



Western Washington Repeater Association
PO BOX 1001, Silverdale, WA 98383-1001
VHF 146.620 MHz & UHF 442.650 MHz Repeaters (tone 103.5 Hz)

2003 NEWSLETTER

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Dave Roddy, N7KZN proprietor of RADIO DEPOT went out of business in February, however not before the WWRA could present him with a token of WWRA appreciation in the form of a plaque from the WWRA General Membership at the NKARC Hamfest in October 2002. Good Luck DAVE and thanks for the memories.

YOUR EMAIL ADDRESS IS VERY IMPORTANT: All year we send out email Ops Bulletins to the Membership keeping the Members informed of changes in repeater status. A quarter of these bounce about every two months. Please keep us informed of your email address changes by clicking on Contact Us on the website.

OPERATIONS COMMITTEE: Elected this past meeting was **Bill, N7YT, George, N7GME, Carl W6NV and Joe, W7COM**. They can be contacted via telephone and email. If you have any questions regarding the repeater feel free to call them.

SUPPORT: We need the support of the ALL users. We hear many users taking advantage of the convenience,

reliability and wide coverage of especially the VHF repeater. All of us pay dues including those who spend much of our spare time working on the repeater equipment and managing the administrative services. It is only fair and reasonable that all of those who benefit from these machines share in their support. They will be receiving invitations from the Board of Directors by U.S. Mail. Please encourage your ham buddies to join if they use the repeater. We would like to acknowledge **Curt, W7CLL** for his recruitment efforts. Thanks Curt.

AUDITS: **Chet, KB7UFT** and yours truly Bob, KB7DRQ volunteered to do the audit this year. This is an important check and balance for the General Membership to provide oversight of the people you elect to run your repeater. The Constitution provides for the audit board to be elected at the annual general meetings. A copy of all audits, including this most recent one, are posted on the website.

GENERAL KNOWLEDGE VHF & UHF REPEATER CODES:

TIME OF DAY	6609
DATE	6610
DAY OF WEEK	6611
KEYPAD TEST	6635
REPEATER PLAYBACK VOX XMSN	6620D

MEMBERSHIP SPEED DIALS: Individual speed dials for Members will be issued only upon request from a Member.

WEBSITE: Visit <http://www.ww7ra.org> and see the wealth of information located there.

DUES: WWRA dues are \$20 and are due on 1 January annually. If you use the repeater please become a Member. The WWRA repeater is Member owned and with your financial support we are able to maintain a working repeater system. Thank you very much for your support. is open to all.

TIME OUT TIMER: TOT is set at 3 minutes. If you talk too long you get to hear the report and make our day! ☺



October Hamfest



WWRA President **Bob, KC7DRQ** did an excellent job hosting & running the meeting



Our general Membership meeting in February was a success. Members were briefed on the recent upgrading of our system. Thank you for your support



Drake, KD7GAR receives recognition for providing consistent service as **NET CONTROL** to the public

Drake, KD7GAR is on the 146.620MHz VHF repeater the **SECOND SUNDAY** of every month **AT 8:00 PM** running the **SECOND SUNDAY NIGHT NET**. This is a great time for new hams and Members to ask questions. Check in and say hello. The NET is very user friendly and primarily promotes information about the WW7RA Repeaters and membership. All members and guests are encouraged to participate and join in QSOs on different subjects. WW7RA monthly NET gets new HAMS and people scanning the bands on occasion. An informal "Check-in" encourages listeners to call in with or without questions and give their QTH, equipment, power and comments about amateur radio. The NET lasts anywhere from fifteen minutes to sometimes over an hour depending on the number of check-ins and topics of interest. Topics have included APRS and mobile operations from boats, airplanes, hiking, biking, and home made antenna systems. Anyone interested in receiving an informal "script" and would like to log some air time running a NET, feel free to contact WW7RA control operator or check out our website at www.ww7ra.org and leave a message. 73's from Net Control for the WW7RA monthly net.



KD7GAR Drake Evans

BOB, KC7DRQ PRESIDENT'S CORNER

PROJECTS: I have been busy promoting innovative money making ideas, like raffles, patches, etc. I have a source that can supply us with WWRA T-shirts and we do not need a big order so contact me with your small ones and twos orders.

