

# SCOPE

## THE PALOMAR AMATEUR RADIO CLUB NEWSLETTER

### NOMINATING COMMITTEE

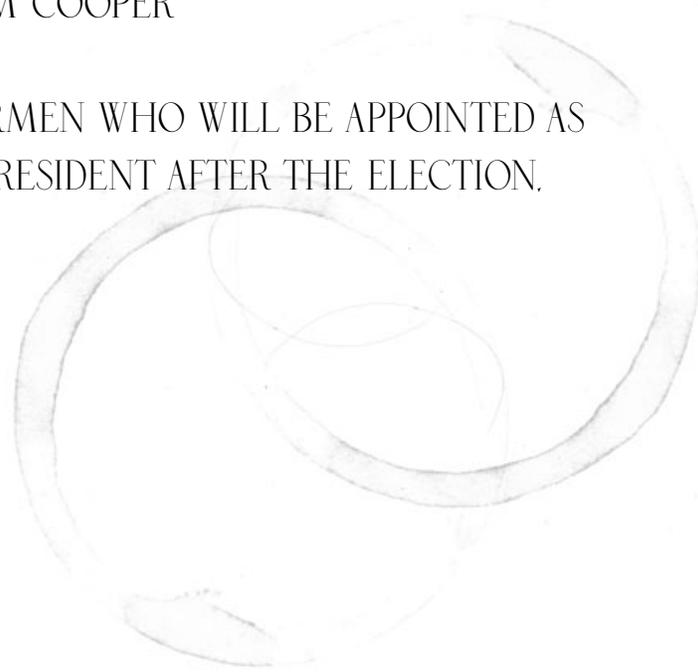
JO ASHLEY, KB6NMK  
DANNY SMITH, W6AOZ  
RICHARD THOMPSON, KJ6WUY

### SLATE FOR 2015

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DIRECTOR	NE6O	JIM COOPER

ALONG WITH THREE DEPARTMENT CHAIRMEN WHO WILL BE APPOINTED AS BOARD VOTING MEMBERS BY THE NEW PRESIDENT AFTER THE ELECTION, CHOSEN FROM THESE FOUR

MEMBERSHIP  
NEWSLETTER EDITOR  
REPEATER SITE CHAIR  
REPEATER TECHNICAL CHAIR



# Save the Date

## Club Meeting

**3 December 2014**

Annual social and election. Bring food and games to share with friends!

## Board Meeting

**10 December 2014**

Palomar Amateur Radio Club board meeting at 7:00pm at W6GNI QTH.

## Club Events

**6 December 2014**

STEAM Maker Faire at Del Mar Fairgrounds  
Come Support PARC!

## 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)

### FOR SALE

Free. Telescoping Antenna Mast, 3 section @ about 10'.  
Escondido, 760-333-5599  
Gilbert Warila

### Dec 13, 2014 Operating Day at Fry's

All Day

Contact Tom KG6RCW to help demonstrate amateur radio and educate the public.

## FERRITES FOR HAMS

### Ferrite – Toroids, Slip-on, Snap-on

Mix 31, 43, 61, 77 for Baluns/Ununs, RFI/EMI  
Quantity pricing for Clubs, DXpeditions

### Antenna Balun/Unun - kits or assembled

1:1, 2:1, 4:1, 9:1 for dipoles, verticals, G5RV, loops, OCF, end fed, NVIS, quad, yagi antennas

### RFI Kits - home, mobile, or portable operation

Free Tip Sheet to cure RFI, reduce radio noise, work more DX and keep your neighbors happy!

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The Ham Radio Lunch Bunch meets Fridays for lunch and socializing at any one of a number of restaurants on a rotating schedule.

The Lunch Bunch signup is

<http://w0ni.com>

Reminders are sent out on Wednesdays.

All are welcome for food and fun!

Some of the restaurants on the schedule are Fuddrucker's, UTC Food Court, Spices Thai, Savory Buffet, Denny's, Callahan's Pub and Grill, and Phil's BBQ.

# STEAM Maker Fest - PARC Booth



## Join us!

The STEAM Maker Fest event coming December 6, 2014 at the Del Mar Fairgrounds is a great fit for amateur radio. This is a chance to demonstrate how YOUR projects related to amateur radio can interest others into our hobby. Any project is worth bringing out for display to start a conversation of how amateur radio can help another field of use. APRS brings telemetry. Radio across light beams brings physics. Video can be deployed on drones. One of the main experimenting areas is antennas. Flower pot antennas will be there for 2m/70cm and 6m. Both complete and partial. Hex antennas are still strange to me and others. Any examples of "maker" items are welcomed and asked for. We will bring out the HF rig and r8 along with a 2m/70cm mobile radio and antenna. A couple of HTs will add to this.

