



Squelch Tales

A Bi-Monthly Publication By The San Diego Repeater Association, Inc.

January/February 2012

Advanced Antenna Design

SANDRA's September 2, 2011 meeting featured Gene Swiech (WB9COY) speaking on Advanced Antenna Design. Gene is a Ham by avocation, software engineer by vocation and antenna designer by need. As Gene migrated through various jobs in the defense industry he happened into antenna design and application. He is currently employed at Qualcomm.



Gene began his discussion by reviewing the various designs applicable to Amateur Radio and their advantages, disadvantages, design criteria and installation. Beginning with isotropic radiators, antennas that have a spherical radiation pattern essentially radiating in every direction of three dimensional space. The ground mounted Vertical Monopole antenna is an example of an isotropic radiator essentially radiating in all directions, and as such has a component with a very low angle of propagation, ideal for long distance communication. Vertical polarized antennas are susceptible to man made noise because man made noise is also mostly vertically polarized. The above ground vertical element of the antenna (the monopole) is just one element of the antenna, the other element is the reflection of the

vertical element in the ground or ground plane. One disadvantage of the Vertical Monopole is the extensive radial system (or alternatively a counterpoise system) required by the design.

The simple horizontally polarized dipole generally has a 20 db man made noise reduction because of the 90 degree polarization mismatch with vertically polarized noise. The dipole has a definite broadside radiation direction which gives it a 2.1 db gain over an isotropic radiator in the broadside direction with nulls at both ends. The horizontally polarized dipole is sensitive to height above the ground because RF reflected from the ground can either reinforce or cancel RF radiated from the antenna wire depending on the phase angle of the reflected wave, making installation an important consideration.

The yagi or Uda-Yagi antenna was invented in 1926 by Shintaro Uda and Hidetsugu Yagi of Tohoku Imperial University, Sendai Japan. The antenna consists of a dipole or folded dipole as the driven element and several parasitic elements which are arranged so that they absorbed and reradiated RF from the parasitic elements reinforces the primary RF wave in only one direction and destructively interferes (cancels) the RF in all other directions, focusing all of the RF in a relatively narrow beam. The concentration of the RF on one path gives a higher gain over the isotropic radiator because all the RF from the transmitter is sent in only one direction. Design attributes for beams are insulated versus non-



Continued on Page 5

Christmas Meeting

Following SANDRA's tradition of holding membership meetings on the first Thursday of the month, this year's holiday meeting was held on December 1st, early for the holiday season. The holiday meeting is a joint meeting with FILAMARS, the Filipino American Amateur Radio Society, a group that works closely with SANDRA on a



number of projects. The early date didn't seem to deter the membership from attending as this year's meeting was one of the best attended of the past few years. Owing at least partially to the long list of prizes that are raffled off, the holiday meeting is always the best attended of SANDRA membership meetings, however, this year's meeting exceeded expectations filling the large double room at the County Education facility on Linda Vista Road. Last year SQ suffered a camera malfunction and a dearth of pictures in the meeting report, a situation that was more than remedied this year, as the author took

63 pictures and several others took as many if not more. SANDRA volunteers began by setting up the room in the manner that they had become accustomed for past holiday meetings, however, as people continued to arrive, they added more tables to accommodate the expanding crowd. As the meeting started, they had set up every available table in the large double room. The December meeting is an augmented pot-luck, with SANDRA supplying ham, turkey and drinks in addition to the wide array of dishes contributed by the membership. The real delight of the meeting is sampling the wide variety of pot luck dishes, many of which will not be encountered again until the next SANDRA pot luck. We include photos for a sampling of the entrees and desserts donated by the participants. This year's meeting was chaired by Vice President Stogie Panger (AJ6AX) in the absence of President John Austin (K6RLV). Since this is a well attended meeting and the only time during the year that



many of these people will be together, the 2012 SANDRA officers were introduced to the membership with specific mention of those that helped organize and present this meeting. The highlight of the meeting is raffle of prizes. This year there were 63 winners of everything from handheld

transceivers to decorations on the table. The two Yaesu FT60R transceivers were won by Chuck Wood (WD6APP) and Barbie Flinn (WA6URS), both SANDRA officers. Other prizes included a Rig Runner, soldering stations, multimeters, books, apparel, and gift certificates to Ham Radio Outlet, Starbucks and a variety of restaurants. Many of this year's prizes were donated by a SANDRA member that wishes to remain anonymous but to whom SQ would like to thank.



