Ham Radio Hawaii Newsletter

#7, Issue 2021-2 KH6OWL February 2021

Welcome to the only newsletter for Amateur radio across all the Hawaiian Islands. Please send in any events or topics and be a contributor for your islands to KH6OWL@arrl.net.

Events:

Upcoming Amateur Radio Classes:

Oahu: http://www.earchi.org/education/

Are you looking to take the FCC Amateur Radio exam? You can register at this website.
http://hameducation.org/register/

The group supporting ZOOM based Amateur Radio Exams have settled into a weekly testing schedule, Saturdays at 6pm. They will even make accommodations for candidates that have personal scheduling problems.
Anyone interested in testing just register online at, http://hameduation.org

Amateur Radio Licensing Classes
The same logon leads to ZOOM classes for students interested in acquiring Technician or General licenses. Four Technician classes are planned starting Feb 10, Feb 22, April 12, and September 20. One General class begins February 25.
For details click the "Classes" button on http://hameducation.org.

Big Island: See article below for class information.

Beginners Corner

Website for new hams. Click **Here**
Ham Radio School: The Basics

Another good site for coax cable can be found here.

Around the Islands

Oahu: The Emergency Amateur Radio Club website can be found by clicking here.

Winlink Training:
Winlink Email Training is being offered by the ARES group. Here is a copy of the invitation sent our way by Van Malan (NH7IT)

QUOTE
Aloha Hawaii,

Many of you have probably heard about Winlink email. This digital means of sending email over Amateur Radio bands is gaining popularity in the emergency communication field. The American Red Cross recognizes Winlink as an important means of sending messages.

See https://tinyurl.com/y3jzsvcl

Our ARES leadership would like to extend the opportunity for you to learn and practice sending Winlink messages. We plan to have a weekly practice and learning session starting in January. I plan to send to each member that joins a practice assignment that you have a week or more to complete.

Please send me your call and starting soon I will send to you via Winlink your weekly assignment. If you are new to Winlink, ask for help and I will send you instructions on how to start learning about Winlink or you can visit www.winlink.org.

-Van (NH7IT)
UNQUTOE

Maui: Repeaters on Maui
The Maui Amateur Radio Club website can be found by clicking here. The Club is meeting on-the-air and/or via ZOOM until further notice.

Big Island: Repeaters on the Big Island

The Big Island Amateur Radio Club website can be found by clicking here.

New Technician License Preparation Class:
Coordinator Doug Wilson, KH7DQ, announces the next Technician License Preparation Class via Zoom starts Feb. 10. He provides this synopsis of the class: Purpose: The purpose of this class is to prepare you to pass the test for the entry level Technician Class Amateur Radio License and be able to assist as a communicator with disaster relief activities. If you're not interested in disaster relief, this will still be a good introduction to a wonderful lifelong hobby. There is much more that you will want and need to learn to become a competent radio operator and to enjoy Amateur Radio as a service activity and hobby. That additional knowledge and experience can be gained after you have received your

license through operation, additional classes, or working with an "Elmer." American Radio Relay League (ARRL): We encourage you to join the ARRL (arrl.net). This is a national organization of radio amateurs which works to protect our frequencies and operating privileges and provides our Volunteer Examiner (VE) service for exams. The cost is very reasonable and you get a great monthly magazine ("QST") with technical, operating, equipment reviews, and general interest features for hams. You can also choose to receive a monthly magazine ("On the Air") that contains subjects to help new hams. References: You will be provided, by email, with the Technician License question pool and numerous other reference materials throughout this course to assist you in preparing for the exam. Schedule: This class will be conducted virtually via Zoom. You will be provided with an invitation that contains a link to the Zoom site before each class. All classes will begin promptly at 6:30 p.m. and we suggest that you check in 5 minutes before class starts. Here is what will be covered: Taking the exam: When you have completed this class, you may take the exam virtually as well. Please go to this web page to register for your http://hameducation.org/register You will need to send a check for $15.00 payable to the ARRL.VEC. You will receive instructions when you register. The trainers for this class will be: Doug Wilson, KH7DQ, Amateur Extra Class, ARRL Registered Instructor Ph. (808) 985-9362.
Email: douscelle@aol.com Jim Tatar, WH6EMN, Amateur Extra Class Ph. (808) 960-1545 Email: james.tatar@yahoo.com It's up to you: Experience has shown that those who are successful on the exam are those who attend class regularly and study outside of class using the study aids provided and available on the internet. For online test practice, we recommend three sources: http://qrz.com. This site generates practice tests and gives you immediate feedback on questions answered correctly or incorrectly. It keeps track of which of the 423 possible questions that you may encounter on your test that you have seen. On the home page click the "Resources" dropdown tab at the top of the page and select "Practice Amateur Radio Exams." You will need to register to use this. You won't have a call sign yet, so register with another user name. You can change it to your call sign later. You need a valid, working email address to complete registration. Make sure that you select the "2018 Technician Exam Practice Test" when using this tool to practice. This site becomes more valuable after about the third session when you have been exposed to most of the material. http://eham.net/exams.
This site also generates practice tests and gives you feedback after you have completed answering all 35 questions. At the end of the test, it gives you the answers you got right and for those that you missed it gives you the correct answers. No registration is required to use this site. http://hamstudy.org.This site offers several study features including "Study Flash Cards", "Read Questions" and "Practice Test."

