Orange County Radio Amateurs (OCRA) Newsletter
January 2008

From the Editor

Welcome to 2008! I hope each of you and your families enjoyed a very Merry Christmas and Happy New Year celebration.

When the calendar turns to a new year, I imagine that many of us think about what lies ahead and what changes are coming. I'd like to challenge each of you this year. I guess you can think of it as an OCRA New Year's Resolution. Here is the challenge – get more involved in OCRA and in amateur radio in 2008. That could mean attending a board meeting, providing an article for the monthly newsletter, volunteering to give a presentation at a club meeting, acting as net control for the weekly ARES net, participating in a club activity that you have not participated in before, and the list goes on. When you look back on 2008, you will definitely appreciate becoming more involved in OCRA.

Now, get comfortable, read your club's newsletter. And, remember – get radio active!

Best regards,
Laurie - N1YXU
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Summary of the December Meeting

As you know, in lieu of a December meeting, OCRA celebrates the end of the year with a group dinner. This year, several members met at the Mayflower restaurant in Hillsborough. A great time was had by all as we shared enjoyed dinner with fellow OCRA members, friends, and family.

The January OCRA meeting will be held on Monday, January 14, at the Sunrise Church beginning at 7:30 pm. One of the main topics on the agenda is the election of OCRA officers for 2008.

The weekly Orange County ARES net meets on Saturdays at 9:30 am local on the W4UNC repeater [442.150MHz with a PL tone of 131.8Hz]. All licensed amateur radio operators are invited and encouraged to check in.

The New Year's Day Work Session at UNC's MEJ Building
by Woody Woodard, K3VSA

A dozen OCRA members and friends shook off the effects of New Year's Eve revelries sufficiently to show up for the annual New Year's Day maintenance session at UNC's Mary Ellen Jones Building (formerly known as the "FLOB") to dust off and otherwise inspect OCRA's 145.230MHz and 443.475MHz repeaters. The weather on January 1st can be daunting, but we were blessed with a most excellent morning. The wind atop the roof could have been a bit less, but it did serve to eliminate every bit of atmospheric haze. Even "been there and done that" Steve Jackson KZ1X remarked that it was the clearest day he'd ever witnessed in all the years he's been involved with this event. Even this author's rather

presbyopic eyes could easily make out the TV antenna towers in Clayton, for example, quite a few miles away on the horizon.

Unfortunately, we couldn't complete our stated mission of getting the 2 Meter machine connected to the Internet Repeater Linking Project ("IRLP") due to several technical factors beyond our immediate control. However, thanks to an equipment donation by OCRA member Bill McClymont (W1REP), we now have a keyboard and monitor onsite that will preclude our having to lug them into the building and up the elevator during future visits.

The new Kenwood commercial grade repeater that we installed two years ago to do 443.475 seems to be holding up well, and all the antenna hardware passed visual inspection, too. And, hopefully, we will be able to address the issues involved and enable 145.230 for IRLP operation in the near future.

Attending the work session were Dan Eddleman (KR4UB), Steve Jackson (KZ1X), Bill McClymont (W1REP), Brian McLamb (KI4YSZ), Kate Millard (KI4LLM), Meg Millard (KI4LLL) and her friend, Randy, Kevin Otte (N8VNR), Gary Pielak (AI4GT), Dan Sears (KD4AGQ), John Shadle III (W4PAH), and yours truly Woody Woodard (K3VSA).

OCRA members (l to r) Brian McLamb (KI4YSZ), Gary Pielak (AI4GT), and Woody Woodward (K3VSA) inspect the 443.475 antenna atop the MEJ Building at UNC
[Photo credit: John Shadle III (W4PAH)]

Magnified shot of Durham skyline as seen from top of MEJ Building on UNC.
[Photo credit John Shadle III (W4PAH)]

Mobile HF Antenna Experiment

by Steve Jackson, KZ1X

This is a story about mobile HF antennas and describes a very long experiment that ended up costing a bunch of time and money and did not work very well when it was over. MOST articles about ham antennas tell you what to do and how well they work if you follow the instructions. This one is different, in that it tells you how lousy it works and precisely NOT to do what I did unless you have no other choice.

This whole process started when I decided I wanted to get on 40 meters from my truck and still be able to drive into the garage without taking the antenna off. I know I can get on 40 with one of my existing 8’ plus antennas but if I use it, I have to get out of the truck to put it on -- and remember to get out again when I come home AND TAKE IT OFF, or I'll mangle the antenna AND the wood trim around the garage door. Of course, I have done just this, more than once, so I am loathe to keep making the same mistake.

I like 40 ‘phone during the day because it has good range and often interesting people to talk to. While I can and have sent CW from the truck while it's moving, it isn't a good idea, and I am not very good at it either. So, the 'phone part of the 40 meter band is the place to be. Propagation-wise, it's less “jumpy” at this point in the solar cycle, the same problem that makes 20 and 17 too erratic for predictable fun. It would, of course, have been easier to make an antenna work for those bands because the length of the required antenna would have been far less. Instead, I opted for the greater challenge of the 40 meter antenna.