Many years ago, 1974 to be exact, I spent my first vacation in Montana on the invite from a friend. I fell in love with the place, in and around Anaconda in the west central area and have been going there every year since. In 1983 I started building a cabin on a small

For years I have been trying to promote 6 meters in the area. Finally in 2006 after a trip to 'C' Hill, where the 147.080 repeater is located, it was decided we could put a 6 meter transmitter there. The receiver would have to be located at another site. Fortunately Pat, WA7MKY,



who has the local two-way shop knew of a hill near Lost Creek with a good building. This is about 4-5 miles line of site to 'C' hill. Plans were made; Pat would provide a 6 meter Mitrek transmitter on 53.030 MHz and the required UHF link transmitter and receiver. I would provide the 6 meter Micor receiver on 52.030 MHz and a folded ground plane antenna for next year.

Vacation time 2007. Photo 1 shows Pat with beta hookup of the link receiver and 6m transmitter. In photo 2 our tower climber, Phil, KB7IQO is getting ready to install the 6m receive and link transmit antennas with an able assist

Ham Vacationing in Montana

Ken Decker WA6OSB

ece of property about 18 miles west of town at Georgetown Lake. That kept my vacations pretty well occupied for a number of years as I could only spend 2 or 3 weeks each summer there. I was still working then.

Early on I discovered they had a small, but friendly group of hams in Anaconda that hung out on the local 147.080 repeater. Conveniently this was linked to the 147.160 repeater on Rumsey Mountain which I could see from my property. HT access!

I soon joined the Anaconda Amateur Radio Club, W7VNE. Although they have monthly club meetings, every Saturday morning we meet at a local restaurant informally, and occasionally on weekdays, for coffee. A potluck supper is usually on tap at a member's house in August.

pi from XYL, Maureen, KB7IQN on the ground. Photo 3 shows the finished antenna install, nice work Phil. Photo 4, Phil, KB7IQO is standing next to the 6m receive rack. The 6m transmitter and link receiver was installed at the 'C' Hill site, photo 5. A ground plane antenna was installed on the fence for 6m.

Another project this year was installing a new tri-bander at Pat's QTH. Photo 6 shows the antenna being hoisted up to Phil, KB7IQO, (naturally) on the tower.

The repeater has been working fine through 2007 and 2008. However a look at the receive site in August '08 showed only one radial left on the antenna. Close inspection revealed that wind vibration



Ham Vacating (Continued from page 3)

had caused the solid aluminum radials to work harden near the mount and break off. Phil, KB7IQO fabricated steel mounting rods with 3/8 x 24 female threads. Ken, KOPP provided stainless steel whips for the radials that could flex to handle the ice and vibrations. Photo 7 shows Phil climbing down after repairing the antenna. In photo 8 club members are enjoying breakfast at Donivan's in Anaconda. This was typically prior to a hill trip.

Fun project for 2009 was the removal of a (supposedly) bare 80 foot Rohn 25 tower from 'C' Hill. When we arrived there, wind monitoring telemetry equipment had been installed on the tower. Arrangements



were made to remove it and bring it to Pat's shop. Again, Phil was the tower man. Except for the wind and some sections that were difficult to separate, all went well. Photo 9 shows Phil removing the 70 foot section. Some of the work crew, photo 10; Phil, KB7IQN; Ken, KOPP; Ken, WA6OSB and Leonard, KB7YKL after safe removal of the tower. The loaded tower and building in the background is where the 147.080 repeater and 53.030 transmitter is located.

