



SDARC Newsletter

Sinbad Desert Amateur Radio Club

Winter 2009 Edition

Volume 3, Issue 1

W7CEU Club News



Dave—KE7YWM working on the link antenna

QST, QST, QST ... All hams please don't pass-out, you are reading a message in the SDARC news letter... finally!! Our ventures have been wide and varied, but our purpose has always been the same...STAY ON THE AIR!!

So let me tell you about some of our adventures this last six months or so. The common thread is repeaters, repeaters, and repeaters.

To begin, I would like to take just a moment to say Thank YOU to a few people who have helped me with projects here at CEU over the last year. Allen-KE7PDO, Ricky-KE7NBB, Kyle-KE7BPQ, Ryan-KB7NBA, Aaron-KE7AK, Wiley-KE7SFO, Dave-KE7YWM, Brett-WX7Y, Jim-KA7YIV, and Bryan-K7GX; THANK YOU!!

It seems like I blinked and another year has come and gone. This fall several students helped the club with tower projects. Aaron, Wiley, and Dave did a great job on Bruin. We had lots of ground help from the club which is also very much appreciated. The grounding on Bruin was very successful, but unfortunately sometime this winter the remote base

antenna got broken and so linking into other locations have been impossible.

The students and I got the Ford replacement repeater ready to go, then with Brett's help got it programmed. We then had a work party over at Brett's shop to build a HD antenna for Ford.

We planned a trip to Ford to replace the antenna, but were never able to make it happen: SPRING PROJECT! We will get a trip planned and replace the repeater and antenna at the same time. Of course it will be late spring (June) before the snow melts and we can get up there.

So this winter, the students and I have been working on a repeater for Woodhill. Because of budget cuts, we were not able to get all the pieces yet, but Allan-KA7LEG was very instrumental in getting us the Woodhill site. This will be an ideal site for teaching repeater basics to students and new hams alike, not to mention it will give Price area hams great hand-held coverage.

We have also been very busy helping Carbon County with their EOC. We have put in better than 200+ man hours on it thus far, with plenty more to do. Our goal is to have a functioning system up by July 09. I feel this is very do-able since we do have many of the infrastructure items nearly all in place.

I hope this message finds all well with you and yours.

73 and let us keep our fingers on the PTT switch!!

Ross-KB7UZX - North Vice-President

Special points of interest:

- "They mentioned after coming down that the weather was completely different 100 ft up." *page 7*
- "I am glad I had my radio equipment with me, and I am glad there was someone listening on the repeater to take the emergency call." *page 4*
- Congratulations to the new Hams. *page 6*
- Congratulations to Ellen Anderson for her new call sign – K7LNJ.

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Hams Wins Science Fair

Two boys, Joshua Fournier, KI6PJW (Gen), and Michael Binon, KI6QOC (Tech), set out to build a totally-self-contained portable HF station that is small enough to fit into a backpack and still allow them to carry necessities for survival. Michael is in sixth-grade and a Boy Scout well on his way toward earning his Eagle Scout rating. He and Josh both like to hike so decided that it would be cool to take the radio with them. The goal was to have it be completely self-contained and provide its own power regardless of the duration of the hike, hence the desire for solar power to keep the battery charged.

Last year I had students who tried to do projects together which did not work out. One student ended up doing most of the work and the results were clearly not a team effort. This year I told them that they could not collaborate and must each produce an individual project. That way one student's failure to perform would not impact another student. Since both Michael and Joshua had an interest in constructing the backpack station, I suggested that they define it as two separate engineering problems to solve and then each could solve their own particular problem independent of the other. Joshua took on the problem of the power system and physical design while Michael tackled the problem of selecting the best antenna to go in the backpack.

Joshua's problem was pretty straight-forward:

1. do a power budget to determine required battery capacity;
2. select an appropriate battery technology (LiPoly, NiMH, or lead-acid);
3. determine necessary PV panel size;
4. come up with a rugged, adjustable mounting for the PV panel that would allow room for the rest of the stuff in the backpack, e.g. sleeping bag, tent, food, water, etc.

Joshua even provided a fall-back position on the antenna by building and testing a center-fed, non-resonant doublet fed with 300-ohm twin-lead and tuned with a small, balanced-line tuner.

Josh did some serious engineering. He would come up with ideas, sketch them in his engineering notebook, bounce his ideas off of me, research materials, and then go build. He got his father and grandfather to help with metal fabrication. I wish that some of the engineers that I once had working for me did work of this quality.

Michael discovered about half-way into his project that antennas are a much more difficult topic than he originally anticipated. He had some real false starts and darned near broke up his parents' marriage getting his father, who knows nothing about radio, to help. I had to take a more proactive role and guide him through understanding the various antenna types and their construction.