Help demonstrate how amateur radio can help other hobbies and grow ours!

Contact Dennis KD6TUJ at 760-672-0223 or kd6tuj-3@hotmail.com to help or ask more info.

Lets show what Amateur Radio is about.



**Braydon Moreno - Robo3D**

10 days 2014 · 4 photos

It was Fall 2012. Coby, a Senior at SDSU, was working on his final project which happened to be utilizing 3D Printed parts for prototyping...

[Read More](#)



**To make a great event you need a great team.**

11 days 2014 · 1 photo

Today was a great day at a private home in Cardiff a volunteer team of makers from the STEAM Maker Festival came together to build lights...

[Read More](#)



**Physics Girl - Dianna Cowern**

11 days 2014 · 4 photos

Physics Girl is a resource for fun physics videos and other material about physics and topics related to physics. It really started as a post-baccalaureate "Yes..."

[Read More](#)



**Close Up on San Diego Business**

16 days 2014 · 1 photo

Victor Occasioni on Close Up on San Diego Business BARRY WALKER and his Co-hosts Andrea Kaye and Urbani Meyares http://www.closeupsandiego.com/ CLOSE UP is a uniquely styled...

[Read More](#)



**Science Day at WWS Point Loma was a blast!**

16 days 2014 · 1 photo

Items from 3D Robotics, the US Navy and STEAM Maker Festival came together today as the students of West Point Loma Warren/Walker School visited six...

[Read More](#)



**#1 Civic High School - Kim Morris**

17 days 2014 · 1 photo

Video: #1 Civic High will engage, educate, and empower their students, teachers, and parents in a community of passionate, life-long learners who value excellence in...

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Science	how do radios work
Technology	make radios better
Engineering	make your add-on smaller and work the way you want
Art	design, pc board layout
Mathematics	distances to contacts, lengths for antennas

PARC will be one of many exhibits. A small selection can be seen above! Join us at this festival!

Dennis KD6TUJ

# The Great Shoot-Out of 2014

## Part 1

Howard White KY6LA

Albert Einstein said that the definition of insanity is to repeat the same experiment and expect different results.

I have participated in a number of Shootouts with Dennis N6KI including SteppIR, Honda vs Yamaha Generators and a number of different Legacy vs Modern Radio Shootouts.

All these shootouts invariably start the same way. Those of us with scientific backgrounds try to set up the experiments with detailed documentation processes, normalization of as many variables as possible so we are comparing apples to apples and a detailed WRITTEN Plan of Experimentation so that we can have Reproducible Results.

Enter Dennis, N6KI, the King of Irreproducible Results, who demands total control of the observations.

He immediately throws out all the carefully and exacting setups that had normalized the variables to a single consistent set. He then continues to fiddle with parameters throughout the experimental time so that there is absolutely no documentation and no way to produce objective reproducible results. We invariably end up with a mish mash of subjective observations colored by the personal biases of the various different observers and absolutely no way to reproduce anything.

The last two days were no different than every other previous N6KI Shootout.

No written plan of Action, no experimental procedure established. No coordination of Normalization of Parameters! No objective observers and no way to produce reproducible results. Everyone frustrated with Dennis.

John W6JBR the audio engineer and I spent a few hours on Friday normalizing audio between receivers.

On Saturday Dave N6EEG and I tried to do the same.

Invariable N6KI started to do the comparative testing by immediately grabbing the tuning knob on his K3 to continually change frequencies and adjust parameters throughout the experiment. After trying and failing to get N6KI to follow any

reproducible protocol, I gave up in frustration. I spent most of my time trying to manually track N6KI's random frequency gyrations so that we could all be on the same frequency for tests. Ultimately I suggested that we connect the CI-V ports on the radios so that they would all track together. But N6KI would not accept that - rather he said we should just manually tune so that they all sound "ABOUT" the same! which of course was impossible because N6KI continued to fiddle with the tuning knob.

### My FIRST CONCLUSION

I will NEVER participate in another "Shootout" UNLESS N6KI is totally banned from the proceedings.

Results:

1. Surprisingly the Flex with its visual interface was by far the easiest/quickest radio to set up and the least likely to screw up during a contest  
Albeit I had accidentally turned on the NR on the 6700 for much of the experiment and did not notice that until the end because NR was one of the few parameter on a hidden drop down menu on the 6700
2. The IC-7800 was so outperformed by the K3, KX3, and 6700 that we quickly dropped it from the testing rotation
3. All radios hear the very weakest signals - as you would expect since the atmospheric noise floor on 20M is about -115dBm and the radios can hear down to -130 dBm or better
4. The Notch filter on the IC-7800 and the 6700 were better than the K3/KX3 at removing a CW Signal in the SSB Bandpass
5. ONLY the 6700 could produce more than one notch filter so it was the only radio to be able to remove more than 1 CW signal from a SSB Bandpass- the 6700 had the most powerful and flexible filters and filtering
6. The 6700 had the lowest Phase Noise (the background static you hear) followed by the KX3, K3 and finally the IC-7800  
This is consistent with the expectations of the different technologies - lower phase noise = lower operator fatigue
7. We ultimately came down to comparing received audio, but that is highly subjective as different people hear very differently. For example I had my 6700's equalizer peaked for my hearing. So, while I could hear well on it, I had trouble hearing on the K3 as it was

not peaked for my hearing. Dennis had his K3 peaked for his hearing so I could not hear well on his K3 but he said my 6700 sound lacked "Brilliance" - albeit that might have been due to the fact that the NR was on...

8. With these subjective hearing tests, the K3, KX3 and 6700 could all hear the very weakest ones and could find them inside a splatter zone.

9. the background noise was easily the lowest on the 6700 and for my hearing was the easiest to discern the content of the weakest signals

10. We really did not do a consistent IMD3 test with a strong signal beside a very weak signal as that was impossible to do with N6KI continually changing frequencies.

Dennis did record audio albeit with a hand held recorder so you can see hear the audio and judge for yourselves

## BY CONTRAST

We did a shoot out at WA3IHV between has IC-7700 (Better receiver than the IC-7800) and his Flex 6700. We normalized for all parameters and just tested a single parameter - Reception of JT-65

Results	Weakest Signal Received
IC-7000	-19 dB S/N
FLEX 6700	-26 dB S/N

Next month:

Dennis responds in Part 2.

But while you wait, check out Dennis' division winning awards below!



# San Diego Microwave Group Update

Many, if not most, of the members of the San Diego Microwave Group are also members of PARC. SDMG meets on the third Monday of the month in the evening at Kerry Banke's QTH. All those interested in microwave are welcome to attend.

by Kerry N6IZW

Here are a few items happening with the San Diego Microwave Group in the last couple of months.

Greg Bailey, K6QPV transmitted and then received his first CW echoes off the moon on 10 GHz a couple weeks ago using a 6'+ dish antenna. He's in the process of improving his rotator system so it will be capable of automatically tracking the Sun for Sun noise measurements and tracking the Moon for operating EME QSOs.

Brian KF6C has designed and is assembling the PCB for a very compact 2 meter SSB transceiver for use with microwave transverters and therefore has low power output and is USB/CW only. It should be ready for a demo soon.

Along the same line I built and demoed a 2 meter DSB direct conversion radio breadboard also for use with microwave transverters.

At the October meeting it was connected to a 10 GHz transverter and used to receive the 10 GHz beacon located on Miguel.

The receiver was set up for "Binaural I-Q" reception which is interesting in that as you tune to the lower side of the CW beacon the tone appears to come from one headphone and then moves to the other headphone as you tune to the upper side.

No circuit board has been made for this project.

Both of the 2 meter radios are based on the Si570 synthesizer kit from K5BCQ for about \$45 and cover 3.5 to 160 MHz with LCD display and variable tuning speed down to 1Hz steps I believe. A very simple kit and worth while project.

<http://www.qsl.net/k5bcq/Kits/Kits.html>

At least 4 or 5 kits have been assembled in our SDMG.

That's about it for now.

73 - Kerry N6IZW

Kerry Banke <[kbanke@sbcglobal.net](mailto:kbanke@sbcglobal.net)>



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# From the Repeater - by W5NYV

## Machine Learning

### Inspired by N6KI

Machine learning is a problem solving method in computer science. Given a particular type of data, a computer is programmed to figure out the best way to solve problems related to that data **by looking at the data**, instead of being programmed solely in advance.

In traditional programming, the solution is prepared before-hand and written into the software. For example, a software program may monitor several sensors and sound an alarm when any of the sensors exceeds a setpoint. The software is sampling, comparing, waiting, and if certain conditions are met, then acting. If the number, type, or behavior of the setpoints needs to be changed, then the program may need to be re-written or re-configured.

In a machine learning solution, the program analyzes the data in order to produce the desired end result. In the sensor monitoring example, the program is "trained" by being exposed to large amounts of historical data linked with correct results. By looking for and taking advantage of patterns in the historical data, the program can partition the training data set, develop a rules set, and then make decisions when new inputs are received. Over time, failures are used to fine-tune or retrain a system that is dealing with shifting or changing inputs. Say our sensors are water levels at a dam, and over the course of three seasons of increasingly severe drought, the spillway behavior needs to be modified. A well-designed machine learning system adapts to this and gives correct output without requiring reprogramming.

Machine learning techniques extend to amateur radio. It's entirely possible to feed signals from all amateur bands for the duration of an entire contest. After analyzing the behavior of all participants over several contests, it may be possible to predict when certain stations appear, how well and where they are heard, and what strategies they use.

Another type of analysis would be of ionospheric conditions, where a machine learning algorithm would be trained on previous openings in order to predict future ones, based on observable phenomena.

An amateur radio related project going on right now is a machine learning challenge to write a morse decoder.

See below for a link to the home page and a screenshot of the contest information. Got an article request and haven't caught me on the repeater lately?

Let [scope@palomararc.org](mailto:scope@palomararc.org) know!

## Machine Learning Challenge Morse Code Competition

<https://inclass.kaggle.com/c/morse-challenge>

The screenshot shows the Kaggle competition page for "Morse Learning Machine - v1". At the top, it says "Knowledge + 4 teams" and "Morse Learning Machine - v1". Below that, it indicates the start date "Wed 3 Sep 2014" and the end date "Sat 27 Dec 2014 (93 days to go)". The main heading is "Build a learning machine to decode audio files containing Morse code." The goal is to build a machine that learns how to decode audio files containing Morse code. It notes that for humans, it takes many months to learn Morse code, but proficient operators can decode up to 60 words per minute. The goal is to create a machine learning algorithm that exceeds human performance. The data is computer-generated Morse code with varying noise levels. The competition ends on Dec 27, 2014 at 11:59 UTC. During the competition, participants build a learning system to decode Morse code from 200 WAV audio files. The page also includes an "Acknowledgements" section and a "Competition Timeline" section.



Dennis at booth



## Carlsbad Village Fair Amateur Radio Outre

by Dennis KD6TUJ

We had a great time! "We" included KG6JEI, Dennis KD6TUJ, and R... came up and want to know how... had past family members, some... but did not know where to go. Goldberg's website that include... had been licensed and had not... their license lapse for several y... come to a meeting and gave th... great opportunities came as I c... and made a strong contact. Th... College, about 3 miles away. N... He was talking to Washington... All done with a interested party... amazement at how easy conta... K2RP made contacts than inclu...



Club literature



Photo by WD6FWE

A gift of FREE publicity to all S... offered, in the form of a new fl... Amateur Radio. A request was... and known non-members to br... at the Faire. The opportunity w... 100,000 visitors. This was don... Three (3) other clubs took the... flyers for this event.

It is really hard to quantify the... think we made a great present... were not there!

There are a few pictures on Pa... facebook page that were poste...

Dennis





ir  
each

cludes Don WD6FWE, Conrad  
Ron K2RP. Several individuals  
w to get licensed. Some  
e had long been interested,  
I made a flyer based on J.  
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got on the HF on 10 meters  
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results of being in public. I  
ation. Much better than if we

lomar Amateur Radio Club's  
ed Sunday by 0800 AM.



The Booth

Photo by WD6FWE



# 5GHz Mesh Node Installation Work Party Report

by Dennis KD6TUJ

A work party was conducted on Palomar to install a 5GHz mesh node for testing. Plans were conferenced at ground level to ensure the project would go off as planned. Or, kind of.

Joe K6JPE met Conrad KG6JEI, Greg KI6RXX and Dennis KD6TUJ at Mother's Kitchen, which is closed on weekdays. From there we traveled to the repeater site. Arriving, we opened up the needed buildings and prepped. After airing out the battery room, Joe got to check out the generator building where the voice machines are kept. Inside temperature was 65 degrees. Then we went to the sunken building where the packet machines are. All looked good.

OK, start the project by trenching a line from the base of the 6m tubular pole to the packet building. Hey, look at the 4-inch ground strapping and roots in the path. Got to work over, under and around to get the path needed. We found trace of power to the storage shed, power to the radio rooms, and a 6m coax run. The hole cutter used to gain entry to the packet shed was the right size for the PVC as it needed to be gently forced in. Then came the feeding of the cat5 through the PVC along the trench, again working the pieces through the root/conduit mazes. Not bad. Let's get the panel set while the software specialist puts RJ45s on the ends. Great, what parts are missing? In true amateur fashion we overcame the missing pieces and actually used less to mount the panel.

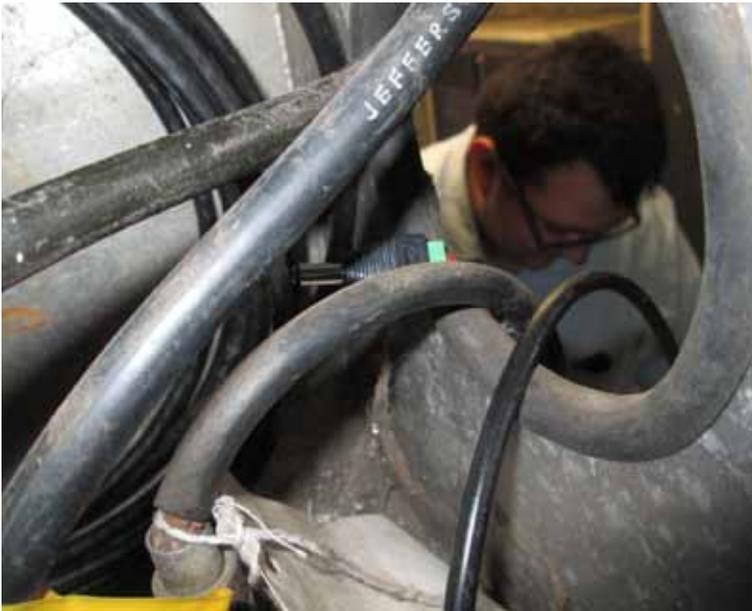
Once placed, you should have seen the high tech directional devices used to orientate the panel to a direction of 215 degrees. (I-phone floating compass vertical at the end of the pole to eyeball 215.) Not to be outdone, duct tape was found to use as a moisture preventive above the panel feeds from the radio. The radio mounts to the back of the panel and receives power from the cat5 plugged into a power cube. Back to the cat5 entry, a lightning protection block was placed before final entry into the building and power source.

Software leader had problems connecting power to the 48 VDC supply. A converter block was arranged for this unit to follow the rest of the site plan. Software leader claimed a tingle while connecting to the supply. AC tingle on a DC line? Oh well, take him out and throw someone else in. Look, no problem, just finish the connection. Black to ground already so red to positive CRACK! Who has the party popper? Oh, the supply block tested the inrush limiter, AND the magic smoke holder. The magic smoke appeared above the power block and could not be contained. What happened? Software lead brought out a SD50 cube. OOOps, it's a 12 to 12 block, NOT a 48 to 12. Another trial by error. We still believe in our Dear Software Leader, I think. Back to the ship with unit power block.

What a great day.

