



# W6TRW CROSSTALK

Monthly news bulletin of the W6TRW Amateur Radio Club  
**April 2024**

YouTube

<https://youtu.be/EZWPgfbEXyo>

Mark KD7DTS

**SOTA Cat meets the Elecraft KH1 | Summits on the Air**



## What's Inside

- General Club Meeting
- News & Announcements
- Membership – 2024 Application
- Repeaters & Nets
- About Us

# Monthly General Club Meeting

**When: Tuesday, April 9th at 5:30 PM**

**Where: S Cafeteria & Virtual Meeting on Zoom**

The 2024 W6TRW Club Meetings are being held as hybrid in-person & virtual via Zoom. In-person meetings take place in the Northrop Grumman Cafeteria (see map, page 3). For Zoom, click on the link below on your computer, tablet, or smartphone. Same meeting link every month, 2<sup>nd</sup> Tuesday of every month, 5:30 PM Pacific Time. **FREE PIZZA ☺!**

<https://us02web.zoom.us/j/82794654895>

Phone dial-in: 1 669 900 6833, Meeting ID: 827 9465 4895

## Speaker Topic for This Month:

**"Two Projects in Amateur Television"**

**Dylon Mutz, N6MX**

Come hear Dylon N6MX's talk about his experience getting into Amateur Television! Dylon will summarize some of the main things he's learned and present two new and exciting ways he's used to get on ATV. The first project combines the wideband Pluto SDR, a RTL-SDR dongle, and everyone's favorite hobby computer, the Raspberry Pi, to build the "Portsdown" digital ATV transceiver! The second project uses inexpensive commercial off-the-shelf (COTS) drone hardware to get on 5.8GHz! Dylon will show the parts needed and how to put these systems together so you can get on the air too!

