QRO

Monthly Newsletter of the Palos Verdes Amateur Radio Club

September 2020

Inside this month's QRO

All **QRO** monthly issues since 2007 are on the PVARC website at: www.k6pv.org in the "Newsletter" tab. Additional club news appears in emailed PVARC Weekly Bulletin.

PVARC online meeting via Cisco Webex

"A Tour of the ARRL Laboratory"

**Bob Allison, WB1GCM
ARRL Assistant Laboratory Mgr.**

Thursday, September 3, 2020

7:15 pm: Webex meeting room opens

7:30-9:00 pm: Meeting and presentation

Use your PC, Mac, Linux, iOS, Android device in full video—or just audio by phone.

We'll be using video conferencing for PVARC meetings until conditions permit resuming in-person meetings.

PVARC's upcoming meeting topics

The PVARC's 7:30 pm **September 3** monthly club meeting has a very special speaker: ARRL Assistant Laboratory Manager Bob Allison, WB1GCM. He'll be talking to us from Connecticut about the ARRL's laboratory that tests ham radio equipment for review in **QST** magazine and also provides precise measurement of electronic phenomena. Bob is an excellent speaker and many of our club members enjoyed meeting him during the HAMCON 2017 / ARRL Southwestern Division Convention at the Torrance Marriott Hotel.

Our **October 1** monthly meeting also via Cisco Webex will be about batteries for amateur radio. The speaker will be announced shortly as will our **November 5** meeting presenter.

The PVARC's December 2020 holiday dinner has been canceled due to COVID-19 limitations as have the holiday meals of virtually all Los Angeles-area radio clubs. We are seeking an alternative holiday event that will still spread the holiday cheer, even if remotely. ∎

Above: That's our September 2020 meeting speaker—ARRL Assistant Laboratory Manager Bob Allison, WB1GCM—on the cover of ARRL's January 2012 **QST** Magazine. Although shown at his home workbench he will be giving us a current tour of the ARRL Lab and its sophisticated test equipment.

PHOTO CREDIT: AMERICAN RADIO RELAY LEAGUE

Status of PVARC public events

As of the time this **QRO** issue is being finalized the 2020 Palos Verdes Half Marathon is still scheduled for Saturday, November 21, along the Peninsula's coastline. The PVARC's operator team led by Steve Collins, KI6TEQ, will provide radio communication coverage if this event is held. The official PV Half Marathon website acknowledges COVID-19 is an ever-changing situation and advises runners signing up that in the event of cancellation their race fees will be applied to another event or a postponed PV Half Marathon.

Additionally, Hesse Park's building remains closed into September for all meetings and classes except hybrid City Council meetings (some of the Council and city staff in-person, the others via Zoom.) Walt Ordway, K1DFO, has ham license classes scheduled for Saturdays, November 7 and 14, followed by a VE test session on November 21 concurrently with the Palos Verdes Half Marathon. These classes and the test session are also subject to cancellation due to public health orders. ∎

FCC seeking comments about proposed fees for ham licenses: $50 for new license, $50 for a renewal, $50 for a vanity call sign

Amateur radio typically isn't affected when the American political process takes strange turns. But recently our luck may have run out.

On August 26 the Federal Communications Commission released a 114-page Notice of Proposed Rulemaking (FCC 20-116) asking for public comments about proposed fee changes affecting nearly all transmitting services to cover their FCC "costs" for license application processing. Proposed amateur radio license costs would increase to: $50 for a new license application; another $50 every 10 years for a license renewal; and $50 when a vanity call sign is requested. Currently there's no charge for an initial amateur radio license, a 10-year license renewal, or vanity call sign application. The latter prior to September 2015 had a variable fee that reached $21.40 per request that year.

What triggered these possible changes was a provision in a 2018 bill sponsored by House member Marsha Blackburn (R-Tennessee) named the RAY BAUM's Act, an acronym for *Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018*. It was intended as an amendment to the Communications Act of 1934 that created the Federal Communications Commission.

What's being proposed is that ham radio and other services that had been free would now need to pay license fees. Some services will experience fee reductions while others already paying will see increases. The Notice details the current and proposed fees for every communication service. Only government licensees and non-commercial radio/television stations (such as educational stations) are to be fee-exempted, as currently written.

The ARRL is certain to respond to these proposals. Individual operators may file comments via the FCC Electronic Comment Filing System at: http://apps.fcc.gov/ecfs/. ∎

Federal Communications Commission   **FCC 20-116**

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)
	)
Amendment of the Schedule of Application Fees	) MD Docket No. 20-270
Set Forth in Sections 1.1102 through 1.1109 of the	)
Commission's Rules	)

NOTICE OF PROPOSED RULEMAKING

Adopted: August 12, 2020   Released: August 26, 2020

Comments Due: 30 days after Federal Register publication
Reply Comments Due: 45 days after Federal Register publication

By the Commission: Chairman Pai issuing a separate statement; Commissioner Rosenworcel approving in part, dissenting in part, and issuing a separate statement; Commissioner Starks approving in part, dissenting in part.

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Above: Screen shot of FCC Notice of Proposed Rulemaking for fees on various services to cover their respective application costs. Full document at: https://docs.fcc.gov/public/attachments/FCC-20-116A1.pdf

Proposed RPV antenna ordinance makes several changes but...

