

K6YQT

PAARA NEWSLETTER  
VOLUME 49 NUMBER 12 December 2000

W6OTX

# PAARAGraphs



Celebrating 63 years as an *active* ham radio club—*Since 1937*  
Newsletter for the Palo Alto Amateur Radio Association, Inc.



## CALENDAR



- Dec.....1, PAARA Meeting, 7:30  
Menlo Park Recreation Center  
700 Alma Street, Menlo Park
- Dec.....6, PAARA Board Meeting, 7:30  
Red Cross Bld., 400 Mitchell Ln., Palo Alto
- Jan.....5, PAARA Meeting, 7:30
- Jan.....10, PAARA Board Meeting, 7:30
- Feb.....2, PAARA Meeting, 7:30
- Feb.....7, PAARA Board Meeting, 7:30

2 m CODE PRACTICE, 2000 to 2030 PST Tues  
N6NFI 145.23 repeater  
Also try 7.100 for 24 hr code  
practice



## PROGRAM

December 1, 2000  
7:30 P.M.

### “Eric Swartz, WA6HHQ -Elecraft ”

“How I rejuvenated my interest in Hamradio by starting a radio kit company. Featuring the new Elecraft K1 and K2 kit radios.”

Join us for pre-meeting eyeball

6 pm—at Su Hong Restaurant , 1039 El Camino Real, Menlo Park

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—PAARA Radio NET every Monday evening at 8:30 P.M., local time—  
on the 145.230 -600 MHz repeater, PL tone off

## Board of Directors Meeting

November 8, 2000  
Red Cross Bldg, Palo Alto

Before our meeting, I met with Rich, KD6WYK, Red Cross Communications Officer (Palo Alto Chapter) & we discussed PAARA participation and use of the Red Cross Station, their multi-mode & -band station with HF tri -bander, etc. as well as our interfacing w/ Xerox's emergency comm van for ARES and RACES.

Anyone interested in hamming with the Red Cross station so we can be better prepared for The Big One, having fun w/ HF and furthering our good rapport with the Red Cross can let me know & we'll get the show on the road.

7:45 P.M. and quorum was obtained. Andreas, N6NU, took roll by passing around his notebook & we signed in. We discussed elections and candidates after realizing we'd have to continue without knowing whom our (U.S.) president-elect was. (That was a coincidence, not a non sequitur). PAARA officers need electing, too. I reiterated that I'm available for this secretary business next year, again. Last year I was appointed to an unfilled position, required by law of any corporation not-for-profit, as we are. Anyway, the search is on for candidates for we need four directors as Charlie, WD6FAF, and Doug, K1DIT, need replacement due to expiration of term and change of QTH, respectively.

Jon, AD6FX, tended his resignation as VP and nominated himself as a candidate for Director.

Discussion ensued re VP recruitment, the qualities and likelihood of various members and a recruiting team spontaneously formed and listed the unusual suspects. This Board of Directors stuff is fun and useful, fulfilling, rewarding and inexpensive. I recommend it!

The VP's main responsibilities include monthly club meeting speaker recruitment (we generated six potential next-speakers in two minutes discussion) and follow up to assure the speaker's showing and the like. Also, the VP controls the Monday night net. That job is Rewarding (I speak from experience as a net control operator!) Net control Operators acquire a “presence”, a sense of purpose, poise, confidence and Competence (just as Jon.)

The Treasurer, Bob, KD6KYT, gave a detailed report of  
(Continued on page 112) Board of Directors

# Miscellaneous Dates

**Flea Market at Foothill** (info at: <http://joslin.com/FleaMarket>)

**PAARA** Palo Alto Amateur Radio Association

meets 1st Friday 7:30 each month, Net 145.230 each Monday 8:30,  
contact: Andreas Junge N6NU.....(650) 233 0843

**EMARC** Electronics Museum Amateur Radio Club

meets 4th Friday 7:30 each month,  
contact: Sheldon Edelman 650-858-2176, [Edelman@richochet.net](mailto:Edelman@richochet.net)

**NCDXC** Northern California DX Club

meets 2nd Friday 7:30 each month, repeater for member info 147.360, Thur 8:00PM,  
contact: Bob Mammarella KB6FEC 408 729 1544.

**NorCalQRP** Northern California QRP Club

meets 1st Sunday each month,  
contact: Jim Cates 3241 Eastwood Rd., Sacramento, CA 95821.

**Perham Foundation**,

contact: Jerry Tucker N6NV 650-961-3266

**SPECS** Southern Peninsula Emergency Communication System

meets each Monday 8:00PM on Net 145.27, 440.80 MHz, [www.specsnet.org](http://www.specsnet.org)  
contact: Tom Cascone, KF6WZ, 650-688-0441, [spec@svpal.org](mailto:spec@svpal.org)

**SCARES** South County Amateur Radio Emergency Service

meets 3rd Thursday 7:30 each month, San Carlos City Hall.  
Net is on 144.45 & 444.50 (PL-100) 7:30 Monday evenings.  
contact:

**SCCARA** Santa Clara County Amateur Radio Association

Operates W6UU repeater 146.385+ Nets: 2m, W6UU, 7:30 Mon; 10m,  
28.385, 8:00 Thur. meets 2nd Mon each month.  
contact: Jack Ruckman AC6FU

**SVECS** Silicon Valley Emergency Communications

Operates WB6ADZ repeater (146.115 MHz+)  
contact: Lon Stierer WA6QYS 408 241 7999

**WVARA West** Valley Amateur Radio Association

operates W6PIY repeater 147.39+, 223.96, 441.875, 1286.2  
meets 3rd Wed every month.  
contact: Glen Lokke Jr. KE6NBO at 408 971 8626, or [glokke@pacbell.net](mailto:glokke@pacbell.net)

**Disaster Services,**

**PALO ALTO CHAPTER**, American Red Cross

Meets 3rd Wed. each month 7:30PM,  
HF, packet, BBS, ATV, OSCAR Gateway, NASA satellite,  
contact: Alan Ball 650-688-0423.