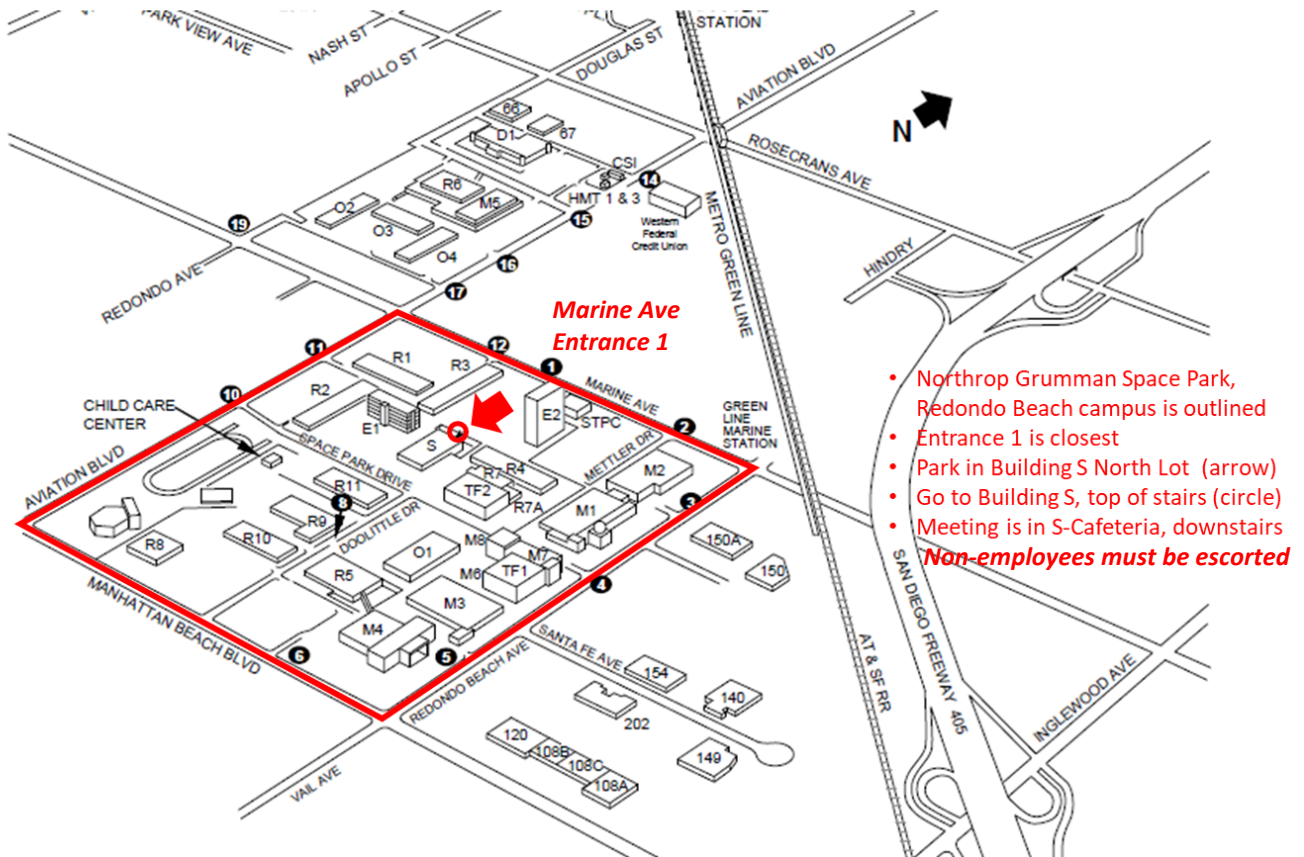


Dylon is the W6TRW Amateur Radio Club 2024 President and Shackmaster. He graduated from CSU, Fullerton in 2015 with a B.S. in Computer Engineering and started his career at NG shortly after in digital design and verification. Dylon joined W6TRW around the same time and credits club members for everything he knows about RF. His interests and projects cover digital hardware, software, and RF. Dylon has also helped manage and participate in our Tower 2 refurb, and in the past two years, he has organized a number of work parties for new HF antennas, a complete re-build of our club's satellite station, as well as implementing and assisting our repeater upgrades and Allstar nodes, and participating in the annual ARRL VHF contests. Dylon has also been a key member of the W6TRW Field Day team for the past few years.

# In-person W6TRW meetings - Map

Here is the map for the location of the Northrop Grumman Cafeteria. This building is in the NG Space Park campus, in the northwest corner of Redondo Beach.

## Space Park Map – W6TRW Meetings



## Classified Ads

### Amateur Radio Ads

No new ham classifieds this month. If you have ham equipment to sell, please send the info to Greg KE6YEX as a reply to the Newsletter email; thanks!



Dr. Doug Millar will be leading a visit to Owens Valley Radio Observatory on the Weekend of June 7. The visit will include a tour of the observatory and nighttime astronomy. You can bring your own scope or look through others. More information is available if you email him at [drzarkof56@yahoo.com](mailto:drzarkof56@yahoo.com). See the flyer and RSVP on following pages.

# INVITATION - Owens Valley Radio Observatory

## Owens Valley Radio Observatory (OVRO) - Invitation and RSVP -

Astronomers setting up for nighttime astronomy.



**Dr. Doug Millar, K6JEY** from San Bernadino Microwave Radio Club, invites current members of W6TRW to the Cal Tech **Owens Valley Radio Observatory (OVRO)** near Big Pine in early June 2024.

**Date:** If you want to come **Friday June 7, 2024**

We will have an evening of astronomy to the south of Building #10 at the west end of the observatory. You can bring your own telescope and there will be a number of telescopes set up to share their views. 120V AC is available.

**Date: Saturday, June 8, 2024**

The main program will be on Saturday afternoon, starting in the dining area in Building #10. Please arrive by 1:00 pm Saturday June 8<sup>th</sup>.

We will go to the Pizza Factory in Bishop for dinner. -TBD

Saturday Night: We will also do Astronomy. You can bring your own telescope.