Although the site asks you to log in, you can click on "Continue as Guest" without having to register.

Ask us: As you study, keep track of the things you don't understand and ask them in class. Also feel free to email or call us at any time with questions. It's a new language. In many ways, learning the material for the amateur radio exam is like learning a new language. You will hear words and terms that sound familiar but which may have a different meaning in this context. There will be concepts that will be new to you, unless you have a technical back ground. Don't feel alone. Everybody feels as lost as you do. Help everyone in the class by asking the things that puzzle you during our class sessions.

Kauai Repeaters on Kauai The Kauai Amateur Radio club website can be found by clicking here.

Lania: Repeaters on Lanai

Molokai: Repeaters on Molokai

YouTube Video: Ham Radio – My durable and portable 2-meter Yagi antenna. By The Old Tech Guy, **Click Here**
Details on the build can be found **here**

Media: EconoTimes article "Why these Times are Perfect for Amateur Radio Geeks". Click HERE

HACKADAY article: Ham Radio Needs to Embrace the Hacker Community Now More Than Ever: https://hackaday.com/2020/11/28/ham-radio-needs-to-embrace-the-hacker-community-now-more-than-ever/
In it he laments that the influx in particular of those for whom disaster preparedness is the reason for getting a license is to blame for amateur radio losing its spark, and he proposes that the hobby should respond by broadening its appeal in the direction of the hacker community. The emphasis should move from emergency communications, he says, and instead topics such as software defined radio and digital modes should

be brought to the fore. Finally, he talks about setting up hacker specific amateur radio discussion channels, to provide a space in which the talk is tailored to our community.
Click HERE

FCC to Require Email Address on Applications Starting on June 29, 2021 Click HERE

FCC Reduces Proposed Amateur Radio Application Fee to $35 Click HERE

AREDN MESH Comes to Hawaii

In 2020, more than 80 AREDN MESH nodes were deployed in Hawaii. As done on the mainland, Amateurs connect their stations via a private Amateur Radio network. Here's a link to the current Hawaii network, https://tinyurl.com/y56ox3wu

The AREDN MESH network is self-configuring. A node added to the network broadcasts its identity to all the other nodes. Installation is truly well designed and easy to use. The ability to deploy go kits with AREDN MESH radios that are added dynamically makes it one more digital tool to pass traffic. Mastering the technology allows us to build networks around our islands. We can be less dependent on access to high places. Hawaii AREDN MESH is not an Internet ISP. We can ring our islands with many short hops that provide multiple paths from one node to another.

The basic component needed for a short hop is the AREDN MESH router, a MikroTik hAP. The term hAP stands for home Access Point. It is really just an Internet home router that has been "flashed" to operate in the Amateur Radio private network. As Amateur Radio equipment goes, it is inexpensive. About $50 on Amazon!

With a hAP connected via Internet, Amateurs can begin learning about the Hawaii network. The next step is to add a microwave link to become more independent of Internet. A pair of MikroTik SXT 5.8 GHz radios can be added to access a "sector node" in his area or interconnect two Amateur's stations via microwave. One of these can be had for about $70.

The IEEE recently hosted a ZOOM meeting that brought a lot of information to Hawaii Amateurs. Stephen Minakami (NH6XL) setup the meeting. We are fortunate that he was able to arrange a member of the AREDN MESH organization, Orv Beach (W6BI), who gave a great overview of mainland networks and the hardware and software components building the network. Here is a YouTube link to Orv's talk, https://youtu.be/qVM4W_I8mx0

Following his talk, Gessie Alpuro (WH6AV) gave an overview of AREDN MESH in Hawaii. As of now AllStar repeaters and seventeen Hawaii gateways are already connected via Hawaii AREDN MESH. It is amazing how well developed the network has become.

