

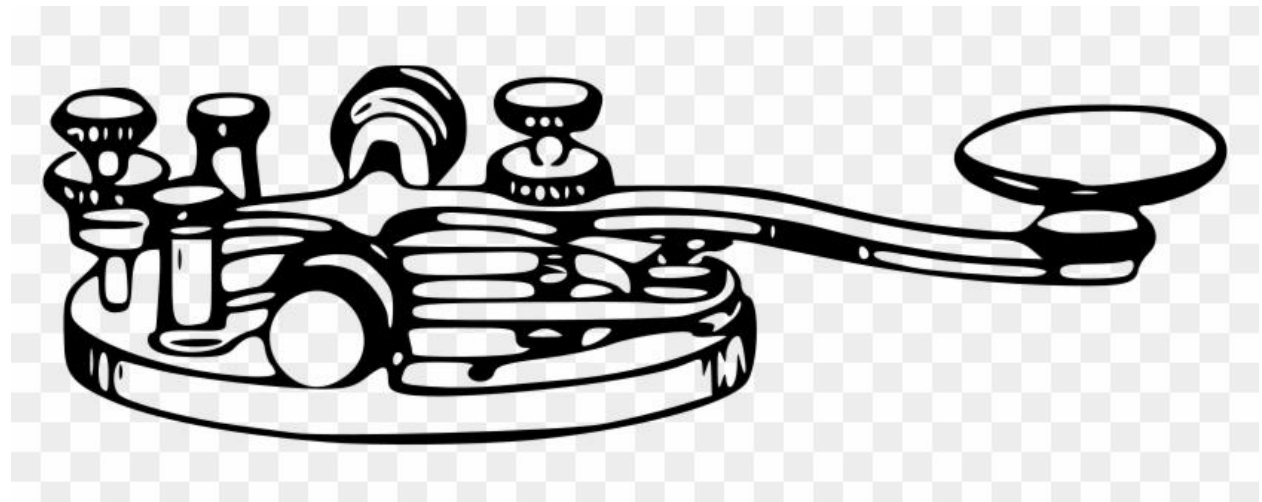


QSA-5

Marin Amateur Radio Society Monthly Newsletter

Established 1933

May, 2022



When all else fails, you can count on Amateur Radio

From Our President:

As Frederick Loewe so eloquently put it “Tra la, it’s May, the lusty month of May; That lovely month when everyone goes blissfully astray”. Or perhaps we should misquote George Lucas “May the fourth be with you.” Either way the rebirth of spring seems to be upon us. It is not just the weather. We are meeting in person for our general meetings. In person attendance remains low and people seem to like the zoom meetings. I know I miss the round of introductions that used to start our meetings and my intention is to try it out again although it will be a little bumpy at first since zoom seems to have an unfathomable algorithm for ordering the little rectangles we live in.

Our public service team is up and running with the “Jane Fondo” on March 12th and the Ridge to Bridge on April 30. This coming weekend on May 7 will be the Miwok 100K. From the pictures and reports I have seen these events went well. The served organizations are happy and so are those of you who have volunteered. I am very pleased to see public service back out in the field. The North Bay 2 Meter Critical Mass meetings are now regularly in person at the Marin Civic Center. For those of you who are unaware of this program, they meet on the third Sunday of the month for hands on practice of communication techniques and technical discussions pitched at people new to the two-meter band. For more information email to nb2mcm@groups.io The club house is now open on Sunday mornings for unstructured meetings which include rig repair sessions, general discussions, coffee, and donuts etc. Doors open at 10 am.

You will also be seeing information about the North Bay Area Mesh NBAM an organization affiliated with MARS and consisting of MARS members who are working to extend an amateur radio-based mesh network through Marin and into Sonoma counties. This provides a TCP/IP based intranet that is not connected to the internet with enough redundancies to remain operational in the event of a PSPS event or other occurrence that makes the internet unavailable. The intention of this system is to provide a communications infrastructure available to our public service events, community-based organizations, and amateurs. Enough of my blather for now. Get out and enjoy spring.

From the Editor:

It's May already and summer is just around the corner! It seems, speaking for myself, that the year is passing by quickly. With the pandemic appearing to cross over into an endemic state of play, life is slowly returning to normal, or at least a "new" normal. Of course, as we have learned over the last few years, life can change at the drop of a hat! Hopefully, any changes we face in the future will be smaller in scope.

Amateur radio is moving along with the times. New technologies and radio devices are working their way into ham shacks around the world and the QSA-5 will be there to cover them for our readers. Of course, there's no substitute for a classic radio rig. However, for our passion to survive and become popular with future generations of Hams, amateur radio needs to go with the technological flow, so to speak.

I want to thank everyone who has been contributing story ideas and material for the QSA-5. This is your publication, not mine. I am simply the fellow who cobbles it all together, an over glorified typist who occasionally adjusts the ship's rudder to ensure the course traveled is true. I was going to make some format changes but decided to wait a little while longer to ensure our content was fully set in place. Thanks again to those of you who have contributed because the QSA-5 is only as good as it's content and that content should reflect the club member's interests. Let's make this publication the best it can be!

QSA-5Editor@w6sg.net



New Members:

Tristan Brenner KG6NLV - San Rafael
Rob Sandusky KN6RAO – Fairfax
Dean Lauerman KK6JLA - Alameda
Carmen Lauerman KK6JKZ – Alameda
Stephen Kramme KD6KXT - Novato
Melanie Kramme KD6KXs - Novato
Brian Jolda KA1MLN - Mill Valley
Mike Wood KN6SVK - Corte Madera

Next General Meeting: May 6th, 2022



“Your parents hath given you a name. And the FCC hath given you another...”

Marin Amateur Radio Society Board of Directors

Meeting April 14th, 2022

President: Curtis Ardourel WA6UDS (1) **Director:** Skip Fedanzo KJ6ARL (2)
Director: Brian Cooley K6EZX (1) **Treasurer:** Bruce Bartel N6VLB (1)
Vice President: Tom Jordan KG6TCM (2) **Director:** Mark Klein KM6AOW (1)
Director: Ken Brownfield AB6JR (2)
Trustee K6GWE: Doug Slusher KF6AKU
Trustee W6SG: Mitch Martin WU1Q

Adopt agenda: No Additions M/S/A

Approve minutes: 10 March meeting M/S/A

Secretary's Report/Communications: Brian K6EZX Brian K6EZX said that Insurance cert will be pulled for Field Day sometime tomorrow or Monday, and also asked that we take up the existing issue of the term "bible study" on our site under New Business below.

Treasurer's Report: Bruce N6VLB noted that the current financials are in the latest QSA-5.

Committee and other Reports:

- 1. Membership:** 137 | 88%
- 2. Education:** N/A
- 3. Facilities:** Skip KJ6ARL reported that all is copacetic with the building. He will soon catch up with Rob NZ6J for a drainage update on the back of the property. Parking lot drainage has been somewhat improved by a new

perforated drain line. High water pressure in the building was recently addressed when it was discovered during an unrelated plumbing visit. We also discussed alerting adjacent neighbors before we do any work on the main drainage project with Chain Drainage which recently gave a prelim estimate of \$1,650 to correct the situation at the rear of the property. (We are under the general impression that all the work is well on our side of the property line, negating any likelihood of recruiting neighbors for partial assumption of the cost.)

4. **Public Service: Pam N6PDW** reported that Ridge to Bridge (R2B) on April 30 and the Miwok 100 on May 7 are underway in terms of development between her, Stan, and Rob with the client orgs. Preparations are proceeding without any unusual wrinkles.
- 5.
6. **Technical:** N/A
7. **VOAD/RCV: Skip KJ6ARL** reported that the [2022 Golden Eagle Drill](#) is coming up and noted that there is a lot of overlap between RCV and RACES members (most of whom are also MARS members). Skip is addressing that by balancing the RCV shifts, morning & afternoon, where ops would work under a different one of their “hats” in each daypart. Doug asked if Skip is trying to bulk up the non-RACES membership of RCV to avoid such conflicts in times of real need, but Skip said he thinks there will be less conflict than imagined in a real emergency because RACES and RCV cover different phases of a disaster. Tom KG6TCM mentioned that RCV may appeal to different kind of prospective member than RACES.
8. **VE Testing: Ken AB6JR** reported that a VE test with 7 participants was held by the club this past Saturday, an attendance number which is smallish due to an increasing amount of people who are [doing their testing online](#). Tom suggested that RCV flyers could be handed out at our VE sessions to generate more RCV awareness. Ken also reminded us that our testing efforts would likely grow when/if we rebuild the Education section of the club.
9. **NBAM: Michael Fisher K6MLF** gave an ad hoc report about the mesh network project prior to the start of the meeting. Tom mentioned the idea of recruiting a local engineering student to take on the planning of some local mesh node expansion that MARS would support. This is imagined as part of some formal student coursework.