**Date: Sunday, June 9, 2024**

Gather for breakfast at a local restaurant (more info available on Saturday).

Leave whenever you like.

Check websites about the area and the Highway 395 for sightseeing opportunities.

[cont'd next page]

# RSVP - Owens Valley Radio Observatory

## OVRO Visit RSVP Form

*This is an invitation from OVRO. W6TRW will collect and provide an RSVP list to Dr. Millar. Please send your RSVP in reply to the W6TRW Newsletter email; thanks!*

Please provide current club member name, callsign, phone #, email with a name of non-member guest with their cell phone.

**Current Club Member\* Name:** \_\_\_\_\_ **Call sign:** \_\_\_\_\_

**Cell Phone #:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Non-Member Guest Name1:** \_\_\_\_\_ ; cell phone #: \_\_\_\_\_

Under 18 years old: Yes/No

**Non-Member Guest Name2:** \_\_\_\_\_ ; cell phone #: \_\_\_\_\_

Under 18 years old: Yes/No

**Non-Member Guest Name3:** \_\_\_\_\_ ; cell phone #: \_\_\_\_\_

Under 18 years old: Yes/No

If you have more guests, please list.

- \*Must be a current W6TRW member; **Non-member guests must sign the liability form.**
- No ID requirement for entry into OVRO for the tour.
- You must provide your own **transportation and lodging.**

You can stay at a motel nearby, camp in a campground, bring a tent or trailer and stay at the OVRO site. If you decide to camp at OVRO, you must provide your own bathroom, as the buildings will be locked. There are places to eat in Big Pine and Bishop.

Millimeter Wave Array dishes at the site.



# Directions - Owens Valley Radio Observatory

## DIRECTIONS TO OVRO

- The observatory address is: **100 Leighton Lane, Big Pine, CA.**
- Please **arrive at OVRO by 1:00 PM on Saturday** for the program.

### The directions from the LA area:

Drive north on the 5/14 through Palmdale and Mojave.

Continue past Inyokern and join 395. Continue on North through Little Lake, Lone Pine and Independence.

Continue through Big Pine.

Just as you get to the end of town turn right on Highway 168 towards the Westgard Pass.

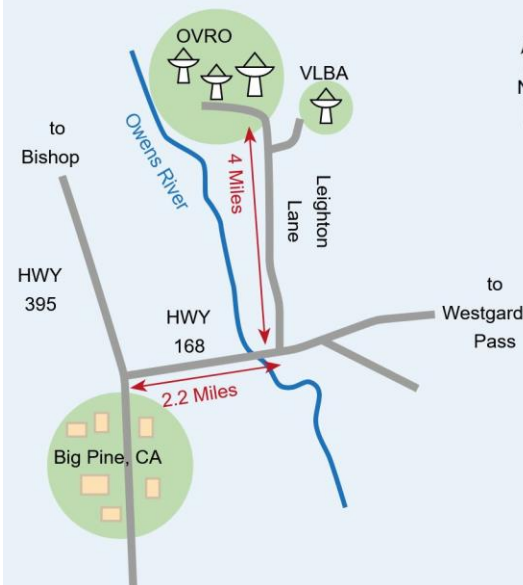
Go about 2 miles and turn left onto Leighton Lane, the observatory road.

You should be able to see the 40m dish in the distance, but it is 4 miles away!

Continue through the gate onto the property and follow the blacktop road.

Go past two 90-foot telescopes to the west end of the site and park.

### Directions to OVRO



Located southeast of Bishop, the Owens Valley Radio Observatory is 6 miles from the town of Big Pine. The only public access road to OVRO is via Highway 168, which begins at the northern end of Big Pine, by a large pine tree. Turn east onto Highway 168. After approximately 2 miles you will cross the Owens River Bridge. 1/4 mile past the bridge, turn left on a paved road, Leighton Lane.

Our main dish to explore is the middle one at 40m in diameter.