**SAN JOSE CHAPTER**, American Red Cross

contact: Scott Hensley KB6UOO, 408 249 7093, [sh@richochet.net](mailto:sh@richochet.net)

**VE Exams**, 3rd Saturday each month, 11AM, 145.23- PL=100Hz

American Legion Hall, 651 El Camino Real, R.C.  
contact: Al Montoya at [WB6IMX@worldnet.att.net](mailto:WB6IMX@worldnet.att.net)

## Contest Calendar

~Vic Black, AB6SO~

(for rules and exchanges, see [www.contesting.com](http://www.contesting.com))

### December Contests

- 1-3 ARRL 160-Meter Contest 2200Z, Dec 1 - 1600Z, Dec 3
- 2,3 TARA RTTY Sprint 1800Z, Dec 2 - 0200Z, Dec 3
- 3 QRP ARCI Holiday Spirits Sprint 2000Z - 2400Z, Dec 3
- 9-10 ARRL 10-Meter Contest 0000Z, Dec 9 - 2400Z, Dec 10
- 15 AGB Party Contest 2000Z - 2200Z, Dec 15
- 16 OK DX RTTY Contest 0000Z - 2400Z, Dec 16
- 16-17 Croatian CW Contest 1400Z, Dec 16 - 1400Z, Dec 17
- 26 DARC Christmas Contest 0830Z - 1059Z, Dec 26
- 26 2000 6m Activity Contest 1800Z - 2200Z, Dec 26
- 30 RAC Winter Contest 0000Z - 2400Z, Dec 30
- 30-31 Stew Perry Topband Challenge 1500Z, Dec 30 - 1500Z, Dec 31

## Palo Alto Amateur Radio Association, Inc.

### PO Box 911

### Menlo Park, CA 94026

President	Andreas Junge N6NU.....(650) 233 0843 <a href="mailto:n6nu@arrl.net">n6nu@arrl.net</a>
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W6OTX Station Trustee	Fred Canham, K6YT .....	(650) 948 9238
K6YQT Station Trustee	Gerry Tucker, WA6LNV.....(650) 326 4908	
Property	Gerry Tucker, N6NV .....	(650) 326 4908
Badges	Don Trask, KF6JMQ.....(408) 251 6494	
ARES Officer	Lily Anne Hillis, N6PGM .....	(650) 325 5484
Club Historian	Steve Stuntz, K6FS.....(650) 322 4952	
Advertising	Bob Korte, KD6KYT.....(650) 595 1842	
Webmaster	Andreas Junge AD6FQ.....(650) 233 0843 <a href="mailto:n6nu@arrl.net">n6nu@arrl.net</a>	

### Board of Directors

Charles Grandjean, WD6FAF	(408) 739 5185 '00 <a href="mailto:wd6faf@webtv.net">wd6faf@webtv.net</a>
Doug Schliebus, K1DIT	(650) 851 0727 '00 <a href="mailto:schliebus@aol.com">schliebus@aol.com</a>
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Joel Wilhite, KA7TXV	(650) 325 8239 '01 <a href="mailto:ka7txv@qsl.net">ka7txv@qsl.net</a>
Gerry Tucker, N6NV	(650) 326 4908 '01 (see "Calendar" for Board meeting times, visitors welcome)

### PAARAGraphs Staff

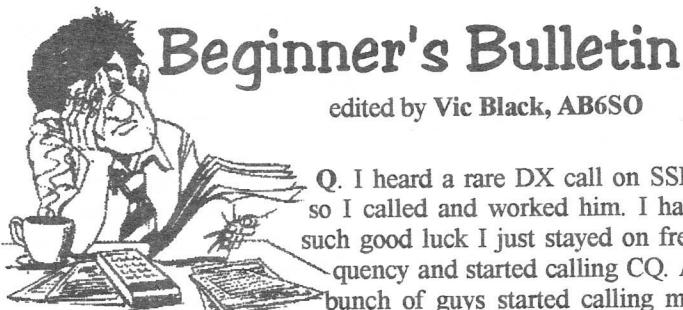
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**PAARAGraphs e-mail address:** [k6uro@arrl.net](mailto:k6uro@arrl.net)

Submit material for PAARAGraphs by the 15th

PAARA Website <http://www.qsl.net/paara/>





## Beginner's Bulletin

edited by Vic Black, AB6SO

**Q.** I heard a rare DX call on SSB so I called and worked him. I had such good luck I just stayed on frequency and started calling CQ. A bunch of guys started calling me "lid". What's up?

**A.** After contacting a desirable station, you should move off frequency to allow others to call that same station. You're unlikely to get calls from anyone else on that frequency since everyone else wants to work the same station you just worked. You aren't rare so they don't want to talk to you. "Lid" is an old Amateur Radio slang term for "lousy operator". Notice that the operators who called you a lid are being impolite and rude themselves, but don't start a flame war on the air. Strive for professional operating habits.

**Q.** I was listening to a DX station calling CQ and then all of a sudden a bunch of squealing sounds appeared right on top of him so I couldn't hear him anymore. What was going on? Are these HF jammers?

**A.** Those sounds were heterodynes, or interacting CW carriers, from rude people tuning up right on top of the rare station. This is a very unsociable thing to do. Don't tell them they are rude, though, since you will only add to the confusion on frequency. Always tune up on an unused frequency into a dummy load or using very low power.