10. Recreation: N/A

- 11. Field Day:** Board members indicated that we would like to have some kind of formal public safety representation at Field Day 2022, i.e., to have some reps from San Rafael Fire or County Fire come by and check out our efforts at the event. This is for the purpose of awareness and bond building. A recommendation was made that Quinn Gardner and/or Raed Al-Zaher of San Rafael's emergency preparedness apparatus be approached along with **Gerald McCarthy KN6MEA. Bruce N6VLB** reported that we have already sent REDXA a check for our participation fee for Field Day.

Old Business:

- 1. Frequency coordination:** Skip KJ6ARL reported that we submitted a request to formally coordinate our 146.700 pairs about a year ago and that was officially logged as a request with NARCC on August 18th, 2021. Since then, no action has taken place that we know of. Skip asked if it's time to crank up the urgency with NARCC. The board decided that we can wait a little longer since we have a long precedent on the channel and have had no complaints or requests for justification from NARCC.
- 2. Drainage:** Tom noted that we've been "lucky" due to light rainfall this season but should be ready to move quickly if a major system arrives on the forecast in the remainder of this year's winter season.

New Business:

- 1. Picnic:** Doug asked if he should pursue a date with the Twin Cities Parks & Rec. for Piper Park? Tom asked for a show of hands opposed to the idea: None shown. Tom also asked if we would consider an alternate location like Miwok Park in Novato since we have a concentration of members in that area. Doug mentioned that the picnic used to be held at Samuel P. Taylor, but that location proved difficult for our older members due to the difficulty of the drive, hence it was moved to Piper Park in Corte Madera which ended up increasing our attendance. Tom mentioned that Miwok has

advantages like Piper Park. Skip suggested we bounce between Piper and Miwok in alternating years. Miwok Park rental terms are here. A map of the Miwok facilities is here. Action items include setting a date as the parks may be booking up fast already; For precedent, our last picnic was held on Saturday, Sept 14, 2019. Doug KF6AKU will take responsibility for following up on available dates and fees at the parks. Tom mentioned he has some informal connections to Novato Park staff that could help us if bookings are tight. An email thread will be established to pursue this matter, selecting a site, and a date.

2. Membership terms: Bruce asked that we take up two ideas:

- a. Create a family membership that will let a licensed couple join the club at the \$30 individual rate.
- b. Our membership terms may confuse members who aren't aware if they are paying for a calendar year of membership or a running year from the date of payment. He suggested we make it clear on our site that membership is calendar year based. Some members asked about people who re-up late in November, to which Bruce noted that we have an existing policy of extending membership to as much as 14 proceeding months if paid in November or December of a year. The board agreed to this overall calendar year approach. Bruce will review the club site to come up with potential language to present at the next board meeting. Also, we have an existing policy that successful VE applicants who get a ticket with us get a free membership for that calendar year under the same terms described above.

1. "Bible Study" Brian noted that this is a link to the places where the term "bible" appears on our site in reference to informal Sunday morning meetings at the clubhouse:

<https://www.google.com/search?q=site%3Aw6sg.net+%22bible%22&oq=site%3Aw6sg.net+%22bible%22&aqs=chrome.69i59j69i58.7640j0j4&sourceid=chrome&ie=UTF-8>

Skip moved that we change all uses of the term "bible" to "babble". M/S/A. Brian will forward that division to Curtis WA6UDS who is best positioned to see that it gets done across our somewhat ad hoc group of web site editors.

Executive Session N/a
Adjourn 21:06

B. Cooley

Next Regular Meeting 6 May 2022
Next Board Meeting 12 May 2022

**Marin Amateur Radio Club
Balance Sheet Comparison
As of April 30, 2022**

ASSETS

Current Assets

Bank Accounts

Accounting services

Auction

B of A Building account - 8795

7,034.95

B of A General account - 4328

8,158.68

CD

25,000.00

Money Market

5,000.00

Total Bank Accounts

\$45,193.63

Total Current Assets

\$45,193.63

Fixed Assets

Clubhouse- 27 Shell Rd. MV

58,983.00

58,983.00

Total Fixed Assets

\$58,983.00

\$58,983.00

TOTAL ASSETS

\$104,440.76

\$104,176.63

LIABILITIES AND EQUITY

Liabilities

Total Liabilities

Equity

Opening Balance Net Assets	124,400.00
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Retained Earnings	-22,228.35
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Net Income	2,004.98
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Total Equity	\$104,176.63
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TOTAL LIABILITIES AND EQUITY	\$104,176.63
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Cash Basis Sunday, May 1, 2022 01:41 PM GMT-07:00

**Marin Amateur Radio Club
Profit and Loss
January - April 2022**

	TOTAL JAN - APR, 2022,	JAN - APR, 2021 (PY YTD)
Income		
Auction	50.00	
Donations	100.00	22.36
Dues	6,305.00	5,123.69
Income from club activities	90.00	65.00
Public Service Refund	450.00	
Rent	10,200.00	9,825.00
Sales of Product Income	24.69	
Total Income	\$13,964.69	\$12,471.05
GROSS PROFIT	\$13,964.69	\$12,471.05
Expenses		
Car & Truck	54.49	959.09
Equipment	< \$2,500	322.79
Field day	350.00	
Food	850.00	
Garbage	191.36	188.56
Insurance	3,301.00	2,849.00
Legal & Professional Services		25.00

Meals	170.00	
Public Service Expense	841.09	
Reimbursable Expenses	3,181.93	476.00
Rent & Lease		150.00
Repair & Maintenance	885.00	951.86
Repairs & Maintenance	813.34	
Repeater		-177.27
Taxes & Licenses	3,925.64	4,550.56
Telephone		93.24
Utilities	1,118.67	4,270.45
VE Session	90.00	65.00
Water	255.53	228.27
Total Expenses	\$15,214.71	\$15,965.89
NET OPERATING INCOME	\$2,004.98	\$ -929.84
NET INCOME	\$2,004.98	\$ -929.84

Cash Basis Sunday, May 1, 2022 01:43 PM GMT-07:00

Questions and Answers

This section of our publication is dedicated to any questions you have. If there is something you need or a problem you cannot solve, this is the place to seek assistance. Who provides the answers? Readers of the QSA-5 publication! Since we have not received any new questions this month, we are repeating last month's question:

This question was not directly sent to the QSA-5 Question and Answer section of the newsletter, I believe that the subject matter warrants our attention. This is the email I received from Steve & Melanie Kramme KD6KXT & KD6KXS:

Hello, my wife and I are licensed HAMs in Novato and have not been on the air due to location and HOA issues. We would, however, like to install a VHF / UHF radio into our truck camper. I am seeking advice regarding which brand and features that they have that would best fill the needs of our local area and when camping. I contacted you in hopes that you could put me in touch with someone in the club that could answer my questions. I was thinking maybe meeting

someplace for coffee. Some time ago I attended meetings in Mill Valley, but my membership has lapsed. I know that with COVID concerns there may still not be any in person club meetings.

You can reach them via email at: skramme@gmail.com

Here are some links to get you started regarding an antenna mount for your rig and vehicle. Hopefully, some of our club members will follow up via email!

Here's a link to the Radio Reference website's forum page that discusses this question:

<https://forums.radioreference.com/threads/best-place-to-mount-dual-band-antenna-on-pickup-truck.324814/>

Here is a page dedicated to mobile antenna mounting from Comet Antenna:

<https://cometantenna.com/land-mobile/no-holes-mobile-mount/mobile-mount-faqs/>

This final link comes from KV5R and is nicely detailed and explains the subject clearly.