His original plan was to build 1/10th scale model antennas at 2M and test those as neither he nor I had come up with a way to test antennas in real-time with the same signal. Instead we were going to use my miniVNA to measure path-loss in the far-field. Being able to quickly build and test scale antennas gave him a much better understanding of what was happening. It also left our technology lab at school looking like a spider web with students having to crawl on the floor to get to open workspace. :-)

About that time I was talking about multiple receivers in the F5K vs. the K3. We were talking about diversity reception and a light bulb went on for me. I suggested to Michael that he use the F5K to measure two antennas simultaneously. He came up with a test plan using the dipole as the reference antenna against which to test each of the other antennas; i.e. 1-wave delta loop, 1/4-wave ground plane, and end-fed non-resonant wire. Michael drew up a layout for the antennas which would minimize interaction and collected materials. The head administrator for the school gave him leave to use his classmates and class



Hams Wins Science Fair (cont)

time to set up his antenna test range as a practice run setting up antennas for field-day. (Field Day at our school is an official school event.)

Nothing went according to plan. Everything took three times longer than planned and Michael only managed to get his data last weekend. Still, it was good data. He used PSK31 signals as his test signals because they are narrow, constant power, and all the power is concentrated close in to the carrier allowing narrow filters to minimize power from adjacent signals and to provide good S:N. The only problem was, last weekend was a big PSK31 contest and it took real skill to collect data points with the quick exchanges. OTOH it also meant that there were a lot of stations on the air so he didn't lack for sources.

When we got done (yeah, I got roped into running the F5K and calling out signal-level readings) we had quite a bit of data. Because of the 1dBm resolution Michael took many readings and then averaged the differences. I was surprised at the accuracy of the results. His data showed that the loop had a 2.6dB advantage over the dipole; the ground-plane had 0dB advantage over the dipole, and the end-fed wire with counterpoise came in well behind the dipole, -15dB.

After taking data for the dipole and loop and seeing the loop's consistent 2-3 dB advantage, he became concerned about the data from the dipole and ground plane with no apparent consistency. I had him put on the headphones and listen to signals in diversity mode.

Understanding led to a discussion of polarization rotation. We took lots of data points and averaged the data. This time the average indicated that there was no advantage to the ground-plane over the dipole.

The end-fed wire was a big loser. Its only saving grace was that it was the easiest antenna to build and erect so it actually didn't end up too far down on his comparison matrix.

Now it is possible to glean this information from the various ARRL handbooks but the act of doing the work and getting good data in the field both aids in building understanding and confidence. When Josh and Michael talk about antennas they now sound like old hams.

Turns out that Michael and Josh were their own competition. Michael placed 1st and Joshua placed 2nd in the engineering category. If I had a choice I would have reversed those because this is Joshua's last year (we only go to 8th grade) and he really did his project 100% independently. Michael is only in 6th grade so has several years to compete in the Junior division. Also Michael needed more help and direction. Regardless, he did the actual work, does understand the material, and could certainly replicate it completely on his own without assistance now so I think he earned the award.

Moving on, I had several low-end 434MHz part-15 transmitter and receiver modules intended for wireless remote control kicking around for the kids to use in projects. I originally got them to use in making hidden transmitters to t-hunting and also to send up in balloons as balloon-sats for tracking and simple telemetry. I figured we could afford to lose the \$8 100mW transmitter modules. The \$8 receiver modules are superregen but they work and I am again unconcerned about something happening to them.

Frankie, KI6QYS, looking for something to do that involved some kind of remote control, latched onto the modules. He has written simple programs to control the robots but this became a crash-course in learning about async serial communications.



Hams Wins Science Fair (cont)

I gave him a plan working up from simple 4-line programs keying the transmitter and detecting that at the receiver, to sending data from a PC, framing it, and displaying it on a small LCD at the receiver.

Again, nothing went as planned and I spent a fair amount of time giving him small experiments to try to determine what was happening.

We ran into all kinds of limitations with the small modules and with the Basic Stamp microcontrollers which ended up reflected in the final code. (The final framing has the transmitter sending pad characters to deal with timing constraints in the receiver code.) Regardless, he finally converged on code that would allow reliable transmission of arbitrary-length messages from one microcontroller to the other. It isn't quite AX.25 or TCP/IP but he understands what he did and what all the problems were. He even asked me about how to do a preamble that wasn't characters so it shows he is thinking. Next I probably need to show him how HDLC is framed. Not bad for a 6th-grader who started out thinking that this science fair stuff was boring and not worth doing.

