



QSA-5



Volunteer for a Public Service Event!



Inside the Clubhouse

Board actions, club activities, and upcoming opportunities to share and get involved..

Ham Radio in the News

From local to national to international – stories, inspiration, and legislation.

Ham Classroom

Every month, we showcase interesting subjects..

“When all else fails, you can count on Amateur Radio”

From the MARS President

At our next board meeting on February 12th, we will be working out the MARS budget for 2026. While this is not the most exciting way to spend a Thursday evening, it has to be done.

We have approved the budget for the Public Service team and we will soon be jumping into action with the Public Service Kickoff Luncheon on Sunday, February 8th at 11:00 AM at the Travis Marina Boathouse (1679 Somerville Rd, Sausalito) .

As usual there will be awards for last year's season, information about events for the 2026 season, discussions about policy and procedures, delicious food, and of course swag. All are welcome, especially those of you who have not yet volunteered for a public service event.

If you wish to attend, please email rsvp@w6sg.net so we can ensure there will be enough food and swag.

Curtis Ardourel, WA6UDS
QSA-5@w6sg.net

Resources

[Membership Application](#)

[Membership Renewal](#)

[Club Calendar](#) July 17

[Local Repeaters](#)

[Our Weekly Net](#)

[North Bay 2-Meter Critical Mass](#)

[Get Licensed](#)

[For Newcomers](#)



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27 Shell Road
Mill Valley, CA 94941

[Membership in the Marin Amateur Radio Society](#) is open to any person with an expressed interest in amateur radio. Annual dues are currently \$30/individual or \$35/family.

From the Editor

I hope the first month of the new year has been a smashing success for everyone. As you have likely noticed, our club publication, **the QSA-5**, has undergone a major transformation. Thanks to the tireless efforts of **Jay Hamilton-Roth (KO6FIR)**, we are proud to unveil a modern, renovated format designed to bring you a "solid copy" on all club news.



Our primary goal with this redesign is efficiency. Jay and I want to ensure that getting the information you need is as seamless as possible. Rather than scrolling through pages of content to find a specific article or report, the new **QSA-5** is fully interactive—the information you're seeking is now just a mouse click away. To better serve the membership, we have also integrated the publication with our club's website, moving several resources online to keep the newsletter lean and readable.

This massive undertaking simply would not have been possible without Jay's dedication. He single-handedly spearheaded the technical transition, creating a publication that is not only easier on the eyes but significantly more functional for our digital era.

Of course, a publication is only as strong as its contributors. I would like to extend a sincere thank you to the team that keeps our content flowing: **Curtiss Kim (KM6GUY)**, **Gerald McCarthy (W6NOV)**, **James Saltzgaber (KM6WWY)**, **Bruce Bartel (N6VLB)**, **Doug Kaye (K6DRK)**, and **Curtis Ardourel (WA6UDS)**. Their ongoing support, alongside Jay's recent reworking, has raised the **QSA-5** to new heights.

As always, this is your publication. We welcome your suggestions, article ideas, and submissions. It truly takes a club to build a great newsletter, and I am incredibly proud of what the **QSA-5** has become. I look forward to hearing your feedback on these changes.

Hugh Patterson, KN6KNB
QSA-5Editor@w6sg.net

Committees

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Education

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Technical

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QSA-5 is published monthly by the Marin Amateur Radio Society (MARS) and sent electronically to its members.

"QSA-5" is a [ham radio Q-code](#) which means "The strength of your signal is very strong."

Have an article or fun ham-related photos you want to share?

Please send by the 24th of the month to QSA5@w6sg.net for publication consideration.





Inside the Clubhouse

Board actions, club activities, and upcoming opportunities to share and learn.

Board of Directors

[Meeting Notes 1/8/2026](#)

Next Board Meeting Thursday, February 12, 2026

[Financials](#)

Next Club Meeting: Friday, February 6, 2026

News

- [2026 Public Service Season](#)
- [Another Successful VE Exam](#)
- [North Bay 2m Critical Mass \(NB2mCM\)](#)
- [Remembering Chris Bigall, KC6ZKO](#)
- [February Calendar](#)

Inside the Clubhouse: 2026 Public Service Season

The 2026 MARS Public Service season is nearly upon us and we have an exciting season in store. Starting with our Randy Jenkins Memorial Kickoff Lunch on February 8th 11am-2pm at the [Travis Marina boathouse](#), 1679 Sommerville Rd, Sausalito, CA 94965 (this is in Fort Baker near the Travis Bar). We will have training, presentations, games, door prizes and lunch. Following the event, the Travis Bar upstairs will be open with live music from the Lonestar Retrobates if anyone is interested in checking it out. All proceeds in the bar benefit the Morale, Welfare, and Recreation (MWR) fund at Travis AFB.



This season will have many of our past events along with two new ones – the Bay Area Outreach & Recreation Program (BORP) [Revolution Ride](#) and stroll is an adaptive athletic event run by BORP Adaptive Sports and Recreation. Staff from this event really appreciated our participation last year at the rainy, stormy, [Kelly Brush Ride](#) and requested we join them in their annual event. Additionally, we will have the [Mt. Tam Trail Run](#), which is run by [INSIDETRAIL](#) (and will be the last event of the season, in November). This is the same group that runs the [Marin Ultra Challenge](#) we participated in last year.



The Public Service Committee wants to thank everyone who participates in these events, which in addition to providing an excellent service to the community, help us get real-life experience - advancing our skills in the technical and communication phases of the radio art.

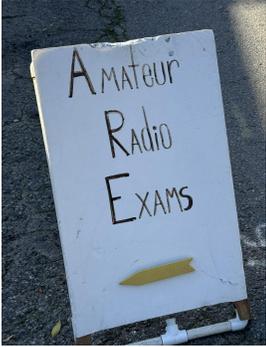
If you've never participated in the public service events, I urge you to give it a try – come to the Kickoff event on the 8th or just start signing up for the events. If you are new ham, this is a brilliant way to meet others and get out of your shell and start speaking on the radio. Most importantly, you will be able to observe professional, accurate radio protocol first hand. As a beginner, I was shy, and while I knew how to transmit, I wasn't polished like some experienced hams, and didn't really have anything to say on the repeater – the gift of gab is not my strength. It was coming to the Public Service events where I really learned to speak on the radio – simply because I had to! I had information that others needed – so there was a good reason to start talking! After that, it got much easier to talk on the radio.

