

VACAVILLE, CALIFORNIA

# VACA VALLEY RADIO CLUB

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January 2010

## President's Message

Happy New Year to you all. With this New Year comes an increase in sunspot numbers, and soon we'll be hearing the sweet sound of "CQ DX."

There has been a change in leadership for 2010. The new President is me Scott Joseph KI6YYZ and the new Vice President is Kim Ware KI6JNX.

The events planned are Field Day and Merriment on Main so far, but suggestions are welcomed for participation in other events. If you have any ideas or suggestions please bring them up at the meetings or to me directly at [ki6yyz@arrl.net](mailto:ki6yyz@arrl.net).

I'm hoping that we can have a ham radio related demonstration or operating activity each month. For example, at this month's meeting, I will be demonstrating the digital mode PSK31.

If anyone would like to facilitate a construction project, I'm sure that most members would be willing to fire up the soldering iron. Are there any QRP, home brew, or satellite enthusiasts out there? If so, let's here from you!

How many would like to have a slow CW net once a month to brush up on CW sending and receiving skills? Until sunspot cycle 24 is in full swing (estimated for 2012) the best bet for DX QSO's is CW.

It's time to pay your 2010 membership dues of \$20. Please see Bob Hewitt, K6HEW, to get up to date.

I have a challenge for everyone in the club. Get upgraded one level this year. If you a Technician, advance to General. If your a General, advance to Extra. If your an Extra, encourage someone to join our hobby and get licensed. Good luck to all.

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That's all I have for now. I look forward to seeing you at the next meeting, 13 January at the Vine Street Fire House in Vacaville.

Business meeting starts at 7:00 PM and the general meeting starts at 7:30 PM.

73 for now,

Scott KI6YYZ

*Editor's Tip—Go to YouTube and review PSK31 videos prior to the demonstration. There are several excellent videos to choose from.*

## Around the Radio Shack

By Jerry Olive, KD6WKY

One thing about amateur radio that I like is that there is always something to do be it on the air or tinkering around in the radio shack. You would think the Holiday Season would slow down activities to a stop with all the personal activities most people have to do. To some extent that's true up; up through mid-month there are a few contest, then it all stops until the New Year.

At the beginning of December the ARRL 1Ø meter contest takes place. In the past few years this contest has been pretty slow being that the sun spot activity has been near zero. This it I noticed a slight increase in QSO's and at a greater distance.

This is a casual contest, not a 24 hour-but-in-chair operation. 1Ø meters is only open during daylight hours, right? I had some help this year, Scott KI6YYZ and I teamed up to run a Multi-Operator, Low Power, Single Transceiver category operation. We took turns on the radio next to the Christmas Tree working primarily California stations but has a few inland into Montana and Colorado, nothing east of the Rockies.

In the end we worked a total of 51 stations over the weekend in between whatever else we had going on over the weekend.

Last contest of the year for me, and a good one.

I also worked eight stations on New Year's Eve as a participant in Straight Key Night, that was fun. SKN is suppose

to be casual and not a quick back and forth. For some reason this year nobody wanted to talk, all they wanted to do was make the contact and move on. Not sure why, but maybe too much cheer on New Year's Eve?

We've had a nice couple of weeks on continuous sun spot activity so maybe this is the beginning of an up tick in cycle 24. Time will tell.

### Dues are Due

Club dues are now \$20 per year beginning now. Please come to the meeting prepared to bring your dues current.

We also collect *QST* subscriptions during January for those interested in the club discount of \$2. Normally your annual subscription is \$39 per year, but we send in subscription money as a club and enjoy a \$37 annual subscription fee because of your membership in VVRC. Woohoo!

### Club to Club Sked

I have contacted the W6LIE Kern County Central Valley Amateur Radio Club to see if we can set up a schedule during club meetings. W6LIE meets the same days and times as W6VVR.

This month we have a PSK31 demonstration on the program. As an example if W6LIE could meet us on 4Ø meters, both clubs could use the same demo during our meetings.

Another possibility is to set up a sked for IRLP during a club meeting. Do you see the possibilities?

I'll keep you informed on my progress.