<https://kv5r.com/ham-radio/mobile-antenna-placement/>

LIFE IS SIMPLE



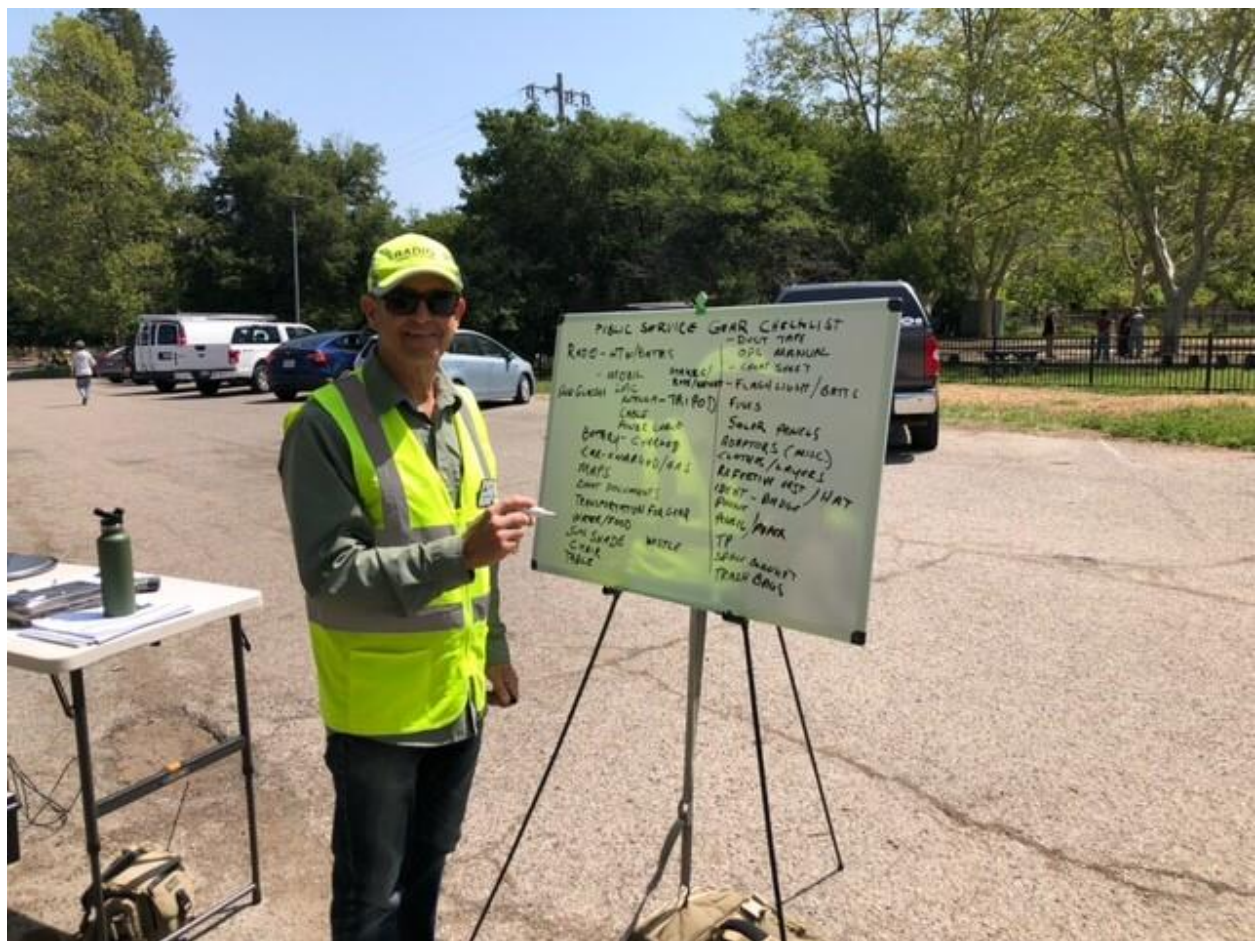
Marin Amateur Radio Society News

Critical Mass Meeting

On April 24th, the Marin Amateur Radio Club held a Two Meter Critical Mass meeting. The meeting took place at the jury parking lot at the Marin Civic Center, from 10:00 am till 12:00 noon. There were ten people in attendance. The primary topic of discussion was the implementation of CTCSS and DCS to make radios selective for user groups and repeater access. They also compared checklists for

gear required for public service events.

One of the most important functions of amateur radio is disaster relief. In today's world, cellphones and the internet are the primary form of communication. However, these critical forms of communication are often the first systems to fail during a disaster. This is where radio comes into play. Radio operators involved in critical mass events train for such occasions. Once again, when all other forms of communication fail, amateur radio operators are always ready to step in and keep critical communication lines open and available. Critical mass operators also volunteer for other radio needed events. Here are some photographs from the April event:





Meshing at Muir Beach

Here's a report from another MESH event recently held by the Marin Amateur Radio Society. The report comes to us via email from Michael Fischer: "Logging Ridge to Bridge participants on the same "live" spreadsheet that was being updated at Tennessee Valley and at net control. The Mesh enabled all of us to see the real-time progress of the event. To connect the three locations, Rob biked up to place two portable mesh nodes that linked the three points to the larger Bay Area Mesh. Bob Salter enabled the spreadsheet which was populated with the roster by Bay Area Ridge Council staff. It worked just fine - even in the face of stiff winds - which required some creative adjustments." Here are some photographs from the event:







North Bay Critical Mass Schedule

In you are interested in participating in our critical mass events, here is a schedule for critical mass meetings:

North Bay 2 Meter Critical Mass

Calling all hams! Attention all stations, attention all stations:

The Marin Amateur Radio Society sponsors a monthly opportunity for Marin and Sonoma hams (actually, anyone interested) to get together and practice radio protocol. **Rob Rowlands NZ6J, Milt Hyams KM6ASI, Michael Fischer K6MLF,**

James Renney KI6RGP, Doug Slusher KF6AKU, and other local experienced hams will be there with an entertaining program, usually featuring hands-on practice with radios.

The ***North Bay Two-Meter Critical Mass*** sessions will be useful for newly licensed amateur radio operators. But it's also a chance for experienced hams to gather and learn new tips. And to become an Elmer to assist those hams who are just learning how to operate their new radios.

During the COVID-19 limitations on gathering, **we will meet on Zoom at 10:30 on the third Sunday of each month.** When those limitations are lifted, we will resume in-person gatherings at the Marin County Civic Center lagoon, just across from the Jurors' parking lot. Those **in-person sessions will start at 10:00—again, every third Sunday. If the third Sunday falls on a holiday, it'll be held on the 4th Sunday.**

To get the Zoom link, and to learn of the agenda for each monthly session, go to <https://groups.io/g/nb2mCM> and click on "subscribe."

Learn (or practice) the NATO phonetic alphabet; learn how to program your handheld radio in the field. Practice speaking on the radio at writing speed; learn how to "make every word an event." Learn about the two types of ambulances: ALS and BLS—and what's the difference between them. Learn the basics on how to communicate with satellites, using them as high-elevation repeaters to make long-distance contacts with your HT. Check out the "go-boxes" used by members to operate in public service events. Get familiar with the repeaters in our area.

The basics of battery management, and more—something new each month.

Check out this video on radio protocol produced by CNET tech journalist and MARS member Brian Cooley K6EZX:

<https://www.youtube.com/watch?v=HHxNOMGSwAI> That's an example of what we'll be practicing when we get together—again, **on the third Sunday of each month; join us!**

ARRL Announcement

Curtis and Board Colleagues

At the request of our President, on Saturday December 4th, I participated in the ARRL Pacific Division meeting via Zoom. The meeting was chaired by Pacific Division Director, **Kristen McIntyre (K6WX)**. She introduced the new Assistant Director, **Anthony, W7XM**. The meeting opened with a recognition of members who became silent keys during the year. There was a total of 104 participants from all over the West Coast. The only attended that I personally knew was **Bill Smith (AB6MT)**. If Bill Hillendahl was there, I missed him.

The substance of the meeting opened with Kristen's report on the State of Ham Radio. She reported that the major issue is recruiting new members to the hobby. As I recall this was the lead issue at the last meeting I attended as well. The recruiting dilemma is how to appeal to younger people while still actively preserving the past. Recruiting young people will be essential to the hobby maintaining relevance. She thinks our stock with government agencies is in decline, particularly emergency services. The consequence will be increasing threats to spectrum preservation by the business sector. She noted that the ARRL's new magazine "On the Air" is proving more appealing to the masses as coffee table book as opposed to "QST" which is seen as most attractive to nerds. Popular outreach is going to be necessary to shore up the hobby.

Kristen is quite impressed with ARRL's new CEO, David Minster, NA2AA. She is convinced that he will be good for the organization and the hobby. The major problem at ARRL is staffing at the national headquarters in Connecticut. It is expensive to live there, and it is relatively remote. For example, ARRL computer development has slowed to a crawl due to thin staffing. There is only ½ full-time equivalent employee working on ARRL software and that person is devoted to Logbook of the World. Otherwise, the organization is relying on volunteers for development and maintenance. To expand the outreach of the organization, ARRL has changed its operating hours to be open later to serve the West Coast. This marks an apparent effort by ARRL to reach out and listen to the field

more before acting and issuing policies. Bottom line is that she thinks the new CEO is taking the organization the right direction and she is optimistic.