By Diana Feinberg, AI6DF
PVARC President

The Rancho Palos Verdes Planning Commission's August 25 meeting continued until September 22 further discussion of proposed amendments to the city's non-commercial (amateur) radio antenna code. This continuance followed a second version of the proposed amendments that was issued in the week prior to the August 25 Planning Commission meeting.

Among changes made in the second version are:

♦ Lattice antenna towers (which comprise most of today's amateur radio towers) would be allowed, after having been banned in the initial proposed amendments.
♦ Antenna guy wires (also banned in the initial proposed amendments) would be permitted if they help reduce the visual impact of an antenna structure, i.e., a more slender tower.
♦ The maximum height for a "by-right" no-permit antenna was restored to the current 16' above ground from a proposed reduction to 12'.   A "by-right" roof-mounted antenna can extend up to 12' above a home's roof.
♦ Instead of requiring a costly exact mock-up of the antenna structure certified for safety by a licensed structural engineer for neighborhood review as stated in the original code amendments the revised draft would allow antenna applicants to submit photo simulations of the antenna structure and antenna as they would appear on the property.

Some major problems still in the second draft are requirements to always lower towers to minimum height when not in use (although it's not practical for lift cables to be continually retracted and extended)—and to notify all property owners within a 500' radius for any antenna over 16'. The PVARC Board of Directors believes the existing RPV non-commercial antenna ordinance developed in 1999 has served well in balancing the needs of amateur radio operators, nearby residents, and the city. We urge retention of the current ordinance that resulted from a collaborative effort of several knowledgeable PVARC members residing in Rancho Palos Verdes, the City's Director of Community Development, and resident input.

The latest draft of the proposed antenna ordinance is not on the City's website but is available to interested parties. ∎

Staying informed about Rancho Palos Verdes' proposed non-commercial antenna ordinance

To receive emailed copies of all City staff reports, Planning Commission agendas, and correspondence pertaining to RPV's proposed non-commercial antenna code amendments please send an email to:

Ms. Jaehee Yoon jyoon@rpvca.gov
Associate Planner
City of Rancho Palos Verdes Community Development Department

A suggested email would be:

Dear Ms. Yoon,

Please add me as an Interested Party to all current and future notifications, agendas, staff reports, etc. regarding the Amateur Radio Code Amendment matter under consideration by the Planning Commission.

Thank you.

(Your name and email address)

WSPR—one-way ham radio

(. . . a whisper from beyond the horizon . . . will it be heard?)

By Jerry Kendrick, NG6R

Weak Signal Propagation Reporter (WSPR, pronounced "whisper") is an amateur radio digital application released in 2008 by Joe Taylor, K1JT, co-developer of FT8, FT4, JT65 and several other modes within the WSJT-X suite of amateur radio digital modes. Signals from WSPR beacon transmitters around the world, often emitting very low power (as little as a few milliwatts), are received and reported by other hams around the world. The objective is to map out potential propagation paths that exist on the various amateur bands throughout the day and night. If you have the WSJT-X digital modes suite already downloaded and installed on your desktop or laptop computer attached to your radio, then you too can report hearing the beacon transmitters of other ham stations around the world. This article will focus on receiving and reporting the reception of these beacons. But, it will also demonstrate how to easily and quickly turn one's own HF transmitter into a low-power WSPR beacon. A **QRO** newsletter article in a later issue will discuss how to build a dedicated beacon transmitter so that you can determine how well your own low-power signal is being received by hams around the world and not tie up your main HF transceiver doing so.

Background

WSPR was originally conceived by Nobel Laureate Dr. Joseph Taylor, former Princeton University physics professor and Faculty Dean. A ham operator from an early age, Joe had a strong interest in weak signal detection in which signals are significantly weaker than the ambient noise in which they are embedded, i.e., where signal-to-noise ratio (SNR) is much less than one, or <<0dB. He was intrigued by the notion of passing short messages using non-traditional radio communications methods, such as moon-bounce and meteor scatter, and wanted to exploit making extremely long-distance contacts using very low power transmissions [1].

WSPR was first released in 2008 as a separate stand-alone application. But, in 2015 after FT8, JT65 and other digital modes already had been assembled into a downloadable suite of applications, WSPR was finally included in that suite. The latest version (currently v2.2.2) of the WSJT-X digital modes suite can be downloaded from: https:// physics.princeton.edu/pulsar/K1JT/wsjtx.html [2].

The standard WSPR message is quite simple, just three parts: callsign, 4-character Maidenhead grid square locator and transmitter power level in dBmW. That adds up to 50 bits: 28 allocated to callsign, 15 for locator and 7 for power level. For transmission robustness, a convolutional code for forward error correction is added, turning those 50 bits into 162 bits, including bit redundancy. Those 162 bits are transmitted at the very slow rate of just under 1.5 bits per second—1.4648 bps, to be exact. Modulation of a given ham band's RF carrier is 4-frequency shift keying (4-FSK), meaning that from symbol to symbol the outgoing frequency will shift among four separate frequencies (spaced ~1.5 Hz apart) so the entire signal bandwidth from an individual station is a mere 6 Hz. Hence, a lot of stations can fit into and share the 200 Hz sub-band that is allocated for WSPR on each ham band. Going back to bit rate, 162 bits divided by 1.4648 bps equals 110.6 seconds. Since each transmission takes just under two minutes to complete, cycle time for WSPR transmissions is set to exactly 2 minutes. Transmissions start one second into an even UTC minute, e.g., 23:54:01, then 23:56:01, etc. As in FT8 and other digital modes, an accurate clock is essential (generally <1 second error) [3][4].

