



CROSSTALK

NEWSLETTER of the
SPACE PARK EMPLOYEES
ASSOCIATION
Amateur Radio Club

Volume 36 Number 8

Sept, Oct, Nov, Dec 2004

From the editor:

Another year is almost over, and it has been a busy one. You will notice that this issue covers the last four months. I hope everyone has a great winter break, and will be ready for some great hamming in 2005.

You should have gotten a ballot for the club officers, if not contact Wendell Young. Please vote and return your ballot before December 31.

And keep sending articles and information for the Crosstalk to:

- jim.harrison@ngc.com
- *Crosstalk Editor, Jim Harrison K6OUE*

Don't forget!

- **Club Meeting: Tuesday December 14, 5:30 PM Round Table Pizza**
 - Dennis Santiago NB6I on Field Day 2004 results
- **Swap meet: Saturday December 25, 7:30 AM to 11:30 AM**
- **Club ballots due December 31**
- **Club Meeting: Tuesday January 11, 5:30 PM Round Table Pizza**
 - Hobson Lane KG6TOD on his sailing trip thru the Panama Canal

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SEA ARC Monthly Calendar of Events

| | | |
|---|------------|---|
| Second Tuesday of each month | 5:30pm | Club Meeting Round Table Pizza, southeast corner Redondo Bch. Blvd. and Hawthorne Blvd. |
| Second Tuesday of each month | 12:00 noon | Emergency Communications Team Meeting R3 Emergency Operations Center |
| Third Monday of each month | 5:30 pm | Executive Board Meeting, R3/1036 (All Club Members are invited) |
| Last Saturday of each month (Rain or Shine & Holidays) | 7:00 am | SEA ARC W6TRW Swap Meet Marine and Aviation (Southeast Corner) |
| During the Swapmeet | 10:00 am | VE Exam Sessions in Cafeteria |

Weekly Events

| | | |
|---|------------|--|
| Every Monday Night (Except the 1st & Holidays) | 7:30 pm | Disaster Communication Systems (DCS) Net DCS Members: Check in on 2m Rptr |
| Every Wednesday | 12:00 noon | ECT Net on 2 meter Repeater All Amateurs Welcome |
| Every Wednesday | 12:00 noon | NG Family Net 14.270 MHz |
| Every Thursday | 6:00 pm | W6TRW Net on 2m Repeater All Amateurs Welcome |
| Every Thursday | 7:00 pm | Space Hams Net on 2 meter Repeater with N6SHI and W6EKK |
| Every Mon, Wed, Fri | 2200Z | W6TRW Retirees Net 7185 KHz |
| Every Friday Morning | 7:00 am | SEA Amateur Radio Club Breakfast Building S Cafeteria - Everyone is invited Talk-in on 2 Meters |

We are making some real progress on Tower 2 again. This is the second tower on building S at Space Park that will hold a 4-element 40m beam, a 7-element 6m beam, an 18-element 2m beam, and a 6/2/440 vertical.

While attempting to tune the 7 element 6m yagi last summer, it was found that the set-screw in one of the tuning elements was frozen. Several attempts were made to remove it, but we finally just purchased a new driven element and tuning bars. These were installed on the antenna recently and we tuned the antenna. Thanks to those who helped out at lunch time to tune up the 6m antenna. We had Pete Livingston W3CRI, Milt Noguchi KM6QV, Craig Gullickson N6ED, and Duane Park WA6EIK. We put the antenna on a pole on the roof of Bldg. S and put it up and down several times trying different tuning points. We ended up with the following measurements:

| <u>Freq.</u> | <u>VSWR</u> |
|--------------|-------------|
| 49.9MHz | 1.2 |
| 50.0 | 1.1 |
| 50.1 | 1.0 |
| 50.2 | 1.2 |
| 50.4 | 2.0 |

This will be perfect for SSB and CW on 6m. We also have a vertical antenna for 2m, 440, and 6m FM that will go on the very top of Tower 2.

The 6m yagi, 2m yagi, and vertical antenna are now ready to be mounted on Tower 2. The rotator is also ready. A 4-element 40m yagi will be purchased next year. The goal of an operational Tower 2 is now in sight! Stay tuned for more announcements of Tower 2 activities and opportunities to volunteer to help complete this important club project.