The good news is that public gatherings will resume next year. Conventions up post COVID including the National Convention at Orlando and the Hamfest at Dayton. ARRL has also conducted an in-person Board meeting recently.

Politically there may be trouble on the horizon. The spectrum loss in the 3 GHZ region may be an indicator of things to come. ARRL recognizes this and they are prepared to spend money to defend the spectrum. Compounding the problem is that the FCC has been hard to get too due to COVID. They are only now returning to their offices. As a result, the license fee is set in concrete now due to the FCC's interpretation of the law. Therefore, ARRL will pay the license application fees for certain new young applicants. The ARRL has had to hire a lobbying firm to push through its latest revised version of the Parity Act (to minimize the restrictions in CC&RS limiting amateur radio antennas in condominium complexes) through Congress.

ARRL is involved in a new significant project called the Public Clean Signal Initiative. They are building upon an earlier initiative in which the quality of receivers has been improved. They are now focused on working on transmitters that are non-linear. The goal is to get transmitters off the air that generate noise and garbage (such as harmonics) along with their signals. This will set new certification standards for manufacturers for clean transmitters. Noted ham gear tester Rob Sherwood is involved in this project. Their studies are discussed at Contest [University.com](https://www.university.com). This project has enough traction that it is likely that their recommendations may be adopted by IEEE.

A new standing committee called the Emergency Communication Field Services Committee has been established in the ARRL organization. The role of this committee will be oversight of ARRL management of its emergency communications service support to hams and liaison to governmental agencies utilizing those services. This is in apparent response to the perception of decreasing relevance of amateur radio in this area.

The next portion of the meeting was entitled Q & A but was more an opportunity for the attendees to speak to matters they thought was important.

One question that was asked was about the adjustments made to the 220 MHz frequency band allocation. While the band has been expanded to 219 to 225 MHz, a couple of practitioners in that range noted that a portion was being carved out for digital only. They were seeking more guidance on that. It was the first that Kristen had heard about it and agreed to follow up. The take-away on this was that if you use that band, you should find out more about spectrum reservations.

Next was a discussion of emergency communications particularly to and within hospitals. A couple of ARES leads met with their hospital clients to talk about needs especially repeaters in hospitals to support HT use in hospitals when the power goes out. (I have some question about the legality of this). However, this discussion quickly morphed into the fact that hospitals generally state that their real need is for data communication for exchange of documents, not voice. It became clear to all that the solution to this problem is a MESH network. This gave rise to a discussion of problems with use of amateur radio MESH in this environment. The first was the limited spectrum availability for amateurs in the 5 GHZ MESH bands. The second was passing HIPAA protected data unencrypted over amateur systems and encryption to protect it. This issue has apparently raised its head before when an FCC Commissioner raised the encryption issue on use of WINLINK and PACTOR for this purpose. Apparently, the FCC sees amateur radio encryption as a national security issue.

This discussion led to several discussions about MESH which is generally viewed as the wave of the future. For emergency services the capability of MESH to support voice communications with VOIP on desk phones has attracted much attention. Gateways utilizing TCP-IP and raspberry-pi computers were touted as being able to provide desk voice communication in emergencies easily and at relative low cost. Also, ARDN MESH in California is getting a number of new key partners such as CALFIRE and the DOD for emergency services. Again, encryption was identified as being a problem in this area as well.

The last substantive discussion was from the Inyo/Kern Section manager. They have a local Emergency Services Committee that includes all interested organizations from police and fire first responders to Red Cross and Salvation Army down to CERT leadership. Its mission is to identify needs and arrange for

provision of services. The mission sounds much like the role of our EOC. The stated emphasis is to meet each served organization's needs rather than to try deciding for those agencies what their needs should be. Interesting concept.

It is always interesting to see what other folks are doing and what is viewed as important in the amateur radio hobby. I appreciated the opportunity to represent MARS at this meeting.

Milt Hyams

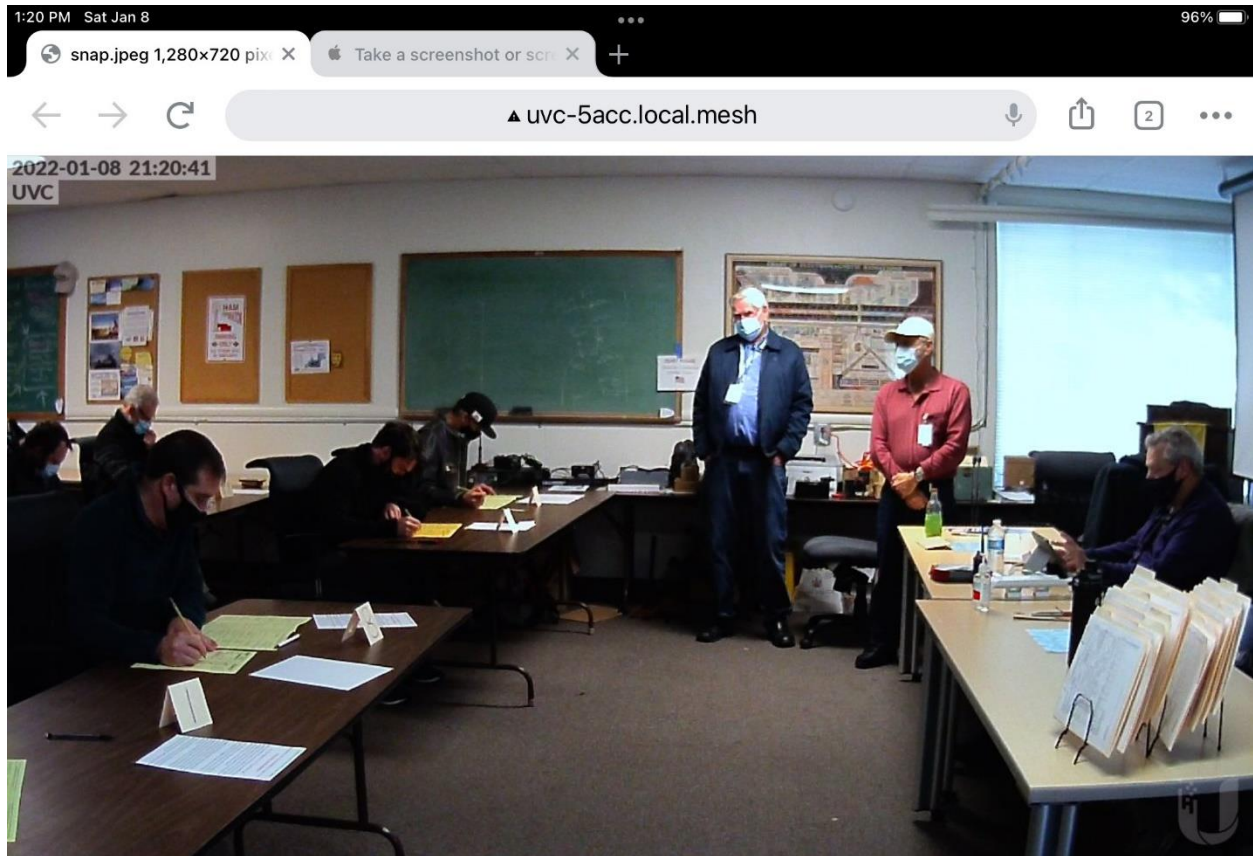
April 2022 VE Test Session Report

The Marin Amateur Radio Society held another Volunteer Examination session of on April 9th, 2022. One of the reasons the number of amateur radio operators grows each year is because of the dedicated work of Volunteer Examiners. **Ken AB6JR** and his team of Volunteer Examiners did a great job of testing new licensees and individuals upgrading their current licenses. Those who sat for their license exams on the 9th, had a seamless experience. It is extremely important to run a problem free, smooth testing session because the VE program has a great responsibility to both the examinees and the FCC. As always, Ken and his team did a brilliant job.

There were 7 applicants signed up for exams: 4 Technician, 2 General and 1 Extra Class. One individual expressed the desire to also take the Extra Class exam after his General. The examinees scheduled to take the exams were from various locations: 2 from San Francisco, 2 from Oakland, 1 from Los Gatos, 1 from Novato and 1 from Santa Cruz. This was the last group of Technician applicants that will not have to pay an additional \$35.00 to the FCC to receive their Technician License. Therefore, should you know anyone planning on sitting for their exam, make sure to tell them about the fee change in case they don't know about it.