## W6TRW Discord Channel

Did you know W6TRW has an active online discussion of ham radio adventures, build projects, and event planning? This is an excellent way to keep up with hot topics in the club. If you haven't already, please join your fellow club members on Discord. You can sign up here: <https://discord.gg/9JMY9SydV3>

### Recent posts on the W6TRW Discord:

**Mark KD7DTS** — 03/24/2024 9:10 PM - Today's adventure with @Di K06BTM and @Ara N6ARA - the CW section could be good practice for you, @Dylon N6MX. I put in closed captioning, so you can listen without the CW translation or watch with it to check your copy.



**Tony KC6QHP** — 02/20/2024 10:11 PM — Tonight I visited the QTH of K6QPV - Greg Bailey in San Diego. This is his 10 GHz EME station. The outdoor enclosure contains a 250 watt TWT amplifier!! Flexible Waveguide connects the amplifier output to the dish feed. Dish is 2m diameter

### HamTV headed to the ISS

Supply mission SpX-30 is on the way from KSC to the ISS! Our HamTV module is among the cargo being delivered!



ARISS Photo

HamTV installation date is not yet scheduled. It will downlink video on 2.395 GHz.



**Dylon N6MX** — 03/21/2024 2:56 PM  
HamTV headed up to ISS today! Time to get on 2GHz!

**Tony KC6QHP** — 03/21/2024 4:56 PM  
That's the box that Kerry N6IZW had been working on in his garage, here in San Diego where we meet monthly for the San Diego Microwave Group.

**@Mike WB6DJI** — 03/26/2024 2:57 PM  
Rare 6 meters opening here, just worked Galapagos Islands HD8MD

### HD8MD



**Dr. Rick Dorsch (NE8Z/HC1MD)**

QTH: Shipwreck Bay, Puerto Baquerizo Moreno  
San Cristobal Island  
Galapagos Islands

QSL: K8LJG or NE8Z

Email: Use mouse to view..



# Crosstalks from the Past – April 1995

For fun, a page from W6TRW's past. See <https://w6trw.com/crosstalk-newsletter/> for newsletters.

Bill Shanney, W6QR has written technical and Elmer articles for the W6TRW Crosstalk for many years. See [https://w6trw.com/wp-content/uploads/Crosstalk/1995/1995\\_04\\_W6TRW\\_Crosstalk.pdf](https://w6trw.com/wp-content/uploads/Crosstalk/1995/1995_04_W6TRW_Crosstalk.pdf) April 1995

## Newcomers Guide: Getting Started on HF by Bill Shanney, KJ6GR

I've been asked several questions recently regarding basic equipment for HF. I'll present my opinions in this article but also encourage all newcomers to get several viewpoints before making your final decisions. many factors enter into this process:

- How much money do you want to spend?
- How much room do you have for antennas? This is influenced by CC&Rs and your spouse's feelings.
- What are your operating interests?

The last question may be difficult for a newcomer to answer. If you think some activity sounds interesting, find a friend who is active in that area and have him show you the ropes and perhaps operate his equipment. The club shacks have equipment that can be used to try most common operating modes and bands, if you need assistance contact one of the club officers and we will try to help you.

The first thing to buy is a transceiver. ICOM, Kenwood, Ten Tec, and Yaesu all offer a range of products to satisfy the needs of basic operating through demanding contesting and DXing. A new entry level rig will cost \$900 - \$1500. Some personal recommendations are the Kenwood TS-50, Yaesu FT-840 and Yaesu FT-900<sup>1</sup>. These are all small rigs with enough features to handle most operating conditions. If you plan on operating CW you should get a 500 Hz CW filter (\$100 - \$150) and you will need a keyer and paddle (\$100 - \$200) (the FT-900 has a built in keyer). You will also need a 12 volt, 20 amp power supply. I don't recommend buying the matching supply since you are paying for appearance, an Astron unit is less than \$100.