One of Gessie's focus has been interconnecting AllStar and Winlink gateways on the Big Island. hAP, SXT and point to point hardware has been donated to BIARC members to get the network started. He is working with Oahu as well as with his own island. Jim Pilgram (NH6HI) is driving the progress on Kauai. This is truly an all-Hawaii project.

Here is a link to Gessie's YouTube,
https://youtu.be/U2_oHUJ2Nn4.

Hawaii ARES now supports Winlink and AREDN MESH use in its exercises. Previously Clem Jung (KH7HO) made arrangements with the Hawaii Amateur Radio Emergency Digital Radio Network, Inc. (HEARDn.org) a 501C3 corporation, to provide audio adapters and VARA software licenses at a reduced cost to interested Amateurs. He now also has HEARDn support for AREDN MESH components.

If interested in adding digital modes to your Amateur Radio station, contact Clem to see how ARES can help Amateurs interested in either of these digital technologies.
ARRL Pacific Section Section Manager: Joseph Speroni, AH0A
ah0a@arrl.org

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Why Antenna Polarity Matters

We live in a universe of opposites — front and back, light and dark, negative and positive, and so on. When we consider magnets, for example, we think of their north or south *polarities*. Electromagnetic waves (including radio signals and light) have similar polarities that concern the orientation of the waves, referenced to the Earth's surface, as they travel from one point to another.

An electromagnetic wave can be horizontal, vertical, or anything in between. Polarities can change as the waves travel, which adds an additional complication.

But why should you care? You press the microphone button and transmit; everything else takes care of itself, right? Well...yes and no.

Let's say you have a mobile FM transceiver connected to a vertical antenna that's attached to the roof of your car, and you enjoy talking on the 2-meter band as you drive around town. Your friend Kathy lives about 10 miles away, and she owns an FM transceiver that is connected to a *directional antenna* known as a *Yagi* on the roof of her house. Rather than sending signals to all points on the compass, directional antennas focus most of their energy in a single direction, somewhat like a flashlight.

Kathy should be able to talk to you while you're out and about, especially when she turns her Yagi in your direction. You're both using considerable output power, and you both live in an area with flat terrain — no mountains or hills to block your signals. Communication across 10 miles should be a snap!

But when Kathy transmits to you, her signal is often weak and difficult to understand. She makes the same complaints about your signals. What could be the problem?

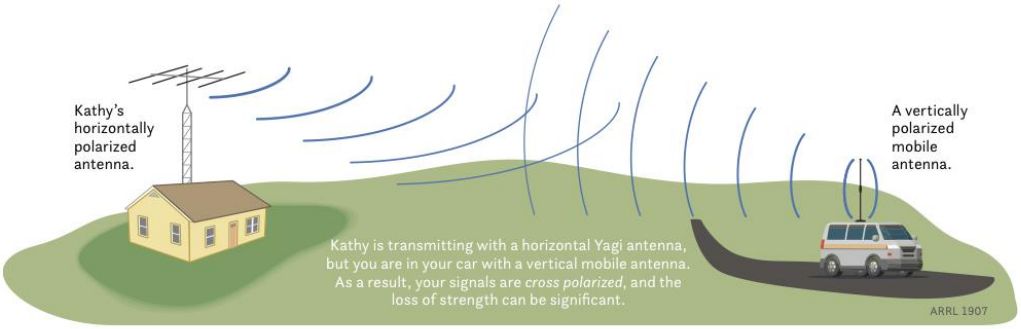
Look at your respective antennas. The antenna on your car is essentially a piece of wire that's positioned vertically with respect to the body of your car. Kathy has mounted her antenna in a horizontal position relative to the roof of her home and the ground around it.

When Kathy transmits, the radio waves leave her antenna and travel in a horizontal orientation. By the same turn, this *horizontally polarized* antenna is also most sensitive to receiving signal waves that are in a horizontal orientation.

When you transmit, the radio waves travel from your car in a vertical orientation. Your *vertically polarized* antenna is most sensitive to waves that have vertical orientations.