Here are the results from the April 9th test session: We had all 7 applicants sit for the exams today. Four passed their Technician Class license (1 lives in Novato). Two passed the General Class (1 also passing the Extra Class), and lastly, one passed his Extra Class. Seven people sat for their exams and all seven passed. All

in all, a good day for amateur radio. Again, a big thanks to Ken and his team for their hard work, keeping ham radio alive and well!



Here's a photograph of January's Volunteer Examination test session

2022 Exam Fee Updates

As of **April 19th, 2022**, the licensing fee you pay upon sitting for your amateur radio examine will be \$35.00. The new Amateur Radio license application fees will take effect on **April 19, 2022**. The Federal Communications Commission's authority to impose and collect fees is mandated by Congress.

The \$35 application fee, when it becomes effective on April 19, will apply to new,

modification (upgrade and sequential call sign change), renewal, and vanity call sign applications. The fee will be per application.

Administrative updates, such as a change of name, mailing or email address, will be exempt from fees.

VECs and Volunteer Examiner (VE) teams will not have to collect the \$35 fee at exam sessions. Once the FCC application fee takes effect, new and upgrade applicants will pay the \$15 exam session fee to the ARRL VE team as usual, and pay the \$35 application fee directly to the FCC by using the CORES FRN Registration system ([CORES - Login](#)).

When the FCC receives the examination information from the VEC, it will email a link with payment instructions to each successful candidate who then will have **10 calendar days** from the date of the email to pay. After the fee is paid and the FCC has processed an application, examinees will receive a second email from the FCC with a link to their official license. The link will be good for 30 days.

Additionally, the FCC stated that applications processed and dismissed will not be entitled to a refund. This includes vanity requests where the applicant does not receive the requested call sign.

The FCC published the notice in the Federal Register on March 23, 2022, stating that the amateur radio application fees, including those associated with Form 605 application filings, would become effective on April 19, 2022.

Further news and instructions will follow as the FCC releases them.

Ken AB6JR and his team of volunteer examiners has sent three dates to the ARRL for examination sessions. Those dates are Jan 8, April 9, July 9, and Oct 8, 2022. The testing sessions will start at 1:00 PM and will take place at the Marin Amateur Radio Society's clubhouse. Ken noted that the club is not restricted in the number of exam sessions taking place, meaning more could be added if need be.

There's been some discussion about possible evening examination sessions as well. Ken has also requested some information regarding do online exams, which would extend the scope of the VE team's abilities. **Jim Saltzgaber KM6WWY**, has volunteered to take the position of Assistant Lead Examiner, should anything happen to the lead examiner, Ken.

2022 is going to be a great year for the club's VE program! Again, a big thank you to Ken and his VE team for bringing new amateur radio operators in the fold. You can only grow interest in an endeavor by increasing the number of people involved. Anyone who has VE credentials and wants to help should contact Ken.

Wondering About Babble Class?

Have you ever had a radio related problem and after searching around the world wide web, found yourself frustrated and confused? Have you ever wished there was a place you could go to sit around and talk about all things ham radio? Your prayers have been answered!

The Marin Amateur Radio Society holds a weekly babble study class on Sunday mornings at our club house in Mill Valley. Here's what Germaine had to say about one of our babble classes:

Success!

The radio received Francis' transmission and in turn will transmit at 100W. It looks like I just need to clean up the effects of the saltwater environment the radio lived in for a good 20 years. (I don't think I have a photo of me in action at the nav station.) Thank you so much, Jan, and also for bringing the pastries. Thank you to the rest of the Babble class for the antenna tips and . . . who was it that finally got that fuse holder open? It was passed around like an offering basket.

Tom is very impressed with my new badge so thank you for wrangling that, Michael. I will show it off at the family zoom blab fest with my 91-year-old dad.

Take care, Germaine

You can join in the fun and learn something you probably didn't know from our club members. Here are some photographs of the last few babble classes:

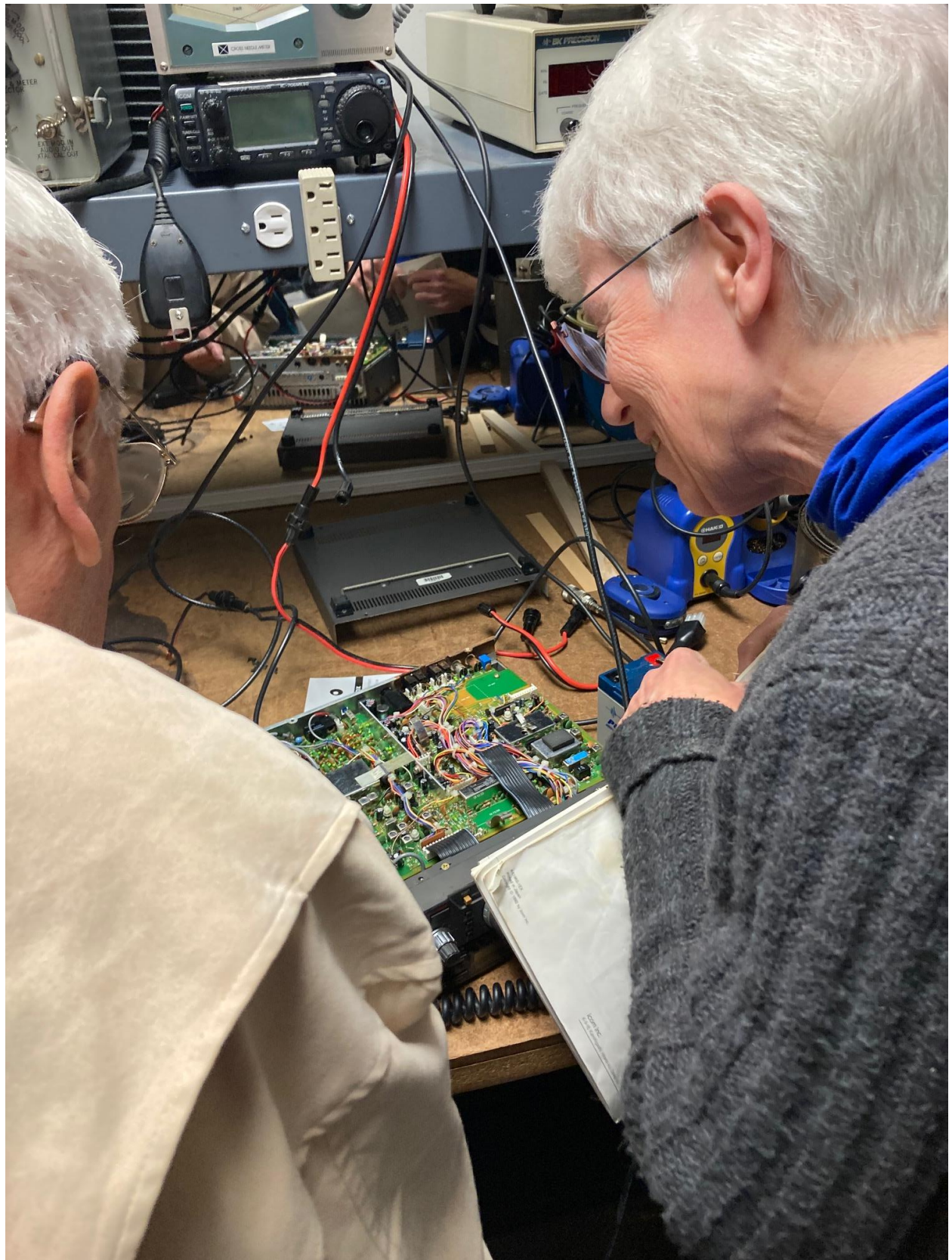












NBAM North Bay Area Mesh

New Backup Emergency Communication Network for Marin and Sonoma

The Marin Amateur Radio Society has received a grant of \$92,000 to install a microwave “mesh” network in Marin and Sonoma Counties. The mesh network, utilizing microwave frequencies allocated to amateur radio, will provide an alternative to the internet, should power outages or other events render the internet unusable. It is also intended to provide an important means of disaster communication with community-based organizations, such as food banks, in underserved and rural communities.

The grant was made by Amateur Radio Digital Communications, a Seattle-based nonprofit funded by proceeds from the sale of microwave frequencies to cellular telephone providers.

The Marin-Sonoma network, called NBAM (North Bay Area Mesh) is connected to the already-established BAM (Bay Area Mesh) which serves the emergency operations centers of San Francisco, San Mateo, and Alameda Counties. There is a parallel effort in Contra Costa County. The long-term objective is to provide a statewide communications network, operated by ham radio volunteers, that will provide a robust backup to existing means of communication among the various Emergency Operations Centers used by police and fire agencies in each county.