While WSPR is most useful on typical "over-the-horizon" HF bands, it has also been used on VHF and UHF bands, most notably for alerting amateurs about the rare occurrence of tropospheric ducting and tropospheric scatter when over-the-horizon communication in these bands is possible [5][6]. Conditions that govern this phenomenon are driven by large-area temperature inversions that occur primarily in late spring and early summer. Ducting paths can form for just a few hours to a week at a time. Inversion thickness determines the frequency most likely to refract [7]. Well-known Hawaiian CW beacon station KH6HME installed WSPR capability on 70 centimeters in 2017 and 2 meters in April 2020 [8]. Stateside VHF/UHF DX enthusiasts monitor that beacon for early warning of when these rare DX opportunities occur.

WSPR—one-way ham radio

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Caveat: Because of WSPR's development history (i.e., standalone app in 2008, but integrated into the WSJT-X suite in 2015), many of the instructions, personal postings and YouTube videos created prior to 2015 are somewhat obsolete or different in appearance relative to the WSJT-X version of WSPR. So, it's important to note the posting dates of materials found on the Internet to avoid confusion and to make sure they're still relevant for your needs.

Getting started—copy and report other hams' beacons

Start by downloading the latest WSJT-X digital modes suite (URL cited above)—unless you're already using this suite for other digital modes such as FT8, FT4 and JT65. Instructions for installing and using the assortment of digital modes in this suite, including WSPR, are available online [9]. This article does not attempt to provide WSJT-X setup instructions, as there are individual decisions to be made related to the operator's radio model, sound card selection, etc. Quick-start guides and detailed manuals are available to ensure successful initial setup. The universal serial bus cabling (or Ethernet connection in the case of Flex Radio) between the radio receiving the WSPR signals and the computer processing the data, as well as any required transmit-enable (PTT) and receive-audio cables, are assumed to be connected and functioning properly. [If not, return to the appropriate manual(s) for troubleshooting instructions.]

Open the WSJT-X suite and position the two display windows to your liking on the computer screen. Since you'll be interested first in determining if you can copy WSPR beacon stations, set the radio on an active band; generally 20m is very active during daylight hours. The receiver dial frequency for 20m is set to exactly 14.095600 MHz. Configure the radio mode to be upper sideband and set bandwidth for 2.5 kHz. (Note: upper sideband is used for WSPR on <u>all</u> bands, not just 20m and higher.) (Note: For Flex radio users, the mode selected is "DIGU," same as for other digital modes like FT8.) In the menu header of the main WSJT-X display window, select Mode as WSPR. Then set the Wide Graph footer section to the parameters shown in Figure 1. (These parameter values work well for WSPR but aren't the best values for FT8, so remember to set them to match the values appropriate for each digital mode [Ref. 9, sections 6.6 and 9]).


Figure 1. Wide Graph footer section in WSJT-X, with parameters specifically selected to properly display WSPR.

Within a few minutes (remember that just one receive cycle takes two minutes), you'll begin to see the Wide Graph region populate with beacon signals, as shown in Figure 2. Each of these vertical lines of width ~6 Hz represents a separate beacon transmission of a little less than 2 minutes in duration. All beacon signals will fall inside the 200 Hz window centered on 1500 Hz in the display. Recall that the radio's upper sideband receive bandwidth has been set to 2500 Hz, so these WSPR signals will fall well inside this band.

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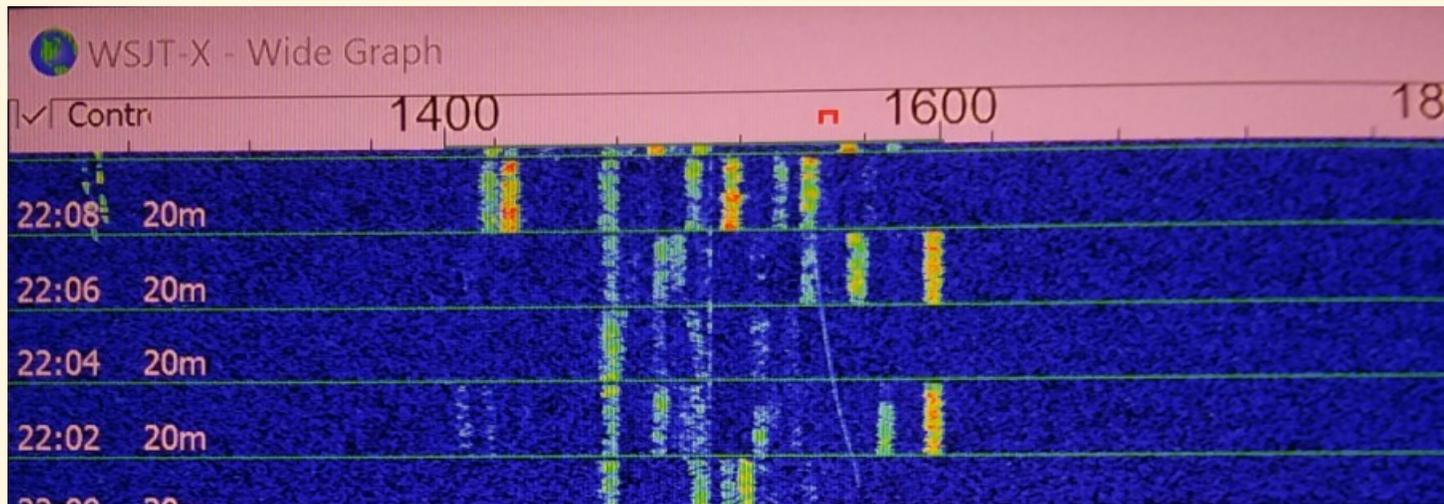
Figure 2. Each vertical segment represents a beacon transmission that lasts for just shy of 2 minutes. Most beacon stations choose to transmit for much less than half the time. (Joe Taylor recommends 20% of the time in transmit mode and 80% in receive mode.) UTC in hh:mm format and ham band are shown on the left side of the window. The little red "inverted u" to the left of 1600 is the transmit frequency indicator that should be set to an unoccupied region in the 200 Hz-wide window in the Wide Graph (to avoid QRM) if it is decided to transmit, not just receive (more about that in the next section).