Summertime 2010: One of my main projects this year was assisting in tree removal on my property. Pine beetles have been decimating the Lodgepole pines over

the past few years. Approximately 60 trees were taken down.

The repeater had been experiencing some interference, apparently on the link frequency and there was talk of upgrading and single siting it. That became the proposed project for 2011.

We had a fun potluck/BBO at the QTH of Ken, KOPP and Rose, K7HKW, photo 11. Entertainment was provided by Donny, K7SIK on keyboards and Beth KB7YKZ, XYL of AI, KD7KD on guitar and vocals. Photo 12.

Early 2011: Our single siting plan depended on obtaining a 6m duplexer. They are hard to find and usually don't come cheap, even used, but I got lucky. I located some cans in Southern California from a repeater that no longer existed. They were outside, (OY!), and no cables, but didn't appear to be in bad shape. I made an offer that was accepted. Now to get them working. They had to be cleaned, one had leaves

Ham Vacating (Continued from page 4)

inside, some had a bit of corrosion, but they came out OK. New RG-214 cable and silver plated UHF connectors were purchased. With some good info from Dan, N6BKL, the new cables were fabricated. Fortunately my service monitor has a good tracking generator and large display. One by one, each band pass/band reject 10 inch can was tuned. Then each pair was tuned with the interconnecting cablessweet, they looked great.

Meanwhile up north, Pat was working on the Mastr II repeater. One hiccup, the boards were mid-split. Luckily I had a high-split Mastr II and sent the boards to Pat. Hey, we are making progress. I had the duplexer tuned and mounted in a quad configuration and Pat had the repeater going.

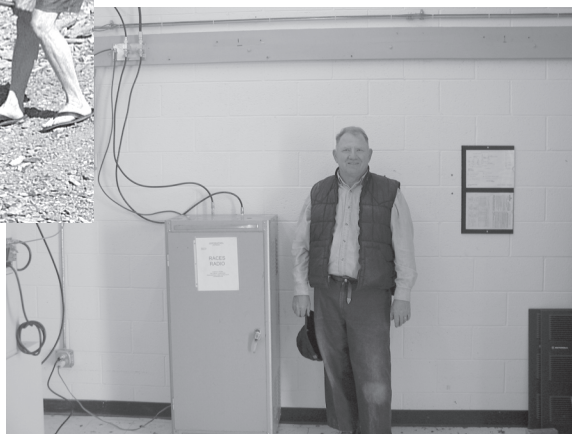
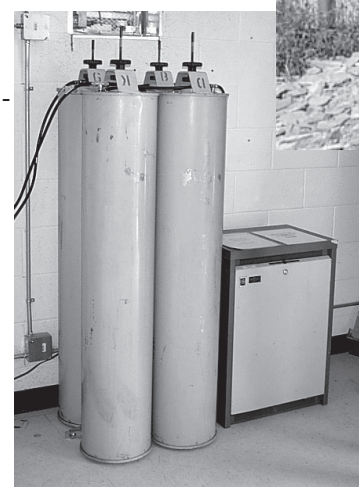
Summer 2011: Vacation time, the duplexer was loaded in my truck with help from Gary, N6LRV. Four 6m cans together (one duplexer) gets cumbersome. About 1200 miles later, I arrived at the cabin. It was another 2 weeks before we got a working party together to go to the site. The duplexer was unloaded and schlepped into the building, see photo 13 (L-R: Russ, KG7VQ; Al, KD7KD; Ken, WA6OSB and Wayne, AB5ZA). Then it was re-swept. After all those miles, it only needed a slight re-tweaking on one of the cans. The repeater was unloaded from Pat's truck and schlepped into the building, photo 14 (L-R: Russ, KG7VQ; Al, KD7KD and Wayne, AB5ZA)



The single site repeater is now up and running, photo 15. Most of the working party is in photo 16, (L-R: Russ, KG7VQ; Russ's daughter Erin, KF7NKY; Wayne (thumbs up), AB5ZA; Al, KD7KD; Ken, K0PP and Pat, WA7MKY).

