



Save  
The  
Date

Club  
Meeting 7:30pm  
6 April 2016

Carlsbad Safety Center,  
2560 Orion Way, Carlsbad

Program is about HF Remote  
Operation by Brian KF6C.

Visalia International DX  
Convention

15-16 April 2016

see events section for  
details!

PARC  
Board of  
Directors Meeting  
7pm  
13 April 2016

14322 Pomerado Road,  
Poway, CA 92064

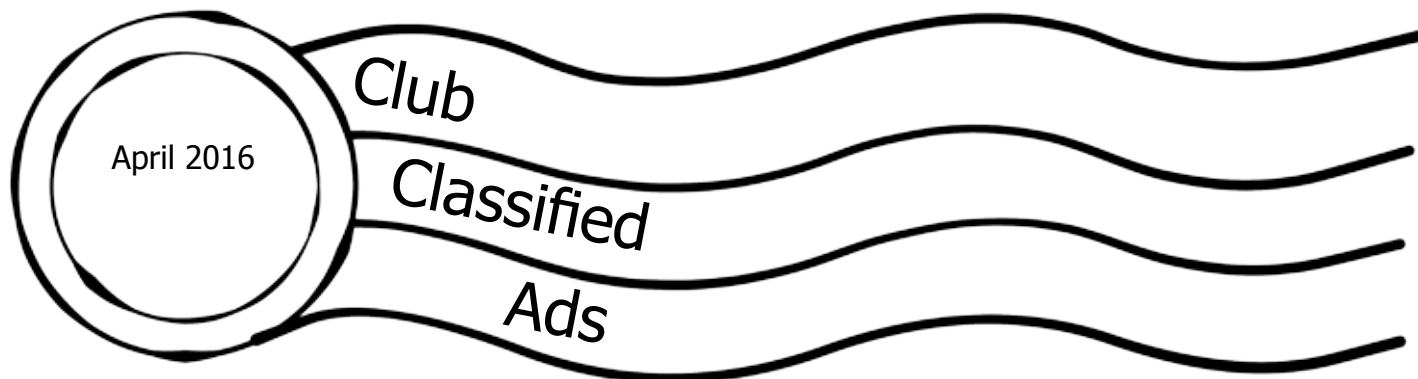


Is digital radio a passing fad? Will C4FM be replaced by another system soon? Not according to Yaesu Sales Manager Chris Wilson, N0CSW, in a talk at The Six Shooters meeting March 21st. "We are in the infancy of digital radio," he declared, pointing out how continuing innovations from the larger world of commercial radio will be filtering down into amateur radio for some time to come, and it is all C4FM. In fact, radio of the future may even be a combination of the best features of D-Star and Fusion combined with innovations that have not yet been announced.

He cited three new models from Yaesu that are pushing into new territory: the FT-991, the HF/6m/2m/70cm digital/analog transceiver that does it all; the FT-2DR dual band digital/analog handheld with the large touch screen; and the FTM-100DR 50-watt dual band digital/analog mobil. He specifically cited such innovations as automatic mode select (which allows radios to switch between analog and digital to match the incoming signal) and Wires-X (the digital linking system for C4FM that even allows remote operations) as technologies that sell themselves. However, he had to keep evading the persistent questions from the floor about specific innovations that might be coming, finally pointing out that they are still confidential. Nevertheless, he assured that they are, indeed, in the works, and that the future of digital radio is bright.

by John AC7GK

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See the following six pages for details on what KM6ARO has on offer!

## For Sale

KM6ARO  
760-908-8078

## FOR SALE!

### **Yaesu FT-2900R -- Rugged High Power 2m Mobile**

75/25/10/5 watts RF, 3 watts audio for noisy environments, no fan, extra large bright display. New condition, two months old, never used in the field. Includes packaging, documentation, etc. \$100, firm. Email to [KK6LWE@arrl.net](mailto:KK6LWE@arrl.net)

### **Yaesu FT-270R -- Rugged 2m HT**

5 watts RF, 800mW audio for noisy environments, submersible 30 min at 3 feet (IPX7). New condition, two months old, used once in the field. Includes packaging, documentation, etc. \$100, firm. Email to [KK6LWE@arrl.net](mailto:KK6LWE@arrl.net)

## Advertisements are free for members

Have items that need to find a new home? Advertise here! Send your ads to [scope@palomararc.org](mailto:scope@palomararc.org)

### **Club Members ONLY!**

**PARC has a tube bank that includes many 6 & 12 volt receiving tubes (and some transmitting types) for use by club members to repair their own personal equipment. Not for commercial use or resale. If we have your requests, we will pre-check the tubes and deliver them to you at the next club meeting.**

**Contact John WB6IQS [WB6IQS@att.net](mailto:WB6IQS@att.net)**



# Parts

**Terminal Blocks**



**BNC Adapters, jumpers**



**Banana Jacks, RF Adapters**



# Recyclable Projects



## Tools

- Small side cutters, needle nose pliers
- Solder sucker, solder wick
- Weller soldering gun
- Mini driver interchangeable tip set
- Ratchet box end wrench set, English
- Test lead racks
- Drill bits, deburr tools, microphone stand
- Punchdown tool, spare blade, 66-block type



# Parts

**Vernier Dials**



**Surface mount ohms, caps,  
surf boards**



# Parts

**2-cond strd shielded wire**



**Parallax MicroC, Motor Ctlr,  
Joysticks**



# Parts

**Landline Listening Devices**



**Potentiometers, Rheostats**



# Parts

**2.1mm 2.5mm power cables**



**¼-20 swivel mounts**





# Parts

## Resistor Assortment



## Potentiometers



# Project Boxes



# Clamshell Aluminum Chassis

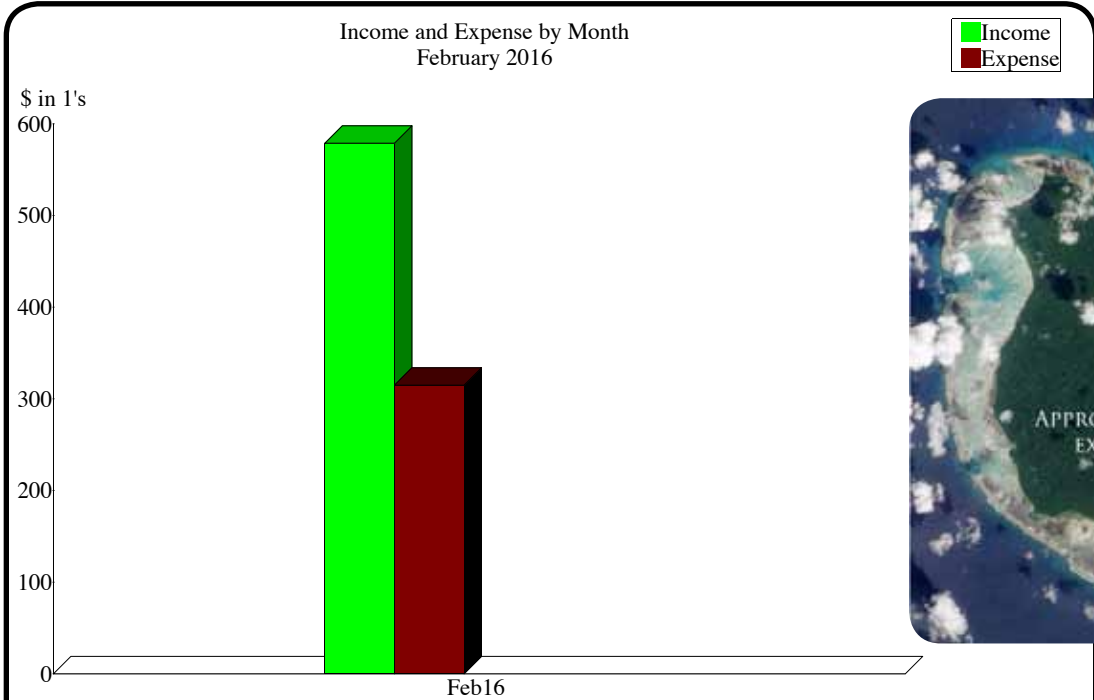
**4" x 6" Large**

**Medium, Small**



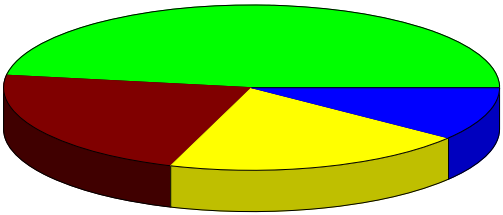
31 March 2016

# Club Financial Update



Expense Summary  
February 2016

Palomar Mtn Mutual Water Co	%47.62
Post Office Box Rental	22.22
Rptr Electric	19.92
Rptr Phone	10.23
Total	\$314.98



By Account

# Reported ATV Status

1 April  
2016

Would you like to help us  
revitalize our ATV system?  
We could use your help.  
Contact [board@palomararc.org](mailto:board@palomararc.org)  
to volunteer.



