall months, when the Sun is most directly overhead at the equator, producing similar ionospheric characteristics over large areas of the world. It tends to maximize

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for February 2023

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 3-11, 13-14, 18, 21, 26	A	A	B	C
High Normal: 1-2, 12, 15, 22, 24-25, 28	A	B	C	C-D
Low Normal: 27	B	C-B	C-D	D-E
Below Normal: 16-17, 19-20	C	C-D	D-E	E
Disturbed: 23	C-D	D	E	E

Where expected signal quality is:
A--Excellent opening, exceptionally strong, steady signals greater than S9
B--Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C--Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D--Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E--No opening expected.

HOW TO USE THIS FORECAST

1. Using the Propagation Charts appearing in "The CQ Shortwave Propagation Handbook, 4th Edition," by Carl Luetzelschwab, George Jacobs, Theodore J. Cohen, and R. B. Rose.

a. Find the *Propagation Index* associated with the particular path opening from the **Propagation Charts**.

b. With the *Propagation Index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the **Propagation Charts** with a *Propagation Index* of **3** will be good on February 1st and 2nd, excellent on February 3rd through February 11th, then good on February 12th, and so forth.

2. Alternatively, you may use the *Last-Minute Forecast* as a general guide to space weather and geomagnetic conditions throughout the month. When conditions are *Above Normal*, for example, the geomagnetic field should be quiet, and space weather should be mild. On the other hand, days marked as *Disturbed* will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these geomagnetic conditions. In general, when conditions are *High Normal* to *Above Normal*, signals will be more reliable on a given path, when the ionosphere supports the path that is in consideration. This chart is updated daily at <https://SunSpotWatch.com> provided by NW7US.

** P.O. Box 110*
Fayetteville, OH 45118
Email: <nw7us@nw7us.us>
@NW7US (https://Twitter.com/NW7US)
@hfradiospacewx (https://Twitter.com/HFRadioSpaceWX)

during sunrise and sunset periods and over both short and long path openings.

We continue to see an increase in sunspot activity. Little-by-little, we'll see improvements in the propagation at higher frequencies over long-distance paths. It is always a surprise to the casual amateur radio operator when getting on a band like 10 meters during these periods of low solar activity, and discovering that there is life on the band, beyond short-skip distances. Such surprises can occur at any time when the ionosphere is sufficiently energized, especially during periods when sunspots occur, and the daily 10.7-cm flux levels increase enough to wake up the higher frequencies.