Dennis



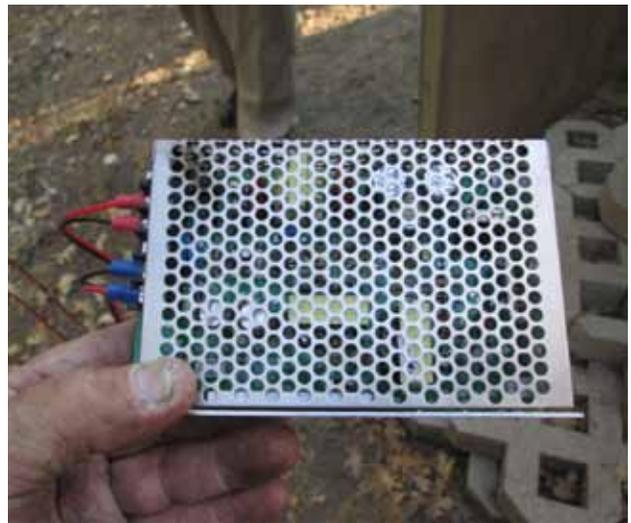


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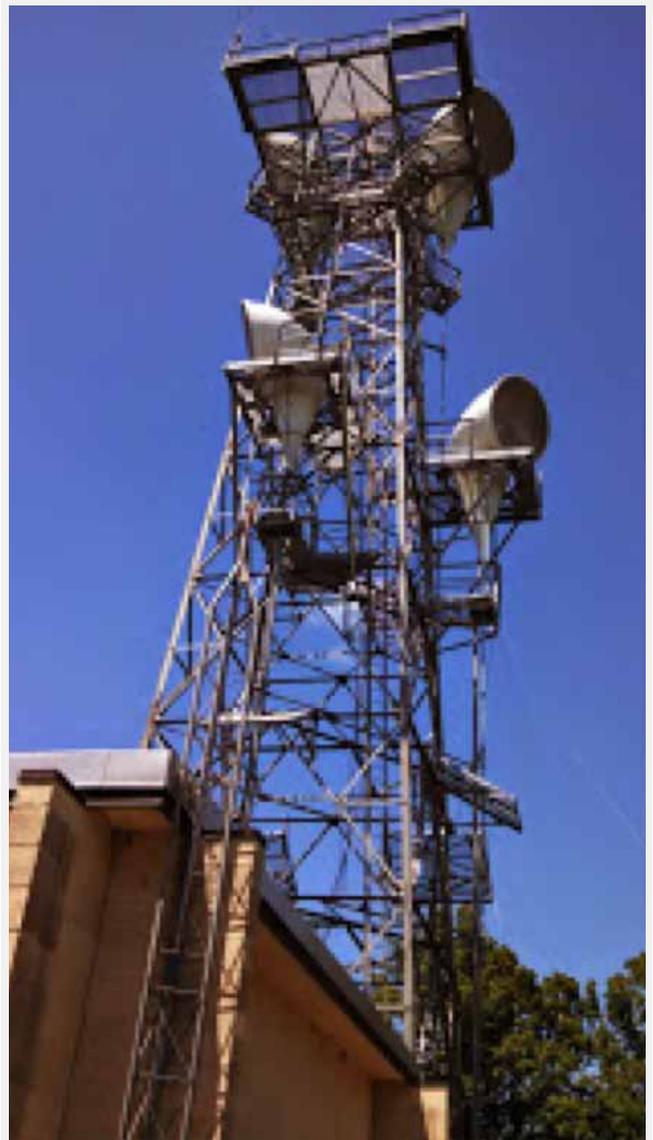
# 5GHz Mesh Node Installation Work Party Photos

# W1AW/5 Centennial Operation from the Big Arkansas Tower

by Bill N6PIG

Recently I was invited to participate in the W1AW/5 centennial operation just north of Dover, Arkansas. In 2001, Dennis Schaefer W5RD and five of his friends purchased a 113-foot-tall tower. The tower was built in the 60's as AT&T built microwave towers across the country to serve as phone lines over vast stretches of land. They also sent television pictures for major events like the Moon landings. This tower was placed near Dover, AR, where it was the link between Petit Jean and Clarksville. It has a Force 12 Beam antenna and a 40 meter rotating dipole at the top of the tower. It also has some VHF and UHF antennas. Ironically, it is not a repeater site. The site sits on a 1300-foot-tall "Mountain" that is considered fairly tall since 2400 feet is as tall as it gets in Arkansas and 500 miles in any direction. The original microwave dishes have been left in place as it makes it look so official.

On Thursday November 19 I met Jonathan Setcer N5QJ at the Dover grocery store and followed him to the BAT. This included a long stretch of dirt road and a 1 lane bridge crossing the Illinois bayou. Though there are dedicated operating positions the radios and equipment is stored on shelving. We used Jonathan's 756 pro III and the BAT's Ameritron AL-80b linear amplifier. The Force 12 antenna has no elements for 17 Meters but provided a 1.3:1 VSWR, Because of this we were not sure if the

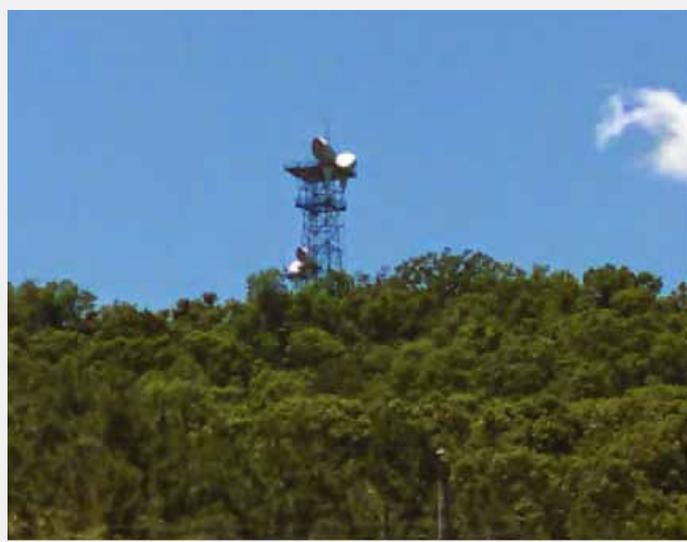


The "BAT" Tower base. Photo by J. Lewter

antenna was directional or just a large horizontal polarized antenna as rotating it only showed nulls but no peaks.

We began operation at 8:00pm UTC and had a scheduled 4-hour window for operations as there is a website where time and bands are scheduled such that only one station is on a band at any time. The operation was a little hectic as there was so many stations calling that at some times we not only had to limit to 6 or 2 call's but to W, K or N2's. We also opened opportunities for DX calls, and I was surprised to find someone who thought Alaska was DX. We were running a rate of 125/hour for the duration. I have never experienced his kind of activity and QRM radio overload being the only station on the band. Even the mid 1990 effort's by W6NWX when we were 1st place 5A in Field Day did not come close to this.

Fun was had by all!



The "BAT" Tower on approach. Photo by J. Lewter

# HF Remote on Palomar

by Michelle W5NYV

Back in 2011, Howard White calculated MicroDem Terrain Models for three sites on Palomar Mountain for me. The goal was to determine which one of the sites was the best HF radio location. They turned out to be all pretty good. During the process of looking at various locations and talking about installing an HF remote location on the mountain, it occurred to me that this might be something the club should consider providing as a service for members.

Here's the locations of the sites modeled:

W5NYV1      33.30901, -116.84868 red home (my house on Palomar)  
W5NYV2      33.31029, -116.84381 immediately east of red home  
W5NYV3      33.30545, -116.84481 immediately south of red home

Howard ran HFTA models for the 3 sites simultaneously @ 14.2 MHz using 80' tower with 4 elements. To Europe (35 degrees azimuth) Africa (90 degrees Azimuth) Asia (305 degrees Azimuth) and South America (135 degrees Azimuth). Results are summarized below in an HFTA chart. The bars in the chart show the statistical elevation-angle percentages versus elevation angle. The lines are elevation responses. On Palomar, the takeoff angles that are most useful are the ones that have the largest bars. The bars differ based on terrain, as different locations in the world require a different set of takeoff angles for optimum results.

The antenna needs to have the best response for those angles represented by the largest bars. One can see that they are all pretty good, with the second location, east of my house, being a bit better when compared to the others.

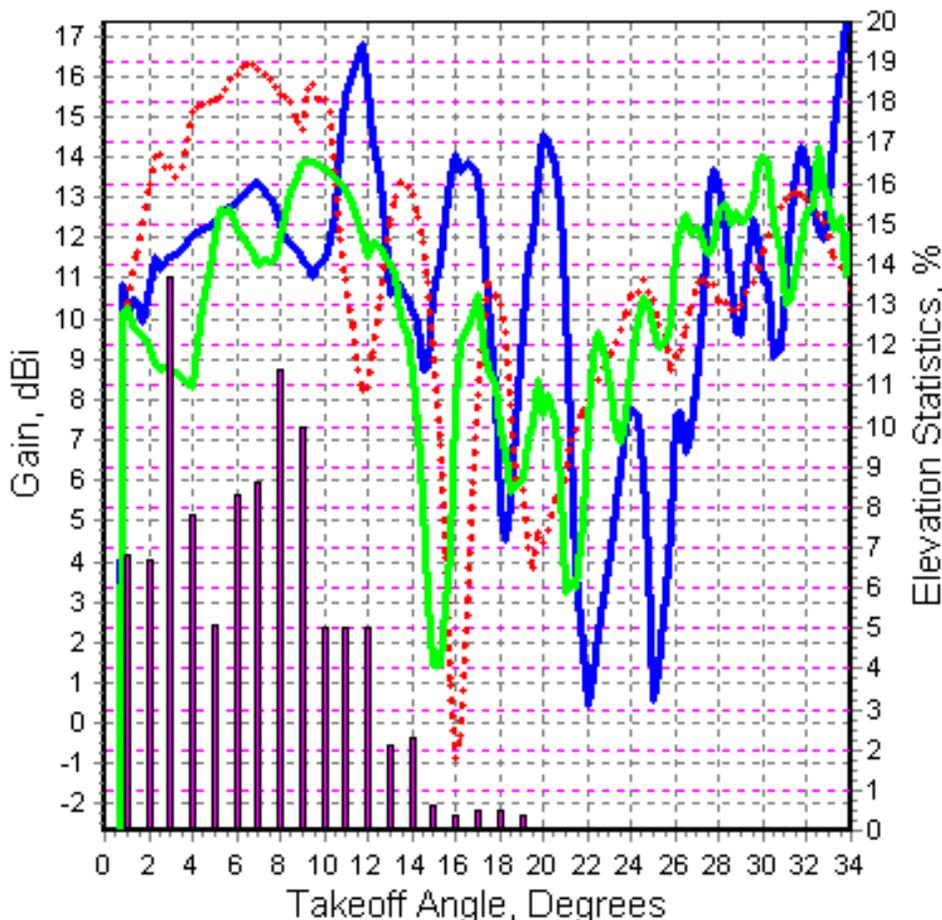
The repeater site will have very similar properties to the measurements made for the locations I was looking at. The repeater site is west of my house.

<p><b>HAM RADIO OUTLET</b></p> <p>Jose XE2SJB Jerry N5MCJ Joe N6SIX</p> <p>H R O</p>	<p><b>KENWOOD rf CONCEPTS DIAMOND US TOWERS KANTRONICS YAESU, MFJ, ICOM BENCHER, Inc. HUSTLER COMET AMERITRON</b></p>	<p><b>Astron, AEA, OUTBACKER Larsen Antennas TEN-TEC Hy-gain, Tri-EX, Cushcraft And Others too Numerous to Mention!</b></p>	<p>Drop in to see our display of working equipment. Find out about Pkt location determining equipment (APRS). Check our complete line of magazines, ARRL books, license manuals, and Bulletin Board with all sorts of Goodies listed.</p>
<p>Open: 10a.m. – 5:30p.m. Monday thru Saturday <i>Ask about our great prices</i> 858 560-4900 or toll free 1-800-854-6046</p>	<p><b>Directions:</b> On 163, take <b>Clairemont Mesa Blvd.</b> off ramp to East. Stay in right-hand lane. Turn right at stoplight. As you are turning right you can see our beams in this shopping center. Travel 100 yds. On Kearny Villa Rd. and U-turn back to shopping area and HRO sign. Be sure to see our equipment in action on <b>real</b> antennas!</p>		

{special}  
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Freq. = 14.2 MHz  
Max. Gain: 17.3 dBi

**W5NYV1-35.00.PRO**

80 ft  
4-Ele.  
Fig. of Merit: 12.5

**W5NYV2-35.00.PRO**

80 ft dots  
4-Ele.  
Fig. of Merit: 14.4

**W5NYV3-35.00.PRO**

80 ft  
4-Ele.  
Fig. of Merit: 11.5

**Elev. Statistic**

**W6-LA-EU.PRN**

Print

Out File

Close

## Club HF Remote Station? Let's Install One!

There are at least three reasons for the club to get involved in the HF remote movement. The first one is technical. The challenge of making a quality remote installation is fun and rewarding. The project involves backhaul establishment, HF equipment selection, remote access protocol development, command channel identification and establishment, testing and tuning, documentation, and training, among other things.

Secondly, autopatch and casual repeater usage has declined due to the increase of cellular coverage. Exploring new services that can be offered from club equipment on the Palomar Mountain property is an important responsibility. A new broadband repeater has been installed, and fresh hardware for the voice repeaters is under active investigation. Adding an HF remote station would expand the services provided by the club. This is an exciting time to get involved with renovating equipment on the site.

Third, many members are negatively affected by CC&Rs and other limitations on putting up HF antennas on their San Diego properties. We live in an urbanized area where antennas may or may not be allowed. Plenty of us live in valleys or in places that are not good for radio. Having a remote station that members can reserve and use would go a long way towards making the hobby possible for people that live in places where radio is limited.

If you would be interested in helping explore a club remote HF station on Palomar Mountain, then please join up by writing me at [scope@palomararc.org](mailto:scope@palomararc.org).

This special interest group for HF remote will write a proposal for the Palomar Amateur Radio Club board of directors to vote on. If the vote is successful, then fundraising will begin immediately.

SCOPE  
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### Featured Program:

At 7:30pm on 3 December 2014, Palomar Amateur Radio Club will have our annual social and election of officers. We look forward to seeing you at the Carlsbad Safety Center, 2560 Orion Way, Carlsbad, CA. Arrive at 7:00 for socializing!

Sign up for the PARC Email Lists:

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