When the band is open, give a listen on 53.030 for the Anaconda 6M repeater. The call is KB7IQO, input is 52.030 with 131.8 tone. Last checked in September it was putting out about 75 watts from the duplexer.

73 Ken WA6OSB



SANDRA Board of Directors Meeting Minutes—October 6, 2011**Board Members present:**

President – John Austin – K6RLV
Vice-President – Stogie Panger – AJ6X
Secretary – Barbie Flinn – WA6URS
Treasurer – Ken Decker – WA6OSB
Membership Chairman – Bob Boehme – W2IRI
MAL-1 – Bayard Rehkopf – K6GAO
MAL-2 – Chuck Wood – WD6APP
MAL-3 – Tom Myrick – N6JOJ

K6RLV called meeting to order at 7pm
Minutes of the September 1, 2011 were approved as submitted.

Treasurer Report:

Checking Account balance: \$ 4,006.10
Savings Account balance: \$13,975.48

Correspondence:

K6RLV sent a letter to the BLM as required for the occupancy of Mt. Otay.
SANDARC delegate WD6APP reported that SANDARC is updating their By-Laws.
Membership Chairman W2IRI reported SANDRA has 245 members.
Nominations for December elections were closed. The Board for 2012 will be President - K6RLV, Vice-President - AJ6X, Secretary -WA6URS, Treasurer – WA6OSB, Membership – W2IRI, Meeting – N6VVY, MAL-1 – WD6APP, MAL-2 – N6JOJ, MAL-3 – K6GAO.

New Business:

Several members reported hearing a repeater located on Mt. Palomar using the same frequency as High Pass145.280 Mhz. Our technical committee is aware of the situation.
WA6OSB is working on the IRS Form 1128.
WA6OSB sent the California SI-100 in July with the \$20.00 fee.
Our site agreements for the users in the Mt. Otay site is being updated to state the change in the billing dates.
Our Christmas Party will be Thursday, Dec.1, 2011 in rooms 401 & 402 at 7pm.
Members are requested to give ideas for the prizes. We have allotted \$300 for prizes.

Announcements:

WA6OSB stated that the SCRBBBA Meeting will be October 15, 2011.
W2IRI made the Motion #100611-1 to adjourn the meeting at 7:30pm. K6GAO seconded the motion. It carried unanimously.

Respectfully submitted,
Barbie Flinn - WA6URS
SANDRA Secretary

SANDRA Annual and Board of Directors Meeting Minutes—November 3, 2011

Annual Meeting was called to order at 7pm by President John Austin K6RLV.

Pledge of Alliance

Ballots for election were handed out.

This was an unchallenged election.

Board members were introduced.

The New Board of Directors for 2011 - 2012

President – John Austin – K6RLV

Vice President – Stogie Panger – AJ6AZ

Secretary – Barbie Flinn – WA6URS

Treasurer – Ken Decker – WA6OSB

Member-at-Large – 1 year – Chuck Wood – WD6APP

2 year - Tom Myrick – N6JOJ

3 year – Bayard Rehkop – K6GAO

Meeting Chairman – Ben Concepcion – N6VVY

Membership Chairman – Bob Boehme – W2IRI

The minutes for the October 2011 meeting were approved as submitted.

The Treasurer's Report for October 2011 was approved as submitted.

Membership Chairman – Bob – W2IRI stated our membership is 245.

Changes to the Policy Manual need to be redone. Also the site agreement also needs changes. Ken – WA6OSB and Alex – WB6DTR will work with Jason – NF6E to make the changes.

John – K6RLV discussed the cost of construction on Otay site road. Chuck WD6APP made the motion 110311-1 for up to \$400 for the project. Bob – W2IRI seconded the motion. The motion carried.

Christmas Party will be Dec. 1, 2011 at 7pm. in rooms #401 & 402. Prizes include a club membership, HRO gift certificates. Ken – WA6OSB is in charge of the prizes.

SANDARC - Our delegates stated that SANDARC new by-laws were not approved by the membership clubs. There are no dues for SANDARC.