The key to me is that these were real engineering projects with real goals. Every single project presented serious problems that required creative problem-solving. All students went from almost zero knowledge to being able to troubleshoot problems effectively which indicates significant understanding. You can't ask for more than that.

It is also somewhat serendipitous to me in that I won the regional and California State science fairs two years running back in the 1960's.

It will be interesting to return to the place where I won 42 years later with my own students in tow.

73 de Brian, WB6RQN/J79BPL



Hams Assist Woman Injured in Desert

The ARRL Letter
Vol. 28, No. 11
March 20, 2009



It was a sunny day, not a cloud in the sky, when Hal Whiting, K12U, Todd Kluxdal, Kluxdal's father and Whiting's two sons decided to go out to the Poverty Mountain area in Arizona to search for airplane crash sites. Whiting, who lives in St George, Utah, and Kluxdal, who lives in Mesquite, Nevada, took two vehicles that day. According to Whiting, they always take two vehicles, just in case a problem pops up: "We always have two spare tires, extra gasoline and a tow rope. We take enough food and supplies to stay two or three days." In addition to the extra equipment, Whiting took the one thing he never goes without -- his ham radio.

"It was a bit after lunch, about 73 miles into our trip," Whiting told the ARRL, "when we were flagged down by a man wanting to know if we had a satellite phone, since he couldn't get coverage on his cell phone." Whiting didn't have a satellite phone, but he asked the man if this was an emergency. Whiting said that the man told him that one of his friends had been injured when her ATV rolled on top of her. "I told him I could call for help on my ham radio," he said. The injured woman was knocked unconscious by the fall, but had regained consciousness and was speaking coherently, but was in pain.

"I picked up my mic and put out a call on the 146.910 repeater, one of four repeaters run by Dean Cox, NR7K," Whiting said. "I called for assistance a couple of times when Mac Magee, N6LRG, in the Arizona Cane Beds, answered."

"Mac lives about 50 miles away from the accident site," Whiting said. "It's funny -- it's usually Washington County hams who are on the repeaters, since that's the direction they're pointed in. But Mac lives in Mohave County. And the accident happened in Mohave County. We were lucky, since if the call was answered by a ham in Washington County, there would have been a delay in them getting the info to the proper authorities in Mohave County, but with Mac answering, all our information went right to the proper place."

That morning, Magee told the ARRL that he came into my shack "and for some reason, turned on the 2 meter rig and it happened to be on the 146.910 repeater. I usually have a problem with the repeater 'hearing' me, so I rarely use it. About 11:20 Arizona time, I heard someone call and say they had emergency traffic and needed help. I fully expected a bevy of hams to answer the call, since so many are in range of that machine, but after his second call, and no answer, I took it."

Magee said that the calling station had been flagged down by another motorist. "He told me there had been an accident in the vicinity of Poverty Mountain," he said. "I really had no idea where that was, but I began to write down details. As soon as I had basic info, I called 911. The Mohave County Sheriff Office answered; I explained who I was and what the call was about."

The dispatcher asked Magee for the coordinates to the site, and Magee relayed the request to Whiting. "I looked at my GPS and gave Mac my coordinates, but he said the dispatcher wanted the coordinates from the accident site," Whiting said. "So I got in my 4-wheel drive and drove down the ridge to the site, about 5600 feet above sea level, and got the coordinates. I had to drive back to the ridge, another 1000 feet up, to call Mac back, because I couldn't get a signal down there."

Whiting told the ARRL that in addition to his ham radio, he also carries a set of FRS radios. "I



Hams Assist Woman Injured in Desert (cont)

gave one of the FRS radios to Todd and he drove his Jeep down the ridge to the accident site," he said. "I kept the other one and Todd was able to relay me information about the injured woman's condition and I was able to relay that information to Mac who in turn relayed it to the 911 dispatcher. Mac put the mic right up to the phone so the dispatcher could hear exactly what was going on."

Magee said the 911 dispatcher requested more information: "While Hal was replying, I held the phone up to my radio speaker. When he finished with the details, I asked them if they copied that. The dispatcher said he did, and they held me on the line. Hal and I talked a while as he gave more data. When the dispatcher returned, they said a chopper was being dispatched from Phoenix! Well, we finished that call after they had the actual accident site GPS coordinates that Hal had passed on."

With emergency help on the way, Kluxdal returned to the ridge and he and Whiting and his group went on their way to go check out an airplane crash site, the original intent of their trip. "The family members told us to go on and get on with our trip, so we did, after making sure they were all okay," Whiting said. "So we left to go to the crash site, about 3-4 miles away. As we were getting ready to return, we saw the helicopter overhead, taking the injured woman to the hospital in Las Vegas. We returned to the top of the ridge and a sheriff's deputy was there and he told us that our GPS coordinates were off, but only by 20 feet! He said that the helicopter crew was real happy that they were so on-target."