In addition to seeing the signals displayed in the Wide Graph region, there will be (usually) numerous entries in the main display window, as illustrated in Figure 3.

UTC	dB	DT	Freq	Drift	Call	Grid	dBm	mi
2300	−11	0.1	14.097087	0	VE7BY	CN89	37	1113
2300	−7	0.1	14.097104	−1	KV4PD	EM75	23	1894
2300	−3	0.1	14.097105	2	KB1MVX	EM73	43	1913
2300	−11	0.5	14.097115	−1	KD6RF	EM22	37	1353
2300	−18	0.1	14.097134	0	8P9DH	GK03	37	3954
2300	−10	1.3	14.097147	0	AG5DB	EM15	23	1219
2300	−21	0.1	14.097149	0	KI7DX	DN40	30	616
2300	4	0.2	14.097163	0	K4COD	EM73	37	1913
2300	4	0.2	14.097166	0	KE7A	EM12	37	1238
2300	−6	0.4	14.097181	0	<K9YWO>	EN61FN	30	1759
2300	−10	0.1	14.097197	0	K7GXB	DM34	30	310

Figure 3. Display of just some of the 20m beacon stations heard at UTC 2300 at receiving station NG6R. Like other digital modes such as FT8 and FT4, the "dB" column shows the SNR of each station as calculated by WSJT-X software at receiver station NG6R. "DT" reflects the difference (in seconds) between the clocks of each beacon station and the clock at NG6R. Note the one station (AG5DB) with a DT of 1.3 seconds and yet the signal was decoded even though the timing difference was greater than 1 second. (What isn't known, of course, is how many stations with DT even greater than this value were not decoded.) The receive frequencies are not tied to fixed slots, but instead reflect a choice made by the beacon station operator. Note that although the beacon station at 14.097147 (AG5DB) is only 2 Hz away from the station at 14.097149 (KI7DX) (so that the two stations actually overlap their 6 Hz-wide signal bandwidths), they are still decoded with ease. This speaks highly about the convolutional coding inherent in each signal and the ability of the WSPR decoding algorithm to pull signals not only out of noise but out of digital QRM as well. "Drift" is measured in Hz/minute and is usually a small number like 1 or 2, often zero, as crystal oscillators in modern rigs are quite stable. Recall that the next three parameters: Call, Grid and dBm are data coming directly from the beacon stations' coded messages. Since Tx power is in dBm, a value of 37 represents 5W, 23 represents 200mW, etc. (Recall that 0dBm=1mW, 10dBm=10mW, 20dBm=100mW, 30dBm=1W and 40dBm=10W.) The "mi" column reflects the software's calculation of reporting stations' separation distance based on mean grid square differences from NG6R's QTH, expressed in statute miles.

WSPR—one-way ham radio

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Having successfully received, decoded and displayed numerous WSPR beacon stations, let's now examine the ease with which we can turn our own station into a WSPR transmit beacon.

Create your own transmit beacon station

The procedure for adding transmit capability to our already successful beacon-receive station is very simple. First adjust the radio's transmit power level to a very low setting. There is no output power setting on the Flex radio between zero and one watt, as power settings are only in one-watt increments. So the radio transmit power at station NG6R is set to 1 watt or 30dBm. If your radio permits even lower output power settings, choose a suitably low setting and note the power output, which will be entered into the main WSPR window footer, as discussed below.

