



PUSH TO TALK

Push to Talk is the monthly newsletter of the Inland Empire Amateur Radio Club, an ARRL Special Service Club. Past issues are available on the club website <http://www.w6ier.org>. W6IER repeaters are 145.460 and 447.220. Both repeaters have a standard negative offset and 77.0 PL. Our 2-meter net is each Thursday at 7:30 pm. Check out our 2-meter Trivia Net Tuesday nights at 7:00 pm.

John Simmons KQ6ES, Editor kq6es@roadrunner.com

GENERAL MEETING

The next regular meeting will be February 7 at our normal time and location: 9 am on the first Saturday of the month in the Ontario PFF Bank meeting room, 333 N. Euclid Avenue at D Street.

SWAPMEET HELP NEEDED!!

The next IEARC swap meet is February 14. The regular schedule is the second Saturday morning of each month in the parking lot of Cable Airport in Upland. <http://www.cableairport.com>. Enter from Benson Avenue at 13th Street. Volunteers are always welcome.

First issue of World Radio Online now available!

The first issue of WorldRadio Online -- February 2009 -- is now posted on the CQ website. It is available to all without charge. Visit the CQ site and click on the World Radio Online link <http://www.cq-amateur-radio.com/>

CONTESTS

SELECTED FEBRUARY CONTESTS

See the February QST or go to <http://www.hornucopia.com> for additional contests and details.

North American Sprint, CW	0000Z to 0400Z, Feb 8
CQ WW RTTY WPX	0000Z, Feb 14 to 2400Z, Feb 15
North American Sprint, Phone	0000Z to 0400Z, Feb 15
ARRL International DX Contest, CW	0000Z, Feb 21 to 2400Z, Feb 22
North American QSO Party, RTTY	1800Z, Feb 28 to 0600Z, Mar1
State QSO Parties:	1 st full weekend: DE, MN, VT

KQ6ES Contest Reports

ARRL RTTY Roundup

This is the most active RTTY contest. I had RF problems on 40m and had to stay mainly to daytime operation. My totals: 317 contacts and 62 multipliers. I worked 45 states.

North American QSO Party CW

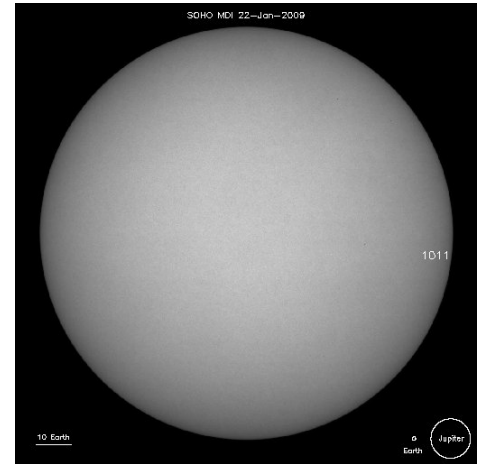
A good beginning, with 15m open, but not enough multipliers, and the low band results were poor. Final totals: 377 contacts and 111 multipliers. 44 states worked.

North American QSO Party Phone

Not much time for this one, with only 19 stations and 19 different states/provinces worked.

CQ WW 160m CW

A tough contest for a small vertical! Conditions were very good and this was a better than usual score for me, with 25 states and 3 countries, 127 total contacts.



A familiar sight: one lonely sunspot about to rotate out of view.

Report your contest activity!

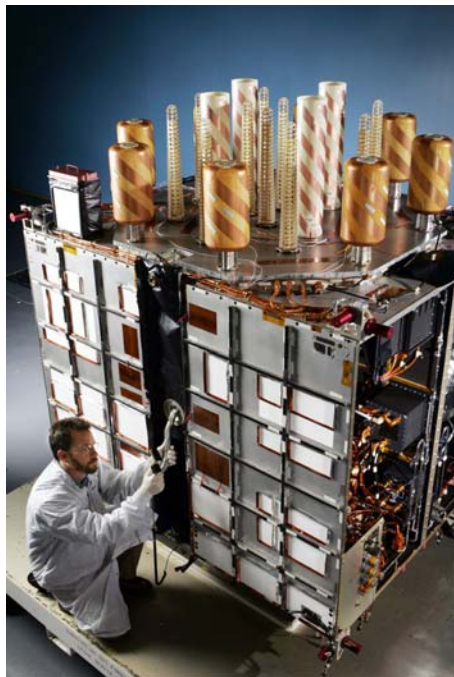
Please let me know if you participated in any contests!