Please RSVP for the Randy Jenkins Public Service Kickoff Lunch by sending an email to RSVP@w6sg.net. Please sign up for the public service events on the [MARS website](#). The Public Service committee looks forward to seeing you this season!



Scott Pasternak, KN6ZDM

Inside the Clubhouse: Another Successful VE Exam



MARS is starting off the year by celebrating another successful VE session resulting in three new licensed amateur operators and the upgrading of two others. The tests were administered at the Mill Valley clubhouse under the auspices of Lead Examiner, James Saltzgaber, KM6WWY. One hopeful came from as far away as Clovis near Fresno. Two others made the short drive from their homes in Mill Valley. The most encouraging achievement, the awarding of a Technician's license to a 16 year old high school student from Archie Williams in San Anselmo.

John David Rogers of Novato came away with a two-fer passing not only the test for a Technician's ticket but then obtaining his General License as well. Michael Herlihy had business on the peninsula and drove in from the Central Valley. He budgeted enough time to make a stop in Mill Valley to score his Technician's License. Teenager Dylan Pilling of Fairfax gave up his Saturday afternoon to earn his Technician's Class license. Two familiar faces at MARS activities, Jay Hamilton-Roth, KO6FIR and Richard Slusher, KI6UIM, both of Mill Valley, upgraded to General Class License.



The tests were anchored by an all volunteer force. The examiners were: Ken Brownfield, AB6JR, Jerry Foster, WA6BXV, and Mark Klein, KM6AOW. Handling registration were JoAnne Saltzgaber, KN6FXH and Michael Ham, WA6LCN.



The Marin Amateur Radio Society offers VE exams on a regular basis and encourages all prospective applicants to take advantage of the quarterly dates. The next testing date is set for April 11, 2026. Register at Exams@W6SG.net.



Curtiss Kim, KM6GUY

Inside the Clubhouse: North Bay 2m Critical Mass (NB2mCM)

At the **January 18, 2016 North Bay 2 meter Critical Mass Sunday session**, a terrific group gathered at the MARS clubhouse on Shell Road in Mill Valley. We were there for a lively hands-on workshop and discussion of electronic circuits, Ohm's law and Multimeters (also referred to by various acronyms including DMM, DVM and VOM).



Northbay 2m Critical Mass Team



Multimeters excel at measuring fundamental values of (ac/dc) voltage, (ac/dc) current (via internal shunt resistor), and resistance. They DO NOT, however, measure power (in watts) which would require simultaneous measurement of volts and amps while applying a power factor for AC. Nor do they tell us anything about impedance, high frequency, RF or complex waveforms and phase.

Early history dates from 1820 laboratory galvanometers with later analog instruments using D'Arsonval meter

movements in the 1880s. In 1920 AVOs combined the ability to measure amps, volts and ohms into one instrument. The first handheld digital design, featuring an LCD display, was introduced by Fluke in 1977.

We discussed the various functions and symbols used on most multimeters including ac/dc volts, ac/dc current and resistance. Secondary functions may include frequency (Hz), temperature, capacitance, diode test and continuity. Some models include functions for dB, transistor gain, low impedance voltage or non-contact voltage sensing. We reviewed Ohm's Law and scale factors such as Mega, Kilo, milli and micro, etc.

One should always put safety first as a danger of shock is always possible at higher voltages and currents. Best to unplug the device under test (DUT) and discharge electrolytic capacitors before troubleshooting.

Resistance (ohms) mode, indicated by the greek letter omega (Ω), uses a small voltage from the battery. Do not try to measure resistance with power on. It may also be necessary to lift one leg of the resistor from circuit as other components in parallel may cause a false reading.

However, current and voltage measurements can only be performed in live circuits. Use caution! Never exceed maximum ratings of the meter or test leads!

Gaglin

MULTIMETER

cheat sheet

MIN/MAX
This feature lets Max, Min, and Average when activated the meter will store and display the selected setting for the duration the feature is activated.

Amps
Amps is a unit of electric current in the International System. This feature is used to read the amount of amps being drawn, the 2 most common methods are in series, and clamp reading. To use this feature, you have to switch the red wire to the fused input.

Volts
Volt is the unit of electric potential, there is 2 types of current, AC represented by ~ and DC represented by V. This can be used to diagnose batteries, devices, voltage usage, find live wires, and determine voltage.

Temp
Temp with the temperature option will have a separate probe that must be connected into the input and common of the meter, this probe can measure surface and ambient temperature, this probe in most cases is not suitable for measuring liquid.

No contact voltage (NCV)
This feature alerts to the presence of voltage, this could be an extra safety precaution when working with wires to ensure they are not live, when voltage is detected the meter will beep, and flash a warning light.

Metric prefix
M Million (1,000,000)
K Kilo (1,000)
m Milli (1/1000)
µ Micro (1/1,000,000)
n Nano (1/1,000,000,000)

Hold
When activated, this feature freezes the display, holding the meter will store and display the selected setting for the duration the feature is activated.

Ohm's Ω
Ohms are a measurement of resistance, this is used to test resistors, find resistor values, ensure low resistance when needed, and diagnose continuity.

Continuity
This feature will make an audible tone when continuity is found, continuity is when there is a closed loop with low enough resistance, this is a simple but surprisingly useful feature for troubleshooting issues in damaged wiring.

Diode
This is an electronic component that conducts current primarily in one direction, with high resistance in the other direction, this feature can be used to ensure diodes are functioning, including LEDs.

Capacitance
Capacitors are devices that store electrical potential for later use, these devices are measured in Farad's, you can use this feature to ensure a capacitor is still in functioning order and within range.

Transistor
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Inside the Clubhouse: North Bay 2m Critical Mass (NB2mCM) (cont'd)

CAT ratings on multimeters, leads and probes refer to their voltage and current handling capabilities and transient protection for specific environments. Auto Range Vs. Manual Range - Start on the highest range and work down!

Measuring current (amperes) requires interrupting a circuit in order to insert the meter in series with the circuit. The test lead must be moved from the meter's 'Volts' measurement jack to the 'Amps' position. When finished, DO NOT leave the meter in current mode! Move test leads back to normal (V) positions and switch mode back to 'Volts' to avoid inadvertent damage to the meter or a costly blown fuse!

Clamp meters are a special type that can sense the magnetic field around a live wire (caused by current flowing in the wire) by clamping around it without having to disconnect it. Clamp meters measure only AC current unless they have a Hall Effect Sensor to measure DC. You must separate the wires to test just one wire. Keep hands behind the guard.