VOLUNTEERS: Coordinating volunteers, keeping them happy and avoiding miscommunication is always a challenge. Our policy is to let people work to their comfort level. In response volunteers need to be responsible and let us know "up front" what they can and are willing to do. We appreciate it that when you volunteer for a committee or project that you notify us up front what aspects you are not willing to do. None of us can read minds so if you keep this thought when volunteering we can provide you with the needed tools and information.

What we do NOT need is someone who volunteers to do something and then disappears. So often we hear many comments such as "If you ever need ANYTHING please let me know". Then when we ask them it becomes too hard or they just let it drag out forever. Please don't be a ghost volunteer. Thank you.

FEEDBACK: Many of the features on the repeater are still being refined and will be for some time. Finding a problem is usually quick but it takes many hours to find a solution. If you notice a problem you can be sure we have noticed it also. We do appreciate your comments and will address them if provided to us from a constructive point of view in the correct forum. Our annual meeting is a great place to do this. Sarcasm and innuendo is probably not going to get you what you desire. I would ask anyone who has any suggestions about your dislikes that you should contact any officer or me personally with your issue so we can resolve it. Please do it via telephone. Comments on the air are inappropriate and are not the correct way to thank volunteers for their efforts.

YOUR WWRA STAFF GOALS: We are looking for ways to expand the WW7RA repeater features. Cell phones are making inroads into our repeater world. Why should teenagers study for a license when they have a cell phone? We have to be innovative to maintain interest for all.

OPERATIONS POLICY: No kilocycle cops. Control Operators are there to assist. A copy of the policy can be downloaded from the website or from our Secretary.

WWRA PROPERTY: I have been on a quest to recover missing technical manuals, documentation, keys, equipment, etc. and have met with some success. If you have any WWRA property please contact me so we can get it into our inventory.

INVENTORY: We inventoried WWRA gear on the hill [photo and inventory copy on website] and kept the good stuff and heaved the junk.

MEETING HIGHLIGHTS: **Joe, W7COM** won the THD7A Kenwood handheld. It was great prize. Thanks to help from **Herb, KB7UVC** and all who bought tickets the WWRA was able to pay for the radio and pay for the refreshments at the meeting. The intent of the raffle was to get people to the meeting as opposed to making money. Next general meeting we will have a DUAL BAND handheld as a door prize. Only need to be a Member and be present to win. No ticket donations.

REPEATER COVERAGE & YOUR RADIO EQUIPMENT: Just because you can "hit" our repeaters from long distances inside buildings through a rubber duck is not necessarily an indication that you have the optimum radio setup. Most of the credit goes to the location, antennae height, and sensitivity of our newly renovated repeater system. It can hear real well. It also possesses the punch to get back out. So, when you key up your radio you may sound like hell but the repeaters will come back to you loud and clear and you will assume, wow, I am hitting the repeater big time! Maybe you are but don't take it for granted. You could use a 100mw with a bent welding rod and bring up the repeater! There is a simple test you can do without the aid of another station. On your keypad punch in **6620D** holding down the microphone the entire time and say something intelligent like your call sign followed by 1 2 3. Unkey and the repeater will repeat back exactly what you just said and you will be able to hear exactly what you sound like. This cuts out the middleman not having to ask someone else what you sound like. In a time not so long ago, during *the dark time* of an eighteen month period in 2001 & 2002, when all us WW7RA users were forced to use our backup whip antennae while waiting for a tower climber, we soon discovered how spoiled we had become. In locations where we once had extremely good repeater reception, that we took for granted, we suddenly discovered that we had broken up or no repeater communications at all. And this was on UHF and VHF. When we checked our various radios SWR we found that in most cases our mobiles had bad antenna matching. It was not uncommon to have high SWR on a dual band antenna VHF side with good SWR on the UHF side and vice-a-versa. We discovered that as soon as we got the two repeaters fixed and the antennae coaxes in place all our personal bad antennae matches were immediately fixed. So if you find that the two WW7RA repeaters are working great for you but you have other problems such as with APRS signals or minimal simplex results remember this story and **check your SWR**.