Annual Banquet a Success**Jim K6OUE**

The annual Amateur Radio Club Banquet was a great success and enjoyed by all who attended. It was held for the first time this year at the Proud Bird restaurant in El Segundo right next to LAX on Nov. 20. We had a nice banquet room and the dress this year was optional island attire (for those in the club who don't own a suit and tie!). Our speaker this year was Bob Heil K9EID of Heil Sound. He not only gave a very interesting and impassioned presentation, but he brought many of his products to demonstrate the effects of microphones on the intelligibility of voice communications. He even donated a mic for a raffle prize. It was interesting to hear his stories of how ham radio taught him electronics which, when combined with his original occupation of theater organist, got him into building sound systems for famous rock bands such as The Who and The Eagles, and then forming his own company to make microphones for professional and amateur radio use. He seemed to really be honored to have been invited to talk to our club and he is very passionate about ham radio.

As usual, we had great food, good companionship, and some great raffle prizes. Thanks to Wendy KQ6CG for organizing it again this year.



100 years old is the vacuum tube -
2004. november 16.

100 years ago, on November 16, 1904, the diode was born! The AIP Physics News Update describes the event something like this: "an English scientist, John Ambrose Fleming discovered the first practical electronic device in 1904. This is called the 'thermionic diode', a vacuum tube, and it has only two electrodes, it can be used to convert alternating current to direct current." (In England, of course, the vacuum tube is called a 'valve' for a good measure, because the electrical current can only flow in one direction in it - provided, that the 'valve' is not damaged!)

Happy Birthday, vacuum tube/valve!
Paul - N6DMV.

The picture to the left shows a World War II German transmitting tube, the RL12P35, which was the 'work-horse' of the military. It loved to work with 800 volt plate voltage and having the anode glow with a nice warm dark red color (colour). It was good to about 50 MHz. The Luftwaffe used the tubes mostly in the 40 MHz band.

Hams Help Hurricane Victims

Calvin Hashi KH7W

I was called up by FEMA to respond to Hurricane Ivan as a member of the Disaster Medical Assistance Team CA-1, based in Santa Ana, CA. The medical team includes physicians, nurses, paramedics, EMTs, pharmacists and administrative and logistics staff. I serve as the team's Communication Officer and my typical role on the team is to facilitate the use of the UHF two-way handheld radios and the portable satellite communications terminal. Wendell KE6ASC, Jason KD6ELS, and Connie WA6JLD are also active members of the CA-1 team.

I flew from LAX to Memphis, TN on Thursday (16 September). After staying overnight, all 35 team members met up on Friday (17 September) morning and we reloaded our medical and support equipment cache into three rented trucks at the FEDEX center in Memphis. We then convoyed with 10 rented vehicles and the trucks to Birmingham, AL. We staged in Birmingham for two nights until Monday when we received orders to report to Fort Rucker, AL. Fort Rucker is in the southeast corner of Alabama and the primary helicopter training base for the U.S. Army.

We staged at Fort Rucker for five days awaiting an assignment and were on a 30-minute recall. The accommodations were five-to-a-room on the base and breakfast cost \$1.70 at the cafeteria (from 0600 to 0700 hours). We were afforded PX privileges so we could do a little shopping and the base has an excellent and free army helicopter museum. The FEMA Joint Mission Team, which is the "field headquarters", was also staged there.

At the end of the week (Thursday?) we received orders to drive our convoy to Pensacola, FL to setup a field medical clinic on Perdido Key which is a small barrier island just off of the Florida coast. After waiting at the hospital in Pensacola for six hours, it was decided that the island would be closed to residents for two more weeks due to unsafe conditions and we were ordered back to Fort Rucker. We saw many downed trees and some building damage along the route.

On Friday (24 September), we received travel orders for Fort Lauderdale, FL to pre-stage for the arrival of Hurricane Jeanne. We traveled by bus to Tallahassee, FL, flew to Orlando by regional commercial jet, and then drove rented vehicles to Fort Lauderdale. The day started at 0700 and we arrived at the Wyndham hotel on Saturday at 0500 hours (a 22-hour day). We did receive an overnight medical mission for half of the team to support a special needs shelter (patients using oxygen, etc.) in a hospital to the north in Lantana, FL. The hurricane on Saturday night brought some rain and winds but landfall of Jeanne was about 100 miles north of us and we lost electrical power twice but only briefly.