### VACA VALLEY RADIO CLUB—2010 ELECTED OFFICERS

President: Scott Joseph, KI6YYZ  
 Vice President: Kim Ware, KI6JNX  
 Secretary: Jerry Olive, KD6WKY  
 Treasurer: Bob Hewitt, K6HEW

### BOARD OF DIRECTORS

Director: Mike Vieira, W6MAV  
 Director: Chris Jones, KD7TQO  
 Director: Antonio Del Rio, N6ZGB  
 Director: Glen Mitchell W6JLX

### APPOINTED POSITIONS

Net Control Chairperson: Kim Ware, KI6JNX  
 Activities Chairperson: Board of Directors  
 Newsletter Editor: Jerry Olive, KD6WKY  
 Newsletter Publisher & Distributor: Bob Hewitt, K6HEW

## 2009 Sees Surge of New Amateur Radio Licensees

This past year was a banner year for new Amateur Radio licensees. According to [ARRL VEC](#) Manager Maria Somma, AB1FM, the FCC issued more than 30,000 new ham radio licenses. "In 2009, the demand for Amateur Radio exam sessions remained elevated and is still running at a higher rate than before the FCC's restructuring of the license requirements in 2007," Somma said. "This high level of exam session activity has produced an elevated influx of new applications, far outpacing recent years."

A total of 30,144 new licenses were granted in 2009, an increase of almost 7.5 percent from 2008. In 2005, 16,368 new hams joined Amateur Radio's ranks; just five years later, that number had increased by almost 14,000 -- a whopping 84 percent! The ARRL VEC is one of 14 VECs who administer Amateur Radio license exams.

"When looking at the statistics over the last 10 years, these are some of the highest numbers we've seen," Somma explained. "Additionally, our total number of licensees across all three classes has grown each year." Currently there are 682,500 licensed Amateur Radio operators in the US, an almost 3 percent rise over 2008. In 2008, there were 663,500 licensed amateurs; there were 655,800 in 2007. Broken down by license class, at the end of 2009 there were 17,084 Novices, 334,245 Technicians, 150,970 Generals, 60,795 Advanced and 119,403 Amateur Extra licensees.

"The ARRL VEC has been busy meeting the needs of the Amateur Radio community by helping people to become radio amateurs or upgrade their existing licenses," Somma said. "In 2009, ARRL VEs administered 44,595 exam elements at 6369 [ARRL VEC-sponsored exam sessions](#). The number of amateurs who want to be Volunteer Examiners and who want to teach Amateur Radio classes is also going up -- we've seen a spike in the number of applications from General and Extra class radio amateurs who want to give back to their community by [serving as ARRL examiners](#) and instructors."

NEW FCC LICENSES					
ISSUED 2005 THROUGH 2009					
Year	2005	2006	2007	2008	2009
Jan	876	1,274	1,647	1,755	1,960
Feb	1,357	1,605	2,435	2,998	2,263
Mar	1,705	2,531	3,478	2,816	3,463
Apr	1,486	1,728	2,673	3,090	3,430
May	1,651	2,283	2,607	2,562	2,717
Jun	1,493	1,967	2,281	2,402	3,011
Jul	906	1,401	1,786	2,077	2,220
Aug	1,500	1,623	2,183	2,084	2,102
Sep	1,139	1,357	1,462	1,763	2,116
Oct	1,385	1,781	2,109	2,303	2,404
Nov	1,540	1,993	2,132	2,197	2,344
Dec	1,330	1,569	1,935	2,019	2,114
Totals	16,368	21,112	26,728	28,066	30,144

Somma applauded all the volunteers whose "hard work and contribution of countless hours of time helps to ensure the future of Amateur Radio. The ARRL VEC thanks our 32,411 VEs from around the world whose dedication and service helped to contribute to the success of Amateur Radio. I am delighted by these important achievements. 2009 was a very good year for Amateur Radio and I am excited by the promise of 2010."

## Introduction to PSK31

PSK31 is a digital communications mode which is intended for live keyboard-to-keyboard conversations, similar to radioteletype. Its data rate is 31.25 bauds (about 50 word-per-minute), and its narrow bandwidth (approximately 60 Hz at -26 dB) reduces its susceptibility to noise. PSK31's ITU emission designator is 60H0J2B. It uses BPSK modulation without error correction or QPSK modulation with error correction (convolutional encoding and Viterbi decoding). In order to eliminate splatter from the phase-reversals inherent to PSK, the output is cosine-filtered before reaching the transmitter audio input. PSK31 is readily monitored and the most popular implementation uses DSP software running on a computer soundcard inside an IBM PC-compatible computer.