REPEATER ANNOUNCEMENTS: I have asked the ops committee to help in membership recruitment by placing short announcements on both repeaters. These announcements are scheduled once a day and contain information about our organization for any hams listening. They are less than 8 seconds. If they come on during your QSO please let them run their course. You may not care but there are lots of new hams out there listening. Remember when you were new and wondered what repeaters were all about. We are trying to accommodate the new guys.

NATURAL DISASTER: If we have a natural disaster like an earthquake our repeaters will be very important communications tools for county volunteer hams and us Members. It is a safe bet that your cell phones you love so dearly will be absolutely useless. They will be turned off to allow first responder communications a clear path for emergency communications. Our repeaters have battery and generator backup so it is reasonable to assume they will have a measure of survivability.

MALICIOUS INTERFERENCE: Occasionally we have to temporarily shut down the repeaters due to someone attempting harassment. If it is the accidental keying of a microphone and the Time Out Timer (TOT) will take over but this past March we heard a familiar voice on the VHF repeater from several years ago using very obscene language that we would not want our families to listen to. So, we shut the VHF repeater down. Because of our new system it is very convenient for the control operators to secure either repeater immediately. It was actually the first time we did it

"under fire" for a good reason and it worked as advertised! That sure felt good. ☺ When it was thought that the perpetrator had gone away we returned the 62 to normal operations. When the 62 machine was enabled our friend was fortunately gone. So, if you key up some time and your radio doesn't work this could be the reason. We will get back on the air when we the problem has passed.

YOU CAN HELP: Users should be aware that this type of behavior will happen and we are prepared to deal with it. You can be very helpful by following some very simple steps. PLEASE:

1. Do not talk to him.
2. Do not acknowledge this type of behavior in any way.
3. Do not make comments to your ham buddies during your QSO about him or reference a hint of interference in any way.
4. Do not acknowledge if he interferes with your QSO just sign off normally giving absolutely no recognition to him. Normally, his signal is down in the mud and most QSOs can continue without interruption. You will hear him when you unkey.

Anything you do in the way of an acknowledgment will merely provide the perpetrator with encouragement. He is waiting for your reaction. You can really help by following this simple procedure listed above. Hopefully a control operator will shut the system down with no fanfare.

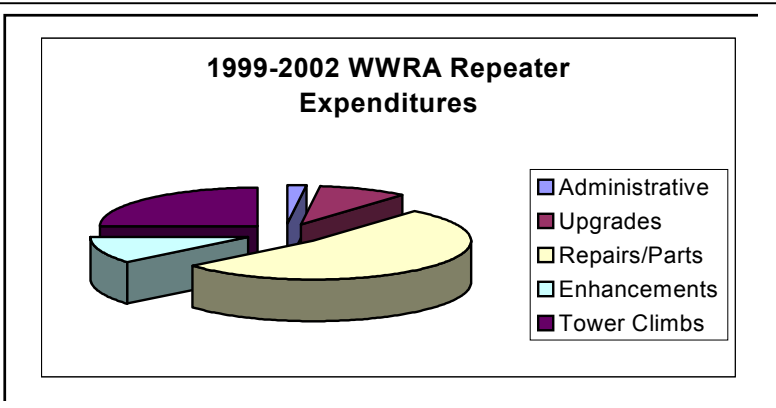
Additionally, if you hear this character on there and would like more information about his history call someone on the Ops Committee or Board of Directors via landline that can brief you. Go to a website and send us an email. He has been around for years. His codename is "GINO". He managed to slip in there in March for a very brief time and so we shut him down very quickly as we happen to be monitoring. This may not always be the case so ignore is the best procedure. If he continuously plays music the TOT will shut the repeater down so he cannot hurt anything. This was the first time we had any malicious interference since overhauling the repeater system. If and when we have to shut down either repeater in the future we will not normally send out an Ops Bulletin later unless it was for some extended period during a peak traffic time. We will also not discuss it on the air but if someone happens to ask why a repeater was OFF then the most you will get out of us over the air will be a "down for maintenance" response. If you are really curious and want further elaboration then it will have to be offline via email or landline. We do not want to let our friend know what we are doing or thinking. Thanks for your understanding and patience. **Bob, KC7DRQ, WWRA President**