PARC  
ATV  
System

915 MHz WBFM in  
5.8 MHz audio subcarrier

146.415  
79.7  
intercom

1241.25 MHz VSB out  
NTSC standard

2441.5 MHz WBFM in  
6.0 MHz audio subcarrier

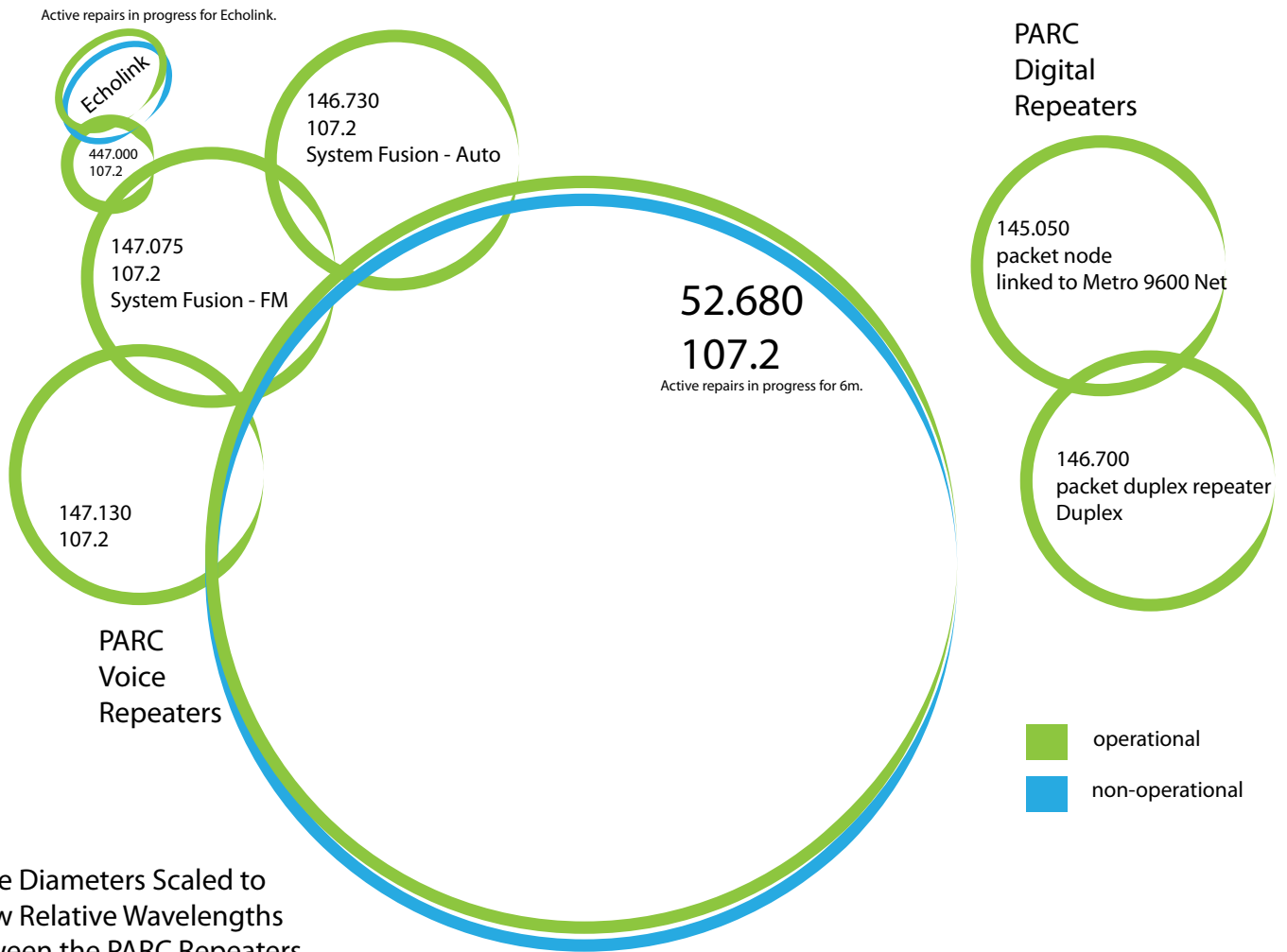
-  operational
-  non-operational

Circle Diameters Scaled to  
Show Relative Wavelengths  
Between Equipment

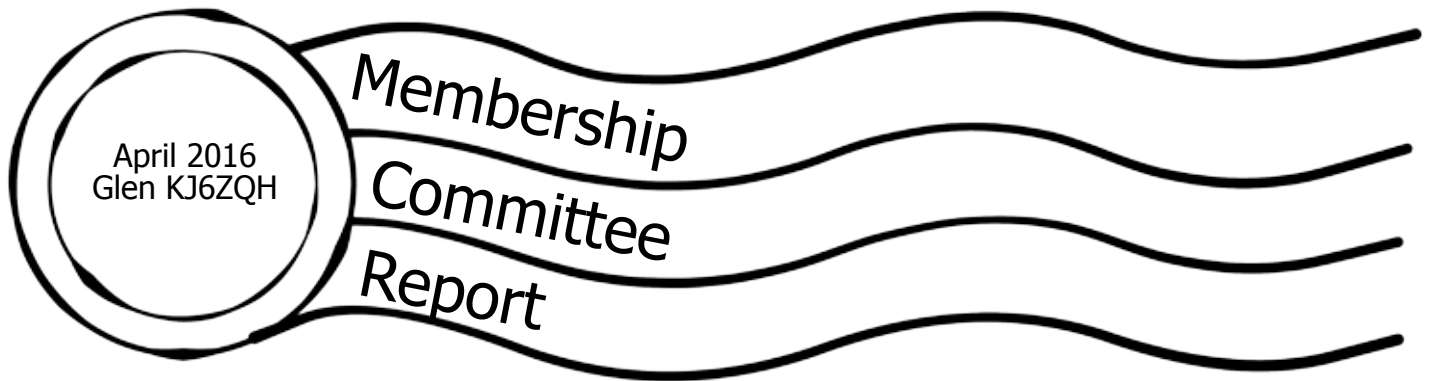


# Reported Repeater Status

1 April 2016



Substantial 6m repeater repair progress has been made. New cavities are at the repeater site awaiting installation.



From the Membership Table

You can check the status of your membership 24/7. 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.

73,  
Glen KJ6ZQH, Membership Chair

April 2016

Committee Chairs  
and  
Board Members

Contact  
Info

**Current Board of Directors**

President	Charlie Ristorcelli NN3V	(619) 368-7617
Vice President	Joe Peterson K6JPE	(619) 630-8283
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 KJ6ZQH	(858) 735-1144
Repeater Technical Chair	Mark Raptis KF6WTN	(760) 672-0223
Scope Editor	Michelle Thompson W5NYV	(858) 229-3399 (text welcome)

**Not on the Board**

Repeater Site Chair	Mark Raptis KF6WTN (acting)	(760) 672-0223
---------------------	-----------------------------	----------------

The board members might have [callsign@amsat.org](mailto:callsign@amsat.org) mail aliases.

**Committee Chairs**

EchoLink	Bernie Lafreniere N6FN	N6FN@niftyaccessories.com
mesh networking	Phil Karn KA9Q	karn@ka9q.net
Operating Day	Tom Martin K6RCW	k6rcw@amsat.org
SANDARC Representative	John Walker AC7GK	ac7gkjohn@gmail.com
SANDARC Representative	Paul Williamson KB5MU	kb5mu@amsat.org
SANDARC Alternate	Michelle Thompson W5NYV	w5nyv@amsat.org
SD Microwave Group Liaison	Kerry Banke N6IZW	kbanke@sbcglobal.net

**Upcoming Event**

**National Parks on the Air**

Take part in this 2016 operating event, celebrating the US National Park Service Centennial.

**Start Planning Now**

National Parks  
**ON THE AIR**  
**2016**



## April 30 PARC Operating Day at Fry's on Airport Blvd.

The Club's spring operating day is scheduled for Fry's on April 30th.

Note: This operating day will take place at the Fry's on Airport Blvd., NOT San Marcos.

**Fry's**  
**9825 Stonecrest Blvd.**  
**San Diego, CA 92123**  
**(Right off Aero Drive on South 15 freeway)**

The operating day is April 30, 9:00 AM through 3:00 PM.

PARC club members who attend and sign the Club attendance sheet may earn "participation points" to be added to the points they earn for attending Club meetings and events.

Also, the Club members who attend the event and sign the Club attendance sheet will be entered in a prize drawing.

To be eligible, members must sign the Club attendance sheet in person. No proxies or other manner of signing in will be considered.

Do not need to be present to win, but must sign the PARC Attendance log at Fry's

One "brandy new" BAOFENG UV-5R dual band VHF/UHF radio.  
Members interested in participating should contact K6RCW (Tom) at K6RCA@amsat.org, or on 146.730 MHz repeater, or just make an appearance and join the operation.

**DON'T MISS THE CHANCE TO WIN A BRAND NEW RADIO!**





# Auction

**What:** EARS Ham-radio-related annual auction

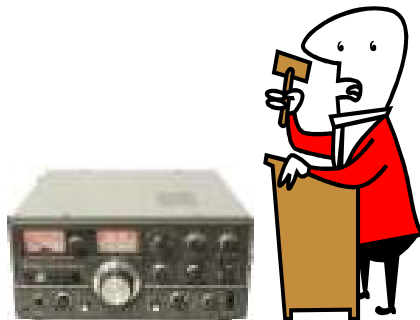
**Cost:** Sellers \$2 for first tag, \$1 each additional tag, buyers free

**When:** Saturday April 23<sup>rd</sup>, 2016, Seller check-in 8:30AM, Buyer 9AM, Auction begins 9:30AM

**Where:** Escondido Methodist Church social hall  
341 S. Kalmia St. Escondido, CA 92025 (4<sup>th</sup> & Kalmia)

**More Info:** <http://www.earsclub.org> (rules and photos of some items up for auction)

**Payment:** Cash, Check, Paypal.



23-24 April 2016

Emergency Preparedness Fair

**SPONSORED BY PARC**

Please bring food donations!

*Interfaith*  
**Emergency Preparedness**  
*Fair & Food Drive*



Saturday April 23rd & 24th  
10:00 am - 2:00 pm

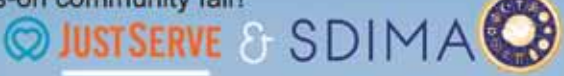
505 S. Vulcan Ave.  
Encinitas, Ca

Encinitas Community Resource Center  
Most Needed Items:  
Canned Beans & Fruit  
Canned Meat (chicken, tuna, salmon)  
Hearty Soups & Chili  
Cooking Oil & Condiments  
Rice, Beans, Sugar & Flour  
Hygiene Items & Diapers (larger sizes)

ARE YOU PREPARED FOR AN EMERGENCY?

Join Encinitas Community Resource Center, Encinitas Fire, Encinitas CERT, Ready America, Rancho Coastal Humane Society and other community organizations at this fun, informative & hands-on community fair!

Cost- Free



San Dieguito Interfaith Ministerial Association

community resource center  
*Creating paths to Safety, Stability & Self sufficiency*

Come visit the Palomar Amateur Radio Club booth at the  
Emergency Preparedness Fair  
in Encinitas, CA  
on 23 April 2016  
from 10am-2pm.







The Club's Field Day site is already reserved. The location is the corner of Valley Center Road and Lilac Road. Other logistics are on order. The Fire Department is arranged to fill the barrel counterweights, food services are planned, etc. In case you do not remember, Field day will take place June 24th. through 26th. Mark your calendars to participate, to help set up, or just come out to see PARC's FD operation. As in the past, the Club will begin set-up of the FD site on Friday, June 24th. Field Day radio operations will start at 11:00 AM on Saturday morning the 25th., and will end at 11:00 AM on Sunday 26th.

FD site will be serving the great tri-tip BBQ for lunch on Saturday, and having excellent breakfast on Sunday. Everyone is invited to attend, and hopefully participate and operate during the FD period. You do not have to operate a station to enjoy the BBQ. Just come out and support the event. In preparation for FD there will be several work parties to prepare the FD equipment.