Whiting said they were glad to have been able to help. "This is a remote area," he said. "There's only one way in, one way out with no shortcuts to get in and out. There are only dirt roads, and it can get very muddy when it rains a lot. I was out that way two weeks ago and got stuck in the mud there, but it was all dry this past weekend."

Whiting said he learned a few things after this trip: "I am glad I had my radio equipment with me, and I am glad there was someone listening on the repeater to take the emergency call. Having the spare FRS radios created an efficient means for relay with a non-ham person, and having the GPS equipment provided a very effective means for the helicopter rescue team to locate the accident, since they did not want the road designation information but the exact patient coordinates. It would have been useless to have my equipment if there had not been someone listening. This proves that there is a good reason to keep your radios with you and in good operating condition."

Whiting, who was first licensed in 1976, is the ARES Assistant Emergency Coordinator for Washington County. A CAD Manager and Aerial Photographer for Bulloch Brothers in Mesquite, Nevada (he and Kluxdal are co-workers), he is currently teaching an Amateur Radio licensing class to 13 prospective hams at the Dixie Regional Medical Center in St George.

Magee said that before this incident he had never been involved in an actual emergency. "I have established emergency communications networks, in particular for the LDS Church in Newbury Park, California, where I was the Stake Emergency Communications Coordinator." He told the ARRL: "Our communications group won the first worldwide test of the system back in the late 1980s. This is like ARRL Field Day, but involved mostly LDS members and facilities, then under the name of Mercury Amateur Radio Association (MARA) <<http://www.mara.net/>>. I feel very pleased in knowing that I had the opportunity to serve in this rescue incident and that every penny I spent on my system, radio and antenna was certainly worth it. In these days of extensive cell phone service and coverage, isn't it satisfying to know that ham radio can still be of use for public service?"

*Article from The ARRL Letter
March 20th, 2009*



Ham Class Update

For the past month Bret Mills (WX7Y) has been teaching a combined Technician and General Ham Class in Castle Dale at the Emery County Sheriff Office. Classes have been held every Wednesday at 7:00 p.m. and will continue to be held for the next couple of weeks and end with a VE test session.

Half way through the class we held a VE test for those that have been taking the class and tested six new Technicians and one upgrade to General. The new Technicians are:

- Phil Fauver – KF7BJQ
- Maureen Copatch – KF7BJR
- Robbie Riley – KF7BJS
- Paul Porter – KF7BJT
- Les Wilburg – KF7BJU
- Jerod Curtis – KF7BOM

The upgrade to General is:

- Dave Wheeler – KE7YWM

Congratulations to all of the above. Thanks to the VEs that helped make the test possible.

Bret Mills – WX7Y
Jim Anderson – KJ7S
Jim Anderson – KA7YIV
Bryan Anderson – K7GX



We're on the web!
www.sdarc.us

Upcoming Events

Hamcon 2009

ARRL Rocky Mountain Division Convention
May 29-31, 2009
Holiday Inn, Estes Park, Colorado

Friendship Cruise

Memorial Day Weekend
May 22-25, 2009
Green River and Moab, UT

ARRL Field Day

June 27-28, 2008

Glacier-Waterton Hamfest

July 17-19, 2009
Glacier Meadow RV Park, Essex, Montana

The next meeting of the SDARC will be held in Orangeville, UT on May 7th, 2008. The location in Orangeville is the Orangeville City Pavilion.

Also there is an informal net sponsored by the SDARC every Tuesday night at 20:00 hours local time on the local repeaters. There is also an informal net held every Saturday at 08:00 hours local time on 3828 KHz +/- QRM.

The Borderline Amateur Radio Club also has a net every Wednesday night at 21:00 hours local time on their repeaters. The SDARC repeaters are usually linked during this time.

Dues for the Sinbad Desert Amateur Radio Club are due for the 2009 year. Dues are \$25 for the year. Please use the form on this page to mail the dues to the club treasurer.



Aaron-KE7AK, and Wiley-KE7SFO top-side of the Bruin tower.

Please use the following form to pay dues, to give a donation, and/or to update your contact information.

Please update your contact information below.

Address

City State Zip

Daytime Telephone

Evening Telephone

E-mail Address



Dues—\$25.00 (per year, per member)	\$
Donations (If any)	\$
Total	\$

Please make checks payable to below and send to:

Sinbad Desert Amateur Radio Club

P.O. Box 1073

Castle Dale, UT 84513

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