SECRETARY'S COMMENTS: First I would like to say something about the WWRA Membership. Only about 1/4 of or Members are on either repeater continuously. The rest use it occasionally and some are just happy to belong and know that they have a resource that is dependable and will be there when they need it. Some members re-join every year and have been members since the repeaters beginnings. To these people we owe a debt of gratitude for first, initially installing the system and going through the heartache and finances to set it up and also for their continuing support over the many years. We also have users who are now using it on a regular basis and are not members. We sometimes send these individuals WELCOME LETTERS if we think they are worth a stamp and would encourage any of you who know of these people to ask them to support the repeater if they use it. This is better done off the air so as not to embarrass them or cause hard feelings. I would also like to recognize and welcome some recent Members: **Dennis, KD7QAG - Steve, W7HDO - Richard, AA7AW - Theresa, KC7FTP - Larry, W7MCT - Kimberly, KD7WGV** and a renewal **Phil, KC7SVI**. The WW7RA repeaters are a great resource and even though you may not use it all the time, it is important for all of us to support the system as it may be of great importance to all of us to have this asset. You never know what the future may bring so we want to be ready. Thank you for your support. **Mel, NA7VY, WWRA Secretary**

BILL, N7YT – TREASURERS COMMENTS

We provide a detailed financial report at the general meetings, however a pie chart to the right depicts what we spent your money on for the past 4 years. You will notice that over 50% was spent on repairs and parts with the next highest cost being tower climbs. Your working staff kept much of the costs down by doing most of the work themselves. Almost \$600 in hill trips was never charged by the ops committee volunteers and over \$1700 was saved on the procurement of a new coax to name a couple of savings. We originally planned to spread spending out over a longer period but events overtook us. Every penny was spent wisely [see 2002 audit]. It is anticipated that the biggest budget item at our next meeting will be the telephone bill.

Bill, N7YT, WWRA Treasurer



GEORGE, N7GME - OPERATIONS COMMITTEE UPDATE

MAJOR ANTENNA SYSTEM UPGRADE: In case you were not at the general meeting and had not heard a second coax was installed last fall. Each repeater now has its own separate coax and antenna completely independent from each other. The VHF repeater is using the best type of coax, which is air-filled and has an Andrews Dehydrator pump keeping it dry 24/7. The UHF repeater utilizes the foam-filled coax pictured below being installed last fall in the below photos. Bill, N7YT and me brought the roll of coax up to the hill in my truck. You can see the tower climber and Bill are rigging to send the coax up the tower. We managed to purchase over \$1800 worth of brand new 7/8" coax for \$125. Bill and I rate this acquisition ahead of the Dehydrator Pump in a quality upgrade and importance since the both of us have been working on the operations committee.

THE PLAN. In the event that we again have problems with or lose entirely the air-filled coax due to its bad connector we will then shift both antennae to the more reliable foam filled coax. We would love to permanently fix the air-filled coax but connectors are no longer available so it is hoped with our recent repairs will last for many more years. Two splitters are already in-place at the top of the tower and in the repeater cabinet standing by to facilitate shifting to one coax if the situation demands. As some of you may recall this upper connector on the air-filled coax has been a problem for many years having been damaged the day it was installed and is the prime suspect in causing damage to the VHF amplifier and transmitter due to high SWR.