On Sunday (25 September), we were sent to the town of Stuart in Martin County, FL and arrived at 1800 hours. The sister North hospital of the Martin Memorial Medical Center South was damaged by Jeanne and completely shut down. In the county of 90,000 people, approximately 80,000 were without power and the South hospital was the only open medical facility in the county. The Emergency department at Martin South typically sees about 60 patients per shift; they were receiving about 150 patients per shift after the hurricane.

We completed setting up two medical treatment tents and a pharmacy tent just outside the Ambulance entrance at 0200 hours Monday (26 September). We spent the rest of the night on army cots set up in the rehabilitation/sports center amongst the exercise equipment. From 0600 hours, the team treated approximately 60 patients per shift; the second shift ran until 0300 hours. All patients entered through the hospital emergency admissions department to be triaged and the minor cases were sent to our medical team for treatment. At various times on the deployment, the Orange County team was supplemented with team members from New York, New Jersey, Virginia, Alabama, Kentucky, Pennsylvania, and Illinois.

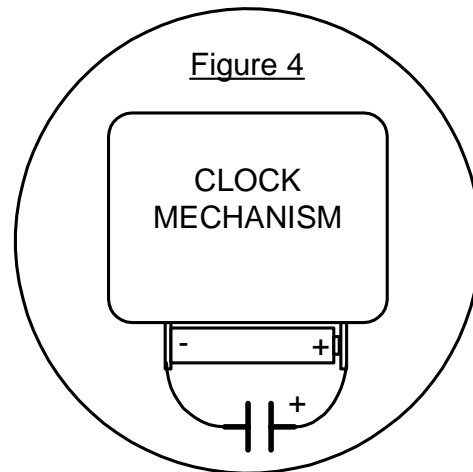
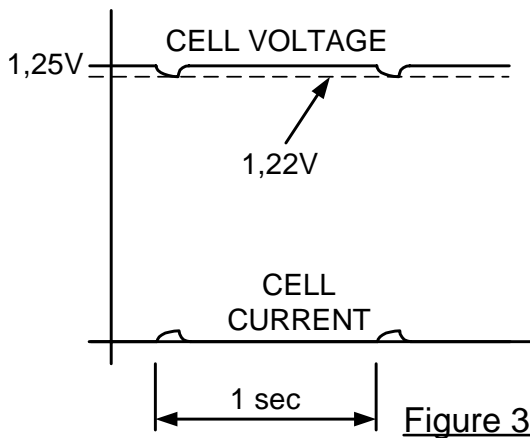
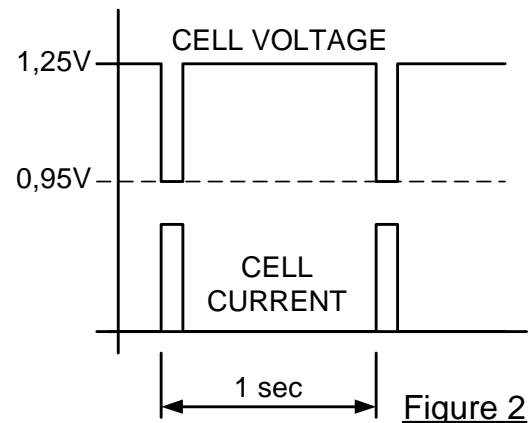
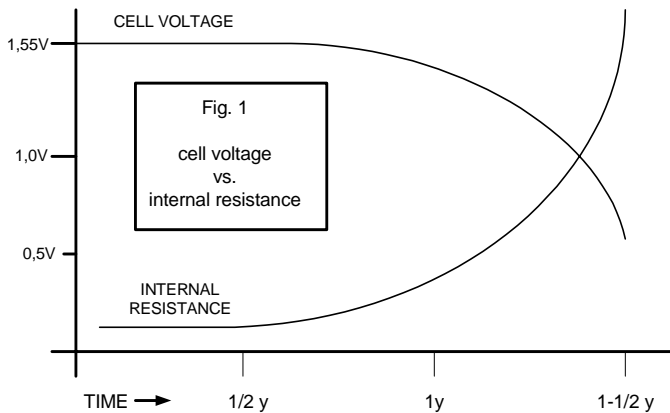
At the end of the shift, we drove 70 miles south to stay overnight in a Holiday Inn in Pompano Beach, FL. On Tuesday (27 September) morning, we transferred the mission to the Florida DMAT from Pensacola, FL who were smart enough to also bring along several air-conditioning units. Several of our team members had suffered from the heat and humidity on Monday. The CA-1 team then drove back to Orlando, FL to stay overnight at the Renaissance Hotel near Sea World (the breakfast buffet was \$13.95 per person).