You can save some money buying used gear. Most hams take good care of their equipment, beware if it looks beat up and always verify that it works before you buy. An IC-735, TS-440, or FT-757 should cost \$700 - \$800 depending on age and options. Make sure that it includes a 500 Hz filter if you want to work CW, getting a filter for out of production gear may be difficult. I recently bought a Ten Tec Corsair II used and reconditioned from the factory for \$875 + \$75 for the CW filter. This is a ham band only rig but is big on CW performance (SSB too).

Some of you may be suffering from sticker shock at this type of investment, please read on. I'm a big QRP fan. QRP operation is less than 5 watts on CW and 10 watts SSB. Other club members who enjoy low power operation include Brian KN6OW and Max, NU6U. Most QRPers build their own gear, there are many easy to build kits available for less than \$200. I'd be happy to help anyone in the club align their rig once assembled. There is something very special about using a rig you built that I can't describe in words. My recommendation is to start with a 40 meter transceiver. If you join the Northern California QRP Club (\$5 per year) you get their excellent newsletter and can purchase a NorCal 40A transceiver kit for about \$100. This is a good kit for a beginner to start with. I've listed other sources of QRP rigs at the end of the article, write for catalogs and price lists.

The QRP Plus transceiver is a multi-band full featured transceiver available from Index Labs for around \$600. It has a full 5 watt output on CW or SSB and many nice features. MFJ single band QRP rigs are available at most ham stores and sell for less than \$180. Ten Tec sells an interesting transceiver called the Scout. The Scout has an output of 5-50 watts and bands are switched via plug in modules. This rig costs \$550 with one band module and \$29 for each additional band. These are all low cost ways to become active on the HF bands. Don't expect the same level of performance from these simple rigs but do expect to have a lot of fun.

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<sup>1</sup> Throughout this article I'll refer only to equipment I'm familiar with. I'm sure there are other fine products out there so ask other experienced hams for their recommendations too.



## Crosstalks from the Past – April 1995

For fun, a page from W6TRW's past. See <https://w6trw.com/crosstalk-newsletter/> for newsletters.

Page 2, W6QR, Getting Started on HF;

See [https://w6trw.com/wp-content/uploads/Crosstalk/1995/1995\\_04\\_W6TRW\\_Crosstalk.pdf](https://w6trw.com/wp-content/uploads/Crosstalk/1995/1995_04_W6TRW_Crosstalk.pdf) April 1995

Antennas are relatively inexpensive. I'm not talking about quads or yagis on a tower, just simple wire antennas. Buy a wide range antenna tuner, a unit that will handle 300 watts cost less than \$150. These tuners will allow you to match random length wires and dipoles on multiple ham bands. The tuners built in to many modern rigs do not have the range required to match many multiband antennas. The MFJ-949E and Vecronics VC-300DLP are examples of tuners in this class. You can also build your own using parts found at the swap meet.

Wire antennas can be home built ("home brewed") or purchased. Lew McCoy, WIICP suggests a dipole of any convenient length fed with inexpensive 450 ohm ladder line. For good performance this wire needs to be at least one quarter wave long on the lowest frequency of operation (that's ~70 feet for 80 meters). The popular G5RV is 102' long and centered with ladder line. Some versions transition to coax after a 34 foot length of 300  $\Omega$  line but I prefer to feed it using 85 feet of 300 or 450 ohm ladder line for multiband use. The G5RV is available commercially from many sources.

The Windom is an offset fed dipole 132 feet long that operates on most bands using a tuner. Antennas West and Radio Works sell well made versions of this good performer as well as other wire designs. W9INN sells dipoles using a combination of inductive loading and parallel wires to achieve multiband operation. He has versions to fit most restricted space installations. Check the ham magazines for information from these sources.