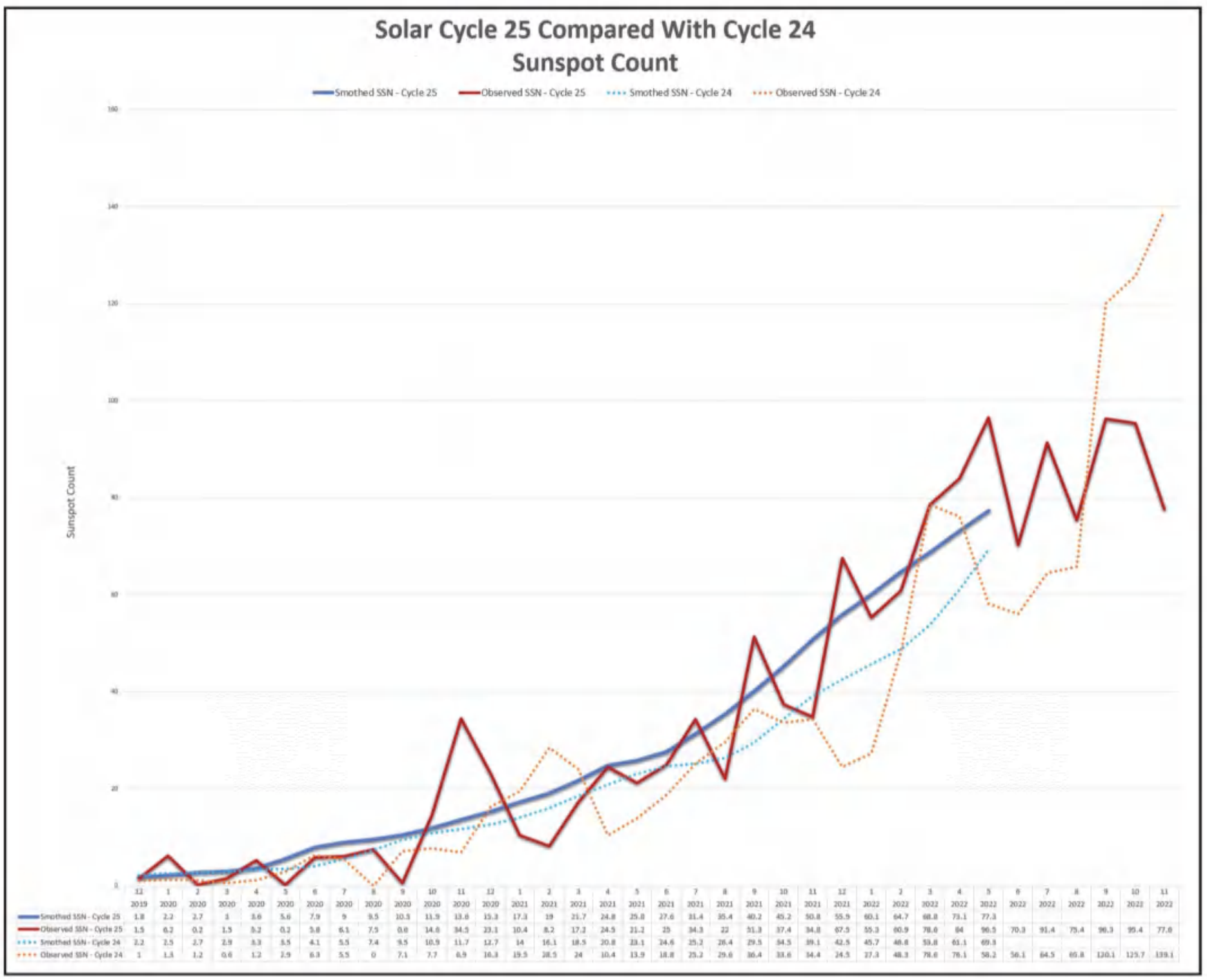
This month, during the daylight hours, optimum DX propagation conditions are expected on 20, 17, and 15 meters. These bands are forecast to open to all areas of the world sometime during this period, though with moderate to strong fading at times on higher frequencies. On these bands, conditions are expected to become optimal for an hour or two after sunrise and again during the late afternoon.

For short-range paths (regional), the 40- and 30-meter bands should be usable during most of the daylight hours. With increasing hours of daylight during February, expect these HF bands to remain open for an hour or so longer into the early evening than during the winter months.

Daily daytime conditions on the 10- and 12-meter bands will be possible for a fair number of days with great DX propagation. Strong openings will be possible for stations in low latitudes using north-south paths. Expect DX openings into Europe and the Far East when 10.7-cm Radio Flux rises above 110.

During the early evening hours and to as late as midnight, eight bands should be available for DX openings: 15, 17, 20, 30, 40, 60, 75/80, and 160 meters. Fifteen and 17 meters should hold up for openings toward Central and South America and the Caribbean, the Pacific area, Far East, and parts of Asia. Better openings into many areas of the world may be possible on 20 meters during this period, with the strongest signals from southerly and westerly directions. Good DX conditions are also forecast for 30, 40, 60, and 75/80 meters for openings toward the east and south. Openings in the same direction, but with higher noise levels and weaker signals, should also be possible on 160 meters.