On the way back on Wednesday (28 September), the three team members (myself included) flying into LAX were lucky enough to be bumped up to first-class by American Airlines. In fact, throughout the entire deployment the people we met were extremely kind and generous to our team members. For the fourteen continuous days of deployment, we logged 207 working hours and traveled 1500 miles between Memphis and Orlando.



Did it ever happen to you, that you discovered that your clock battery gave out, losing time - the clock stopped completely, or the second hand just jerkingly trying to advance without success? It happened to me a few times, and I thought I will do something about it. At least extend the useful life of the battery. The following is an article as appeared in the March, 2004 issue of Hirmondo, an IHARC publication

It was noted, that toward the useful end of the batteries, the internal resistance increases along with the drop of the voltage. With no load on the cell, the voltage stays up for a relatively long time, although the internal resistance increasing dramatically. Most of the battery operated clocks feature a small, pulse duty electrical motor, stepping every second. The motor draws a relatively high current, but since the duty cycle is low, the batteries last from 6 months to about a year, or somewhat longer with a better clock. Figure 1. shows the relationship between the cell no-load voltage and the internal resistance.



Batteries come in different styles - alkaline, etc., so are the clocks. The above graphs illustrate a hypothetical average 1,5V AA battery with a conventional clock. The fresh battery is about 1,55V, and the internal resistance is low. Fig. 2 shows an aged, but still operational battery, it shows the large current the cell has to supply during pulsing. By arranging (wrapping, soldering) 2 wires to the clock terminals and connecting (with the correct polarity!) of a 1000-2000 microfarad capacitor (Fig. 4), the current out of the battery is dramatically reduced, the capacitor does the heavy lifting by supplying the current during the pulses. This very simple arrangement effectively reduces the battery-capacitor system's impedance, and during the pulse, the majority of the current is supplied by the capacitor. I had one of those failing batteries (Fig. 3), just tugging the second hand but unable to advance it, for about 3 months sitting

there and just jerking. Then I applied the capacitor, and the clock came to life: the clock was running for almost an extra year on that half-dead battery! I use this system on all of my clocks with good results, and am using a 16V min. electrolytic capacitor to cut down on the leakage current. In the long run, every microampere saving help!

Crosstalk History

Dave Nelson AB6DU

As this is the first year of this column, we are including notes from the first years of Crosstalk (starting 1968) and from 25 years ago (1979). It provides a historical perspective on club events and former members and highlights significant items of our rich heritage. Bracketed comments are by the author. Copies of the original Crosstalks are included on the club website (Members Only page) along with this current issue, for those wanting complete details.