Technically speaking, we say that your signals and Kathy's signals are *cross polarized* (see the figure below) in relation to each other. You wouldn't think this would be a big deal, but cross-polarization results in considerable loss of strength at the receiving ends of the paths. This loss is expressed in decibels (dB), and it can be huge. In some cases, cross polarization loss can be as high as 30 dB. Without going into the mathematics, a 30-dB loss means that the 50-watt signal from your mobile transceiver will be reduced to barely a whisper in Kathy's radio.

Cross polarization results in substantial signal loss at both ends of the path.



From the Nov 2020 issue of "On the Air" Magazine from the ARRL.

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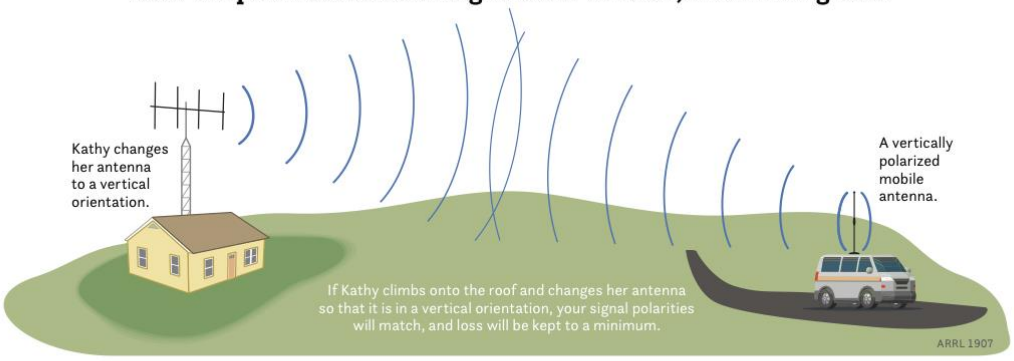

The Fix

If Kathy climbed onto the roof and changed her Yagi installation so that the antenna was in a vertical orientation, you would both notice big changes (see the figure above). Your signal would be much stronger at her end, while she would be substantially louder at your location. Problem solved!

Vertical polarization became the standard for amateur VHF/UHF FM signals because most people operated from cars, and those antennas were vertically polarized. Yes, it is possible to have horizontally polarized antennas on cars, but they aren't very practical, and folks find them unsightly compared to the clean lines of vertical antennas.

Not all VHF/UHF antennas are vertically polarized, however. Amateurs who operate SSB and digital on VHF and UHF commonly use horizontal polarization. In its horizontal position, Kathy's Yagi antenna would have been fine for talking to SSB operators in her area.

Does Polarization Matter on the HF Bands?

In a word, no. HF antennas *do* have polarization. A vertical antenna will have a vertical polarization while a horizontal antenna, such as a wire dipole antenna strung between two trees, will be horizontally polarized.

However, HF signals travel high into the Earth's atmosphere and enter a region known as the *ionosphere*, where the signals are bent back toward the Earth (see "The Ionosphere: The Great Radio Prism in the Sky," in the January/February 2020 issue of *On the Air* for a discussion of the ionosphere). As the signal is bent, or *refracted*, its polarity changes. A signal can leave your antenna with a horizontal polarization, but when it touches down a thousand miles away, it may be vertical (or something in between). If there is a polarity mismatch at the receiving antenna, there can be a bit of loss, but at HF frequencies the amount is inconsequential. Besides, as you can probably imagine, it wouldn't be practical to change a large HF antenna's orientation while you are making a contact!

Polarization Every Which Way

You may occasionally hear about *circular polarization*, especially when it comes to antennas used for communicating with satellites at VHF and UHF.

One of the challenges of communicating with amateur radio satellites is that their antennas can change polarity due to various effects, such as the movement of the satellite itself. This means you're never quite sure of the signal polarity at any moment.

Circularly polarized antennas compensate by being able to transmit (and receive) radio waves whose polarities continuously "rotate" from horizontal to vertical and back (see the photo below). If Kathy owned a circularly polarized antenna, she could communicate with you while you're driving, and still enjoy conversations with her buddies using horizontal polarization on SSB — all without having to change her antenna.

In case you're wondering why more hams don't use circular polarization, it is because these antennas tend to be more complex to design and build. They aren't commonly available from dealers, and when they are, they're expensive. In most cases, you're better off saving your money and using simpler antennas with polarities best suited to your favorite activities.

Circularly polarized antennas transmit (and receive) signals with polarities that rotate as they travel. This is an array of four circularly polarized antennas used for space communication.

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