I also opted to try and focus on just the one band, instead of trying to make a multiband antenna, because, in general, making an antenna work on one band is far easier.

The antenna would have to mount in the same location as the other antennas I use on my truck. I did not want to make another mount and type, and I wanted to keep the Hustler QD-2 style, very sturdy, machined stainless disconnect I already use for other antennas. This would allow rapid changes to other antennas when I want to and also to facilitate A-B comparisons between the antenna I made for this project and others I already have.

A decision had to be made how to electrically "load" the antenna because my maximum physical length of 44" is MUCH shorter than the electrical quarter-wave length I need for this band. I decided to top-load the antenna because that produced the longest area of large-size conductor for the high-current portion of the antenna design, and that's where the radio wave comes from. I knew I wanted the most efficient possible antenna. One that turns as much of the radio energy into radiated power and not onto heat. In an antenna, the voltage and the current change depending on what part of the antenna you are talking about, the type of antenna, how it is mounted ... just about everything affects everything!

These complex interactions are why people use computer modeling tools to "see" how an antenna will or won't work before they actually make one. The goal for a mobile vertical should include as large as possible size conductors in places where the radio wave is best generated, and that's how modeling programs figure how to tweak Yagi beams and so forth.

The problem with modeling is that you have to expect that your model accurately reflects the physical elements you are working with. In the case of a mobile 40 meter antenna, I was not able to accurately create modeling elements to show how the real antenna might work, much less to accurately mimic the ground plane of the steel-bodies truck over ground. So, in this case, the old-fashioned route of "try and see" --using real parts-- was all that was available to me.

The feedpoint impedance of a quarter wave vertical, if all things are perfect, is 37 ohms. That's an ideal value, and it is rarely met with mobile antennas. I did not expect to get this good, so I started by trying to build a matching network for what I originally thought would be the impedance of the antenna I was going to make. This investigation resulted in the toroidal transformer assembly that I brought to the OCRA meeting this past fall. I expected to have to match to an antenna that was around 25 ohms, and I did not care to use a shunt inductor (to overcome the capacitive reactance of the antenna) because of the mounting complexities of such a coil and the fact that water (and seemingly everything else) detunes these coils.

Next up was the antenna itself. The Newtronics "Hustler" brand of mobile whip components has been on the market for many years and has always been an economical way of building effective mobile antennas. I already own a lot of this hardware, and it is readily available. So that's what I decided to use instead of making my own hardware 100%.

I calculated the maximum mechanical size of the antenna using the relatively sophisticated method of opening the garage door, placing the truck in the exact position where the mount was under the door edge, and using a tape measure and bullet level to see what would fit. No, really, that was the 2nd attempt; the first was to use a helium balloon from Harris Teeter, but it got away, and I already got too many funny looks from the cashier for the first one I took "for my kids" that I decided not to go back and get another. Worse, I'm sure the errant balloon has now fouled the nest of some distant endangered snail darter or something.

Following this door-snag measuring effort was the need to see how long the antenna "pieces" would be so I could make the longest possible mast section. First, I wanted to minimize the amount of wire in the load coil so as to reduce the ohmic loss. Of course, I could simply use a standard 40 meter Hustler coil (and I happened to have one) but I also reasoned that if I used a so-called "top hat" on my antenna, I would be able to use a coil from a higher frequency band, ergo less wire, and still resonate it.

DX Engineering sells such capacity "top hats" and I already had one of those as well. It took a bit of estimation and cross-checking from the design guides that firm provides, but I was able to create a combination of top-hat size and

"stinger" tip length that would resonate with a 30 meter loading coil at about 7.2 MHz, given the "remaining" length I had to work with.

"Remaining" length? Yes, you see, once the dimensions I could not change any further (the size of the tuning "stinger" and length of the coil) were set, that would dictate the maximum possible mast length I was going to have. Once that dimension was set, I asked Skip (N6LUZ) to cut a length of aluminum mast I had to this length and to thread the end for use with my other Hustler 3/8"- 24 hardware. Skip returned with a professionally finished, custom-length mast section, and I was ready to start testing.

Many new hams get caught up in "SWR fever" because one of the first things you do to see if an antenna is working is to check the standing wave ratio (SWR). Lower is better, of course. SWR --by itself-- however, is no indication of how well the antenna works as an antenna. After all, a dummy load exhibits perfect SWR and does not radiate any signal. So, why is SWR important? Well, it's a quick way to see if the 50 ohm radio and feedline are going to be able to put any power into the antenna, since this too either needs to be 50 ohms, or be matched in some way so that whatever impedance the antenna is gets transformed to what the radio wants to see as a load.