From the cross talk, September 1968

THE PREZ SEZ, by Doug Heydon, WB6WDS, reports on the logo/title for the newsletter. The Executive Committee unanimously agreed to accept the logo designed by Ray Kirby [no call sign reported] and the title by Don Schweitzer (WB6TES). [Ah, another mystery resolved! Now then, when was it changed to one word?]. . . It was only September, but Prez Heydon announced the names and phone numbers of the Nominating Committee for next year's officers. [Doug seemed to have *planning* ingrained in his *modus operandi*.] . . . In the ongoing saga of the antenna towers, it was reported that a volunteer crew of 7 finally painted them. [Those of you following the saga of our current Tower 2 antennas will notice our stop-start pace closely follows club tradition, apparently long entrenched in club history.] . . . *SECRETARY'S REPORT* was very brief in that a quorum was not present at the last general meeting. But those present enjoyed a talk by John Richmond of IRC on "The Use of Semiconductor Rectifiers" . . . And the *TREASURER'S REPORT*, by Ed Thornley, WA6JHD, reported a closing balance of \$98.76 that month. He added a thank you for a donation to the club of a Collins low pass filter, a dummy load, a pair of heavy duty filter chokes and a small blower. . . In *PROGRAM NOTES*, Arnie Cohn, WB6VTQ, listed the upcoming Metrology Lab tour for the September meeting program, the upcoming second annual [and when was the last?] family picnic, and the second November [ah hah! It did start in 1967] Nominations and Award Dinner. . . Doug Freeman, WA6AZW, provided a Field Day Critique. His recommendations included tuning antennas before erecting them at the field day site, and that the directional HF antennas should be capable of being rotated. Also that sufficient gas cans be available for refueling the generator. Operationally, the CW – SSB interference on same bands was a problem. No solution was suggested, but was clearly wanting. VHF however, was a reported success, providing over 2700 points. Other problems were mentioned, with need for sleeping quarters a key issue. Logging was manual in those days, and trying to decipher the wee hours scribbling was a real headache for the QSL crew [10 named for this duty!] . . . One of the benefits of club QSL cards allowed others to qualify for the TRW Systems ARC achievement award. Five cards from the club or member stations qualified for that award. It was also mentioned that Art Bliss, K6TJO, wanted to contact as many members as possible, probably to set a record for number of W6TRW member contacts. [I wonder who would win that one today?] . . . *OSCAR NOTES* by George Peck, K8WAI, reported all OSCAR gear was moved near the shack and was soliciting volunteers to complete the ground station. . . *BLIPS* by Don Schweitzer, WB6TES, provided a one column essay, *IS OUR STATION A DOG?* capturing some club issues, hopefully motivating members toward club goals. An adjacent column translated each thought into 60's era slang under the title, *IS WB6WPO K90?* [Readers are referred to the original text. No way this writer would touch that one.] . . . The *cross talk* made mention that ARRL was proposing a 5 band DXCC. [Ahh, so that's when it got started. How's yours coming?]

From the September 1979 cross talk, News Bulletin of TRW Amateur Radio Club

[*cross talk* has lasted at least 11 years. We don't yet know when it was changed to one word.] Up front, this issue announced the next meeting program would be "Slide Presentation Antarctic," by John Lohr, K6AEL/KC4AAB...After 11 years, *The Prez Sez* column by the club president was missing. [Wonder how long that column actually lasted? It seems like such a good idea.]...A *SWAPMEET* paragraph by Bill Schreck, WA6EVS, summarized its evolutionary status in 1979. It was described as very well attended with 75 plus sellers and over 500 plus buyers, becoming a major amateur event in the LA area. The club booth was operated by three members, with three more handling traffic and parking...For the W6TRW shack, the long expected Bencher paddle and MFJ keyer were finally installed. Then, plans were begun to purchase a 2 meter all mode transceiver, probably a Yaesu 225 RD. [Wonder if that plan ever completed? Anyone seen a 225 RD around the place?...]...*The Gopher's Lament*, by Austin Rudnicki, K6IA, poetically described an encounter between a ham and a gopher, the latter not only winning the battle of the turf, but parlaying it into a radio success, at the ham's expense. [Readers with high literary standards may skim that one.]...The *Treasurer's Report*, by Jim Hill, W6IVW, included a line for swapmeet income of 66.05, and membership dues of 85.00... Thanks to a special mention, we now know that long time member Bob Hume, KG6B, passed his extra class exams in 1979. And still an active DXer. Congrats for your enduring support to the hobby and the club, Bob. [Any current members deserving similar recognition should report to the editor.]...The issue concluded with mention of the upcoming '79 Southwestern Division Convention, announcement of the new club representatives to the Council of Radio Clubs, a paragraph about a 4X4 finding assistance in LA by recognizing a call plate, a "Woodpecker" complaint, a schematic for a T Hunt Sniffer, and the ½ page club membership app. [Readers are encouraged to find these on the club website copy of the entire September 1979 issue.]