You can use an AC line splitter to measure the line current in a line cord to an appliance. Note it may have a 10x multiplier position as well as 1x. You can increase the reading with multiple turns, but must then divide the result by the same number of turns. Be cautious of short duration high inrush currents at the moment of turn on!



When testing batteries, a parallel load resistor should be included, for example ~4 ohms for AAA, AA, C & D cells or ~215 ohms or so for 9v. Use Ohm's law to determine the appropriate power rating for the resistor. Various probe types and accessories were demonstrated.

All were 'hands-on' building and testing breadboard circuits using a battery powered LED with a series dropping resistor. Once test circuits were constructed, we were able to measure LED forward voltage (in volts), value of the dropping resistor (in ohms) and the total circuit loop current (in milliamps) using our multimeters.



quite another to actually take part, doing it in real time, putting theory into practice and observing the results first hand.

Observations; Folks seemed enthusiastic about the 'hands on' aspect while building the breadboard circuits, seeing the circuit respond and 'come to life' with the LED illuminating. Using the multimeters, plugging in test leads, setting it to the appropriate function and applying probes to the circuit and taking measurements. It is one thing to talk about concepts in the abstract and



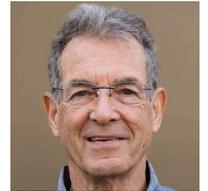
Inside the Clubhouse: North Bay 2m Critical Mass (NB2mCM) (cont'd)

We have folks coming at this from all levels, while some have a great deal of experience with this kind of stuff, others are discovering it for the first time.

Things that I might take for granted might be mysterious to others. For example some were having difficulty trying to measure with the spring loaded hook clip probes, as they were unfamiliar with how that type of probe works. The probe is fully insulated until it is squeezed and only then is the metal probe tip exposed. It's easy to forget what we, too, once had to learn.

I really enjoyed talking with people after the event, hearing their take on how they perceived it, walking through how they approached building and testing their circuits.

Caused me to have to think through and explore several functions that these meters are capable of that I rarely have need to use. Fun thing about electronics - you never stop learning!



James Renney, KI6RGP

This Month's Quick Online Survey



[What is your current amateur radio license class?](#)

Inside the Clubhouse: Remembering Chris Bigall, KC6ZKO



Chris Bigall lived up to his name. He was big and all heart. A regular at the twice monthly MARS luncheons in Novato, Chris would regale the assembled hams with his humor, stories and radio knowledge. By far his closest friend was Steve Toquinto, KB6HOH. The pair go back to the mid 1970's when they met...where else, on the radio. At that time the two were interested in Citizen Band radio but their common interest drew them together and started a life long friendship. In his early years Chris got his motor running. He would travel cross country with his motorcycle buddies showing off his Honda Gold Wing which was one of his top-tier luxury touring bikes. Chris also owned a boat and used it to take friends on excursions on the bay to see the sights like the USS Hornet, an aircraft carrier serving as a museum ship in Alameda. When he



wasn't playing Peter Fonda or Christopher Columbus, he drove big rig trucks for a living. Everything from fuel tankers to the real thing, Coke. Even though he enjoyed being around people, a stroke in his 50's slowed him down. Thank goodness he had his radios to turn to. He would ply the airwaves with several Icom HF rigs, two Kenwoods and even a Yaesu HF among others. Married and divorced he remained a bachelor in his later years. Chris battled health problems and a bout with kidney

stones led to an infection and eventually sepsis. He started missing his MARS luncheons but kept in touch with Steve who would update the gatherings. Around Thanksgiving of last year Chris suffered a series of strokes, the third resulting in his "silent key". Chris used to attend many of the MARS events such as Field Day, the yearly picnic and other social gatherings. At the second luncheon in January over a dozen lunch attendees paid tribute to the ham. Chris' sister, Heide, treated lunch to all who showed up and one by one each operator in attendance introduced himself and shared thoughts about Chris. It was a fitting "73" for a club member who kept transmitting to the end. Chris Bigall was 71.



Chris and other "Silent Keys" can also be found [online](#).



Curtiss Kim, KM6GUY

Inside the Clubhouse: Calendar

Curious what's coming up? You'll find our weekly nets, upcoming meetings, and public service events.

Take a look at our new calendar (below) or [online](#). You can even [subscribe to the calendar](#).

Please submit corrections or suggestions to: QSA5@w6sg.net.

The screenshot shows a Google Calendar interface for February 2026. The calendar is viewed in a monthly grid. The days of the week are labeled at the top: SUN (Feb 1), MON (2), TUE (3), WED (4), THU (5), FRI (6), and SAT (7). The calendar contains several entries, primarily on Tuesdays and Saturdays. The entries include:

- Feb 1 (SUN):** 9:30am MARS HF Net, 10am MARS VHF Net.
- Feb 3 (TUE):** 5pm RACES Early Net, 6pm RACES HF Nets, 6:45pm MARS DMR Net, 7pm Zello Net, 7:15pm RACES Local Nets, 7:30pm RACES County Net.
- Feb 6 (FRI):** 7:30pm MARS Club Meeting.
- Feb 8 (SUN):** 9:30am MARS HF Net, 10am MARS VHF Net, 11am Randy Jenkins Memorial Pub.
- Feb 10 (TUE):** 5pm RACES Early Net, 6pm RACES HF Nets, 6:45pm MARS DMR Net, 7pm Zello Net, 7:15pm RACES Local Nets, 7:30pm RACES County Net.
- Feb 12 (THU):** 7:30pm MARS Board Meeting.
- Feb 15 (SUN):** 9:30am MARS HF Net, 10am MARS VHF Net.
- Feb 17 (TUE):** 5pm RACES Early Net, 6pm RACES HF Nets, 6:45pm MARS DMR Net, 7pm Zello Net, 7:15pm RACES Local Nets, 7:30pm RACES County Net.
- Feb 22 (SUN):** 9:30am MARS HF Net, 10am North Bay 2 Meter Critical Mass, 10am MARS VHF Net.
- Feb 24 (TUE):** 5pm RACES Early Net, 6pm RACES HF Nets, 6:45pm MARS DMR Net, 7pm Zello Net, 7:15pm RACES Local Nets, 7:30pm RACES County Net.

At the bottom left of the calendar, there is a section titled "MARS Events" with the text "Events shown in time zone: (GMT-08:00) Pacific Time - Los Angeles". At the bottom right, the "Google Calendar" logo is visible.