SWR can also tell you that an antenna is lousy as an antenna if you interpret what you're reading in the correct context. For example, my first clue that my new antenna was awful was that is looked like a pretty good match and presented a 1.6:1 SWR without much added effort. Not good. Odd, you say... I had a good SWR, and I am complaining?

Yes. Remember that I said a perfect mobile antenna would show me a 37 ohm load? Because my antenna had too GOOD an SWR, it is suspect. Something was making it look close to 50 ohms when it should be quite a bit different. I'd have been happier to see a 2.5: 1 SWR. The actual antenna might have been working, sort of, but resistive loss in the system added to the actual antenna impedance and brought the feedpoint up closer to 50 ohms. That resistance would turn my transmit power not into radio waves but into heat. (I didn't need the custom-wound toroidal transformer, either.) You can't communicate well with heat.

I would come to prove this in the next test … a key-down at 100W into the antenna for 10 seconds warmed up the loading coil so much that I could feel it when I touched the coil. Since the coil is rather large dimensionally, the amount of power needed to raise it from ambient to the 85 F (measured later) was probably a large part of the 100W I was using to drive it.

So, does it work? Sure. I can make contacts on the antenna, and it easily fits going in and out of the garage. It doesn't look too ungainly and won't poke somebody in the eye walking by. Mechanically, it's quite rigid and sound.

But does it work as well as the big 8 foot job it replaces? Not by a long shot. I performed other tests which I will leave out for sake of brevity. Basically: What I have proven is what I knew already -- you can't get something for nothing. Maxwell's equations seem to hold up, darn it all. I have what may be the best compromise possible without spending several hundred more dollars, and it also proves that, as Tom (N6BT) famously wrote: "everything works." Even a wet noodle can be loaded up in a pinch. Sayings such as "any antenna is better than no antenna" are always true, and having an antenna attached instead of having to stop the truck and put one on … and not wrecking it because I forget to take it off, are also of great value.

Our Rich Ham Radio Heritage (Number 4 of a Series)

by Woody Woodard, K3VSA

Way back, ice ages ago, in the early sixties when I first got my ticket, I chose to get a Technician license rather than a General partly because I was just a kid and couldn't see how I'd be able to go to Norfolk Virginia to the FCC's regional office to take the exam. You could take the Technician exam by mail. They'd send the exam to your Elmer, who would administer it to you and send it back to the FCC. Then, after a wait that seemed longer than the eleven year sunspot cycle,

you'd receive your ticket in the U.S. mail and could get on the air.

My, how times have changed--and for the better in this instance. I don't remember exactly when it took place, but some years ago, the ham community volunteered to do Amateur Radio license testing for the government, and, surprisingly, the government agreed. Thus was born the "VE", or Volunteer Examiner. For the past several years, I've been a VE myself.

What's it like being a VE? Well, next to (1) getting on the air and making that first QSO or (2) operating with equipment you built yourself, being a VE is the most satisfying activity that a ham can do, at least in my opinion. Volunteer examining is also right up there next to emergency communications as an example of Amateur Radio as what it truly is: A service rather than merely a hobby.

It's also easy and a heck of a lot of fun. You can download all the material you need to study from the ARRL's website, take the open book test, send it back in, and receive your credentials. You get a name tag to wear whenever you're actually officiating at a test session and a certificate (suitable for framing).

Yeah, but you say, there are already a zillion VEs out there at dozens of test sessions every weekend, right? Well, no, not really. Paradoxically, as the demand for new licenses and upgrades has risen since Morse Code ceased to be a licensing requirement, the availability of test sessions, at least in our area, has actually decreased. Our semi monthly OCRA exam sessions are now one of the few remaining on the schedule. Why this should be so is a mystery to me, but there it is.

As of the time I'm writing this, OCRA has perhaps seven or eight VEs that I know of who are accredited through the ARRL's VEC program, the program with which we are affiliated. Three VEs at minimum are required to administer a test, and a VE can always encounter an emergency which would preclude his or her attending the session. With many of us having work situations that make Saturday test session availability problematic, we could use more VEs to insure a full staff at every test session. Also, we're considering additional test sessions in the evenings during the middle of the week.

So, if you have a General class license or higher, consider joining the VE program. If you're not an Extra, consider upgrading if for no other reason than to be qualified to administer every exam level as a VE. You'll be glad you did. It's an incredible privilege to be able to shake some kid's hand and say, "Congratulations. You passed your exam, and now you're an Amateur Radio operator. Welcome!"

2007 OCRA Officers
[Note: The 2008 OCRA officers will be elected at the January 14, 2008 OCRA meeting.]

Dave Snyder, W4SAR - President
Woody Woodward, K3VSA - Vice President
Dan Eddleman, KR4UB - Treasurer
Laurie Meier, N1YXU - Secretary