From the cross talk, October 1968

THE PREZ SEZ, by Doug Heydon, WB6WDS, reports that a tower raising party for Building 65 was scheduled for Oct. 26, with Fred Reed, W6UMC, as coordinator; that someone pulled the right strings and the company installed phone in the shack; that the company gave permission to use the room across from the shack for a classroom and library; that the club Award Certificate was available to qualified amateurs [whatever happened to that? Anyone have a clue?]; and that Dwight Weber gave the club a Hallicrafters SX-28A. [Ahh, a classic! I'm sure you tube buffs would appreciate that one. Wonder where it went?...]...Doug then appealed to the membership to report their status as ARRL members, pointing out club benefits if we were 51% members. [BTW, this applies today, folks, so please report to the Membership Chairperson if you are an ARRL member]...Doug reiterated that the #1 FD lesson was to plan early! [He would be proud to see the 2004 operations, perhaps we do learn from history after all.]...A summary Minutes of the September Meeting was published, noting that the last two months reports were approved as published in the CROSS TALK...Old Business included status of the tower project, that George Peck had started another OSCAR project, and plans for the new classroom to be used for Training...New Business mentioned the upcoming second annual picnic at Alondra Park and a tour of the Metrology department as part of the meeting...Treasurer's Report showed receipts of \$107.70 and expenses of \$40.04, with a balance of \$310.83...A presentation on quartz crystals was planned for the next noon meeting by Ed Plummer of Monitor Corp...A SPECIAL ANNOUNCEMENT highlighted the second annual awards dinner [\$5.50 per person] at the Lobster House, Redondo Beach. The agenda included nomination of next year's officers, door prizes, and the program by John Griggs, W6KW, ARRL Southwestern Division Director...NEW MEMBERS announced three newcomers. Anyone remember Mac McGrew, W6Y CZ, James Conner, WN6EQE, or Allen Jansen, WB6DOW? ...In SHACK NOTES, Ed Thornley, WA6JHD, reported that the towers were indeed raised to the roof of building 65, but that the mounting pad and eyebolt installation made

by the Maintenance Dept. didn't quite match up to the towers. [Must have been before Radio Ray's time. Building S went a whole lot smoother.]...However, three transceivers were online and an appeal for their use made with 100% QSL as a club goal [which still applies, please]. QSL manager Bill Dews, K6AWO, wrote that pre-stamped QSLs for WB6WPO were provided. Just fill out and drop in the mail on the way out. He added a note that the first CO5 worked by WB6WPO wrote a three page letter in reply saying that his college student daughter had taken the card to school to discuss with her friends. [Cards were a color glossy of the OGO satellite in those days, a most desirable card for any DX station, nearly always getting a reply.]...A Frequency Allocation chart effective November 1968 was provided. [Hey! No WARC bands!]

From the October 1979 cross talk, News Bulletin of TRW Amateur Radio Club

[*cross talk* has lasted at least 11 years. We don't yet know when it was changed to one word.] *THE PREZ SEZ*, by Bill Ivey, WA6QET, reports that the November banquet would feature John Lohr, K6AEL/KC4AAB, with a slide presentation on Antarctica...He also gave contact phone numbers for the nominating committee, another traditional part of the November banquet [actually written into club's constitution now]...Bill wrote that a bidding method was in the works for disposing of excess club assets, "...if the trustee and swap meet chairman could list the excesses in the crosstalk..." [Ah hah! First found use of one word there]...Prize winners for the September meeting included W6EKK, Stan Johnson, who won a mike. [Is it still working, Stan?]. Other lucky winners grabbed tickets for the upcoming Southwestern convention...Bill Dews, K6AWO, listed attendees of the Friday AM breakfast, including one just returned from the HEAO launch, [any HEAO veterans still with us?], Bill Rodner, K6AWS. [Note, Bill can usually be heard on the morning CA-HI net on 14.340, and often checks into the MWF TRW Retirees net on 7.185 from his ID QTH]...A member moved to the Oak Ridge area reports on activities there, apparently quite an active bunch. They also asked if the W6TRW club still awarded the cert for working a certain number of club members. [Anyone have any info on this award?]...Over the Horizon (OTH) HF radars were a constant irritation in those days, and an item on the Russian "woodpecker" included quotes from a letter reply to Herb Glead, W6FQ, from a Member of Congress...*Treasurer's Report* showed an income item from the swapmeet of \$30, and a balance of just over \$248 that month...An estate sale of ham items included a Collins 75A3 for \$325, a Drake TR3 for \$275 (including accessories), and a Swan 2 meter FM transceiver for \$125. [Wonder what they'd bring today?]...Ah, last month reported that the club was wanting a Yaesu FT225RD 2 meter rig. This issue listed the committee of 10 that made that decision with intent to gain best possible price at the Southwestern convention. Still no report if that happened [stay tuned...]...QSL cards, probably showing the OGO satellite, were offered to members. A reasonable printer had been found. Costs provided showed that 500 cards could be overprinted for \$55.50 with member's call sign. [Note, cards showing AXAF may still be available, check with club QSL manager]...A circa 1924 poem lamented a radio widow's plight, sounding still relevant in 2004.