**Q.** How do you know if you're tuned to exactly the same frequency as another CW station you are calling?

**A.** This is called "zero beating". There will be no beat frequency sound between your signal and the other signal when you're on exactly the same transmitting frequency. However, in order to hear your own code being sent, you need a side tone frequency to listen to. If you listen with your side tone too high or too low in pitch, your transmitted signal will be outside the range of the receiver band pass filter of the station you're trying to contact.

Modern receivers have the ability to listen to either upper or lower side band in the SSB mode. Switch between those two modes until you can no longer hear the CW station, then switch back to the CW mode. You'll be exactly on frequency. Make sure your VOX (voice operated transmit) is turned off while you're doing this so you won't run the risk of inadvertently transmitting voice in the CW portion of the band.

Some transceivers have a CWR (R for Reverse) switch. It can be used in the same manner. Be sure to switch to the normal mode (CW) to make the contact. Other rigs provide a momentary "Spot" tune button. It allows you to hear your side tone and the received signal simultaneously while you tune your receiver to the other station's frequency. When both your signal and the received signal sound the same pitch, you are "spot on".

**Q.** The phonetic alphabet seems to make a lot of sense, especially on crowded HF SSB frequencies when there's a lot of interference.

Too bad there isn't something like that for numbers.

**A.** Actually, there is a standard for pronouncing numbers so you won't confuse numbers such as 15 and 50. Say each digit separately and use the word "decimal" for the decimal point. A frequency, such as 145.230, would then be stated, "one, four, five, decimal, two, three, zero". Notice that the last numeral is a "zero", not an "oh". For numbers like telephone numbers, it's best to repeat the number in a different format. That way 2345 becomes "two, three, four, five, repeat twenty three, forty five". Say the numbers only as fast as you can write them down on a piece of paper. If they're on a paper in front of you, trace them with your fingers to simulate writing as you speak. This will help you to avoid talking too fast.

**Q.** I thought that 2 meters is "line-of-sight", meaning that you can only work as far as you can see in a straight line. Sometimes I can access the repeater in Palo Alto from Pescadero over the 2,000-foot mountain. How does that happen?

**A.** Although VHF is line of sight, special conditions can cause radio waves to reflect, refract or bend much like light waves do. In the case of the mountain, what you may be experiencing is called "knife-edge refraction". This occurs when the signal beam hits the top of a ridge and the bottom of the waveform is slowed down a little while the top of the signal waveform continues on at its original speed. This causes a bending of the signal right over the top of the mountain and down the other side. This is why ocean waves break when they hit the shoreline. The bottom, or trough, of the wave hits the sand and stops, but the top wants to keep moving. Any radio opaque solid, such as high buildings about 50 times as high as the wavelength, can cause radio signals to bend. Signals can also bend horizontally around obstacles in the same manner.

Your signal could also be reflecting off the bottom of a temperature inversion. Normally temperature decreases with altitude. Warm, moist air tends to rise until it cools off and condenses to create clouds. Denser, dry cold air descends to become warmed by the Earth's surface. However, at certain times of the year, particularly late spring and early fall, the sun may warm air aloft more quickly than at ground level during the morning and a layer of cool, moist air becomes trapped beneath an upper layer of warm, dry air. During the evening, the sun strikes the upper troposphere and warms the air aloft longer than usual.

Sometimes air masses of different temperature and humidity characteristics don't mix for days or weeks at a time. This is known as a temperature inversion. It contributes to the formation of photochemical smog when chemical pollution is trapped near the ground. It also contributes to the formation of tule fog in the California Central Valley during the winter and the characteristic marine fog layer during summer afternoons between Pescadero and Palo Alto. The boundary between the denser and less dense air masses can cause light and radio waves to reflect or refract. For instance, mirages can result from a layer of hot air over water or two layers of air of unequal density. The image of a patch of sky might strike the cold air/hot air interface on a road surface, for instance. Cold air is denser than warm air. This creates more resistance for the waves, slowing them (Continued on page 112) Beginner's Bulletin



## PAARA PONDERINGS

de VIC BLACK, AB6SO

Have you wondered if Amateur Radio

will be replaced by other services such as the Internet, cellular or PCS phones, Family Radio Service and MURS (Multi Use Radio Service, the "UHF CB")? Is there any real difference among these services? At times the various services appear to be converging, but actually Amateur Radio is a hobby for experimenters who want to have fun with radio while the other services are for people who want to guarantee direct communications for personal or business uses. Sometimes Amateur Radio leads the others in technology because Hams are weak signal experts. That's part of the challenge and fun of Amateur Radio. At other times, the other services appear to be the trendsetters. Understanding those trends can help us to enjoy our hobby more.

Besides Internet connected "smart phones" the latest phone trend is toward disposable cell phones that look like pre-paid phone cards. Plastic credit card-sized phones, being developed by a Motorola/MIT joint venture, will be sold by vending machines with the number of minutes programmed in at the time and point of sale. After use, the phones will be recycled or disposed of in the trash. (Was this inspired by the Alinco "credit-card" VHF radios such as the DJ-C5?). It's intriguing to think of converting used recyclable phones for 900 MHz and 2400 MHz point-to-point Amateur use.

I've often wondered why we had to buy the latest expensive technology for simple computing tasks. We won't have to do this much longer. Disposable personal computers are on the way. Hewlett-Packard has announced plans to market low-end recyclable personal computers, which will come in standard configurations and be non-upgradeable. CPU and RAM functions will be integrated on the motherboard inside sealed computer cases. If you outgrow your dedicated computer, or something goes wrong with it, it will be easier to replace it than to upgrade or repair it. They should be more reliable and also generate less electrical noise because of the lack of interconnecting cables and connectors. Inexpensive, fully functional, computers should be just the ticket for dedicated Ham shack uses such as logging, APRS, or packet radio.