**The first work party was held March 20th** at NN3V QTH.

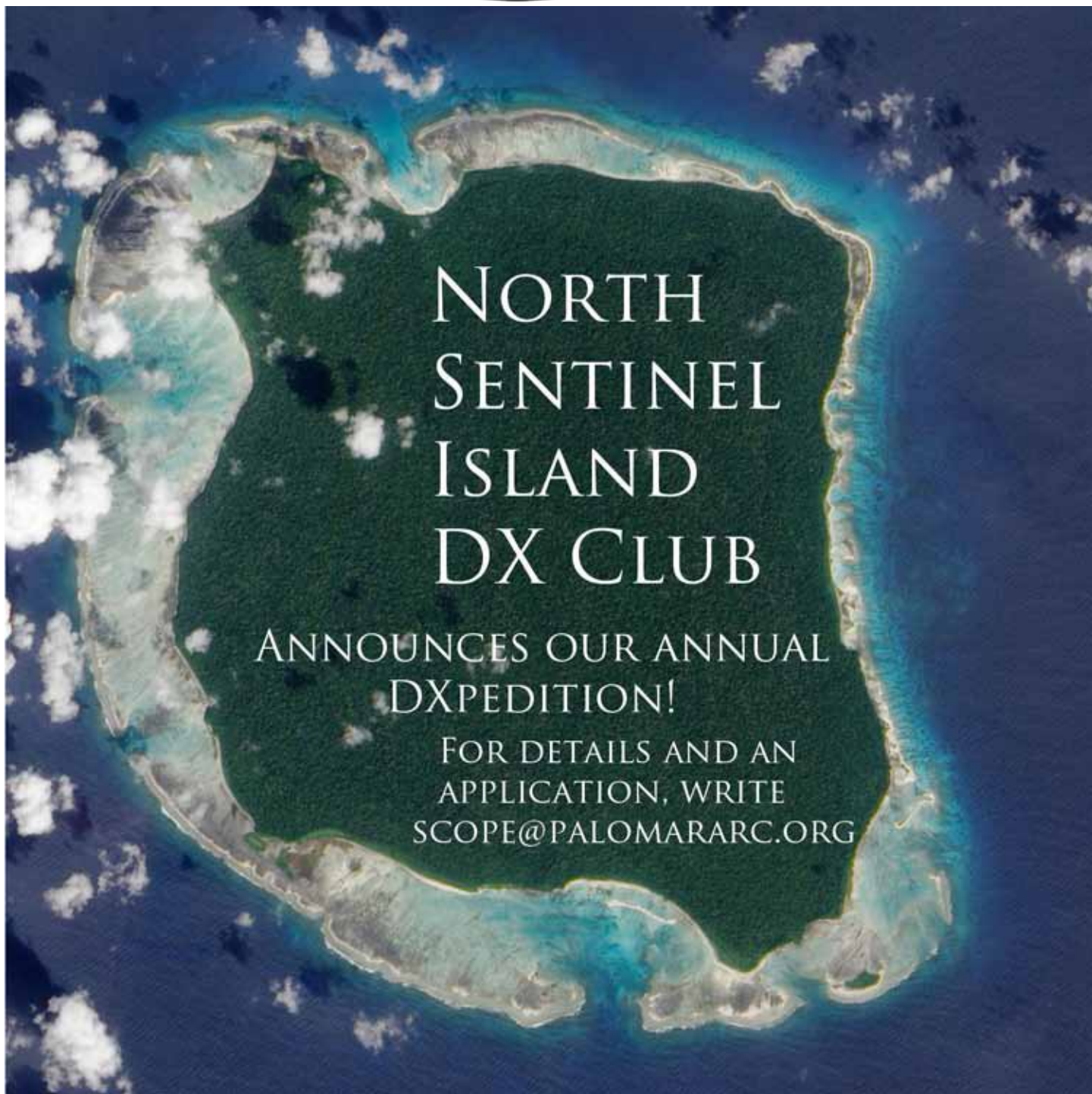




**SPONSORED BY PARC**

1 April 2016

DXpedition  
Announced

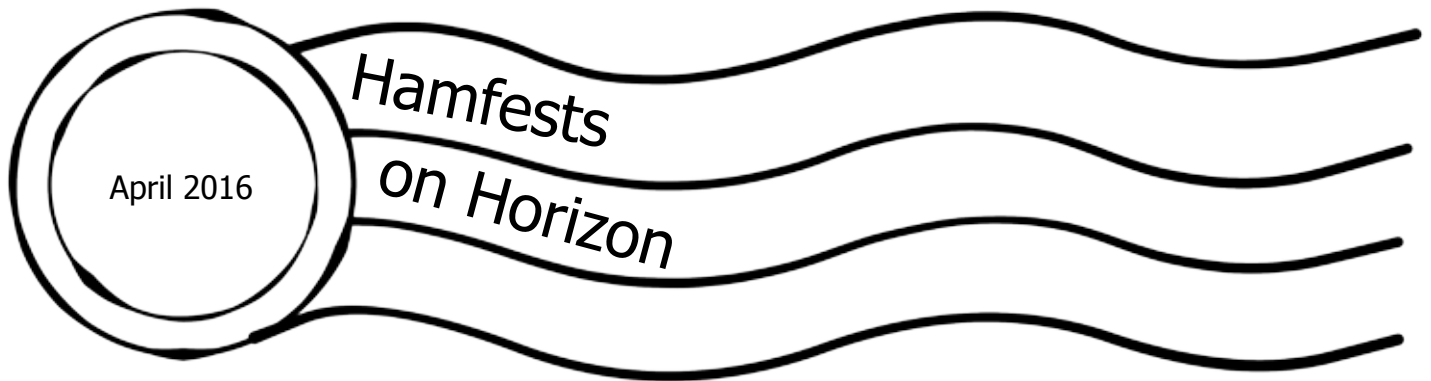


NORTH  
SENTINEL  
ISLAND  
DX CLUB

ANNOUNCES OUR ANNUAL  
DXPEDITION!

FOR DETAILS AND AN  
APPLICATION, WRITE  
[SCOPE@PALOMARARC.ORG](mailto:SCOPE@PALOMARARC.ORG)

This DXpedition will be in coordination with a scientific mission tasked to evaluate the amount of uplift from the February 4, 2005 earthquake. DXpedition participants will be expected to provide backup communications for the geologists involved in this ambitious and unprecedented project.



The time is near for you to be thinking about going to a hamfest. And there are some on the horizon that are really very good.

The **Visalia International DX Convention**. If you have any interest in HF communications, or if you are an avid DX chaser, this is a top notch event, and easily reachable from San Diego. There are many opportunities to ride share, and if you are interested, come up on the repeaters and mention you are looking for a ride. The hamfest / convention takes place at the Visalia California Convention Center on April 15 – 16. There you can enjoy all the traditional fun of a hamfest, and you will be treated to exceptional presentations by some of the world's top DXers. You can find out all about this at:

<http://dxconvention.org/>

The **Dayton Hamvention**. Start planning now! If you are a ham and have not been to Dayton at least once in a lifetime, then you are not yet "a real ham! Just kidding of course, but there is no question that Dayton is the largest amateur radio event in the world. Getting to and from Dayton is relatively inexpensive as Southwest and other bargain airlines offer excellent fares. And hotel accommodations in the vicinity of Hara Arena are very reasonable. Ignore the rumors you've heard about there being no Hamvention because Hara arena is falling down. Not true. It is in need of extensive renovation, but repairs have begun. And if you are looking for something about ham radio and cannot find it at Dayton, then it has not been invented or created yet! Dayton takes place at Hara Arena, Dayton, Ohio, the weekend after Mother's Day: May 20 – 22, and you can read all about it at:

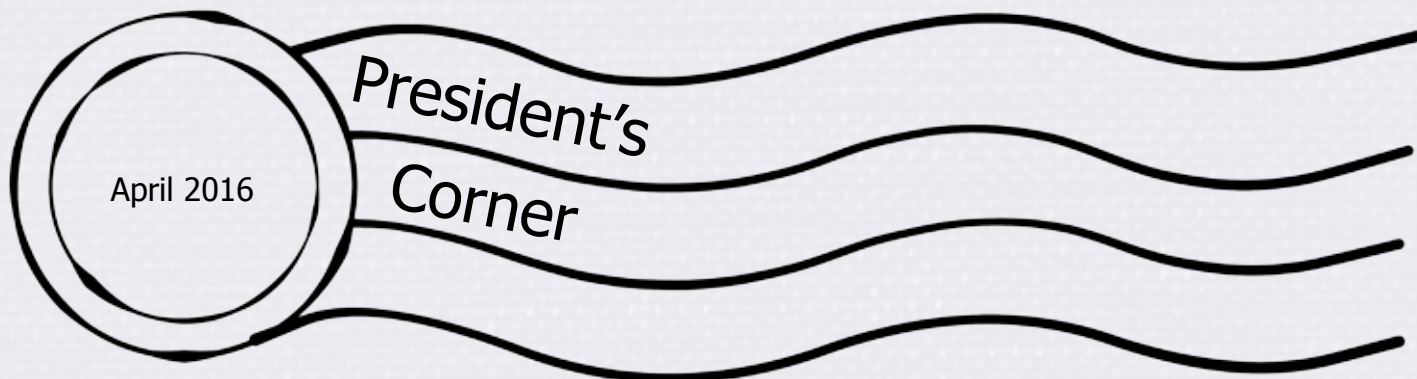
<http://hamvention.org/>

Love hamfests? Looking for one a little closer to home?

The Next **San Diego Ham Fest** will be in October 2016 Exact date: TBA  
Location: Lakeside Rodeo Grounds located at 12584 Mapleview Street in the town of Lakeside

<http://www.lakesidearc.org/sdhamfest/sdhamfest.php>





By now I am sure you recovered from your April Fool's debacles, and are eagerly looking forward to your appointment with IRS on April 15th. There are times I wish the two events had a coincident date.

Thanks to the PARC club members who took up Kris Rolfson's invitation to tour the Mira Costa College Technology Center where he teaches the course we heard of in February. Several of those touring the facility donated ham radio equipment for the planned hamshack at the college. Those are nice "Elmer" efforts.

As we evolve our 501. (C).3 non-profit public charity designation, please take note. If you are eligible to itemize charitable donations when filing your taxes, you may take advantage of the club's designation in any ham radio equipment donation you wish to make. The Club's focus and mission in public non-profit operation is to extend the fraternal value of amateur radio. It does so by supporting ham operators in their education, practice of ham radio, and operation of their hobby. Rest assured that any donation to PARC of ham radio equipment will be put to that use. Also, please remember that if you are inclined to donate, should you be shopping at Amazon, please consider doing so at [www.smiles.amazon.com](http://www.smiles.amazon.com). That is the Amazon web portal into charitable donations. When you shop, at checkout, you will be asked to identify the charity to which you wish to contribute. Please consider donating to Palomar Amateur Radio club. The choice has absolutely no effect on the prices you are charged by Amazon. It merely results in an Amazon corporate donation to the charity you indicate. Great news for PARC repeater enthusiasts. As reported elsewhere in this Scope, the new 6-meter repeater cavities arrived as scheduled, and PARC Technical Chair KF6WTN (Mark) and his team are preparing the complete restoral of our venerable 6-meter repeater. Details shortly.

I was pleased to see several PARC members, including W6YOO (Harry) at the Palm Springs hamfest. A very nice hamfest, small as was Yuma 10 years ago, but growing year to year as did Yuma. I encourage PARC members to put Yuma and Palm Springs on the ham calendar for next year. Fun, close by, and more and more vendors are appearing. Plus, for those with RVs, excellent on-site facilities.

On the subject of RVs, if any of you is an RV owner, or has a friend who is an RV owner, consider helping PARC for FD operation. If you consider lending PARC your RV, or asking your friend to do so, contact the Board of Directors. Email to [board@palomararc.org](mailto:board@palomararc.org). This would also be an excellent opportunity to participate in Field day. The period of time for which it will be required is 5:00 PM June 24 through 2:00 PM June 26. And PARC's Field day operators are known to leave loaned equipment in cleaner condition than when it was received, so here is a chance to get an RV polished inside!

# Radio Scouting Update



## NEWS FLASH – RADIO SCOUTER CASEY HUBBARD KK6WRU GOES TO CALIFORNIA STATE SCIENCE FAIR WITH HIS ANTENNA ENTRY!!!

Casey Hubbard, KK6WRU, from Troop 474 in San Diego won first place in his school competition at Good Shepherd Catholic School in the Physics category. His entry was qualified for the 62<sup>nd</sup> Greater San Diego Science and Engineering Fair (GSDEF), which was held at Balboa Park from March 14-17<sup>th</sup>. At the GSDEF Awards ceremony Viejas Arena on March 17<sup>th</sup>, Casey was one of the first place winners for the Junior Division in Physics and Astronomy! He also won runner-up for the Junior Division Sweepstakes award and got a neat plaque and an award check.



Winning the GSDEF means that Casey is qualified for the California State Science Fair and the Broadcom Masters competition too! The State Science Fair is in Los Angeles in May.

Casey expressed his thanks to PARC members Erik Johnson, W6ETJ, Ed Boss, KJ6LOX, and Kevin Walsh, KK6FRK for all their work in getting the FCC technician class arranged and helping all the Scouts in Troop 474 to pass their exams. He also expressed thanks to PARC for helping set up the Radio Merit Badge day at Camp Balboa, and the awesome prize of the Baofeng GT- III radios for the Scouts who passed their Technician exam.

