

W6OTX

W6ARA

PAARA NEWSLETTER
VOLUME 73, NUMBER 4, April 2022

K6OTA

K6YQT

PAARAGraphs



The Official Newsletter of the
Palo Alto Amateur Radio Association, Inc.
Celebrating 85 years as an active amateur radio club—Since 1937



Pico-Ballooning and Ham Radio

Brian Basura, N6CVO

I will be discussing what Pico-Ballooning is and how it differs from other types of High Altitude Balloons (HAB's). I will also go over the basics of a complete balloon as launched as well as a number of common options. I will then talk about Ham Radio and the key role it plays in this hobby. Finally I'll finish up discussing our recent launches from QuartzFest in AZ.

I'm an Extra Class operator, Assistant DEC for ARES High Desert (LAX Section), VP of the Acton Agua-Dulce ARC and I work as a Hydro-electric Powerplant Technician. I also manage two Winlink Gateways and I am trustee for two local repeaters.

This meeting will be a
Hybrid Meeting
Zoom and In Person

Time: April 1, 2022 07:00 PM Pacific Time

Please check <https://www.paara.org> for
Zoom Details

President's Corner

April 2022

In case you haven't heard; the Electronics Flea Market will hold its first event in 2 years on April 9th at the Sunnyvale Public Library. The event will be hosted by the West Valley Amateur Radio Association. Directions to the new venue can be found here:



Upcoming Events

April 1***	PAARA General Meeting, 7:00 PM In-Person and Zoom Meeting ### Zoom & IRL Meeting
May 6	
June 3	
April 20	Board Meeting, 7:00 PM. Everyone welcome! Zoom Meeting, eMail President for details!
May 18	
June 15	
April 9	Electronic Flea Market

<http://www.electronicsfleamarket.com/directions>.

The event will have the same format as before Covid meaning there will be donuts, soft drinks, and coffee. Space cost and size have changed some so check out the website if you intend on selling.

PAARA is hosting the May 14th event. We need lots of members to help throughout the entire 5 AM~12 PM event. This is PAARA's major fund-raising event! This is your opportunity to help raise funds for your club and maybe even pick up a new treasure. You don't need to be there the entire time but some activities like selling food need overlapping schedules so they are staffed the entire time. Here's a shortlist of activities that need coverage:

- Costco run for drinks & supplies
- P/U trailer and generator from Doug's Friday and load stuff from ASVARO's locker & return after the event (tow vehicle is needed)
- P/U EFM stuff from their storage locker, Friday evening & Sat AM transport to site, return the stuff to the storage locker, assist the trailer driver to load & unload the trailer
- Early AM & later gatekeepers x4 about 3:30AM / 2 about 6AM
- Coffee urns & water, make 1st pot early Sat. AM & bring it to the site before 5 AM
- 4:30 AM food tent setup x3

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PAARGraphs — April 2022
Celebrating 85 years as an active ham radio club—Since 1937

(President — Continued from page 1)

- Donuts, order & P/U Saturday 5 AM
- Food sales x4, all-day
- Kick vendors out & Cleanup x2

Please email me at thielem@pacbell.net if you're interested in assisting on this important club event. Also note, the new EFM location is in a residential area. We need to be mindful of that and keep our noise down to a bare minimum before 8 AM. We could lose the permit if residents complain to the city.

If you recall last month's column, I attended Quartzfest and hung around AZ until the Yuma Hamvention. I managed to make some additional contacts despite some days and or nights of rather high winds which blew the base of my Bravo 7K over one night. If you haven't been to the Yuma Hamvention, it's an event that runs from Friday through Saturday at the local fairgrounds. Camping is permitted on the grounds from Thursday through Sunday at noon. This year they allowed campers to assemble in the parking lot between the grounds and the airport.

The Yuma airport is a little unusual as there is a Marine airbase there along with the International Airport. As it turns out, the parking lot is at the end of the main runway used by the Marine Core Air Station, which means LOTS of jets and other planes flying at times rather loudly overhead. When Joanne, K6YL, Randy, Joanne's BF, and myself arrived early on Wednesday, the flight pattern had the planes landing over us. Let me tell you, an F35 landing in a vertical mode with the exhaust nozzle aiming down is REALLY LOUD! I measured them in the 110 to 115 dB range, A-weighted, at about 75' overhead. Thank goodness, there was a warning as the plane approached before it got very loud.

By 3 PM on Thursday we were set up and "camping" on the fairground's lawn. We all wandered around chatting with others who'd set up near us. Numerous people also attended Quartzfest thus turning into a bit of a reunion. The show doesn't open until noon on Friday. Before that, we could wander through the "garage sale" (like a flea market but they can't call it that due to selling restrictions) area as some of the sellers had set up their goods.



Fortunately, the wind turned around thus turning around the flight path of the jets. Generally, they weren't as loud taking off as they were when landing. Though consistently, the wingman, 2nd plane to take off, was much louder than the 1st as they were trying to catch up to the lead plane.