Are you participating in the Search for Extraterrestrial Intelligence? Whatever we see in astronomy is actually a glimpse of the distant past. Signals from a relatively close star 1000 light years away were actually generated 1000 years ago and are just now arriving at Earth. Our search is based on the hypothesis that alien cultures have leaked narrowband RF signals into space much as we have done with radio and TV signals for the past few decades. How much longer will we be doing this? Now that our RF spectrum is becoming crowded, we're putting more signals on fiber optic cables and we're starting to use spread spectrum techniques, which turn the signals into background noise. What will we do in another hundred (or thousand) years? Will signals be recognizable as such after we implement newer RF technologies or modulate laser beams? Any alien culture capable of communicating over vast distances has

probably gone through this evolutionary process as well. If there are any advanced cultures, maybe they're the cause of part of the cosmic background noise. Maybe they've advanced to the point that they no longer produce narrowband signals, per se, in which case they probably won't be listening for any, either, just as we no longer search for or recognize smoke signals. Just a thought.

Coming soon to a car near you: In a couple of years we'll see the first of the high voltage automotive electrical systems. This is the first change since the 1950's when car electrical systems operated at 6 volts. New 42-volt systems will use a disc alternator about the size of a large pizza mounted between the car's engine and transmission. The decision to change was made after considering the large number of electronic accessories being installed in cars. The 12-volt systems are becoming overwhelmed. Drive-by-wire systems will allow engine designers to eliminate drive belts and friction inducing driveline components and operate remote electrical motors instead. This may include replacing mechanical valve camshafts with motors to allow more precise infinitely variable valve timing.

Amateur Radio 12 volt gear will need to be redesigned, or voltage regulators will need to be added to radios. Electric motors may generate more electrical noise for us to deal with and we'll have to be concerned with inducing current into control lines when we transmit. Changes like this are part of the reason Amateurs are accused of being behind the times (i.e. we aren't aware that the ground rules are changing so we don't prepare for them).

Glen Leinweber sent more information about lightning and Amateur Radio. "I got curious about static discharge from antennas and hooked up a multimeter between the feed line of a 100 foot dipole and ground. Mostly I was curious about static (DC) current flow. Any static current could easily charge up coupling capacitors inside a tuner or, worse, inside a rig. I had a 0.01uf capacitor (at the output stage of a 40 M rig) short out, likely due to over voltage from static charging. Could have been from a nearby lightning hit, too. Anyway, a T-storm was approaching while the multimeter was hooked up. Before disconnecting, I switched the multimeter to its highest voltage scale (300v), sat and watched for a while. Can you say Ben Franklin? Thunder was barely audible, but the meter was kicking upscale. One hit a little closer, perhaps three or four miles away, and the meter whanged off scale with a "whack". Whoaa! Get that antenna disconnected! Must've been a kilovolt pulse or more."

It ought to be obvious that nearby lightning hits can send a good jolt down your feed line, and can do some damage. But I've also seen considerable voltage develop from static currents due to rain, snow, and dust, usually accompanied by wind and not a T-storm anywhere nearby. Static currents from these sources up to one microamp can generate kilovolts on coax feedlines in a matter of seconds. Been there, seen that. You think a 1 uA static current is too feeble to do damage? Think again. This current can charge up your feed line (distributed) capacitance and dump a much larger current pulse into a tuner or rig when something goes into voltage breakdown. I never leave feed lines connected to anything, not even a tuner, unless I'm in the shack."

(Continued on page 112) Ponderings

## WEB WANDERINGS

de Vic Black, AB6SO



PAARA member Ron Carmichael is having a good time chasing DX with his new call sign NC6U. Ron recommends the propagation web site <http://dx.qsl.net/propagation> to help plan the correct time of day to hunt for exotic DX.

PAARA member Dick Kors KM6EP tutors Middle School students involved in Stanford University's CanSat program. Go to <http://www.rjkent.com/sci-club> for St. Andrews School Science Club satellite project photos of their Black Rock Desert launch during the summer of 2000. Ten student club members earned Amateur Radio licenses as part of the club's activities. Everything old is new again. Multi-Frequency Shift Keying (MFSK) is an extension of the 2-tones at a time of RTTY. Similar schemes, such as Piccolo, were developed by the military in the past and were designed for electro-mechanical readout systems. Modern PC Sound Blaster board digital signal processing has allowed a revisiting of the older modes, which are now showing up on the Amateur bands.

The error rate decreases as the number of tones increases so the robust mode MFSK is an improvement over PSK31 for DX contacts. When comparing Pactor II, Amtor, HF Packet, RTTY, etc. Murray Greenman ZL1BPU says, "In terms of performance, of the examples given, only MFSK16 and PSK31 are considered practical for DX QSOs. PSK31 often performs poorly on long path (because of QSB), and provides no improvement when the FEC (Forward Error Correction) is used, so is usually used without it. MFSK is virtually as sensitive as PSK31 in practice and is unaffected by Doppler. It is also less affected by interference, and offers effective FEC. These results are supported by ionospheric simulation tests." Murray points out the bad with the good reminding us that MFSK requires frequency stable receivers and precise tuning. See Murray's web site at <http://www.qsl.net/zl1bpu> for theory of operation and software implementation for MFSK as well as other "fuzzy digital modes" such as Hellschrieber. In case you wonder what "fuzzy modes" are, they're digital modes, such as CW, that are fully or partially decoded by the operator rather than modes, such as RTTY, which are fully decoded by machine.

