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Our Next Meeting

Annual NCCC Holiday Dinner

Dec. 12, 2005: 5:30 PM schmooze (no host bar), 6:30 dinner, 7:30PM short meeting, 7:35 PM program
Location: Michael's Shorline (same as last two years). Michaels at Shoreline, Mountain View, California. We'll have a private meeting room. Maps on Web site – www.nccc.cc .

RSVP to W0YK with dinner choice by Monday, 5 December, so we can give Michael's a count. PayPal payment preferred, otherwise at the door is fine.
London Broil $ 28
Chicken Marsala $ 26
Salmon $ 29
Vegetable Brochette $ 22 inclusive of salad, coffee/tea/milk, dessert, gratuity and tax.

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SS Suspense

The 2005 SS CW and Phone contests are history, now. Was it a "three-peat?" Only time will tell.

Bill, N6ZFO, is conjuring up his statistical magic, and should have a good prognosis in time for the December annual dinner.

Early indicators are that SMC and NCCC are both down from last year. PVRC, however, may be up. The question is whether our downward trend and PVRC's upward trend crossed over one another. At this point, though, the only thing we can do to influence the outcome is to make sure we get the logs in before the deadline. So, if you have not done so, DO IT NOW!

From some of the NCCC scores that were posted, it would seem that more than 1,200 unique calls were to be had in CW and close to 2,000 in phone. That would seem to be a decent turnout considering that 10 meters was way underutilized.

In both modes, by late afternoon, most of the action was squeezed between the band edges on 20 meters. Many NCCCers QSY'd early to 40 meters in both CW and phone, and several sustained impressive rates to boot.

Don't break out the champagne just yet, but there appear to grounds for muted optimism.

2005 SS Preparation – Part I

By Ed Muns, W0YK

"Don't change the spark plugs the night before the race", Dave Leeson, W6NL, reminds us. Radio contesting equivalents are: don't upgrade the logging software, don't install new antennas, equipment, wiring, etc., right before the contest. Instead, make these changes months ahead of time and run some contests to make sure everything is solid. Besides, the weather is often nicer in June than October for antenna work. Great advice and I advocate it strongly, but I also fall victim to my vocation and other life priorities just as everyone else does. The result is that many of us find ourselves scrambling around just days or hours before Sweepstakes … or, in some cases into the first hours of Sweepstakes.

Preparing for SS CW

Many prior Sweepstakes I have been on a tower installing or fixing antennas, feed lines or wiring on Saturday morning of the CW weekend. A few times, I didn't get off the tower and into the operating chair until after 1pm. And, each of those years I "thought" it would not turn out that way. 2005 was another one of those self-deceptive experiences.

Harvest was finished by the third week of September, the bird netting retrieved, the grow tubes collected, the cover crop sewn, and the October weather was uncharacteristically dry and perfect for antenna work. It was a few weeks before CW Sweepstakes and so began the fantasy that "some things could be accomplished" on the Ham radio front. In a really weak moment I deluded myself that they could be accomplished in time for CQP and tried out with plenty of buffer time before CW SS.

The reality was that I finally got focused on my station refurbishment about the third week of October. On 40, the linear-loading wires were broken and the Sigma-80 dipole VSWR went out-of-sight when more than 5-10 watts was fed into it. So, those had to come down for repair and troubleshooting.

The past few years, I've taken the easy path of using a couple of C3-HH's in different stacked and non-stacked configurations for the high bands. These are wonderful little antennas that are relatively easy to install and tune. (Actually, mine weigh more than twice the production models because they were custom-designed for 140mph wind survival.)

But, for three reasons I wanted to do something more for the high bands. First, two elements on 15 and 20 really can't stand up to the many full-out SS stations that are fun to compete with. Second, there was no single height that worked well for all three bands, even just 15 and 20. In a ridge top terrain, it is critical to get each band's antenna(s) at the appropriate height for maximum gain. Stacks aren't nearly as effective with a sloping foreground as in the flats. Third, K6RB and K6XX have built bigger and bigger antenna farms over the past five years and their 1500 watt signals just a few miles LOS off my back side were real killers … I needed some F/R attenuation on the high bands.