There is a preamble at the start of each transmission and a postamble at the end. The preamble is an idle signal of continuous zeroes, corresponding to continuous phase reversals at the symbol rate of 31.25 reversals/second. The postamble is just continuous unmodulated carrier, representing a series of logical ones. This makes it possible to use the presence or absence of the reversals to squelch the decoder so that the screen doesn't fill with noise when there is no signal.

Different characters are represented by a variable-length combination of bits called Varicode. Because shorter bit-lengths are used for the more common letters, Varicode improves efficiency in terms of the average character duration. Varicode is also self-synchronizing: No separate process is needed to define where one character ends and the next begins, since the pattern used to represent a gap between two characters (at least two consecutive zeroes) never occurs in a character. Because no Varicode characters can begin or end with a zero, the shortest character is a single one by itself. The next is 11, then 101, 111, 1011, and 1101, but not 10, 100, or 1000 (because they end with zeroes), and not 1001 (since it contains two consecutive zeros). This scheme generates the 128-character ASCII set with ten bits.

The Varicode character set is shown following, starting with NUL and ending with DEL. The codes are transmitted left bit

### THE VVRC WELCOMES YOU

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**Wheelchair accessible**

first, with 0 representing a phase reversal on BPSK and 1 representing a steady carrier. A minimum of two zeros is inserted between characters. Some implementations may not handle all the codes below 32. Note that the lower case letters have the shortest patterns and so are the fastest to transmit.

The QPSK mode reduces the error-rate while keeping the bandwidth and the traffic speed the same. There is a 3-dB SNR penalty with QPSK, because the same transmitter power is being shared by twice the signals. Therefore, the error-correction scheme has to be at least good enough to correct the extra errors which result from the 3 dB SNR penalty, and preferably a lot more, or it will not be worth doing. By doing simulations in a computer, and tests on the bench with a noise generator, it has been found that when the bit error-rate is less than 1% with BPSK, it is much better than 1% with QPSK and error-reduction, but when the BER is worse than 1% on BPSK, the QPSK mode is actually worse than BPSK. Therefore, if we are dealing with radio paths where the signal is just simply very noisy, there is actually no advantage to QPSK at all!

On-the-air testing shows that QPSK with the convolutional coding for error-reduction is usually better than BPSK, except where the signal was deliberately attenuated to make it artificially weak. Typical radio circuits are far from being non-fading with white noise. Typical radio paths have errors in bursts rather than randomly spread, and error-reduction schemes can give useful benefits in this situation in a way that cannot be achieved by anything which can be done in the linear part of the signal path. With the convolutional coding used in PSK31, a 5:1 improvement is typical, but it does depend on the kind of path being used. There may be times when one mode works better than the other, and other times when the reverse will be the case. The switch between straight BPSK and error-corrected QPSK modes in PSK31 is done with both the bandwidth and the data-rate remaining the same. Contacts tend to start on BPSK and change to QPSK if both stations agree. Although both stations have to be using the same sideband in QPSK, it doesn't matter for BPSK.

Convolutional coding is used to reduce errors in the QPSK mode. In a convolutional code, the characters are converted to a bitstream and then this bitstream is itself processed to add the error-reduction qualities. Since the convolutional code used in PSK31 doubles the number of data bits, it is a natural choice for the QPSK mode which provides double the bit-rate available with BPSK. The convolutional encoder generates one of the four phase-shifts, not from each data bit to be sent, but from a sequence of them. This means that each bit is effectively spread

Visit the Repeater online courtesy of Bob K6HEW at:  
<http://www.jcis.net/~hewbob/vvrc>  
 Club repeater in Vacaville: W6VVR 145.470 MHz(-) PL 127.3

The W6VVR net call is Tuesday evenings at 7pm on the club repeater. All are invited to participate in this weekly meeting on the air. 73!