One of the landings late Thursday afternoon was very welcome. Kristen, K6WX, got her airplane back from its annual inspection just in time to fly to Yuma. With big smiles, we got together on Friday morning. It was great to see her at one of her favorite Hamventions.

Besides being there for fun, she gave a couple of wonderful presentations and as the ARRL's Pacific Division Director had a few meetings.

When at Quartzfest, I was challenged by the Northern Arizona DX club which hosted the DX competition to wear my winning hat during the Yuma show. I met the challenge of having it on throughout the entire event. Of note, the weather was wonderful during the entire event so I never needed the fan in the hat. The hat led to some fun comments as well as starting many enjoyable conversations. I even met a couple of past winners thanks to my hat. Though it was a little hard on the head after being on all day, it was worth it!

Pink, K7ILA, drove her tent trailer down for the show. Though we saw her at Quartzfest, it was wonderful to see her again and spend a bit more time visiting. She's been rather busy with all of her various activities. She committed to coming for Field Day assuming we can conduct the event.

Randy, Joanne's, K6YL, BF, was under the gun to take his technician's test. He studied himself silly preparing for the test. To his credit, he was asking LOTS of questions both related to the test content as well as amateur radio in general. I received a joyous text from Joanne on Saturday that Randy had passed his test. He now has the call sign KI6TUH. Now he's studying for the General test.

On Saturday, I was walking around through the ven-

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(President — Continued from page 2)

dors when a couple passed me. She said to him “it’s not going to mean an antenna on my house, is it?” He replies “it might.....”. I couldn’t help but stop and quietly laugh! I think he has his work cut out for him.

Yes, it’s true! Yuma has one of the best “Buzzard Dinners” around. It isn’t buzzard but BBQ’d pulled pork or chicken with all the fixings. It’s something that one shouldn’t miss if at all possible. At the end of the dinner, they have the largest raffle prize give-away ever! There were no less than 16 major radios, 7 VHF/UHF, and 9 HF radios with the big grand prize being a Yaesu FTDX-101MP! Unfortunately, none of team PAARA won one of the wonderful rigs.

All told, everyone had a wonderful time during the Yuma Hamvention. It was much different being able to camp at the site of the Hamvention and mill around with others at day’s end. Yuma is smaller, more casual, and spread out than Pacificon but none the less enjoyable.

Once Yuma was over, it was time for the return trip. I did take it slow and had one stop in Redlands to have upgraded anti-sway bars and shocks installed on my Motorhome. Fortunately, the shop where I had the work done also has a small RV park where I was able to spend the night as the work wasn’t completed until rather late in the day. Unfortunately, spending that night in the park cost me an additional day as weather moved in during the night. Snow fell on the mountain passes closing them leaving me stuck in the LA basin. As the passes didn’t open until mid-afternoon and there were LOTS of vehicles stuck in the backup, I opted to spend another night there and leave early the next morning. The next day after 9 hours of driving and 36 days away from home, I returned. Though weary, I had a big smile on my face.

Where are your stories? I’m sure others of you have enjoyed experiences like I’ve written about in the last two issues. Or, have equally interesting adventures involving ham radio. I need something from you for the next issue(s) as I have nothing! Please submit your stories by the Friday after a board meeting. Thanks go to Andy, KR6DD, for getting his story in this issue completed just under the wire.

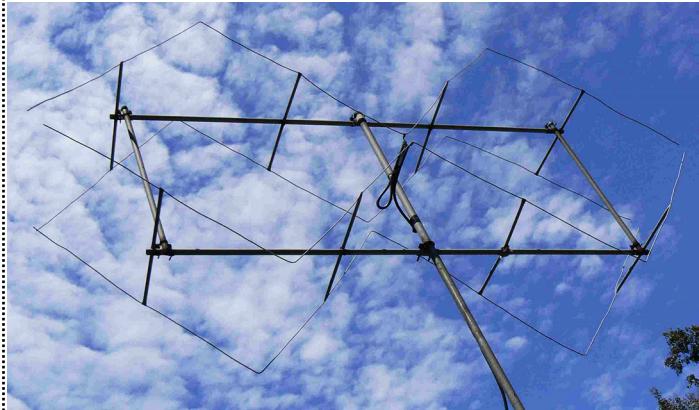
73, Jim K6SV

Get on the air to keep the airwaves alive!

4NC2 Software Model of a 16-Element Broadside Array

Andrew Korsak, KR6DD

I was donated a crazy looking 2m antenna by a ham who retired and left SRI in Menlo Park back around the late 60's or early 70's and moved to the east coast. Here is a picture of it.



I gave this antenna to a ham in the north bay shortly after downsizing from my Emerald Hills home (just outside Redwood City limits in San Mateo county) to a 1br apartment in Mountain View in Aug 2016 where no antennas were allowed. One day recently I got the idea of simulating it using 4nec2 free download antenna modeling software I had used for modifying the March 2021 QST cover page “flag antenna” design (see my article about that:

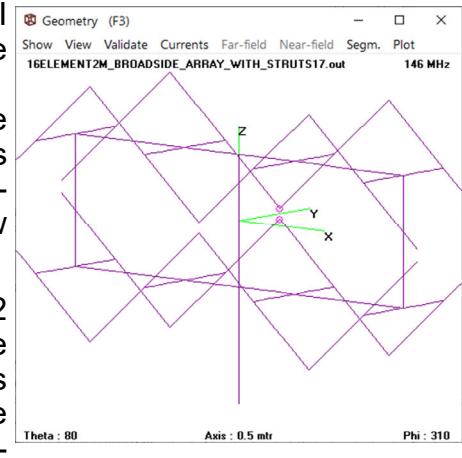
<https://paara.org/newsletter/2022/graph0122.pdf>)

I recall that this antenna had great gain and a smooth roll off of signal received as it was rotated, without any deep nulls as one gets with a long Yagi, so I

guessed at the dimensions

looking at the picture. Here is a 4nec2 implementation view of its structure:

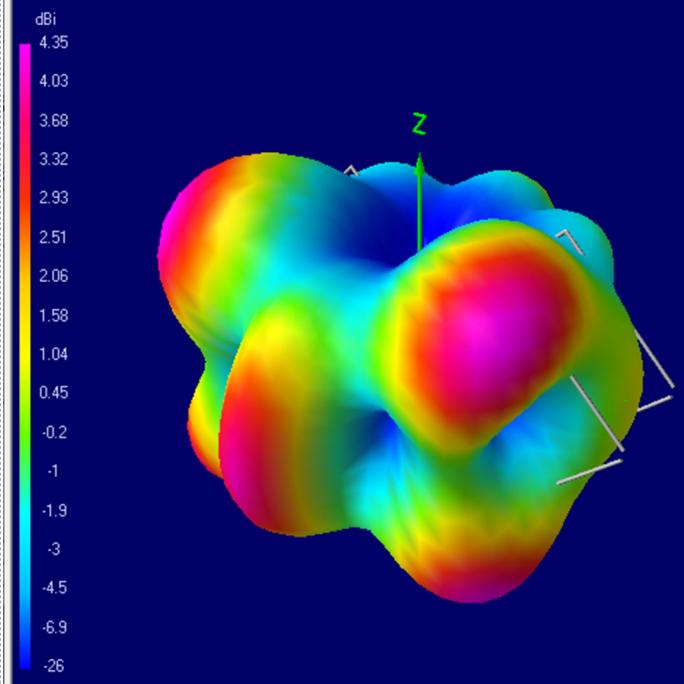
Running 4nec2 on this array the pattern looks nothing like what I expected! I spent the last weeks playing around with parameters like element length, spacing



(Simulation — Continued on page 4)

(Simulation — Continued from page 3)

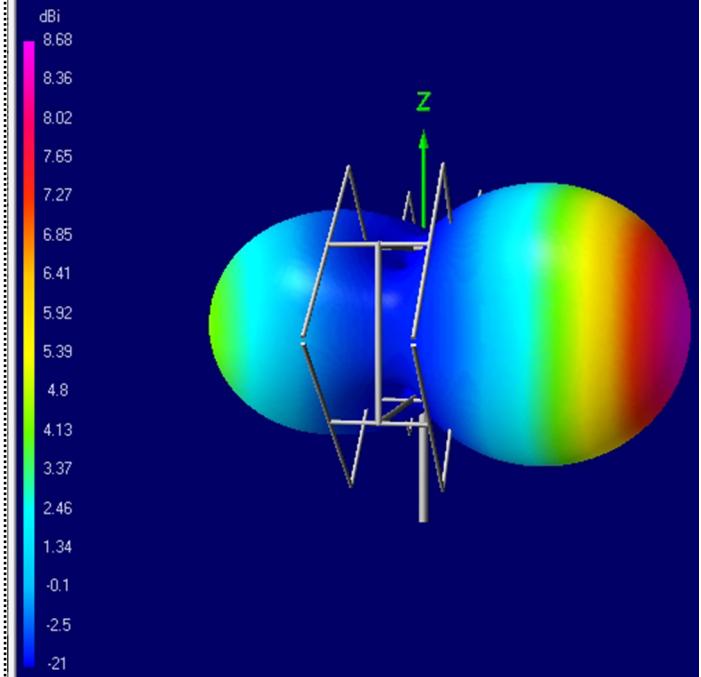
between the two 8 element M-over-W shaped arrays, and small changes to the ratio of radiator to reflector size (or was it a director?). The 3D “jelly bean” pictures for various trial parameters looked absolutely horrible!