Decisions, decisions

So, for 10/15/20, the basic plan was, "Hey, I've got a 30-year old Wilson Electronics DB-54 15/20-meter Yagi and a KT-34XA that I could parlay into two 5-element beams on 20 and 15. Put the five 20-meter DB-54 elements back on the 40' DB-54 boom and move the four 15-meter elements, plus a new fifth element, over to the 32' KT-34XA boom." It sounds simple enough. And, I had three 48' boom 7-element 10-meter heavy duty DX Engineering Yagis to reconfigure for a 5-element 24' boom 10-meter SS Yagi, with plenty of parts left over for another set of high band Yagis for an Asia tower in the future. Well, heck, since I had to assemble everything again anyway, why not optimize the designs with software modelers like YO (Yagi Optimizer software) for the electrical design and YS (Yagi Stress software) for the

mechanical design? And, while I'm at it, let's rewire the tower with new hardline, coax jumpers and control cables, getting them all buried underground in PVC pipe, etc., etc.

OK, off we go. N6BV was very helpful coaching me through the Yagi design and optimization work. He has some useful software in the recent ARRL Antenna Handbooks for Yagi analysis, frequency scaling, hairpin design, terrain analysis, etc. W6NL provided suggestions for sources of U-bolts, tubing, aluminum plate stock, etc. N6BT offered to chop up the tubing I needed to repair elements and build a fifth 15-meter element. K6STI tolerated my questions on YO and K7NV got me up-to-speed on his latest version of YS Professional. I also got a couple of those nifty re-furbished prop pitches that Kurt sells. Those rotors are real works-of-art, more beefy than even I need even in this high-wind location and superbly engineered and fabricated.

It took about five-times longer to do the computer work and rework with all the re-learning I had to do on the software and the design principles. Then, the fabrication overshot its time estimate by at least that much. I came up with a much better way (simpler and stronger) to build the linear-loading wires on the 40. I think they will survive the wind much better and actually support the elements more substantially. I futzed around with the 80 dipole for many hours like I have over the past year, trying to discover where the short/open was occurring under power. I had replaced virtually everything in the feedpoint and band-switching network with no success.

The AEA CIA showed the eight perfect VSWR curves across 3.5-4.0MHz as the sub-bands were switched in from the operating position control. And at QRP, it all worked fine, but when the power was increased to 10 watts or more, the VSWR shot up high and flat across the band. I decided to just keep mulling this over in the back of my mind as I climbed up and down the tower working on the other antennas.

About a week before CW SS, I trammed the 2-element 40 up to the top of the 80' tower (you don't need much height in a sloping foreground QTH). I lowered the mast down so the Yagi could be attached to its top with the boom truss anchored down without having to climb the mast. I climb masts, but its not my favorite thing to do. Besides, with the new prop pitch that installs from BELOW the rotor shelf, it really works slick to lower the mast through the rotor mounting plate and attach the prop pitch on the bottom of the mast as a counterweight for helping keep the mast vertical as you raise the whole assembly up with the Yagi on the top. I have to say that this operation worked about as smoothly as I planned and a lot of thanks go to K7NV for a precisely fabricated mounting system on the prop pitch rotor.

The 40 meter antenna goes up the tram.

The prior years' winds had broken some of the welds in the element joints of the Sigma-80, so a couple of stainless steel ¼" bolts were installed in each of the five joints in each element half. That done, I trammed the Sigma-80 up to mount below the 40 just above the thrust bearing on the tower. Neither of these installations are trivial because while they sound like small antennas, mine are beefed up like the C3-HH's for 140+ mph wind survival and Force 12 put a ton (it seems) of aluminum in each one. I use the vineyard ATV to pull the line that is attached to the antenna as it is suspended from a 3/16" aircraft cable tram line. The pull line runs through a cleated

block salvaged from our sailboat parts stock and works really well for this application. But, working by myself, this necessitates a lot of trips up and down the tower.

Now, I'm less than a week from CW SS, but all I have to do is throw the elements on the 20- and 15- meter booms, raise them up and start working on the other items on my to-do list above. Yeah, right! It took until Friday evening, after dark, just hours before SS started to get the 20-meter Yagi constructed.

The old Wilson element clamps were rusted on and had to be cut off. Almost every element was badly bent and needed straightening. The stainless steel hose clamps I had purchased to replace the old element section clamps were not holding. So, I wound up drilling and riveting all the joints. I tried to preserve the old polypropylene rope inside the elements for vibration damping and that was a challenge with all the rivets. N6BT didn't have the exact tubing sizes I needed so we mechanically redesigned the center sections around what he did have in stock, resulting in some really weird looking center sections on the 20-meter elements that start at 1.250" diameter, step UP to 1.500" and then are swaged back down to 1.125" to accept the old Wilson element tips.

Back to YO and YS to modify and evaluate the design which effected the tip lengths. The driven element was redesigned to fit a KLM plastic boom-element mount for insulation so a Beta or hairpin match could be deployed. As the first and second directors were being finished I discovered the tip sections weren't long enough for my new design! Amazingly, when I wondered down to my stockpile of tower sections and old antennas, I found a huge supply of 12' lengths of brand new aluminum tubing. But, there were no 0.500" pieces that I needed. However there were a couple lengths of 0.375", so back to YO/YS and modified designs for those two elements were produced.

New element and boom U-bolts from the East Coast to replace the badly rusted Wilson components had arrived just two days after my Internet order. A new boom-mast mounting plate was fabricated from 3/8" aluminum plate to replace the rather flimsy ¼" Wilson plate. Coax jumpers were made up and a hairpin wound, etc. etc.

Darn, here we go again for another déjà vu SS kick-off.

The morning of…

Up early Saturday morning with fortunately good weather and light wind, to raise the 20 … all 100lbs of it. Almost 20 lbs of counterweight was added inside the forward end of the boom to compensate for the severely unbalanced mechanical design that had the reflector, driven element and first director bunched together 14-20' out from the mast on the back of the boom. Even at the balance point, this sprawl of aluminum was unstable and did not want to stay horizontal on its way up the tram. Accordingly, it got tangled up in the 80, 40 and top two sets of guys before I was able to muscle it around all this interference and clamp it onto the side of the tower a few feet below the 80. It's now 11am and I'm a bit exhausted physically. The 80 still doesn't work, I don't know if my 20 design is anywhere near the band in reality and the SixPack still has to come off the tower to remove the diode steering I installed when 20 meters was coming from the C3. Of course, any hope of a 15-meter monobander, let alone 10-meters, for CW SS was long gone.

All six bands on the tower.

T Minus One Hour and Counting

By 12am, I had the SixPack modified and back up on the tower, all the coax lines installed and sort-of waterproofed, and ready to smoke test it all. Happily, the 20 VSWR was according to model, although shifted 175KHz high. (I'm thinking that is probably due to the proximity of the 80 since I didn't model the two together in YO.) The 87A had to be kept below 800 watts on 20 CW to keep from faulting out. 80 only worked with 5 watts QRP (but THAT's popular in SS, isn't it!), and … OH NO! … the C3 VSWR on all three bands was high and flat indicating a feedline or switching problem. At this point, it seemed like the best option for SS points for the NCCC was for me to shower and just do the best I could on two bands: 20 and 40. The bright side was that this would certainly get me down on 40 early like N6BV advised us in his SS propagation talks at the last two NCCC meetings!

The opening bell

I actually started CQing on time at 1pm. Starting on 20 meters isn't like starting on 10 or 15 from here. I stayed high in the band, thinking it would be hard to compete with East Coast signal levels and was only able to sustain about a constant 75/hour rate for the first four hours.

But, as the hours passed I felt pretty strong and confident on 20. Frequency poachers and encroachers would come in, but not stay very long. At most, I cranked in 250Hz filters for a few minutes while they sorted themselves out and decided to leave. But, even a lot of the QRPers were loud enough on this new antenna to be copied through the QRM. When I moved to 40 around 4:45pm, it felt about the same as 20 and the rate stayed up for a while. I still stayed higher in the band as a hedge against strong East Coast signals. I had 62 sections when I went to 40 and by 8pm Saturday night, I had the other 18. The only one I went to was VY1JA, thanks to packet spotting. All the others came to my CQs, as they often do.

Packet Didn't Hack It

Other than pouncing on J, the only value I got out of packet all weekend was being spotted by NCCCers. Another chapter of my SS "preparation" was that I couldn't get packet working with my TR-Log band map. First, I was only able to connect to the N7TR node for the first few hours on Saturday and the last two hours on Sunday.

The W4UAT node wasn't any better for me and I wasn't prepared with other West Coast cluster URLs. But, all this really didn't matter much because my packet interface software was sending a continual stream of CR/LF's to the cluster at about a 1Hz rate! Needless to say, that caused me to disconnect to reduce cluster load. Having my screen filled with cluster prompts wasn't useful either. I wound up defaulting to DX Summit on the packet computer and would glance at it periodically to see what was going on across the bands.

WK6I, W6ZZZ and several others were fun to watch as their spots provided clear evidence of their tuning pattern up, or down, the band before they would QSY to another band and do it all over again. When I wanted to change bands I would pick a frequency just above where they were headed on their methodical band scan, and sure enough, I'd get spotted right away sometimes. You can imagine things really slowed up for me on Saturday night with only 40 to play on.

When it got unbearably slow, I bit the bullet and went to 80 with my 5 watt signal, worked two stations and retreated back to 40. I personally know what it was like trying to pull through some of the East Coast QRPers on 40, so I wasn't motivated to torture myself and others with my 5 watt 80-meter signal. Besides, I haven't been doing much QRP lately and don't have the secrets that N6WG and N6RO must have developed by now!

By 11:30 Sunday morning, this two-band gig was wearing thin. Not only were the

Sunday doldrums setting in, but all I had was 20 and 40 to deal with it. From packet I could see that many others were exploiting 15 meters as they had done on Saturday. 20 had slowed to a crawl, and I knew 40 wouldn't give much rate, so I decided to forfeit some operating time and go climb the tower to see what was going on with the C3.

Miracles Do Happen

Miraculously, I had the fleeting thought as I was rising from the operating position that maybe I ought to check the C3 from the shack in case it might give me some insight into what I should look for out on the tower. Surprise! … the C3 VSWR looked OK. How about 1500 watts? Wow, that was OK too. Well, shucks, let's rock 'n roll on 15 for a while and see what happens. Worst case, I create enough smoke and black residue in the antenna system somewhere to pin point the C3 problem! I ran 120 stations on 15 over the next 2-3 hours and while it wasn't any better than what I had experienced on 20 and 40, it was certainly better than 30/hour, and dropping, on 20 at that point in time. Then, I did another couple hours on 20 and 40 before welcoming the closing SS bell at 7pm Sunday night.

SO2R Saga

By: Rob Brownstein, K6RB

It's all Ken N6RO's fault. Since first joining the club in 1997, I've heard Ken allude to SO2R and been intrigued. How could someone listen to two radios, on two bands, at the same time – and not go crazy? It had to be some parlor trick, some genetic predisposition, some focused form of lunacy. I had to find out.

At the time, I was using one IC-761, an Amp Supply Co. LK500-ZC amp, a KT-34XA tribander and a multi-band half sloper. I was getting better than mediocre scores, but nothing to write home about. So, little by little I decided to go for the gusto.

In 2002 I sold the IC-761 and bought a used FT-1000D. I also sold the amp and replaced it with a Ten-Tec Titan. Now, I could run full legal. No big difference in scores

In 2003 I sold the Titan and bought in quick succession an Alpha 86 then an Alpha 87A. Now, I could run full legal and QSY from band to band, instantly. The result? More frequent band changes and overall higher average scores. The summer before, I had replaced the KT-34XA and its 10-foot mast with a 20 foot mast, a C31-XR, and a MAG 240N. The most noticeable change was higher scores on 40 meters. That, more than 500 extra watts, probably accounted for most of the increases.

I began to get serious about SO2R in 2004. I bought an AV-640 vertical and mounted it on the chimney. I took out my IC-751A and plopped it on the desk next to the FT-1000D. I bought inexpensive serial-port interfaces for both radios and connected one to COMM1 and the other to COMM2. With WriteLog running, I could see both radios, and track frequency and mode.

That same year I bought a DX Doubler and a pair of ICE 419A band-pass filter arrays. I also bought a pair of Top Ten Band Decoders after having sold the IC-751A and replacing it with an FT-990. The decoder got band info from the radios, and switched the ICE 419A to the appropriate bands. The FT-1000D drove the Alpha 87A and was attached to the C31-XA and MAG 240N through a single feedline attached to a mast-mounted switch. The FT-990 was attached to the AV-640 vertical.

To achieve QRO on both radios, I used an old Collins 30L-1, with a relay buffer, and outboard QSK-5 switch to generate about 700 watts out. With both rigs running QRO, I had very little cross-band interference – the ICE 419As were doing their jobs. I replaced the FT-990 with an FT-1000, so now both radios were identical!

By the end of 2004, I had gotten my feet wet in a couple of contests using SO2R. It was a real kick to hit the arrow key on the keyboard and jump from the "run" radio to spear a mult on the S&P radio. Though the vertical was a compromise antenna, I was able to snag a lot of mults.

Then, in February '05 disaster struck. A big wind came up from the flats, below, blowing from the south and punished the tower and yagis until the tower bent over cataclysmically and destroyed both itself and the antennas. So, from February

until July, I was running a crippled SO1R station.

I had a long time to think about replacements. Instead of the vertical, I wanted yagis for both radios. Plus, I wanted gain antennas on all three WARC bands, too. After weighing a system with a 4-element SteppIR at 75 feet, a Monster at 82 feet, and a rotary 80 m dipole at 88 feet, I decided on a Force 12 5-BA at 75 feet, an EF240/230 at 82 feet and Sigma 180S at 88 feet. Cost, windload, and other factors had a lot to do with the decision.

The 5 BA is a five-band yagi array that covers 20 through 10 including 17 and 12. The EF240/230 is a yagi array with a pair of 2-el yagis – one for 40 m and one for 30 m. And, the Sigma 180S is a shortened rotary 80 m dipole. When the dust settled, there were six feed lines going into a pair of mast-mounted switches, with two runs of coax coming back the 150 plus feet to the shack. The switches are controlled by DC logic over the coax. So, I ended up with three run of lines – two coax and one rotator.

The 5 BA has three feedlines, one for 20, one for 17/15 and one for 12/10. The EF240/230 has two separate feedlines, and the Sigma has its own feedline. I hung a 160m inverted vee at 72 feet to complete the nine bands of antenna.

In the shack, one feedline controls 80, 20 and 12/10; the other controls 160, 40 and 17/15. This allows me to run the left radio on 80, 20 or 10, and the right radio on 160, 40 or 15 during a contest. I find that I am usually on adjacent bands, and this set up works well (I stole the idea from N6TV). When operating casually, I switch the right radio's coax line to the left radio, through the tuner switch, so I can operate all 9 bands from a single radio and amplifier.

My biggest fear was that with the higher frequency antennas all sharing the same 33-foot boom, and with adjacent bands somewhat interleaved, the amount of interference on adjacent bands would be troubling even with the ICE 419As in line. In fact, that turned out not to be a problem. I can even operate 160 and 80, or 80 and 40 meters, alternately, with no difficulties.

So, as the end of 2005 approaches, I have finally put in place a righteous SO2R capability. I now have two FT-1000s and two amps. As you can see in the photo, the units are set up in a very symmetrical fashion. Atop each exciter is a tuner (left for 80 m; right for 160), and above the tuner are the antenna switches and monitor scopes. Further to the left and right are the amplifiers. The 87A has the ICE 419A switch, band decoder and rotator on top; the LK500-ZC has ICE 419A switch band decoder and Bird wattmeter on it. Directly in front of the operator is the monitor screen, DX Doubler, voice keyer and CW keyer. The rig computer is under the desk to the operator's right.

SO2R set up with FT1000-D, Alpha 87A on left; FT-1000 and LK500-ZC on right.

A quick glance at the monitor scopes will tell me, instantly, which radio is transmitting and whether there are any problems. The DX Doubler is set up so that left radio is in left ear; right radio in right ear. A toggle switch allows me to double up on either radio during runs or difficult copy situations. The radios follow my arrow-key keystrokes. The only manual switching are the antenna switches, when changing bands on the same radio, and the right-hand amp, when changing bands. I plan to build an adaptor that will transfer band-data info to the antenna switches, so that they, too, will be automatic. And, should I ever stumble on a great buy on another 87A, the right-hand amplifier may be automatic, too. That would make the whole operation automated.

Meanwhile, each contest I end up spending more time with both radios playing into both ears, and gaining more second radio Qs and mults. I'm sure I will hit my limit of cognition, but I think I have still lots of room for improvement. So, Ken, thanks for inspiring me to challenge myself even more, and for making me crazy.

-- CL --

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