Go to <http://www.pacificsites.com/~brooke/index.shtml> for the web site of Brooke Clarke N6GCE. This is one of the most comprehensive sites you'll come across on the Internet. For many years, Brooke lived on Corbett Lane, a stone's throw from the Foothill College Swap Meet. I once joked that he must be the only person on his cul-de-sac with a fully functional and operating aircraft radar set. Wrong! A 15 year old down the street also had one tracking aircraft traffic over Santa Clara Valley. Brooke's very detailed site covers many hobbies and interests. Click on "Electronics" for Amateur Radio tutorials. Brooke had a high school reputation for causing our physics teacher's demonstrations to fail. We knew even then that he was destined to have a great electronics future!

Adrian Robinson G7WFM set up the UK's first Internet linked repeater system. Go to [www.g7wfm.co.uk](http://www.g7wfm.co.uk) for an explanation of how the system works. You must set up Vocaltec's Iphone to operate the system. A demo copy is available at Adrian's web site. Once Iphone Internet Link is operating, call CQ and you will be in control of the Nottingham, England repeater (431.075 MHz). The repeater operates during specified times, listed on the web site. Repeater Link software validates your call sign before allowing you to transmit since you must be licensed to access the repeater from the Internet. This is an example Amateur Radio integrating the Internet, your local PC sound card and remote repeaters.

George Heron N2APB from New Jersey sold more than 100 Warbler kits at Pacificon. The Warbler, also known as the PSK-80, is an 80-meter PSK31 transceiver. The fine kit requires about 2 hours to build and is available from the New Jersey QRP Club for \$35 plus \$3 shipping. The Warbler, named for the sound it makes on the air, as well as for the state bird of New Jersey, produces 4 W PEP output and features a crystal-filtered direct conversion receiver. Easy to get on the air, it requires only 4 standard cables available from computer stores or Radio Shack, plus free software from the Internet. Download the software into your Sound Blaster board equipped PC and you're ready for this exciting new digital mode. George tells us that PSK31 software is also available for Mac computers. Go to <http://www.kender.es/~edu/psk31.html> for Mac software. Warbler information is available at <http://www.njqrp.org>. Ace designer Dave Benson NN1G of Small Wonder Labs designed the rig. His company's page is located at <http://www.smallwonderlabs.com>. Common PSK frequencies are 3.580, 7.035, 7.080, 14.070, 21.070, and 28.080 MHz. Simple hookup directions are at <http://www.qsl.net/wm2u/psk31.html>.

Bill Mabry N4QA reports, "For 'receive only' PSK31, I simply connected a cable from the 'external speaker' jack on my transceiver to the 'line in' jack on the PC soundcard. This sort of thing may be accomplished using any reasonably frequency-stable communications receiver. Default gain settings in DigiPan worked very well so this was, indeed, an exercise in plug and play." James Rue KC5HAC has an even easier way to read only (i.e. not transmit). "I downloaded DigiPan a few months ago. I have been watching activity on 20 meters by just placing a microphone connected to my sound card to within inches of my rig's speaker. I know that this is not the best way, but it worked for me and I was able to use what I already had on hand. It's just a quick way to watch PSK if you already have a microphone for your computer."

Howard "Skip" Teller KH6TY said, "I'm pleased to announce the official release of DigiPan 1.5 by KH6TY, UT2UZ and UU9JDR. DigiPan 1.5 adds dual channel reception, selectable colors for all windows, the ability to transmit and receive on different frequencies, an easier to use log, QSO data display on the status bar, phase scope, sound history, and transmitted IMD measurement. Download DigiPan 1.5 at <http://members.home.com/hteller/digipan>. DigiPan is still freeware for the enjoyment of Radio Amateurs all over the world."

Ken Hopper N9VV points out that DigiPan author Howard Teller KH6TY/4, has just released "The world's first PSK31 (Continued on page 115) Web Wanderings

(Continued from page 109) Beginner's Bulletin

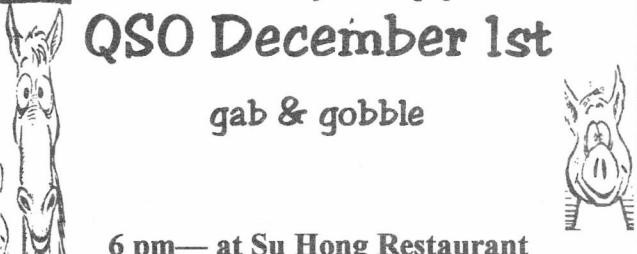
down. The light then bends toward the side traveling the slowest. The image is refracted to your eye where it appears to cause a blue patch on the ground.

A related phenomenon, tropospheric ducting, can carry VHF signals hundreds or thousands of miles. Instead of the signal bouncing between the temperature inversion and the ground, the wave is caught between two atmospheric layers, which create a duct somewhat analogous to a light pipe. Stations at both ends must be in the duct, or capable of transmitting into the duct, for this to occur. A signal from the valley could get into the duct by knife-edge refraction, for instance. Look for "tropo" openings on 2 meters and up between California and Hawaii during the summer whenever there is a major high-pressure system over the Pacific between the two states.

Join us for pre-meeting eyeball

## QSO December 1st

gab & gobble



6 pm— at Su Hong Restaurant  
1039 El Camino Real, Menlo Park  
—across from Kepler's Book Store—

*Go the extra mile. It's never crowded.*

(Continued from page 107) Board of Directors

PAARA finances and Was complimented and thanked for his services.