With WSJT-X in Mode WSPR, go to the lower left corner of the main display footer and click on the band select window, as illustrated in Figure 4.
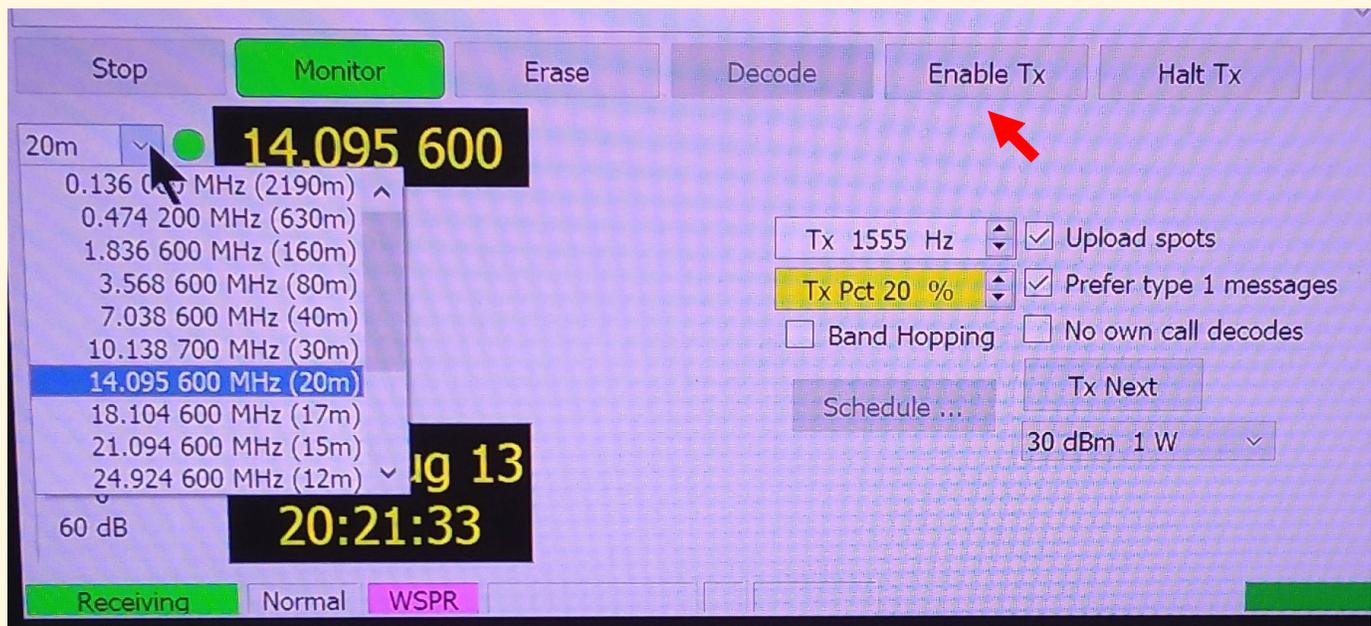
Figure 4. Left portion of WSJT-X main display footer showing band selection window highlighted on the left.

You'll see a standard set of pre-loaded WSPR frequencies for all HF (as well as LF, MF, VHF and UHF) bands. These are the frequencies that are to be dialed into the radio receiver, which is set in upper sideband mode with a 2.5 kHz bandwidth. Note in Figure 4, the 20m frequency of 14.095600 MHz is highlighted.

Now, look at the right side of Figure 4. The "Tx 1555 Hz" indicates that the little red "inverted u" shown in the upper portion of Figure 2 is currently set to 1555 Hz up from the receiver dial frequency of 14.095600 MHz. This is where our transmit signal will be positioned, i.e., 14.095600 + 0.001555 = 14.097155 MHz. This Tx position was chosen to generally stay clear of all other beacons we could see operating in the band at the time. This QRM-avoidance technique will look familiar to experienced FT8 and FT4 users.

For general WSPR operation, the percentage of time spent transmitting should be significantly less than time spent receiving (K1JT recommends 20/80), but this is a parameter than can be set, as shown in Figure 4. Note that NG6R output power is selected from the pull-down menu to be 30dBm or 1W.

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There is just one more step in becoming a WSPR transmit beacon—click on the box in Figure 4 labeled Enable Tx. It will turn red and thus place your transceiver in an "on-the-air" condition for whenever the software algorithm determines it's your turn to transmit. There is a certain amount of seeming "randomness" in which 2-minute interval your transmitter will automatically activate, especially if the percentage of Tx time does not result in a consistent transmit periodicity. But at a Tx Pct setting of 20%, your transmissions should occur generally every fifth 2-minute interval. For the other four 2-minute intervals, your transceiver will operate in receive mode.

Displaying the results

There is another very important feature of WSPR that is actually captured via a separate website called *wsprnet.org* [10]. It has maps with adjustable size and can create a database of reports based on settable parameters. Figure 5 shows a small sampling of WSPR stations that received NG6R's 1-watt transmission at 23:56Z on 11 Aug 2020.

Timestamp	Call	MHz	SNR	Drift	Grid	Pwr	Reporter	RGrid	km	az
2020-08-11 23:56	NG6R	14.097114	-23	0	DM03us	1	WD4ELG	FM06be	3488	74
2020-08-11 23:56	NG6R	14.097132	-23	0	DM03us	1	VA7TZ	DN09fu	1791	357
2020-08-11 23:56	NG6R	14.097128	-20	0	DM03us	1	G8NXD	IO70je	8605	37
2020-08-11 23:56	NG6R	14.097129	-10	0	DM03us	1	WD0E	DM79qm	1375	58
2020-08-11 23:56	NG6R	14.097126	-19	0	DM03us	1	N4AN	EL96wc	3753	93
2020-08-11 23:56	NG6R	14.097144	-25	0	DM03us	1	KG4GUF	EM73us	3128	80

Figure 5. A small sampling of the 70+ worldwide reports posted on *wsprnet.org* after just one 2-minute WSPR transmission by NG6R at 2356Z on 11 Aug 2020. The Flex radio was set for 1 watt output power and the antenna was the hex beam at 30' height pointed toward Europe (35 degrees Az). Note the Great Britain (G8) station at -20dB signal-to-noise relative to a reference 2.5 kHz bandwidth. Since -28dB SNR (sometimes even lower) is possible in WSPR, a power of approximately one-tenth of NG6R's 1-watt output power (i.e., 100mW) might have been reported by this station—Europe on ~100mW!!