RACES HF Nets
Tuesday, February 17 · 6:00 – 6:30pm

- 6:00pm on 80mtrs 3895khz LSB for 5minutes.
- 6:05pm on 60mtrs 5405khz/5403.5khz Dial Freq USB for 5minutes
- 6:10pm on 40mtrs 7228khz LSB OR 160mtrs on 1980khz LSB for 5minutes. (these bands depend on what time of year it is)
- 6:15pm on 40mtrs 7083khz USB JS8call Digital Mode similar to FT8.

Frequencies are announced at 6:00 on the 3895 kHz segment if changes are required.

The net is looking for NVIS propagation conditions that vary continuously with time of day, year, and the 11 year solar cycle.

[More details](#) [+ Copy to my calendar](#)

North Bay 2 Meter Critical Mass
Sunday, February 22 · 10:00am – 12:00pm

37.99936, -122.5301

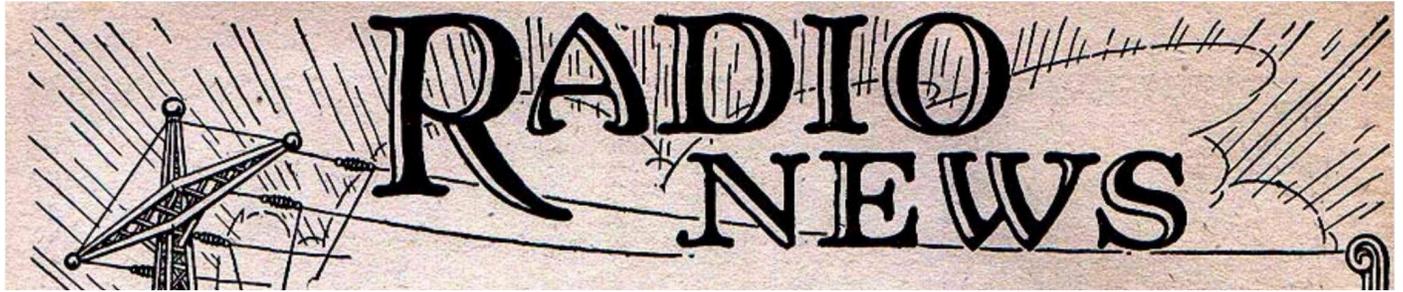
[More details](#) [+ Copy to my calendar](#)

Marin Ultra Challenge
Saturday, March 14 · 5:00am – 8:45pm

Organizer: Oliver Lu. [Signup link](#)

[More details](#) [+ Copy to my calendar](#)

Calendar entries have lots of details



Ham Radio in the News

From local to national to international – stories, inspiration, and legislation.

[What is known about the detained radio amateurs facing up to the death penalty](#)

[Ham Radio Inspired This Scranton University Student to Pursue Engineering Amateur Radio has been his hobby since he was young](#)

[Hacking Ham Radio for Texting: An Arduino shield taps the potential of VHF handheld radios](#)

[FCC Poised to Exempt Amateurs from Foreign Adversary Reporting Requirements](#)

[The ARRL Solar Update](#)

[FCC Regulatory News](#)

Trusted Radio News Sources

[ARRL News Page](#) for national news regarding ham radio.

[QRZ Now](#) for ham radio news from around the globe.

[Amateur Radio Newline](#) weekly amateur radio story highlights.



Ham Classroom

Every month, we showcase interesting subjects.

[Choosing Your First HF Antenna](#)

[Understanding CODAR Interference on the 60m Band](#)

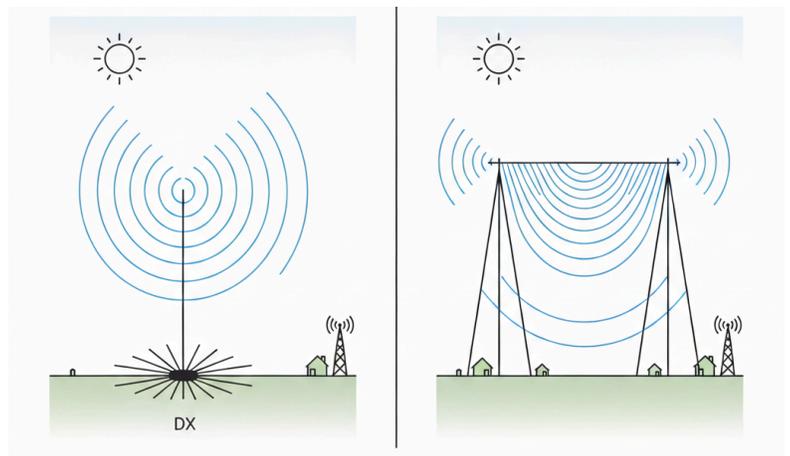
[Do it Yourself \(DIY\) Radio References](#)

Ham Classroom: Choosing Your First HF Antenna

Choosing your first HF antenna is a big step in your amateur radio journey, because it dictates both your signal's reach and the ease of your station's setup. For a beginner, the decision typically rests on your available space, local noise conditions, and whether you want to prioritize long-distance communication. Horizontal wire antennas, like the classic half-wave dipole or end fed antenna, are often the first choice because they are inexpensive to build, easy to hide in trees, and very effective for regional chatting and long-distance communication. Vertical antennas, conversely, are favored for their small horizontal footprint and their natural ability to reach distant global stations even when mounted at ground level.

The physical environment of your home often makes the choice for you. If you have a large yard with tall trees, a horizontal wire antenna is usually the best starting point because it can be [strung up easily](#) with minimal investment. However, if you live on a small suburban lot or lack high support structures, a vertical antenna is much more practical since it only requires a few square feet of space for its base. Keep in mind that a standard quarter-wave vertical requires a [radial system](#) - a series of wires spread out on or under the ground - to act as a ground plane for efficient performance. Also keep in mind that vertical antennas perform better when raised above ground.

Propagation and signal "take-off" angles are where the two types truly diverge in performance. Vertical antennas naturally have a low angle of radiation, which is ideal for "skipping" signals long distances across the ionosphere for [worldwide DX \(long Distance\) contacts](#). Why is a low angle of radiation important? What you want, when trying to reach a distant location, is a low take off angle for your signal so it travels further towards the distant location before reaching the ionosphere, where the signal comes back down to earth at an angle that carries that signal even further. The lower the angle of radiation, (take off angle) the



greater the distance your signal can travel. Horizontal antennas can also achieve these low angles, but only if they are mounted at least a half-wavelength above the ground, which can be over 60 feet high on lower bands. 20 to 30 feet is a more realistic height for most amateur radio operators and will provide plenty of action for DXing. When mounted lower, horizontal antennas can send signals nearly straight up, making them excellent for [regional "NVIS" \(Near Vertical Incidence Skywave\) communication](#) within a few hundred miles but less effective for distant countries.