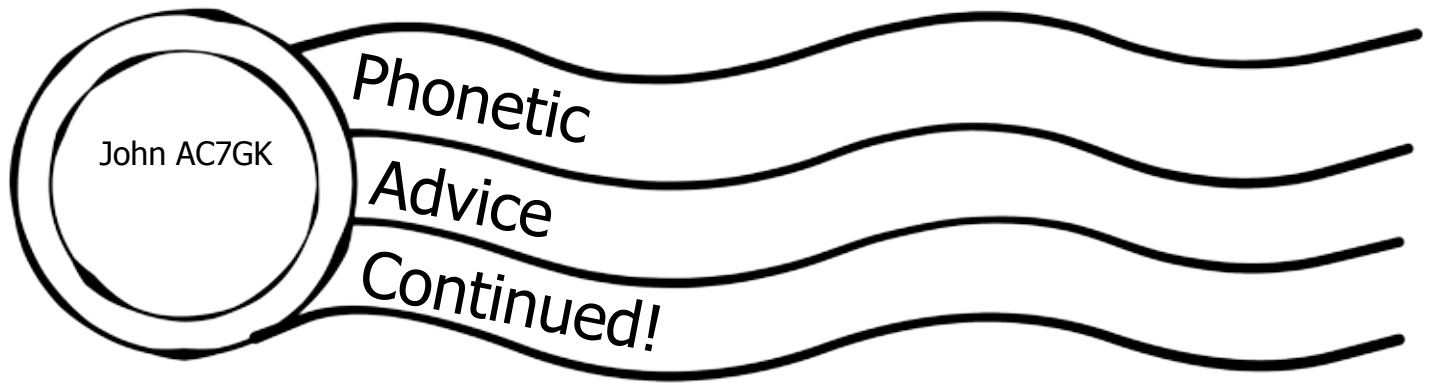
Special thanks goes to Erik and Ed for elmering Casey in the design of the antenna, and with the final testing with their antenna analyzers to prove the design worked and recording SWRs.



Casey Hubbard KK6WRU  
wins first place in science fair  
photos from Kevin KK6FRK







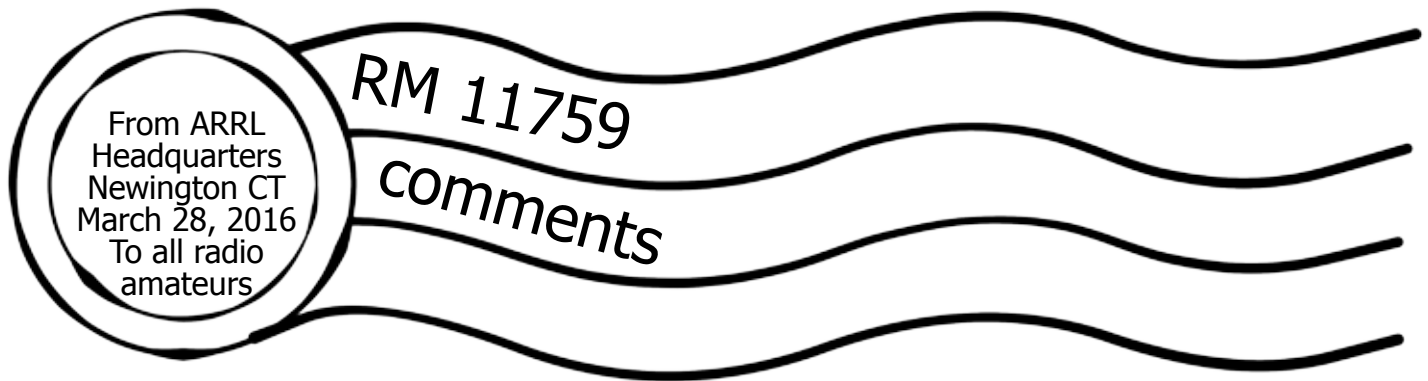
Last month we saw why it is best to use standard phonetics when spelling out words or names in our transmissions. This month, let us look at commonly accepted variations of these.

One widely accepted variance from the standard ITU phonetic alphabet is to use "fox" instead of "foxtrot." This may work just fine when transmission conditions are good, but in broken or noisy transmissions, "fox" can sound like "golf," and confusion may arise.

Sticking with "foxtrot" until it becomes automatic can eliminate this problem.

The phonetic "zed" is often used in place of "zulu." Actually, "zed" is the accepted phonetic in Commonwealth countries and has such acceptance all over that it can, indeed, be used interchangeably, provided that it not be confused with "echo" in noisy transmissions.

"Quebec" is sometimes pronounced "kwee-beck," the way many North Americans say the name of the city, and sometimes with the military pronunciation of "kay-beck." Usage here is a matter of choice, although the latter is actually faster, and also might keep the person hearing the first pronunciation from automatically writing the letter "k" for "kilo" before hearing the second syllable.



## ARLB013 ARRL Tells FCC to Restore Balance of Modes on 80 and 75 Meters

In comments filed on March 23 on its Petition for Rule Making (RM 11759) seeking changes to 80 and 75 meters, the ARRL has told the FCC that its primary objective is to “rebalance” the bands by correcting a 10-year old FCC error.

“ARRL’s proposal is not fairly viewed as a proposal to take anything away from anyone,” the League’s comments assured. “It is more properly viewed as the effectuation of a fair, equitable, and efficient ‘band plan’ looking forward for the foreseeable future that balances everyone’s needs, and which remedies a plainly unfair plan, imprudently created in the 2006 Report and Order in WT Docket 04-140.” The Report and Order can be found on the web at, <http://apps.fcc.gov/ecfs/comment/view?id=5513680269> .

Prompting the League’s assurances were comments filed on the ARRL’s Petition by a number of Amateur Extra class licensees, who felt that refarming 3600 to 3650 kHz for data modes could prove to be a disincentive to General licensees to upgrade. Others commenters saw it as an unfair spectrum grab. The ARRL noted that prior to 2006, the band was evenly divided between RTTY/data and phone/image subbands, with the RTTY/data subband extending from 3500 to 3750 kHz, and the phone/image subband extending from 3750 to 4000 kHz.

The 2006 FCC Report and Order “substantially altered” what the League called “this even division of emission types.” In outlining the history of the proceeding, the ARRL pointed out that the FCC’s Notice of Proposed Rulemaking in Docket 01-140 would have shifted the line between the 80 meter RTTY/data subband and the 75 meter phone/image subband from 3750 kHz to 3725 kHz, pursuant to a 2002 ARRL Petition for Rule Making, RM-10413. This would change the ratio of spectrum between phone/image and RTTY/data segments on 75/80 meters from 50/50 to 55/45, and it is what the FCC proposed in its NPRM.

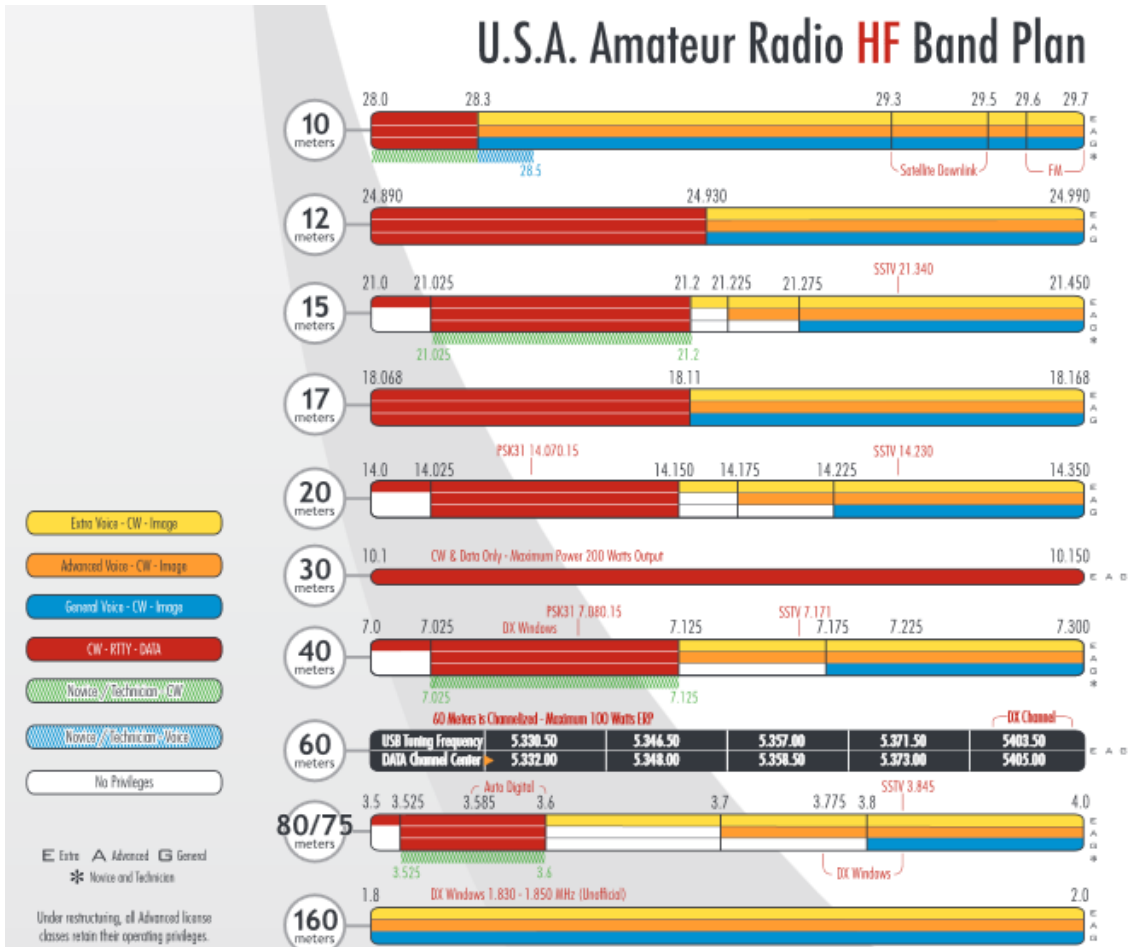
In its Report and Order in Docket 04-140, however, the FCC made “a very substantial and unjustifiable departure” from what it had proposed in its NPRM, the ARRL recounted. The Commission expanded the phone/image subband at 75 meters to 3600-4000 kHz, and it reduced the 80 meter RTTY/data subband to 3500-3600 kHz, eliminating RTTY operation above 3600 kHz and changing “the entire dynamic of this band,” the League said.

The FCC had said in its proposal that no licensees would lose operating privileges. Nonetheless, the FCC’s phone band expansion reduced by 100 kHz the spectrum between 3500 and 4000 kHz that was previously available to General class licensees, while Advanced licensees lost 75 kHz. In an apparent FCC oversight, the Report and Order completely eliminated access by automatically controlled digital stations (ACDS) to 3620 to 3635 kHz. A subsequent FCC Report and order and Order on Reconsideration only made the situation worse by replacing the deleted ACDS segment with 3585-3600 kHz.

"It resulted in a sudden and severe dislocation of traffic-handling nets using telegraphy, without advance planning or notice," the ARRL said. "It disaccommodated net participants with General and Advanced class licenses; and it worsened the effect of the overexpansion of the 75 meter phone/image subband."

The result, the ARRL noted, has been "a shortfall in available RTTY/data spectrum on 80 meters" that has created a significant obstacle to narrowband digital data communications and experimentation. The League said its current Petition "simply restores that which was disrupted in 2006 in error."