Note that the "SNR" values in Figure 5 represent what was reported by the respective receiving stations. How did *wsprnet.org* get these data values? Look back at the right side of Figure 4 and note that the "Upload spots" box is checked. Checking that box means that a WSPR receiving station's data will be continually forwarded via the Internet to *wsprnet.org* for analysis and display.

Another great feature of the *wsprnet.org* website is the availability of maps, which can display stations that you hear, stations that hear you, or both, depending on configurable settings. Figure 6 shows the stations that heard NG6R's 1-watt WSPR signal, late afternoon local, with the 20m antenna generally directed toward the northeast.

Some WSPR users have exploited this propagation reporting asset to compare different antenna configurations or the same antenna under different conditions [11]. In this scenario, "Tx Pct" could be set to 100%, as you would want to acquire the A-versus-B configuration data as quickly as possible. Antenna A (or condition A) would be run for, say, 10 minutes (or even as little as just one 2-minute cycle); then antenna B (or condition B) would be run for the same period of time. Then, count up the number and examine the locations of stations reporting receipt of your signals (complete with SNR levels), and compare them to see which antenna configuration (or condition) is better suited to meet your objectives.

WSPR—one-way ham radio

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Figure 6. Map of the stations copying NG6R emitting only <u>one watt</u> of transmit power in just one 2-minute WSPR transmission. The 20m hex beam antenna was pointed toward Europe at ~5:45PM PDT (0045Z). A glance at this map would suggest that contacts with Europe on other modes (such as FT8, CW, SSB) might be likely.

Summary and conclusions

WSPR (pronounced "whisper") stands for "Weak Signal Propagation Reporter." The WSPR software (within the WSJT-X suite of digital modes) is designed for exploring potential radio propagation paths using low-power beacon-like transmissions. WSPR signals convey a callsign, Maidenhead grid locator, and power level using a compressed data format with strong forward error correction and narrow-band 4-FSK modulation. The protocol is effective for signal-to-noise ratios as low as –28 dB in a 2500 Hz bandwidth. Receiving stations with Internet access can automatically upload reception reports to a central database at *wsprnet.org*. This website provides a simple user interface for querying the database, a mapping facility and many other features.

Besides the advantage of using WSPR to learn which propagation paths might be open for your station as you chase DXCC or WAS or for some other quest, there are other advantages as well. For any sensitivity analysis where changes to your station configuration might have an impact on how your transmitted signal is received by others (or how others' transmitted signals are received by you), this propagation reporting tool can be quite useful. Comparing two antennas for their differences in transmit and/or receive coverage patterns is an example.

The scenarios discussed in this article assumed that the main station HF transceiver was dedicated to WSPR. A future **QRO** article will present details on building a small and inexpensive dedicated WSPR transmitter, eliminating the need to tie up the station's main HF transceiver for WSPR operation.

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References

1. https://en.wikipedia.org/wiki/Joseph_Hooton_Taylor_Jr.

2. https://physics.princeton.edu/pulsar/K1JT/wsjtx.html

3. https://en.wikipedia.org/wiki/WSPR_(amateur_radio_software)

4. https://www.extremetech.com/electronics/297703-wspr-explained-one-way-ham-radio-howto

5. https://en.wikipedia.org/wiki/Tropospheric_propagation

6. https://en.wikipedia.org/wiki/Tropospheric_scatter

7. http://www.dxinfocentre.com/propagation/luf.htm

8. Conversations with Gary, WA6MEM, noted VHF/UHF DX enthusiast

9. http://physics.princeton.edu/pulsar/k1jt/wsjtx-doc/wsjtx-main-2.0.0.html

10. https://wsprnet.org/drupal/wsprnet/map

11. https://www.youtube.com/watch?v=atRUzlvmPPc (early version software before WSPR was integrated into WSJT-X) ■

Solar Minimum Most Likely Occurred in December 2019

From the ARRL website: 08/31/2020

Sunspot Index and Long-Term Solar Observations (SILSO) in Belgium said this month that the minimum between Solar Cycles 24 and 25 "most probably" took place last December. SILSO, a part of the Royal Observatory of Belgium and formerly known as SIDC, cited as evidence the January 2020 increase in the 13-month smoothed sunspot number — the first upswing since the Cycle 24 maximum in April 2014.

"[F]or now, this latest smoothed value in January 2020 is the very first point indicating a rise of the activity. So, the date of the minimum still needs a full confirmation over the coming months," SILSO said on its website. "For now, preliminary smoothed values, limited to less than 13 months, hint at increasing values over coming months. If the rising trend indeed continues, this [December 2019] date will become fully definitive."

SILSO said another indication of the transition between the two solar cycles can be drawn from counting individual sunspot groups that belong to either the old or new solar cycle. "While most sunspot groups belonged to the last solar cycle [Cycle 24] until September 2019, the dominance switched to groups of the new cycle in November 2019," SILSO said.

SILSO said that in terms of the number of active regions, the minimum between Cycle 24 and Cycle 25 falls in October 2019. "This is close to December 2019," SILSO said. It attributes the difference to three factors:

- The sunspot number also takes into account the total number of spots, and thus the size of the emerging active regions.
- The time of the minimum depends on the respective trends of the declining phase of the past cycle, and of the rising phase of the new cycles, over the 12 months surrounding the minimum.
- The date of the minimum has a significant uncertainty range. Near minimum the activity hardly varies and is close to minimum during a few months. "The date of the minimum is thus always less sharply defined than the date of the maximum of the cycles, which are more sharply peaked," SILSO explained.