Additional local repeaters  
 WV6F 224.200(-) WV6F 440.025(+) PL 127.3  
 W6OMF Repeater 224.540 MHz, PL 118.8 Hz

out in time, intertwined with earlier and later bits in a precise way. The more spread out, the better will be the ability of the code to correct bursts of noise, but too great a spread would introduce an excessive transmission delay. A time spread of 5 bits was chosen.

It is not quite correct to refer to the convolutional code system as error-correcting since the raw data is not actually transmitted in its original form and therefore it makes no sense to talk about it being corrupted by the link and corrected in the decoder. In PSK31, the raw data is transformed from binary (1 of 2) to quaternary (1 of 4) in such a way that there is a precisely known pattern in the sequence of quaternary symbols. In the code used in PSK31, each quaternary symbol transmitted is derived from a run of 5 consecutive data bits. This means that each binary bit to be transmitted generates a 5-symbol sequence, overlapping with the sequences from adjacent bits, in a predictable way which the receiver can use to estimate the correct sequence even in the presence of corruptions in parts of the sequence.

Viterbi decoding is used on the receiving side. It consists of a whole bank of parallel encoders, each fed with one possible guess at the transmitted data sequence. The outputs of these parallel encoders are all compared with the received symbol stream. Each time a new symbol is received, the encoders need to add an extra bit to their sequence guesses and consider that the new bit might be a 0 or a 1. This doubles the number of sequence guesses, but a clever technique allows half of all the guessed sequences to be discarded as being less likely than the other half, and this means that the number of guesses being tracked stays constant. After a large number of symbols have been received, the chances of a wrong guess at the first symbol tends to zero, so the decoder can be pretty sure that the first bit was right and it can be fed to the output. In practice this means that the decoder always outputs decoded data bits some time after they have been received. The one-way delay in PSK31 is 25 bits (800 ms) which is long enough to make sure that the decoder has done a good job, but not so long that it introduces an unacceptable delay in displaying the received text.

The official PSK31 Web site is <http://aintel.bi.ehu.es/psk31.html>, operated by Eduardo Jacob, EA2BAJ. The PSK31 software program may be downloaded from this site.

Steve Ford, WB8IMY, [PSK31--Has RTTY's Replacement Arrived?](#) *QST*, May 1999, pp 41-41.

Peter Martinez, G3PLX, [PSK31: A New Radio-Teletype Mode](#), *Radio Communication*, December 1998 and January 1999.

[PSK31 Gets Raves](#), *The ARRL Letter*, Vol. 18, No. 7, February 12, 1999.

## ACKNOWLEDGEMENT

This technical description was prepared by Steven L Karty, N5SK.

## Top 10 Ham Radio Websites

By Stan Horzempa, WAILOU

In the [May 2004 issue of QST](#), I wrote about the Top 20 ham radio-related Web sites and I thought it would be interesting to see how that list compares with the Top 10 list of today.

As I wrote back in 2004, this is an unscientific study using a variety of search engines. Also, I excluded the Web sites of various ham radio hardware and software manufacturers and dealers, despite the fact that these sites are popular -- but you and I already know who they are and how to find them.

Back in 2004, I also excluded the Web sites of foreign ham radio organizations because the primary audience of *QST* lives in the US and I excluded local ham radio organizations because the primary audience of *QST* lives throughout the US. Although the audience of the ARRL Web site may be more international than *QST* circa 2004, I am going to continue to exclude those Web sites to make the 2004 versus 2009 comparison fairer.

Here is the 2009 Top 10 Ham Radio Web Sites List:

1. ARRLWeb: The [ARRL Home Page](#) 'twas Number 1 in 2004, too.
2. [Amateur Radio on Wikipedia](#), the free encyclopedia, was not on the list in 2004.
3. The ARRL's [Welcome to the World of Ham Radio](#) is another newcomer to the Top 10 List.
4. [CQ Amateur Radio Magazine](#) was a no-show in 2004.
5. The [qrz.com Call Sign Database](#) was Number 3 in 2004.
6. [Amateur Radio Web Ring](#) did not move; it was Number 6 in 2004.
7. [AC6V's Amateur Radio and DX Reference Guide](#) was Number 5 in 2004.
8. [eHam.net](#) was Number 7 on the 2004 list.
9. [Amateur Radio on 101science.com](#) is a newbie on the Top 10 List.
10. [FCC: Wireless Services: Amateur Radio Service: Amateur Home](#) was among the missing in '04.