Between midnight and sunrise, it should be a toss-up between 20, 30, and 40 meters for DX paths. These bands



	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022
Smothed SSN - Cycle 25	1.8	2.2	2.7	1	3.6	5.6	7.9	9	9.5	10.5	11.9	13.6	15.3	17.3	19	21.7	24.8	25.8	27.6	31.4	35.4	40.2	45.2	50.8	55.9	60.1	64.7	68.8	73.1	77.3						
Observed SSN - Cycle 25	1.5	0.2	0.2	1.5	5.2	0.2	5.8	6.1	7.5	0.0	14.0	34.5	23.1	10.4	8.2	17.2	24.5	21.2	25	34.3	22	51.3	37.4	34.8	67.5	55.3	60.9	78.0	84	96.5	70.3	91.4	75.4	98.3	95.4	77.0
Smothed SSN - Cycle 24	2.2	2.5	2.7	2.9	3.3	3.5	4.1	5.5	7.4	9.5	10.9	11.7	12.7	14	16.1	18.5	20.8	23.1	24.6	25.2	26.4	29.5	34.5	39.1	42.5	45.7	48.6	53.8	61.1	69.3						
Observed SSN - Cycle 24	1	1.3	1.2	0.6	1.2	2.9	6.3	5.5	0	7.1	7.7	6.9	16.3	19.5	28.5	24	10.4	13.9	18.8	25.2	29.6	36.4	33.6	34.4	24.5	27.3	48.3	78.6	78.1	58.2	56.1	64.5	65.8	120.1	125.7	139.1

Figure 1. This plots the progression of Sunspot Cycles 24 and 25, allowing us to compare the smoothed counts and the monthly observed counts for each cycle. Cycle 24 is represented by the dotted lines. What is revealed is that both cycles are somewhat similar in terms of rise from solar cycle minimum. (Charts by NW7US using SWPC/NOAA data)

should open to many areas of the world with conditions favoring openings toward the south and west. Expect similar conditions on 75/80 meters, but with weaker signals and higher noise levels. Be sure to check 160 meters for some unusual DX openings toward the south and west during this period. Conditions on the bands between 160 and 20 meters are expected to peak at local sunrise.

VHF Conditions

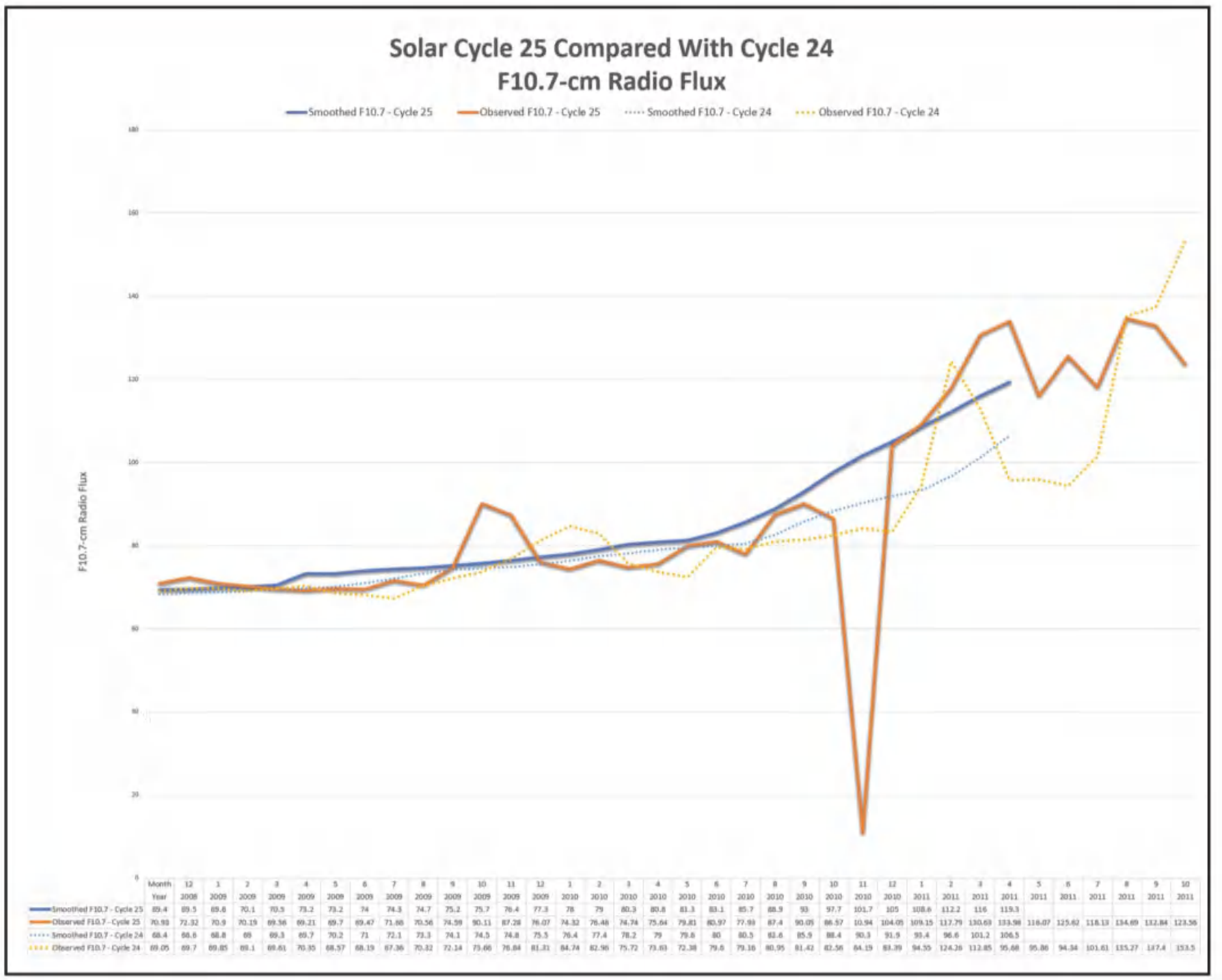
Check for 6-meter short-skip openings during the daylight hours. Some short-skip openings over distances of about 1,200 to 2,300 miles may occur. The best times for such openings are during the afternoon hours.