"This late-breaking upward trend is now expected to accelerate over the coming months," SILSO predicted. "So be prepared for a more eruptive and interesting sun!" ■

PVARC Club News

Become an ARRL member: Support amateur radio while increasing your learning

Please consider joining the American Radio Relay League (ARRL) if not a member. The ARRL is the only national organization representing amateur radio and has another significance for the PVARC: We receive benefits from being an ARRL-affiliated club. But an ARRL-affiliated club requires at least 51% of club members also be ARRL members.

Annual ARRL membership costs $49 and includes your choice of the printed monthly **QST** magazine or the ARRL's new **On The Air** magazine for newer hams. Both are available electronically to all ARRL members plus a new member benefit: free online access to ARRL's two other publications, **QEX** and **National Contest Journal**. Additionally all ARRL members can access numerous web-based materials, ARRL staff, and assistance with ham radio issues. Visit: www.arrl.org/ then click "Join/Renew." ∎

Need a PVARC badge?

Gary Lopes, WA6MEM, has distributed all PVARC badges that were ordered before our transition to virtual meetings in April. If you wish to order a new or replacement badge please contact him at wa6mem@cox.net and he will make arrangements for your payment and sending your new badge. ∎

Embroidered PVARC patches still available

PVARC club patches are still available by special arrangement for $4 each. They may be sewn onto any cap, jacket, shirt, or bag.

The four illustrations in the patch center are emblems of the Palos Verdes Peninsula's four cities (clockwise from top left: Palos Verdes Estates, Rolling Hills Estates, Rancho Palos Verdes and Rolling Hills.)

During our COVID-19 period of virtual meetings if you would like a patch please contact Diana, AI6DF, at ai6df@arrl.net and we'll find a way to get your patch to you. ∎

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Email us: k6pv@arrl.net

Website: www.k6pv.org

Mailing Address:
Palos Verdes Amateur Radio Club
PO Box 2316
Palos Verdes Peninsula, CA 90274-8316

Monthly Meetings:
1st Thursday (except December in 2020) 7:30 pm via Webex at Fred Hesse Park, 29301 Hawthorne Blvd., Rancho Palos Verdes, CA. Visitors always welcome.

Repeaters (Open, though often listed as "Closed"):
  PVARC: K6PV, 447.120 MHz
  • **Analog FM:** (-), PL 100.0, CTCSS
  • **Digital DMR:** 447.120 MHz (RX); 442.120 MHz (TX)
    Talkgroup 31060, Color Code 1, Time Slot 2

  "PV-West": W6MTA, 449.980 MHz (-), PL 173.8, CTCSS

To order a Club badge:
  Gary Lopes, WA6MEM, wa6mem@cox.net

To order a Club jacket or patch:
  Dave Scholler, KG6BPH, 310-373-8166

Front page photo — Pt. Vicente Lighthouse on a late-summer afternoon in September 2019.
PHOTO: DIANA FEINBERG, AI6DF

PVARC Club News

PVARC upcoming dates in 2020

- ◆ **PVARC monthly meetings online via Webex**

  1st Thursday each month, 7:30-9:00 pm, except in December.
  (in-person meetings at Hesse Park's McTaggart Hall will resume when permitted)

- ◆ **PVARC HF Enthusiasts Group meetings online via Webex**

  2nd Saturday each month, 10:00 am to Noon
  (in-person meetings at Palos Verdes Library main branch's Purcell Room will resume when permitted)

- ◆ **PVARC EmComm Interest Group online meetings via Webex**

  3rd Saturday every month, 10:00-11:00 am

- ◆ **Walt Ordway, K1DFO, Technician and General amateur radio license classes at Hesse Park**

  Saturdays, Nov. 7 and 14, 2020; exams, Nov. 21.

- ◆ **Public service events:**

  Palos Verdes Half Marathon-10K-5K, Nov. 21.

- ◆ **PVARC 2020 Holiday Dinner:** Dec. 3 TBA

Non-PVARC Events of Note:

- ◆ **W6TRW Swap Meet is canceled until January 2021**, Northrop Grumman Space Park, North Redondo Beach. ∎

Upcoming amateur radio contests of note:

- ◆ Russian RTTY World-Wide Contest: 0000Z-2359Z, Sept. 5
- ◆ All Asian DX Contest, phone: 0000Z Sept. 5 through 2359Z Sept. 6
- ◆ ARRL VHF Contest, 1800Z Sept. 12 through 0300Z Sept. 14
- ◆ Worked All Europe DX Contest, SSB: 0000Z Sept. 13 through 2359Z Sept. 14
- ◆ CQ World-Wide DX Contest, RTTY: 0000Z Sept. 26 through 2400Z Sept. 27
- ◆ California QSO Party: 1600Z Oct. 3 through 2200Z Oct. 4

