



THE RICHMOND HAM

Published Monthly by the Richmond Amateur Radio Club

P.O. Box 35279, Richmond, Virginia 23235

February 2019

THE RICHMOND AMATEUR RADIO CLUB will meet Friday, February 8th 2018, 7:00PM, at the Bon Air United Methodist Church, 1645 Buford Road.

Coming Events:

RARC VE Testing Session. March 9th 2019.

This Month's Program:

Gordon Miller NQ4K will speak on the upcoming Virginia QSO Party.

January Meeting Minutes

The regular meeting of the Richmond Amateur Radio Club was called to order at 19:00 on January 11, 2019 at Bon Air United Methodist Church by John DeMajo, (K5HTZ).

Members Present: All present signed RARC Log Book

Treasurer's Report: Ken Leidner, (WV0L) gave the Treasurer's Report, with an ending balance of \$8114.10. The Report was approved unanimously. Ken also presented 2 prospective members; Alan Farms, Jr, (W4AFJ) and David A. Farr (KF2YB). Both were approved unanimously. President John DeMajo, (K5HTZ) also added that William Norman Jr. donated \$250 to the club.

Committee Reports:

Frostfest: George Golding, (W3PPY) has a signup sheet for RARC table, which will be manned in shifts, as at previous Frostfest.

Tech Committee: Bruce MacAlister, (W4BRU) reported that the RARC Remote Station is working well again.

ARRL Section Report: Dr. Joe Palsa, (K3WRY): Frostfest is state ARRL section meeting. Informed members of ARES and RATS Nets and reminded that the nets have no membership requirements, they are open to all. ARRL has almost 800,000 members worldwide.

Testing: Allan Johnson, (WA3J) reminded members that VEC testing will take place on Jan 12 at 9am.

License School: Bruce MacAlister, (W4BRU) stated that Spring class registration will be on February 26, at 7pm.

Makers: RARC makers group meets Tuesday at Ken Zutavern's, (K4ZUT) house from 2-4 pm

New Business: Jim Lewis gave a Swan 500C to John and he gave it to a member who asked for it
Show and Tell: Dr. Joe Palsa, (K3WRY) demonstrated a Quicksilver Go Kit. Daniel Brown, (W4ERF) demonstrated a paint can antenna that he constructed.

Adjournment: Meeting was adjourned by vote. Jim Bates, (K8OI) gave his presentation on Internet Security after a short intermission. The next general meeting will be at 19:00 on February 8th, 2019 at Bon Air United Methodist Church.

Minutes submitted by: David F. Robinson , (KJ4LHP), Secretary

From The Prez

I was very pleased with this year's Frostfest. I enjoyed seeing many of you out there, and I hope you were all able to find some gear that you have been looking for. I was able to add a rare Hallicrafters model SX43 to my collection, which absolutely made the day for me. Thanks and kudos to all who worked to make Frostfest 2019 a memorable occasion.

This month, our meeting program will feature Gordon Miller, NQ4K who will speak on the upcoming Virginia QSO party. Also remember that we still have a few openings for program presentations in the summer and fall months, so if you have something you would like to present, please let me know and we will schedule you.

John DeMajo - K5HTZ

RARC VE News

FCC EXAMS EVERY OTHER MONTH

RARC offers VE Testing Sessions on the second Saturday of odd months except June to cover Field Day instead of July: Bon Air United Methodist Church, 9 AM.

The March testing session will be on the 9th at the Bon Air United Methodist Church, 9 AM.

If you have questions about a session, please see our website, www.rarclub.net or contact Allan, WA3J, at 804-399-8724, or ve@rarclub.net

Club Info...

RARC meets on the second Friday of each month at 7:00 PM, at the Bon Air United Methodist Church, 1645 Buford Road.

We offer 10-week license prep classes in September and March with exams following. Members provide VE testing sessions on odd-months during the year.

Join the Richmond Amateur Radio Club.