Noise is another critical factor for amateur radio operators, especially in residential areas filled with electronic devices. Vertical antennas tend to be significantly noisier on receive because most [man-made electrical interference](#) from power lines and appliances is vertically polarized. Horizontal antennas are generally quieter, offering a cleaner signal that makes it easier to hear weak stations through the static. For a beginner in a noisy urban environment, a horizontal wire can often mean the difference between a clear conversation and a frustrating operating experience with fainter distant signals buried in background noise.

Ham Classroom: Choosing Your First HF Antenna (cont'd)

Ultimately, many seasoned operators find that no single antenna is perfect for every situation, and they eventually install [both types](#) to switch between them as band conditions change. As a beginner, starting with a simple horizontal dipole or end fed antenna is often the most forgiving and [cost-effective way](#) to get on the air and learn the ropes. If you find yourself chasing distant stations and have the space for a ground system, adding a vertical later will give you the best of both worlds.

Vertical and horizontal HF ham radio antennas each have distinct advantages depending on the operator's goals and physical constraints. Verticals naturally favor long-distance (DX) communication, while horizontals are often quieter on receive and can be configured for either local or DX contacts with sufficient height.

Key Differences at a Glance

Feature	Vertical Antennas	Horizontal Antennas
Primary Use	Long-distance (DX) communication due to naturally low take-off angles.	Local/regional communication when low to the ground; DX when higher up.
Space Required	Compact, requiring minimal horizontal space, making them ideal for small lots or rooftops.	Require significant horizontal space, often a half-wavelength or more.
Ground System	Requires an extensive radial system for efficiency (6+ radials recommended).	More forgiving of ground conditions, a simple common-mode choke at the feed point is often sufficient.
Noise Levels	Tend to be noisier on receive, sensitive to man-made, vertically-polarized noise.	Generally quieter on receive, less susceptible to ground-level noise sources.
Installation Height	Effective even at ground level. However, better performance with increased height.	Performance improves significantly with height (ideally 0.5λ (1/2 wavelength) or higher).

Ham Classroom: Choosing Your First HF Antenna (cont'd)

Detailed Comparison

- **Radiation Angle:** Vertical antennas inherently have a low angle of radiation, which is ideal for "skipping" signals off the ionosphere for DX contacts around the world. Horizontal antennas can produce a low-angle radiation pattern, but only when mounted at least high above the ground (20 feet or higher). When a horizontal antenna is installed low to the ground, it becomes effective for Near Vertical Incidence Skywave (NVIS) propagation, which covers a regional area with no "skip zone".
- **Installation & Space:** The physical size difference is a major factor. Vertical antennas are tall but slim, fitting into small gardens or even on mobile vehicles. Horizontal antennas, typically made of wire, require considerable horizontal real estate, which can be a limiting factor in urban or suburban environments.
- **Ground System Efficiency:** A vertical antenna relies heavily on a good ground plane (radial system) to act as the other half of the antenna. Skimping on the radial system significantly reduces efficiency and signal strength. However, you can still make plenty of contacts with 4 to 6 radials (provided you're in an open area free of large vertical obstructions). Horizontal antennas are less dependent on ground conditions, making them a simpler, often cheaper, option to establish.
- **Noise and Interference:** Due to their proximity to the ground and sensitivity to vertically polarized noise (like that from power lines and lightning), vertical antennas tend to have a higher noise floor. Horizontal antennas, when mounted higher, tend to be less noisy, offering a cleaner receive signal for weak DX stations.

Ultimately, the best choice depends on your specific goals and available space. Many experienced amateur radio operators use both types and switch between them to maximize performance based on current band conditions and the desired contact location. Please note that the antennas described here will vary in performance depending on the physical assets the antennas are installed on.



Hugh Patterson, KN6KNB

Ham Classroom: Understanding CODAR Interference on the 60m Band

As a General class amateur radio operator (ARO), you have access to a wide range of HF bands, including the unique 60-meter band (around 5 MHz). This band offers excellent propagation for regional and long-distance contacts, especially during low solar activity, but it comes with a catch: amateurs are secondary users. That means we must yield to primary users and tolerate interference from them. One of the most common sources of interference on 60m is the CODAR system, often manifesting as a distinctive sweeping or chirping noise. This is particularly noticeable on Channel 5 (centered at 5405 kHz, with a dial frequency of 5403.5 kHz USB), where signals around 5.403.500 MHz can be disrupted. In this article, we'll break down what CODAR is, why it causes this noise, its impact on your operations, and what you can do about it.

What is the 60m Band and Why Does Interference Happen?

First, a quick refresher for General class and above operators: The 60m band consists of five discrete channels allocated to U.S. amateurs on a secondary basis under FCC Part 97 rules. These channels are:

- Channel 1: 5332 kHz (dial 5330.5 kHz USB)
- Channel 2: 5348 kHz (dial 5346.5 kHz USB)
- Channel 3: 5358.5 kHz (dial 5357 kHz USB)
- Channel 4: 5373 kHz (dial 5371.5 kHz USB)
- Channel 5: 5405 kHz (dial 5403.5 kHz USB)

Operations are limited to upper sideband (USB) voice, CW, or digital modes like FT8, with a maximum effective radiated power (ERP) of 100 watts. As secondary users, we share the band with government and non-government primary services, including military communications and scientific systems. If a primary user fires up, we have to move or deal with the QRM (interference).

CODAR (Coastal Ocean Dynamics Applications Radar) is one such primary user. Developed for oceanographic research, it's a network of high-frequency (HF) radars deployed along coastlines to monitor ocean currents, waves, and surface conditions. These systems help with everything from search-and-rescue operations to environmental studies, but their signals can blanket parts of the 60m band, making it tough for AROs to communicate.

Demystifying CODAR: How It Works and Why It Sounds Like That

CODAR is essentially a shore-based radar that bounces HF signals off ocean waves to measure their speed and direction. It uses a technique called Interpulse Linear Frequency Modulation (ILFM), which is a form of frequency-modulated continuous wave (FMCW) radar. In simple terms, the transmitter sends out a rapid series of "chirps"—signals that sweep across a frequency range in a pulsed pattern, from a vertical HF antenna. Two receiving antennas located at the marine lab work in coordination with three remote receiving antennas operated by the Bureau of Land Management.