FOCUS ON:

A regular column looking at organizations and activities of special interest.

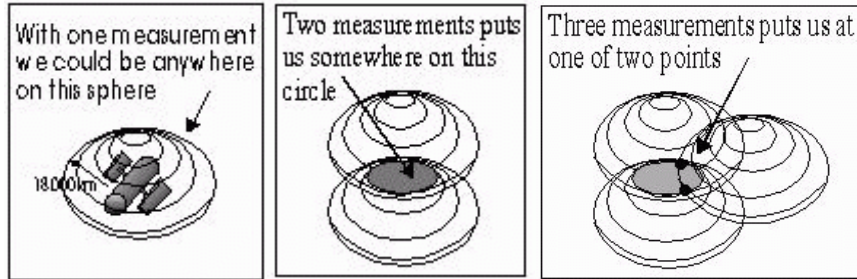
GLOBAL POSITIONING SYSTEMS

GPS was developed by the U.S. Department of Defense mainly to provide a precise form of worldwide positioning for their submarine launched missiles.



GPS satellites have an altitude of 10,900 nautical miles and an orbital period of 12 hours. There are 24 or more in use (30 total), and always at least 5 of these satellites usable from any point on earth. They are monitored and controlled from ground stations around the world. The satellite in the photo is of the new IIR-M series, not yet usable for most of us. Yes, that is an antenna array on “top”. Details to build a GPS Helix Antenna can be found at <http://www.ggrweb.com/article/gulley.html>

By very accurately measuring our distance from three satellites in different locations we can determine our position anywhere on earth.



The distance to each satellite is calculated by measuring the time a radio signal takes to travel from the satellite to the earth. Radio signals travel at 186,000 miles per second, meaning precise clocks are needed: atomic clocks. But both the satellite and the receiver need to be able to precisely synchronize their codes to make the system work. If our receivers needed atomic clocks nobody could afford them. The designers of GPS came up with a trick that lets us get by with much less accurate clocks. The secret is to make an extra satellite measurement.

If our receiver's clocks were perfect, then all our satellite ranges would intersect at a single point: our position. With imperfect clocks, a fourth measurement, done as a cross-check, will NOT intersect with the first three. So the receiver's computer knows it is out of sync with Universal Time. Since any offset from universal time will affect all of our measurements, the receiver looks for a single correction factor that it can subtract from all its timing measurements that would cause them all to intersect at a single point. That correction brings the receiver's clock back into sync. Once it has that correction it applies to all the rest of its measurements and now we've got precise positioning.

The radio signal is in the form of a very complicated “pseudo-random” digital code. Each satellite has a unique code. Two carrier frequencies are used. The L1 carrier is 1575.42 MHz and carries both the status message and a pseudo-random code for timing. The L2 carrier is 1227.60 MHz and is used for the more precise military pseudo-random code. There are two types of pseudo-random code. The first is called the C/A (Coarse Acquisition) code and is the basis for civilian GPS use. The second pseudo-random code is called the P (Precise) code. This code is intended for military users and can be encrypted.

There is a low frequency signal added that gives information about the satellite's orbits, their clock corrections and other system status. There are several good reasons for that complexity: First, the complex pattern helps make sure that the receiver doesn't accidentally sync up to some other signal.



There's another reason for the complexity of the Pseudo Random Code, a reason that's crucial to making GPS economical. The codes make it possible to use information theory to amplify the GPS signal. And that's why GPS receivers don't need big satellite dishes. In fact, they can be part of a watch, like the Casio model shown here.

Why doesn't satellite TV use the same idea to eliminate those big dishes? Too slow. A GPS signal has very little information in it. A better antenna is needed for a TV signal, which carries a lot of information.

Any decent GPS receiver will need to have at least four channels so that it can make the four measurements simultaneously. The spacing of the satellites is arranged so that a minimum of five satellites are in view from every point on the globe. On the ground all GPS receivers have an almanac programmed into their computers that tells them where each satellite is at all times. The basic orbits are quite exact but to make things perfect the satellites are constantly monitored by the Department of Defense. They use very precise radar to check each satellite's altitude, position and speed. The errors they're checking for are called ephemeris errors because they affect the satellite's orbit or "ephemeris." These errors are caused by gravitational pulls from the moon and sun and by the pressure of solar radiation. The errors are usually very small but if you want great accuracy they must be taken into account. Once the DoD has the measurements, they relay the information back to the satellite, which then includes this new information in the timing signals it broadcasts.