GOLD MOUNTAIN TOWER WORK
Installation of NEW coax in the fall of 2002

ALTERNATE VHF REPEATER: The alternate VHF repeater is part of our new robust repeater system. In the unlikely event that we should have a major system failure with the RLC 2 controller we will have this stand-alone VHF repeater ready to go on the air. We resurrected the old VHF repeater, reset the built-in controller, re-programmed it and returned it to the hill as the ALTERNATE VHF REPEATER. If you hear it on the air it will identify itself as the "... alternate VHF repeater..." and you will know our system is down hard or we are just running an operational test. The ALTERNATE VHF repeater came in handy on Saturday, 7 December 2002 when we were in the final stages of installing our new UHF repeater on the hill we ran into problems with the Link Communications RLC 2 controller. As previously reported we had to bring down the entire repeater system for trouble shooting. Since our major job of installing the second coax had gone so well we were now very excited in finalizing the installation of the last two pieces of the repeater system [UHF repeater and UHF control link] so, this was very dissappointing as we had been building slowly to get our complete system working as advertised. We have subsequently discovered that when wiring up the UHF repeater and following the manufacturers technical manual, page 6, the ACS schematic had the 12VDC and the relative RF output connectors reversed on the UHF transmitter consequently sending voltage into the controller and scrambling the programming. It took us awhile to home in on this problem and about 20 minutes on a long distance call to convince the manufacturer. We subsequently fixed the problem in short order and got the the entire repeater system back up and running. More details of the extensive work can be found on the website. *See Ops Task Tracking, Archived Tasking, 2003 General Meeting Minutes and Newsletters.*

DIFFERENCE in UHF and VHF Repeaters: Both repeaters have identical user capabilities. With the exception of the weather code, any codes you use on one can be used on the other. They both announce the same information such as time and public service announcements and they both have Microphone Encoder (MicE) capability. The following is a few differences you may or may not have been aware of.

1. A difference in band spectrum provides longer-range for the VHF repeater under normal conditions and it will get into some nooks and crannies that the UHF repeater cannot reach. However, having made that claim the UHF repeater has surprised us on more than one occasion with its coverage. You will have to experiment yourself to figure out where these patches are. We mostly attribute this unique ability for our UHF machine to punch out there due to the location of our antennae high atop Gold Mountain.
2. Users will notice that the VHF repeater only ID's with a male synthesized voice and the UHF only ID's with CW. For those of us who monitor both machines this enables us all to identify each repeater by listening without squinting at our radios.
3. VHF repeater only provides voice weather reports. This is because of ECHO LINK on UHF.
4. The UHF repeater will be the repeater that you may hear sound off from time to time while responding to commands when a control operator is connected via computer landline to the RLC 2 controller. You will hear synthesized voice reports, usually in numerical format as the RLC 2 is acknowledging programming. The UHF repeater is setup to provide this service as it has the least traffic.
5. UHF repeater has an ECHO LINK capability. *More information described below in WWRA UHF Echo Link System.*

FOURTH REPEATER? Yes, we have one! In addition to the 2 VHF and 1 UHF repeaters we have a 4th repeater. It is actually a DIGIPEATER. We get more bang for our buck from this little 25W Alinco VHF packet transmitter than all the other gear put together. It shares the dual band whip antenna with our UHF link on the roof of the building where we are located and operates on 144.390MHz. It transmits weather no less than every ten minutes, acts as a very high RELAY for the other APRS users re-transmitting all relay signals it hears and provides the re-transmission services in conjunction with the microphone encoder operations explained above.

UHF CONTROL LINK RECEIVER: This is actually a FIFTH receiver. The UHF Control Link is new and can be worked from a variety of locations and different radios by the Control Operators. It replaced our old unit that was sick. Control operators can now connect to and program the RLC 2 controller by yet another remote method. This installation provides us four avenues by which Control Operators are able to access the Link Comm RLC 2 Controller and thus remotely program our repeater system. This adds to our systems flexibility and redundancy.

MICROPHONE ENCODER OPERATIONS: The WWRA repeater system has Mic E capability. What is it? Simply put, for the APRS (Automatic Position Reporting System) users the Microphone Encoder allows the individual hams using their rig coupled to a GPS (Global Positioning System) receiver and a TNC (Terminal Node Controller) to transmit their exact location while talking on one of the WWRA repeaters. At the Gold Mountain site we have the capability of stripping off the APRS data string and re-transmitting it into the APRS on 114.390MHz. For owners of MicE equipment you already know how to re-transmit your position via the repeaters however for people who are interested but don't have the TAPR MicE devices you can accomplish MicE operations by procuring an amateur rig like the Kenwood TMD700-A mobile rig [**Bob, K7ACP is our TM-D700 ELMER**] or the TH-D7A handheld [**Chas, W4HFZ is our TH-D7 ELMER**]. If you own either of these units you can talk on either the UHF or VHF repeater and have your position re-transmitted consistently as you move along in your vehicle or boat. First you need a Global Positioning System (GPS) receiver to plug into your radio then set your unit to BEACON every 2 minutes and Push To Talk (PTT).