Using off-the-shelf low-power microwave antennas, NBAM will identify and install key nodes on hilltop locations up the US101 corridor from the Golden Gate Bridge north to Healdsburg and beyond. On the coast, the nodes will provide service to the rural communities of Tomales Bay, Bodega Bay, Timber Cove and up to The Sea Ranch. The Marin Amateur Radio Society will partner with—and provide equipment and training to—other radio clubs in each of the two corridors to place, maintain and utilize the mesh network.

BAM is working closely with the Sheriff's Departments in both counties. The Marin Amateur Radio Society has been an active nonprofit amateur radio Club since the 1930s with its own clubhouse (a retired fire station) in Mill Valley. Its FCC-licensed volunteers provide communications support to a dozen bicycle rides and footraces—including the fabled Dipsea—each year.

Quote from Tom Jordan, Emergency Management Coordinator or Rob Ireson, Chief Radio Officer, Marin County Sheriff's Auxiliary Communications Service: "The mesh will provide us with another redundant means of emergency communications—in a disaster, redundancy spells resilience."

Quote from Dan Ethan, Chief Radio Officer, Sonoma County Sheriff's Auxiliary Communications Service: "The importance of establishing alternative methods and modes of high-speed reliable communication between the North Bay Counties is more important now than ever before."

Quote from Curtis Ardourel, President, Marin Amateur Radio Society:

Quote from Kristen McIntyre, Pacific Division Director, national Amateur Radio Relay League: "Mesh networks like this are both a way to offer resilient communications during emergencies and a platform to further explore the development of mesh technology on the amateur radio bands."

Contact in Sonoma County: Jeff Young KM6Y 707 322 3221 Jeff.KM6Y@gmail.com

Contact in Marin County: Michael Fischer K6MLF 415 519 2201
michaelfischer149@gmail.com

Here are some photographs from an event held on April 17 in which the mesh connection was set up and tested. The network ran from Wolfback to Tennessee Valley to Coyote Ridge to Muir Beach.



NZ6J-NSM5-PubSvc-1

Location Not Available

[Help](#)

[Refresh](#)

[Mesh Status](#)

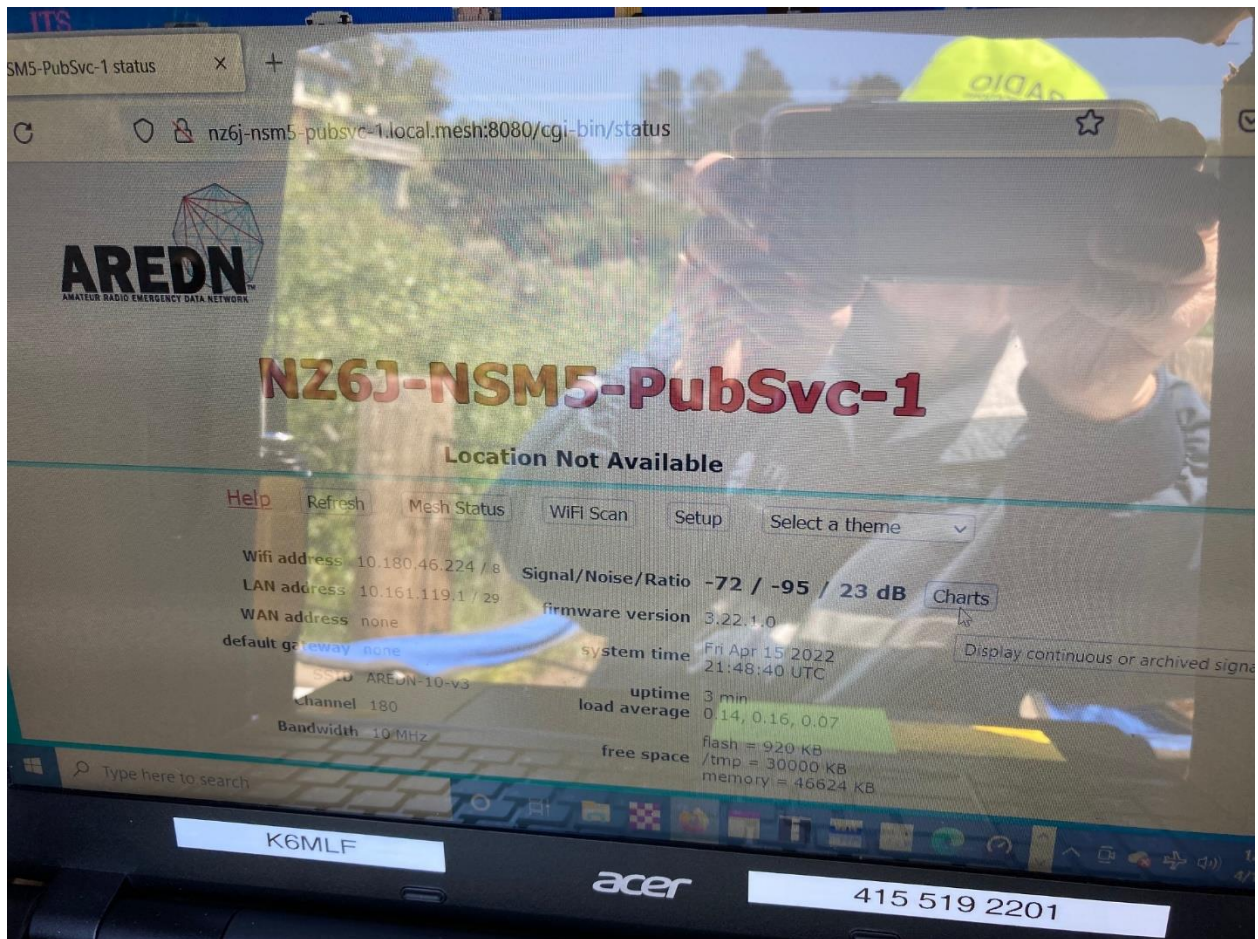
[WiFi Scan](#)

[Setup / LAN](#)

[Select a theme](#)

Wifi address	10.180.46.224 / 8	Signal/Noise/Ratio	-72 / -95 / 23 dB	Ch
LAN address	10.161.119.1 / 29	firmware version	3.22.1.0	
WAN address	none	system time	Fri Apr 15 2022 21:48:40 UTC	
default gateway	none	uptime	3 min	
SSID	AREDN-10-v3	load average	0.14, 0.16, 0.07	
Channel	180	free space	flash = 920 KB /tmp = 30000 KB memory = 46624 KB	
Bandwidth	10 MHz			









Help Extend the SF Emergency Wireless Emergency MESH (Update)

Since the previous article was about the MESH network, the QSA-5 decided to leave this posting up: The MESH network is not simply an idea being employed by our club for emergency communications. The MESH system was recently on the news in New York City where it's being used to provide affordable WiFi for city residents (note, this is a different MESH system than our club is using). MESH networks are becoming commonplace and easily available. The router needed for a MESH network connection can be found on Amazon. While the MESH system in New York City is being used for internet connectivity, it still serves an emergency service in

that people can receive important information via the MESH system in times of disaster. Here's a link to a news story about the installation of a MESH internet system in New York:

Sick of Traditional Internet Providers, BK Neighbors Are Setting Up Their Own WiFi with NYC Mesh

<https://bkreader.com/2021/05/10/nyc-mesh-brooklyn-new-york-community-mutual-aid-pandemic/>

Because the San Francisco Emergency Wireless Emergency MESH is such an important project, we are once again reposting this writeup about it.

From Rob Rowlands: We have about 6 nodes working in Marin so far and need people with property in high places to host more nodes. The mesh depends on line-of-site (LOS) paths between nodes interworking and while we have a great site on Wolfback ridge above Sausalito, there are multiple places we can't reach, for example the Club house! If you have access to homes or buildings with great views, we may be able to mount a node, regardless of whether you want to connect (see the following page for a picture of the node).

http://meshmap.sfwem.net/map_display.php#11/37.8586/-122.3836



This is an example of a MESH Node

All it takes is space to mount a \$50 radio on a wall and connect it via ethernet cable to a power feed adapter. The radio node is about the size of a small loaf of bread and can be painted to appease your family! Call Michael Fisher (415) 519-2201 or Rob Rowlands (415) 849 5667 if you can help.