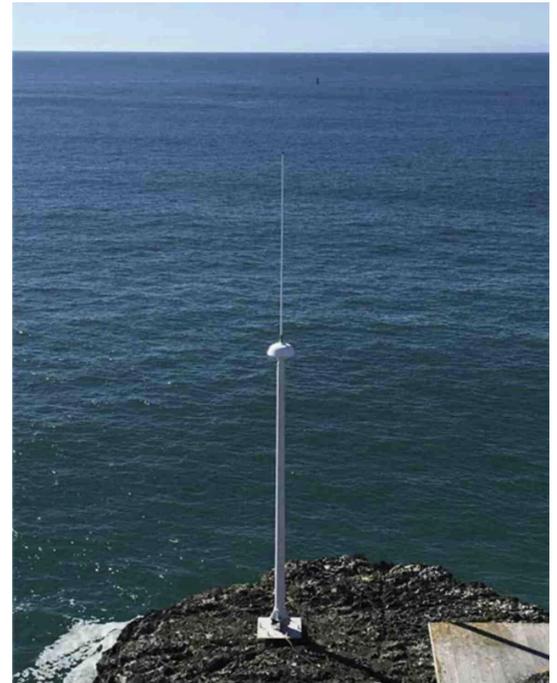
(Bonus information: these chirps rely on Bragg scattering, where radio waves reflect off ocean waves at specific angles, allowing scientists to calculate current velocities with high precision over distances up to 200 km).

Ham Classroom: Understanding CODAR Interference on the 60m Band (cont'd)

CODAR operates in the HF spectrum from 4.4 MHz to 25 MHz, with allocated bands including segments like 4.438–4.488 MHz, 5.250–5.275 MHz, and others up to 25 MHz (see locations below). The 5 MHz range is particularly useful for long-range ocean monitoring, which is why it overlaps with our 60m allocation.

To your receiver, this doesn't sound like static or a carrier—it's a repetitive, whooshing, or sweeping noise, often described as "wee-woo" or a fast chirp that pulses across the band. On Channel 5, this interference is frequently centered around 5.403.500 MHz, sweeping through the channel. The sweeping noise is clearly present during the Tuesday evening Marin County OEM HF RACES net.

The signal strength is particularly notable due to our proximity to the UC Davis Bodega Bay Marine Lab, which operates a 5 MHz, 80-watt CODAR transmitter. It's not constant; it might come and go based on the radar's operational schedule, but when it's active, it can wipe out the entire 3 kHz channel width.



CODAR HF Antenna Bodega Bay

CODAR Transmitting Station Locations:

- 5 MHz Trinidad: 41°04.414'N,124°09.467'W - Installed: 2008
- 5 MHz Samoa: 40°46.127'N,124°13.126'W - Installed: 2022
- 5 MHz Shelter Cove: 40°02.002'N,124°04.732'W - Installed: 2008
- 5 MHz Fort Bragg: 39°26.281'N,123°48.967'W - Installed: 2010
- 5 MHz Point Arena: 38°55.706'N,123°43.666'W - Installed: 2007
- 5 MHz Bodega Marine Laboratory: 38°19.169'N,123°04.417'W - Installed: 2007
- 13 MHz Salt Point State Park: 38°34'0.5"N,123°19'53.7"W - Installed: 2002
- 13 MHz Bodega Marine Laboratory: 38°19.039'N,123°04.348'W - Installed: 2001
- 13 MHz Point Reyes: 38°2'49.7"N,122°59'20.9"W - Installed: 2001
- 13 MHz Slide Ranch: 37°52.350'N,122°35.855'W - Installed: 2008
- 25 MHz Point Bonita: 37°48.929'N,122°31.794'W - Installed: 2010

For those interested in emergency communications, come join us—the Marin County OEM HF RACES net is held Tuesday evenings beginning at 1800 hours local time and starts on 3.895 MHz with Steve, W6SDY as the Net Control Operator.

Final Thoughts: CODAR's sweeping noise on the 60m band, especially Channel 5 around 5.403.500 MHz, is a reminder of the shared nature of our spectrum. While it's annoying, understanding it as a tool for vital ocean science can foster patience. Keep experimenting on 60m—it's a gem for NVIS (near-vertical incidence skywave) contacts—and remember, as secondary users, flexibility is our strength. 73!



Gerald McCarthy, W6NOV

Ham Classroom: Do it Yourself (DIY) Radio References

Microcontrollers and Single Board Computers

Using these small and inexpensive computers, amateur radio enthusiasts can build both accessories, such as antenna tuners, and fully functioning transceivers.

[Arduino](#): The Arduino microcontroller board was the first to popularize these devices. They are inexpensive, can be used for a variety of radio related projects, and have lots of open source software.

[Raspberry Pi](#): Did you ever wish you could have a PC small enough to fit into your shirt pocket? 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.

Electronics

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. [PCBway](#) 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.

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 companies that sell electronic components and parts: [Electronics Plus](#) (in San Rafael), [Digikey](#) (claims to have the world's largest selection of electronic components), and [Jameco](#) (a good source for almost everything, especially mainstay items such as resistors, capacitors, etc.).

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. 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:

[Antenna building basics](#)

[Instructions for a VHF/UHF dual band antenna](#)

[Good Reference for several antenna types](#)

[Build an HF dipole antenna](#)

[A step-by-step guide for building a simple antenna](#)

[Introduction to antennas](#)

Marin Amateur Radio Society Board of Directors Meeting 1/8/2026 Call to Order 19:30 Hours (7:30 PM) 1932

Attendance:

President: Curtis Ardourel WA6UDS
 Secretary James Saltzgaber KM6WWY
 Director Richard Cochran AG6QR
 Director: Ed Essick K6ELE
 Trustee W6SG Marc Bruvry KF6VNT

Director Kathy Funke-Spicher KM6URP
 Treasurer Bruce Bartel N6VLB
 Director Steve Toquinto KB6HOH
 Trustee K6GWE Brian Cooley K6EZX

Adopt agenda- Rob NZ6J Requested to add discussion for authorization to negotiate with the Muir Woods Park Association for an MOU covering an iGate station to be located at their site. Added to Public Service Committee reports. MSC TO ADOPT AGENDA AS AMENDED

Elect officers

Treasurer – MSC to retain Bruce Bartel as Treasurer
 Secretary – MSC to retain Jim Saltzgaber as Secretary
 Vice President – MSC to elect Kathy Spicher as Vice President
 President – MSC to elect Curtis Ardourel as President

Approve minutes of 11 December board meeting as published in QSA-5 MSC without objection.