When talking on the repeaters you will transmit a data packet at the end of your transmissions every couple of minutes, which will find its way onto the APRS world. The Microphone Encoder is currently working very well on the VHF and UHF repeaters with unsuppressed (not-muted) tones. In addition to our other projects Microphone Encoder has been an ongoing task for almost 4 years now. Other pressing work has kept pushing this project back or we would have completed about 3 1/2 years ago. It is finally done. Initially you will hear data bursts at the end of the transmissions of users operating with this feature. This will be necessary to allow us to ensure this is working properly under all geographic and operating conditions. The Microphone Encoder goals are to provide more capabilities for Members from the APRS community on the WW7RA repeater system allowing their position to be passed at great distances.

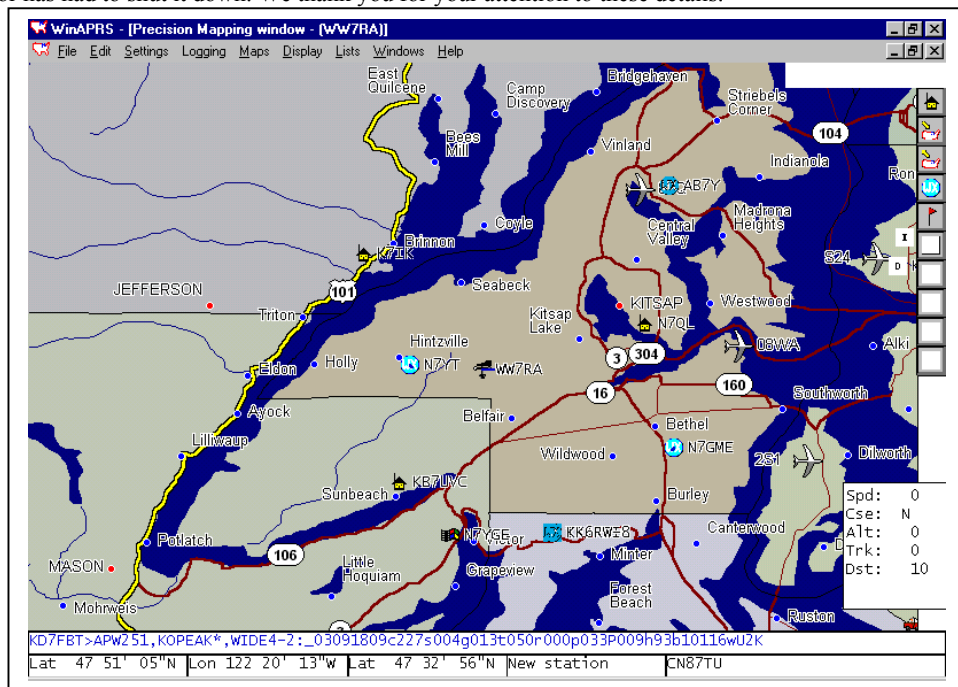
WEATHER REPORTS: For those interested in weather there are several ways to access your WW7RA weather station on Gold Mountain. For graphic display you can go to our website and click on the weather button which is connected to findu.com which receives data from Automatic Position Reporting System (APRS). You can access it via your own computer APRS setup and see the readings. Incidentally the WW7RA weather station is part of the National Weather System (NWS) reporting system so it's inputs are integrated into what you may receive on your government and local commercial weather reports. Local Gold Mountain weather is announced every day at noon on VHF by a Crocodile Dundee sounding voice because the voice box [Vox Box] is manufactured in Australia. The amount and length of the information can be varied so for starters we have set it up to be brief. It has the capability to make a very lengthy report. For those who do not want to wait for the noon report then you can punch in the following code on your radios and get voice responses on demand from our Gold Mountain weather station via the VHF repeater. Be sure to identify when you access this feature.