Bob – W2IRI made motion 110311-2 to adjourn the meeting at 7:40pm. Tom – N6JOJ seconded the motion. The motion carried.

Respectfully submitted,

Barbie Flinn – WA6URS

SANDRA - Secretary

SANDRA Board of Directors Meeting Minutes—January 5, 2012

The meeting was called to order at 7:03pm by President John Austin, K6RLV.

Minutes:

Two typos were corrected. Tom, N6JOJ made motion 1512-01 to approve the corrected minutes of the Nov. 3, 2011 Board meeting. Bob, W2IRI seconded the motion. Motion 1512-01 was approved as corrected.

Treasurer's Report:

Treasurer Ken, WA6OSB presented the current treasurer's report.

Ken presented the annual report.

The 2012 budget estimate was presented to the board.

President John, K6RLV made standing committee appointments:

Bayard, K6GAO to assist our meeting chairman, Ben N6VVY.

Alex, WB6DTR to assist our technical committee chairman.

SANDARC representatives are Bob, W2IRI and Chuck, WD6APP.

Alex, WB6DTR is an advisor to the board.

Jason, NF6E is the Web-master and an advisor.

Herb, KF6ROX is SQUELCH TALES editor.

SANDARC: President John, K6RLV will give the boards' suggestions on SANDARC's By-laws changes to our delegate Chuck, WD6APP.

Tom N6JOJ made motion 1512-02 to adjourn the meeting at 8:03pm. Bayard, K6GAO seconded the motion. The motion passed unanimously.

Respectfully submitted,
Barbie Flinn – WA6URS
SANDRA Secretary

Advanced Antennas (Continued from page 1)

insulated booms, boom length, element length and element spacing, all of which determines gain, bandwidth, and front to back ratio. The number of independent elements in mechanical contact also impacts the noise generated in the antenna. The Yagi being essentially a balanced antenna with an impedance near 20 ohms needs to have a matching network for unbalanced lines and to match feed line impedance. Yagi antennas can be ganged and fed with phasing networks for additional gain, mounted either vertically or horizontally or ganged and phased for circular polarization.

Gene discussed the Zepp antenna which was developed to have a low voltage at the feed point as a safety precaution for use with hydrogen filled Zeppelin airships. Having an antenna that was a long trailing wire was also a plus for airship use. The Zepp antenna models as an end fed dipole with similar performance characteristics. The J-Pole antenna, which is a popular VHF design, is actually a Zepp antenna with a built in matching stub. The J-Pole can be vertically mounted for FM modulation or horizontally mounted for SSB and CW operation.

Gene spent some time designing antennas to be used by schools to communicate with the International Space Station (ISS). These need to be easily transported to various schools participating in the program and easily aligned to the ISS. Space communication uses circular polarization which can be left handed or right handed circularly polarized and just as there is a 20 db loss between vertically and horizontally polarized antennas there is also a 20 db loss between left and right handed

circularly polarized antennas. However, there is only a 3 db loss between a circularly polarized antenna and linearly polarized antenna polarized vertically, horizontally or somewhere in the middle. Gene designed a Yagi for use with schools to contact the ISS that was easier to set up, align and by designing in more than the 3 db gain, more than neutralized the loss between the circularly polarized ISS and the linearly polarized Yagi.

The process of designing high performance antennas is the process of determining the desired antenna performance and manipulating the design characteristics to optimize the desired performance. Gene's talk was well received by the group and well worth attending. {SQ}



Errata

This section of Squelch Tales is so we can address mistakes, errors, omissions, and additions to articles previously presented. The section relies on member feedback as we will probably not find too many of our own mistakes. Please write.

Larry Cox (K6AIL) sent an email correcting the history portion of the Sharp repeater article. Larry states that "Bruce Smith and Walt Hicks were not involved until the 1986 upgrade to the system" and goes on to state that "The 76 version was Brian Kantor and David Olson and maybe another person or two that I don't remember." We especially apologize if we have left anyone out and stand corrected as to the history.