Flashlight Reviews and LED Modifications

Mike Hamada KF6UCN

http://flashlightreviews3.home.att.net/reviews/pila_168s_150s.htm

SEA AMATEUR RADIO CLUB

ELECTED OFFICERS

| | | | | |
|----------------|----------------|--------|-----------|----------------|
| President | Wendell Young | KE6ASC | R3 / 1086 | (310) 813-7691 |
| Vice President | Mike Hamada | KF6UCN | M5 / 0560 | (310) 814-2628 |
| Secretary | Jim Winterroth | KF6IMA | R4 / 1185 | (310) 812-2844 |
| Treasurer | Greg Shreve | KE6YEX | R2 / 1120 | (310) 812-9347 |

APPOINTED STAFF

| | | | | |
|----------------------------|-----------------|--------|-------------|----------------|
| 2m Repeater | John Cheatham | KE6OJM | R9 / 2896 | (310) 813-5903 |
| 447 Repeater/Autopatch | Duane Park | WA6EIK | O1 / 1080 | (310) 813-4219 |
| Activities Chairperson | Mike Hamada | KF6UCN | M5 / 0560 | (310) 814-2628 |
| Crosstalk Editor | Jim Harrison | K6OUE | R6 / 2541 | (310) 814-1937 |
| Emer. Comm. Coordinator | Wendell Young | KE6ASC | R3 / 1086 | (310) 813-7691 |
| Librarian | Jim Harrison | K6OUE | R6 / 2541 | (310) 814-1937 |
| Membership Chairperson | Jason Fujino | KD6ELS | R5 / 2130 | (310) 812-5461 |
| Past President | Bob Briggs | KD6WYQ | O1 / 1250 | (310) 813-2622 |
| Publicity Chairperson | Jim Harrison | K6OUE | R6 / 2541 | (310) 814-1937 |
| QSL Manager | Rod Scott | KE6PI | R7 / 2041 | (310) 813-1493 |
| Shack Master | Pete Livingston | W3CRI | R1 / 1096 | (310) 813-9550 |
| S.P. Packet/Internet Sysop | Chris Wachs | WA2KDL | 201A / 5386 | (310) 813-1506 |
| SEA Representative | Chris Wachs | WA2KDL | 201A / 5386 | (310) 813-1506 |
| Swap Meet Manager | Wendy Crawford | KQ6CG | | |
| Technical Chairperson | John Cheatham | KE6OJM | R9 / 2896 | (310) 813-5903 |
| Training Chairperson | Bryan DeAro | KN6OW | 120 / 1020B | (310) 812-4789 |
| Trustee of W6TRW License | Duane Park | WA6EIK | O1 / 1080 | (310) 813-4219 |
| Webmaster w6trw.com | Duane Park | WA6EIK | O1 / 1080 | (310) 813-4219 |

| | |
|--|---------------------------|
| SEA ARC Hotline (Club Answering Machine) | (310) 813-8569 |
| W6TRW 2 Meter Repeater (Open Repeater) | 145.32 (-600) PL 114.8Hz |
| W6TRW UHF Repeater (Open Repeater / Closed Autopatch) | 447.00 (-5 MHz) PL 100 Hz |
| W6TRW-3 Packet Radio Internet Gateway and BBS (1200 Baud Port) | 146.745 (-600) |

W6TRW Internet Home Page <http://www.w6trw.com/>

SEA Amateur Radio Club
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 One Space Park
 Redondo Beach, CA 90278

FIRST CLASS

Deliver To:

