Happy

Holidays

Michelle W5NYV

Thank you very much for your support of and contributions to the Scope over the past 11 years!

The time has now come to decide whether or not to continue for another year. That decision is no.

I've been a member of the club for 20 years. I've served as site chair, trustee, SANDARC delegate, nominating committee member, newsletter editor, field day co-chair, and done a variety of program presentations for PARC. I set up our Logbook of the World, YouTube, Facebook, and Google Plus accounts. I applied and paid for several awards for W6NWG from ARRL. I've donated a variety of equipment to the club, the most significant being the new 6m cavities. I was able to get us a discount off the retail price due to the reputation of amateur radio in public service.

I've been either a lead or a contributor on numerous technical projects ranging from autopatch renovation to repeater repair to the current efforts to get us on the air with digital ATV. I have negotiated several challenging legal and financial issues. All were resolved in the club's favor. I have served as a member of the VE team for several club test events, the most notable being on Palomar Mountain at the fire station in the middle of a massive snow storm! Our instructor, Steve Early, had to use a chainsaw to reach the site. While the pass rate wasn't the best ever, we did mint some new hams that very memorable weekend and earned the respect and camaraderie of a lot of busy firefighters.

The first issue of the Scope that I edited was October 2005. I had been a contributor and helper for several years before that. When the opportunity came up I took on the job.

Since then every month has had an issue of the club newsletter. We've never taken advantage of the club bylaw that allows us to take breaks from publishing, although this past year we were tempted!

We've transitioned from an 8-page mailed paper newsletter with a lot of "boilerplate" to a digital distribution with as much original content as possible. We have grown substantially in page count.

We sought out and digitized every Scope issue or document that we could find for the club website. We now have an almost complete archive. We upgraded our tools along the way and added multimedia. We began with Microsoft Word and are now producing the newsletter with a variety of Adobe programs, primarily InDesign.

There are Easter eggs in some issues that have never been found.

We mentored and encouraged writers that went on to (paid!) success with QST, QEX, VHF, and many other amateur radio publications and conference proceedings. Some of our early volunteers are now newsletter editors in other states.

I have greatly enjoyed editing the Scope and will miss doing it. While writing and editing will be a very large part of the engineering opportunities I'm moving on to, those writings won't have the same continuous feel and sense of history that I find in the Scope.

Very truly yours,
-Michelle W5NYV

Paul KB5MU

I took over the club web site, www.PalomarARC.org, in mid 2002, over fourteen years ago. That's long enough. Will you be taking it over in 2017?

Every organization needs a web site. Some only need a simple page with some basic information, just to be present and accounted for when somebody searches the web. Some need incredibly complicated sites with a continuous stream of "content" to attract "eyeballs", or a fancy database-driven storefront with thousands of products, or some flavor of social network community structure, or who knows what. We're just a local amateur radio club, albeit a large and diverse one, so our needs are fairly modest.

The most basic function a club web site serves is to answer the most basic questions a newcomer might ask. Are they for real? What are they about? How do I contact them? How do I join? Where and when are the meetings? How much are dues? The kind of thing that would be (and are) on a brochure for the club. There's nothing wrong with a web site that answers just those questions, and many clubs and even businesses get by with less.

The web site can make it easier for members to do business with the club. Since we provided a way for members to join or renew their memberships on the web site, a significant fraction of all such transactions have been online. It's just more convenient, for both the member and the membership chairperson. Beyond this, we also provide an online roster with expiration dates, so anyone can see who is a member and when they need to renew.

In the dark days before the Internet, the club communicated with its members primarily through the monthly Scope newsletter, printed and mailed out to everyone. Because the Scope was the only written material most members had, it was necessary to print important reference information in the Scope over and over again, filling pages with boilerplate and limiting the space available for news and interesting articles. Nowadays, the reference material is on the web. What's more, with the cost of printing and mailing a monthly newsletter becoming impractical, the Scope itself is on the web, in full color and with no limit on page count. We even have an extensive collection of back issues online.

The web site can also provide access to media such as photographs and video. We have gigabytes of photos organized in an online gallery, showing all kinds of club activity. Other gigabytes are video, including many club meeting programs from recent years, though lately we have been hosting these on YouTube instead. These media archives provide a way for members to enjoy the club experiences they missed, or remember the ones they enjoyed.

While not, strictly speaking, part of the web site, the club's web server also provides email services. The biggest mailing lists are the two that distribute the Scope newsletter, as an attached PDF file or with just a link to the web site. We also maintain an opt-in discussion list, and many small lists and specific email addresses for various internal club functions.

During my tenure as webmaster, the site has evolved gradually, with few dramatic changes, but more and more function and content. The cool kids would probably say the site design is dated. Perhaps. I'd argue that there's no need for a club web site to keep up with every design trend, or to look like it was just redesigned yesterday with the latest look. The current site design may not be the fanciest, but it also doesn't depend on lots of fast-evolving software toolkits, and it requires minimal maintenance. It won't be hard for the next person (that's you?) to figure out.

During your tenure as webmaster, you get to decide. With fresh vision and enthusiasm, you'll be able to make the web site even more beneficial to the club. If you follow my advice (rather than my example) you'll build a team of several people to share the load.

If you have an interest in working on the club web site, please contact the President. That's president@palomararc.org, naturally!
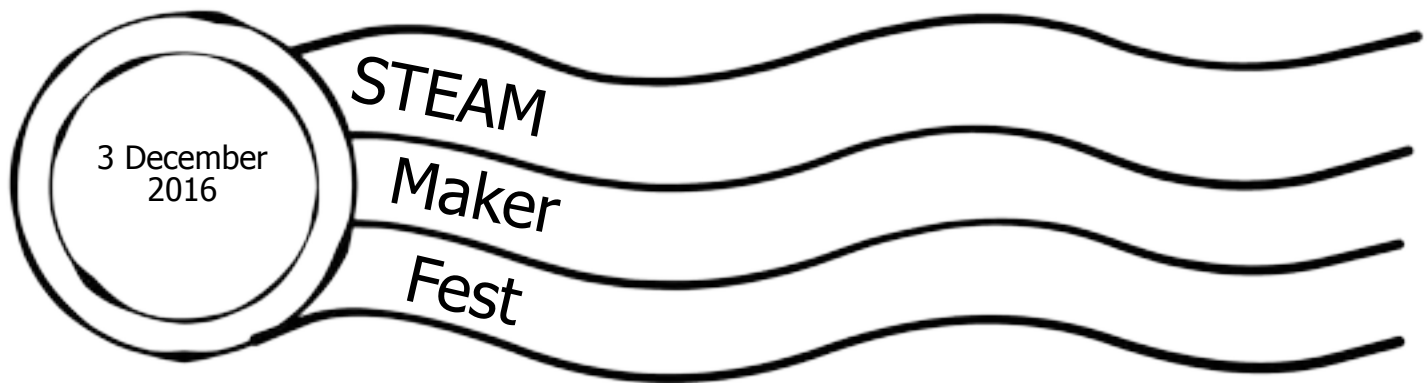
Club meeting minutes can be found on our website at

http://palomararc.org/about_parc.htm

CONTENTS

SAVE THE DATE

Club Meeting 7:30pm
7 December 2016

Carlsbad Safety Center, 2560
Orion Way, Carlsbad

Holiday Party

PARC Board of Directors
Meeting 7pm
14 December 2016

14322 Pomerado Road, Poway,
CA 92064

STEAM Maker Fest at Del
Mar Fairgrounds!
3 December 2016

PALOMAR AMATEUR RADIO CLUB INC.
Since 1936
W6NWG
San Diego County, Ca

## December 3rd, 2016

# Science, Technology, Engineering, Art & Mathematics

STEAM Maker Festival is  in 36 days, 1 hour, 22 minutes, 29 seconds



STEAM Maker Festival is a collaborative venue for students, educators and professionals within our community and industry to demonstrate programs, projects, practices and resources that enrich STEAM education. The STEAM Maker Festival is an opportunity for members of our community to come out and display their commitment to the outreach of STEAM programs and to show that SCIENCE and TECHNOLOGY can impact learning in fun and exciting ways.

STEAM Maker Festival unites San Diego Sponsors, Foundations, Schools, Parents, Students and Community Partners for a grand hands-on STEAM experience.

100% of all proceeds and sponsorship go directly to allowing us to provide free events, programs and activities to San Diego County schools, including all our STEAM Challenges which welcome hundreds of participants from 200+ schools, in addition to over 6000+ attendees, all from DIVERSE socioeconomic backgrounds.

Come share the day with 42 School Districts, over 200 participating schools, 100+ student teams participating in STEAM Challenges and 26+ industry/tech company demonstrations and activities.

## The San Diego STEAM Maker Festival.
### There is no other festival like it.

**Special Event Station**

3 December 2016
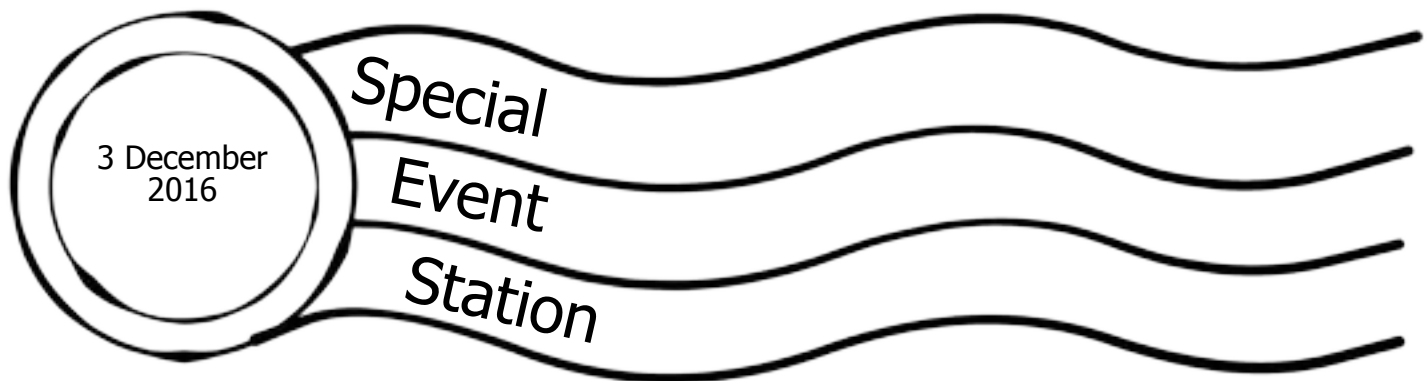
The W9CAP station will be launched next weekend to commemorate Civil Air Patrol's 75th Anniversary. Operators from all over Illinois, including an aero mobile station, will be participating and making contacts.

Date and Time:
Saturday, December 3, 2016
1700-2300Z (0900-1500 PST)

Primary Frequencies:
28.450 USB
18.125 USB
14.250 USB
7.225 LSB
Aero Mobile:
If conditions permit, a Piper Arrow will be launched from KDPA airport with a radio on board between 1500 and 1700 CST (1300-1500 PST).

QSL Cards:
We will be sending full-color QSL cards to all stations who send a card to us with a stamped, self-addressed envelope.

For more information about the special event station or Civil Air Patrol in general, please see:
http://ilwg.cap.gov/communications/w9cap/ or email fzheng@ilwg.cap.gov.

I hope to catch you and many others on the air!

Thanks,
C/CMSgt Felix Zheng, CAP

**7 December 2016**

**Club Holiday Party**
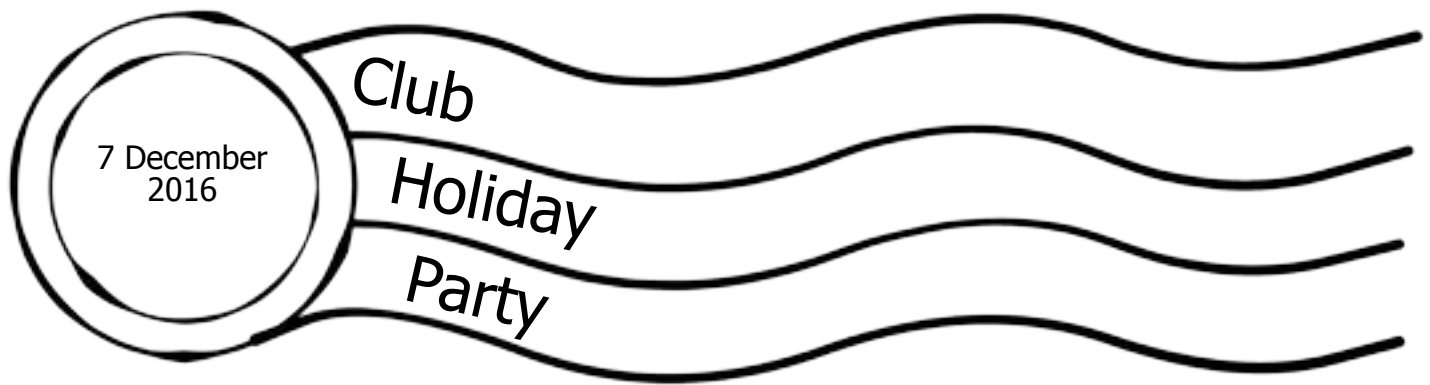
Bring a dish to share at our December meeting and celebrate the past year.

On the agenda are brief announcements, electing the board of directors for 2017, eating, and plenty of tall tales and conversation!

Show-and-tell and demonstrations are welcome.

## Current Board of Directors

Joe K6JPE President
Michael KB6D Vice President
Kevin KK6FRK Director
John AC7GK Director
Sandy KK6EED Secretary
Tom W0NI Treasurer
Mark KF6WTN Repeater Site Chair, Repeater Site Technical Chair
Glen KJ6ZQH Membership
Michelle W5NYV Newsletter

Nominations for the 2017 Board were announced at the November membership meeting and are as follows.

## Slate for 2017 Board of Directors

Joe K6JPE President
Michael KB6D Vice President
Kevin KK6FRK Director
John AC7GK Director
Sandy KK6EED Secretary
Tom W0NI Treasurer

There are three additional directors. These directors are selected from four appointed positions, which include Repeater Site Chair, Repeater Technical Chair, Membership Chair, and Newsletter Chair.

**At the December meeting, the election takes place.** No new nominations are accepted in December, unless candidates nominated in November for some position have withdrawn. If there is more than one nominee for any position, the members vote by secret written ballot.

**The newly elected officers and directors start their term at the end of the December meeting.**

IC-7300

HF+50MHz (SSB/CW/RTTY/AM/FM/100W) トランシーバー

IC-7300
IC-7300M<50Wタイプ>
IC-7300S<10Wタイプ>

YOUR CHANCE TO

# WIN!

# 12.12.2016
# SDSSARC
# FUNDRAISER
# RAFFLE

## San Diego Six Shooters ARC Christmas Dinner

Traditional holiday dinner, Fun, Fellowship, and a chance to win!

WINNER NEED NOT BE PRESENT

**President's Corner**

Joe K6JPE
December 2016
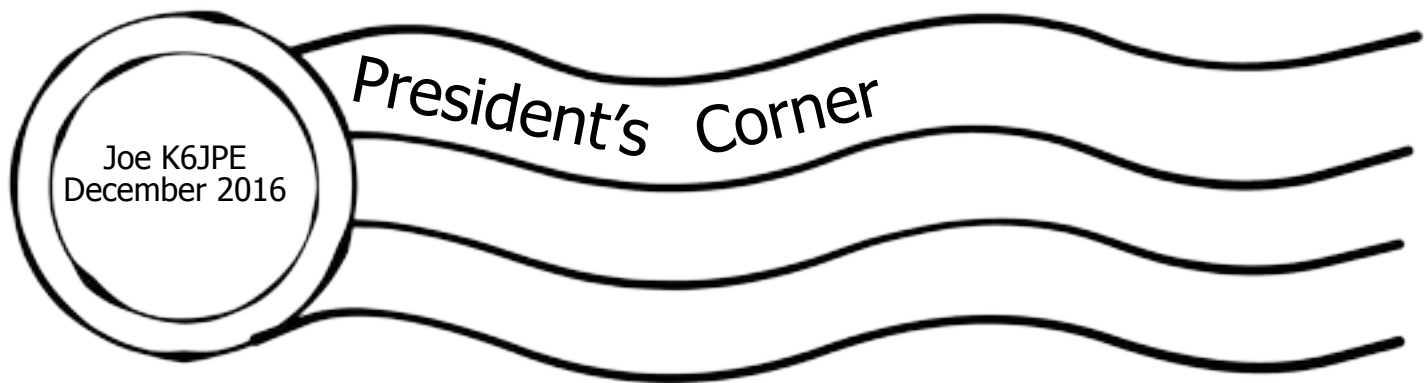
Greetings fellow HAMs!

As we work our way through this Holiday Season, it is my hope that everyone is enjoying time off work, getting a chance to operate, and generally winding down 2016 in preparation for 2017.

Be sure to check out the Member Spotlight column on page 13 of the November 2016 QST for a mention of Past PARC President, W9FQN (Stan Rohrer)!

We have some exciting things coming up, don't miss the general meeting on Wednesday December 7th where we will elect our 2017 board of directors, bring some holiday treats to share with other members as we socialize after announcements and business is taken care of.  There is no formal presentation this month, as is traditional. Feel free to bring in radios or other tech to show-and-tell, if you need help programming an obscure HT this would be a good month to bring it in!

We had previously announced some bylaws changes to be voted on at the December meeting, but due to a need to tighten up a few things with required notice, we must delay this vote.  Look for further information early in 2017.

Related to notice, please be sure your Membership Chair, Glen (AI6RR) has your accurate contact information, we would like to maintain current physical and digital contact information.

T-Shirt and/or Polo order - look for some information in the coming months! we're working to find a suitable vendor.

73 de K6JPE

Joseph Peterson
President
Palomar Amateur Radio Club

## WARNING

BECAUSE IT CONTAINS HUNDREDS OF WARNINGS DESCRIBING IN GHASTLY DETAIL EVERY POSSIBLE CONSEQUENCE OF EVERY CONCEIVABLE KIND OF NEGLIGENCE PERTINENT TO THE INSTRUMENT, THIS OPERATING AND SERVICE MANUAL SHOULD NOT BE OPENED OR LEFT UNGUARDED WHERE IT MIGHT BECOME ACCESSIBLE TO ANY PERSON OR PERSONS HAVING A HISTORY OF NERVOUS DISORDER, STROKE, OR HEART DISEASE.

HEWLETT-PACKARD COMPANY ASSUMES NO RESPONSIBILITY FOR TRAUMAS PURPORTEDLY INDUCED BY THE CONTENTS OF THIS MANUAL.

## OPENING MANUAL

TO OPEN MANUAL, LAY IT ON A FLAT SURFACE AND PRESS DOWN ON FRONT COVER WHILE TURNING COVER COUNTERCLOCKWISE (TO THE LEFT).

Please support our advertisers. Their support of the club is vital.

{special} **THANKS** to our sponsors

# Advertisements are free for members

Have items that need to find a new home? Advertise here!

Send your ads to scope@palomararc.org

ADVERTISEMENTS

# KD6AKT Estate Items For Sale

The following items remain from the radio estate of KD6AKT.   All proceeds will go to Ted's widow Donna.   All sales will be cash (greenbacks) only and will be final.  Since I did not own this equipment I do not have details as to any problems that any may have.   I tested what I could and am providing a description of what I have found.  I cannot accept responsibility for any problems that may be discovered subsequent to the purchase.

Prices have been reduced since last month in most cases.

Jim   W6YXY  760-758-7655

**TS-570DG.**  160 – 10 mtr transceiver. While this radio is marked TS-570D, it includes the 3 additional CW DSP filters which makes it a DG model.   Included is a Heil traveler headset, power cord, instruction and service manuals and original packing boxes.   Does not include a microphone. Very clean.   9 out of 10 in appearance.   Receives and transmits ok.   Will demonstrate for you if you pick it up at my house. $480.00. Will reduce the price if the Heil traveler isn't needed.

**TS-440S** 160 – 10 mtr transceiver with internal antenna tuner.  Appears to be in good shape.  7 out of 10 in appearance.  A few marks on the top of the case.  Full power output on all bands.   No manual.   Includes microphone and power cord.  Also includes original boxes.   $375.00

**Coax Box.**   It's a box of coax of different lengths.    100 ft RG-8X, 43 ft of RG8 mini, 62 ft of RG8 mini, 71 ft of RG8/U.  Also included is a Kenwood LF-30 Low pass filter and MFJ-812B SWR bridge which covers 144 – 220 MHZ.  This is used coax but it still looks pretty good.  All cables have PL-259 connectors on each end but some look like they should be replaced $40.00.

**TM-733** Dual Band VHF/UHF transceiver.  Includes microphone, Diamond MX72D duplexer, guessing 35 – 50 feet of RG8 mini coax with a connector at one end, speaker, manual and Astron RS-7A power supply. 7 out of 10 in appearance. $200.

**TM-261** 2 meter mobile radio.  Includes box, book, short power cord, microphone and mobile bracket. 7 out of 10.  $75.

**RadioShack Pro-49 hand held scanner with Wall wart, antenna and book.**   Not tested. $10.

**D-104 Silver Eagle Mic.**   Has connector that fits a Kenwood although I did not test this microphone.  Also has 3 switches on it, but their functions are unknown.  It has a hole in the bottom for the gain pot on the amplifier board but I do not believe it has the board.  $25.

**Packet Box.**  Grab bag.  Includes Kantronics KPC-3, MFJ 1272M, Kantronics board dated 1993, BuxComm Rascal GLX Mark V (PSK 31?), MFJ-1270C, 3 Baypac BP-1, 1 Baypac BP-2m, various software and cables and a plastic container containing dozens of switches (maybe a sample kit). $25.

**2 Kenwood microphones with modular connectors for VHF or UHF radios.**  $15 for both.

Committee Chairs

and

Board Members

Contact

Info

December
2016
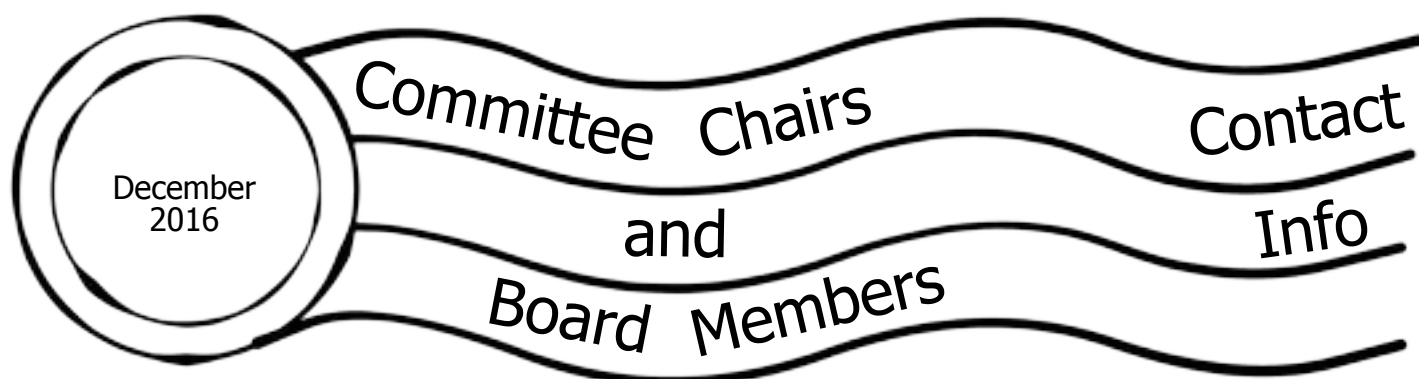
## Current Board of Directors

| | | |
|---|---|---|
| President | Joe Peterson K6JPE | (619) 630-8283 |
| Vice President | Michael Gottlieb KB6D | (858) 212-4646 (text welcome) |
| Treasurer | Tom Ellett W0NI | (858) 546-1148 |
| Secretary | Sandy Pratt KK6EED | (858) 748-2611 |
| Director #1 | Kevin Walsh KK6FRK | (858) 722-5069 (text welcome) |
| Director #2 | John Walker AC7GK | (949) 212-5533 |
| Membership Chair | Glen Christensen AI6RR | (858) 735-1144 |
| Repeater Technical Chair | Mark Raptis KF6WTN | |
| Scope Editor | Michelle Thompson W5NYV | (858) 229-3399 (text welcome) |

## Not on the Board

| | |
|---|---|
| Repeater Site Chair | Mark Raptis KF6WTN (acting) |

The board members might have callsign@amsat.org mail aliases.

## Committee Chairs

| | | |
|---|---|---|
| Boy Scouts | Michael Palugod | mpalugod@yahoo.com |
| Digital ATV | open, group forming | atv@palomararc.org |
| EchoLink | Bernie Lafreniere N6FN | N6FN@niftyaccessories.com |
| HF Remote | HF Remote SIG | hfremote@palomararc.org |
| mesh networking | open, group forming | mesh@palomararc.org |
| Operating Day | Tom Martin K6RCW | k6rcw@amsat.org |
| SANDARC Representative | John Walker AC7GK | ac7gkjohn@gmail.com |
| SANDARC Representative | Paul Williamson KB5MU | kb5mu@amsat.org |
| SD Microwave Group Liaison | Kerry Banke N6IZW | kbanke@sbcglobal.net |
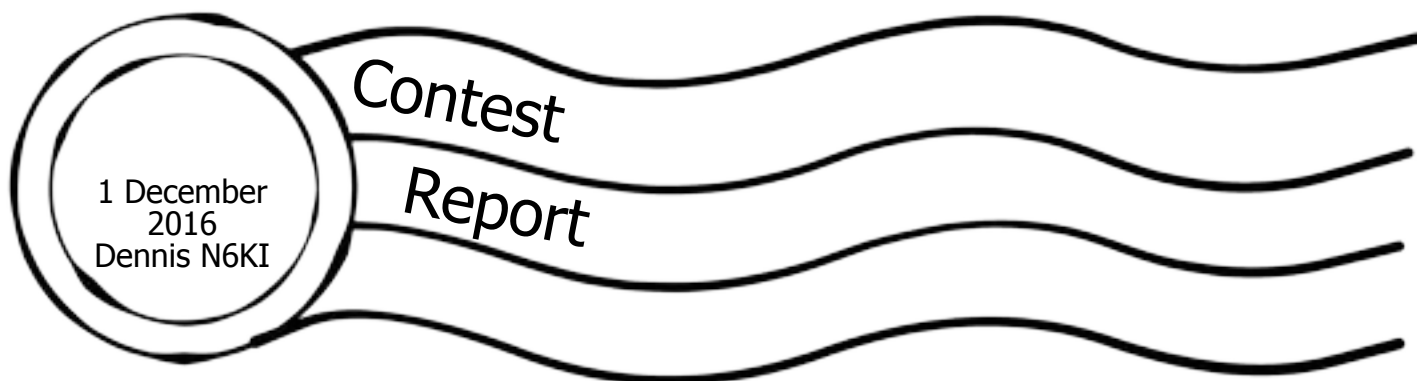
# KX2 Working CQWW CW

Thanks to help from JR W6JBR, I am getting a few hours in over the weekend in CQWW CW Contest from Nash-Ville site !!

Amazing what 5 watts can do hooked to some decent antennas at Fallbrook "Nash-Ville" site

(Site Videos on YouTube - search "NX6T"

I actually got thru a pile-up last nite to Danny ZF2MJ (N6MJ) on Cayman Island (Of course his super-human 3 brains managed to process and hear my puny signal !!)

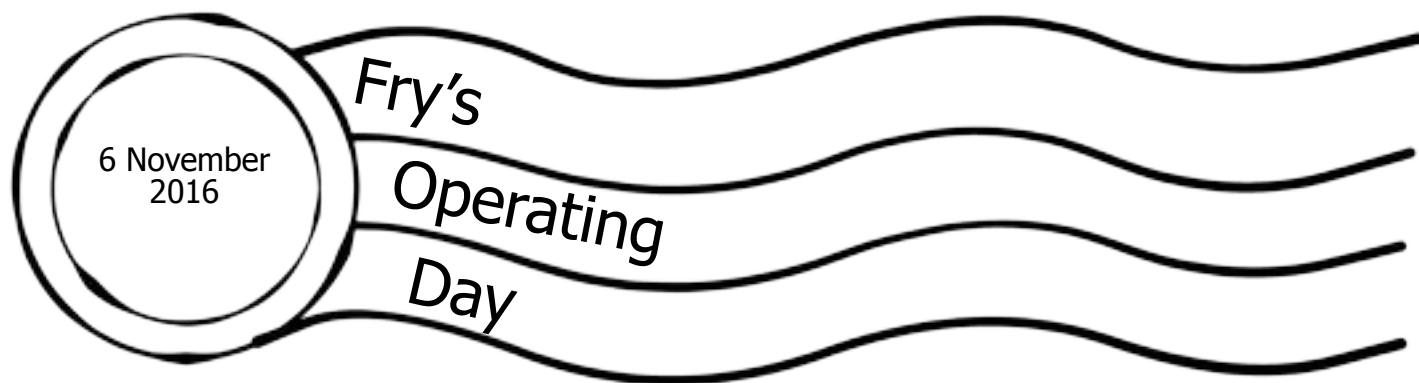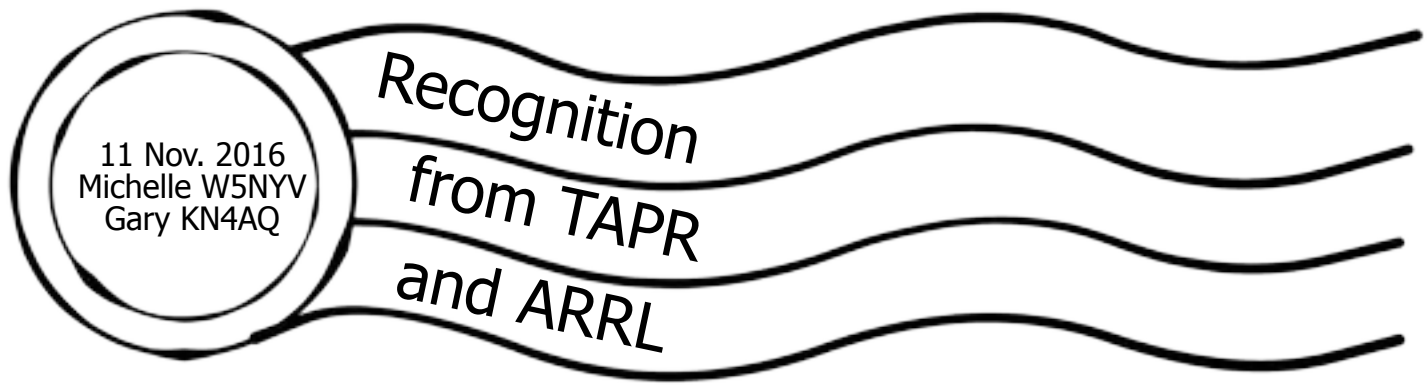I also managed to work EA, HK, HG, XE and KH last nite in 40 and 80.

We'll see what this afternoon and evening brings as the pile-ups thin out, I hope good things!

N6KI/QRP

6 November 2016

Fry's Operating Day

A HIGHLIGHT OF THE YEAR WAS RECEIVING A PLAQUE FROM TAPR FOR PRESENTING THE SUNDAY SEMINAR AT DCC 2016. MY CO-PRESENTER BOB MCGWIER AND I WERE FEATURED IN THE ARRL LETTER, SHARED HERE.

## Amateur Radio "Uniquely Situated" to be at Leading Edge Again, Conferees Told

11/10/2016

The dawn of so-called "smart" — or cognitive — radio has presented Amateur Radio with an opportunity to regain the leading edge in radio technology in the near future. It will also alter our view of spectrum as a limited resource. Those points and others were part of a forward-looking, tag-team Sunday Seminar presentation, "Spectrum (It's the frequency crunch for real)," by Michelle Thompson, W5NYV, and Bob McGwier, N4HY, at the 2016 ARRL and TAPR Digital Communications Conference (DCC), September 16-18 in St. Petersburg, Florida. Thompson heads the AMSAT Ground Terminal Team, a component of the Phase 4B geosynchronous satellite project. McGwier is chief scientist at the Hume Center for National Security and Technology at Virginia Tech. This week, HamRadioNow made the entire 3-hour presentation available as part of its conference coverage: HamRadioNow Episode 276 Parts 1, 2, and 3.

"If you put the smarts in the radio, what can possibly go wrong?" quipped Thompson, pointing to an example that demonstrated how sufficiently complicated technology is also more likely to fail.

Thompson said cognitive radio technology will alter the paradigm of treating spectrum as if it were land. "Spectrum is immediately reusable," she said, "and land is not." Regulation and spectrum allocation have been necessary to manage interference among services, but smart radios can avoid collisions among users, she said.

"[I]t hasn't been until fairly recently that we've been able to inexpensively and quickly reconfigure a radio," she said. Thompson's Phase 4B project will take maximum advantage of cognitive radio technology, which can — among other things — determine an optimal clear frequency, mode, and path on the fly, transparently, and without human intervention.

McGwier called the computer "the tidal wave that has swept over Amateur Radio." And, he predicted, "It is going to bring us back to becoming technical innovators." He said radio amateurs "are uniquely situated to be the leading edge in radio again."

McGwier said the innovation needed in Amateur Radio will come about through what he called "Amateur Radio freedom," that encourages experimentation and thinking outside the box. "It's the ultimate democratic assignment of frequencies in the world," he said.

He painted a picture of intelligent radio technology that will operate like the human brain. "It's going to design the radio on the fly, from scratch, without a subject-matter expert involved," he said. "The radio will be done by artificial intelligence, from beginning to end. The object becomes not the radio, but the activity it allows."

Responding to a question, McGwier conceded that today's hams may balk at this sort of paradigm shift, since it's far removed from how most Amateur Radio communication takes place today. But he said embracing smart radio technology is what will attract a younger generation of new hams.

"We need to not limit what these kids can do with Amateur Radio," he maintained. "They are going to outdo us, if we only allow them. We can't limit them, because this is a fundamental paradigm shift."

Predicted McGwier: "You will not recognize your world in 10 years." The HamRadioNow presentation also is available in audio format, and a highly condensed 11-minute synopsis is available on YouTube. — Thanks to Gary Pearce, KN4AQ/HamRadioNow

http://www.hamradionow.tv/episodes/



## Part ONE

Michelle Thompson W5NYV talks spectrum and cognitive radio. She expects technology to really disrupt the radio art in the near future. Just how that happens is for Parts TWO and THREE

In the intro, Gary mentions a pair of TV shows that have a significant ham radio component:

- Before MARS
- Frequency

The Sunday Seminar, Part ONE - AUDIO
KN4AQ, W4NYV                                                    Download

## Part TWO

Bob McGwier N4HY begins his portion of the Sunday Seminar.

Bob reviews a lot of history as he lays the groundwork for his prediction of a major shakeup in communications (and Ham Radio) that he'll detail in Part Three.

HRN 276 Part TWO: Ham Radio 8.0 - Sunday Seminar from the 2016 DCC

The Sunday Seminar, Part TWO - AUDIO
N4HY                                                            Download
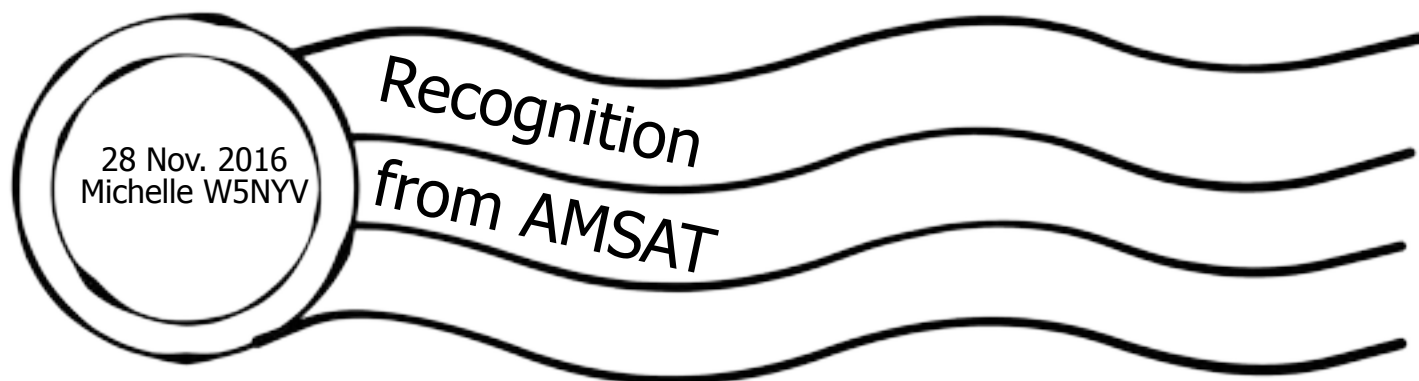
In late November 2016, I received recognition from AMSAT for a job well done over the past year on various AMSAT projects. I'm looking forward to next year already!

# PARC Student Scholarship

The Palomar Amateur Radio Club is creating at least one amateur radio scholarship for San Diego students to promote our goal of fostering our hobby and motivating young hams.

QST has three pages of the pictures of the recipients of the 2016 ARRL scholarships. Only two went to a California student! The survival of The Amateur Radio Service depends on us. If we do not act, who will succeed us? Our youth are our future.

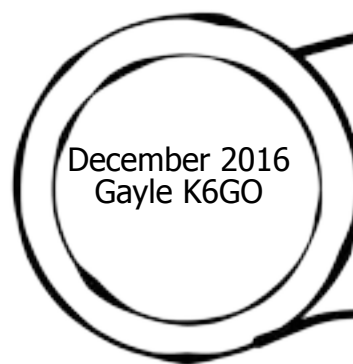To that end we are looking for funding sources especially corporate ones. We have two letters requesting scholarship funds from companies and corporations: one that is general, and one where we can use the name of the referring employee. Either one could be addressed to a specific person in the company.

Club members have indicated that we have members who work at companies that could be looking for a charitable tax contribution donation. If you work for one of these companies and you would like to come forward with a contact person, please contact us at board@palomararc.org with a possible contact person. We can send the letter we have created or if you are so inclined, you could personally deliver it.

# Looking For High School Seniors

Calling for Applicants for the 2017 ARRL Foundation scholarship program. Applications will be accepted between midnight, October 1, 2016 and 11:59 PM Eastern Standard Time January 31, 2017. Transcripts must be received by Thursday, February 16, 2017.

The scholarship descriptions are all on line where you will find a brief summary of the terms and conditions required by the donors of the scholarships or established by the ARRL Foundation Board of Directors. (According to the ARRL Foundation, the brief descriptions may not include complete selection criteria and are subject to change without notice.)

There are 84 scholarships. (Some have insufficient funds and some are inactive.)

Only 20 have no geographical restrictions. 2 are for California students.

Please go to:
http://www.arrl.org/the-arrl-foundation
then choose Scholarship Program from the left menu
http://www.arrl.org/scholarship-program
then you can review the details for each one
http://www.arrl.org/scholarship-descriptions

We hope to see your name and picture in QST this time next year!

Income and Expense
October 2016

Income
Expense

$ in 1's

### Palomar Amateur Radio Club, Inc.
## Income/Expense by Category
### October 2016

| | Oct 16 |
|---|---|
| **Income** | |
| Auction Incom | 1,088.50 |
| Dues | 117.43 |
| **Total Income** | 1,205.93 |
| **Expense** | |
| Auction Expns | 761.85 |
| Equipment Storage | 245.00 |
| Picnic | 229.35 |
| Rptr Electric | 56.38 |
| **Total Expense** | 1,292.58 |
| **Net Income** | **-86.65** |

Oct16

Expense Summary
October 2016

| Auction Expns | $ 761.85 |
|---|---|
| Equipment Storage | 245.00 |
| Picnic | 229.35 |
| Rptr Electric | 56.38 |
| Total | $1,292.58 |

By Account
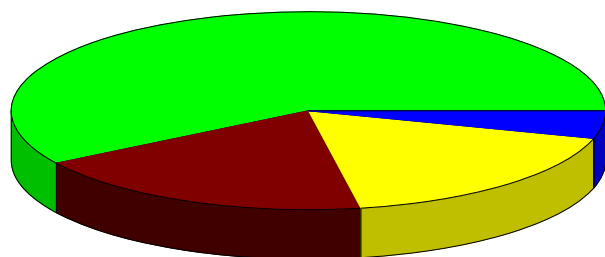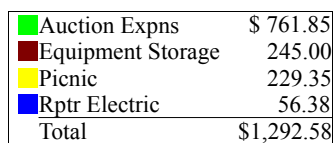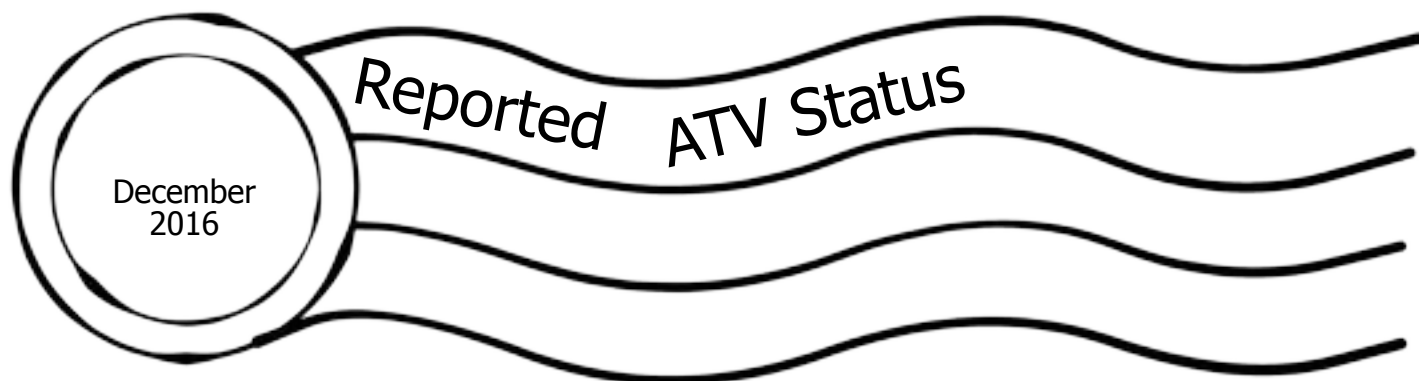
Reported ATV Status

December 2016

PARC ATV System

915 MHz WBFM in 5.8 MHz audio subcarrier

1241.25 MHz VSB out NTSC standard

2441.5 MHz WBFM in 6.0 MHz audio subcarrier

146.415 79.7 intercom

operational

non-operational

Circle Diameters Scaled to Show Relative Wavelengths Between Equipment

# Reported Repeater Status

December 2016

Active repairs in progress for Echolink.

Echolink

447.000
107.2

146.730
107.2
System Fusion - Auto

147.075
107.2
System Fusion - Auto

52.680
107.2
Active adjustments in progress for 6m.

147.130
107.2

PARC
Voice
Repeaters

PARC
Digital
Repeaters

145.050
packet node
linked to Metro 9600 Net

146.700
packet duplex repeater
Duplex

PALOMAR AMATEUR RADIO CLUB INC.
Since 1936
W6NWG
San Diego County, Ca

operational

non-operational

Circle Diameters Scaled to
Show Relative Wavelengths
Between the PARC Repeaters

December 2016
Glen KJ6ZQH

**Membership Committee Report**

**From the Membership Table**
You can check the status of your membership 24/7 at **Member List** (or go to the club's website and navigate to Join and click on "here" at the top of the page. Enter your call sign into the box and click the "Look up my membership status now" button.

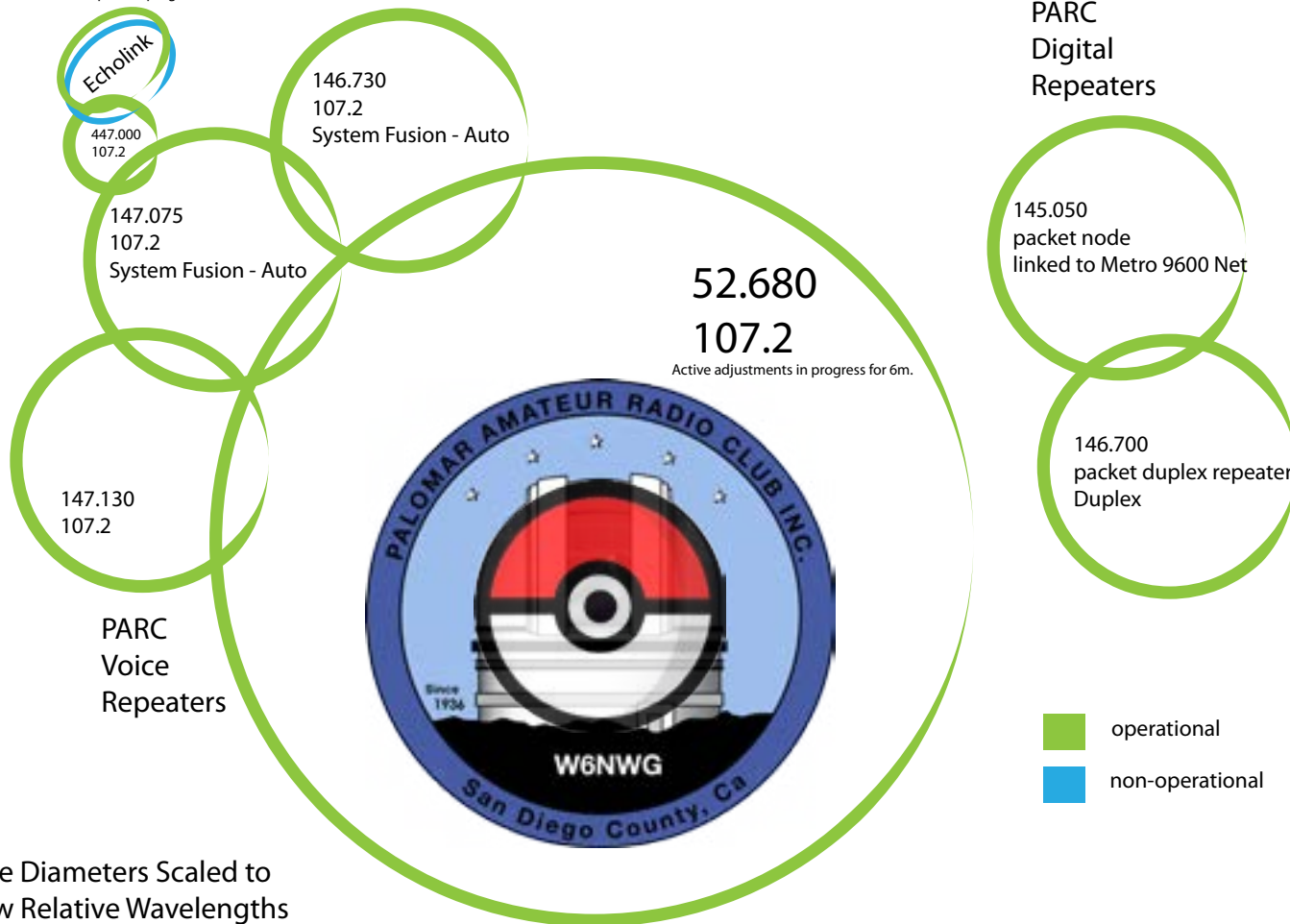To renew your membership or extend your membership, fill in the form on the Join page. Make sure you select the correct value from each of the drop-down menus (Type of Membership, How many years, I'm an ARRL Member, Newsletter option and License Class). If you want to receive an email when your membership is coming due for renewal, please make sure that I have a valid email address for you. To do that, please send an email to

Membership@palomararc.org.

As you may recall from prior reports, since the new Yaesu DR-1X repeaters as delivered by Yaesu are not compatible with EchoLink or IRLP repeater linking requirements, the EchoLink project morphed into buying and configuring a commercially available repeater controller to solve the problem, as well as to address several other more general repeater control related issues and limitations.

On Saturday, November 19th, a major milestone was reached after about 5 months of programming, designing and building cable assemblies and power control boxes and making hardware modifications to the repeaters, Mark Raptis, KF6WTN, John Kuivinen, WB6IQS and myself successfully installed a controller and two modified Yaesu repeaters on the mountain.   The 147.075 and 147.130 repeaters and the controller were mounted in a rack as can be seen in the photo below.

Currently both the 147.075 and 147.130 repeaters are operating in what Yaesu calls AMS mode, "Automatic Mode Select", allowing both digital and normal FM communications.  If you have recently used either of these repeaters you most likely noticed the voice ID as well as perhaps a slightly different sounding courtesy beep. As noted in the voice ID, both repeaters require the 107.2 Hz repeater access tone (CTCSS). In addition to normal FM, either of these repeaters can also be used with the Yaesu C4FM digital mode.

Repeaters connected to the controller have 3 different forms of transmitting the repeater's callsign:
1.      An "initial" repeater ID in voice: "W6WNG Repeater, PL 107.2".
2.      A "normal" ID at 20 wpm CW:  W6NWG/R.
3.      An "impolite" ID at 20 wpm CW, with audio reduced by 20db: W6WNG.

The "intitial" ID plays at initial repeater key up, which is any time the repeater has been idle for an extended period of time: i.e. greater than 10 minutes.

The "normal" ID is played during breaks in a conversation if the normal ID timer has timed out. The normal ID timer is adaptable and looks for a break in the conversation any time between 8 and 10 minutes.  The idea is to look for an opportunity to transmit the ID when conversations are not in progress.



*Repeaters in Rack*

If the "normal" ID does not get a chance to be sent sometime between 8 and 10 minutes since the conversation started, or the last ID was transmitted, to meet FCC requirements the "impolite" ID will

be transmitted at the 10-minute interval on top of the conversation.  To minimize the intrusion into the conversation, the "impolite" ID is sent at a 20dB reduced audio level and does not include the "/R" at the end of the W6WNG call sign.

The repeaters are set for a maximum transmit time of 3 minutes.  If a timeout occurs, the "Repeater Timeout" voice message is transmitted, then transmission is terminated.  After the received signal has dropped for a 5-second "quiet period" the "Three Minute Transmit Limit" voice message is transmitted and the repeater returns to normal operation.  These two messages inform listeners why transmission was cut off.  However, the user that timed out the repeater only hears the second message after he unkeys.

As a reminder, the 3-minute time out can be triggered when repeater users tailgate / quick key the repeater without waiting for the curtesy beep.  Every time you hear the courtesy beep, the 3-minute timer is reset.  For example, if 3 people are having a QSO, but are keying before hearing the beep, and each person only transmits for 1-minute and 10 seconds, the third person to transmit will trigger the 3-minute maximum timeout, even though no one transmitted for the full 3 minutes.

You may recall in last month's report that as I was testing one of the repeaters in preparation for installation on the mountain noticeable distortion was occurring in the transmitted audio.  The problem was that the repeater's discriminator output signal was distorted.  The discriminator signal is used to get audio received by the repeater's receiver into the controller.  Then after some processing in the controller it is fed back to the repeater's transmit signal input.

I originally traced the discriminator problem to an emitter follower buffer circuit inside the receiver module.  However the suspect circuit was on the underside of the receiver board, which could only be accessed by removing the board from the receiver module, which requires some unsoldering of connections.

Before I got around to doing that, since Mark had brought me another Yaesu repeater from the mountain to be upgraded to the latest firmware, I modified it for operation with the controller.  In testing, I discovered it would not break the squelch, even though it was detecting the CTCSS code on.  In troubleshooting that problem, I found that the discriminator signal was being dragged down to almost nothing.  Apparently, the CTCSS decode circuit is extremely sensitive and could detect the signal while the squelch circuit would not.

Hmm!  Two repeaters in a row with discriminator problems, one being distorted and this one being dragged down.  This is unlikely to be caused by a defective part, something else is wrong.

Having no other option, I opted to remove the receiver board to be able to troubleshoot the problem.  Removing the board is one issue, being able to power it with all its cables connected is another.  After removing the board, I found the cables were just long enough to stand the board on edge, allowing me to re-power the repeater and trace the signals as shown in the picture at right.

Looking at the signals relative to the schematic for the board made no sense.  There was no signal at all on the backside of the board, but at the output connector on back of the repeater there is one, its degraded but there.  After several hours of doublechecking everything and questioning my sanity, I finally decided to manually trace the entire circuit from where it starts on the circuit board to where it exits the repeater.
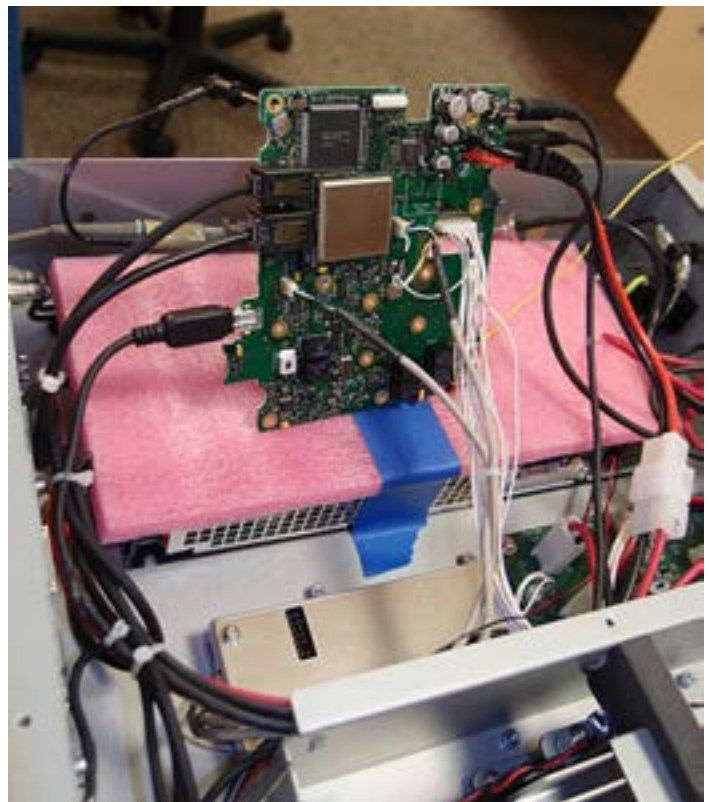


*Receiver Board on Edge*

After tracing everything out I found that the signal interconnect diagrams in the Yaesu maintenance manual had signals mislabeled and schematics showing them connected them to the wrong pins. But even after getting all that figured out, the problem was still the same, things still did not make any sense.  So I went back through it all again, and found that in addition to the documentation problems Yaesu had installed an undocumented factory modification to the receiver board and to the interconnecting harnesses.

The undocumented modification was the root cause of the problem.  Yaesu had removed a tiny surface mount ferrite bead on the receiver board, breaking the connection to the buffered discriminator signal.  And had rewired the discriminator signal in the harness assemblies to come directly from the FM discriminator chip instead of the buffer.

The problem was that the discriminator chip does not have the capacity to drive the signal to a couple of different circuit boards and out the external connector.  It apparently was already overloaded and could not handle an additional 10K ohm load presented by the external controller.  It is impossible to know why Yaesu decided to modify the repeaters.  One of our repeaters does not have the modification, and it works fine with the controller.

The solution was to add a buffer chip on the board that houses the external signal I/O connector. This involved mounting a small perf board with the amplifier and 5 volt regulator chip to power to the board as can be seen in the photo.  We now have two repeaters with this modification installed and both are working fine with it. Next on the agenda is finish modifying yet another Yaesu repeater and modifying the controller firmware to run it on a different port of the controller.  This one will either be the 447.000 or the 146.730 machines.



*Complete Installation*

# SPECTRUM COLLABORATION CHALLENGE

The world's first collaborative machine-intelligence competition to overcome spectrum scarcity.

1ST PLACE $2,000,000

2ND PLACE $1,000,000

3RD PLACE $750,000

https://spectrumcollaborationchallenge.com
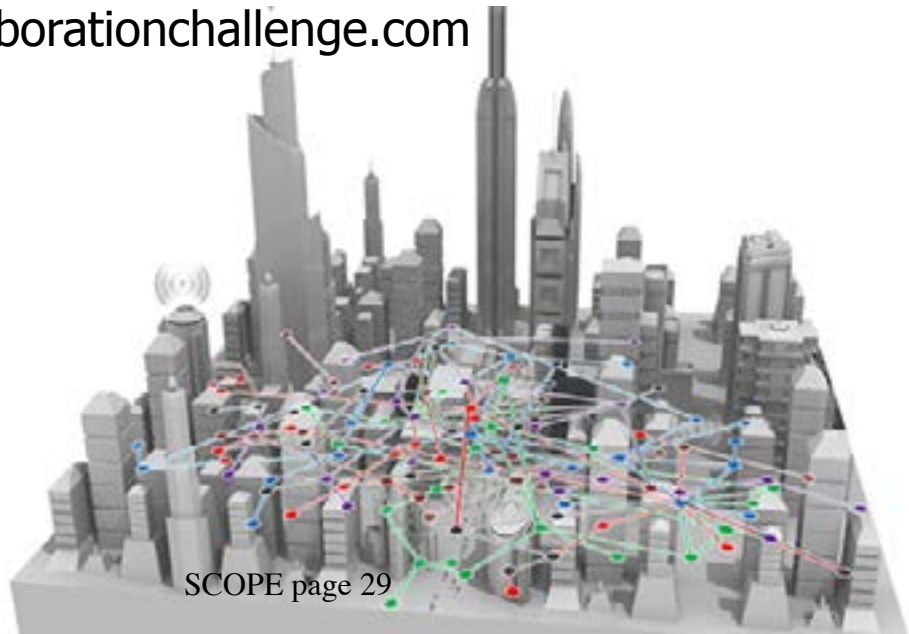
# Repeater Site Work Party

November 2016

On 5 November 2016, Palomar Amateur Radio Club organized a work party at the club repeater site. Grounds keeping, exterior building painting, and the re-installation of the Americas Unidos repeater (224.380 MHz) were all successfully accomplished.

The raking up and shredding of a thick layer of oak leaves and branches created many bags of highly desirable compost that was distributed amongst any work party participant that wanted it!

*Remember these? From the collection of John WB6IQS.*

Bylaws Update
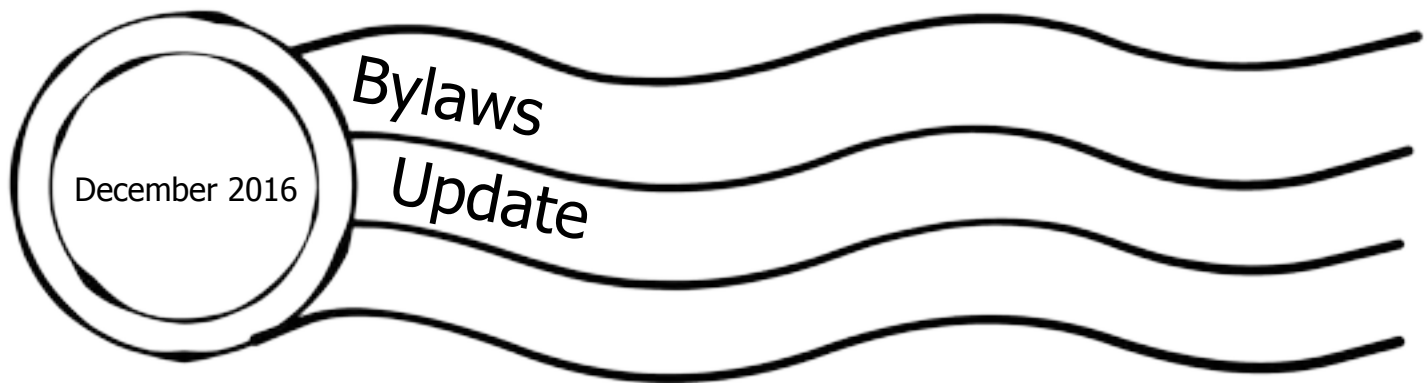
December 2016

List of Proposed Bylaws Amendments

J. Add Webmaster as a committee chair. (Needs membership approval)

**Across / Down filled grid:**

- CURSOR
- HTML
- ROM
- COMPUTER
- SST
- ISS
- PROTOCOL
- ACCESS
- LOOP
- ACC
- UU
- COMMANDKEY
- BBS
- MPP
- II
- MMER
- UTILITY
- QUEUE
- RLH
- NK
- SGML
- VDU
- QE
- PROGRAM
- NS
- IT
- LE
- PEE
- I
- M
- OVERHEAD
- P
- E
- LR
- CISC
- AO
- TL
- ICON
- THREAD
- OU
- HTTP
- BINARYFILE
- AN
- RAY
- NI
- AN
- CHARACTERSET
- SCANNER
- KE
- I
- FTP
- TL
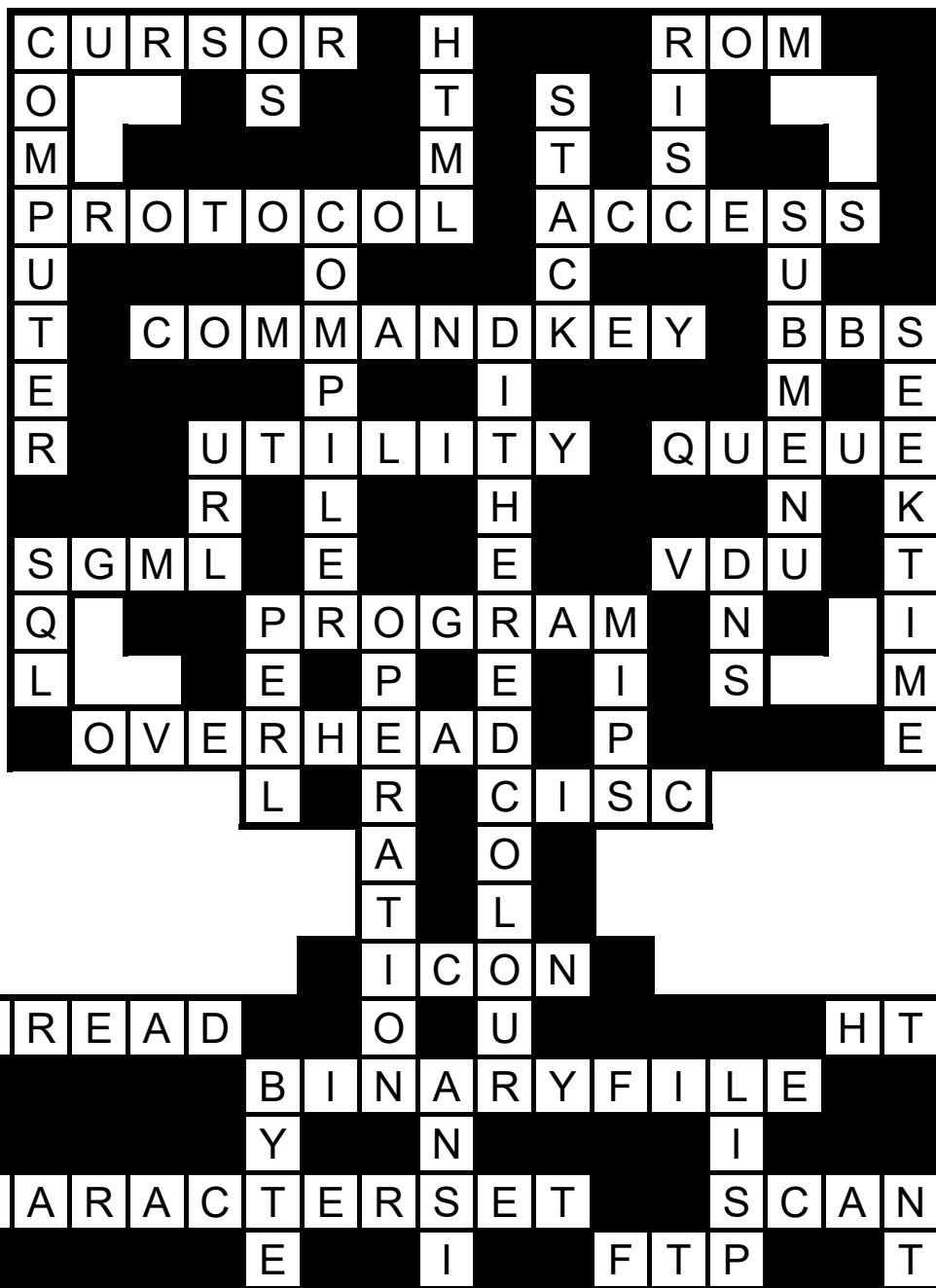
# On Being Thankful For Amateur Radio And Our Need to Share It

As each year winds down, I often reflect back on what I've learned and experienced in this year.  And, for the past 2 years, I've been grateful to have re-discovered amateur radio.  I believe I learned a lot in this time.  And, I know that my biggest blessings are the friends I've gained, particularly those in the Palomar Amateur Radio Club.  "A Scout Is Friendly."

But, with today's technology, the relevancy of amateur radio has been questioned.  I can see why they might have asked that with all that modern technology can do.  But, articles and responses poured out proving that amateur radio is not only keeping up with technology but is also innovating it as well. And, when you factor in our abilities to use these technologies in emergencies (perhaps when cell phones and the internet are longer in service), then amateur radio will always have an important place in our community.  Scout Motto: "Be Prepared."

Each of us have our own personal interests in amateur radio.  Some are drawn to the thrill of contesting.  Others enjoy the design and building of antennas.  There's digital modes to explore, awards to earn, plus states and even countries to log QSOs from.  And, community service is a big part for many hams with ARES, parades, runs, etc.  But, we all share the common foundation of having fun, learning, and even helping others by sharing what we've learned.

In fact, sharing our knowledge of amateur radio could be one of the best things you could do! Firstly, it deepens your knowledge of what you know.  You can't teach it if you don't understand it.  Secondly, you get to show something you're good at.  And, that's always fun.  Lastly, it helps our Club and our amateur radio community by letting others know who we are and what fun activities we do.

In May 2015, a friend shared with me a proposal written by 2 friends in PARC, Kevin Walsh KK6FRK and Erik Johnson W6ETJ, to establish 3 radio stations for the San Diego Boy Scouts.  It got me so fired up that I got my Technician license the next week, followed by my General the next month and my Extra the month after.  And, this summer, I registered as a Radio Merit Badge Counselor.  And, now I find myself sharing amateur radio with Scouts and their parents in our community.  Several of these Scouts and parents have joined PARC and/or operate on our repeaters.  And, this is good.  PARC is providing service to our community via repeater use and by members teaching.  PARC is also being promoted by this as others learn about our repeater and program it as their "home" repeater.  And, this helps PARC get new members as they learn about us then join.

I continue to be in awe of the accomplishments and abilities of our PARC members.  There's so much knowledge to share.  And, not only would it be fun to share, but it would be a missed opportunity not to.  There are several PARC members who are Boy Scout Radio Merit Badge Counselors, including Kevin Walsh, KK6FRK, and Michelle Thompson, W5NYV.  If you are interested, please contact us.  Just like us, you may discover that sharing your passion for amateur radio could be fun and rewarding.
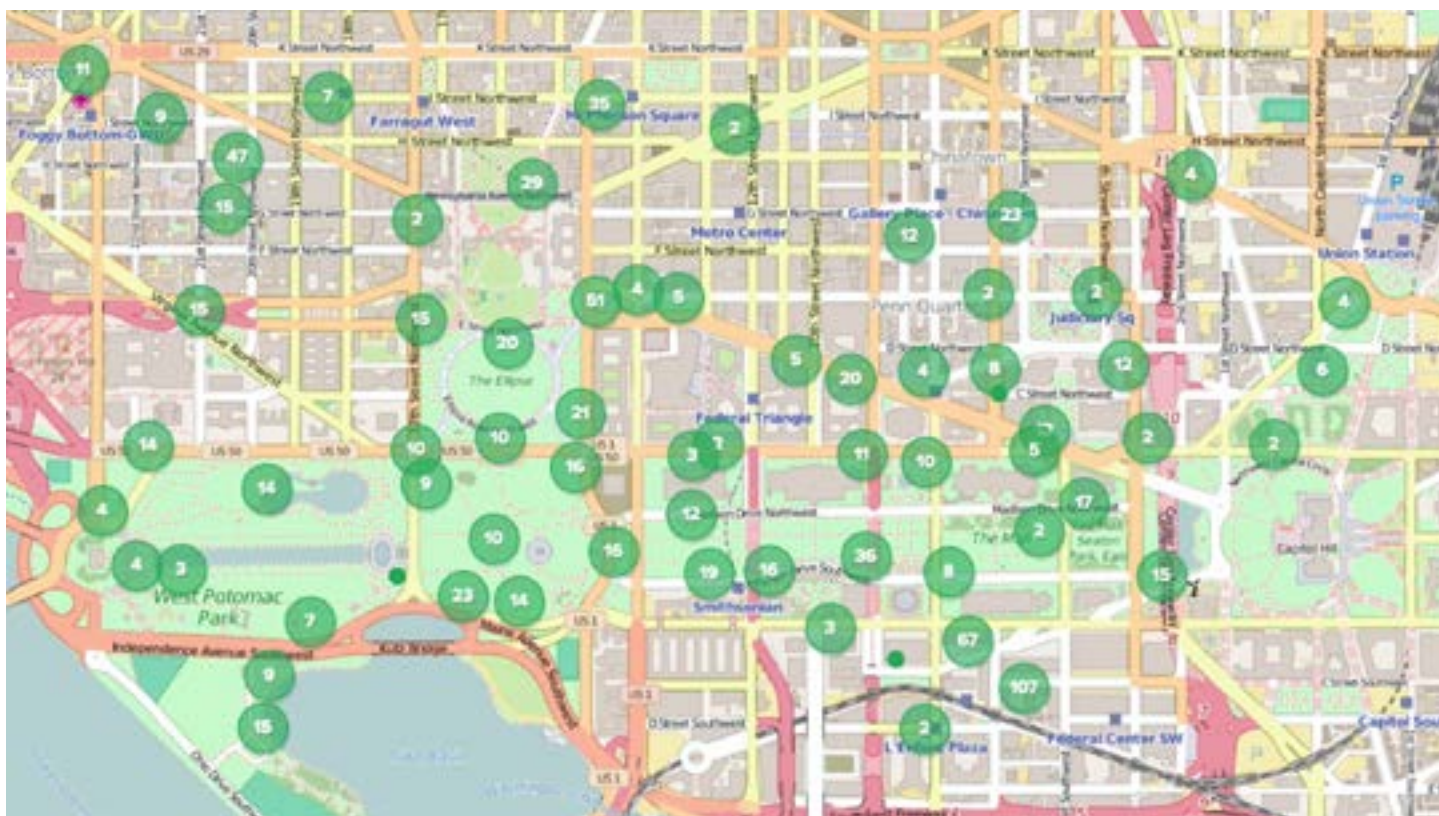
"A Scout Is Helpful."

-------------------------------------------------

Thanks,

Mike, N6PIH

*A map of the National Mall in Washington, D.C., shows the location of the SIGMA mobile radiation detectors as deployment participants moved around the city. DARPA's SIGMA program is developing networked sensors that can provide dynamic, real-time radiation detection over large urban areas.*

# Advanced Radioactive Threat Detection System Completes First Large-Scale Citywide Test

FIELD TESTING OF MORE THAN 1,000 NETWORKED, MOBILE RADIATION SENSORS IN WASHINGTON, D.C., YIELDS VALUABLE DATA FOR IMPLEMENTING ENHANCED RADIATION-DETECTION NETWORKS IN MAJOR U.S. CITIES.

On a recent sunny fall day in the nation's capital, several hundred volunteers—each toting a backpack containing smartphone-sized radiation detectors—walked for hours around the National Mall searching for clues in a "whodunit" scavenger hunt to locate a geneticist who'd been mysteriously abducted. The geneticist and his abduction were fictitious. But the challenge this scavenger hunt was designed to address is real: The need to detect even small quantities of radioactive material that terrorists might try to bring into an urban area with the intent of detonating a "dirty bomb," or worse. By getting volunteers to walk all day looking for clues, the DARPA-sponsored exercise provided the largest test yet of DARPA's SIGMA program, which is developing networked sensors that can provide dynamic, real-time radiation detection over large urban areas.

A key element of SIGMA, which began in 2014, has been to develop and test low-cost, high-efficiency, radiation sensors that detect gamma and neutron radiation. The detectors, which do not

themselves emit radiation, are networked via smartphones to provide city, state, and federal officials real-time awareness of potential nuclear and radiological threats such as dirty bombs, which combine conventional explosives and radioactive material to increase their disruptive potential. Following a demonstration earlier this year with the Port Authority of New York and New Jersey involving more than 100 SIGMA sensors, the 1,000-detector deployment in Washington, D.C., marked the largest number of SIGMA mobile detectors ever tested at one time and was a demonstration of the program's ability to fuse the data provided by all those sensors to create minute-to-minute situational awareness of nuclear threats.
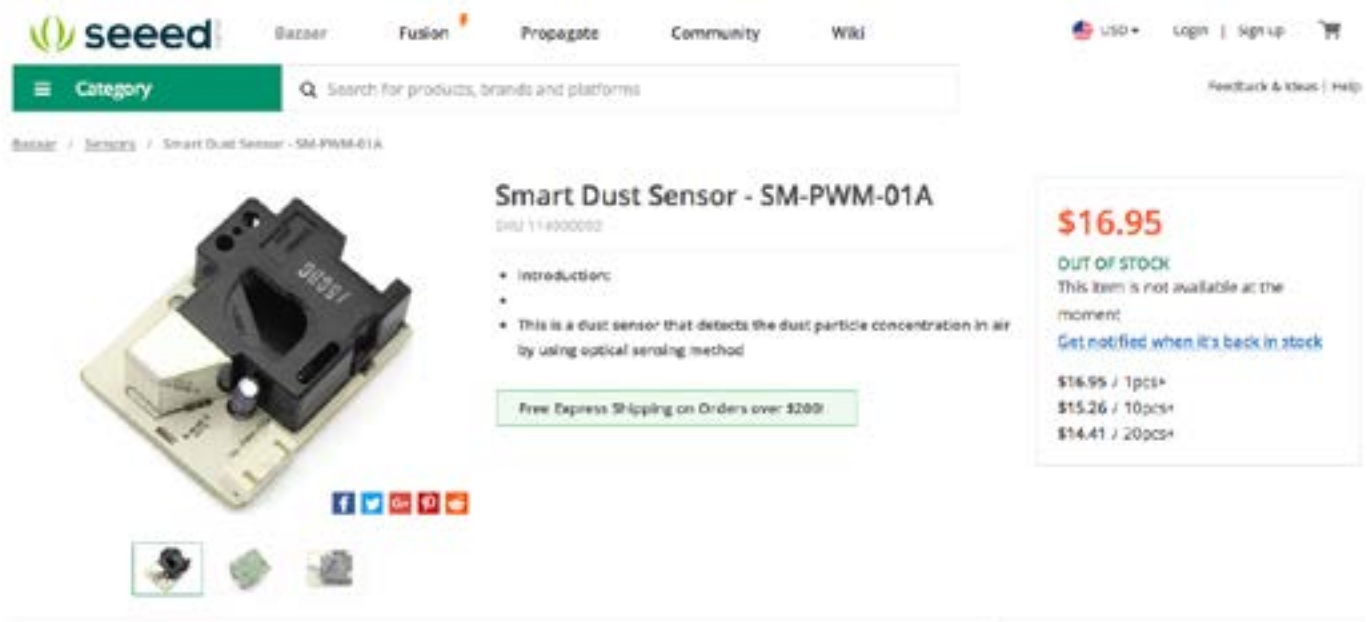
-DARPA blog 11 October 2016
http://www.darpa.mil/news-events/2016-10-11

Something like this probably works with APRS and/or Packet as well!

I imagine we could not only detect radiation. CO2 and Particulates could be used too.

SeeedStudio has a particulate sensor (https://www.seeedstudio.com/Smart-Dust-Sensor-SM-PWM-01A-p-2085.html) that is actually used in building sensors.



This is a dust sensor that detects the dust particle concentration in air by using optical sensing method. An infrared light emitting diode (IR LED) and a photo-sensor are optically arranged in the device. The photo-sensor detects the reflected IR LED light by dust particles in air.

The SMART Dust Sensor can detect the small particles like cigarette smoke, or wildland fire smoke, and it can distinguish small particles like smoke from large house dust by pulse pattern of signal output.

Features:

Compact size, light weight (about W59x H46x D18 mm, 23g)
PWM (pulse width modulation) output (Low pulse output)
Enable to distinguish small particle of cigarette smoke from large particle of house dust
Constant forced air convection flow by heater resister in dust sensor
Lead free and ROHS directive compliant
Minimum particle size can be detected over 1μm
(House dust size: avg 20μm, yellow dust size: avg 20um, cigarette dust size: avg 1μm)

So, once you have a working mesh network, stations can be deployed (or carried around) with a variety of sensors that can monitor the environment. Sensors can be purchased. One of the most popular for embedded devices is the Grove sensor system. However, there are initiatives to construct

open source and do-it-yourself sensors and laboratory grade monitoring equipment. Mesh networks play an important role in environmental monitoring already. One of the groups active in developing environmental gear is Public Lab.

Check out their website at https://publiclab.org/

Here is their mission, summarized in problem, collaboration, and solution steps.

I. The Problem
Communities lack access to the tools and techniques needed to participate in decisions being made about their communities, especially when facing environmental hazards.
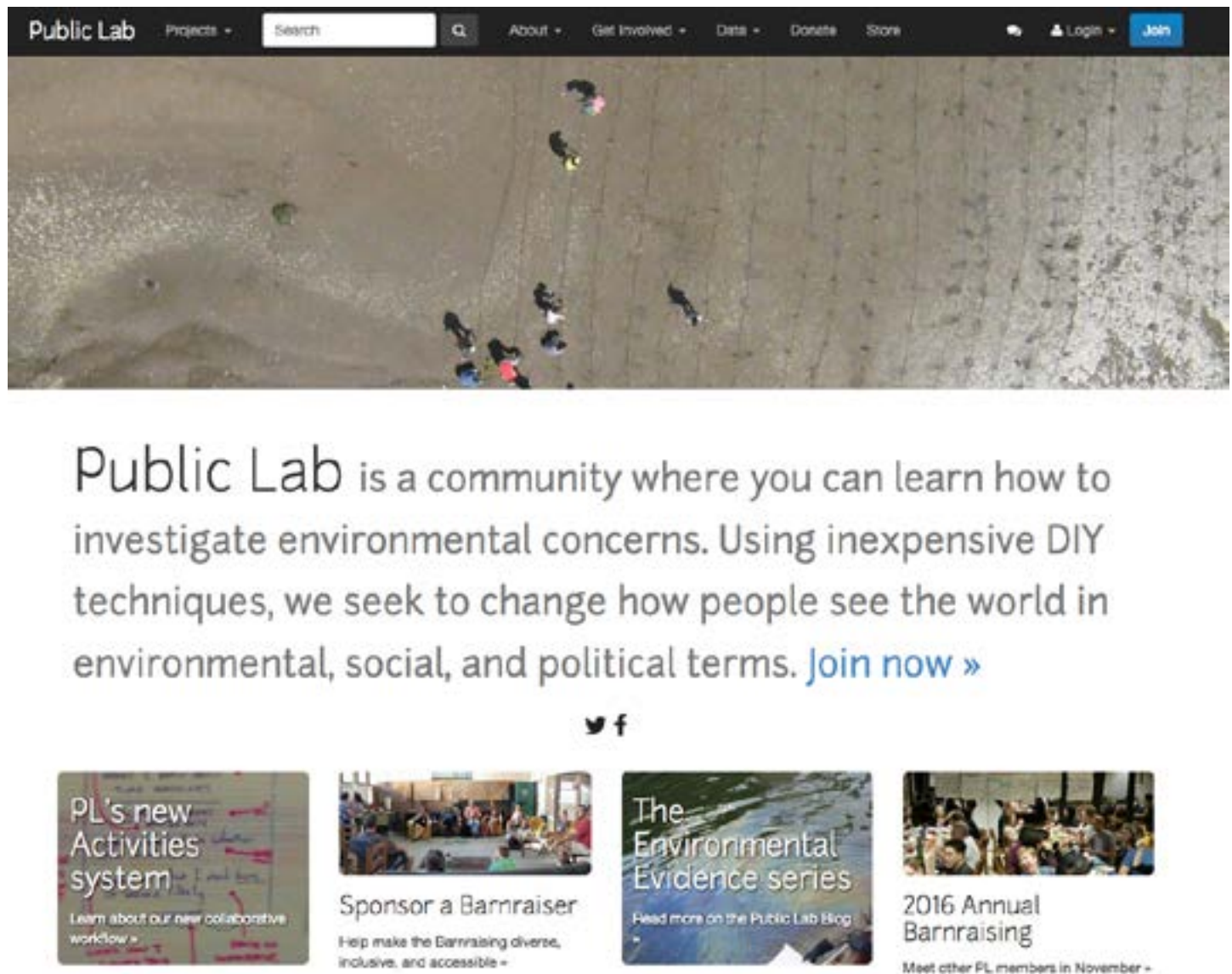II. The Collaboration
We are an open network of community organizers, educators, technologists and researchers working to create low cost solutions for monitoring air, water and land.
Discover, collaborate on, and contribute to locally important matters with the support of a global community.
III. The Solution
Join us today, as we work together to build and inspire a community of DIY activists and explorers using simple tools to build a growing body of data about our local environments.

Plenty of great ideas out there for our mobile mesh stations to incorporate!



Public Lab is a community where you can learn how to investigate environmental concerns. Using inexpensive DIY techniques, we seek to change how people see the world in environmental, social, and political terms. Join now »
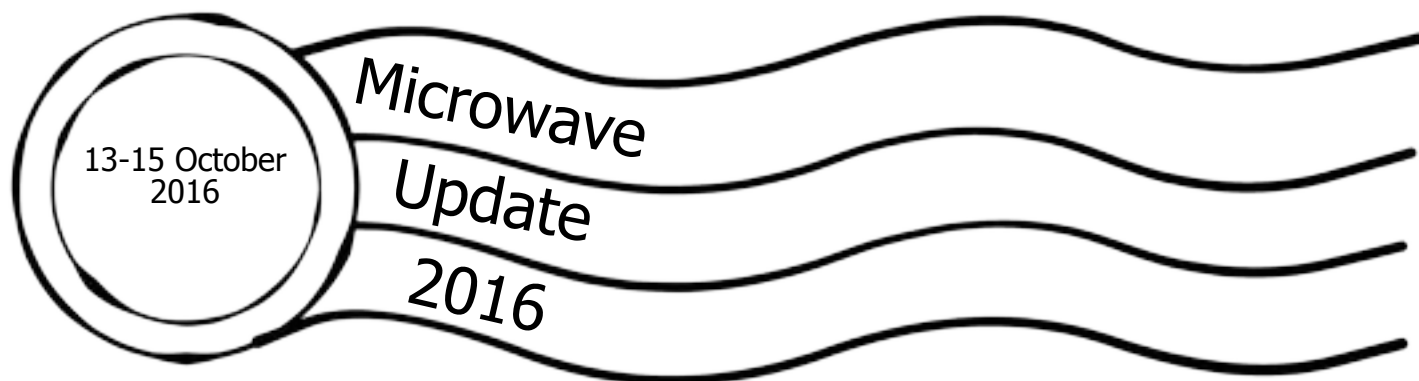
PL's new Activities system
Learn about our new collaborative workflow »

Sponsor a Barnraiser
Help make the Barnraising diverse, inclusive, and accessible »

The Environmental Evidence series
Read more on the Public Lab Blog »

2016 Annual Barnraising
Meet other PL members in November »

**Microwave Update 2016**
13-15 October 2016

Microwave Update (MUD) is an annual event held since 1985. MUD is a conference dedicated to microwave equipment design, construction, and operation. It is focused on, but not limited to, amateur radio on the microwave bands. The 2016 conference was on October 13-15, in Saint Louis, Missouri.



*Video clip of the conference as it got underway on the first day.*

MUD is a single-track lecture-based conference with a highly technical focus. The schedule can be found on the following pages. Talks ranged from reports on contesting to obscure filter prototyping to policy proposals to high frequency transverters. Circuit design up to 122GHz was discussed with greatest interest in the 24 and 48GHz bands.

Collaboration and catching up with fellow microwave enthusiasts happens all weekend. Noise figure measurements are one of several services offered to MUD participants. Vendors, a flea market, banquet, and auction are all traditional events.

W5LUA set up an EME station on Thursday and Friday night at moonrise to demonstrate operating by bouncing signals off the moon. On Saturday, he showed a video sent in from the other end of the contact in his talk. Being able to see the station work a contact and then hear what that contact sounded like from the other side brought EME to life for many in the audience.

## Schedule at a Glance

**Thursday, 13 Oct**

| | |
|---|---|
| 3:00 PM - 6:00 PM | Conference Registration Open |
| 8:00 PM - 12:00 AM | Hospitality Suite Open |

**Friday, 14 Oct**

| | |
|---|---|
| 7:30 AM - 4:00 PM | Conference Registration Open |
| 8:00 AM - 9:00 AM | Vendor Setup/Display |
| 8:15 AM - 8:30 AM | Welcome |
| 8:30 AM - 3:00 PM | Technical Sessions |
| 11:30 AM - 1:00 PM | Luncheon, Speaker: Ward Silver |
| 1:00 PM - 1:15 PM | Auction! |
| 3:00 PM - 5:00 PM | Noise Figure Measurements |
| 3:00 PM - 5:00 PM | Antenna Gain Measurements |
| 7:00 PM - 9:00 PM | Swap Meet |
| 7:00 PM - 9:00 PM | Noise Figure Measurements |
| 8:00 PM - 12:00 AM | Hospitality Suite |

**Saturday, 15 Oct**

| | |
|---|---|
| 7:30 AM - 1:00 PM | Conference Registration |
| 8:00 AM - 5:00 PM | Open Vendor Setup/Display |
| 8:15 AM - 8:30 AM | Welcome |
| 8:30 AM - 4:45 PM | Technical Sessions |
| 11:30 AM - 1:00 PM | Luncheon, Speaker: Steve Bible |
| 1:00 PM - 1:15 PM | Auction! |
| 6:30 PM - 9:00 PM | No-Host Cash Bar |
| 7:00 PM - 9:00 PM | Dinner Banquet |
| 9:00 PM - 12:00 AM | Hospitality Suite |

## Rooms at a Glance

**Thursday**
**Registration** - Lobby (near Central)
**Hospitality Suite -** Chouteau

**Friday**
**Registration -** Lobby (near Central)
**Vendors -** North A-C
**Lunch -** Central
**Noise Figure Measurements** - North C
**Auction -** Central
**Antenna Gain Measurements -** West Side Parking Lot
**Swap Meet -** Central
**Hospitality Suite** - Chouteau

**Saturday**
**Registration -** Lobby (near Central)
**Vendors -** North A-C
**Lunch -** Central
**Auction -** Central
**Dinner Banquet -** Central
**Hospitality Suite -** Chouteau
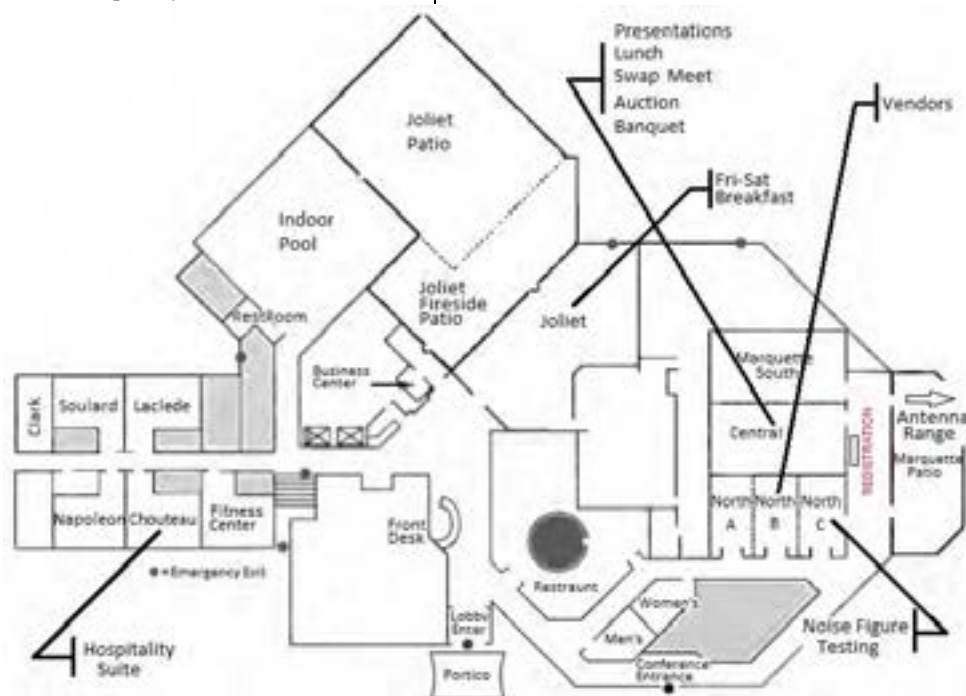
# *Preliminary* MUD 2016 Conference Schedule

| | Friday Session | | Saturday Session | Thursday Check-In |
|---|---|---|---|---|
| 8:00 AM | Conference Registration (to 4:00 PM) <br> Vendor Room Open (to 9:00 PM) | 8:00 AM | Conference Registration (to 1:00 PM) <br> Vendor Room Open (to 5:00 PM) | Registration <br> 3:00 – 6:00 PM <br><br> Hospitality Suite <br> 8:00 PM - Midnight |
| 8:15 AM | Welcome and Daily Announcements <br> Bob Sluder, NØIS | 8:15 AM | Welcome and Daily Annoucements <br> Bob Sluder, NØIS | |
| 8:30 AM | Experiences with Circular <br> Polarisation on 10 GHz <br> Charlie Suckling, G3WDG | 8:30 AM | Increase Local EHF Activity - <br> with 47 GHz Beacons <br> Tom Williams, WA1MBA | |
| 9:15 AM | Deep Space Exploration Society: 60-Foot <br> Dish Multi-Band Feed Development <br> Ray Uberecken, AAØL | 9:15 AM | Multi-Band Transverters: 24 GHz, 47 GHz, <br> 76 GHz, and 122 GHZ <br> Alan Devlin, VK3XPD | |
| 10:15 AM | Break | 9:45 AM | Break | |
| 10:30 AM | A Water Cooled 2.3 GHz Spectrian <br> Amplifier With Microcontroller <br> Control and Visual Basic Monitoring <br> Skip MacAulay, VE6BGT | 10:00 AM | Circular Polarization <br> Antennas from the <br> Republic of Texas <br> Kent Britain, WA5VJB | |
| 11:30 AM | Luncheon - "Ham Radio - Now What?" <br> Speaker: Ward Silver, NØAX | 10:30 AM | Understanding the OE9PMJ Filters <br> 24GHz and Up <br> Paul Wade, W1GHZ | |
| 1:00 PM | Auction! <br> Kent Britan, WA5VJB | 11:00 AM | Increasing Activity on the Microwave <br> Bands: A VHF/UHF Century Club <br> Award Change Proposal <br> Donn Baker, WA2VOI | |
| 1:15 PM | Five Microwave Topics <br> of Interest <br> Dr. Jerry Johnson, KØCQ | 11:30 AM | Luncheon - "3D CAD for Amateur Radio" <br> Speaker: Steve Bible, N7HPR | |
| 1:45 PM | Microwave-On-A-Stick <br> Jim Froemke, KØMHC | 1:00 PM | Auction! <br> Kent Britain, WA5VJB | |
| 2:30 PM | Garage Shop Experiments <br> at 24 and 47GHz <br> Mike Kana, AA9IL | 1:15 PM | Antenna Gain Measurement by the Three <br> Antenna Method: Techniques & <br> Considerations <br> Jeff Kruth, WA3ZKR | |
| 3:00 PM to 5:00 PM | Noise Figure Measurements <br> Tom Holmes, N8ZM <br> Mike Kelly, Keysight Technologies | 2:00 PM | Using Sun Noise to Evaluate <br> System Performance <br> Barry Malowanchuk, VE4MA | |
| 3:00 PM to 5:00 PM | Antenna Gain Measurements <br> Kent Britain, WA5VJB | 2:45 PM | Small Dish EME on 10368 MHz: <br> Summer 2016 Update <br> Al Ward, W5LUA | |
| 7:00 PM to 9:00 PM | Noise Figure Measurements <br> Tom Holmes, N8ZM <br> Mike Kelly, Keysight Technologies | 3:30 PM | The Second Annual Microwave <br> Gulf Outing 2015 <br> Tony Emanuele, WA8RJF | |
| 7:00 PM to 9:00 PM | Swap Meet | 4:15 PM | Amateur Radio Use of <br> Automotive Radar <br> Barry Malowanchuk, VE4MA | |
| 8:00PM | Hospitality Suite Open | | | |



Thursday 6:00 to 9:00 PM

Friday 6:30 to 9:00 PM

**DINNER**
No-Host Cash Bar (6:30 PM)
Dinner (7:00 PM - 9:00 PM)
Speaker:
**Richard Heuermann,** NASA Solar Ambassador
"Hubble Highlights: A Quarter Century of Discovery"

**Award Presentation and Prize Drawing**

| 9:00 PM | Hospitality Suite Open |
|---|---|

| Midnight | Hospitality Suite Closed |
|---|---|

Welcome to MUD 2016

St Louis, Missouri



Multiverter : 902-10368 MHz



At top, the conference opens. Above, Alan Devlin VK3XPD multiverter project began simply enough, but then expanded to include 24, 47, 76, and 122GHz! At right, the room listens intently to one interesting talk after another.

Paul Wade W1GHZ machined and tested a set of prototype OE9PMJ filters. References to this design are very rare. Paul's tests on 24 and 48GHz versions were successful. He built a 78GHz version, but has yet to find a lab that can test it too!

Kent Britain WA5VJB not only hosted the auction but also gave a very entertaining talk on a wide variety of circularly polarized antennas.
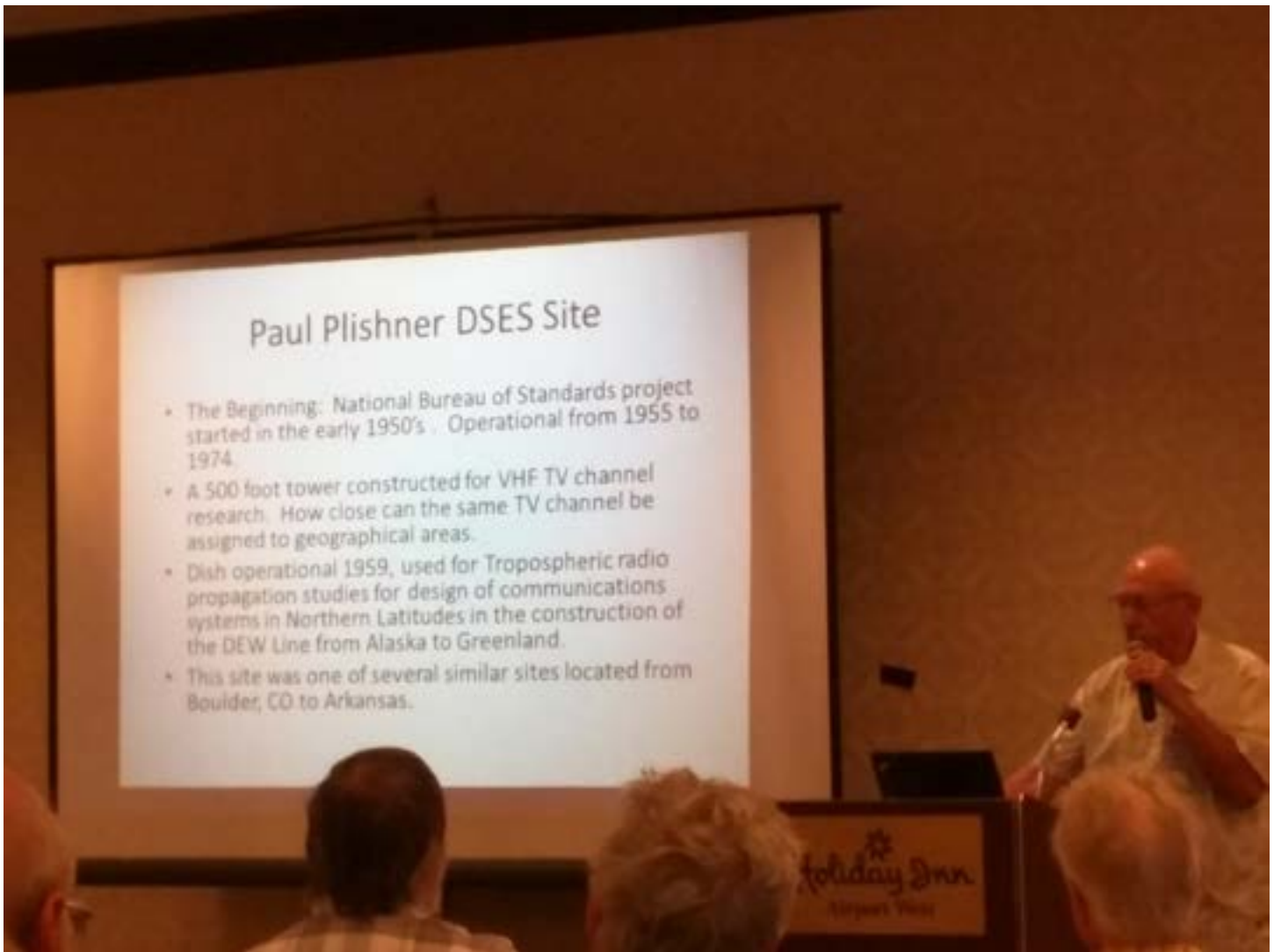
One of the most compelling presentations was about the ham "takeover" of an old National Bureau of Standards site.

T-22 is a building with two 60 foot dish antennas located on the northern most edge of the mesa north of Boulder, Colorado. The site is part of the current Department of Commerce, Institute for Telecommunication Services (ITS). In 1990 a group of people received permission, from then the National Bureau of Standards, to work on the facility. They formed the Deep Space Exploration Society and dove in! When they arrived at T-22 it was an abandoned, rat infested building full of racks of vacuum tube equipment. They have made many improvements to the building itself as well as the dishes and control systems.

They started by doing some extensive cleanup and repair of the building to make it a place where humans could work. They then painted the whole interior and erected a wall between the control area and a general work/meeting area. They had the power converted to single phase and were able to obtain a 30kw three phase diesel generator from Colorado University that was wired into the towers to run the three phase motors. This was used until they upgraded the motor drive system to a much more efficient single phase variable frequency drive system.

Vandalism was a problem in the early years of the project. Better locks eventually stopped the damage.

Extensive motor repair work was needed before they could even attempt to move the dishes. They undertook the difficult task of detaching and lowering these extremely heavy motors along with their clutches to the ground so that they could be repaired. All motors were rebuilt and repaired and reinstalled in working order. The dish gears and elevation screws were inspected and lubricated

before movement was attempted. When all of the repairs were completed they successfully moved the upper dish. An upper and a lower dish were both renovated.

The original drive systems were not very suitable for tracking celestial objects, which is what the group wanted to support. After several years they were able to obtain two variable frequency drives and the right type of motors.

The dishes had very old Heliax cables and a feed point mount that was difficult to use. They designed a feed point mount that easily accepted different feed point antennas. They also undertook the difficult task of replacing the Heliax. This involved threading this cable up the center of the tower, into the bottom of the dish, attaching it to one of the tripod legs and terminating it at the feed point.

Numerous feed point antennas have been built over the years. Crossed dipoles, horns, helix's and patch antennas have been used at a variety of frequencies.
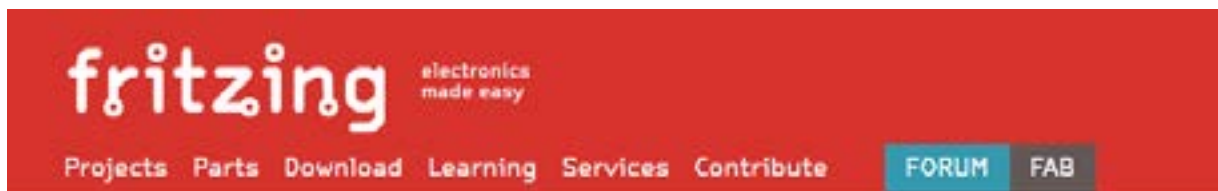
They have done several major projects with other groups over the years. The most significant ones were Falcon Gold with the Air force Academy and Paratrak with CU computer science students.

DSES has provided a number of school groups with exciting and educational tours. It must be emphasized that this part of Colorado is remote, rural, and lacks the educational resources that other parts of the country take for granted. Having this scientific and amateur radio site inspire students is a big goal of DSES.

DSES involves students in the use and continuing development of the site. Students from a University of Colorado engineering class developed a tracking and control program for the facility known as Paratrack.

**Join and support DSES here: http://www.dses.org/join-dses**

On
the
Fritz!

# fritzing
electronics made easy

Projects   Parts   Download   Learning   Services   Contribute    FORUM   FAB

fritzing CREATOR KIT

Your introduction to the world of interactive electronics

Fritzing is an open-source hardware initiative that makes electronics accessible as a creative material for anyone. We offer a software tool, a community website and services in the spirit of Processing and Arduino, fostering a creative ecosystem that allows users to document their prototypes, share them with others, teach electronics in a classroom, and layout and manufacture professional pcbs.

## Download and Start

Download our latest version 0.9.3b released on June 2, 2016 and start right away.

## Produce your own board

With Fritzing Fab you can easily and inexpensively turn your circuit into a real, custom-made PCB. Try it out now!

## Participate

Fritzing can only act as a creative platform if many people are using it as a means of sharing and learning. Let us know how it fits your needs and how it doesn't, show it to your friends, and share your projects.

Fritzing – An Introduction

http://fritzing.org/home/

Fritzing is an electronic design automation software tool for people that want to prototype and develop physical hardware. It's free to download and use. Donations are gratefully accepted!

## Installing Fritzing
Please make sure your system satisfies one of these requirements:
Windows - XP and up
Mac - OSX 10.7 and up, though 10.6 might work too
Linux - a fairly recent linux distro with libc >= 2.6
Start downloading the Fritzing package that's right for you.
Unzip your Fritzing folder somewhere convenient on your hard drive.
This may also be a good time for you to create a shortcut to the Fritzing application.

## To start Fritzing:
on Windows: double-click fritzing.exe
on Mac: double-click the Fritzing application
on Linux: double-click Fritzing, or try ./Fritzing in your shell window
If you experience problems, please try downloading again. This often helps. If it doesn't, have a look at our forums.
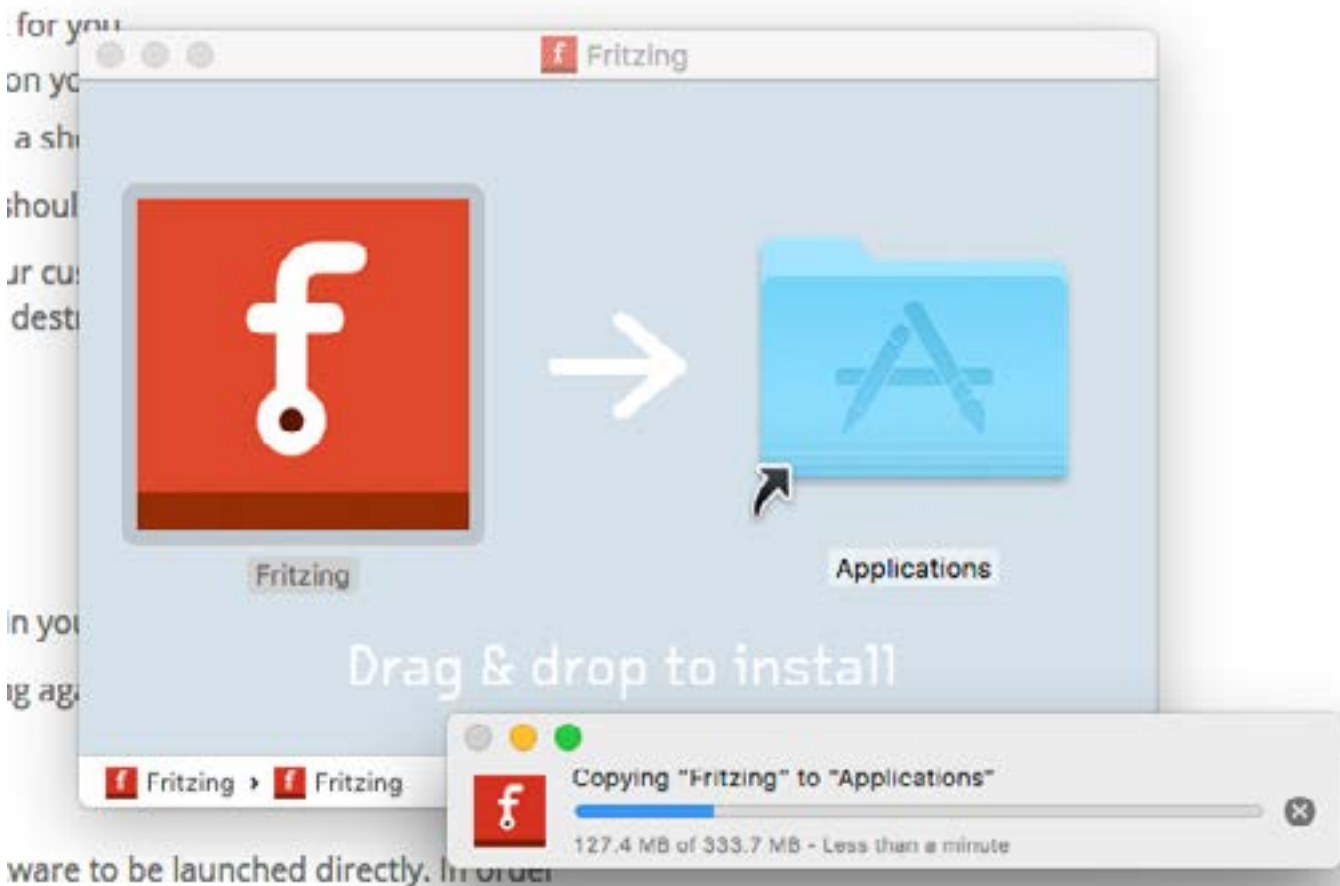


## Mac notes
Recent versions of OS X do not allow "unverified" software to be launched directly. In order to run Fritzing, you will need to either:
right-click the Fritzing icon and select "Open"
in the warning dialog, click "Open"
or, to get rid of the warning permanently:
go to the System Preferences
open the Security & Privacy page
unlock it by clicking the lock in the lower left corner

set it to allow app downloads from anywhere

I installed Fritzing on my mac without much trouble. The way I install "insecure" software is to option+click on the program icon, then select "Open" to set permissions for that particular application going forward. The directions given in the Fritzing installation instructions are close, but not exact.

The alternative is to allow all software to run on the computer from any source, and I don't want to do that as a general rule.

The first thing Fritzing wanted to do was to update the parts library. I clicked yes.

First impression? The user interface was complex, but cheerful and clean.
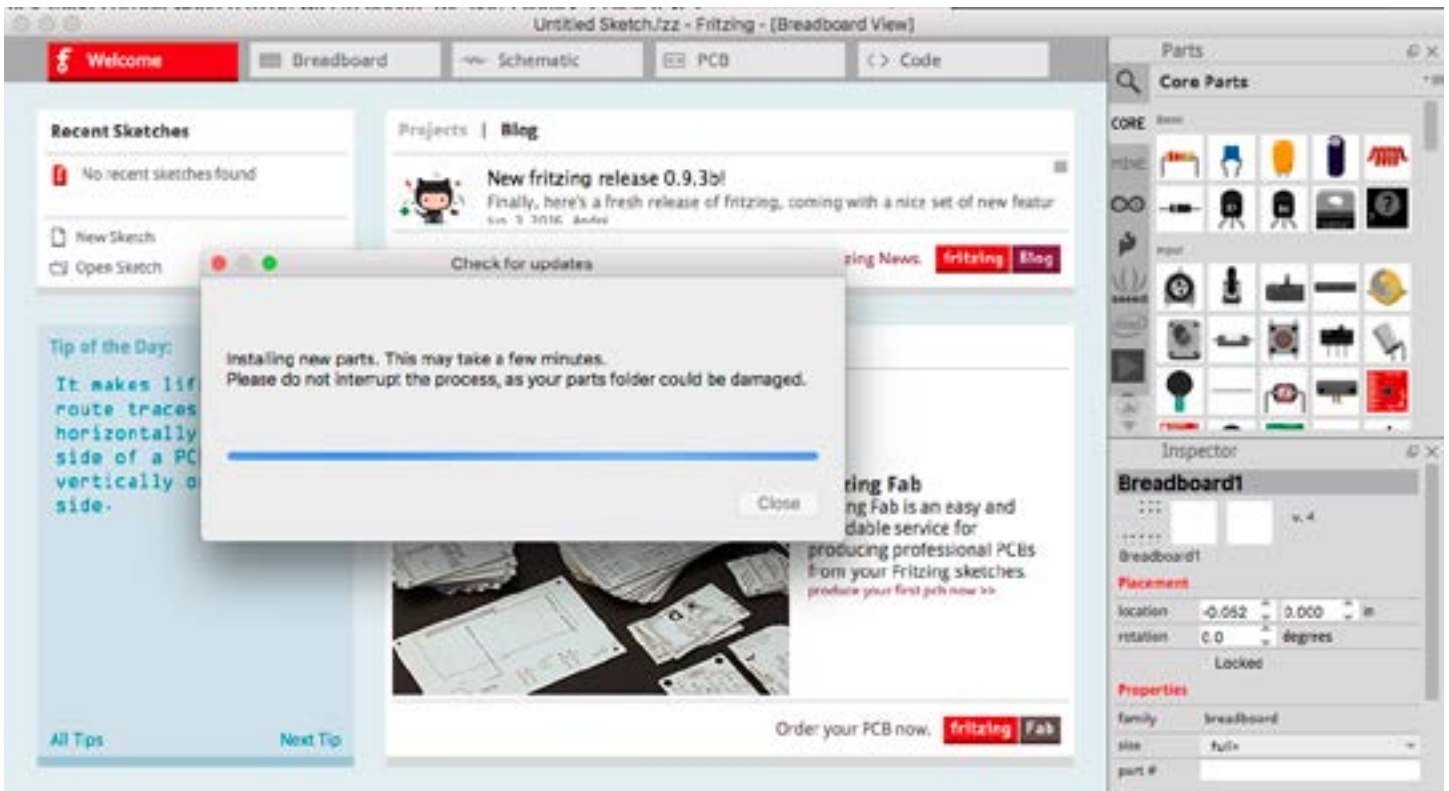


Work in Fritzing is called a "sketch", which is similar to Arduino and Processing. The workspace is divided up into tabs, like a browser. The Welcome tab has the following sections.

**Recent Sketches**
**Blog** viewer for Fritzing projects and updates
**Core Parts** library
**Tip of the Day**

Below the weblog is a **Fab Shop**. Fritzing Fab allows you to produce professional PCBs from your Fritzing files. Neat!

Below the Core Parts view is an **Inspector**, which gives details on selected parts.

The Breadboard tab has a big photo-realistic breadboard front and center. Core Parts and Inspector are on the right, just like on the Welcome tab. Along the bottom are Breadboard-specific functions.

The Schematic tab has a graph paper style worksheet. Core Parts and Inspector are on the right, just like on the Welcome and Breadboard tabs. Along the bottom are Schematic-specific functions.

The PCB tab has a blank PCB front and center. Again, Core Parts and Inspector are on the right. PCB-specific functions, including "export for PCB" are on the bottom.

Finally, the Code tab, with Core Parts and Inspector on the right as before. Code-specific functions are on the bottom. You can choose Platform (Arduino and PICAXE), Board (lots of choices!), and Port (bluetooth on my version). You can launch a serial monitor. And, it looks like you can upload code. The layout of this screen looks very similar to other embedded processor development environments.

There are plenty of choices at the http://fritzing.org/learning/ tutorial page. The documentation appeared to be top notch. The "Getting Started" lesson explained the user interface, the basic workflow, PCB production, and introduced the Fritzing community.

In addition to the Project views that were obvious from opening up the program and clicking through the tabs, there's a Part Creator, so that you can modify existing parts or create new parts. Open Part Creator by selecting Part and the New in the main menu.

The user interface can be re-arranged so that your workflow matches your preferences. For example, if you want the parts library on your left, you can set it up that way. Rearrangement is done by dragging the various windows around and dropping them where you want them.

# The Basic Workflow

A simple Fritzing workflow consists of the following steps:

1. **Building a real circuit**. Make sure it works on your bench first!
2. **Rebuilding the circuit** in Fritzing
3. **Editing the circuit,** including changing part properties if necessary
4. **Designing a PCB** - when the circuit is ready in Breadboard View, you can design a PCB layout in the PCB View. Fritzing features automatic routing and different export formats.
5. **Documenting a Project** - a project can be documented and shared using the Export function in the menu bar.

PCB files can be exported as etchable PDFs and Gerbers.

Multiple tutorials for Breadboard, PCB, Parts, and Programming tabs are on the website.

Projects from the very active Fritzing community can be found at http://fritzing.org/projects/
Three projects that were tagged with "ham radio" are below!
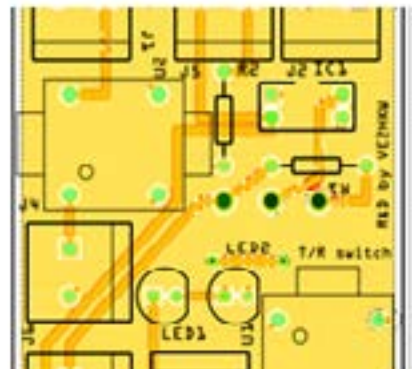


Projects tagged as ham radio
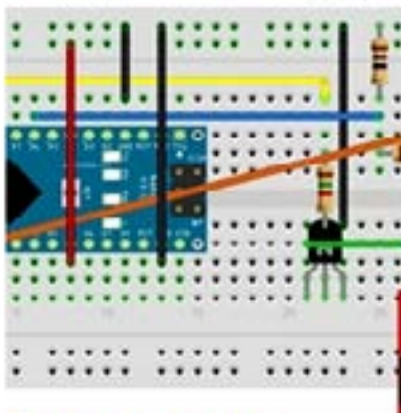
Kiss TNC for Ham Radio
by bakpakr

Ham Radio ALC Control
by ZS6KMD

Amateur radio Transmit Receive board
by ve2hkw

# Using Fritzing

First attempt at a real circuit was to document the Vadar Vambrace in the Breadboard tab. This working circuit was my daughter's entry into a Hackster competition involving the Particle Photon. She wanted to create a circuit that would turn off televisions. The idea was to integrate the electronics into a costume replica of Darth Vadar's glove. Hence the name Vadar's Vambrace. Hidden in the glove was an IR LED that constantly blinkined out off codes for as many TVs as possible. One would simply use The Force, and the TV would be silent. Some of you might recognize this strategy as the same one used by the TV B Gone project and product.
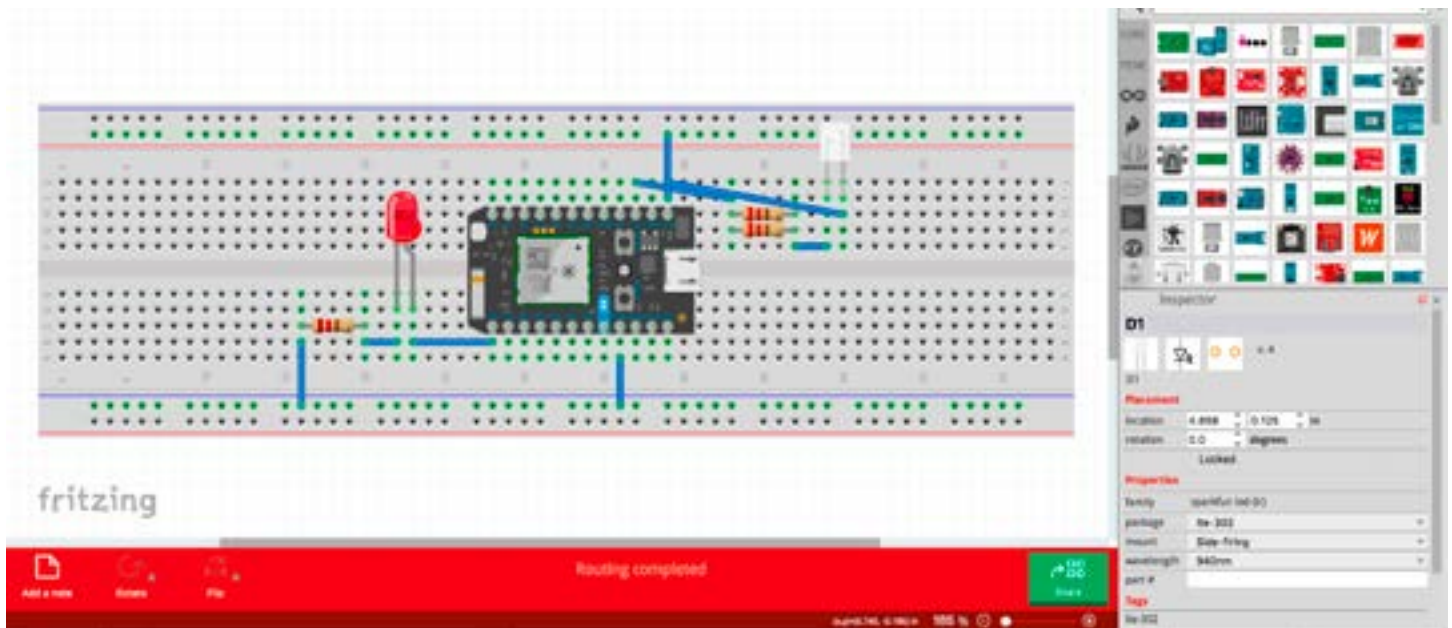


As you can see from the Breadboard tab work above, it's essentially a hardware version of the "Hello World" software exercise. With Fritzing, the Photon board and all the parts were already in the built-in parts library. Placing them was as easy as drag and drop. Parts can be rotated and flipped and notes added by using the Breadboard specific functions along the bottom. This was easy and straightforward is visually impressive. Pictured is the default breadboard. Different sizes are available and parts can be modified in the inspector. As you can see, this breadboard is a bit narrow for a Photon with only two holes on either side of the Photon's pins. For a simple project like this, it was ok, but for more complex designs, a different wider breadboard would be ideal.

The Particle Photon is based on Cypress's WICED architecture, the Particle Photon Series combines a powerful STM32 ARM Cortex M3 microcontroller and a Cypress Wi-Fi chip. Find lots more information at https://www.particle.io/
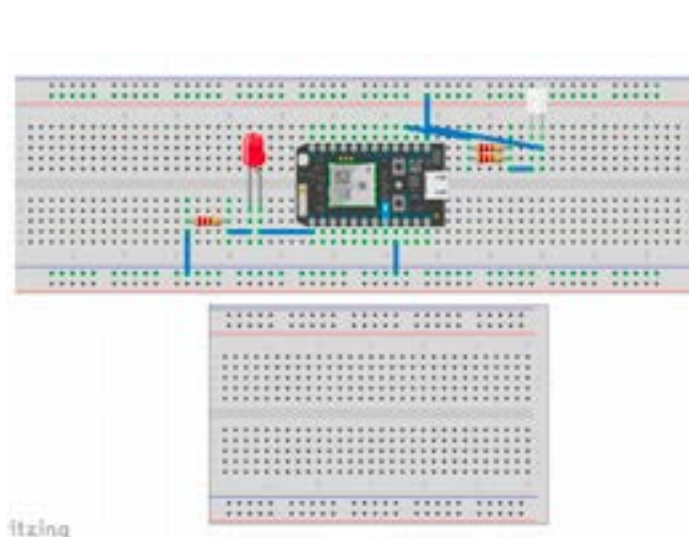


At left is the Vadar Vambrace on the default breadboard compared to a smaller version of the breadboard found in the library. The design could probably fit on the smaller one. But, the width is still a problem.

A popular alternative to the built-in breadboards is the built-in resizeable stripboards. These can be configured to have almost whatever rows and columns you like, but above a certain relatively small limit, Fritzing will warn you that it will run very slow. Handling all the possible interconnects as the rows and columns grows can be very heavy processing.
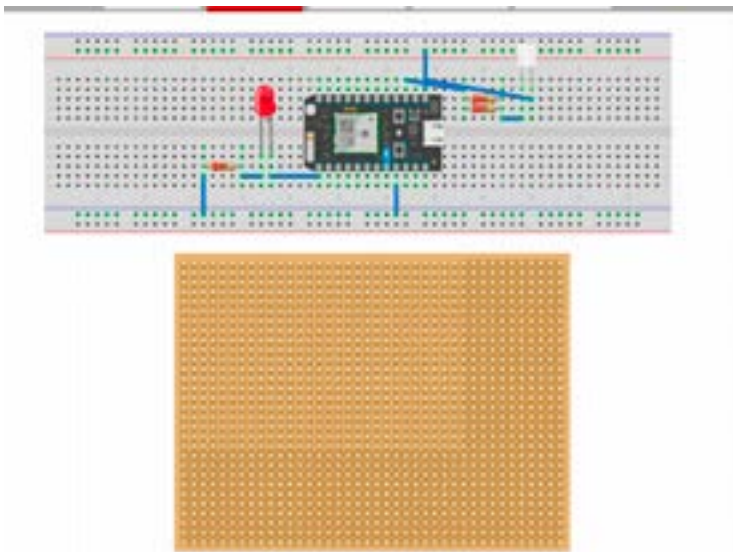
At left is the design so far on the default breadboard compared to a custom stripboard 40 columns by 30 rows wide.

Stripboards don't have built-in connections on the rows like breadboards do, but the sizing is much more flexible than that of the Fritzing breadboards.

The next step was to look at the Schematic tab. It was a mess! I clicked the Autorouting function along the bottom of the screen and it scattered the parts around with abandon. After some minor nipping and tucking and putting the parts closer to the pins they were connected to on the Photon, it cleared up. Autorouting in Fritzing requires some assistance.
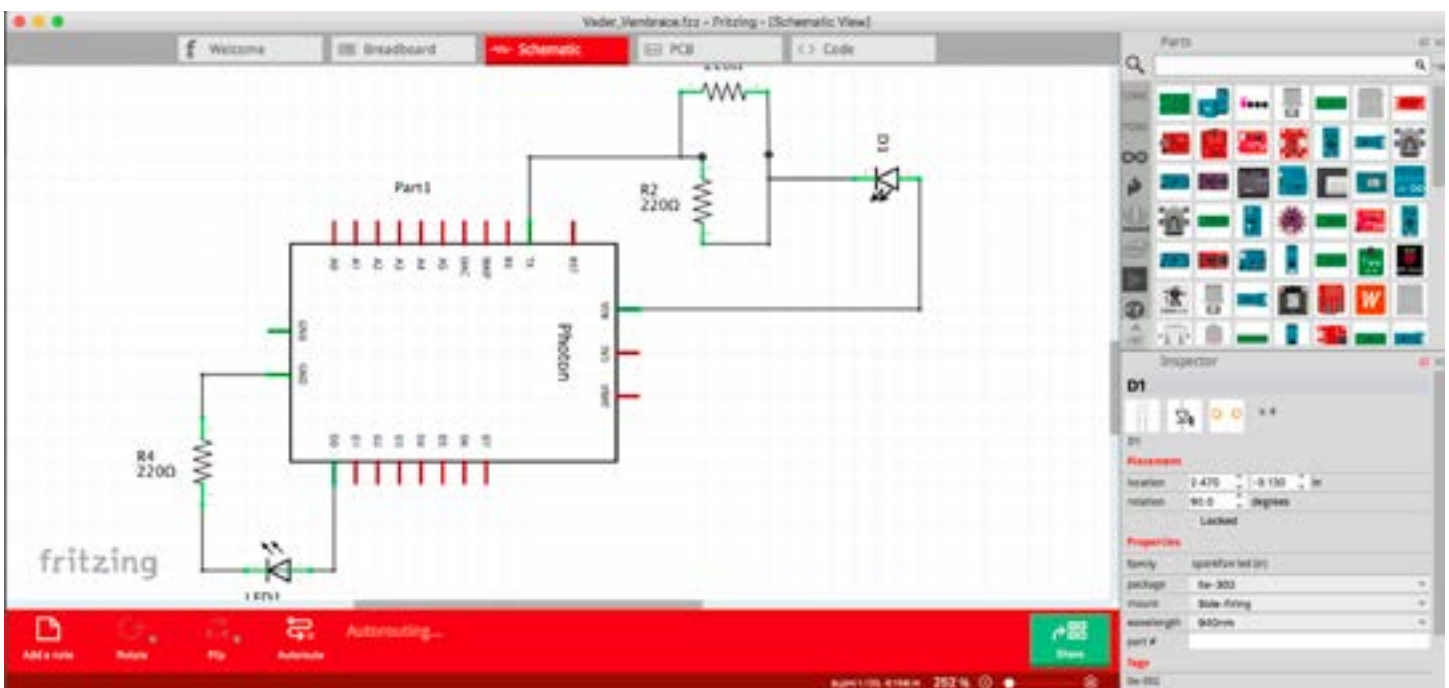
*Fritzing Schematic tab after hand editing.*

The next tab is PCB. I don't do layout or PCB design routinely, but the autoroute function for PCB layout seemed to behave in a similar manner to the schematic autorouting. In other words, it connected things up but didn't lay them out in a clean or efficient manner or human-readable manner until parts were dragged close to where they were connected or some hand-editing happened.

This is not a show-stopper. Documentation requires human curation even in the age of machine learning and advanced algorithms. Autorouting is not magical, even in expensive professional programs used to lay out multilayer boards.

Hand-placing the parts in a graphics program like Adobe Illustrator would be much slower. Despite the fact that hand-editing is required, I found the results from Fritzing to be well worth the time invested.

I didn't hand edit the PCB layout. What you see on the next page is the result of the autorouting with all the defaults. It appears to be off the board edge, which doesn't work for me and wouldn't work for production, but with some small additional effort a good layout and then a Gerber file can be sent off to a company to make your board. "Export for PCB", and "Fabricate", and "Store" are the tab-specific functions. I didn't try any of these out this time around!
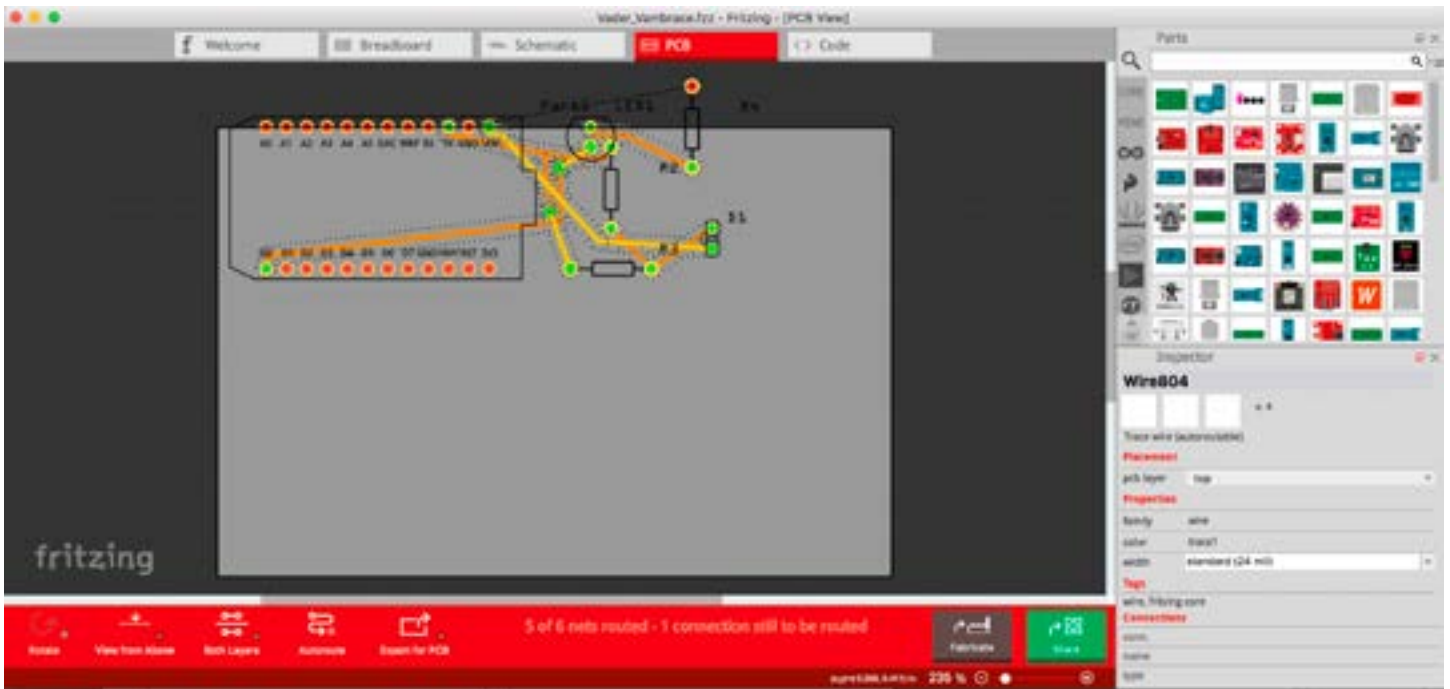
Above, the resulting PCB layout. Below is the Code tab.

The Code tab intended to be a place to type your script for downloading to a microcontroller, and then actually download it. Fritzing designers do not intend to replace your usual microcontroller programming environment. This is meant to be a lightweight alternative. The assumption is that you already have a working hardware prototype, and you'd cut and paste the code here. It's a nice way to keep both your sketch and script files together, which can help with documentation.

When I plugged in the Photon prototype board, the port appeared in the Port drop down list. This was a great sign! However, only certain types of Arduino and PICAXE are supported, so the code download part didn't work right off the bat. Since I already had working code onboard the prototype, I was reasonably sure that the production boards, if I ordered and populated them, could be programmed with the Particle IDE no problem.

Fritzing is fun, free (they would love your donation if you like it), and useful!
Try it out at http://fritzing.org/home/

**Donate to PARC by Shopping at Amazon**

December 2016

As publicized earlier this year, PARC is now a not-for-profit charity, and fund donations to PARC are eligible for tax deduction itemization for those who are eligible for such a tax itemization.

PARC also announced that in cooperation with Amazon, it is now possible to shop on Amazon at NO cost increase, and have Amazon distribute a percentage donation to PARC.

This is done by shopping on www.smile.Amazon.com.

If you choose to avail yourself of this opportunity, when shopping on www.smile.amazon.com, specify Palomar Amateur Radio Club as your charity of choice for donation.

For more information:

http://smile.amazon.com/gp/chpf/about/ref=smi_aas_redirect?ie=UTF8&ref_=smi_se_ft_abt_saas



amazonsmile
You shop. Amazon gives.

Shop Now

You can join or renew your membership, find a repeater listing, find contact information for the board all on the club's web site http://www.palomararc.org

# Featured Program:

For the December 7th meeting, Palomar Amateur Radio Club will have our Holiday Party. Bring a dish or treat to share!

Meeting starts at 7:30pm. Come at 7:00pm to socialize.

We look forward to seeing you at the Carlsbad Safety Center, 2560 Orion Way, Carlsbad, CA.

Sign up for the PARC Email Lists:

http://www.palomararc.org/mailman/listinfo