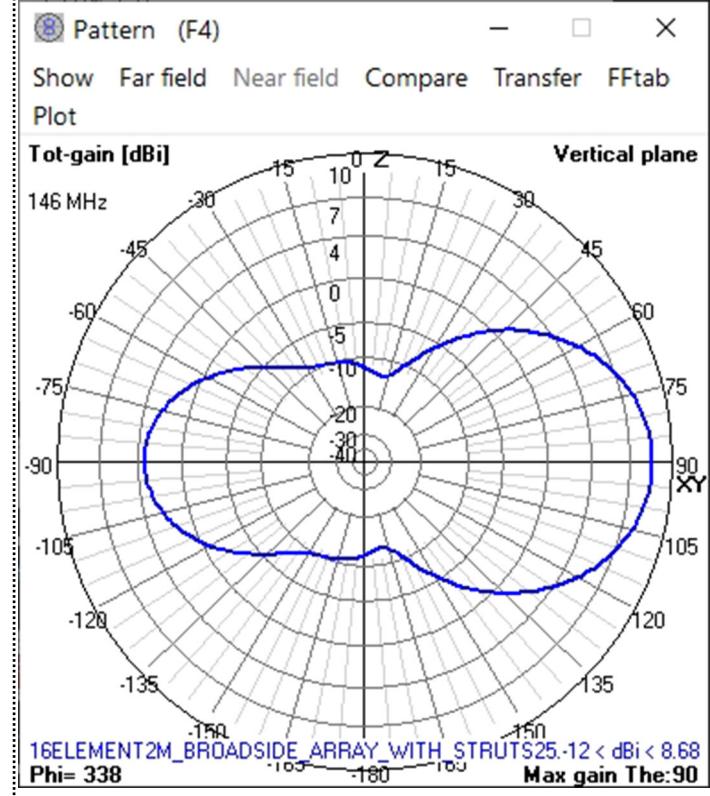
Oh well, maybe it had insulators at some of the junctions, and I was not going to waste any more time experimenting to see if one can arrive at a model having a nice “jelly bean” pattern like this for a VHF Yagi example that comes with the 4nec2 free download:

Well, I contacted Steve K6OIK for help, his being an expert in antenna design, modeling, and simulation. He has given numerous talks at Pacificon, FARS, and PAARA on this subject and others like transmission line and antenna equivalent models. Steve pointed out my errors in wrong implementation of feed line and connections – 4nec2 software has a limited content help .rtf file and its normal type of html help file does not work under Windows10. Here

is a greatly improved pattern I got once I connected properly to the feed points and ran the optimizer again:



And the Polar Plot becomes:



3/16/22 Board Meeting Minutes

Attending: President Jim Thielemann K6SV, Vice President Rob Fenn KC6TYD, Secretary Ric Hulett N6AJS, Treasurer Bob Korte KD6KYT, Directors Doug Teter KG6LWE, Darryl Presley KI6LDM, Joel Wilhite KD6W. Clark Martin KK6ISP also attended. The meeting was called to order at 8:10. A quorum was present.

President's Report: Good news: The EFM (Electronic Flea Market) is happening! Bad news: The EFM is happening! The first market of 2022 will be held April 9. PAARA is sponsoring the second EFM on Saturday, May 14. This is a major source of income for PAARA. We need several club members to step up and assist with setup, selling spaces, food sales etc. Please contact Jim K6SV to volunteer.

Secretary's Report: Most club members have renewed for 2022. Those who have not renewed will not receive a newsletter in April. We welcomed Kieth Swaney K1OKS as our newest PAARA member.

Treasurer's Report: The club expenses have been as normal: We paid for newsletter printing, and the club's insurance. We have invoiced our advertisers for 2022, and most are current.

VP / Program Chair Report Guest speaker for April meeting is Brian Basura N6CVO. He will present on "Pico-Ballooning and Ham Radio".

Old Business

Members! We have an ongoing need for articles for PAARAGraphs! It's member content that makes our newsletter special. Please write up your ham activities or interests and submit to Jim K6SV. We are at the bottom of the barrel, so pitch in!

Education Committee, Rob KC6TYD: The March PAARAGraphs had a request for presenters or Elmers for ham Education topics. We need presenters to support this effort.

EFM update: The first Electronic Flea Market

for 2022 is on April 9, from 5:30 a.m. to Noon. There are quiet hours until 8:00 am. PAARA will sponsor the May 14 meeting. Cost to us is \$1,300 to host the event. We need PAARA members to attend the April 9th EFM, to scope out the operation and understand how PAARA should conduct the May meeting.

We had a discussion about how the new venue (Sunnyvale) will work out, as it is smaller than the Fry's lot.

PAARA repeater: Bob KD6KYT will check on payments for the repeater electricity bills.

Club-owned ham equipment: PAARA has acquired a significant amount of ham gear, mostly donated by families of SK members. Rob KC6TYD, Doug KG6LWE and Ric N6AJS have been building a catalog and setting prices. A few items will be retained for PAARA use, and the remainder will be offered for sale, first to PAARA members and later to the wider ham community. Shri KA6Q is developing a website to display the gear.

Jim Tiemstra's tower removal: Scheduled a club activity for March 19. This has been postponed due to the rain/wind on that day.

Field Day: We are waiting for word from the City of Menlo Park about whether we can get permits for Bedwell Bayfront Park.

April Club meeting: The board decided to hold an in-person PAARA meeting on April 1, with Zoom link available. We wish to move back to in-person meetings as long as the situation allows. The 'eyeball QSO' just can't be duplicated online.

New Business: The board discussed having an honorarium or token as a gift for our guest speakers. We could for instance furnish PAARA coffee cups or the like. Rob and Joel will investigate further

The meeting was adjourned at 8:53 pm.

Respectfully Submitted
Ric Hulett N6AJS
PAARA Secretary

PAARAGraphs — April 2022
Celebrating 85 years as an active ham radio club—Since 1937

Palo Alto Amateur Radio Association, Inc.

PO Box 911 Menlo Park, CA 94026

Officers

President	Jim Thielemann, K6SV	408-839-6815 thielem@pacbell.net
Vice President	Rob Fenn, kc6tyd	650-888-9060 kc6tyd@gmail.com
Secretary	Ric Hulett, N6AJS	408-332-4593 energyconserved@sbcglobal.net
Treasurer	Bob Korte, KD6KYT	408 396 4745 bob@rgktechsales.com

Directors

Director ('21-'22)	Joel Wilhite, KD6W	408-839-5948 kd6w@arrl.net
Director ('20-'21)	Walt Gyger, K6WGY	408-921-5901 walt@tradewindsaviation.com
Director ('21).....	Doug Teter, KG6LWE	650-743-7892 dteter@wcwi.com
Director ('21).....	Darryl Presley, KI6LDM	650 255-2454 ki6ldm@arrl.net

Appointed Positions

Membership	Vic Black, AB6SO	650-366 0636 ab6so@smrn.com
Database	Ric Hulett, N6AJS	408-332-4593 energyconserved@sbcglobal.net
Chaplain	Rick Melrose K6RDM	408-341-9070 K6RDM@yahoo.com
Public Affairs	<i>Position Vacant</i>	
Station Trustee W6OTX, W6ARA....	Gerry Tucker, N6NV	
Station Trustee K6YQT..	Doug Teter, kg6lwe	650-743-7892
Station Trustee K6OTA...	Ron Chester, W6AZ	
Property Manager	Gerry Tucker, N6NV	
Badge Coordinator	Doug Teter, kg6lwe	650-743-7892 dteter@wcwi.com
Historian Position	<i>Position Vacant</i>	
Raffle Coordinators	Rob Fenn, KC6TYD,	rtyd@aol.com
	Shrikumar, KA6Q	
	shri.paara@enabletry.org	
Field Day Coordinator ...	Doug Teter, kg6lwe	650-743-7892
ASVARO Rep.....	Clark Martin, KK6ISP	
	kk6isp@comcast.net	
Webmaster	John Miller K6MM	
	webaron@gmail.com	
Technical Coordinator...	Joel Wilhite. Kd6w	408-839-5948 kd6w@arrl.net
QSL Manager	Marty Wayne, W6NEV	408-234-8023
Speaker Coordinator	Rob Fenn, kc6tyd	650-888-9060

PAARAGraphs Staff

Editorial Board	
Bob Van Tuyl K6RWY	Kristen McIntyre k6wx
Ron Chester w6az	Vic Black AB6SO
Joel Wilhite, kd6w	Jim Thielemann k6sv
Editor	Bob Van Tuyl, K6RWY
	408 799-6463 rrvt@swde.com
Back Up Editor	Jim Thielemann, k6sv
	408-839-6815 thielem@pacbell.net
Advertising.....	Walt Gyger, K6WGY
	408-921-5901 walt@tradewindsaviation.com
Member Profiles	<i>Position Vacant</i>
Technical Tips	Vic Black, AB6SO
	650-366 0636 ab6so@smrn.com
Photographer	<i>Position Vacant</i>

VE Exams

Redwood City Main Library, Community Conference Room, 4th Saturday 10:30 am each month and De Anza Park, Sunnyvale, 2nd Saturday 10:30 am each month except November and December. See website for details and exceptions: <http://amateur-radio.org> or Contact Al, WB6IMX@att.net

Electronics Flea Market

Sponsorship by A.S.V.A.R.O. — Association of Silicon Valley Amateur Radio Organizations
Second Saturday of month, March-September, 6am-12 noon
Contact: <http://www.electronicsfleamarket.com/>

PAARA — Palo Alto Amateur Radio Association

Meets 1st Friday 7:00pm each month at Room H-6, Cubberley Community Center; Net 145.230 - PL 100Hz Mondays at 8:30. See our website at <http://www.para.org> for more information or contact: Joel Wilhite KD6W, KD6W@ARRL.NET, 650-325-8239