A good GPS receiver needs to take a wide variety of possible errors into account. Variations in the speed of light are one source of error: the speed of light is only constant in a vacuum. As a GPS signal passes through the charged particles of the ionosphere and then through the water vapor in the troposphere it is slowed, and this creates the same kind of error as a slow clock.

Much of the delay caused by a signal's trip through our atmosphere can be predicted. Mathematical models of the atmosphere take into account the charged particles in the ionosphere and the varying gaseous content of the troposphere.

Another source of errors is multipath reception. GPS relies on the idea that its signal flies straight from the satellite to the receiver, but in the real world the signal will bounce around on just about everything. The result is many signals arriving at the receiver: first the direct one, then many delayed reflected ones, which if strong enough can cause errors in measurements. Sophisticated receivers use a variety of signal processing tricks to make sure that they only consider the earliest arriving signals (which are the direct ones).

GPS Applications

- 1. Location:** The first and most obvious application of GPS is the simple determination of a "position" or location. GPS is the first positioning system to offer highly precise location data for any point on the planet, in any weather. Accuracy is about 10 meters with standard devices. Newer Differential GPS techniques can lead to near pin-point accuracy. Before the military stopped scrambling GPS signals in 2000, accuracy was only about 100 meters.
- 2. Navigation:** GPS helps you determine exactly where you are, but it's important to know how to get somewhere else, especially in our cars, although ships and planes were the first beneficiaries of the technology. This is the most popular private consumer use of GPS.
- 3. Tracking:** Tracking is the process of monitoring an object as it moves along. Commerce relies on fleets of vehicles to deliver goods and services across a city or the country. It can track packages, know when the next bus will arrive, direct the nearest ambulance to an accident, or help tankers avoid hazards. There are many commercial GPS tracking services available. You can keep track of your children and pets, cars can be traced after an accident or when stolen, and so on. This photo is of the *Xplorer* GPS shoe for kids.



4. **Mapping:** GPS to survey and map precisely saves time and money in this most stringent of all applications. Today, GPS makes it possible for a single surveyor to accomplish in a day what used to take weeks with an entire team. And they can do their work with a higher level of accuracy than ever before.
5. **Timing:** Although GPS is well-known for navigation, tracking, and mapping, it's also used to disseminate precise time, time intervals, and frequency. Knowing that a group of timed events is perfectly synchronized is often very important. GPS synchronized clocks and watches are now very affordable.

And then there's gaming. Activities like Geocache and ConQwest, high-tech versions of old-fashioned scavenger hunts, which use GPS capabilities of handheld devices to find places, people, and things around town, the country, or the planet. Some involve getting outdoors, or moving other people around outdoors while you stay at the computer. The photo to the right is of a "taxi" – one of 18 used as playing pieces tracked by GPS and used in Hasbro's Monopoly game based in London. See http://www.howstuffworks.com/framed.htm?parent=urban-gaming.htm&url=http://www.in-duce.net/archives/locationbased_mobile_phone_games.php for a rundown of other games.



The variety of GPS gadgets is impressive. Time will tell how many are really useful. And for those who fear the 21st century may invade their privacy too much, or worry that Big Brother can find them wherever they go, this anti-GPS tracker is available. Plug into the cigarette lighter and nothing within 5 meters can be tracked. For this and many others see <http://www.coolest-gadgets.com/category/gps-gadgets/>



This article made extensive use of the *Trimble* website. John kq6es

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from the ARRL Contest Update for January 7

Canadian hams may be heard using special prefixes until 28 February as part of the International Year of Astronomy. See www.hamiya2009.info/ This event commemorates Galileo Galilei's first look through an optical instrument towards the heavens. VE changes to CG, VA changes to CF, VO changes to CH, VY changes to CI.

 The December 2008 issue of Contest Club Finland's *PileUP!* magazine will be placed on-line on 13 January. (Thanks, Ilkka OH1WZ) www.helsinki.fi/~korpela/PU/PU.html

 If you're trying the new D-STAR radios, such as Icom's IC-2820 or IC-92AD, you know that getting all the information programmed into the radio can be tedious. John K7VE notes that AE7Q has written a nice little utility found at www.d-star.com that takes CSV files (such as from a spreadsheet or database) and creates ICF files used by Icom programming software. The NWHAM Web site www.nwham.com/repeaters/ offers a convenient way to get the frequencies (and for analog FM, the access tones) into the CSV file easily for systems in the Western US and most of Canada. Enter your search criteria and from the list of repeaters, select Export->Icom->D-STARcomm and a CSV file will be created. If you register, you can also send the site updates on information contained in the database. Special thanks to the Web site administrators!