Falling off the 2004 Top Ten List were #2 [Ham Radio Online](#), #4 [AMSAT](#), #8, [IARUWeb](#), #9 [Amateur Radio Newslines](#) and #10, [mods.dk](#).

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## University Researchers Need Your Help as they Study Early Amateur Station Logs

Researchers at the [University of Wisconsin](#) and [Miami University of Ohio](#) are seeking copies of amateur station logs from 1913-1927 in hopes they may offer insights into the relationship between individuals' work and leisure activities, technology, and their social networks.

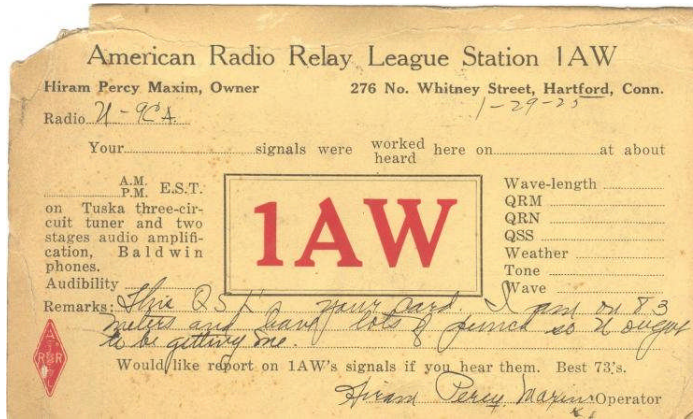
"Early hams laid the foundation for the now-ubiquitous use of technology for communications and entertainment," said Director of Engineering and Operations for Wisconsin Public Radio Steve Johnston, WD8DAS. "Many operators did not work in a technical field, but pursued Amateur Radio as a hobby for its own sake. This is a true success story about how a pastime can develop into an entirely new commercial and social phenomenon."

began to more carefully document the new communications era.

"Amateur Radio operators during this time period were on the forefront of a new method of communication and social interaction, similar to how social media is evolving today," Kim said. "We notice a lot of similarities between these two groups, even across time."

Steve Lippmann, an Assistant Professor at Miami University of Ohio, concurred: "We can learn a lot about ourselves -- and our own interactions -- from how these pioneers pursued their hobby and expanded their social networks."

In an effort to uncover new information about approaches to work and leisure time and the development of social networks, Kim, Lippmann and Johnston are comparing early ham licensing records from the Department of Commerce with detailed information in amateur operators' station logs. If you happen to have an old ham station log from the period (1913-1927) that you would like to include in this study, please contact Steve Johnston, WD8DAS, via e-mail or by telephone at (608) 262-5584.



Phil Kim, an Assistant Professor at the Wisconsin School of Business, has noted that diaries, letters, QSL cards and station logs can contain valuable insights into the link between an individual's occupation, hobbies and friends. Early in Amateur Radio history, thousands of ham radio enthusiasts were licensed by the government to comply with the Radio Act of 1912, and

**Happy New Year!**



PLEASE RENEW YOUR MEMBERSHIP

**VACA VALLEY RADIO CLUB, INC.**  
MEMBERSHIP APPLICATION / RENEWAL FORM

Please Print & Fill in Completely

Dues are delinquent January 1st

Name: _____ Call Sign _____	MEMBER Dues -----\$20.00 _____
Street: _____	Each Family Member ---\$ 2.00 _____
City: _____ Zip: _____	Student -----\$ 5.00 _____
Phone: (____) _____ - _____ OK to Publish?(____)	Repeater/Autopatch donation--- _____
License Class: _____ ARRL Member?(____)	Call/Name badge -----\$10.00 _____
E-Mail Address _____	Optional ARRL membership
<b>FAMILY Member (Spouse or Children)</b>	ARRL dues-----\$37.00 _____
Name: _____ Call Sign _____	ARRL dues (Senior) -----\$34.00 _____
License Class: _____ ARRL Member?(____)	Senior is 65 yr or older with one time proof on age.
Name: _____ Call Sign _____	Total----- _____
License Class: _____ ARRL Member?(____)	Paid by CASH: _____ Check # _____

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