WEATHER REPORT-VHF REPEATER ONLY	6020
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CALL SIGN IDENTIFICATION REMINDER: We all know that we are supposed to ID over the air announcing our call signs and we follow this all-important procedure most of the time. FCC rules say at least every 10 minutes or at the end of your transmission whichever comes first. At one time or another most of us have gotten carried away with our QSO and have lapsed in meeting this FCC requirement. The VHF repeater thanks us routinely for identifying but even this seems to float right by some users. It is a reminder to use our call signs properly.

AUTOPATCH ID: Also when using the auto-patch please use the proper procedures outlined in the Ops Policy and ID the station your calling which is the WW7RA repeater and your own call sign. When you are completed using the phone patch say the same call signs again to close the operation. Key in #661 and please make sure the repeater has responded with AUTOPATCH OFF at TIME OF DAY. We have had users leave the auto-patch connected and a control operator has had to shut it down. We thank you for your attention to these details.

APRS INFORMATION: For those of you who do not have APRS this picture to the right is a graphic look into this portion of the ham world. You will notice that our WW7RA weather station is in the center of the map. For example, this particular windows precision mapping program allows the user to zoom into street level to observe vehicle movement or out to encompass the whole US. If you click on the various weather station icons including the WW7RA icon you will get the latest weather at that particular location. In this display there is five weather stations of different levels of sophistication in Kitsap County. Because our WW7RA station is registered with the National Weather Service (NWS) we keep it on line 24/7. For those of you are interested in more information on APRS contact



KB7UVC, Herb Gerhardt or click on the <http://www.wv7ra.org> and go to links. You will find Northwest APRS listed there so follow that and you will be able to get as much information as you will need to get started. **George, N7GME-WWRA, Chief Op**

WW7RA UHF ECHO LINK SYSTEM: Echolink testing on the WW7RA UHF repeater has progressed to the point that the system is now available for initial general usage. Echolink is the voice over IP linking software that enables the WW7RA UHF repeater to be linked over the internet to thousands of other repeaters, simplex links, and direct internet connected hams world wide.

The WW7RA UHF repeater setup uses a link radio and computer at W4HFZ to interface with the network. Repeater audio is received at W4HFZ, and then fed to a sound card interface for transmission to the remote station via the Internet. Audio from the remote station is taken off the Internet by the computer at W4HFZ, fed through the sound card to the link radio, and on to the repeater. The system is normally available 24/7, and is controlled via DTMF tones. To determine system status, enter DTMF "08". The computer will respond:

- Disconnected [Available, but not in QSO]
- Connected (station) [Available, in QSO]
- Disabled [Not available, not connected to the internet servers]

To connect to a remote system, simply key in the remote node number. Two popular ones used for testing recently include:

KO4HO-L 53772 Hampton, VA repeater
W1AAA-R 90769 Salem, CT repeater

Another useful node is the APRS conference, **70715**. There are several thousand total available nodes. An up to the minute active node list, as well as full details on the software, can be found at <http://www.echolink.org>. Once connected, enjoy the QSO. Note that capabilities at the remote site vary, and in particular with repeaters, there may be up to 4 T/R transitions that have to happen when completing an exchange. Given that the link radio is half duplex, the far side has to drop our repeater before you can transmit back. We have done a fair amount of tweaking to our settings right, but that is not always the case with the remote systems.

When the QSO is over, disconnect the link with the DTMF "#" command.

Note that both the repeater controller, and the link computer, responds to DTMF commands. I am working on a procedure to separate the two, but in the interim, if Echolink responses are interfering with your ability to use other repeater controller features, disable Echolink with the DTMF command

"53" (LD or Link Down). It can later be reenabled with the DTMF command

"58" (LU or Link Up).

Our repeater can support up to 5 simultaneous connections. The link radio identifies every 6 minutes in QSO, upon connection, upon disconnect, and every 45 minutes when not connected. The every 45-minute when not connected announcement will be moved to the repeater controller. More work is being done to enhance capabilities, and suggestions are always welcome. Also, consider taking a copy of Echolink with you on your travels this summer, and using it to link to the repeater when you are out of range.