Web Site of the Week – Clocks of the 24-hour variety are popular gifts for hams and one of the most accurate clocks is the type synced to the VLF signals of WWVB. Considering that the wavelength of a 60 kHz signal is 5000 meters, how do they do it? Take a tour of the station online <http://tf.nist.gov/stations/wwvb.htm> and marvel that those tiny clocks hear the signal so well! (Thanks, Rod AI7NN)

This Web site of K6DPZ's collection of vintage SSB gear is certainly generating some buzz! And you thought YOU had a lot of equipment? www.vintagesb.net/k6dpz.htm (Thanks, Arnie N6HC)

As if the three-element rotating 160-meter Yagi isn't enough to shrivel your coax, here's a video presentation on the OH8X station's remote operating capabilities. www.youtube.com/watch?v=Rth8FWBJFY (Thanks, Dave N2NL)

Neil K7WK discovered a source of online technical books, downloadable in PDF format from www.ibiblio.org/kuphaldt/electricCircuits. Some of these are readable on other sites, but having the PDF version on one's computer is often more convenient. A note: when reading a book online or downloading it, please respect copyrights.

Technical Web Site of the Week -- Two excellent Web sites are featured this week. The first is <http://w7zoi.net/tech.htm> the home of Wes W7ZOI, author of Introduction to RF Design, co-author of Experimental Methods in RF Design, and designer of many rigs and radio circuits. The site is well-stocked with articles and designs for your browsing and project planning. If your tastes run to the microwave part of the spectrum, check out the web site of Jim W6PQL at www.w6pql.com. Jim has presented loads of projects aimed at 23 cm "and up", so if you are thinking about extending your VHF+ contesting to those high-point-value bands, you might want to start here.

Cycle 24 Predictions

See the full article by [Carl Luetzelschwab K9LA](#) in the ARRL Contest Update.

There are more than 50 predictions for Cycle 24 in the scientific community. These predictions are based on a variety of models... and range from a low smoothed sunspot number of 40 to a high smoothed sunspot number of 185.

“...we've been spoiled by shorter than average solar minimum periods, and when something approaching the average comes along we naturally wonder if it's unusual. Based on all historical data, we are not experiencing anything unusual.”

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KP5 Desecheo DXpedition Update - from the ARRL web site. See www.kp5.us.

Members of the February 2009 KP5 Desecheo team met in Puerto Rico the week of December 17-21. They visited US Fish and Wildlife Headquarters and met with the Chief Refuge Manager and law enforcement personnel in preparation for the DXpedition, set to start February 12.

"After an evening with local DXers and members of the Puerto Rico Amateur Radio League for dinner and a night of fellowship, DXpedition team members underwent UXO (unexploded ordnance) training," team leader Bob Allphin said. "... we accompanied US Fish and Wildlife law enforcement and UXO personnel to Desecheo Island. In the three hours we were there, the campsite

and antenna fields were thoroughly swept for UXO and several areas were found suspicious. These areas were clearly marked, mapped by GPS and declared off limits for the DXpedition."

The operation has been granted the callsign **K5D**.

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Heathkit Manuals - from the ARRL web site article by Stan Horzepa, WA1LOU

For a long time, you could get old Heathkit manuals online for free at a variety of Web sites, but in October, Data Professionals purchased the intellectual property of the Heathkit legacy products. As a result, Technology Systems Laboratory removed the free manuals from their Web site. Now you can now purchase the printed Heathkit manuals from the Data Professionals Web site at

<http://sc2.vom.com/d8/index.fwx?C=MANUALS>

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from the ARRL Bulletin 3, January 16, 2009

FCC Chairman Kevin Martin announced he will resign from the FCC on Tuesday, January 20. The Aspen Institute, a non-partisan think-tank, announced today that he will join their group as a Senior Fellow in the Communications and Society Program immediately upon his departure from the FCC. Martin will be the fourth consecutive FCC Chairman to make the move to the group.

In his letter of resignation to President Bush, Martin wrote that during his tenure, "... the Commission has focused on establishing the appropriate regulatory environment that achieves the right balance between two competing interests: To encourage investment in communications infrastructure, and to make sure consumers and innovation are not unintentionally or intentionally disadvantaged by the owners of that infrastructure."

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from the ARRL Letter, January 16, 2009

Sources report that President-elect Barack Obama has selected Julius Genachowski, 45, a technology executive and former classmate from Harvard Law School, to lead the Federal Communications Commission. The New York Times called Genachowski "a prolific fund-raiser and chairman of the campaign's group of technology-policy advisers, who produced a report advocating an open Internet, diversity in media ownership and a nationwide wireless system for emergency personnel."

According to Bloomberg.com, the FCC may turn to expanding access to high-speed Internet service once the pressure from the digital television transition eases: "Obama has made universal broadband a cornerstone of his plan to boost US competitiveness. House Speaker Nancy Pelosi has said broadband funds will be part of the economic stimulus package Congress intends to take up this month."

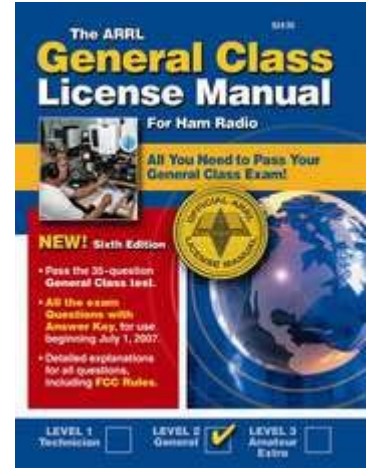
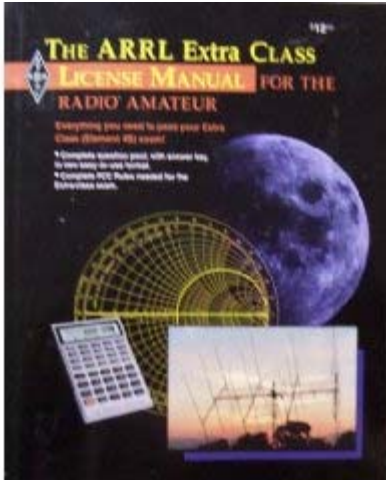
FCC License Activity on the Rise

According to ARRL VEC Manager Maria Somma, AB1FM, there continues to be a heightened interest in Amateur Radio following the FCC's elimination of the Morse code exam requirement in February 2007. In 2008, the total number of US amateurs rose 1.2 percent, from 655,800 in 2007, to 663,500 in 2008. The number of new Amateurs in 2006 was 21,112; in 2007 it was 26,782; and through November 2008, 28,066.

Somma said that the number of General and Extra class upgrades is also on the rise. "When looking at 2006 totals," she said, "we see that upgrade applications for 2007 were up 286 percent; in 2008, they were up 146 percent over 2006. Requests for new club licenses also remain strong. In 2008, we had 671 applications for club licenses come in, while in 2007, there were 506 applications. That's an increase of 133 percent."

Somma broke down the numbers to show the approximate number of licensees per license class:

Novice: 18,500
 Technician: 322,500
 General: 145,000
 Advanced: 62,000
 Extra: 115,500



"I can think back to the mid 1980s when there were approximately 450,000 US Amateurs," Somma recalled. "These are the highest numbers of General and Extra class licensees I have ever seen." As of April 15, 2009, the FCC no longer issues Novice or Advanced class licenses.

from the ARRL Letter, January 23, 2009

The ARRL Board of Directors held its 2009 Annual Meeting on January 16-17. The complete Minutes will soon be available on the ARRL web: <http://www.arrl.org/announce/board.html>

The Board voted to approve five legislative objectives for the 111th Congress:

- Objective #1: The ARRL seeks legislation to extend the requirement for "reasonable accommodation" of Amateur Radio station antennas to all forms of land use regulation.
- Objective #2: The ARRL opposes legislation that encourages the deployment of RF technologies such as broadband over power line (BPL) systems unless adequate safeguards against interference to licensed radiocommunication services are included in the legislation.
- Objective #3: The ARRL opposes legislation that would diminish the rights of federal licensees in favor of unlicensed emitters, especially unintentional emitters.
- Objective #4: The ARRL seeks recognition of the unique resources, capabilities and expertise of the Amateur Radio Service in any legislation addressing communications issues related to emergencies, disasters, or homeland security.
- Objective #5: The ARRL supports the complementary legislative objectives of other radio-communication services, particularly the public safety and scientific services that require spectrum access and protection from interference for noncommercial purposes that benefit the public.

President Harrison appointed Dick Norton, N6AA, Southwestern Director to the Administration and Finance Committee, and appointed Fullerton's Joe Moell, K0OV as Amateur Radio Direction Finding Coordinator.

from the ARRL Contest Update for January 21

CQ Magazine announced a new e-mail list

<http://mailman.sunserver.com/mailman/listinfo/WorldRadio-L>

has been established to notify readers of the availability of each new issue of *WorldRadio* magazine, which is converting to a free online-only publication.

SatMagazine, a free Web-based magazine is also available on-line [at www.satmagazine.com/cgi-bin/display_edition.cgi] and this month's issue is dedicated to Cubesats. AMSAT and Amateur Radio are mentioned, as well. The first English issue of the free electronic Amateur Radio magazine *Ham-Mag* is also available [at www.ham-mag.com.] The first issue can be downloaded and if you subscribe (subscriptions are free) the magazine will be emailed to you each month. (From AMSAT News Service Bulletin 011.05)

Ramon XE1KK went on a short trip to NA-124 and has published a presentation about his "lunch time" expedition at <http://files.xe1kk.com/xe1kk-xf1.pdf>. It is quite interesting, especially considering the very simple setup and the short time on the islands.



Alan K0BG has released another good eham article on safe mobile installations. This should be of particular interest to the VHF+ rovers and HF mobile contesters. We make more intensive use of our equipment while in motion and often have lots of extra gear installed on a temporary basis. Consider your safety when gearing up for the next road trip! www.eham.net/articles/20723

from the ARRL Orange Section Letter

Section Manager: Carl H. Gardenias, WU6D, wu6d@arrl.org

13TH ANNUAL 2009 SATERN SYMPOSIUM - The Salvation Army Team Emergency Radio Network invites you to their 13th annual seminar, Saturday, January 31 at The Salvation Army San Bernardino Corps, 746 West 5th St, San Bernardino. Topics include: A View of the Future, SATERN's role in Critical Communications and NVIS. The Ultimate Backup in Reliable Regional Communications. Attendance is free. Complimentary refreshments and lunch. Reservations preferred, needed for our lunch count. Check it all out at www.satern.net. Please contact Tony Stephen KE6JZF, for more info. (909) 628-2843 or ke6jzf@verizon.net



BONELLI PARK FOX HUNT - Edited from the article by Joe Moell 00V

The next on-foot transmitter hunting session will be Saturday, February 7 at Bonelli Regional Park. A ham license and knowledge of radio equipment are not needed. Experts will be there to teach you. Go 1/4 mile past the entrance and turn left into the bike rental parking lot. Look for the orange-and-white flag directing you to the starting area. A map of the area is at www.homingin.com.



For beginners, there are entry-level two-meter fox transmitters. The main 5-fox hunt begins about 10:30 am. At 9:00 there will be an antenna and attenuator building session for those who have a two-meter HT or scanner, but nothing for radio direction finding. If you pre-register, Measuring-tape yagi and attenuator kits will be provided, with tools and soldering stations. There will be experts to help you. Send e-mail to marvin@west.net to pre-register and get more info. If you have equipment and just want to hunt, you don't need to pre-register.

If bad weather threatens, check the Homing In site (www.homingin.com) or call on the talk-in frequency 146.97 simplex before you set out to make sure that the event is a "go."

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PRESIDENT'S DAY IS FEBRUARY 16



Listen for W7G on 17, 20, 40, 80m from the town of George, Washington, February 20 to 23.



This February 12 is Lincoln's 200th Birthday. Listen for W6L on 20, 40, 80m from Bloomington, Indiana, on February 12 & 13.

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To all members of the Inland Empire Amateur Radio Club:

Thank you for allowing me to attend and speak at your recent monthly club meeting. As discussed, we will be providing communications (including that of a health and welfare nature) for various law enforcement running teams during the 25th Annual Challenge Cup Relay Baker to Vegas race March 14 and 15, 2009.

This event is, by far, the best communications training exercise in which we can participate each year. With many of our volunteers returning year after year, newcomers will be working with returning experienced people to help them. This is a wonderful opportunity for an excellent training exercise, as well as a chance to support law enforcement departments.

The only equipment you need to bring with you is a 2m HT and a small flashlight. All other equipment is provided. For more information, please visit our website at www.K6CSS.com. Please do not hesitate to contact me directly if you have any questions.

Sandra Sue Taylor KD6HCI, Administrator, Communications Support Services K6CSS

Email: admin@K6CSS.com, Cell Phone: 909.223.3328

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See you next month. Please contribute to the newsletter! John kq6es, Editor