Discussion ensued about billing for advertisers in PAARAGraphs and tracking membership dues, paying for call sign badges, the need to document our procedures and the fact that dues are due the first of the calendar year. Bob and Don, KF6JMQ, will track receivables in the database for mailing the newsletter and will use the database to issue call sign badges. Membership cards will be mailed following receipt of dues. Badges will be paid for separately from membership dues. Lists of paid members will be posted at meetings & feedback for the database will be solicited. A prototype call-sign badge should be available for viewing at the December meeting. More announcements will be made at the meetings. Direct any questions to the PAARA officers; email & phone numbers are listed herein.

Andreas reported that Rolf, N6NFI, is coordinating PAARA use of the Loral Space Systems cafeteria room for a joint auction. Gerry, N6LNV, will chair the auction project. Stay tuned for more excitement!

73, - Jay, WA6SBO, Secretary  
WA6SBO@ARRL.NET

## PAARA Members Aid Coast Guard Search

Late Saturday afternoon, November 4, 2000, the day after our November PAARA club meeting, Al Montoya WB6IMX noticed a dead carrier signal on Marine Channel 16, which he monitors from his vessel. Channel 16 is the Emergency/Calling frequency for Marine communications used by the Coast Guard and ships. Al said, "After the signal continued for over an hour, I noticed it seemed to be strongest in the Redwood City area. I contacted Andy Korsak KR6DD on the N6NFI 145.230 repeater."

Andy took a bearing from his home in the Emerald Hills area above Redwood City and noticed the signal appeared to come from the Port of Redwood City. Andy, a veteran hidden transmitter hunter stated, "I met Al at the Redwood City harbor, to which my initial bearing pointed, and we located the source of the signal at a commercial vessel docked near the east end of Seaport Blvd. Al spoke to some personnel on the ship MV BARUNA JAYA III and got them to turn off their radio transmitter, which had been inadvertently left on."

When Al reported the incident to the Coast Guard Group San Francisco he was told that they had been attempting to localize the signal for several hours using their vessels and Coast Guard Auxiliary personnel. Quick action by the two Amateurs prevented them from going to the next phase, which would have been an expensive helicopter search.

® Vic Black, AB6SO

(Continued from page 110) Ponderings

Tucson's Bob Nielsen N7XY, reports a hearing problem, maybe from listening to his radio for too long at high volume into earphones. Bob puts a positive spin on it. "My right ear seems to have a narrow pass band which is just about right for the CW note and side tone and nicely filters out much of the off-frequency stuff. I expect that it's really some sort of evolutionary adaptation to improve my code proficiency." Hearing loss is probably a greater potential problem to Amateurs than RF damage is. Most public places have such high background noise levels that it would be unhealthy to work a full shift there. The younger generation turns music volume up loud, but many claim it doesn't hurt because they're accustomed to it. You don't actually become accustomed to loud sounds. In reality, you become permanently deaf in a short period of time.

Acoustic trauma deafness results from nerve end damage caused by chronic day-to-day exposure to loud noises. It's usually partial and involves high-pitched sounds. When I photographed race cars, I wore earplugs under full coverage earmuff-type sound suppressors to diminish bone conduction. Many nearby workers with no protection didn't even flinch at the more than 120 dB sound levels, which vibrated my whole body. That's equivalent to standing directly behind a 747 jetliner at takeoff. Many people involved considered it "macho" to take the full hit from the loud sounds. The real reason they didn't flinch from the truly painful sounds is because they could barely hear. To protect your ears while using the radio, keep volume to the minimum that will work and use your automatic gain control (AGC), which will limit the volume when a loud signal appears.

® Vic Black, AB6SO

## How Will MURS Impact Amateur Radio?

by Vic Black AB6SO

There's a new kid on the block for CB fans. MURS, or Multi-Use Radio Service, joined the other "citizens' bands" in June when the FCC authorized the new unlicensed VHF radio service. Final approval, expected in October, would make radios available by the end of year 2000. Handheld radios will be allowed to use up to 2-Watts effective radiated power (ERP) on frequencies of 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz and 154.600 MHz. The FCC defines the new service as, "a private, two-way, short-distance voice, data or image communications service for personal or business activities of the general public."

The unique thing about the new service that sets it apart from other CB bands is that the law appears to allow just about any modulation type that will fit in the authorized 12.5 kHz channel bandwidth. This would be the first time CB operators could use VHF packet, for instance. Radios must be FCC type-approved for MURS band operation under Part 90 rules. This is an unlicensed band so no callsigns are assigned, required, or even allowed.

Functions, which are disallowed on other CB bands, are not specifically prohibited on MURS. This is known as a negative legal right; i.e. if it's not specifically prohibited, then it's probably allowed. For instance, there are no prohibitions against changing the antennas or in locating the antennas at high remote locations. The only rule in this respect regards effective radiated power. It appears that simplex repeaters are acceptable so long as they conform to the maximum power rule. Chances for interference within the band are high with only five channels available. Avoiding interference will depend on low power and physical separation for frequency re-use.

FCC-designated Personal Radio Services ("citizens' bands") include 460 MHz GMRS (General Mobile Radio Service) and FRS (Family Radio Service); R/C (Radio Control Radio Service); 27 MHz CB (Citizens Band Radio Service);

216-217 MHz LPRS (Low Power Radio Service); WMTS (Wireless Medical Telemetry Service); MICS (Medical Implants Communication Service) and the new 151 - 154 MHz MURS (Multi-Use Radio Service). Note that the Personal Radio Services should not be confused with the commercial telephone PCS (Personal Communications Services), which operate in the 900 and 1900 MHz bands. CB and GMRS radios must be crystal controlled, but R/C, LPRS, FRS, MICS, WMTS and MURS units may be frequency synthesized.