FARS — Foothills Amateur Radio Society

Meets 4th Friday each month at 7:30pm
Contact: <http://www.fars.k6ya.org>

NCDXC — Northern California DX Club

Meets 3rd Thursday 7:30pm each month,
Repeater for member info 147.360, Thursday 8:00PM
Contact: <http://ncdx.org> or Mike Gavin W6WZ, (650) 851 8699

50 MHz & Up Group

Meets 1st Thursday each month at 7pm in the Summit Room at the Sunnyvale Sports Basement, 1177 Kern Ave, Sunnyvale
Contact: <http://50MhzandUp.org>

San Mateo Radio Club W6UQ.ORG

Meets, 3rd Friday, January through November
Tuesdays, [Directed] Net, 7pm, N6ZX 145.370Hz -600KHz PL107.2Hz
Contact: <http://W6UQ.org/calendar>

SPECS

Southern Peninsula Emergency Communication System

Meets each Monday 8:00pm on Net 145.27, 440.80 MHz
Contact: <http://specsnet.org> or Tom Cascone, KF6LWZ, 650-688-0441

SCARES

South County Amateur Radio Emergency Service

Meets 3rd Thursday 7:30pm each month, Belmont EOC, Belmont City Hall, One Twin Pines Lane, Belmont CA 94002. Net is on 146.445 [PL 114.8] & 444.50 (PL-100) 7:30 Monday evenings. Contact: President Gary D. Aden, K6GDA 650-743-1265 (D), 650- 595-5590 (N)
Web: <http://k6mpn.org> E-mail: pres@k6mpn.org

SCCARA

Santa Clara County Amateur Radio Association

Operates W6UU & W6UU/R, repeater 146.985-pl
Nets: 2m, 7:30pm Mon; 70cm, 10M (28.385) 8PM Thur.
Meets 2nd Mon each month @ 7:30 PM.
ARRL/VEC license testing contact 408-507-4698

SVECS — Silicon Valley Emergency Communications

Operates AA6BT repeater (146.115 MHz+)
contact: <http://www.svecs.net> or Lou Stierer WA6QYS 408 241 7999

TEARS — The Elmer Amateur Radio Society

Dedicated to operational training, knowledge building & FCC exam testing.
KV6R repeater under construction.
Contact: AA6T@ARRL.NET

Most members are Extra Class or VE's. See QRZ dot com/kv6r for class info

WVARA — West Valley Amateur Radio Association

W6PIY six-meter repeater on 52.58MHz. Normally, six-meters is linked with 147 and 223, while 441 and 1286 repeaters are linked.
VHF: 52.58 (-500) 151.4 ctss UHF:
147.39 (+600) 151.4 ctss 441.35 (+5.0) 88.5 ctss
223.96 (+1.6) 156.7 ctss 1286.20 (-12m) 100.0 ctss

Meetings are 2nd Wednesday of every month except July, August and December.
Contact: <http://wvara.org>, Bill Ashby N6FFC, 408-267-3118, president@wvara.org

**American Red Cross,
Santa Clara Valley Chapter**

Contact: <http://santaclaravalley.redcross.org> or Scott Hensley KB6UOO, (408) 967 7924 shensley@Novell.com