Secretary's Report/Communications -Insurance broker has submitted our upcoming (March 2026) Insurance renewals to underwriters. No indication of price increase(s) to be expected. They will forward the renewals to us as soon as they are available.

Treasurer's Report – Bruce N6VLB Year-end report has not been completed. The last of the money from PayPal has been imported and allocated as previously agreed.

Members Present: Ken Brownfield AB6JR, Milt Hyams KM6ASI, Scott Pasternak KN6ZDN, Charlie Benett AI6TT, Skip Fedanzo KJ6ARL, Antonis Papas AA6PP, Gerald McCarthy W6NOV, Mark Klein K6AOW, Rob Rowlands AB6JR, Doug Kaye K6DRK, Larry Bradley KK6QPE, Tom Jordan KG6TCM

Committee and other Reports:

1. **Membership** Curtis WA6UDS – Currently 35 21% of the membership totals at the end of last year. First 2026 reminder email for renewals will be sent out this month.
2. **Facilities** Skip AJ6ARL – Gerald McCarthy has done some drain cleaning on the west side of the building. He also has some suggestions to control silting and debris pileup. If anyone notices anything that requires attention at the clubhouse, please advise Skip.
3. **VOAD/RCV** Skip KJ6ARL – Skip and Rob Ireson are putting together a 2026 calendar of events/drills/training for VOAD/RCV. Once the Public Service Committee events and kickoff luncheon dates are known, dates for training & exercises will be announced.

Marin Amateur Radio Society Board of Directors Meeting 1/8/2026 (cont'd)

4. **Technical** Milt KM6ASI – We have started on installation of antenna coax (3 lines) to the work bench/test rack from antennas mounted at the back of the garage structure. This will provide the capability of having one HF and one VHF antenna in the workbench area. Jim KM6WWY – The plan is to complete installing a weatherproof box on the outside of the garage with bonding and grounding hardware, as well as a junction box inside. Cable hangers will be along the west side inside wall to the area above the test rack and coax fed down there to the rack with a patch panel for connecting to the antennas. Jim KM6WWY requested \$250 for the hardware needed to complete this work. It was MSC by show of hands to approve the \$250. Milt has requested to step back from the Technical Committee. Antonis AA6PP has volunteered to assume this role. He will be working with Milt on handover of Technical Committee projects and responsibilities as schedule permits.
5. **Public Service** Scott KN6ZDN – We received a donation of \$5,000 from Marin Century - \$2000 for iGates and \$3,000 for repeater replacement. Milt KM6ASI has agreed to join the Public Service Committee, thank you Milt. He is working on a location for the Public Service kickoff luncheon. Waiting on a date (and a cost, if any) from the Port Captain of 60th Port Support Squadron at the Travis Marina under the north side of the golden gate bridge. We cannot have a large enough group in the clubhouse to hold this event there. Tom KG6TCM also volunteered to help obtain a location if the Travis Marina does not work out. Rob NZ6J is working with Muir Woods Park to negotiate an MOU (and insurance certificate if required) for an iGate station on their building. Milt KM6ASI will assist with the document.
5. **VE Testing** Jim KM6WWY – Next VE test session is scheduled for this coming Saturday 1/10/26. We have 5 applications, 3 for new Tech license and 2 club members for upgrade to General. Next VE session will be 2nd Saturday in April. All 2026 dates have been posted on the ARRL “Find an Exam” website. Curtis has updated the VE schedule on the MARS W6SG.net website. Antonis AA6PP noted that SF Radio Club does not hold VE sessions and would like to refer potential applicants to MARS. He was assured that we would welcome license applicants from SF Radio Club.
6. **Comm Truck** Charlie AI6TT – He and Dan N6HLZ attempted to replace the end panel of the Comm Truck garage but need more help and ladders. He would like an additional 3 people and one 8’ ladder. He will give Curtis a proposed date and Curtis will announce it.
7. **NBAM** Kathy KM6URP – She reported at the general meeting that Rob and James had gone up ON Wild View, John Camella’s site, that Mark has put together a rack with equipment to put establish a tunnel at Schellinger tower in Cloverdale. It will be installed when weather permits access to the site. Annual NBAM planning meeting Jan 25th at the clubhouse as well as equipment flashing party that same day.

Old Business:

1. **Donations Committee Charter** Curtis WA6UDS – Meeting scheduled on Zoom Wednesday 14th at 7pm to clarify procedures for handling equipment donated to the club. Steve KB6HOH and Milt KM6ASI will be at the Clubhouse on Friday 1/9/26, to inventory equipment recently donated by Steve KN6IDZ.
2. **New Google environment – Online storage of club records** Bruce N6VLB – Curtis has been set up with access to the new Google Environment system. Curtis – will upload a “significant photo archive” of MARS historic photos after Bruce sets up a directory for it.

Marin Amateur Radio Society Board of Directors Meeting 1/8/2026 (cont'd)

- 3. Club Cleanup Committee** Curtis WA6UDS – Dan N6HLZ has donated a new metal shelf rack unit for storage in the garage area. Milt KM6ASI noted that there is some drywall work to be done in the garage, this needs to be done ASAP and must be completed before the new shelves can be installed as well as to mitigate the fire hazard, particularly near the heater unit. Urgent drywall and wiring repairs are needed in the Kitchen/Office area. Curtis has a couple of people who are interested in doing this work. Request was made by Milt for \$1,200 for drywall supplies and an additional new shelf. It was MSC to approve \$1,200 for these repairs by a show of hands. Items taken from the garage and stored in the yard need to be disposed of ASAP.