Horizontal HF antennas perform better when they are higher in the air. Radio Shack sells 35' push up masts that work great for wire antenna supports, so do trees. At heights less than  $\lambda/8$  ground loss becomes considerable. If at all possible put your antenna up  $\lambda/4$  or higher on the lowest band of operation. If you can't do this, no problem, you can still have fun with QSOs less than 1,000 miles or so. 70% of my QSOs are within this range. To increase your range a vertical cold be used<sup>2</sup>. Cushcraft (R7), GAP and Butternut make excellent products. Please stay away from power lines for safety sake.

Many years ago W3EDP popularized an 85 foot end fed long wire antenna. Installed as an inverted vee or inverted L with the top up about 35' it is a good performer on the lower bands. You must have a good ground at your tuner to use this type antenna. I recently had good luck with a 67 foot horizontal wire fed 17 feet from one end. This antenna matches easily on 40, 30, and 20 meters when fed with 68 feet of 450 ohm ladder line. It can also be used on 80 meters with a wide range tuner. I used it as an inverted vee with an apex at 40 feet.

The ARRL Antenna Book, Lew McCoy on Antennas, the Bill Orr, Stu Cowan series and many other antenna books have many ideas for wire antennas. One of my personal favorites is HF Antennas for All Locations by Les Moxon, G6XN. This book is full of interesting antenna designs for limited space applications.

The 80 through 20 meter bands are where most of the HF action will be for the next few years (i.e. during the minimum of the sunspot cycle). Casual operating on these bands is a lot of fun. Coast-to-coast contacts can be made almost any night on 40 meters. It is relatively inexpensive to get started (less than most computers) and equipment is easy to operate. Put up a simple wire antenna and give HF a try.

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<sup>2</sup> I'm partial to horizontal antennas on the lower bands since most man made noise is vertically polarized. Local noise pickup by verticals is 6-10 dB higher in this area.

## News and Announcements



### Membership

The W6TRW 2024 Membership Form is on our [Membership](#) page. Be sure to renew for the 2024 club year! **Our annual participation fee for the W6TRW club is still \$5, as it always has been! You can now send the participation fee ELECTRONICALLY to Dylon N6MX – see the note in the new 2024 W6TRW Membership Form! And you can scan your signed ink signature pages and send to Dylon’s email address on the form. We’re going electronic!**

**Our durable, high-tech magnetic club badges are now \$30, the real cost of making them.** The badge, with your call sign, name & W6TRW logo, will last for many years!

Each year, when you renew or join the W6TRW Amateur Radio Club, we will send out a physical membership card via regular mail, as confirmation that you are a member for the year.

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### W6TRW Swap Meet – Last Saturday of Every Month !

Our club puts on the largest monthly amateur radio swap meet in the Los Angeles area. The W6TRW Swap Meet has been held monthly for almost 40 years. The W6TRW Swap Meet is well known throughout the western US and even the world! It is always held the last Saturday of every month, rain or shine, holiday or not, from 7:00 AM until 11:30 AM, in the R2 parking lot near the southeast corner of Aviation Blvd. and Marine Ave. where the cities of Redondo Beach, Manhattan Beach, and Hawthorne meet. Talk-in on 145.320 -600 PL 114.8.

If you wish to sell at the swap meet, please visit our [swap meet sellers’ webpage](#) for all the necessary information.

Our Swap Meet Manager, Wendell KE6ASC, is always on the lookout for volunteers to help at the Swap Meet. If you'd like to get up early and help the club put on this important traditional activity, email Wendell at [w6trwswapmeet@gmail.com](mailto:w6trwswapmeet@gmail.com) to get more information.

The next swap meet is the last Saturday of the month, from 7:00 am to 11:30 AM. See you there!

## W6TRW Club Members SHOW ‘N TELL

### W6TRW Club Members SHOW ‘N TELL / DIY / Maker / Activity Talks

At past and recent club meetings, we’ve had members of our club describe and/or demonstrate projects they have created or been involved in. We’d like to continue that tradition! We’re all excited to hear what you’ve been doing. All you need to do is put together a few slides!