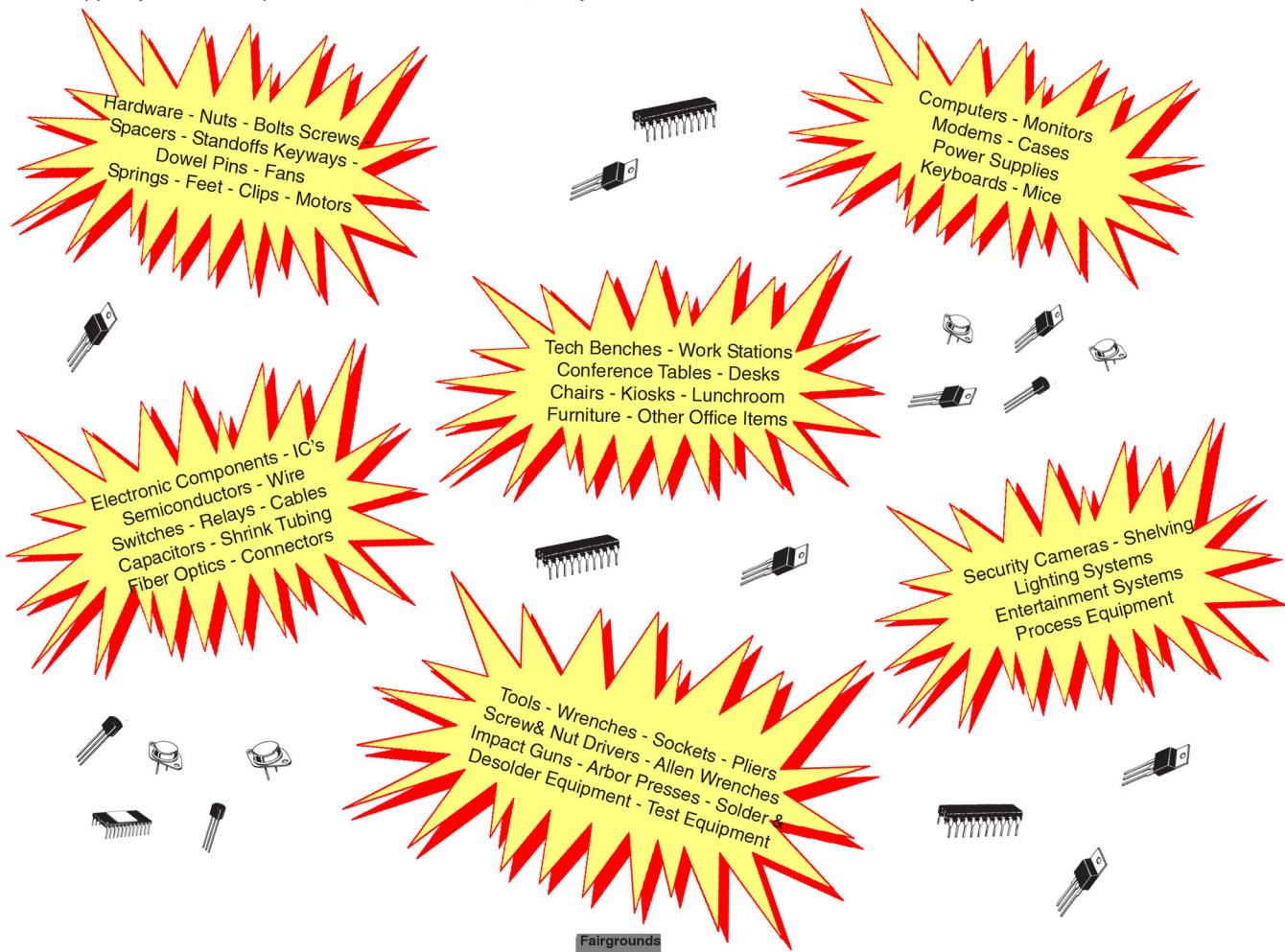
(Please send changes to PAARAGraphs editor)

EXCESS SOLUTIONS

ELECTRONIC SURPLUS MEGA-STORE!

We have completed our move, you should visit to see the new store!

- ⊕ That's right...Excess Solutions in San Jose recently lost the lease on their old site as the property was sold. We have moved to new premises very nearby at the far end of S. Seventh St., just before Tully Rd. It's easy to find!
- ⊕ Techs, Developers, Experimenters, Hobbyists and Creators will once again have access to the basic electronic parts, hardware and infrastructure that Silicon Valley was built upon!
- ⊕ Support your local surplus store...there are few left, and you know how much this vital Silicon Valley resource is needed!



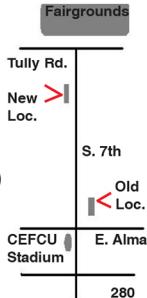
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Store Hours

Mon. - Thur. 8:00 - 6:00, Fri. 8:00 - 5:00, Sat. 10:00 - 3:00



This Ad space is available

PAARA Weekly Radio Net

Info and Swap Session
 every Monday evening at 8:30pm
 on the N6NFI 145.230 MHz repeater

Week Control Operator

1 st	Joel - KD6W
2 nd	John - W6JMK
3 rd	Ric - N6AJS
4 th	Rob - KC6TYD
5 th	Rob - KC6TYD

If you're interested in trying out at Net Control, Contact Doug, KG6LWE. It's good practice, and lots o' fun! Give it a try.



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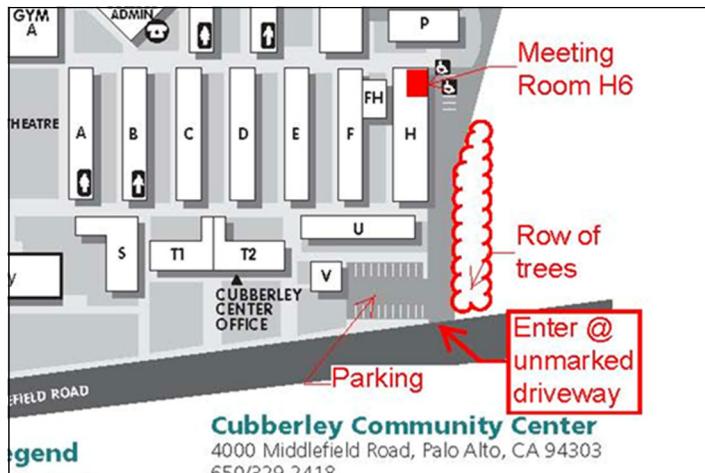
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Email: KARLDRESDEN@juno.com

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

Club meetings are on the first Friday of each month, 7:00pm at the Room H-6, Cubberley Community Center.

Radio NET & Swap Session every Monday evening, at 8:30pm, on the 145.230 –600 MHz repeater, PL 100Hz.