Trans-equatorial (TE) scatter propagation tends to increase during the equinoctial period and some 6-meter openings may be possible between 7 and 10 p.m. local time. The best bet for such openings is between the southern tier states and South America for paths approximately at right angles to the equator. An occasional TE opening may also be possible on 2 meters. Unlike F_2-layer or sporadic-E (E_s) openings on 6 meters, TE openings are characterized by very weak signals with considerable flutter fading.

Do expect moderate coronal hole activity on occasion. With the influence of coronal mass ejections or elevated solar wind streams, the geomagnetic field may reach minor storm levels. While most days will see quiet conditions, there is a fair chance that geomagnetic storms will trigger modest auroral activity. Auroral activity tends to occur more frequently during the equinoctial period. Look for days when the planetary A index (A_p) is climbing and the planetary K index (K_p) reaches 5 or higher. These are the days on which VHF auroral-type openings are most likely to occur.

There are no major meteor showers during February that could provide any VHF meteor-scatter propagation. For a detailed list of meteor showers, check out <https://tinyurl.com/bdcpttcw> for a complete calendar of meteor showers in 2023.

If you use Twitter.com, you can follow <@hfradiospacewx> for hourly updates that include the K index numbers. You can also check the numbers at <https://SunSpotWatch.com>, where this columnist provides a wealth of current space weather details as well as links. Please report your observations of any notable propagation conditions, by writing this columnist via Twitter, or via the Space Weather and Radio



Month	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10
Year	2008	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011
Smoothed F10.7 - Cycle 25	69.4	69.5	69.8	70.1	70.5	73.2	73.2	74	74.3	74.7	75.2	75.7	76.4	77.3	78	79	80.3	80.8	81.3	83.1	85.7	88.9	93	97.7	101.7	105	108.6	112.2	116	119.3						
Observed F10.7 - Cycle 25	70.93	72.32	70.9	70.19	69.56	69.21	69.7	69.47	71.68	70.56	74.59	90.11	87.28	76.07	74.32	76.48	74.74	75.64	79.81	80.97	77.93	87.4	90.05	86.57	10.94	104.05	109.15	117.79	130.63	133.98	116.07	125.62	118.13	134.69	132.84	123.56
Smoothed F10.7 - Cycle 24	68.4	68.6	68.8	69	69.3	69.7	70.2	71	72.1	73.3	74.1	74.5	74.8	75.5	76.4	77.4	78.2	79	79.6	80	80.5	82.6	85.9	88.4	90.3	91.9	93.4	96.6	101.2	106.5						
Observed F10.7 - Cycle 24	69.05	69.7	69.85	69.1	69.61	70.35	68.57	68.19	67.36	70.32	72.14	75.66	76.84	81.31	84.74	82.96	75.72	73.63	72.38	79.6	79.16	80.95	81.42	82.56	84.19	83.39	94.55	124.26	112.85	95.68	95.86	94.34	101.61	135.27	147.4	153.5

Figure 2. Here is our comparison of the 10.7-cm Radio Flux progression of Sunspot Cycle 24 (represented by the dotted lines) and Cycle 25 (solid lines), both smoothed numbers and monthly observed numbers. As is the case for the sunspot numbers chart, this chart reveals that both cycles are similar in terms of rise from solar cycle minimum.

Propagation Facebook page at <https://fb.me/spacewx.hfradio>.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for November 2022 is 77.6. The 12-month running smoothed sunspot number centered on May 2022 is 77.3. A smoothed sunspot count of 81, give or take about 9 points is expected for February 2023.

The Dominion Radio Astrophysical Observatory at Penticton, British Columbia, Canada, reports a 10.7-cm observed monthly mean solar flux of 123.56 for November 2022. The 12-month smoothed 10.7-cm flux centered on May 2022 is 133.98. The predicted smoothed 10.7-cm solar flux for February 2023 is 113, give or take 7 points.

Geomagnetic activity level this month is expected to range from quiet to stormy, resulting in occasional degraded propagation. Remember that you can get an up-to-the-day *Last-Minute Forecast* at <https://SunSpotWatch.com> on the main page.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may email me, write me a letter, or catch me on the HF amateur bands. If you are on Facebook, check out <https://fb.me/spacewx.hfradio> and <https://fb.me/NW7US>. Speaking of Facebook, check out the *CQ Amateur Radio* magazine fan page at <https://fb.me/CQMag>. Also, please check out the new alternative social networking ham radio group at <https://amateurhamradio.locals.com> and please share this with your amateur radio friends and clubs. *– 73, Tomas, NW7US*

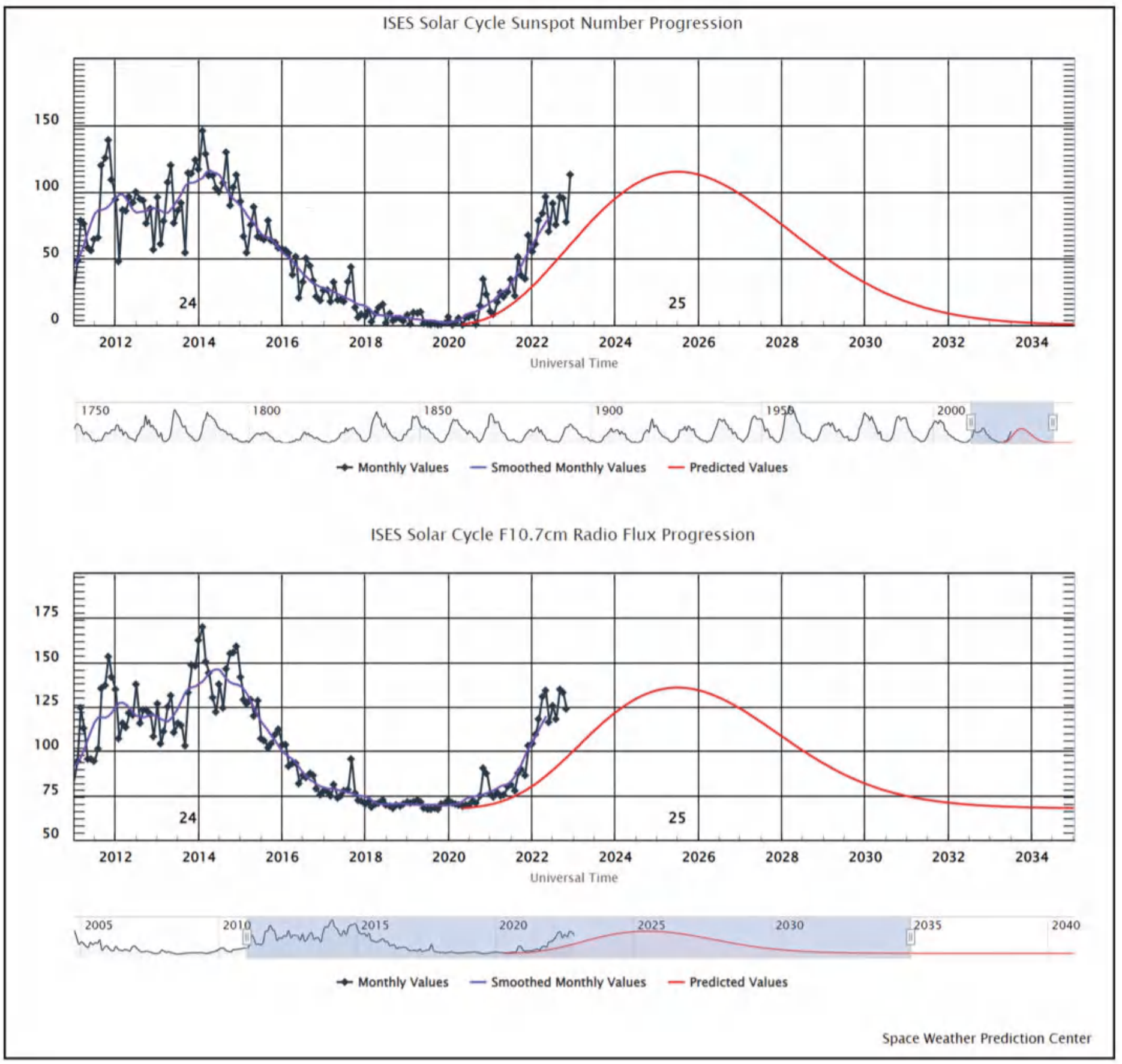


Figure 3. Cycle 25 is still outpacing the forecast, although it seems to have leveled off somewhat for now. On the HF bands, we have observed that even the 10-meter band is open worldwide. Imagine how the bands will be over the next few years, as the cycle's activity is expected to increase even more! (Credit: SWPC/NOAA)

announcements *(from page 2)*

GODFREY, ILLINOIS — The Lewis and Clark Radio Club will hold its **2023 Hamfest** from 7 a.m. to noon, Saturday, March 11 at the Lewis & Clark Community College, 5800 Godfrey Road. Email: <hamfest@k9ham.org>. Website: <www.k9ham.org>. Talk-in 145.230- (PL 79.7). VE exams.

KALAMAZOO TOWNSHIP, MICHIGAN — The Southern Michigan Amateur Radio Society will hold the **61st Annual Michigan Crossroads Hamfest & Radio Swap** from 8 a.m. to noon, Saturday, March 11 at the Wings Event Center, 3600 Vanrick Drive. Phone: (269) 815-8007. Email: <smarshamfest@gmail.com>. Website: <www.w8df.com/hamfest>. Talk-in 147.000+ (PL 94.8). VE exams.

PUYALLUP, WASHINGTON — The Mike & Key Amateur Radio Club will hold the **41st Annual Mike and Key Electronics Show & Swap Meet** from 9 a.m. to 3 p.m., Saturday March 11 at the Pavilion Exhibition Hall, Washington State Fairgrounds, 110 9th Avenue SW. Phone: (253) 631-3756. Email: <n7wa@arrl.net>. Website: <www.mikeandkey.org>. Talk-in 146.82- (PL 103.5). VE exams.

RAYNE, LOUISINA — The Acadiana DX Association will hold its **Hamfest & Swapmeet** from 8 a.m. to 2 p.m., Saturday, March 11 at the Rayne Civic Center, 210 Frog Festival Drive. Contact: James Romero, K5CNU, (337) 319-6414. Email: <k5cnu@att.net>. Website: <http://kn5grk.com>. Talk-in 145.410 (PL 123). VE exams.

TULLAHOMA, TENNESSEE — The Middle Tennessee Amateur Radio Society will hold the **MTARS Tullahoma Hamfest** from 8 a.m. to 2 p.m., Saturday, March 11 at the First United Methodist Church, 208 West Lauderdale Street. Contact: Larry Cagle, K4WLO, (251) 680-3250. Email-: <k4wlo@arrl.net>. Website: <www.mtars-ham.org>. Talk-in 146.700- (PL 114.8) or 443.950+ (PL 107.2). VE exams.

ELYRIA, OHIO — The Northern Ohio Amateur Radio Society will hold the NOARS Winter Hamfest and Computer Show from 9 a.m. to noon, Sunday, March 12 at the Lorain County Community College-John A. Spitzer Conference Center, 1005 N. Abbe Road. Contact: Carl Rimmer, W8KRF, (216) 256-9624 (before 9 p.m.). Email: <winterhamfest@noars.net>. Website: <www.noars.net>. Talk-in 146.70- (PL 110.9).

FORT WALTON BEACH, FLORIDA — The Playground Amateur Radio Club will hold its **53rd Annual Hamfest** from 4-7 p.m., Friday, March 17 and from 8 a.m. to 2 p.m., Saturday, March 18 at the Northwest Florida Fairgrounds, 1958 Lewis Turner Boulevard. Phone: (850) 359-9186. Email: <hamfest@w4zbb.org>. Website: <www.w4bzz.org>.

BUFFALO, MINNESOTA — The Maple Grove Radio Club will hold its **39th Annual Midwinter Madness Hobby Electronics Show** from 8 a.m. to noon, Saturday, March 18 at the Buffalo Civic Center, 1306 County Road 134. Phone: (763) 537-1722. Website: <http://k0ltc.org>. Talk-in 147.000+ (PL 114.8). VE exams, ARRL card checking.

LOOMIS, CALIFORNIA — The Sierra Foothills Amateur Radio Club will hold the **7th Annual Loomis Hamfest** from 7 a.m. to noon, Saturday, March 18 at the Historic Loomis Train Depot, 5775 Horseshoe Bar Road. Website: <www.w6ek.org>.

STUART, FLORIDA — The Martin County Amateur Radio Association will hold the **48th Annual Stuart Hamfest** from 8 a.m. to 2 p.m., Saturday, March 18 at the Martin County Fairgrounds, 2616 SE Dixie Highway (A1A). Website: <www.mcaraweb.com>. Talk-in 145.150- (PL 107.2).

PERRYSBURG, OHIO — The Toledo Mobile Radio Association will hold its **65th Annual Hamfest** from 8 a.m. to 2 p.m., Sunday, March 19 at the Owens Community College-Student Health and Activity Center, 30335 Oregon Road. Contact: TMRA, P.O. Box 9673, Toledo, OH 43697-9673. Website: <www.tmrahamradio.org>. Talk-in 147.27+ (PL 103.5). VE exams.

SOUTHINGTON, CONNECTICUT — The Southington Amateur Radio Association will hold its **Flea Market** from 8:30 a.m. to noon, Sunday, March 26 at the Southington High School, 720 Pleasant Street. Contact: Bob, K1HSN, (860) 628-4808. Email: <w1cev@arrl.net>. Website: <www.chetbacon.com/sara>. Talk-in 147.345 (PL 151.4), 145.49, or 145.17 (PL 77). VE exams.

TROY, MICHIGAN — The Utica Shelby Emergency Communications Association will hold the **USECA 2023 Swap and Shop** from 8 a.m. to 2 p.m., Sunday, March 26 at the Balkan America Community Center, 1451 E. Big Beaver Road. Website: <http://usecaarc.org>. VE exams.

APRIL

RALEIGH, NORTH CAROLINA — The Raleigh Amateur Radio Society will hold RARSfest and the 2023 ARRL Roanoke Division Convention from 8 a.m. to 3 p.m., Saturday, April 8 at the Jim Graham Building, NC State Fairgrounds, 4285 Trinity Road. Contact: Chuck Littlewood, K4HF, (919) 872-6555. Email: <k4hf@arrl.net>. Website: <www.rarsfest.org>. Talk-in 146.64. VE exams.