At a recent SANDRA meeting, two SANDRA officers got into a discussion of time and why there is an apparent 15 second difference between the time as presented by a GPS receiver and that distributed by the National Institute of Science and Technology (NIST) as UTC. There are actually a number of different official time scales being used by technical organizations and groups. This is an opportune time to discuss time because currently there is an international discussion (read argument) on what the official world time should be and Universal Time (UTC) will probably undergo a redefinition in the next year.

All time scales are based on a second that is defined as 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of caesium 133 atom – this is provided by caesium atomic clocks and fixes the length of the second very accurately. International Atomic Time (TAI) is

determined by the average of 200 caesium atomic clocks counting the seconds since January 1, 1972. Unfortunately the earth wobbles on its axis and the length of the day and the year changes based on this wobble which is particularly noticeable when measure to the accuracy of an atomic clock. Therefore, Leap Seconds (LS) are seconds added and subtracted at various times to TAI to align time with the earth which results in Coordinated Universal Time (UTC). UTC is calculated by adjusting TAI for the sum of leap seconds since January 1, 1972. Terrestrial Time (TT) is an astronomical time scale that aligns to the universe for astronomical measurements. TT is equal to TAI +32.184 second plus the correction for LS. GPS time is TAI+19 seconds. GPS cannot be adjusted for LS because all calculations would shift tens of thousands of miles and stays bound to TAI. All of this generates differences and confusion when talking about time and not defining the time scale being used. Accordingly, there is currently a movement underway to eliminate the Leap Second and bind all time scales to TAI. Up until a month ago this proposed change was being blocked by the Chinese, however, recently the Chinese have their own problems keeping the systems aligned and are likely to cancel their objection. In a year or so we might find the seasons wandering in time if only by a few seconds. Besides it will all return to 0 leap seconds in 100,000 years or so.



Squelch Tales

SANDRA, Incorporated
 San Diego Repeater Association
 P.O. Box 81103
 San Diego, CA 92138

SANDRA NETS

Sunday 8:00 P.M. Mt. Otay Repeater
 Wednesday 7:30 P.M. Mt. Laguna Repeater

GUIDELINES SUMMARY

SANDRA, Inc. operates their repeaters for service in the San Diego area. The policy of the organization is that the repeaters are available for all licensed amateur radio operators to use so long as applicable rules and regulations are observed, whether members of SANDRA or not.

SQUELCH TALES

SQUELCH TALES is published bi-monthly by the San Diego Repeater Association (SANDRA, Inc.), a corporation dedicated to the promotion of amateur radio. Distribution is free to members.

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SANDRA MEMBERSHIP & BOARD MEETING

The SANDRA membership meets the first Thursday in the Months of March, June, September and December. Meetings start at 7:00 P.M. and are located at the San Diego County Education Center, 6401 Linda Vista Road, San Diego. Board meetings take place immediately following each membership meeting and additional Board meetings take place in January, February, May, July, October and November. All SANDRA members are encouraged to attend.

SANDRA Repeaters

| Callsign | Location | Input | Output | Callsign | Location | Input | Output |
|----------|------------|----------|----------|----------|----------------|---------|---------|
| WB6WLV | Mt. Otay | 146.040 | 146.640 | WB6WLV | Mt. Laguna | 444.200 | 449.200 |
| WB6WLV | Mt. Otay | 222.600 | 224.200 | K6GAO | Hi-Pass | 144.680 | 145.280 |
| WB6WLV | Mt. Otay | 444.500 | 449.500 | W6SS | Lyon's Peak | 146.865 | 146.265 |
| WB6WLV | Mt. Otay | 1270.300 | 1282.300 | K6AIL | Sharp Hospital | 147.285 | 147.885 |
| WB6WLV | Mt. Laguna | 147.750 | 147.150 | WB6WLV | San Diego | 442.320 | 447.320 |
| WB6WLV | Mt. Laguna | 222.460 | 224.060 | | | | |

All SANDRA repeaters use PL 107.2