Last Minute News

If you have anything you wish to include within the pages of the QSA-5 and you submit it past our deadline (one week before the start of a new month), we'll include it. However, we won't be able to provide a detailed writeup unless you provide it. Here are some photographs of the April R2B event:









Ham Radio News

Each month, QSA-5 searches the internet for stories about amateur radio in the news. As editor of our publication, I merely present these articles and do not take a position regarding their message or content. Our first story regards the coolness of ham radio:

Amateur radio is more than just a cool hobby: We all know just how cool amateur radio is. This article articulates what we already know, giving the rest of the world a glimpse of just what it is we do!

https://www.timesnews.net/living/features/amateur-radio-is-more-than-just-a-cool-hobby/article_02f01e08-c01a-11ec-bc34-bf15c0fb6937.html

Are decommissioned satellites susceptible to hackers? As someone who holds cyber security credentials, I can assure you that this is an interesting topic. This is a video but newsworthy.

<http://www.southgatearc.org/news/2022/april/are-decommissioned-satellites-susceptible-to-hackers.htm#.Ymcq-trMLIU>

Scientists hope to broadcast DNA and Earth's location for curious aliens: Well, this article speaks for itself. It's quite interesting.

https://www.theguardian.com/science/2022/apr/18/scientists-hope-to-broadcast-dna-and-earths-location-for-curious-aliens?CMP=Share_AndroidApp_Other

The Uncertain Future of Ham Radio: Is the future of amateur radio in peril? Will younger generations become involved and thus, carry ham radio into the future? This article looks at those very questions:

<https://sdr.news/military-sdr/the-uncertain-future-of-ham-radio-2/>

Amateur Radio News: This is an interesting site for those interested in listening to ham related Podcasts:

<https://www.amateurradio.com/>

Ham Payload Going to the Chinese Space Station: The International Amateur Radio Union (IARU) satellite frequency coordination panel reports that an application has been submitted for an amateur radio payload to be hosted on the Chinese Tiangong space station.

<https://www.arrl.org/news/ham-payload-going-to-the-chinese-space-station>

Our next two stories come from Rob Rowlands:

Russian Forces Invading Ukraine Using Civilian (Baofeng) Radios: Invading Russian forces in the Ukraine are using civilian radios such as the Baofeng UV-82. Here's a link to an image from Twitter:

https://twitter.com/CITeam_en/status/1498233574834716674

Here is another link from Reddit with an image of captured gear, including a Baofeng UV-82.

https://www.reddit.com/r/ukraine/comments/t2mj0i/they_really_are_using_baofeng_radios/

The last mile and the longest! Communications challenges February 2022: An interesting piece on the James Webb Space Telescope and the great complexities involved in communicating across vast distances in space.

https://docs.google.com/presentation/d/1VyQ2NRQhzpRPd7-qcyWB9TwFjFNwdV3XANcGoaLZgY0/edit#slide=id.g1152e6bfe65_0_1

Pirates Spammed an Infamous Soviet Short-wave Radio Station with Memes: This is a fun article for all you fans of classic cold war Numbers Stations:

<https://twiar.net/?p=7365>

Strong Winds Power Electric Fields in the Upper Atmosphere: From Ken AB6JR regarding electric fields in the upper atmosphere. Some interesting news from the NASA/Goddard Space Flight Center

<https://www.sciencedaily.com/releases/2021/11/211129172751.htm>

Is the Game Up for Baofeng in Europe? Yes, an article, thanks to Rob Rowland, about the radio many Hams love to hate. However, there's a review of the Baofeng

GT-5R in the ARRL's QST January issue (page 39 Product Reviews).

<https://hackaday.com/2021/12/05/is-the-game-up-for-baofeng-in-europe/>

FCC Regulatory News

Here are the current regulatory changes and FCC news as it applies to Amateur Radio. This section of the QSA-5 newsletter was introduced last year. We will add new regulations and rules monthly, removing the older regulations and rules as new regulations/rules are introduced. As of the August 2021 issue of the QSA-5 newsletter, this list of FCC regulations and changes will be reduced, only covering this year's new regulations and rules. The newest regulations and changes will appear at the top of the list. Note that we are not able to cover every change the FCC has made this year within our publication:

FCC Has Resumed Processing License Applications and Exam Session Files: The FCC was having some computer issues that put a temporary halt to their licensing and examination session fee processing. It appears the problem has been resolved:

<http://www.arrl.org/news/fcc-has-resumed-processing-license-applications-and-exam-session-files>

New FCC Application Fee Will Not Apply to Amateur Radio License Upgrades: This has been a confusing issue for many amateur radio operators looking to upgrade their licenses. This article should clear things up:

<http://www.arrl.org/news/new-fcc-application-fee-will-not-apply-to-amateur-radio-license-upgrades>

New Amateur Radio License Applications Fee to Become Effective April 19, 2022,
The fee changes will be here soon. Read more:

<https://www.arrl.org/news/new-amateur-radio-license-applications-fee-to-become-effective-april-19-2022>

FCC: Amateur Service Licensees May Not Use Radio Equipment to Commit Criminal Acts: This really should not have to be repeated by the FCC is still sending this out:

<https://www.arrl.org/news/fcc-amateur-service-licensees-may-not-use-radio-equipment-to-commit-criminal-acts>

Two Radio Amateurs Appointed to the FCC Technological Advisory Council (TAC)

FCC Chairwoman Jessica Rosenworcel named two prominent radio amateurs among her appointments to the FCC Technological Advisory Council:

<https://www.arrl.org/news/two-radio-amateurs-appointed-to-the-fcc-technological-advisory-council-tac>

FCC Seeks Attorney-Advisor for its Mobility Division. The Federal Communications Commission (FCC) has [posted](#) an opening for an attorney-advisor in the Mobility Division of its Wireless Telecommunications Bureau in Washington, DC:

<https://www.arrl.org/news/fcc-seeks-attorney-advisor-for-its-mobility-division>

FCC Orders Amateur Access to 3.5 GHz Band to “Sunset” It doesn’t look for amateur access to the 3.5 GHz band. While many amateur radio operators, especially those who hold new licenses, may not be familiar with this band, some older license holders (especially those with specialty interests) use it. Here is the article from the ARRL:

<http://www.arrl.org/news/fcc-orders-amateur-access-to-3-5-ghz-band-to-sunset>

The FCC Headquarters Relocates: The government organization that regulates amateur radio is moving their headquarters. Here’s a piece on the move from the ARRL:

<http://www.arrl.org/news/fcc-headquarters-relocates>

ARRL Urges Members to Join in Strongly Opposing FCC's Application Fees Proposal: The ARRL is asking their members to oppose the FCC application fee proposal. Here's the article:

<http://www.arrl.org/news/arrl-urges-members-to-join-in-strongly-opposing-fcc-s-application-fees-proposal>

FCC Grants 60-Day Waiver of Part 97 Data Rate Rules for Hurricane Relief Traffic: The FCC has granted a sixty-day waiver permitting radio amateurs handling hurricane relief communications on HF to use any protocol that would comply with the FCC's rules but for the symbol rate limits.

<https://www.arrl.org/news/fcc-grants-60-day-waiver-of-part-97-data-rate-rules-for-hurricane-relief-traffic>

FCC Investigating Alleged "Jamming" on 40 Meters:

Amateur radio operators have reported that there is some sort of signal jamming on the 40-meter band. Here is an article from the ARRL that covers the story in greater detail.

<https://www.arrl.org/news/fcc-investigating-alleged-jamming-on-40-meters>

Propagation News

Here are some links dedicated to propagation conditions, space weather, sunspot cycle information and all things related to solar conditions:

The K7RA Solar Update: This is the K7RA solar update, which is updated regularly:

<http://www.arrl.org/news/the-k7ra-solar-update-726>

Solarham.com: This is a great resource for all things related to solar cycles and ham radio:

<http://www.solarham.com/index.htm>

DX.QSI Propagation:

A simple, straightforward website for propagation conditions that is regularly updated:

<https://dx.qsl.net/propagation/>

Radio Society of Great Britain: What's New and Propagation Now:

A great resource from the UK version of the ARRL regarding solar activity and propagation:

<https://rsgb.org/main/technical/propagation/whats-new-propagation-now/>

SunSpotWatch.com:

A good general interest site for amateur radio operators who follow solar activity:

<http://sunspotwatch.com/>



DIY Radio References

We have added a few additional links to our list and will continue to do so as we discover more websites related to the Do-It-Yourself movement! QSA-5 is going to keep adding to the original list of online resources, bringing you more resources as we find them. If there is anything you think would be useful to other club members, contact me and I will be happy to include it in this reference section.

Microcontrollers and Single Board Computers: With the advent of the Arduino micro-controller board, the Raspberry Pi (a single board minicomputer) and Texas Instrument's Launchpad (also a single board microcontroller), Amateur Radio enthusiasts can build both accessories, such as antenna tuners, and fully functioning transceivers. I have spent the last year at the University of California studying these devices, learning how to use them and incorporate them into electronic projects. I was able to build two HF receivers based on the Arduino and Raspberry Pi devices. The best news of all is that these devices are inexpensive! I encourage you to check these websites out!