**If you’ve been building something interesting, or engaged in recent ham radio adventures or volunteering, please send a reply to [newsletter@w6trw.com](mailto:newsletter@w6trw.com), and we’ll get you on the agenda in 2024!**

**Please REPLY if interested!**

# News and Announcements

## W6TRW Repeaters Now Playing Newsline & ARRL News

We're putting a regularly scheduled rebroadcast of [Amateur Radio Newsline](#) ham radio news and the [ARRL weekly news](#) on the W6TRW repeaters on Wednesdays and Sundays at 9:00pm Pacific time! Newsline is a free service that produces a weekly report of important goings-on in the ham radio community and is a great way to stay in the loop on current ham radio topics.

Take a listen and let us know what you think!

-- Shackmaster, Dylon N6MX

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## [AMSAT - Amateur Radio in Space](#)

The number of active amateur radio satellites keeps increasing. Here is the current satellite status, making it easy to find satellites you may be able to hear: <https://www.amsat.org/status/>. For many satellites, the telemetry downlink or Morse code beacon is easy to receive with a simple dual-band VHF-UHF magmount antenna.

If you have a VHF/UHF SDR (software defined radio) connected to your computer, you can see the Doppler shift of the signal as the satellite passes over.

To find out when a satellite will fly over your location, go to <https://www.amsat.org/track/index.php>. Just put in your grid square or approximate latitude-longitude. One of the most reliable and easy downlinks is the ISS (International Space Station) on 145.800 MHz.

The next step is transmitting – making amateur contacts through the satellites. AMSAT satellites for amateur communications: <https://www.amsat.org/two-way-satellites/>.

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## [Amateur Radio Contests - Calendar](#)

There are many amateur radio contests during the year, for the full range of different radio interest areas. Click [here \(WA7BNM's Contest Calendar\)](#) for a listing of all the amateur radio contests.

Just listening to contests is a great way to hear a lot of stations from all over the US and even all over the world – better than just randomly tuning on any given day, hoping to hear something.

One popular contest is the [ARRL January VHF Contest](#) (The third or fourth full weekend in January) and the [ARRL June VHF Contest](#). The VHF contests are easy and fun – just find your grid square at [Amateur Radio Ham Radio Maidenhead Grid Square Locator](#) and then key up your VHF/UHF FM radio on the calling frequencies – 146.52 MHz and 446.000 MHz. The calling frequencies 146.52, 146.55, and 146.58 are busy during the contest and you can make many contacts just by answering contest calls. It's a great way to check out your VHF/UHF radios!

# W6TRW Repeaters and Nets

## W6TRW Repeaters

VHF 2 Meters • 145.320 MHz, Offset: -600 kHz, PL: 114.8 Hz; Located in Redondo Beach, CA • All-Star node 505680  
UHF 440 MHz • 447.000 MHz, Offset: -5 MHz, PL: 100.0 Hz; Located in Redondo Beach, CA • All-Star node 505681  
(Our VHF 145.320 MHz and UHF 447.000 MHz repeaters are linked – but may be disconnected for certain nets listed below)  
UHF MotoTRBO DMR • 446.050 MHz, Offset: -5 MHz, Color Code: 2; Located in Redondo Beach, CA

### **Monday K6MBC Manhattan Beach MBCERT Net**

Weekly; Monday nights at 6 PM \*except\* first Monday of the month, on the W6TRW 447.000 MHz repeater

### **Monday Lomita and South Los Angeles DCS Net: Weekly**

Monday nights at 7:30 PM, on the W6TRW 145.320 MHz repeater

### **Tuesday Absolute Tech Net: Weekly**

We retransmit the weekly [Absolute Tech Net](#) on Tuesday afternoons at 4 PM Pacific time. This is a great group of knowledgeable people who are enthusiastic to share their knowledge with others. Please see the [Absolute Tech Net web page](#) for the many topics they have discussed, and upcoming topics.