Membership in PAARA is \$25.00 per calendar year, which includes one subscription to PAARAGraphs \$6 for each additional family member (no newsletter).

Make payment to the
 Palo Alto Amateur Radio Association,
 P.O. Box 911, Menlo Park, CA 94026-0911

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ARV'S, WA6UUT (SK)
WEDNESDAY
HAM RADIO
LUNCHEON
Our 11th year!
- Since May 2, 2007 –

BLACK BEAR DINER

Sunnyvale, California

415 East El Camino Real
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Website: www.blackbeardiner.com

Many food choices available from the breakfast, lunch or dinner menus. Ample parking is available. Walk in & "bear" left for our location in the restaurant!

NOT A CLUB, CLOSED GROUP OR CLIQUE; AMATEUR RADIO OPERATORS AND FRIENDLY PEOPLE ARE ENCOURAGED TO ATTEND! Call in on the N6NFI Repeater, 145.230 MHz, PL® 100Hz

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Photos: jpg, png or tiff
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PAARA Badges

In the absence of in person meetings, you can still order a badge from the Club's website, PAARA.org. Go to the bottom of the membership page to order. Badges will be mailed to purchasers, at an additional cost of \$4.95 until we can meet face to face again.

PAARAGraphs Ad Rates

PAARAGraphs accepts paid advertisements from non-members. (short personal ads remain free for members in good standing). **All ad rates listed are per issue.**

1. Not-for-profit ads by association members for ham-related items and wants. No cost for business card-size ads (additional space at \$2.50 per business card size per issue).

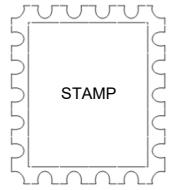
2. For Profit organizations and/or individuals: \$5-business card size, \$14.00-quarter page, \$25-half page, \$50 full page or back cover per issue.

These fees may be reduced or waived in exchange for a valuable consideration that is given to the Association or its general membership. Such consideration must be in addition to any existing arrangements with the association. The PAARAGraphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association.

All fees payable in advance by the year with "scanner-ready" copy or text-only ads. **Give payment and copy to Walt Gyger, K6WGY.**

PAARGraphs — April 2022

Accept no substitutes. Produced and printed in California USA



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PAARGraphs Newsletter
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FTDX101MP | 200W HF/50MHz Transceiver

• Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Spectrum Display 3DSSC • M4 (Active Band Indication & M4D) Multi-Point VFO Outer Ring • PR Remote Control Software to Extend the Operating Range • Includes External Power With Matching Front Speaker

FTDX10 | HF/50MHz 100W SDR Transceiver

• Narrow Band and Direct Sampling SDR • Down Conversion, 90Hz IF, Roofing Filters, Precise Excellent Shape Factor • 5" Full-Color LCD Touch Panel w/3D Spectrum Stream • High-Speed Auto-Antenna Tuner • Microphone Amplifier w/5-Stage Preamp/EQ • External Power w/Optional LAN Unit (SCU-LAN10) • Remote Operation w/Optional LAN Unit (SCU-LAN10)

FT-991A | HF/6M/144MHz All Mode Transceiver

• Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State-of-the art 32-bit Digital Signal Processing System • 34kHz Roofing Filter for enhanced performance • 3.5 inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO

FTDX101D | HF + 6M Transceiver

• Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filter • Phenomenal Multi-Signal Receiving Characteristics • Unparalleled 70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream

- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free phone hours 8:30AM - 5:30PM
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Rugged Construction in an Ultra-Compact Body • Stable 100 Watt Output with Efficient Dual Internal Fans • 32-Bit IF DSP Processor • Effective Anti-Optimized QRM Rejection • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to PC with a Single Cable • CAT Control/PITTRITY Control

FT-300DR | 24MHz/144/430MHz Dual Band

• 50W Reliable Output Power • Real Dual Band Operation (UHF/VHF) • 2.4-inch High-Res Full Color TFT Display • 3-band Scope • Built-in Bluetooth • Wi-Fi/WESX • Portable Digital Notebook Node with WiFi/BT

FT-400XD | 2MHz/40MHz X-Vari

• System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Color Display • Automatic Mode Select detects CAT4 or FM Analog and Synthesizes Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack or MicroSD slot • 500 memory per band

FT-70DR | 24MHz/144/430MHz X-Vari

• Color Display (green, blue, orange, purple, gray) • GPS/APRS • Packet 1200/9600 bps • RFID • Spectrum scope • Bluetooth • Analog and Synthesizers • Analog • High-Precision GPS • Built-in High-Precision GPS • Bluetooth® Unit • Built-in High-Precision GPS • Antenna • 1200/9600 bps APRS Data Communication • Micro SD Card Slot

FT-50R | 144/430 MHz Transceiver

• Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Reliable Power Within a compact Body • 3.5-hour Rapid Charge included • Large White LED Flashlight, Alarm and Quiet Home Channel Access

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