Our WW7RA node number is **112405**, and status is kept up to date in the APRS status text of W4HFZ. It works great on a 56k dialup and laptop.

Chas, W4HFZ - WW7RA ECHO LINK Coordinator, w4hfz@amsat.org

George, N7GME Op Ed - Nobody Asked Me But ! A Better Navigation System ☺

In case you were worried what to tell your spouse what you wanted for your birthday here is something to think about along with some background on Global Positioning System (GPS) and what is the latest and greatest. Prior to May 2000 signals were degraded SA (Selective Availability) from their inherent accuracy of 15m 95% of the time, to 100m 95% of the time ostensibly to deprive the bad guys like terrorists from the advantages of having a really accurate positioning system for lobbing missiles or other hostilities. In May 2000 this all changed when SA was lifted. Suddenly, every GPS on the planet became dramatically more accurate. Prior to this Differential GPS was developed to correct the errors imposed by SA by using low frequency signal containing GPS error correction messages. GPS receivers connected to differential beacon receivers resulted in accuracies of about 6m, whenever the user is located within about 200 miles of a differential beacon. There is one located at the southern tip of Vashon Island in Puget Sound. The Coast Guard has co-located most of these DGPS stations at the old Loran station sites. Think about it, one government agency giving you bum information, another government agency correcting it and a contractor vendor in between selling you expensive equipment at a profit so you can use it; the American way! And wouldn't you know it, after I procured three of these differential beacon receivers the lifting of SA has reduced their significance. I still use mine and find that the accuracy is excellent for finding halibut holes out at Swiftsure Banks. There is also one of these DGPS stations located at an old Coast Guard Loran Station in George, Washington. Why do they need a DGPS station that far inland you say? Well for waterborne craft operating along the Hanford Reach on the Columbia River.

Navigating nuclear material to the Hanford Reservation along a tight river system in a seasonally foggy area is critical. So when I am elk hunting along the Manastash Ridge or waterfowl hunting in the Potholes Reservoir marsh DGPS reception is excellent. Having a super accurate navigation system for elk hunting is not really necessary but when you are in a marsh in the black of night with thick fog trying to find your way through shallow channels, some only a few meters wide, super accuracy can be invaluable. The logical replacement for DGPS is the Wide Area Augmentation System known to its friends as WAAS. The Federal Aviation Agency under the Department of Transportation needing to provide precision flight plan positioning information for the aviation community developed it. Although it is not yet approved for aviation plenty of other users are taking advantage of it. WAAS is based on a network of 25 ground stations in North America (no where else yet), which continually monitor GPS satellite data. These precisely surveyed stations receive the GPS signals and determine what errors exist. Errors are relayed to a wide area master station, which calculates correction algorithms and assesses the integrity of the system. A correction message is then uplinked to a geo-stationary communications satellite (the ones used by Inmarsat - International Marine Satellite), where the message is rebroadcast on the same frequency as the GPS signals (1575.42MHz). This eliminates the need for an independent receiver, like the differential beacon receivers I bought, and allows the communications satellite to act as an additional navigation satellite. WAAS corrects for satellite orbit errors and clock drift, as well as signal delays caused by the atmosphere and the ionosphere, resulting in a positional accuracy of about 3m. The WAAS accuracy of 3m is impressive compared to the inherent accuracy of 15m for a non-WAAS GPS receiver. With SA disabled the actual accuracy could possibly be right around 8m 95% of the time. Therefore it becomes academic whether you use the inherent accuracy without WAAS or with WAAS. You may not need the accuracy that the latest cutting edge GPS technology has to offer. The good news is that virtually all-new GPS receivers come with WAAS built in with no extra associated costs. My latest GPS, and I really needed another one to add to my collection ☺; includes WAAS for incrementally better position and velocity accuracy to find those spring-time halibut holes at Swiftsure Banks off of Cape Flattery or at 3am on a foggy winter morning finding a 2 meter wide marsh channel at northern Potholes Reservoir.