You don't have to have a ham license, just have a genuine interest in the hobby.

Annual Dues are:

80 and over \$0
Regular Membership \$20.00

Lots of information about the Club and our activities is available on our website, www.rarclub.net.

Nets

RARC has the first and only D-STAR digital repeater in the area. 147.255 (+ 600), 443.7125 (+ 5) and now 1284.0000 (-20). In addition to our Wednesday local D Star net (below), we link the D Star VHF module for the National Capital Region D Star Net on Wednesday nights at 9pm. On Tuesday nights at 9pm, we link our VHF module to the North Carolina D Star Net, and on Sunday nights at 9pm to the South Eastern D Star Weather Net.

Beginning on March 5, 2014, the RARC D Star Net which meets on Wednesday nights at 8:00pm will be accessible on our three D Star modules, all of which will be linked.

You can use any of the three frequencies, 2 meters, 70 cm or 23 cm, and you should hear and be heard by everyone.

If you participate in the net via DVAP or DV Dongle, you must link your device to Ref 062D rather than to any of our modules. Since the W4FJ stack will all be linked to Ref 062D, anyone linked to that reflector will be connected to the net.

Sunday	7:00 pm	50.135	USB
	7:30 pm	52.525	FM
Wednesday	7:00 pm	28.475	USB
	8:00 pm	147.255	D-Star Rptr
	8:15 pm	145.730	Packet

MRA

Interested in information or support of the **Metropolitan Repeater Association (MRA)?**

Call Ed, KG4SNK, at 804-513-1947. The sole business of the MRA is to own, operate and maintain the 145.430 repeater.

Show and Tell!

If you have an item, idea, latest and greatest, or whatever gizmo; please bring it to the RARC meeting. We have a table (usually) set up near the front where you can place your item and share/discuss it with others as they arrive. We also have a section of the agenda set aside for members to discuss their "Show and Tell" item(s). No need to be tentative; we are INTERESTED in what you are doing, how you are doing it and, in true Ham fashion, how much it costs!

New repeater coming to Powhatan!

With an Analog-Fusion VHF repeater, a UHF DMR repeater, and a Winlink access point expected in February, PARC will add to the ham radio connections especially for the southwest end of the metro area. Check out their website at <https://www.n4pow.com/>

Virginia Distracted Driving Legislation Update

In response to public concerns about the dangers of distracted driving while the driver is using a cell phone or other communications devices, a Bill was introduced into the 2018 session of the General Assembly which would have made it unlawful, with certain stated exceptions, to use a cell phone or Amateur mobile radio while driving. The Bill specifically exempted Citizens Band radio but neglected to mention Amateur Radio. The Club's **Concerned, Unofficial, Self-appointed, and ad hoc Watchdog Committee** and Hams in Northern Virginia took action to lobby effectively to have Amateur Radio added to the exemptions. The requested change was added but the Bill subsequently died in a Senate Committee.

At the beginning of the 2019 session of the General Assembly, identical Bills were introduced into both the House and Senate which would accomplish the intent of the 2018 Bill and, in addition, would ban verbal communication using cell phones, etc. Again, RARC's **Concerned, Unofficial, Self-appointed, and ad-hoc Watchdog Committee** reviewed both 2019 House and Senate Bills. The wording in both Bills is identical and, although there are minor changes and amendments to the 2018 version, both provide exemptions for Amateur Radio mobile operations. Since there seems to be no

proposed legal restrictions for Amateur Radio mobile operations in Virginia, the **Watchdog Committee** determined therefore that no further lobbying is needed this session.

Both Bills are still in Committee, but it should be understood that if a Bill containing the wording of the proposed Bills is passed into law, the law will only exempt Amateur mobile usage but not use of a cell phone or GMRS even though the user has a Ham license.

Just for idle curiosity, members of RARC's **Concerned, Unofficial, Self-appointed, and ad hoc Watchdog Committee** are: Win Grant, W4WIN, Bruce MacAlister, W4BRU, Joe Palsa, K3WRY, Allan Johnson, WA3J, and Mac McNeer, K4YEF. But if others want to be a part, all are welcome.

Mac, K4YEF

Auto-Spot, Tuning Aids, and the Arcane History of CW Pitch-Matching

by Wayne Burdick

Elecraft's auto-spot and CWT features -- available on the K3/K3S/KX2/KX3 -- are very useful tools for CW operators, especially those not experienced in pitch-matching. Here's a bit of history on where these features came from and how they work.

CW Spotting History

When a station finishes a CQ in CW mode, the operator faces the challenge of copying someone who's calling back. Callers may be weak or obscured by QRM; the op can usually deal with both problems by narrowing the filter passband. However, callers may also be off frequency. A calling station may be using a wide filter passband themselves, not attempting to carefully match their VFO frequency to that of the CQing station. The result may be no QSO, even when propagation is excellent.

In the Days of Yore, a frequency offset between stations didn't always matter. Sometimes both stations used crystal-controlled transmitters, so operators had to patient tune around after calling CQ.

As a 14-year-old novice I embraced this operating style for a year or so, armed with a dozen or so crusty FT-243 crystals for my Heath HW-16. I nearly wore out the socket swapping them in and out. After calling CQ, it was not unusual to find a caller 30 or more kHz away! (Away from "where" was a poorly answered question, as my Hallicrafters receiver dial wasn't exactly digital.)

Fortunately I soon acquired an outboard VFO, a life-changing addition to my station. Jealous friends doubled up on their paper routes to pay for their own. Girls suddenly paid more attention to me.

These days virtually everyone has a VFO, along

with the expectation that they won't have to tune theirs very far, if at all, to tune you in. Not only that, they're stable and well calibrated, not like the beasts we had to skillfully tame. Progress!

Manual Spotting (SPOT switch)

Once I had a VFO I quickly learned to do *manual* pitch matching. Older rigs didn't provide a way to do that explicitly, so you'd improvise. Basically, you had to coerce a very weak signal out of your own transmitter, say by turning on only the driver, then tune the transmit VFO until you could hear your signal on your own receiver -- superimposed on the calling station, at the same pitch. This is what we call spotting.

Of course spotting is a lot more convenient these days, as many rigs include a SPOT switch. This function is easy for a modern transceiver designer to add, because the radio's firmware is quite capable of turning on only the CW sidetone without transmitting.

That is the purpose of the SPOT switch on all Elecraft transceivers. Tap SPOT, and you'll hear your sidetone pitch. Most people can do a good job of adjusting the VFO such that the CQing station's pitch matches that of the SPOT tone. This ensures that when you call them, you'll be close to their own frequency.

Tuning Aids: Filtering (APF), PLL (NE567), and Spectral (CWT)

Since not everyone has an inherent musical ear, various hardware-enhanced means of tuning in CW signals have been developed.

The simplest method is to just narrow your receiver passband so much that, if you can hear a station calling CQ at all, you're guaranteed to be "right on top of him." This assumes that your transceiver enforces alignment between its transmit and receive pitch...true of all Elecraft gear.

Narrow filtering has gone through decades of evolution. Some filters were based on op-amps (active filters), while others were based on LC filtering, conscripting humongous toroidal cores scavenged from telco equipment. I acquired my stash of these from a haphazard mound of old switching racks, decaying in an abandoned aircraft hanger on the Bermuda U.S. Navy base. (That irresistible junk pile was also a mother load of TO5 transistors, multi-pound electrolytic capacitors, and tetanus, but that's another story.) Typically the toroids were 88 millihenries -- a huge value for a high-Q inductor, permitting resonance in the low audio range.

Later, such filters migrated to digital signal processing, in the form of switched-capacitor ICs or DSPs. You can still buy these switched-capacitor chips, like the MF10, from various sources. It's instructive to roll your own tunable filter, just for fun.

Whether passive or active, the goal of filtering is typically to achieve a narrow passband, say 250 Hz

or less. With DSP, nearly perfect filters with "brick wall" passbands can be created. But these have the disadvantage of ringing like a bell when pinged by a CW signal or noise, making copy difficult.

One solution incorporated into the K-line and KX-line is the Audio Peaking Filter (APF), which provides a 30-Hz bandwidth at -3 dB, but broad skirts, preventing ringing from occurring. As our customers will attest, APF works like magic on weak signals obscured by noise.

Another forerunner to DSP techniques was the audio phase-locked-loop, using inexpensive ICs like the legendary LM567. When locked on a signal that matched its center frequency, the circuit would turn on an LED, alerting the operator that the VFO was now properly tuned.

With the DSPs in our K-line and KX-line radios, we can provide a much more powerful tool: CWT, or "CW Tuning Aid." When enabled, CWT turns the upper portion of the rig's S-meter into something of a mini spectrum analyzer. The pitch of the strongest signal in the passband is analyzed by the DSP, then represented as a single segment of the bar graph. For CWT-enhanced manual spotting, the operator simply tunes the VFO slowly until the center CWT segment is flashing along with the keyed signal.

Manual tuning with CWT can also be used in FSK-D and PSK-D modes as described in the owner's manual.

Closing the Loop: Auto-Spotting (SPOT + CWT)

The Elecraft K3/K3S/KX2/KX3 take CW tuning another step forward by providing a way to *automatically* retune the VFO frequency to match that of a received signal. How does this work?

When CWT is turned on, firmware treats the SPOT switch as AUTO-SPOT. The DSP analyzes the incoming signal, and with a bit of processing, determines its exact audio pitch. From there all that's needed is a bit of math to offset the VFO to match this pitch to the CW sidetone.

There's another subtlety, though. Since a CW signal is generally being keyed on and off, the CWT algorithm has to ensure that it doesn't "take off," chasing a signal that's not there. To avoid this, we keep track of the energy in the passband, and slew the VFO incrementally over an average of about 0.5 second, moving only when the target signal is present.

How to Use Auto-Spot

I encourage you to give the auto-spot feature a try. It's best to start with a fairly narrow passband, say 400-600 Hz; narrower if there's a lot of QRM. Find a signal, turn on CWT, then tap SPOT to tune it in. A second tap of SPOT may get even closer, especially if there's a lot of band noise.

Auto-spot can also be used in Elecraft's PSK-D mode, i.e. for PSK31/PSK63. As with CW mode, just

turn on CWT, tune in a prospective signal, and tap SPOT. Since PSK auto-decoding requires very accurate tuning, it's best to set the filter bandwidth to 50 Hz, then let auto-spot dial things in down to the last 2 or 3 Hz. If you have text decode turned on, you should start seeing text characters scroll by after auto-tuning has completed. Tapping a second time or fine-tuning the VFO a bit in 1 Hz steps may improve copy.

From the Elecraft Newsletter

Famous Hams You Didn't Know About

Amory H. "Bud" Waite, Jr. was born near Boston on February 14, 1902 and died in Venice, Florida on January 15, 1985. A radio and electrical engineer, Waite participated in eleven expeditions to the Antarctic and twelve expeditions to the Arctic regions between 1933 and 1965. As a radio operator during the Second Byrd Antarctic Expedition, Waite gained national recognition as one of the three men who rescued Admiral Richard E. Byrd from the Bolling Advanced Base during the Antarctic winter of 1934. His most notable achievement in polar exploration and research was the development during the 1950s and 1960s of a system to measure the depth of ice using radio waves. Waite patented this system, known as radio ice depth sounding.

Waite's career as a radio operator began in 1912 when, as a twelve-year-old Boy Scout, he obtained his first amateur radio license. Following graduation from high school in 1919, Waite joined the U.S. Navy and went through the Naval Radio School at the Great Lakes Naval Station in Illinois. First stationed aboard the battleship U.S.S. Florida in the Atlantic Fleet, Waite eventually rose in rank to become the Flag Radio Operator for the fleet aboard the U.S.S. Arkansas. After leaving the U.S. Navy with an honorable discharge in 1923, Waite worked for a variety of companies installing radio equipment in naval vessels under construction in the Boston area. During this time he also took night classes at the Lowell Institute (present-day Massachusetts Institute of Technology), graduating in 1926 with a degree in radio and electrical engineering.

In 1929, Waite became the Assistant Electrical Officer aboard the M.S. Triumph, the world's first electrically driven cargo vessel. Waite traveled to the Philippines, Shanghai and Hong Kong and back through the Panama Canal during the ship's eight-month maiden voyage. Upon his return from the Orient, Waite worked for four years at the Shortwave and Television Corporation in Boston, where he eventually became the Chief Operator of New

England's first television station. During this time period Waite also served as a Master Sergeant in the Massachusetts National Guard, working to develop some of the military's first mobile radio stations.

As an amateur radio operator during the 1920s, Waite spent many evenings monitoring the radio broadcasts sent by various polar explorers, including U.S. Navy Lieutenant Richard E. Byrd. In 1933, when Byrd called for volunteers for his second expedition to Antarctica, Waite applied and was accepted as an electrician aboard the expedition's ship, the S.S. Bear of Oakland. Waite eventually became the ship's chief radio operator and later was assigned to the shore party at Little America. While living at the Little America base Waite helped erect radio towers and became one of the expedition's radio operators. As such, Waite traveled on many of the expedition's exploratory tractor trips across the ice of the continent. In July and August of 1934, Waite participated in all three attempts to rescue Richard E. Byrd from his isolated position at the Bolling Advanced Base. Waite, along with Dr. Thomas Poulter and Peter Demas, finally reached Byrd on August 13th, after traveling 123 miles in seventy straight hours during the pitch darkness of the Antarctic winter at temperatures averaging minus 70 degrees Fahrenheit. The rescue party found Byrd alive, but too weak to travel due to carbon monoxide poisoning. The four men subsequently spent ten weeks together in the base's nine by thirteen foot hut until Byrd recovered from his sickness and weather conditions improved enough to allow Byrd to return to Little America by airplane.

Upon returning to Boston from his first trip to Antarctica, Waite resumed his work in television, but kept in contact with Richard E. Byrd. At Byrd's request, Waite began lecturing about his experiences in the Antarctic to various high school and college groups. Over the next four decades Waite gave more than 3,000 such lectures, expanding his talks to incorporate his experiences in the twenty-two subsequent trips he took to the polar regions.

Following the attack at Pearl Harbor in December 1941, Waite became a civilian radio engineer with the U.S. Army Signal Corps based at Fort Monmouth, New Jersey, a position he would keep until his retirement in 1965. During World War II, Waite helped design and install the radio relay system used to communicate between England and France in the days immediately following the Allied invasion at Normandy. He designed and installed similar systems in Saipan in the Pacific Theater of the war

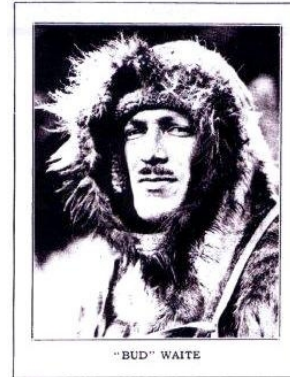
and in Japan after the war's end. From 1946 to 1953, Waite was part of a U.S. Army Signal Corps team monitoring the affects on radio communications during fourteen atomic bomb tests conducted in the Nevada desert and at islands in the South Pacific.

Waite's second trip to Antarctica occurred in 1946-47 when, as an observer for the U.S. Army Signal Corps, he participated in Operation Highjump. He next returned to the region as a member of the expedition aboard the icebreaker U.S.S. Atka, which circumnavigated the Antarctic Continent in 1954-55. The following year, Waite participated in Operation Deep Freeze I (1955-56) and returned to the Antarctic seven more times between 1956 and 1965 during subsequent Operation Deep Freeze expeditions. In addition, Waite traveled to the Arctic region twelve times from 1946 until his retirement in 1965, alternating his summers in the Arctic and his winters in the Antarctic. Most of his early Arctic research took place in Alaska and in the Hudson's Bay area near Fort Churchill, Manitoba in Canada. During the 1960s, Waite's research took him to Camps Tuto and Century in Greenland.

During the 1950s, Waite became curious about aircraft crashes that occurred during flights over Greenland, which reports attributed to errors in altimeter readings. Waite speculated that the faulty readings were caused by the radar waves used by altimeters to measure an aircraft's height penetrating, rather than bouncing off, the deep ice covering the Greenland landmass. If this was true, Waite thought a system could be developed to use radio or radar waves to measure the thickness of the ice covering the polar regions. Waite first tested his theory on the Ross Ice Shelf in Antarctica during the winter of 1955-56, where he successfully recorded the long-distance transmission of radio waves through ice. In January 1957, he recorded the first bottom echo from the base of the Ross Ice Shelf and in the following year successfully measured the ground beneath 500 feet of ice at Wilkes Station. Following these initial experiments, over the next eight years Waite made more than fifty flights by aircraft and helicopter measuring ice depths over hundreds of miles of the polar regions. In the summers of 1963 and 1964, Waite organized the International Cooperative Field Experiment in Glacier Sounding, in which teams from a number of countries compared the measurements of ice depth obtained along the same sounding lines using radar, seismic, gravimetric and electrical systems.

Waite continued to lecture about the polar regions

after his retirement in 1965. He also pursued his interests in genealogy, publishing a book on his maternal ancestors in 1982. Waite was an avid collector of polar philately and in 1983 designed the cache for the postal cover commemorating the 50th anniversary of the Second Byrd Antarctic Expedition. A Life Member of the Pioneer Wireless Association, Waite held an amateur radio operator's license throughout his life with the call letters of W2ZK.



The SWAP SHOP

Club members may list their wares in the newsletter. Send descriptive information to Armand at wa1ugo@arrl.net, or call me at 508-838-8353. The Swap Shop is presented in the newsletter as a benefit to our members. RARC takes no responsibility for items sold or traded in this newsletter. The ad will appear three times unless extended. Interested parties will contact you directly. **You must be an RARC member to place an ad.**

Wanted

Two (2) surplus type '30 (thirty) thermionic triode valves.
Matched pair preferred.
Will buy or trade.

Contact Alexander Sahhar at 804-560-3449 agsahhar@gmail.com

A donation of an older 2 meter rig (base or mobile, it doesn't matter) that doesn't do the CTCSS (PL) tones. I want to try creating my own tone generator to make these old radios work with the local repeaters. If successful, I will share the schematics and code with the group. The radio needs to be in working condition. Thank you. Please call Dan (w4erf) 540-872-5946 or email chronobot2001@gmail.com

Drake 2NT Transmitter in reasonable condition. Maylon Pearman @ sailj24@me.com

For Sale: Kenwood TS430s, PS430 power supply and AT250 antenna tuner for sale \$950 plus shipping in US. It passed all the tests, USB, LSB, CW & AM on the Ham bands. Bought new in the box, 1984. call Bruce Haynes at brucehaynes@comcast.net

Thought For The Day!

Boss: Someone who is early when you are late and late when you are early.

John DeMajo	K5HTZ	President	(504) 858-7689	jdemajo@demajo.net
Allan Johnson	WA3J	Vice President	(804) 318-6951	wa3j@arrl.net
Dave Robinson	KJ4LHP	Secretary		
Ken Leidner	WV0L	Treasurer		