Although General Mobile Radio Service (GMRS) at 460 MHz partially overlaps the unlicensed FRS band and is sometimes called "the old UHF CB" it actually requires a license and is not a citizens' band, per se. Two-way voice communications are not permitted in LPRS, which is used for theft tracking, medical assistance devices and automated maritime radio network control stations. MICS and WMTS are used for medical telemetry in hospitals. This leaves MURS as the only narrow band FM VHF two-way voice citizens' band. The FCC is currently evaluating another possible CB service called PLB, or Personal Locator Beacons. These beacons would be similar to the Emergency Position Indicating Radio Beacons (EPIRBs)

used by boaters. PLBs could be used to summon help in remote areas during emergencies.

When it was first announced, FRS seemed to many to be a potential threat to UHF Amateur operation. As it turned out, it introduced many non-licensed users to the potential of VHF and UHF HTs. Many subsequently became licensed Amateurs. Even more important, perhaps, was the trickle down effect FRS manufacturing had on Amateur Radio. Some VHF and UHF radios probably resulted from the mass production of FRS radios. Since the MURS band is so close to 2-meters, it makes sense that some models will be reconfigured during manufacturing to operate in the 2-meter Amateur band. Reconfiguring production lines "on the fly" is inconsequential using modern robotic flexible automation. New products may require little more than proper firmware to be installed at final test. No doubt some enterprising Amateurs will manufacture antennas and accessories for the new service, thereby opening up new business opportunities, as well.

Because of the low power restrictions and limited channels available, MURS shouldn't impact traditional Amateur Radio. In the long run, this is just one more communications tool that will be available to Amateurs who choose to use it. The service could conceivably include all mode transceivers or mini-keyboard packet HTs. Remote control and telemeter functions are also allowed on MURS frequencies. Amateurs should be able to imagine many uses for the service, including emergency communications support, as an adjunct to their licensed operations. We can only hope that the radios are inexpensive enough to encourage modifications and experimentation in the 2-meter band by licensed Amateurs.

## Technical Tip

"Small flexible cables for connecting keys, keyers, and other such things can be had from your discarded computer mice. I found some of them are shielded with two wires and some have four wires unshielded. All are supple, flexible, and handy for the job."

Chuck Carpenter W5USJ Point, Texas





## Technical Tip

### Solar Coronal Holes

by Paul Harden NA5N

Coronal Holes are not all that well understood, but they are holes or "tears" on the solar surface that allow energetic particles to escape the sun's gravitational and magnetic fields and be flung into space. Occasionally you'll hear that a fairly large coronal hole has rotated into "geoeffective" position. This means it is near the central meridian of the sun, the "window" where activity on the sun will likely (eventually) hit the earth. In the case of these "geoeffective" coronal holes, the particles (Coronal Mass Ejection) flow outward to ride along with the solar wind, adding velocity and density to the electrons in the solar wind. The solar wind constantly pushes against the earth's magnetic field, distorting it into a torpedo shape with the blunt end facing the sun and the "tail" extending beyond our moon.

Sudden changes to the velocity or density of the solar wind pushing against our magnetic field cause changes in the field's shape, often causing it to "wiggle" from the arriving shock wave or constant changes in solar wind. When this happens, our moving magnetic field generates huge currents that flow between our poles, causing noise on the HF bands.

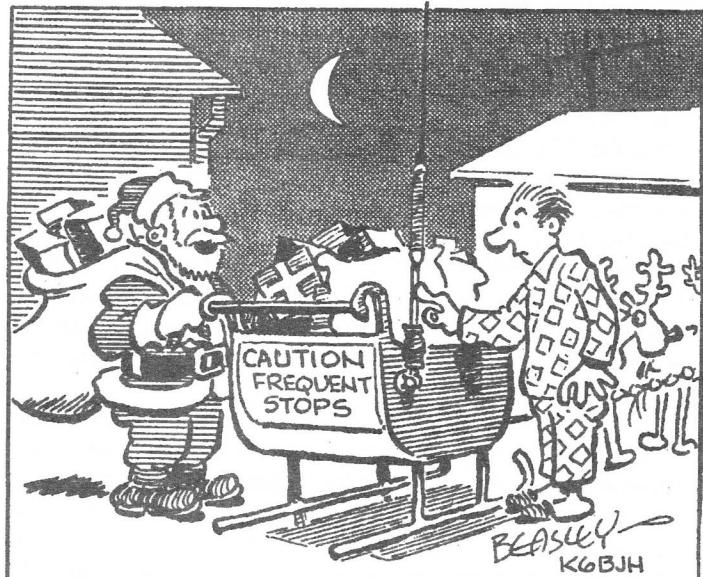
Our magnetic field is normally quiet (K index 1 and 2). The increased velocity in solar wind caused by a coronal hole pushes against our magnetic field triggering a MINOR geomagnetic storm, K index of 4, which may go higher as the day goes on. The 24-hour average (the A-index) may go as high as the 20-30 range. As the earth rotates into darkness, the solar wind pushes against our magnetic field AWAY from us, so conditions will tend to quiet down some during the evening. During daylight hours, if the solar wind is still variable from the coronal stream, the disturbance will become more evident again.

When this happens, the forecast from NOAA will suggest erratic minor storm conditions as a result of this coronal stream riding along the solar wind. These conditions usually persist over the next 2-3 days. This does not mean conditions will be lousy 24-hours a day, but will be "on and off" for 2-3 hour periods as our magnetic field responds to variations in the solar wind.