New Business:

- 1. APRS Hardware Reimbursement** – Doug Kaye K6DRK has been building APRS iGate units for use by the Public Service Committee. These iGate units will be installed at various locations and some will be portable for temporary installation at sites for various events. He presented an invoice for the iGates that have been built and delivered in the amount of \$2,341.72. The system will have 12 permanent and 5 portable deployable iGates for APRS tracking during Public Service events. Software, cellular connectivity, etc. have been obtained without having any recurring charges. Following discussion of the invoice and budget details, it was MSC by show of hands to reimburse Doug Kaye \$2,341.72.
- 2. Public Service Events** – Scott KN6ZDN presented the Public Service 2026 events calendar (See Attachment-1 **Public Service Committee Proposed Event Schedule, 2026**). Last year was our first time doing the Kelly Brush Ride and it was very successful for both MARS and the event organizer. Out of that event, a person from BORP (Berkeley Adaptive Sports and Recreation), Berkeley equivalent of the Kelly Brush Foundation, a 501(c)(3) organization, asked for MARS assistance with their event. We will also be doing the Mt. Tam Trail Run. We were scheduled for last year, but their permits were not available due to the US Govt. shutdown. They also do the Marin Ultra Challenge, which we did with them last year, a phenomenally “nice event.” So organized that we really kind of didn’t need to be there, but once they saw us with our APRS and we could see where our sweeps were and watch sweeps at night arrive after dark on the map, they requested that we again work with them this year. The 2026 Public Service Calendar approval was MSC without objection.
- 3. QSA-5 Refresh** – Headshots for board and committee chairs, and NBAM steering committee Curtis KM6ASI – Jay Hamilton-Roth KO6FIR is working with our QSA-5 newsletter publisher Hugh Patterson KN6KNB and requests headshot photographs of all MARS Board members and committee chairs. These can be submitted via Curtis KM6ASI.

Good of the Order – Nothing noted

Executive Session – Not Required

Adjourn - MSC to adjourn at 20:59

Next Regular Meeting 6 February 2026

Next Board Meeting 12 February 2026

Marin Amateur Radio Society Board of Directors Meeting 1/8/2026 (cont'd)**Attachment 1 – Public Service Committee Proposed Event Schedule, 2026**

<u>Date</u>	<u>Event</u>
TBA	Randy Jenkins Memorial Public Service Kickoff Lunch
3/14/2026	Marin Ultra Challenge
4/18/2026	Ridge to Bridge
5/2/2026	Miwok 100
5/3/2026	BORP 2026 Revolution Ride
6/14/2026	115th Annual Dipsea
8/15/2026	MCBC Dirt Fondo
8/1/2026	Marin Century
Early August	Double Dipsea
9/12/2026	DC Escape from Alcatraz
9/19/2026	NorCal Adventure Revival
10/24/2026	Kelly Brush Ride
11/7/2026	Mt. Tam Trail Run

Marin Amateur Radio Society

Balance Sheet Comparison - Custom (as of December 31, 2025)

Distribution account	TOTAL	
	As of December 31, 2025	As of December 31, 2024 (PY)
Assets		
Current Assets		
Bank Accounts		
CD	0.00	0.00
MARS BUILDING FUND (8795) - 3 - 2	1,960.40	3,000.90
MARS GENERAL FUND (4328) - 9 - 1	86,120.70	77,993.56
Money Market	0.00	0.00
VE Session Cash	0.00	0.00
VE Session Cash Received	0.00	0.00
Total for Bank Accounts	\$88,081.10	\$80,994.46
Accounts Receivable		
Other Current Assets	0.00	0.00
Uncategorized Asset	0.00	0.00
Total for Other Current Assets	\$0.00	\$0.00
Total for Current Assets	\$88,081.10	\$80,994.46
Fixed Assets		
club house- 27 Shell Rd. MV	58,983.00	58,983.00
Total for Fixed Assets	\$58,983.00	\$58,983.00
Other Assets		
Total for Assets	\$147,064.10	\$139,977.46
Liabilities and Equity		
Liabilities		
Current Liabilities		
Accounts Payable		
Credit Cards		
Other Current Liabilities		
Total for Current Liabilities		
Long-term Liabilities		
Equity		
Retained Earnings	15,577.46	13,748.91
Net Income	7,086.64	1,828.55
Opening Balance Net Assets	124,400.00	124,400.00
Total for Equity	\$147,064.10	\$139,977.46
Total for Liabilities and Equity	\$147,064.10	\$139,977.46

Marin Amateur Radio Society

Profit and Loss Comparison (January-December, 2025)

Distribution account	TOTAL	
	Jan 1 - Dec 31 2025	Jan 1 - Dec 31 2024 (PY)
Income		
Christmas Party Income	1,719.00	2,289.08
Donations	13,737.08	35,496.51
Dues	3,365.00	3,437.18
Rent	33,270.00	3,000.90
Public Service Refund		168.15
Unapplied Cash Payment Income	0.00	0.00
Total for Income	\$52,091.08	\$75,890.92
Cost of Goods Sold		
Gross Profit	\$52,091.08	\$75,890.92

Marin Amateur Radio Society

Profit and Loss Comparison (January-December, 2025) (cont'd)

Distribution account	TOTAL	
	Jan 1 - Dec 31 2025	Jan 1 - Dec 31 2024 (PY)
Expenses		
Accounting	1,859.11	1,730.00
Awards	400.00	-100.00
Car & Truck	498.33	2,224.89
Car & Truck Gas	34.89	224.66
Total for Car & Truck	\$533.22	\$2,449.55
Contractors	1,555.00	22,549.00
Equipment < \$2,500	431.48	
Field day	341.91	854.66
Food	3,361.42	797.74
Garbage	641.76	613.44
Insurance	7,453.53	6,207.00
Comm Van Insurance	2,607.16	2,528.84
Total for Insurance	\$10,060.69	\$8,735.84
Meals	70.77	235.24
Office Supplies & Software	255.00	1,068.05
Other Business Expenses	823.32	13.00
Picnic	2,001.60	1,705.10
Public Service Expense	3,295.57	4,188.44
Repair & Maintenance	1,521.63	2,851.06
Station Upgrades & Maintenance	1,894.69	
Taxes & Licenses	8,606.84	8,222.03
Telephone	223.08	
Utilities	5,013.24	4,758.80
Water	593.45	
Web Services Expenses	0.00	1,583.40
Christmas Party		4,774.47
Housekeeping		1,123.80
Reimbursable Expenses		587.06
Repairs & Maintenance		1,770.00
Repeater		2,158.67
Uncategorized Expense		104.51
Total for Expenses	\$43,483.78	\$72,773.86
Net Operating Income	\$8,607.30	\$3,117.06
Other Income		
Other Expenses		
MESH Grant Disbursement	1,520.66	1,288.51
Total for Other Expenses	\$1,520.66	\$1,288.51
Net Other Income	-\$1,520.66	-\$1,288.51
Net Income	\$7,086.64	\$1,828.55