Arduino: The Arduino microcontroller board was the first to popularize these devices. They are inexpensive and can be used for a variety of radio related projects.

I will include some links to radio related Arduino projects in the next issue of the QSA-5. Here's a link to the Arduino homepage:

<https://www.arduino.cc/>

Raspberry Pi: Did you every wish you could have a PC small enough to fit into your shirt pocket? Your dream has come true. The Raspberry Pi 4 is a fully functional Quadcore 1.6 GHz computer, about the size of a package of playing cards. It has an Ethernet jack, two USB 2 ports, two USB 3 ports and two HDMI ports. Next month, I'll post some links to radio related Raspberry Pi projects. Here's a link to their homepage.

<https://www.raspberrypi.org/>

Texas Instruments TI Launchpad: The Launchpad is Texas Instruments answer to the Arduino. The Launchpad is geared more towards advanced projects and is slightly more expensive. However, the Arduino still holds it own against this device. The Arduino also has more in the way of opensource software. Here is a link to the TI Launchpad homepage.

<https://www.ti.com/design-resources/embedded-development/hardware-kits-boards.html>

Tools for electronics: It is a lot easier to build or repair your electronics if you have the right tool. Paperclips and duct tape are not the solution to everything (unless you are McGyver – hopefully, you got the reference). Therefore, we added some links to suppliers of electronics tools.

All Electronics: A one stop electronics shop that has a variety of tools for your repair and building needs:

<https://www.allelectronics.com/category/780/tools-and-supplies/1.html>

Jameco Electronics: A supplier of decent tools at a reasonable price:

<https://www.jameco.com/Jameco/content/tools.html>

Electronic Printed Circuit Boards (PCB): If you design and build projects that require specific circuit boards, you know how difficult it is to find a board that will work for your purposes. Designing a board and then having it made can be expensive. Here is a company that has a large number of radio PCBs you can purchase and then add components to. They also can take your design and fabricate a PCB at a very reasonable cost. The company's name is **PCBway**:

<https://www.pcbway.com/project/>

Electronic Components and Parts: Many of us involved in amateur radio are constantly tinkering with electronics. It seems to be part of our genetic makeup! Here are some links to companies that sell electronic components and parts, starting with San Rafael's own Electronics Plus (Support local business).

Electronics Plus: It's great to have an electronics store close by for those times when you need a part immediately:

<https://www.electronicplus.com/>

Digikey: A good source for DIY and Maker projects as well as parts. They claim to have the world's largest selection of electronic components.

<https://www.digikey.com/>

Jameco: This company is a good source for almost everything, especially mainstay items such as resistors, capacitors, etc.

<https://www.jameco.com/>

Homemade Antennas: Many new amateur radio enthusiasts put a great deal of time and effort into researching their first radio. However, they often neglect the most important component to a successful radio experience, the antenna. Even if you have some ham radio experience, antennas can be a daunting subject. Commercially manufactured antennas can be expensive and beyond your budget during these hard financial times. Even if you have the funds available to purchase an antenna, reading through the antenna's specs can be akin to reading some long lost ancient language. A good solution for increasing your knowledge of antennas and radio wave propagation, not to mention cutting the costs down, is to build them yourself. Here are some links to DIY (do it yourself) sites to give you a start:

Antenna building basics:

<https://www.wikihow.com/Build-Several-Easy-Antennas-for-Amateur-Radio>

Good Reference for several antenna types:

<https://www.hamradiosecrets.com/homemade-ham-radio-antennas.html>

A step-by-step guide for building a simple antenna:

<https://geardiary.com/2012/07/21/building-a-simple-ham-radio-antenna-without-soldering/>

Instructions for a VHF/UHF dual band antenna:

<https://www.instructables.com/Quarter-Wave-Dual-Band-VHFUHF-Ham-Radio-Antenna/>

Build an HF dipole antenna:

<https://www.electronics-notes.com/articles/antennas-propagation/dipole-antenna/hf-ham-band-dipole-construction-80-40-20-15-10-meters.php>

Introduction to antennas:

<https://www.onallbands.com/ham-radio-antenna-options-for-home-and-portable-operations/>

Ham Radio QRP Transceiver Kits: With the advent of SDR (Software Defined Radio), building fully functioning ham radios has become a lot easier and extremely inexpensive. While, having fewer bells and whistles, as well as being low power units, many have fully functional touchscreens and cover many of the HF bands:

An easy to build QRP transceiver. No soldering needed to build:

<https://www.hfsignals.com/>

An easy to build, single band CW kit:

<https://qrp-labs.com/>

Offering several kits and finished transceivers:

<https://youkits.com/>

Propagation Websites: Propagation is a key factor in successful radio communications. Here are some links to websites that will help you with all your basic propagation needs:

Real time band conditions:

<https://qrznow.com/real-time-band-conditions/>

VOACAP band conditions:

<https://www.voacap.com/hf/>

ARRL Propagation Page:

<http://www.arrl.org/propagation>

Real Time HF Propagation Prediction:

<https://hamwaves.com/propagation/en/index.html>

Ham Radio Websites of general interest:

Ham Radio News: Here are some sites and articles you may find of interest regarding ham radio.

ARRL News Page, which is a good place to find national news regarding ham radio:

<http://www.arrl.org/news>

QRZ Now. Another good site for ham radio news from around the globe:

<https://qrznow.com/>

The Amateur Radio Newslane. An AP styled news feel page for amateur radio:

<https://www.arnewslane.org/>

DMR Radio

Creating a Codeplug

I've been using DMR radios for roughly one year. I was attracted to DMR because it allowed me to easily communicate, via radio, with people around the world. While there is no replacement for setting up an HF rig and antenna, it can be expensive and difficult, especially if you need to work with an HOA (homeowner's association). DMR gives amateur radio operators, especially those new to the hobby, an opportunity to rag chew around the globe!

In many ways, DMR is easier for global radio communication. You don't have to worry about mastering the use a bunch of knobs and buttons that fine tune your signal, as is the case with traditional, old-school HF rigs. However, the initial set up of a DMR radio can be daunting. You must first set up a WiFi hotspot and then create a codeplug. We examined setting up the WiFi connection last month. This month, we'll look at setting up a codeplug. What's a codeplug?

A codeplug is simply a name for a software file that gets uploaded to your radio. That's it. There is no great mystery to it! Well, in all honesty it is not as easy as conventional analog radio software used for a similar purpose.

Most new radios are programmed via a software program. You connect your radio to a computer, open the radio's software program and start entering frequency data. Each radio today comes with its own software for programming it. This can be a real pain if you own three or four radios, all with their own software program. Enter the CHIRP software program. CHIRP allows you to program a variety of radios from a single software program. CHIRP covers a large number of radio brands and models. However, when program a DMR radio you need to use a DMR software program, which is a bit more complicated!

I had problems when I first tried to program my DMR radio. I'd follow a set of instructions that came with the software, and it wouldn't work! When I did a Google search, I discovered that plenty of other radio operators had trouble with the programming of their DMR radios. There's a consensus that codeplugs are difficult to create. The problem people run into is that there are a few additional

steps to creating the codeplug and you need to follow those steps in a specific order. When you program an analog radio via a software program, it is very straight forward. All pertinent data is entered left to right, with one frequency per program line. DMR radio programming is similar, but you need to bounce back and forth between files and that is where things become seemingly complicated. It's in this back-and-forth action that things go wrong.

What I decided to do was to provide you links to the websites and webpages that I used to be able to program my DMR radio successfully. I suggest reading through them and watching the videos first, taking notes, and then start programming. Look at all the links, not just one. While the radio brands differ, the basics are the same.

Videos:

How To Write a DMR Codeplug in 2021:

<https://www.youtube.com/watch?v=T3sUntEVqCY>

How to program a DMR radio Codeplug:

<https://www.youtube.com/watch?v=VExx628R0DM>

How to Build your own DMR Digital Radio Code Plug - Ham Radio Q&A

<https://www.youtube.com/watch?v=h0ssXJUT458>

Articles:

Creating a DMR Codeplug

<https://www.jeffreykopcak.com/2017/06/11/dmr-in-amateur-radio-programming-a-code-plug/>

How to Build Your Own DMR Digital Radio Codeplug

<https://www.jpole-antenna.com/2018/02/20/how-to-build-your-own-dmr-digital-radio-code-plug/>