WELCOME NEW MEMBERS OF THE PALOS VERDES AMATEUR RADIO CLUB IN 2019-2020

Georgiann Keller, KM6YGM

Annalise Little, KM6YGS

Tim Couture, KM6QWA

Frank Brown, KM6YGQ

Charlie Hansen, AJ6HZ

Diana DiDomenico, KM6IQN

William McClure, W7QLI

Rick Shigio, K6RTS

David Calloway, K6DKC

Jon Kuroyama, K6LDQ

Ray Grace, WA6OWM

Robert Keller, K9BGC

Alex Marko, KD6LPA

Erin Okada, KN6FYV

Derek Okada, K6DMO

Xing Yang, KN6FYX

Stephen Anderson, KN6FZA

Charles Tang, KN6FYY

Ikue Duncan, KN6FYW

Judy Frankel, KN6FYU

Robert Sawyer, KG6SFQ

Heidi Gransar, KN6HVG

Bruce Ward, KN6HVI

David Salazar, KE6GFR

Ed Jenkins, K6EXY

David Hostetler, W6OQ

Robert Rodriguez, KN6FQL

PVARC Calendar

September 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 **PVARC analog weekly net on K6PV repeater** **7:30-7:55 pm**	2 **PVARC digital DMR weekly net on K6PV repeater** **7:30-7:55 pm**	3 **PVARC Monthly Meeting** **7:30-9:00 pm via Webex**	4	5
6	7	8 **PVARC analog weekly net on K6PV repeater** **7:30-7:55 pm**	9 **PVARC digital DMR weekly net on K6PV repeater** **7:30-7:55 pm**	10	11	12 **PVARC HF Enthusiasts Group, 10 am to Noon via Webex**
13	14	15 **PVARC analog weekly net on K6PV repeater** **7:30-7:55 pm**	16 **PVARC digital DMR weekly net on K6PV repeater** **7:30-7:55 pm**	17	18	19 **PVARC EmComm Interest Group, 10:00-11:00 am via Webex**
20	21	22 **PVARC analog weekly net on K6PV repeater** **7:30-7:55 pm**	23 **PVARC digital DMR weekly net on K6PV repeater** **7:30-7:55 pm**	24	25	26
27	28	29 **PVARC analog weekly net on K6PV repeater** **7:30-7:55 pm**	30 **PVARC digital DMR weekly net on K6PV repeater** **7:30-7:55 pm**			

Please tell your friends and family about our November 2020 classes scheduled at Hesse Park.

<u>Two Free Amateur Radio Courses</u>

FCC <u>**"Technician"**</u> course (entry level)
FCC <u>**"General"**</u> course (2nd level)
<u>Each course is 2 sessions</u>
<u>The sessions</u> will be on 7 and 14 November 2020
<u>**Technician**</u> 9:30 AM to 1:30 PM both Saturdays (bring your lunch)
<u>**General**</u> 1:45 PM to 5:00 PM both Saturdays
The FCC tests will be 10:00 AM to noon on 21 November 2020

At the start of the 7 November Technician course, a member of the Palos Verdes Amateur Radio Club will give a 30 minute presentation on how to get further involved with amateur radio.

The class location is at Fred Hesse Community Park,
29301 Hawthorne Blvd., Rancho Palos Verdes, CA 90275
Confirm your attendance to Walt, K1DFO at waltordway@juno.com

There is <u>no fee</u> for either course.
Taking the FCC test is $15.

<u>Optional Material (sold at cost)</u>
Gordon West books with all the FCC test questions,
$26 for the Technician and $26 for the General
Paper copy of Walt's Power Point charts,
$22 for the Technician and $20 for the General

For courses sponsored by the Palos Verdes Amateur Radio Club, students thru grade 12 who pass their examination at a PVARC VE test session will, upon application to the Club, be eligible for reimbursement up to a maximum of $50 to cover the cost of materials and the examination fee.

Everyone who obtains their first ham radio license through a PVARC VE test session, regardless of age, will receive a free membership in the Palos Verdes Amateur Radio Club for the remainder of the current calendar year.

Palos Verdes Amateur Radio Club
P.O. Box 2316
Palos Verdes Peninsula, CA 90274
www.k6pv.org

NEW MEMBER & 2020
MEMBERSHIP RENEWAL FORM

NEW: _____ or RENEWAL: _____ MEMBERSHIP   **DATE: _____**

Last Name: _____ First Name: _____Spouse: _____

Street Address: _____

City: _____ Zip: _____

Phone: Home _____ Work _____Cell_____

Email address: _____
(Unless otherwise noted emails will be sent to the applying member only)

License Call: _____ License Class: _____ARRL Member?____Birth Mo./Day: _____

Other amateur radio groups you belong to:_____

Additional Household and/or Family Members (if Applicable):

Name_____ Call _____ Class_____ ARRL____ Birth Mo./Day: _____

Name_____ Call _____ Class_____ ARRL____ Birth Mo./Day: _____

Name_____ Call _____ Class_____ ARRL____ Birth Mo./Day: _____

Individual membership ($20.00) $_____

Household and/or Family membership ($25.00) $_____

Additional donation to support PVARC activities $_____

PayPal:_____Cash: _____ or Check #: _____ Date_____ TOTAL $_____

Please make checks payable to: Palos Verdes Amateur Radio Club; Dues based on January 1ˢᵗ to December 31ˢᵗ year.

PayPal payment: Go to www.paypal.com, enter recipient name: PVARC90274@gmail.com

All New and Renewal Member applications must be signed below.

I am applying for a new or renewal membership in the Palos Verdes Amateur Radio Club and understand that by accepting membership I agree to abide by the Club's constitution and by-laws (available on-line at: http://www.k6pv.org or upon request.)

Signature:_____ Date: _____

Family Member Signature: _____ Date: _____

Family Member Signature: _____ Date: _____