CUYAHOGA FALLS, OHIO — The Cuyahoga Falls Amateur Radio Club will hold its 67th Annual Hamfest from 8 a.m. to 1 p.m., Saturday, April 15 at the Emidio & Sons Expo Center, 48 E. Bath Road. Contact: Bruce Ferry, (330) 790-1680. Email: <hamfest2023@w8vpv.org>. Website: <www.w8vpv.org/hamfest>. Talk-in 147.270+ (PL 110.9) or 444.850+ (PL 110.9). Free VE exams.

GEORGETOWN, DELAWARE — The Sussex Amateur Radio Association will hold the **Georgetown Hamfest** and **2023 ARRL Delaware State Convention** beginning 8 a.m., Saturday, April 15 at the Cheer Community Center, 20520 Sand Hill Road. Contact: Jamie, W3UC, (410) 202-7690. Email: <hamfestdelaware@gmail.com>. Website: <www.radioelectronicsexpo.com>. Talk-in 147.090 (PL 156.7). Free VE exams, DXCC / VUCC / WAS / WAC card checking.

LANDING, NEW JERSEY — The Splitrock Amateur Radio Association will hold the **2023 North Jersey Tailgate Hamfest** beginning 8 a.m., Saturday, April 22 at the Landing Park Recreation Complex, 165 Landing Road. Email: <hamfest@splitrockara.org>. Website: <www.splitrockara.org>. Talk-in 146.985- (PL 131.8). DXCC card checking.

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HF Mobile or Fixed Virtual X Antenna Patent: For Sale or License. Request Free Power Point Presentation file. Shows design details, pictures, prototype tests. Design applies to a broad frequency range for mant antenna arrays/beams/verticals. <lgslay@sbcglobal.net>. Larry Slay, K5WUL

FOR SALE: Samlex Power Supply Model SEC 1223, 13.8V @ 25 amps. Not working. Includes operating manual and schematic. Price $50 or best offer. Contact Harry, W9HRQ, at <harrygraziano@gmail.com> or phone 1-773-334-4492.

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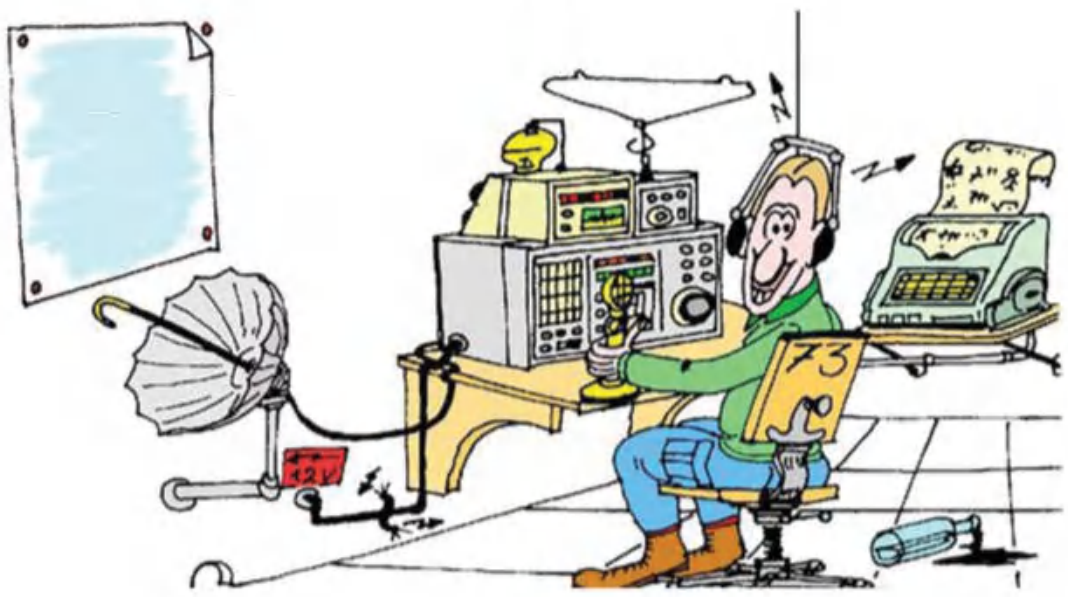

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