A minor storm does not shut down HF communications. It just makes the lower bands, like 40M, a bit noisier than normal, and may be accompanied by bursty static crashes as our magnetic field "wiggles." Levels may also be ACTIVE or just shy of minor storm activity. Current conditions, including the 3-hour K-index numbers, are broadcast on WWV at 18 minutes past the hour, and at several Internet sites. K Index of 4 or higher indicates disturbed conditions.

73, Paul NA5N

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THOSE WORK SO GOOD I DECIDED TO KEEP THAT ONE FOR MY OWN MOBILE---YOURS IS ON BACK-ORDER  
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## The Senility Prayer

Submitted By Bob Triggs KD7FKT

God grant me the senility to  
 forget the people I never liked anyway,  
 the good fortune to run into the ones I do,  
 and the eyesight to tell the difference.

Now that I'm older here's what I've discovered:

I started out with nothing I still have most of it.  
 My wild oats have turned to prunes and All Bran.  
 I finally got my head together, now my body is falling apart.  
 Funny, I don't remember being absent minded.  
 All reports are in life is now officially unfair.

If all is not lost, where is it?

It is easier to get older than it is to get wiser.  
 Some days you're the dog, some days you're the hydrant.

I wish the buck stopped here. I sure could use a few.

Kids in the back seat cause accidents-

Accident in the back seat cause kids.

It's hard to make a comeback

when you haven't been anywhere.

Only time the world beats a path to your door  
 is if you're in the bathroom.

If God wanted me to touch my toes.

He would have put them on my knees.

When I'm finally holding all the cards,  
 why does everyone decide to play chess?

It's not hard to meet expenses-They're every-where.

The only difference between a rut and a grave is the depth.  
 (From ARNS news service & "Static", newsletter of the London Bridge ARA, Bob Triggs, KC7UTK, ed.)



# ARRL Headquarters

Newington CT September 1, 2000

## ARLB037 RF SAFETY RULES

now in force for all amateurs

Starting September 1, every US amateur is required to fully comply with the FCC's RF exposure guidelines.

The regulations, which went into effect January 1, 1998, require US Amateur Radio operators to read and understand the rules and, where necessary, perform technical evaluations to determine that their stations are compliant with the new regulations. Up until now, only hams who have had to file an Amateur Radio application with the FCC have had to certify compliance with the RF exposure rules. As of September 1, all amateurs must comply.

Under the regulations, an amateur station must not exceed the maximum permissible exposure limits for transmitter operation.

"These regulations are not a major burden on the Amateur Radio Service," said ARRL Lab Supervisor Ed Hare, W1RFI. "Most hams are already in compliance with the MPE requirements; some hams will need to conduct a simple station evaluation."

A complete description of the rules is available on the ARRL Web site at <http://www.arrl.org/news/rfsafety/>. The site also contains resources to make your station evaluation quite painless.

Address questions about RF safety and the FCC exposure guidelines to ARRL Lab Supervisor Ed Hare, W1RFI, [ehare@arrl.org](mailto:ehare@arrl.org).

(Continued from page 111) *Web Wanderings*

IMD detector". Skip Teller tells us that, "the DigiPan IMD Detector will pick up your transmitted signal from off the air and display it on Digipan 1.5's spectral display, so you can observe your own signal and unwanted sidebands as you adjust your transmitter for lowest distortion". Check it out on Skip's DigiPan page. Even if you don't use PSK-31, you may want to download DigiPan. It provides a real-time audio spectrum analyzer display that is very easy to interpret. CW signals appear as vertical lines at your receiver's beat note audio frequency. Digipan allows you to place a marker, a thin vertical red line, on the waterfall at any desired frequency. If that marker is set for the frequency of your receiver's side tone offset, 700 Hz, for instance, you can tune until the received audio signal is under the marker and you will be "zero beat" within a few Hz. This spectrum analyzer function allows you to see signals in a pileup, lets you know exactly when to call and where to tune to avoid QRM. It can also be used to fine calibrate your transceiver by comparing the calibration against WWV signals.

**PAARA · Palo Alto Amateur Radio Association · P.O. Box 911, Menlo Park, California 94026-0911**

- Club meetings are on the first Friday of each month, 7:30pm at the Menlo Park Recreation Center, 700 Alma Street, Menlo Park, CA. •
  - Radio NET every Monday evening, at 8:30pm, on the 145.230-600 MHz repeater, PL tone off. •

Membership in PAARA is \$12.00 per calendar year which includes a subscription to PAARAGraphs, \$6 for additional family members (no newsletter).

Make payment to the Palo Alto Amateur Radio Association.

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The PAARAGraphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association. All fees payable in advance by the year with "scanner-ready" copy or text-only ads. Give payment and copy to Bob Korte

# PAARAGraphs December 2000

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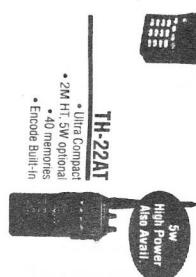
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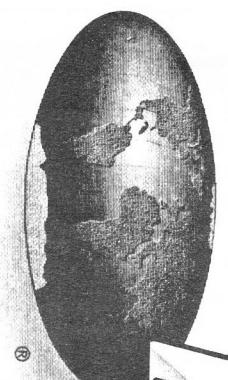
Calendar & Program	107
Board Meeting	WA6SBO 107
Contests	AB6SO 108
Miscellaneous Dates	108
Beginner's Bulletin	109
PAARA Ponderings	AB6SO 110
Web Wanderings	AB6SO 111
Coast Guard	AB6SO 112
New Members	AB6SO 113
MURS	AB6SO 113
Tech Tip	NA5N 114
Senility Prayer	KD7FKT 114
Safety Rules	ARRL 115
Map to General Meetings	108
1st Friday 7:30 PM	

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