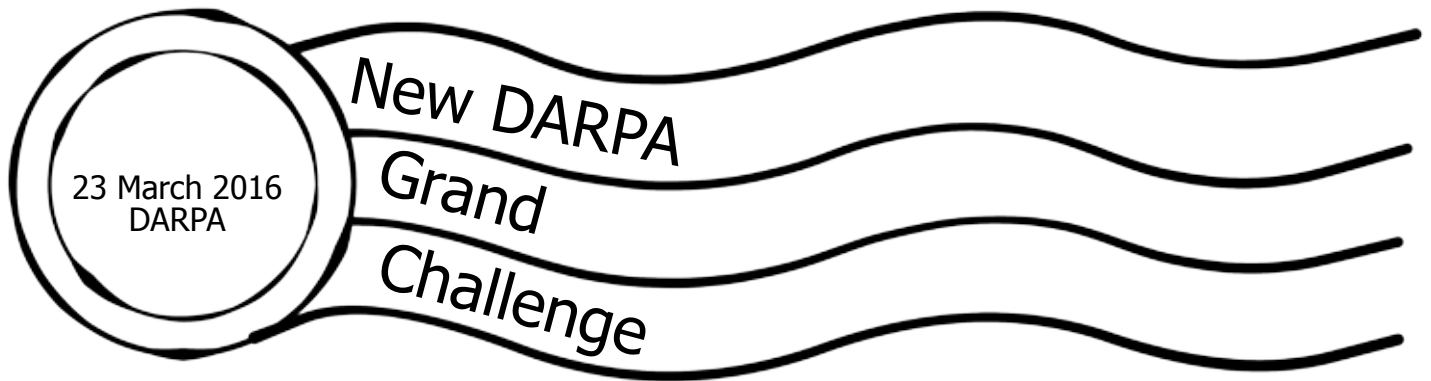
In its comments, the League conceded that compromises are inevitable in managing a heavily used band like 75/80 meters, no matter the band planning approach. "Looking forward, it is necessary, in order to encourage experimentation with and expand the use of digital communication techniques, to rebalance the 75 and 80 meter subbands," the ARRL concluded.



The ARRL is asking members to comment by April 19 on possible changes to the League's HF Band Plans suggested by the HF Band Planning Committee. The survey is part of the committee's efforts to tweak the band plans for the RTTY/data/CW portions of 80 through 10 meters — excepting 60 meters. The committee developed its suggested revisions to the voluntary band plans after reviewing some 400 member comments in response to a March 2014 solicitation that sought suggestions for using the spectrum more efficiently so that data modes may coexist compatibly.

"The committee concluded that most of the concerns voiced by members could be addressed by modest adjustments to the existing band plans, and mainly by confining data modes with bandwidths greater than 500 Hz to the FCC-designated segments for automatically controlled digital stations (ACDS) and to parts of the RTTY/data subbands above those segments," ARRL CEO David Sumner, K1ZZ said. His article detailing the committee's suggestions will appear in the April edition of QST.

The proposed changes differentiate among ACDS, narrow RTTY/data modes having a bandwidth no greater than 500 Hz, and wider data modes having a bandwidth up to 2700 Hz.



UNITED STATES FREQUENCY ALLOCATIONS

THE RADIO SPECTRUM



# New DARPA Grand Challenge to Focus on Spectrum Collaboration

Agency unveils the world's first collaborative machine-learning competition

OUTREACH@DARPA.MIL  
3/23/2016

DARPA today announced the newest of its Grand Challenges, one designed to ensure that the exponentially growing number of military and civilian wireless devices will have full access to the increasingly crowded electromagnetic spectrum. The agency's Spectrum Collaboration Challenge (SC2) will reward teams for developing smart systems that collaboratively, rather than competitively, adapt in real time to today's fast-changing, congested spectrum environment—redefining the conventional spectrum management roles of humans and machines in order to maximize the flow



of radio frequency (RF) signals. DARPA officials unveiled the new Challenge before some 8000 engineers and communications professionals gathered in Las Vegas at the International Wireless Communications Expo (IWCE).

The primary goal of SC2 is to imbue radios with advanced machine-learning capabilities so they can collectively develop strategies that optimize use of the wireless spectrum in ways not possible with today's intrinsically inefficient approach of pre-allocating exclusive access to designated frequencies. The challenge is expected to both take advantage of recent significant progress in the fields of artificial intelligence and machine learning and also spur new developments in those research domains, with potential applications in other fields where collaborative decision-making is critical.

"DARPA Challenges have traditionally rewarded teams that dominate their competitors, but when it comes to making the most of the electromagnetic spectrum, the team that shares most intelligently is going to win," said SC2 program manager Paul Tilghman of DARPA's Microsystems Technology Office (MTO). "We want to radically accelerate the development of machine-learning technologies and strategies that will allow on-the-fly sharing of spectrum at machine timescales."

The Challenge comes at a time of fast-growing need. Military operations increasingly rely on access to the wireless spectrum in order to assess the tactical environment and coordinate and execute their critical missions. But the military is not alone in this challenge: as society enters an era in which ever more products, from refrigerators to automobiles to commercial unmanned aerial vehicles, need access to the spectrum, it will take far more efficient and nimble use of finite spectrum resources to meet the demand.

"The current practice of assigning fixed frequencies for various uses irrespective of actual, moment-to-moment demand is simply too inefficient to keep up with actual demand and threatens to undermine wireless reliability," said MTO director William Chappell, who provided preliminary details about the new challenge yesterday in keynote remarks at the Dynamic Spectrum Sharing Summit, also in Las Vegas.

To host the new Challenge, DARPA aims to construct the largest-of-its-kind wireless testbed, which will serve during and after the SC2 as a national asset for evaluating spectrum-sharing strategies, tactics, and algorithms for next-generation radio systems. The "Colosseum," named after the ancient Roman amphitheater, will allow researchers to remotely conduct large-scale experiments with intelligent radio systems in realistic, user-defined RF environments, such as the wireless conditions of a busy city neighborhood or battle setting.

SC2 will unfold in three year-long phases beginning in 2017 and finish in early 2020 with a live competition of finalists who have survived the two preliminary contests. The team whose radios collaborate most effectively with various types of other radios to dynamically optimize spectrum usage will walk away with a grand prize of \$2M.

A Broad Agency Announcement for the Spectrum Collaboration Challenge will be released in the coming months and will be available on FedBizOpps.gov. An SC2 website is accessible at <http://spectrumcollaborationchallenge.com> and will be updated with information about the challenge, a rules document, and registration forms as they become available.

# March Membership Meeting Report

April 2016

*Photos by Paul KB5MU*



\$\$\$\$



Sandy KK6EED speaks about her Yuma Hamfest experience.



Membership report by Glen KJ6ZQH



Don WD6FWE works some AV at the meeting.



Dennis KD6TUI won a radio at Yuma and showed it off to the club.







The March membership meeting presentation was about AREDN by Andre Hansen N6AH. AREDN stands for Amateur Radio Emergency Data Network. Find more information at <http://www.aredn.org/>

Andre not only talked about AREDN at the meeting, but also showed nodes in action with a highly successful demonstration.

In addition to the lecture, which substantially updated his presentation at Microwave Update in October 2015, he also passed around examples of hardware used in AREDN. He explained their role and approximate cost.

The Q&A was lively. Attendees asked a variety of questions ranging from how to handle encrypted

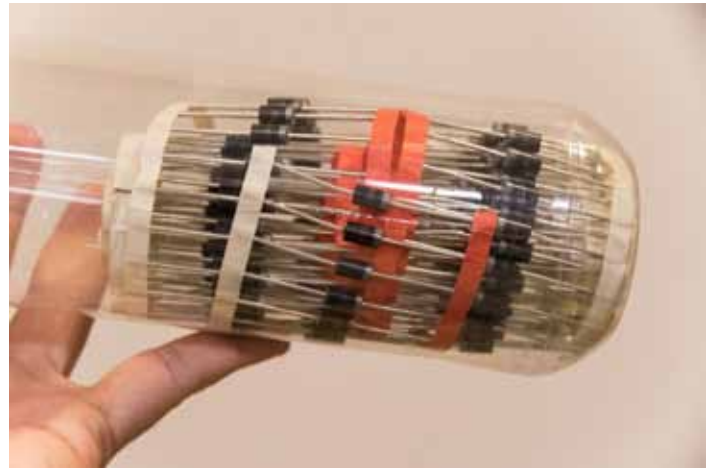


traffic to what sort of range can be expected to power requirements. Andre stayed after the meeting to better explain how interested hams could get more involved in the project.

Thank you Andre for a great presentation to PARC!



John WB6IQS (age > 9) and Rose (age 9) each wore Dr. Who T-shirts to the meeting. Here they are right before the meeting began near the Goodie Table. John manages the Goodie Table for each membership meeting. Featured on this page are items from the March Goodie Table.



At left, Rose can't believe all the treasures she found! Her primary focus was to find things that she "could take apart." She left the meeting happy with a bag full of gear.



At left, John WB6IQS captured in action letting meeting attendees know what's what at the Goodie Table.

Goodie Table items are available for a small donation or designated as free giveaways. Any proceeds are donated to the club.

A very wide variety of items can be found at the Goodie Table at each meeting.

Thank you John for making the Goodie Table so great each meeting!



# Amazon Shopping for PARC

Shop on [www.smile.amazon.com](http://www.smile.amazon.com). Same thing as shopping on Amazon, BUT! when you shop at [www.smile.amazon.com](http://www.smile.amazon.com) if you designate Palomar Amateur Radio Club as your charity of choice, Amazon will Donate to PARC!



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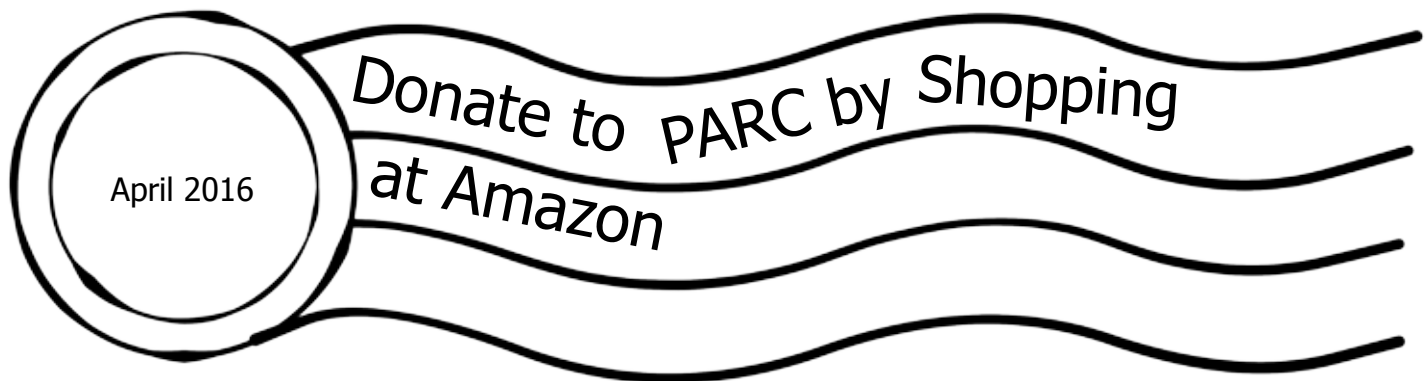
Merit W6NQ • Gary K6CAQ • Steve K6NDG • Rob WA6GYG • Doug K6DRA

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There is good news about our club's non-profit status. As mentioned in December, PARC is now a tax exempt non-profit public corporation. If you choose to donate money or equipment to PARC, and if you itemize deductions, you can take a tax exemption for the value of the donation.

BUT There is even an easy way to donate to PARC! Do you shop online at Amazon?

PARC is now registered with smile.Amazon.com as a not-for-profit public corporation. If you so choose, any purchase you make on Amazon can be identified as a purchase for which you desire that Amazon donate funds to PARC!

Here is how it works.

If you wish to designate that some funds of your Amazon purchases be donated to PARC, go to [www.smile.amazon.com](http://www.smile.amazon.com) and log on to make your regular purchases just as you always do. After logging in, you proceed to order your purchase as usual, and in the checkout procedure you are offered an opportunity to designate a portion of the purchase to be distributed by Amazon to any of thousands of charities. There we ask that you select "Palomar Amateur Radio Club" as the non-profit to which the funds will be donated by Amazon.

**This will have absolutely NO EFFECT on the regular purchase price of your item.**

What happens is that without any further action on your part, Amazon will forward to PARC's bank account 0.5% of the purchase price of what you bought.

You can learn all about this further by visiting the following link:  
<https://smile.amazon.com/ch/95-3737299>

Amazon is aware of one problem with this initiative. **The Amazon smartphone shopping app DOES NOT work for charity designations. You must use the web browser.**

Your PARC Board of Directors hopes you will consider donating to PARC as you shop on Amazon. The Board of Directors is evaluating a series of projects to update the Club's infrastructure, to bring remote capability to PARC members, to upgrade our FD equipment, and to update the technologies we have available throughout our repeaters. Some of these projects are the result of your response to questionnaires, or suggestions you forwarded to the board for consideration. All these potential projects will be evaluated and announced to you so you can give us feedback about the project's desirability. To carry the projects to completion will require that club member volunteers get hands-on experience in the project. This too will be an opportunity to follow the requests expressed by members, and also an opportunity to elmer recent licensees in all aspects of ham radio.

You asked that the Club be revitalized in this manner, and here are the beginnings of the effort. So please remember, when you shop on Amazon, donate to your club! But they will all involve material purchases for which the Club will be using funds that are donated for the project accomplishment.

We hope you will be generous in donating to PARC through Amazon purchases since the donation has zero impact on what you buy.



Want to help PARC earn more awards?

Contact [board@palomamarc.org](mailto:board@palomamarc.org) about using the club call sign in upcoming contests or operations!

We aren't that far from getting several more shiny stickers!

At right is the overall picture of our club call sign's Logbook of the World WAS record.

Notice that 20m Phone and 20m CW are pretty close to having all 50 states.

Which states are missing? See the image at the bottom of this page. We need Hawaii for 20m Phone and Nevada for 20m CW.

Think you can bag these states to give us two more awards?

The cost of the award will be covered by a donor. Want to help?

- 1) arrange for permission to use W6NWX by writing the board about your plans.
- 2) submit a log of the contacts to the board. Uploading to LoTW and application for awards will then occur.
- 3) get accolades from the club!

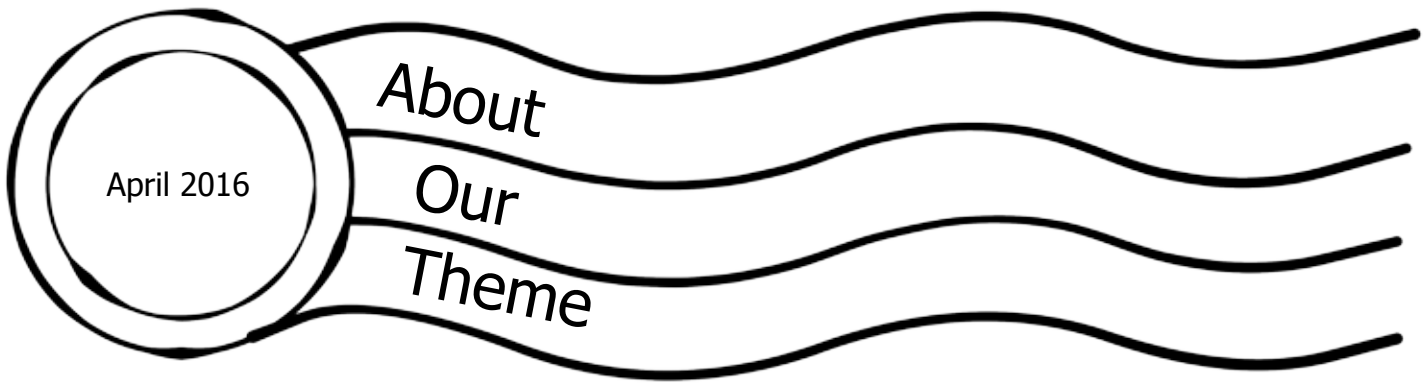
### Your Logbook WAS Account (W6NWX WAS)

#### Account Status

WAS Award	New LoTW QSLs	LoTW QSLs in Process	WAS Credits Awarded	Total
<a href="#">Mixed</a> *	0	0	50	50
<a href="#">80M</a>	22	0	0	22
<a href="#">40M</a>	39	0	0	39
<a href="#">20M</a> *	0	0	50	50
<a href="#">15M</a>	40	0	0	40
<a href="#">10M</a>	6	0	0	6
<a href="#">CW</a> *	0	0	50	50
<a href="#">Phone</a> *	0	0	50	50
<a href="#">80M Phone</a>	15	0	0	15
<a href="#">80M CW</a>	13	0	0	13
<a href="#">40M Phone</a>	19	0	0	19
<a href="#">40M CW</a>	38	0	0	38
<a href="#">20M Phone</a>	49	0	0	49
<a href="#">20M CW</a>	49	0	0	49
<a href="#">15M Phone</a>	23	0	0	23
<a href="#">15M CW</a>	37	0	0	37
<a href="#">10M Phone</a>	5	0	0	5
<a href="#">10M CW</a>	1	0	0	1
<a href="#">Triple Play</a>	100	0	0	100
<a href="#">5-Band</a>	157	0	0	157

\* = Award has been issued

<b>20M Phone</b>	49	<input type="checkbox"/>	The 20M endorsement sticker to be affixed to your Phone WAS certificate. <b>Missing:</b> HI
<b>20M CW</b>	49	<input type="checkbox"/>	The 20M endorsement sticker to be affixed to your CW WAS certificate. <b>Missing:</b> NV

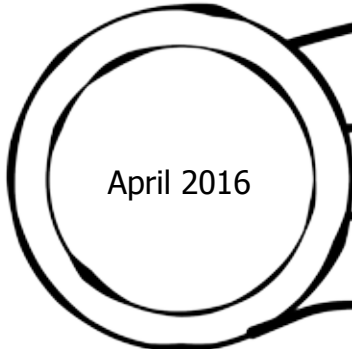


John W6JBR provides our postal theme for April Scope cover. He writes,

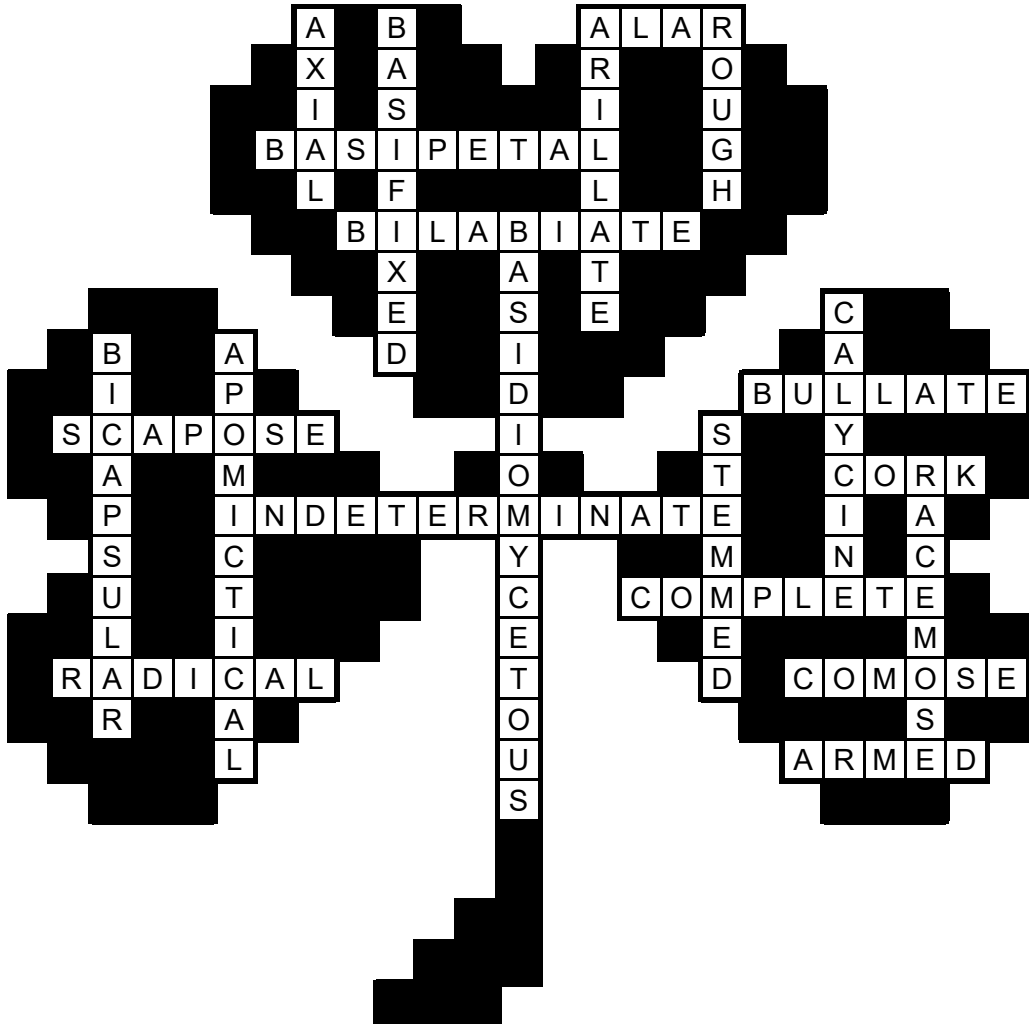
“I bought this on eBay as a gift for one of my ham buddies, who worked at Barry Goldwater K7UGA’s personal MARS facility, running phone patches for servicemen during the Vietnam war. It is a First Day Of Issue Amateur Radio 5 cent stamp.”

In honor of the presidential election, please enjoy the April postal theme for your club newsletter, the Palomar Amateur Radio Club Scope!



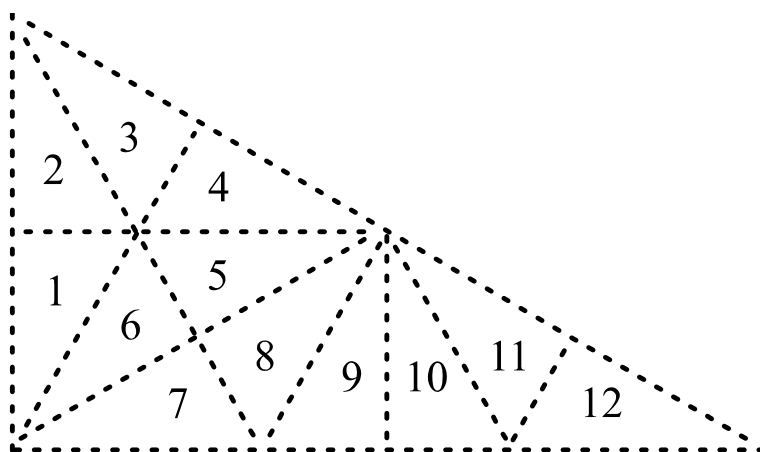


Want  
solution?



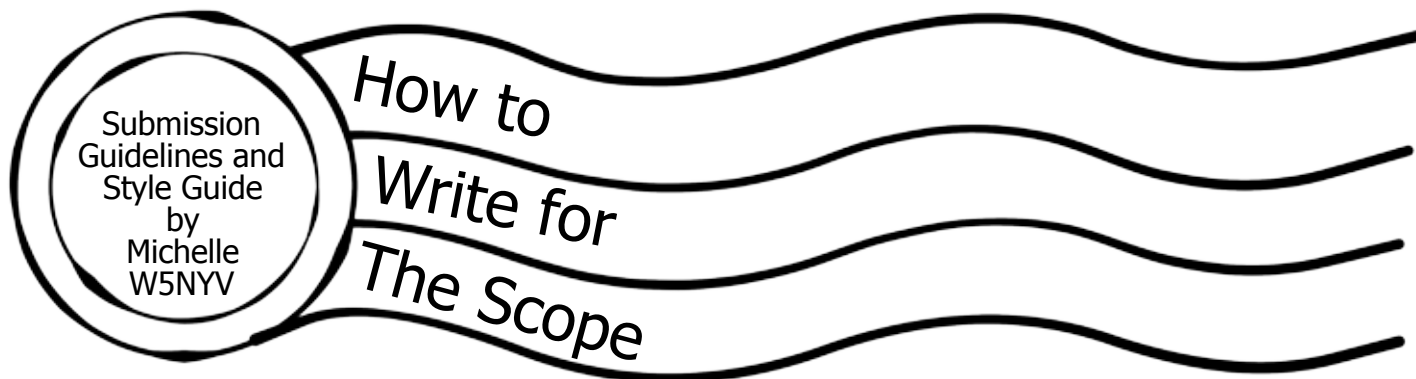


## Stamp Folding Puzzle #4



Fold this block of  $60^\circ$ -right triangular stamps into a packet 12-deep with stamps in the following order:

5 2 8 9 7 3 4 11 12 1 6 10



## Submission Guidelines

Article submissions in most modern file formats are accepted. Plain text in the body of an email, with attached full resolution photographs, is most preferred. Dropbox and several other file transfer services are supported.

Sending a fully-formatted PDF, so that the author can control formatting and exact wording, is also accepted. We use Tahoma font for body text, but will accept PDFs with other fonts. If any editing is necessary, then it will be negotiated with the author, and will then be the responsibility of the author.

For 2016, the Scope theme is postal marks and radio-related stamps. Postal theme artwork is welcome! Scans of amateur radio stamps, stories about stamps in general, interesting or quirky postal marks, fun things to do with the mail, puzzles about stamps, interesting stamp-related narratives, stories about current mail technology, QSL cards, QSL bureaus, and QSL collections are all very highly desired throughout 2016.

We want to publish articles about amateur radio and amateur radio related events and interests. Amateur radio covers a very broad swath of subjects. Contesting, technical experiments, narratives about the hobby, stories about how you became a ham, suggestions for an interview, ideas for more puzzles and games, experiences in community service, emergency communications, tours and travelogues of places of interest to amateur radio operators, mobile installation articles, ham shack articles, good operational practices, ideas for what PARC should be doing in 2016, and many other subjects are what we want to print in the Scope every month.

Articles that misrepresent a person, subject, or event will not be printed. Articles that are attack pieces, demean groups or individuals, or ridicule others will not be printed. The editorial staff

of the Scope, in coordination with the Palomar Amateur Radio Club Board of Directors, has the final say on what is published in the club newsletter. Being a member of the club does not guarantee that a submitted article will be published. No payment is given in exchange for any article. Copyright remains entirely with the original author.

## Style Guide

Time: Use 24-hour time in the following format.

"We started the event at 9:00 and began tear down at 16:00."

Name and Call Sign: Name is followed by call sign with no commas.

"Michelle Thompson W5NYV began writing the article."

After the first name and call sign is listed in an article, the style is to shorten it to first name and call sign with no commas.

"Michelle W5NYV was writing all day."

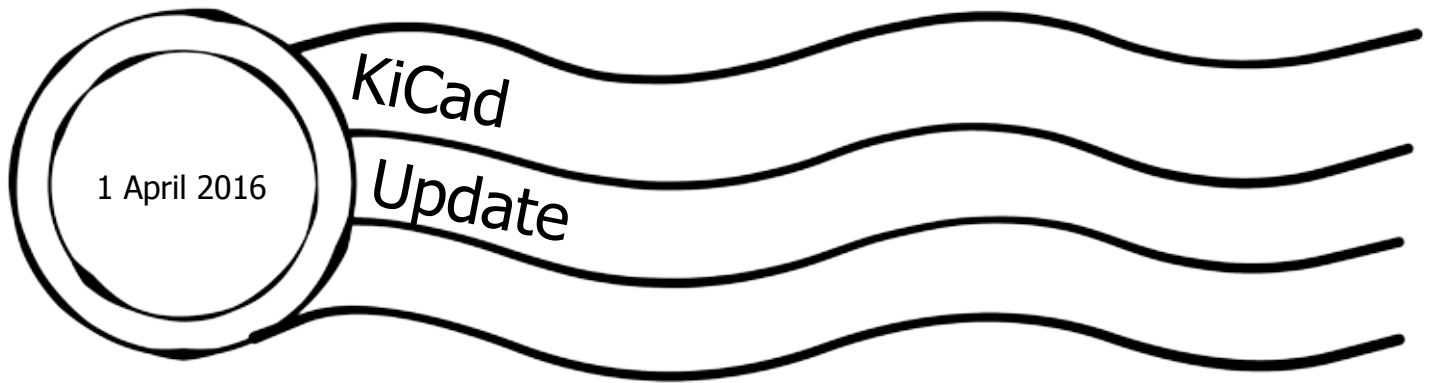
Do not use ellipses unless you know exactly how to use ellipses.

Ellipses... are not... the same thing... as a comma... or a pause...

Capitalization should be used for proper nouns. Proper nouns are the names used for an individual person, place, or organization. They are spelled with initial capital letters. For example, Michelle, New Mexico, and Boston Red Sox.

"And... that's it! That's All there is To It!"

What's the next step? Write an article, or propose one. If you need help, just ask! Mail to: [scope@palomararc.org](mailto:scope@palomararc.org)



Members of SDMG have been trying out Kicad, the open source schematic capture and board layout software. One of the members used it to quickly knock out an Arduino shield PCB last fall.

There is an experimental feature to place RF printed elements like radial stubs and what not. Sounds very cool. With it being open source, things can be fixed if their broken, or you can work with someone to add something else new, etc.

Check it out at:

<http://kicad-pcb.org/>

Hat tip to Drew KB9FKO for this update!

A screenshot of a webpage with a white background and a black border. It is organized into three rows, each featuring a title, a short paragraph of text, a "LEARN MORE" button, and a screenshot of the software interface. The first row is for "Schematic Capture", the second for "PCB Layout", and the third for "3D Viewer".

**Schematic Capture**

With the schematic editor you can create your design without limit; there are no paywalls to unlock features. An official library for schematic symbols and a built-in schematic symbol editor help you get started quickly with your designs.

[LEARN MORE](#)

**PCB Layout**

Make professional PCB layouts with up to 32 copper layers. KICad now has a push and shove router which is capable of routing differential pairs and interactively tuning trace lengths.

[LEARN MORE](#)

**3D Viewer**

KiCad includes a 3D viewer which you can use to inspect your design in an interactive canvas. You can rotate and pan around to inspect details that are difficult to inspect on a 2D view. Multiple rendering options allow you to modify the aesthetic appearance of the board or to hide and show features for easier inspection.

[LEARN MORE](#)



# Interference Investigation

Bob Bruninga  
WB4APR



Our satellite ground station has been jammed for about a week with 60 dB over pulse (spread spectrum) Looks and sounds just like Wifi but from below 420 to above 460 MHz. Yesterday we built up a portable USB receiver and attenuator and began measurements. Went everywhere in the building and outside. Could be heard 40 dB over everywhere in the building.

But darned if the signal wasn't always just a bit stronger right at the Ground station console. Switched from omni to a hand held beam. Still signal seemed strongest right at the console. Turned off everything one by one. No change.

Completely disconnected antenna, attenuator and cable but signal was still S9 into the portable receiver (AOR AR5000) and good enough for sniffing. Still strongest right on the console!

BINGO! It was an FRS walkie talkie, not used in years, that someone had pulled out of its charger (it was dead) and re-inserted a few days ago. As the dead FRS slowly attempted to charge up, somehow its processor must have gone wild trying to power up and that was it! Remember, nothing electronics anymore has a real OFF switch. Just a processor that is always ON to sense the switch. When I pulled the radio from the charger, the noise instantly stopped and nothing we can do can recreate that one-in-a-million condition. And the FRS radio is still dead.

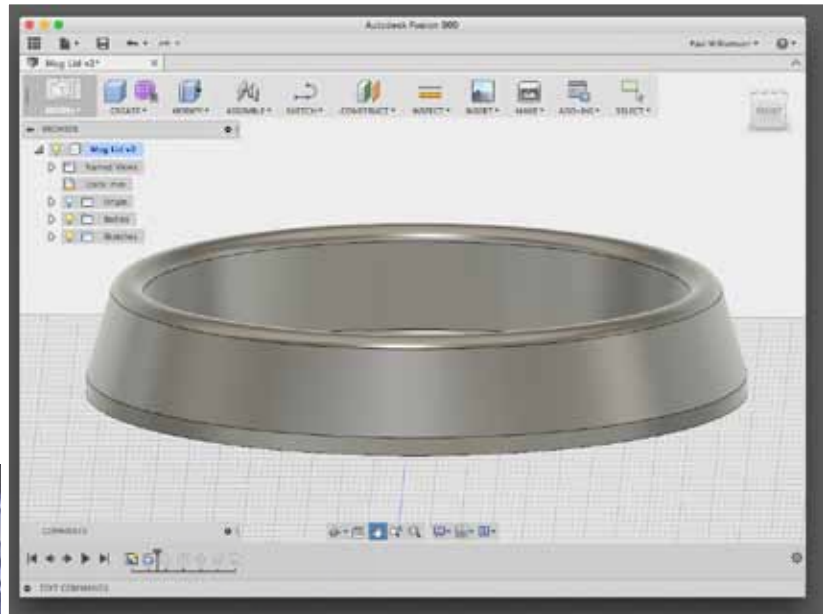
But we can finally hear the noise floor again on the UHF band.

Bob, WB4APR

1 April 2016  
Michelle W5NYV

3D print  
for N6KI  
Successful!

Dennis N6KI presented a 3D modeling challenge to Michelle W5NYV and Paul KB5MU. A venerable and beloved Joe Camel travel mug cap had worn out. Dennis inquired whether a new top could be 3D printed. At right is the cap modeled in Fusion 360, one of many exciting new 3D modeling tools that has appeared in the past few years.

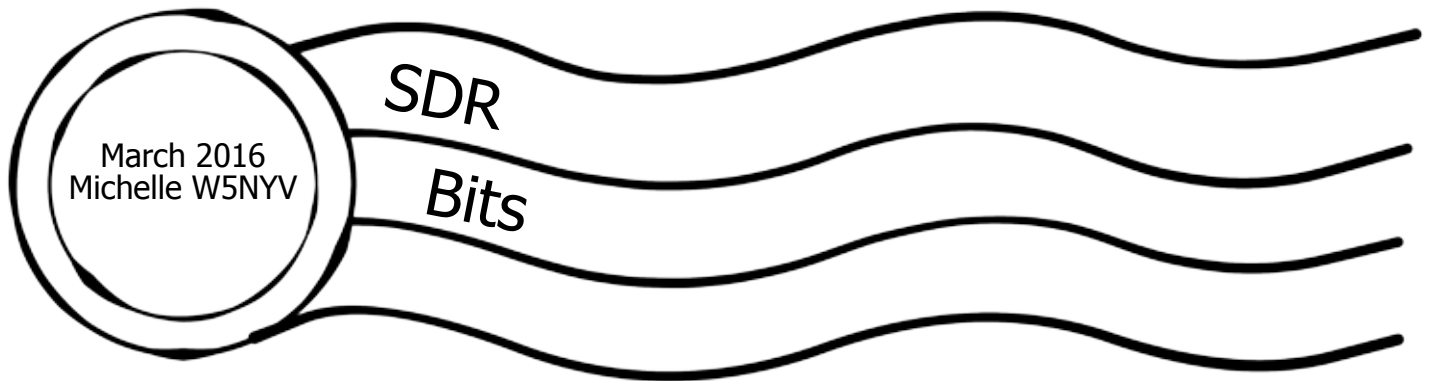


At left is the design after printing. Amazingly, the top and mug magically appeared on the print bed!

It was suspected that the Fusion 360 software had developed some sort of artificial intelligence, and had pattern matched the cap to the highly-sought-after Joe Camel travel mug.

Massive amounts of network traffic between Google, Fusion 360, and a server in North Korea were monitored during the 16-hour print.

Finished product to be shown at an upcoming membership meeting.



## SDR Duck Hunt

Adapted from <http://sdr.ninja/training-events/sdr-dunk-hunt/>

How about this for a club event?

### Background

While Fox and Hound activities are fun, they're also seemingly simplistic: find the transmitter. In the SDR Duck Hunt, a player not only has to find a transceiver, but also exercise knowledge of radio communications to transmit back to the transceiver to then receive their points. Using the right antenna, filters and transceivers, a player will be very successful in finding, shooting and collecting their virtual "ducks".

Here on in, the following terms are synonymous:

Antenna and Transceiver – Shotgun

Duck Calls – The Beacon

Shooting – Transmitting "BANG"

Duck – You hash to use for points

Dog – a character in the hunt that monitors for shooting spam

### How to Play

#### Warm Up

1. The organizer is encouraged to have practice ducks, which are demonstration transceivers for testing your shotgun. Take your shotgun to the transceiver hunt, and test to make sure you can shoot the practice ducks. Meaning, bring your directional antenna and transceiver and test to make sure you can detect and interact with the practice duck.

#### Get your Hunters License

1. Find one of the event staff members and prove to them that you are properly licensed by the FCC or equivalent authorities. You will sign in, and a hunters license will be issued to you.

#### In the Fields of Glory

1. Explore the hunting grounds listening for the duck calls. They should happen once every three seconds.
2. Feel free to corner, distract or engage in conversation with the ducks. Shoot at them. But shoot too often, and they will fly away for 5 to 10 minutes.
3. Receive the duck, it'll be an MD5 hash. There may be a bag limit on ducks!

#### Poaching

1. Be wary of poachers; someone else can steal your duck without needing a license.

# The Duck

1. The duck is constantly listening on a fixed frequency.
2. It is using a mis-matched antenna system for receive; this is why you have to use a directional antenna to be successful.
3. You will hear the "dog" laugh at you if you shoot too frequently on the same frequency that the ducks quack on.
4. It may be easier as a team effort; one person shoot, while the other tries to collect the duck.

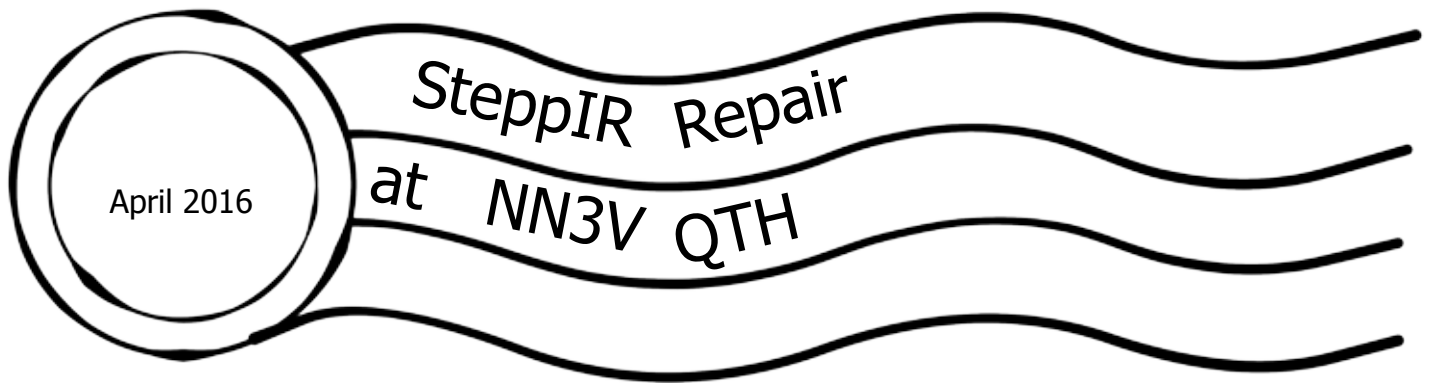
## Technical Requirements:

1. The BANG and duck hash are transmitted via AFSK. Each time the contest is run, there are slight and minor changes to the AFSK encoding.
2. You can use a RaspberryPi that supports PiFM and a RTL-SDR, or a HackRF, or pretty much anything within the operating frequencies of the context.

If you were to want to shoot aimlessly into the sky, a command such as the below would achieve that if you were using a RaspberryPi to transmit with PiFM:

```
#!/bin/sh
while true ; do echo "bang" | minimodem --tx -f -8 1200 -f /home/pi/bang.wav && /home/pi/pifm /
home/pi/sentence.wav 80.0 48000 ; sleep 4;done
```





### Antenna Adventure

This antenna adventure began in October 2004.

At that time, I was immensely pleased to receive and install my dream antenna, a 4 element SteppIr yagi. I was thrilled, and immediately started enjoying the wonders of excellent antenna performance on 40 M through 6 M. The SteppIr lives up to the reputation it enjoys. My installation is shown in Figure 1.



Figure 1

In the life of every ham, sooner or later an antenna nightmare strikes! It happened to me February 1<sup>st</sup>. 2016, 12 years after installing my SteppIr.

That day, San Diego was afflicted by a very strong rain and wind storm. Power was lost, and rain and hail pelted the area. I was blissfully unaware of the local conditions as I was on travel.

On returning I was greeted by a very strange 4 element yagi antenna configuration as you can see in Figure 2. **Strange Indeed!**



Figure 2

How did this happen?

Talking with a neighbor I learned that the night the storm struck San Diego, our neighborhood experienced wind gusts of up to 90 Knots! He was pleased to show me the wind data preserved by his wind data recording anemometer.

What you see when looking at a SteppIr yagi is not a metallic antenna. You are looking at an assembly of tubes, PVC if you can imagine, and inside the tubes a beryllium-copper tape much like a tape measure extends or contracts as directed by the computer controlling the SteppIR motors. The commands are based on formulae governing the electromagnetic properties that define the precise mechanical shape of a yagi antenna as specified by the desired operating frequency, set to resonate with no SWR. The ULTIMATE ham radio objective.

***Thank God before going on travel I had "homed" the elements.*** In that condition, the metal tapes are retracted entirely into the motor housings you see at each pipe's junction to the boom. This is a protective measure which many hams use as a means of lessening the possibility of a lightning strike. With the tapes retracted, the metallic surface of the antenna is minimized. The risk of damage mechanical damage to the beryllium-copper tapes is also minimized in the event of damage to the structure.

The PVC tubes attach to the boom at the SteppIR motor housings. The tubes insert into a slightly larger tube that forms part of the stepir motor housing. At the attachment point a rubber collar surrounds both the PVC tube and the motor housing, and it is fastened with stainless steel hose clamps.

Planning the antenna repairs I reflected on a lot of ham radio operator conversations, some factual and some likely urban legend. Much is rumored about the durability of the SteppIr yagis when exposed to the elements for a period of time. The rumors center on the perceived fragility of the PVC when exposed to the sun's ultraviolet rays, and to rain and other natural phenomena. I wondered what I would find when I examined the antenna closely.

This antenna had been in service for 12 uneventful years, exposed to the never ending sunny skies of San Diego. When I erected the antenna, it went from the shipping containers to the tower, without any special preparations frequently rumored as necessary to prevent rapid deterioration.

Here is what I found.

Some of the PVC tubes indeed showed the ultraviolet effect on the PVC coating paint. It was flaky in some parts, and had fallen off in others allowing the exposure of the metallic mask upon which the PVC was formed. There was no penetration of the tubes. They remained integral. No cracks, or splits. See figure 3.



Figure 3

At the point where the PVC tube that had fallen were attached to the boom, I found the cause of the failure. Over the 12 years of exposure to the elements, the rubber boot had dried out. The long PVC tube invariably flexed slightly (up and down oscillation) in the wind and during rotation of the antenna on the mast. That motion combined with the rubber's drying out

allowed the rubber to crack very slowly over the years of exposure, ultimately failing completely. As you can see in Figure 4, it looked as if someone had taken a box cutter and ran it around the point where the PVC tube inserted into the motor fixture. Once it cracked completely, the PVC tube very slowly vibrated out of the fixture until it failed and fell.



Figure 4

With the knowledge of the failure mode, I ordered a complete set of the PVC antenna replacement parts in order to refurbish all the PVC tubing, and all the rubber boots to clamp the pipes to the boom. Figure 5 shows the material as delivered to me from SteppIr. Their service was friendly, prompt, and I felt satisfied that they took pride in the length of service I had obtained from their product



Figure 5

With KJ6ZQH's (John) help I assembled the PVC tubes (pulling them lengthwise and applying a glue and sealing compound at the tube joints).



The end product is shown in Figure 6.



Figure 6

Figure 7 shows the arduous task we faced in restoring the antenna. The labor required was merely a case of inserting the tubes into the SteppIR motor housings, and then tightening the clamps. The figure shows KJ6ZQH relaxing from the arduous task. When I installed the crank up tower, I wanted the antenna to be at roof top level so that maintenance would be a snap. It worked! And the view from the roof top is magnificent. A perfect setting for a pleasant picnic as the sun sets on the horizon!



Figure 7

After about 16 hours of time from dismantling the failed antenna, receiving the new materials, and reassembling the antenna, I returned the tower to its usual height, went into the shack, turned the SteppIr control on and pushed a button to extend the elements for use on the 20 Meter band, tuned to 14.050 and was rewarded with a 0.001 SWR, and an immediate DX contact. What a pleasure!

Figure 8 shows the completed refurbished antenna.



Figure 8

All in all, what appeared to be a tragic incident turned out to be an interesting opportunity to do some antenna work, some detective effort at discovering how this happened, and a small amount of labor to restore full functionality.

I remain incredibly impressed with the quality and durability of the SteppIr product. Definitely the way to go for exceptional HF operations!

And thanks to KJ6ZQH for his help in the repair.

73 de NN3V

Charlie

SCOPE  
P.O. Box 73  
Vista, CA 92085-0073

PERIODICALS

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Scope Volume #48 Issue #1 (USPS #076530) is published monthly by the Palomar Amateur Radio Club 1651 Mesa Verde Drive, Vista, CA 92084.

POSTMASTER: Send address changes to SCOPE, P.O. Box 73, Vista, CA 92085. Periodicals postage paid at Vista, CA 92084 and at additional mailing offices. Dues are \$20 per year or \$35 per year for a family. Dues include a subscription to Scope.

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### Featured Program:

At 7:30pm on 6 April 2016, Palomar Amateur Radio Club will have a program about HF remote operation by Brian Comer KF6C.

Come at 7pm 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>