### **Wednesday W6TRW Emergency Communications Team (ECT) Net: Weekly**

The ECT net is held weekly Wednesdays starting between 12:00-12:15pm on our 145.320 MHz and 447.000 MHz repeaters. The whole net only takes about 10-15 minutes.

The purpose of the net is to promote club participation and to increase the general awareness of hams to emergency communications resources. The net is open to all W6TRW members as well as any non-member visitors!

Check-ins reply with their name and callsign, general location, and their radio communication capabilities at the time.

During an actual emergency, the W6TRW 145.320 MHz repeater will be dedicated to DCS, and won't be available for open use, but it will be very useful to monitor! The W6TRW 447.000 MHz repeater should be available and open for use during an actual emergency, so please save a memory in your radio for our 447.000MHz repeater!

### **Wednesday Northrop Grumman HF Family Net**

Also at noon Pacific Time on Wednesday is a long-running Northrop Grumman net on 14.270 MHz. Northrop Grumman and TRW employees / retirees are welcome to check in and represent the West Coast!

### **Thursday Space Net**

Our W6TRW 145.320 MHz and 447.000 MHz repeaters host the long-running Space and Information Net every Thursday evening at 7:00 PM. Ronnie N6SHI (Space Hams International) is the net controller, taking check-ins and providing the best of the weekly space news, launches, and visual flyovers. Tune in and check in!!

### **Newsline & ARRL Weekly News – Wednesday and Sunday**

9:00 PM & 9:30 PM

News released every Friday

# About Us – W6TRW

The W6TRW Amateur Radio Club is a non-profit organization that started in the early 1960s.

The W6TRW Amateur Radio Club started as the TRW ARC and held the club call sign WB6WPO. The club became an ARRL Affiliated Club in 1971, and the club call sign was changed to W6TRW in 1974. The club was formed at the TRW facilities in Redondo Beach California comprised of employees of the aerospace company.

Our club station is located in Building S and includes 2 Yaesu FT-1000's, Alpha 87a amplifier, and two towers with multiple HF antennas in Redondo Beach, California. We also have all-mode capability on 6m, 2m, 440, and 1.2 GHz. We have ATV, and satellite and packet stations.

W6TRW sponsors open repeaters on 2 meters and 440 MHz that serve the Los Angeles basin. We also have a Motorola MOTOTRBO Digital Repeater in Redondo Beach. IRLP node 7067 is connected to our open 440 repeater and typically is connected to the Western Amateur Linking Association LAX Reflector 9350. Please visit our repeater page for more information!

The Amateur Radio Club (W6TRW) offers a full range of radio related activities, including contest operating events, community public service events, picnics and classes for those wishing to obtain their first license. Stop by the Amateur Radio Swap Meet on the last Saturday of the month in the R2 parking lot from 7:00-11:30am – you'll be surprised by what you will find.

## W6TRW Officers 2024

### Elected Officers:

**President** (Dylon Mutz)  
**Vice President** (Mike Hamada)  
**Treasurer** (Jason Fujino / Wendell)  
**Secretary** (Mark Knight)  
**NGRC Commissioner** (Greg Madden)

### Staff Officers:

**Banquet** (Janice Miya)  
**Publicity Chair** (Greg Shreve)  
**Training Chair** (Chris Wachs)  
**QSL Manager** (Craig Gullickson)  
**Librarian** (Janice Miya)

### Appointed Officers:

**Activities Chair** (Janice Miya)  
**W6TRW Trustee** (Chris Newton)  
**Technical Chair** (Chris Wachs)  
**Swap Meet Manager** (Wendell Young)  
**Membership Chair** (Wendell Young)  
**ECT Coordinator** (Greg Madden)  
**Web Master** (Deedee Banh)  
**Web Page Designer** (Rich Sauer)  
**Equipment Chair** (vacant)  
**S-Shack Master** (Dylon Mutz)  
**Field Day Chair** (Greg Shreve)  
**Past President** (Chris Wachs)